

Supporting Information

Synthesis of Isoxazolo[5,4-*b*]pyridines by Microwave-Assisted Multi-Component Reactions in Water

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Experimental

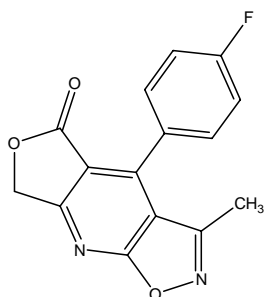
Microwave irradiation was carried out with microwave reactor Emrys™ Creator from Personal Chemistry, Uppsala, Sweden. Melting points were determined in open capillaries and were uncorrected. IR spectra were taken on a FTIR-Tensor 27 spectrometer in KBr pellets and reported in cm^{-1} . ^1H NMR spectra were measured on a Bruker DPX 400 MHz spectrometer in $\text{DMSO-}d_6$ with chemical shift (δ) given in parts per million relative to TMS as internal standard. X-Ray crystallographic analysis was performed with a Siemens SMART CCD and a Semens P4 diffractometer. HRMS (ESI) was determined by using the micrOTOF-Q II HPLC/MS instrument (BRUKER).

General procedure for the synthesis of compounds **4**, **6**, **8**, **10** and **12**

with microwave irradiation.

In a 10-mL Emrys™ reaction vial, aromatic aldehyde (**1**, 1 mmol), 3-methylisoxazol-5-amine (**2**, 1 mmol), with several cyclic 1,3-dicarbonyl compounds separately [tetronic acid (**3**, 1 mmol), 1,3-indanedione (**5**, 1 mmol), Meldrum's acid (**7**, 1 mmol), dimedone (**9**, 1 mmol) or cyclohexane-1,3-dione (**11**, 1 mmol)] and H_2O (2.0 mL) were mixed and then capped. The mixture was heated for a given time at $120\text{ }^\circ\text{C}$ under microwave irradiation (initial power of 100 W and maximum power of 200 W). Upon completion, as monitored by TLC, the reaction mixture was cooled to room temperature and filtered to give the crude product, which was subsequently recrystallized from EtOH (95%) to give the pure product.

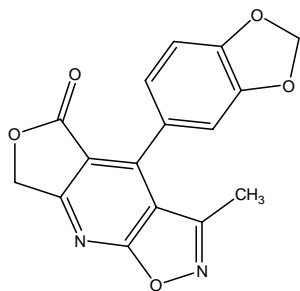
Compound **4a**



4-(4-Fluoro-phenyl)-3-methyl-7H-1,6-dioxo-2,8-diaza-s-indacen-5-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1769 cm^{-1} ;
 ^1H nmr ($\text{DMSO-}d_6$): δ 7.70-7.66 (m, 2H, ArH), 7.42 (t, 2H, $J = 8.8\text{ Hz}$, ArH), 5.52 (s, 2H, CH_2), 2.12 (s, 3H, CH_3);
 ^{13}C NMR ($\text{DMSO-}d_6$): δ 171.75, 170.04, 166.91, 161.89, 156.99, 148.07, 132.04, 126.21, 115.11, 114.90, 113.09, 68.88, 12.60;

HRMS (ESI): m/z calcd for: 307.0490 $[M+Na]^+$, found: 307.0491.

Compound **4b**



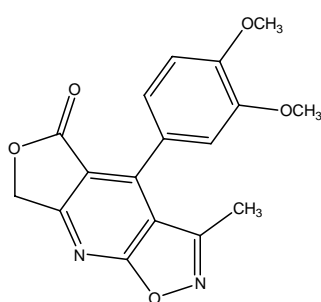
4-Benzo[1,3]dioxol-5-yl-3-methyl-7H-1,6-dioxo-2,8-diaza-s-indacen-5-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1760 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 7.21 (s, 1H, ArH), 7.12-7.07 (m, 2H, ArH), 6.17 (s, 2H, CH₂), 5.49 (s, 2H, CH₂), 2.18 (s, 3H, CH₃);

^{13}C NMR (DMSO- d_6): δ 171.78, 170.04, 166.88, 157.07, 148.95, 148.77, 146.83, 124.18, 123.21, 113.63, 113.04, 110.13, 107.87, 101.64, 68.75, 12.72;

HRMS (ESI): m/z calcd for: 333.0482 $[M+Na]^+$, found: 333.0468.

Compound **4c**



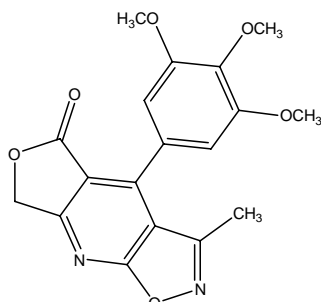
4-(3,4-Dimethoxy-phenyl)-3-methyl-7H-1,6-dioxo-2,8-diaza-s-indacen-5-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1754 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 7.25 (s, 1H, ArH), 7.17-7.12 (m, 2H, ArH), 5.49 (s, 2H, CH₂), 3.87 (s, 3H, OCH₃), 3.78 (s, 3H, OCH₃), 2.18 (s, 3H, CH₃);

^{13}C NMR (DMSO- d_6): δ 171.80, 170.11, 166.92, 157.16, 150.24, 149.40, 147.85, 122.86, 121.85, 113.62, 113.50, 112.93, 110.86, 68.67, 55.69, 55.54, 12.88;

HRMS (ESI): m/z calcd for: 349.0795 $[M+Na]^+$, found: 349.0785.

Compound **4d**



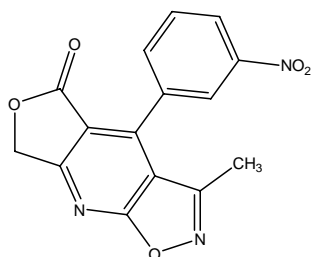
4-(3,4,5-Trimethoxy-phenyl)-3-methyl-7H-1,6-dioxo-2,8-diaza-s-indacen-5-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1750 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 6.94 (s, 2H, ArH), 5.51 (s, 2H, CH₂), 3.80 (s, 6H, 2OCH₃), 3.78 (s, 3H, OCH₃), 2.19 (s, 3H, CH₃);

^{13}C NMR (DMSO- d_6): δ 171.69, 170.01, 166.74, 157.20, 152.32, 149.08, 138.58, 125.11, 113.66, 113.03, 107.40, 68.74, 60.19, 56.15, 12.73;

HRMS (ESI): m/z calcd for: 379.0901 $[M+Na]^+$, found: 379.0907.

Compound **4e**



4-(3-Nitro-phenyl)-3-methyl-7H-1,6-dioxo-2,8-diaza-s-indacen-5-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1772 cm^{-1} ;

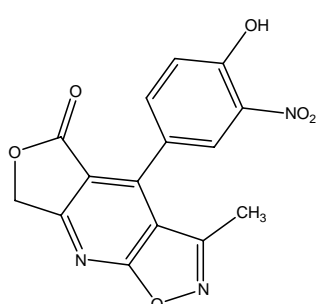
^1H nmr (DMSO- d_6): δ 8.54 (s, 1H, ArH), 8.47 (d, 1H, $J = 8.4\text{ Hz}$, ArH), 8.10 (d, 1H, $J = 8.0\text{ Hz}$, ArH), 7.89 (t, 1H, $J = 8.0\text{ Hz}$, ArH), 5.56 (s, 2H, CH₂), 2.12 (s, 3H, CH₃);

^{13}C NMR (DMSO- d_6): δ 171.74, 169.92, 166.96, 156.91, 147.21, 145.87, 135.96, 131.47, 129.71, 124.72, 124.50, 113.99, 113.16,

69.12, 12.57.

HRMS (ESI): m/z calcd for: 334.0435 $[M+Na]^+$, found: 334.0412.

Compound **4f**

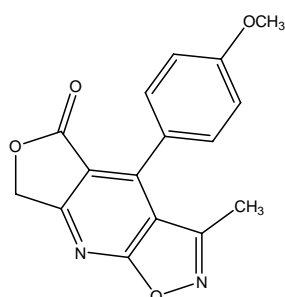


4-(4-Hydroxy-3-nitro-phenyl)-3-methyl-7H-1,6-dioxo-2,8-diaza-s-indacen-5-one: ir (potassium bromide) (ν , cm^{-1}): OH: 3279 ; CO: 1775 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 11.67 (s, 1H, OH), 8.23 (s, 1H, ArH), 7.80 (d,

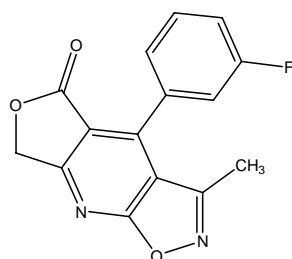
^1H , $J = 8.8$ Hz, ArH), 7.30 (d, 1H, $J = 8.4$ Hz, ArH), 5.51 (s, 2H, CH_2), 2.22 (s, 3H, CH_3);
 ^{13}C NMR ($\text{DMSO-}d_6$): δ 171.84, 170.02, 167.08, 156.95, 153.27, 146.59, 136.43, 136.30, 127.06, 120.33, 118.56, 113.72, 113.03, 68.91, 12.82;
HRMS (ESI): m/z calcd for: 350.0384 $[\text{M}+\text{Na}]^+$, found: 350.0388.

Compound **4g**



4-(4-Methoxy-phenyl)-3-methyl-7H-1,6-dioxo-2,8-diaza-s-indacen-5-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1759 cm^{-1} ;
 ^1H nmr ($\text{DMSO-}d_6$): δ 7.56 (d, 2H, $J = 8.8$ Hz, ArH), 7.12 (d, 2H, $J = 8.8$ Hz, ArH), 5.49 (s, 2H, CH_2), 3.87 (s, 3H, OCH_3), 2.16 (s, 3H, CH_3);
 ^{13}C NMR ($\text{DMSO-}d_6$): δ 171.84, 170.16, 167.00, 160.71, 157.07, 149.38, 131.54, 121.73, 113.40, 113.30, 112.89, 68.72, 55.30, 12.86;
HRMS (ESI): m/z calcd for: 319.0695 $[\text{M}+\text{Na}]^+$, found: 319.0725.

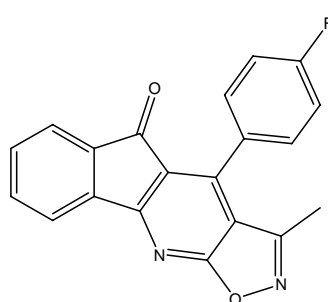
Compound **4h**



4-(3-Fluoro-phenyl)-3-methyl-7H-1,6-dioxo-2,8-diaza-s-indacen-5-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1762 cm^{-1} ;
 ^1H nmr ($\text{DMSO-}d_6$): δ 7.65-7.60 (m, 1H, ArH), 7.54-7.43 (m, 3H, ArH), 5.54 (s, 2H, CH_2), 2.11 (s, 3H, CH_3);
 ^{13}C NMR ($\text{DMSO-}d_6$): δ 171.71, 169.98, 166.71, 156.94, 130.17, 130.09, 125.60, 116.89, 116.68, 116.60, 116.36, 113.78, 113.00, 68.97, 12.40,

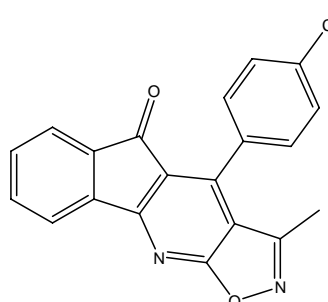
HRMS (ESI): m/z calcd for: 307.0490 $[\text{M}+\text{Na}]^+$, found: 307.0491.

Compound **6a**



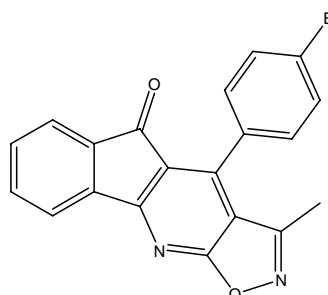
1-Methyl-10-(4-fluorophenyl)-3-oxa-2,4-diaza-cyclopenta[b]fluoren-9-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1723 cm^{-1} ;
 ^1H nmr ($\text{DMSO-}d_6$): δ 7.98 (d, 1H, $J = 7.2$ Hz, ArH), 7.79 (t, 1H, $J = 7.2$ Hz, ArH), 7.69-7.65 (m, 4H, ArH), 7.40 (t, 2H, $J = 8.8$ Hz, ArH), 2.04 (s, 3H, CH_3);
HRMS (ESI): m/z calcd for: 353.0697 found: 353.0679.

Compound **6b**



1-Methyl-10-(4-chlorophenyl)-3-oxa-2,4-diaza-cyclopenta[b]fluoren-9-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1720 cm^{-1} ;
 ^1H nmr ($\text{DMSO-}d_6$): δ 7.99 (d, 1H, $J = 7.6$ Hz, ArH), 7.81-7.77 (m, 1H, ArH), 7.68-7.64 (m, 6H, ArH), 2.04 (s, 3H, CH_3);
HRMS (ESI): m/z calcd for: 369.0402 $[\text{M}+\text{Na}]^+$, found: 369.0396.

Compound **6c**

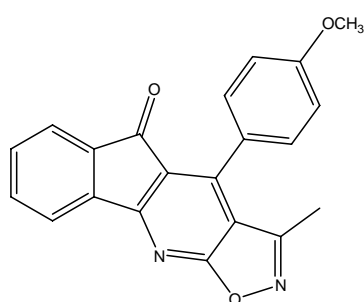


1-Methyl-10-(4-bromophenyl)-3-oxa-2,4-diaza-cyclopenta[b]fluoren-9-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1714 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 7.99 (d, 1H, J = 7.6 Hz, ArH), 7.81-7.76 (m, 3H, ArH), 7.66-7.62 (m, 2H, ArH), 7.57 (d, 1H, J = 8.4 Hz, ArH), 2.04 (s, 3H, CH $_3$);

HRMS (ESI): m/z calcd for: 412.9897 $[\text{M}+\text{Na}]^+$, found: 412.9894.

Compound **6d**



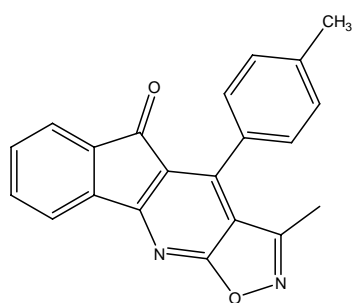
1-Methyl-10-(4-methoxyphenyl)-3-oxa-2,4-diazacyclopenta[b]fluoren-9-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1713 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 7.97 (d, 1H, J = 7.2 Hz, ArH), 7.80-7.76 (m, 1H, ArH), 7.67-7.61 (m, 2H, ArH), 7.55 (d, 2H, J = 8.0 Hz, ArH), 7.10 (d, 2H, J = 8.8 Hz, ArH), 3.88 (s, 3H, OCH $_3$), 2.08 (s, 3H, CH $_3$);

^{13}C nmr (DMSO- d_6): δ 188.33, 172.30, 167.25, 160.45, 157.16, 147.15, 140.64, 136.25, 135.59, 132.63, 131.03, 123.53, 122.71, 121.72, 121.55, 113.23, 111.86, 55.28, 12.62;

HRMS (ESI): m/z calcd for: 365.0897 $[\text{M}+\text{Na}]^+$, found: 365.0896.

Compound **6e**

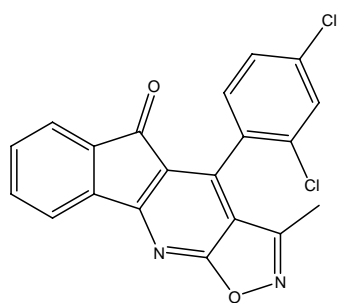


1-Methyl-10-(4-methylphenyl)-3-oxa-2,4-diazacyclopenta[b]fluoren-9-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1716 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 7.97 (d, 1H, J = 7.6 Hz, ArH), 7.80-7.76 (m, 1H, ArH), 7.66-7.60 (m, 2H, ArH), 7.47 (d, 1H, J = 8.0 Hz, ArH), 7.36 (d, 1H, J = 8.0 Hz, ArH), 2.45 (s, 3H, CH $_3$), 2.04 (s, 3H, CH $_3$);

HRMS (ESI): m/z calcd for: 349.0948 $[\text{M}+\text{Na}]^+$, found: 349.0950.

Compound **6f**

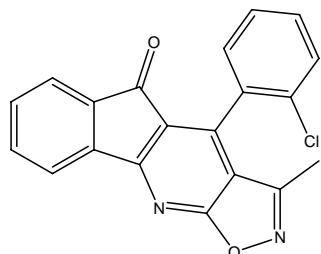


10-(2,4-Dichloro-phenyl)-1-methyl-3-oxa-2,4-diazacyclopenta[b]fluoren-9-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1717 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 8.02 (d, 1H, J = 7.6 Hz, ArH), 7.93 (s, 1H, ArH), 7.83-7.80 (m, 1H, ArH), 7.70-7.64 (m, 4H, ArH), 2.01 (s, 3H, CH $_3$);

HRMS (ESI): m/z calcd for: 403.0017 $[\text{M}+\text{Na}]^+$, found: 403.0015.

Compound **6g**

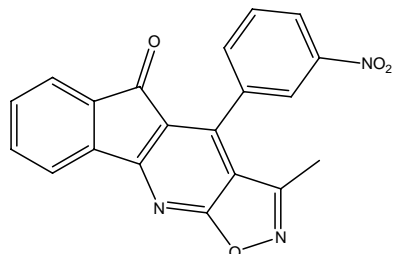


1-Methyl-10-(2-chlorophenyl)-3-oxa-2,4-diazacyclopenta[b]fluoren-9-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1721 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 8.02 (d, 1H, J = 7.2 Hz, ArH), 7.83-7.79 (m, 1H, ArH), 7.72-7.63 (m, 4H, ArH), 7.61-7.55 (m, 2H, ArH), 1.96 (s, 3H, CH $_3$);

HRMS (ESI): m/z calcd for: 369.0402 $[\text{M}+\text{Na}]^+$, found: 369.0396.

Compound **6h**



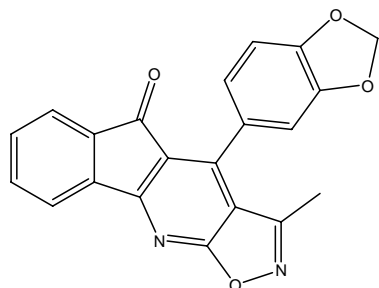
1-Methyl-10-(3-nitrophenyl)-3-oxa-2,4-diazacyclopenta[b]fluoren-9-one: ir (potassium bromide) (ν , cm^{-1}): CO: 1730

cm⁻¹;

¹H nmr (DMSO-*d*₆): δ 8.55-8.54 (m, 1H, ArH), 8.47-8.45 (m, 1H, ArH), 8.10 (d, 1H, *J* = 8.0 Hz, ArH), 8.00 (d, 1H, *J* = 7.6 Hz, ArH), 7.90-7.86 (m, 1H, ArH), 7.82-7.80 (m, 1H, ArH), 7.69-7.64 (m, 2H, ArH), 2.03 (s, 3H, CH₃);

HRMS (ESI): *m/z* calcd for: 380.0642 [M+Na]⁺, found: 380.0643.

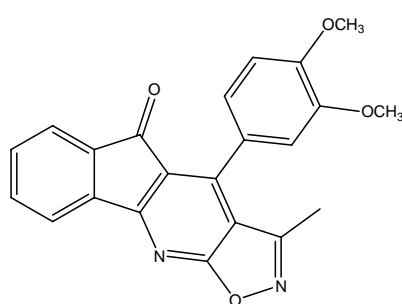
Compound 6i



10-Benzo[1,3]dioxol-5-yl-1-methyl-3-oxa-2,4-diaza-cyclopenta[b]fluoren-9-one: ir (potassium bromide) (ν, cm⁻¹): CO: 1727 cm⁻¹;

¹H nmr (DMSO-*d*₆): δ 7.96 (d, 1H, *J* = 7.2 Hz, ArH), 7.79-7.75 (m, 1H, ArH), 7.67-7.60 (m, 2H, ArH), 7.21 (s, 1H, ArH), 7.11-7.06 (m, 2H, ArH), 6.17 (s, 2H, CH₂), 2.10 (s, 3H, CH₃);
HRMS (ESI): *m/z* calcd for: 379.0690 [M+Na]⁺, found: 379.0675.

Compound 6j

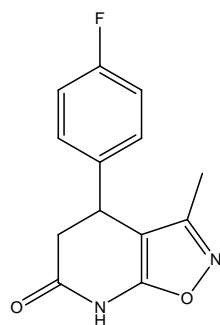


10-(3,4-Dimethoxy-phenyl)-1-methyl-3-oxa-2,4-diaza-cyclopenta[b]fluoren-9-one: ir (potassium bromide) (ν, cm⁻¹): CO: 1732 cm⁻¹;

¹H nmr (DMSO-*d*₆): δ 7.96 (d, 1H, *J* = 7.2 Hz, ArH), 7.81-7.76 (m, 1H, ArH), 7.68-7.60 (m, 2H, ArH), 7.25 (s, 1H, ArH), 7.16-7.10 (m, 2H, ArH), 3.87 (s, 3H, OCH₃), 3.78 (s, 3H, OCH₃), 2.10 (s, 3H, CH₃);
HRMS (ESI): *m/z* calcd for: 395.1003 [M+Na]⁺, found:

395.0976.

Compound 8a



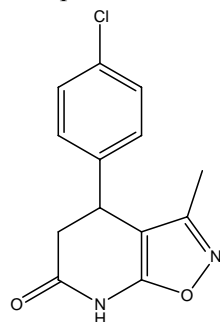
4-(4-fluorophenyl)-4,5-dihydro-3-methylisoxazolo[5,4-*b*]pyridin-6(7*H*)-one: ir (potassium bromide) (ν, cm⁻¹): 3112, 3037, 2921, 2808, 1664, 1530, 1478, 1330, 1217, 1192, 1105, 972, 821;

¹H nmr (DMSO-*d*₆): δ 11.63 (s, 1H, NH), 7.26-7.22 (m, 2H, ArH), 7.20-7.15 (m, 2H, ArH), 4.21 (t, 1H, *J* = 6.4 Hz, CH), 3.00 (dd, 1H, *J*₁ = 8.0 Hz, *J*₂ = 16.4 Hz, CH₂), 2.64 (dd, 1H, *J*₁ = 6.0 Hz, *J*₂ = 16.4 Hz, CH₂), 1.81 (s, 3H, CH₃);

¹³C NMR (DMSO-*d*₆): δ 169.22, 162.25, 159.96, 157.88, 138.47, 128.84, 128.76, 115.68, 115.46, 93.82, 39.89, 32.00, 9.85;

δ HRMS (ESI): *m/z* calcd for: 247.0878 [M+H]⁺, found: 247.0882.

Compound 8b

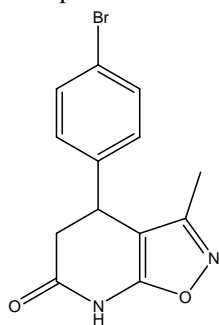


4-(4-chlorophenyl)-4,5-dihydro-3-methylisoxazolo[5,4-*b*]pyridin-6(7*H*)-one: ir (potassium bromide) (ν, cm⁻¹): 3118, 3048, 2931, 2812, 1661, 1541, 1411, 1288, 1171, 1011, 829;

¹H nmr (DMSO-*d*₆): δ 11.64 (s, 1H, NH), 7.41 (d, 2H, *J* = 8.4 Hz, ArH), 7.22 (d, 2H, *J* = 8.4 Hz, ArH), 4.22 (t, 1H, *J* = 7.2 Hz, CH), 3.02 (dd, 1H, *J*₁ = 8.0 Hz, *J*₂ = 16.4 Hz, CH₂), 2.63 (dd, 1H, *J*₁ = 5.6 Hz, *J*₂ = 16.4 Hz, CH₂), 1.83 (s, 3H, CH₃);

HRMS (ESI): m/z calcd for: 263.0582 $[M+H]^+$, found: 263.0584.

Compound **8c**

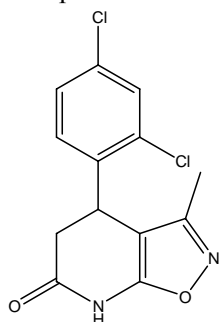


4-(4-bromophenyl)-4,5-dihydro-3-methylisoxazolo[5,4-*b*]pyridin-6(7H)-one: ir (potassium bromide) (ν , cm^{-1}): 3124, 3052, 2928, 2834, 1670, 1540, 1423, 1290, 1173, 1017, 834;

^1H nmr (DMSO- d_6): δ 11.65 (s, 1H, NH), 7.54 (d, 2H, $J = 8.0$ Hz, ArH), 7.16 (d, 2H, $J = 8.4$ Hz, ArH), 4.20 (t, 1H, $J = 6.0$ Hz, CH), 3.02 (dd, 1H, $J_1 = 8.0$ Hz, $J_2 = 16.8$ Hz, CH_2), 2.63 (dd, 1H, $J_1 = 5.6$ Hz, $J_2 = 16.4$ Hz, CH_2), 1.83 (s, 3H, CH_3);

^{13}C NMR (DMSO- d_6): δ 169.12, 162.35, 157.88, 141.79, 131.73, 129.15, 120.11, 93.41, 39.61, 32.16, 9.87.

Compound **8d**



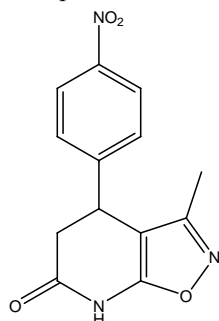
4-(2,4-dichlorophenyl)-4,5-dihydro-3-methylisoxazolo[5,4-*b*]pyridin-6(7H)-one: ir (potassium bromide) (ν , cm^{-1}): 3125, 3045, 2933, 2810, 1657, 1538, 1407, 1289, 1206, 1173, 1048, 955, 868;

^1H nmr (DMSO- d_6): δ 11.74 (s, 1H, NH), 7.69 (s, 1H, ArH), 7.42 (d, 1H, $J = 8.4$ Hz, ArH), 7.10 (d, 1H, $J = 8.4$ Hz, ArH), 4.55 (t, 1H, $J = 6.8$ Hz, CH), 3.10 (dd, 1H, $J_1 = 8.4$ Hz, $J_2 = 16.4$ Hz, CH_2), 2.57 (dd, 1H, $J_1 = 5.6$ Hz, $J_2 = 16.4$ Hz, CH_2), 1.82 (s, 3H, CH_3);

^{13}C NMR (DMSO- d_6): δ 168.68, 162.99, 157.76, 138.08, 133.13, 132.62, 129.88, 129.37, 128.08, 91.94, 37.81, 29.55, 9.77.

HRMS (ESI): m/z calcd for: 297.0193 $[M+H]^+$, found: 297.0195.

Compound **8e**



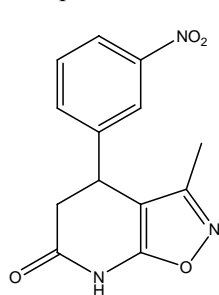
4,5-dihydro-3-methyl-4-(4-nitrophenyl)isoxazolo[5,4-*b*]pyridin-6(7H)-one: ir (potassium bromide) (ν , cm^{-1}): 3114, 3037, 2924, 2811, 1660, 1519, 1349, 1208, 1014, 859;

^1H nmr (DMSO- d_6): δ 11.73 (s, 1H, NH), 8.22 (d, 2H, $J = 8.8$ Hz, ArH), 7.49 (d, 2H, $J = 8.8$ Hz, ArH), 4.41 (t, 1H, $J = 6.0$ Hz, CH), 3.10 (dd, 1H, $J_1 = 8.0$ Hz, $J_2 = 16.4$ Hz, CH_2), 2.68 (dd, 1H, $J_1 = 5.6$ Hz, $J_2 = 16.8$ Hz, CH_2), 1.84 (s, 3H, CH_3);

^{13}C NMR (DMSO- d_6): δ 168.85, 162.55, 157.86, 150.14, 146.65, 128.37, 124.07, 92.83, 39.18, 32.56, 9.90;

HRMS (ESI): m/z calcd for: 296.0642 $[M+H]^+$, found: 296.0648.

Compound **8f**



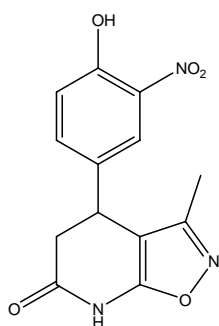
4,5-dihydro-3-methyl-4-(3-nitrophenyl)isoxazolo[5,4-*b*]pyridin-6(7H)-one: ir (potassium bromide) (ν , cm^{-1}): 3101, 3037, 2929, 2805, 1666, 1541, 1348, 1204, 1181, 827;

^1H nmr (DMSO- d_6): δ 11.73 (s, 1H, NH), 8.16-8.08 (m, 2H, ArH), 7.68-7.64 (m, 2H, ArH), 4.43 (t, 1H, $J = 6.4$ Hz, CH), 3.08 (dd, 1H, $J_1 = 8.0$ Hz, $J_2 = 16.8$ Hz, CH_2), 2.73 (dd, 1H, $J_1 = 6.0$ Hz, $J_2 = 16.4$ Hz, CH_2), 1.83 (s, 3H, CH_3);

^{13}C NMR (DMSO- d_6): δ 168.96, 162.59, 157.87, 148.11, 144.61, 133.77, 130.50, 122.17, 121.70, 92.98, 39.77, 32.34, 9.92;

HRMS (ESI): m/z calcd for: 274.0818 $[M+H]^+$, found: 274.0822.

Compound **8g**

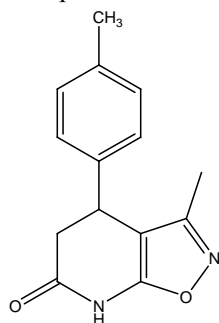


4,5-dihydro-4-(4-hydroxy-3-nitrophenyl)-3-methylisoxazolo[5,4-*b*]pyridin-6(7H)-one: ir (potassium bromide) (ν , cm^{-1}): 3207, 3121, 3039, 2927, 2815, 1676, 1532, 1361, 1212, 1021, 864;

^1H nmr (DMSO- d_6): δ 11.65 (s, 1H, NH), 10.99 (s, 1H, OH), 7.71 (s, 1H, ArH), 7.39 (d, 1H, $J = 8.4$ Hz, ArH), 7.12 (d, 1H, $J = 8.8$ Hz, ArH), 4.23 (t, 1H, $J = 6.8$ Hz, CH), 2.99 (dd, 1H, $J_1 = 7.6$ Hz, $J_2 = 16.4$ Hz, CH_2), 2.66 (dd, 1H, $J_1 = 6.0$ Hz, $J_2 = 16.4$ Hz, CH_2), 1.84 (s, 3H, CH_3);

^{13}C NMR (DMSO- d_6): δ 1169.11, 162.41, 157.88, 151.12, 136.53, 133.83, 133.39, 123.24, 119.81, 93.32, 39.60, 31.53, 9.93.

Compound **8h**



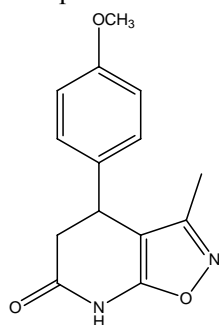
4,5-dihydro-3-methyl-4-p-tolylisoxazolo[5,4-*b*]pyridin-6(7H)-one: ir (potassium bromide) (ν , cm^{-1}): 3118, 3034, 2922, 2808, 1664, 1527, 1348, 1310, 1212, 1173, 965, 820;

^1H nmr (DMSO- d_6): δ 11.59 (s, 1H, NH), 7.14 (d, 2H, $J = 8.0$ Hz, ArH), 7.06 (d, 2H, $J = 8.0$ Hz, ArH), 4.13 (t, 1H, $J = 6.0$ Hz, CH), 2.99 (dd, 1H, $J_1 = 7.6$ Hz, $J_2 = 16.4$ Hz, CH_2), 2.61 (dd, 1H, $J_1 = 5.6$ Hz, $J_2 = 16.4$ Hz, CH_2), 1.82 (s, 3H, CH_3);

^{13}C NMR (DMSO- d_6): δ 169.36, 162.18, 157.94, 139.36, 136.16, 129.38, 126.64, 94.02, 39.77, 32.30, 20.56, 9.83;

HRMS (ESI): m/z calcd for: 265.0948 $[\text{M}+\text{Na}]^+$, found: 265.0668.

Compound **8i**



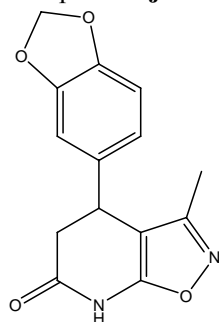
4,5-dihydro-4-(4-methoxyphenyl)-3-methylisoxazolo[5,4-*b*]pyridin-6(7H)-one: ir (potassium bromide) (ν , cm^{-1}): 3117, 3044, 2935, 2812, 1660, 1541, 1416, 1283, 1170, 1038, 830;

^1H nmr (DMSO- d_6): δ 11.58 (s, 1H, NH), 7.10 (d, 2H, $J = 8.8$ Hz, ArH), 6.90 (d, 2H, $J = 8.8$ Hz, ArH), 4.12 (t, 1H, $J = 6.0$ Hz, CH), 3.73 (s, 3H, OCH_3), 2.97 (dd, 1H, $J_1 = 8.0$ Hz, $J_2 = 16.4$ Hz, CH_2), 2.61 (dd, 1H, $J_1 = 6.0$ Hz, $J_2 = 16.4$ Hz, CH_2), 1.82 (s, 3H, CH_3);

^{13}C NMR (DMSO- d_6): δ 169.41, 162.12, 158.25, 157.94, 134.20, 127.85, 114.21, 94.23, 55.05, 40.13, 31.91, 9.84;

HRMS (ESI): m/z calcd for: 259.1078 $[\text{M}+\text{H}]^+$, found: 259.1077.

Compound **8j**



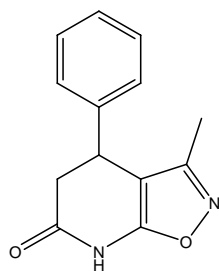
4-(benzo[*d*][1,3]dioxol-6-yl)-4,5-dihydro-3-methylisoxazolo[5,4-*b*]pyridin-6(7H)-one: ir (potassium bromide) (ν , cm^{-1}): 3103, 3036, 2897, 2808, 1665, 1537, 1488, 1349, 1243, 1196, 1042, 940;

^1H nmr (DMSO- d_6): δ 11.58 (s, 1H, NH), 6.86 (d, 1H, $J = 6.8$ Hz, ArH), 6.78 (s, 1H, ArH), 6.62 (d, 1H, $J = 8.0$ Hz, ArH), 6.00 (s, 2H, CH_2), 4.10 (t, 1H, $J = 6.4$ Hz, CH), 2.95 (dd, 1H, $J_1 = 7.6$ Hz, $J_2 = 16.0$ Hz, CH_2), 2.62 (dd, 1H, $J_1 = 6.0$ Hz, $J_2 = 16.4$ Hz, CH_2), 1.83 (s, 3H, CH_3);

^{13}C NMR (DMSO- d_6): δ 169.36, 162.17, 157.92, 147.64, 146.22, 136.18, 119.82, 108.35, 107.20, 100.99, 94.03, 40.08, 32.45, 9.84;

HRMS (ESI): m/z calcd for: 273.0875 $[\text{M}+\text{H}]^+$, found: 273.0883.

Compound **8k**



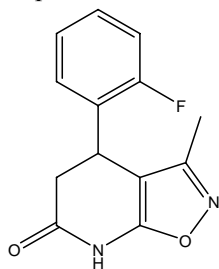
4,5-dihydro-3-methyl-4-phenylisoxazolo[5,4-*b*]pyridin-6(7*H*)-one: ir (potassium bromide) (ν , cm^{-1}): 3144, 3035, 2927, 2810, 1662, 1528, 1348, 1307, 1205, 1167, 823;

^1H nmr (DMSO- d_6): δ 11.62 (s, 1H, NH), 7.36-7.32 (m, 2H, ArH), 7.28-7.24 (m, 1H, ArH), 7.19 (d, 2H, $J = 7.2$ Hz, ArH), 4.18 (t, 1H, $J = 6.0$ Hz, CH), 3.03 (dd, 1H, $J_1 = 7.6$ Hz, $J_2 = 16.0$ Hz, CH_2), 2.65 (dd, 1H, $J_1 = 5.6$ Hz, $J_2 = 16.0$ Hz, CH_2), 1.82 (s, 3H, CH_3);

^{13}C NMR (DMSO- d_6): δ 169.32, 162.24, 157.94, 142.38, 128.84, 127.05, 126.79, 93.90, 39.84, 32.70, 9.82;

HRMS (ESI): m/z calcd for: 229.0767 $[\text{M}+\text{H}]^+$, found: 229.0973.

Compound **8l**



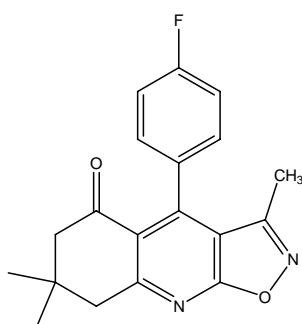
4-(2-fluorophenyl)-4,5-dihydro-3-methylisoxazolo[5,4-*b*]pyridin-6(7*H*)-one: ir (potassium bromide) (ν , cm^{-1}): 3117, 3039, 2928, 2818, 1664, 1530, 1488, 1336, 1227, 1192, 1100, 970, 819;

^1H nmr (DMSO- d_6): δ 11.67 (s, 1H, NH), 7.35-7.33 (m, 1H, ArH), 7.25-7.14 (m, 3H, ArH), 4.41 (t, 1H, $J = 6.4$ Hz, CH), 3.11 (dd, 1H, $J_1 = 8.4$ Hz, $J_2 = 16.4$ Hz, CH_2), 2.58 (dd, 1H, $J_1 = 4.0$ Hz, $J_2 = 16.8$ Hz, CH_2), 1.86 (s, 3H, CH_3);

^{13}C NMR (DMSO- d_6): δ 169.06, 162.47, 157.83, 129.29, 129.21, 128.61, 124.83, 115.91, 115.70, 92.22, 38.02, 26.91, 9.61;

HRMS (ESI): m/z calcd for: 269.0697 $[\text{M}+\text{Na}]^+$, found: 269.0697.

Compound **10a**



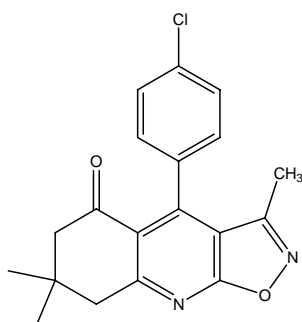
4-(4-fluorophenyl)-7,8-dihydro-3,7,7-trimethylisoxazolo[5,4-*b*]quinolin-5(6*H*)-one: ir (potassium bromide) (ν , cm^{-1}): CO 1702 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 7.38-7.34 (m, 2H, ArH), 7.30 (t, 2H, $J = 9.2$ Hz, ArH), 3.19 (s, 2H, CH_2), 2.54 (s, 2H, CH_2), 1.82 (s, 3H, CH_3), 1.07 (s, 6H, 2 CH_3);

^{13}C NMR (DMSO- d_6): δ 196.24, 168.68, 166.15, 163.13, 160.70, 156.91, 149.05, 131.88, 131.85, 129.71, 129.63, 122.57, 114.82, 114.61, 112.18, 52.89, 47.22, 32.02, 27.58, 11.88;

HRMS (ESI): m/z calcd for: 325.1347 $[\text{M}+\text{H}]^+$, found: 325.1339.

Compound **10b**



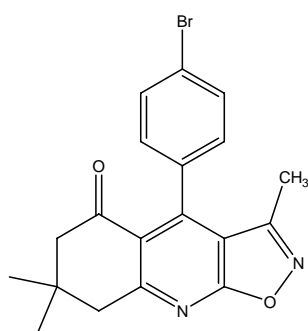
4-(4-chlorophenyl)-7,8-dihydro-3,7,7-trimethylisoxazolo[5,4-*b*]quinolin-5(6*H*)-one: ir (potassium bromide) (ν , cm^{-1}): CO 1699 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 7.53 (d, 2H, $J = 8.4$ Hz, ArH), 7.34 (d, 2H, $J = 8.4$ Hz, ArH), 3.20 (s, 2H, CH_2), 2.54 (s, 2H, CH_2), 1.83 (s, 3H, CH_3), 1.07 (s, 6H, 2 CH_3);

^{13}C NMR (DMSO- d_6): δ 196.25, 168.72, 166.20, 156.85, 148.67, 134.60, 132.77, 129.39, 127.80, 122.41, 111.98, 52.83, 47.20, 32.03, 27.57, 11.91;

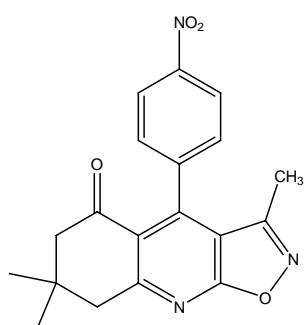
HRMS (ESI): m/z calcd for: 363.0871 $[\text{M}+\text{Na}]^+$, found: 363.0839.

Compound **10c**



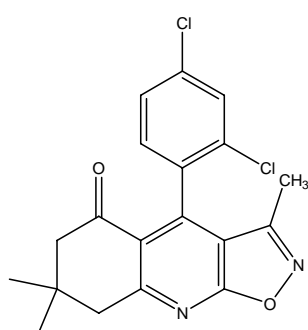
4-(4-bromophenyl)-7,8-dihydro-3,7,7-trimethylisoxazolo[5,4-*b*]quinolin-5(6*H*)-one: ir (potassium bromide) (ν , cm^{-1}): CO 1698 cm^{-1} ;
 ^1H nmr (DMSO- d_6): δ 7.66 (d, 2H, $J = 8.4$ Hz, ArH), 7.28 (d, 2H, $J = 8.4$ Hz, ArH), 3.19 (s, 2H, CH_2), 2.54 (s, 2H, CH_2), 1.83 (s, 3H, CH_3), 1.07 (s, 6H, 2 CH_3);
 ^{13}C NMR (DMSO- d_6): δ 196.39, 168.70, 166.27, 162.47, 148.68, 134.97, 130.71, 129.63, 122.34, 121.34, 111.88, 52.80, 47.16, 32.02, 27.55, 11.88;
HRMS (ESI): m/z calcd for: 407.0366 $[\text{M}+\text{Na}]^+$, found: 407.0368.

Compound **10d**



7,8-dihydro-3,7,7-trimethyl-4-(4-nitrophenyl)isoxazolo[5,4-*b*]quinolin-5(6*H*)-one: ir (potassium bromide) (ν , cm^{-1}): CO 1687 cm^{-1} ;
 ^1H nmr (DMSO- d_6): δ 8.33 (d, 2H, $J = 8.8$ Hz, ArH), 7.63 (d, 2H, $J = 8.8$ Hz, ArH), 3.22 (s, 2H, CH_2), 2.55 (s, 2H, CH_2), 1.80 (s, 3H, CH_3), 1.08 (s, 6H, 2 CH_3);
 ^{13}C NMR (DMSO- d_6): δ 196.35, 168.79, 166.36, 156.72, 147.56, 147.12, 143.17, 128.94, 122.97, 122.06, 111.66, 52.57, 47.09, 32.10, 27.54, 11.89;
HRMS (ESI): m/z calcd for: 352.1292 $[\text{M}+\text{H}]^+$, found: 352.1294.

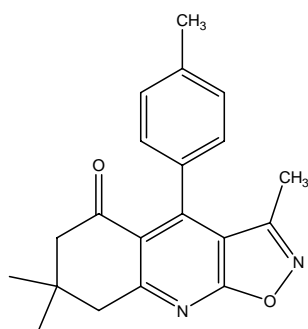
Compound **10e**



4-(2,4-dichlorophenyl)-7,8-dihydro-3,7,7-trimethylisoxazolo[5,4-*b*]quinolin-5(6*H*)-one: ir (potassium bromide) (ν , cm^{-1}): CO 1693 cm^{-1} ;
 ^1H nmr (DMSO- d_6): δ 7.80 (s, 1H, ArH), 7.57 (d, 1H, $J = 8.0$ Hz, ArH), 7.43 (d, 1H, $J = 8.4$ Hz, ArH), 3.23 (s, 2H, CH_2), 2.55 (d, 2H, $J = 4.0$ Hz, CH_2), 1.86 (s, 3H, CH_3), 1.09 (s, 3H, CH_3), 1.05 (s, 3H, CH_3);
 ^{13}C NMR (DMSO- d_6): δ 196.13, 169.06, 166.55, 156.52, 145.00, 133.77, 133.71, 131.54, 130.36, 128.46, 127.30, 122.31, 111.55, 52.30, 47.00, 32.00, 27.82, 27.03, 11.25;

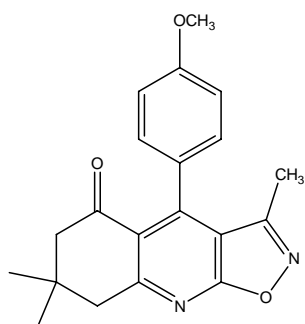
HRMS (ESI): m/z calcd for: 375.0662 $[\text{M}+\text{H}]^+$, found: 375.0631.

