Supporting Information

Tabernabovines A-C, Three Monoterpenoid Indole Alkaloids from the Leaves of *Tabernaemontana bovina.*

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S1. General experimental procedures

Optical rotations were measured with a Horiba SEPA-300 polarimeter. UV spectra were recorded on a Shimadzu 2401A spectrophotometer. 1D and 2D NMR spectra were acquired on BrukerAvance III-600 and DRX-500 spectrometers with SiMe4 as an internal standard. MS data were obtained using a Shimadzu UPLC-IT-TOF. Column chromatography (CC) was performed on either silica gel (200–300 mesh, Qing-dao Haiyang Chemical Co., Ltd., Qingdao, China) or RP-18 silica gel (20–45 lm, Fuji Silysia Chemical Ltd., Japan). Fractions were monitored by TLC on silica gel plates (GF254, Qingdao Haiyang Chemical Co., Ltd., Qingdao, China), and spots were visualized with Dragendorff's reagent spray. MPLC was performed using a BÜCHI pump system coupled with RP- 18 silica gel-packed glass columns (15× 230 and 26 × 460 mm, respectively). HPLC was performed using Waters 1525E pumps coupled with analytical semi-preparative or preparative Sunfire C18 columns (4.6 × 150 and 19 × 250 mm, respectively). The HPLC system employed a Waters 2996 photodiode array detector and a Waters fraction collector II.

S2. Plant material and extraction and separation

Leaves of *Tabernaemontana bovina* Lour. were collected in Jun., 2017 in Hainan Province, P. R. China, and identified by Dr. Sheng-Zhuo Huang. A voucher specimen (No. Cai20170612) was deposited in the State Key Laboratory of Phytochemistry and Plant Resources in West China, Kunming Institute of Botany, Chinese Academy of Sciences.

Air-dried leaves (75 kg) were powdered and extracted three times with MeOH at room temperature. The extract was partitioned between 0.5% HCl solution and EtOAc, and the acidic layer was then adjusted to pH 8−9 with 15% ammonia solution and subsequently extracted with EtOAc to obtain crude alkaloid extract (875 g). The extract was subjected to column chromatography (CC) over silica gel and eluted with gradient $CHCl_3$/MeOH (1:0–1:1, v/v) to afford five fractions (I–VI). Fr. IV (107 g) was subjected to C18 MPLC again using MeOH–H_2O (25-75%, v/v) yielding six subfractions (IV1-6). Subfraction IV4 (18 g) was separated by reversed-phase MPLC column eluted with MeOH–H_2O (20-50%, v/v) and was further purified on the HPLC preparative column with CH_3CN-H_2O (35-50%, v/v, 40min) to afford **2** (2.7 mg, Rt = 15.5 min). Fr. V (52 g) was separated by reversed-phase MPLC column eluted with MeOH–H_2O (20-70 %, v/v) yielding five subfractions (V1-5). Fr.V4 (7 g) was chromatographed on Sephadex LH-20 (MeOH) and purified by reversed-phase preparative HPLC using CH_3CN-H_2O (45-60%, v/v, 40min) to give **4** (20.6 mg, Rt = 35 min) and **5** (46.8 mg, Rt = 39 min). Fr. VI (34 g) was subjected to C18 MPLC using MeOH–H_2O (15-65%, v/v) yielding four subfractions (Fr. VI1-4). Fr.V3 (5 g) was was chromatographed on Sephadex LH-20 (MeOH) and purified by reversed-phase preparative HPLC using CH_3CN-H_2O (40-55%, v/v, 40 min) to give **3** (1.1 mg, Rt = 25 min) and **1** (9.8 mg, Rt = 35 min).

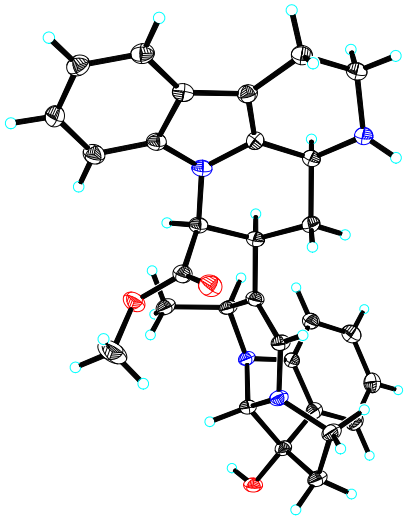
S3.Xanthine oxidase and NO inhibition activity

