Supporting Information

Palladium Oxidative Addition Complexes Enabled Synthesis of Amino-Substituted Indolyl-4(*3H*)-quinazolinones and Their Antitumor Activity Evaluation

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1. General information

The solvents used were dried by distillation over the drying agents indicated in parentheses and were transferred under argon: toluene (Na), tetrahydrofuran (Na) and diethyl ether (Na). Methanol, petroleum ether (PE) and ethyl acetate （EA） were purchased from Energy-chemical. Commercially available chemicals were obtained from commercial suppliers and used without further purification unless otherwise stated.

Proton (^{1}H) and carbon (^{13}C) NMR spectra were recorded at 500 (or 400), 376, and 126 (or 101) MHz, respectively. The following abbreviations are used for the multiplicities: s: singlet, d: doublet, t: triplet, q: quartet, m: multiple, dd = doublet of doublet for proton spectra. Coupling constants (*J*) are reported in hertz (Hz).

High-resolution mass spectra (HRMS) were recorded on a Bruker VPEXII spectrometer with EI and ESI modes unless otherwise stated, and the mass analysis mode of HRMS was TOF.

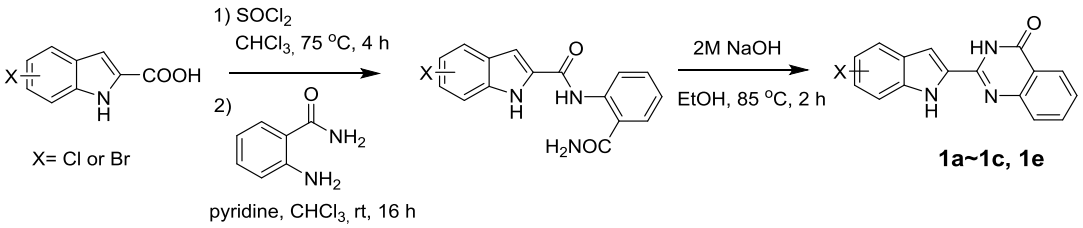
Analytical thin layer chromatography was performed on Polygram SIL G/UV254 plates. Visualization was accomplished with short wave UV light, or $KMnO_4$ staining solutions followed by heating. Flash column chromatography was performed using silica gel (200-300 mesh) with solvents distilled prior to use.

Cell culture：HCT116 were obtained from American Type Culture Collection (Shanghai, China, ATCC). Cells were cultured in 1640 culture medium supplemented with 10% fetal bovine serum at 37 ℃ in a humidified 5% CO_2 incubator.

No attempts were made to optimize yields for substrate preparation.

2. Preparation of the starting materials 1

2.1 Preparation of substrates 1a~1c and 1e.



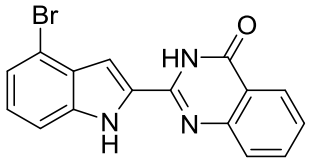
General procedure A:

Following the method reported by Huang and co-workers [1]: halogenated 1H-indole-2-carboxylic acid (10.0 mmol, 1.0 equiv) were added to an appropriate single-necked round-bottomed flask, then added $CHCl_3$ (100.0 ml, 0.1M) to dissolve. The flask was transferred to ice-bath to cool to 0 ℃, then $SOCl_2$ (4.35 mL, 60.0 mmol, 6.0 equiv) were added dropwise. The mixture was allowed to stir at 75 ℃ for 4 h and was then cooled to rt. The reaction mixture was concentrated under reduced pressure to make solid and then re-dissolve by $CHCl_3$.

The mixture was then added into 2-aminobenzamide (10.0 mmol, 1.0 equiv), pyridine (0.83 mL, 10.0 mmol, 1.0 equiv) and $CHCl_3$ (60.0 ml) which stirred in advance under ice-bath. Then the mixture was stirred at rt overnight. The reaction mixture was filtered, and washed by $CHCl_3$ to get solid.

The dried solid of halogenated N-(2-carbamoylphenyl)-1H-indole-2-carboxamide was added to an appropriate single-necked round-bottomed flask, 2M NaOH (25.0 ml) solution and EtOH (25.0 ml) was added to dissolve. The mixture was stirred at 85 ℃ for 2 h and then cooled to rt. The reaction mixture was poured into ice water to make solid precipitation by adjusting pH to 2-3 using 4 M HCl. Then the solid precipitation was filtered to get solid. Wash the solid by water and dry it to get **1a~1c** and **1e**.

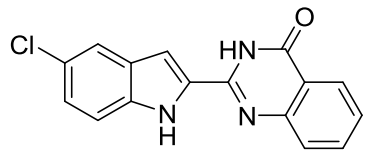
2-(4-bromo-1H-indol-2-yl) quinazolin-4(3H)-one **(1b)**



1b

Following the general procedure A，starting from 4-bromo-1H-indole-2-carboxylic acid (2.39 g, 10.0 mmol), the substrate **1b** was obtained in 65% yield as a white solid powder (2.21g, 6.5 mmol). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.70 (s, 1H), 12.17 (s, 1H), 8.16 (dd, *J* = 8.0, 1.5 Hz, 1H), 7.88 – 7.83 (m, 1H), 7.75 (d, *J* = 8.0 Hz, 2H), 7.55 (d, *J* = 8.2 Hz, 1H), 7.54 – 7.50 (m, 1H), 7.30 (d, *J* = 7.5 Hz, 1H), 7.16 (t, *J* = 7.9 Hz, 1H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 162.0, 148.5, 146.5, 137.9, 134.6, 131.1, 128.2, 126.8, 126.4, 126.1, 125.0, 122.6, 121.3, 114.5, 112.0, 104.7. **HRMS (ESI-TOF):** *m/z* calculated for $C_{16}H_{10}N_3OBr$ $[M+H]^+$: 340.0080, found: 340.0077.

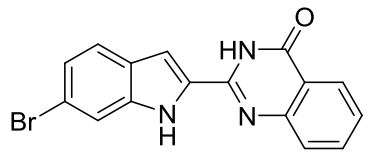
2-(5-chloro-1H-indol-2-yl) quinazolin-4(3H)-one **(1c)**



1c

Following the general procedure A，starting from 5-chloro-1H-indole-2-carboxylic acid (1.95 g, 10.0 mmol), the substrate **1c** was obtained in 62% yield as a pale yellow solid powder (1.83 g, 6.2 mmol). **^{1}H NMR (400 MHz, DMSO-d6)** δ 12.68 (s, 1H), 12.03 (s, 1H), 8.16 (dd, *J* = 7.9, 1.5 Hz, 1H), 7.88 – 7.82 (m, 1H), 7.74 (d, *J* = 7.1 Hz, 1H), 7.71 (d, *J* = 2.0 Hz, 1H), 7.65 (s, 1H), 7.57 – 7.48 (m, 2H), 7.23 (dd, *J* = 8.8, 2.1 Hz, 1H). **^{13}C NMR (101 MHz, DMSO-d6)** δ 161.7, 148.6, 146.2, 136.0, 134.7, 131.6, 128.4, 127.0, 126.5, 126.1, 124.5, 124.1, 121.3, 120.5, 114.0, 104.5. **HRMS (ESI-TOF):** *m/z* calculated for $C_{16}H_{10}N_3OCl$ $[M+H]^+$: 296.0585, found: 296.0583.

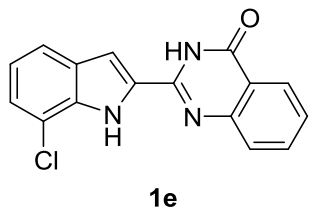
2-(6-bromo-1H-indol-2-yl) quinazolin-4(3H)-one (1a)



1a

Following the general procedure A，starting from 6-bromo-1H-indole-2-carboxylic acid (2.39 g, 10.0 mmol), the substrate **1a** was obtained in 62% yield as a yellow solid powder (2.05 g, 6.2 mmol). **^{1}H NMR (400 MHz, DMSO-d6)** δ 12.67 (s, 1H), 11.94 (s, 1H), 8.16 (dd, *J* = 7.8, 1.5 Hz, 1H), 7.90 – 7.83 (m, 1H), 7.75 (d, *J* = 8.1 Hz, 1H), 7.73 – 7.67 (m, 2H), 7.62 (d, *J* = 8.5 Hz, 1H), 7.52 (t, *J* = 7.5 Hz, 1H), 7.19 (dd, *J* = 8.5, 1.8 Hz, 1H). **^{13}C NMR (101 MHz, DMSO-d6)** δ 161.7, 148.6, 146.2, 138.3, 134.8, 131.0, 127.0, 126.5, 126.4, 126.1, 123.4, 123.0, 121.3, 116.9, 114.8, 105.0. **HRMS (ESI-TOF):** *m/z* calculated for $C_{16}H_{10}N_3OBr$ $[M+H]^+$: 340.0080, found: 340.0075.

2-(7-chloro-1H-indol-2-yl) quinazolin-4(3H)-one **(1e)**

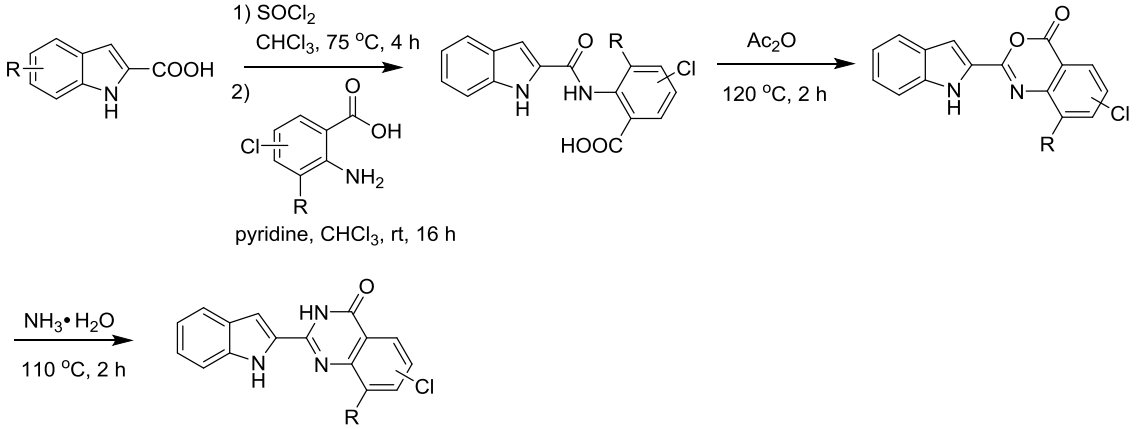


1e

Following the general procedure A，starting from 7-chloro-1H-indole-2-carboxylic acid (1.95 g, 10.0 mmol), the substrate **1e** was obtained in 52% yield as a white solid powder (1.53 g, 5.2 mmol). **^{1}H NMR (400 MHz, DMSO-d6)** δ 12.64 (s, 1H), 11.70 (s, 1H), 8.16 (d, *J* = 7.7 Hz, 1H), 7.86 (t, *J* = 7.5 Hz, 1H), 7.78 (d, *J* = 8.1 Hz, 1H), 7.66 (d, *J* = 7.8 Hz, 2H), 7.52 (t, *J* = 7.4 Hz, 1H), 7.35 (d, *J* = 7.5 Hz, 1H), 7.11 (t, *J* = 7.8 Hz, 1H). **^{13}C NMR (101 MHz, DMSO-d6)** δ 161.7,

148.7, 145.9, 134.8, 134.4, 131.7, 129.2, 127.3, 126.6, 126.0, 123.7, 121.3, 121.1, 120.7, 116.4, 106.8. **HRMS (ESI-TOF):** *m/z* calculated for $C_{16}H_{10}N_3OCl$ $[M+H]^+$: 296.0585, found: 296.0598.

2.2 Preparation of substrates 1d and 1f~1j.



1d and 1f~1j

General procedure B:

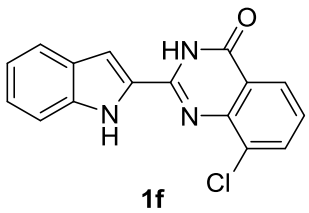
Following the method reported by Huang and co-workers [1]: halogenated 1H-indole-2-carboxylic acid (10.0 mmol, 1.0 equiv) were added to an appropriate single-necked round-bottomed flask, then added $CHCl_3$ (100.0 ml, 0.1M) to dissolve. The flask was transferred to ice-bath to cool to 0 ℃, then $SOCl_2$ (60.0 mmol, 6.0 equiv) were added dropwise. The mixture was allowed to stir at 75 ℃ for 4 h and was then cooled to rt. The reaction mixture was concentrated under reduced pressure to make solid and then re-dissolve by $CHCl_3$. The mixture was then added into halogenated 2-aminobenzoic acid (10.0 mmol, 1.0 equiv), pyridine (10.0 mmol, 1.0 equiv) and $CHCl_3$ (60.0 ml) which stirred in advance under ice-bath. Then the mixture was stirred at rt overnight. The reaction mixture was filtered, and washed by $CHCl_3$ to get solid.

The dried solid of halogenated 2-(1H-indole-2-carboxamido) benzoic acid was added to an appropriate single-necked round-bottomed flask, Ac_2O (20.0 ml) was added to dissolve. The mixture was stirred at 120 ℃ for 2 h and then cooled to rt. The solid precipitation was filtered, washed by EtOH and dried to get target solid product.

The dried solid of 2-(1H-indol-2-yl)-4H-benzo [1,3] oxazin-4-one was added to an appropriate pressure tube, ammonia water (20.0 ml) was added to dissolve. The mixture

was stirred at 100 ℃ for 2 h and then cooled to rt. The reaction mixture was poured into water to make solid precipitation by adjusting pH to 2-3 using 4 M HCl. Then the solid precipitation was filtered to get solid. Wash the solid by water and dry it to get **1f~1j** and **1d**.

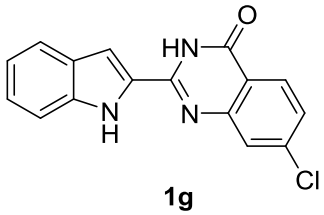
***8-chloro-2-(1H-indol-2-yl) quinazolin-4(3H)-one* (1f)**



1f

Following the general procedure B，starting from 1H-indole-2-carboxylic acid (1.61 g, 10.0 mmol), the substrate **1f** was obtained in 65% yield as a white solid powder (1.92 g, 6.5 mmol). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.80 (s, 1H), 11.54 (s, 1H), 8.10 (d, *J* = 8.0 Hz, 1H), 7.98 (d, *J* = 7.9 Hz, 1H), 7.71 (s, 1H), 7.65 (dd, *J* = 16.0, 8.2 Hz, 2H), 7.46 (t, *J* = 7.8 Hz, 1H), 7.26 (t, *J* = 7.8 Hz, 1H), 7.08 (t, *J* = 7.5 Hz, 1H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.9, 147.6, 145.8, 138.3, 135.2, 131.0, 130.2, 127.9, 126.9, 125.6, 124.8, 123.3, 122.1, 120.6, 113.2, 106.3. **HRMS (ESI-TOF):** *m/z* calculated for $C_{16}H_{10}N_3OCl$ $[M+H]^+$: 296.0585, found: 296.0582.

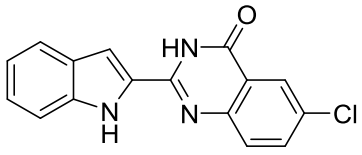
***7-chloro-2-(1H-indol-2-yl) quinazolin-4(3H)-one* (1g)**



1g

Following the general procedure B，starting from 1H-indole-2-carboxylic acid (1.61 g, 10.0 mmol), the substrate **1g** was obtained in 70% yield as a yellow solid powder (2.06 g, 7.0 mmol). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.68 (s, 1H), 11.94 (s, 1H), 8.17 (dd, *J* = 7.9, 1.5 Hz, 1H), 7.89 – 7.83 (m, 1H), 7.76 (d, *J* = 8.1 Hz, 1H), 7.72 (s, 1H), 7.70 (d, *J* = 2.0 Hz, 1H), 7.63 (d, *J* = 8.5 Hz, 1H), 7.53 (t, *J* = 6.9 Hz, 1H), 7.20 (dd, *J* = 8.5, 1.8 Hz, 1H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 162.2, 149.1, 146.7, 138.8, 135.2, 131.5, 127.4, 127.0, 126.9, 126.6, 123.9, 123.5, 121.7, 117.3, 115.3, 105.5. **HRMS (ESI-TOF):** *m/z* calculated for $C_{16}H_{10}N_3OCl$ $[M+H]^+$: 296.0585, found: 296.0586.

***6-chloro-2-(1H-indol-2-yl) quinazolin-4(3H)-one* (1h)**

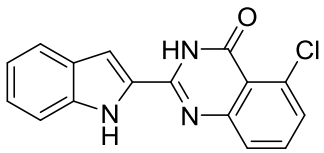


1h

Following the general procedure B，starting from 1H-indole-2-carboxylic acid (1.61 g, 10.0 mmol), the substrate **1h** was obtained in 65% yield as a yellow solid

powder (1.92 g, 6.5 mmol); **^{1}H NMR (500 MHz, DMSO-*d*$_6$)** δ 12.77 (s, 1H), 11.80 (s, 1H), 8.08 (d, *J* = 2.6 Hz, 1H), 7.84 (dd, *J* = 8.7, 2.5 Hz, 1H), 7.73 (d, *J* = 8.7 Hz, 1H), 7.68 (d, *J* = 2.2 Hz, 1H), 7.64 (d, *J* = 8.0 Hz, 1H), 7.54 (d, *J* = 8.2 Hz, 1H), 7.23 (t, *J* = 7.6 Hz, 1H), 7.06 (t, *J* = 7.4 Hz, 1H). **^{13}C NMR (126 MHz, DMSO-*d*$_6$)** δ 160.9, 147.5, 147.0, 137.8, 134.7, 130.4, 129.8, 129.1, 127.4, 125.1, 124.2, 122.4, 121.6, 120.0, 112.4, 105.4. **HRMS (ESI-TOF):** *m/z* calculated for $C_{16}H_{10}N_3OCl$ $[M+H]^+$: 296.0585, found: 296.0592.

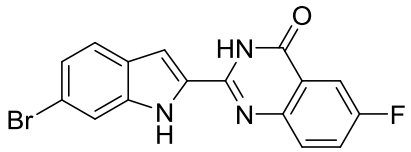
5-chloro-2-(1H-indol-2-yl) quinazolin-4(3H)-one **(1j)**



1j

Following the general procedure B, starting from 1H-indole-2-carboxylic acid (1.61 g, 10.0 mmol), the substrate **1j** was obtained in 50% yield as a white solid powder (1.47 g, 5.0 mmol); **^{1}H NMR (400 MHz, DMSO-d6)** δ 12.60 (s, 1H), 11.79 (s, 1H), 7.75 (t, *J* = 7.9 Hz, 1H), 7.69 (d, *J* = 1.4 Hz, 1H), 7.68 – 7.62 (m, 2H), 7.53 (dd, *J* = 8.2, 1.0 Hz, 1H), 7.49 (dd, *J* = 7.8, 1.3 Hz, 1H), 7.24 (ddd, *J* = 8.2, 6.9, 1.2 Hz, 1H), 7.07 (ddd, *J* = 8.0, 6.9, 1.0 Hz, 1H). **^{13}C NMR (101 MHz, DMSO-d6)** δ 160.0, 151.3, 147.2, 137.7, 134.4, 132.7, 129.4, 128.6, 127.4, 126.5, 124.3, 121.6, 120.0, 118.0, 112.4, 105.5. **HRMS (ESI-TOF):** *m/z* calculated for $C_{16}H_{10}N_3OCl$ $[M+H]^+$: 296.0585, found: 296.0598.

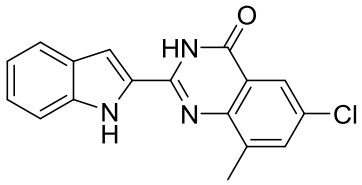
2-(6-bromo-1H-indol-2-yl)-6-fluoroquinazolin-4(3H)-one **(1d)**



1d

Following the general procedure B，starting from 6-bromo-1H-indole-2-carboxylic acid (2.39 g, 10.0 mmol), the substrate **1d** was obtained in 43% yield as a white solid powder (1.53 g, 4.3 mmol); **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.75 (s, 1H), 11.95 (s, 1H), 8.21 (dd, *J* = 8.8, 6.3 Hz, 1H), 7.70 (d, *J* = 1.6 Hz, 2H), 7.63 (d, *J* = 8.5 Hz, 1H), 7.41 (dd, *J* = 10.0, 2.5 Hz, 1H), 7.37 (td, *J* = 8.7, 2.6 Hz, 1H), 7.19 (dd, *J* = 8.4, 1.6 Hz, 1H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 166.9, 164.9, 161.0, 150.8, 150.7, 147.5, 138.4, 130.6, 129.3, 129.2, 126.4, 123.5, 123.1, 118.3, 117.1, 114.9, 114.9, 114.8, 111.9, 111.7, 105.6. **HRMS (ESI-TOF):** *m/z* calculated for $C_{16}H_9N_3OFBr$ $[M+H]^+$: 357.9986, found: 357.9997.

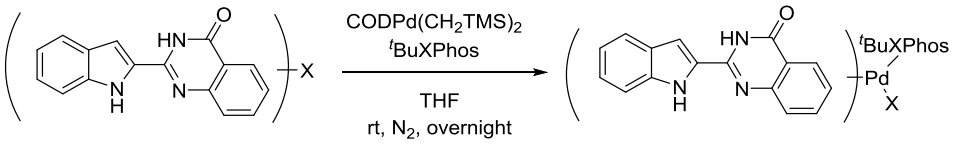
6-chloro-2-(1H-indol-2-yl)-8-methylquinazolin-4(3H)-one **(1i)**



1i

Following the general procedure B，starting from 1H-indole-2-carboxylic acid (1.61 g, 10.0 mmol), the substrate **1i** was obtained in 46% yield as a white solid powder (1.42 g, 4.6 mmol); **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.73 (s, 1H), 11.59 (d, *J* = 2.1 Hz, 1H), 7.90 (d, *J* = 2.5 Hz, 1H), 7.72 (d, *J* = 1.5 Hz, 1H), 7.67 (d, *J* = 2.2 Hz, 1H), 7.65 (d, *J* = 8.0 Hz, 1H), 7.58 (d, *J* = 8.0 Hz, 1H), 7.26 (t, *J* = 7.1 Hz, 1H), 7.07 (t, *J* = 7.5 Hz, 1H), 2.70 (s, 3H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.2, 146.0, 145.7, 138.5, 137.6, 134.5, 130.0, 129.8, 127.5, 124.2, 122.4, 122.2, 121.6, 120.0, 112.3, 105.1, 16.9. **HRMS (ESI-TOF):** *m/z* calculated for $C_{17}H_{12}N_3OCl$ $[M+H]^+$: 310.0742, found: 310.0752.

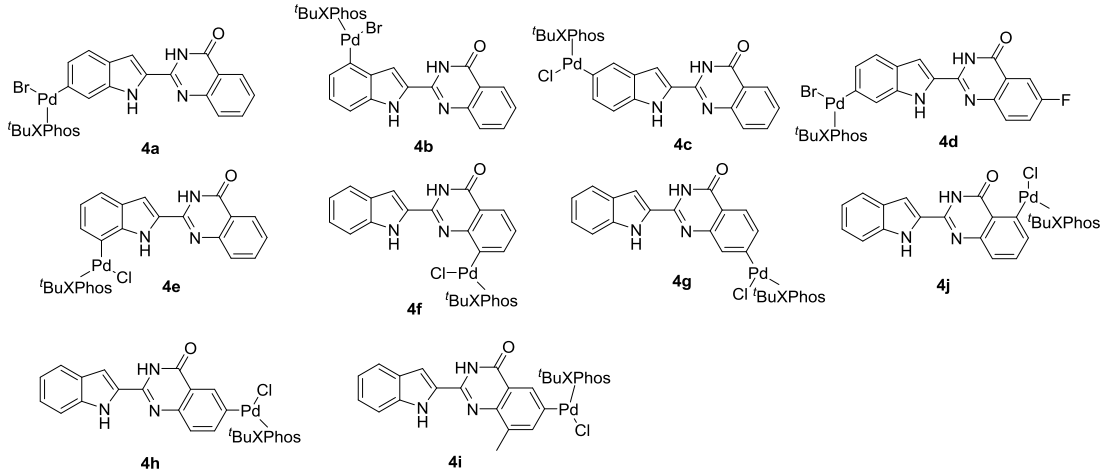
3. The general procedures for synthesis of oxidative addition complexes (OACs) 4



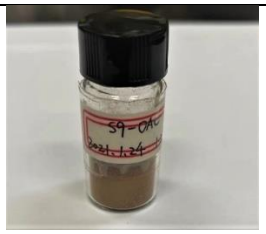
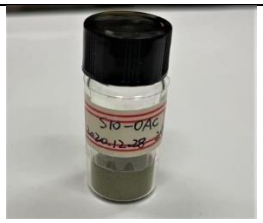
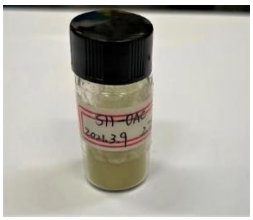
1a~1j Pd-based OACs **4a~4j**

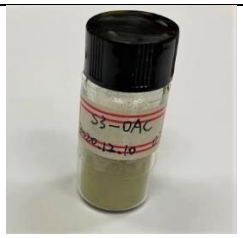
According to the method reported by Buchwald and co-workers [2]: a 50 mL reaction flask was equipped with a stir bar and charged with aryl halide (3.0 mmol, 1.0 equiv), $CODPd(CH_2TMS)_2$[3] (3.0 mmol, 1.0 equiv) and ^{t}BuXPhos (3.0 mmol, 1.0 equiv). The flask was capped with a rubber cap then evacuated and backfilled with dry nitrogen gas for 3 times. Dry, air-free, THF (24 ml) was added via needle. The reaction mixture was allowed to stir for 16 h at room temperature. After 16 h, the flask was opened to air and the mixture was concentrated with the aid of a rotatory evaporator. The crude material was triturated with pentane to provide a powder. The powder was collected on a fritted filter funnel by vacuum filtration and washed with pentane. The solid was then placed under high vacuum for 2 h to remove all remaining volatiles.

The structures of oxidative addition complexes **4a~4j:**

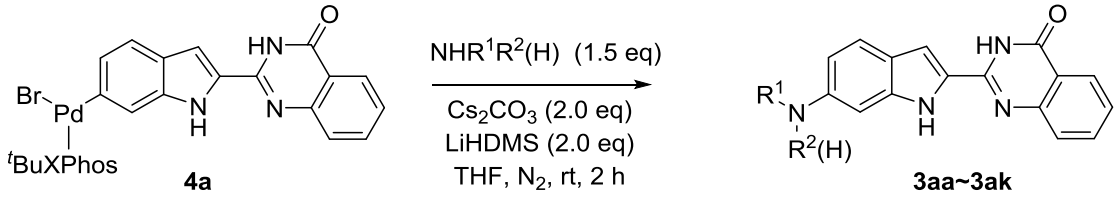


The details of different OACs including appearances, synthesis and yields:

Name	Appearance	Methods	Yield
4b		Following the general method of synthesis of OACs: Starting from **1b** (576 mg, 1.7 mmol), oxidative addition complex **4b** (1.29 g) was obtained as a red powder.	87%
4c		Following the general method of synthesis of OACs: Starting from **1c** (1.09 g, 3.7 mmol), oxidative addition complex **4a** (2.43 g) was obtained as a dull yellow powder.	80%
4a		Following the general method of synthesis of OACs: Starting from **1a** (1.02 g, 3.0 mmol), oxidative addition complex **4a** (2.27 g) was obtained as a dark yellow powder.	87%
4e		Following the general method of synthesis of OACs: Starting from **1e** (590 mg, 2.0 mmol), oxidative addition complex **4e** (1.35 g) was obtained as a celadon powder.	82%

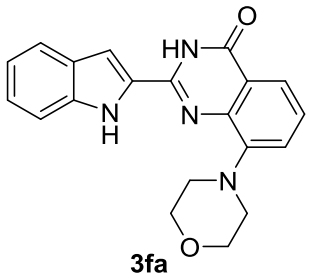
4f		Following the general method of synthesis of OACs: Starting from **1f** (354 mg, 1.2 mmol), oxidative addition complex **4f** (690 mg) was obtained as a green powder.	70%
4g		Following the general method of synthesis of OACs: Starting from **1g** (1.09 g, 3.7 mmol), oxidative addition complex **4g** (2.43 g) was obtained as a yellow green powder.	80%
4h		Following the general method of synthesis of OACs: Starting from **1h** (442 mg, 1.5 mmol), oxidative addition complex **4h** (902 mg) was obtained as a celadon powder.	73%
4j		Following the general method of synthesis of OACs: Starting from **1j** (442 mg, 1.5 mmol), oxidative addition complex **4j** (890 mg) was obtained as a dark yellow powder.	72%
4d		Following the general method of synthesis of OACs: Starting from **1d** (535 mg, 1.5 mmol), oxidative addition complex **4d** (960 mg) was obtained as a dark yellow powder.	72%
4i		Following the general method of synthesis of OACs: Starting from **1i** (463 mg, 1.5 mmol), oxidative addition complex **4i** (895 mg) was obtained as a dark yellow powder.	71%

4. General procedures for the synthesis of amino-substituted indolyl-4(3*H*)- quinazolinones 3



Take synthesis of **3aa~3ak** as an example, general procedures as follows: A reaction tube was equipped with a stir bar and charged with the Pd-based OAC **4a** (174.0 mg, 0.2 mmol, 1.0 equiv) and Cs_2CO_3 (130.0 mg, 0.4 mmol, 2.0 equiv). The tube was capped, evacuated and backfilled with nitrogen. Then added dry THF (2.0 ml) into the tube and stir it for few minutes. Then amine nucleophile (0.3 mmol, 1.5 equiv) was dissolved by moderate dry THF, and use injector to transfer the mixtures into the tube. After 10 minutes, LiHDMS (0.4 mmol, 2,0 equiv) was added into the tube. The mixture was allowed to stir at room temperature for 1.5 h, then added acetic acid (24.0 μL，0.4 mmol, 2.0 equiv) in DCM (2.0 ml) into the tube and allowed the mixture stir for 30 minutes to stop the reaction. Then the mixture was filtered through a pad of Celite. The Celite pad was washed with additional CH_2Cl_2 and MeOH. The combined organic fractions were concentrated with the aid of a rotatory evaporator. The resulting residue was purified by flash column chromatography on silica gel to get the pure coupling product.

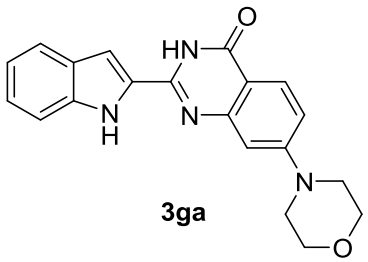
***2-(1H-indol-2-yl)-8-morpholinoquinazolin-4(3H)-one* (3fa)**



Following the general procedures，**4f** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and morpholine (27 μL, 0.3 mmol) was used; The product **3fa** was obtained as a yellow solid (27.6 mg, 40% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx 0.4$). **^{1}H NMR (500 MHz, DMSO-*d*$_6$)** δ 12.52 (s, 1H), 11.21 (s, 1H), 7.75 (d, *J* = 7.8 Hz, 1H), 7.65 (d, *J* = 7.9 Hz, 1H), 7.59 (d, *J* = 11.7 Hz, 2H), 7.39 (t, *J* = 7.8 Hz, 1H), 7.29 (d, *J* = 7.8 Hz, 1H), 7.25 (t,

J = 7.5 Hz, 1H), 7.08 (t, *J* = 7.4 Hz, 1H), 3.94 (s, 4H), 3.31 (s, 4H). **^{13}C NMR (101 MHz, DMSO-*d*$_6$)** δ 162.1, 148.0, 144.0, 141.6, 137.5, 130.5, 127.5, 126.6, 124.0, 122.4, 121.6, 121.5, 120.1, 118.4, 112.6, 105.1, 66.2, 51.8. **HRMS (ESI-TOF):** *m/z* calculated for $C_{20}H_{18}N_4O_2$ $[M+H]^+$: 347.1503, found: 347.1493.

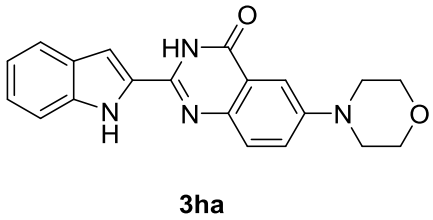
2-(1H-indol-2-yl)-7-morpholinoquinazolin-4(3H)-one (3ga)



3ga

Following the general procedures，**4g** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and morpholine (27 μL, 0.3 mmol) was used; The product **3ga** was obtained as a yellow solid (40.1 mg, 58% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx 0.3$). **^{1}H NMR (400 MHz, DMSO-*d*$_6$)** δ 12.27 (s, 1H), 11.72 (s, 1H), 7.96 (d, *J* = 8.9 Hz, 1H), 7.63 (d, *J* = 7.9 Hz, 2H), 7.52 (d, *J* = 8.3 Hz, 1H), 7.24 – 7.16 (m, 2H), 7.05 (t, *J* = 7.5 Hz, 1H), 6.99 (d, *J* = 2.4 Hz, 1H), 3.78 (t, *J* = 4.8 Hz, 4H), 3.32 (s, 4H). **^{13}C NMR (101 MHz, DMSO-*d*$_6$)** δ 161.3, 155.4, 150.4, 146.8, 137.5, 130.3, 127.5, 127.0, 123.9, 121.5, 119.9, 114.5, 112.4, 112.1, 108.4, 104.6, 65.9, 47.1. **HRMS (ESI-TOF):** *m/z* calculated for $C_{20}H_{18}N_4O_2$ $[M+H]^+$: 347.1503, found: 347.1491.

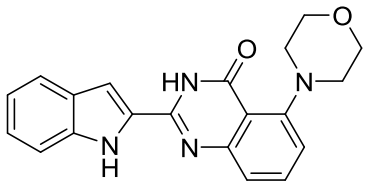
2-(1H-indol-2-yl)-6-morpholinoquinazolin-4(3H)-one (3ha)



3ha

Following the general procedures，**4h** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and morpholine (27 μL, 0.3 mmol) was used; The product **3ha** was obtained in as a yellow solid (37.4 mg, 54% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx$ 0.4). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.50 – 12.42 (m, 1H), 11.68 (s, 1H), 7.66 – 7.56 (m, 4H), 7.51 (d, *J* = 8.2 Hz, 1H), 7.48 (d, *J* = 2.8 Hz, 1H), 7.23 – 7.18 (m, 1H), 7.04 (t, *J* = 7.5 Hz, 1H), 3.78 (t, *J* = 4.8 Hz, 4H), 3.25 (t, *J* = 4.8 Hz, 4H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.7, 149.3, 143.8, 141.7, 137.5, 130.4, 127.9, 127.6, 123.7, 123.5, 121.7, 121.3, 119.8, 112.3, 108.2, 103.9, 66.0, 48.1. **HRMS (ESI-TOF):** *m/z* calculated for $C_{20}H_{18}N_4O_2$ $[M+H]^+$:347.1503, found: 347.1490.

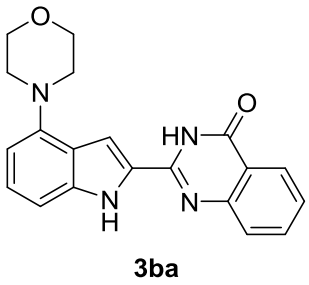
***2-(1H-indol-2-yl)-5-morpholinoquinazolin-4(3H)-one* (3ja)**



3ja

Following the general procedures, **4j** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and morpholine (27 μL, 0.3 mmol) was used; The product **3ja** was obtained in as a yellow solid (27.7 mg, 40% yield) after column chromatography (eluent = petroleum ether/EtOAc 5:1 v/v); (PE/EA = 6/1, $R_F \approx 0.6$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 15.26 (s, 1H), 11.83 (s, 1H), 7.75 (d, *J* = 8.1 Hz, 1H), 7.60 (t, *J* = 7.8 Hz, 1H), 7.54 (d, *J* = 8.2 Hz, 1H), 7.45 (d, *J* = 8.0 Hz, 1H), 7.24 (t, *J* = 7.6 Hz, 1H), 7.09 (t, *J* = 7.5 Hz, 1H), 7.03 (d, *J* = 7.5 Hz, 1H), 3.76 (t, *J* = 4.6 Hz, 4H), 2.65 (s, 4H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 164.2, 151.9, 148.4, 144.7, 137.1, 134.1, 129.5, 129.4, 128.1, 125.0, 124.2, 120.8, 120.1, 119.0, 113.4, 113.4, 66.6, 52.7.

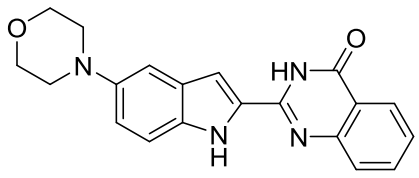
***2-(4-morpholino-1H-indol-2-yl) quinazolin-4(3H)-one* (3ba)**



3ba

Following the general procedures，**4b** (174 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and morpholine (27 μL, 0.3 mmol) was used; The product **3ba** was obtained in as a yellow solid (27.0 mg, 39% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx 0.3$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.51 (s, 1H), 11.76 (s, 1H), 8.15 (d, *J* = 7.9 Hz, 1H), 7.83 (d, *J* = 7.3 Hz, 2H), 7.72 (d, *J* = 8.2 Hz, 1H), 7.54 – 7.45 (m, 1H), 7.18 – 7.06 (m, 2H), 6.47 (d, *J* = 7.2 Hz, 1H), 3.92 – 3.82 (m, 4H), 3.23 – 3.13 (m, 4H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 162.3, 149.3, 147.0, 146.6, 139.6, 135.2, 128.7, 127.3, 126.6, 126.5, 125.4, 121.5, 121.2, 107.0, 106.2, 105.0, 67.0, 51.7. **HRMS (ESI-TOF):** *m/z* calculated for $C_{20}H_{18}N4O_2$ $[M+H]^+$: 347.1503, found: 347.1491.

