Supporting Information

Synthesis of novel antibacterial and antifungal quinoxaline derivatives

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1. Abbreviation

Abbreviation

	abbreviation	full name
1	^{1}H NMR	^{1}H nuclear magnetic resonance
2	^{13}C NMR	^{13}C nuclear magnetic resonance
3	^{19}F NMR	^{19}F nuclear magnetic resonance
4	HRMS	High-resolution mass spectroscopy
5	Xoo	*Xanthomonas oryzae* pv. *Oryzae*
6	*Xcm*	*Xanthomonas campestris* pv. *Mangiferae indicae*
7	*Pcb*	*Pectobacterium carotovorum* subsp. *Brasiliense*
8	*Rs*	*Ralstonia salanocearum*
9	*Ac*	*Acidovorax citrulli*
10	*AB*	*Alternaria brassicae*
11	*FF*	*Fusarium fujikuroi*
12	*FO*	*Fusarium oxysporum f.sp.cucumerinum*
13	*CT*	*Colletotrichum truncatum*
14	*PC*	*Phytophthora capsici*
15	*CG*	*Colletotrichum gloeosporioides*
16	*RS*	*Rhizoctonia solani*
17	*FG*	*Fusarium graminearum*
18	*PS*	*Phytophthora soja*
19	*PP*	*Phytophthora palmivora*
20	*BC*	*Botrytis cinerea*
21	*PL*	*Phytophthora litchii*
22	DMSO	Dimethylsulfoxide
23	DMF	*N*,*N*-dimethylformamide
24	TLC	Thin Layer Chromatography
25	m.p.	Melting point
26	EC_{50}	50% effective concentration
27	NB	Nutrient broth
28	OD	Optical density
29	PDA	Potato dextrose agar
30	TC	Thiodiazole-copper
31	BT	Bismerthiazol
32	SEM	Scanning electron microscope

2. Chemical synthesis

2.1 General Procedures for Preparing Target Compounds 5a-5t

Firstly, intermediate **4** (0.85 mmol), K_2CO_3 (1.28 mmol) and acetonitrile (10 mL) were added into a 50 mL round bottom flask, and the mixture were reflux for 30 min. Then, intermediate **2** (1.28 mmol) dissolved in acetonitrile (5 mL) was added dropwise and the reaction mixture was continued reacted under reflux until the reactant was consumed completely. After that, the water (20 mL) was added into the reaction mixture, and the crude product was precipitated as brown solid promptly. Finally, the target compounds **5a-5t** was purified by column chromatography (petroleum ether: ethyl acetate = 20:1 to 12:1, *V*/*V*) with the yield of 36 ~ 91%.

3. Biological activities tests

3.1 In Vitro Antibacterial Activity Assay

Antibacterial activities of the title compounds against *Xanthomonas oryzae pv. Oryzae (Xoo), Xanthomonas campestris pv. Mangiferaeindicae (Xcm), Pectobacterium carotovorum subsp. Brasiliense (Pcb), Ralstonia salanocearum （Rs） and Acidororax citrulli (Ac)* were evaluated by using the 96 well plate method. DMSO served as the negative control, commercial agricultural antibacterial thiodiazole-copper (TC) and bismerthiazol (BT) were used as positive controls. Briefly, a single previously activated colony was incubated into 30 mL NB medium and cultivated in a constant temperature shaker at 28 ℃ under 180 r/min until the bacteria grew on the logarithmic phase. Furtherly, two tubes of 2 mL bacterial solution were centrifuged at 6000 rpm for 5 min, the medium liquid was removed and the bacteria was resuspended with 2 mL sterile water. The optical density at 595 nm (OD_{595}) of one tube was detected and adjusted to 0.6 using a spectrophotometer, the other tube is reserved. Subsequently, the test compounds were dissolved in 100 μL of dimethylformamide and diluted with NB medium to prepare the drug solution with the final concentrations of 200 and 100 μg/mL, respectively. After that, 10 μL of the liquid sample was added to 190 μL NB medium containing the test compounds, which were performed on 96 well plate. Finally, the inoculated 96 well plate was incubated at (28 ± 1) °C

under continuous shaking at 180 rpm until the OD_{595} of the negative control reached 0.6-0.8. The culture growth was monitored spectrophotometric ally by measuring the optical density at 595 nm (OD_{595}) and expressed as corrected turbidity, and the relative inhibitory rate (I %) compared with a blank assay was calculated as follows:

$$\text{Relative inhibitory rate } I\ (\%) = (C_{tur} - T_{tur})/C_{tur} \times 100$$

In there, C_{tur} represents the corrected turbidity value of bacterial growth on untreated NB, T_{tur} represents the corrected turbidity value of bacterial growth on treated NB and *I* is the relative inhibitory rate, respectively.

3.2 In Vitro Antifungal Assay

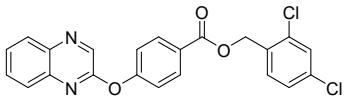
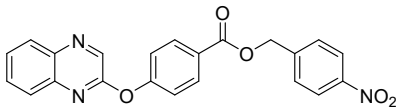
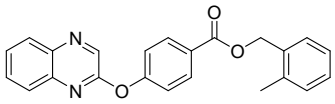
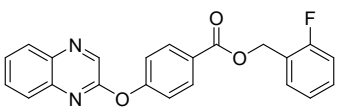
All title compounds were dissolved in dimethylsulfoxide (DMSO: 200 µL) before mixing with potato dextrose agar (PDA: 1980 µL). The compounds were tested at a concentration of 100 µg/mL. All fungi were previously cultivated in PDA at 27 ± 1 °C for 1-5 d to make new mycelium for the identification of antifungal activity. Then, mycelia dishes with 4 mm diameter were cut from the culture medium and inoculation on the middle of the treated PDA plate using a sterile inoculation needle. DMSO used as the negative control, and azoxystrobin served as the positive control, respectively. Next, the inoculated plates were incubated at 27 ± 1 °C for 1-5 d, all treatments were carried out with three replicates. Finally, the diameter of the fungal colonies was measured and the *in vitro* inhibitory effects of the tested compounds against fungi were statistically analyzed according to the formula, as following:

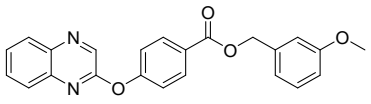
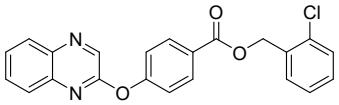
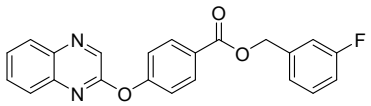
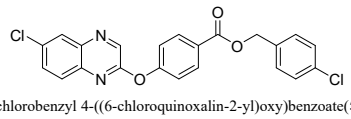
$$I\ (\%) = [(C - T)/(C - 0.4)] \times 100\%$$

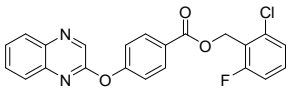
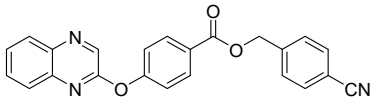
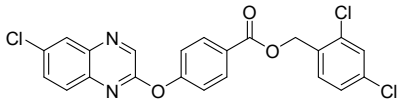
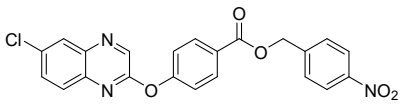
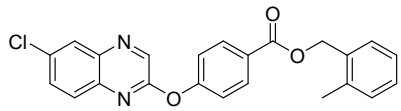
In there, *C* represents the diameter of fungal growth on untreated medium, *T* represents the diameter of fungi on treated medium and *I* is the inhibition rate, respectively.

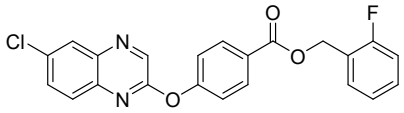
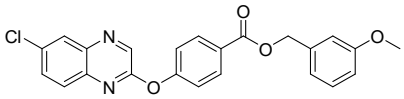
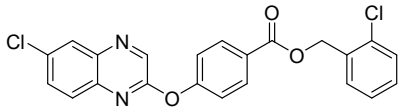
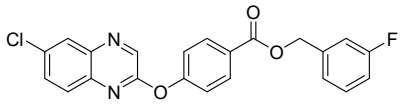
4. 1H NMR, 13C NMR, 19F NMR and HRMS spectrum of the title compounds

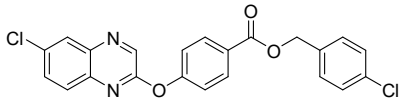
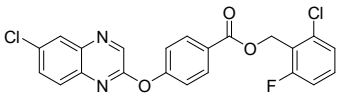
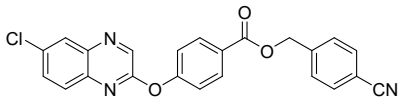
^{1}H NMR, ^{13}C NMR, ^{19}F NMR and HRMS spectrum of the title compounds

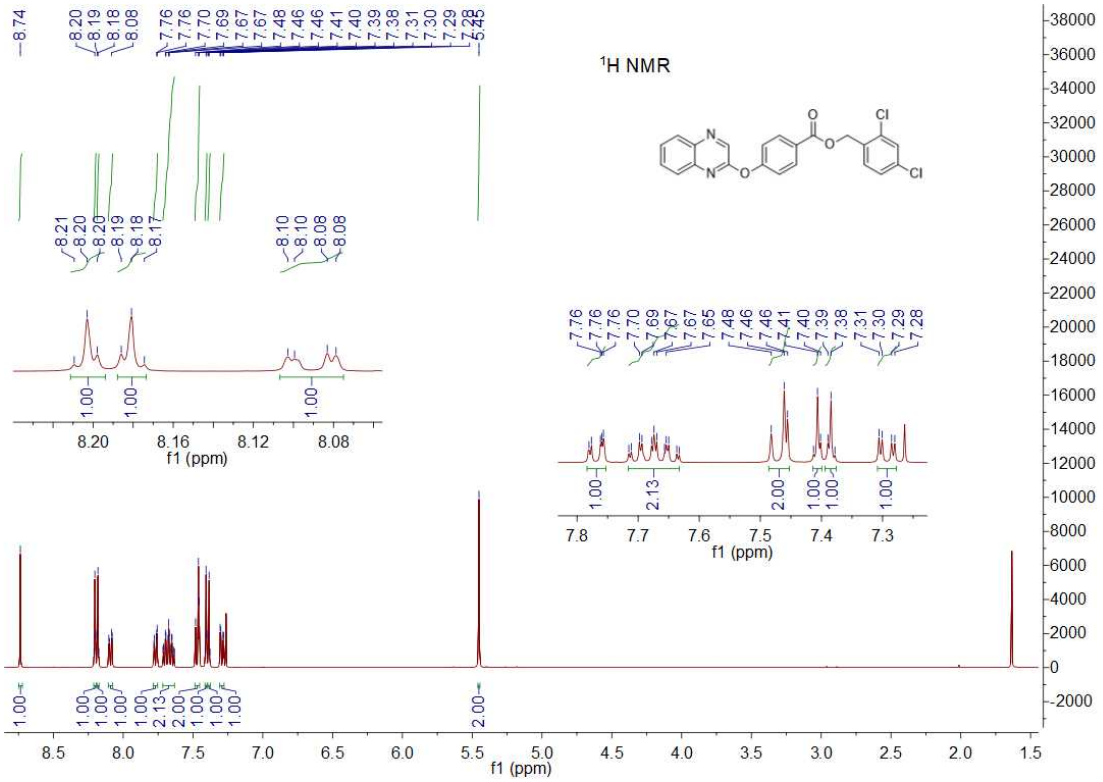
	Physical and chemical data
 2,4-dichlorobenzyl 4-(quinoxalin-2-yloxy)benzoate(**5a**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.74 (s, 1H, Qu-H), 8.21 – 8.19 (m, 1H,Ph-H), 8.19 – 8.17 (m, 1H,Ph-H), 8.09 (dd, *J* = 8.1, 1.6 Hz, 1H, Qu-H), 7.78 – 7.75 (m, 1H, Qu-H), 7.72 – 7.63 (m, 2H, Qu-H), 7.47 (t, *J* = 5.3 Hz, 2H,Ph-H), 7.41 – 7.40 (m, 1H,Ph-H), 7.39 – 7.38 (m, 1H,Ph-H), 7.29 (dd, *J* = 8.3, 2.1 Hz, 1H,Ph-H), 5.45 (s, 2H,O-CH_2-Ph) ; **^{13}C NMR (101 MHz, $CDCl_3$)** δ 156.87, 156.22, 139.90, 139.82, 139.82, 139.12, 134.87, 134.58, 132.34, 131.67, 130.86, 130.78, 129.58, 129.05, 127.94, 127.74, 127.31, 126.69, 121.33, 63.59; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{14}Cl_2N_2O_3$: 425.0454, found: 425.0437; White solid; m.p.: 114.6-116.3 °C; yield, 61%.
 4-nitrobenzyl 4-(quinoxalin-2-yloxy)benzoate(**5b**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.74 (s, 1H, Qu-H), 8.29 – 8.28 (m, 1H, Ph-H), 8.27 – 8.26 (m, 1H, Ph-H), 8.23 – 8.21 (m, 1H, Ph-H), 8.20 – 8.19 (m, 1H, Ph-H), 8.10 (dd, *J* = 8.1, 1.5 Hz, 1H, Qu-H), 7.78 – 7.75 (m, 1H, Qu-H), 7.72 – 7.66 (m, 2H, Qu-H), 7.65 (s, 1H, Ph-H), 7.63 (s, 1H, Ph-H), 7.44 – 7.42 (m, 1H, Ph-H), 7.41 – 7.40 (m, 1H, Ph-H), 5.49 (s, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.46, 157.03, 156.17, 147.76, 143.30, 139.93, 139.72, 139.11, 131.68, 130.74, 129.07, 128.43, 128.00, 127.72, 126.40, 123.95, 121.40, 65.31; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{15}N_3O_5$: 402.1084, found: 402.1078; White solid; m.p.: 164.2-165.6 °C; yield, 58%.
 2-methylbenzyl 4-(quinoxalin-2-yloxy)benzoate(**5c**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.72 (s, 1H, Qu-H), 8.20 – 8.18 (m, 1H, Ph-H), 8.18 – 8.16 (m, 1H, Ph-H), 8.10 – 8.06 (m, 1H, Ph-H), 7.78 – 7.74 (m, 1H, Ph-H), 7.66 (tdd, *J* = 9.7, 6.9, 1.6 Hz, 2H, Qu-H), 7.39 – 7.36 (m, 2H, Qu-H), 7.35 (t, *J* = 2.1 Hz, 2H, Ph-H), 7.21 (d, *J* = 7.8 Hz, 2H, Ph-H), 5.35 (s, 2H, O-CH_2-Ph), 2.37 (s, 3H, Ph-CH_3); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.84, 156.63, 156.28, 139.87, 139.82, 139.82, 139.13, 138.23, 132.97, 131.60, 130.68, 129.34, 129.02, 128.46, 127.89, 127.83, 127.22, 121.20, 66.84, 21.29 ; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{23}H_{18}N_2O_3$: 371.1390, found: 371.1380; Brown solid; m.p.: 123.2-125.1 °C; yield, 59%.
 2-fluorobenzyl 4-(quinoxalin-2-yloxy)benzoate(**5d**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.73 (s, 1H, Qu-H), 8.20 – 8.19 (m, 1H, Ph-H), 8.18 – 8.17 (m, 1H, Ph-H), 8.08 (dd, *J* = 8.1, 1.5 Hz, 1H, Ph-H), 7.78 – 7.75 (m, 1H, Ph-H), 7.67 (tt, *J* = 6.9, 5.3 Hz, 2H, Qu-H), 7.51 (td, *J* = 7.5, 1.6 Hz, 1H, Qu-H), 7.38 (d, *J* = 1.9 Hz, 1H, Qu-H), 7.35 (ddd, *J* = 7.3, 4.9, 1.8 Hz, 2H, Ph-H), 7.20 – 7.09 (m, 2H, Ph-H), 5.46 (s, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.68, 162.37, 156.73, 156.26, 139.88, 139.76, 139.12, 131.65, 130.74, 130.68, 130.41, 129.03, 127.75, 126.95, 124.27, 123.23, 123.08, 121.26, 115.50, 60.87;

	^{19}F NMR (376 MHz, $CDCl_3$) δ -117.78; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{15}FN_2O_3$: 375.1139, found: 375.1128; Brown solid; m.p.: 97.1-98.7 °C; yield, 67%.
 3-methoxybenzyl 4-(quinoxalin-2-yloxy)benzoate(**5e**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.73 (s, 1H, Qu-H), 8.21 – 8.20 (m, 1H, Ph-H), 8.19 – 8.18 (m, 1H, Ph-H), 8.08 (dd, *J* = 8.1, 1.5 Hz, 1H, Qu-H), 7.78 – 7.75 (m, 1H, Qu-H), 7.71 – 7.62 (m, 2H, Qu-H), 7.40 – 7.38 (m, 1H, Ph-H), 7.37 – 7.35 (m, 1H, Ph-H), 7.32 (t, *J* = 7.9 Hz, 1H, Ph-H), 7.06 – 7.00 (m, 2H, Ph-H), 6.91 – 6.88 (m, 1H, Ph-H), 5.36 (s, 2H, O-CH_2-Ph), 3.83 (s, 3H, Ph-O-CH_3); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.75, 159.79, 156.72, 156.27, 139.89, 139.78, 139.12, 137.53, 131.62, 130.67, 129.74, 129.03, 127.89, 127.76, 127.10, 121.23, 120.41, 113.76, 113.69, 66.69, 55.31; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{23}H_{18}N_2O_4$: 387.1339, found: 387.1328; Brown solid; m.p.: 94.6-96.3 °C; yield, 49%.
 2-chlorobenzyl 4-(quinoxalin-2-yloxy)benzoate(**5f**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.73 (s, 1H, Qu-H), 8.23 – 8.21 (m, 1H, Ph-H), 8.20 – 8.19 (m, 1H, Ph-H), 8.09 (dd, *J* = 8.1, 1.6 Hz, 1H, Qu-H), 7.78 – 7.76 (m, 1H, Qu-H), 7.71 – 7.63 (m, 2H, Qu-H), 7.53 (dd, *J* = 5.7, 3.6 Hz, 1H, Ph-H), 7.44 (dd, *J* = 5.6, 3.6 Hz, 1H, Ph-H), 7.41 – 7.39 (m, 1H, Ph-H), 7.39 – 7.37 (m, 1H, Ph-H), 7.31 (dd, *J* = 5.8, 3.5 Hz, 2H, Ph-H), 5.50 (s, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.60, 156.78, 156.25, 139.89, 139.77, 139.12, 133.87, 133.69, 131.67, 130.68, 129.98, 129.70, 129.66, 129.03, 127.91, 127.76, 126.98, 126.93, 121.28, 64.24; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{15}ClN_2O_3$: 391.0844, found: 391.0834; White solid; m.p.: 109.4-110.7 °C; yield, 52%.
 3-fluorobenzyl 4-(quinoxalin-2-yloxy)benzoate(**5g**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.73 (s, 1H, Qu-H), 8.21 – 8.19 (m, 1H, Ph-H), 8.19 – 8.17 (m, 1H, Ph-H), 8.09 (dd, *J* = 8.1, 1.5 Hz, 1H, Qu-H), 7.79 – 7.75 (m, 1H, Qu-H), 7.72 – 7.63 (m, 2H, Qu-H), 7.46 (d, *J* = 0.6 Hz, 1H, Ph-H), 7.41 – 7.40 (m, 1H, Ph-H), 7.39 – 7.37 (m, 1H, Ph-H), 7.36 – 7.32 (m, 3H, Ph-H), 5.36 (s, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.61, 156.84, 139.91, 139.11, 137.99, 134.54, 131.64, 130.68, 129.97, 129.04, 128.50, 128.22, 127.92, 127.76, 126.81, 126.23, 121.29, 65.91; **^{19}F NMR (376 MHz, $CDCl_3$)** δ -117.78; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{15}FN_2O_3$: 373.0983, found: 373.0966; Yellow solid; m.p.: 74.3-75.9 °C; yield, 64%.
 4-chlorobenzyl 4-((6-chloroquinoxalin-2-yl)oxy)benzoate(**5h**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.73 (s, 1H, Qu-H), 8.20 – 8.18 (m, 1H, Ph-H), 8.17 – 8.16 (m, 1H, Ph-H), 8.11 – 8.07 (m, 1H, Qu-H), 7.78 – 7.75 (m, 1H, Qu-H), 7.71 – 7.63 (m, 2H, Qu-H), 7.43 – 7.40 (m, 1H, Ph-H), 7.40 (d, *J* = 2.1 Hz, 2H, Ph-H), 7.38 – 7.37 (m, 2H, Ph-H), 7.36 (dd, *J* = 2.6, 1.2 Hz, 1H, Ph-H), 5.35 (s, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.64, 156.77, 156.21, 139.87, 139.73, 139.08, 134.47, 134.22, 131.57, 130.65, 129.64, 129.01, 128.83, 127.89, 127.71, 126.86, 121.24, 65.98; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}ClH_{15}N_2O_3$: 391.0844, found: 391.0836; Brown solid; m.p.: 104.5–106.1 °C; yield, 73%.

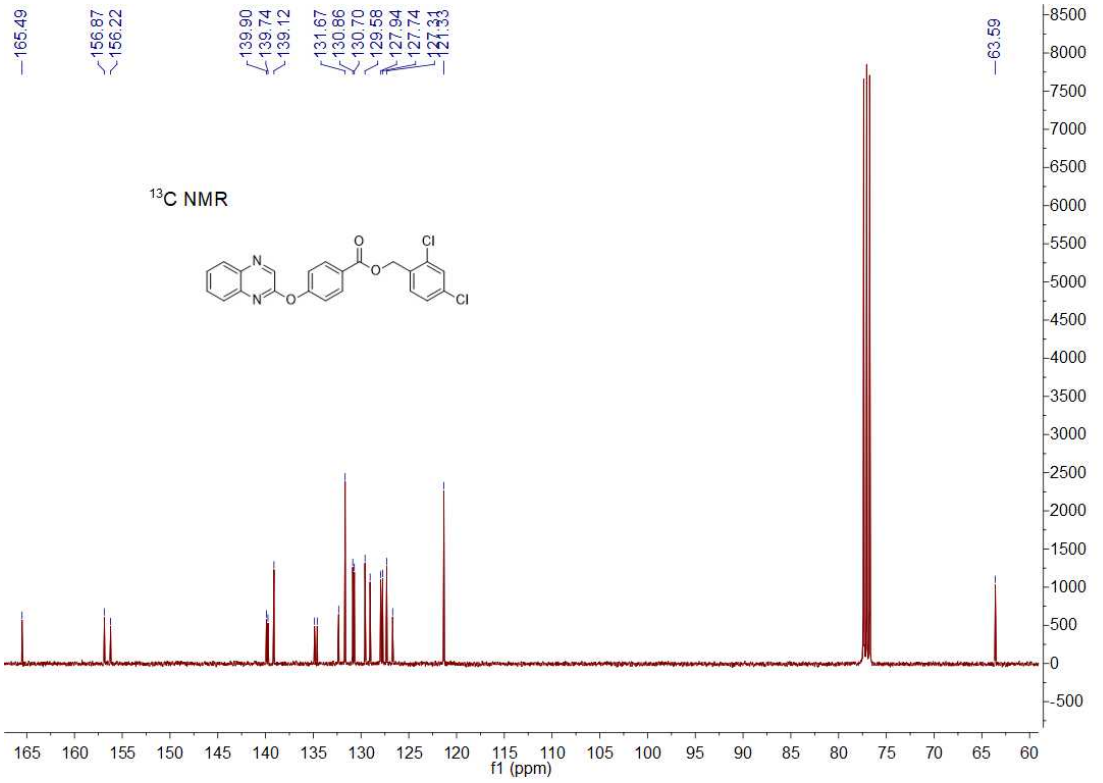
 2-chloro-6-fluorobenzyl 4-(quinoxalin-2-yloxy)benzoate(**5i**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.72 (s, 1H, Qu-H), 8.17 – 8.16 (m, 1H, Ph-H), 8.15 – 8.13 (m, 1H, Ph-H), 8.08 (dd, *J* = 8.1, 1.5 Hz, 1H, Qu-H), 7.77 – 7.74 (m, 1H, Qu-H), 7.70 – 7.62 (m, 2H, Qu-H), 7.36 (d, *J* = 2.0 Hz, 1H, Ph-H), 7.35 (d, *J* = 2.0 Hz, 1H, Ph-H), 7.32 (dd, *J* = 8.1, 5.8 Hz, 1H, Ph-H), 7.28 (s, 1H,Ph-H), 7.10 – 7.05 (m, 1H,Ph-H), 5.55 (d, *J* = 1.7 Hz, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.61, 160.84, 156.71, 156.26, 139.87, 139.82, 139.11, 136.60, 131.68, 130.88, 130.66, 129.02, 127.88, 127.82, 126.84, 125.56, 121.66, 121.23, 114.28, 57.91; **^{19}F NMR (376 MHz, $CDCl_3$)** δ -112.69; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{14}ClFN_2O_3$: 409.0749, found: 409.0736; Brown solid; m.p.: 90.8–91.4 °C; yield, 54%;
 4-cyanobenzyl 4-(quinoxalin-2-yloxy)benzoate(**5j**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.74 (s, 1H, Qu-H), 8.22 – 8.20 (m, 1H, Ph-H), 8.19 – 8.18 (m, 1H, 1H, Ph-H), 8.09 (dd, *J* = 8.1, 1.5 Hz, 1H, 1H, Qu-H), 7.78 – 7.75 (m, 1H, Qu-H), 7.72 – 7.69 (m, 3H, Ph-H), 7.68 – 7.64 (m, 1H, Ph-H), 7.57 (d, *J* = 8.4 Hz, 2H, Qu-H), 7.43 – 7.41 (m, 1H, Ph-H), 7.41 – 7.39 (m, 1H, Ph-H), 5.44 (s, 2H, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.48, 156.99, 156.18, 141.34, 139.92, 139.72, 139.10, 132.52, 131.65, 130.73, 129.06, 128.34, 127.98, 127.71, 126.47, 121.38, 118.61, 112.12, 65.59; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{23}H_{15}N_3O_3$: 382.1186, found: 382.1174; White solid; m.p.: 142.1–143.5 °C; yield, 91%.
 2,4-dichlorobenzyl 4-((6-chloroquinoxalin-2-yl)oxy) benzoate(**5k**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.74 (s, 1H, Qu-H), 8.21 – 8.19 (m, 1H, Ph-H), 8.19 – 8.17 (m, 1H, Ph-H), 8.08 (d, *J* = 2.2 Hz, 1H, Ph-H), 7.65 (dt, *J* = 8.9, 5.6 Hz, 2H, Ph-H), 7.49 – 7.45 (m, 2H, Qu-H), 7.40 – 7.38 (m, 1H, Qu-H), 7.38 – 7.36 (m, 1H, Ph-H), 7.29 (dd, *J* = 8.2, 2.1 Hz, 1H, Ph-H), 5.45 (s, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.40, 156.43, 156.43, 140.04, 138.26, 134.88, 134.59, 133.45, 132.26, 131.57, 131.57, 130.88, 129.57, 128.82, 128.05, 127.28, 126.90, 121.38, 63.60; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{13}Cl_3N_2O_3$: 459.0064, found: 459.0051; White solid; m.p.: 149.1–150.3 °C; yield, 62%.
 4-nitrobenzyl 4-((6-chloroquinoxalin-2-yl)oxy) benzoate(**5l**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.74 (s, 1H, Qu-H), 8.29 – 8.27 (m, 1H, Ph-H), 8.27 – 8.25 (m, 1H, Ph-H), 8.23 – 8.21 (m, 1H, Ph-H), 8.21 – 8.19 (m, 1H, Ph-H), 8.08 (d, *J* = 2.2 Hz, 1H, Ph-H), 7.71 – 7.64 (m, 3H Qu-H), 7.62 (s, 1H, Ph-H), 7.42 – 7.41 (m, 1H, Ph-H), 7.40 – 7.39 (m, 1H, Ph-H), 5.49 (s, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.39, 156.72, 156.32, 147.78, 143.25, 140.20, 140.08, 138.26, 133.54, 131.62, 131.62, 128.82, 128.44, 128.10, 126.63, 123.95, 121.49, 65.35; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{14}ClN_3O_5$: 436.0694, found: 436.0694; Brown solid; m.p.: 157.2–159.0 °C; yield, 51%.
 2-methylbenzyl 4-((6-chloroquinoxalin-2-yl)oxy) benzoate(**5m**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.72 (s, 1H, Qu-H), 8.20 – 8.18 (m, 1H, Ph-H), 8.17 – 8.16 (m, 1H, Ph-H), 8.07 (d, *J* = 2.3 Hz, 1H, Ph-H), 7.70 – 7.67 (m, 1H, Ph-H), 7.62 (dd, *J* = 8.9, 2.3 Hz, 1H, Ph-H), 7.37 (s, 1H, Qu-H), 7.36 (d, *J* = 2.2 Hz, 2H, Qu-H), 7.34 – 7.33 (m, 1H, Ph-H), 7.21 (d, *J* = 7.8 Hz, 2H, Ph-H), 5.35 (s, 2H, O-CH_2-Ph), 2.37 (s, 3H, CH_3, Ph-O-CH_3);