Compound **10f**



7,8-dihydro-3,7,7-trimethyl-4-p-tolylisoxazolo[5,4-*b*]quinolin-5(6*H*)-one: ir (potassium bromide) (ν , cm^{-1}): CO 1698 cm^{-1} ;
 ^1H nmr (DMSO- d_6): δ 7.27 (d, 2H, $J = 7.6$ Hz, ArH), 7.17 (d, 2H, $J = 8.0$ Hz, ArH), 3.19 (s, 2H, CH_2), 2.53 (s, 2H, CH_2), 2.40 (s, 3H, CH_3), 1.80 (s, 3H, CH_3), 1.07 (s, 6H, 2 CH_3);
HRMS (ESI): m/z calcd for: 343.1417 $[\text{M}+\text{Na}]^+$, found: 343.1422.

Compound **10g**



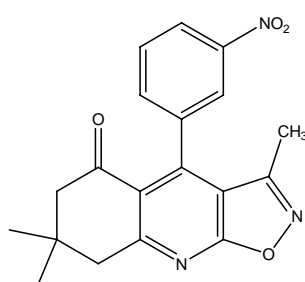
7,8-dihydro-4-(4-methoxyphenyl)-3,7,7-trimethylisoxazolo[5,4-*b*]quinolin-5(6*H*)-one: ir (potassium bromide) (ν , cm^{-1}): CO 1701 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 7.27 (d, 2H, $J = 8.8$ Hz, ArH), 7.01 (d, 2H, $J = 8.8$ Hz, ArH), 3.83 (s, 3H, OCH₃), 3.18 (s, 2H, CH₂), 2.53 (s, 2H, CH₂), 1.85 (s, 3H, CH₃), 1.07 (s, 6H, 2CH₃);

^{13}C NMR (DMSO- d_6): δ 196.26, 168.69, 166.04, 159.07, 157.03, 150.17, 129.02, 127.47, 122.78, 113.14, 112.24, 55.12, 53.05, 47.27, 32.01, 27.61, 12.02;

HRMS (ESI): m/z calcd for: 359.1367 [M+Na]⁺, found: 359.1396.

Compound **10h**



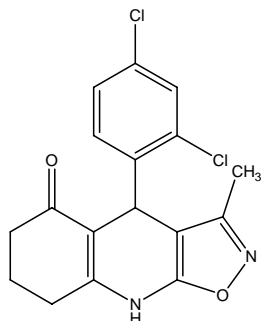
7,8-dihydro-3,7,7-trimethyl-4-(3-nitrophenyl)isoxazolo[5,4-*b*]quinolin-5(6*H*)-one: ir (potassium bromide) (ν , cm^{-1}): CO 1697 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 8.35-8.33 (m, 1H, ArH), 8.25-8.24 (m, 1H, ArH), 7.82-7.75 (m, 2H, ArH), 3.22 (s, 2H, CH₂), 2.55 (s, 2H, CH₂), 1.79 (s, 3H, CH₃), 1.09 (s, 3H, CH₃), 1.07 (s, 3H, CH₃);

^{13}C NMR (DMSO- d_6): δ 196.37, 168.80, 166.27, 156.72, 147.35, 147.06, 137.53, 134.19, 129.43, 122.87, 122.43, 122.27, 112.11, 52.73, 47.21, 32.07, 27.64, 27.52, 11.95;

HRMS (ESI): m/z calcd for: 352.1292 [M+H]⁺, found: 352.1294.

Compound **12a**



4-(2,4-dichlorophenyl)-7,8-dihydro-3-methylisoxazolo[5,4-*b*]quinolin-5(6*H*)-one: ir (potassium bromide) (ν , cm^{-1}): NH 3211; CO 1672 cm^{-1} ;

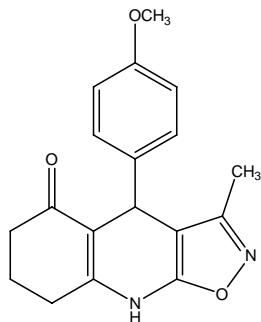
^1H nmr (DMSO- d_6): δ 10.88 (s, 1H, NH), 7.47 (s, 1H, ArH), 7.31 (d, 1H, $J = 8.4$ Hz, ArH), 7.24 (d, 1H, $J = 8.4$ Hz, ArH), 5.34 (s, 1H, CH), 2.60-2.57 (m, 2H, CH₂), 2.23-2.09 (m, 2H, CH₂), 1.96-1.90 (m, 2H, CH₂), 1.85 (s, 3H, CH₃);

^{13}C NMR (DMSO- d_6): δ 194.20, 159.36, 158.04, 153.15, 142.71, 132.24, 131.96, 131.17, 128.22, 127.59, 110.14, 94.33, 36.79, 33.29, 27.13,

20.89, 9.89;

HRMS (ESI): m/z calcd for: 371.0325 [M+Na]⁺, found: 371.0313.

Compound **12b**



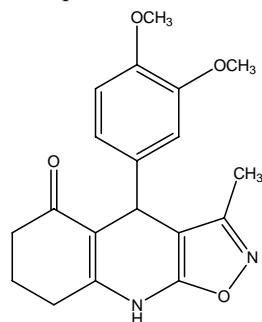
7,8-dihydro-4-(4-methoxyphenyl)-3-methylisoxazolo[5,4-*b*]quinolin-5(6*H*)-one: ir (potassium bromide) (ν , cm^{-1}): NH 3203; CO 1674 cm^{-1} ;

^1H nmr (DMSO- d_6): δ 10.69 (s, 1H, NH), 7.08 (d, 2H, $J = 8.4$ Hz, ArH), 6.78 (d, 2H, $J = 8.4$ Hz, ArH), 4.92 (s, 1H, CH), 3.69 (s, 3H, OCH₃), 2.59-2.56 (m, 2H, CH₂), 2.23-2.14 (m, 2H, CH₂), 1.93-1.86 (m, 2H, CH₂), 1.84 (s, 3H, CH₃);

^{13}C NMR (DMSO- d_6): δ 194.43, 158.98, 158.32, 157.43, 151.83, 138.93, 128.42, 113.38, 111.37, 95.83, 54.92, 36.92, 34.72, 27.12, 20.87, 9.74;

HRMS (ESI): m/z calcd for: 333.1210 [M+Na]⁺, found: 333.1209.

Compound **12c**

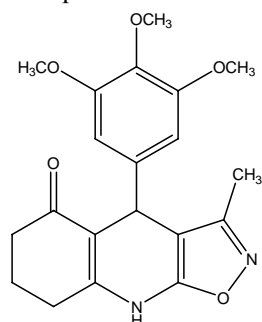


7,8-dihydro-4-(3,4-dimethoxyphenyl)-3-methylisoxazolo[5,4-b]quinolin-5(6H)-one: ir (potassium bromide) (ν , cm^{-1}): NH 3202; CO 1679 cm^{-1} ;
 ^1H nmr (DMSO- d_6): δ 10.69 (s, 1H, NH), 6.80 (d, 2H, $J = 8.4$ Hz, ArH), 6.62 (d, 1H, $J = 8.4$ Hz, ArH), 4.93 (s, 1H, CH), 3.70 (s, 3H, OCH₃), 3.68 (s, 3H, OCH₃), 2.60-2.56 (m, 2H, CH₂), 2.24-2.20 (m, 2H, CH₂), 1.92 (s, 3H, CH₃), 1.87-1.82 (m, 2H, CH₂);
 ^{13}C NMR (DMSO- d_6): δ 194.55, 158.88, 158.40, 151.99, 148.18, 147.01, 139.49, 119.28, 111.71, 111.59, 111.12, 95.77, 55.44, 36.94, 35.04, 27.13,

20.92, 9.89;

HRMS (ESI): m/z calcd for: 363.1316 $[\text{M}+\text{Na}]^+$, found: 363.1339.

Compound **12d**

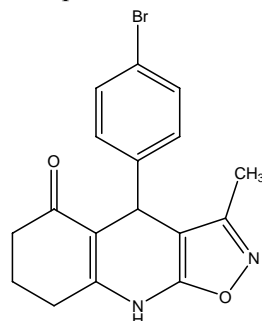


7,8-dihydro-4-(3,4,5-trimethoxyphenyl)-3-methylisoxazolo[5,4-b]quinolin-5(6H)-one: ir (potassium bromide) (ν , cm^{-1}): NH 3205; CO 1669 cm^{-1} ;
 ^1H nmr (DMSO- d_6): δ 10.71 (s, 1H, NH), 6.46 (s, 2H, ArH), 4.97 (s, 1H, CH), 3.71 (s, 6H, 2OCH₃), 3.60 (s, 3H, OCH₃), 2.63-2.59 (m, 2H, CH₂), 2.26-2.23 (m, 2H, CH₂), 1.99 (s, 3H, CH₃), 1.95-1.88 (m, 2H, CH₂);
 ^{13}C NMR (DMSO- d_6): δ 194.64, 158.85, 158.42, 152.57, 152.50, 142.46, 135.71, 110.56, 104.51, 95.52, 59.86, 55.75, 36.96, 35.76, 27.16, 20.98,

10.06;

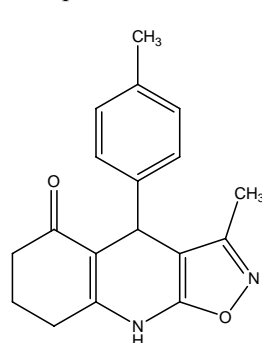
HRMS (ESI): m/z calcd for: 393.1421 $[\text{M}+\text{Na}]^+$, found: 393.1339.

Compound **12e**



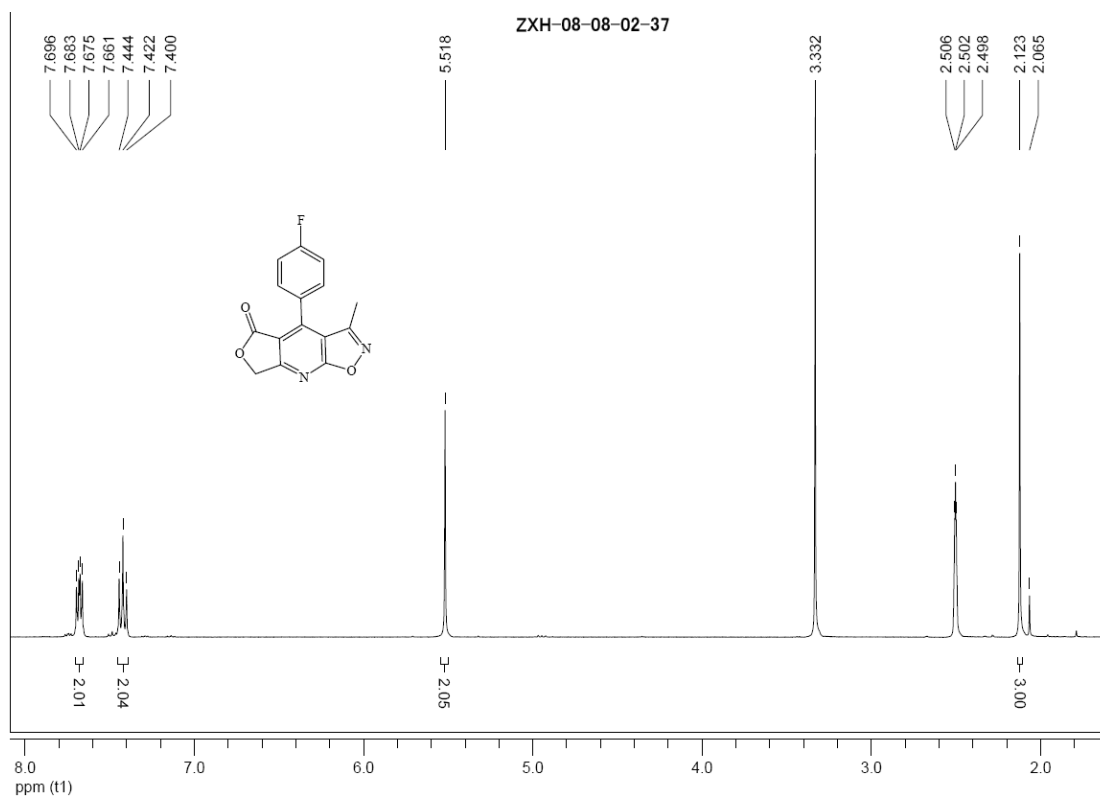
4-(4-bromophenyl)-7,8-dihydro-3-methylisoxazolo[5,4-b]quinolin-5(6H)-one: ir (potassium bromide) (ν , cm^{-1}): NH 3210; CO 1673 cm^{-1} ;
 ^1H nmr (DMSO- d_6): δ 10.81 (s, 1H, NH), 7.42 (d, 2H, $J = 8.4$ Hz, ArH), 7.15 (d, 2H, $J = 8.4$ Hz, ArH), 4.98 (s, 1H, CH), 2.62-2.58 (m, 2H, CH₂), 2.31-2.24 (m, 2H, CH₂), 1.94-1.91 (m, 2H, CH₂), 1.87 (s, 3H, CH₃);
 ^{13}C NMR (DMSO- d_6): δ 194.40, 159.12, 158.27, 152.44, 145.99, 130.89, 129.75, 118.99, 110.68, 95.14, 36.84, 35.33, 27.13, 20.84, 9.76;
HRMS (ESI): m/z calcd for: 359.0390 $[\text{M}+\text{H}]^+$, found: 359.0371.

Compound **12f**

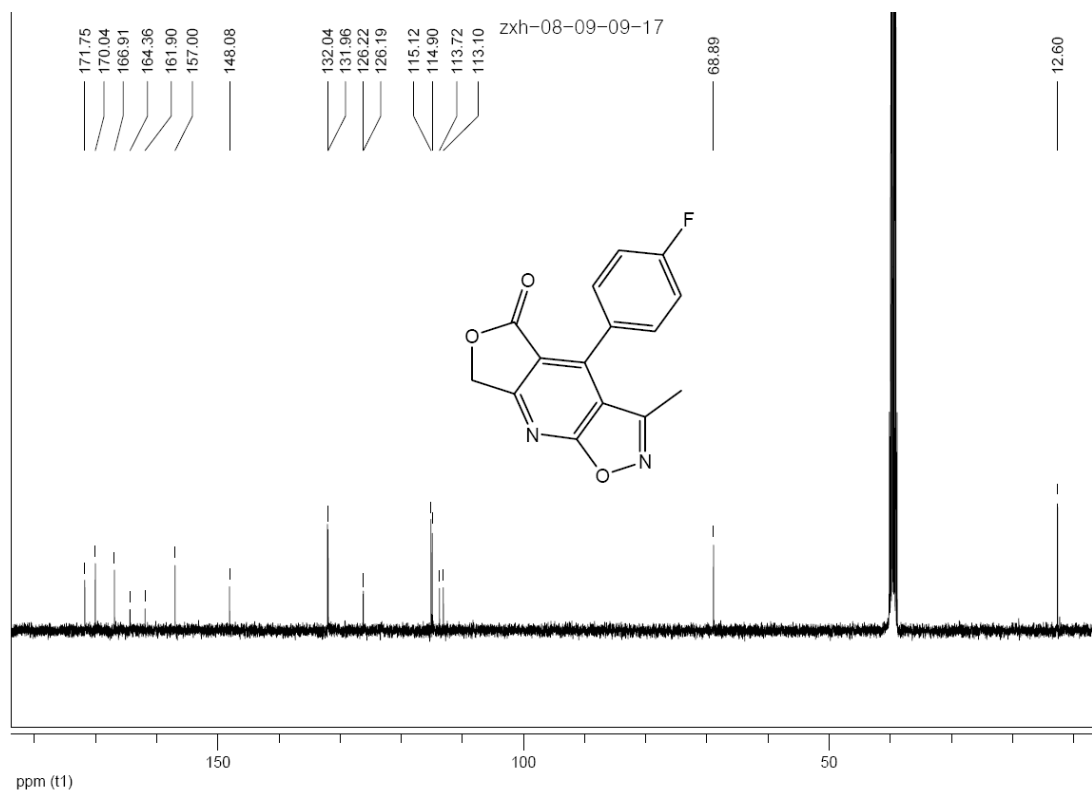


7,8-dihydro-3-methyl-4-p-tolylisoxazolo[5,4-b]quinolin-5(6H)-one: ir (potassium bromide) (ν , cm^{-1}): NH 3217; CO 1673 cm^{-1} ;
 ^1H nmr (DMSO- d_6): δ 10.71 (s, 1H, NH), 7.06-7.03 (m, 2H, ArH), 4.93 (s, 1H, CH), 2.59-2.56 (m, 2H, CH₂), 2.25-2.23 (m, 2H, CH₂), 2.21 (s, 3H, CH₃), 1.95-1.91 (m, 2H, CH₂), 1.86 (s, 3H, CH₃);
 ^{13}C NMR (DMSO- d_6): δ 194.34, 159.02, 158.28, 151.97, 143.77, 134.86, 128.57, 127.33, 111.24, 95.73, 36.91, 35.20, 27.13, 20.88, 20.54, 9.76;
HRMS (ESI): m/z calcd for: 317.1261 $[\text{M}+\text{Na}]^+$, found: 317.1265.

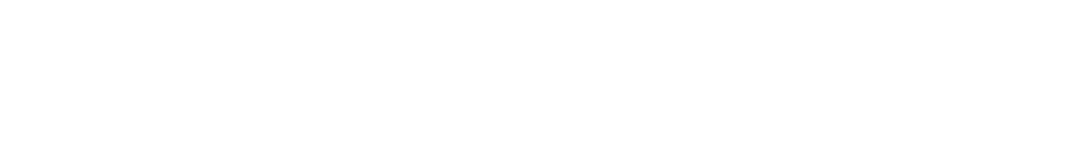
^1H NMR and ^{13}C NMR of the synthesized compounds