***2-(5-morpholino-1H-indol-2-yl) quinazolin-4(3H)-one* (3ca)**

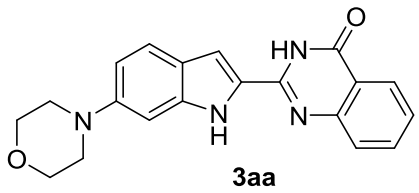


3ca

Following the general procedures，**4c** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and morpholine (27 μL,

0.3 mmol) was used; The product **3ca** was obtained as a yellow solid (20.7 mg, 30% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx 0.3$). **^{1}H NMR (400 MHz, DMSO-*d*$_6$)** δ 12.55 (s, 1H), 11.58 (s, 1H), 8.14 (dd, *J* = 7.9, 1.5 Hz, 1H), 7.87 – 7.81 (m, 1H), 7.71 (d, *J* = 8.1 Hz, 1H), 7.56 (d, *J* = 2.1 Hz, 1H), 7.51 – 7.46 (m, 1H), 7.41 (d, *J* = 8.9 Hz, 1H), 7.07 (dd, *J* = 8.9, 2.3 Hz, 1H), 7.03 (s, 1H), 3.83 – 3.68 (m, 4H), 3.10 – 3.02 (m, 4H). **^{13}C NMR (101 MHz, DMSO-*d*$_6$)** δ 161.8, 148.9, 146.6, 145.9, 134.7, 133.2, 129.9, 127.9, 126.8, 126.1, 126.1, 121.1, 117.7, 112.9, 106.1, 104.7, 66.4, 50.8. **HRMS (ESI-TOF):** *m/z* calculated for $C_{20}H_{18}N4O_2$ $[M+H]^+$: 347.1503, found: 347.1519.

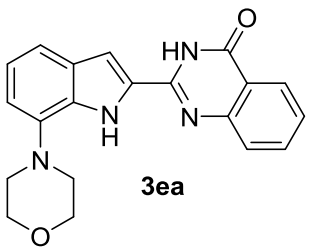
***2-(6-morpholino-1H-indol-2-yl) quinazolin-4(3H)-one* (3aa)**



3aa

Following the general procedures, **4a** (174 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and morpholine (27 μL, 0.3 mmol) was used; The product **3aa** was obtained as a yellow solid (49.8 mg, 72% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx 0.3$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.46 (s, 1H), 11.46 (s, 1H), 8.13 (d, *J* = 7.8 Hz, 1H), 7.82 (t, *J* = 7.7 Hz, 1H), 7.70 (d, *J* = 8.1 Hz, 1H), 7.57 (s, 1H), 7.53 – 7.43 (m, 2H), 6.93 (s, 1H), 6.89 (d, *J* = 8.8 Hz, 1H), 3.78 (t, *J* = 4.4 Hz, 4H), 3.12 (t, *J* = 4.4 Hz, 4H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 162.3, 149.8, 149.4, 147.1, 139.6, 135.1, 128.9, 127.2, 126.5, 126.3, 122.4, 121.9, 121.4, 113.0, 105.9, 97.3, 66.7, 50.0. **HRMS (ESI-TOF):** *m/z* calculated for $C_{20}H_{18}N_4O_2$ $[M+H]^+$: 347.1503, found: 347.1499.

***2-(7-morpholino-1H-indol-2-yl) quinazolin-4(3H)-one* (3ea)**

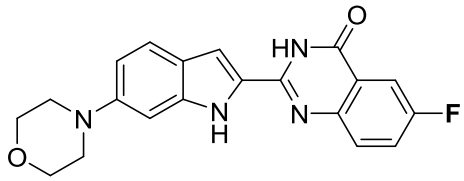


3ea

Following the general procedures，**4e** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and morpholine (27 μL, 0.3 mmol) was used; The product **3ea** was obtained as a yellow solid (35.2 mg, 51% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx 0.3$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.66 (s, 1H), 11.03 (s, 1H), 8.15 (d, *J* = 7.9 Hz, 1H), 7.83 (t, *J* = 7.5 Hz, 1H), 7.76 (d, *J* = 8.1

Hz, 1H), 7.58 (d, *J* = 2.3 Hz, 1H), 7.49 (t, *J* = 7.5 Hz, 1H), 7.35 (d, *J* = 7.8 Hz, 1H), 7.04 (t, *J* = 7.7 Hz, 1H), 6.86 (d, *J* = 7.3 Hz, 1H), 3.97 – 3.85 (m, 4H), 3.07 (t, *J* = 4.4 Hz, 4H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 162.3, 149.4, 146.9, 139.3, 135.1, 131.9, 130.5, 129.2, 127.7, 126.7, 126.4, 121.5, 121.4, 116.8, 112.6, 107.5, 67.0, 51.9. **HRMS (ESI-TOF):** *m/z* calculated for $C_{20}H_{18}N_4O_2$ $[M+H]^+$: 347.1503, found: 347.1498.

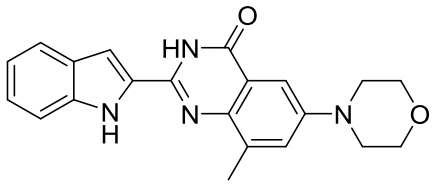
6-fluoro-2-(6-morpholino-1H-indol-2-yl) quinazolin-4(3H)-one **(3da)**



3da

Following the general procedures，**4d** (178 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and morpholine (27 μL, 0.3 mmol) was used; The product **3da** was obtained as a yellow solid (30.5 mg, 42% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA =2/1, R_F ≈ 0.3). **^{1}H NMR (500 MHz, DMSO-*d*$_6$)** δ 12.54 (s, 1H), 11.48 (s, 1H), 8.21 – 8.15 (m, 1H), 7.59 (s, 1H), 7.49 (d, *J* = 8.7 Hz, 1H), 7.36 (d, *J* = 12.1 Hz, 1H), 7.34 – 7.29 (m, 1H), 7.20 (s, 1H), 6.90 (d, *J* = 10.8 Hz, 2H), 6.65 (s, 1H), 3.83 – 3.75 (m, 4H), 3.16 – 3.08 (m, 4H). **^{13}C NMR (126 MHz, DMSO-*d*$_6$)** δ 174.7, 170.3, 167.4, 165.4, 161.6, 149.9, 148.3, 139.8, 130.1, 129.7, 128.5, 122.5, 121.9, 113.1, 106.5, 97.2, 66.7, 49.9. **HRMS (ESI-TOF):** *m/z* calculated for $C_{20}H_{17}N_4O_2F$ $[M+H]^+$: 365.1408, found: 365.1415.

2-(1H-indol-2-yl)-8-methyl-6-morpholinoquinazolin-4(3H)-one **(3ia)**

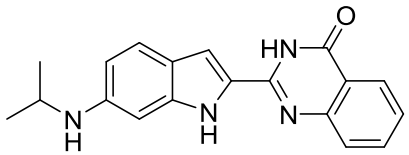


3ia

Following the general procedures，**4i** (176 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and morpholine (27 μL, 0.3 mmol) was used; The product **3ia** was obtained as a yellow solid (24.5 mg, 34% yield) after column chromatography (eluent = petroleum ether/EtOAc 5:1 v/v); (PE/EA = 2/1, R_F ≈ 0.5). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.43 (s, 1H), 11.49 (s, 1H), 7.62 (d, *J* = 8.0 Hz, 1H), 7.56 (d, *J* = 10.9 Hz, 2H), 7.47 (s, 1H), 7.33 (s, 1H), 7.22 (t, *J* = 7.8 Hz, 1H), 7.05 (t, *J* = 7.5 Hz, 1H), 3.78 (d, *J* = 4.6 Hz, 4H), 3.23 (d, *J* = 3.1 Hz, 4H), 2.69 (s, 3H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 162.1, 148.8, 142.5, 140.5, 137.4, 136.6, 130.7, 129.6, 123.8, 123.7, 121.7, 121.3, 119.8, 112.2, 106.0, 103.6, 66.0, 48.2, 17.5. **HRMS (ESI-TOF):** *m/z*

calculated for $C_{21}H_{20}N_4O_2$ $[M+H]^+$: 361.1659, found: 361.1663.

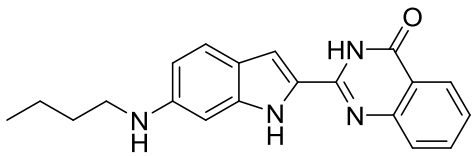
2-(6-(isopropylamino)-1H-indol-2-yl) quinazolin-4(3H)-one **(3ab)**



3ab

Following the general procedures，**4a** (174 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and propan-2-amine (26 μL, 0.3 mmol) was used; The product **3ab** was obtained as a yellow solid (38.1 mg, 60% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 3/1, $R_F \approx 0.3$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.32 (s, 1H), 11.11 (s, 1H), 8.10 (d, *J* = 7.9 Hz, 1H), 7.79 (t, *J* = 7.7 Hz, 1H), 7.65 (d, *J* = 8.2 Hz, 1H), 7.48 (s, 1H), 7.42 (t, *J* = 7.5 Hz, 1H), 7.29 (d, *J* = 8.6 Hz, 1H), 6.53 (s, 1H), 6.49 (d, *J* = 8.7 Hz, 1H), 5.48 (s, 1H), 3.53 (s, 1H), 1.17 (d, *J* = 6.3 Hz, 6H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 162.3, 149.7, 147.2, 146.8, 140.7, 135.0, 127.0, 127.0, 126.5, 125.9, 122.4, 121.2, 119.6, 112.1, 106.6, 92.0, 43.9, 22.9. **HRMS (ESI-TOF):** *m/z* calculated for $C_{19}H_{18}N_4O$ $[M+H]^+$: 319.1553, found: 319.1553.

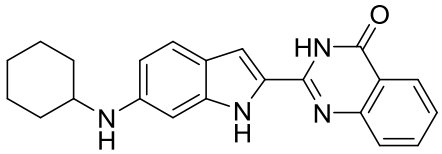
2-(6-(butylamino)-1H-indol-2-yl) quinazolin-4(3H)-one **(3ac)**



3ac

Following the general procedures，**4a** (174 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and butan-1-amine (16 μL, 0.3 mmol) was used; The product **3ac** was obtained as a yellow solid (23.2 mg, 35% yield) after column chromatography (eluent = petroleum ether/EtOAc 3:1 v/v); (PE/EA = 3/1, $R_F \approx 0.3$). **^{1}H NMR (500 MHz, DMSO-*d*$_6$)** δ 12.31 (s, 1H), 11.13 (s, 1H), 8.10 (d, *J* = 7.8 Hz, 1H), 7.79 (t, *J* = 7.6 Hz, 1H), 7.65 (d, *J* = 8.1 Hz, 1H), 7.48 (s, 1H), 7.42 (t, *J* = 7.5 Hz, 1H), 7.29 (d, *J* = 8.7 Hz, 1H), 6.51 (d, *J* = 7.9 Hz, 2H), 5.66 (s, 1H), 3.02 (q, *J* = 6.0 Hz, 2H), 1.58 (p, *J* = 7.1 Hz, 2H), 1.42 (h, *J* = 7.2 Hz, 2H), 1.20 – 1.06 (m, 2H), 0.94 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR (126 MHz, DMSO-*d*$_6$)** δ 161.9, 149.2, 147.4, 146.7, 140.2, 134.6, 126.6, 126.4, 126.0, 121.8, 120.7, 119.2, 111.4, 106.1, 90.7, 42.9, 30.8, 20.0, 13.9. **HRMS (ESI-TOF):** *m/z* calculated for $C_{20}H_{20}N_4O$ $[M+H]^+$: 333.1710, found: 333.1702.

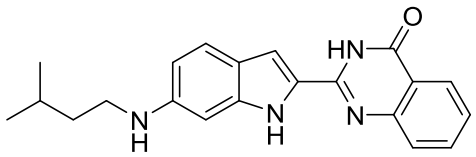
***2-(6-(cyclohexylamino)-1H-indol-2-yl) quinazolin-4(3H)-one* (3ad)**



3ad

Following the general procedures，**4a** (174 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and cyclohexanamine (21 μL, 0.3 mmol) was used; The product **3ad** was obtained as a yellow solid (30.0 mg, 42% yield) after column chromatography (eluent = petroleum ether/EtOAc 3:1 v/v); (PE/EA = 2/1, $R_F \approx 0.4$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.29 (s, 1H), 11.06 (s, 1H), 8.10 (dd, *J* = 7.9, 1.5 Hz, 1H), 7.82 – 7.76 (m, 1H), 7.64 (d, *J* = 8.1 Hz, 1H), 7.47 (d, *J* = 2.1 Hz, 1H), 7.42 (t, *J* = 7.5 Hz, 1H), 7.28 (d, *J* = 8.6 Hz, 1H), 6.55 (s, 1H), 6.51 (dd, *J* = 8.6, 2.0 Hz, 1H), 5.49 (d, *J* = 7.8 Hz, 1H), 3.18 (s, 1H), 2.03 – 1.96 (m, 2H), 1.75 (dt, *J* = 12.2, 3.0 Hz, 2H), 1.40 – 1.32 (m, 2H), 1.22 – 1.12 (m, 4H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.8, 149.2, 146.7, 146.2, 140.2, 134.5, 126.6, 126.4, 126.0, 125.4, 121.9, 120.7, 119.1, 111.5, 106.1, 91.4, 51.1, 32.5, 25.7, 24.7. **HRMS (ESI-TOF):** *m/z* calculated for $C_{22}H_{22}N_4O$ $[M+H]^+$: 359.1866, found: 359.1855.

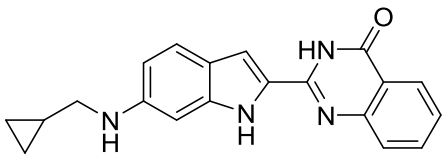
2-(6-(isopentylamino)-1H-indol-2-yl) quinazolin-4(3H)-one (3ae)



3ae

Following the general procedures, **4a** (174 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and 3-methylbutan-1-amine (35 μL, 0.3 mmol) was used; The product **3ae** was obtained as a yellow solid (38.1 mg, 55% yield) after column chromatography (eluent = petroleum ether/EtOAc 3:1 v/v); (PE/EA = 3/1, $R_F \approx 0.3$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.33 (s, 1H), 11.19 (s, 1H), 8.10 (d, *J* = 7.8 Hz, 1H), 7.78 (t, *J* = 7.7 Hz, 1H), 7.65 (d, *J* = 8.2 Hz, 1H), 7.49 (s, 1H), 7.42 (t, *J* = 7.5 Hz, 1H), 7.29 (d, *J* = 8.7 Hz, 1H), 6.52 (d, *J* = 7.7 Hz, 2H), 5.69 (s, 1H), 3.03 (t, *J* = 7.5 Hz, 2H), 1.72 (dp, *J* = 13.5, 6.7 Hz, 1H), 1.49 (q, *J* = 7.1 Hz, 2H), 0.93 (d, *J* = 6.6 Hz, 6H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 162.3, 149.7, 147.8, 147.2, 140.7, 135.0, 127.0, 126.9, 126.5, 125.9, 122.3, 121.1, 119.6, 111.9, 106.7, 91.2, 41.8, 38.0, 25.9, 23.0. **HRMS (ESI-TOF):** *m/z* calculated for $C_{21}H_{22}N_4O$ $[M+H]^+$: 347.1866, found: 347.1862.

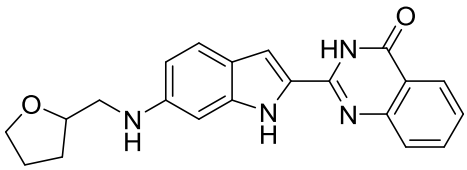
***2-(6-((cyclopropylmethyl)amino)-1H-indol-2-yl) quinazolin-4(3H)-one* (3af)**



3af

Following the general procedures，**4a** (174 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and cyclopropylmethanamine (26 μL, 0.3 mmol) was used; The product **3af** was obtained as a yellow solid (33.0 mg, 50% yield) after column chromatography (eluent = petroleum ether/EtOAc 5:1 v/v); (PE/EA = 2/1, $R_F \approx 0.5$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.32 (s, 1H), 11.15 (s, 1H), 8.11 (d, *J* = 7.8 Hz, 1H), 7.80 (t, *J* = 7.7 Hz, 1H), 7.66 (d, *J* = 8.2 Hz, 1H), 7.49 (s, 1H), 7.43 (t, *J* = 7.6 Hz, 1H), 7.30 (d, *J* = 8.5 Hz, 1H), 6.59 – 6.48 (m, 2H), 5.77 (t, *J* = 6.2 Hz, 1H), 2.92 (t, *J* = 5.6 Hz, 2H), 1.27 – 1.22 (m, 1H), 0.50 (d, *J* = 7.7 Hz, 2H), 0.26 (d, *J* = 4.9 Hz, 2H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 162.3, 149.7, 147.8, 147.2, 140.6, 135.0, 127.0, 127.0, 126.5, 125.9, 122.3, 121.2, 119.7, 111.9, 106.6, 91.4, 48.3, 11.0, 4.1. **HRMS (ESI-TOF):** *m/z* calculated for $C_{20}H_{18}N_4O$ $[M+H]^+$: 331.1553, found: 331.1549.

***2-(6-(((tetrahydrofuran-2-yl) methyl) amino)-1H-indol-2-yl) quinazolin-4(3H)-one* (3ag)**

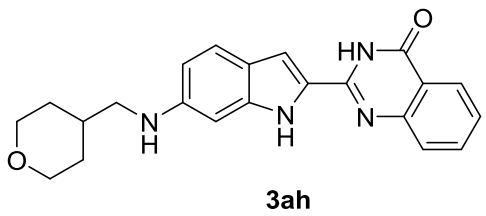


3ag

Following the general procedures，**4a** (174 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and Tetrahydrofurfurylamine (31 μL, 0.3 mmol) was used; The product **3ag** was obtained as a yellow solid (40.3 mg, 56% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx 0.3$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.33 (s, 1H), 11.16 (s, 1H), 8.11 (d, *J* = 7.8 Hz, 1H), 7.80 (t, *J* = 7.7 Hz, 1H), 7.66 (d, *J* = 8.1 Hz, 1H), 7.49 (s, 1H), 7.43 (t, *J* = 7.5 Hz, 1H), 7.30 (d, *J* = 8.7 Hz, 1H), 6.57 (d, *J* = 7.1 Hz, 2H), 5.69 (t, *J* = 5.8 Hz, 1H), 4.04 (p, *J* = 6.4 Hz, 1H), 3.81 (q, *J* = 7.2 Hz, 1H), 3.66 (q, *J* = 7.3 Hz, 1H), 3.10 (t, *J* = 5.9 Hz, 2H), 2.00 (ddd, *J* = 19.6, 10.9, 4.8 Hz, 1H), 1.86 (qp, *J* = 13.2, 7.0 Hz, 2H), 1.63 (dp, *J* = 14.5, 7.4, 6.9 Hz, 1H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 162.3, 149.7, 147.6, 147.2, 140.6, 135.0, 130.1, 127.1, 126.5, 125.9, 122.3, 121.2, 119.8, 111.8, 106.6, 91.5, 77.4, 67.6, 48.3, 29.6, 25.7. **HRMS (ESI-TOF):** *m/z* calculated for $C_{21}H_{20}N_4O_2$ $[M+H]^+$: 361.1659, found:

361.1659.

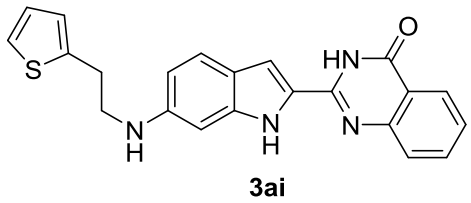
2-(6-(((tetrahydro-2H-pyran-4-yl)methyl)amino)-1H-indol-2-yl)quinazolin-4(3H)-one (3ah)



3ah

Following the general procedures, **4a** (174 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and (tetrahydro-2H-pyran-4-yl)methanamine (34 μL, 0.3 mmol) was used; The product **3ah** was obtained as a pale yellow solid (40.4 mg, 54% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx 0.3$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.32 (s, 1H), 11.12 (s, 1H), 8.10 (d, *J* = 7.9 Hz, 1H), 7.79 (t, *J* = 7.6 Hz, 1H), 7.65 (d, *J* = 8.1 Hz, 1H), 7.49 (s, 1H), 7.42 (t, *J* = 7.5 Hz, 1H), 7.29 (d, *J* = 8.5 Hz, 1H), 6.53 (d, *J* = 10.4 Hz, 2H), 5.79 (t, *J* = 5.6 Hz, 1H), 3.88 (dd, *J* = 11.5, 4.1 Hz, 2H), 3.29 (t, *J* = 11.8 Hz, 2H), 2.93 (t, *J* = 6.0 Hz, 2H), 1.91 – 1.79 (m, 1H), 1.71 (d, *J* = 12.6 Hz, 2H), 1.28 (dd, *J* = 12.2, 4.5 Hz, 2H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.9, 149.2, 147.4, 146.7, 140.2, 134.6, 126.6, 126.5, 126.0, 125.4, 121.9, 120.7, 119.2, 111.3, 106.1, 90.9, 66.9, 49.5, 34.1, 30.9. **HRMS (ESI-TOF):** *m/z* calculated for $C_{22}H_{22}N_4O_2$ $[M+H]^+$: 375.1816, found: 375.1806.

2-(6-((2-(thiophen-2-yl) ethyl) amino)-1H-indol-2-yl) quinazolin-4(3H)-one (3ai)

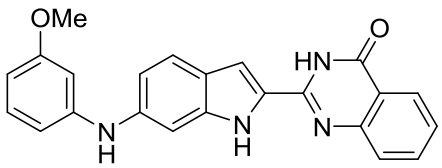


3ai

Following the general procedures，**4a** (174 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and 2-(thiophen-2-yl)ethan-1-amine (38 μL, 0.3 mmol) was used; The product **3ai** was obtained as a yellow solid (38.5 mg, 50% yield) after column chromatography (eluent = petroleum ether/EtOAc 3:1 v/v); (PE/EA = 2/1, $R_F \approx 0.6$). **^{1}H NMR (500 MHz, DMSO-*d*$_6$)** δ 12.34 (s, 1H), 11.18 (s, 1H), 8.11 (d, *J* = 7.9 Hz, 1H), 7.79 (t, *J* = 7.8 Hz, 1H), 7.66 (d, *J* = 8.3 Hz, 1H), 7.50 (s, 1H), 7.43 (t, *J* = 7.5 Hz, 1H), 7.39 – 7.29 (m, 2H), 6.98 (s, 2H), 6.59 (s, 1H), 6.53 (d, *J* = 8.7 Hz, 1H), 5.88 (s, 1H), 3.31 (s, 2H), 3.11 (t, *J* = 7.5 Hz, 2H). **^{13}C NMR (126 MHz, DMSO-*d*$_6$)** δ 161.9, 149.2, 146.7, 142.0, 140.1, 134.6, 126.9, 126.7,

126.6, 126.0, 125.5, 125.2, 123.9, 122.0, 120.7, 119.4, 106.1, 91.1, 45.2, 28.9. **HRMS (ESI-TOF):** *m/z* calculated for $C_{22}H_{18}N_4OS$ $[M+H]^+$: 387.1274, found: 387.1262.

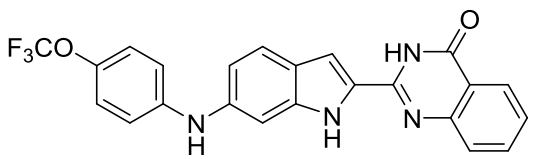
***2-(6-((3-methoxyphenyl)amino)-1H-indol-2-yl)quinazolin-4(3H)-one* (3aj)**



3aj

Following the general procedures，**4a** (174 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and 3-methoxyaniline (36 μL, 0.3 mmol) was used; The product **3aj** was obtained as a yellow solid (22.9 mg, 30% yield) after column chromatography (eluent = petroleum ether/EtOAc 5:1 v/v); (PE/EA = 2/1, $R_F \approx 0.7$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.47 (s, 1H), 11.44 (s, 1H), 8.27 (s, 1H), 8.13 (d, *J* = 7.9 Hz, 1H), 7.82 (t, *J* = 7.6 Hz, 1H), 7.69 (d, *J* = 8.1 Hz, 1H), 7.58 (s, 1H), 7.53 – 7.44 (m, 2H), 7.32 (s, 1H), 7.14 (t, *J* = 8.4 Hz, 1H), 6.85 (d, *J* = 8.6 Hz, 1H), 6.69 (d, *J* = 8.0 Hz, 2H), 6.40 (d, *J* = 7.9 Hz, 1H), 3.73 (s, 3H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 162.3, 160.7, 149.5, 147.0, 145.6, 140.9, 139.5, 135.1, 130.3, 129.0, 127.2, 126.5, 126.3, 122.6, 122.5, 121.4, 114.6, 109.5, 106.0, 105.3, 102.3, 98.8, 55.3. **HRMS (ESI-TOF):** *m/z* calculated for $C_{23}H_{18}N4O_2$ $[M+H]^+$: 383.1503, found: 383.1489.

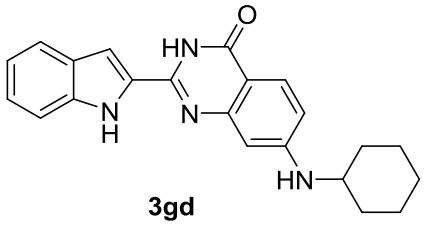
2-(6-((4-(trifluoromethoxy)phenyl)amino)-1H-indol-2-yl)quinazolin-4(3H)-one (3ak)



3ak

Following the general procedures，**4a** (174 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and 4-(trifluoromethoxy)aniline (41 μL, 0.3 mmol) was used; The product **3ak** was obtained as dark yellow solid (41.0 mg, 47% yield) after column chromatography (eluent = petroleum ether/EtOAc 5:1 v/v); (PE/EA = 2/1, $R_F \approx 0.7$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.50 (s, 1H), 11.48 (s, 1H), 8.45 (s, 1H), 8.14 (d, *J* = 7.9 Hz, 1H), 7.82 (t, *J* = 7.7 Hz, 1H), 7.69 (d, *J* = 8.0 Hz, 1H), 7.60 (s, 1H), 7.53 (d, *J* = 8.5 Hz, 1H), 7.47 (t, *J* = 7.5 Hz, 1H), 7.29 (s, 1H), 7.22 (d, *J* = 8.6 Hz, 2H), 7.15 (d, *J* = 7.2 Hz, 2H), 6.88 (d, *J* = 8.7 Hz, 1H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 162.3, 149.4, 147.0, 144.0, 141.0, 141.0, 140.4, 139.4, 135.1, 130.1, 129.3, 127.2, 126.5, 126.4, 123.0, 122.8, 122.7, 121.8, 121.4, 119.8, 117.2, 114.5, 106.0, 99.7. **HRMS (ESI-TOF):** *m/z* calculated for $C_{23}H_{15}N_4O_2F_3$ $[M+H]^+$: 437.1220, found: 437.1212.

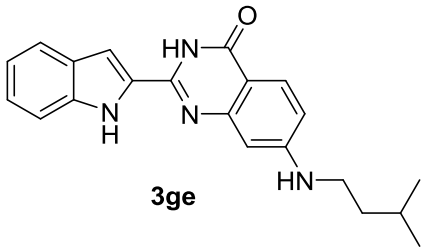
***7-(cyclohexylamino)-2-(1H-indol-2-yl) quinazolin-4(3H)-one* (3gd)**



3gd

Following the general procedures，**4g** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and cyclohexanamine (21 μL, 0.3 mmol) was used; The product **3gh** was obtained as a yellow solid (40.8 mg, 57% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx$ 0.4). **^{1}H NMR (400 MHz, DMSO-d6)** δ 12.05 (s, 1H), 11.65 (d, *J* = 2.3 Hz, 1H), 7.80 (d, *J* = 8.7 Hz, 1H), 7.65 – 7.56 (m, 2H), 7.52 (d, *J* = 8.3 Hz, 1H), 7.21 (t, *J* = 7.6 Hz, 1H), 7.05 (t, *J* = 7.5 Hz, 1H), 6.77 (dd, *J* = 8.8, 2.3 Hz, 1H), 6.64 (d, *J* = 2.2 Hz, 1H), 6.56 (d, *J* = 7.5 Hz, 1H), 2.00 (d, *J* = 10.2 Hz, 2H), 1.83 – 1.72 (m, 2H), 1.45 – 1.32 (m, 2H), 1.31 – 1.17 (m, 4H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.7, 153.5, 147.0, 138.0, 130.8, 130.1, 127.9, 127.5, 124.3, 121.9, 120.4, 114.8, 112.8, 109.7, 105.0, 51.2, 32.7, 25.9, 25.0. **HRMS (ESI-TOF):** *m/z* calculated for $C_{22}H_{22}N_4O$ $[M+H]^+$: 359.1866, found: 359.1862.

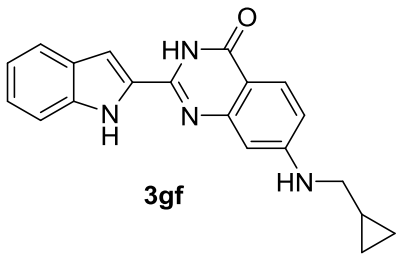
***2-(1H-indol-2-yl)-7-(isopentylamino) quinazolin-4(3H)-one* (3ge)**



3ge

Following the general procedures，**4g** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3M in THF, 0.4 mmol) and 3-methylbutan-1-amine (35 μL, 0.3 mmol) was used; The product **3ge** was obtained as a yellow solid (41.5 mg, 60% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx 0.3$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.08 (s, 1H), 11.71 (s, 1H), 7.80 (d, *J* = 8.7 Hz, 1H), 7.61 (d, *J* = 8.7 Hz, 2H), 7.52 (d, *J* = 8.3 Hz, 1H), 7.20 (t, *J* = 7.6 Hz, 1H), 7.04 (t, *J* = 7.5 Hz, 1H), 6.79 (dd, *J* = 9.8, 7.5 Hz, 2H), 6.64 (s, 1H), 3.13 (q, *J* = 6.7 Hz, 2H), 1.79 – 1.64 (m, *J* = 6.8 Hz, 1H), 1.51 (q, *J* = 7.2 Hz, 2H), 0.93 (d, *J* = 6.6 Hz, 6H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.7, 154.5, 151.4, 146.9, 137.9, 131.0, 128.0, 127.4, 124.2, 121.8, 120.3, 114.3, 112.8, 110.0, 104.8, 104.3, 41.1, 37.7, 25.9, 22.9. **HRMS (ESI-TOF):** *m/z* calculated for $C_{21}H_{22}N_4O$ $[M+H]^+$: 347.1866, found: 347.1855.

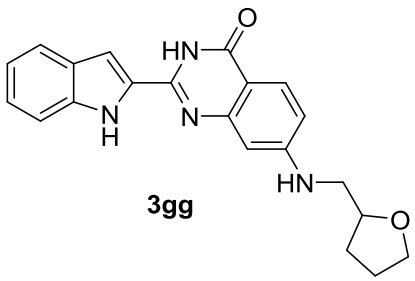
7-((cyclopropylmethyl)amino)-2-(1H-indol-2-yl) quinazolin-4(3H)-one (3gf)



3gf

Following the general procedures，**4g** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and cyclopropylmethanamine (26 μL, 0.3 mmol) was used; The product **3gf** was obtained as a yellow solid (40.9 mg, 62% yield) after column chromatography (eluent = petroleum ether/EtOAc 3:1 v/v); (PE/EA = 3/1, $R_F \approx$ 0.5). **^{1}H NMR (400 MHz, DMSO-d6)** δ 12.07 (s, 1H), 11.69 (s, 1H), 7.81 (d, *J* = 8.7 Hz, 1H), 7.61 (d, *J* = 9.5 Hz, 2H), 7.52 (d, *J* = 8.2 Hz, 1H), 7.20 (t, *J* = 7.6 Hz, 1H), 7.04 (t, *J* = 7.5 Hz, 1H), 6.88 (t, *J* = 5.4 Hz, 1H), 6.80 (dd, *J* = 8.8, 2.3 Hz, 1H), 6.67 (d, *J* = 2.2 Hz, 1H), 3.03 (t, *J* = 6.0 Hz, 2H), 1.15 – 1.06 (m, 1H), 0.51 (q, *J* = 5.5 Hz, 2H), 0.26 (q, *J* = 4.8 Hz, 2H). **^{13}C NMR (101 MHz, DMSO-d6)** δ 161.2, 154.0, 150.9, 146.4, 137.4, 130.5, 127.5, 126.9, 123.8, 121.4, 119.8, 113.9, 112.3, 109.7, 104.2, 104.0, 46.9, 10.2, 3.6. **HRMS (ESI-TOF):** *m/z* calculated for $C_{20}H_{18}N_4O$ $[M+H]^+$: 331.1553, found: 331.1548.

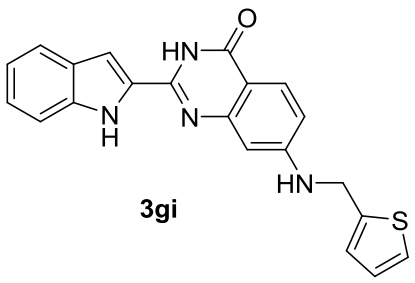
2-(1H-indol-2-yl)-7-(((tetrahydrofuran-2-yl)methyl)amino)quinazolin-4(3H)-one **(3gg)**



3gg

Following the general procedures，**4g** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and tetrahydrofurfurylamine (31 μL, 0.3 mmol) was used; The product **3gg** was obtained as a yellow solid (40.3 mg, 56% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx$ 0.3). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.08 (s, 1H), 11.68 (s, 1H), 7.82 (d, *J* = 8.8 Hz, 1H), 7.61 (d, *J* = 11.9 Hz, 2H), 7.52 (d, *J* = 8.3 Hz, 1H), 7.21 (t, *J* = 7.6 Hz, 1H), 7.05 (t, *J* = 7.5 Hz, 1H), 6.89 – 6.76 (m, 2H), 6.72 (s, 1H), 4.04 (p, *J* = 6.4 Hz, 1H), 3.80 (q, *J* = 6.4 Hz, 1H), 3.65 (q, *J* = 6.5 Hz, 1H), 3.21 (qt, *J* = 13.3, 5.6 Hz, 2H), 2.03 – 1.95 (m, 1H), 1.84 (th, *J* = 13.3, 7.0, 6.5 Hz, 2H), 1.70 – 1.55 (m, 1H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.7, 154.5, 151.3, 146.9, 137.9, 130.9, 130.1, 128.0, 127.4, 124.2, 121.9, 120.3, 114.4, 112.8, 110.3, 104.7, 77.2, 67.7, 47.3, 29.4, 25.6. **HRMS (ESI-TOF):** *m/z* calculated for $C_{21}H_{20}N_4O_2$ $[M+H]^+$: 361.1659, found: 361.1645.

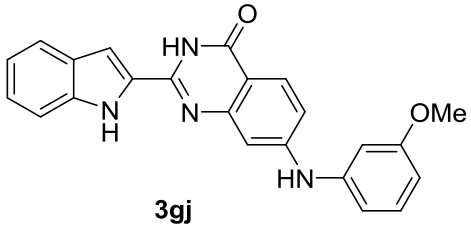
2-(1H-indol-2-yl)-7-((thiophen-2-ylmethyl)amino)quinazolin-4(3H)-one **(3gi)**



3gi

Following the general procedures，**4g** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and thiophen-2-ylmethanamine (34 μL, 0.3 mmol) was used; The product **3gi** was obtained as a yellow solid (44.6 mg, 60% yield) after column chromatography (eluent = petroleum ether/EtOAc 5:1 v/v); (PE/EA = 3/1, $R_F \approx 0.5$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.12 (s, 1H), 11.66 (s, 1H), 7.85 (d, *J* = 8.7 Hz, 1H), 7.64 – 7.58 (m, 2H), 7.51 (d, *J* = 8.2 Hz, 1H), 7.40 (d, *J* = 5.0 Hz, 1H), 7.37 (t, *J* = 5.9 Hz, 1H), 7.20 (t, *J* = 7.4 Hz, 1H), 7.09 (d, *J* = 3.5 Hz, 1H), 7.04 (t, *J* = 7.5 Hz, 1H), 7.01 (dd, *J* = 5.0, 3.5 Hz, 1H), 6.86 (dd, *J* = 8.7, 2.3 Hz, 1H), 6.70 (d, *J* = 2.2 Hz, 1H), 4.61 (d, *J* = 5.8 Hz, 2H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.3, 153.4, 150.8, 146.5, 143.2, 137.5, 130.4, 129.6, 127.5, 127.0, 124.8, 124.7, 123.8, 121.4, 119.9, 114.3, 112.4, 110.5, 104.8, 104.4, 41.6. **HRMS (ESI-TOF):** *m/z* calculated for $C_{21}H_{16}N_4OS$ $[M+H]^+$: 373.1118, found: 373.1126.

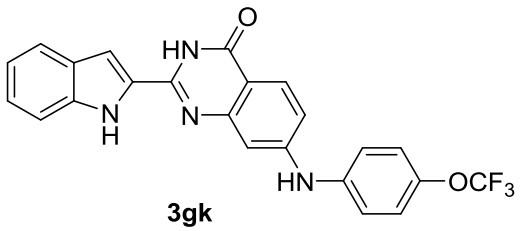
2-(1H-indol-2-yl)-7-((3-methoxyphenyl)amino)quinazolin-4(3H)-one **(3gj)**



3gj

Following the general procedures，**4g** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and 3-methoxyaniline (36 μL, 0.3 mmol) was used; The product **3gj** was obtained as a yellow solid (49.6 mg, 65% yield) after column chromatography (eluent = petroleum ether/EtOAc 5:1 v/v); (PE/EA = 4/1, $R_F \approx 0.4$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.27 (s, 1H), 11.73 (s, 1H), 8.91 (s, 1H), 7.99 (d, *J* = 8.7 Hz, 1H), 7.71 – 7.59 (m, 2H), 7.52 (d, *J* = 8.2 Hz, 1H), 7.29 (d, *J* = 8.5 Hz, 2H), 7.21 (t, *J* = 7.7 Hz, 1H), 7.11 (d, *J* = 8.5 Hz, 1H), 7.05 (t, *J* = 7.5 Hz, 1H), 6.88 (d, *J* = 8.0 Hz, 1H), 6.81 (s, 1H), 6.64 (d, *J* = 8.2 Hz, 1H), 3.77 (s, 3H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.6, 160.6, 151.2, 150.3, 147.3, 142.9, 138.0, 130.7, 130.7, 128.0, 124.4, 121.9, 120.4, 116.4, 113.0, 112.8, 108.4, 108.0, 106.4, 105.1, 55.5. **H RMS (ESI-TOF):** *m/z* calculated for $C_{23}H_{18}N_4O_2$ $[M+H]^+$:383.1503, found: 383.1501.