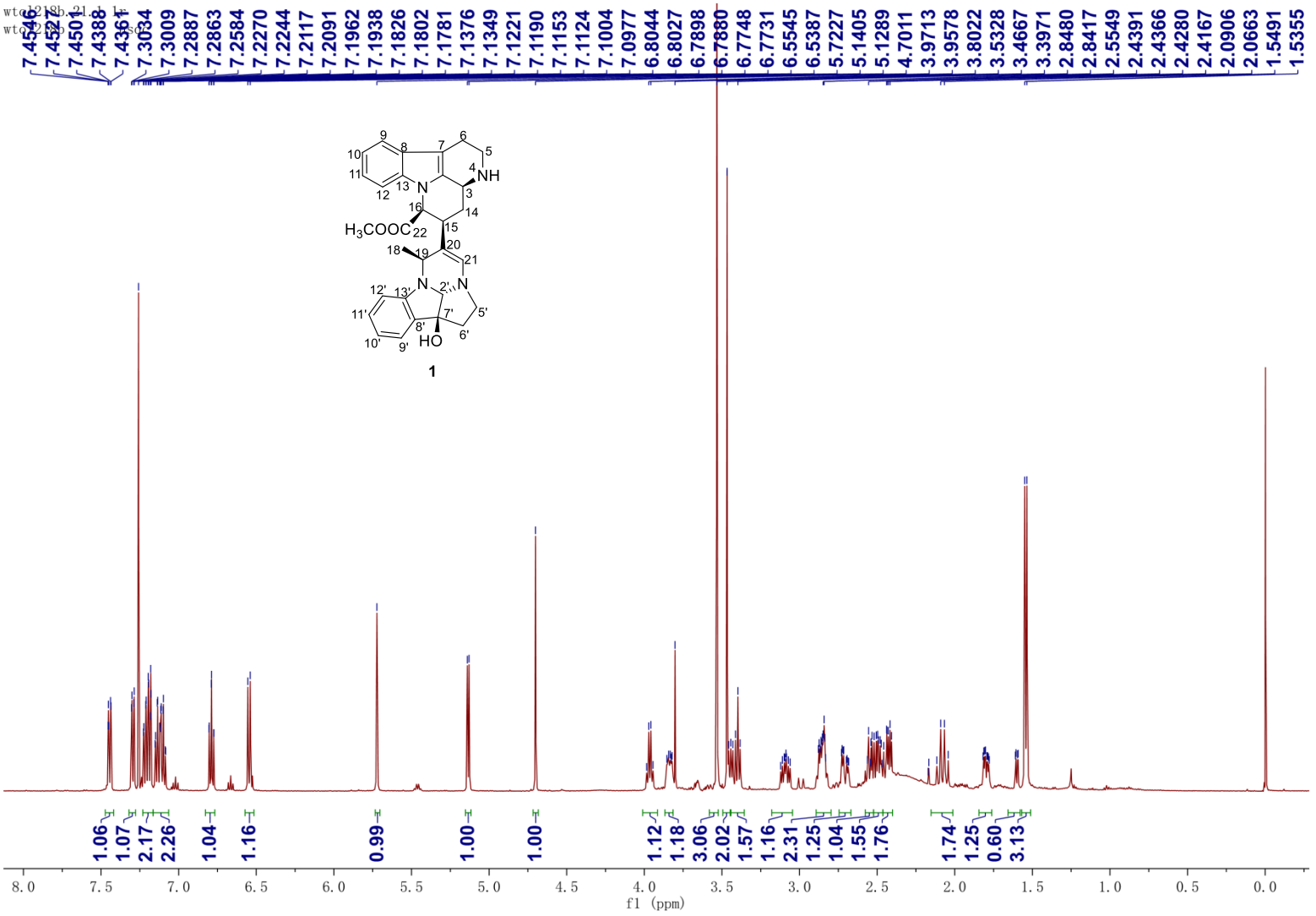
Alkaloids **1-3** were bio-assayed for inhibitory activity of xanthine oxidase. The uric acid production was calculated according to the increasing absorbance at 290 nm. Test solutions (final concentration 50 μg/ml) were prepared by adding xanthine (final concentration 29.2 μg/ml). The reaction was started by adding 40 μL of xanthine oxidase (0.1 U/ mL) in a phosphate buffer solution (pH = 7.50, 0.2 mM). Alkaloids were dissolved in DMSO and immediately diluted with phosphate buffer solution to 0.5 mg/ml. The mixture (total 100 μL) was incubated at 37 °C. The uric acid production was calculated from the differential absorbance with a blank solution in which the xanthine oxidase was replaced by buffer solution. A test mixture containing no alkaloids was prepared to measure the total uric acid production. Different concentrations of alkaloids were analyzed, and then the half-maximal inhibitory concentration (IC50) was calculated by linear regression analysis. Different concentrations of allopurinol were measured in triplicate.