	^{13}C NMR (101 MHz, $CDCl_3$) δ 165.77, 156.43, 156.33, 140.08, 140.05, 138.33, 138.25, 133.42, 132.94, 131.61, 131.47, 129.34, 128.87, 128.47, 128.06, 127.46, 121.28, 66.87, 21.28; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{23}H_{17}ClN_2O_3$: 405.1000, found: 405.0999; Brown solid; m.p.: 89.9–90.8 °C; yield, 36%.
 2-fluorobenzyl 4-((6-chloroquinoxalin-2-yl)oxy) benzoate(**5n**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.73 (s, 1H, Qu-H), 8.20 – 8.19 (m, 1H, Ph-H), 8.18 – 8.17 (m, 1H, Ph-H), 8.07 (d, *J* = 2.3 Hz, 1H, Ph-H), 7.68 (d, *J* = 8.9 Hz, 1H, Ph-H), 7.62 (dd, *J* = 8.9, 2.3 Hz, 1H, Ph-H), 7.50 (td, *J* = 7.5, 1.6 Hz, 1H, Ph-H), 7.38 – 7.34 (m, 3H, Qu-H), 7.20 – 7.09 (m, 2H, Ph-H), 5.46 (s, 2H, CH_2, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.61, 162.38, 156.43, 140.07, 138.31, 133.43, 131.66, 131.48, 130.72, 130.44, 130.36, 128.86, 128.06, 127.19, 124.23, 123.05, 121.34, 115.51, 60.87; **^{19}F NMR (376 MHz, $CDCl_3$)** δ -117.78; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{14}ClFN_2O_3$: 409.0749, found: 409.0741; White solid; m.p.: 100.6–101.9 °C; yield, 75%.
 3-methoxybenzyl 4-((6-chloroquinoxalin-2-yl)oxy) benzoate(**5o**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.73 (s, 1H, Qu-H), 8.22 – 8.20 (m, 1H, Ph-H), 8.19 – 8.18 (m, 1H, Ph-H), 8.08 (d, *J* = 2.2 Hz, 1H, Ph-H), 7.65 (dt, *J* = 8.9, 5.6 Hz, 2H, Qu-H), 7.37 (d, *J* = 2.0 Hz, 1H, Ph-H), 7.35 (d, *J* = 2.0 Hz, 1H, Ph-H), 7.31 (d, *J* = 7.9 Hz, 1H Qu-H), 7.03 (dd, *J* = 16.5, 4.8 Hz, 2H, Ph-H), 6.90 (dd, *J* = 8.2, 2.0 Hz, 1H, Ph-H), 5.37 (s, 2H, O-CH_2-Ph), 3.84 (s, 3H, Ph-O-CH_3); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.69, 159.78, 156.42, 140.08, 138.32, 137.48, 133.44, 131.56, 131.56, 129.75, 128.87, 128.06, 127.32, 121.32, 120.42, 113.73, 113.73, 66.73, 55.32; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{23}H_{17}ClN_2O_4$: 421.0949, found: 421.0938; Brown solid; m.p.: 116.6–118.3 °C; yield, 80%.
 2-chlorobenzyl 4-((6-chloroquinoxalin-2-yl)oxy) benzoate(**5p**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.73 (s, 1H, Qu-H), 8.23 – 8.21 (m, 1H, Ph-H), 8.20 (d, *J* = 2.0 Hz, 1H, Ph-H), 8.08 (d, *J* = 2.2 Hz, 1H, Ph-H), 7.65 (dt, *J* = 8.9, 5.6 Hz, 2H, Qu-H), 7.53 (dd, *J* = 5.6, 3.7 Hz, 1H, Qu-H), 7.45 – 7.42 (m, 1H, Ph-H), 7.39 – 7.38 (m, 1H, Ph-H), 7.37 – 7.36 (m, 1H, Ph-H), 7.31 (dd, *J* = 5.9, 3.5 Hz, 2H, Ph-H), 5.50 (s, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.50, 156.43, 140.04, 138.27, 133.87, 133.60, 133.41, 131.65, 131.45, 129.98, 129.66, 128.83, 128.03, 127.12, 126.94, 121.33, 64.25; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{14}Cl_2N_2O_3$: 425.0454, found: 425.0442; White solid; m.p.: 115.3–117.1 °C; yield, 69%.
 3-fluorobenzyl 4-((6-chloroquinoxalin-2-yl)oxy) benzoate(**5q**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.73 (s, 1H, Qu-H), 8.20 – 8.19 (m, 1H, Ph-H), 8.18 – 8.17 (m, 1H, Ph-H), 8.07 (d, *J* = 2.2 Hz, 1H, Ph-H), 7.68 (d, *J* = 8.8 Hz, 1H, Qu-H), 7.62 (dd, *J* = 8.9, 2.3 Hz, 1H, Qu-H), 7.50 (td, *J* = 7.5, 1.7 Hz, 1H, Qu-H), 7.38 – 7.34 (m, 3H, Ph-H), 7.20 – 7.09 (m, 2H, Ph-H), 5.46 (s, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ1 165.57, 162.35, 156.39, 40.04, 138.28, 133.40, 131.63, 131.45, 130.69, 130.40, 130.32, 128.83, 128.03, 127.15, 124.19, 123.15, 121.30, 115.48, 60.88; **^{19}F NMR (376 MHz, $CDCl_3$)** δ -117.78; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{14}ClFN_2O_3$: 409.0749, found: 409.0761; Brown

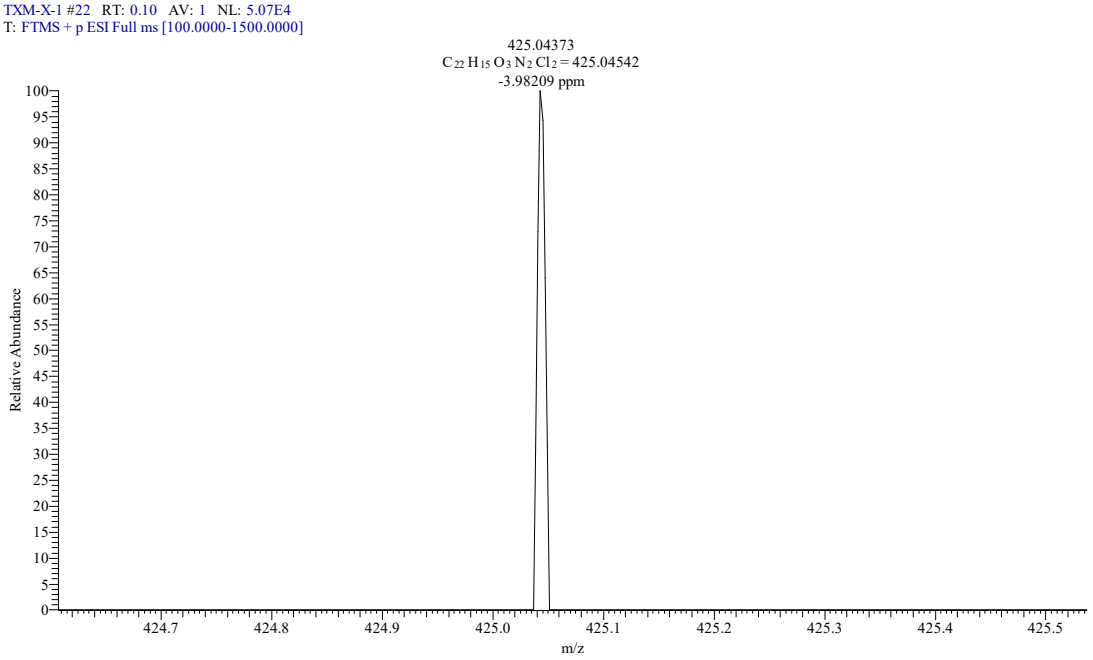
	solid; m.p.: 90.1–92.6 °C; yield, 53%.
 4-chlorobenzyl 4-((6-chloroquinoxalin-2-yl)oxy) benzoate(**5r**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.73 (s, 1H, Qu-H), 8.20 – 8.18 (m, 1H, Ph-H), 8.17 – 8.16 (m, 1H, Ph-H), 8.08 (d, *J* = 2.2 Hz, 1H, Ph-H), 7.69 (d, *J* = 8.9 Hz, 1H, Qu-H), 7.63 (dd, *J* = 8.9, 2.3 Hz, 1H, Qu-H), 7.42 – 7.39 (m, 2H, Qu-H, Ph-H), 7.38 (s, 1H, Ph-H), 7.38 – 7.35 (m, 3H, Ph-H), 5.35 (s, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.61, 165.39, 156.48, 140.07, 138.30, 134.45, 134.28, 133.47, 131.62, 131.50, 129.69, 128.87, 128.08, 127.12, 121.36, 66.06; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{14}Cl_2N_2O_3$: 425.0454, found: 425.0442; Brown solid; m.p.: 105.6–107.4 °C; yield, 48%.
 2-chloro-6-fluorobenzyl 4-((6-chloroquinoxalin-2-yl)oxy) benzoate(**5s**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.79 – 8.66 (m, 1H, Qu-H), 8.16 (dd, *J* = 10.8, 4.2 Hz, 2H, Ph-H), 8.07 (dd, *J* = 6.1, 1.9 Hz, 1H, Ph-H), 7.71 – 7.66 (m, 1H, Ph-H), 7.66 – 7.60 (m, 1H, Ph-H), 7.41 – 7.31 (m, 3H, Qu-H), 7.29 (d, *J* = 8.2 Hz, 1H, Ph-H), 7.12 – 7.04 (m, 1H, Ph-H), 5.56 (d, *J* = 6.3 Hz, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.55, 163.36, 160.85, 156.42, 140.06, 138.33, 136.64, 133.43, 131.71, 131.48, 131.01, 128.87, 128.06, 127.08, 125.58, 121.81, 121.33, 114.52, 57.91; **^{19}F NMR (376 MHz, $CDCl_3$)** δ -112.69; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{22}H_{13}Cl_2FN_2O_3$: 443.0360, found: 443.0343; Brown solid; m.p.: 105.6–106.8 °C; yield, 55%.
 4-cyanobenzyl 4-((6-chloroquinoxalin-2-yl)oxy) benzoate(**5t**)	**^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.74 (s, 1H, Qu-H), 8.22 – 8.20 (m, 1H, Ph-H), 8.19 – 8.18 (m, 1H, Ph-H), 8.08 (d, *J* = 2.2 Hz, 1H, Ph-H), 7.71 (d, *J* = 1.7 Hz, 1H, Qu-H), 7.70 – 7.67 (m, 2H, Qu-H), 7.63 (dd, *J* = 8.9, 2.3 Hz, 1H, Ph-H), 7.57 (d, *J* = 8.5 Hz, 2H, Ph-H), 7.41 (d, *J* = 2.0 Hz, 1H, Ph-H), 7.39 – 7.38 (m, 1H, Ph-H), 5.44 (s, 2H, O-CH_2-Ph); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 165.41, 156.68, 156.33, 141.29, 140.06, 138.26, 133.52, 132.52, 131.67 s), 131.54, 128.82, 128.36, 128.10, 126.70, 121.47, 118.59, 112.14, 65.63; **HRMS** (ESI) $[M+H]^+$ calcd for $C_{23}H_{14}ClN_3O_3$: 416.0796, found: 416.0780; White solid; m.p.: 139.9–141.5 °C; yield, 45%.