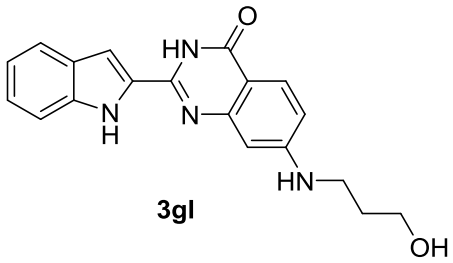
2-(1H-indol-2-yl)-7-((4-(trifluoromethoxy)phenyl)amino) quinazolin-4(3H)-one **(3gk)**



3gk

Following the general procedures，**4g** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and 4-(trifluoromethoxy)aniline (41 μL, 0.3 mmol) was used; The product **3gk** was obtained as a yellow solid (49.7 mg, 57% yield) after column chromatography (eluent = petroleum ether/EtOAc 5:1 v/v); (PE/EA = 4/1, $R_F \approx 0.5$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.31 (s, 1H), 11.71 (s, 1H), 9.05 (s, 1H), 8.01 (d, *J* = 8.2 Hz, 1H), 7.72 – 7.60 (m, 2H), 7.52 (d, *J* = 8.3 Hz, 1H), 7.38 (s, 4H), 7.26 (d, *J* = 2.3 Hz, 1H), 7.21 (t, *J* = 7.6 Hz, 1H), 7.11 (d, *J* = 8.8 Hz, 1H), 7.05 (t, *J* = 7.5 Hz, 1H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.6, 151.1, 149.9, 147.3, 143.3, 141.1, 138.0, 130.7, 128.1, 128.0, 124.4, 122.9, 121.9, 121.7, 121.5, 120.4, 119.7, 116.4, 113.4, 112.8, 108.5, 105.1. **HRMS (ESI-TOF):** *m/z* calculated for $C_{23}H_{15}N_4O_2F_3$ $[M+H]^+$: 437.1220, found: 437.1205.

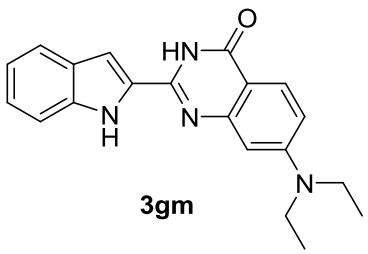
7-((3-hydroxypropyl)amino)-2-(1H-indol-2-yl)quinazolin-4(3H)-one **(3gl)**



3gl

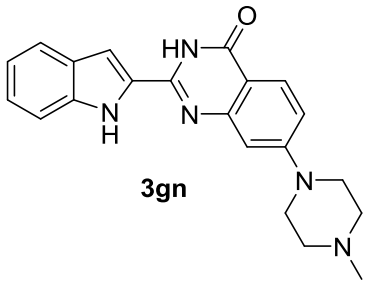
Following the general procedures，**4g** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and 3-aminopropan-1-ol (23 μL, 0.3 mmol) was used; The product **3gl** was obtained as a yellow solid (39.4 mg, 59% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = 2/1, $R_F \approx 0.3$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.06 (s, 1H), 11.68 (s, 1H), 7.82 (d, *J* = 8.7 Hz, 1H), 7.66 – 7.56 (m, 2H), 7.52 (d, *J* = 8.2 Hz, 1H), 7.21 (t, *J* = 7.7 Hz, 1H), 7.05 (t, *J* = 7.6 Hz, 1H), 6.76 (d, *J* = 8.8 Hz, 1H), 6.70 (t, *J* = 5.6 Hz, 1H), 6.66 (s, 1H), 4.57 (d, *J* = 5.4 Hz, 1H), 3.55 (q, *J* = 5.9 Hz, 2H), 3.21 (q, *J* = 6.6 Hz, 2H), 1.77 (p, *J* = 6.7 Hz, 2H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.7, 154.5, 151.4, 146.9, 137.9, 130.9, 130.1, 128.0, 127.4, 124.2, 121.9, 120.3, 114.5, 112.8, 110.1, 104.7, 59.0, 49.1, 32.1. **HRMS (ESI-TOF):** *m/z* calculated for $C_{19}H_{18}N_4O_2$ $[M+H]^+$: 335.1503, found: 335.1491.

7-(diethylamino)-2-(1H-indol-2-yl)quinazolin-4(3H)-one **(3gm)**



Following the general procedures，**4g** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and diethylamine (32 μL, 0.3 mmol) was used; The product **3gm** was obtained as a pale yellow solid (30.5 mg, 46% yield) after column chromatography (eluent = petroleum ether/EtOAc 2:1 v/v); (PE/EA = /1, $R_F \approx 0.3$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.07 (s, 1H), 11.68 (s, 1H), 7.90 (d, *J* = 9.0 Hz, 1H), 7.63 – 7.59 (m, 2H), 7.52 (d, *J* = 8.3 Hz, 1H), 7.21 (t, *J* = 7.6 Hz, 1H), 7.05 (t, *J* = 7.6 Hz, 1H), 6.89 (dd, *J* = 9.0, 2.5 Hz, 1H), 6.75 (d, *J* = 2.5 Hz, 1H), 3.48 (p, *J* = 7.1, 6.2 Hz, 4H), 1.18 (t, *J* = 7.0 Hz, 6H). **^{13}C NMR (101 MHz, DMSO-d6)** δ 161.2, 151.9, 150.7, 146.5, 137.5, 130.4, 129.6, 127.5, 123.8, 121.4, 119.8, 112.3, 111.8, 109.2, 104.9, 104.3, 44.1, 12.4. **HRMS (ESI-TOF):** *m/z* calculated for $C_{20}H_{20}N_4O$ $[M+H]^+$:333.1710, found: 333.1716.

***2-(1H-indol-2-yl)-7-(4-methylpiperazin-1-yl)quinazolin-4(3H)-one* (3gn)**



Following the general procedures，**4g** (165 mg, 0.2 mmol), Cs_2CO_3 (130 mg, 0.4 mmol), LiHDMS (300 μL, 1.3 M in THF, 0.4 mmol) and 1-methylpiperazine (34 μL, 0.3 mmol) was used; The product **3gn** was obtained as a yellow solid (43.0 mg, 60% yield) after column chromatography (eluent = petroleum ether/EtOAc 1:1 v/v); (PE/EA =2/1, $R_F \approx 0.1$). **^{1}H NMR (500 MHz, DMSO-d6)** δ 12.29 (s, 1H), 11.79 (s, 1H), 7.94 (d, *J* = 8.8 Hz, 1H), 7.62 (d, *J* = 7.7 Hz, 2H), 7.53 (d, *J* = 8.2 Hz, 1H), 7.21 (t, *J* = 7.7 Hz, 1H), 7.16 (d, *J* = 9.1 Hz, 1H), 7.05 (t, *J* = 7.5 Hz, 1H), 6.99 (s, 1H), 3.43 (s, 4H), 2.63 (s, 4H), 2.33 (s, 3H). **^{13}C NMR (126 MHz, DMSO-d6)** δ 161.7, 155.4, 150.9, 147.2, 138.0, 130.8, 127.9, 127.5, 124.4, 121.9, 120.4, 115.2, 112.9, 112.3, 109.1, 105.1, 54.2, 46.7, 45.4. **HRMS (ESI-TOF):** *m/z* calculated for $C_{21}H_{21}N_5O$ $[M+H]^+$: 360.1819, found: 360.1816.

5. Screening for antitumor activity of amino-substituted indolyl-4(3*H*)-quinazolinone derivatives

Inhibition ratio detection：Seed 5000 cells each well into 96 well plates. After 24 h, cells were exposed to Compound (10 μM and 50 μM) treatment for 24 h. Then cells were fixed in 70% ethanol (precooled at - 20 ℃) at 4 ℃ overnight. After fixation, cells were stained with 10 μg/mL Propidium Iodide at room temperature for 4 h, then the data was measured with high content screening system. The inhibition ratio is calculated as follow：

$$\text{Inhibition ratio} = 100\%-（\text{Data}_{(\text{compound})}/\ \text{Data}_{(\text{control})}）*100\%$$

Half maximal (50%) inhibitory concentration detection：Seed 5000 cells each well into 96 well plates. After 24 h, cells were exposed to **3gj** or **3gn** (0.1, 1, 5, 10, 25 and 50 μM) treatment for 24 h. Then cells were fixed in 70% ethanol (precooled at - 20 ℃) at 4 ℃ overnight. After fixation, cells were stained with 10 μg/mL Propidium Iodide at room temperature for 4 h, then the inhibition ratio were measured with high content screening system. Finally, the half maximal (50%) inhibitory concentration (IC_{50}) was fitting by Nonlinear regression using GraphPad Prism 8.0.1.

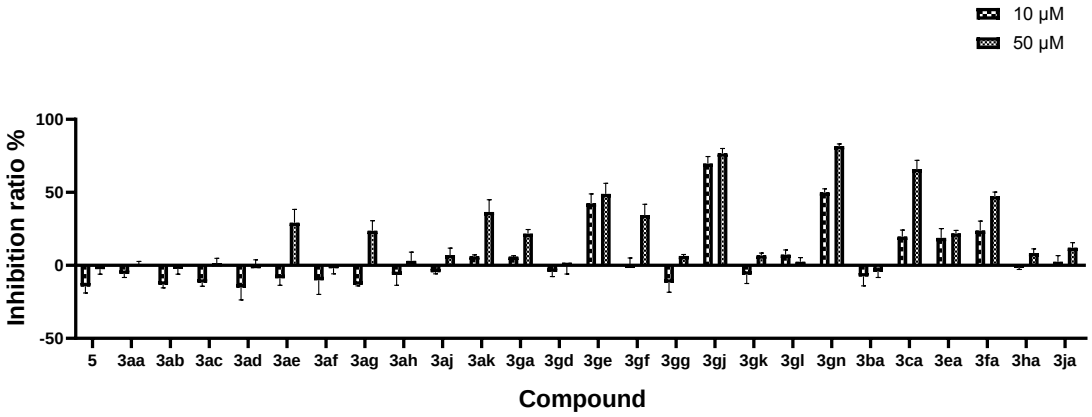


Figure S1. The screening of antitumor activity

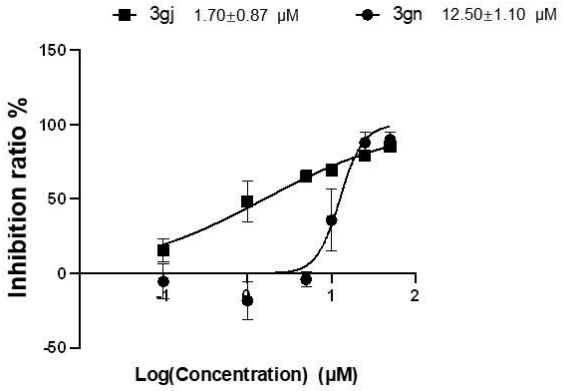


Figure S2. The detection of half maximal (50%) inhibitory concentration (IC_{50}) for **3gj** and **3gn**

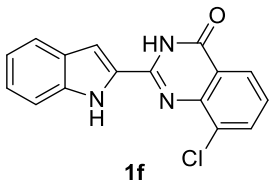
6. References

[1] L. Gao, Z. Xu, Y. Rao, Y.-T. Lu, Y.-T. Hu, H. Yu, Y.-H. Xu, Q.-Q. Song, J.-M. Ye and Z.-S. Huang, *Eur. J. Med. Chem.*, 2018, **147**, 90.

[2] M. R. Uehling, R. P. King, S. W. Krska, T. Cernak and S. L. Buchwald, *Science*, 2019, **363**, 405.

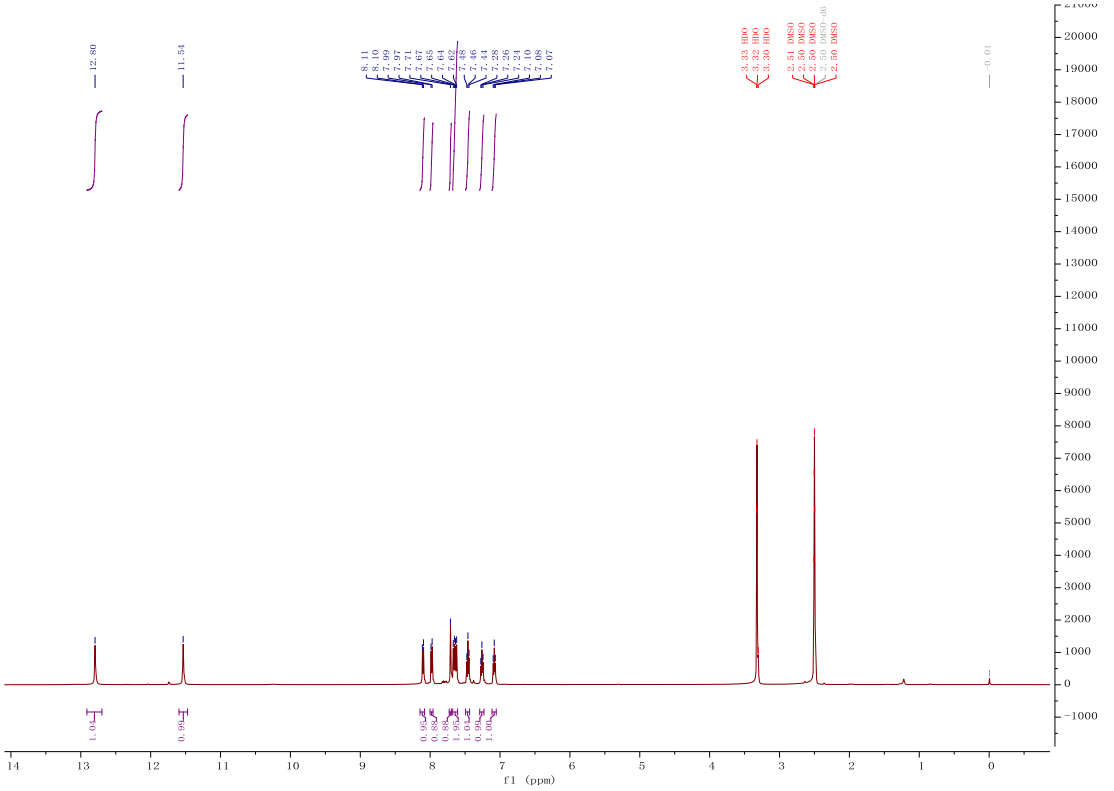
[3] H. G. Lee, P. J. Milner, M. T. Colvin, Loren Andreas and S. L. Buchwald, *Inorg. Chem. Acta.*, 2014, **422**,188.