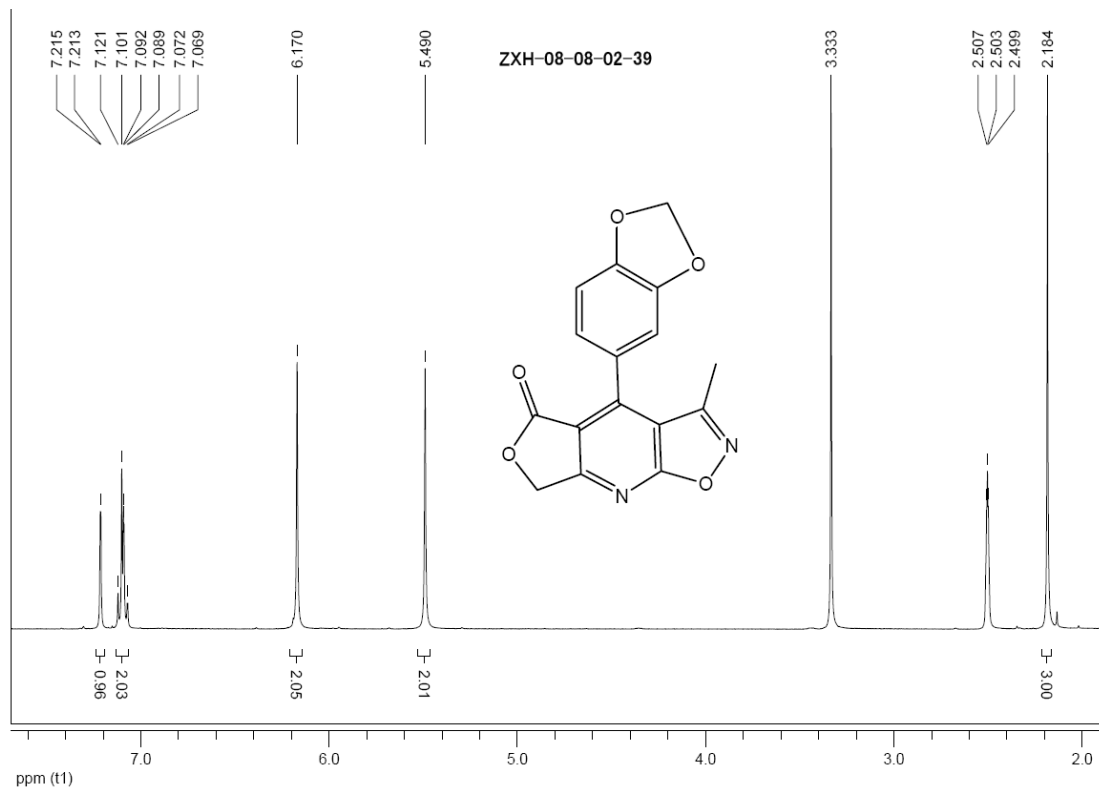


^1H NMR of compound 4a

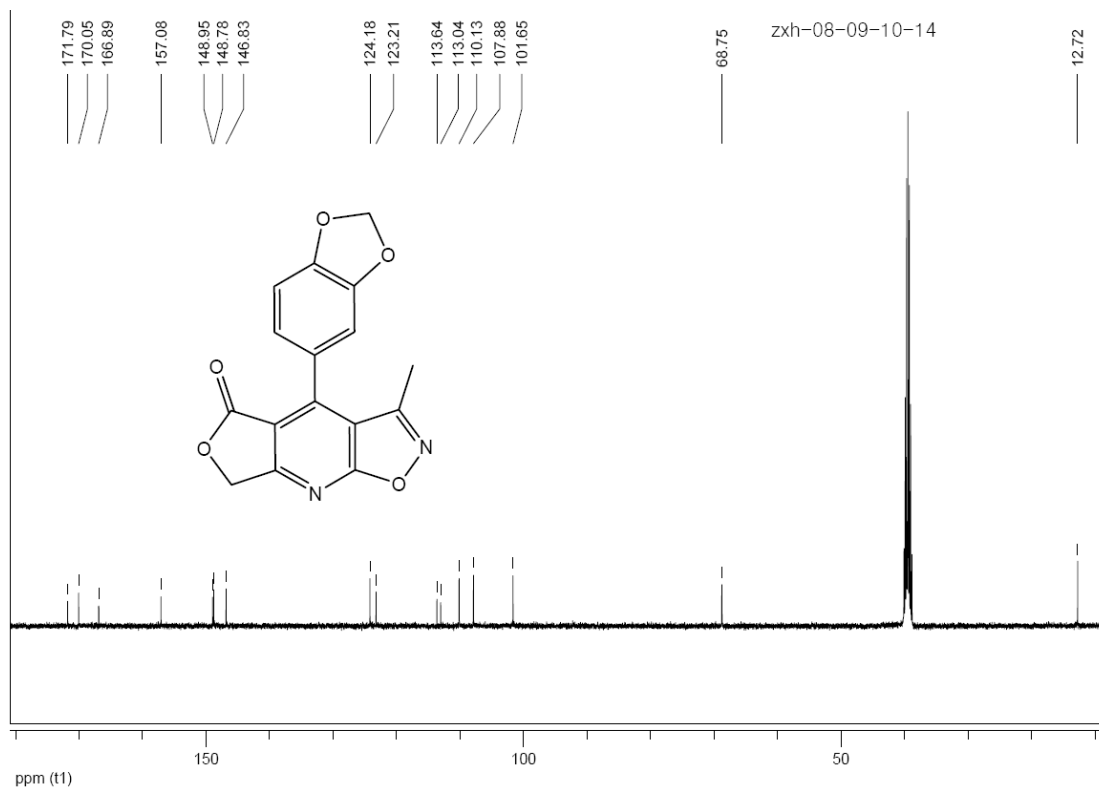


^{13}C NMR of compound 4a

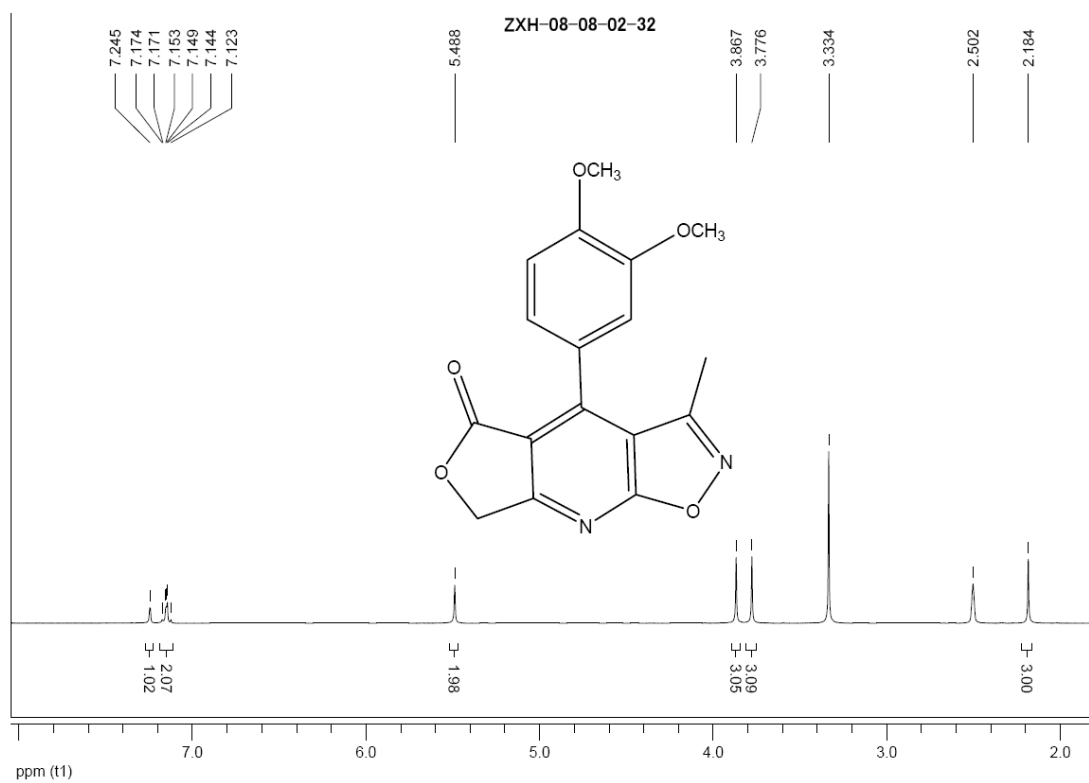




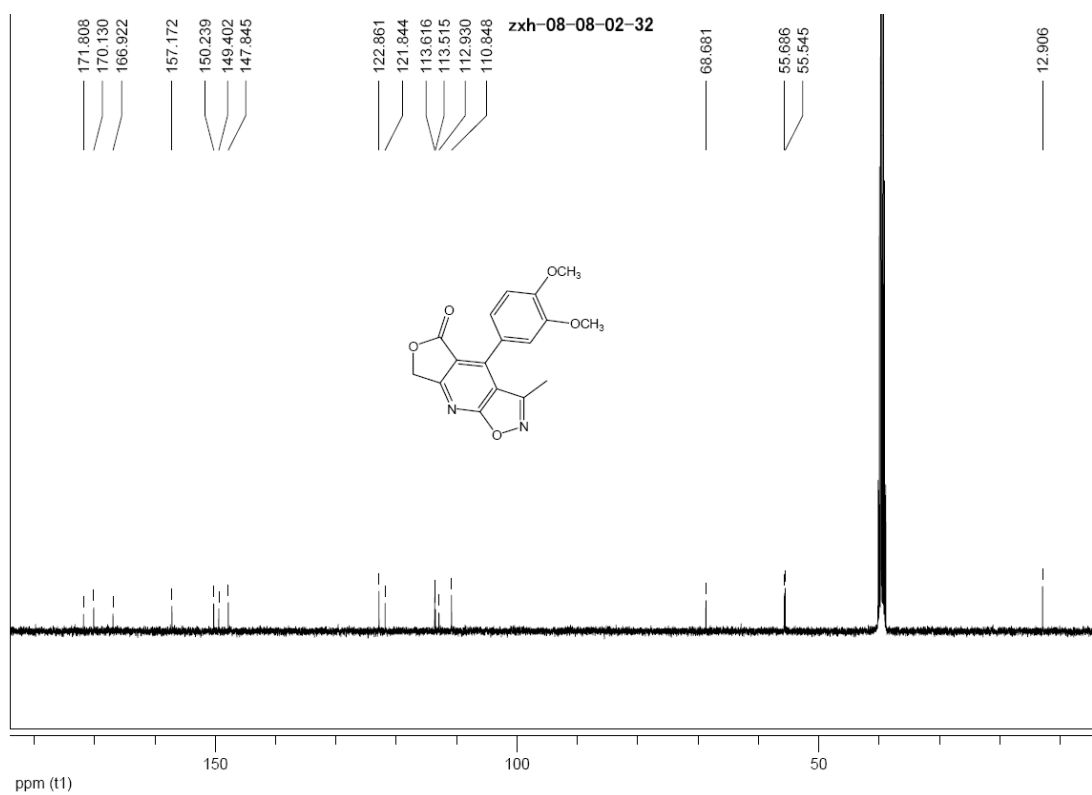
¹H NMR of compound **4b**



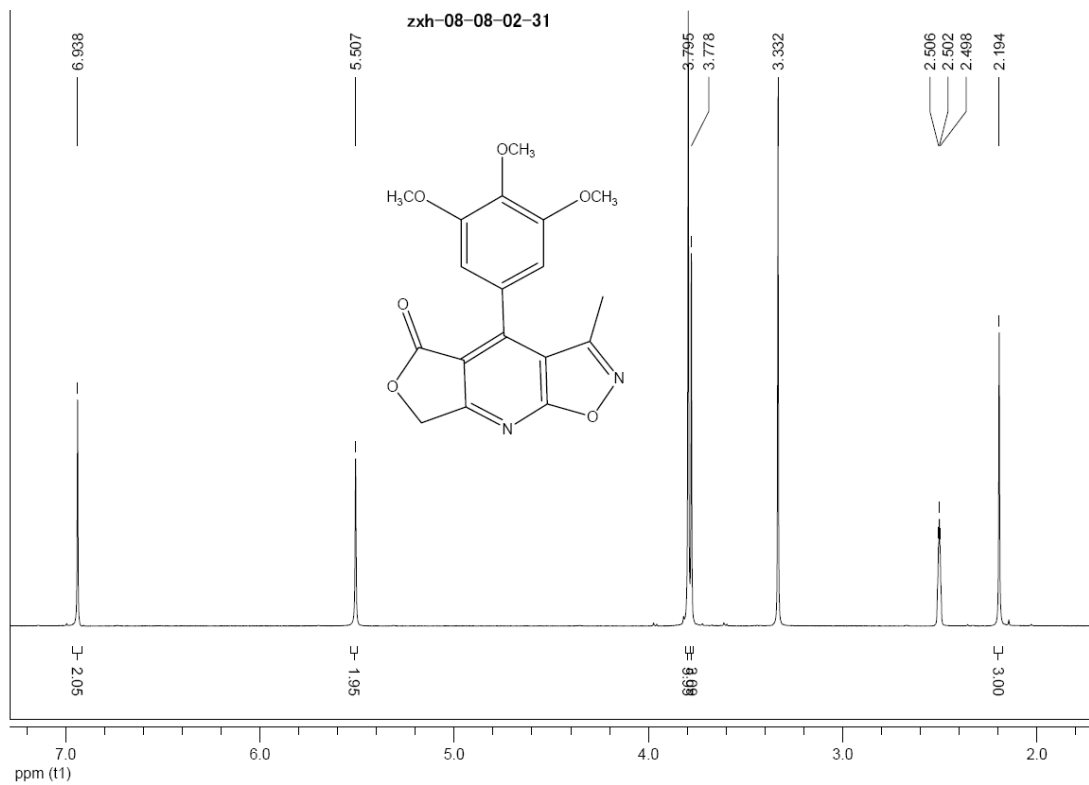
¹³C NMR of compound **4b**



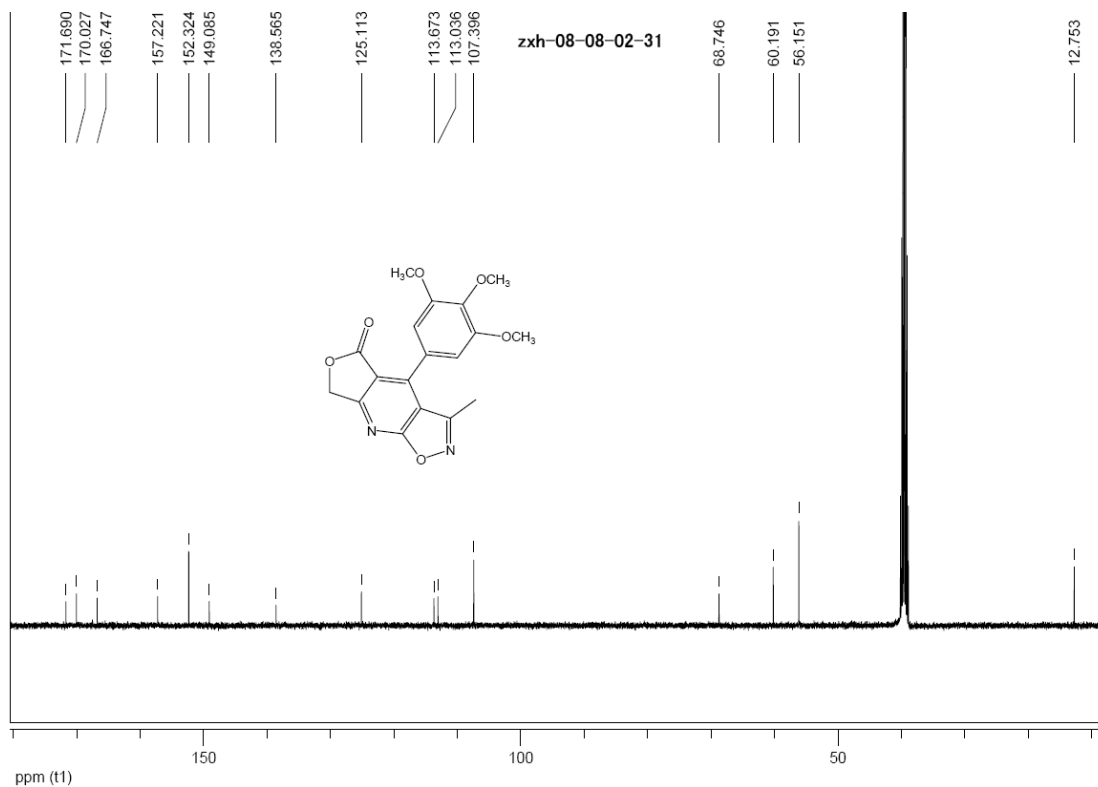
¹H NMR of compound **4c**



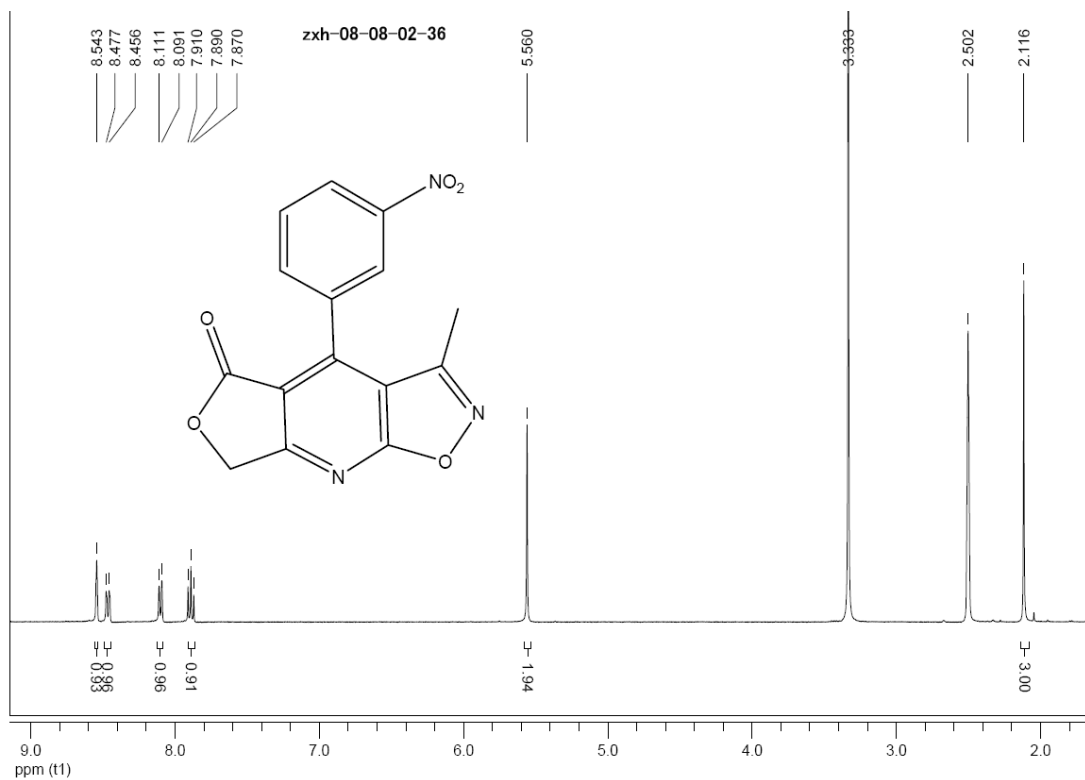
¹³C NMR of compound **4c**



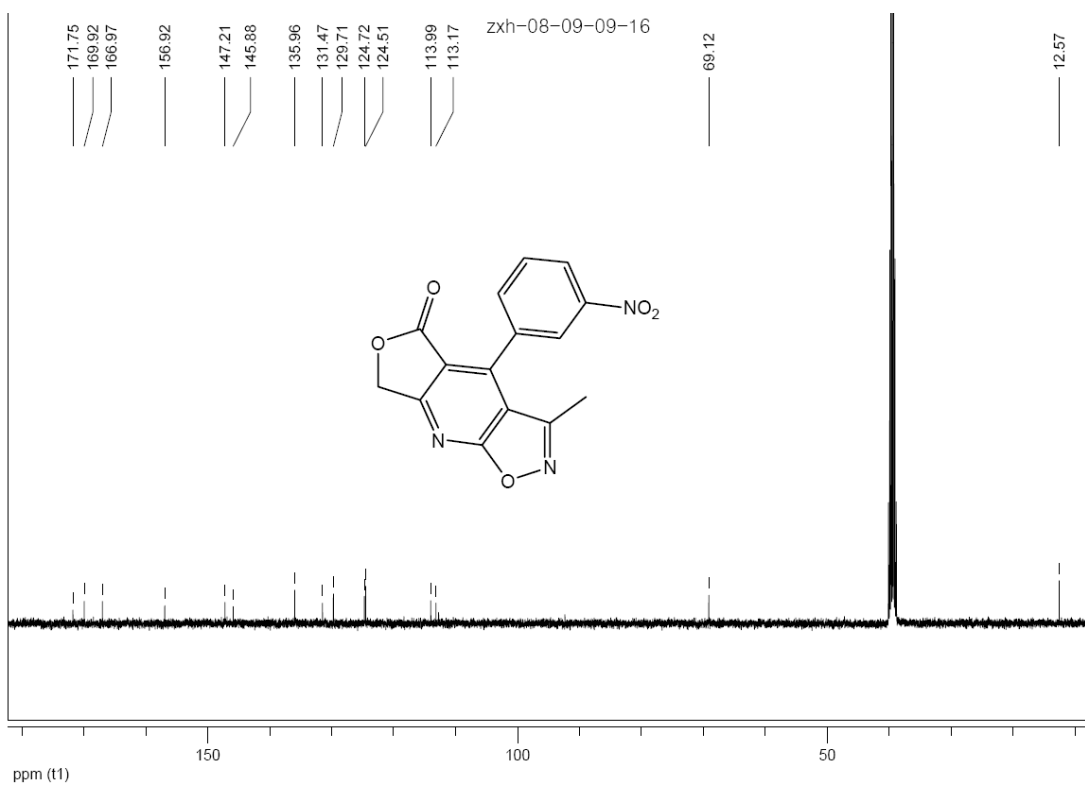
¹H NMR of compound **4d**



¹³C NMR of compound **4d**



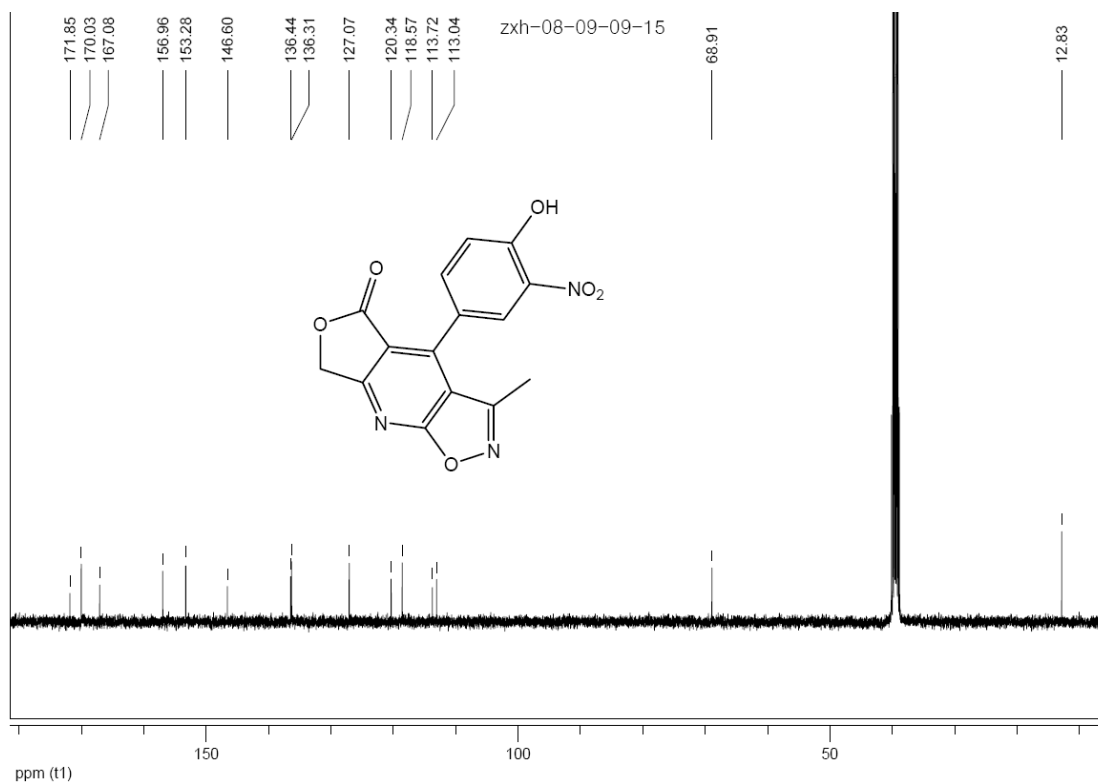
^1H NMR of compound **4e**



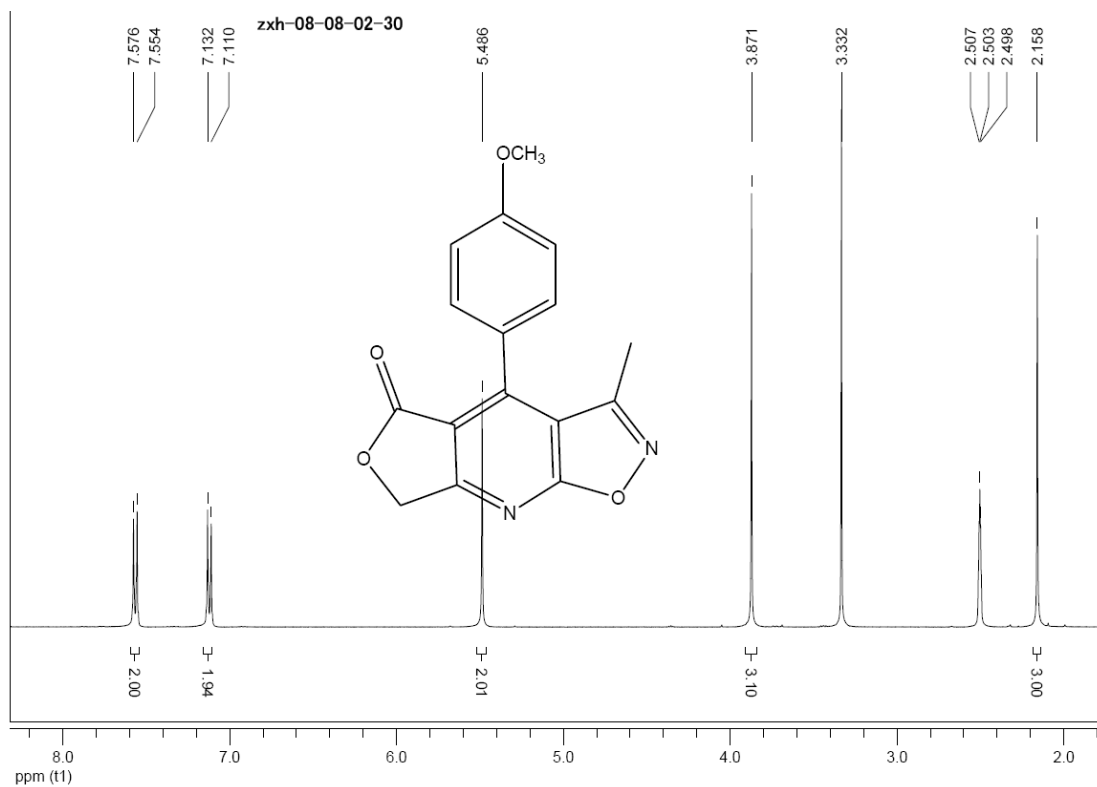
^{13}C NMR of compound **4e**



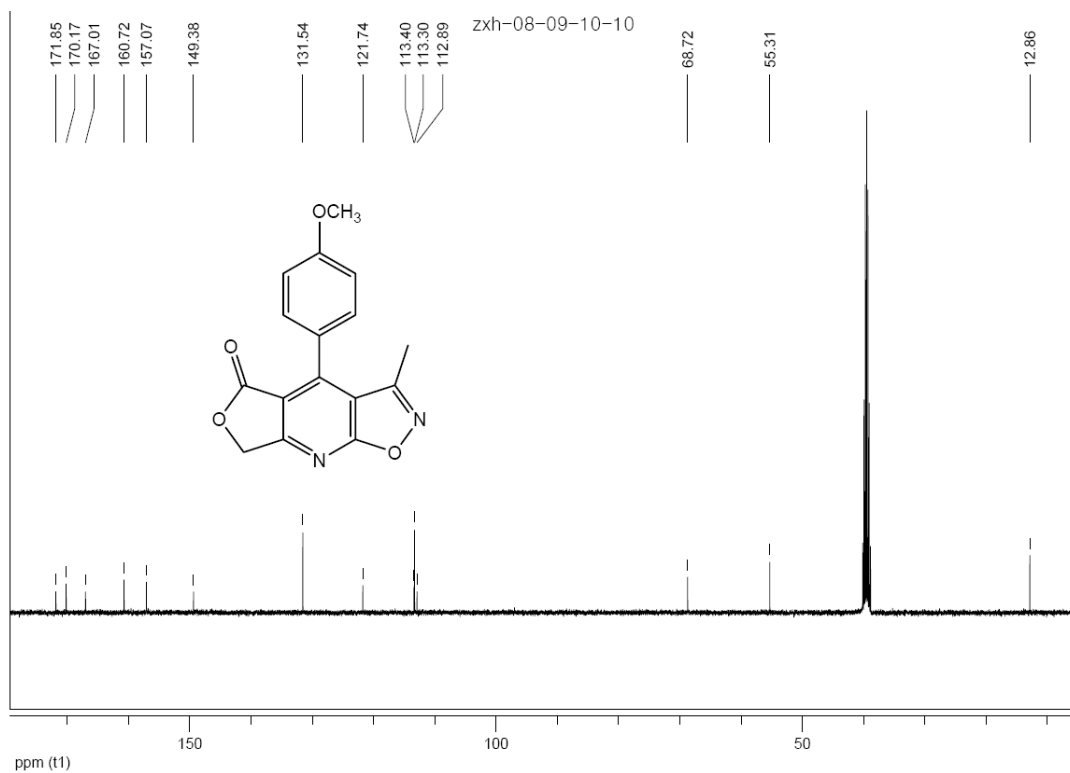
^1H NMR of compound **4f**



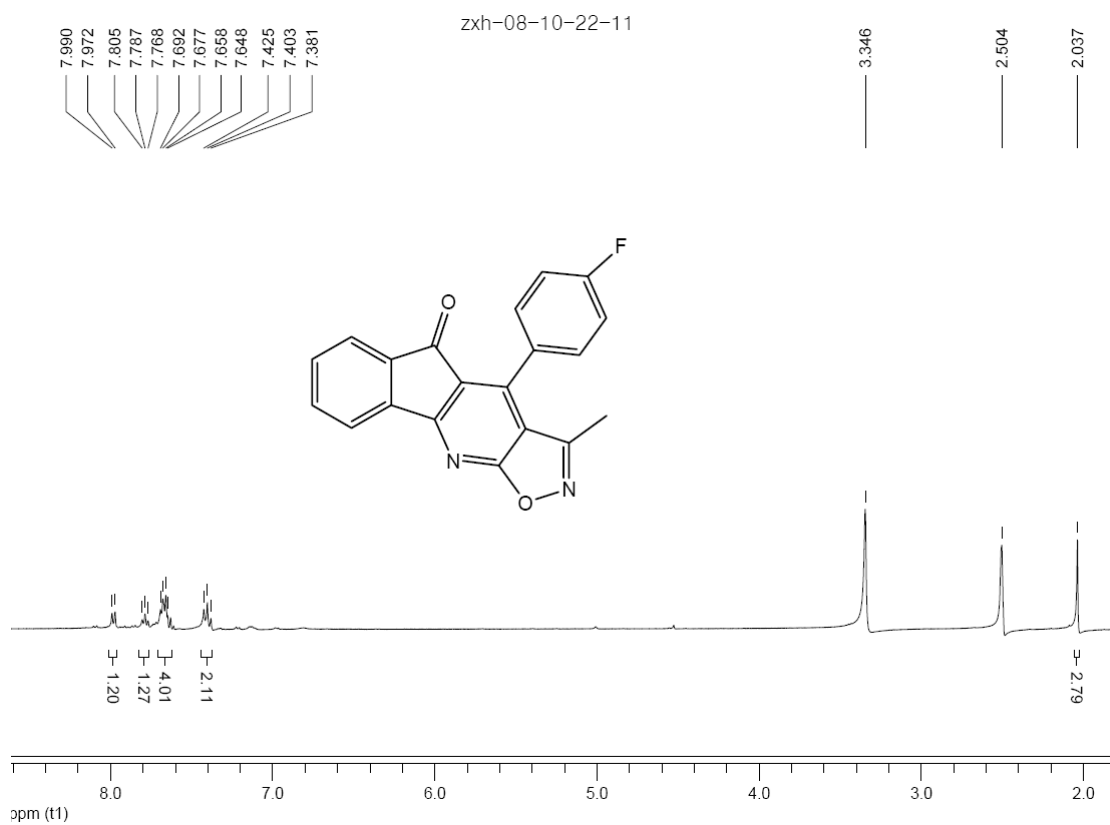
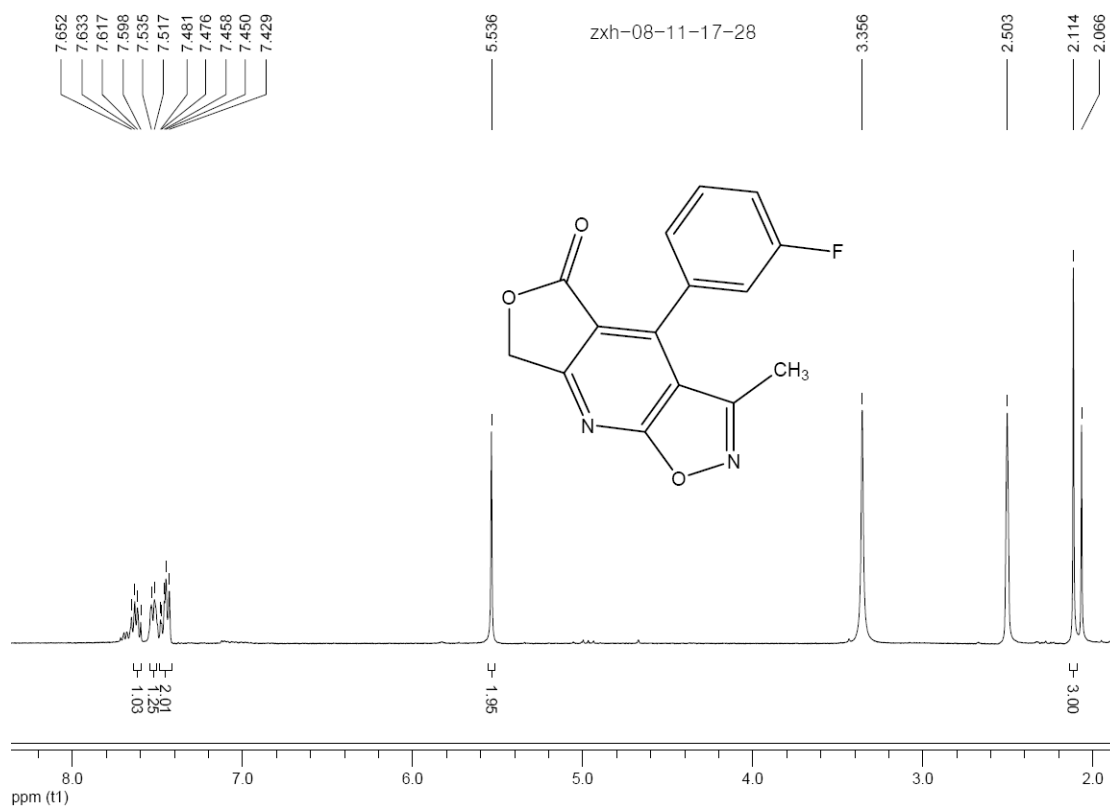
^{13}C NMR of compound **4f**