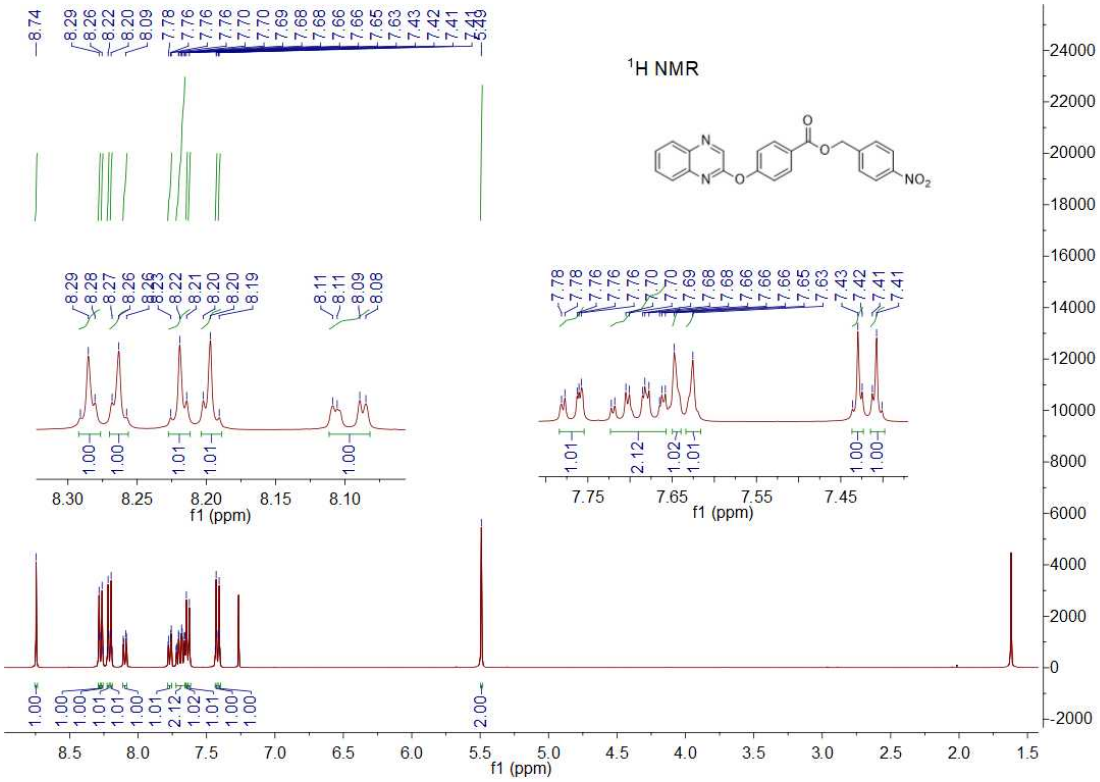
^{1}H NMR spectrum of compound **5a**



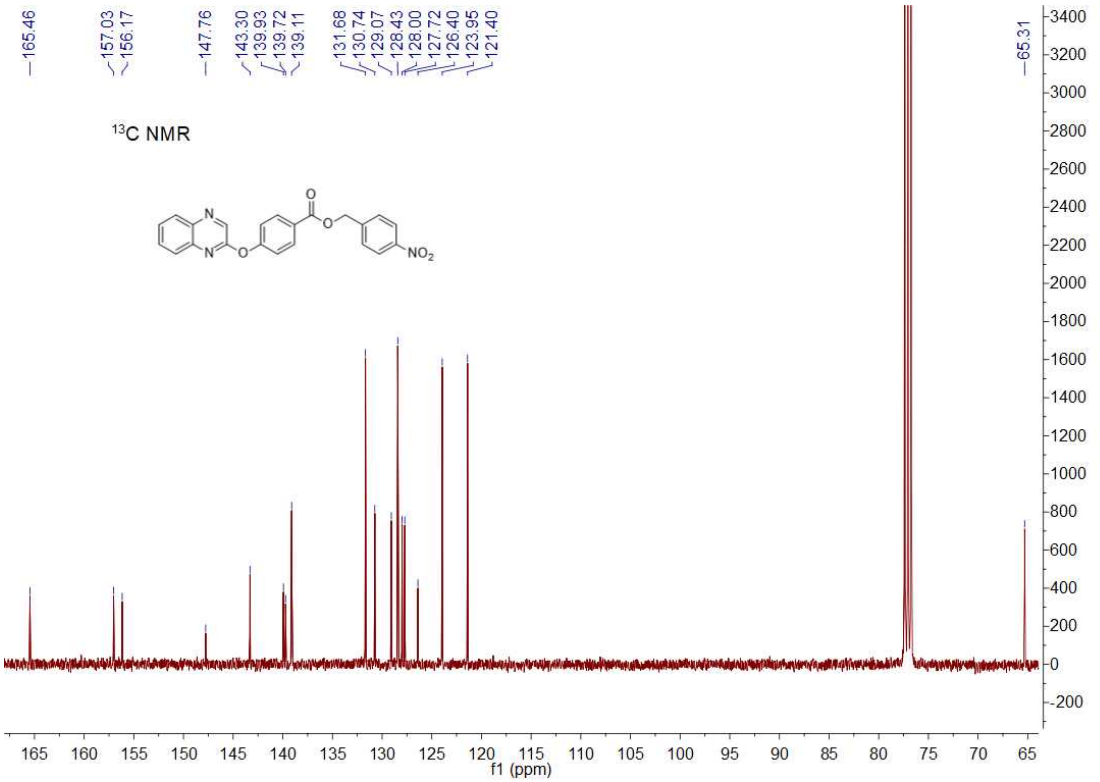
^{13}C NMR spectrum of compound **5a**



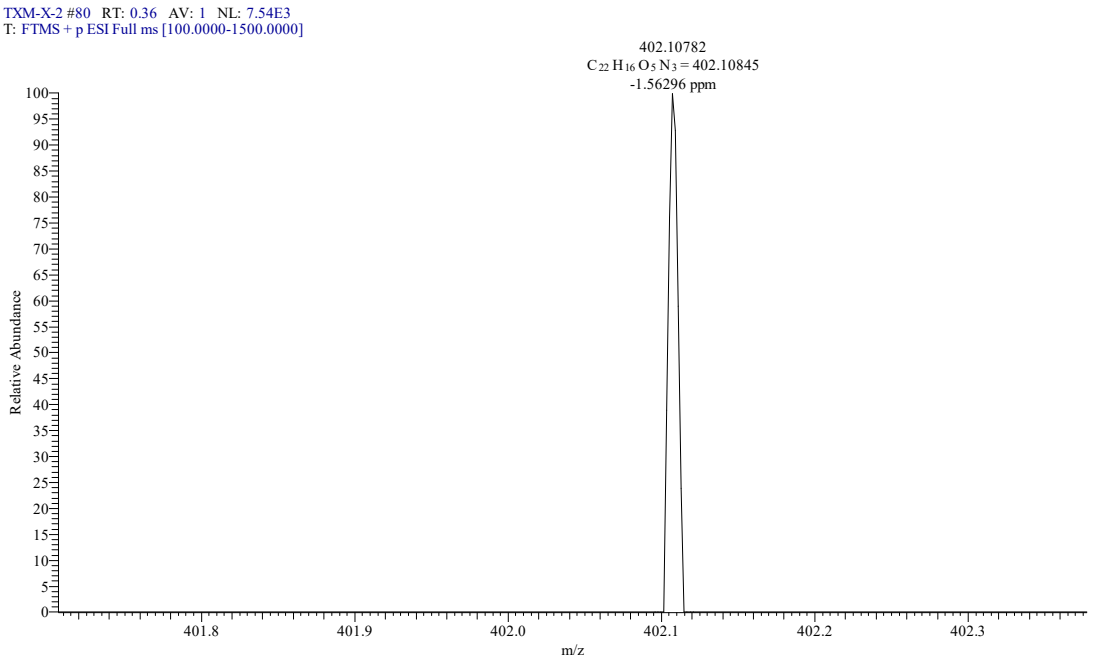
HRMS (ESI) spectrum of compound **5a**



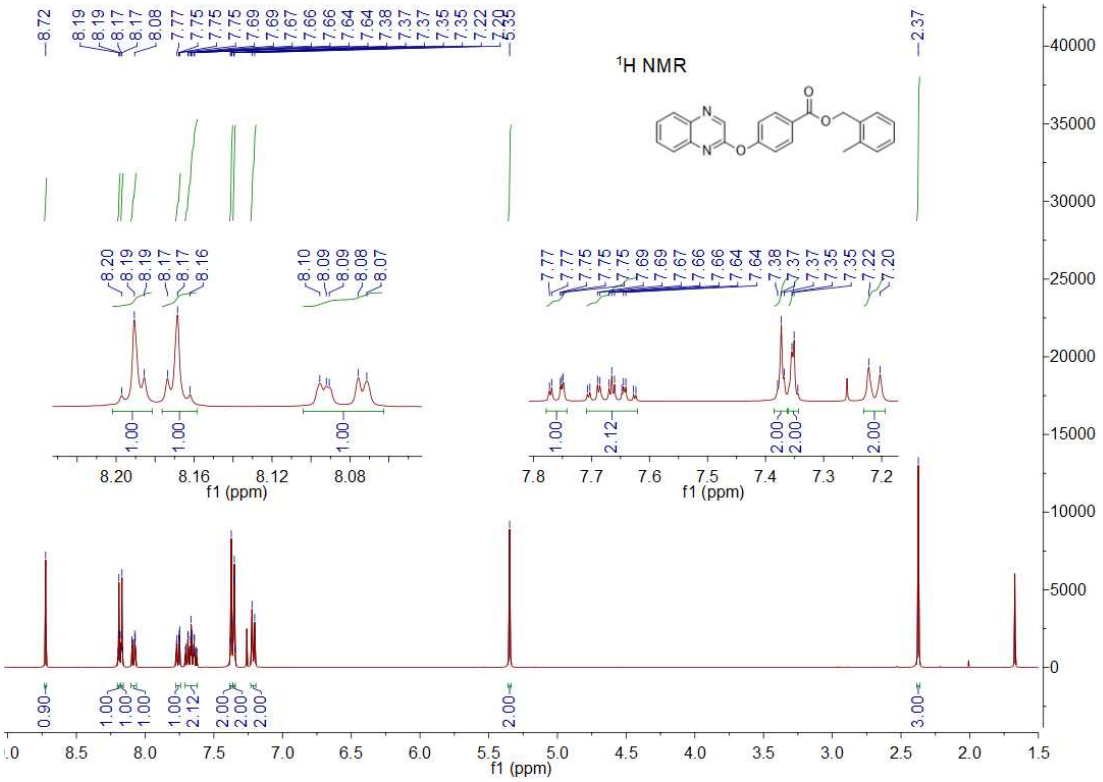
^{1}H NMR spectrum of compound **5b**



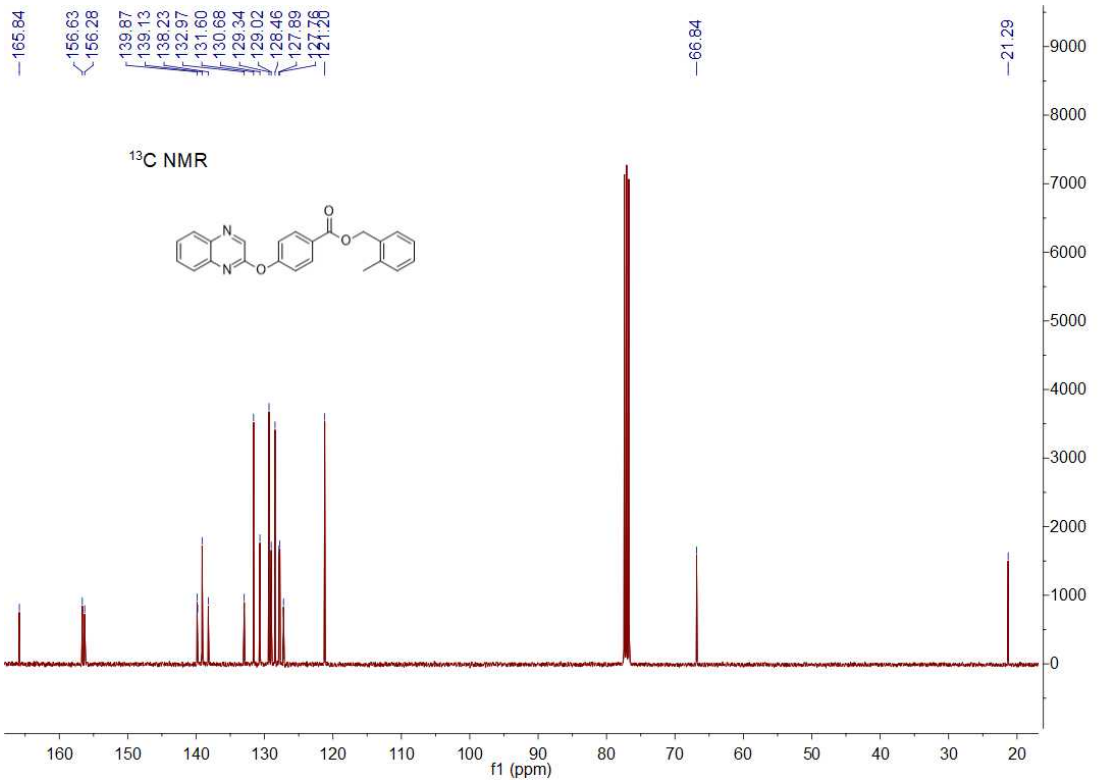
^{13}C NMR spectrum of compound **5b**



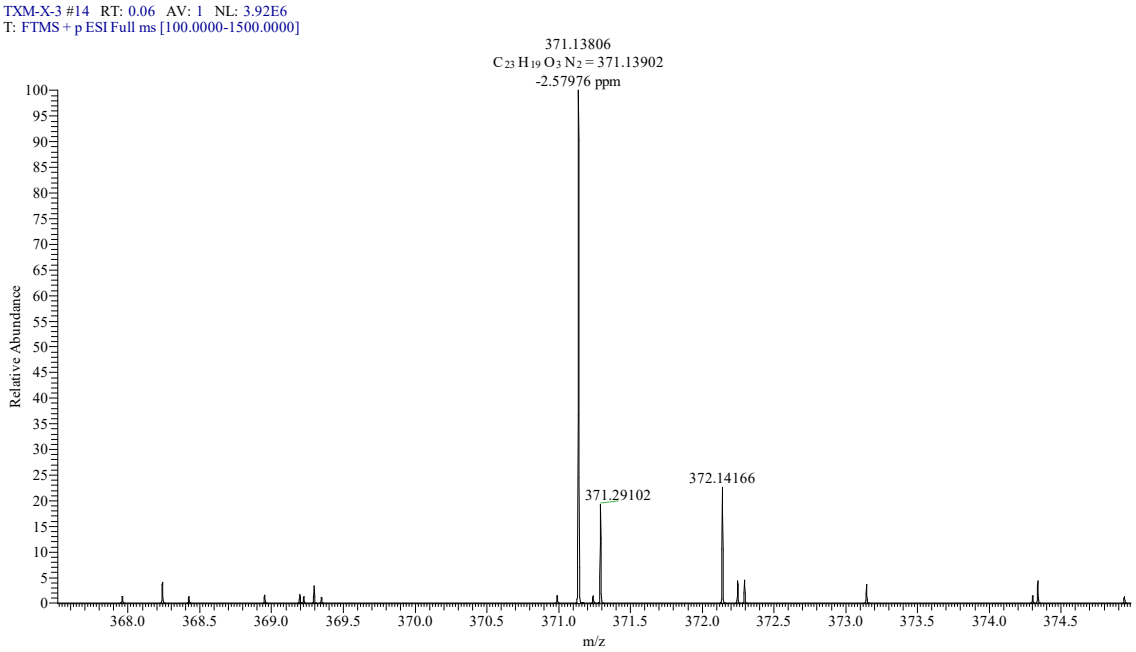
HRMS (ESI) spectrum of compound **5b**



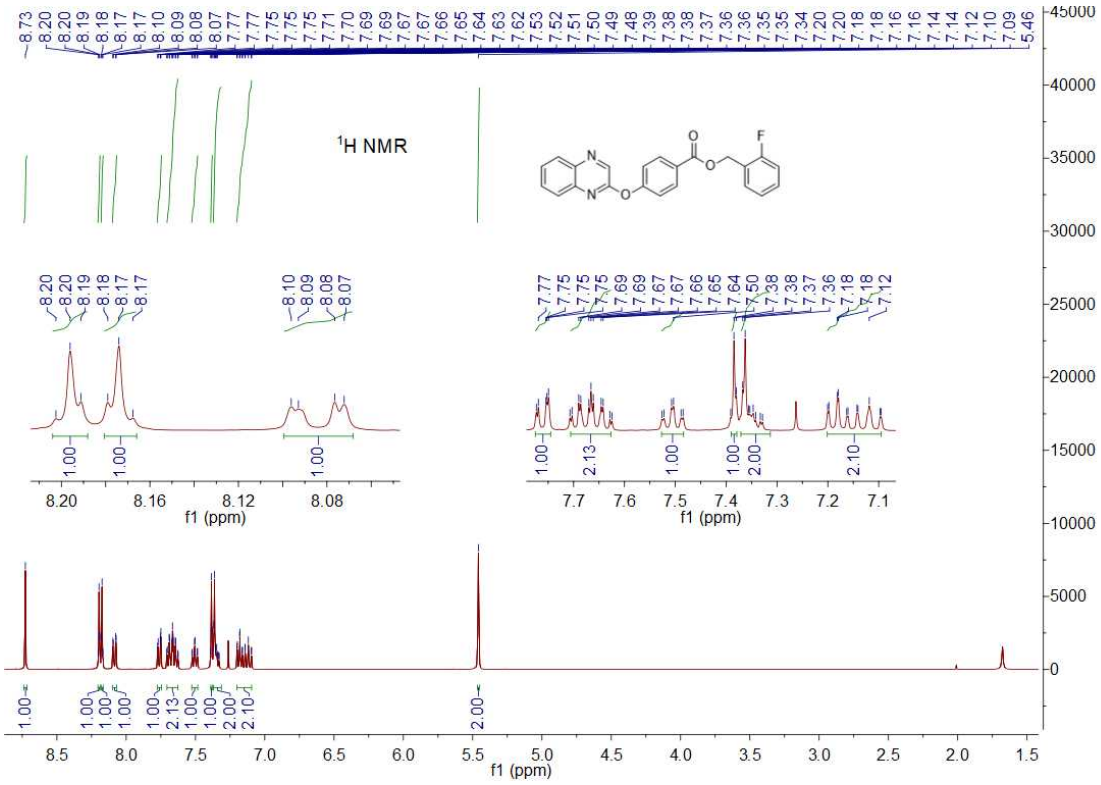
^{1}H NMR spectrum of compound **5c**



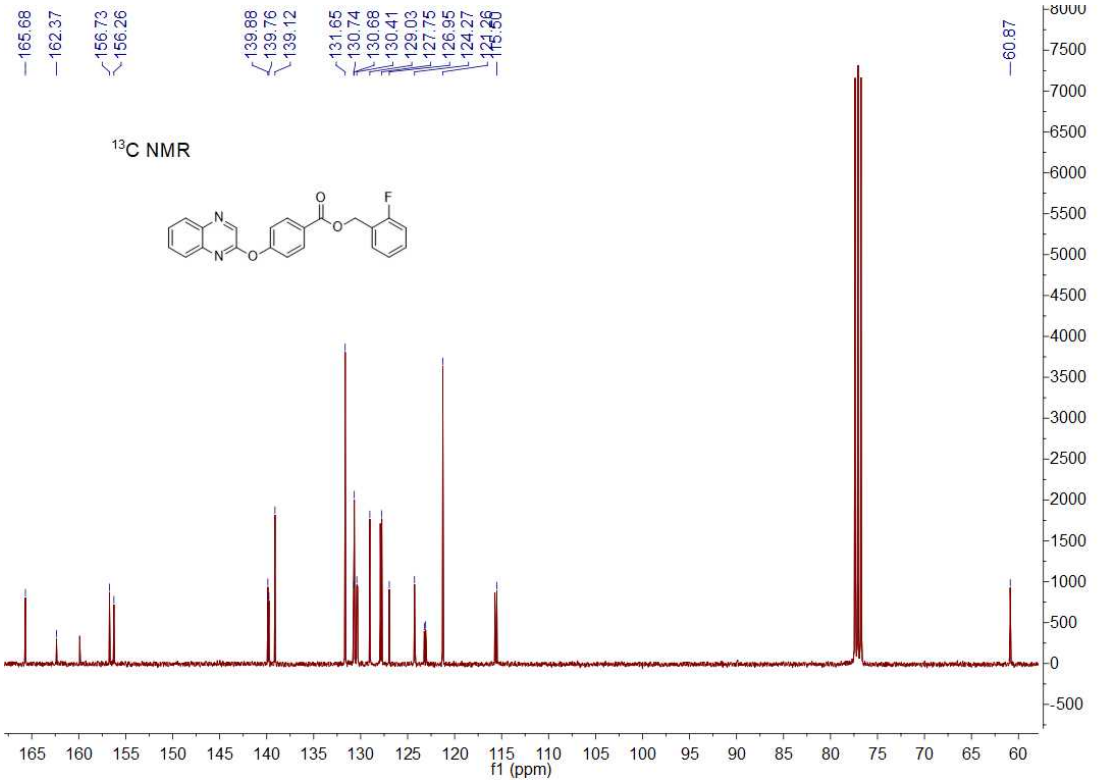
^{13}C NMR spectrum of compound **5c**



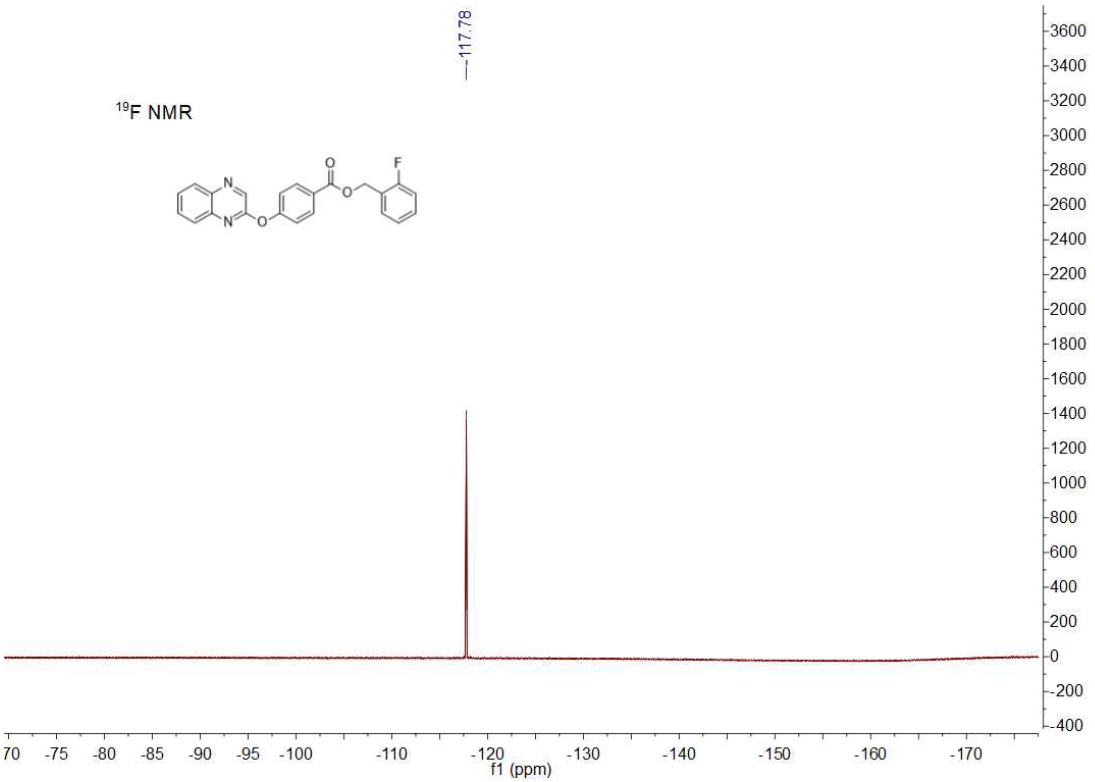
HRMS (ESI) spectrum of compound **5c**



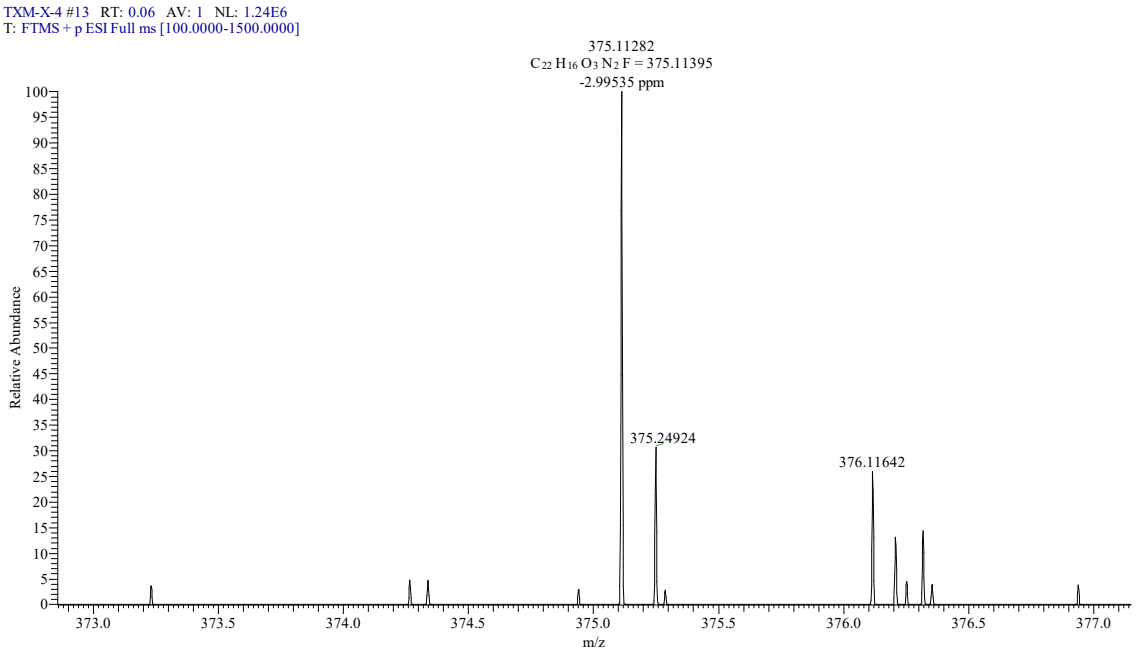
^{1}H NMR spectrum of compound **5d**



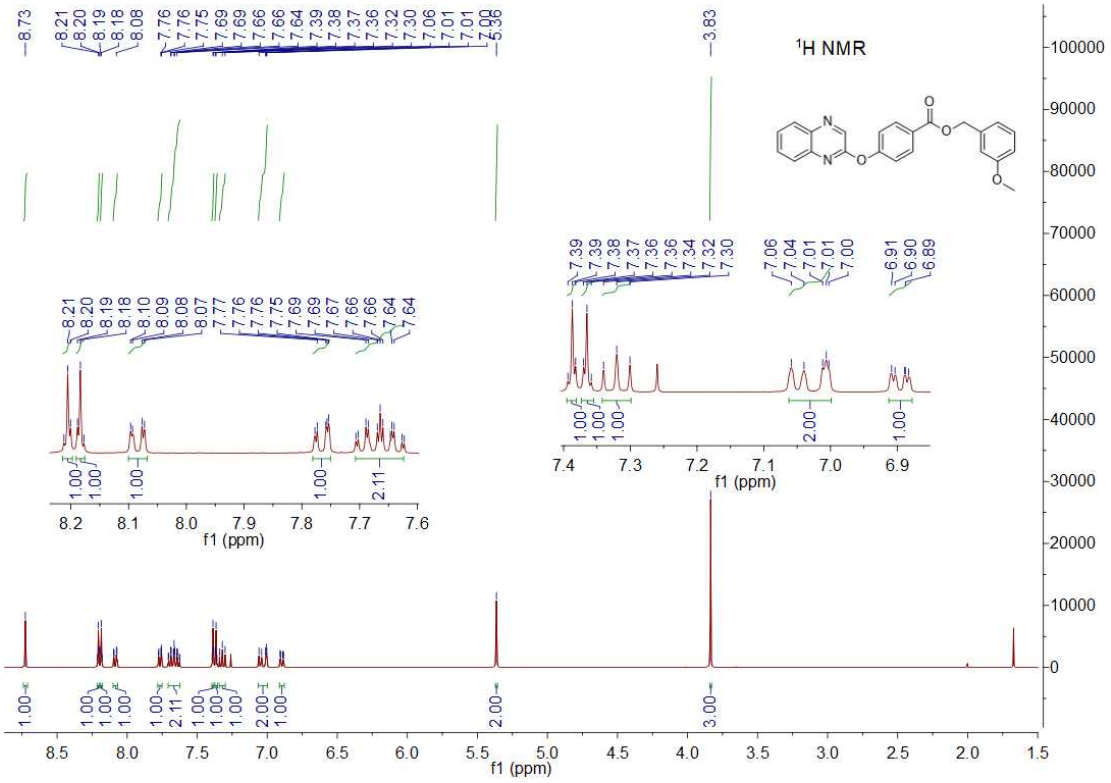
^{13}C NMR spectrum of compound **5d**



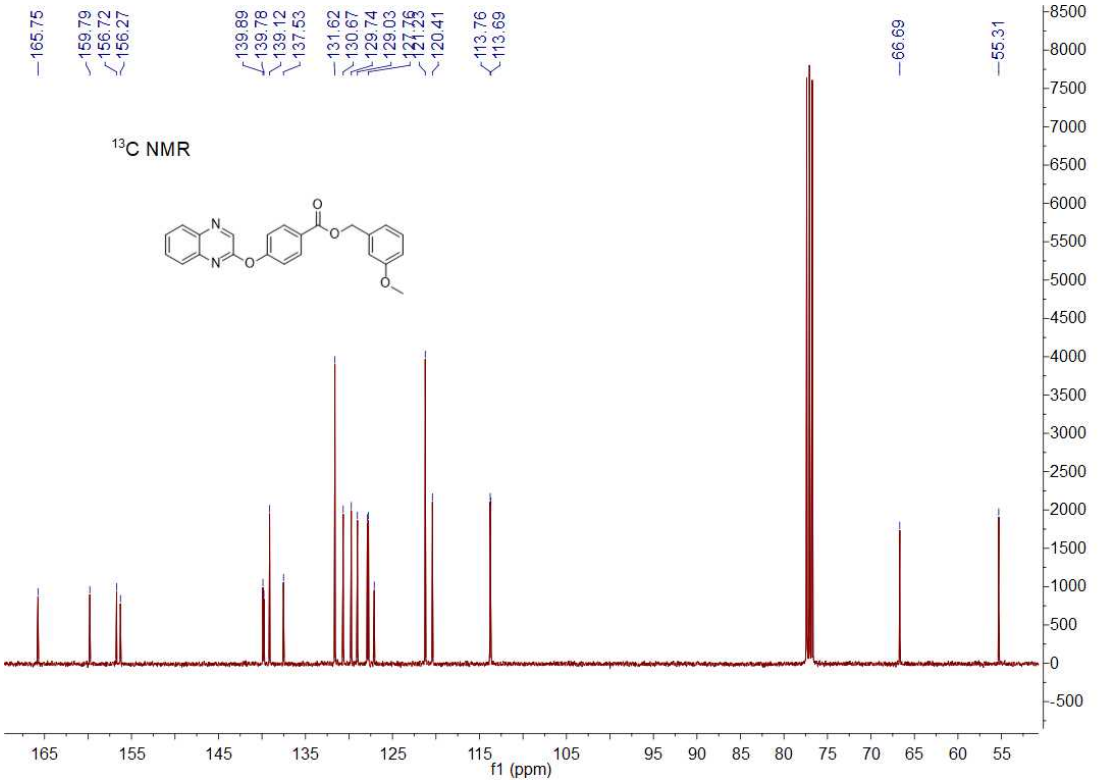