7. NMR spectrum of some starting materials and products

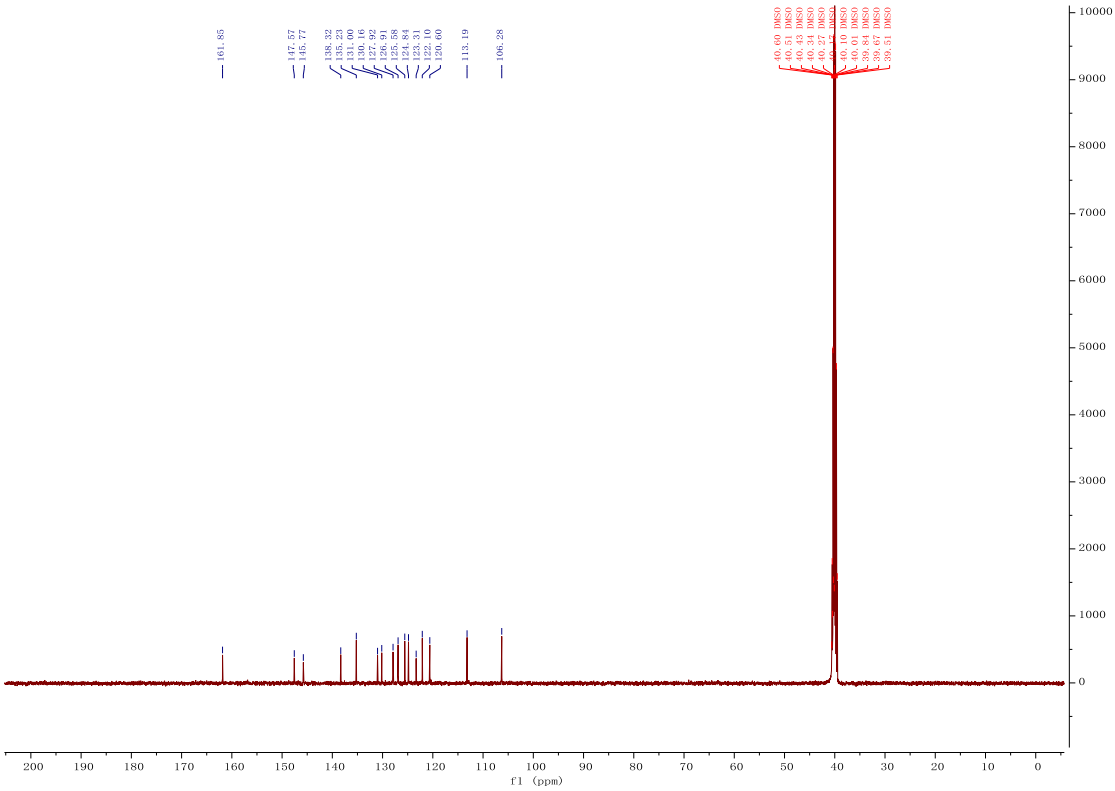


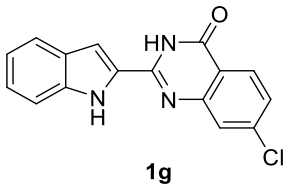
1f

^{1}H NMR of **1f**，500 MHz，DMSO-d_6



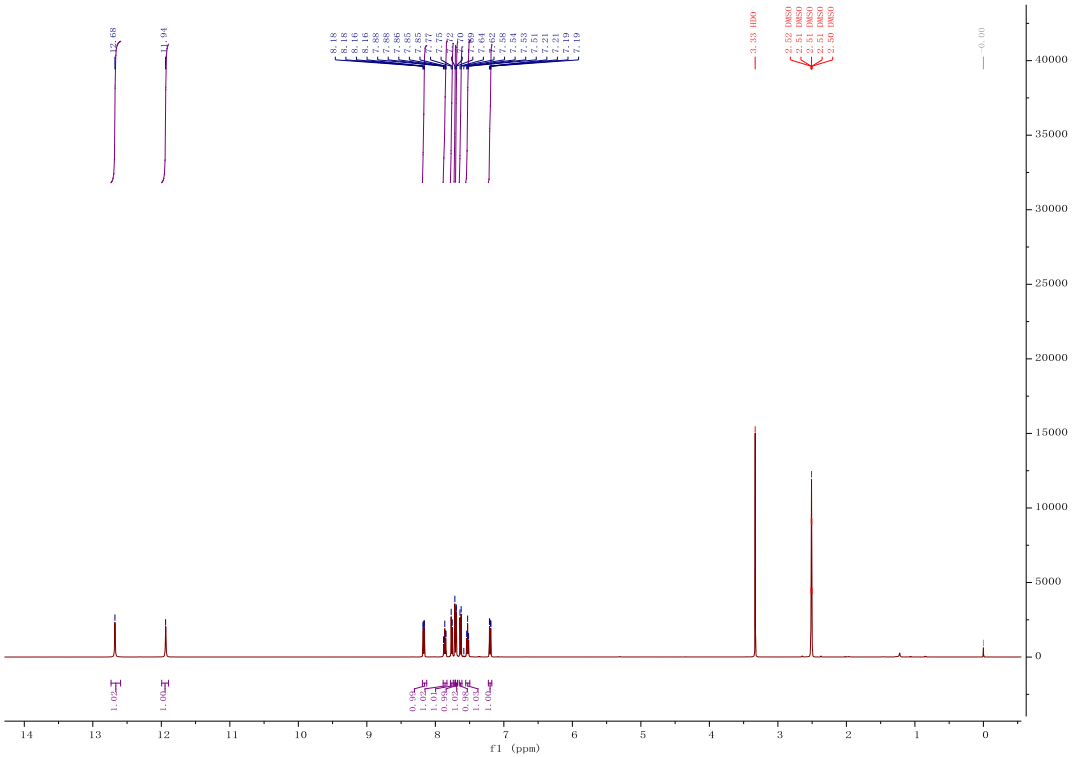
^{13}C NMR of **1f**, 126 MHz, DMSO-d_6



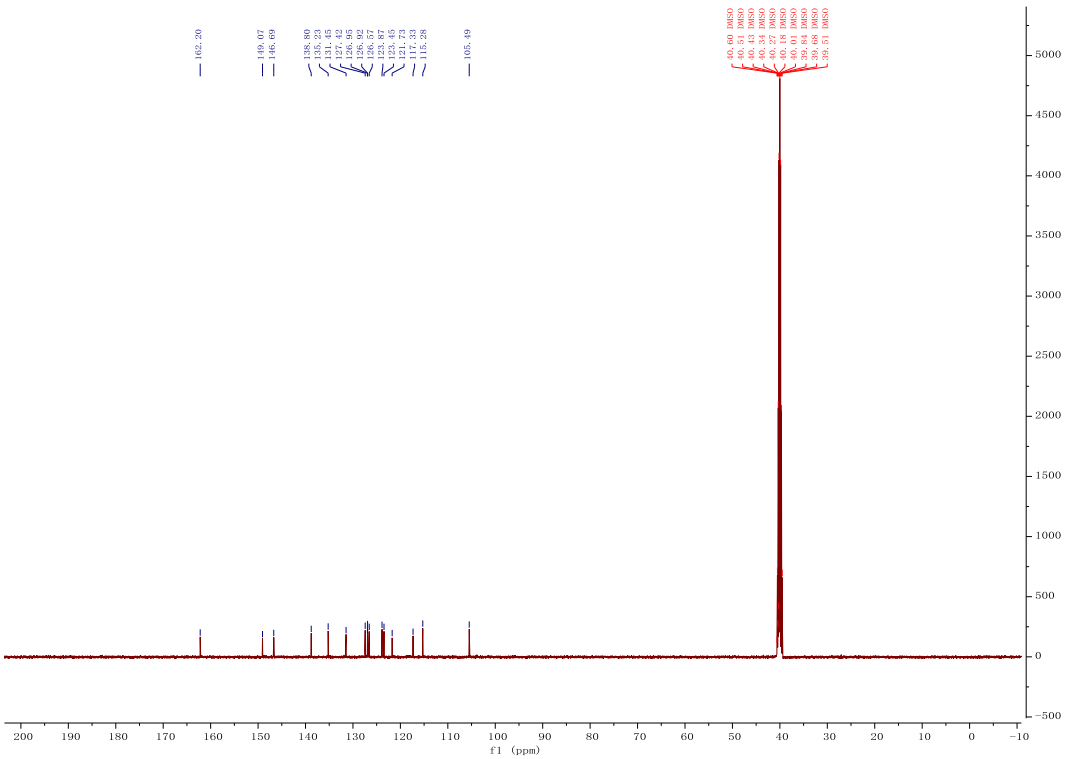


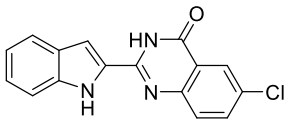
1g

^{1}H NMR of **1g**, 500 MHz, DMSO-d_6



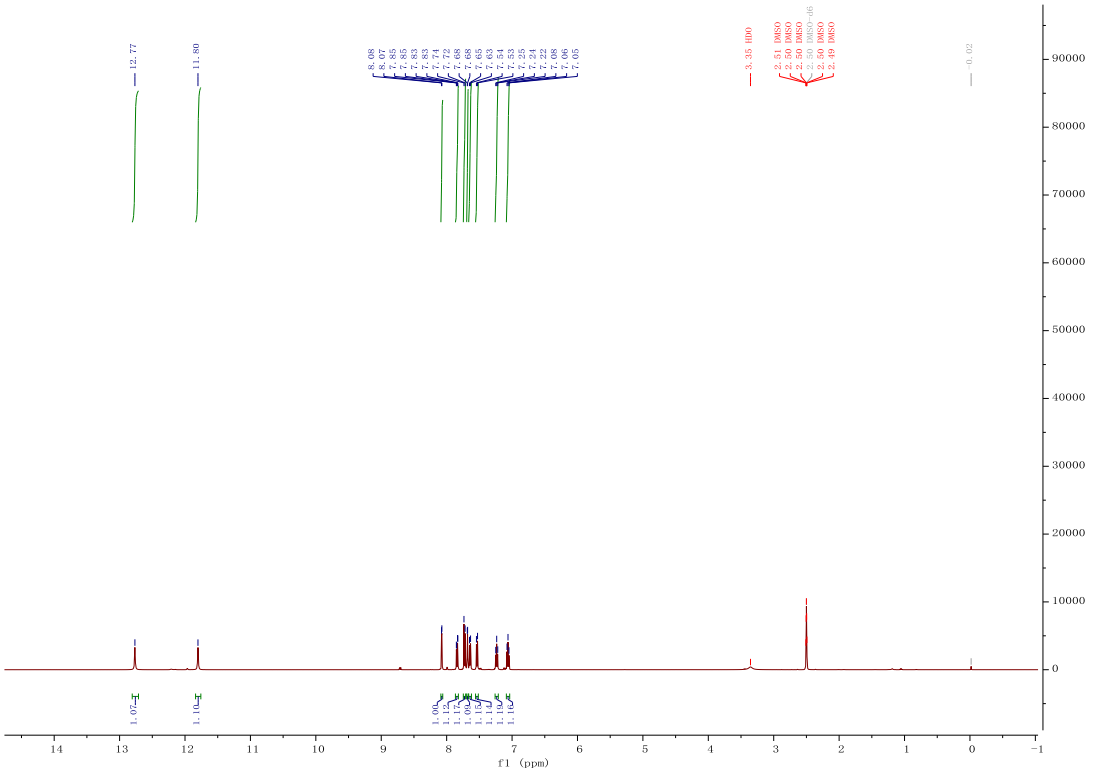
^{13}C NMR of **1g**, 126 MHz, DMSO-d_6



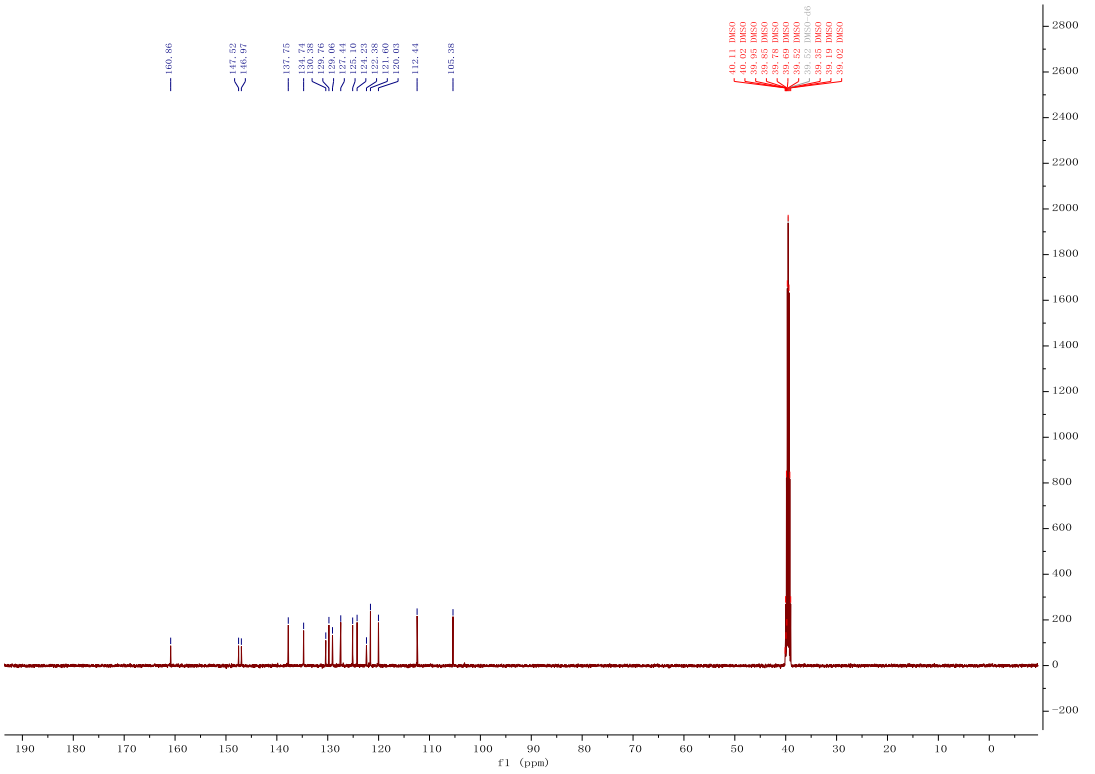


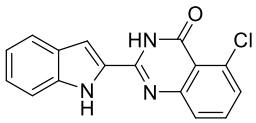
1h

^{1}H NMR of **1h**, 500 MHz, DMSO-d_6



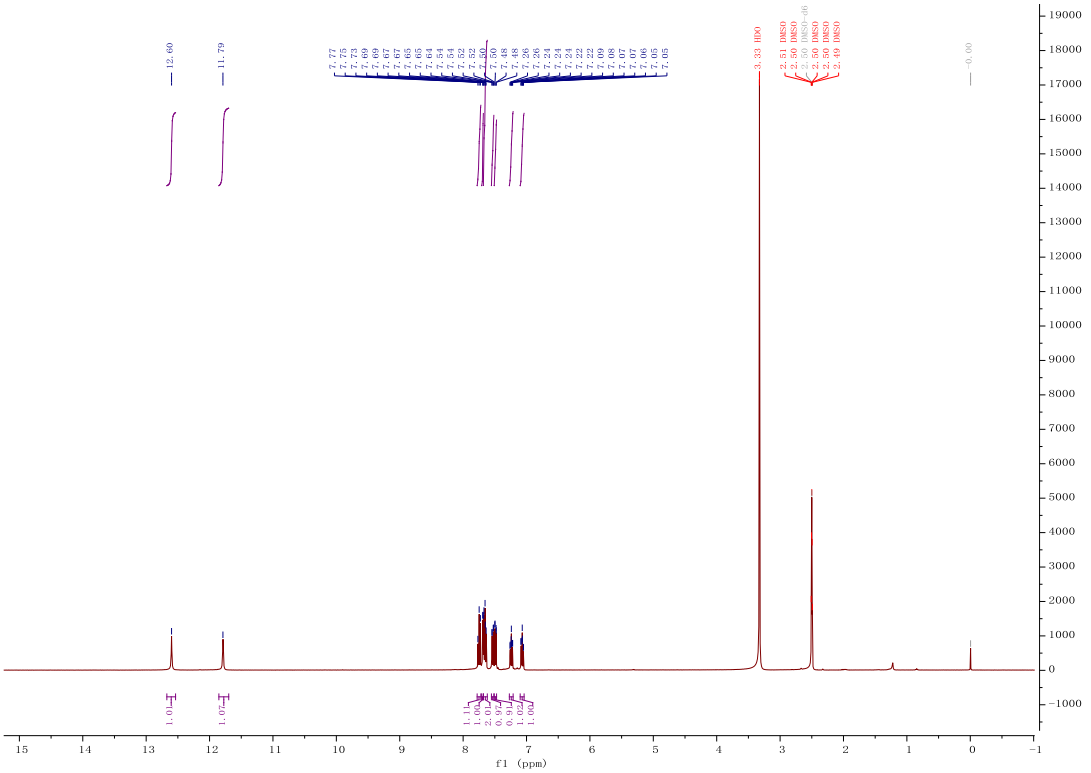
^{13}C NMR of **1h**, 126 MHz, DMSO-d_6



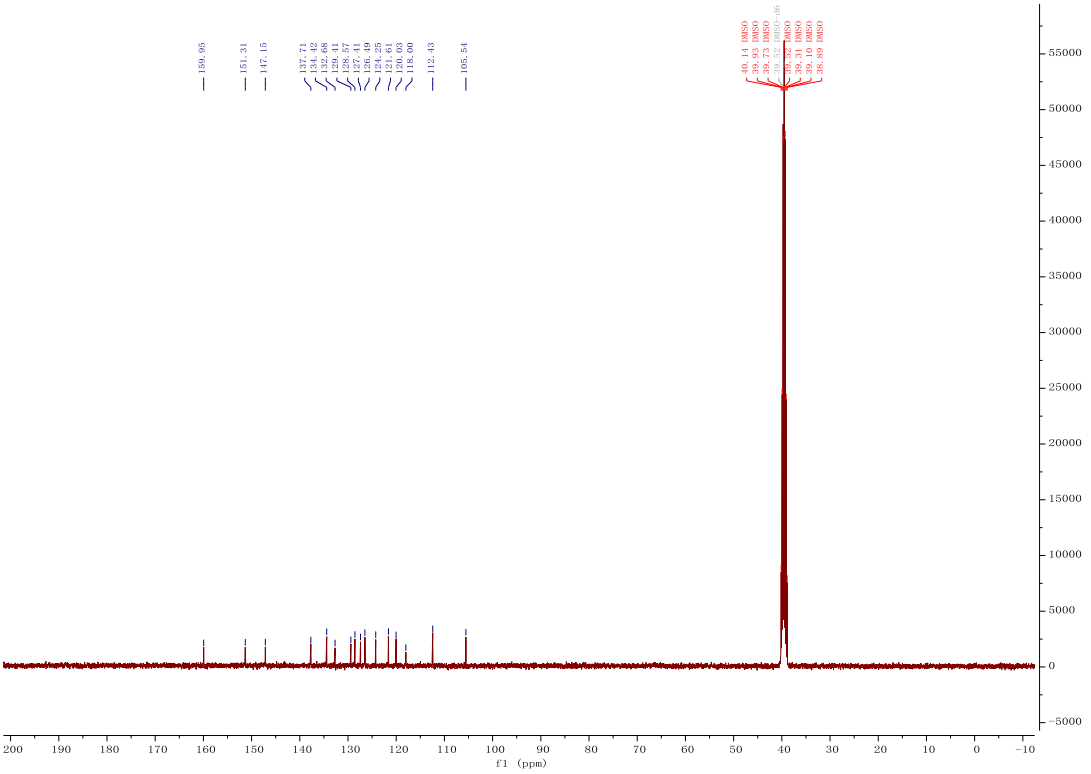


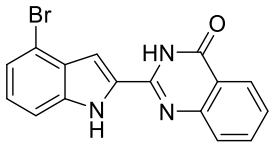
1j

^{1}H NMR of **1j**, 400 MHz, DMSO-d_6



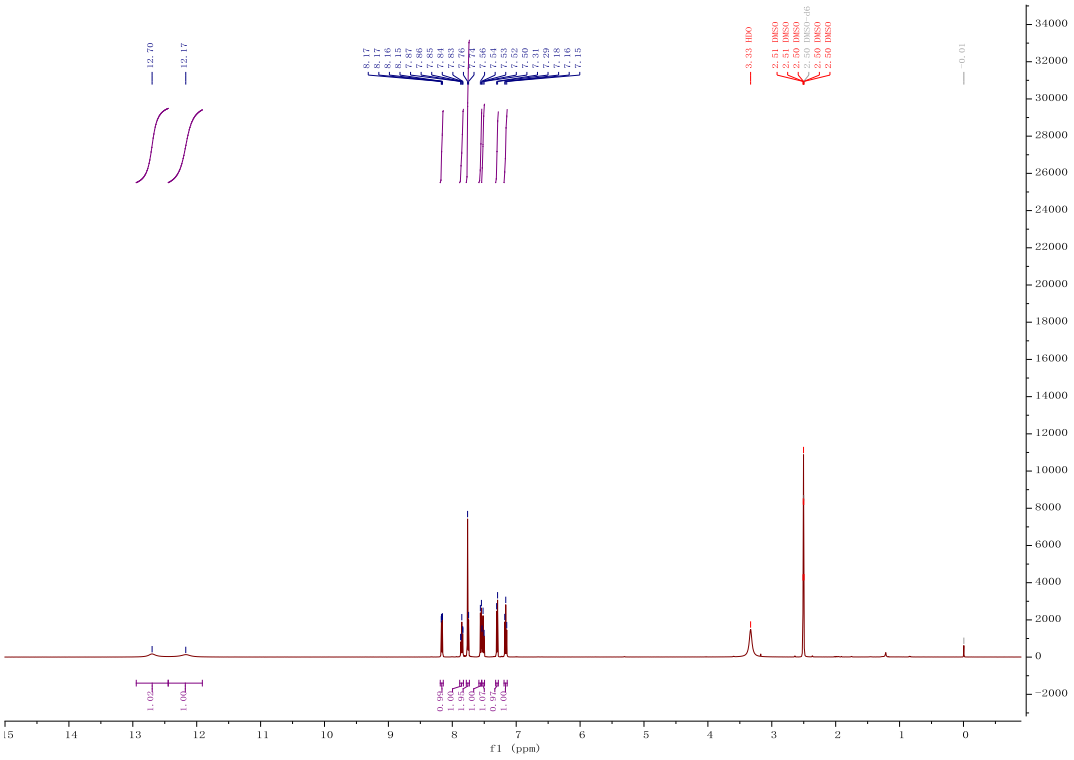
^{13}C NMR of **1j**, 101 MHz, DMSO-d_6



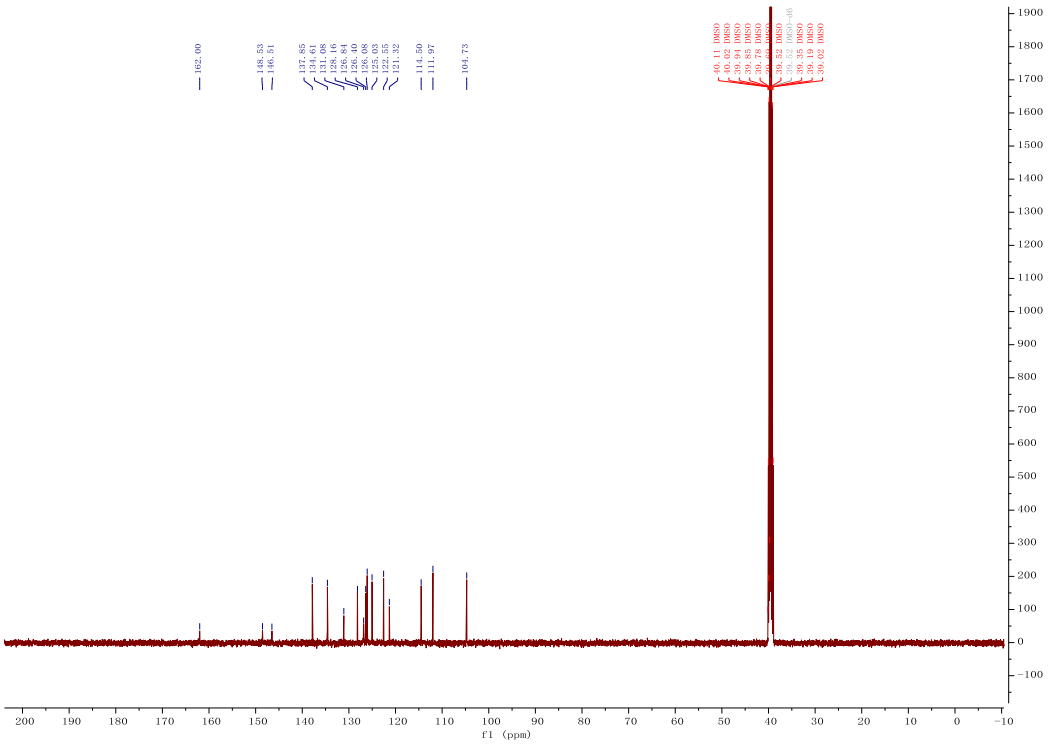


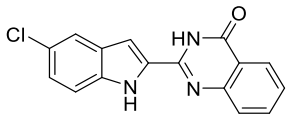
1b

^{1}H NMR of **1b**, 500 MHz, DMSO-d_6



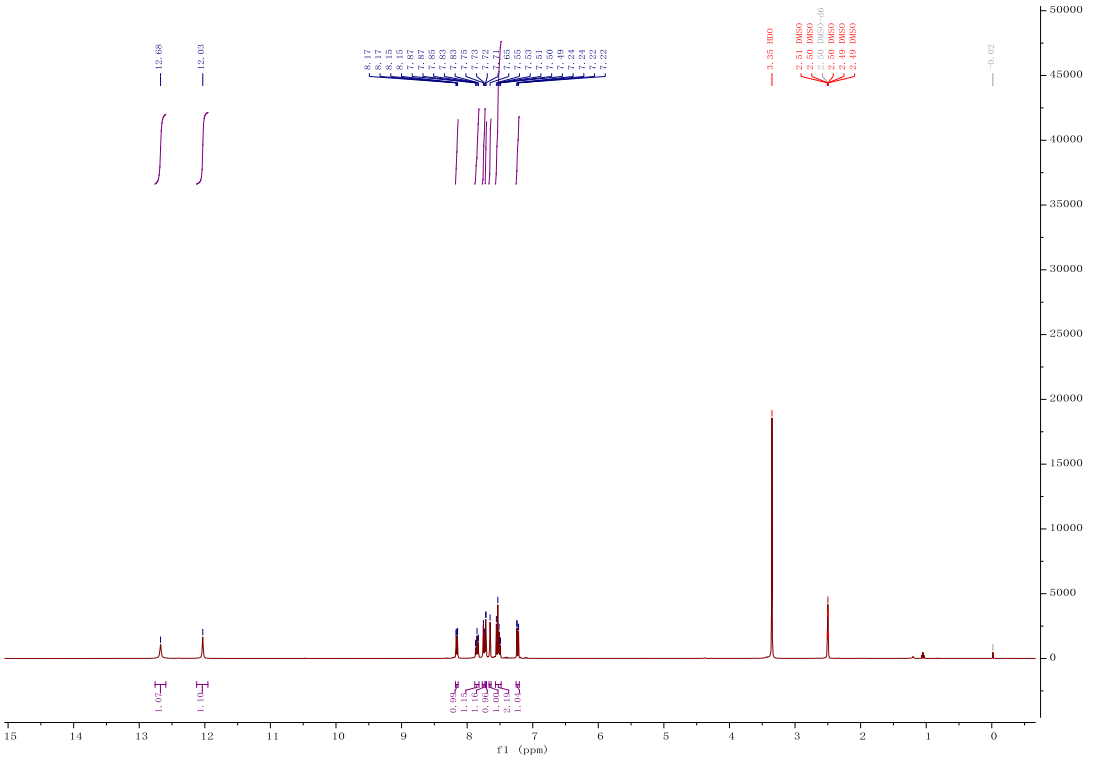
^{13}C NMR of **1b**, 126 MHz, DMSO-d_6



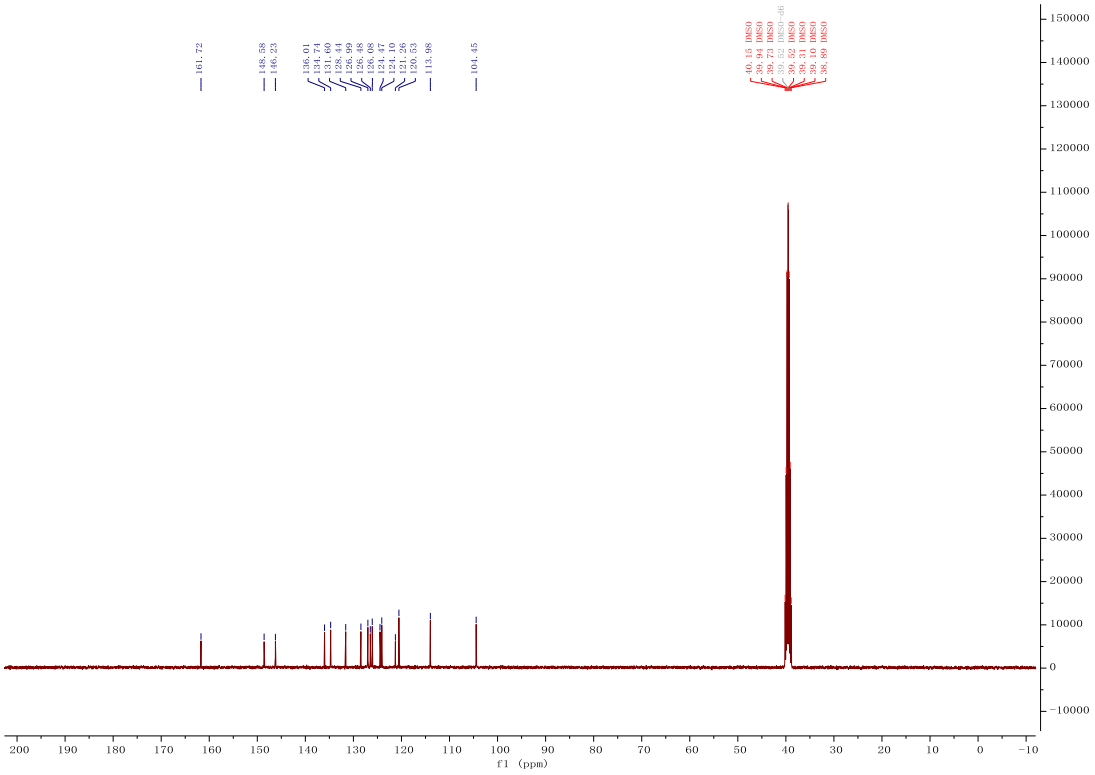


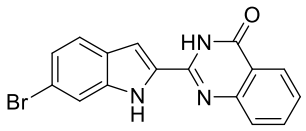
1c

^{1}H NMR of **1c**, 400 MHz, DMSO-d_6



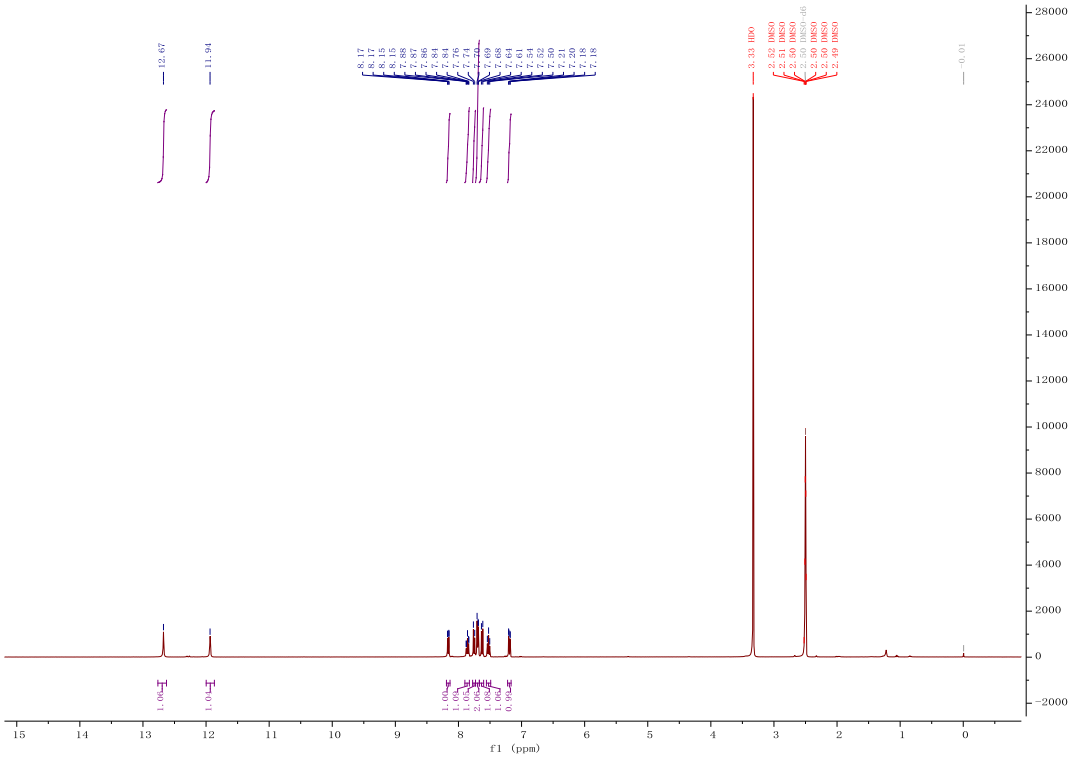
^{13}C NMR of **1c**, 101 MHz, DMSO-d_6



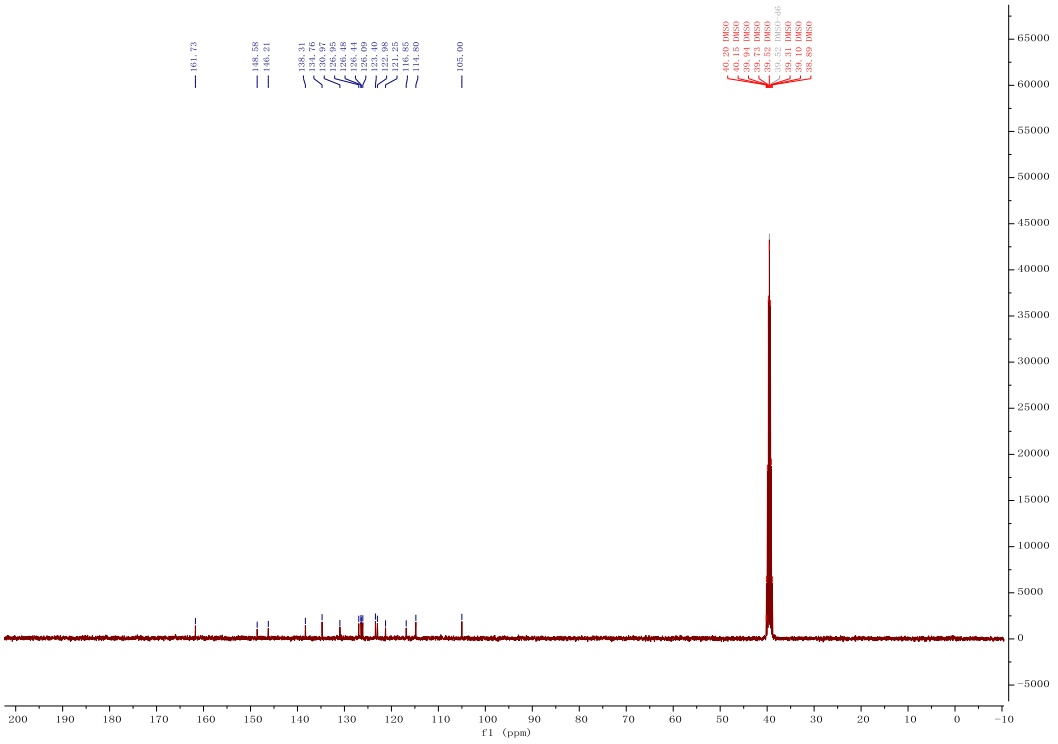


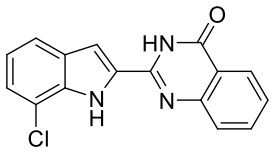
1a

^{1}H NMR of **1a**, 400 MHz, DMSO-d_6



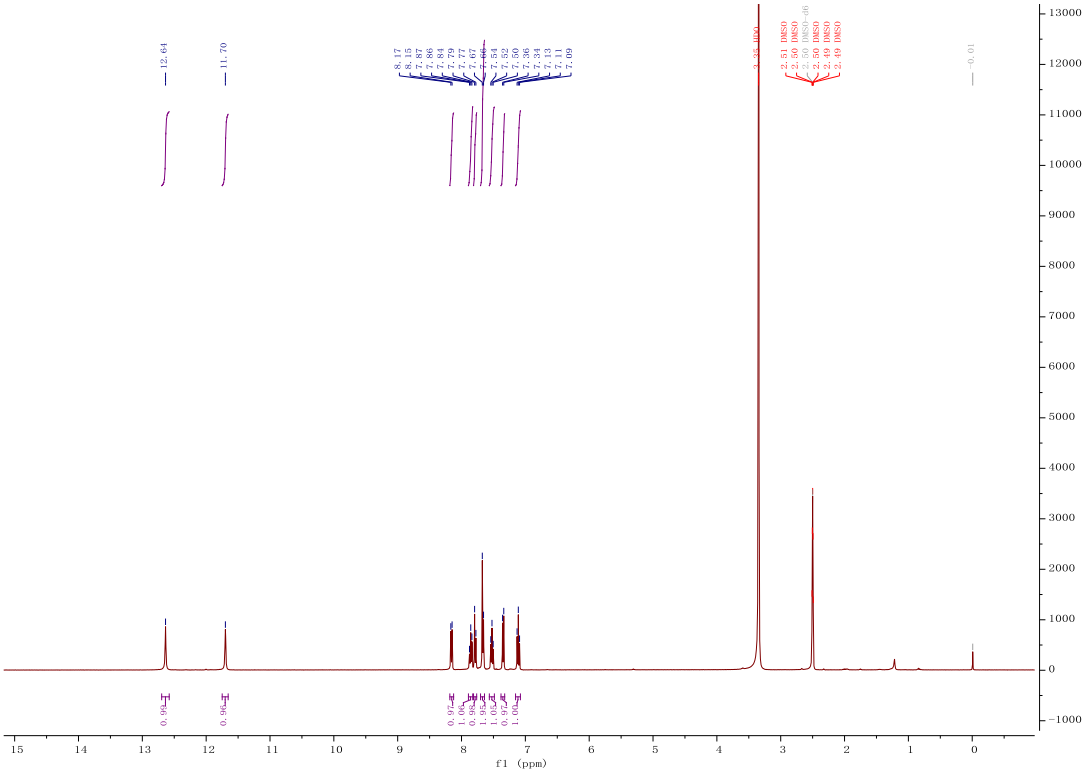
^{13}C NMR of **1a**, 101 MHz, DMSO-d_6



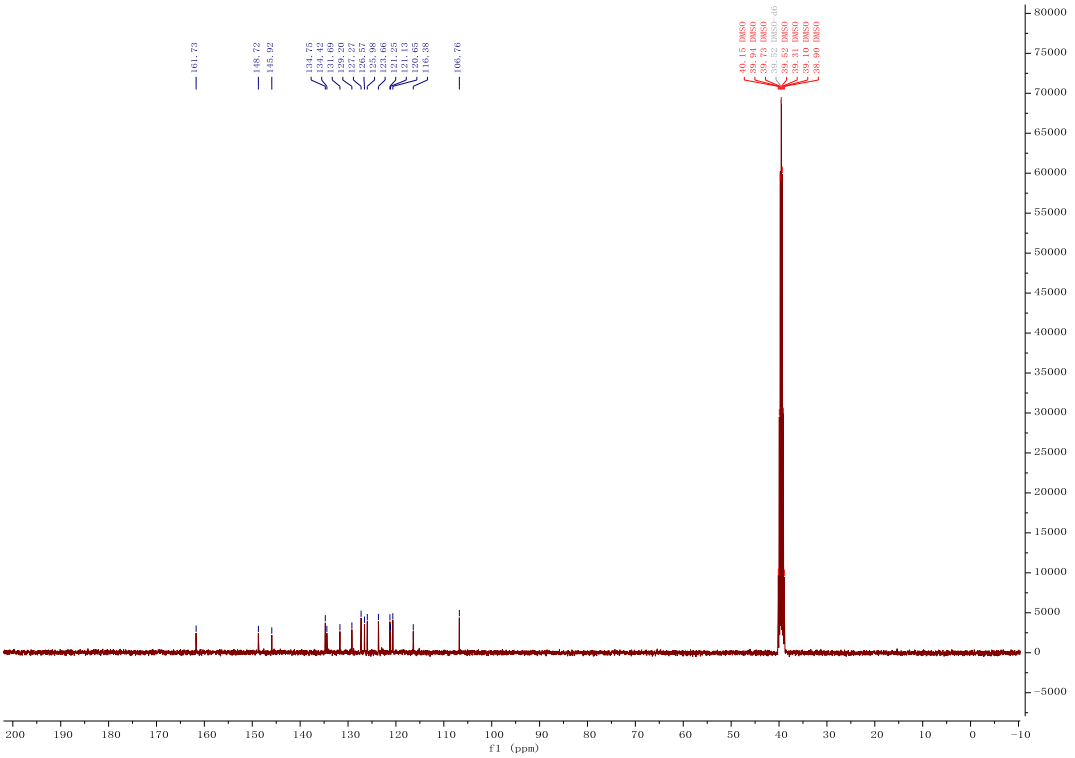


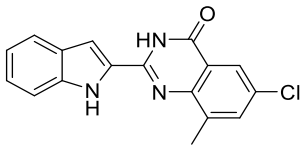
1e

^{1}H NMR of **1e**, 400 MHz, DMSO-d_6



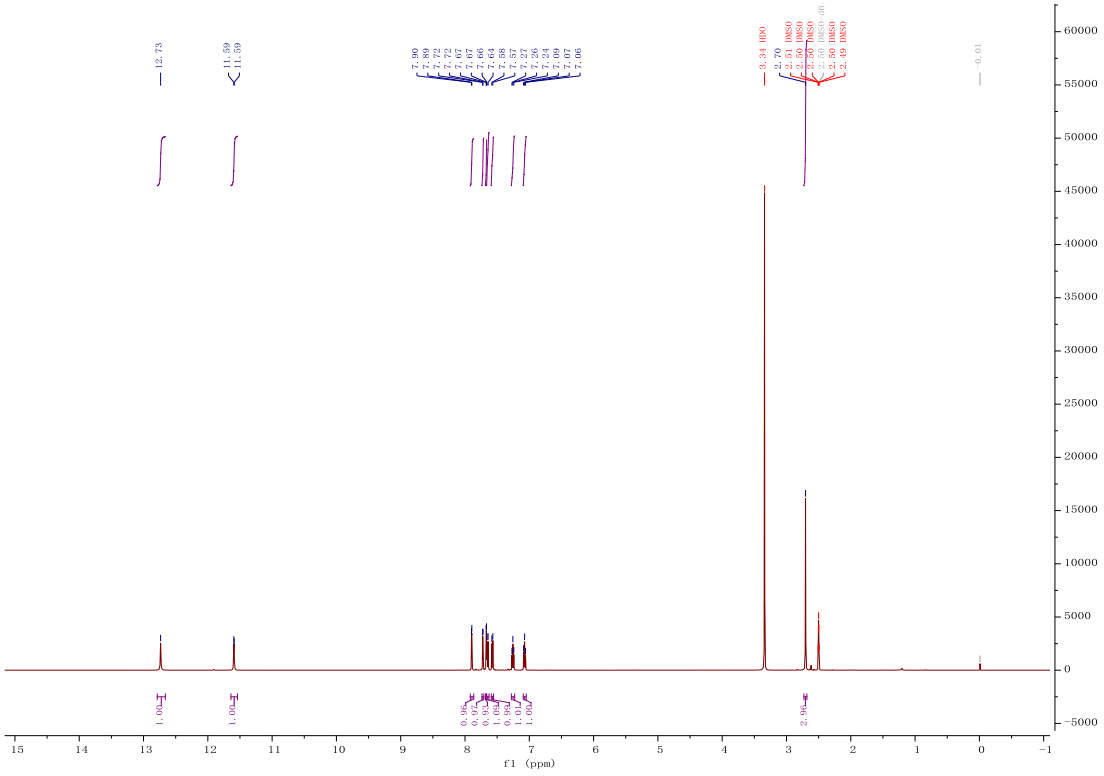
^{13}C NMR of **1e**, 101 MHz, DMSO-d_6



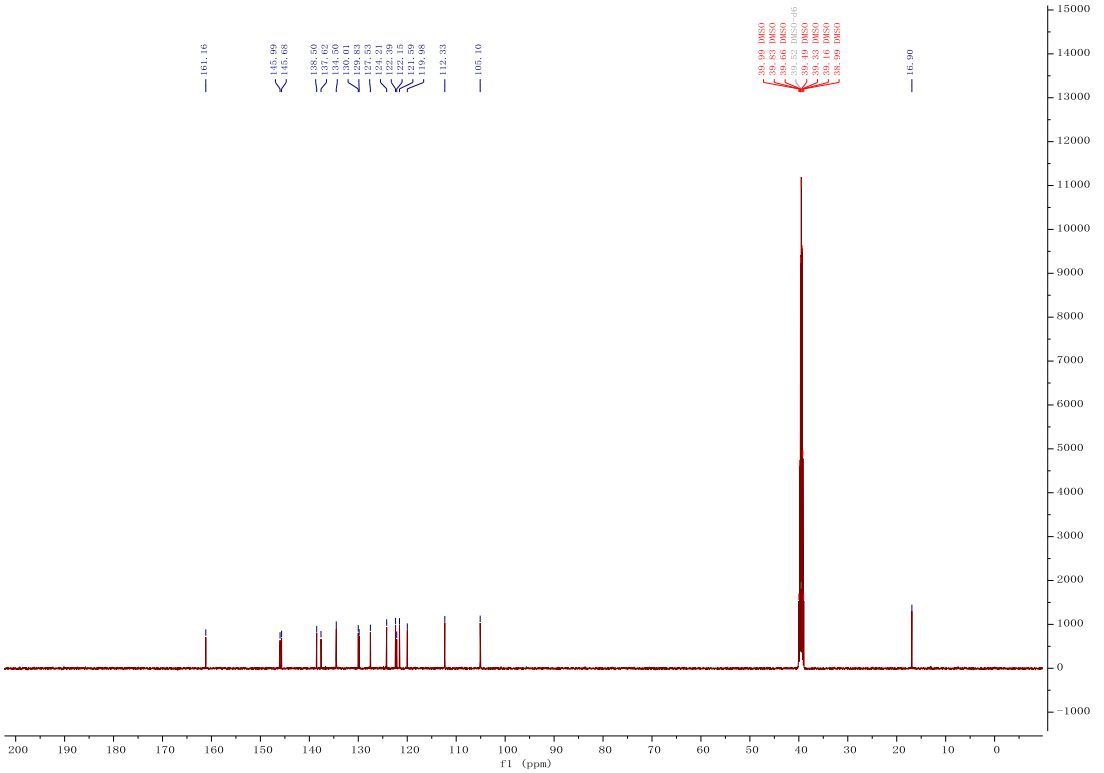


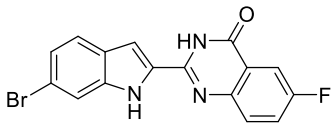
1i

^{1}H NMR of **1i**, 500 MHz, DMSO-d_6



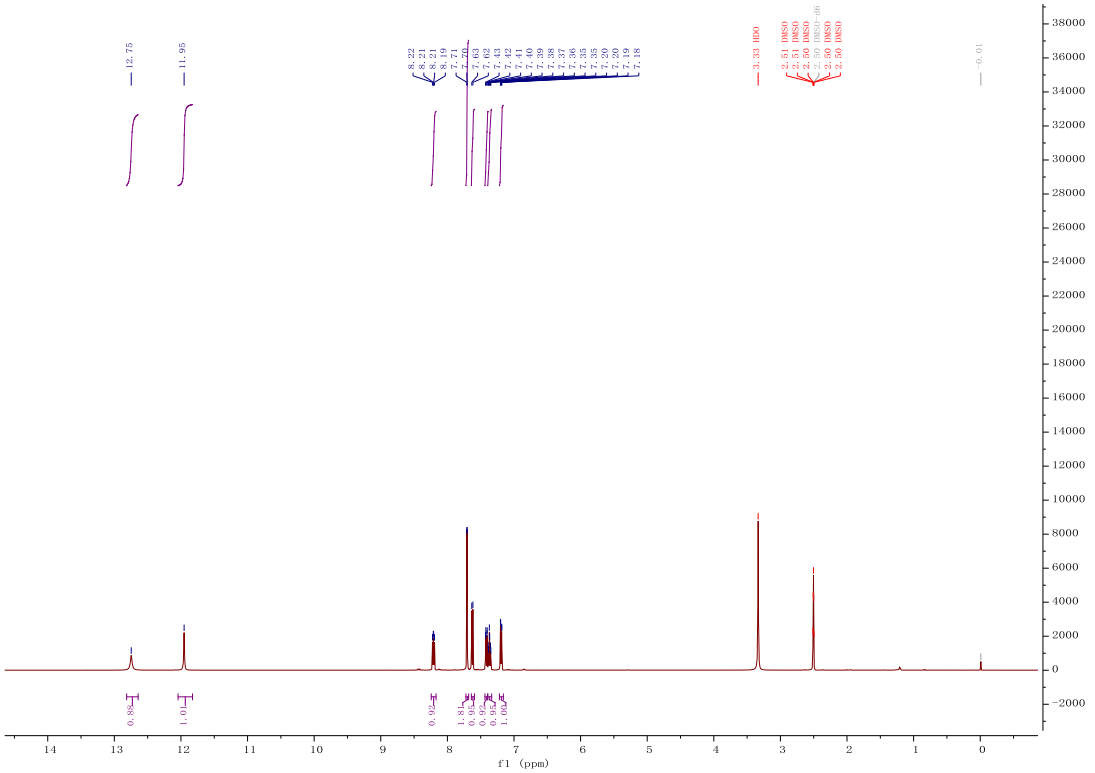
^{13}C NMR of **1i**, 126 MHz, DMSO-d_6



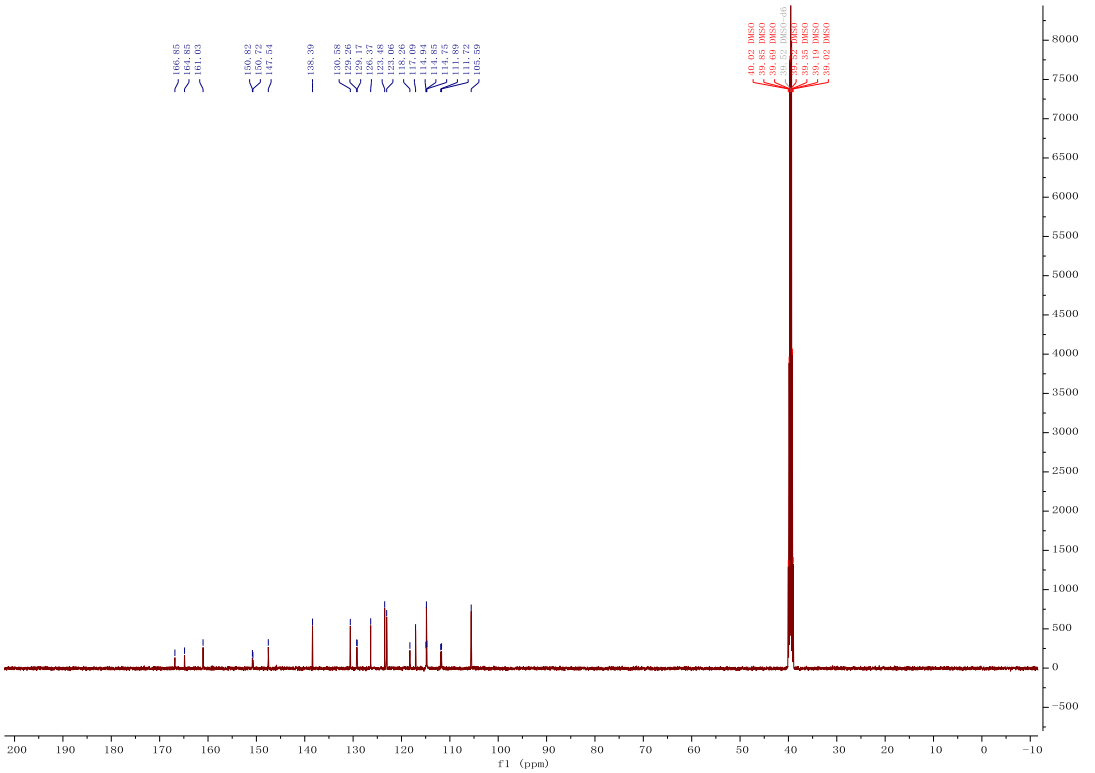


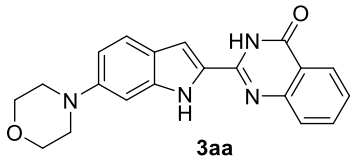
1d

^{1}H NMR of **1d**, 500 MHz, DMSO-d_6



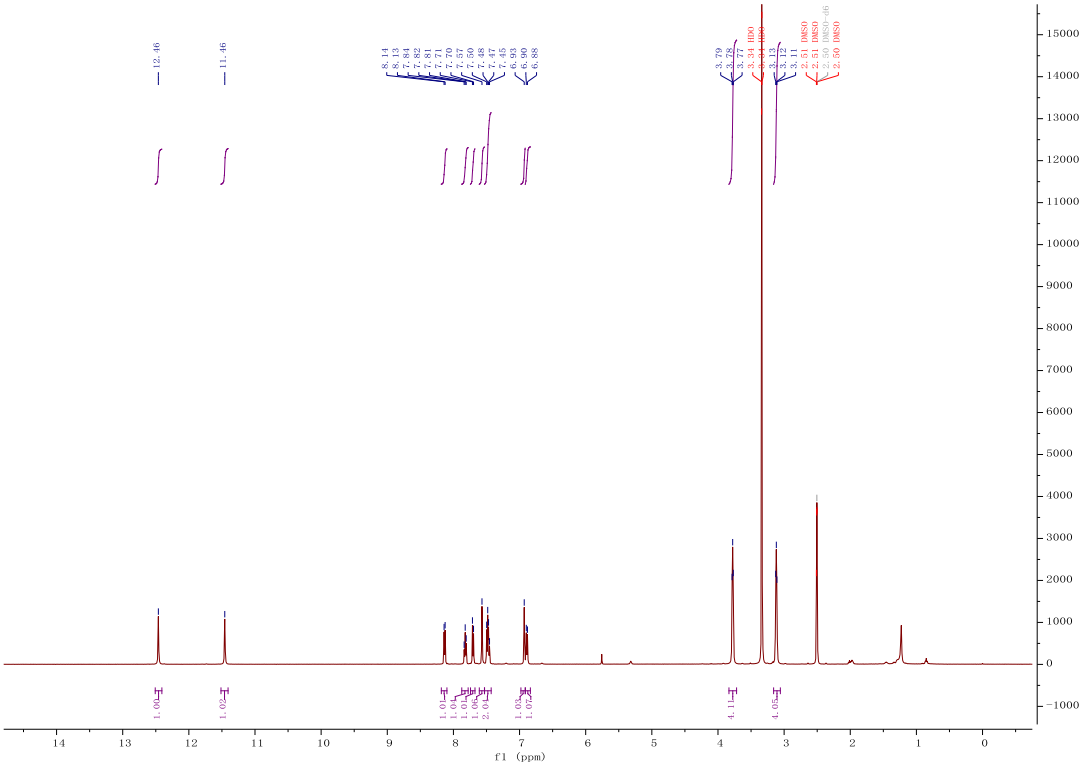
^{13}C NMR of **1d**, 126 MHz, DMSO-d_6



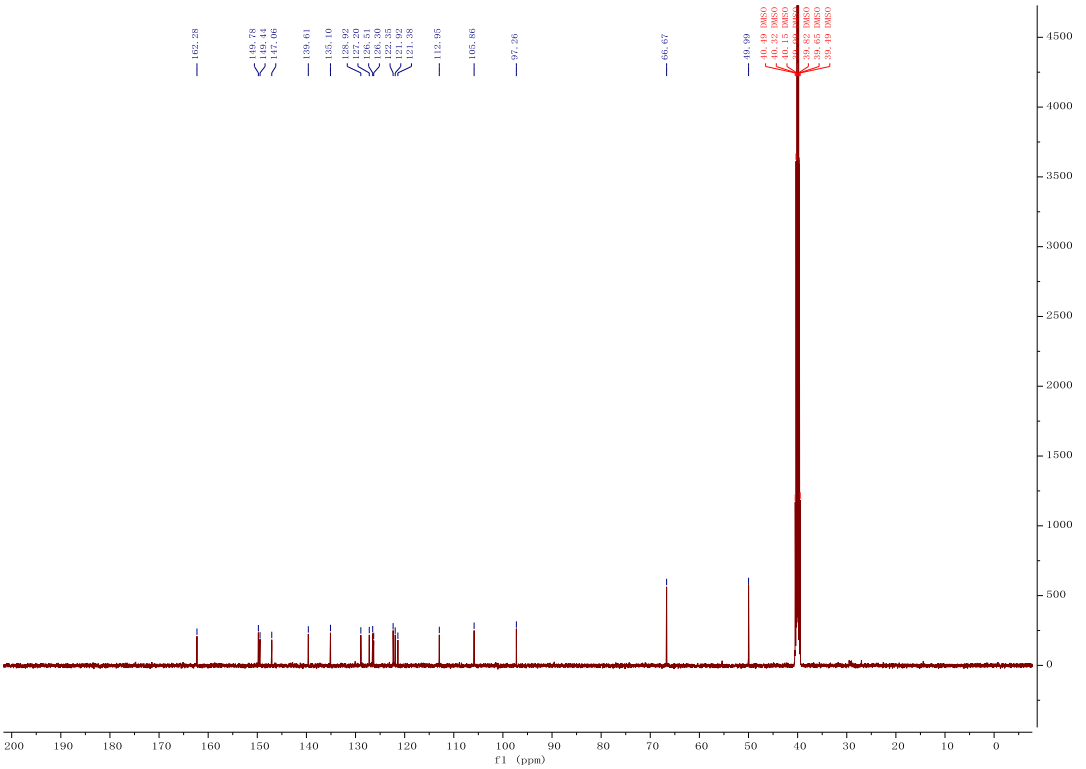


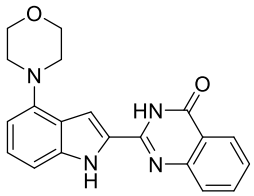
3aa

^{1}H NMR of **3aa**, 500 MHz, DMSO-d_6



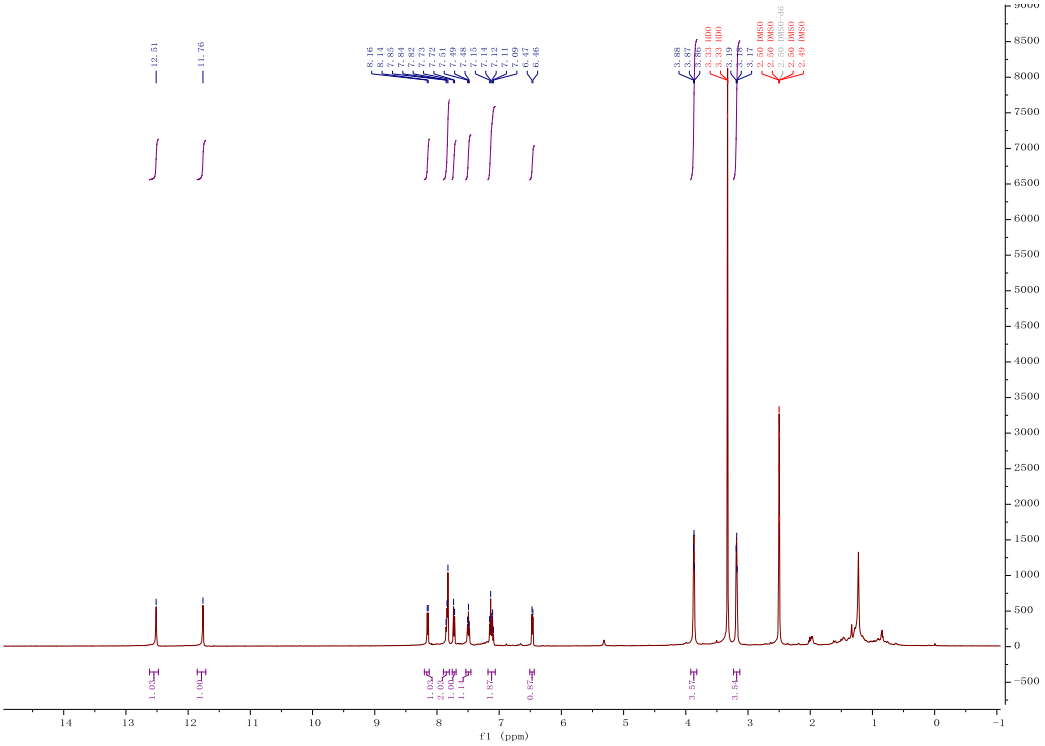
^{13}C NMR of **3aa**, 126 MHz, DMSO-d_6