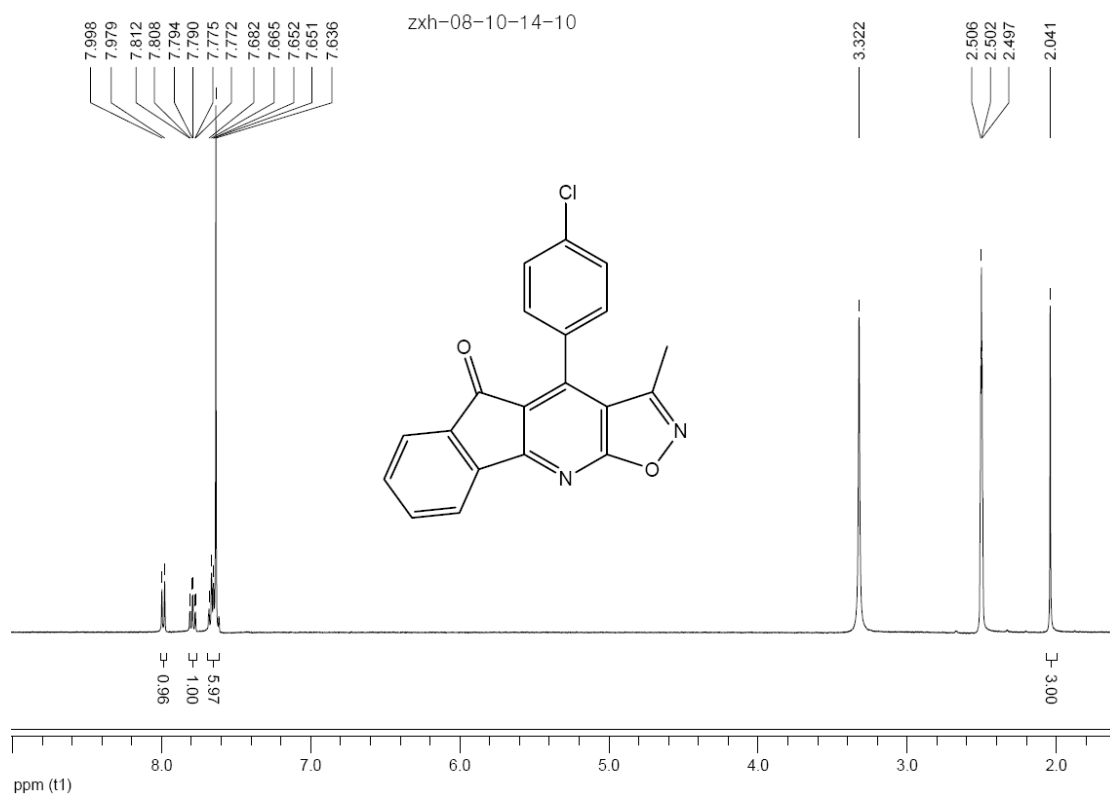


^1H NMR of compound **4g**

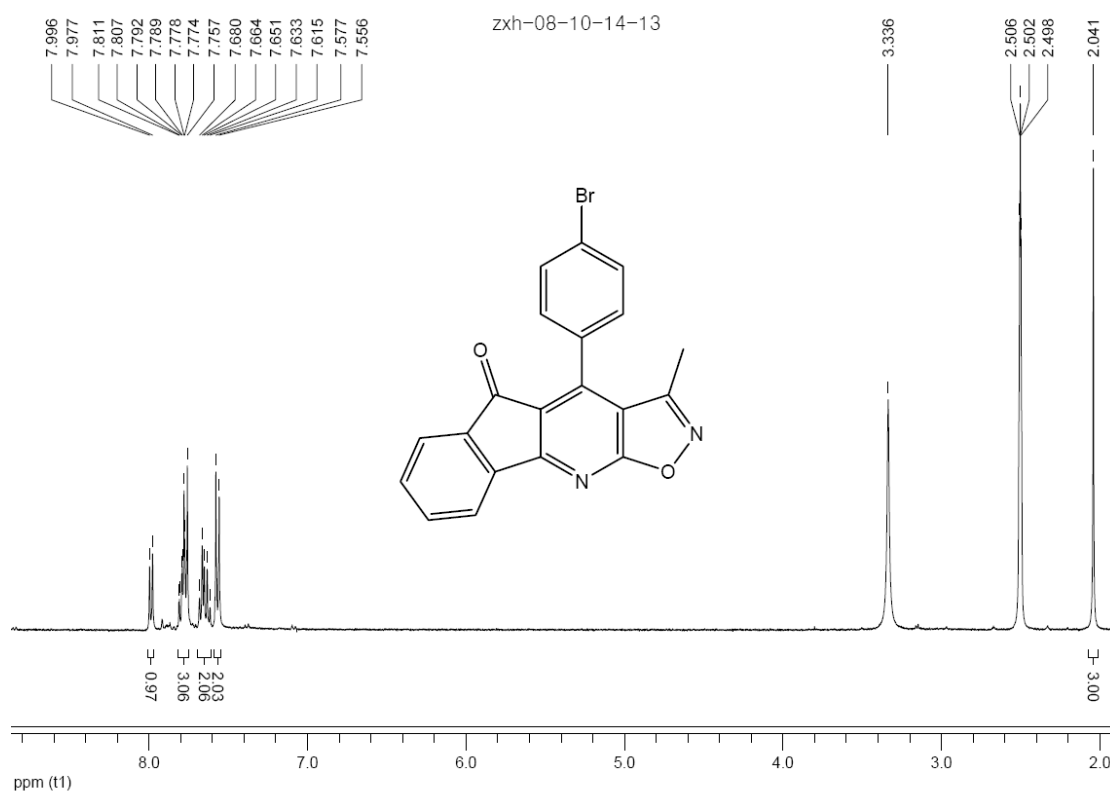


^{13}C NMR of compound **4g**

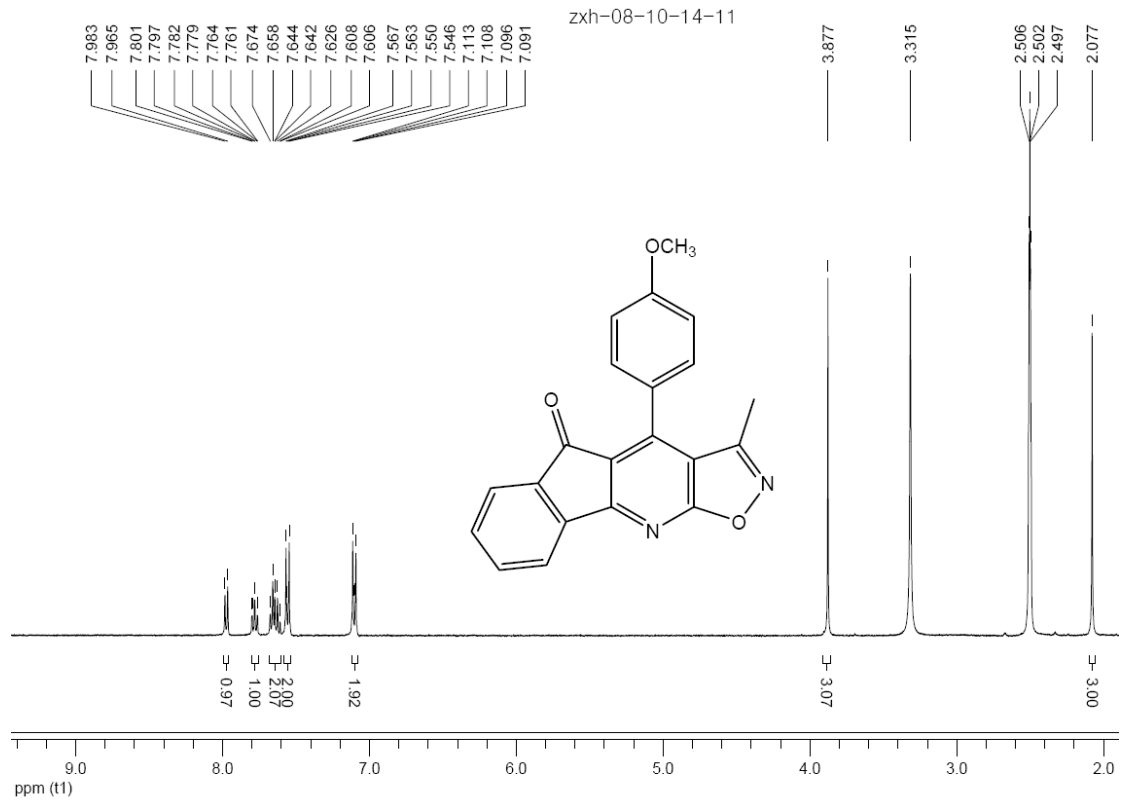




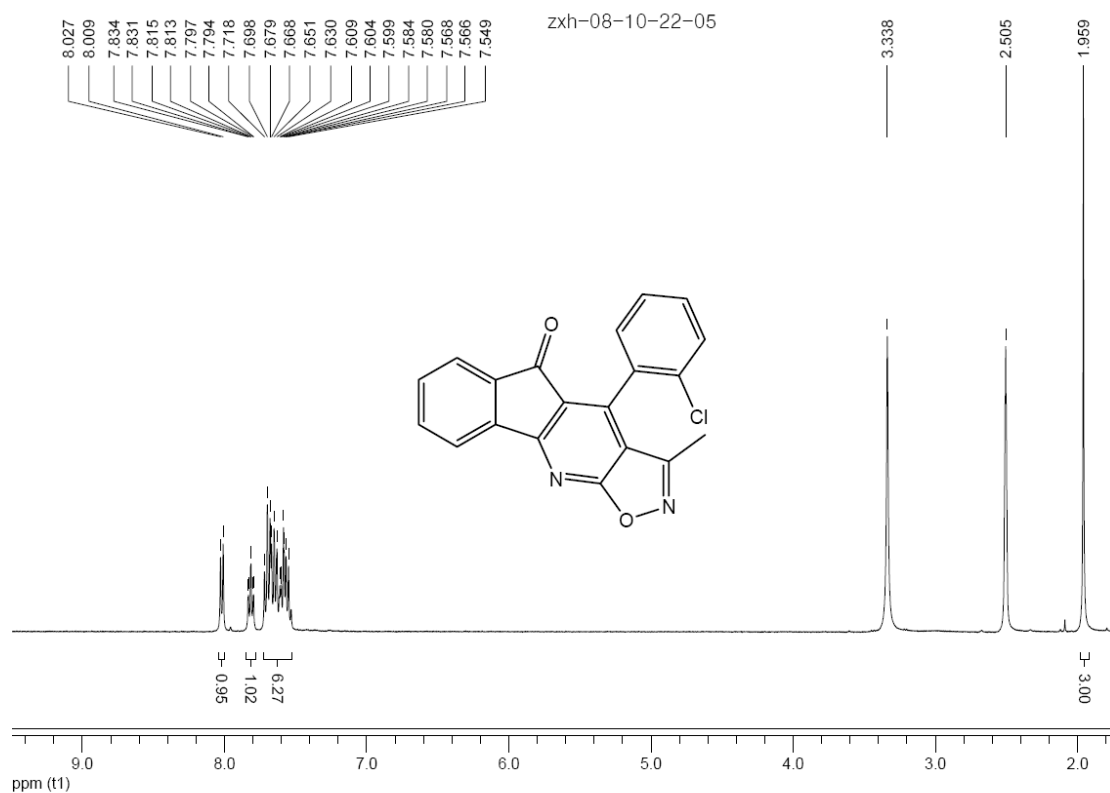
¹H NMR of compound **6b**



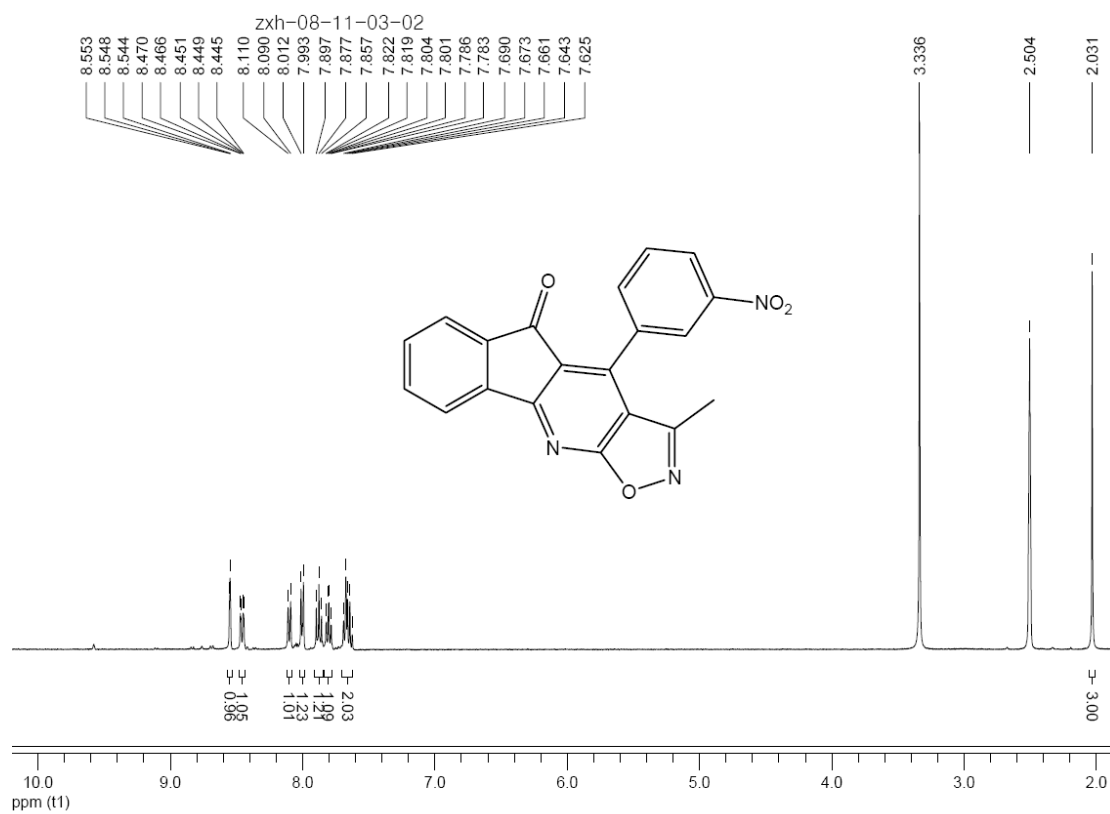
¹H NMR of compound **6c**



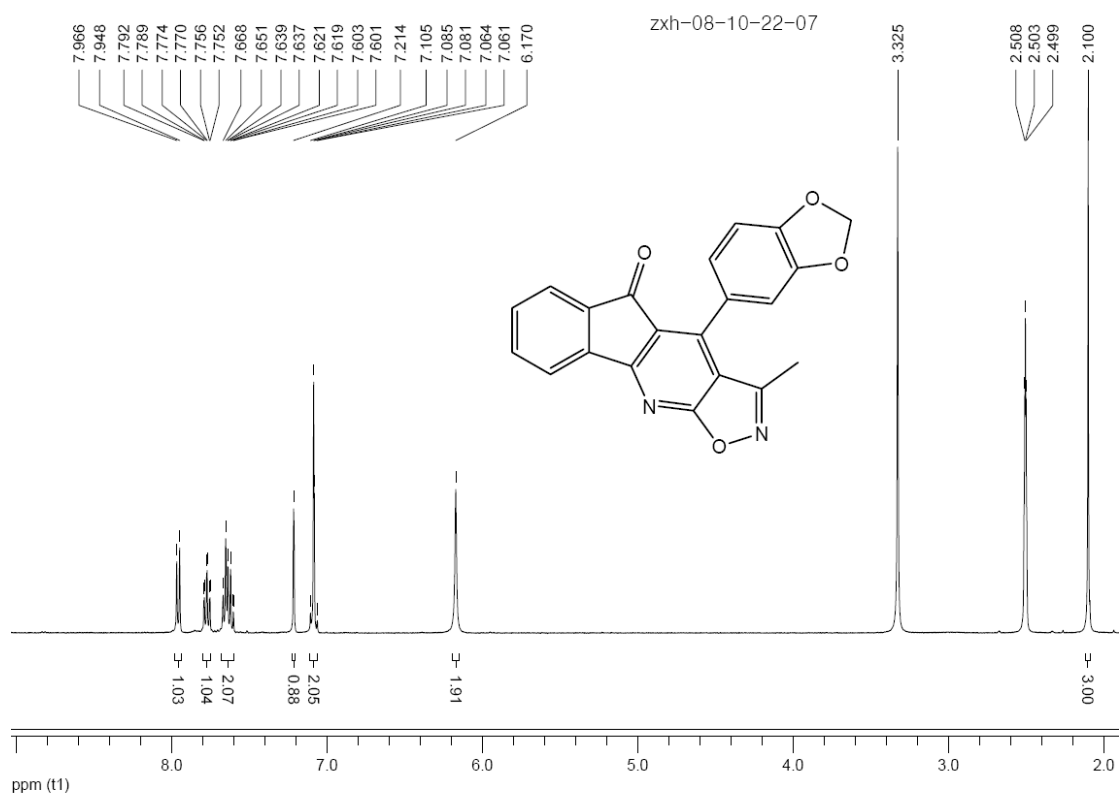
¹H NMR of compound **6d**



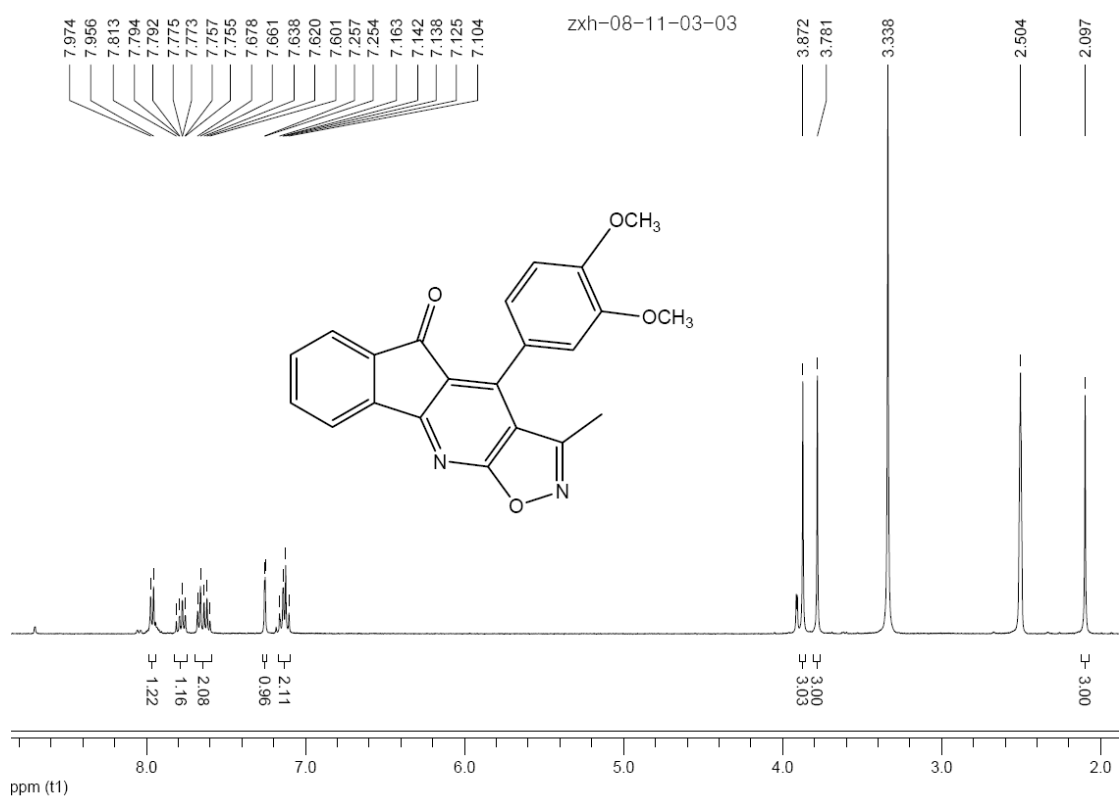
¹H NMR of compound **6g**



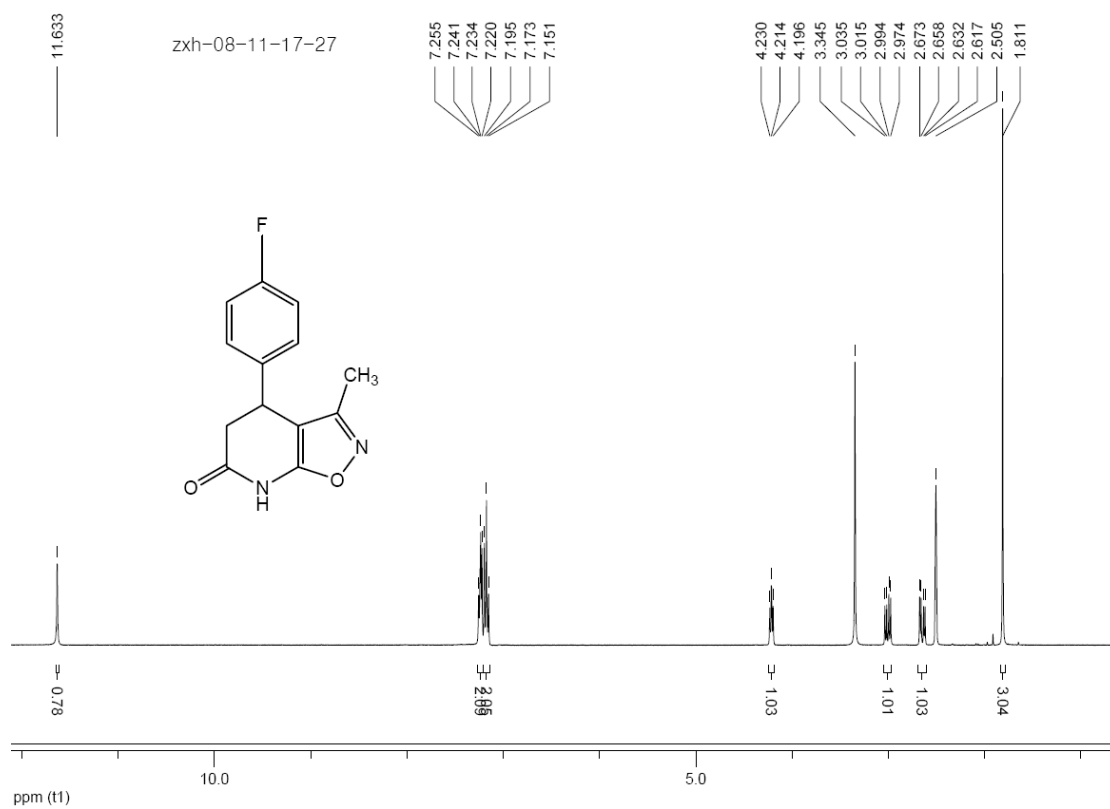
¹H NMR of compound **6h**



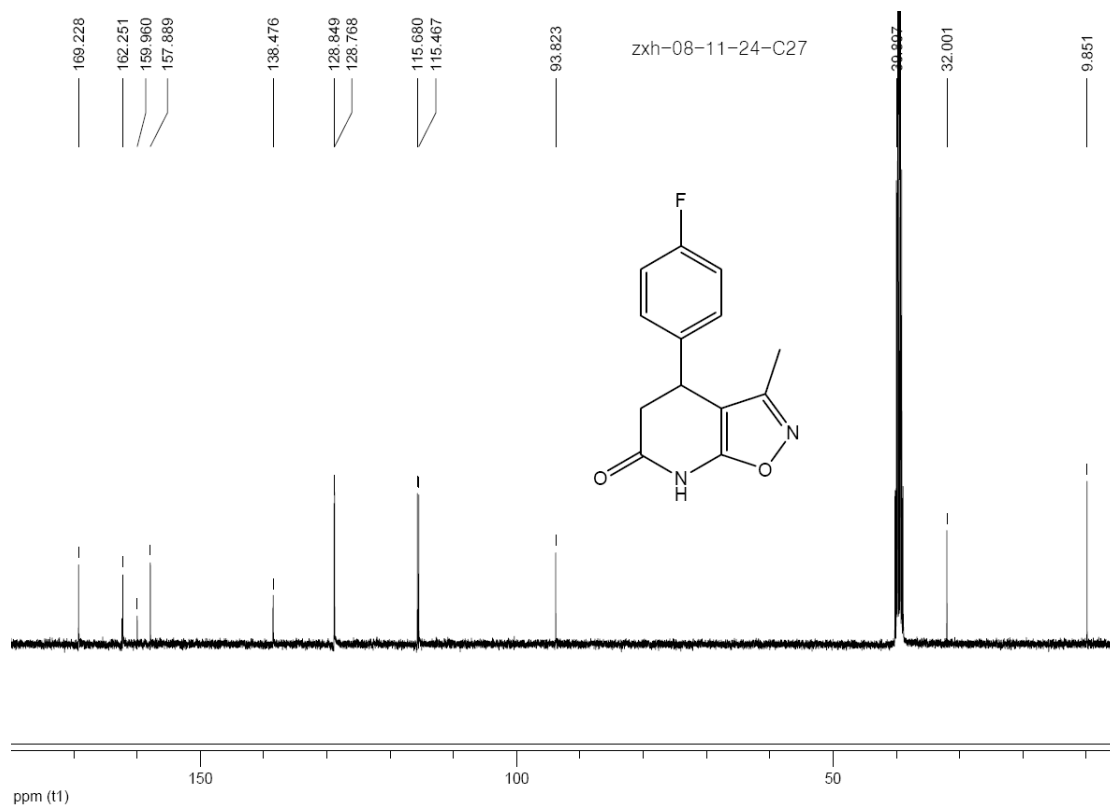
¹H NMR of compound **6i**



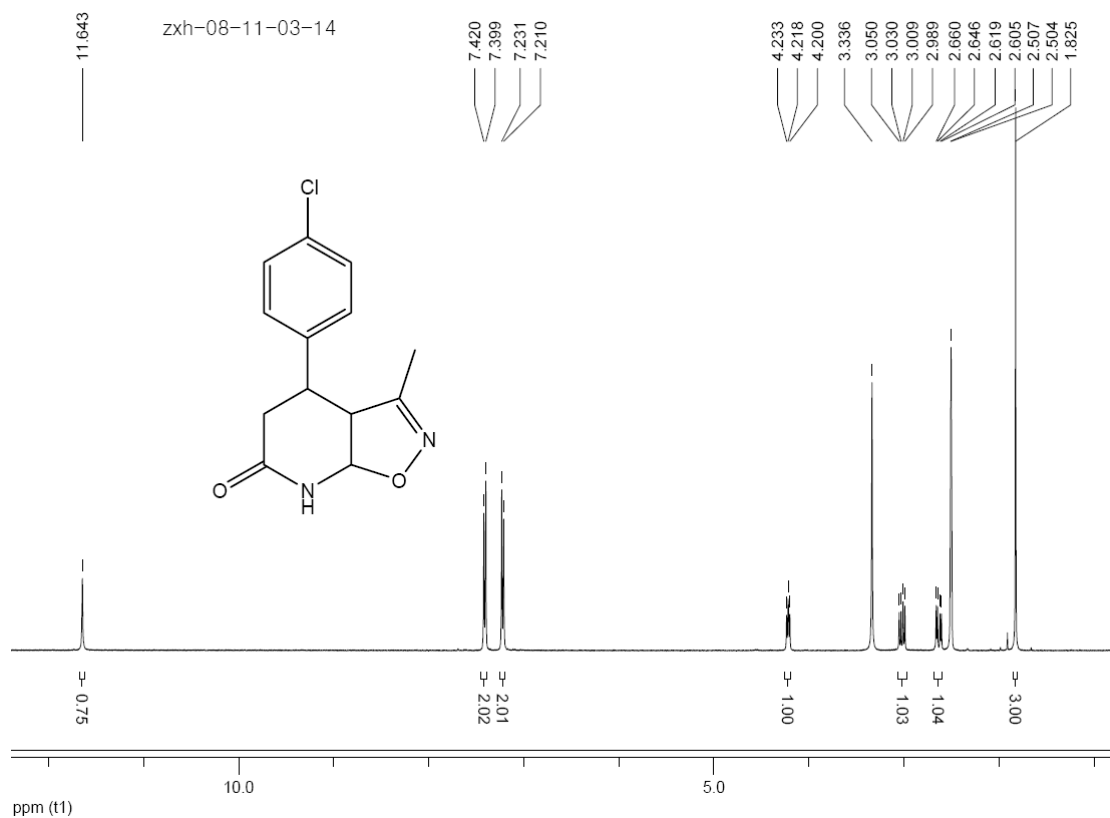
¹H NMR of compound **6j**



¹H NMR of compound 8a



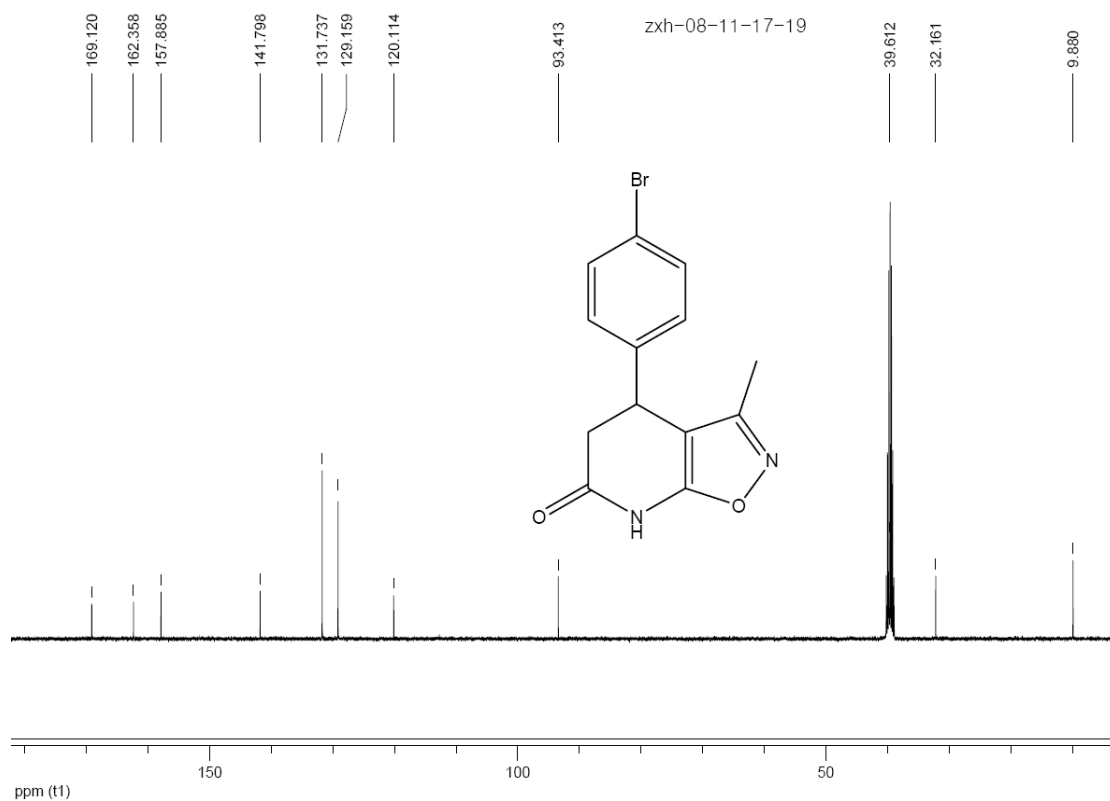
¹³C NMR of compound 8a



^1H NMR of compound **8b**



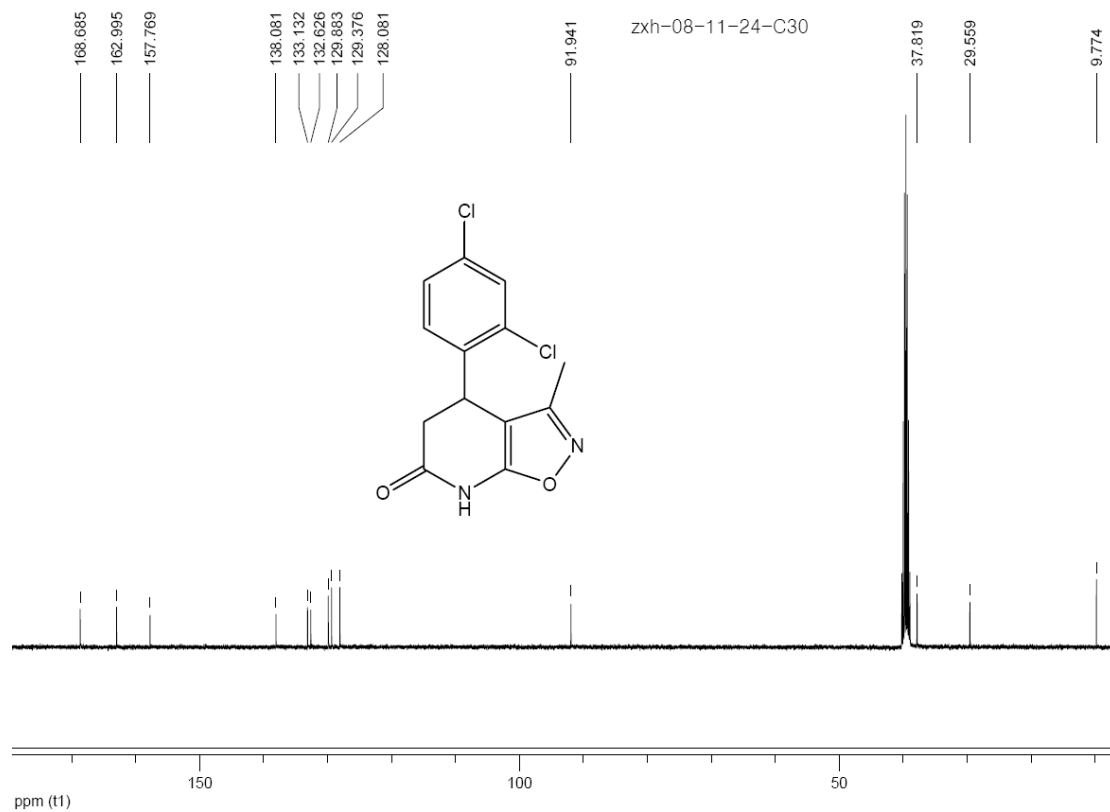
^1H NMR of compound **8c**



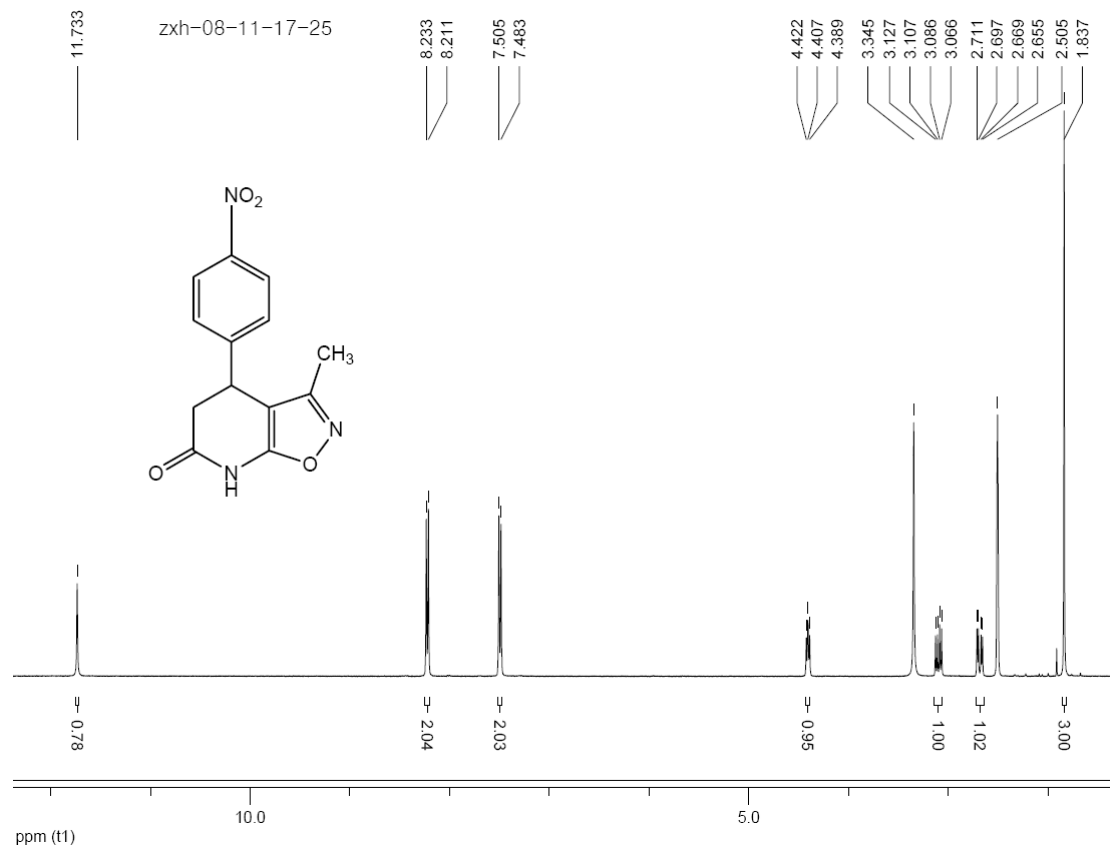
^{13}C NMR of compound **8c**



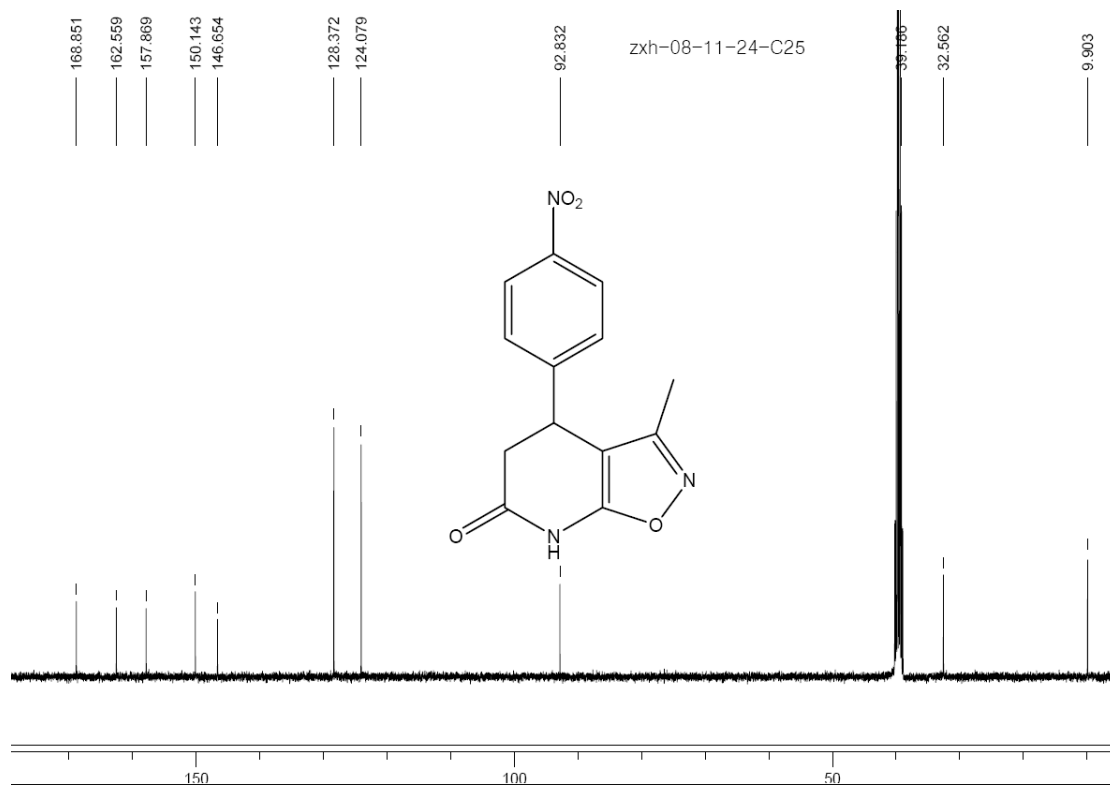
^1H NMR of compound **8d**



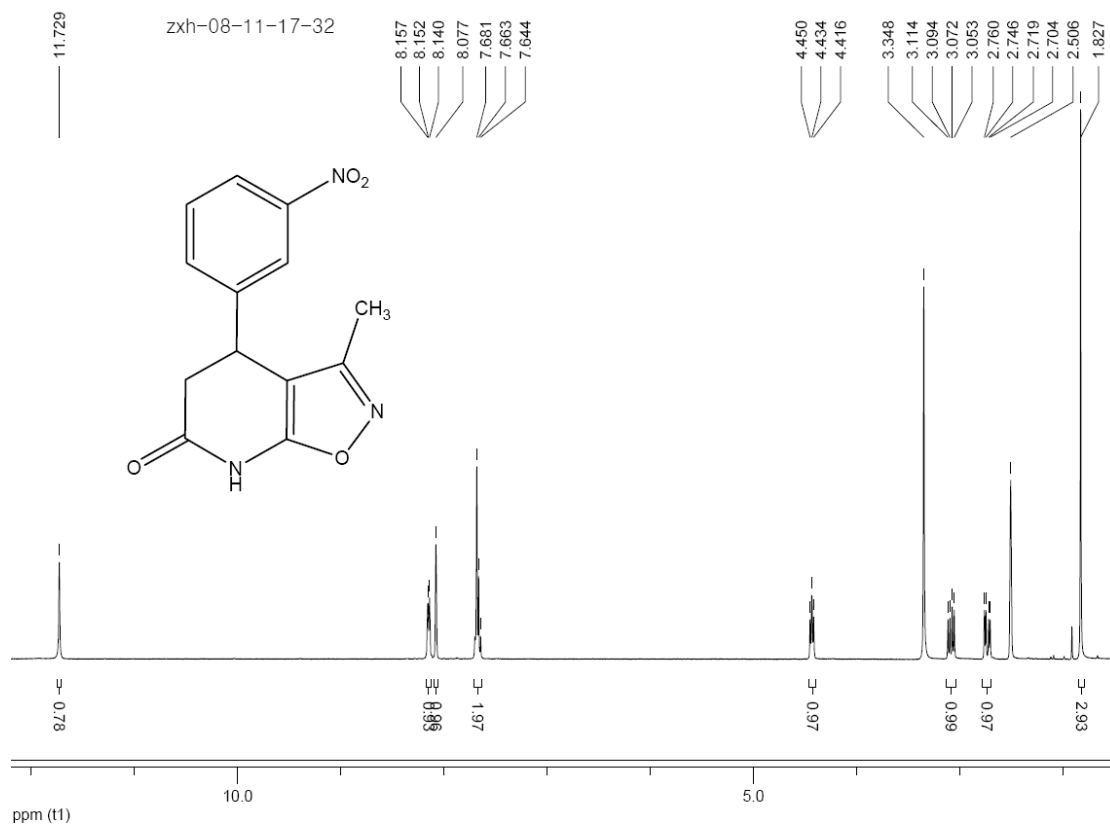
^{13}C NMR of compound **8d**



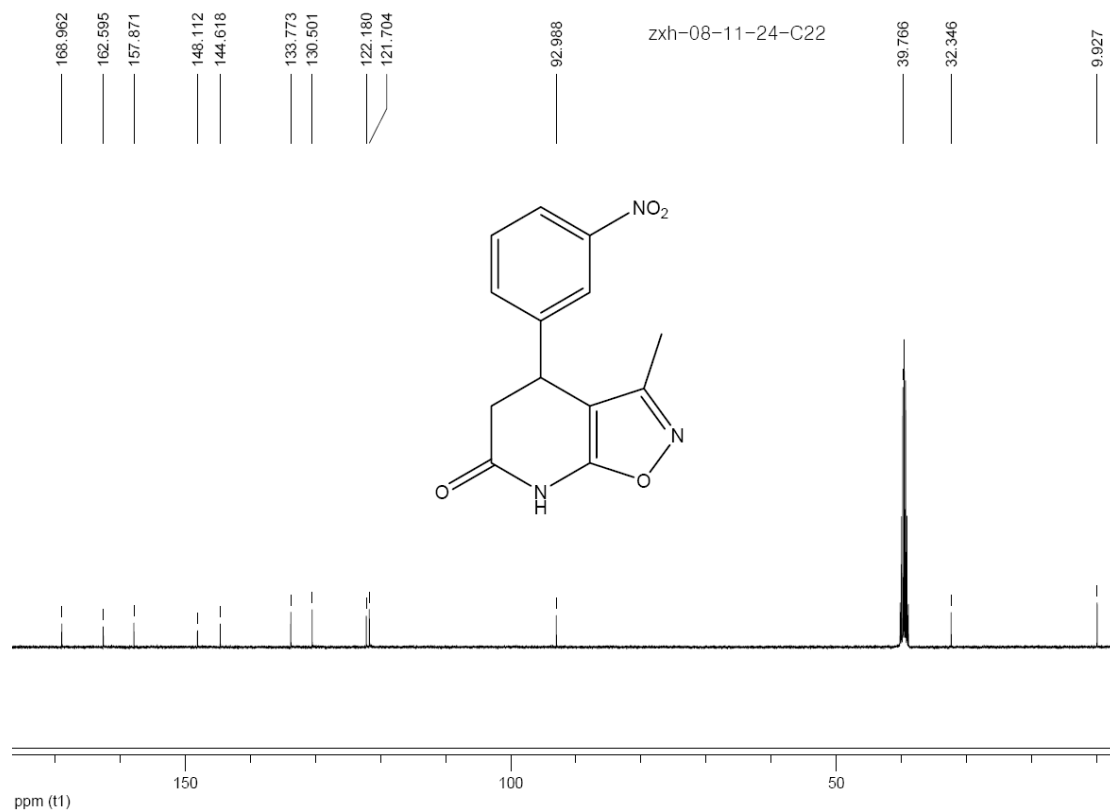
^1H NMR of compound **8e**



¹³C NMR of compound **8e**



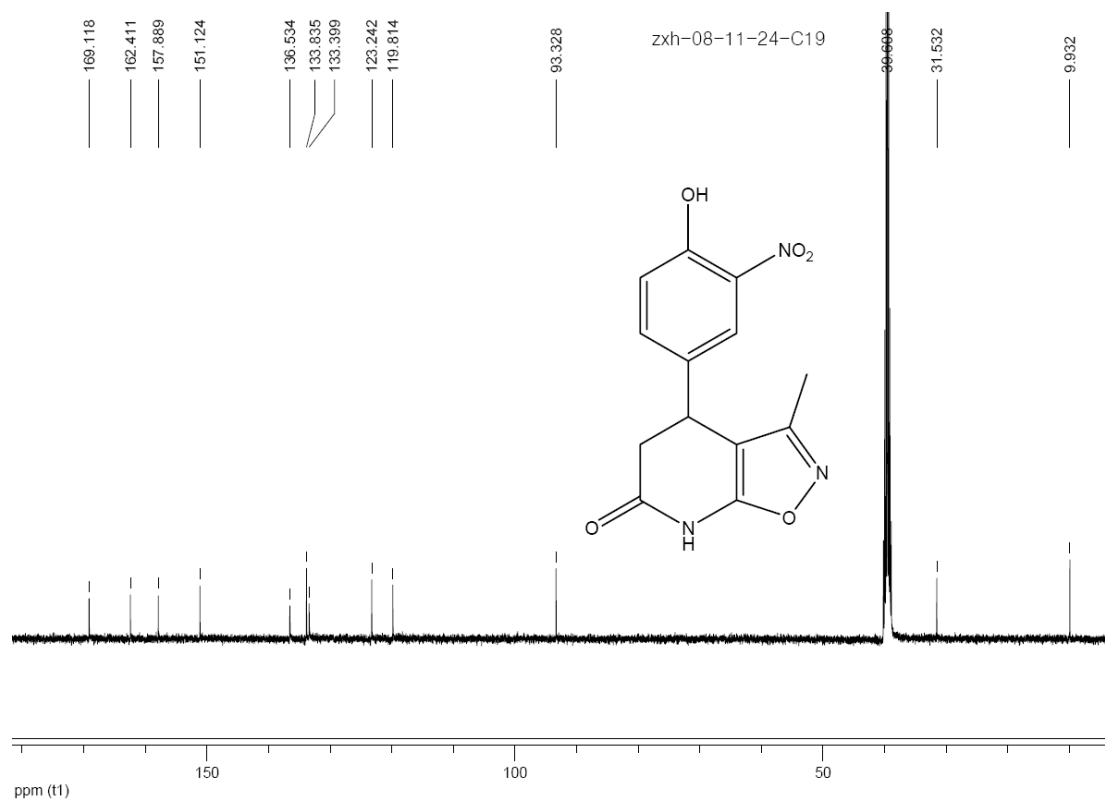
¹H NMR of compound **8f**



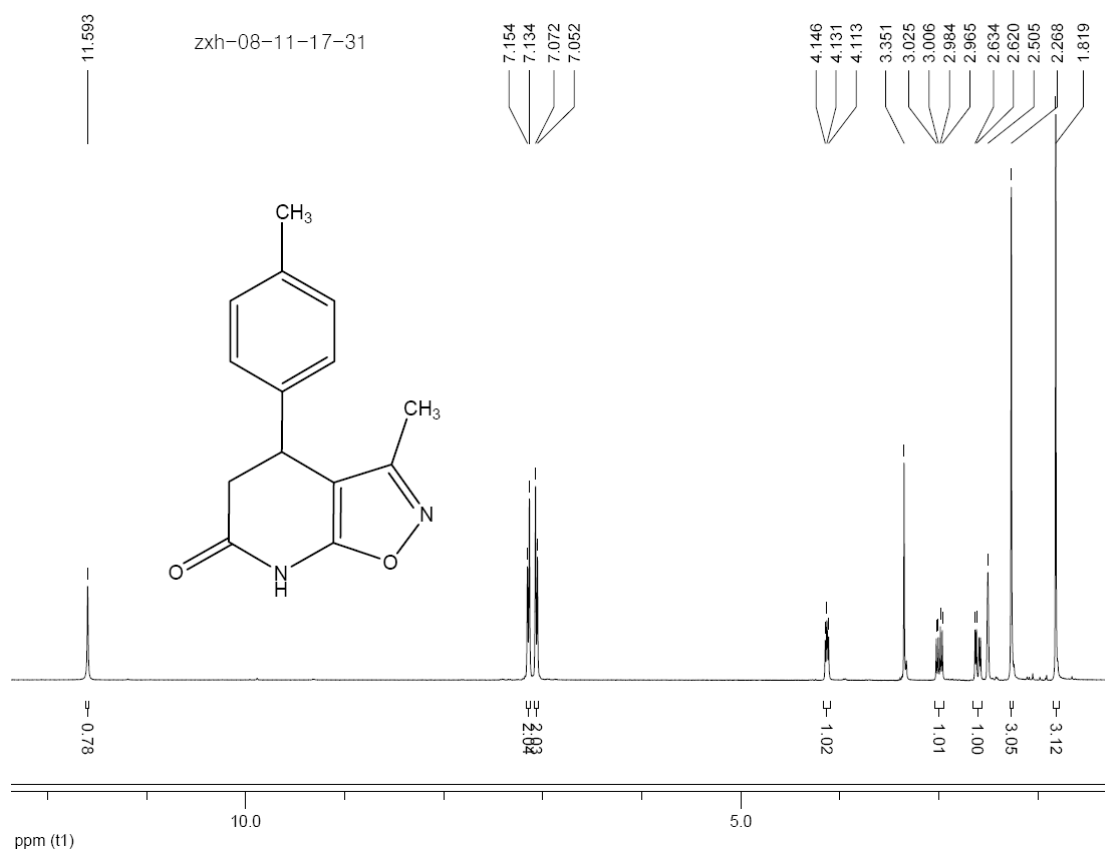
^{13}C NMR of compound **8f**



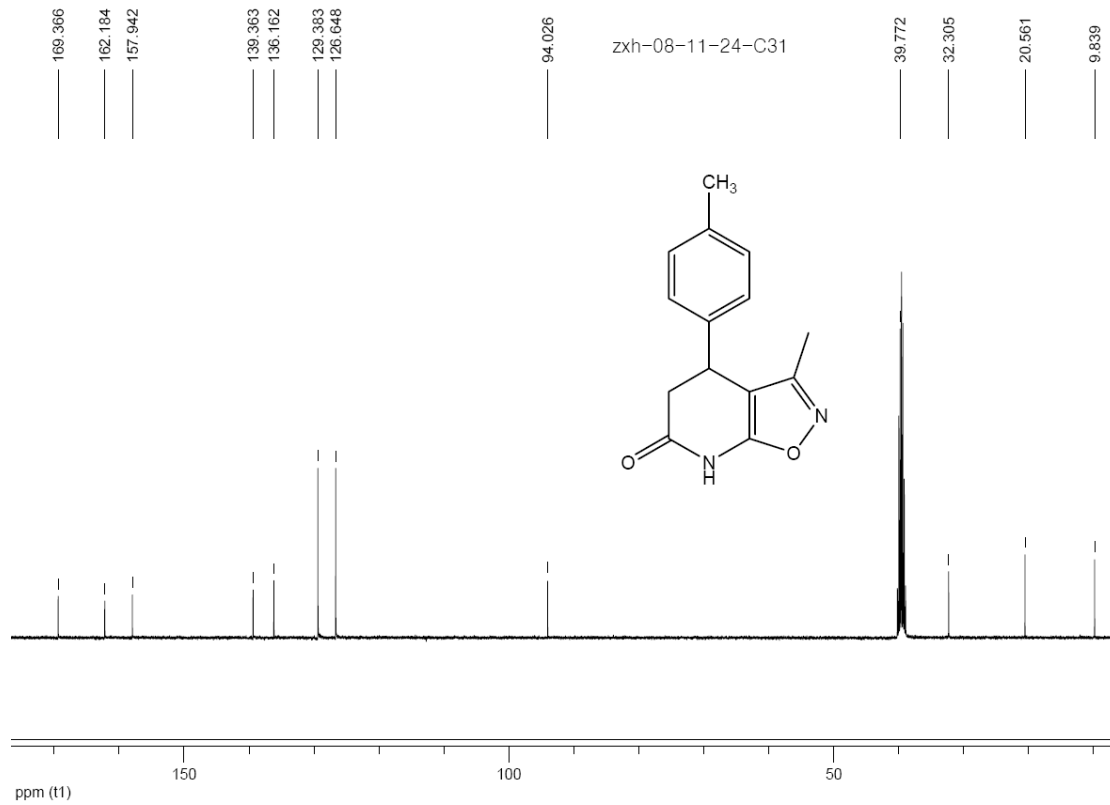
^1H NMR of compound **8g**



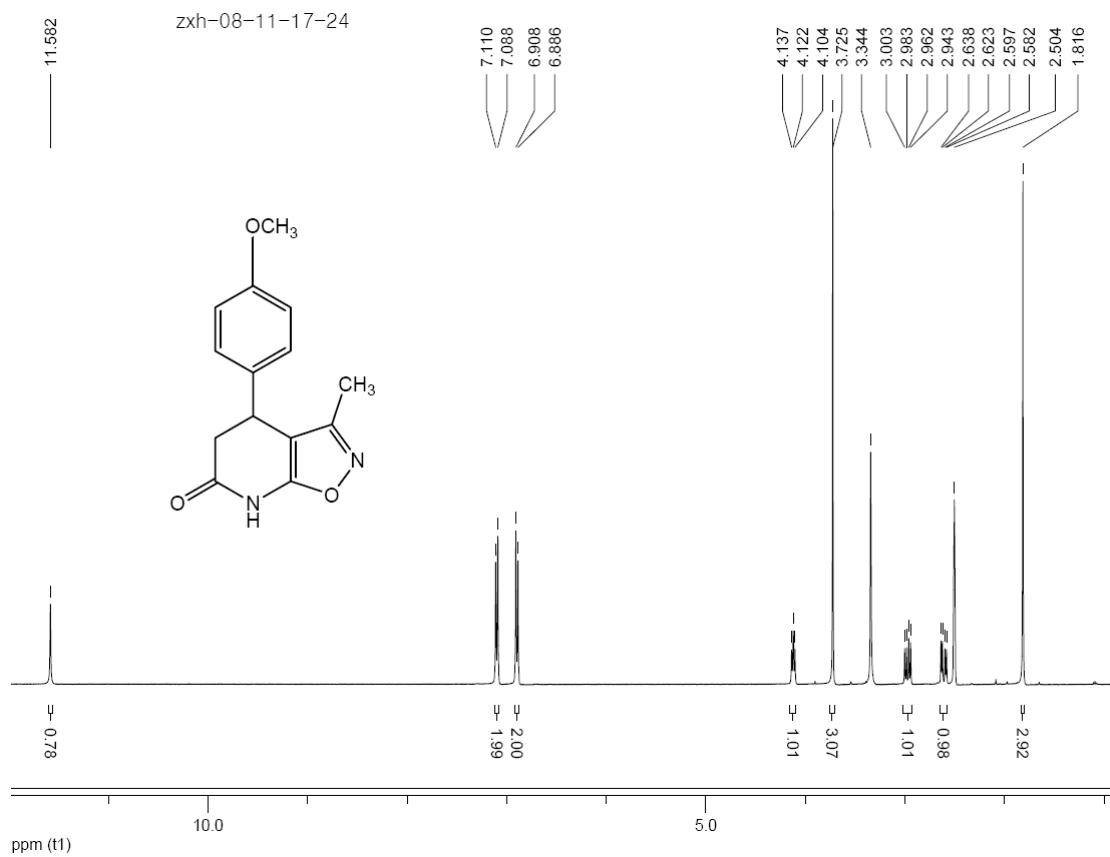
^{13}C NMR of compound **8g**



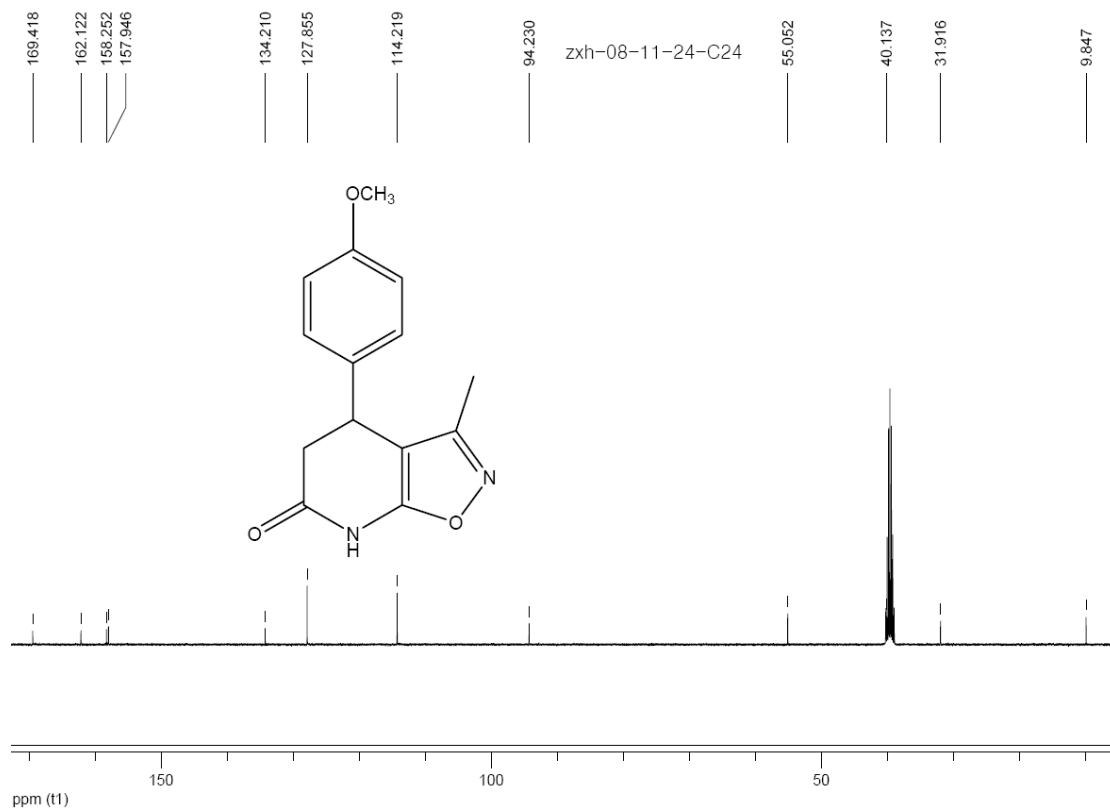
^1H NMR of compound **8h**



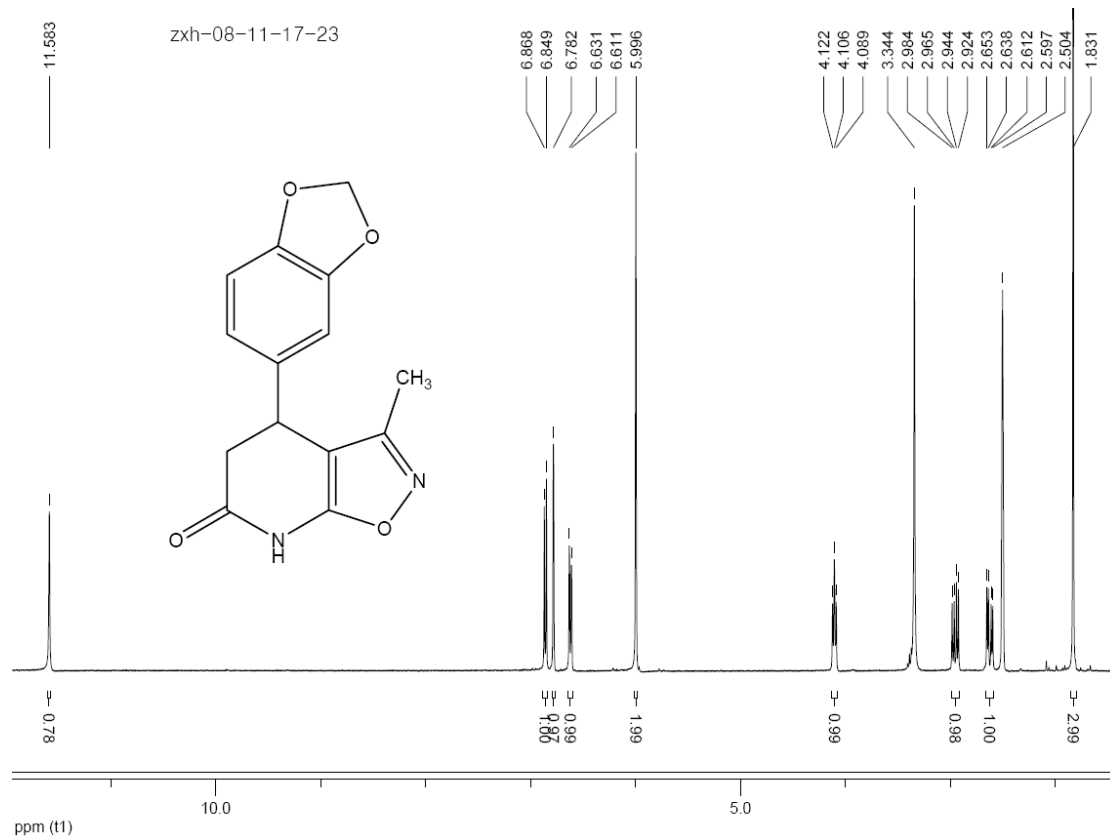
^{13}C NMR of compound **8h**