^{19}F NMR spectrum of compound **5d**



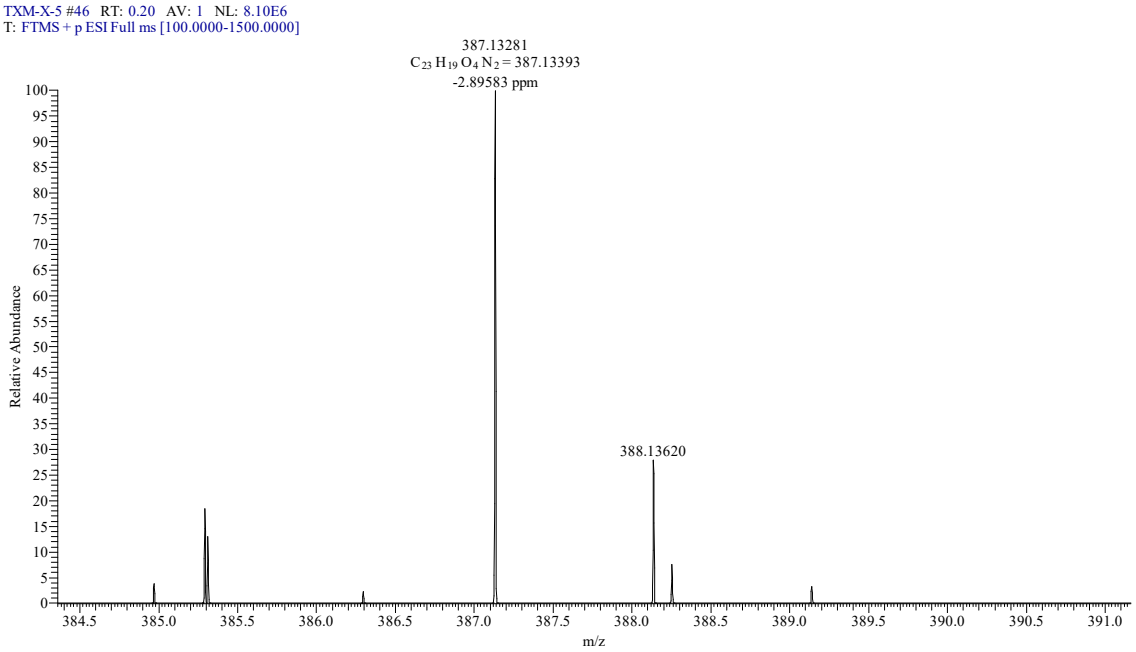
HRMS (ESI) spectrum of compound **5d**



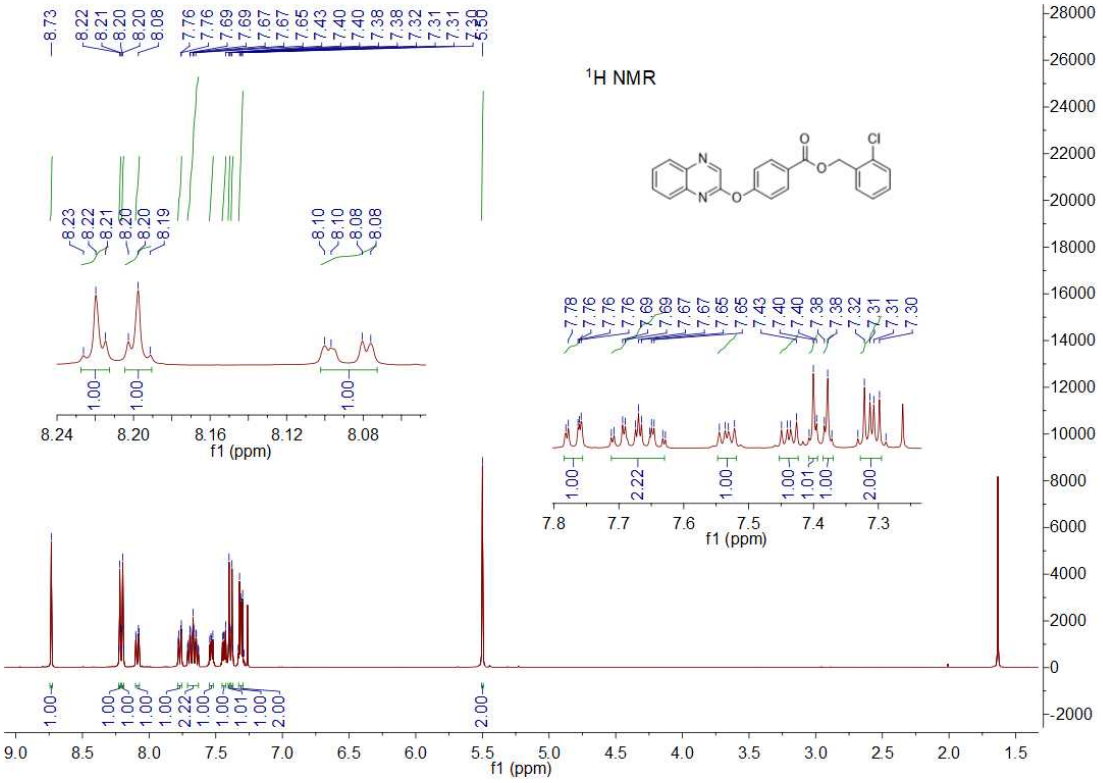
^{1}H NMR spectrum of compound **5e**



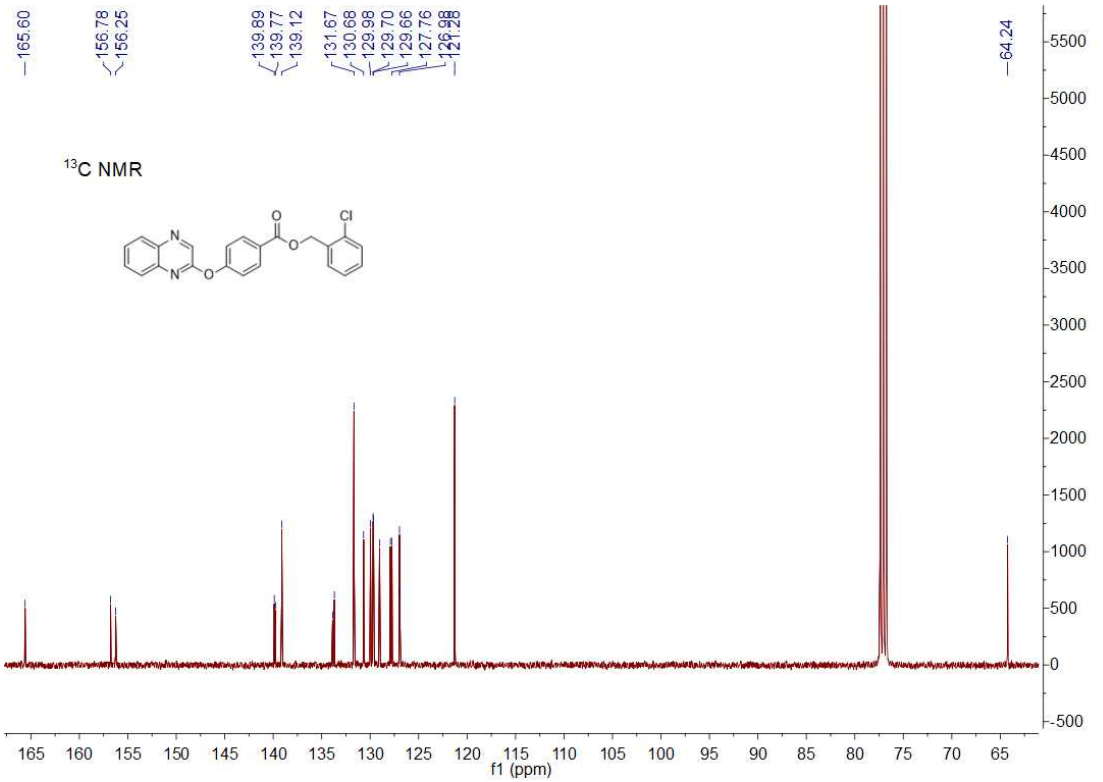
^{13}C NMR spectrum of compound **5e**



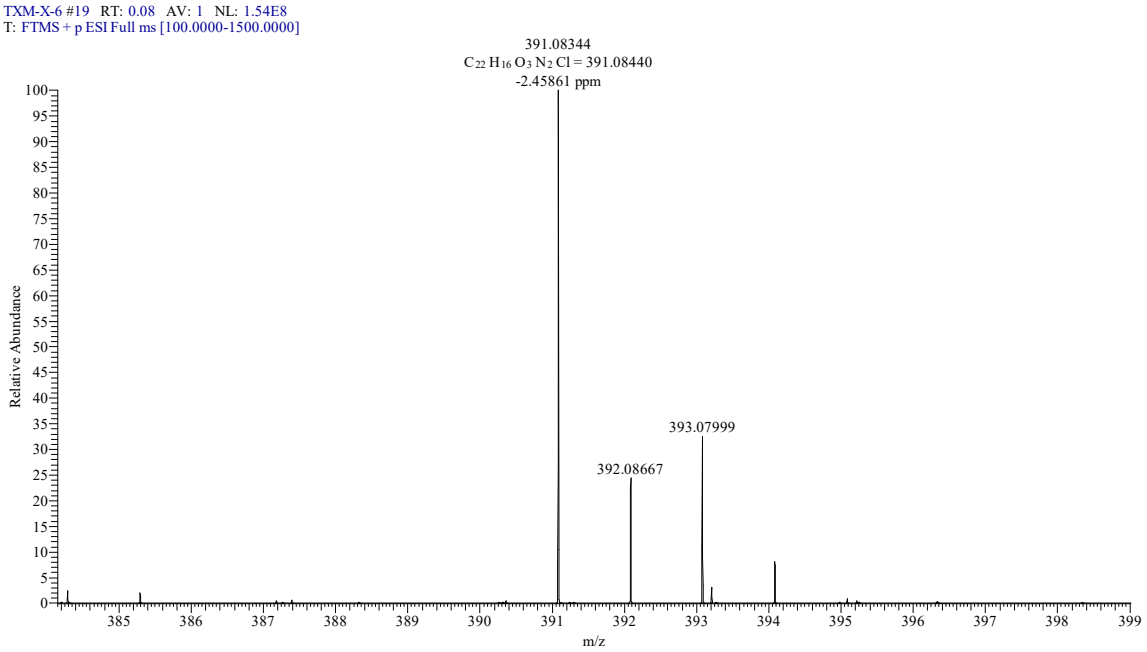
HRMS (ESI) spectrum of compound **5e**



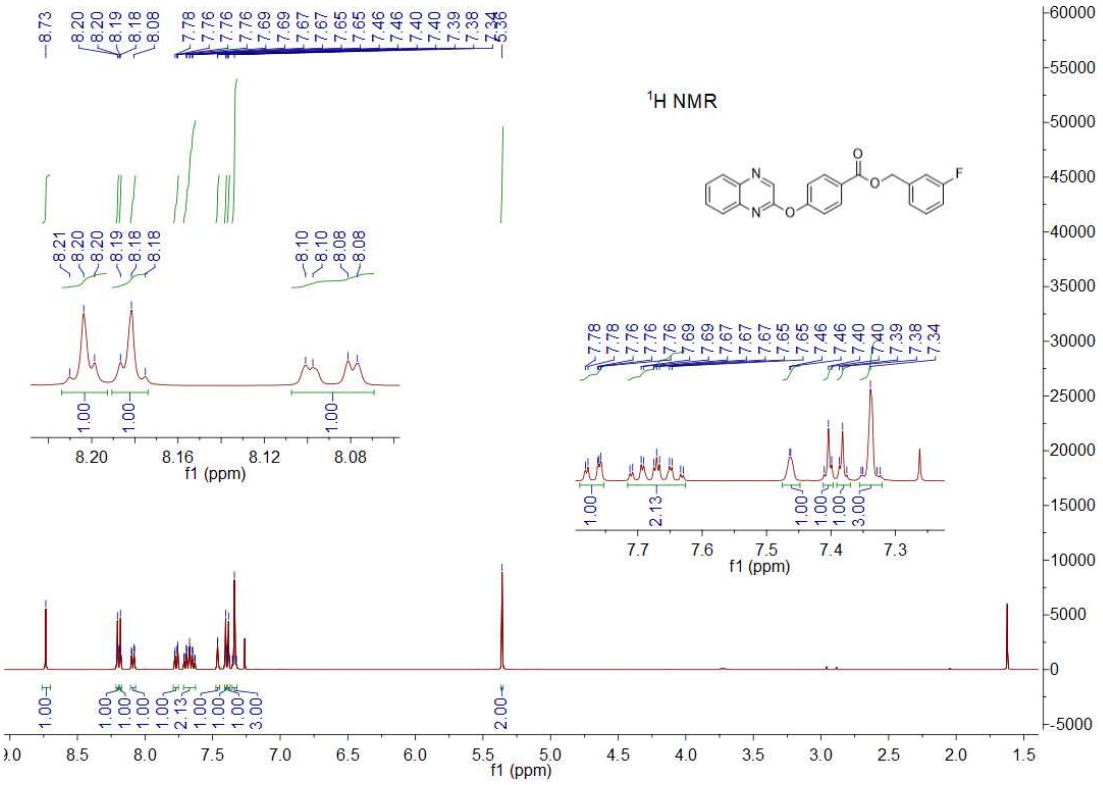
^{1}H NMR spectrum of compound **5f**



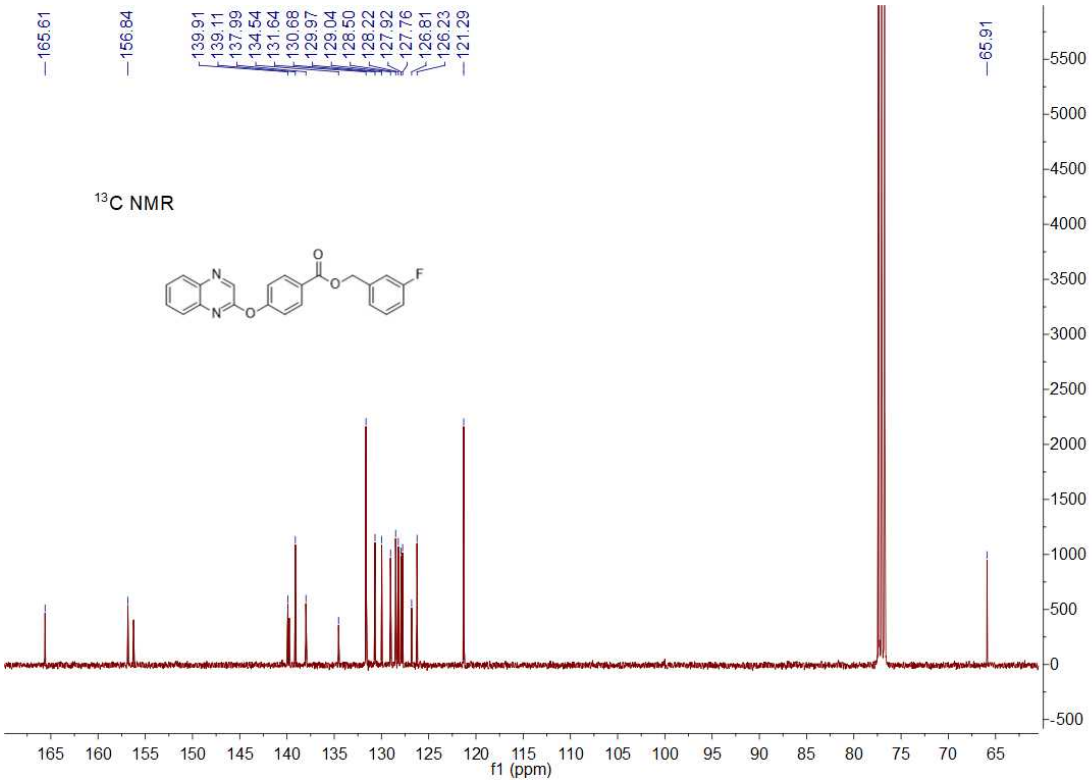
^{13}C NMR spectrum of compound **5f**



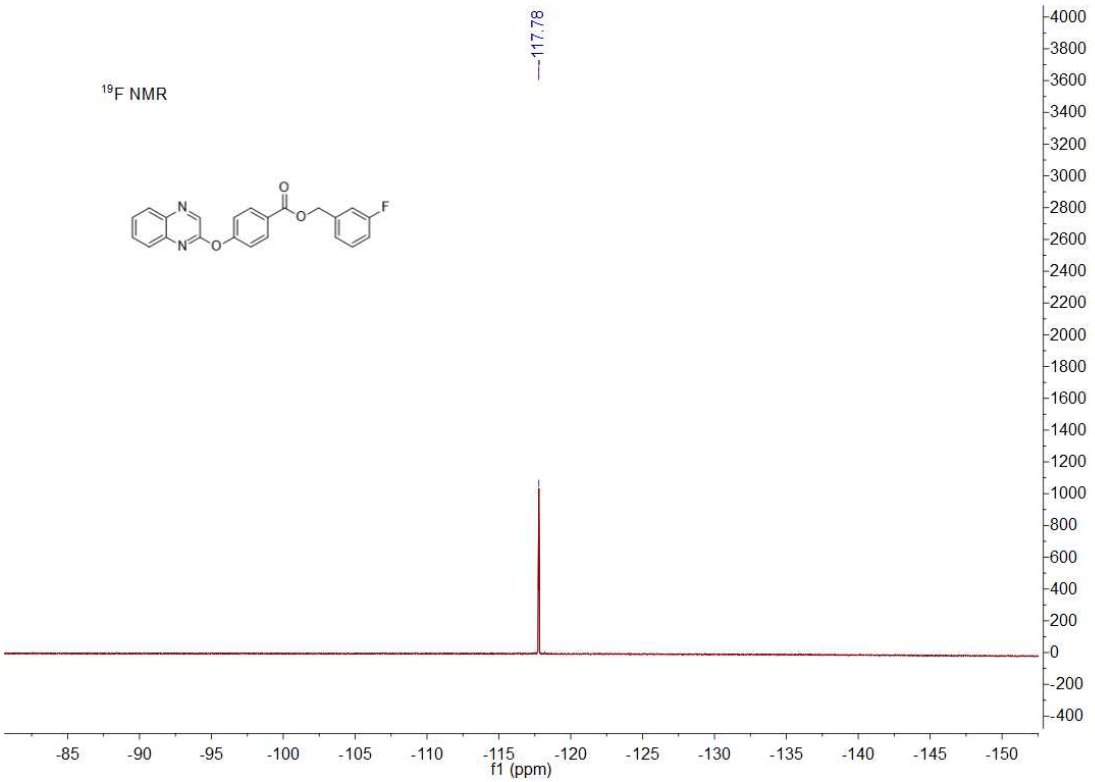
HRMS (ESI) spectrum of compound **5f**



^{1}H NMR spectrum of compound **5g**

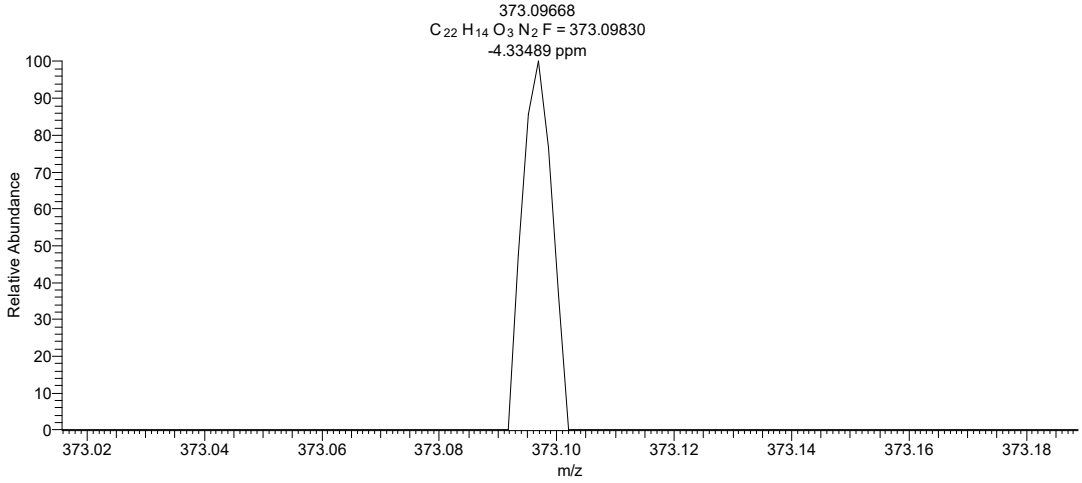


^{13}C NMR spectrum of compound **5g**

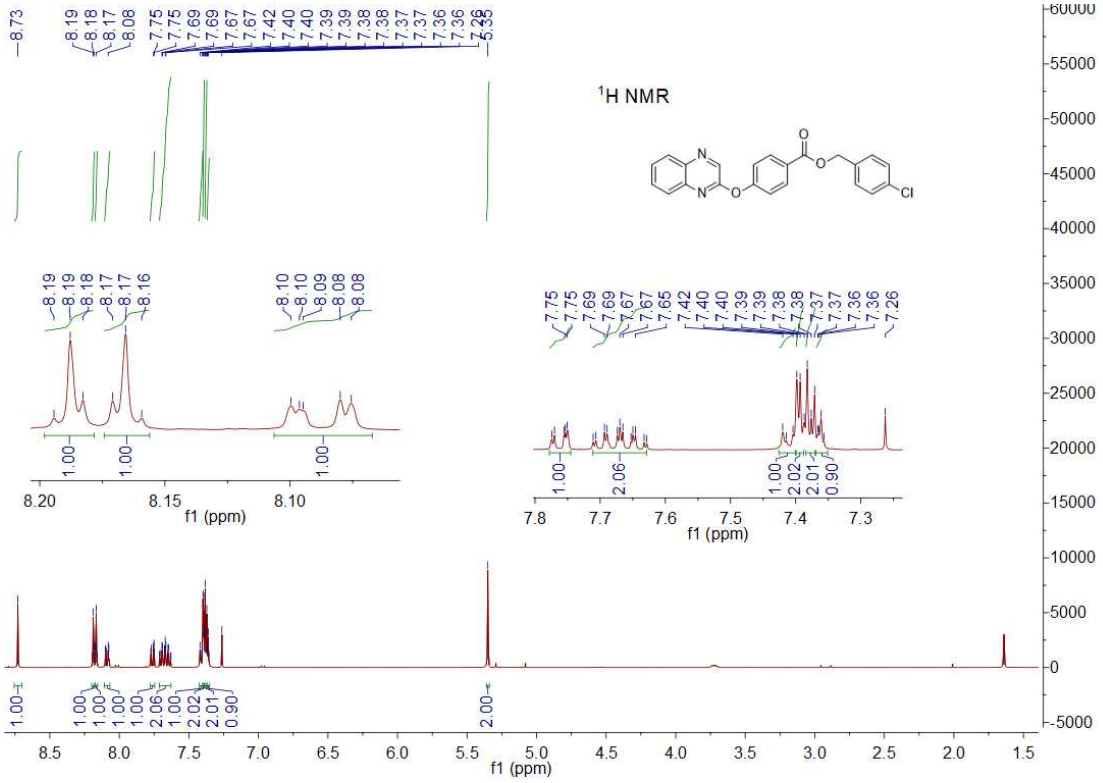


^{19}F NMR spectrum of compound **5g**

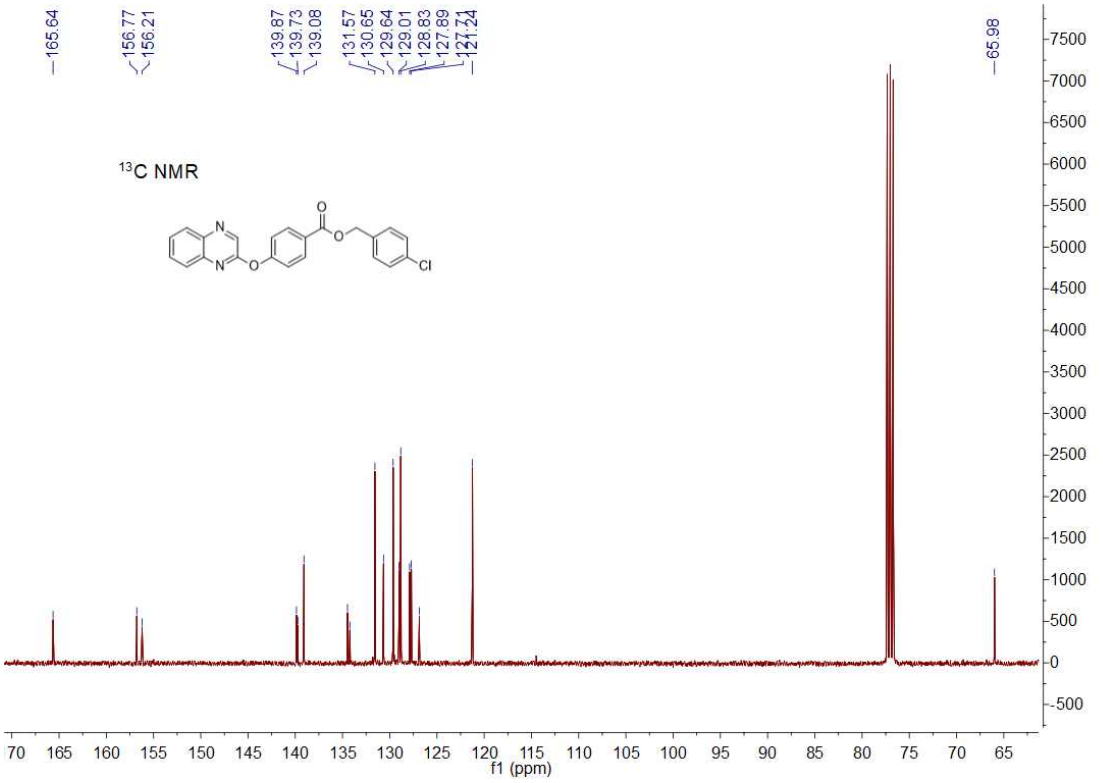
txm-x-7 #7 RT: 0.08 AV: 1 NL: 4.61E4
T: FTMS + p ESI Full ms [150.0000-2200.0000]