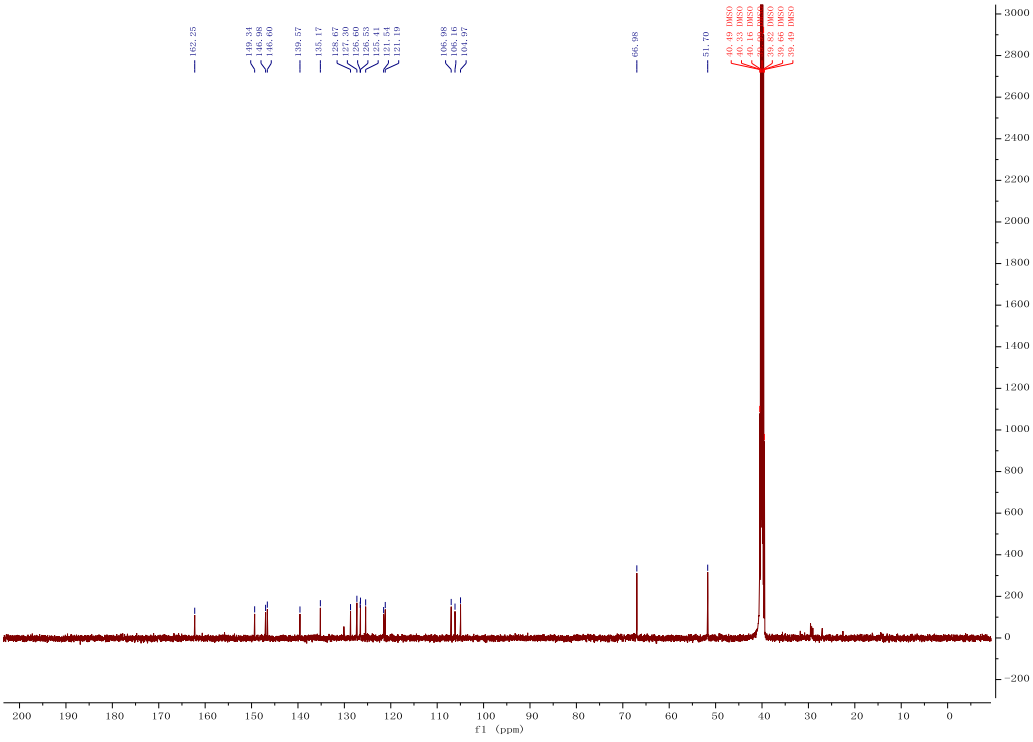


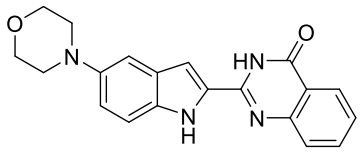
3ba

^{1}H NMR of **3ba**, 500 MHz, DMSO-d_6



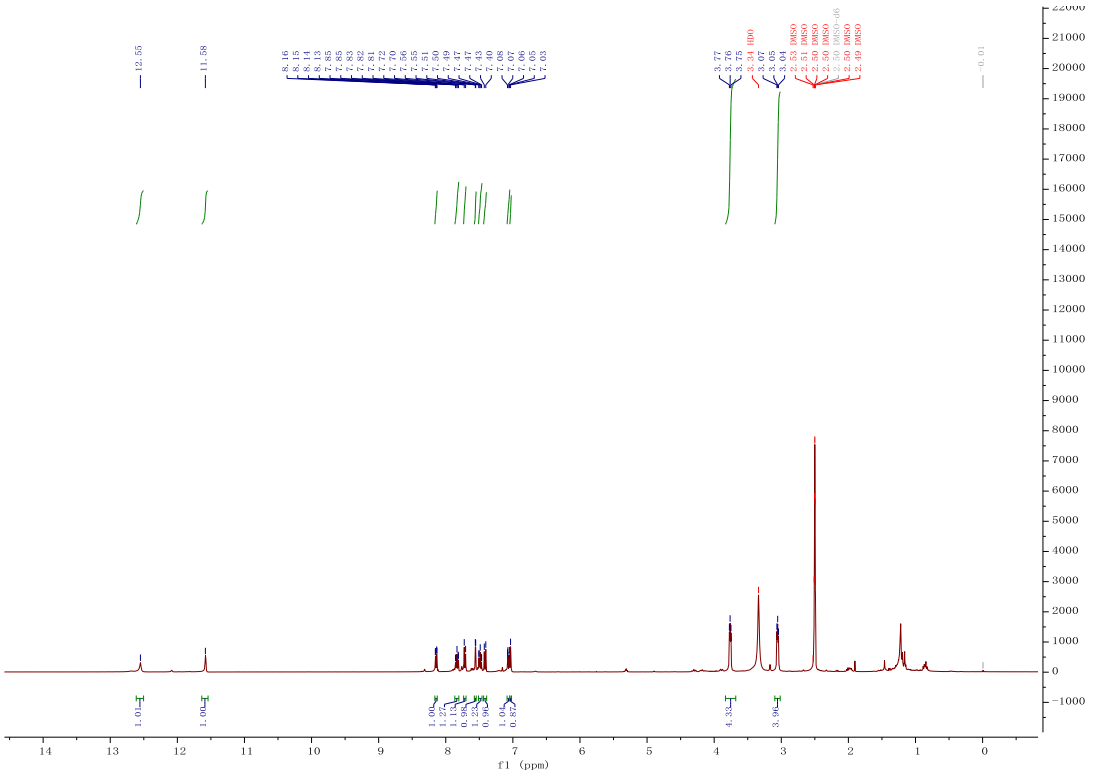
^{13}C NMR of **3ba**, 126 MHz, DMSO-d_6



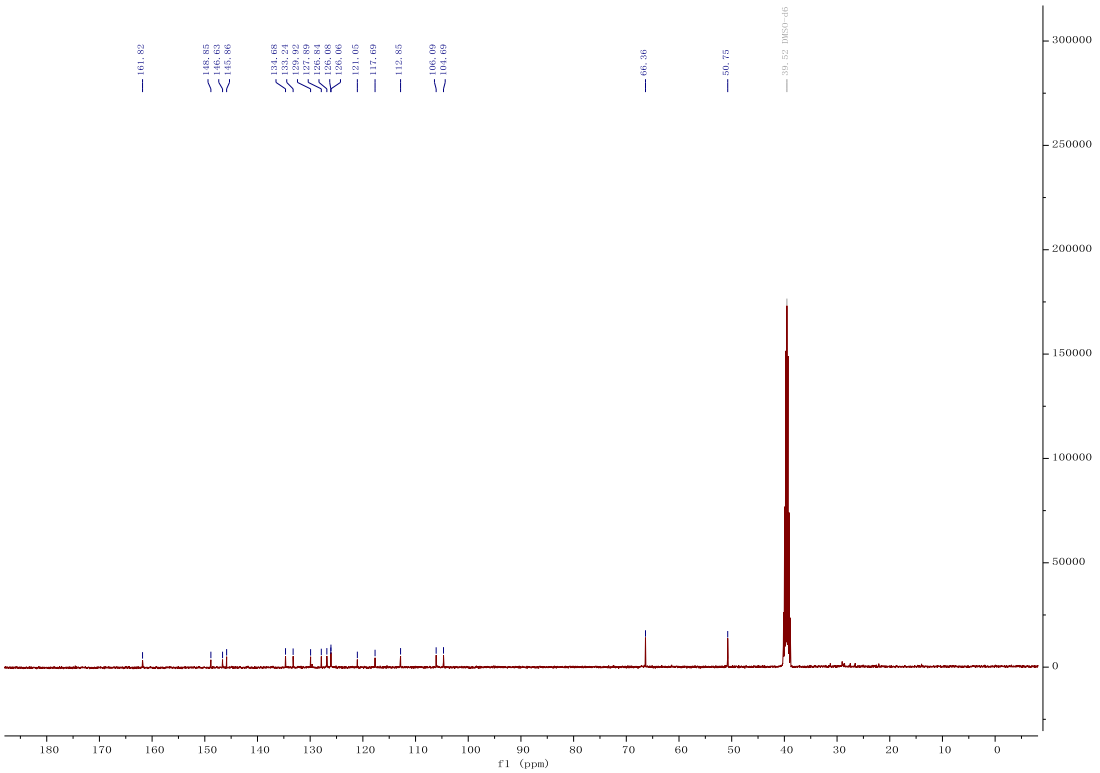


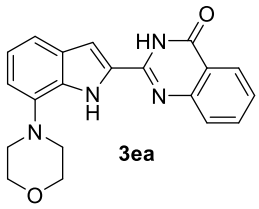
3ca

^{1}H NMR of **3ca,** 400 MHz, DMSO-d_6



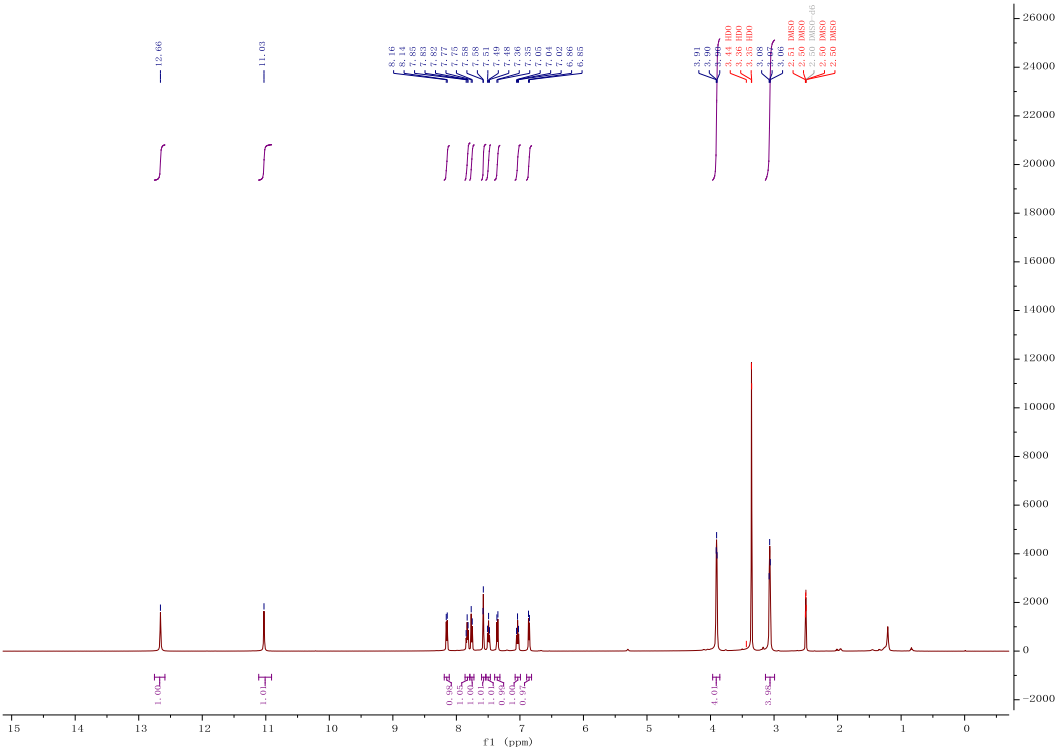
^{13}C NMR of **3ca**, 101 MHz, DMSO-d_6



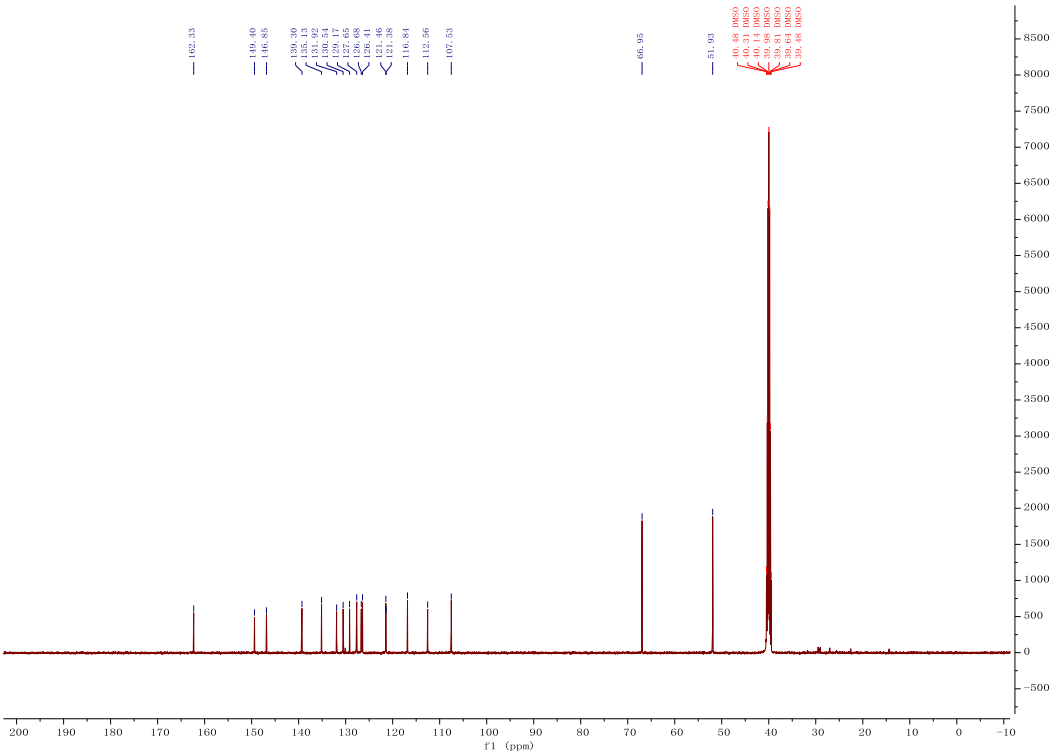


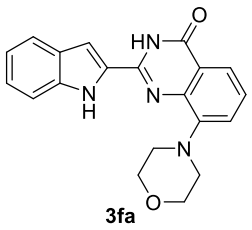
3ea

^{1}H NMR of **3ea**, 500 MHz, DMSO-d_6



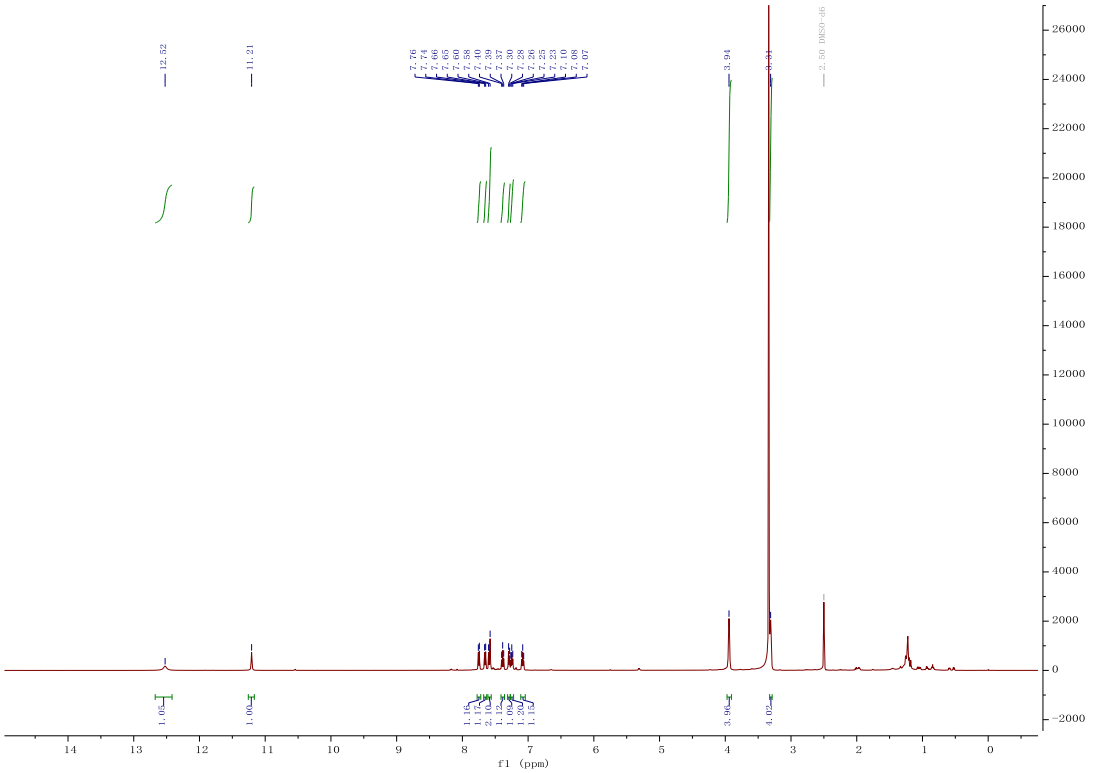
^{13}C NMR of **3ea**, 126 MHz, DMSO-d_6



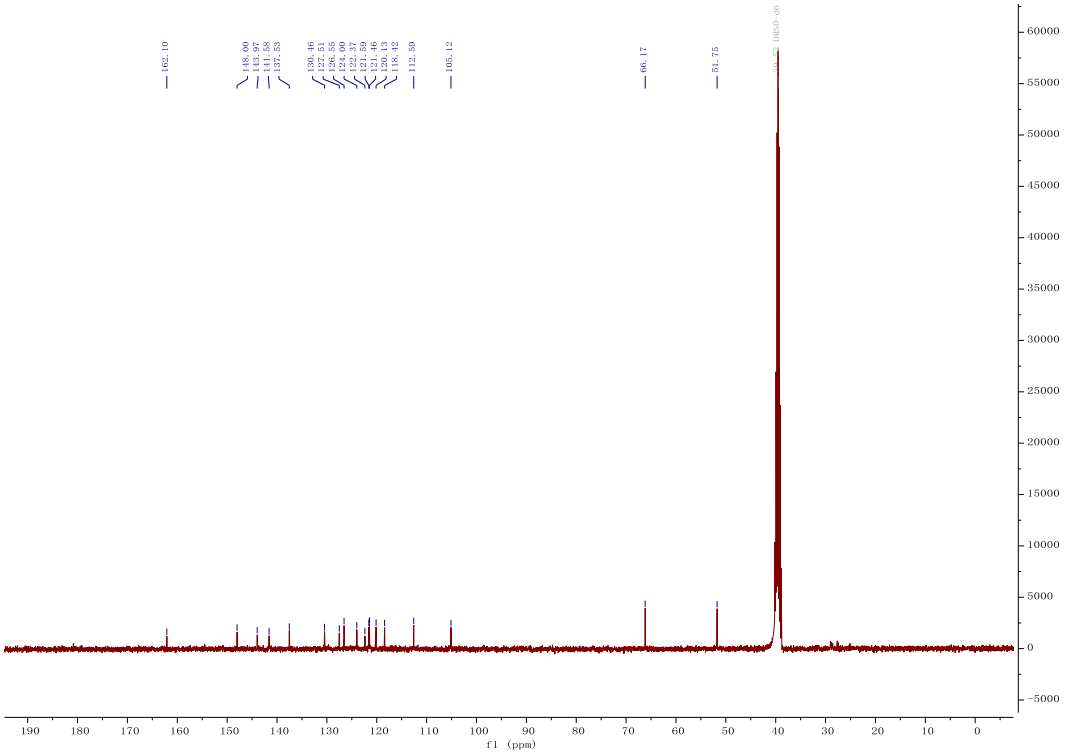


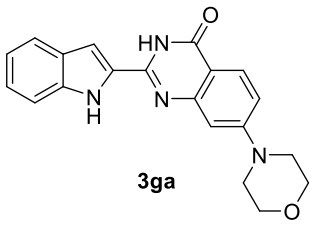
3fa

^{1}H NMR of **3fa**, 500 MHz, DMSO-d_6



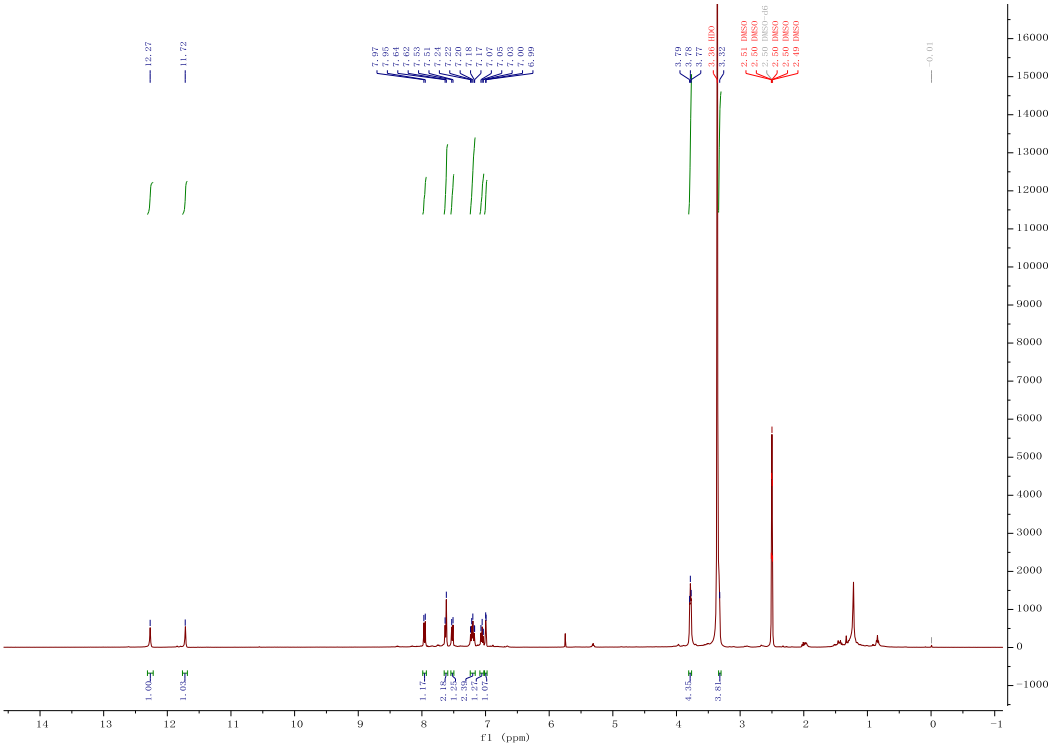
^{13}C NMR of **3fa**, 101 MHz, DMSO-d_6



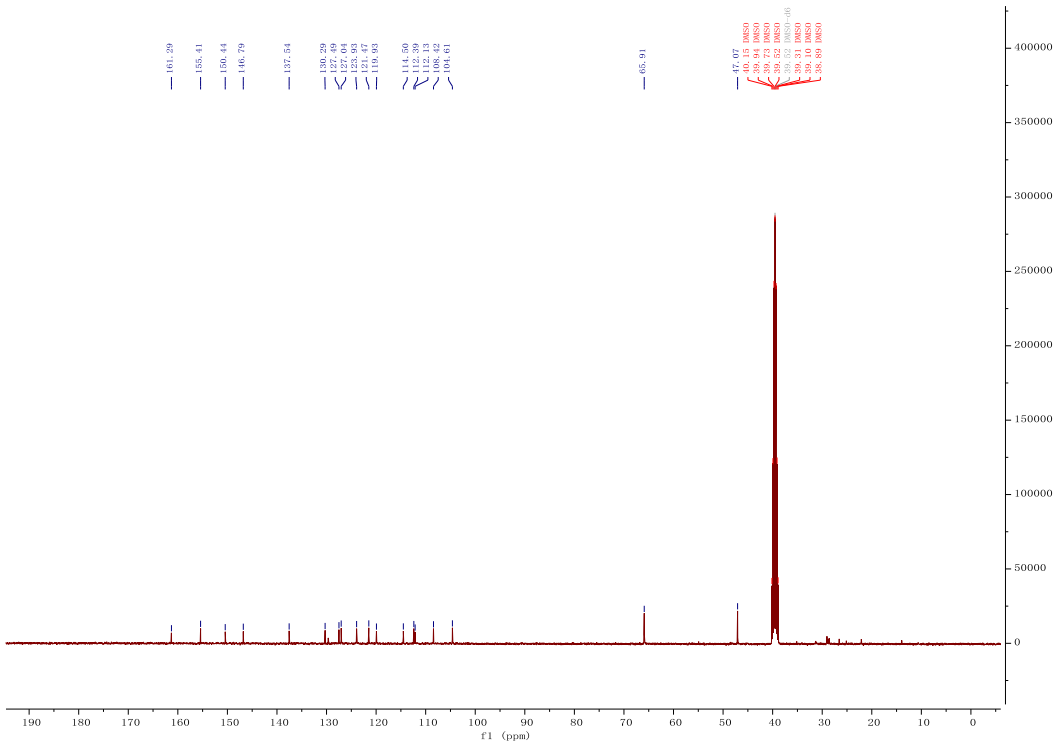


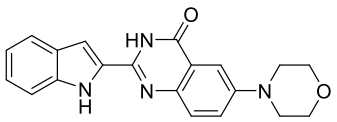
3ga

^{1}H NMR of **3ga**, 400 MHz, DMSO-d_6



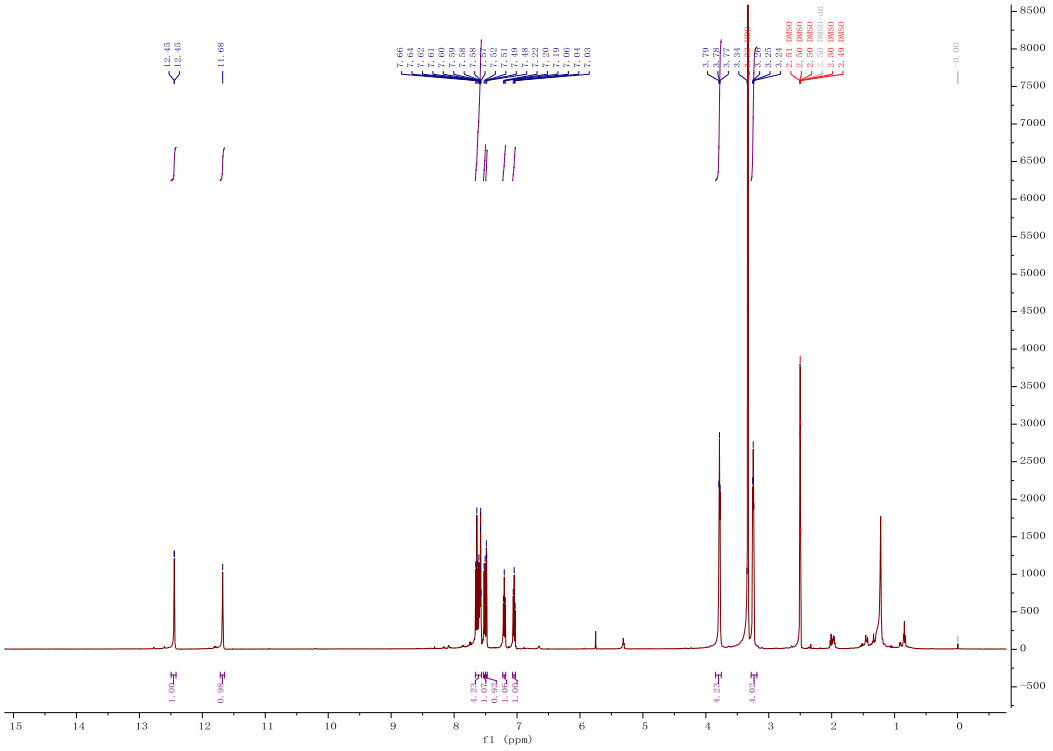
^{13}C NMR of **3ga**, 101 MHz, DMSO-d_6



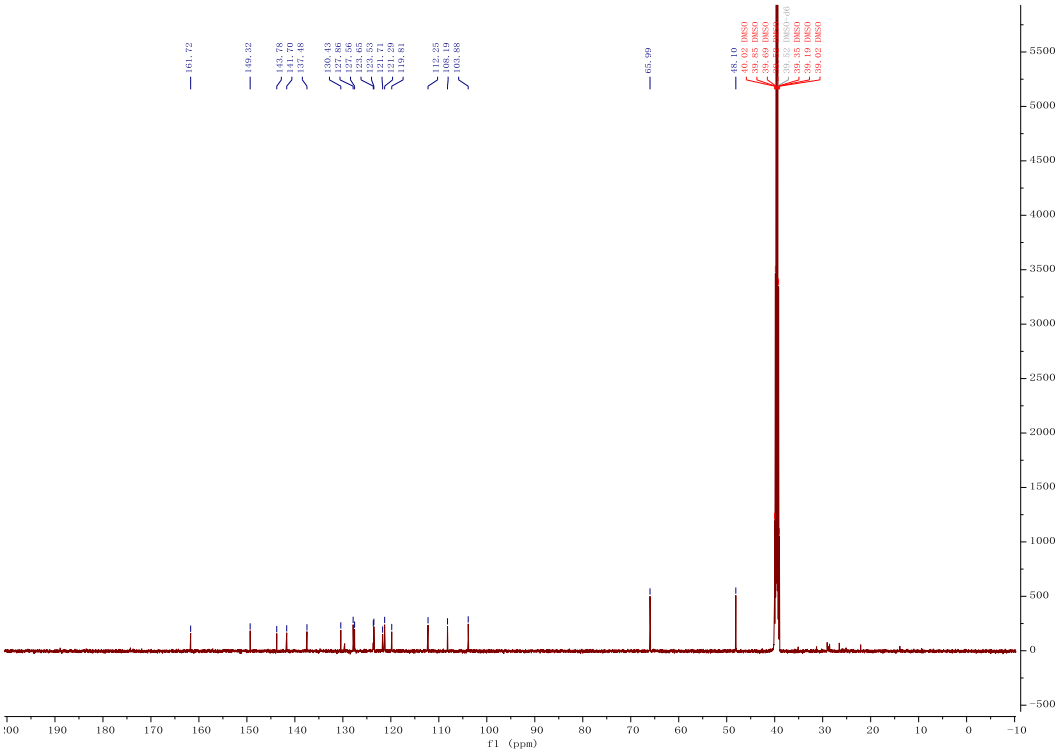


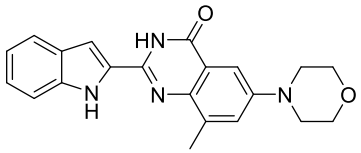
3ha

^{1}H NMR of **3ha**, 500 MHz, DMSO-d_6



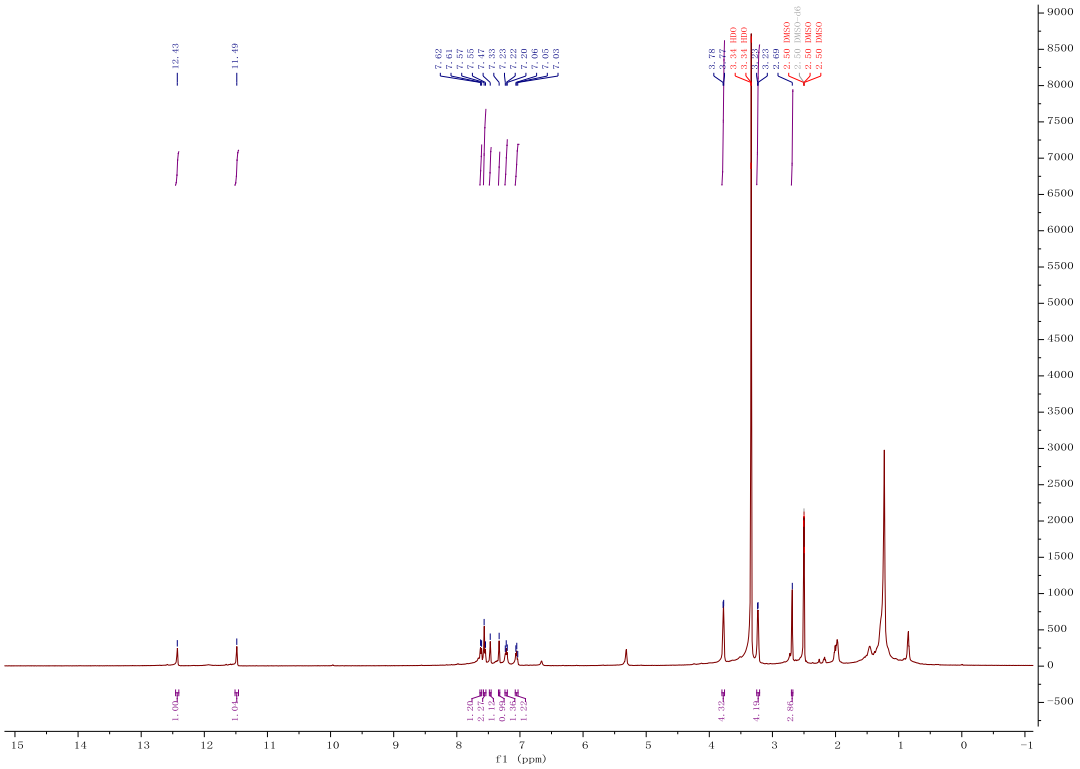
^{13}C NMR of **3ha**, 126 MHz, DMSO-d_6



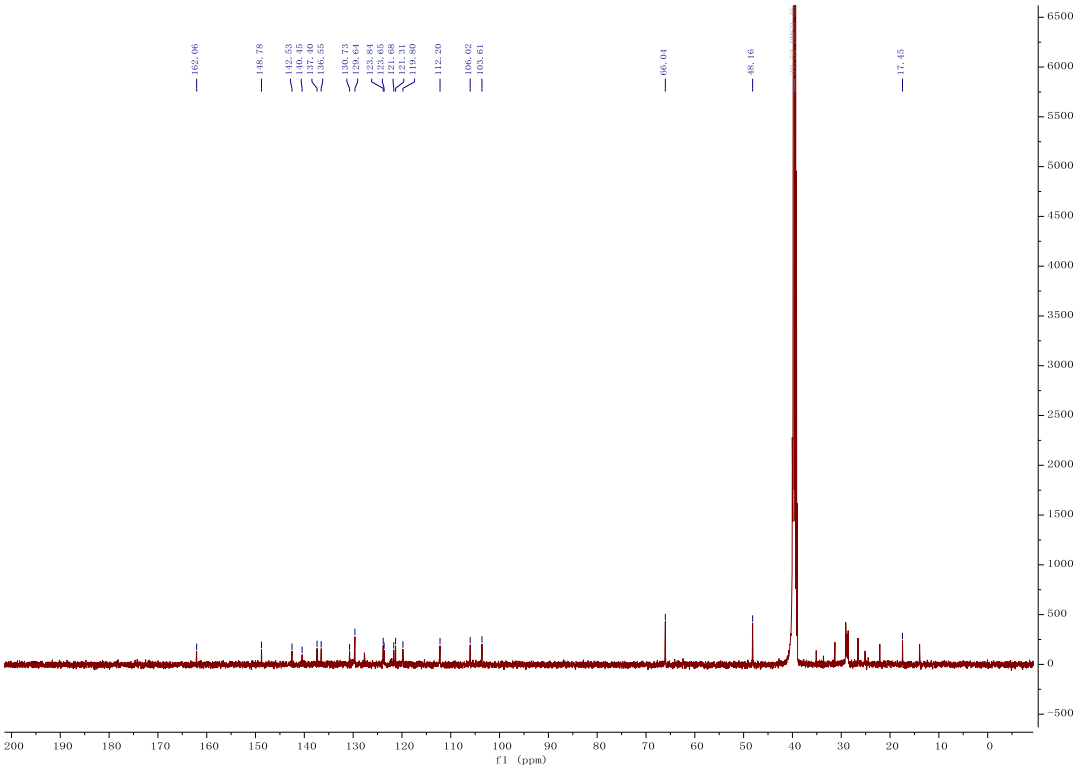


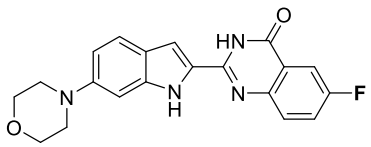
3ia

^{1}H NMR of **3ia**, 500 MHz, DMSO-d_6



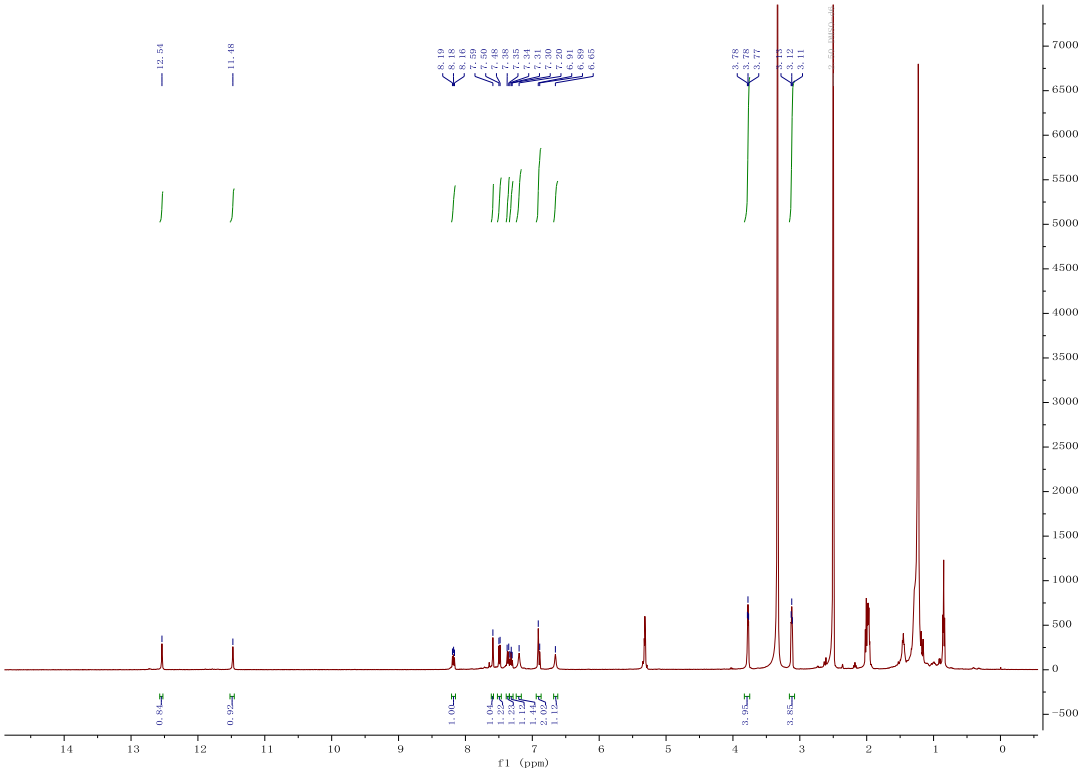
^{13}C NMR of **3ia**, 126 MHz, DMSO-d_6