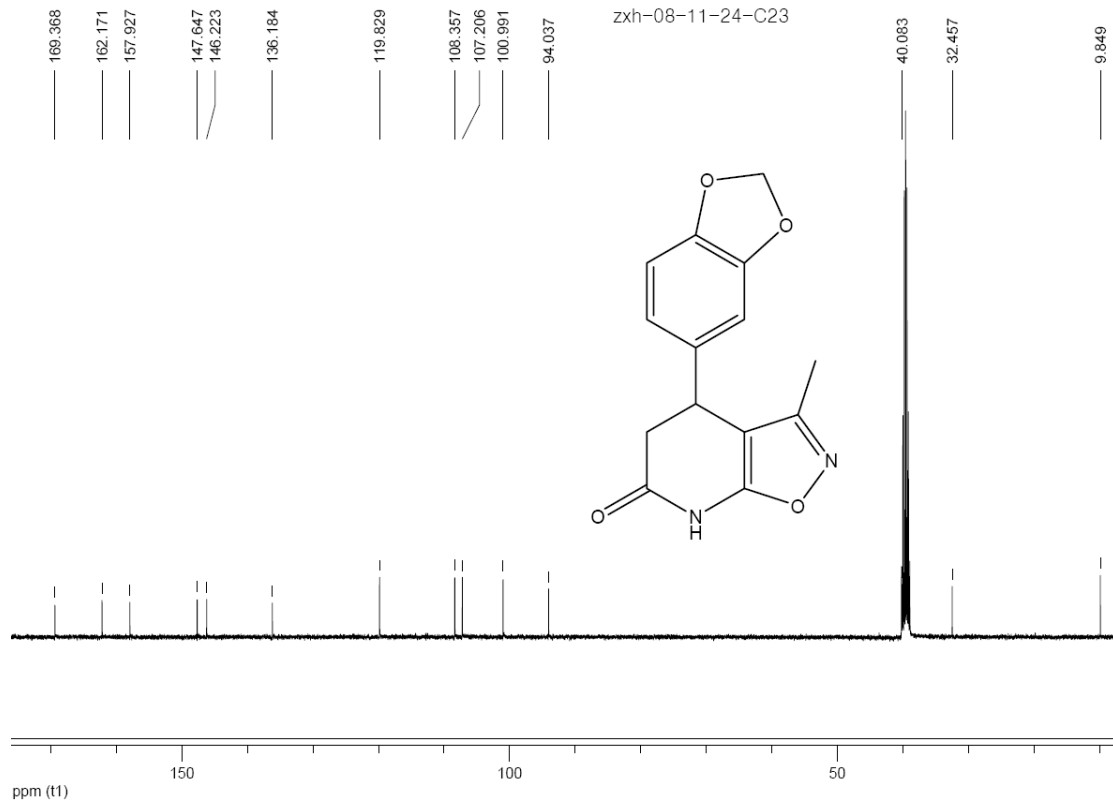
^1H NMR of compound **8i**



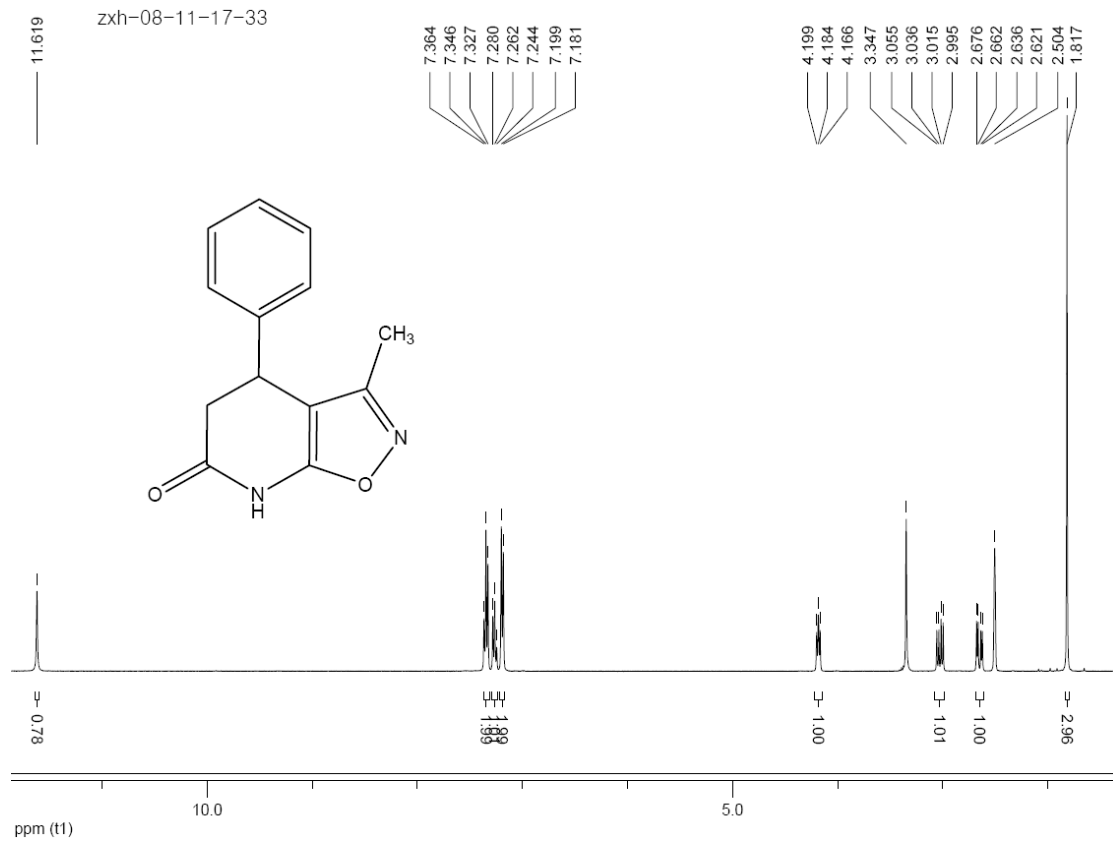
¹³C NMR of compound **8i**



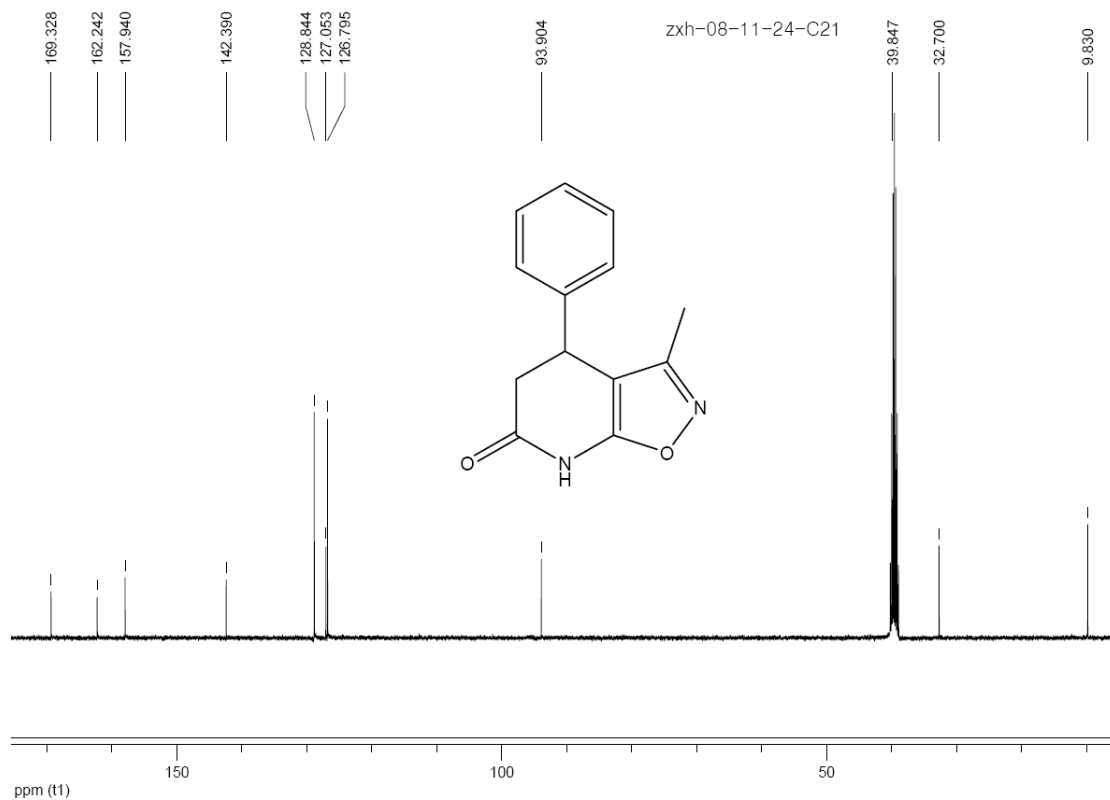
¹H NMR of compound **8j**



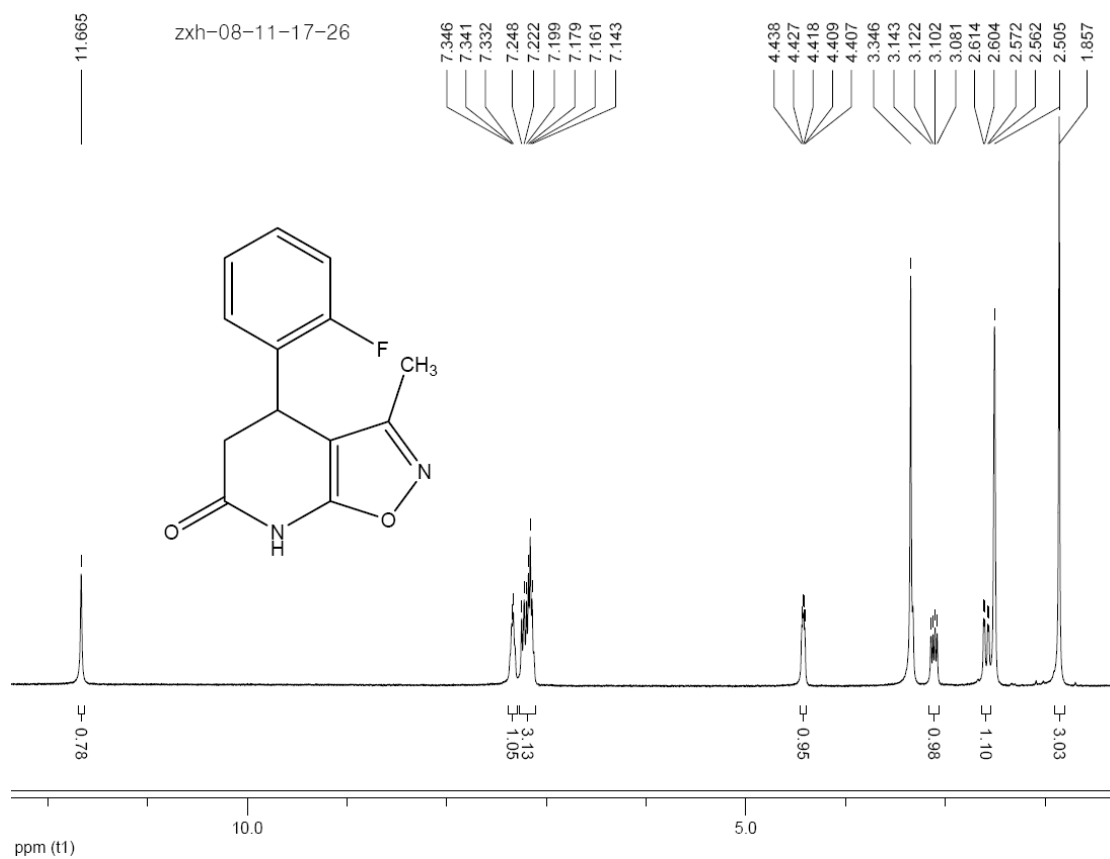
^{13}C NMR of compound **8j**



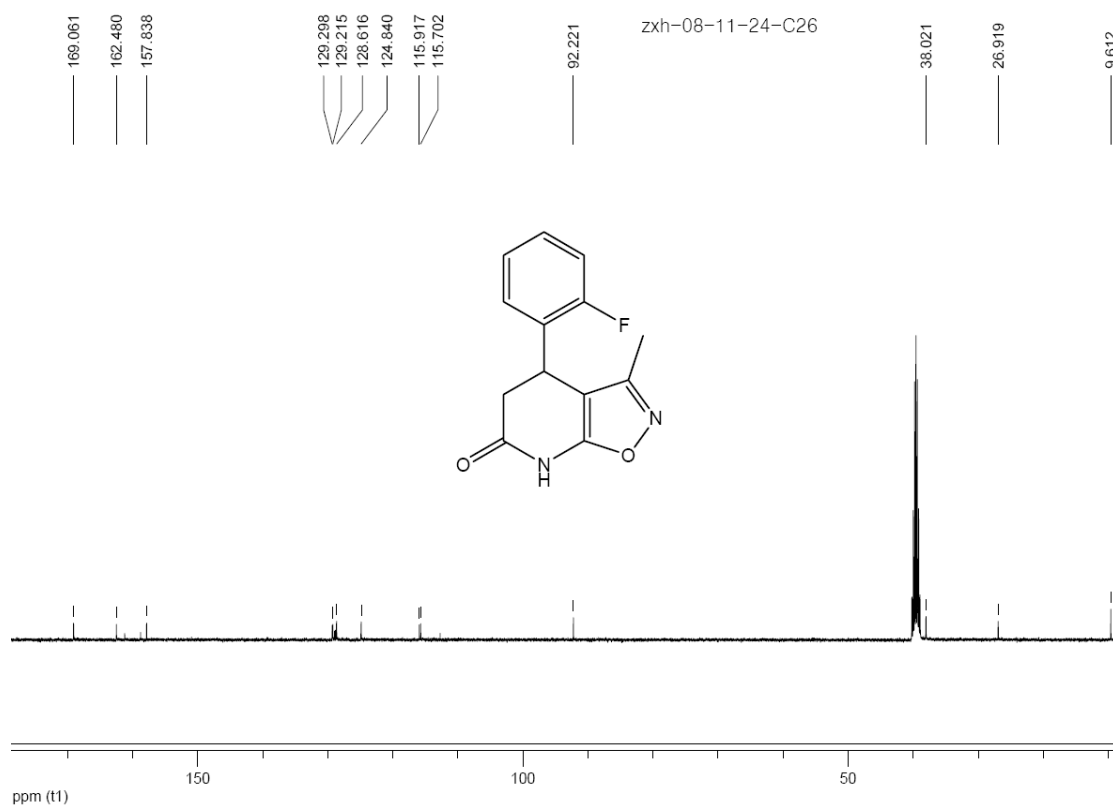
^1H NMR of compound **8k**



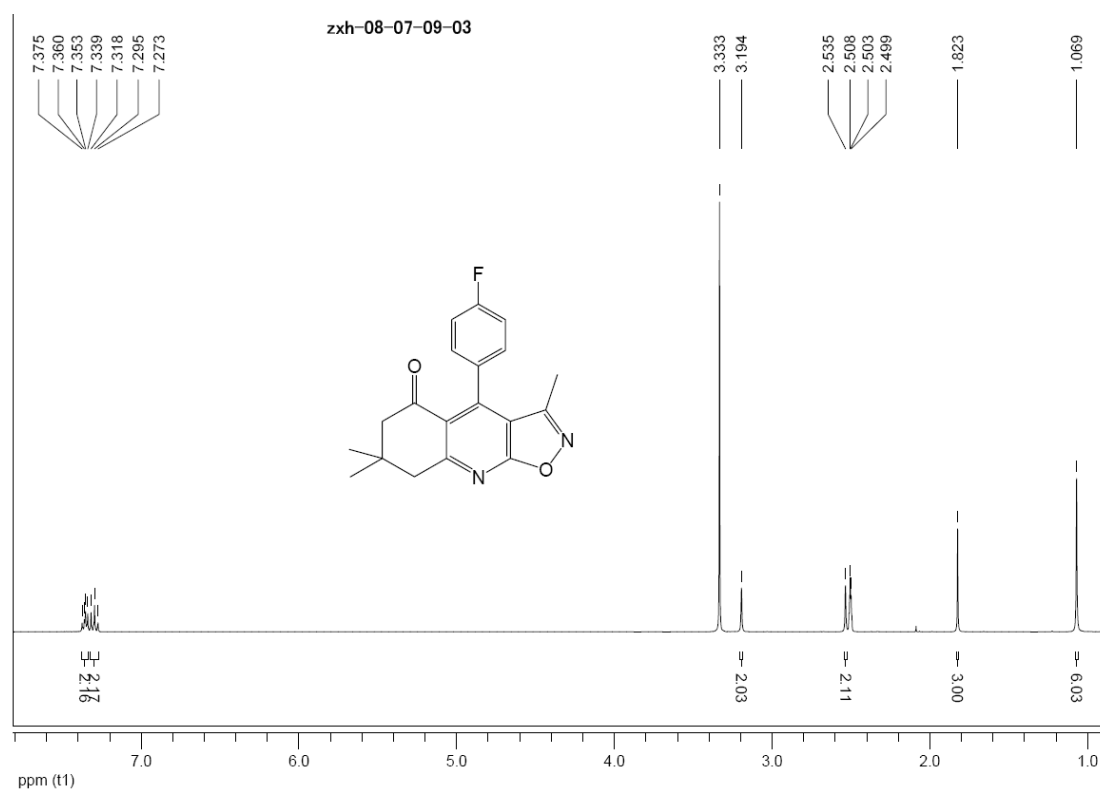
¹³C NMR of compound **8k**



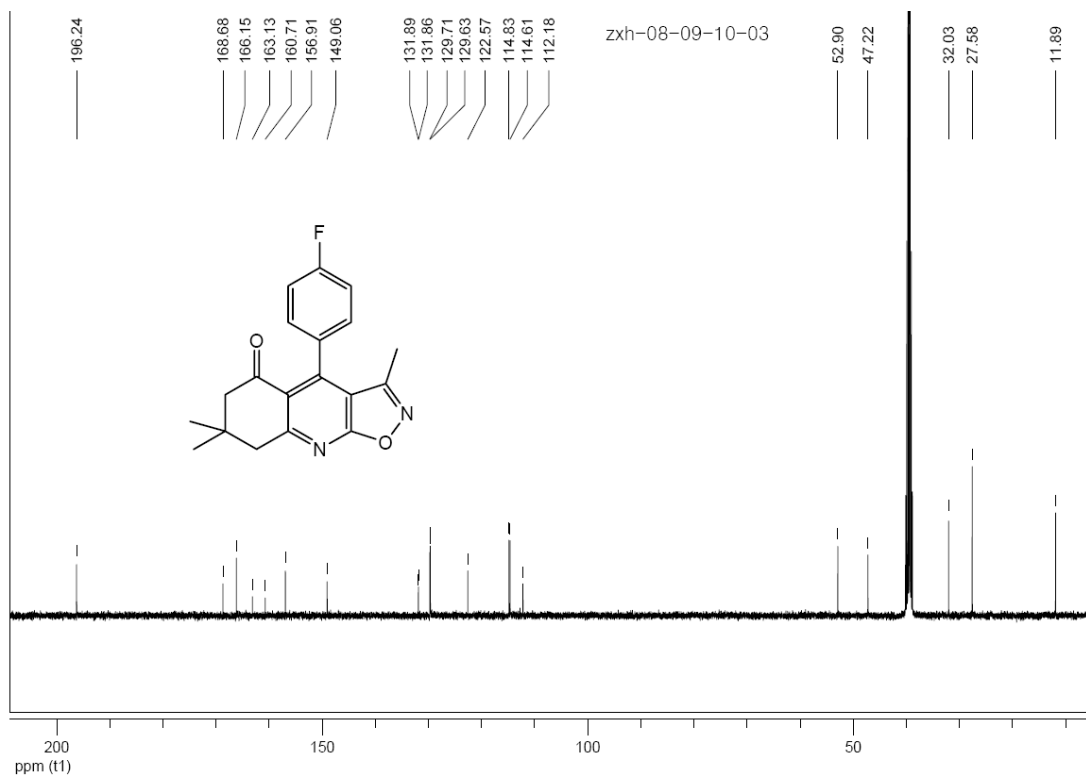
¹H NMR of compound **8l**



¹³C NMR of compound **8l**



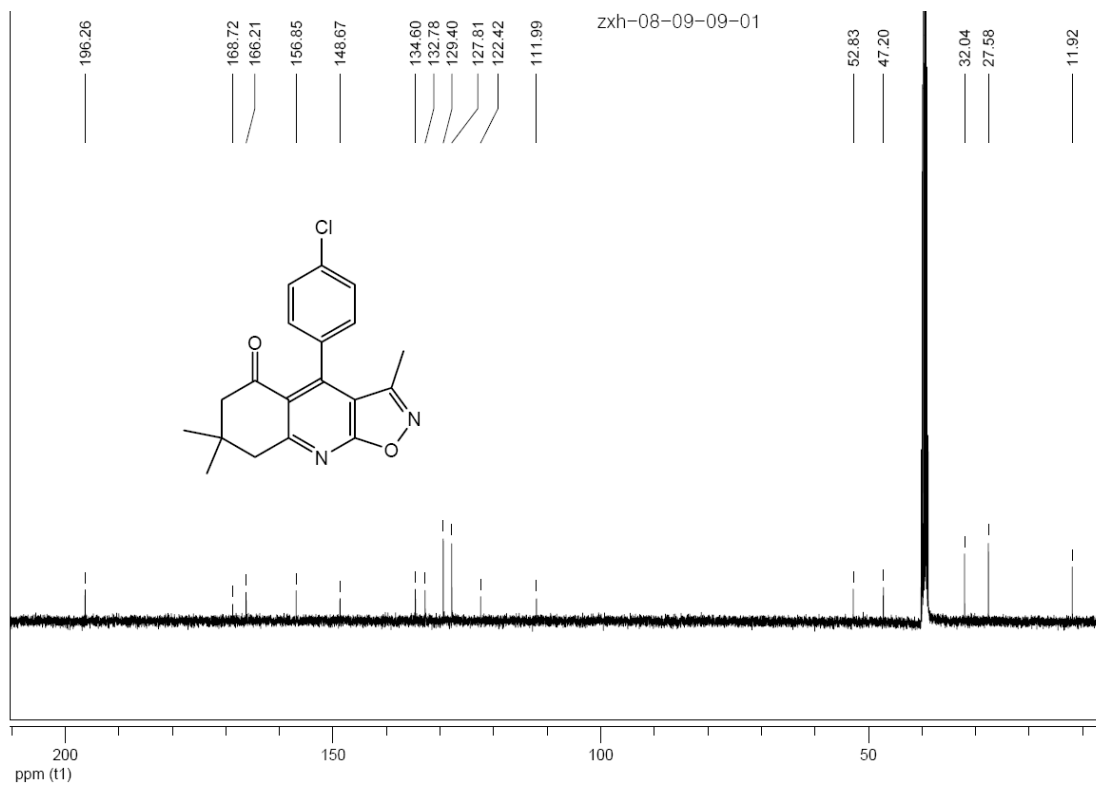
¹H NMR of compound **10a**



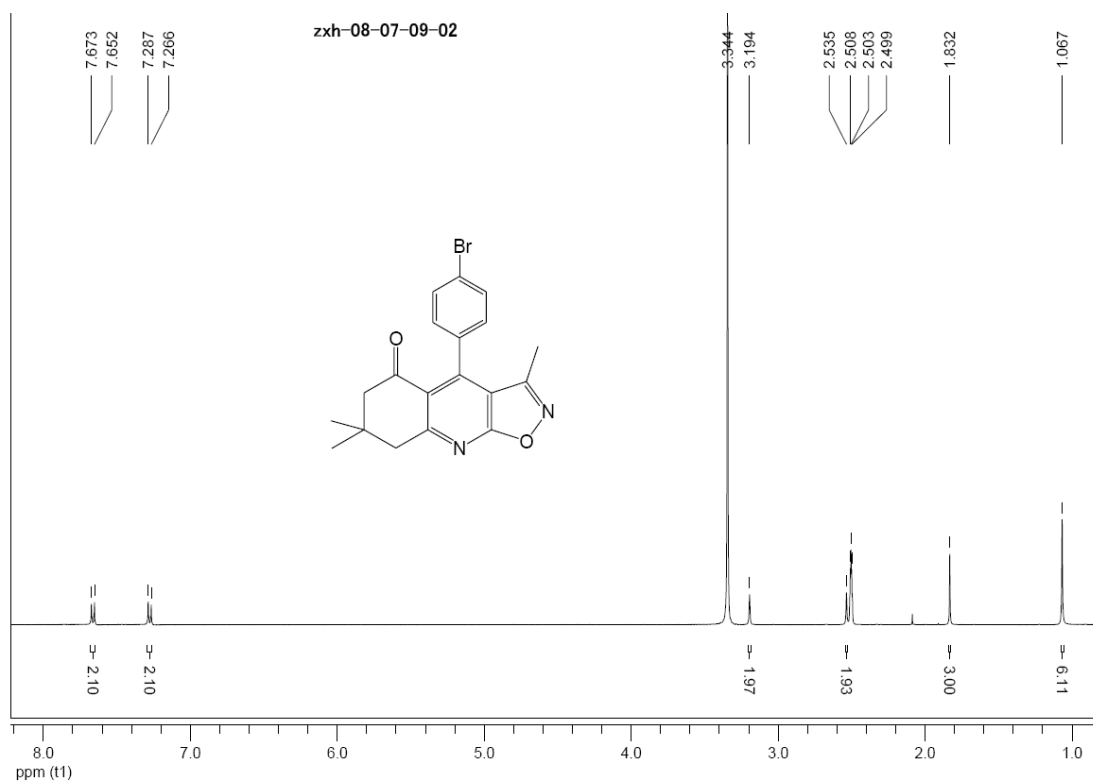
^{13}C NMR of compound **10a**



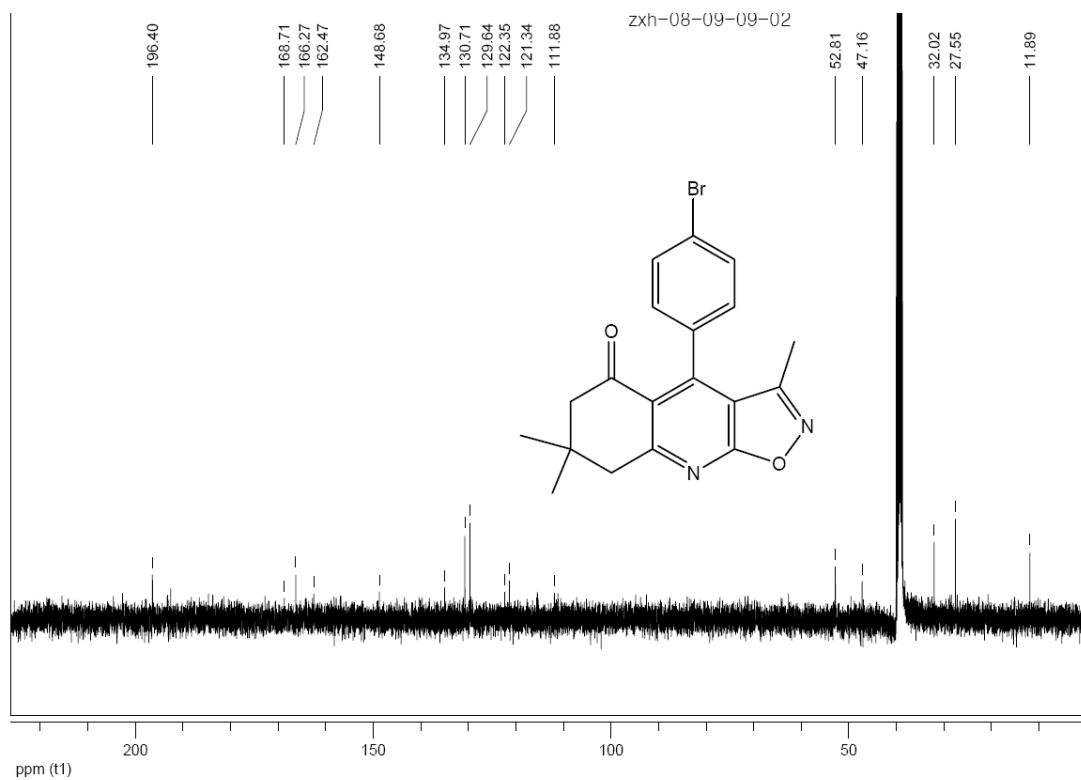
^1H NMR of compound **10b**



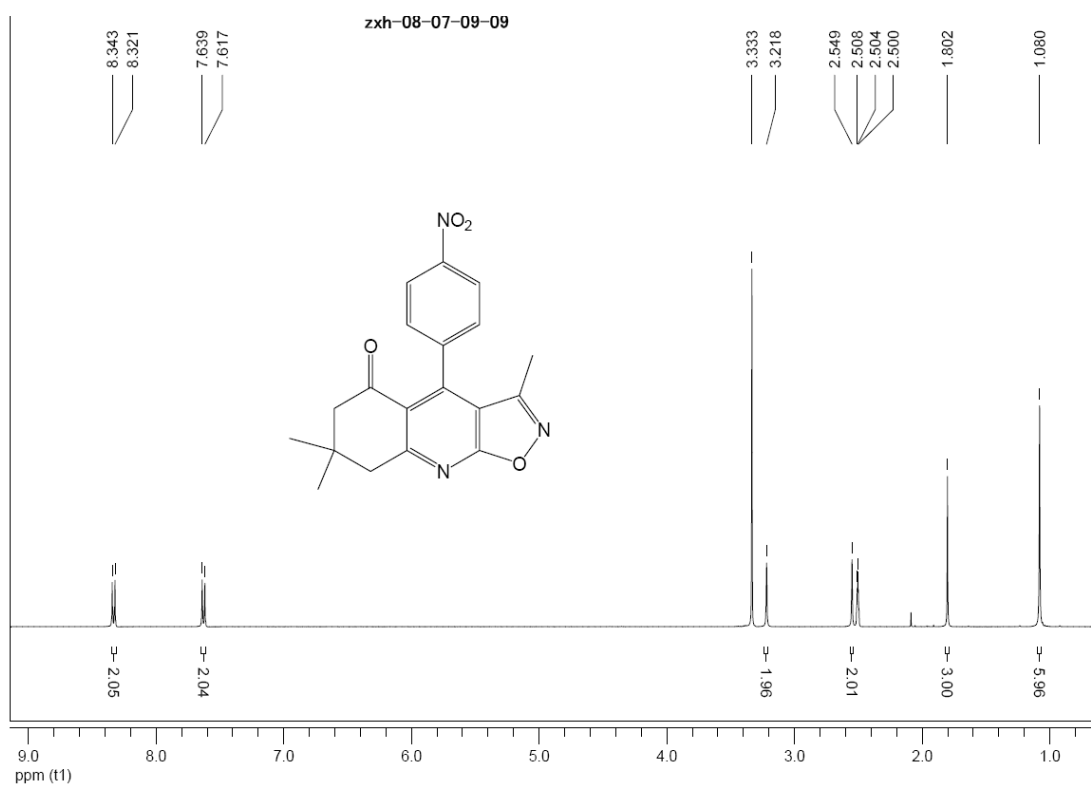
^{13}C NMR of compound **10b**



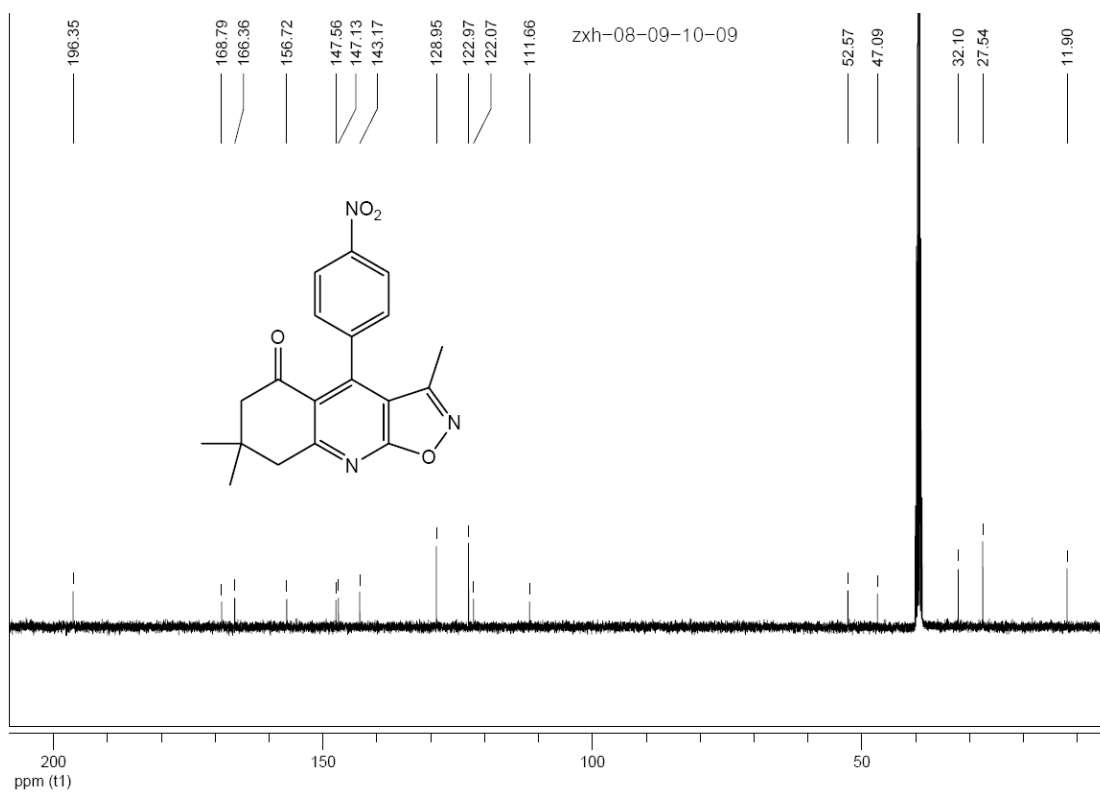
^1H NMR of compound **10c**



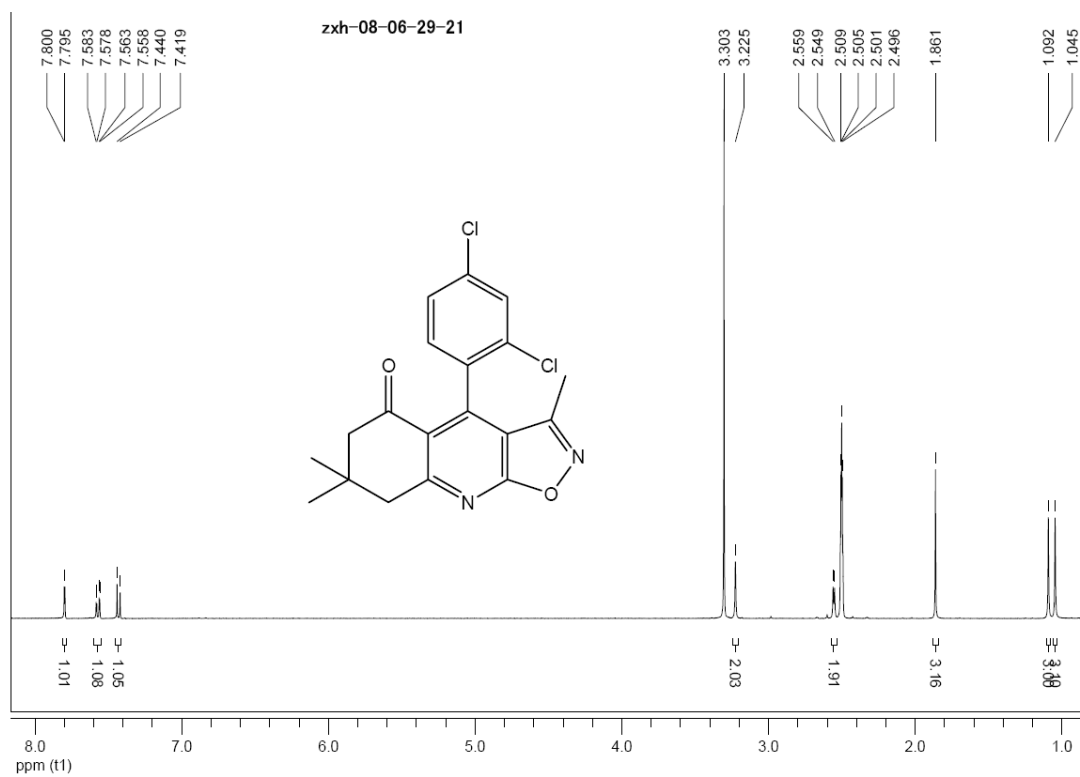
^{13}C NMR of compound **10c**



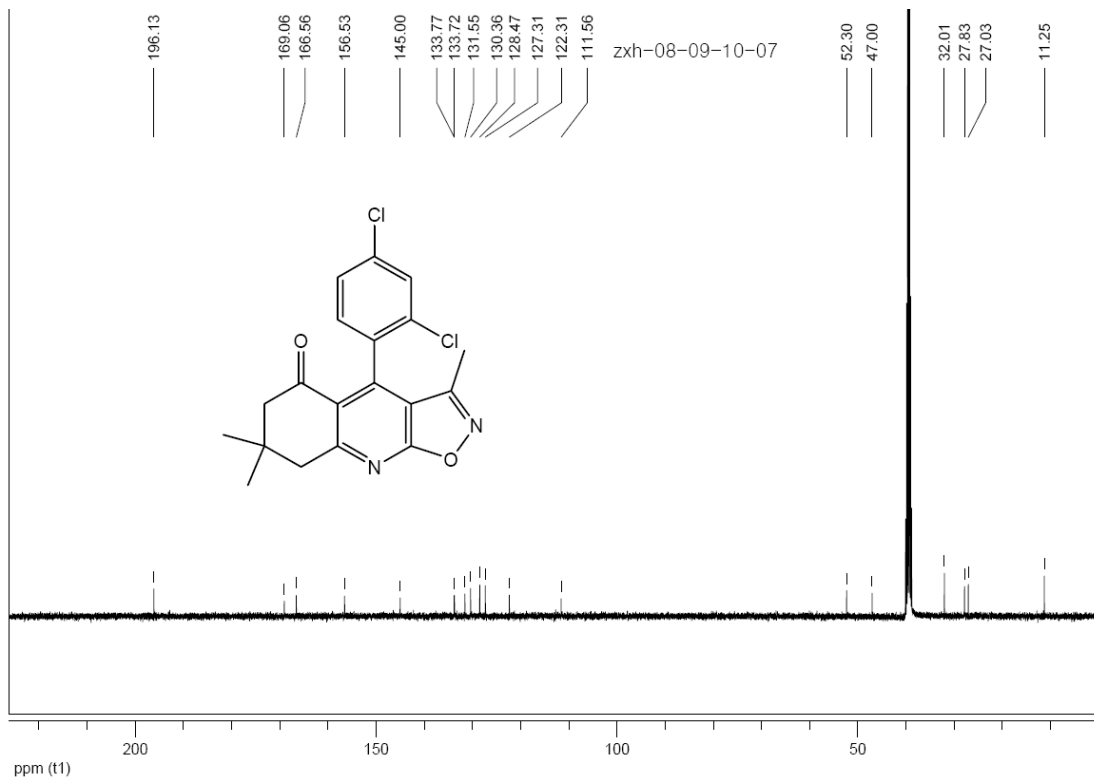
^1H NMR of compound **10d**



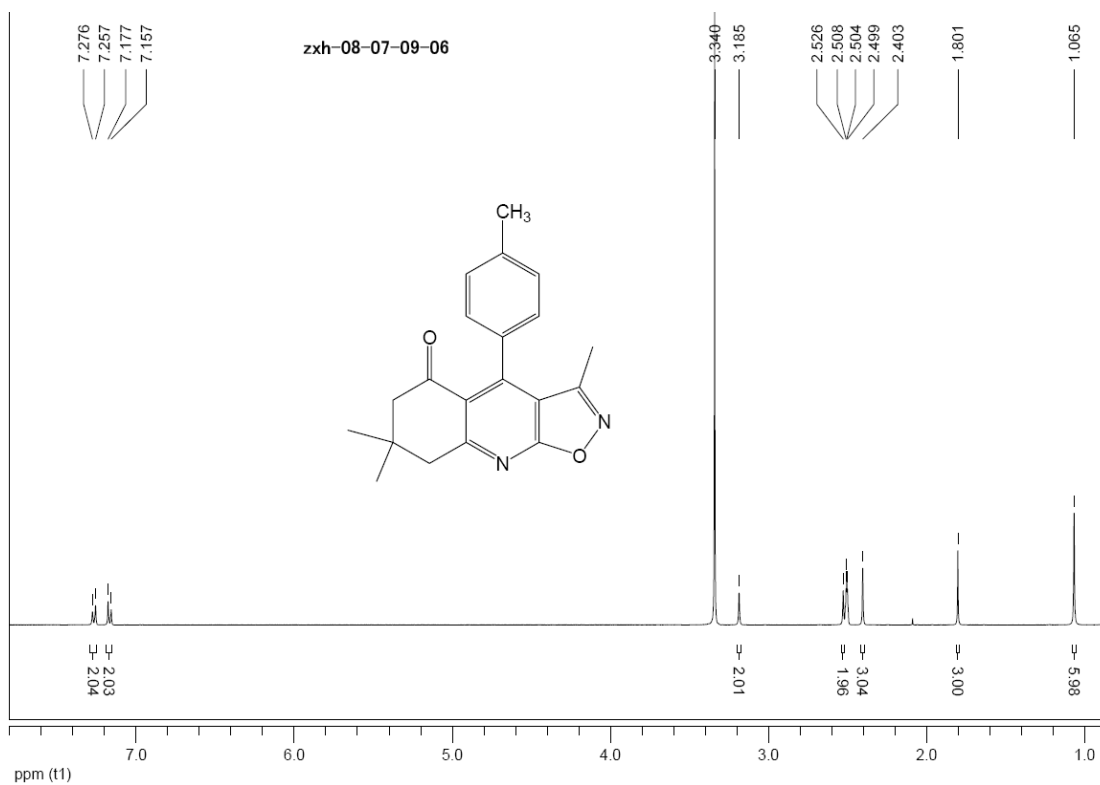
^{13}C NMR of compound **10d**



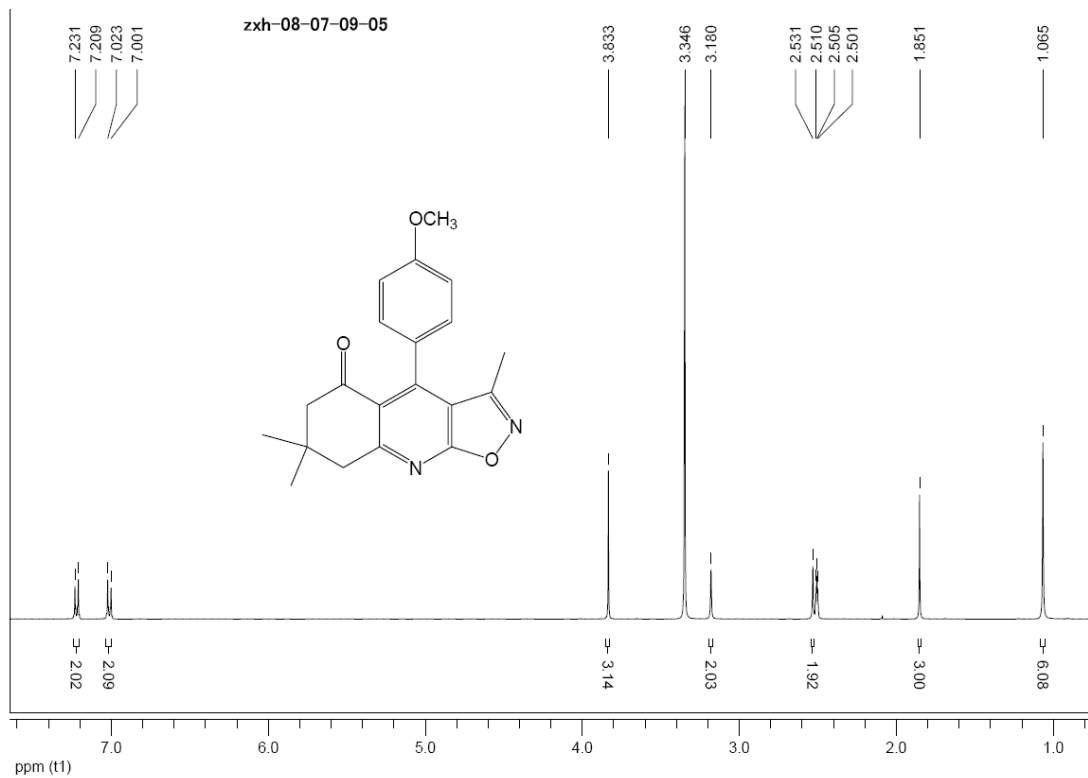
^1H NMR of compound **10e**



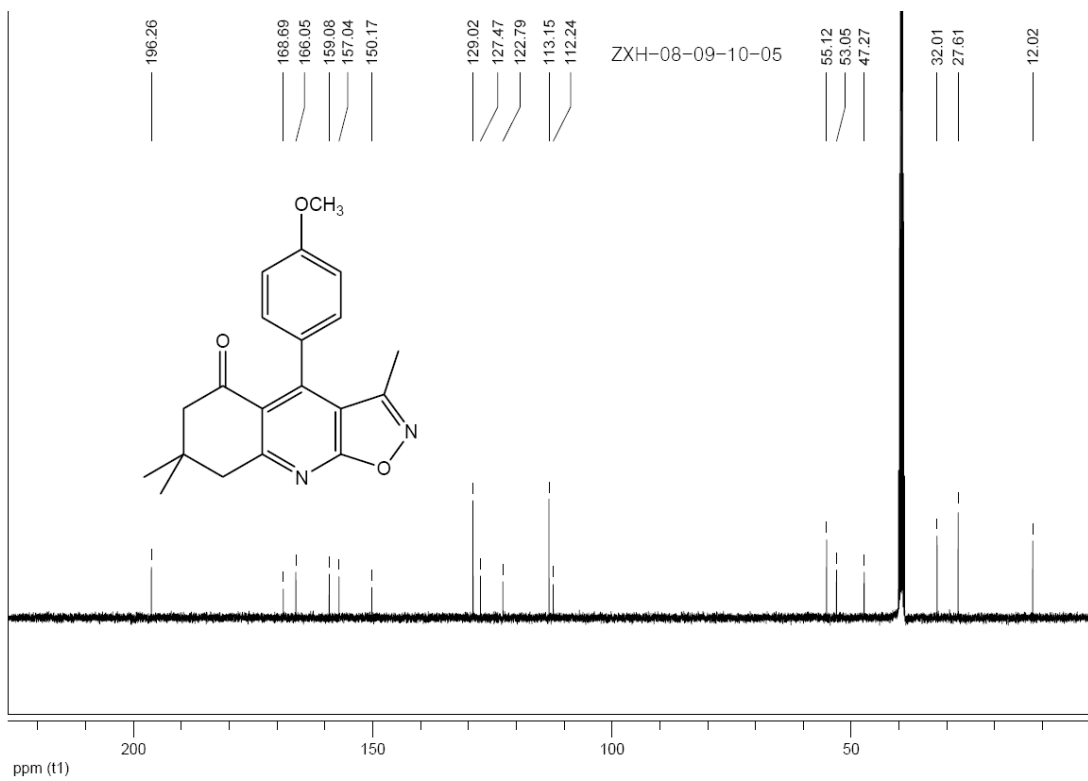
^{13}C NMR of compound **10e**



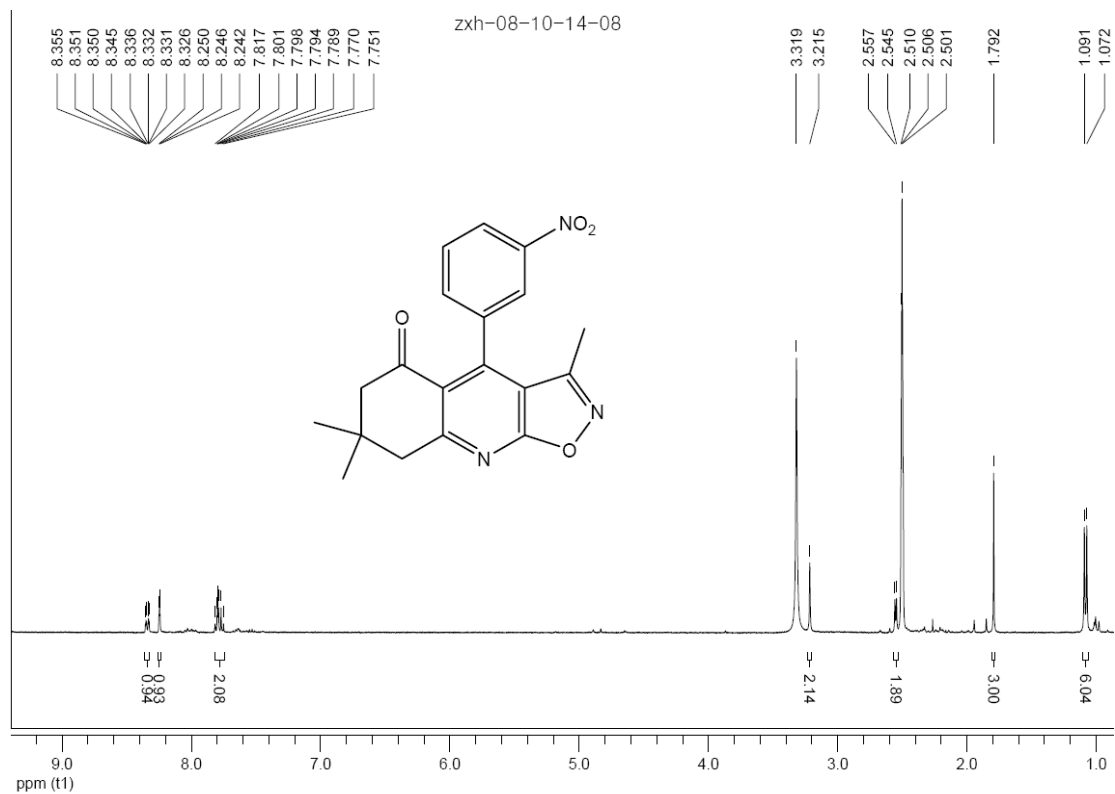
^1H NMR of compound **10f**



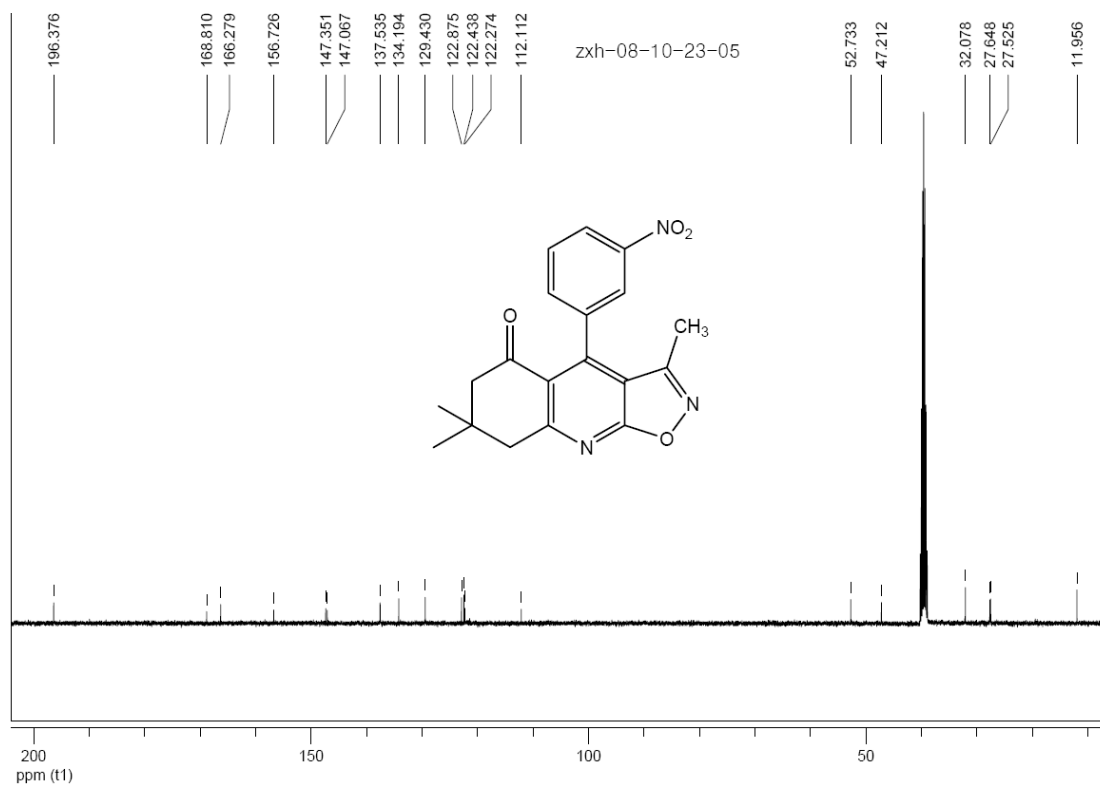
^1H NMR of compound **10g**



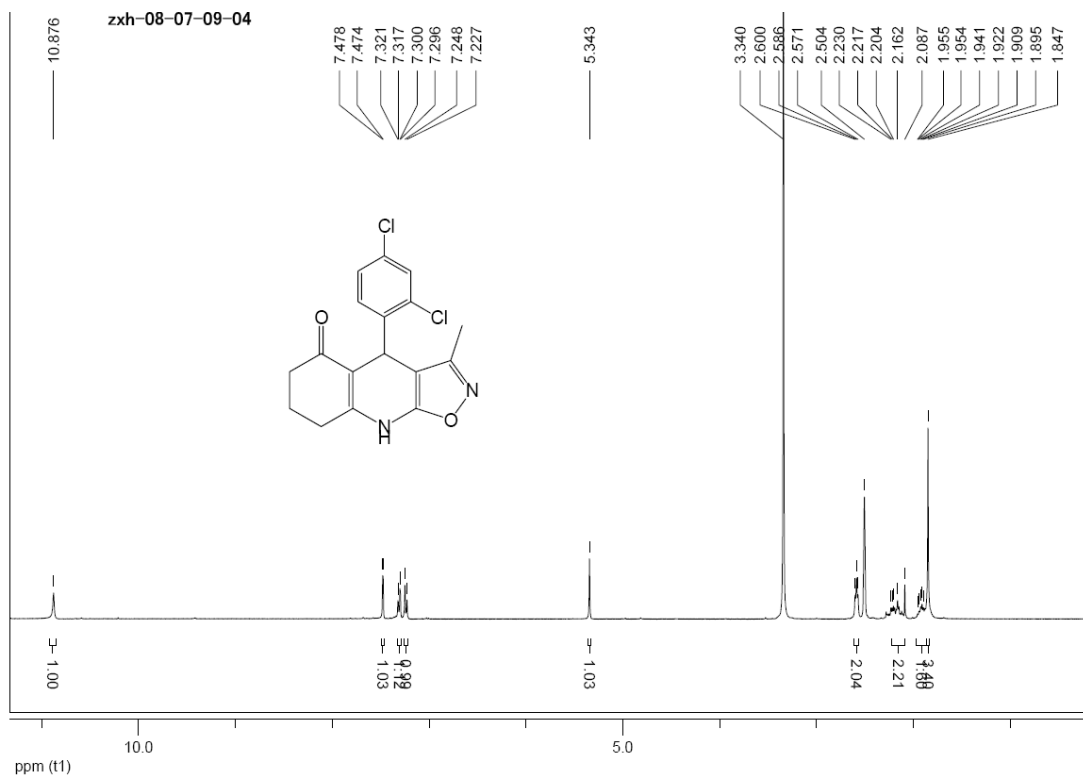
^{13}C NMR of compound **10g**



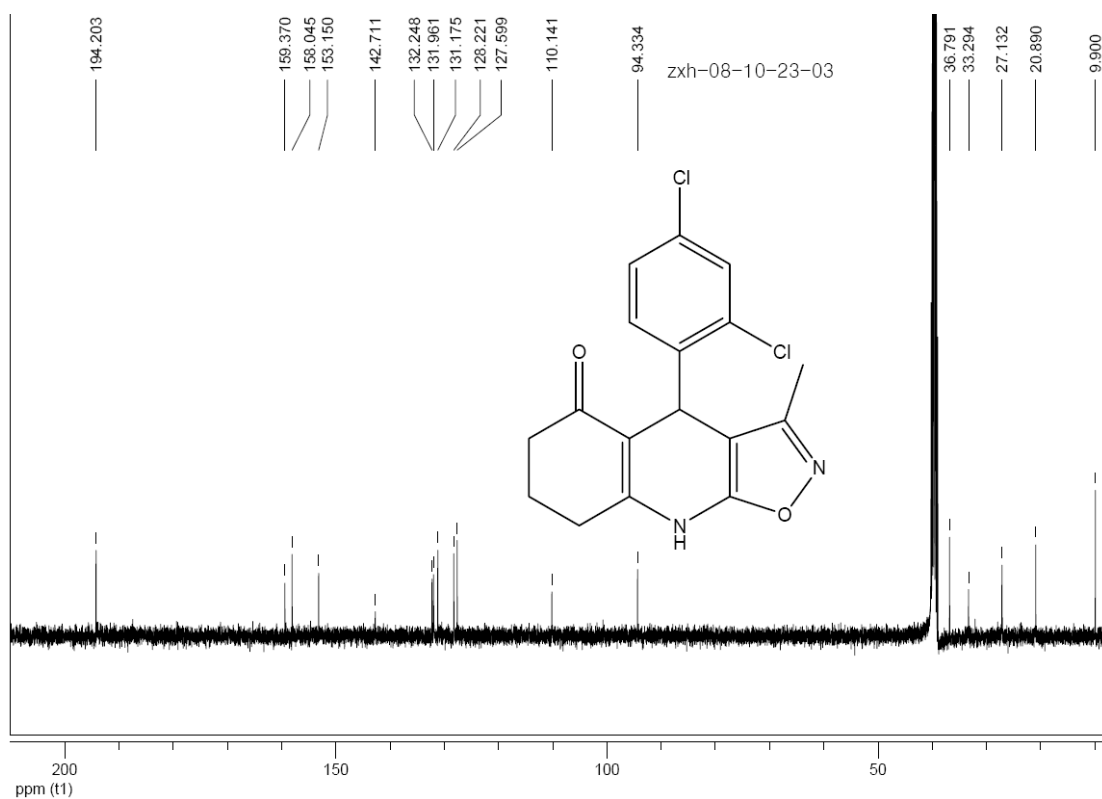
¹H NMR of compound **10h**



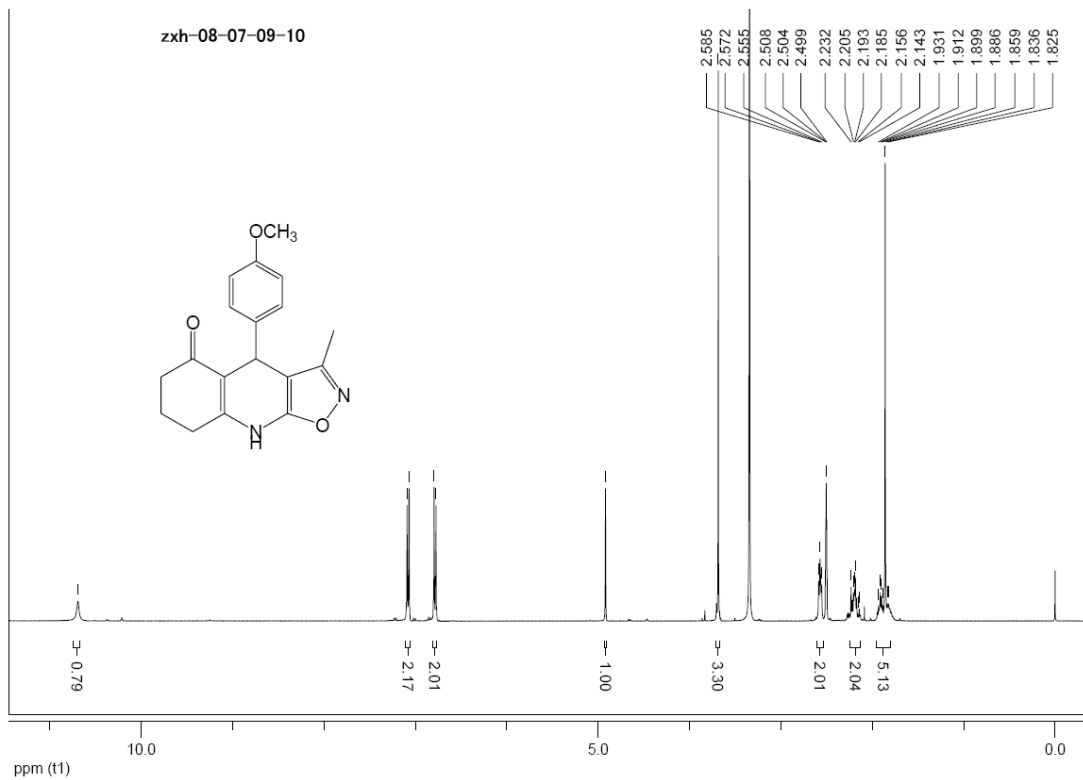
¹³C NMR of compound **10h**