Murine macrophage cells line RAW164.7 was obtained from Cell Bank of Chinese Academy of Sciences. RAW164.7 cells were seeded in 96-well cell culture plates (1.5×105 cells/well) and treated with serial dilutions of the compounds with a maximum concentration of 50 μM in triplicate, followed by stimulation with 1μg/ml LPS (Sigma). NO production in the supernatant was assessed by Griess reagents (Sigma). The absorbance at 570 nm was measured with microplate reader, L-NMMA was used as a positive control, the viability of RAW164.7 cell was evaluated by the MTS assay simultaneously to exclude the interference of the cytotoxicity of the test compounds.

S4. *X*-ray diffraction of 1

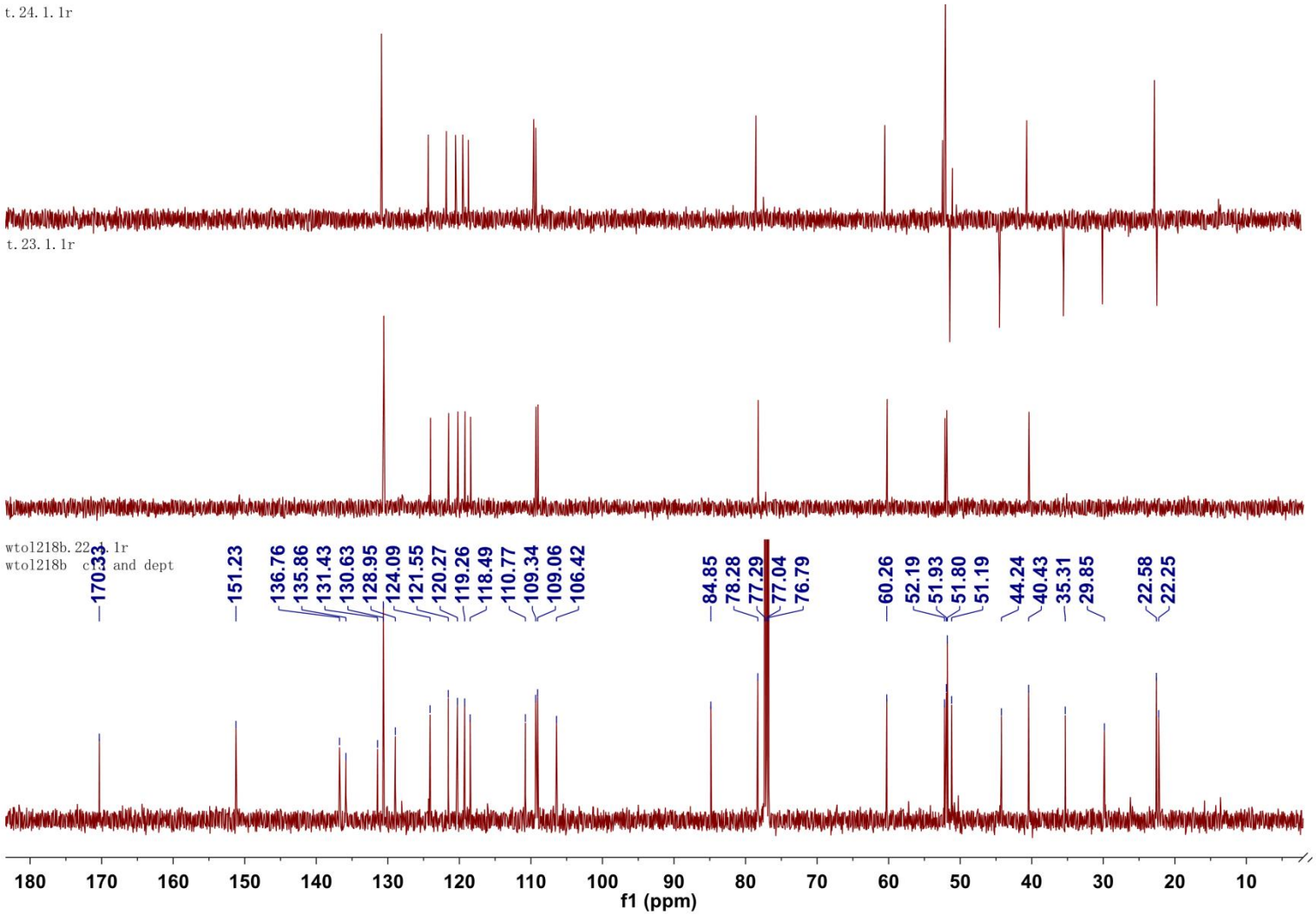
Crystal data for **1**: $C_{30}H_{32}N_4O_3$, M = 496.59, a = 7.6144(4) Å, b = 11.2458(6) Å, c = 15.4199(8) Å, α = 90°, β = 98.619(3)°, γ = 90°, V = 1305.49(12) Å^3, T = 100.(2) K, space group $P1211$, Z = 2, μ(Cu Kα) = 0.662 mm^{-1}, 45047 reflections measured, 5175 independent reflections (R_{int} = 0.0988). The final R_1 values were 0.0692 ($I > 2\sigma(I)$). The final $wR(F^2)$ values were 0.1929 ($I > 2\sigma(I)$). The final R_1 values were 0.0782 (all data). The final $wR(F^2)$ values were 0.2040 (all data). The goodness of fit on F^2 was 1.518. Flack parameter = 0.30(17). The CCDC number is 1916676.