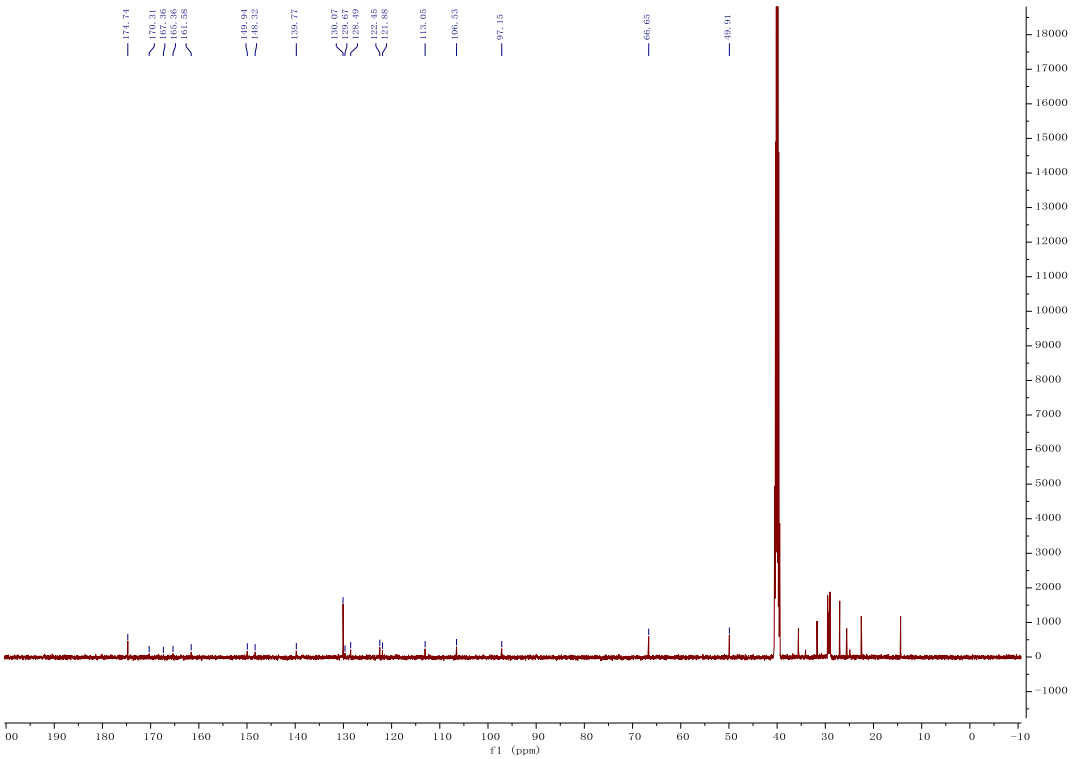


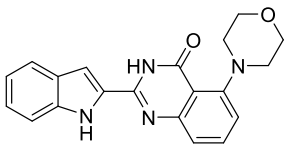
3da

^{1}H NMR of **3da**, 500 MHz, DMSO-d_6



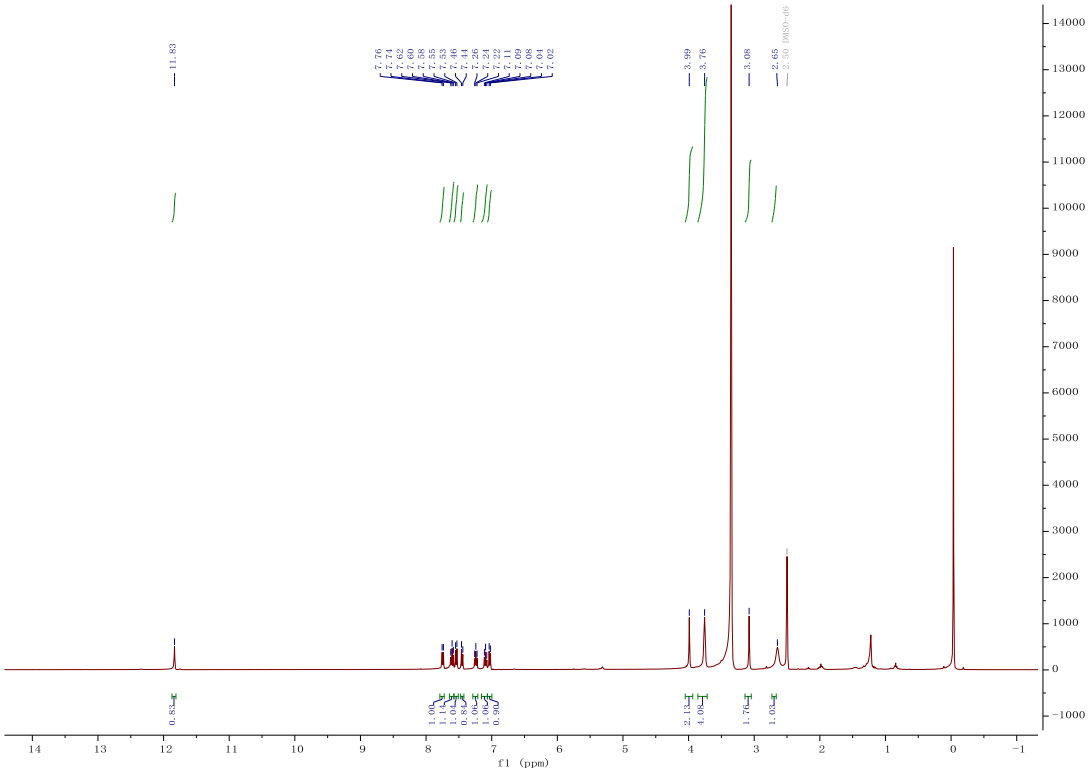
^{13}C NMR of **3da**, 126 MHz, DMSO-d_6



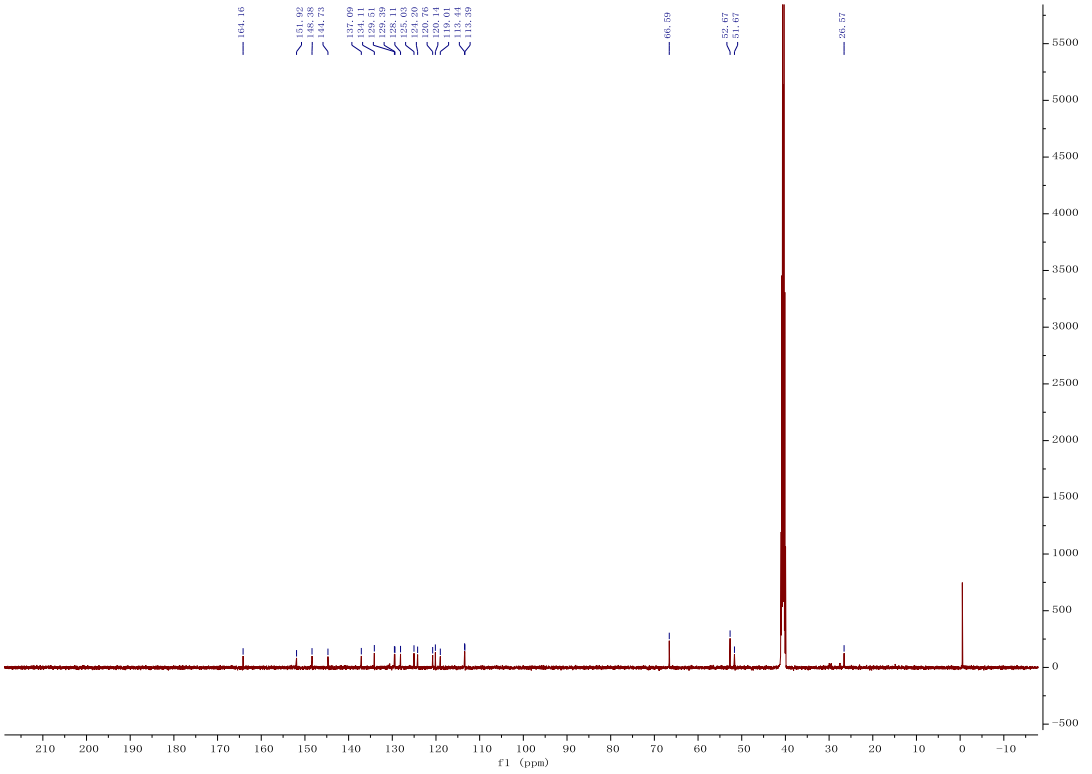


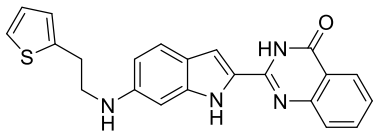
3ja

^{1}H NMR of **3ja**, 500 MHz, DMSO-d_6



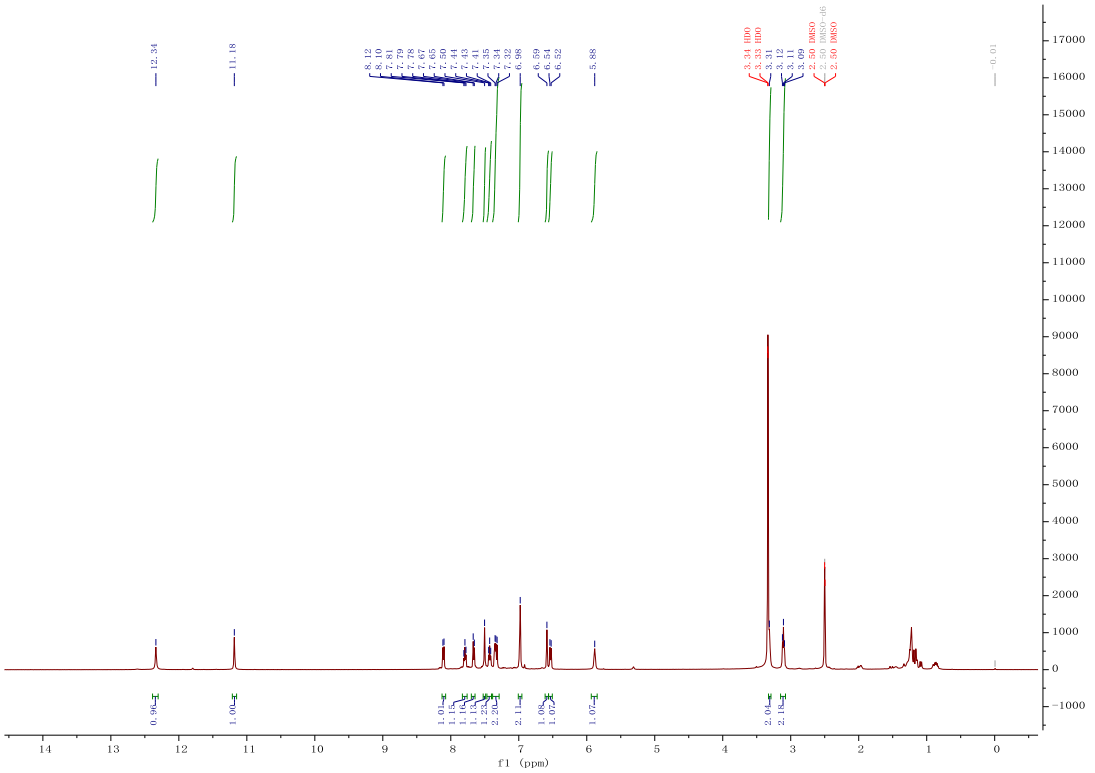
^{13}C NMR of **3ja**, 126 MHz, DMSO-d_6



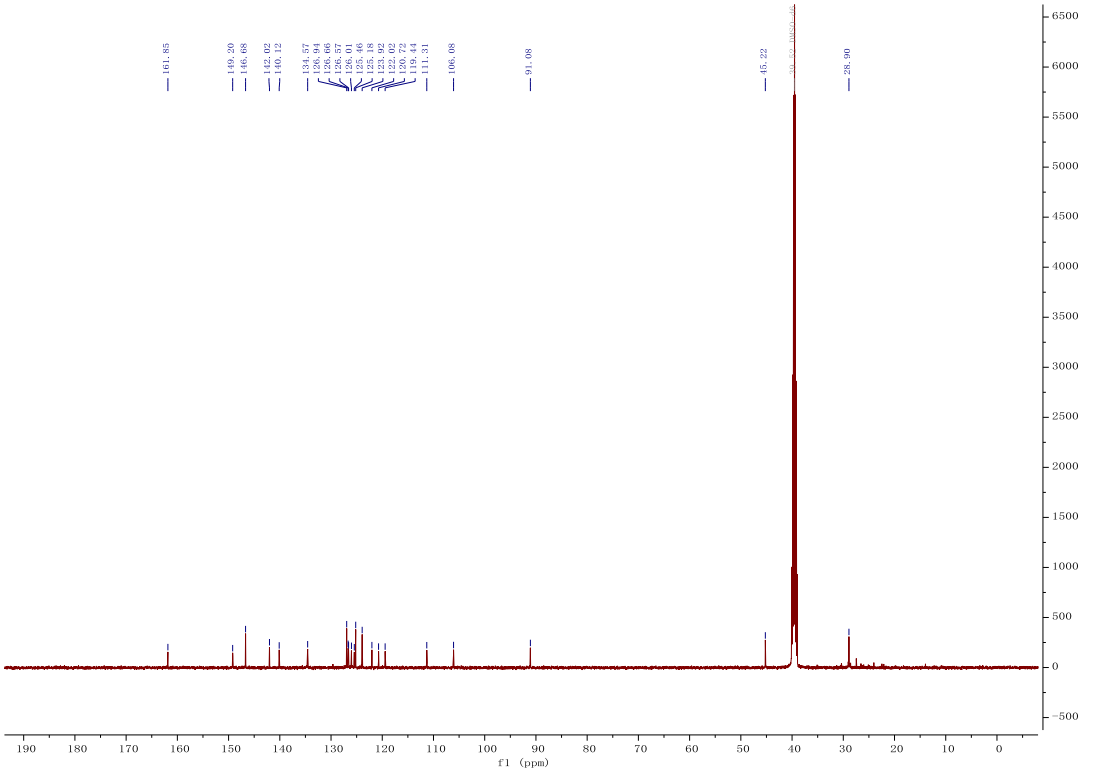


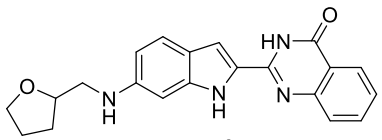
3ai

^{1}H NMR of **3ai**, 500 MHz, DMSO-d_6



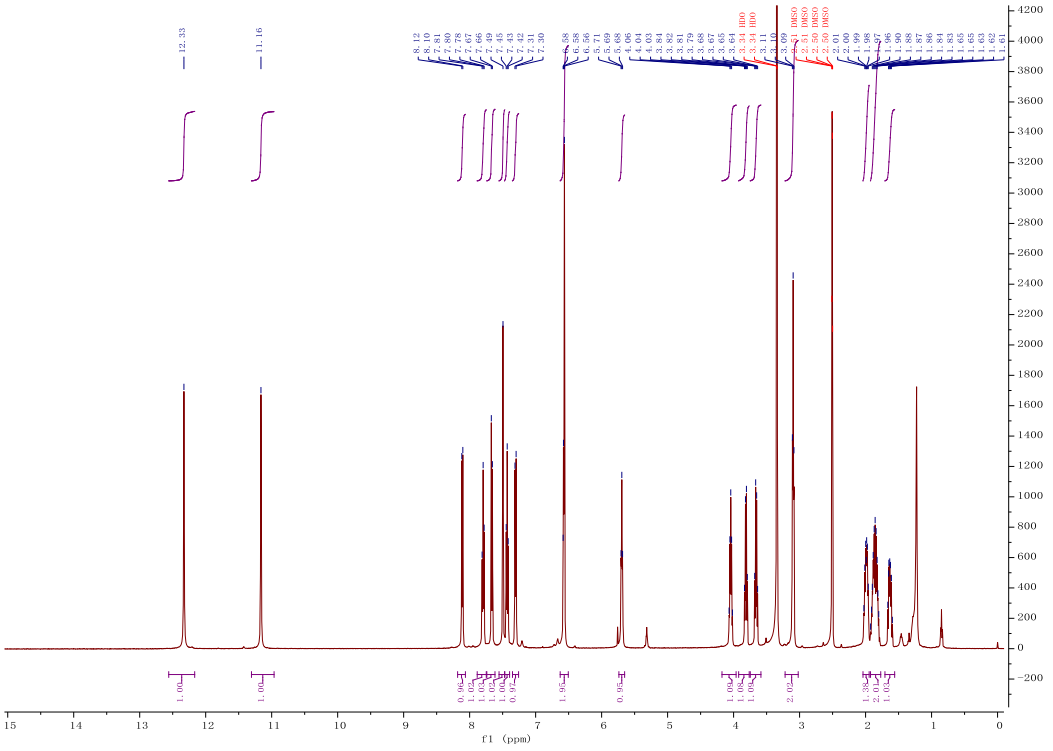
^{13}C NMR of **3ai**, 126 MHz, DMSO-d_6



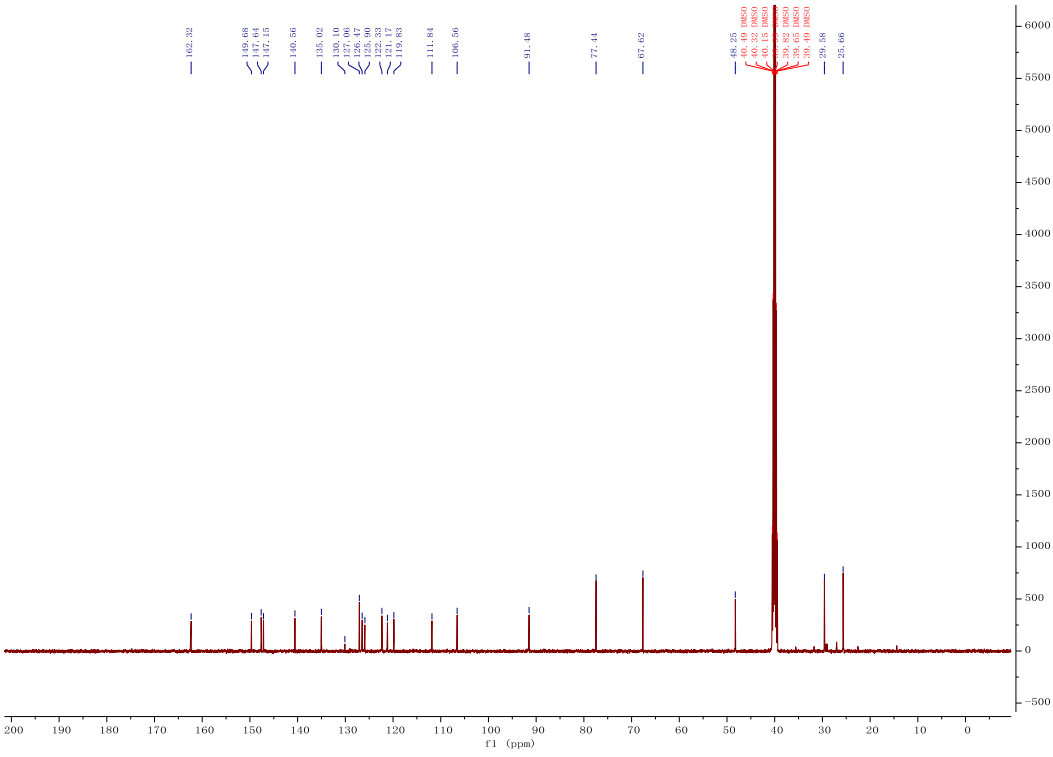


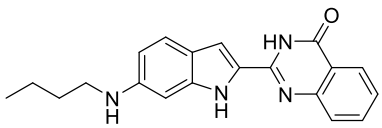
3ag

^{1}H NMR of **3ag,** 500 MHz, DMSO-d_6



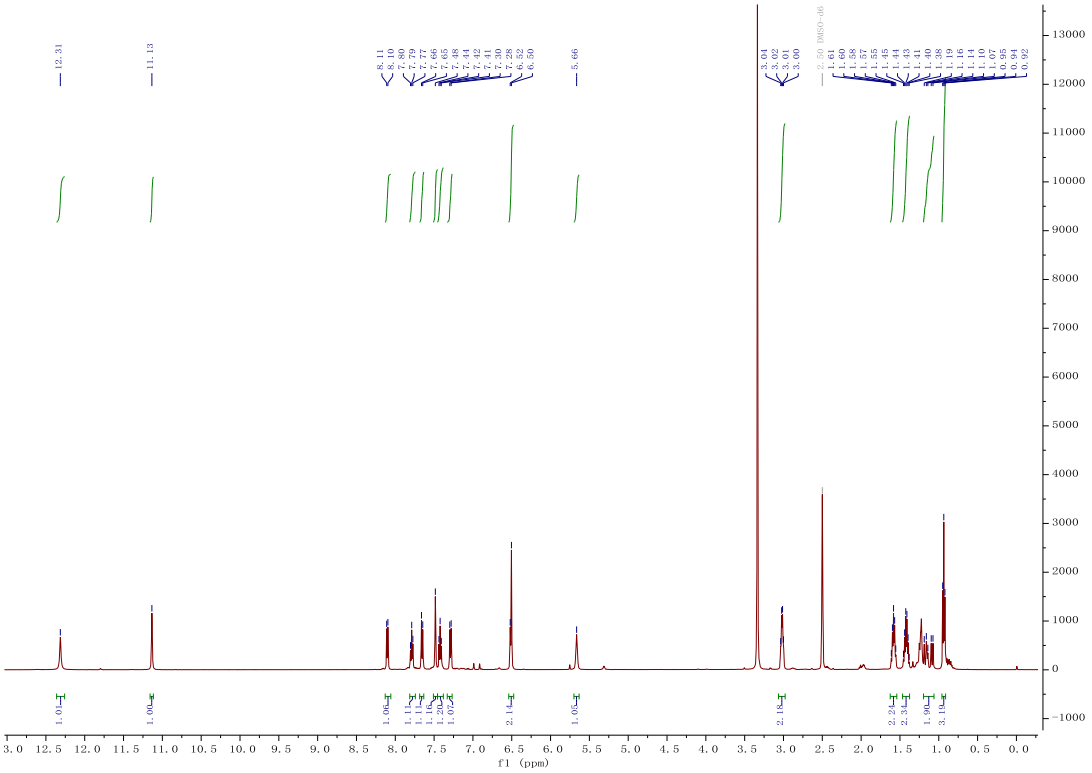
^{13}C NMR of **3ag**, 126 MHz, DMSO-d_6



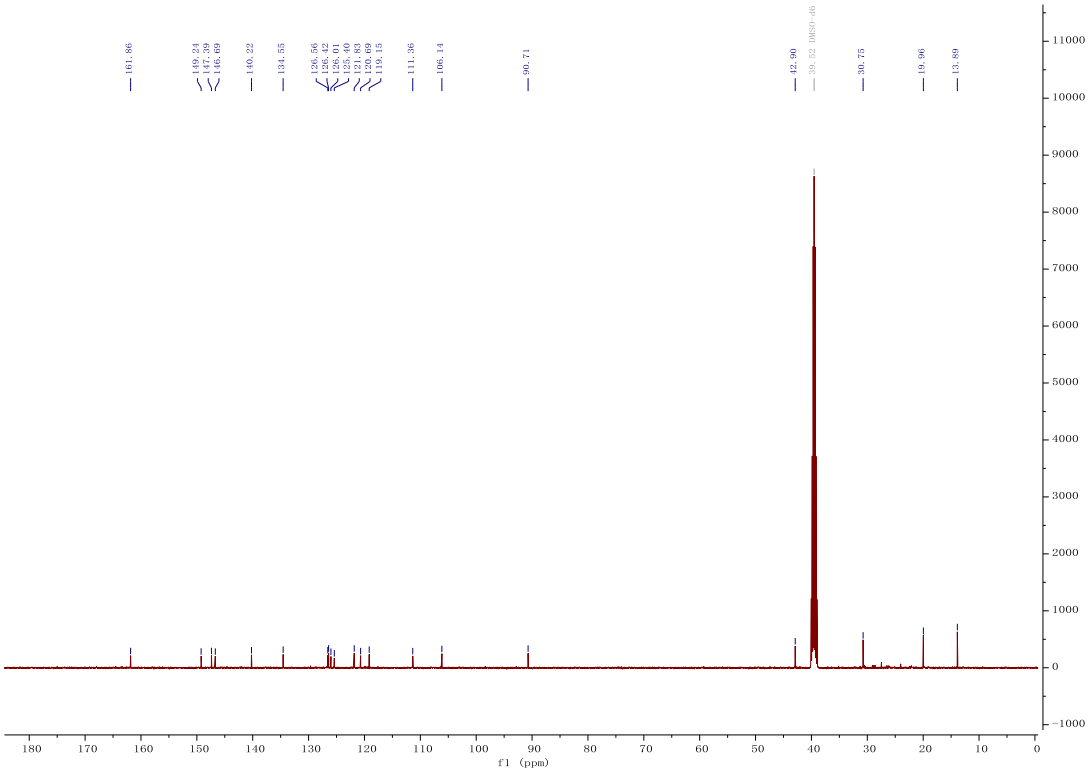


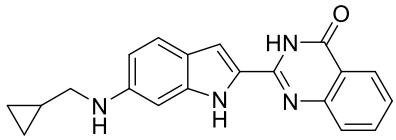
3ac

^{1}H NMR of **3ac**, 500 MHz, DMSO-d_6



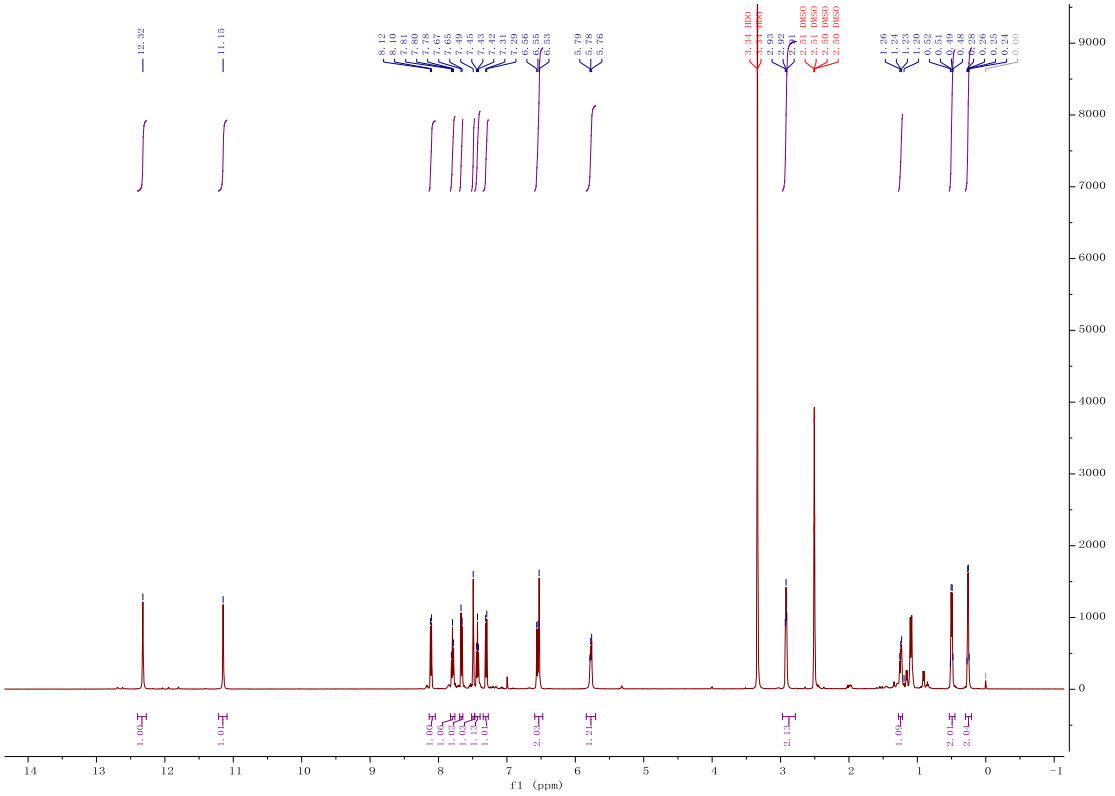
^{13}C NMR of **3ac**, 126 MHz, DMSO-d_6



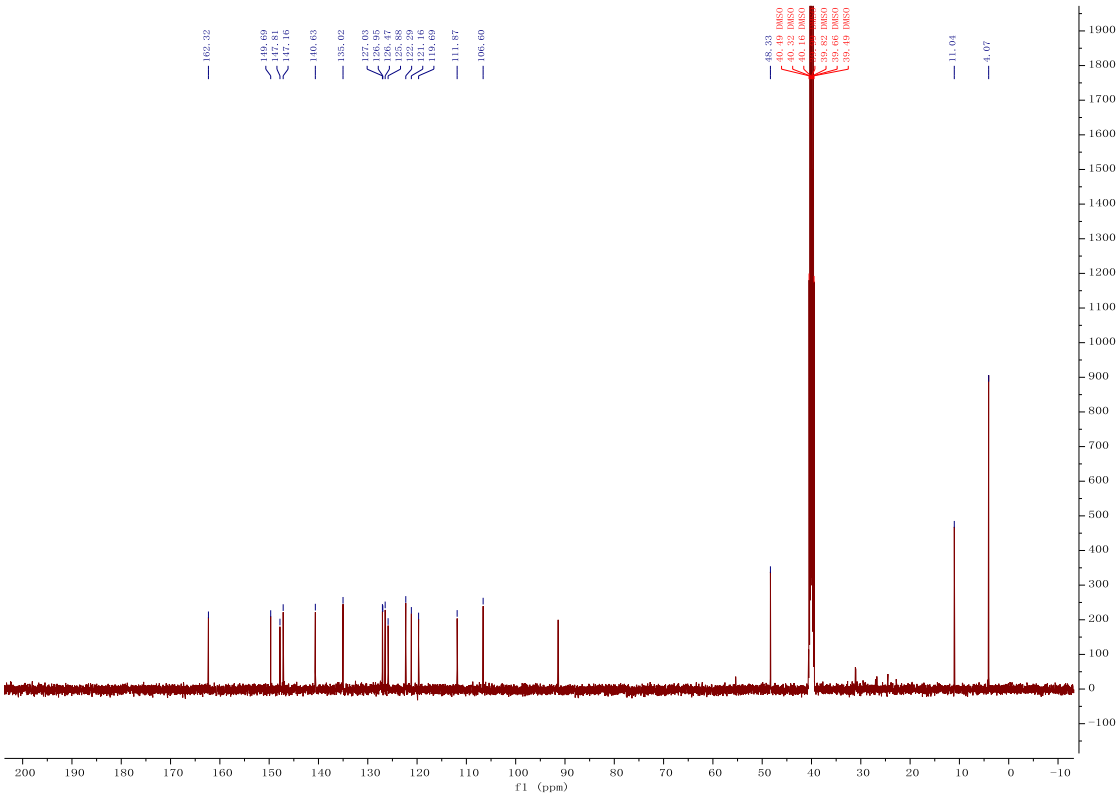


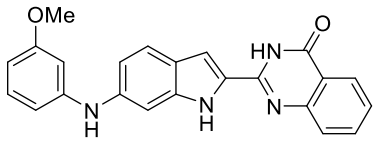
3af

^{1}H NMR of **3af**, 500 MHz, DMSO-d_6



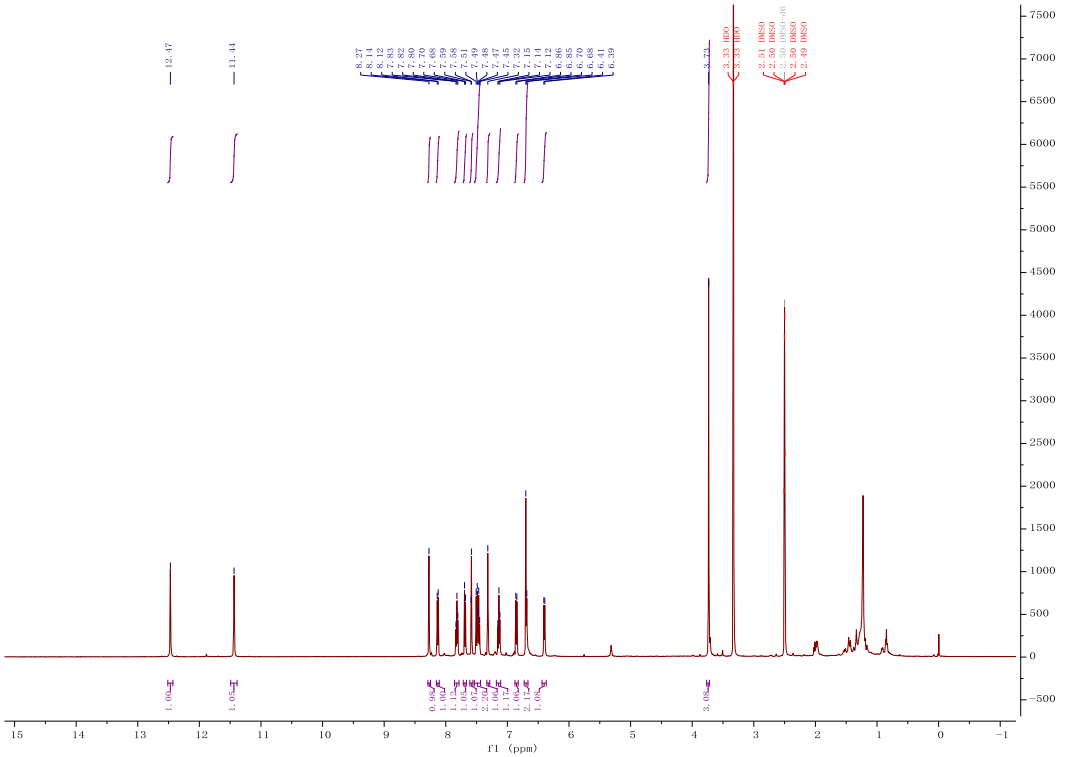
^{13}C NMR of **3af**, 126 MHz, DMSO-d_6



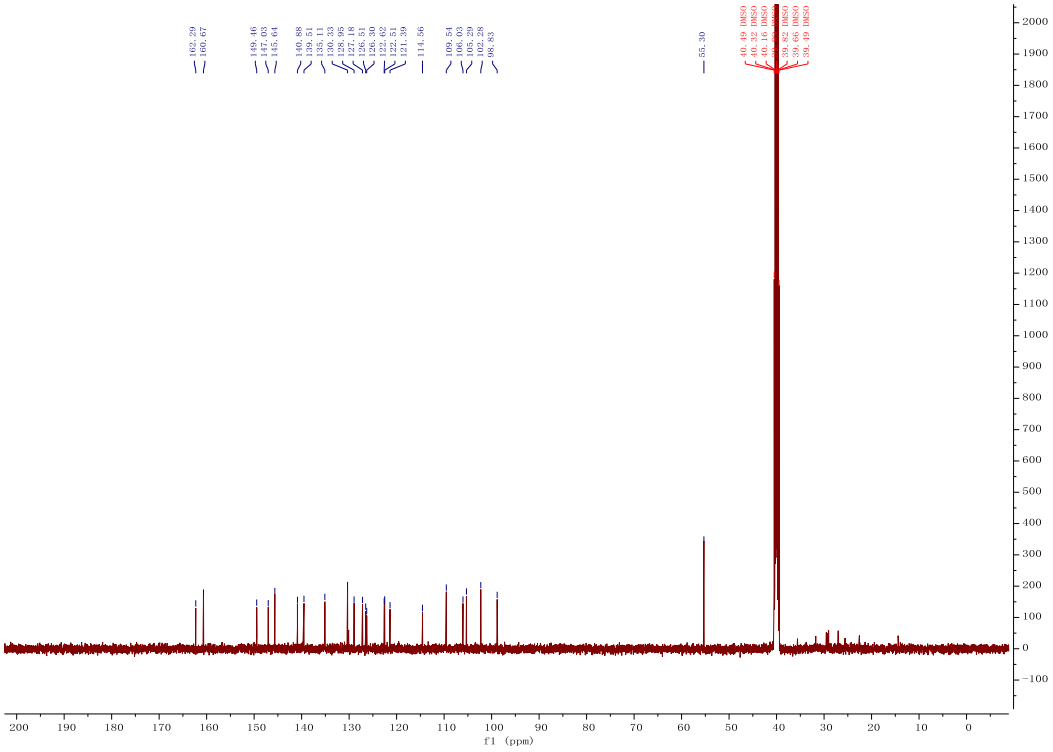


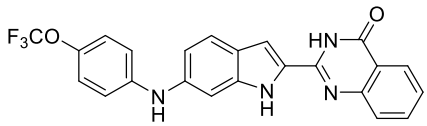
3aj

^{1}H NMR of **3aj**, 500 MHz, DMSO-d_6



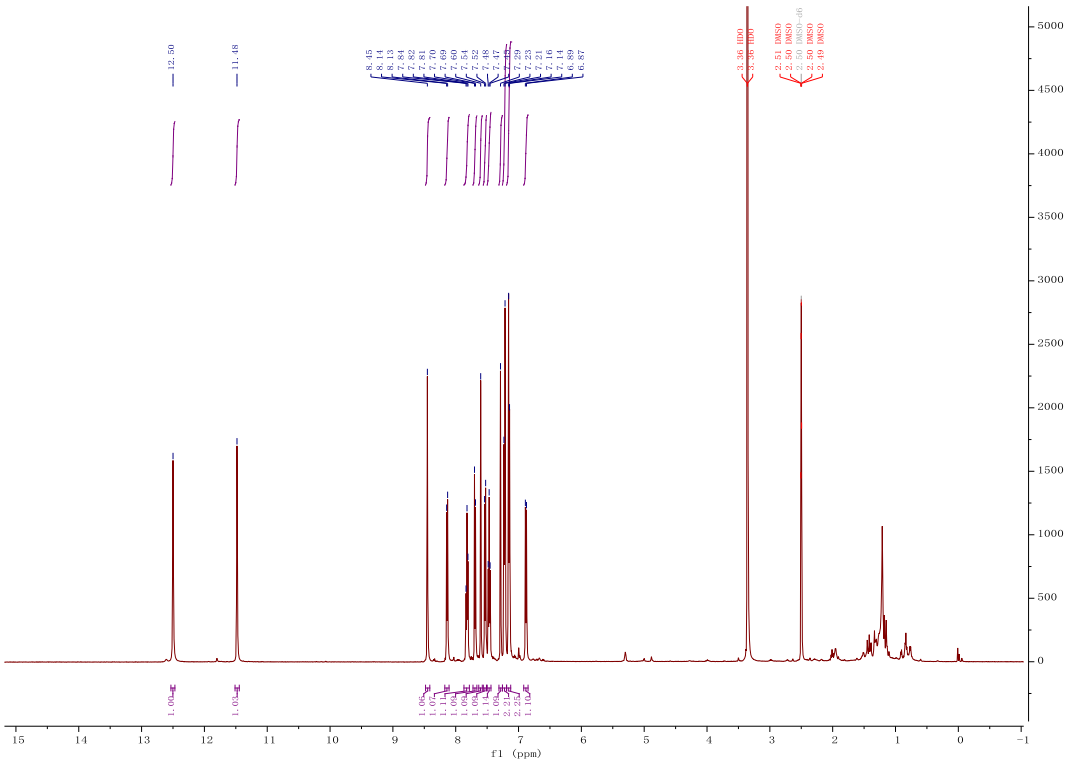
^{13}C NMR of **3aj**, 126 MHz, DMSO-d_6