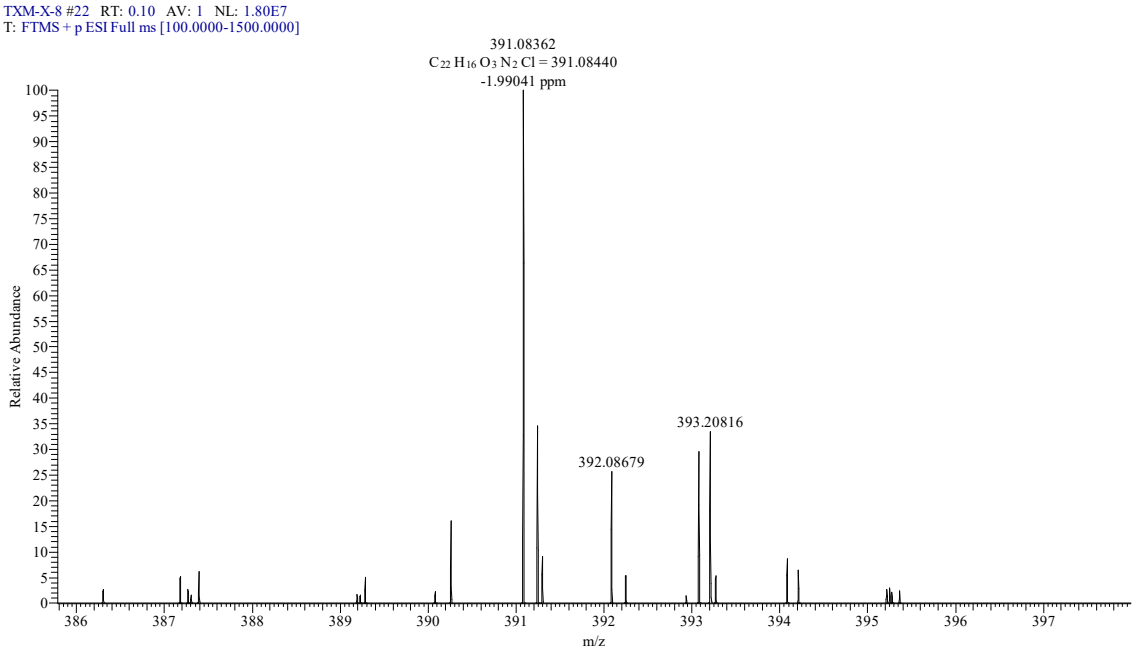
HRMS (ESI) spectrum of compound **5g**



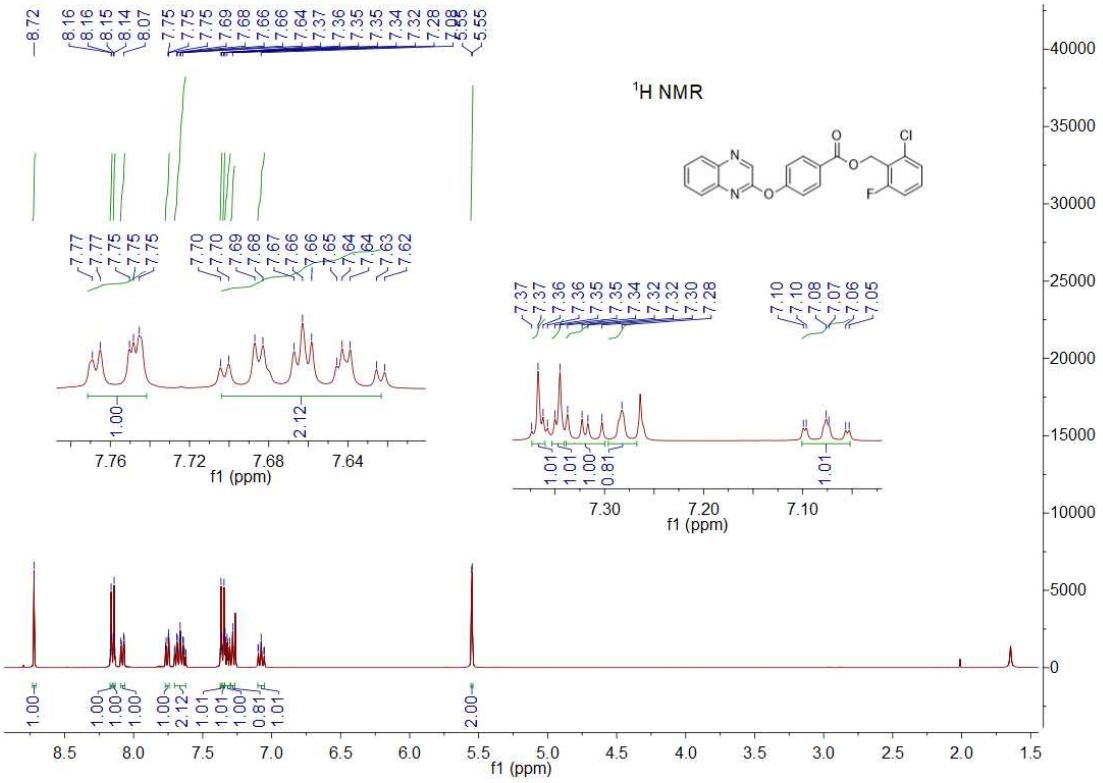
^{1}H NMR spectrum of compound **5h**



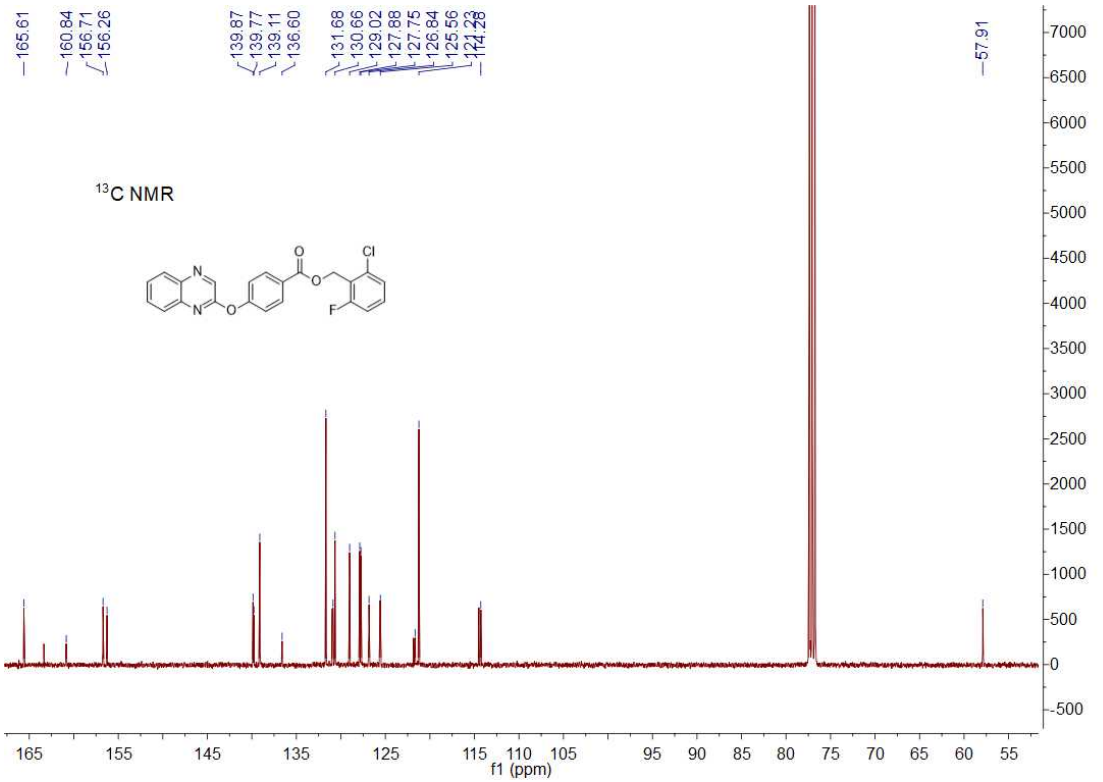
^{13}C NMR spectrum of compound **5h**



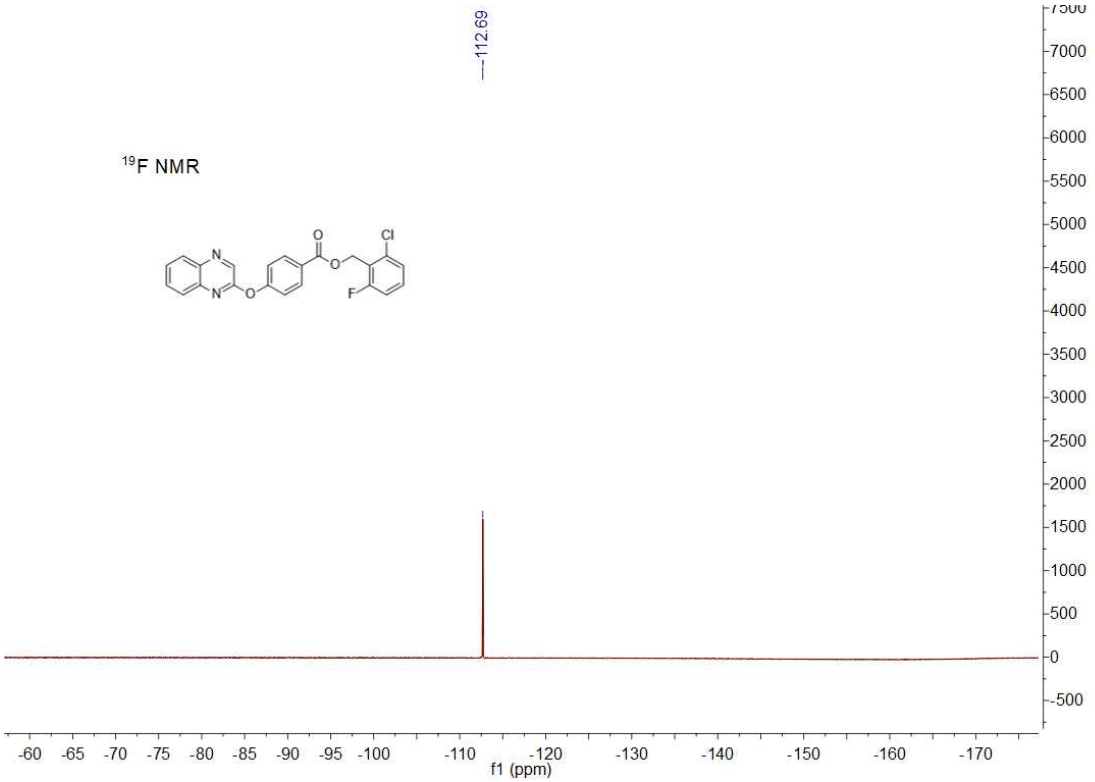
HRMS (ESI) spectrum of compound **5h**



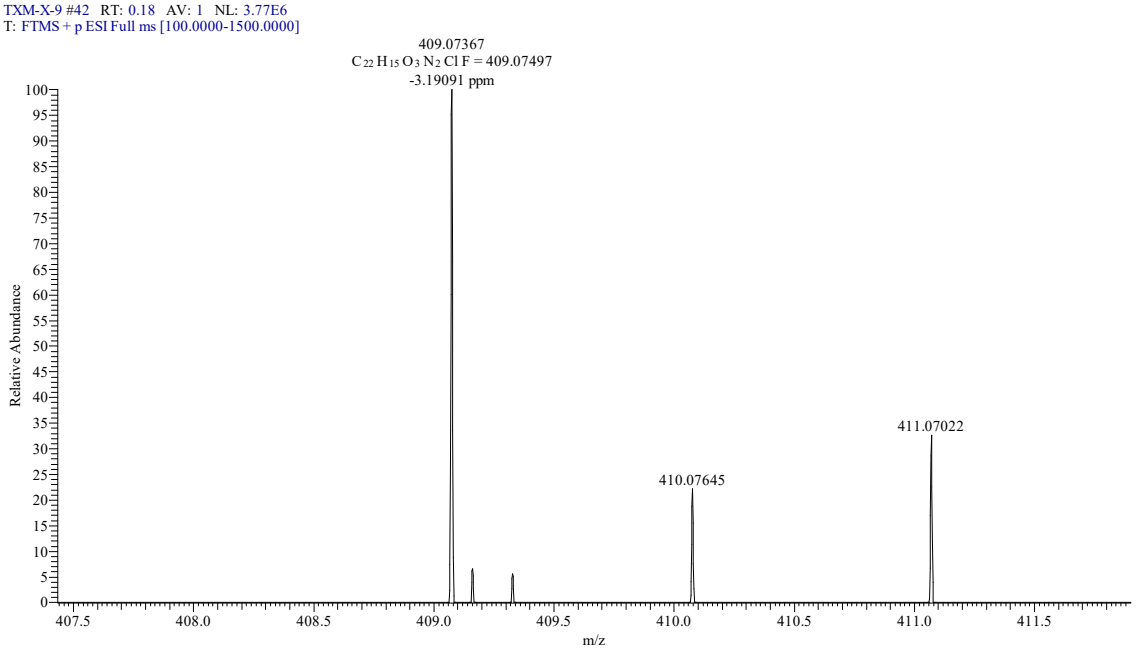
^{1}H NMR spectrum of compound **5i**



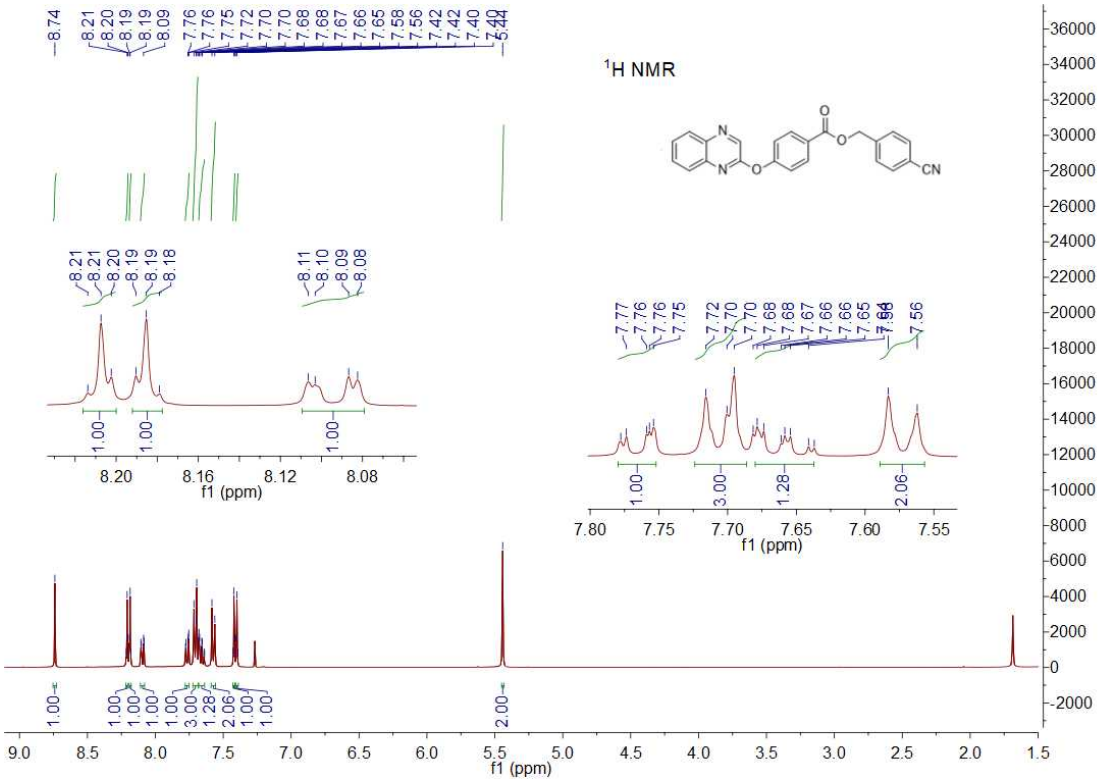
^{13}C NMR spectrum of compound **5i**



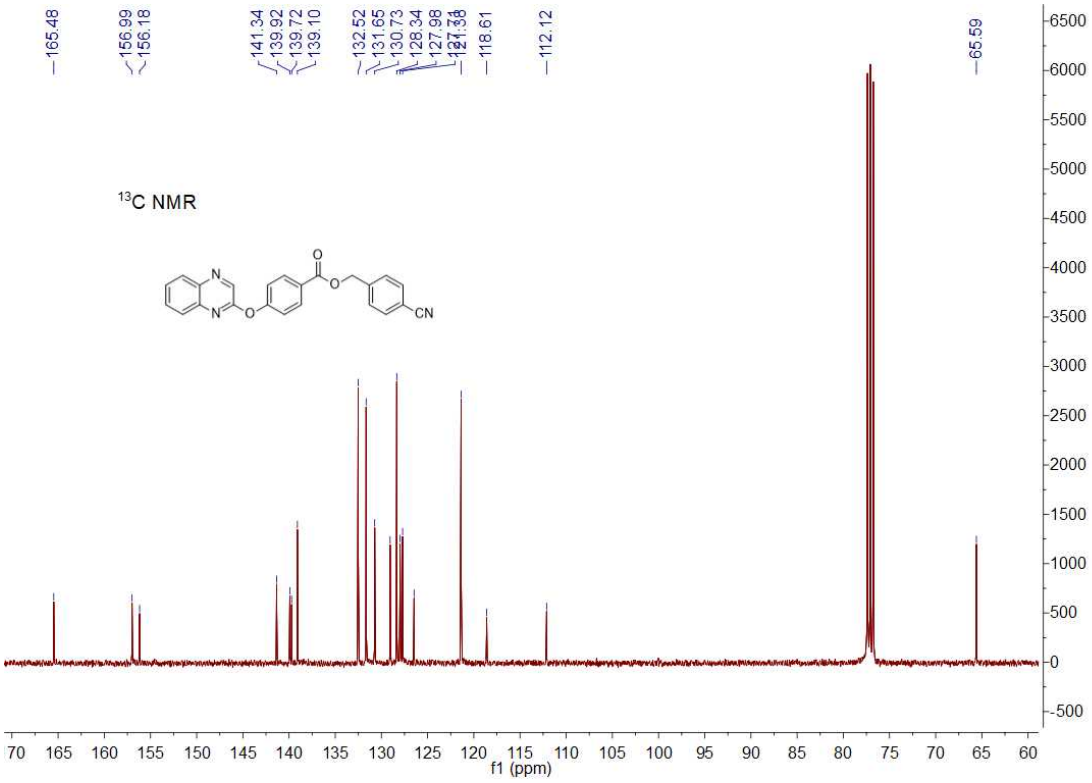
^{19}F NMR spectrum of compound **5i**



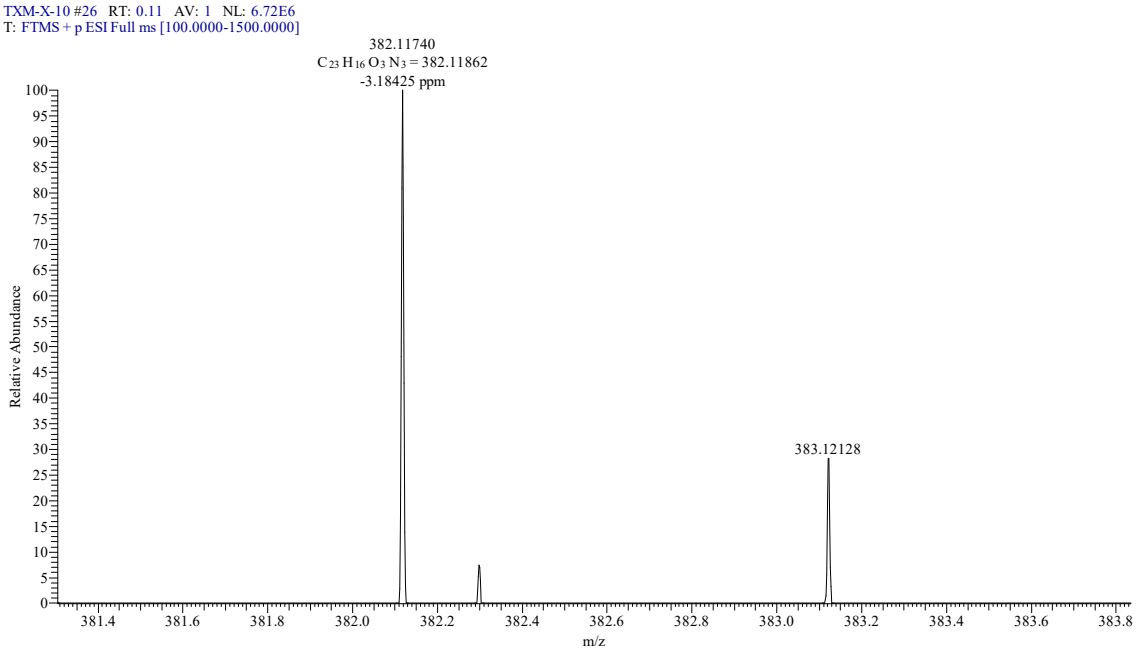
HRMS (ESI) spectrum of compound **5i**



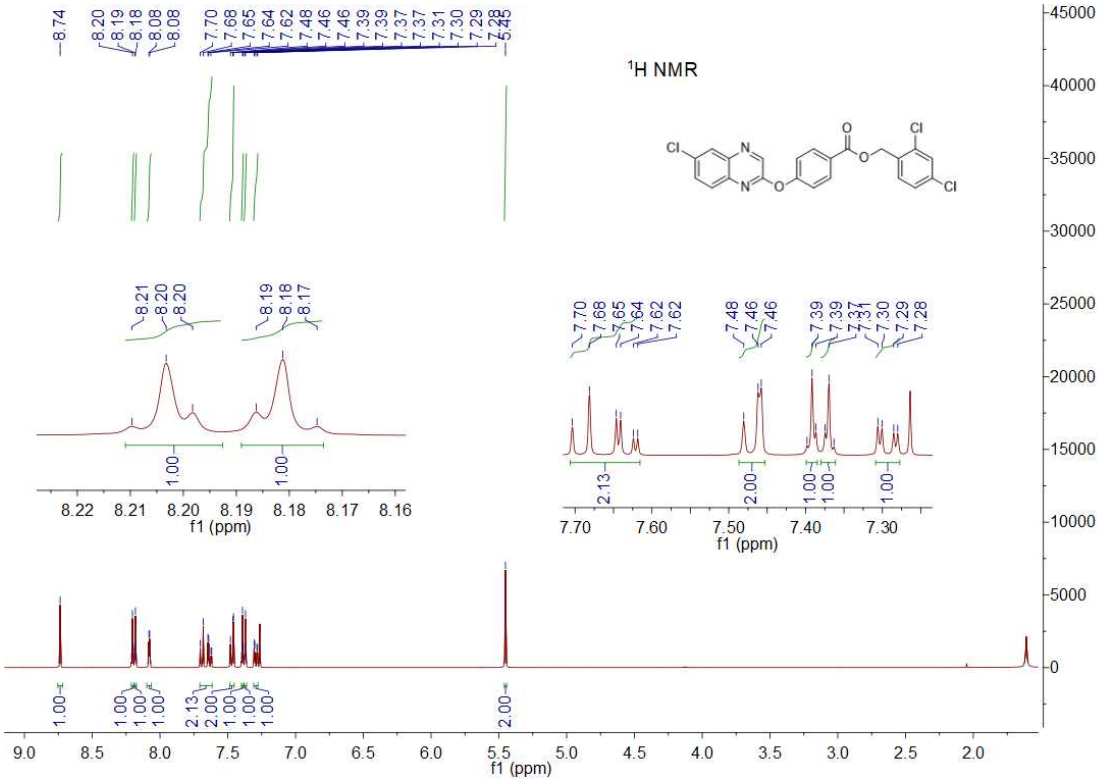
^{1}H NMR spectrum of compound **5j**



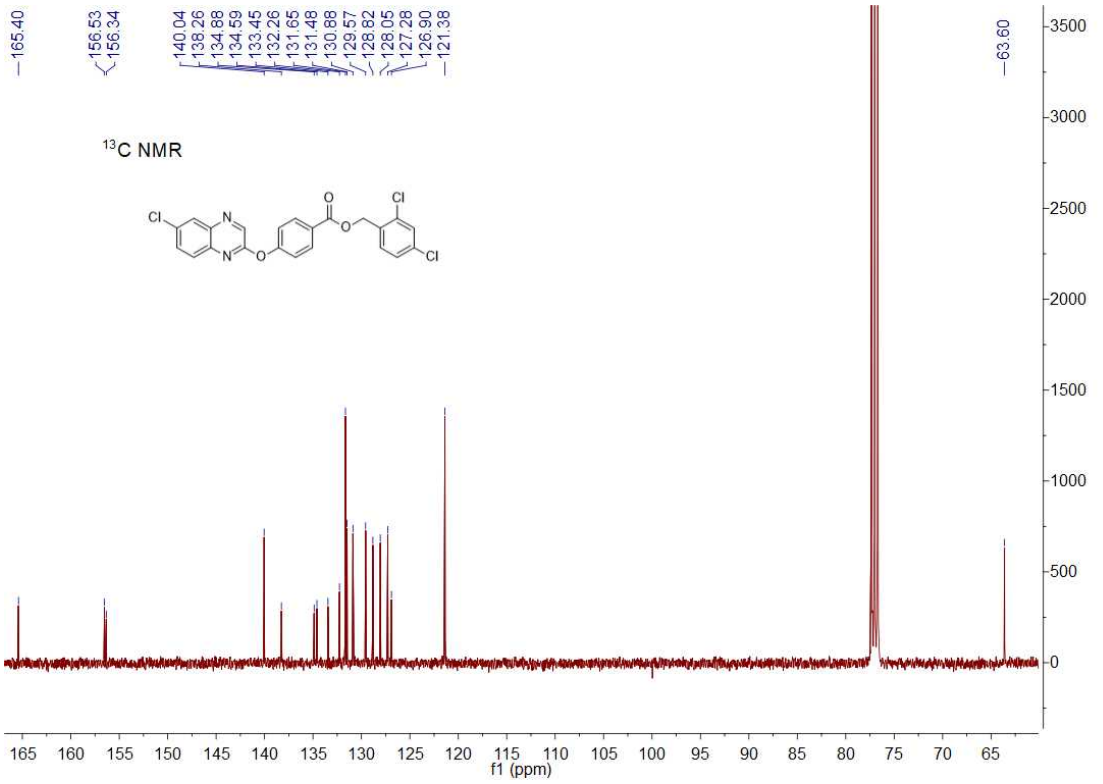
^{13}C NMR spectrum of compound **5j**



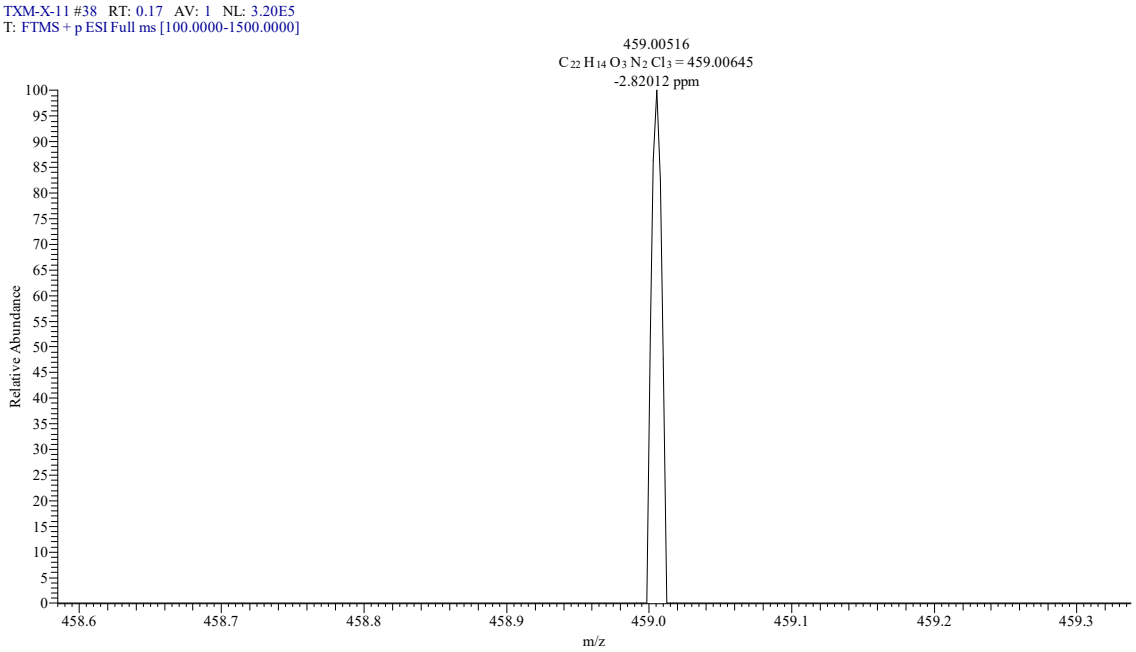
HRMS (ESI) spectrum of compound **5j**



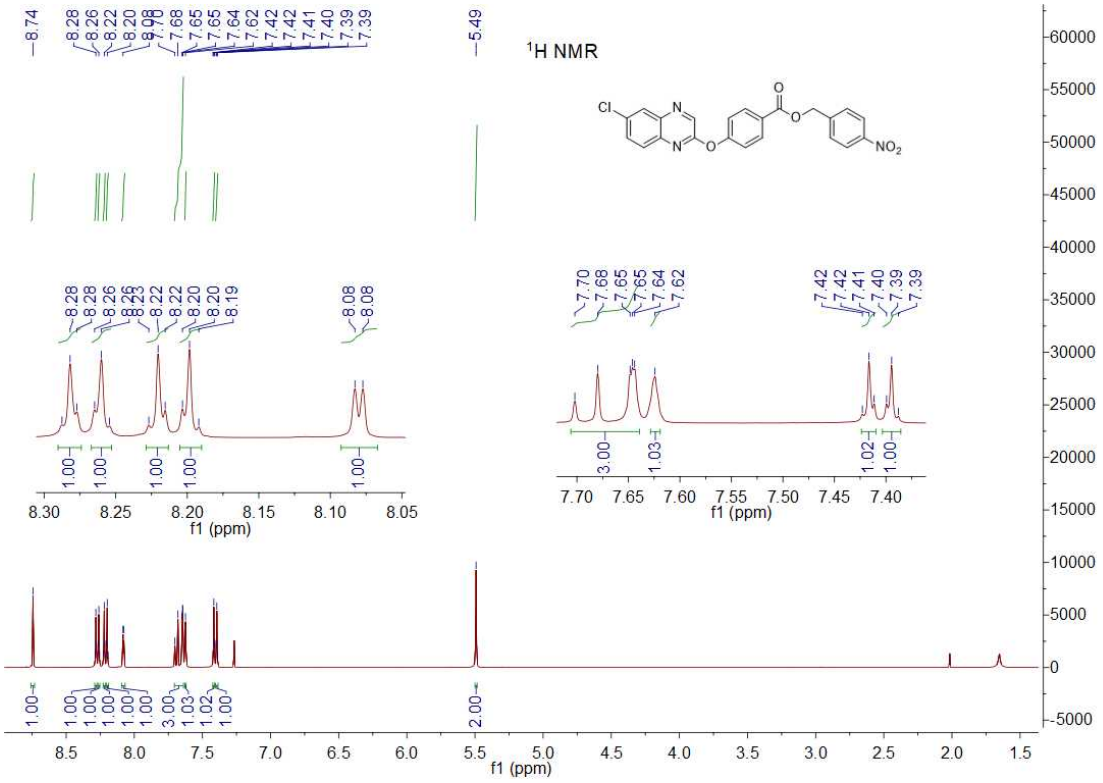
^{1}H NMR spectrum of compound **5k**



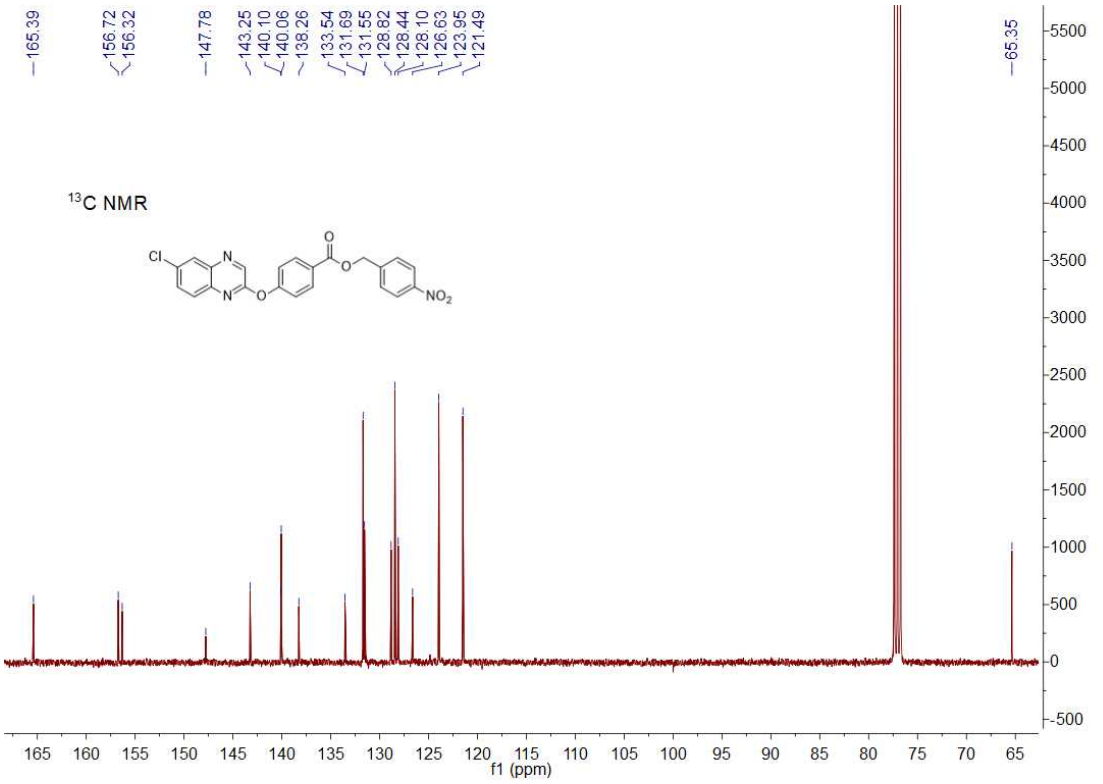
^{13}C NMR spectrum of compound **5k**



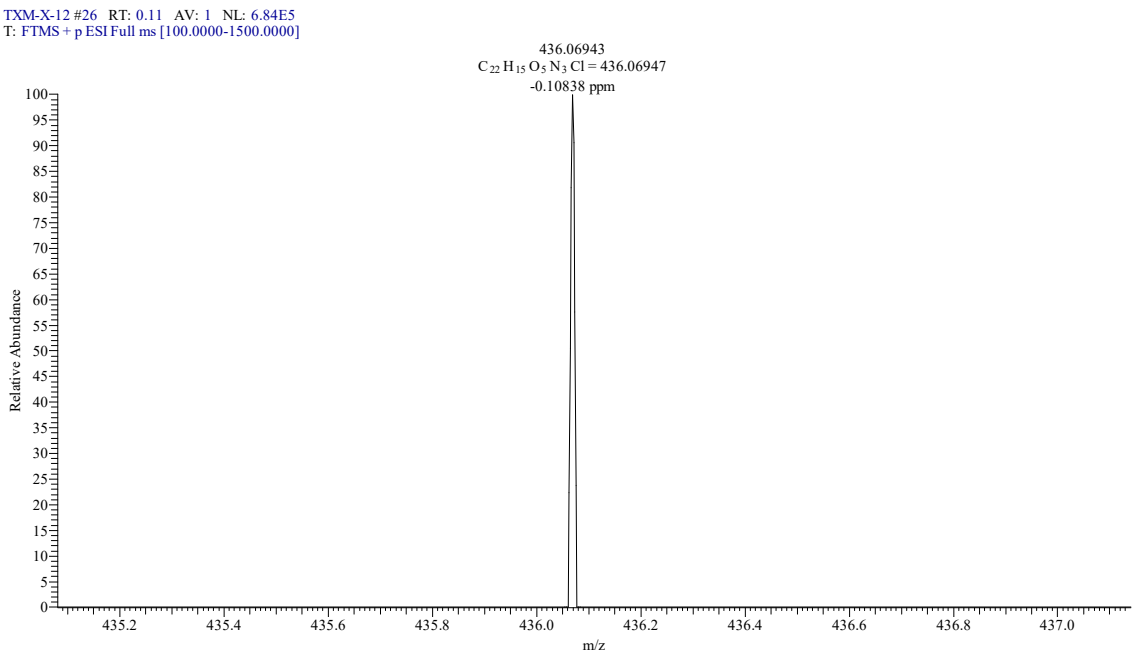
HRMS (ESI) spectrum of compound **5k**



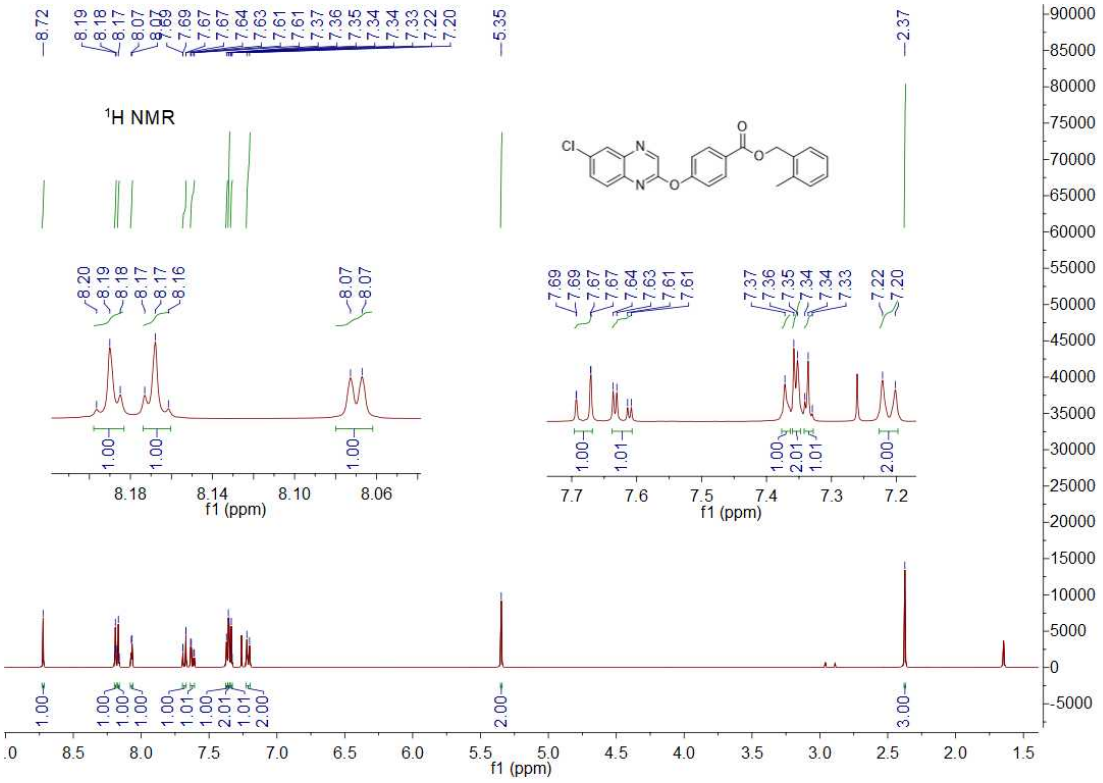
^{1}H NMR spectrum of compound **5l**



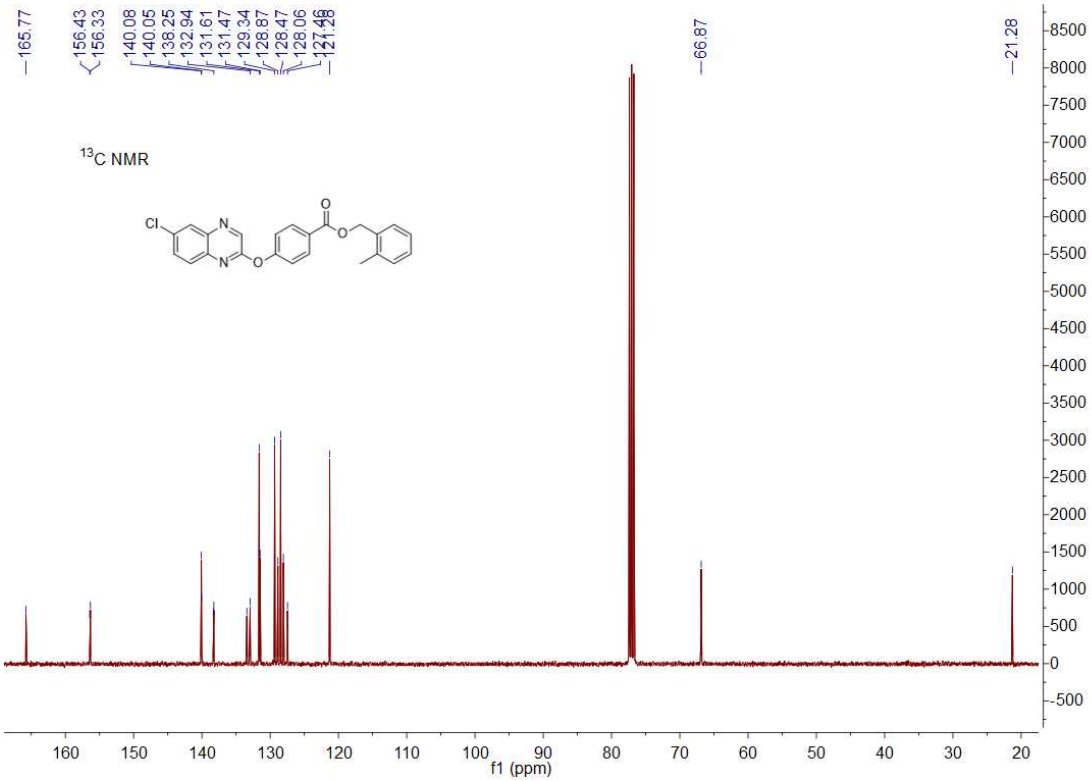
^{13}C NMR spectrum of compound **5l**



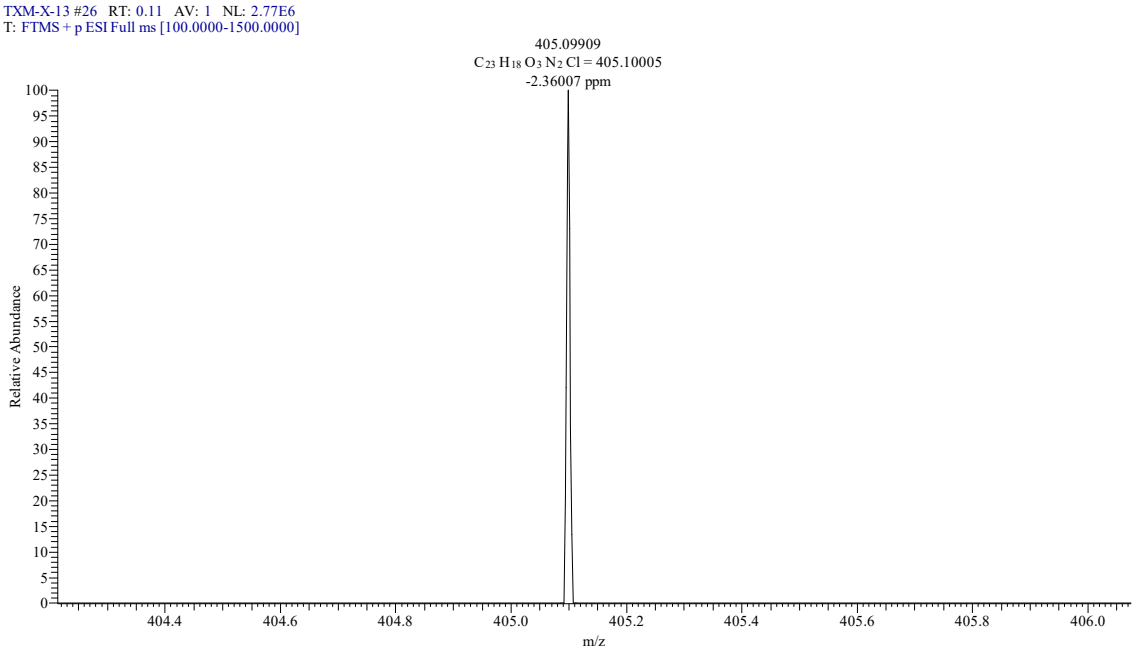
HRMS (ESI) spectrum of compound **5l**



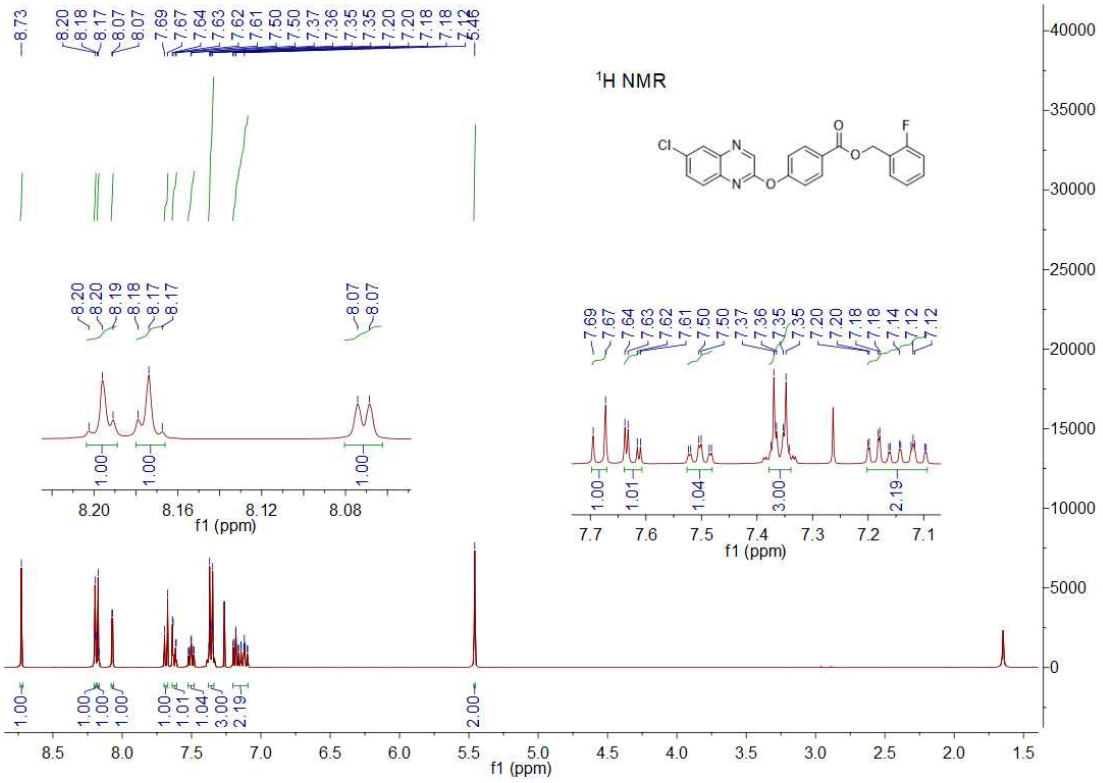
^{1}H NMR spectrum of compound **5m**



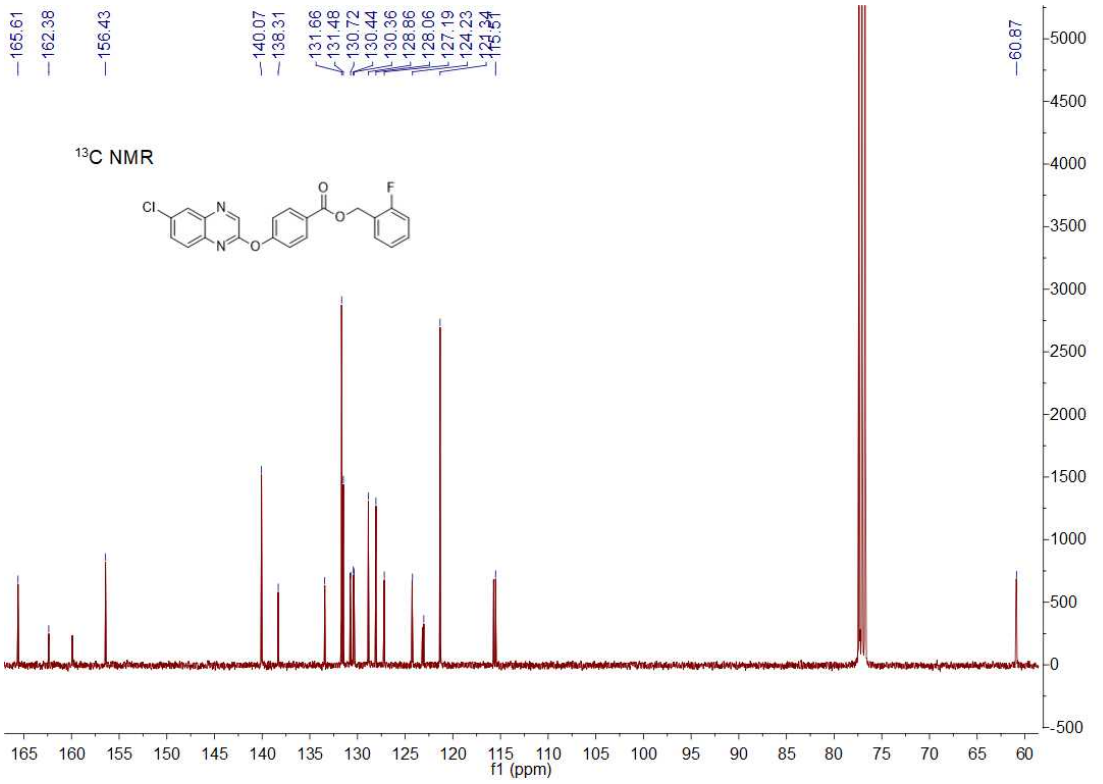
^{13}C NMR spectrum of compound **5m**



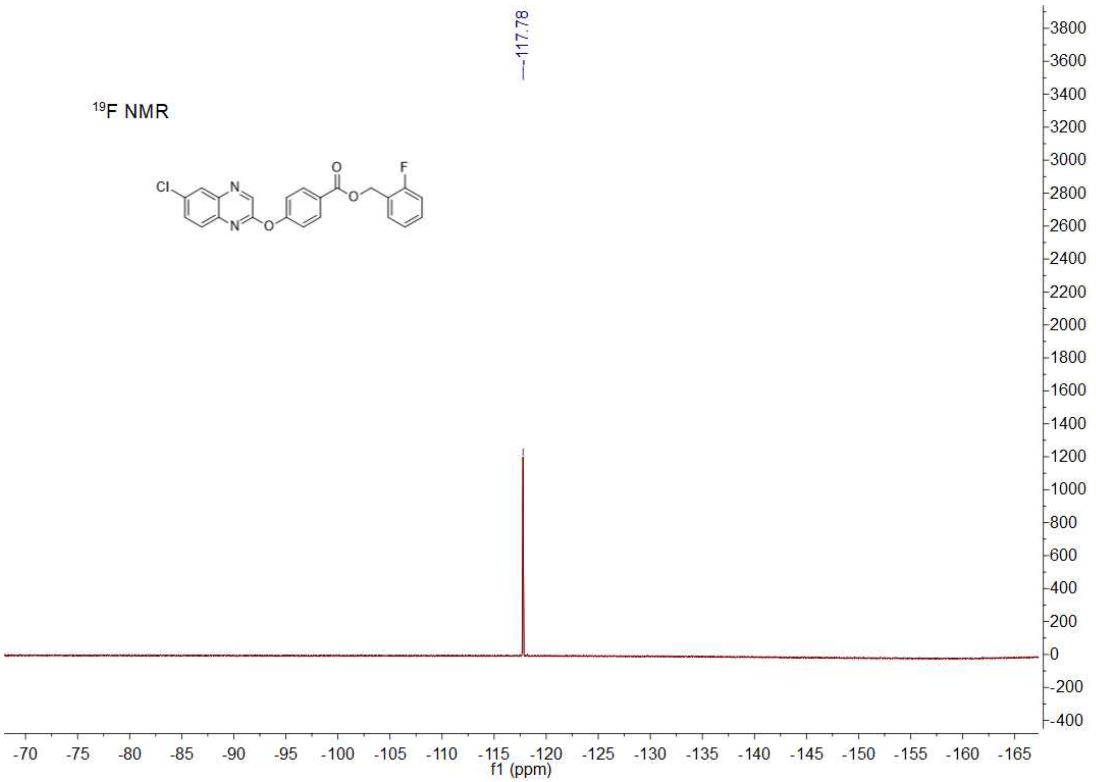
HRMS (ESI) spectrum of compound **5m**



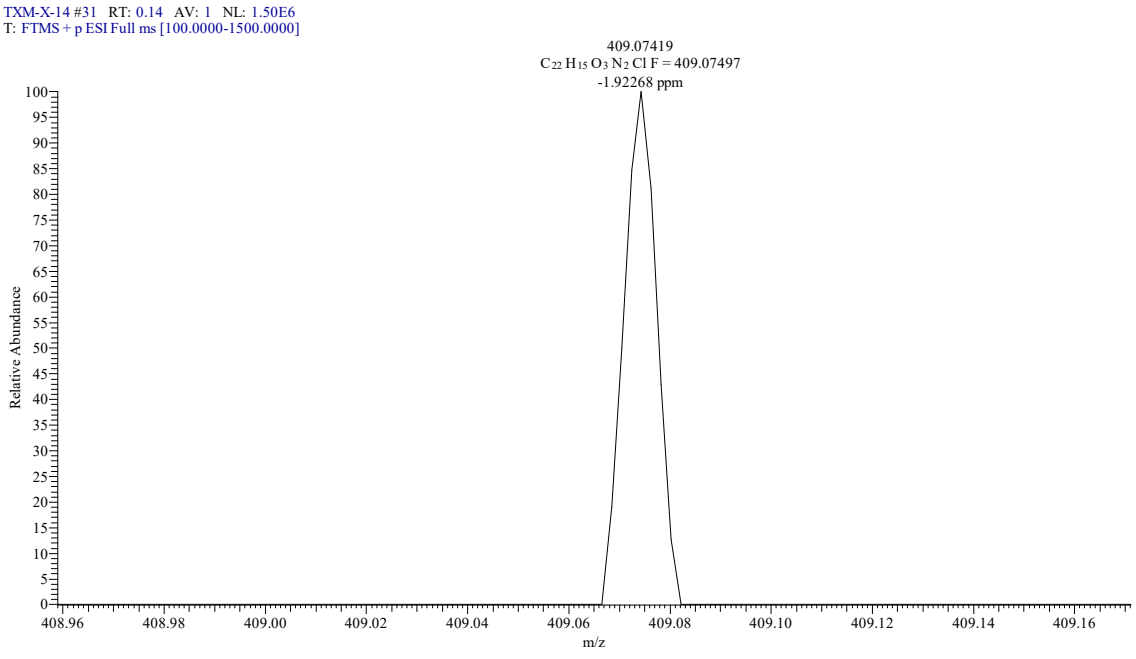
^{1}H NMR spectrum of compound **5n**



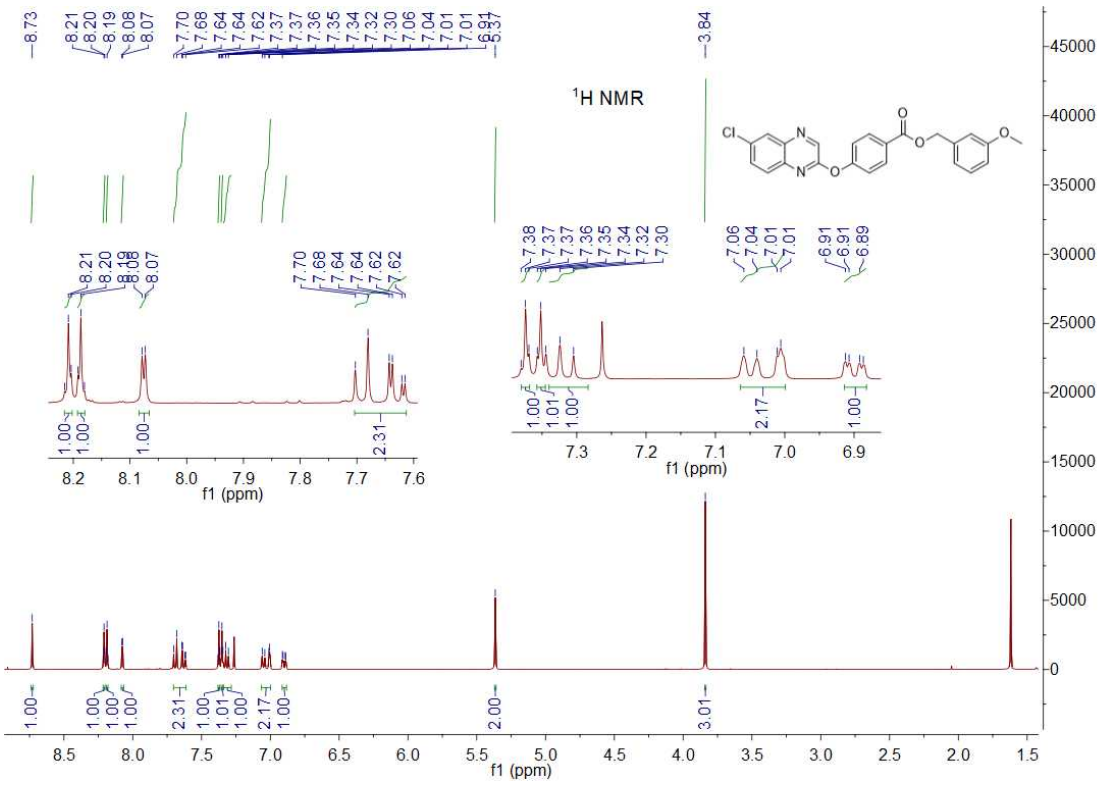
^{13}C NMR spectrum of compound **5n**



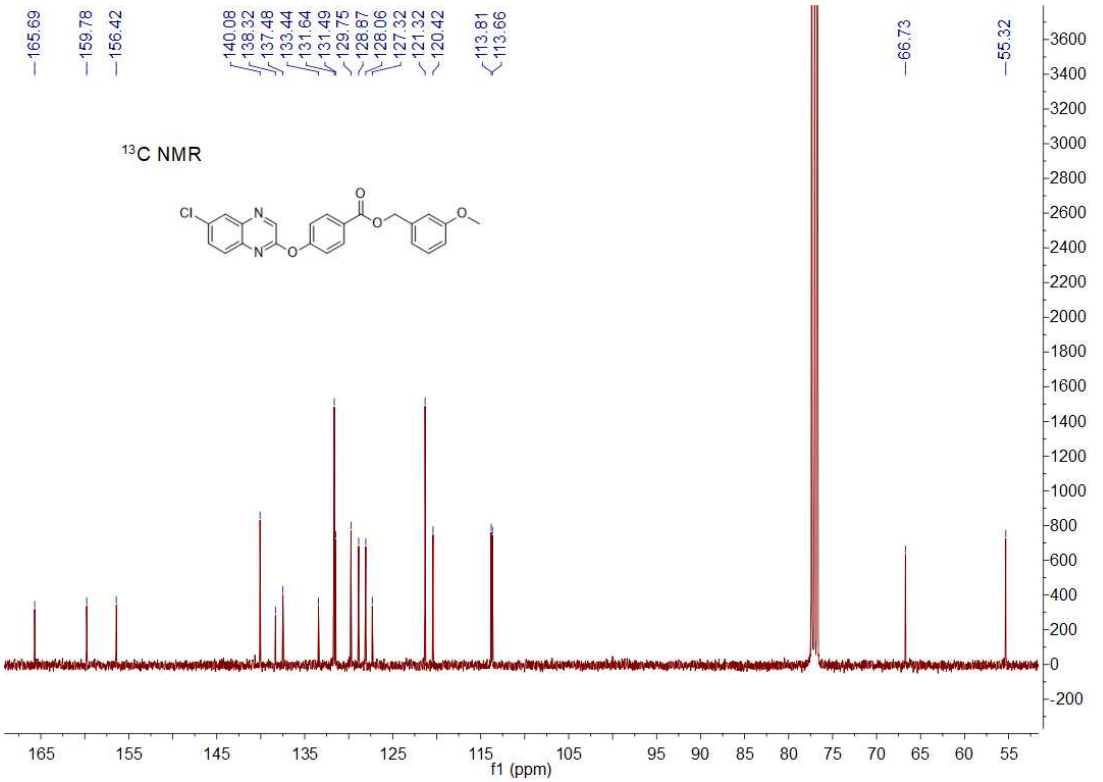
^{19}F NMR spectrum of compound **5n**



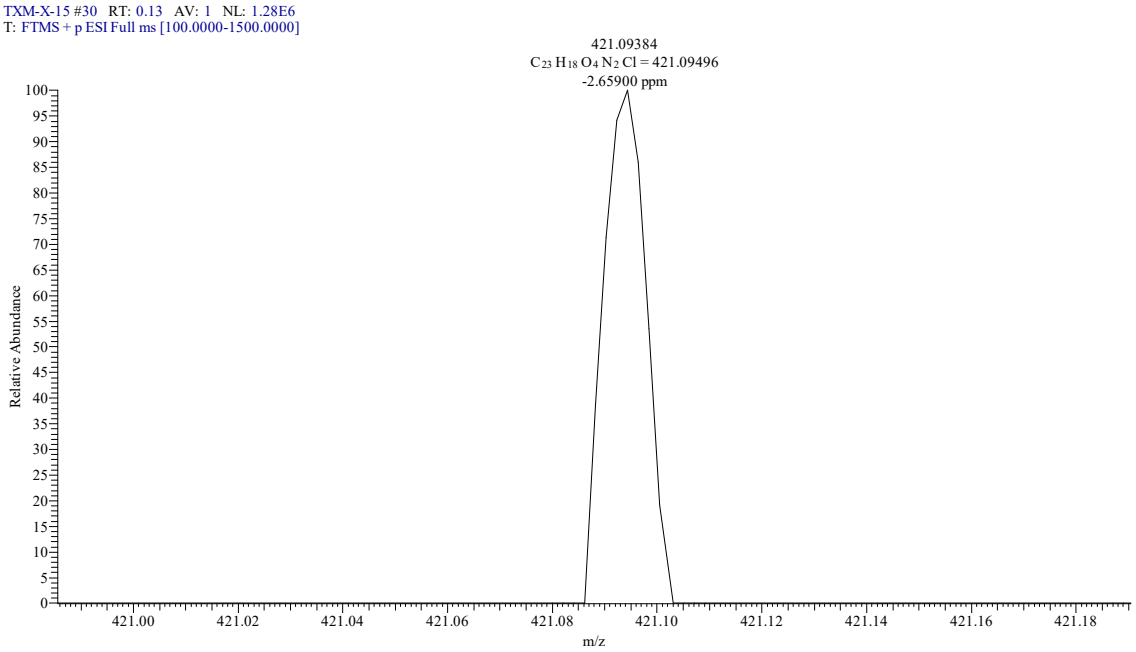
HRMS (ESI) spectrum of compound **5n**



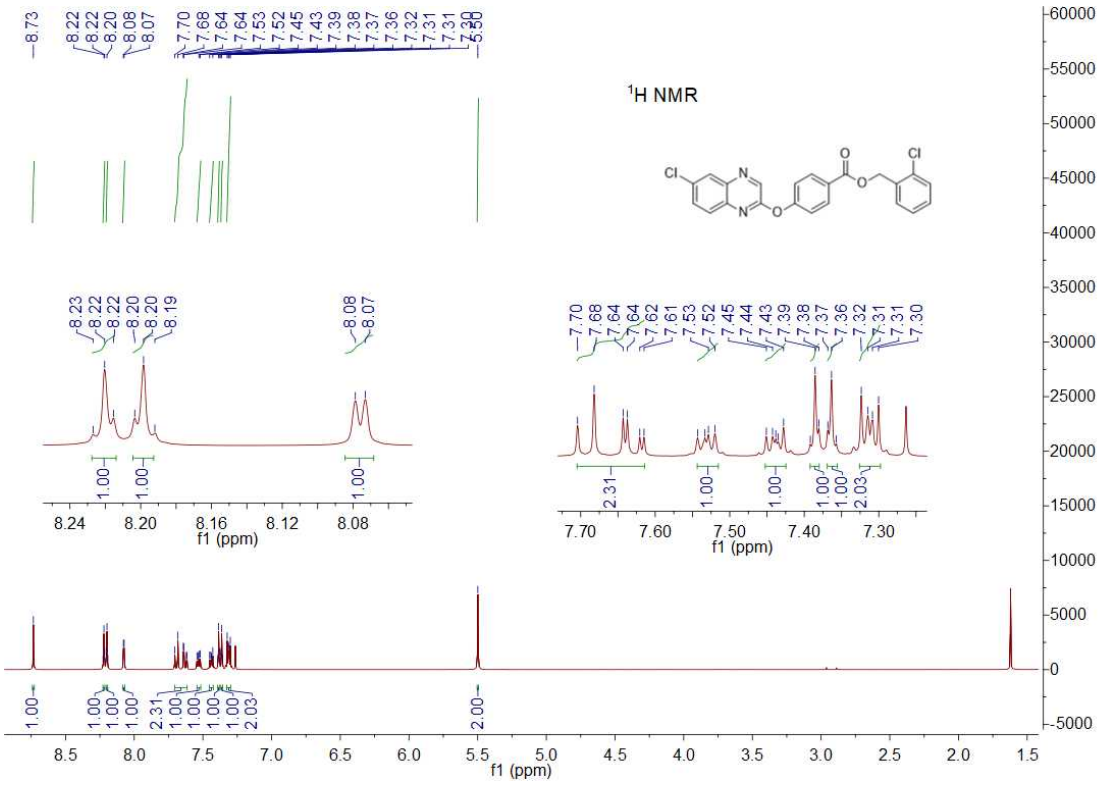
^{1}H NMR spectrum of compound **5o**



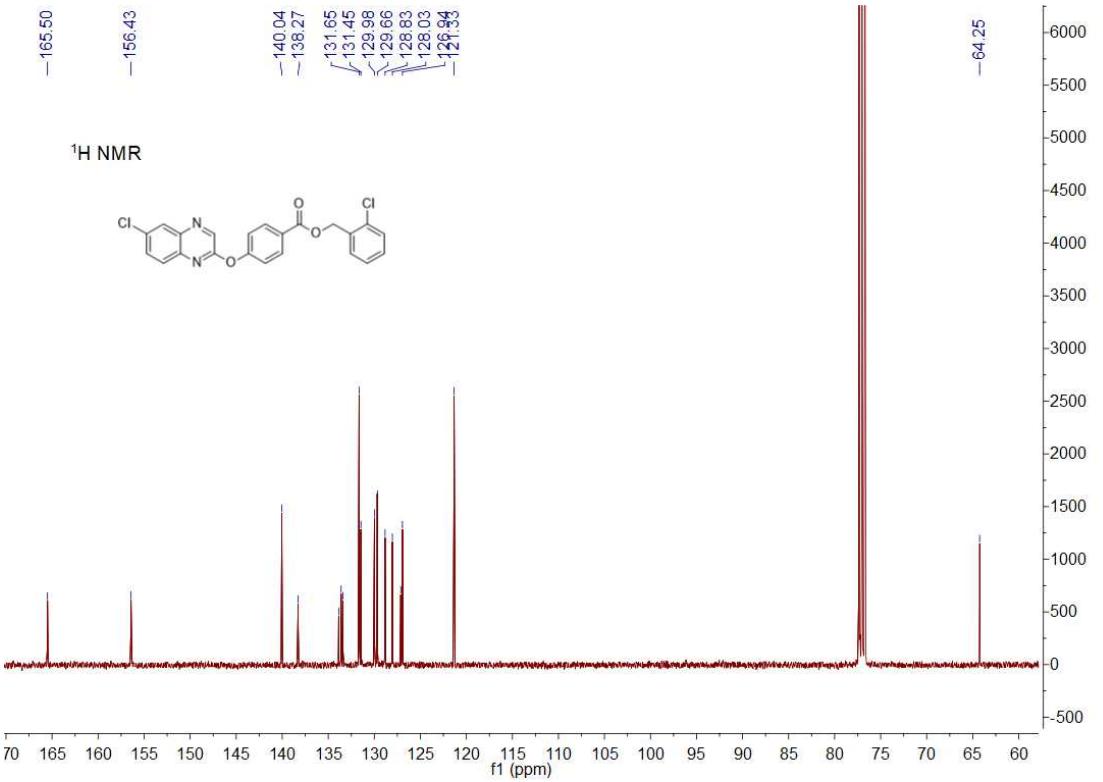
^{13}C NMR spectrum of compound **5o**



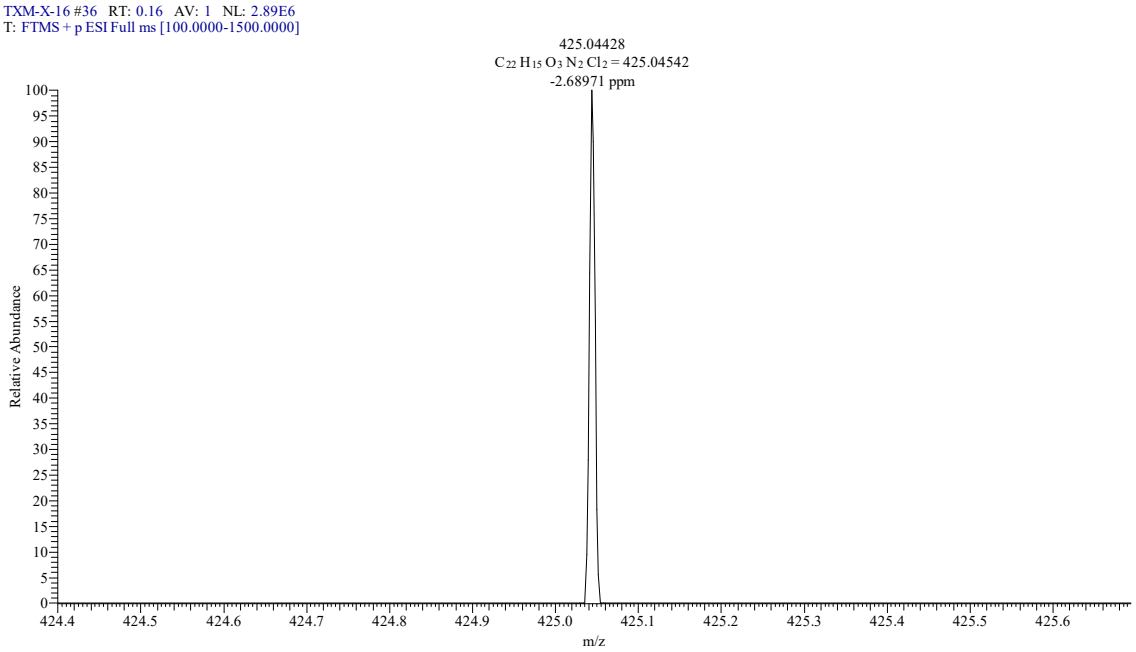
HRMS (ESI) spectrum of compound **5o**



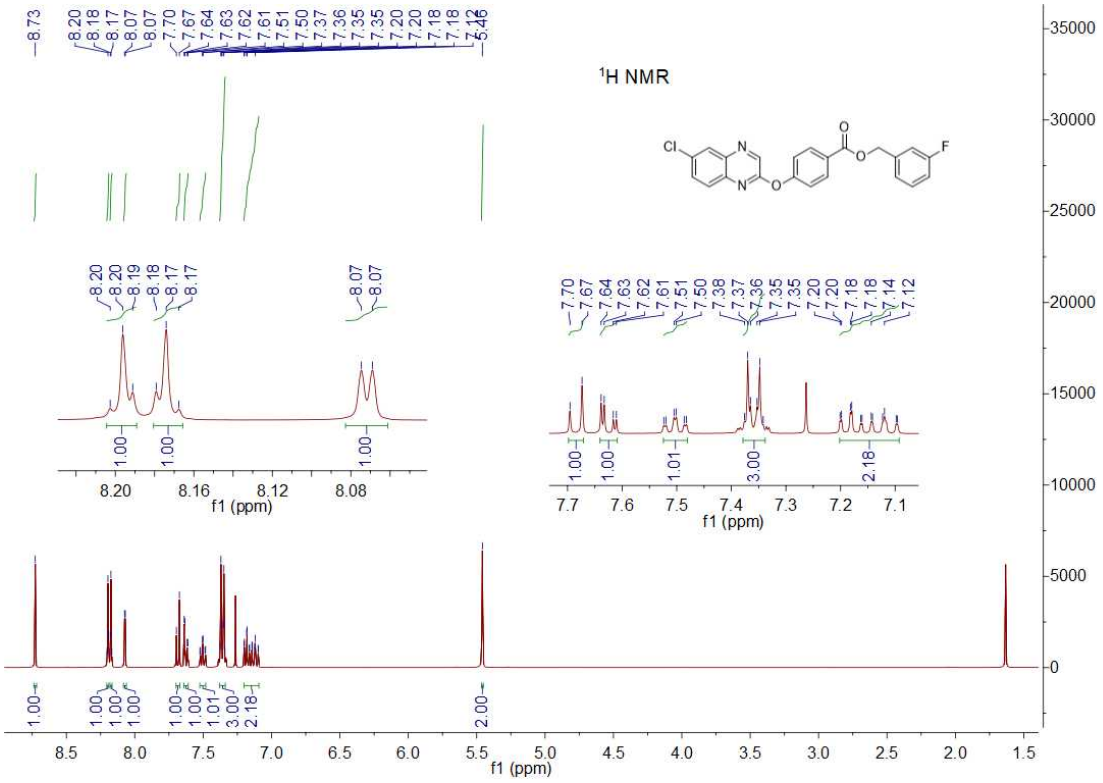
^{1}H NMR spectrum of compound **5p**



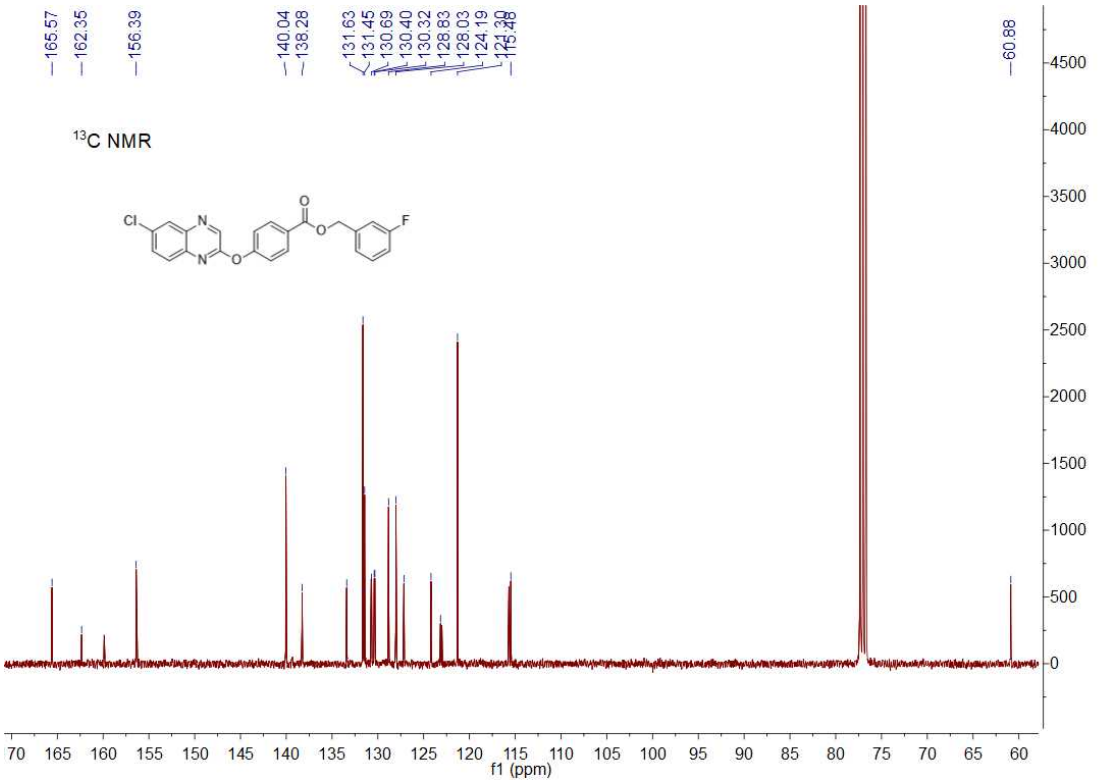
^{13}C NMR spectrum of compound **5p**