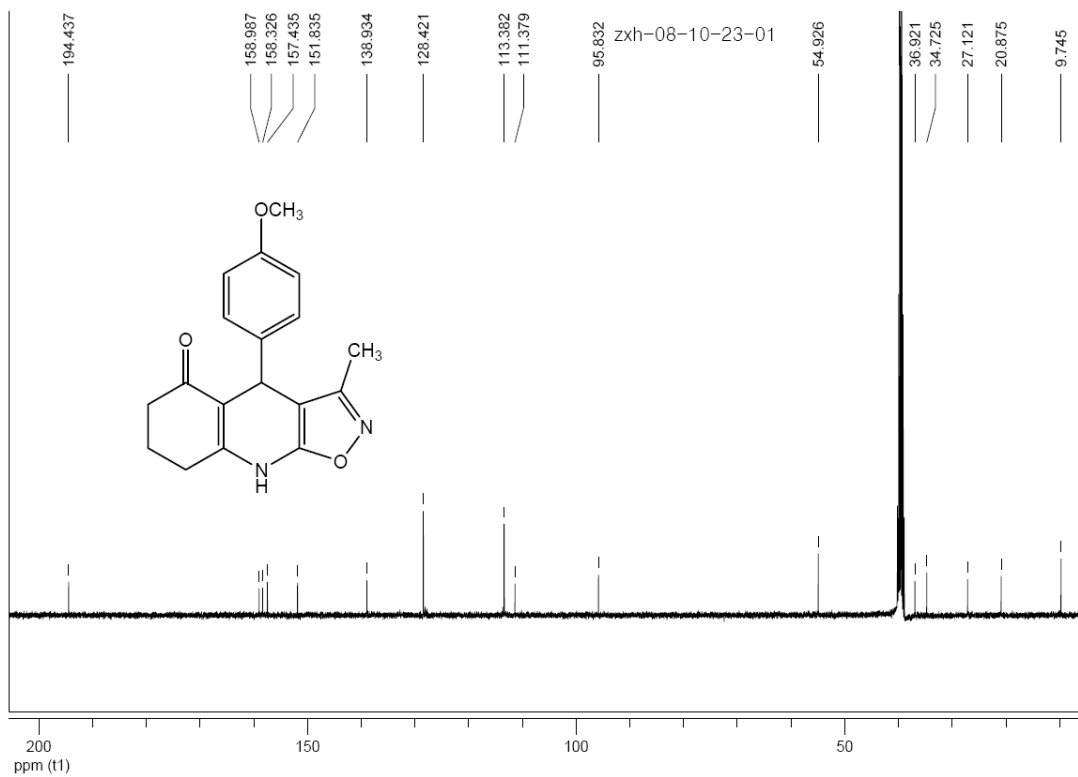
^1H NMR of compound **12a**



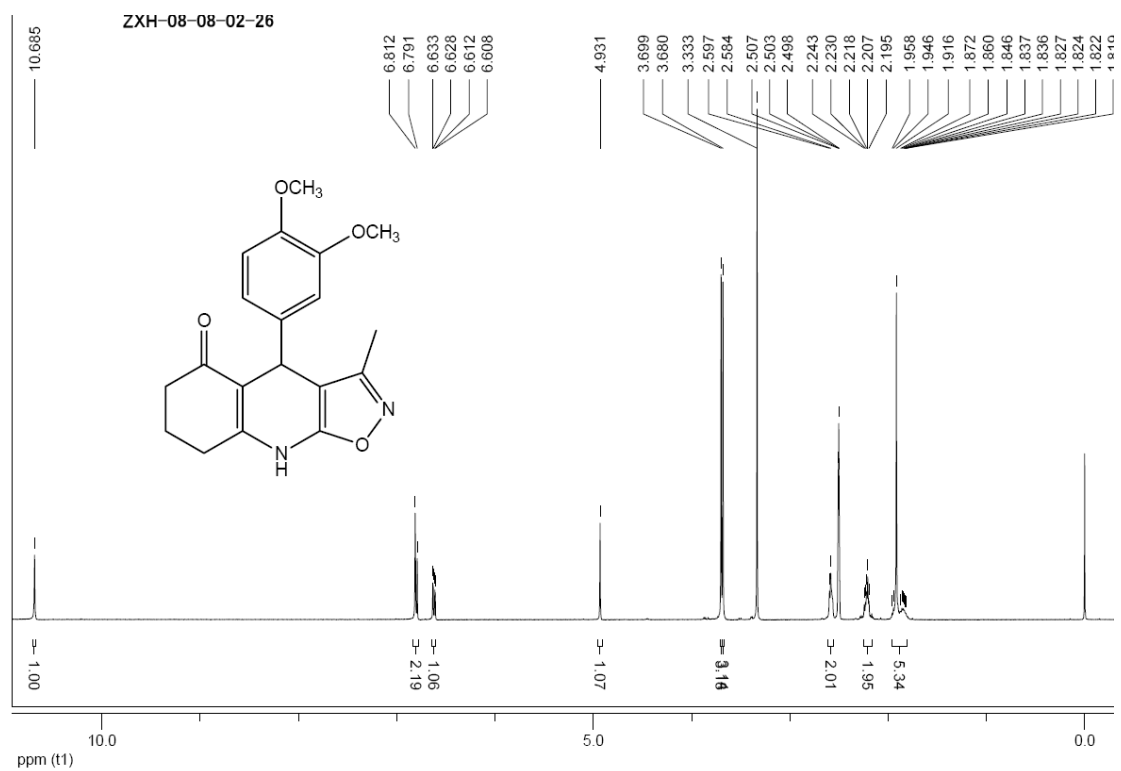
^{13}C NMR of compound **12a**



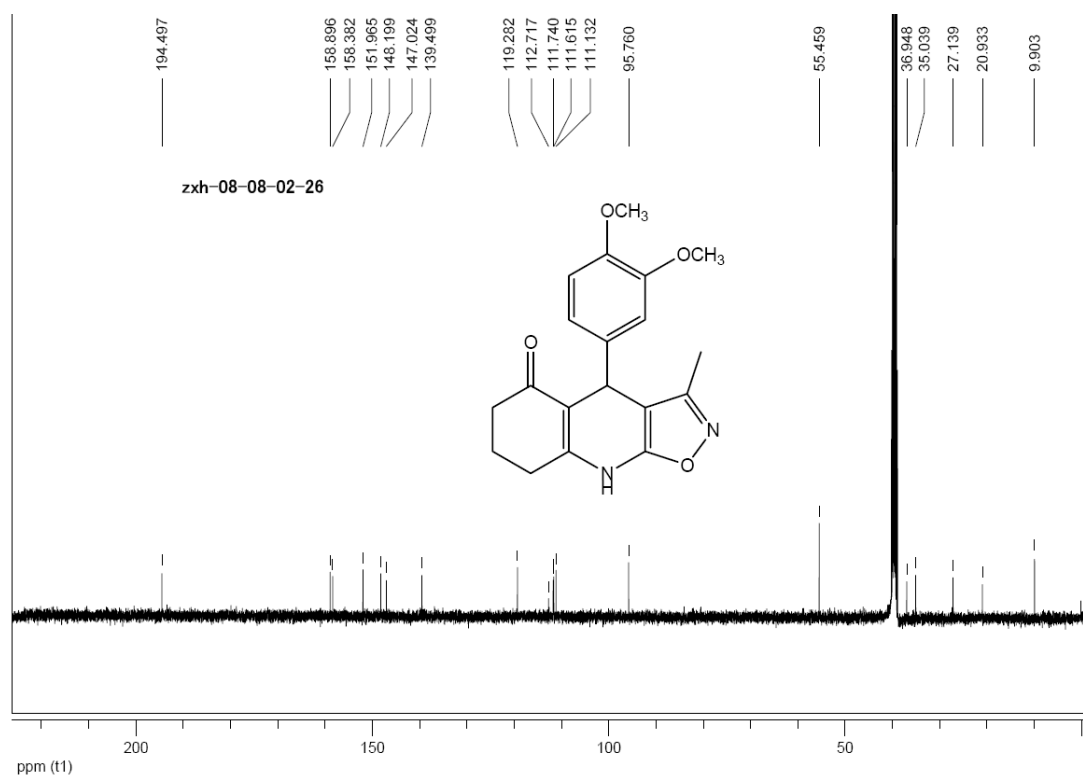
^1H NMR of compound **12b**



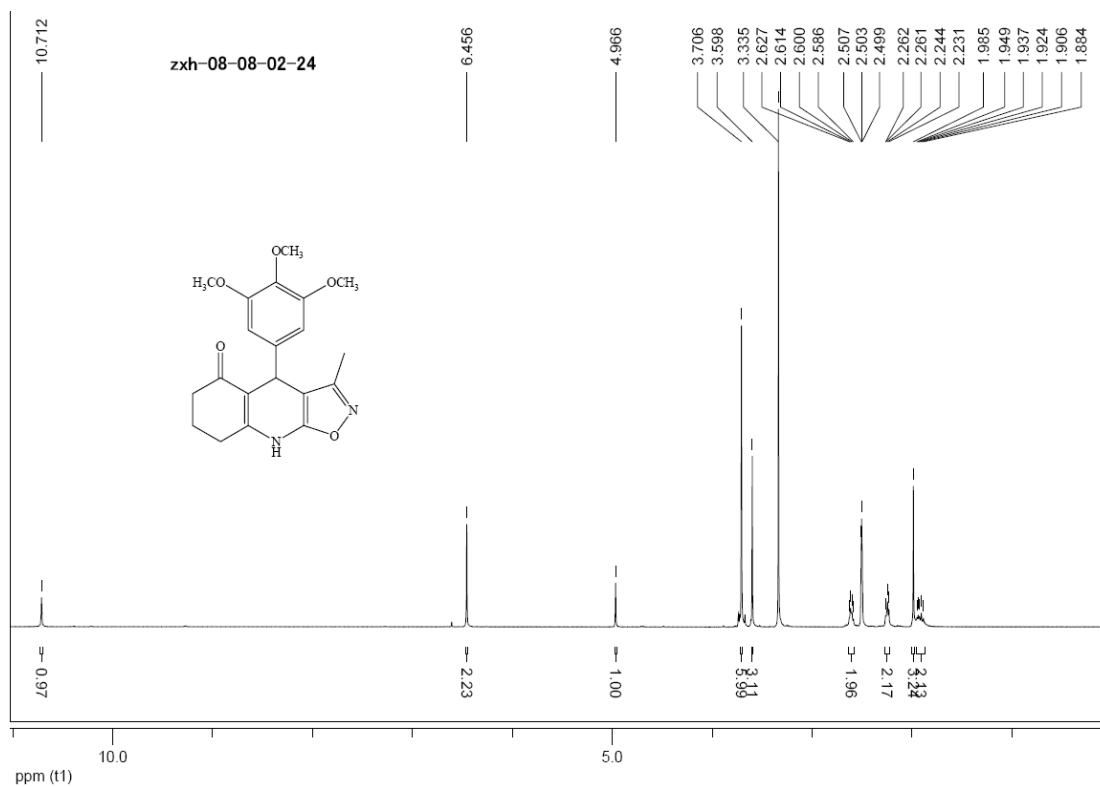
^{13}C NMR of compound **12b**



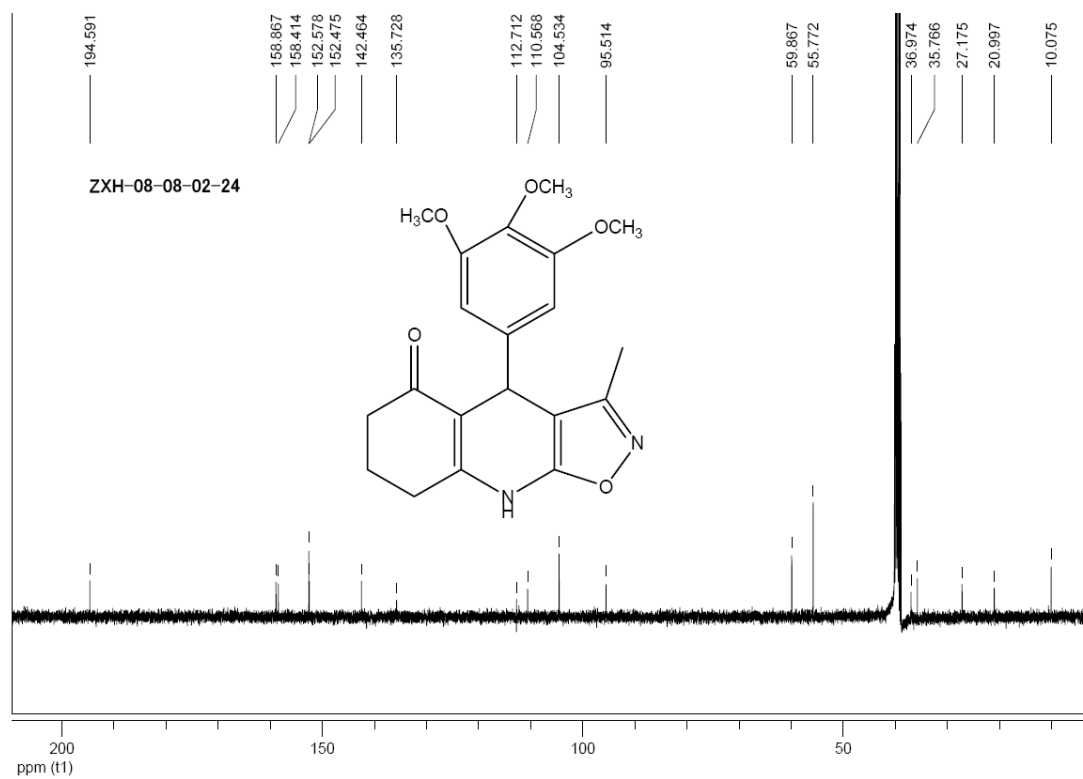
^1H NMR of compound 12c



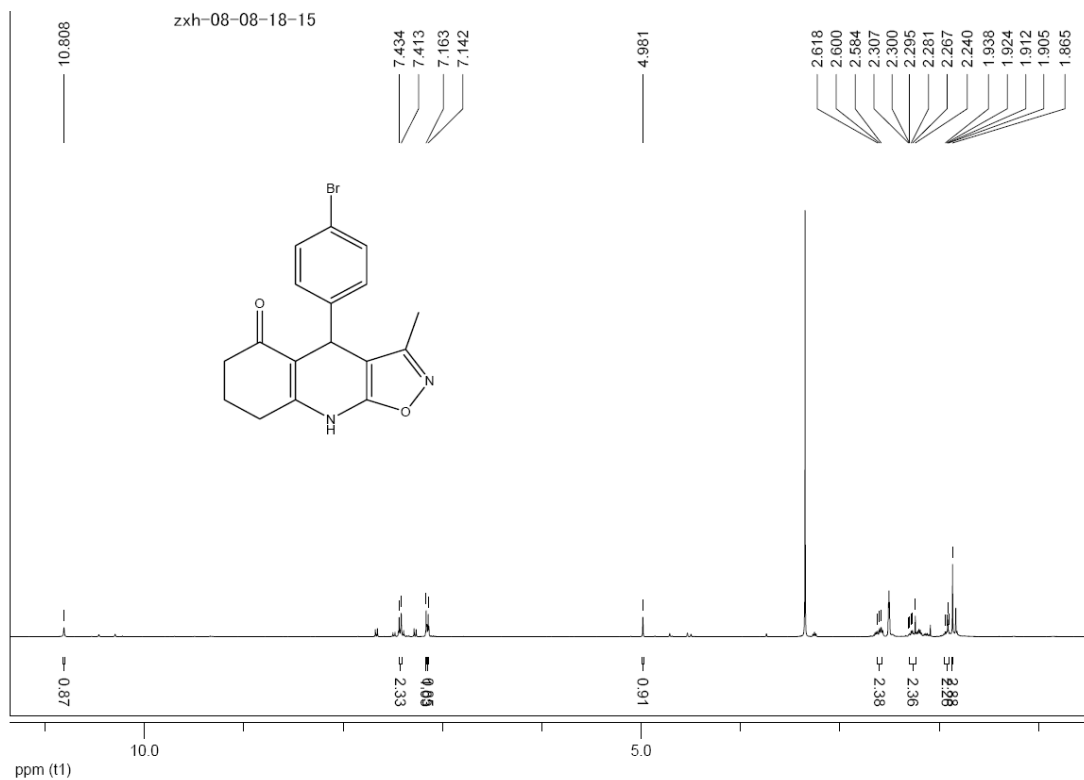
^{13}C NMR of compound 12c



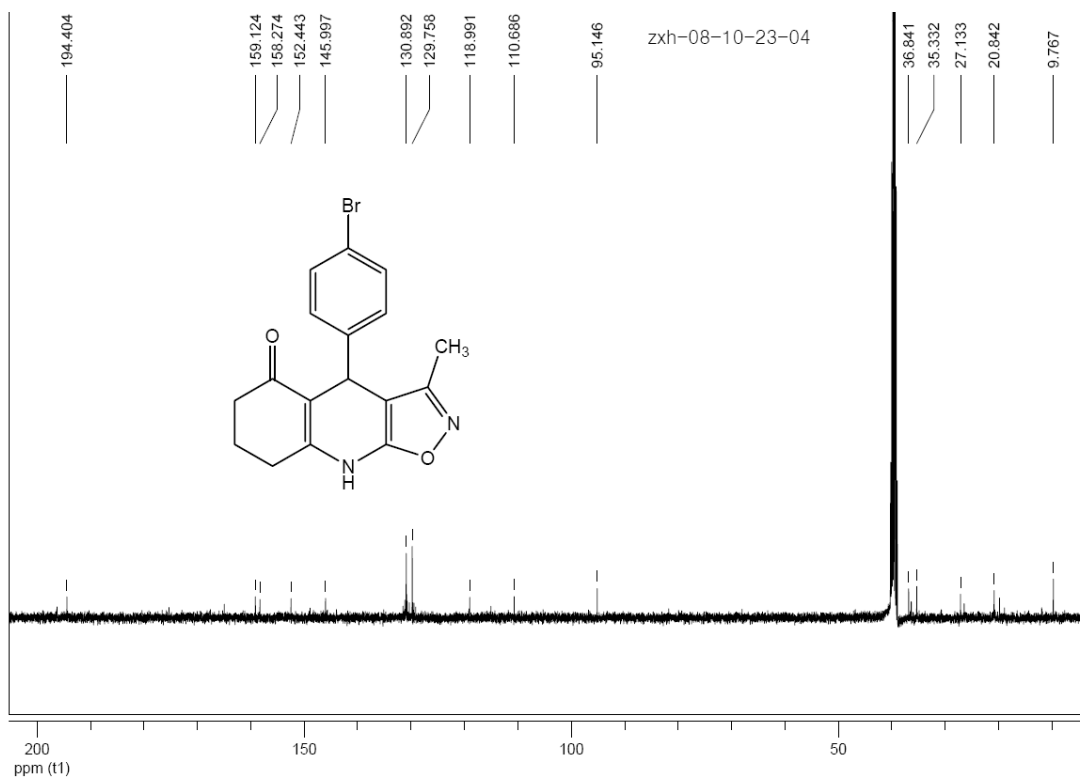
^1H NMR of compound **12d**



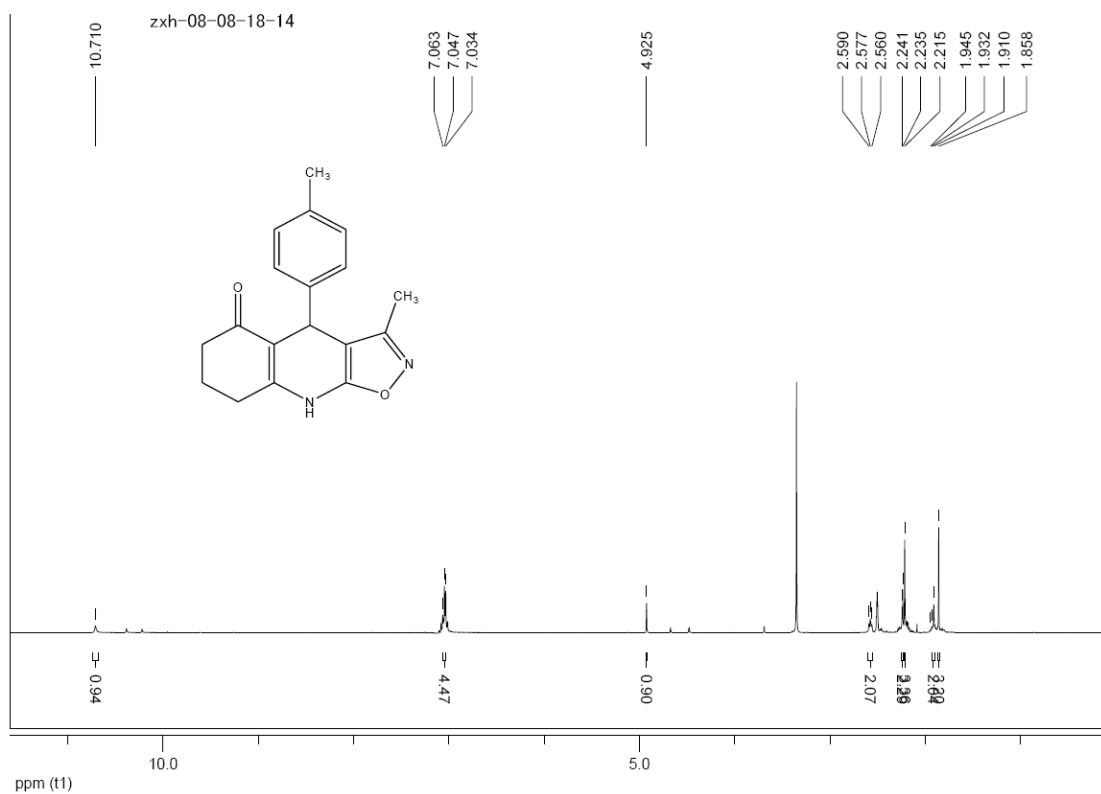
^{13}C NMR of compound **12d**



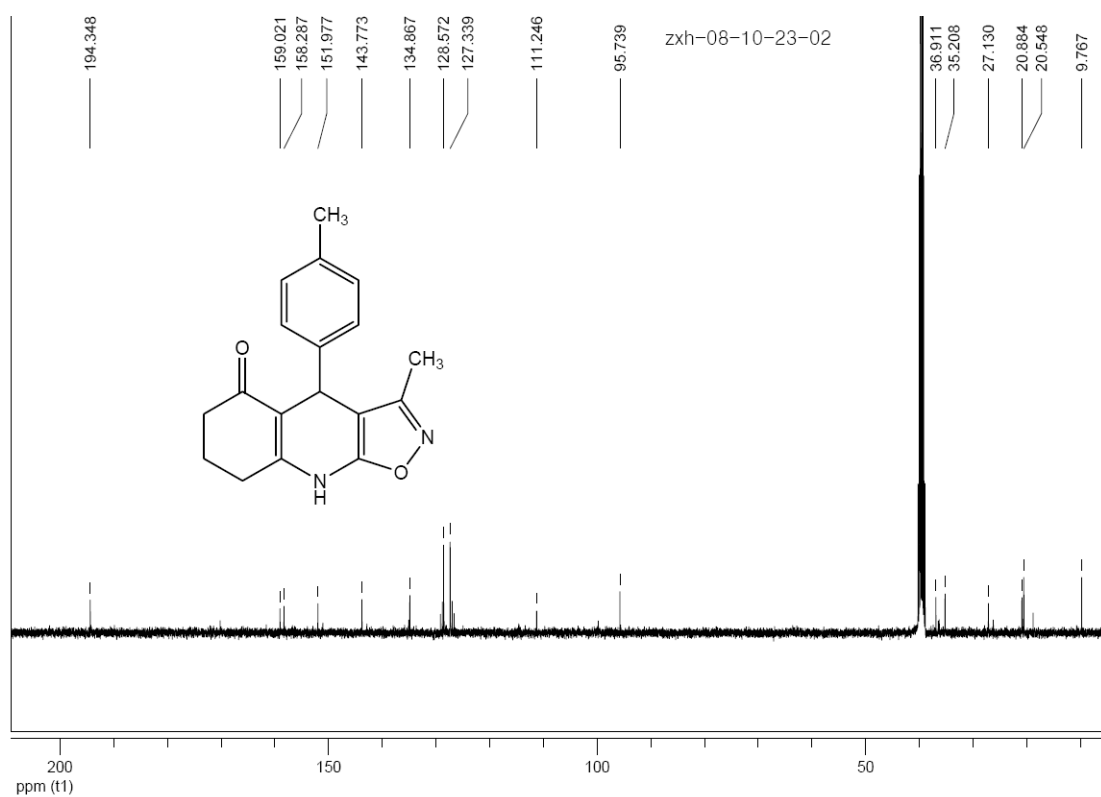
$^1\text{H NMR}$ of compound **12e**



$^{13}\text{C NMR}$ of compound **12e**

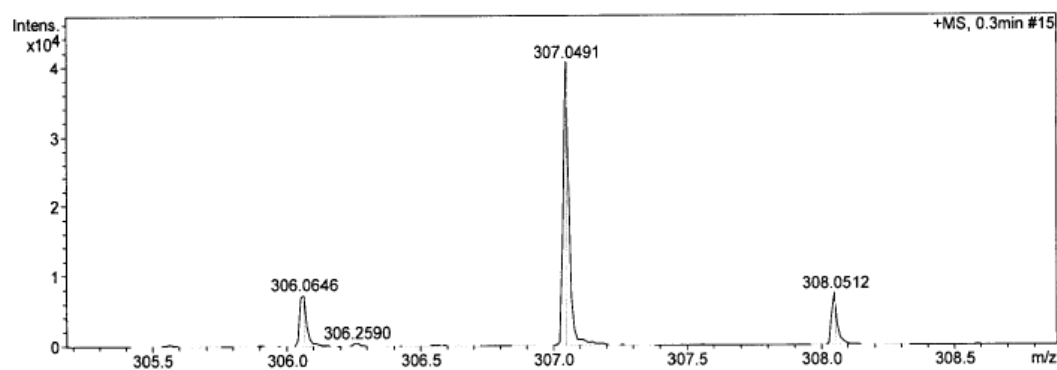
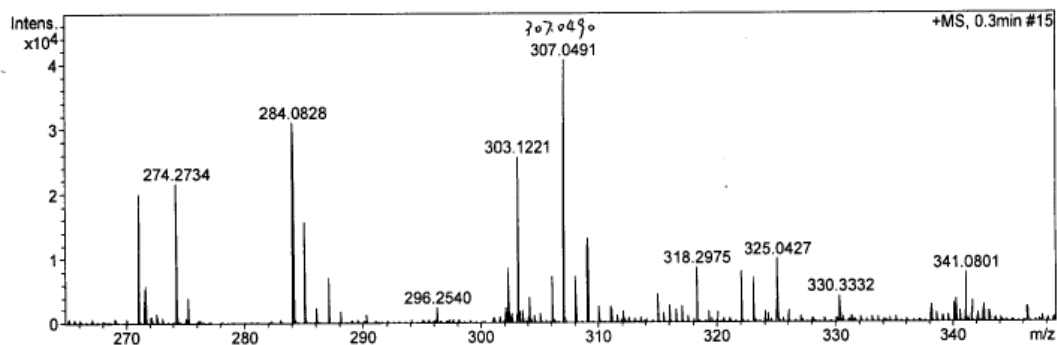


^1H NMR of compound **12f**



^{13}C NMR of compound **12f**

HRMS of all the synthesized compounds

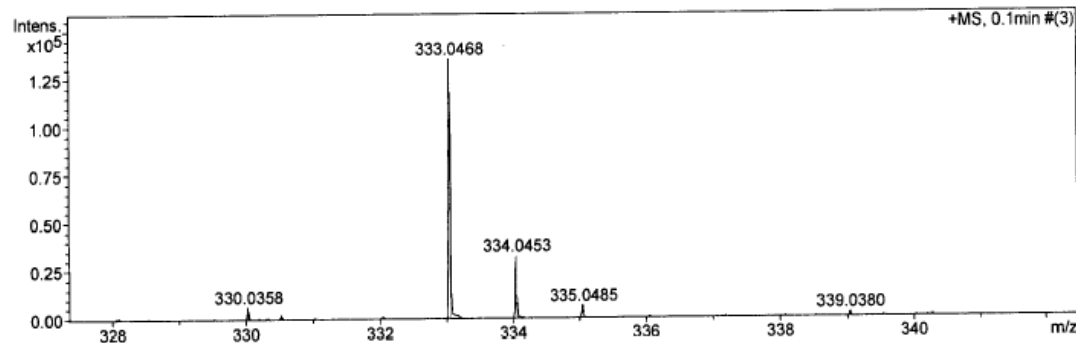
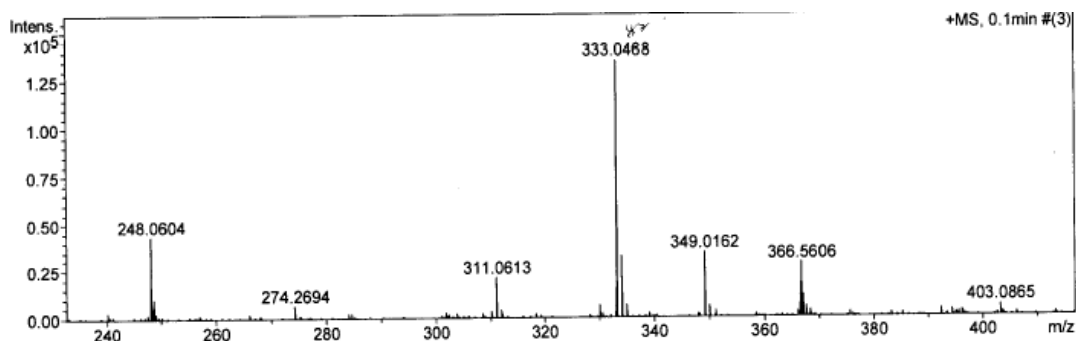


Bruker Compass DataAnalysis 4.0

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HRMS of compound 4a

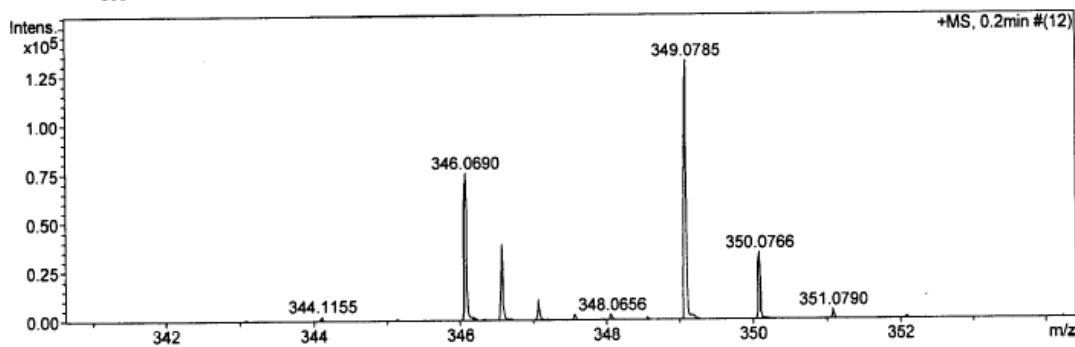
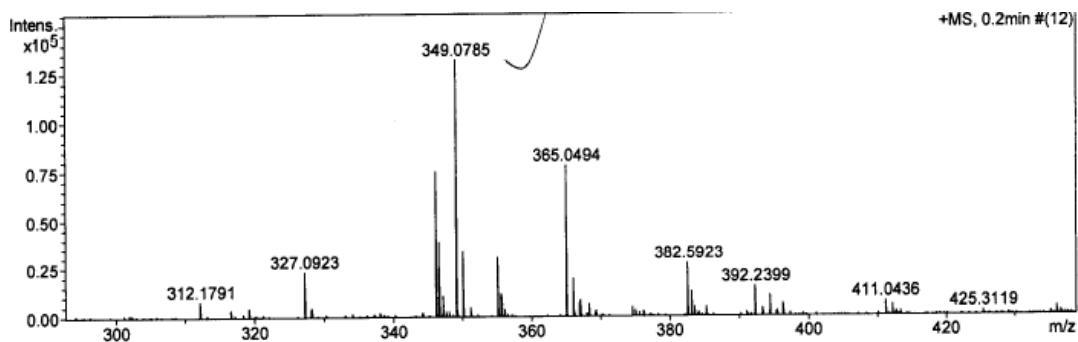


Bruker Compass DataAnalysis 4.0

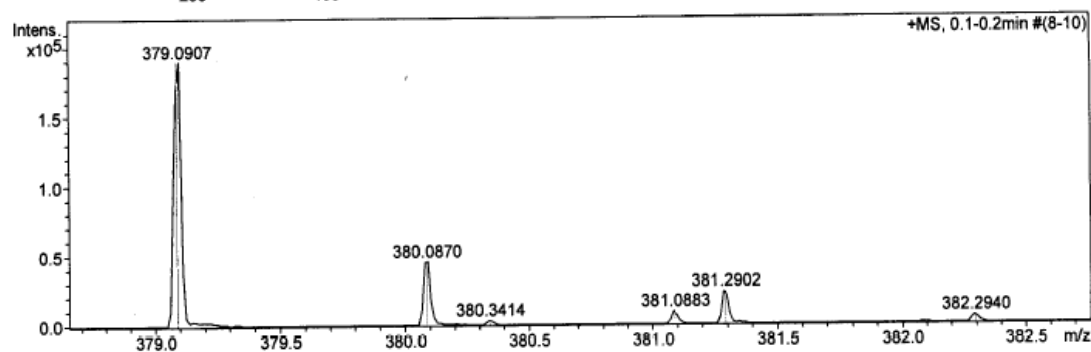
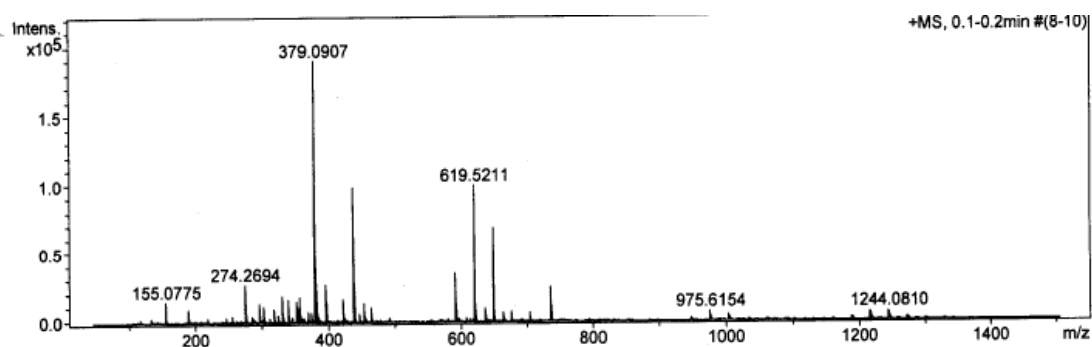
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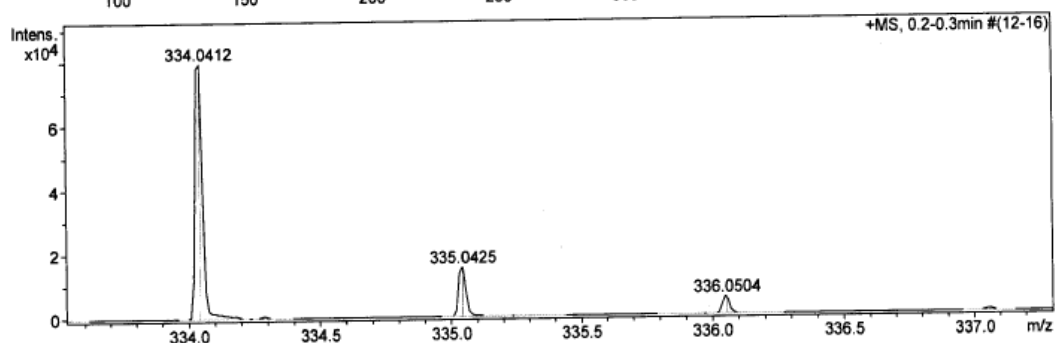
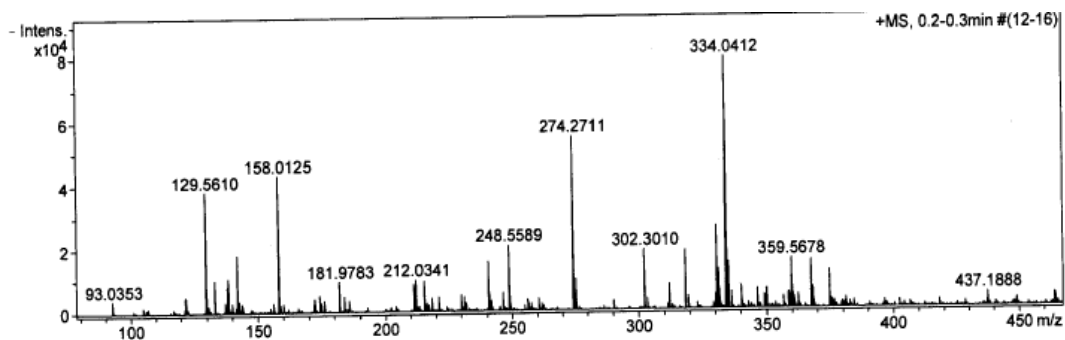
HRMS of compound 4b



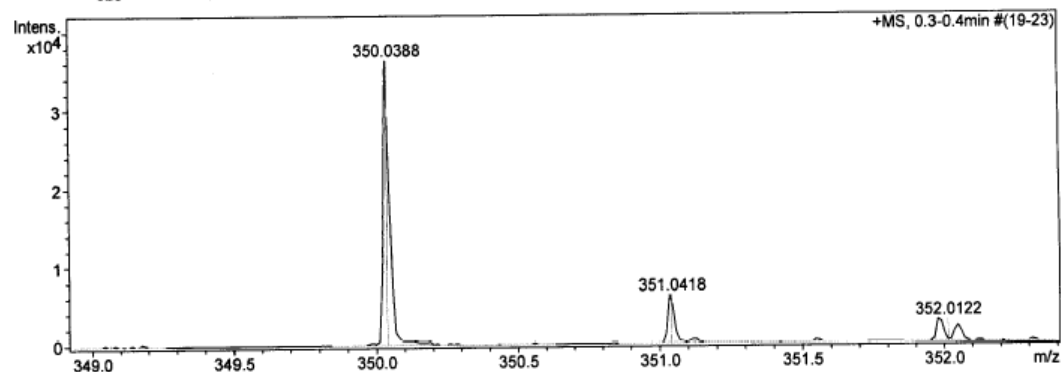
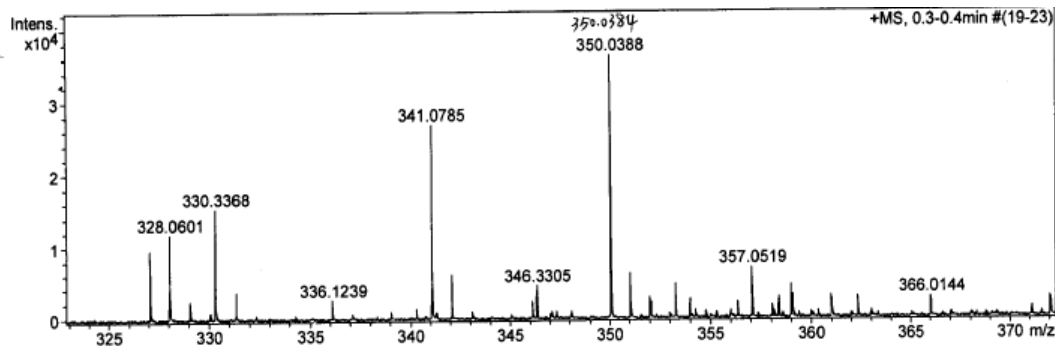
HRMS of compound **4c**



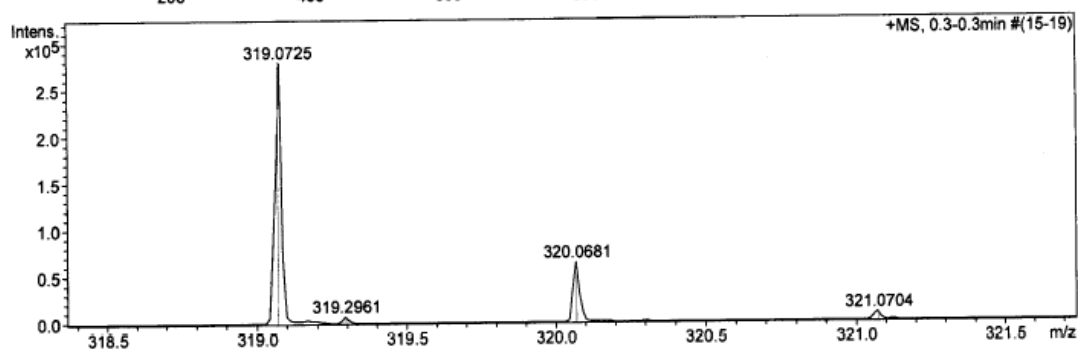
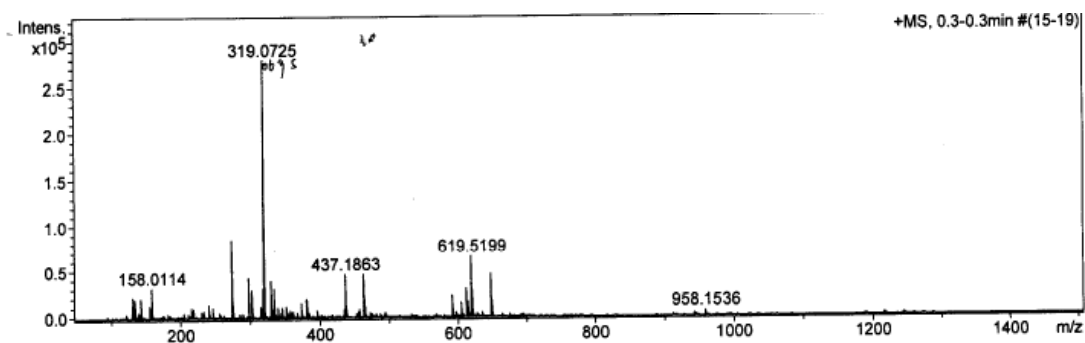
HRMS of compound **4d**