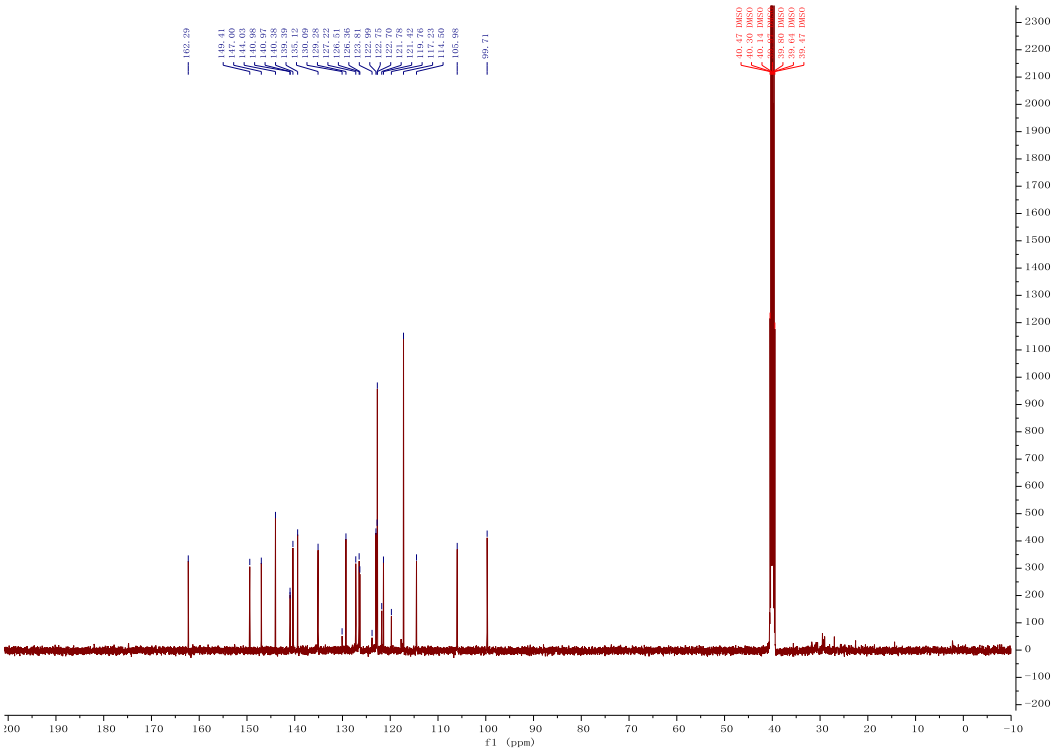


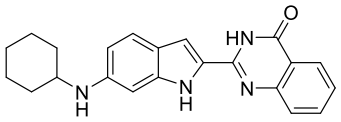
3ak

^{1}H NMR of **3ak**, 500 MHz, DMSO-d_6



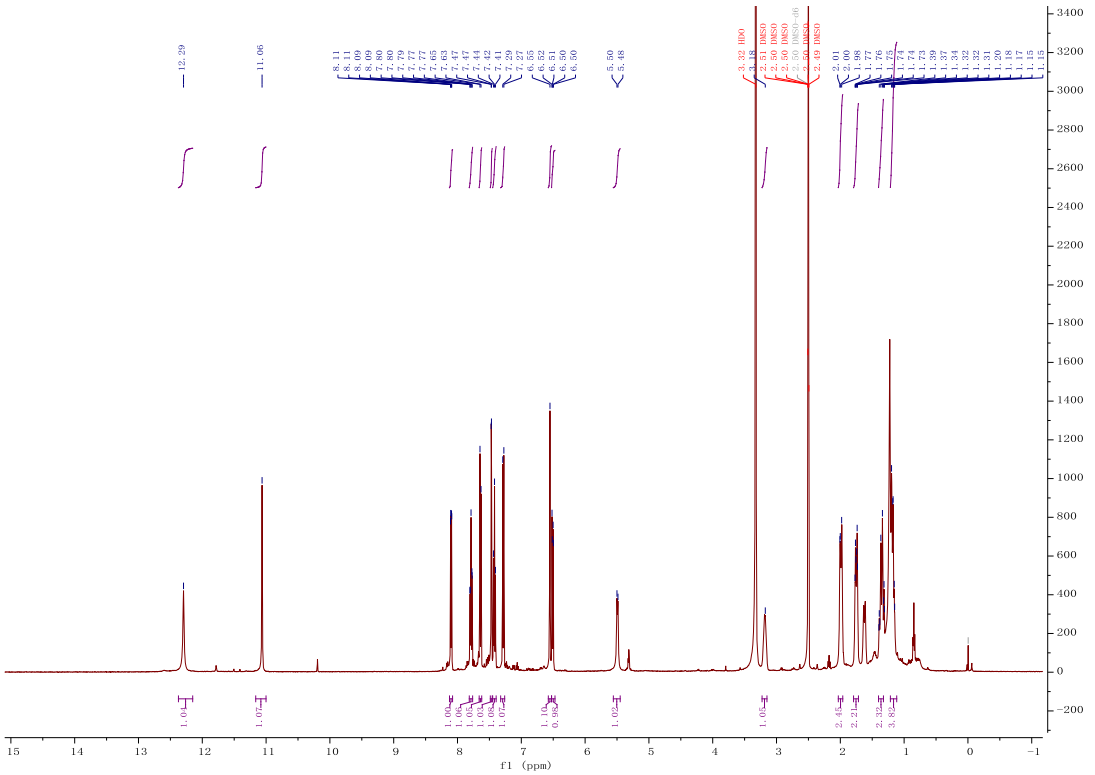
^{13}C NMR of **3ak**, 126 MHz, DMSO-d_6



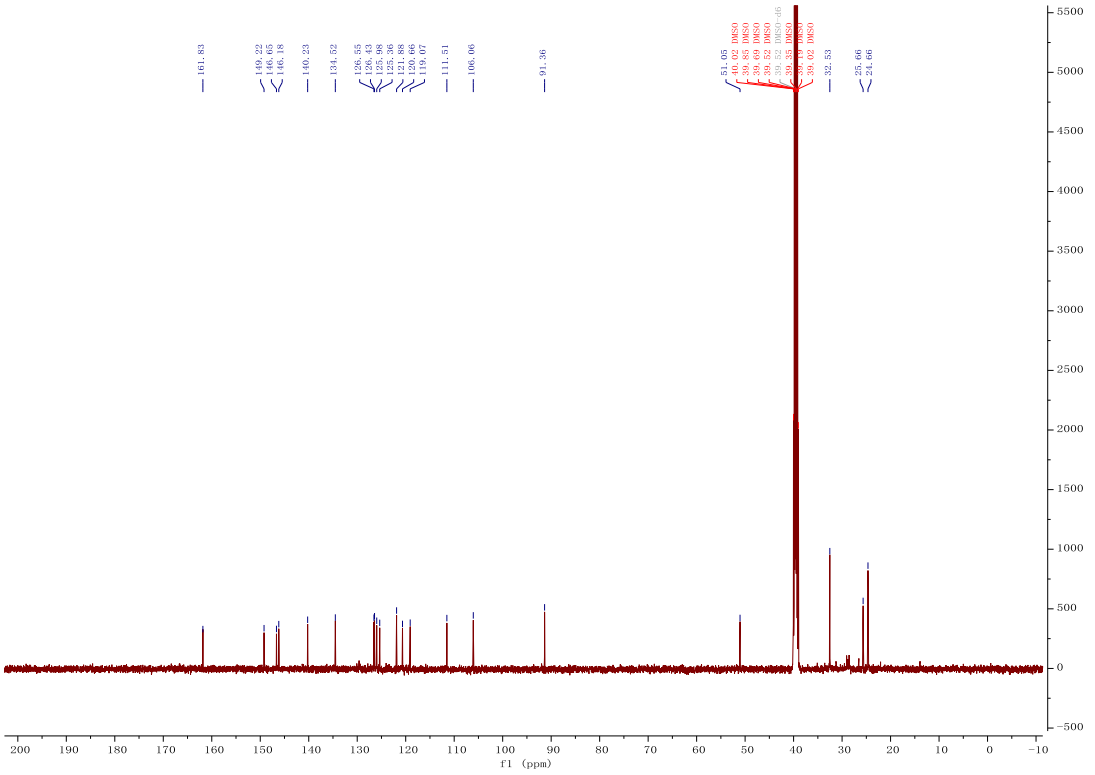


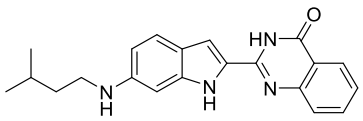
3ad

^{1}H NMR of **3ad**, 500 MHz, DMSO-d_6



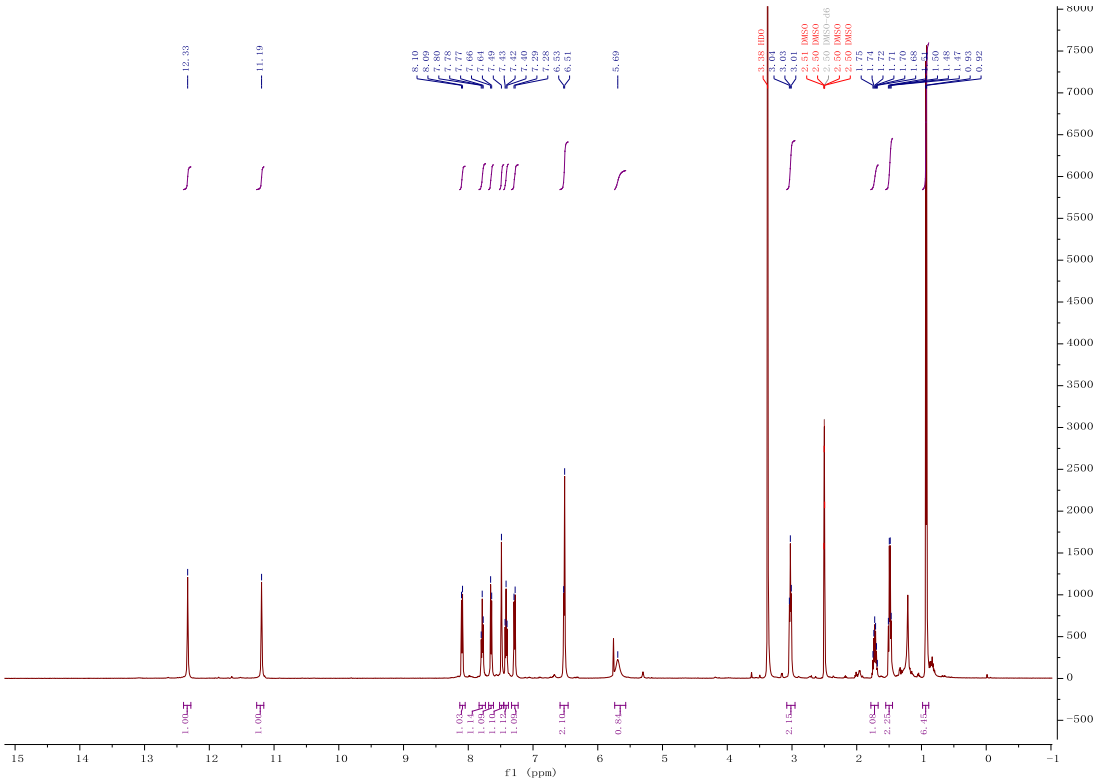
^{13}C NMR of **3ad**, 126 MHz, DMSO-d_6



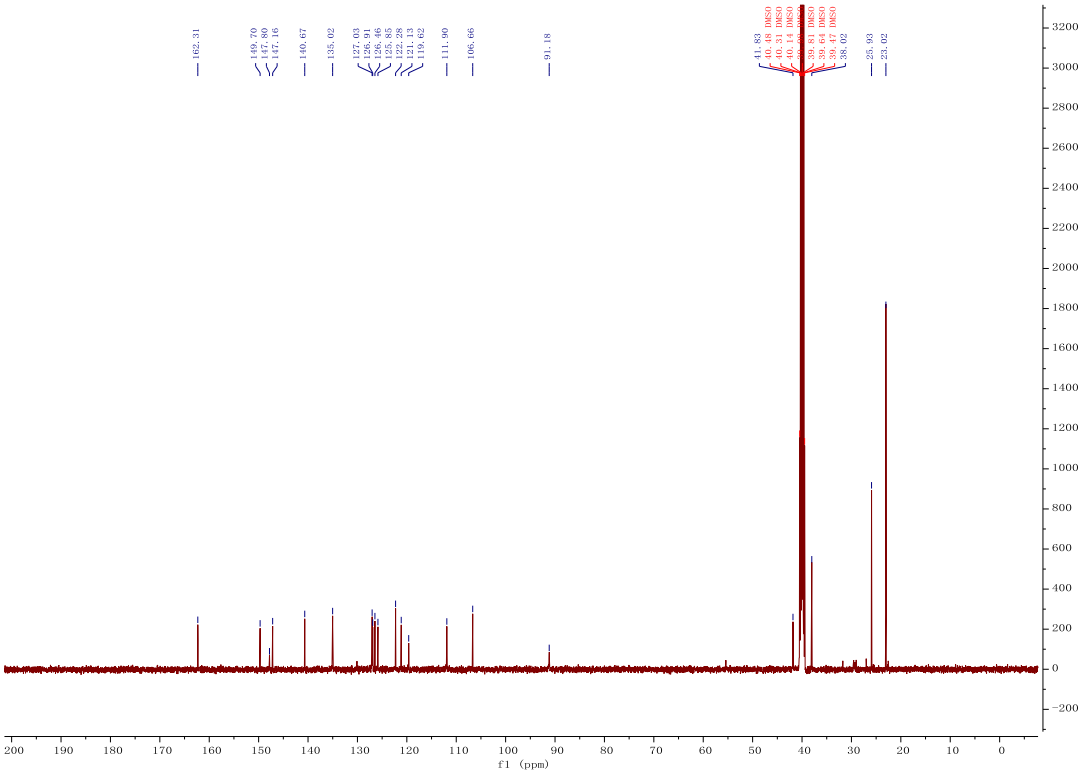


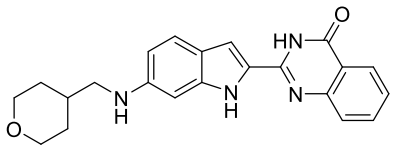
3ae

^{1}H NMR of **3ae**, 500 MHz, DMSO-d_6



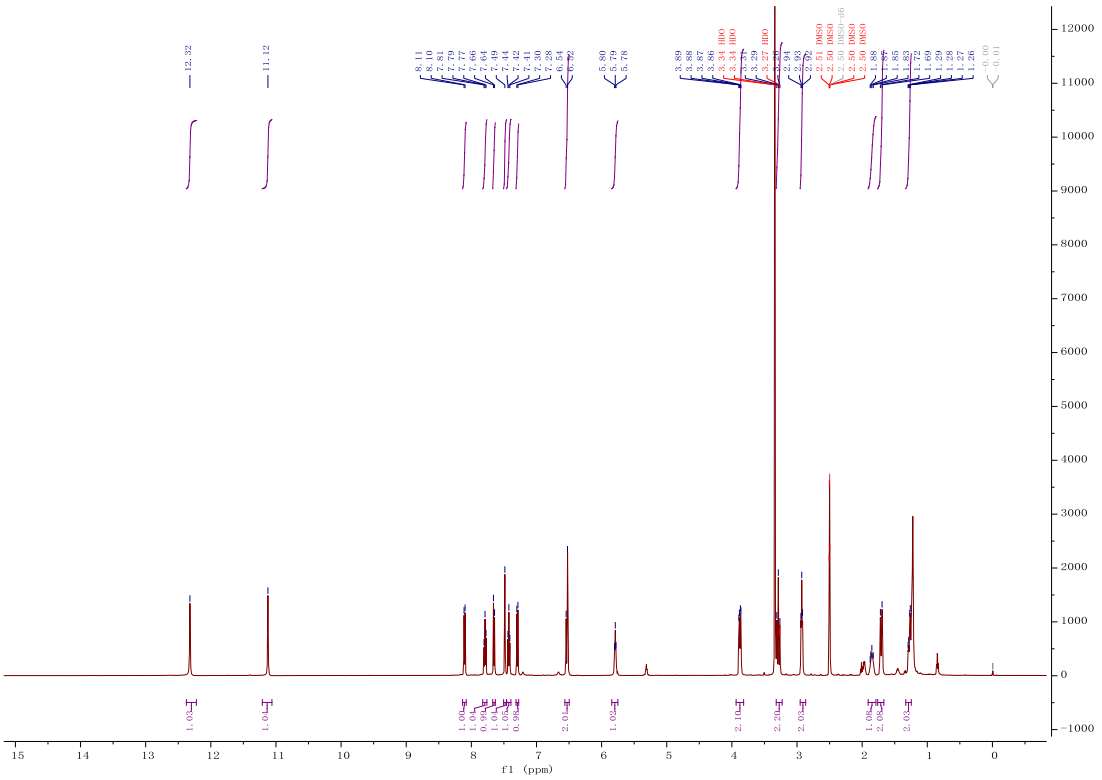
^{13}C NMR of **3ae**, 126 MHz, DMSO-d_6



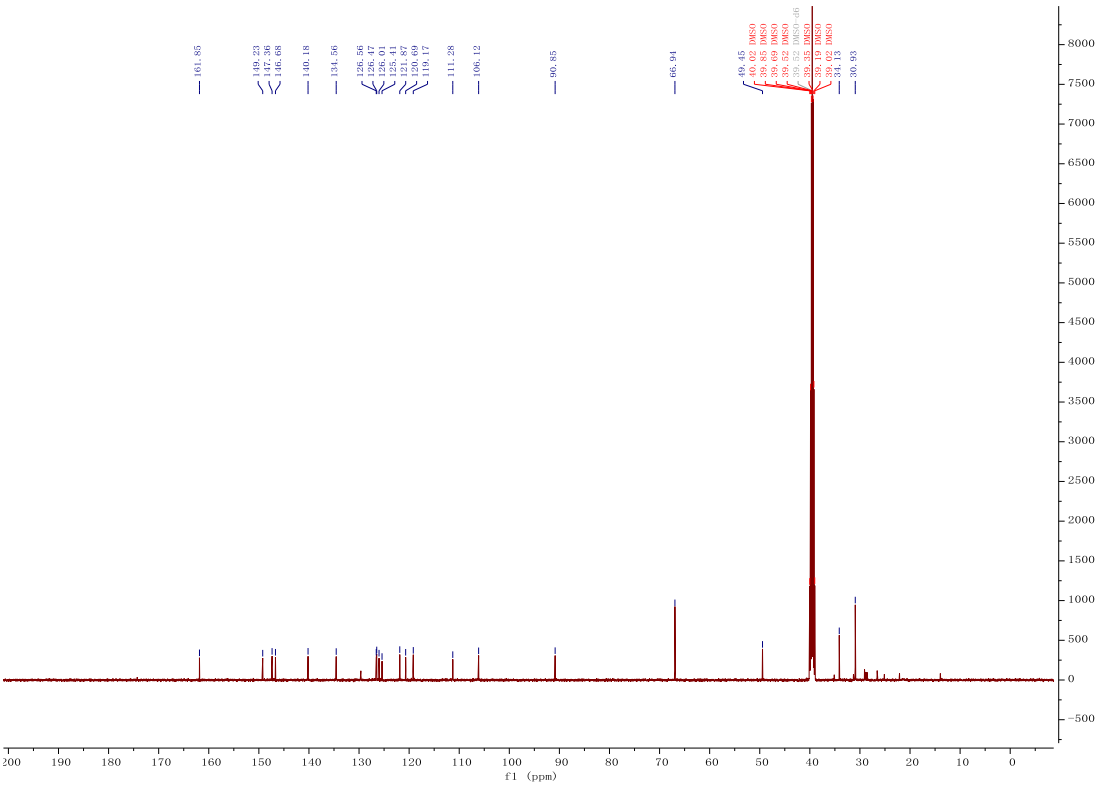


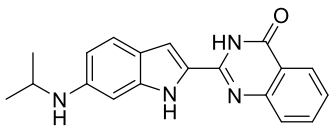
3ah

^{1}H NMR of **3ah**, 500 MHz, DMSO-d_6



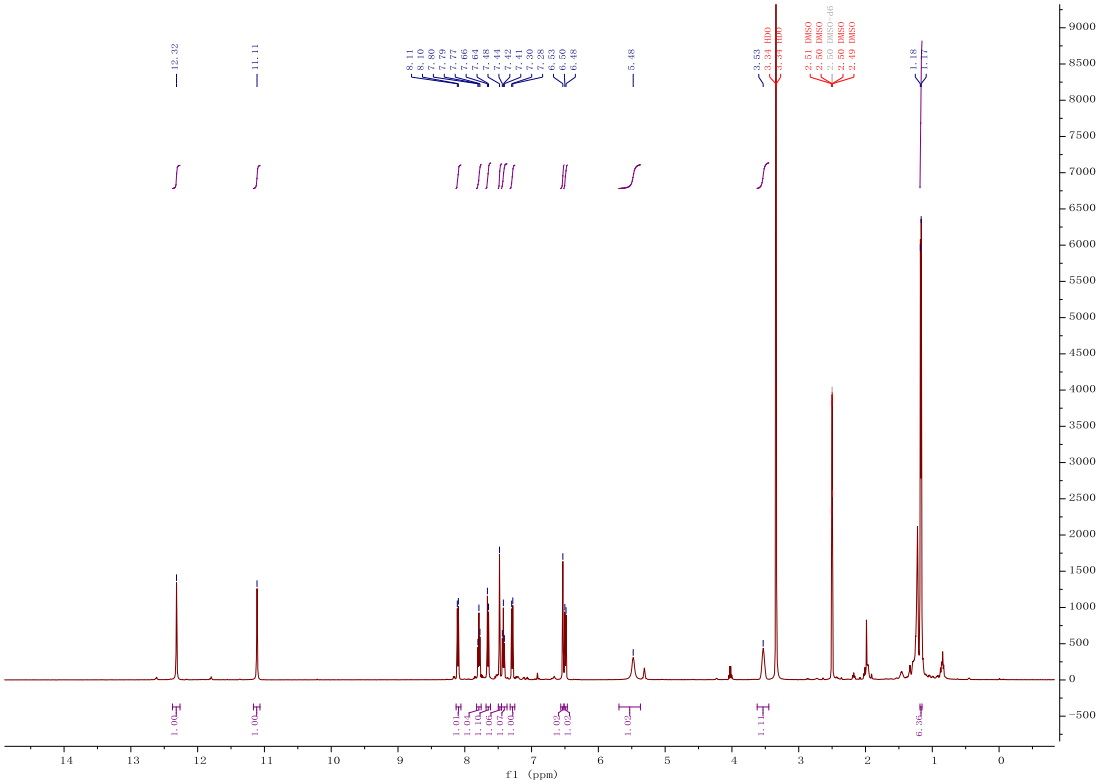
^{13}C NMR of **3ah**, 126 MHz, DMSO-d_6



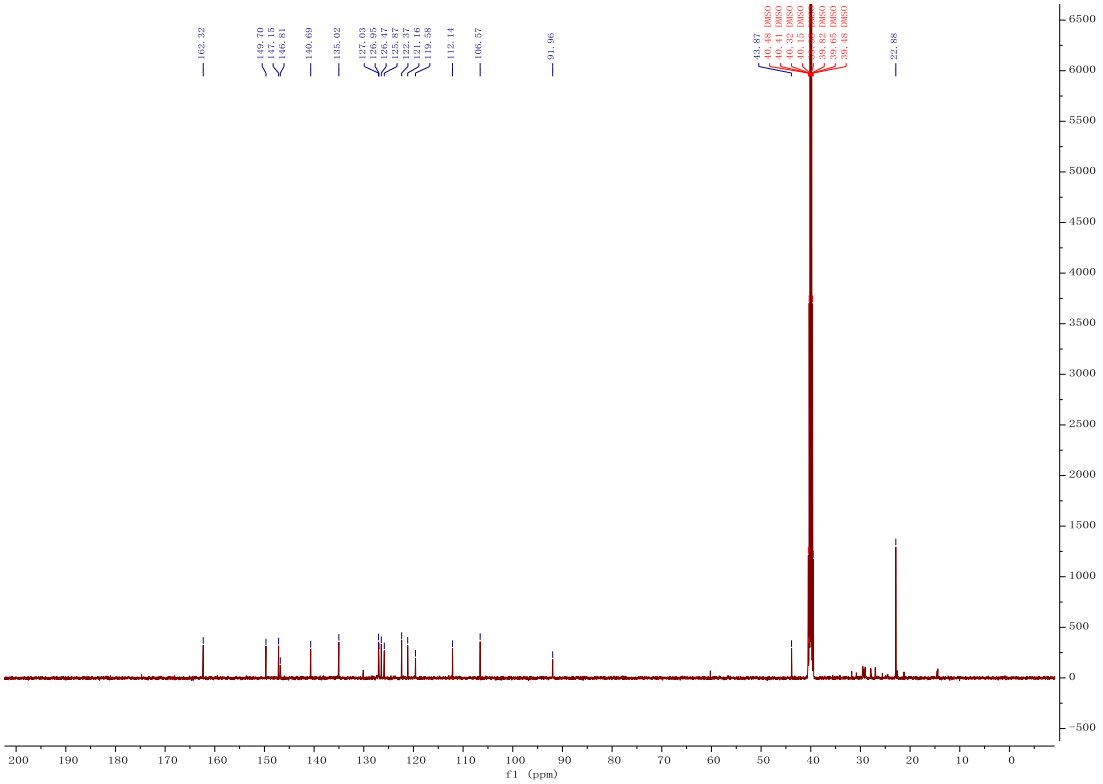


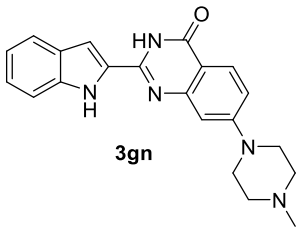
3ab

^{1}H NMR of **3ab**, 500 MHz, DMSO-d_6



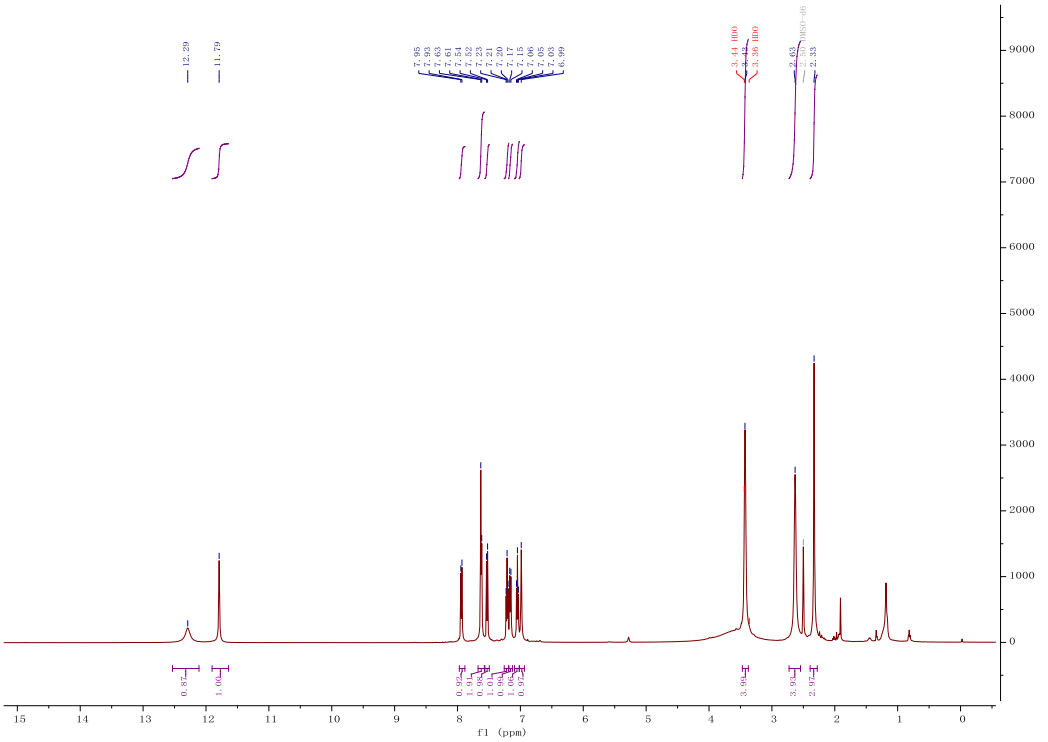
^{13}C NMR of **3ab**, 126 MHz, DMSO-d_6



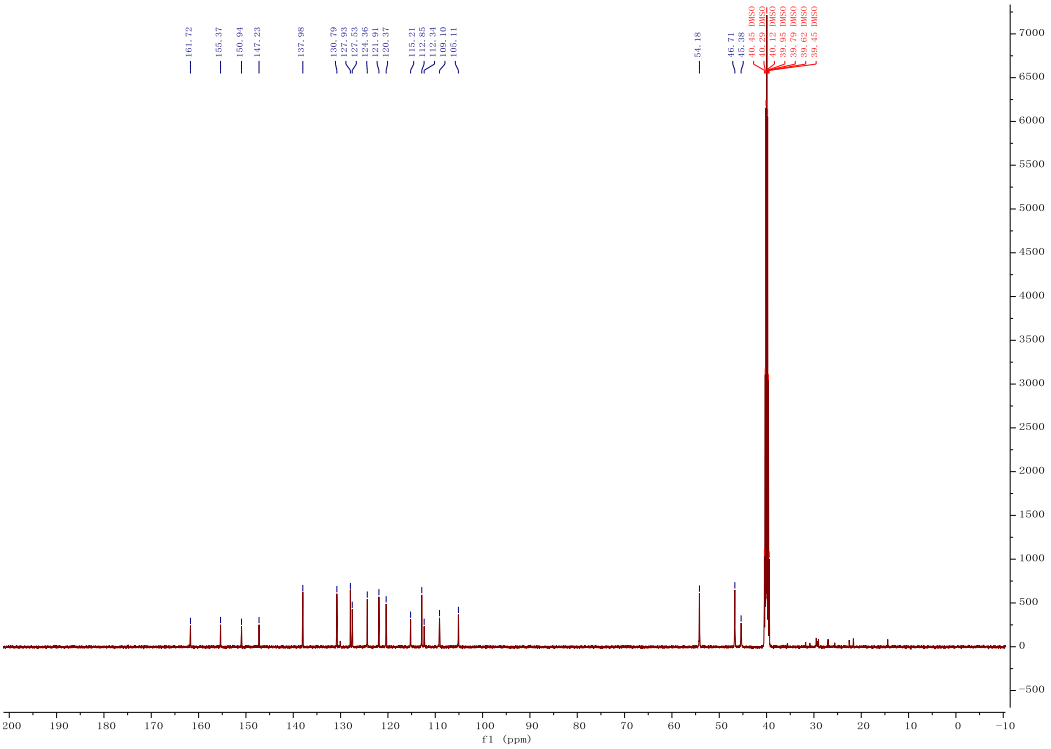


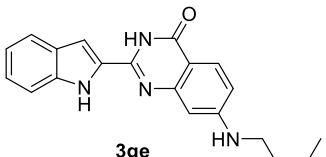
3gn

^{1}H NMR of **3gn**, 500 MHz, DMSO-d_6



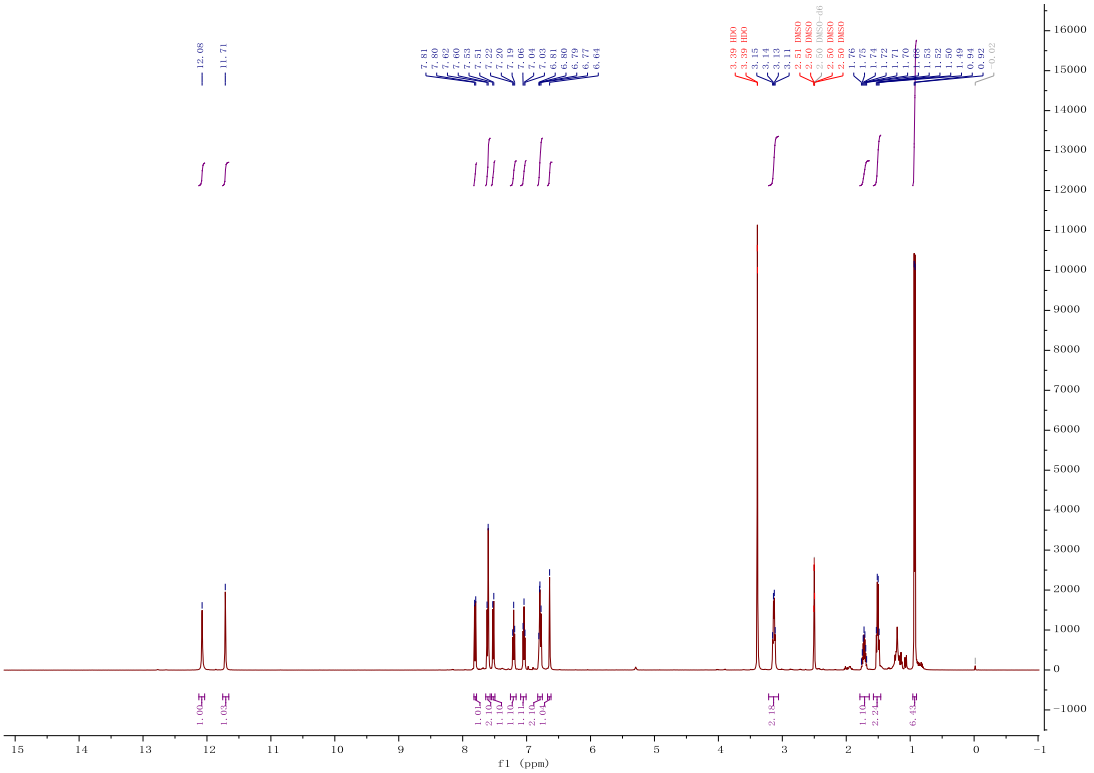
^{13}C NMR of **3gn**, 126 MHz, DMSO-d_6



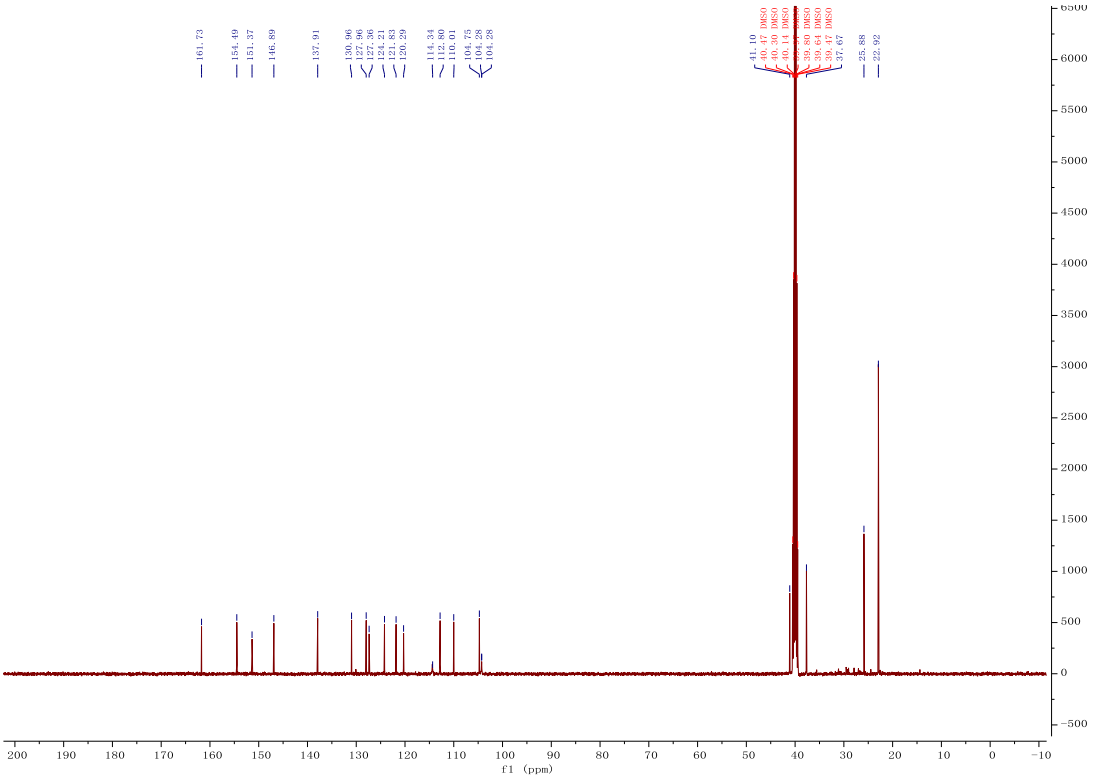


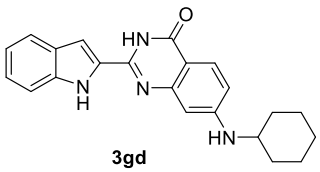
3ge

^{1}H NMR of **3ge**, 500 MHz, DMSO-d_6



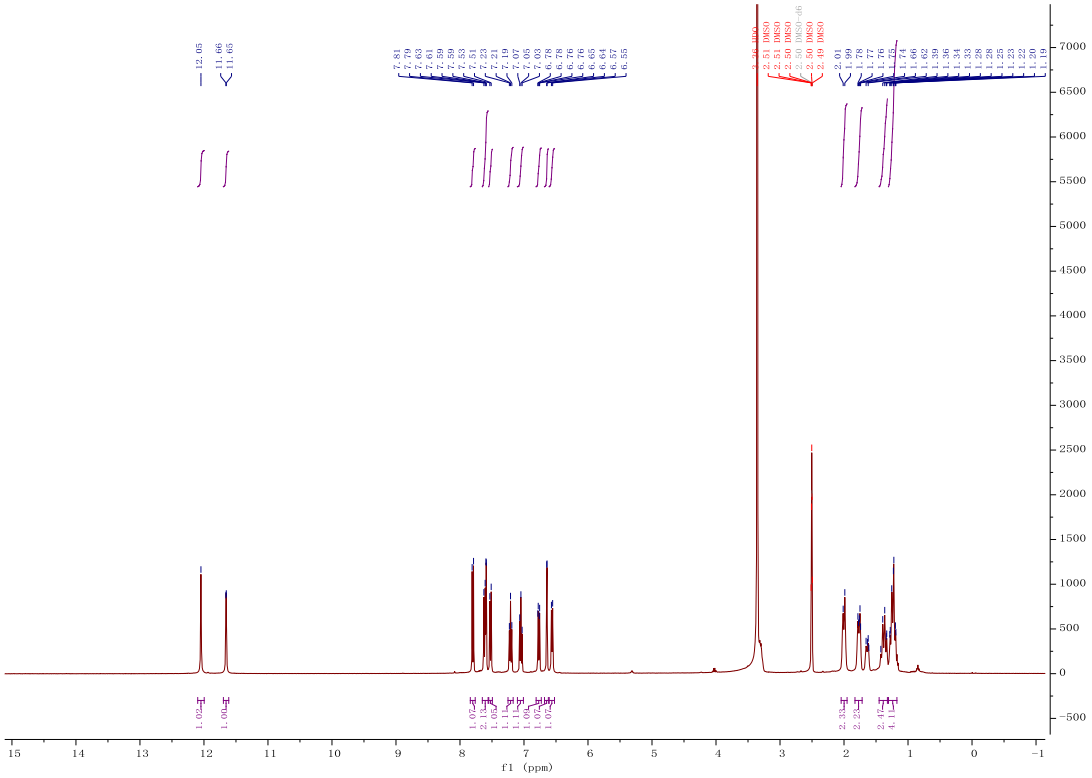
^{13}C NMR of **3ge**, 126 MHz, DMSO-d_6