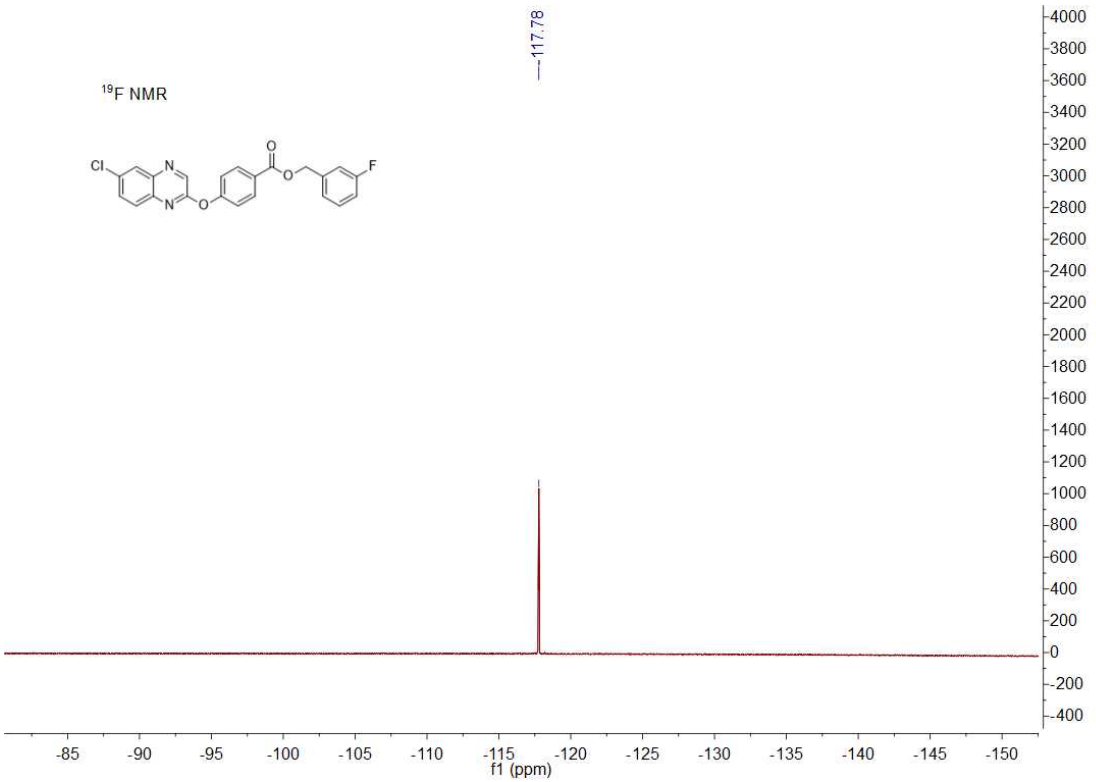
HRMS (ESI) spectrum of compound **5p**



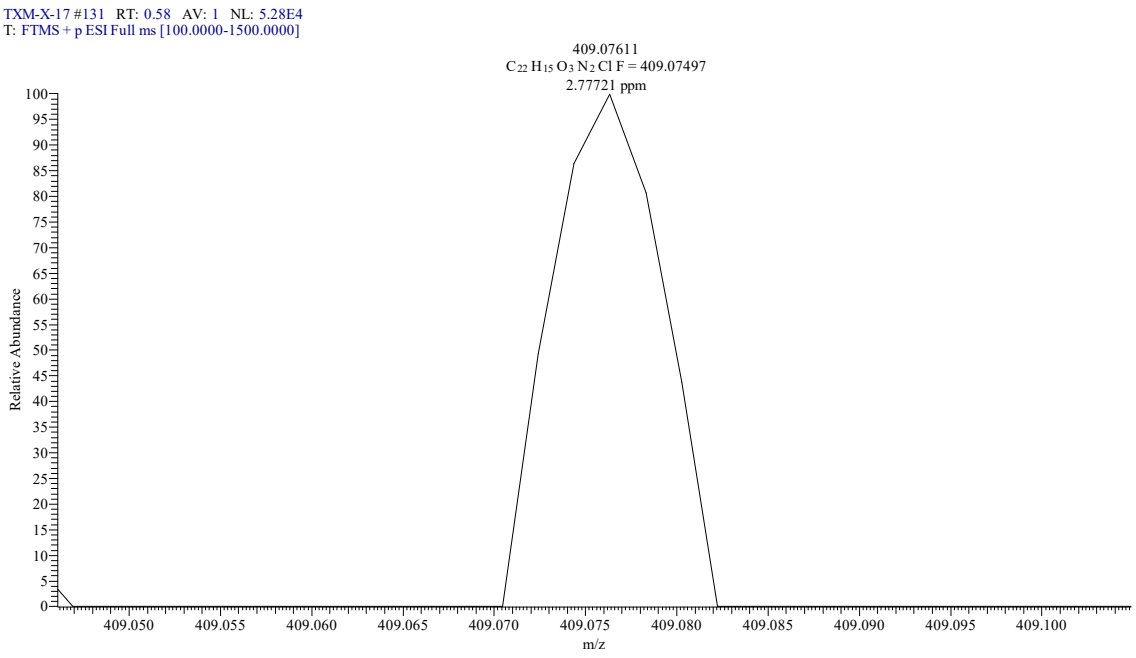
^{1}H NMR spectrum of compound **5q**



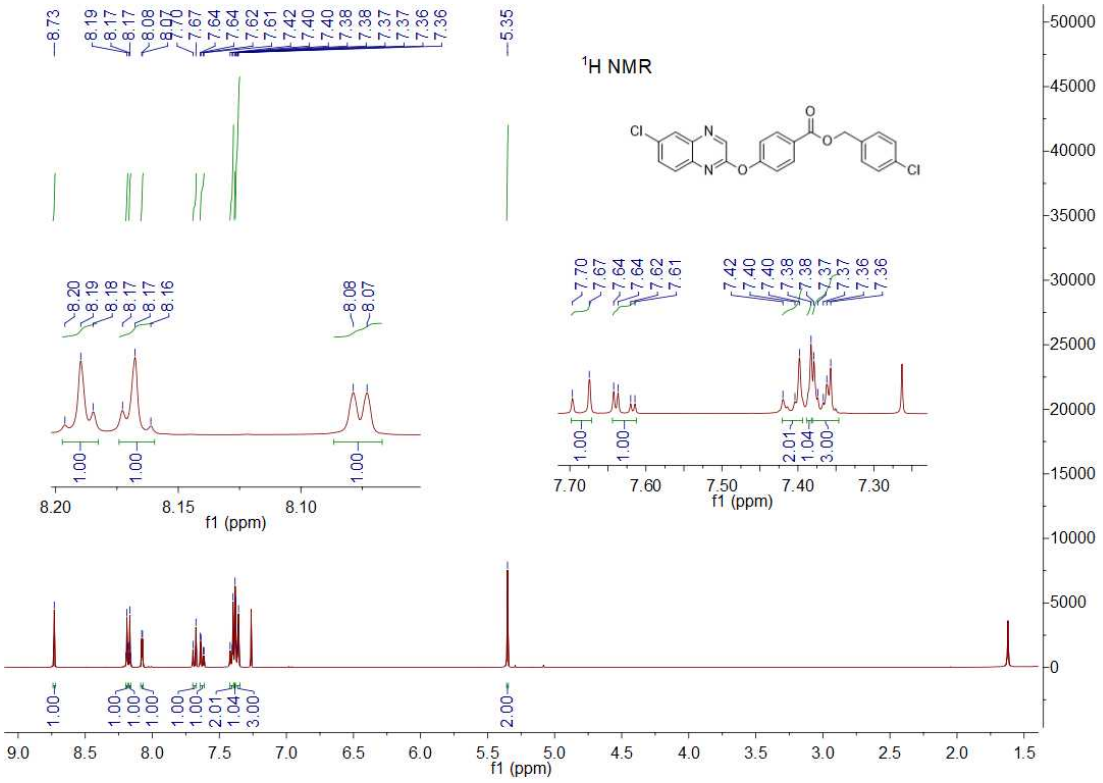
^{13}C NMR spectrum of compound **5q**



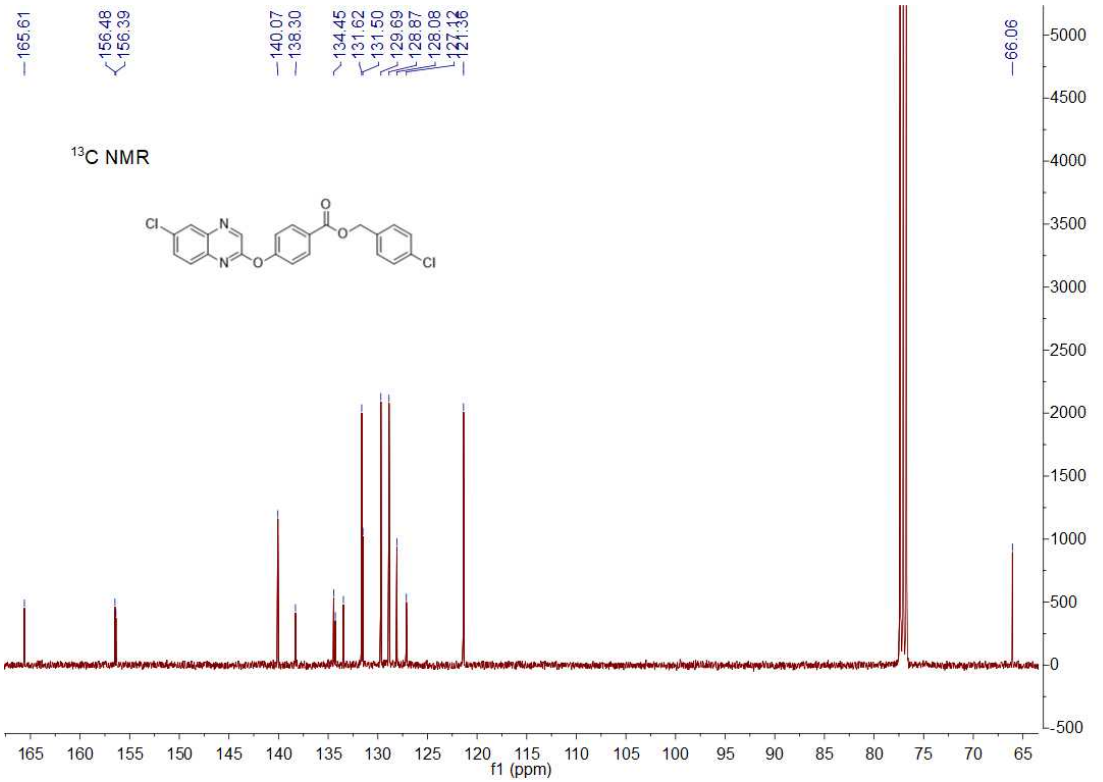
^{19}F NMR spectrum of compound **5q**



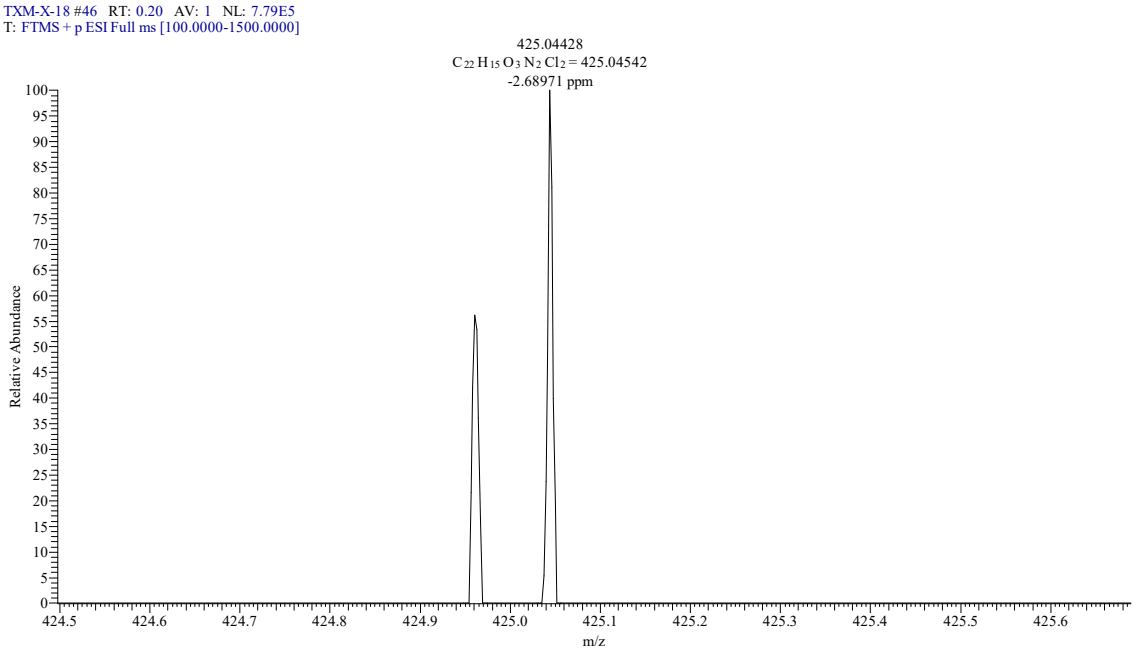
HRMS (ESI) spectrum of compound **5q**



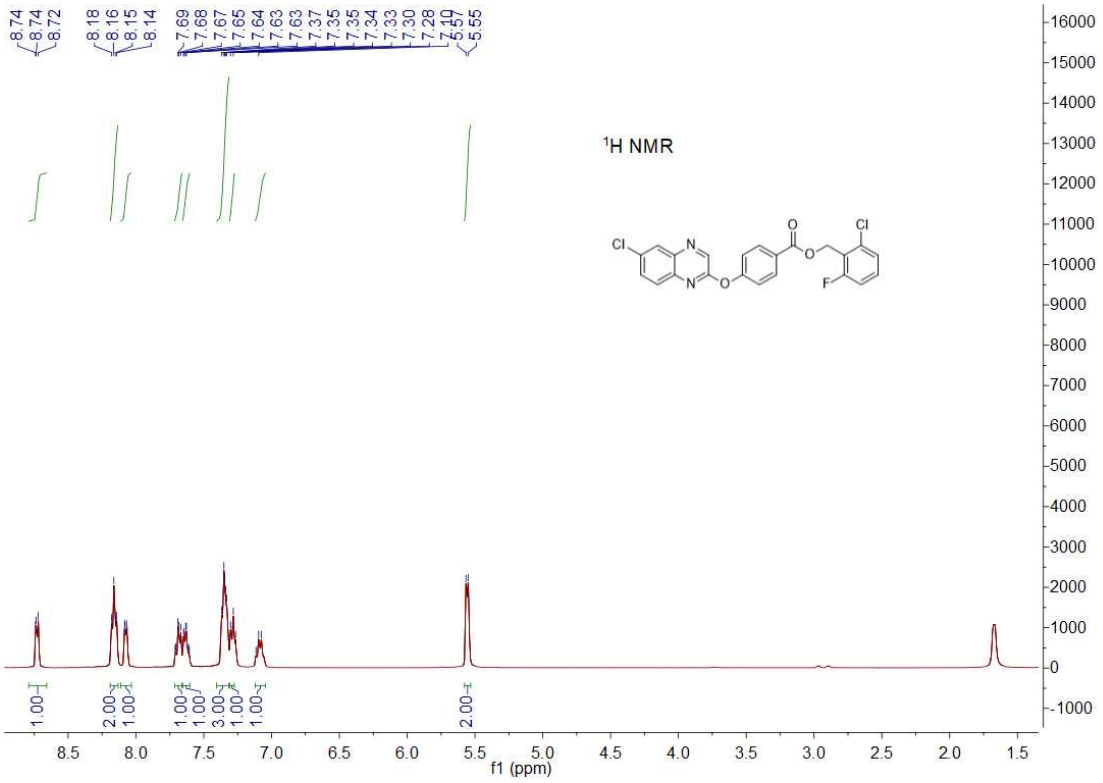
^{1}H NMR spectrum of compound **5r**



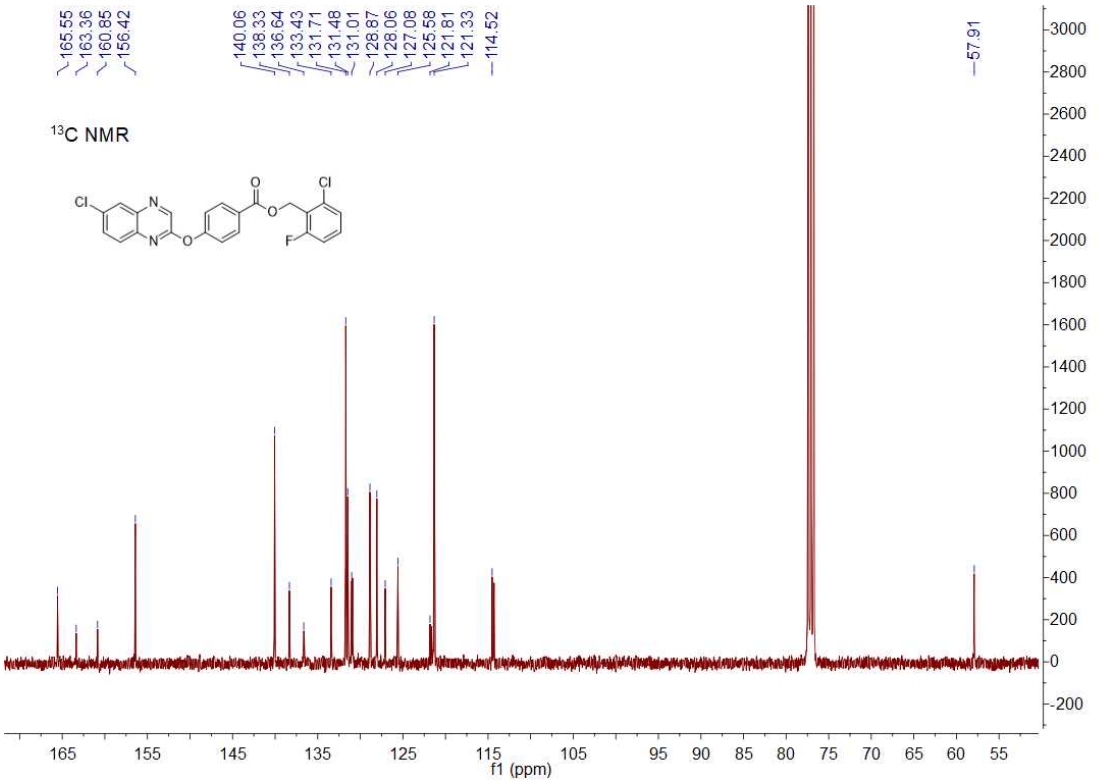
^{13}C NMR spectrum of compound **5r**



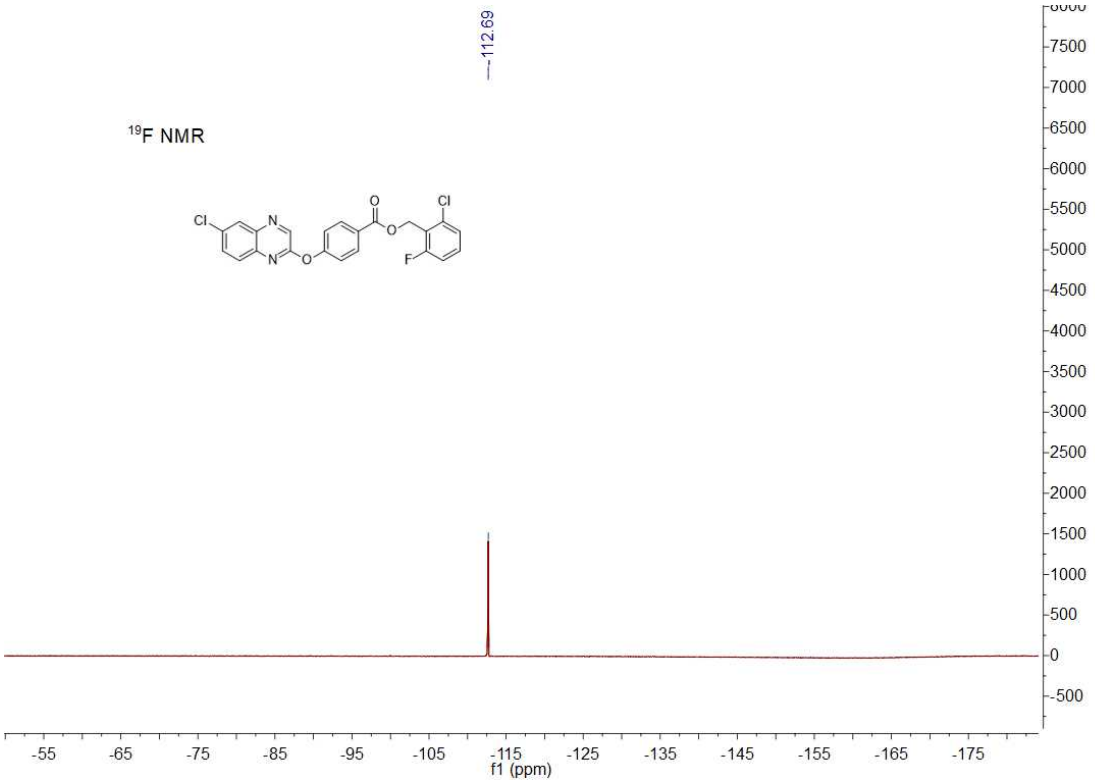
HRMS (ESI) spectrum of compound **5r**



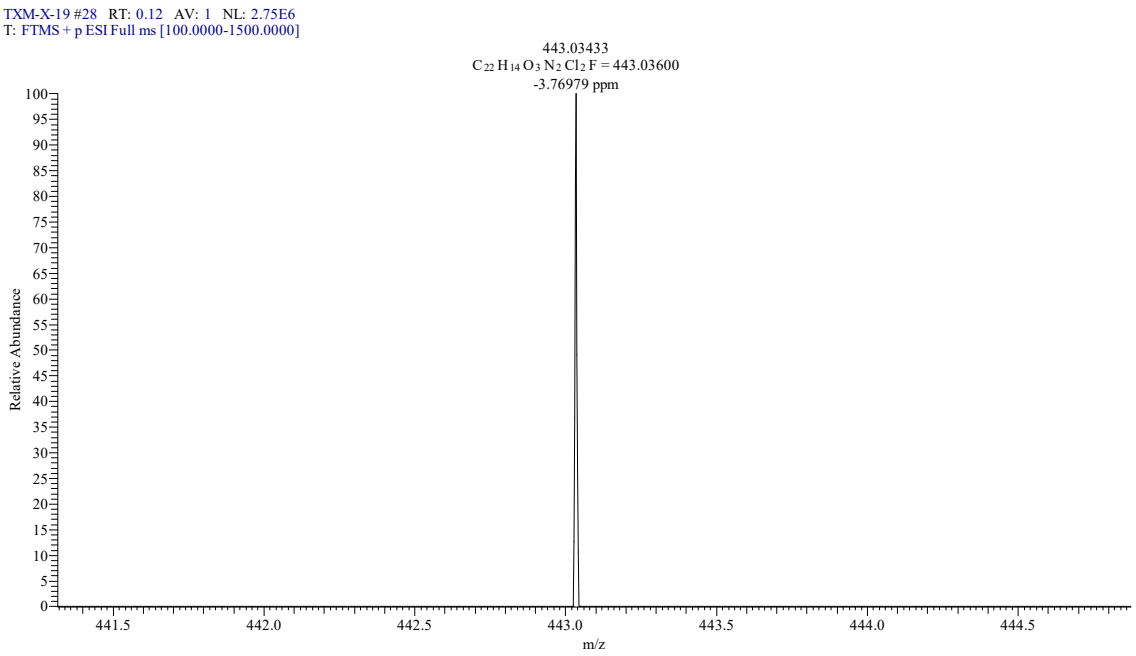
^{1}H NMR spectrum of compound **5s**



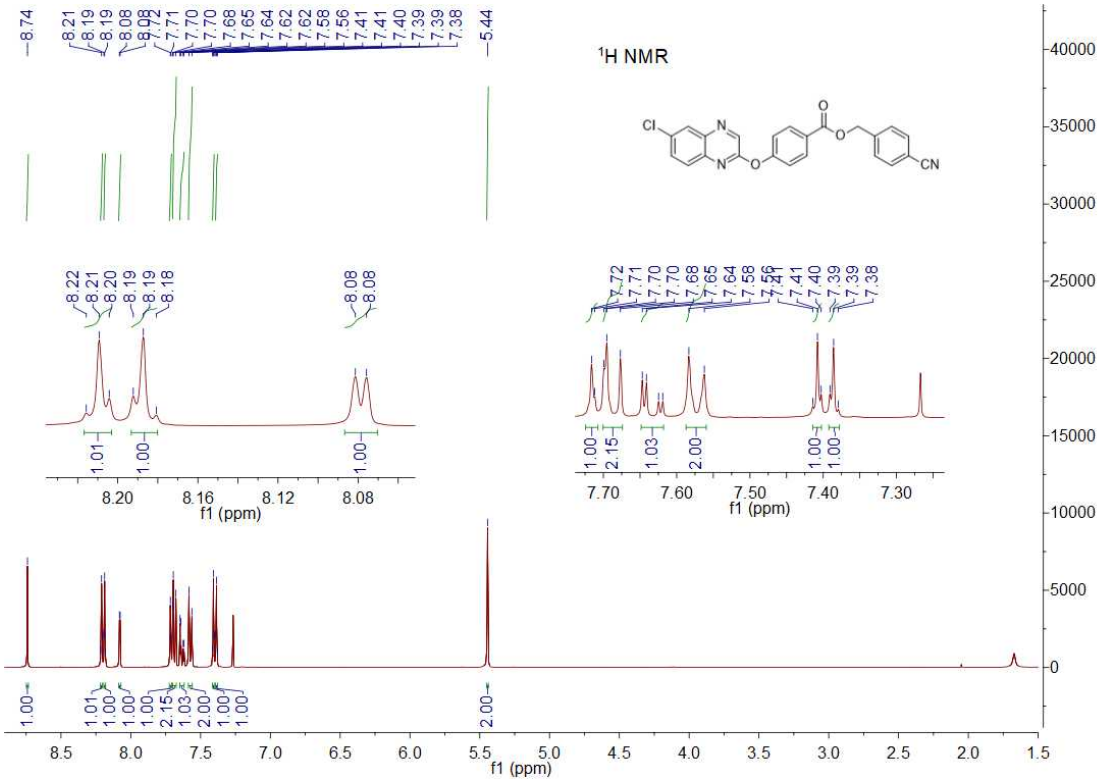
^{13}C NMR spectrum of compound **5s**



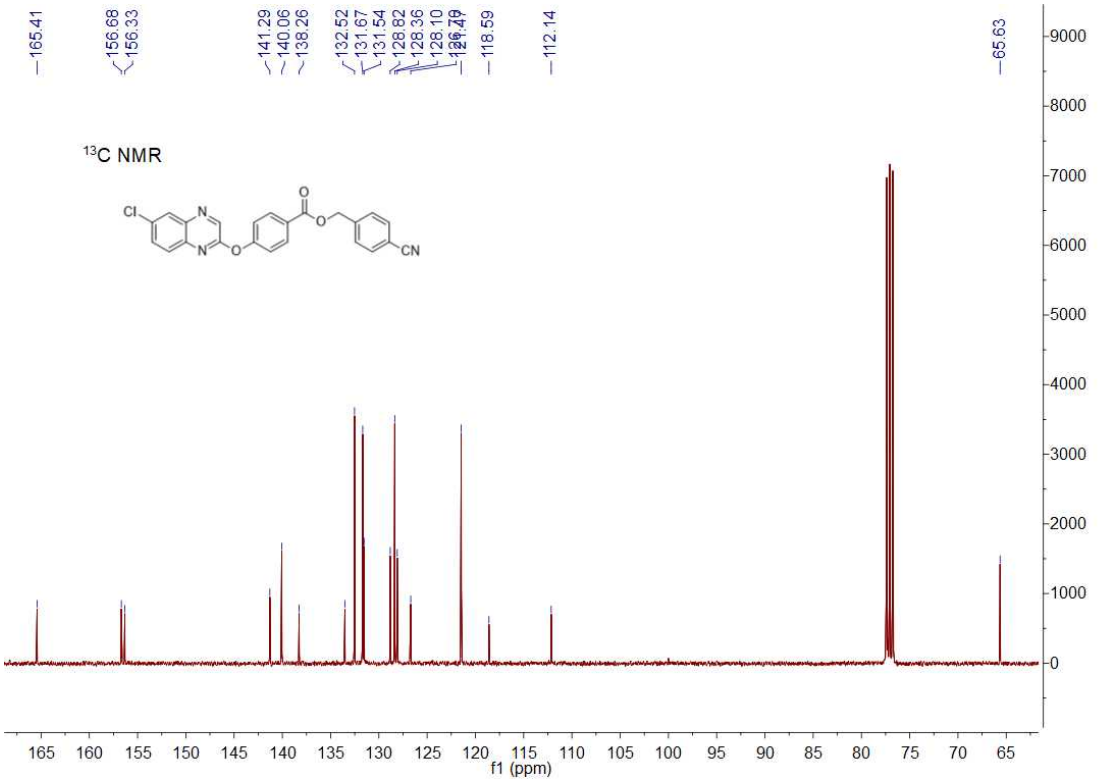
^{19}F NMR spectrum of compound **5s**



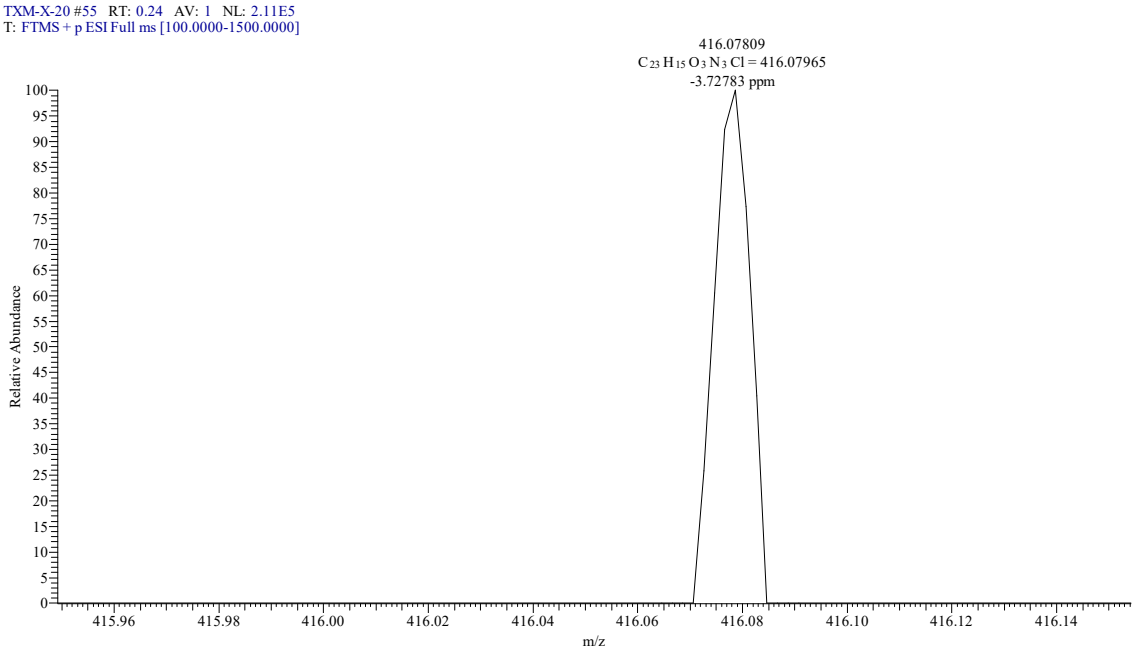
HRMS (ESI) spectrum of compound **5s**



^{1}H NMR spectrum of compound **5t**



^{13}C NMR spectrum of compound **5t**



HRMS (ESI) spectrum of compound **5t**

5.Table S1 and Table S2

Table S1. *In vitro* antibacterial activity of the target compounds against five kinds of bacteria [a]

	Ac		*Pcb*		*Xoo*		*Rs*		*Xcm*	
	200 μg/mL	100 μg/mL	200 μg/mL	100 μg/mL	200 μg/mL	100 μg/mL	200 μg/mL	100 μg/mL	200 μg/mL	100 μg/mL
5a	44.23±4.88	17.63±3.98	44.17±4.60	12.65±3.39	62.53±1.03	45.08±1.81	68.32±3.87	19.43±1.80	65.84±1.41	61.01±0.17
5b	22.27±1.11	13.06±3.21	32.02±4.19	23.47±1.19	33.63±3.91	19.54±1.41	71.33±1.97	54.59±3.87	51.96±0.18	19.25±0.90
5c	50.52±4.73	47.07±3.34	64.77±2.58	37.88±2.28	59.22±0.85	23.52±2.11	70.45±4.18	35.78±3.33	69.09±1.81	27.62±5.78
5d	37.41±2.07	29.97±2.84	30.47±1.33	18.10±3.68	42.17±3.14	30.05±4.01	61.64±1.49	22.24±1.85	55.59±0.07	16.96±0.78
5e	52.28±4.32	33.05±2.91	62.32±2.46	32.38±4.25	66.81±0.25	39.47±1.85	66.57±3.77	44.09±2.60	60.28±2.09	10.66±0.78
5f	37.03±2.17	34.05±2.45	28.36±4.41	25.87±2.00	53.79±2.61	30.11±2.43	46.78±3.98	18.64±1.52	30.77±3.31	15.77±2.01
5g	50.38±3.06	32.56±3.04	53.81±2.02	27.62±2.42	65.49±1.89	43.22±3.73	52.73±2.55	30.64±4.79	63.29±0.82	27.96±4.30
5h	26.36±0.51	15.90±2.41	57.82±4.81	20.87±3.35	55.09±0.12	24.28±3.05	61.57±1.37	14.68±3.65	33.85±2.25	8.96±4.50
5i	38.36±1.98	16.04±3.27	38.49±4.08	25.83±0.88	61.35±2.57	35.66±4.56	48.15±1.64	22.42±0.84	52.45±0.73	24.44±5.41