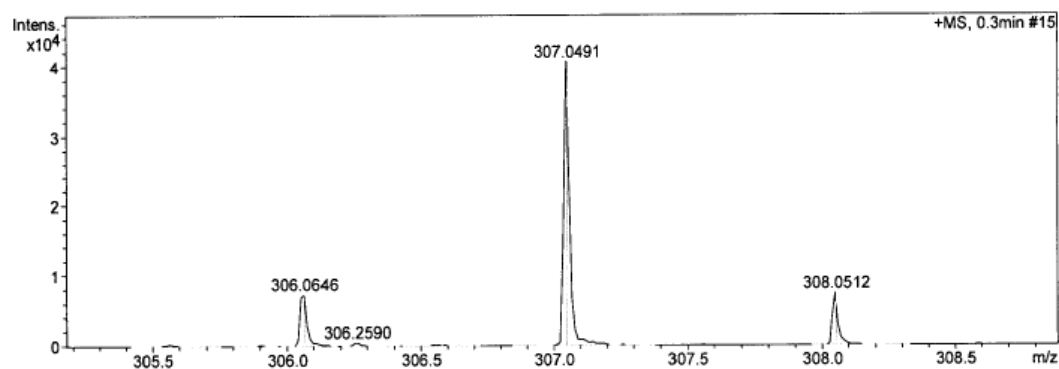
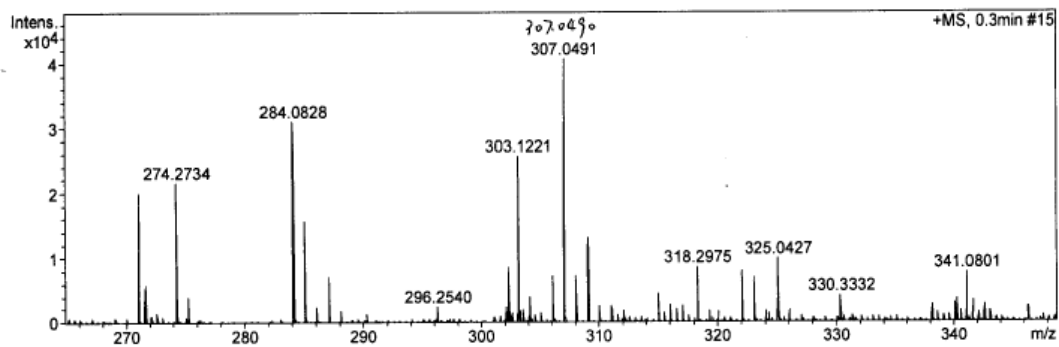
HRMS of compound 4e



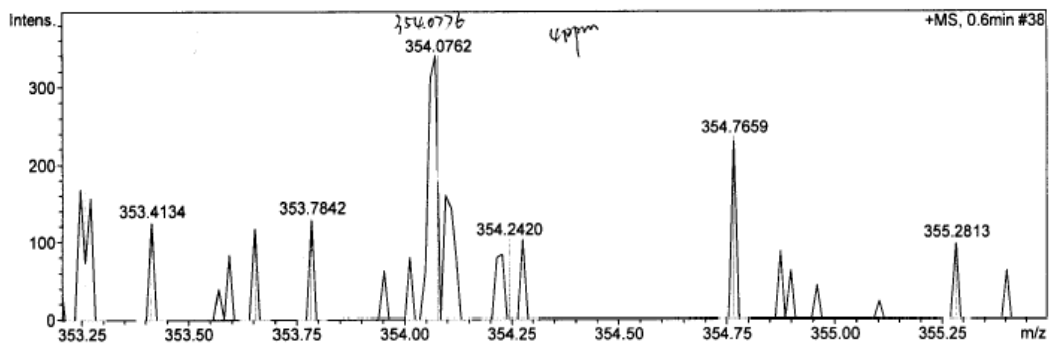
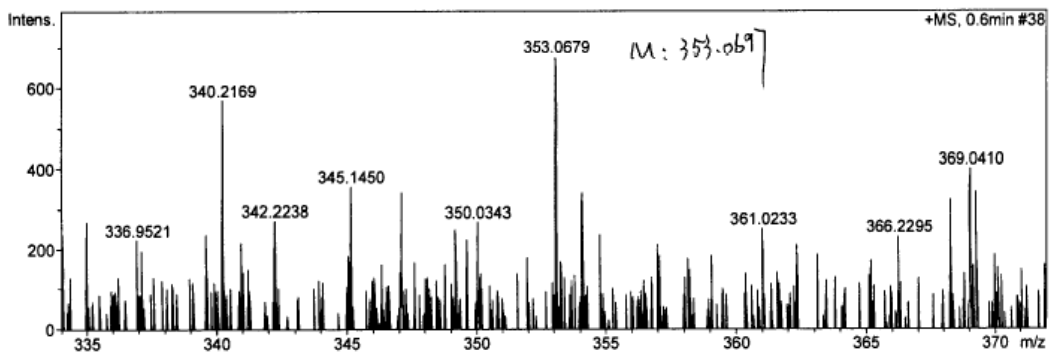
HRMS of compound 4f



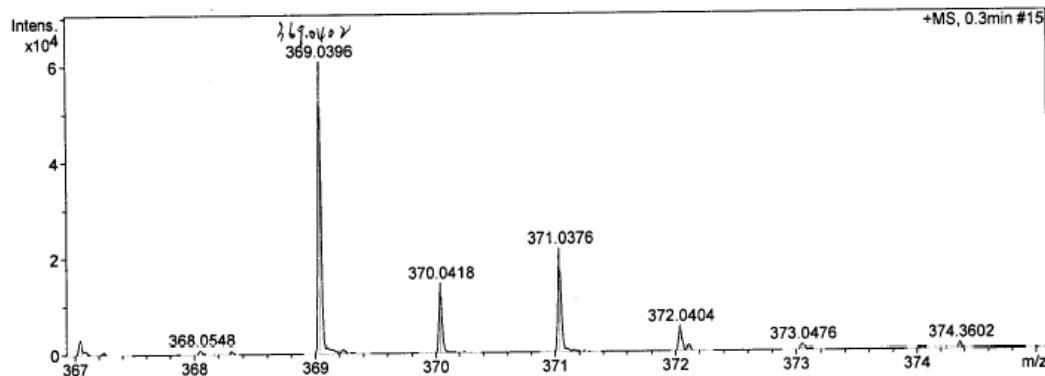
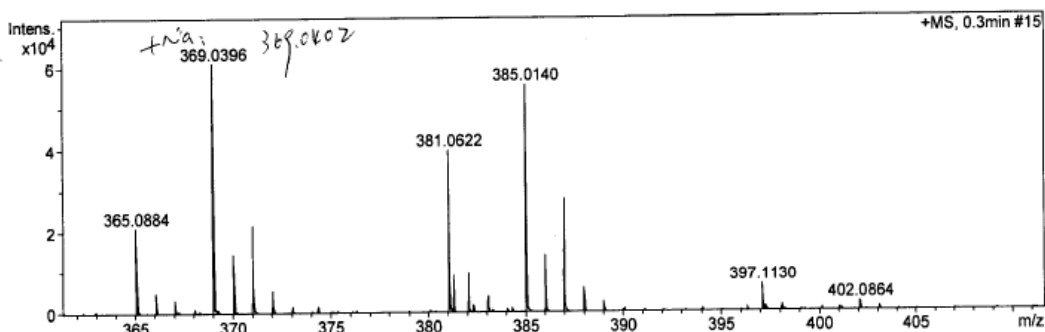
HRMS of compound 4g



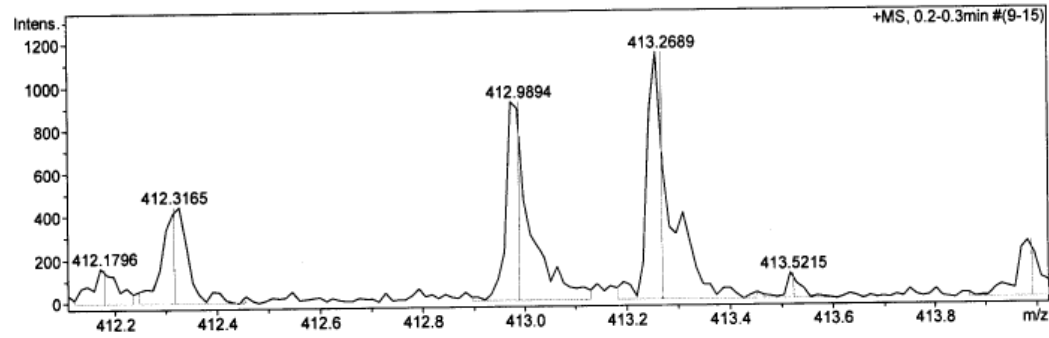
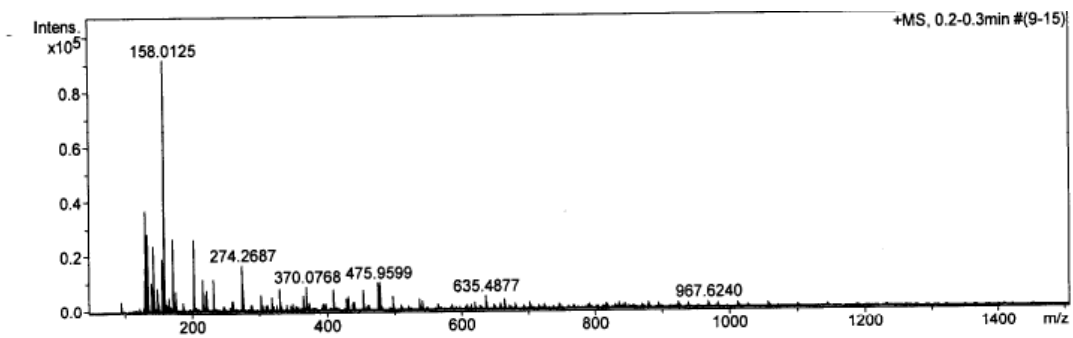
HRMS of compound 4h



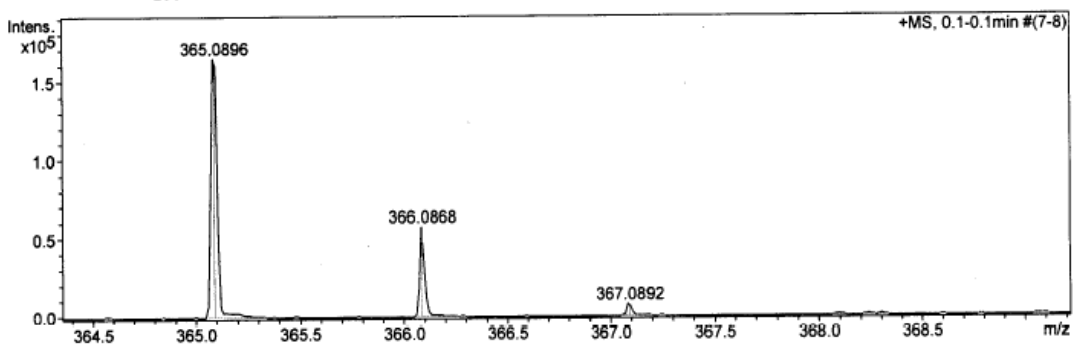
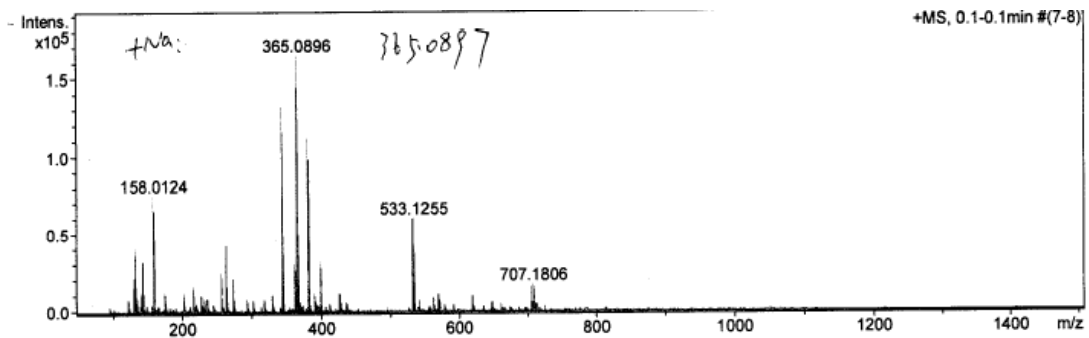
HRMS of compound 6a



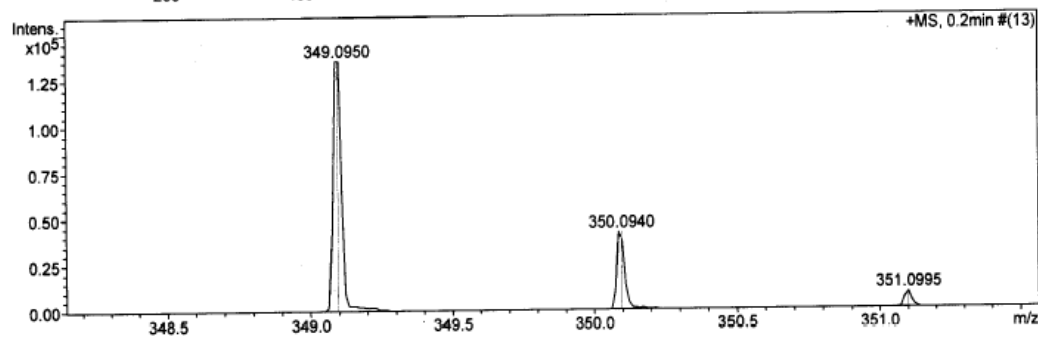
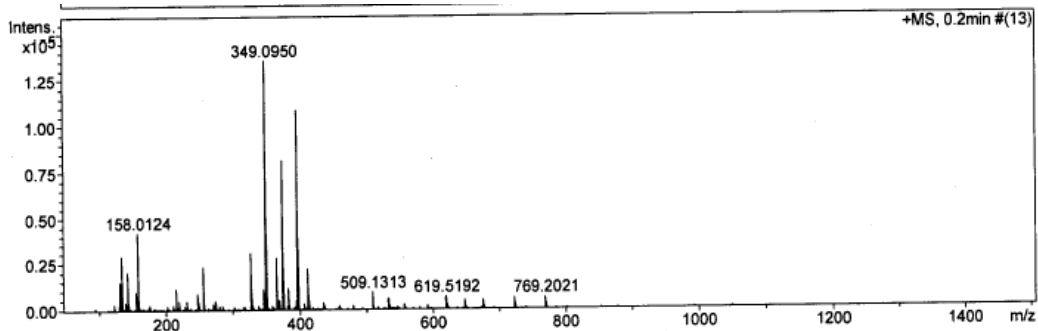
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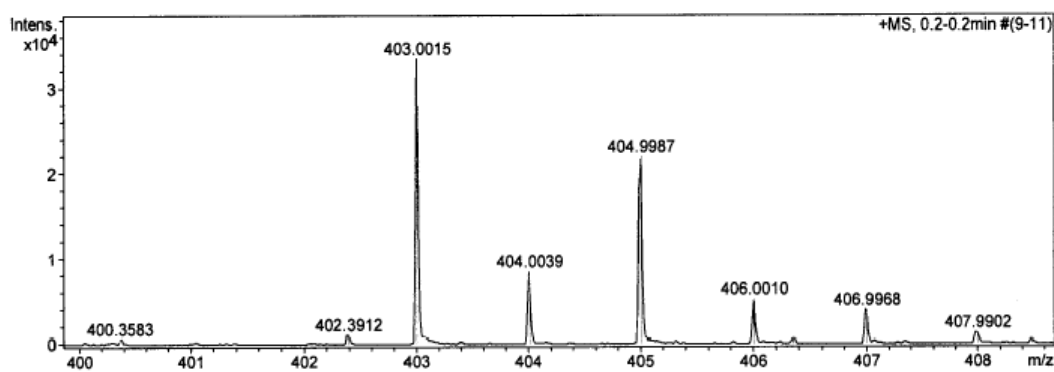
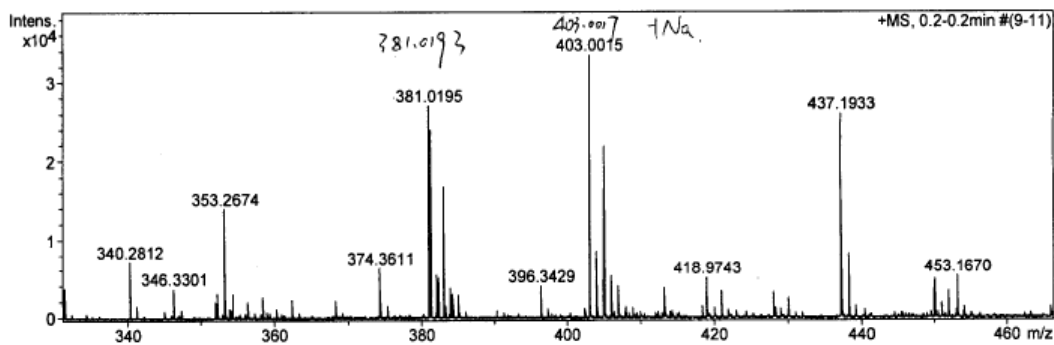
HRMS of compound 6c



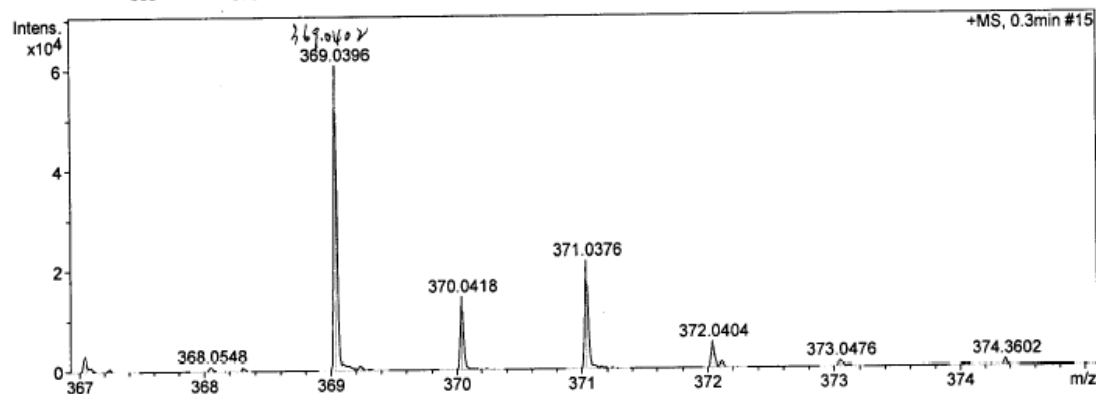
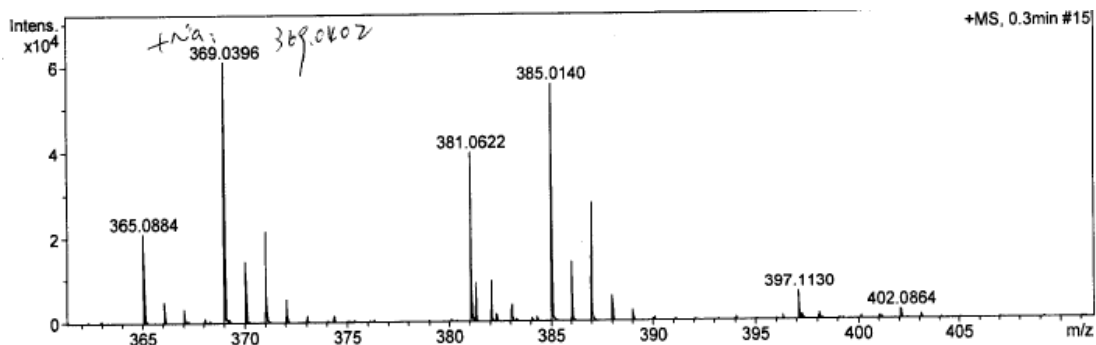
HRMS of compound 6d



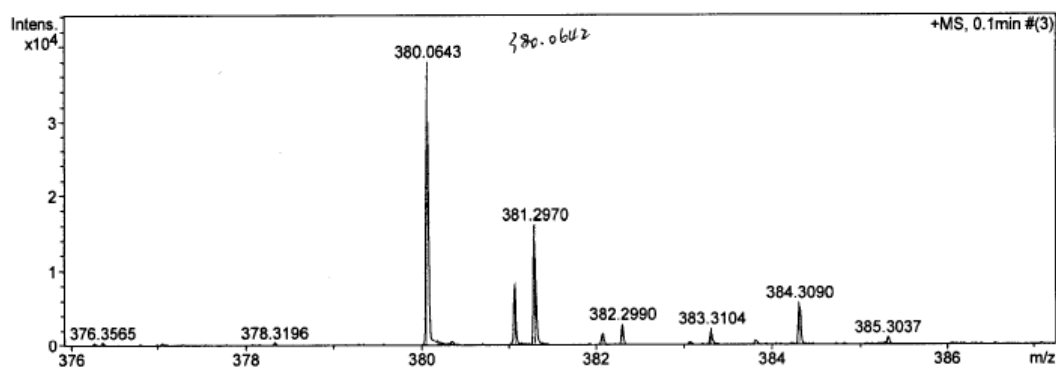
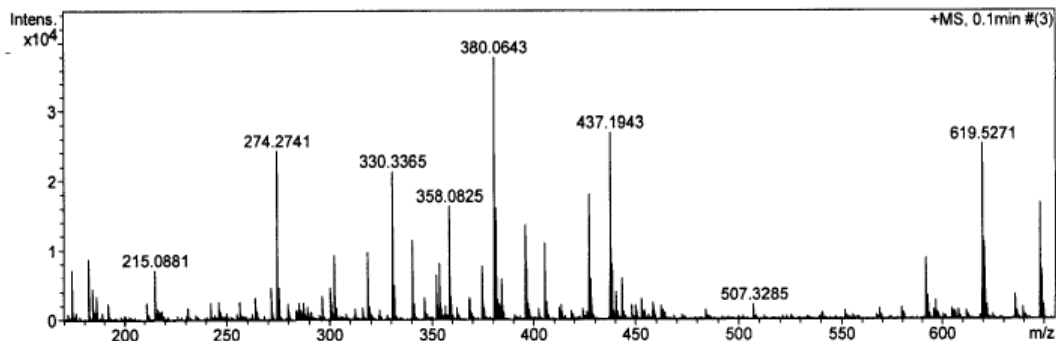
HRMS of compound 6e



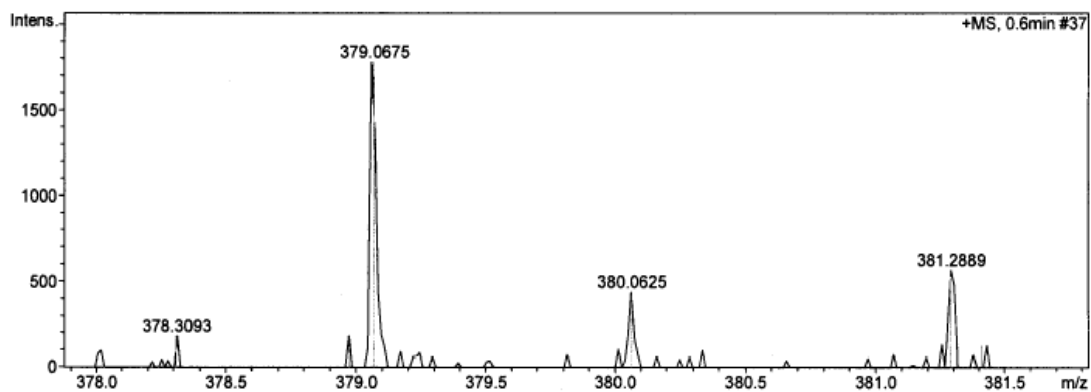
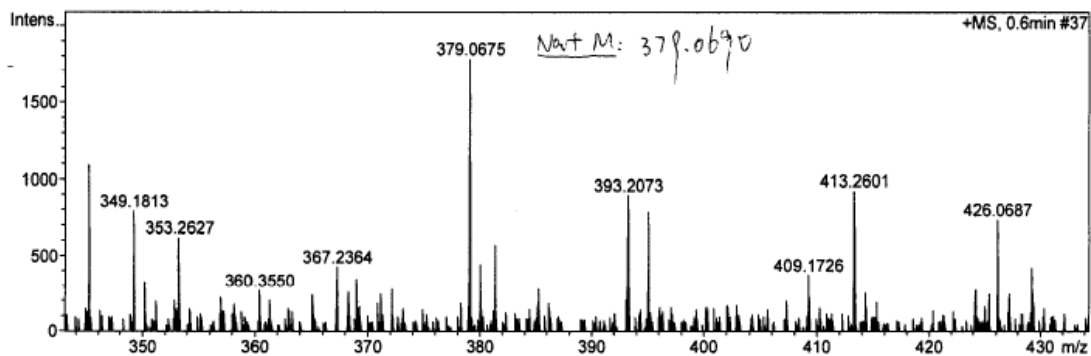
HRMS of compound 6f



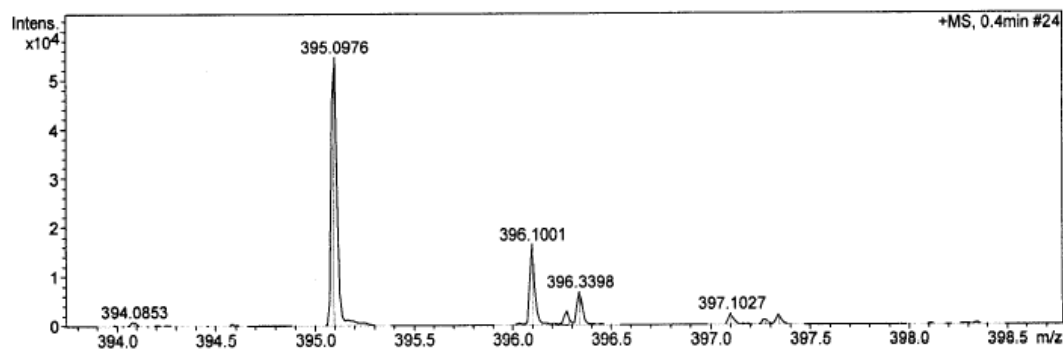
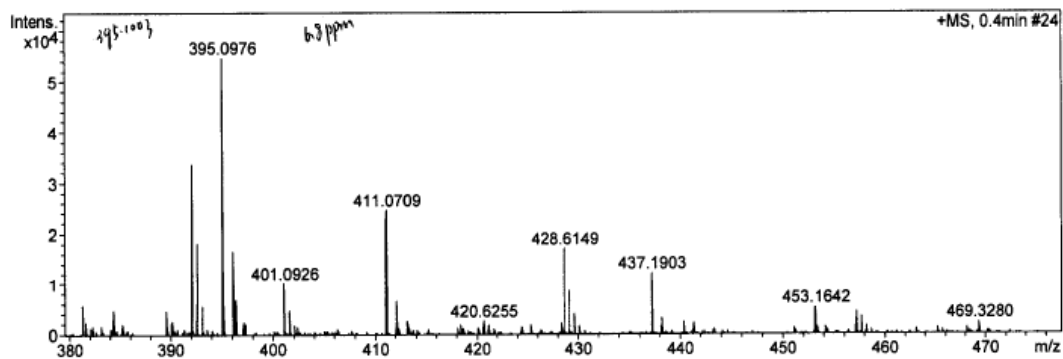
HRMS of compound 6g



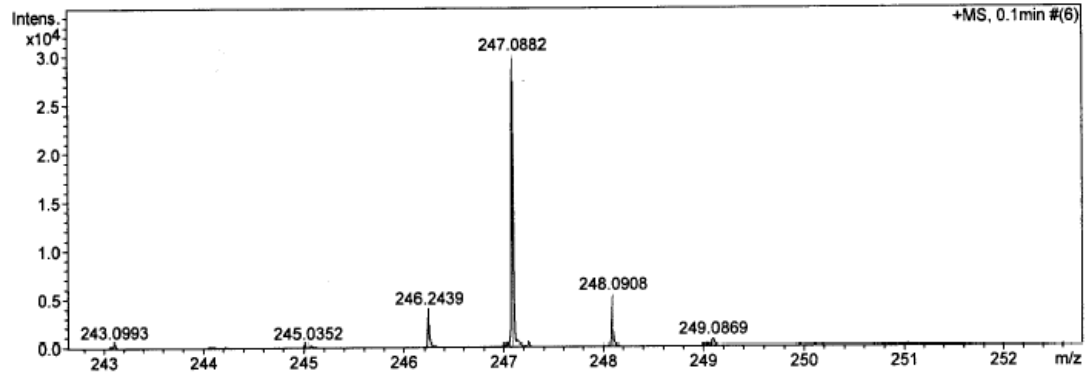
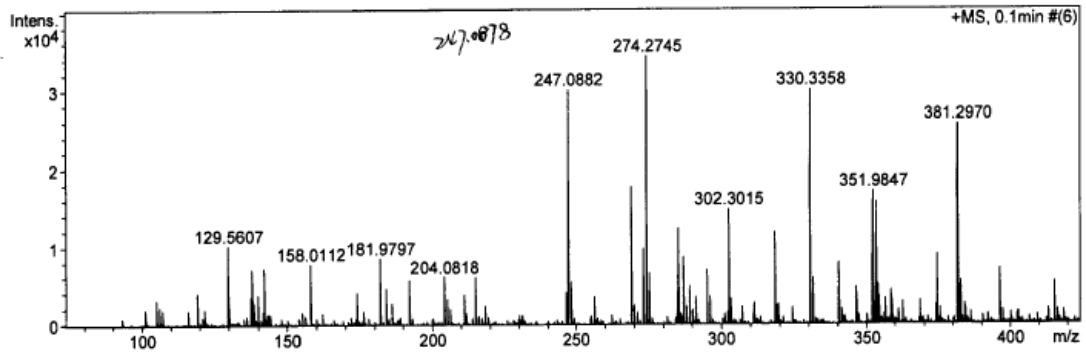
HRMS of compound 6h



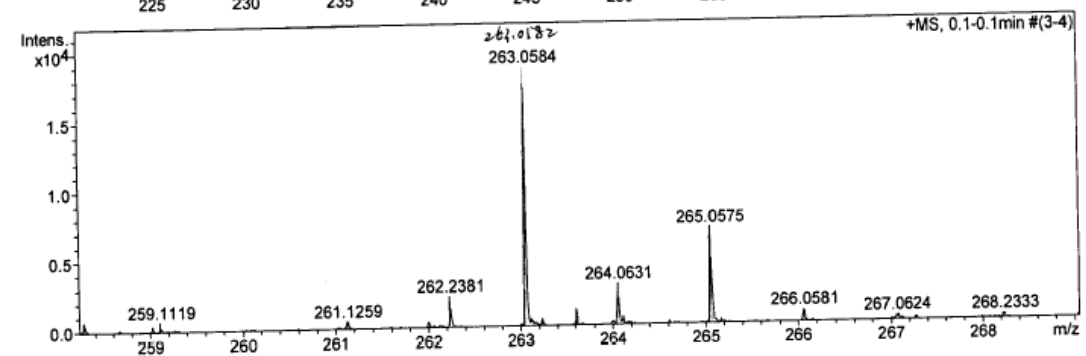
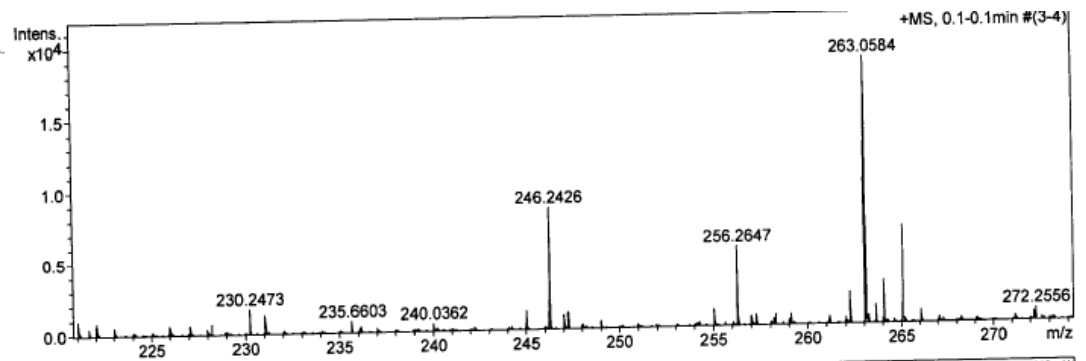
HRMS of compound **6i**



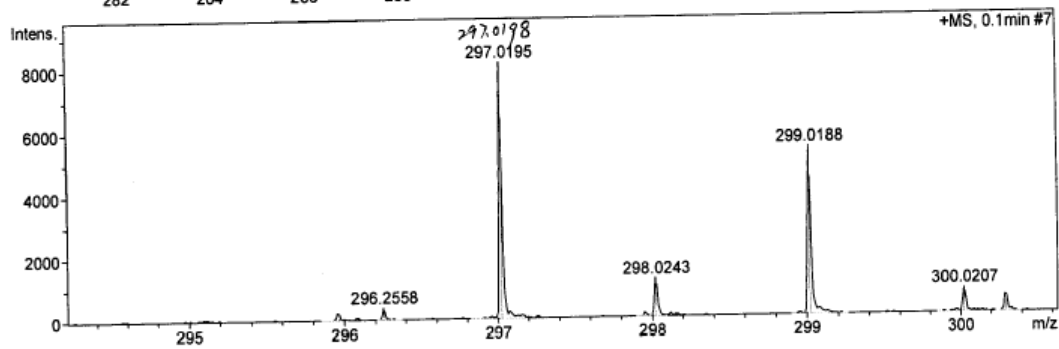
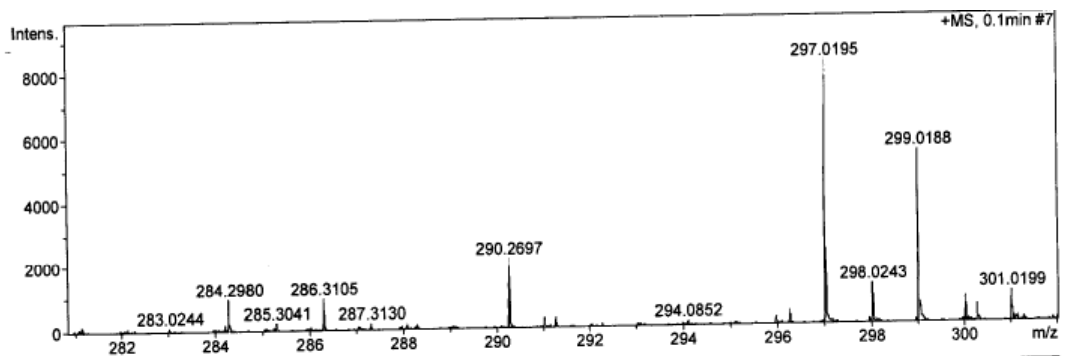
HRMS of compound **6j**



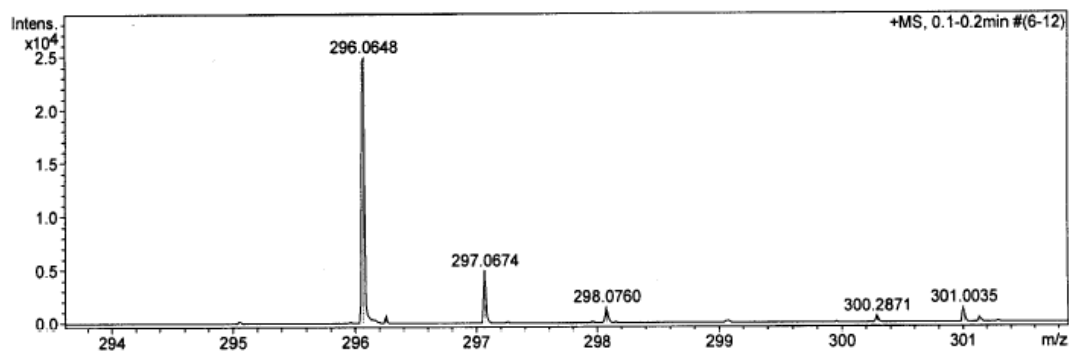
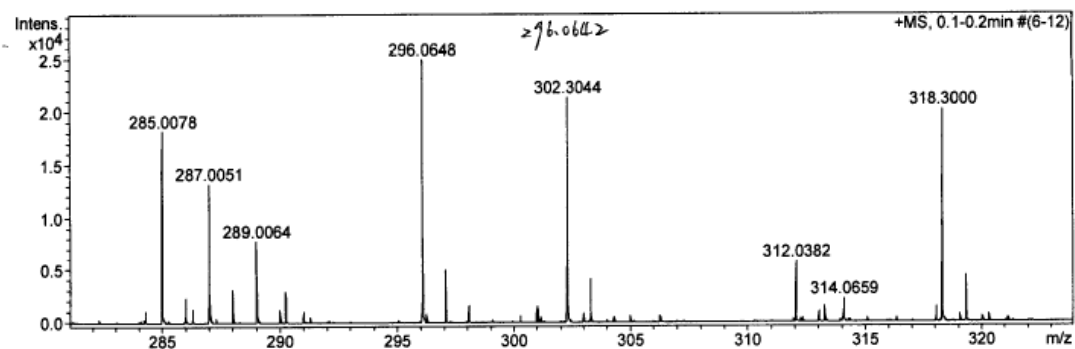
HRMS of compound 8a



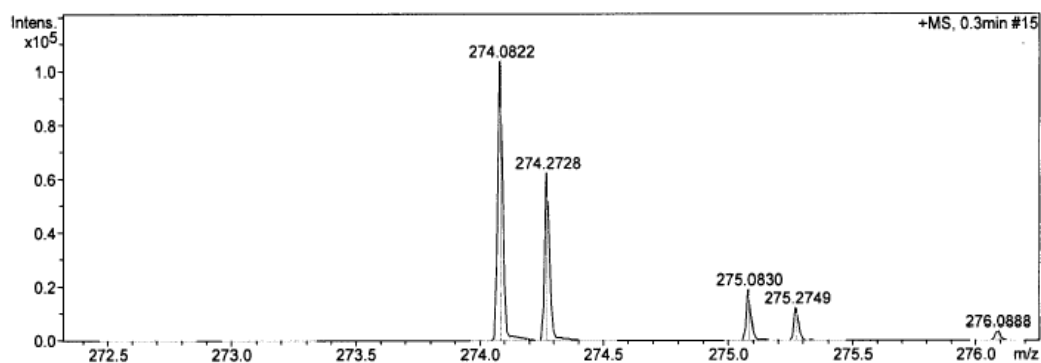
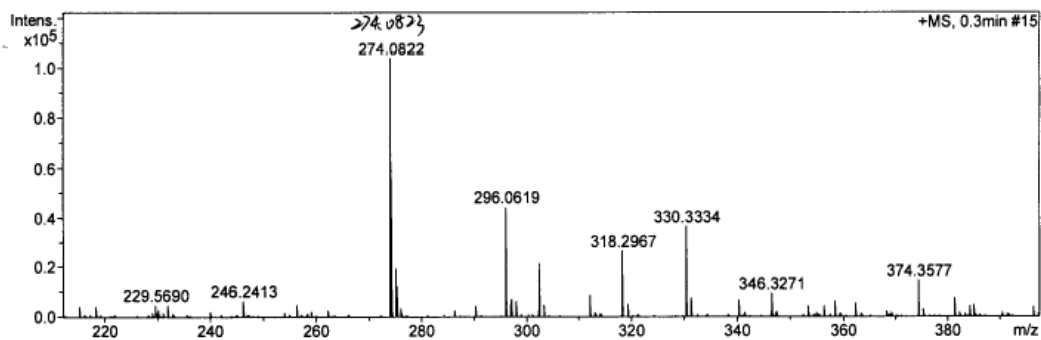
HRMS of compound 8b



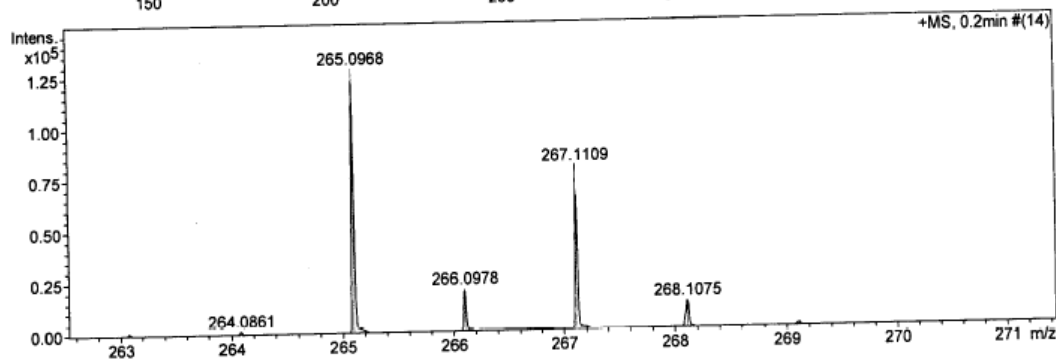
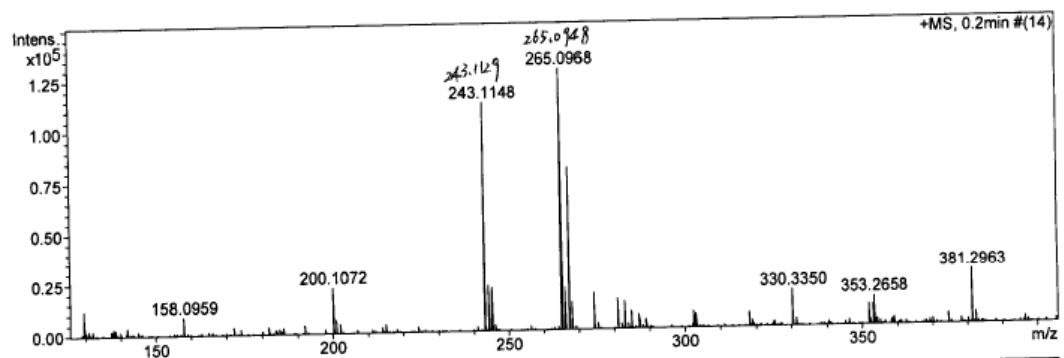
HRMS of compound 8d