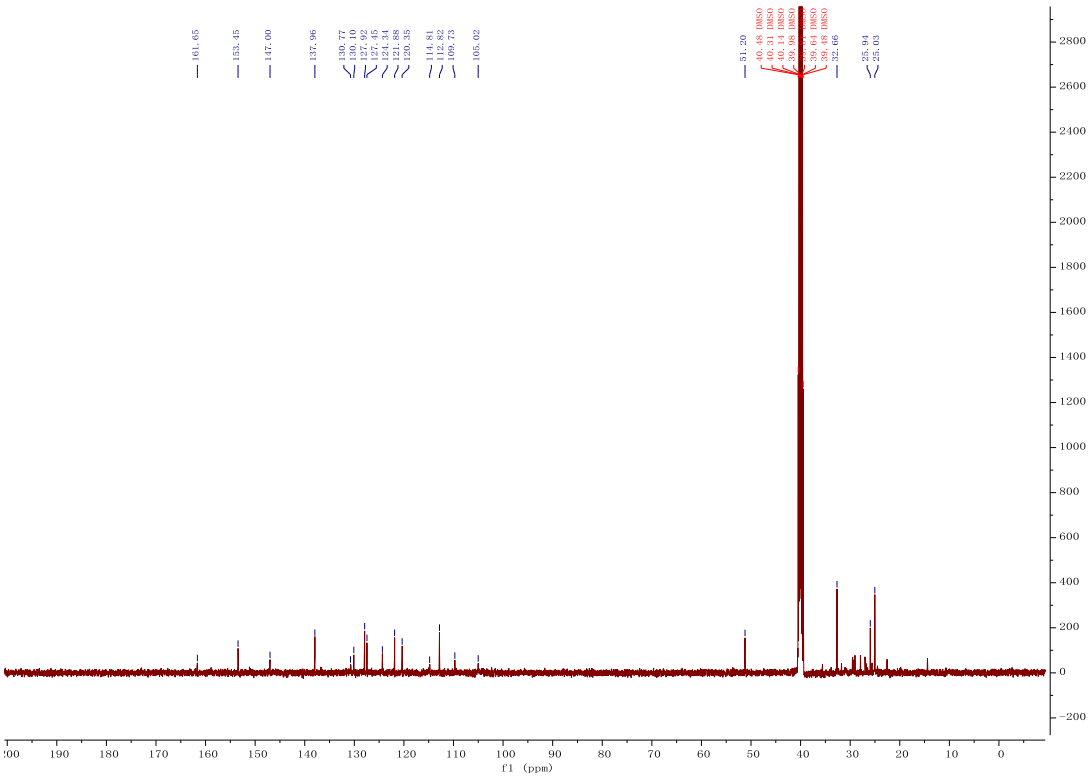


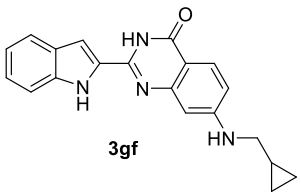
3gd

^{1}H NMR of **3gd**, 400 MHz, DMSO-d_6



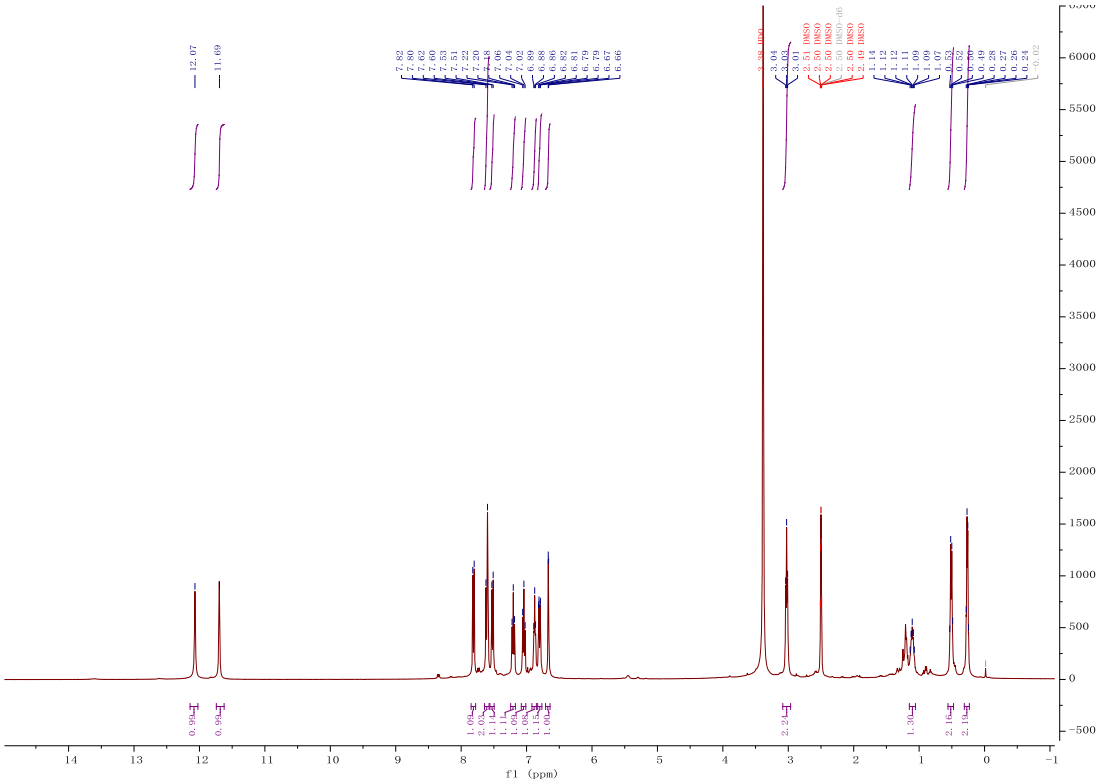
^{13}C NMR of **3gd**, 126 MHz, DMSO-d_6



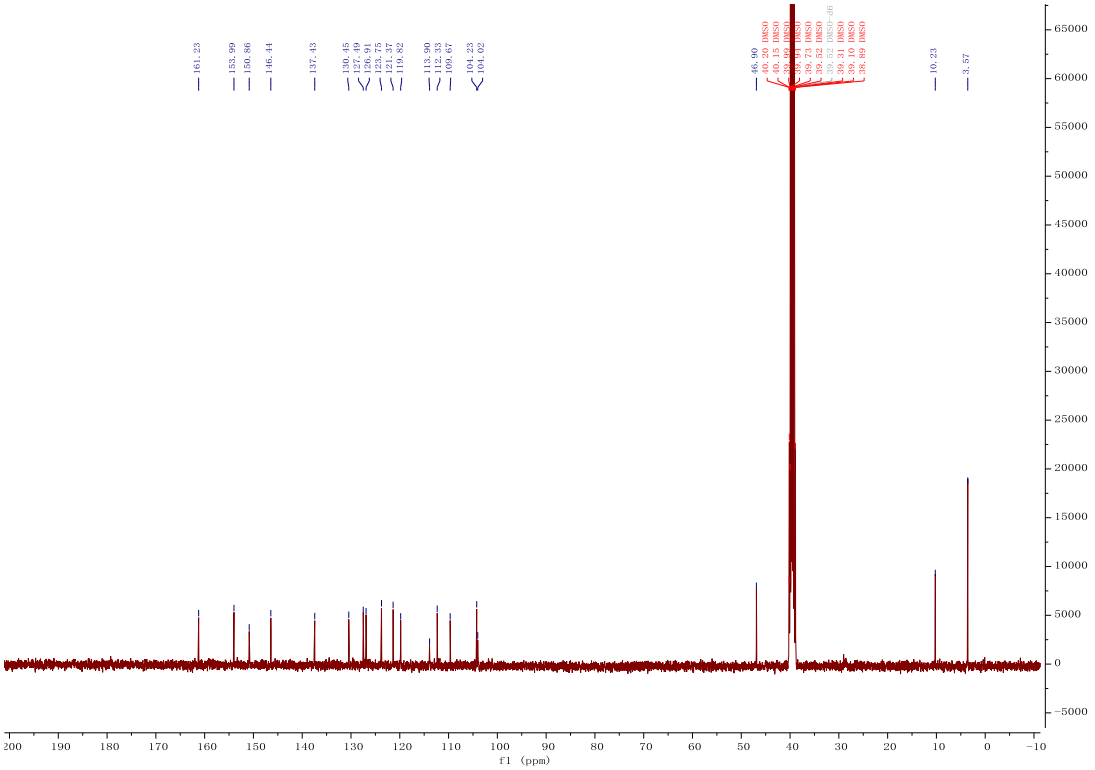


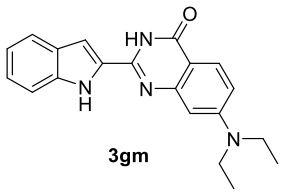
3gf

^{1}H NMR of **3gf**, 400 MHz, DMSO-d_6



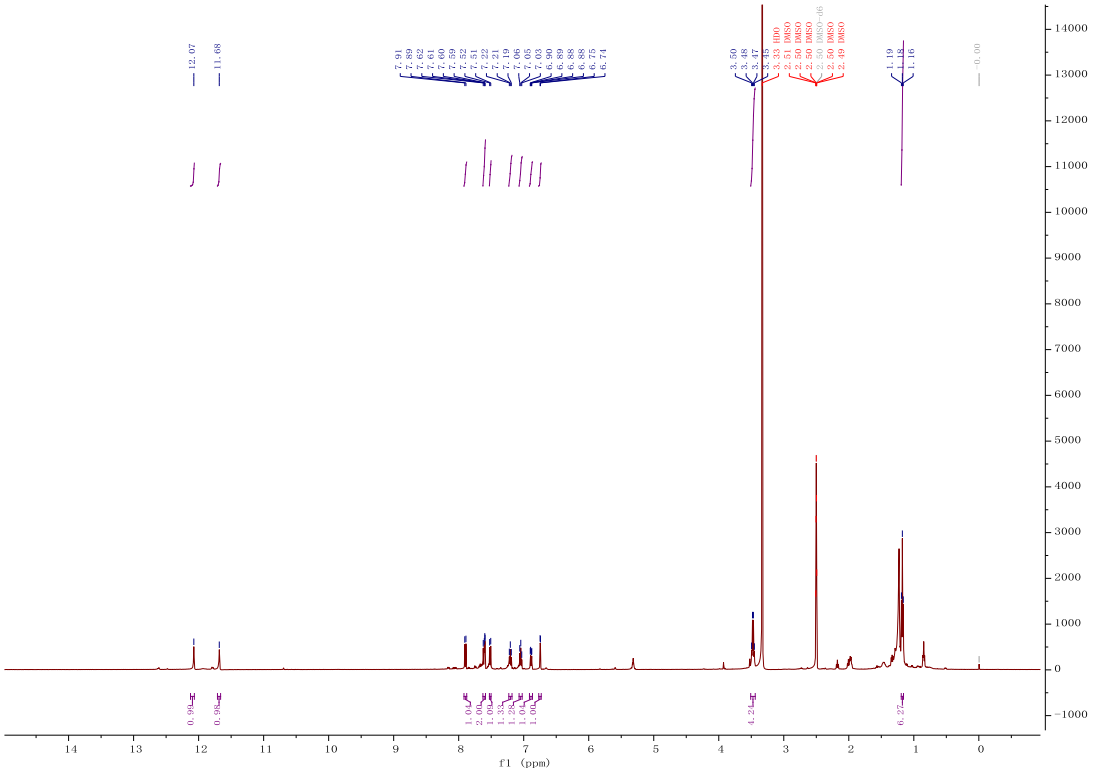
^{13}C NMR of **3gf**, 101 MHz, DMSO-d_6



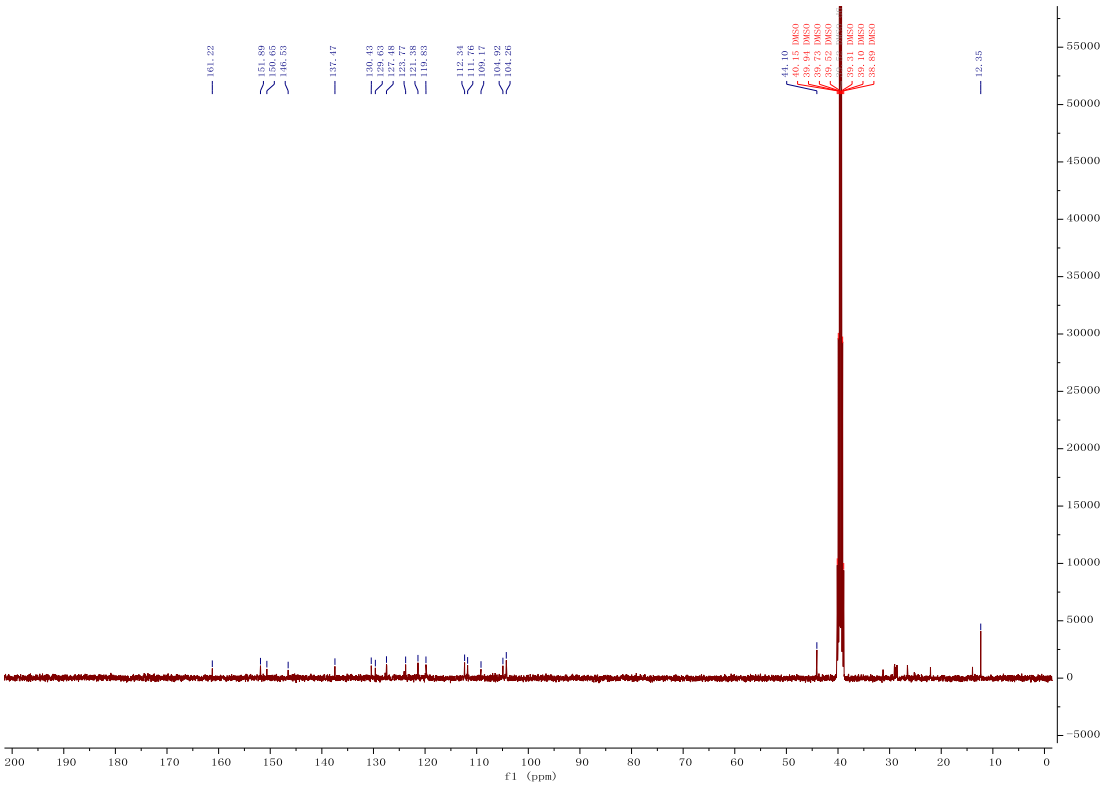


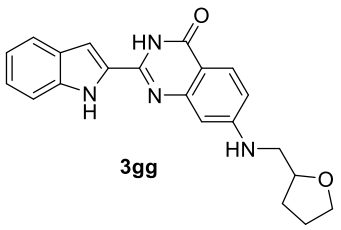
3gm

^{1}H NMR of **3gm**, 500 MHz, DMSO-d_6



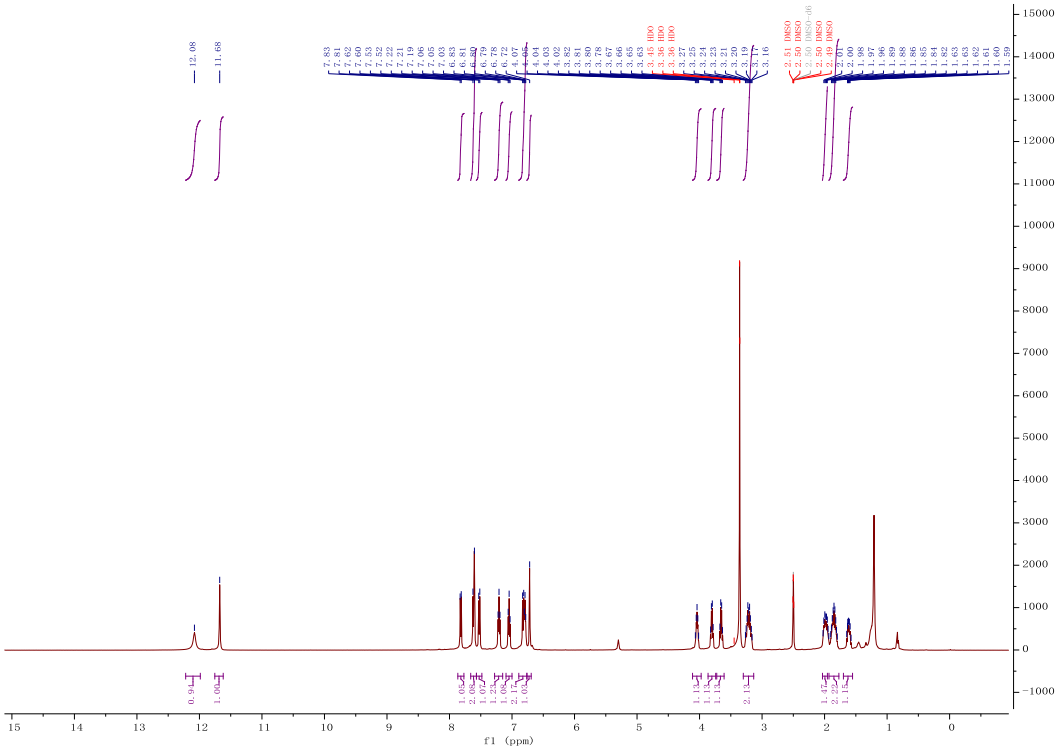
^{13}C NMR of **3gm**, 101 MHz, DMSO-d_6



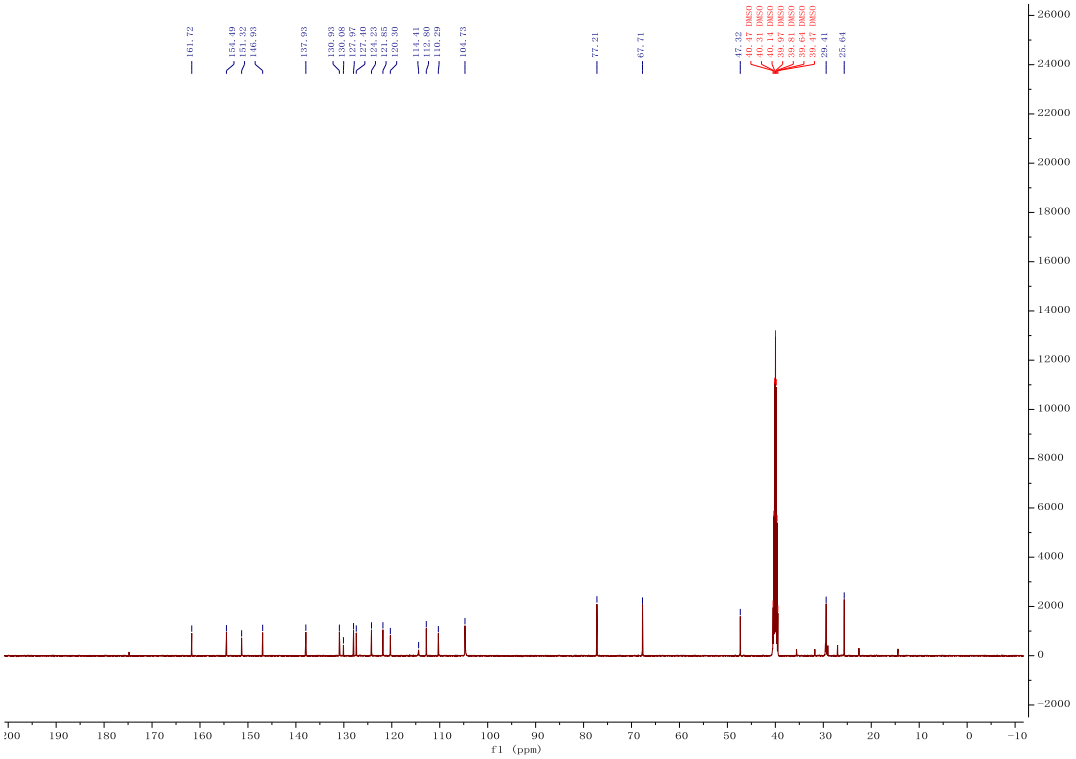


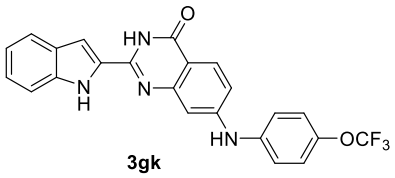
3gg

^{1}H NMR of **3gg**, 500 MHz, DMSO-d_6



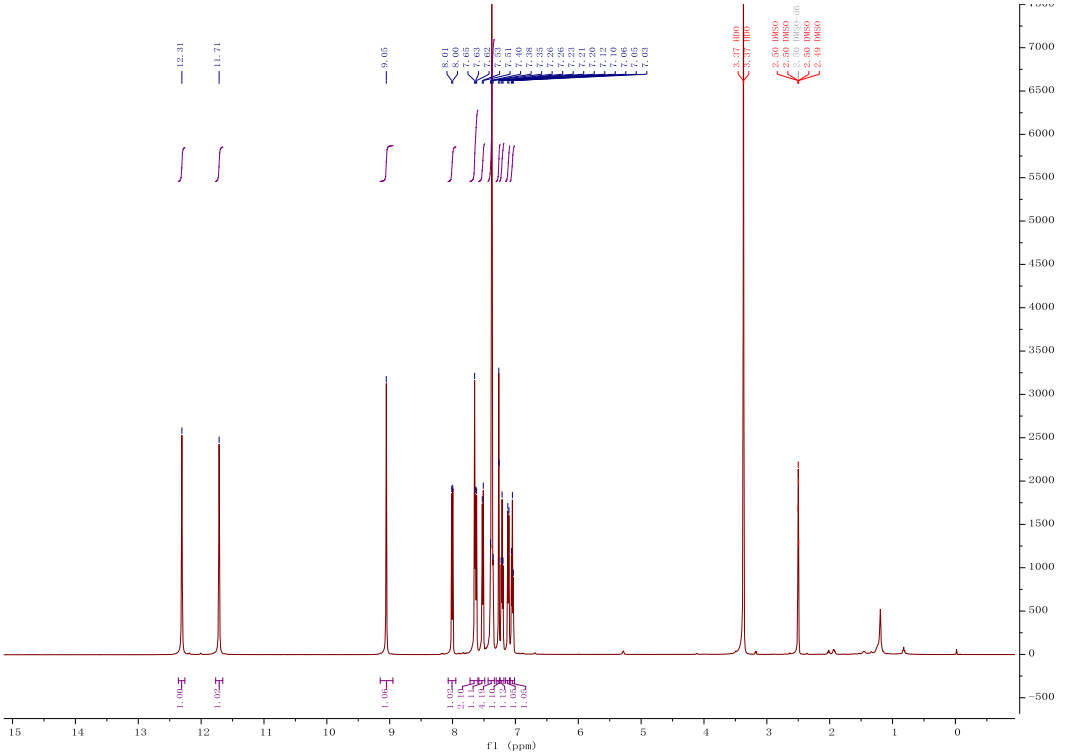
^{13}C NMR of **3gg**, 126 MHz, DMSO-d_6



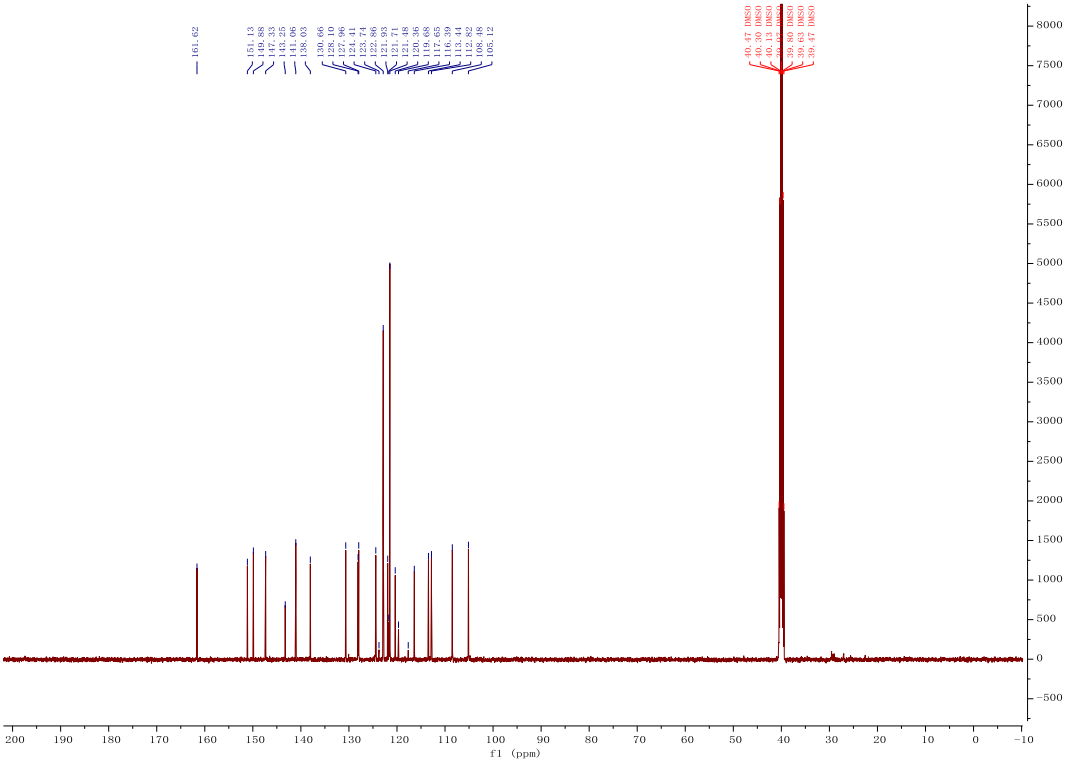


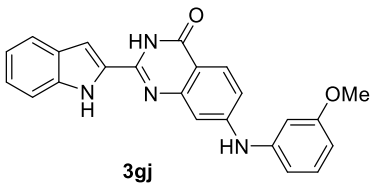
3gk

^{1}H NMR of **3gk**, 500 MHz, DMSO-d_6



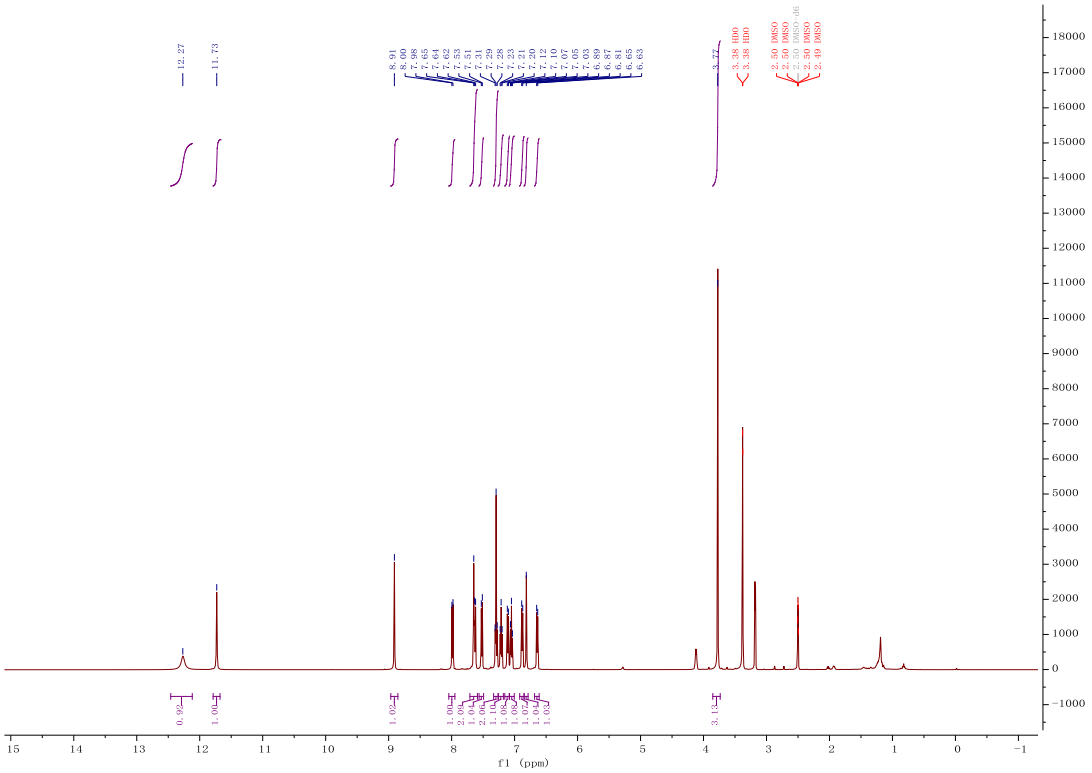
^{13}C NMR of **3gk**, 126 MHz, DMSO-d_6



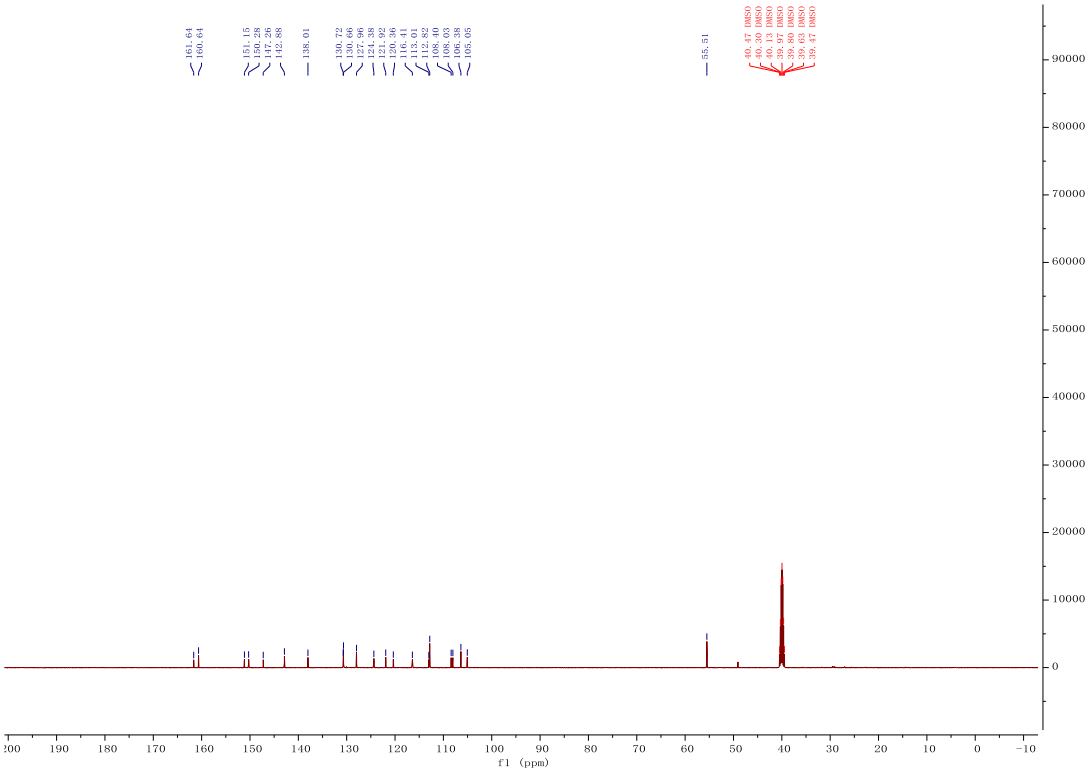


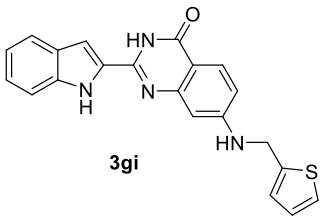
3gj

^{1}H NMR of **3gj**, 500 MHz, DMSO-d_6



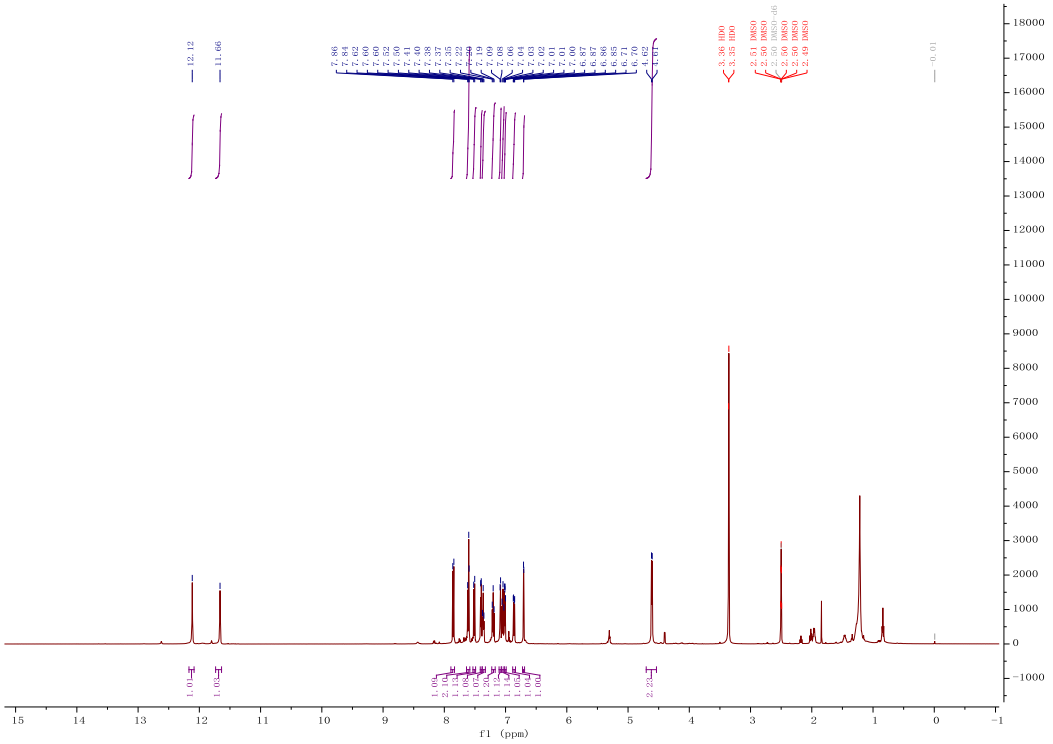
^{13}C NMR of **3gj**, 126 MHz, DMSO-d_6



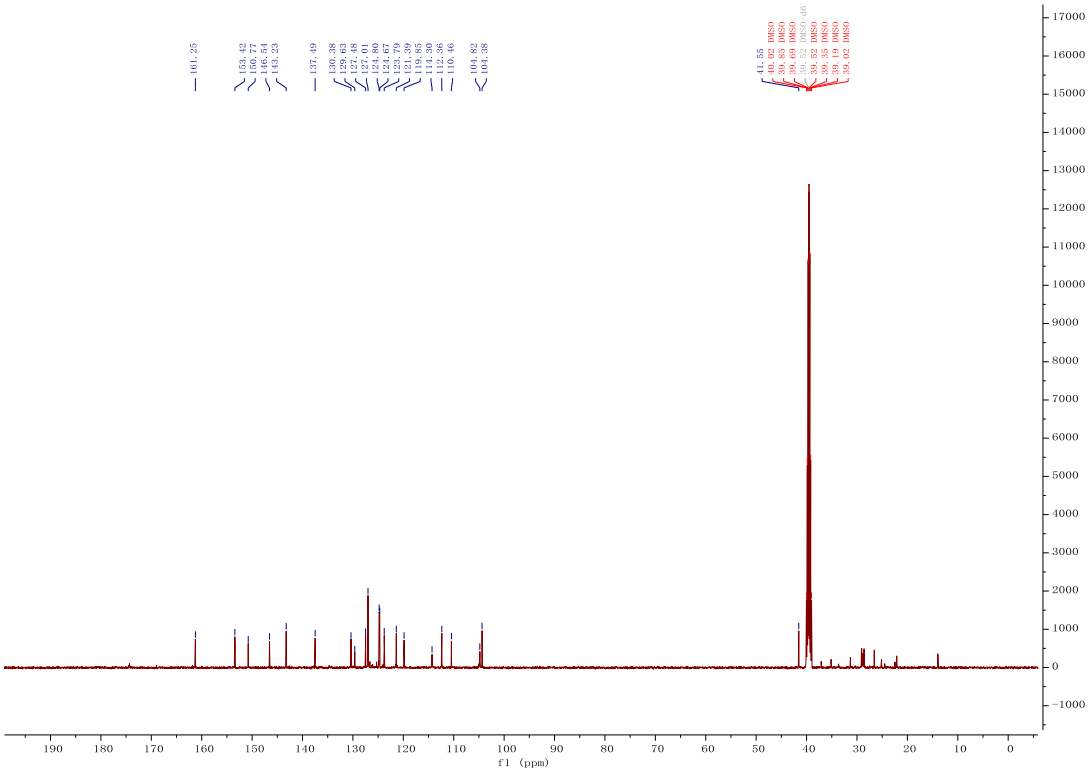


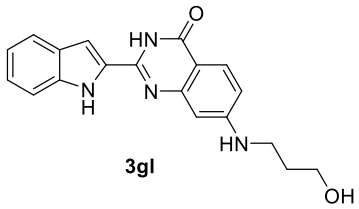
3gi

^{1}H NMR of **3gi**, 500 MHz, DMSO-d_6



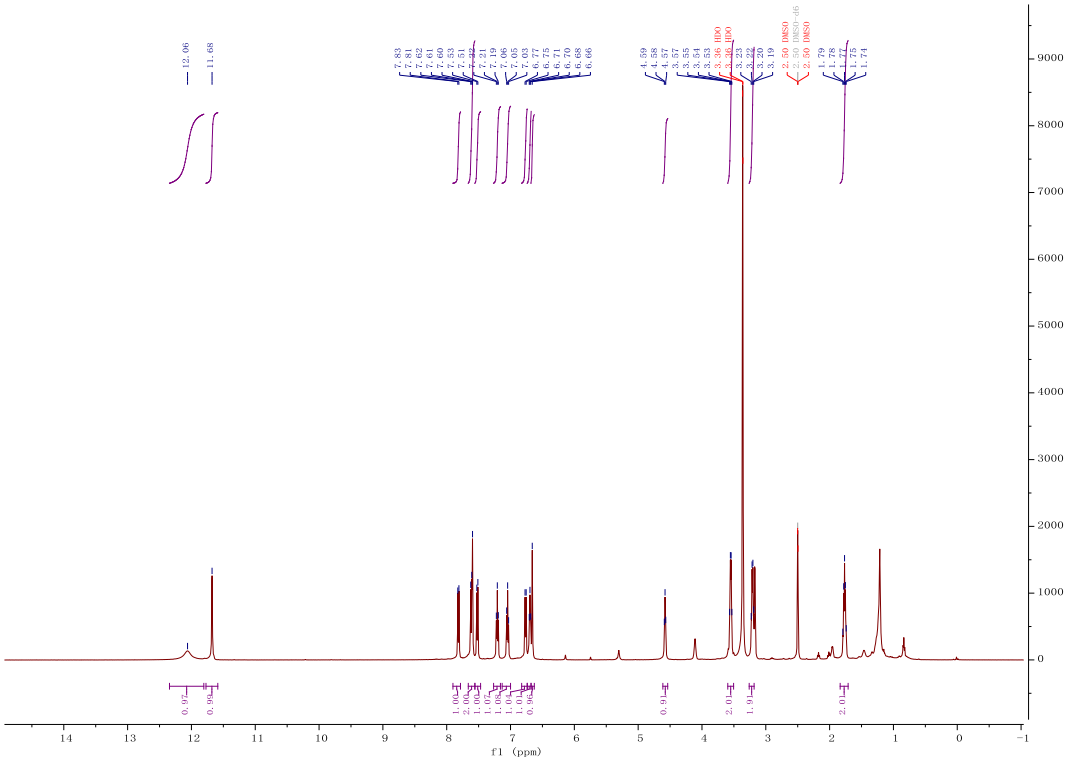
^{13}C NMR of **3gi**, 126 MHz, DMSO-d_6





3gl

^{1}H NMR of **3gl**, 500 MHz, DMSO-d_6



^{13}C NMR of **3gl**, 126 MHz, DMSO-d_6