5j	29.65±2.22	17.05±3.33	32.42±2.58	23.11±1.38	32.83±0.84	17.72±2.81	29.02±2.67	13.58±2.44	40.98±3.18	13.89±1.08
5k	86.28±1.78	61.05±4.37	68.76±2.18	37.47±3.37	34.57±3.67	15.26±2.61	51.07±2.91	12.62±0.35	39.05±1.58	5.33±4.26
5l	11.71±2.84	6.29±3.06	54.22±4.64	34.17±2.91	67.25±1.49	36.12±0.78	68.67±0.72	25.19±1.12	44.37±4.58	10.51±1.94
5m	32.63±0.63	27.91±1.91	38.29±1.94	29.09±0.37	52.11±4.01	28.89±2.85	65.35±3.15	43.03±0.57	34.06±1.13	39.02±4.47
5n	20.57±1.62	15.23±3.52	34.90±1.72	27.71±2.45	67.28±4.47	31.98±4.81	43.46±2.59	17.67±4.04	45.56±2.79	21.55±4.22
5o	14.34±2.71	6.39±4.07	72.64±3.79	38.97±3.95	72.84±0.52	39.02±3.02	54.13±1.91	38.15±2.29	57.48±4.69	18.88±2.28
5p	39.34±2.24	7.42±1.68	45.91±2.22	29.41±1.25	76.15±0.64	44.80±3.55	41.55±3.63	25.05±1.33	75.17±4.87	42.62±4.01
5q	39.97±3.94	14.99±0.74	43.21±4.88	22.05±3.92	25.82±2.66	11.06±2.98	64.06±1.59	26.59±3.79	74.23±2.91	35.03±4.81
5r	65.70±6.23	39.87±3.46	40.39±2.46	31.61±4.73	34.01±1.27	15.88±3.95	38.89±2.62	13.05±3.17	45.45±1.68	9.81±1.52
5s	31.29±4.02	16.95±3.24	28.05±4.87	22.42±4.01	35.52±4.12	19.73±2.03	51.41±0.06	22.02±3.92	30.21±0.82	29.69±1.25
5t	31.12±2.42	5.24±4.25	23.78±2.94	16.46±2.31	33.46±0.11	15.93±4.68	21.19±1.33	18.73±0.67	34.99±1.33	19.62±4.17
TC	57.67±0.58	25.11±2.01	51.09±0.33	25.32±0.85	60.11±1.35	26.5±4.42	66.01±0.17	56.31±2.49	67.82±1.55	52.12±4.13
BT	41.07±2.73	19.58±1.94	49.61±1.61	30.22±1.52	52.13±0.19	19.46±3.50	42.33±2.04	22.01±0.17	46.82±0.17	21.57±0.25

[a] The average of three trials, [b] Commercial bactericides Bismerthiazol (BT) and Thiodiazole-copper (TC) were used as positive control agents.

Table S2. *In vitro* antifungal activities of the target compounds against twelve species of fungi at 100 μg/mL [a]

Chemicals	*AB*	*FF*	*FO*	*CT*	*PC*	*CG*
5a	11.79±2.69	22.12±2.42	11.76±2.83	7.69±2.74	15.64±4.76	36.64±1.25
5b	20.91±4.42	23.45±5.01	19.75±1.69	2.14±3.35	18.18±0.69	28.88±1.25
5c	19.39±1.74	17.26±3.45	13.45±3.06	11.54±3.52	31.27±3.23	33.62±4.01
5d	28.14±3.61	1.77±1.48	6.72±3.06	21.79±4.23	26.55±3.21	4.31±3.37
5e	20.15±2.59	10.18±4.04	14.29±2.00	45.30±1.47	32.12±4.56	40.52±4.35
5f	27.00±4.67	20.80±5.82	17.23±2.66	56.84±2.23	20.36±3.23	36.21±1.18
5g	41.06±2.99	21.24±4.10	11.34±2.62	21.37±1.86	35.64±3.68	42.24±1.87
5h	38.02±2.01	22.57±5.01	10.50±3.68	–	31.27±3.68	1.72±1.18
5i	28.52±3.59	16.81±3.53	13.03±4.64	4.70±3.35	20.36±2.06	37.07±1.87
5j	28.14±2.82	15.04±2.10	13.45±1.83	20.09±0.89	33.45±1.12	34.91±0.93