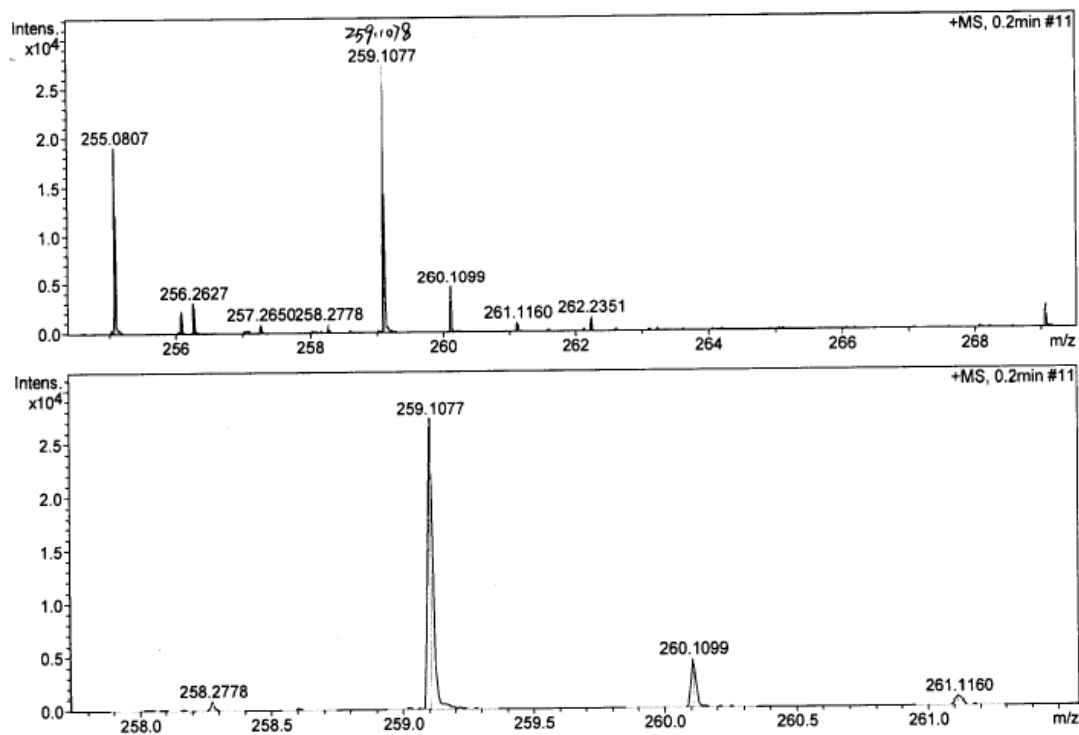
HRMS of compound 8e



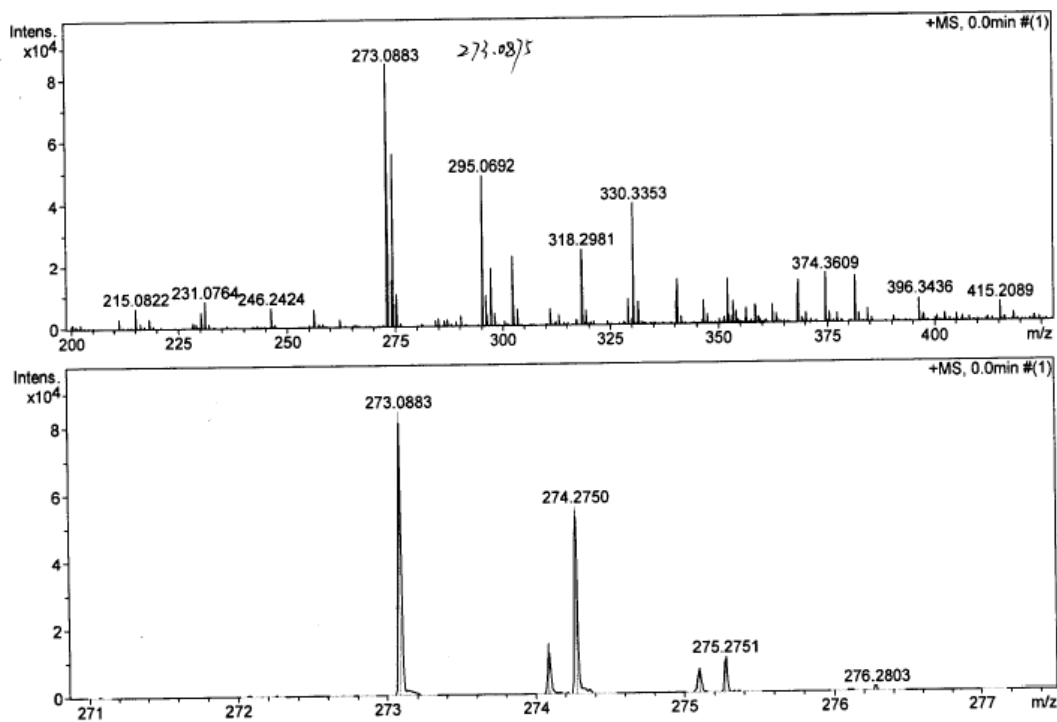
HRMS of compound 8f



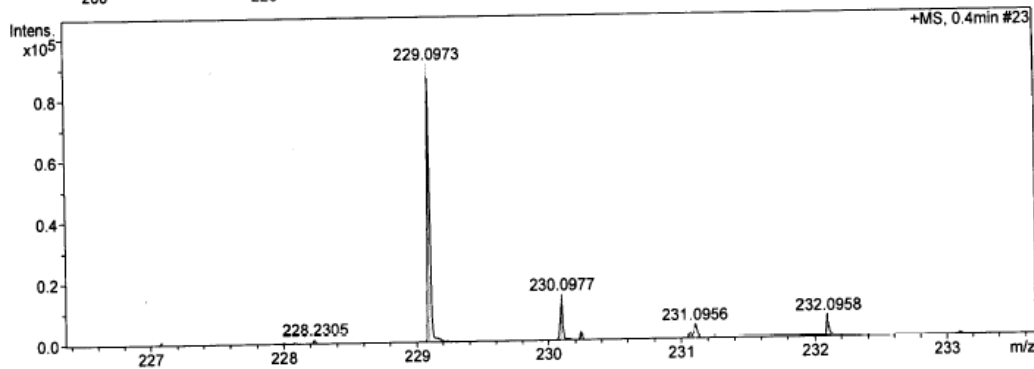
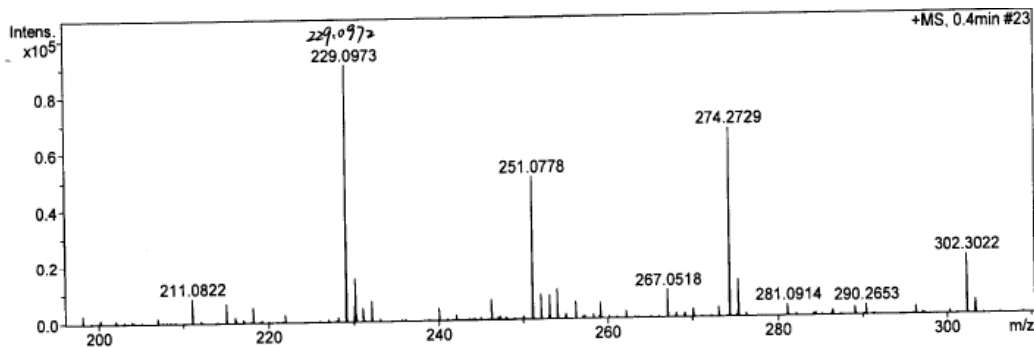
HRMS of compound 8h



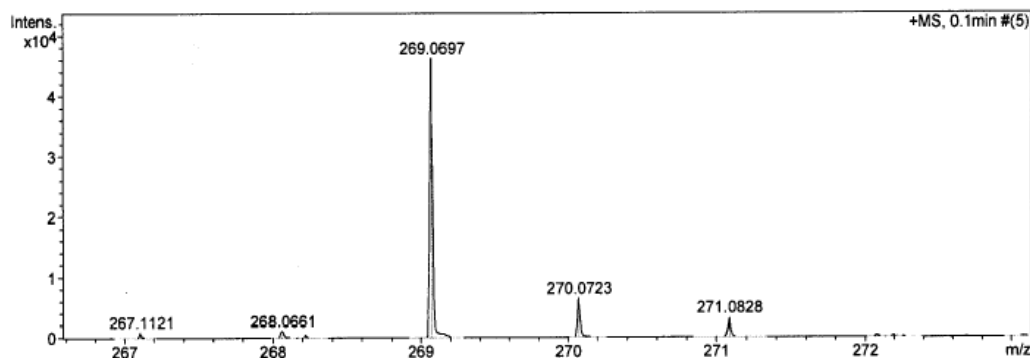
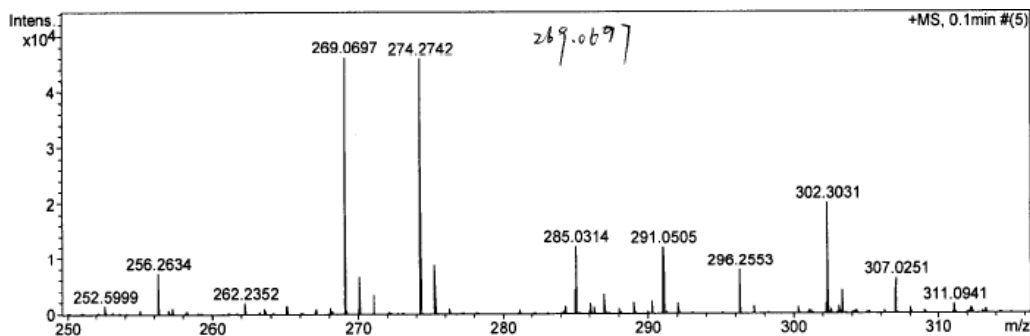
HRMS of compound 8i



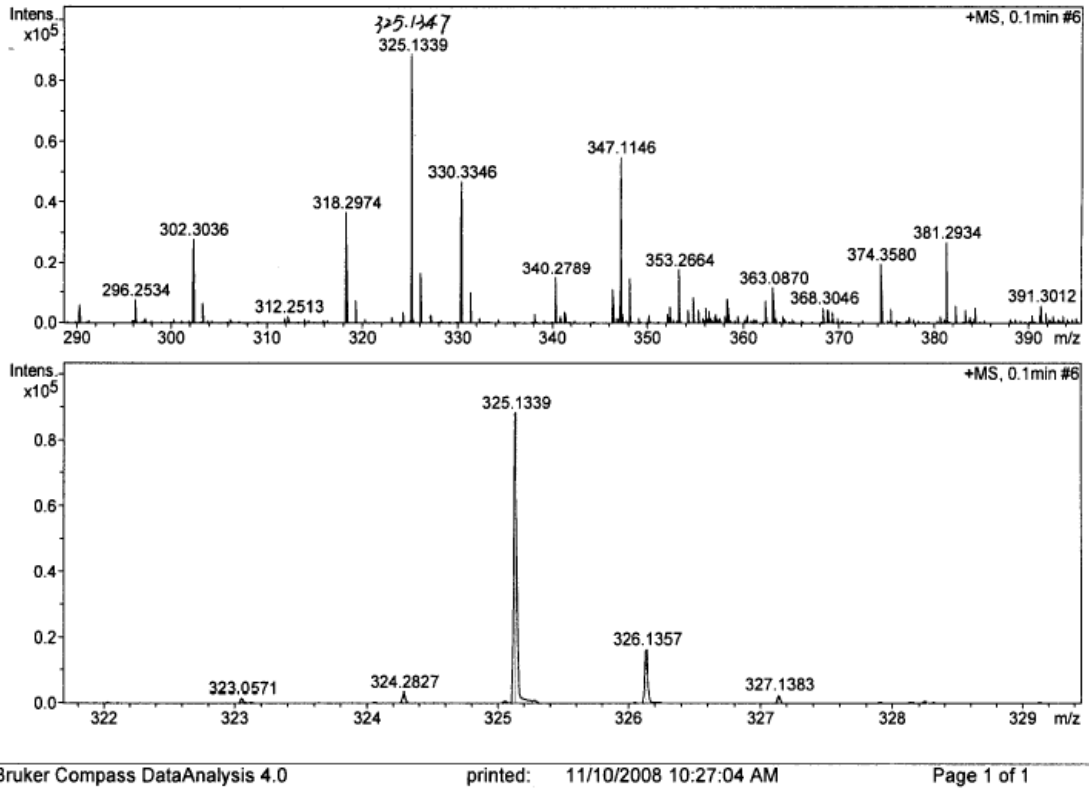
HRMS of compound 8j



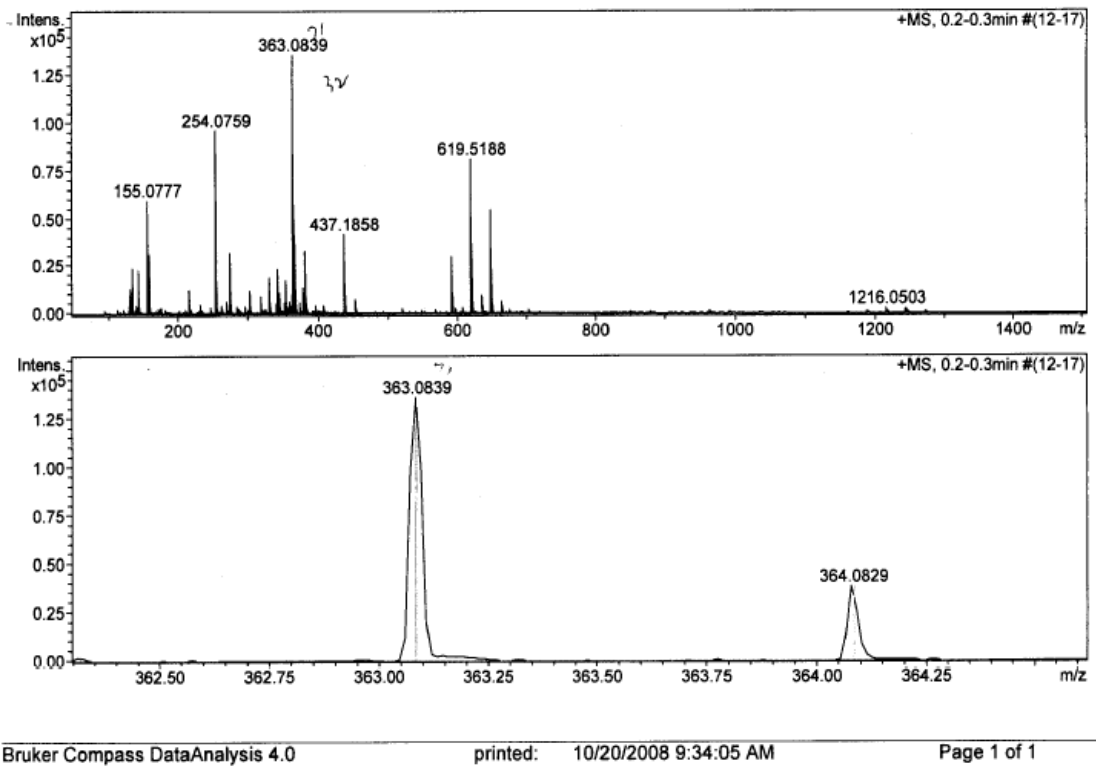
HRMS of compound 8k



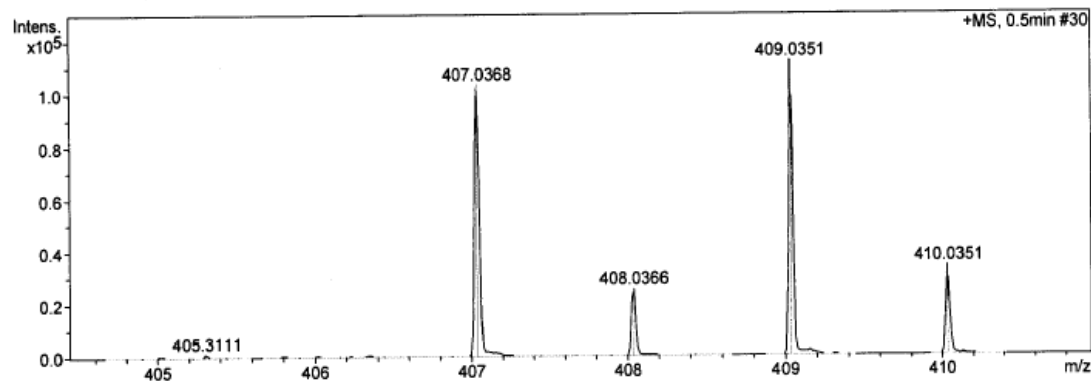
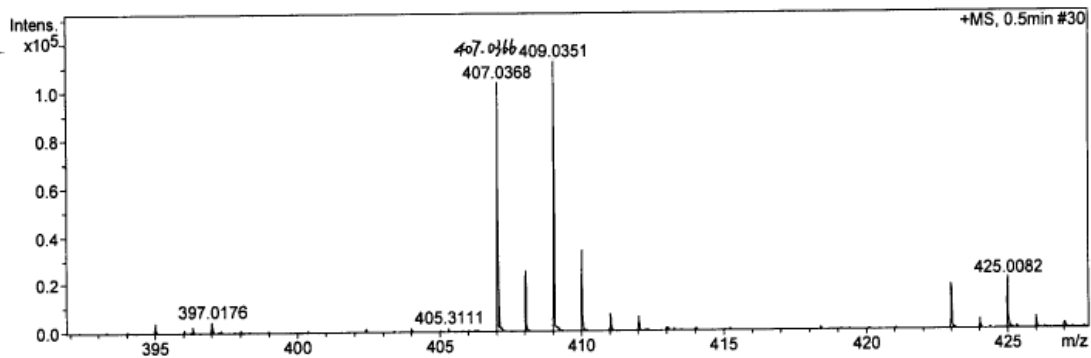
HRMS of compound 8l



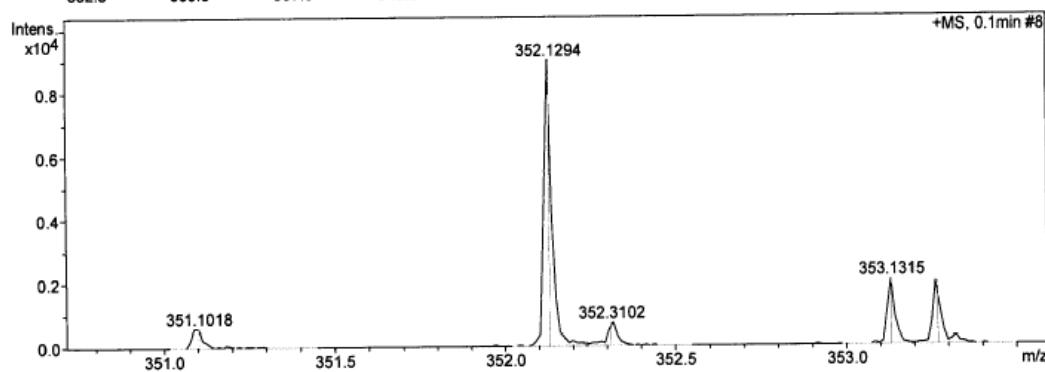
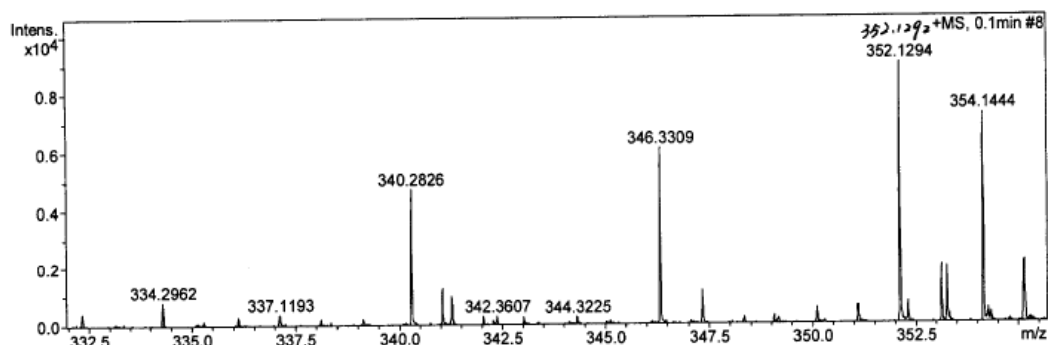
HRMS of compound 10a



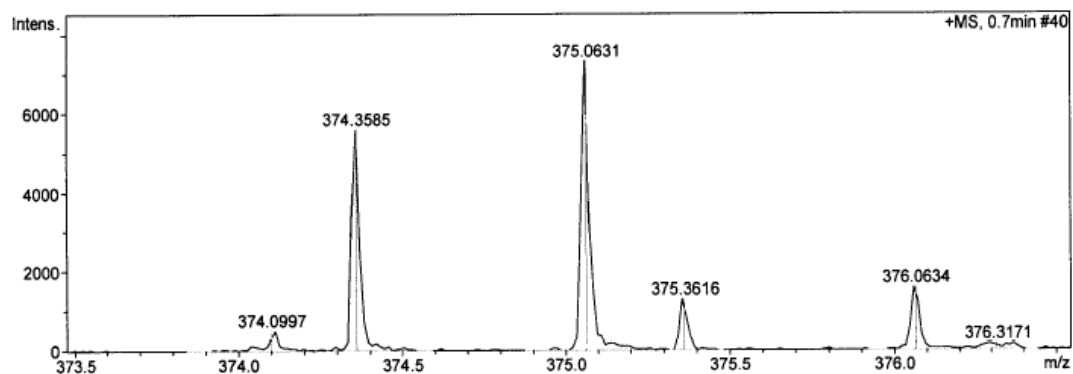
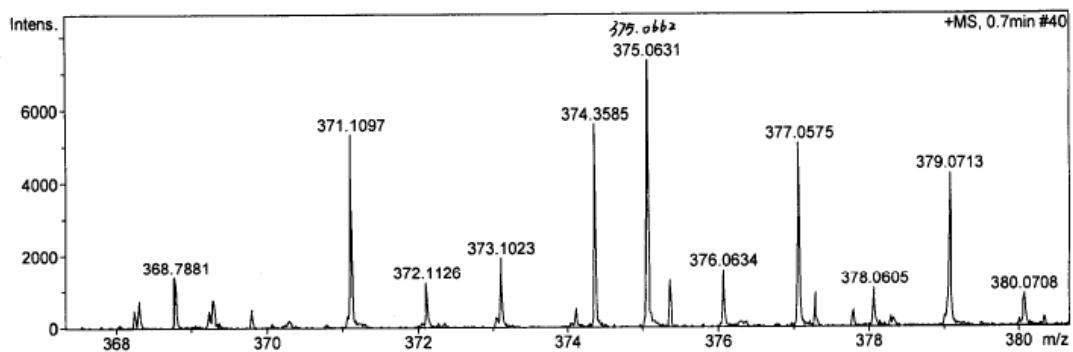
HRMS of compound 10b



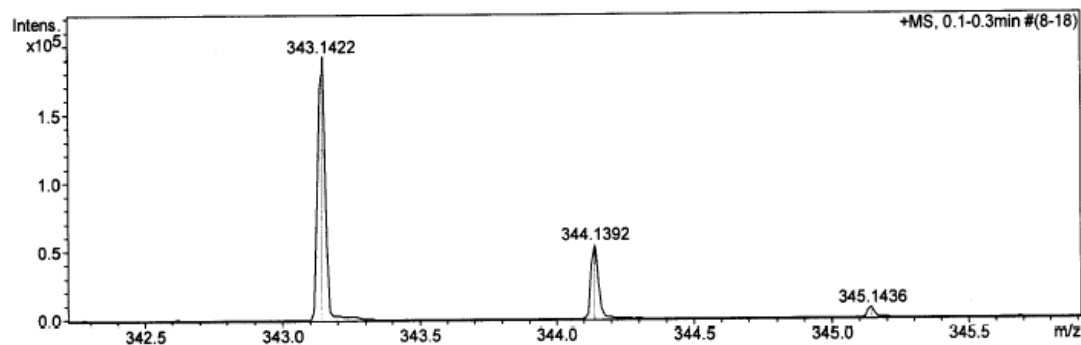
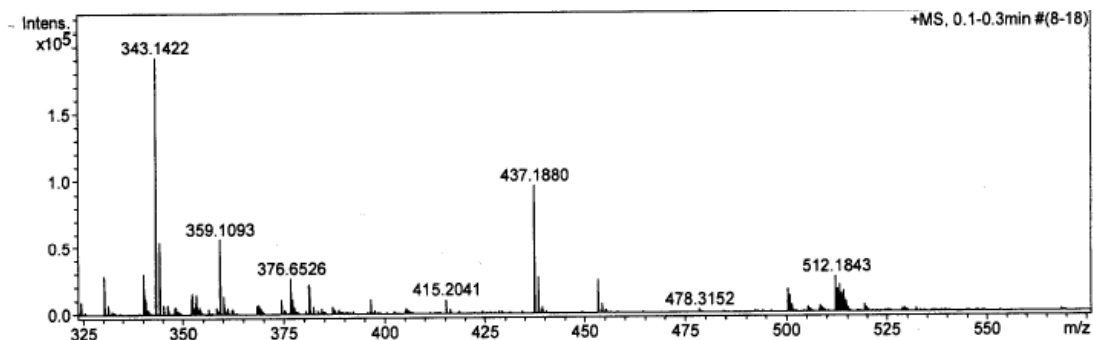
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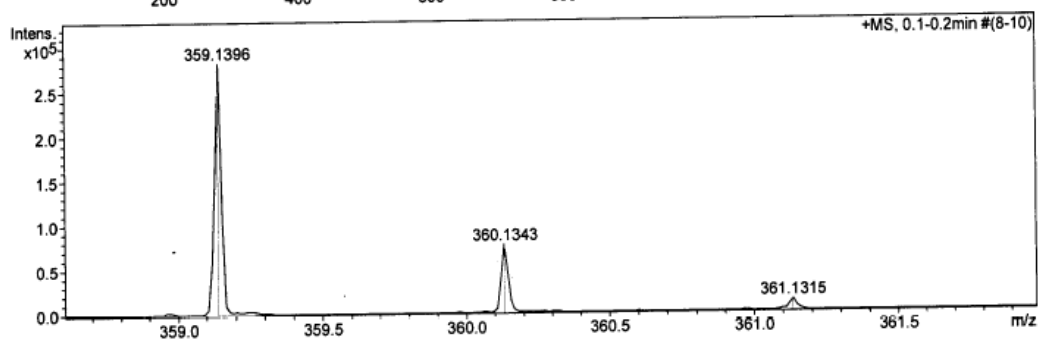
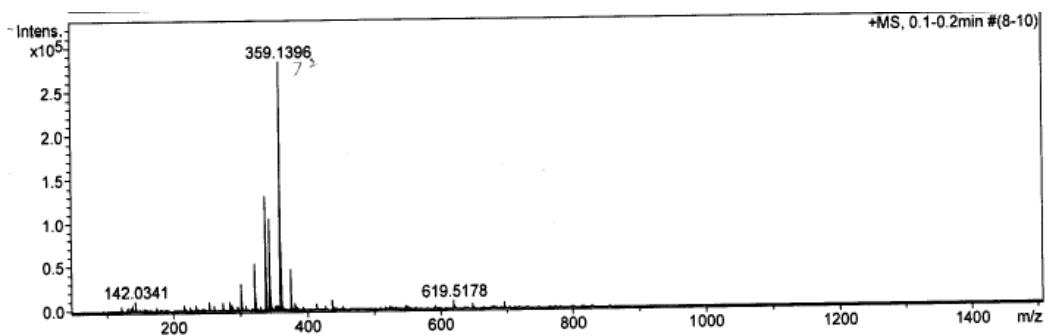
HRMS of compound 10d



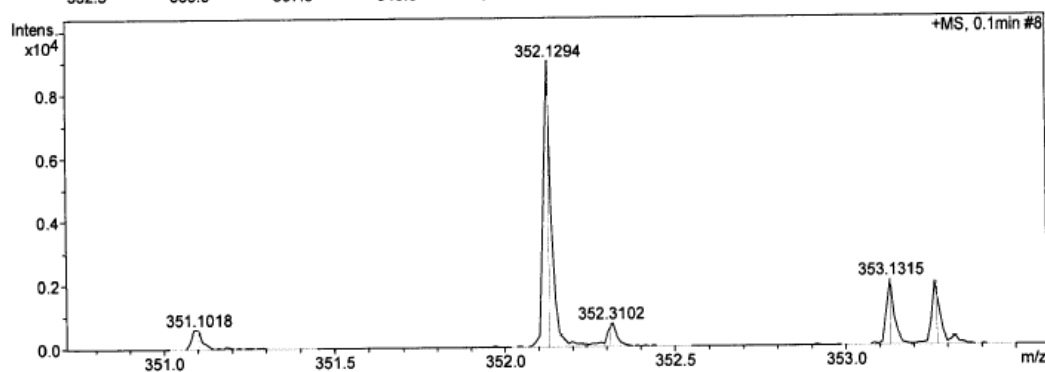
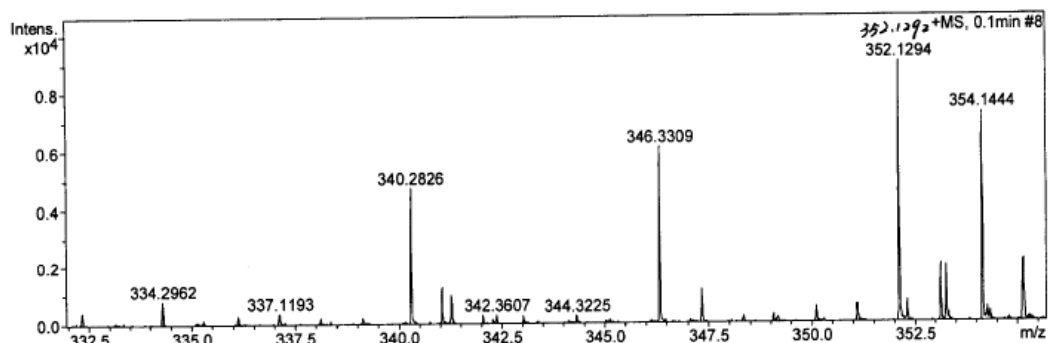
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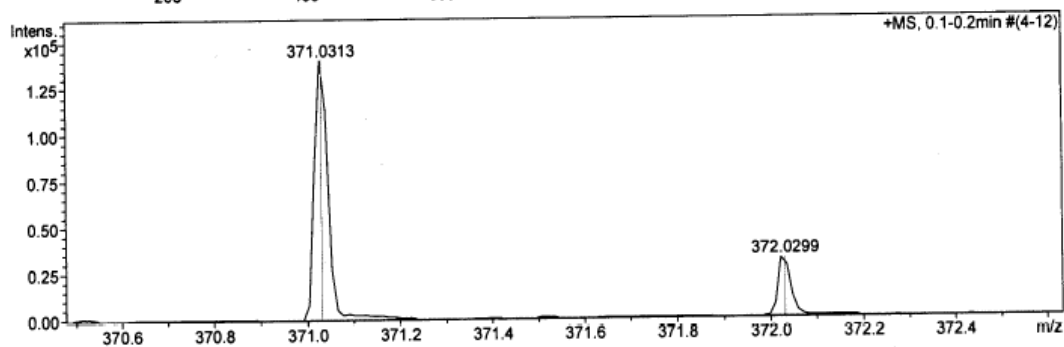
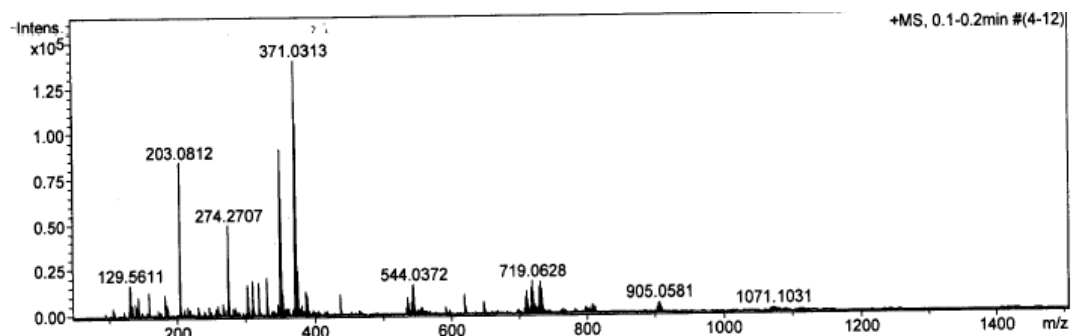
HRMS of compound 10f



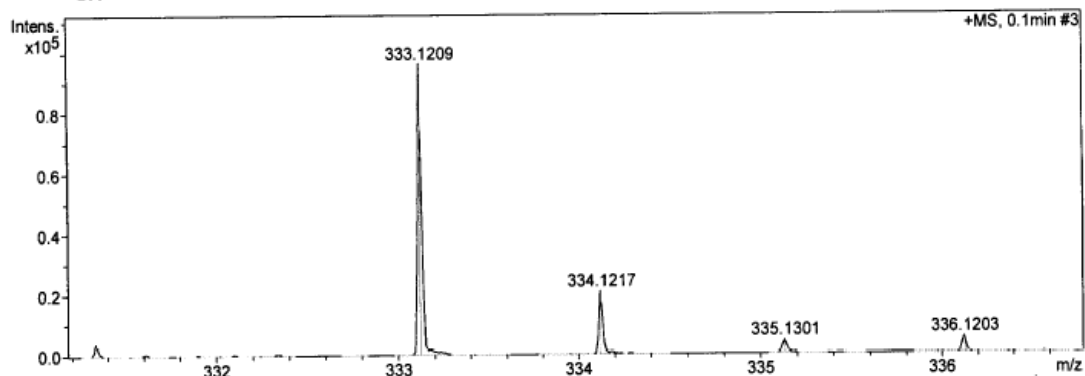
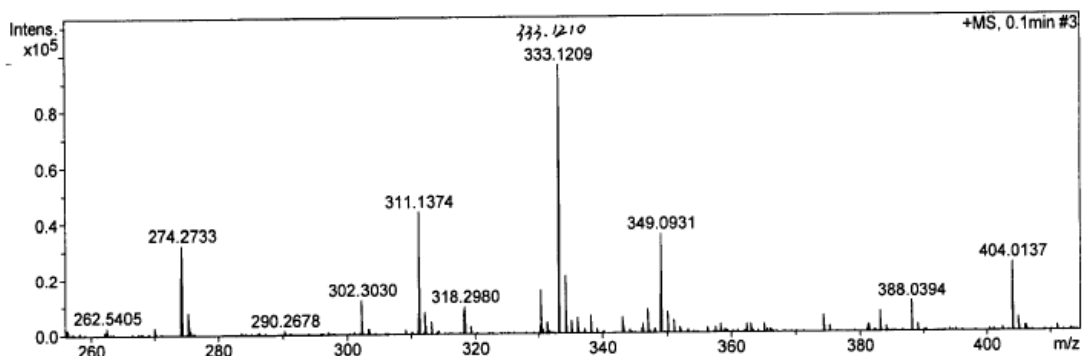
HRMS of compound 10g



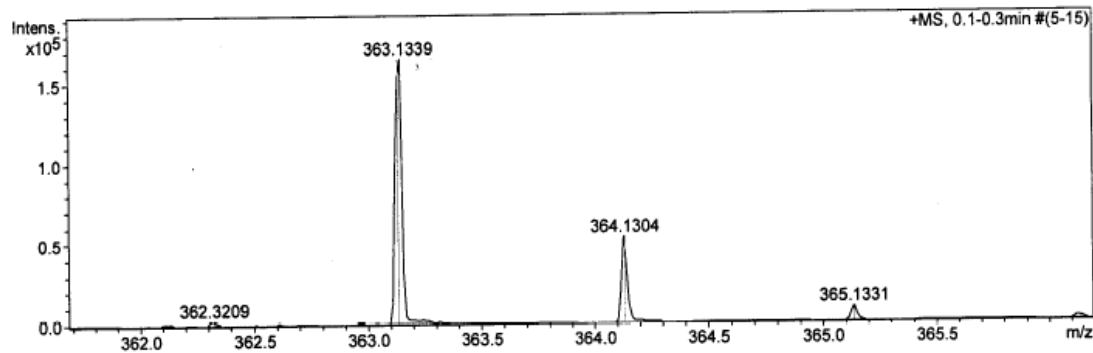
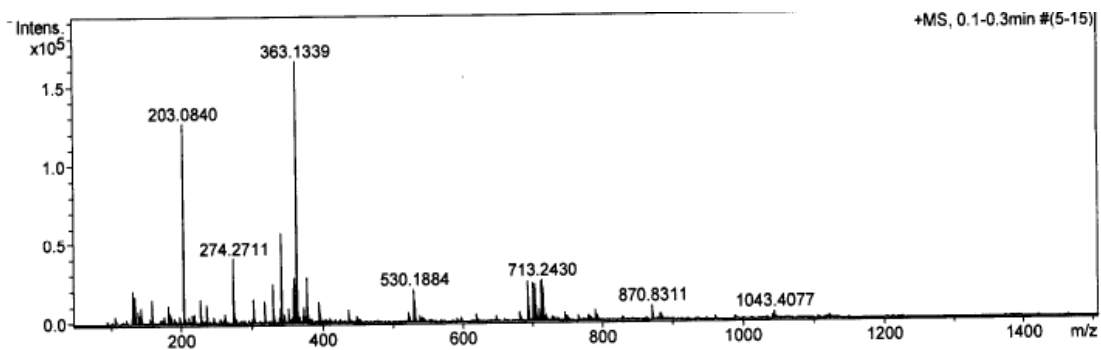
HRMS of compound 10h



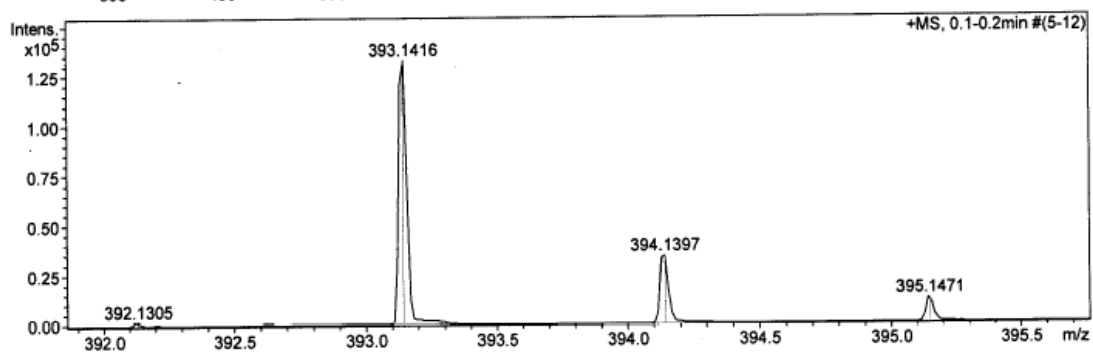
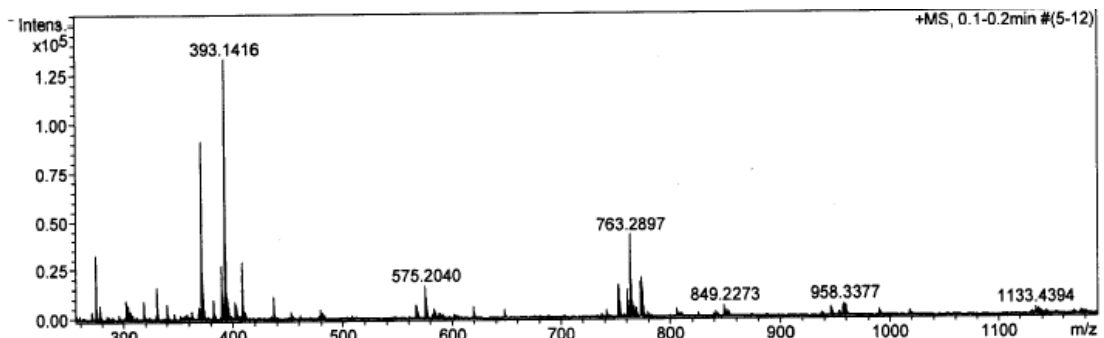
HRMS of compound 12a



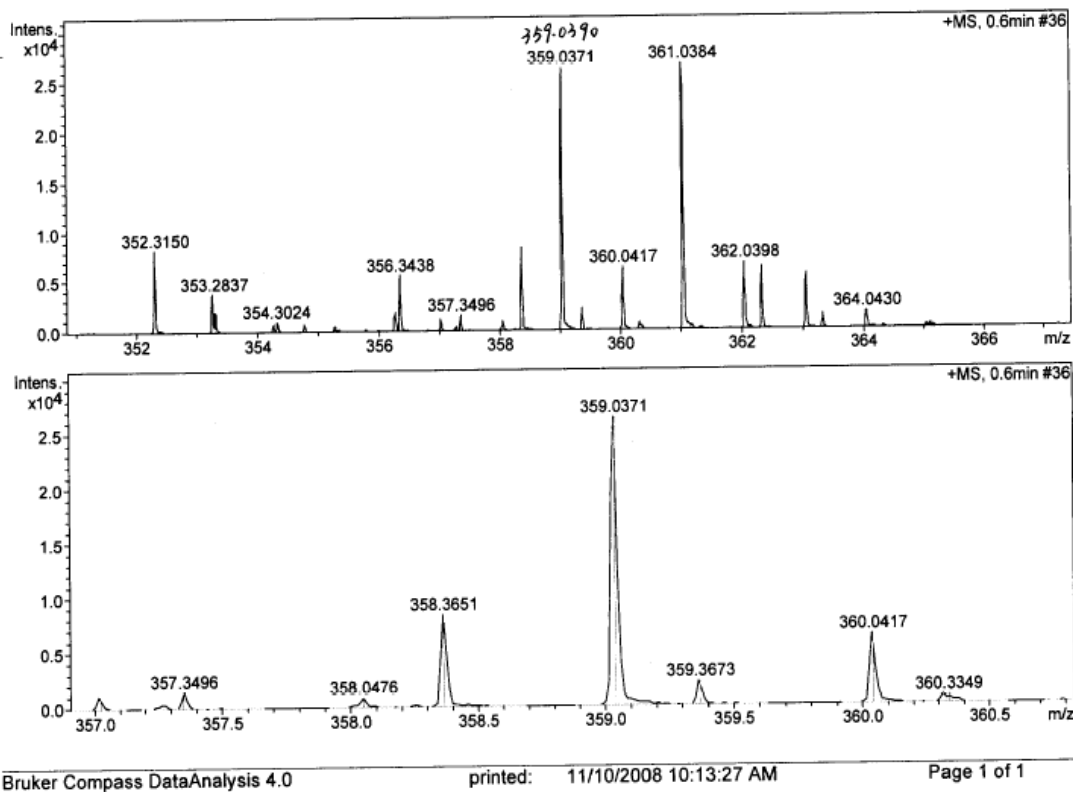
HRMS of compound 12b



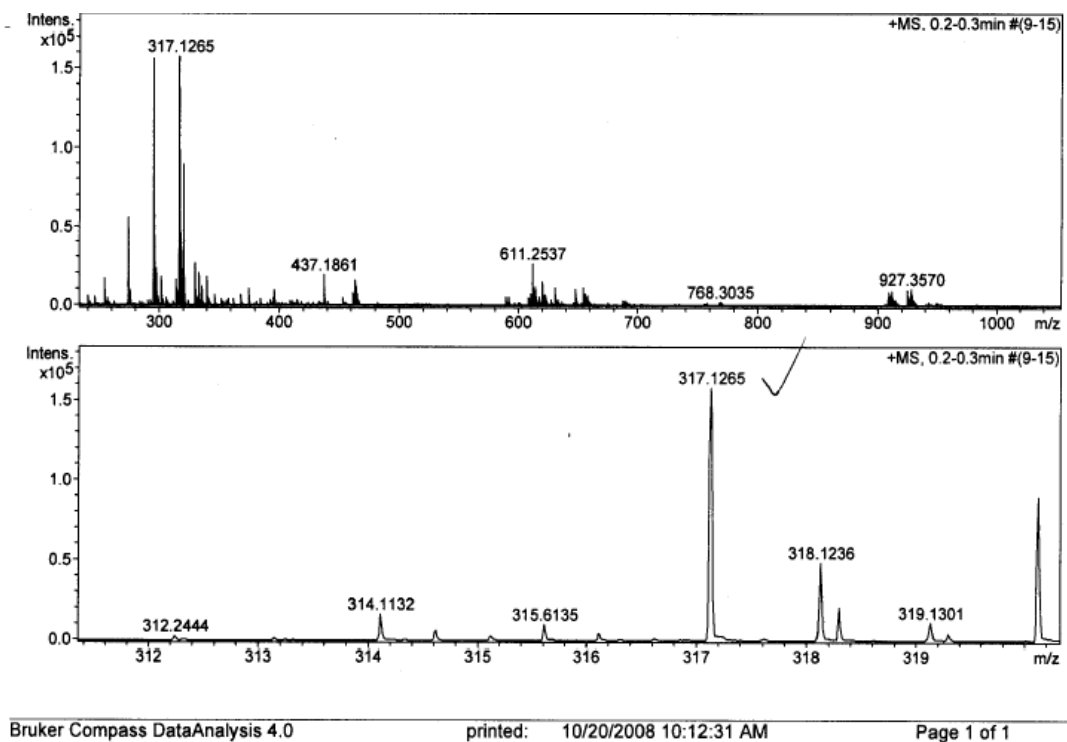
HRMS of compound 12c



HRMS of compound 12d



HRMS of compound 12e



HRMS of compound 12f