5k	30.42±3.83	89.38±1.46	57.14±0.01	13.68±2.69	34.91±0.48	14.66±1.45
5l	28.90±0.84	21.68±1.28	18.49±2.71	21.79±2.38	36.58±2.38	–
5m	18.25±2.01	35.84±30.21	20.59±1.23	5.98±1.12	31.27±2.06	35.34±2.90
5n	33.46±3.01	32.30±1.28	23.53±1.16	29.49±3.73	22.55±2.06	34.48±1.18
5o	27.38±1.99	21.68±6.25	11.34±2.20	3.85±0.55	34.55±2.78	32.76±2.90
5p	35.36±0.44	26.99±6.42	20.59±1.23	32.48±3.42	34.91±2.90	–
5q	45.63±3.53	37.61±2.46	40.34±2.31	14.53±1.34	33.82±2.69	38.36±1.72
5r	2.70±2.90	33.63±0.01	18.07±2.35	42.74±4.91	19.27±4.66	37.07±2.77
5s	32.70±3.83	26.99±3.23	13.87±2.21	17.09±3.71	22.18±1.61	34.48±1.18
5t	52.09±1.30	26.99±1.28	16.39±2.52	40.60±1.98	36.01±4.60	–
Azoxystrobin	76.43±3.44	51.34±2.03	55.70±0.90	77.19±0.02	60.36±2.30	65.92±3.77

[a] The average of three trials.

Table S2. *In vitro* antifungal activities of the target compounds against twelve species of fungi at 100 μg/mL [a]

Chemicals	*RS*	*FG*	*PS*	*PP*	*BC*	*PL*
5a	14.02±3.52	31.49±1.32	43.7±4.84	22.12±2.42	34.42±1.02	29.84±3.34
5b	41.29±1.97	11.49±3.10	33.61±1.70	23.45±1.01	21.29±2.07	31.05±2.97
5c	25.76±2.11	15.74±1.57	42.44±2.20	17.26±3.45	29.06±2.56	29.03±2.61
5d	40.53±2.01	26.81±3.89	6.72±1.83	1.77±1.48	–	25.11±1.37
5e	30.30±1.67	31.49±1.42	42.02±2.66	10.18±4.04	29.31±1.09	28.63±4.04
5f	28.79±2.52	12.77±3.33	31.51±0.25	20.80±2.82	34.32±0.02	33.47±4.48
5g	19.32±1.42	32.77±3.96	39.50±2.83	21.24±4.10	23.07±1.56	16.53±1.18
5h	35.23±2.50	23.83±3.63	35.71±0.57	22.57±1.01	33.03±4.51	22.98±2.86
5i	34.85±0.07	12.34±3.41	8.40±2.31	16.81±3.53	23.65±1.55	27.42±1.37
5j	89.56±0.39	17.87±2.65	23.53±1.71	15.04±2.10	–	49.60±2.12
5k	32.58±3.33	13.62±0.92	89.92±2.78	89.38±3.05	39.45±0.32	53.63±1.62
5l	28.03±2.79	12.34±1.85	31.93±4.11	21.68±1.28	21.62±1.59	23.79±1.18
5m	31.82±2.16	20.43±2.52	49.58±3.23	35.84±0.21	19.58±0.76	46.37±3.18
5n	31.44±1.54	19.15±3.18	51.26±2.71	32.30±1.28	26.32±4.04	30.24±1.51
5o	20.83±1.54	13.19±2.72	47.06±3.75	21.68±0.25	34.16±2.65	32.26±3.05
5p	21.97±2.11	16.17±4.15	45.38±1.83	26.99±3.42	32.25±3.55	18.15±2.52
5q	43.18±2.58	22.13±2.37	38.24±1.13	37.61±2.46	28.68±0.88	43.55±3.64
5r	18.18±4.28	22.55±1.17	37.39±3.39	33.63±0.35	27.79±2.32	23.79±3.55
5s	23.48±2.28	18.72±2.23	11.34±0.91	26.99±3.23	36.55±2.89	33.06±1.76
5t	95.17±1.03	16.60±2.02	25.21±5.78	26.99±1.28	28.34±0.90	28.23±2.74
Azoxystrobin	76.43±3.44	51.34±2.03	55.70±0.90	77.19±0.02	60.36±2.30	85.37±4.25

[a] The average of three trials.