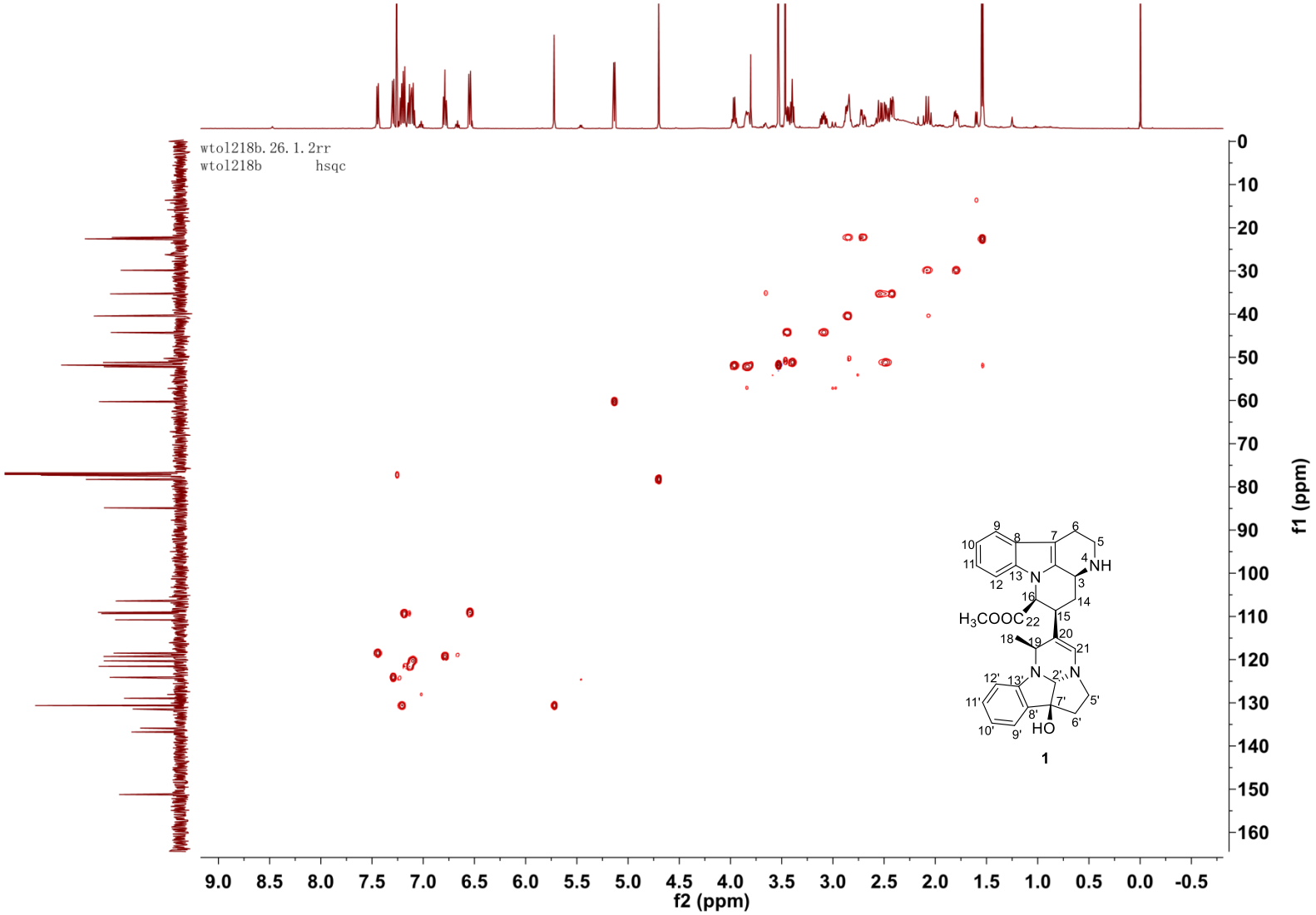


1

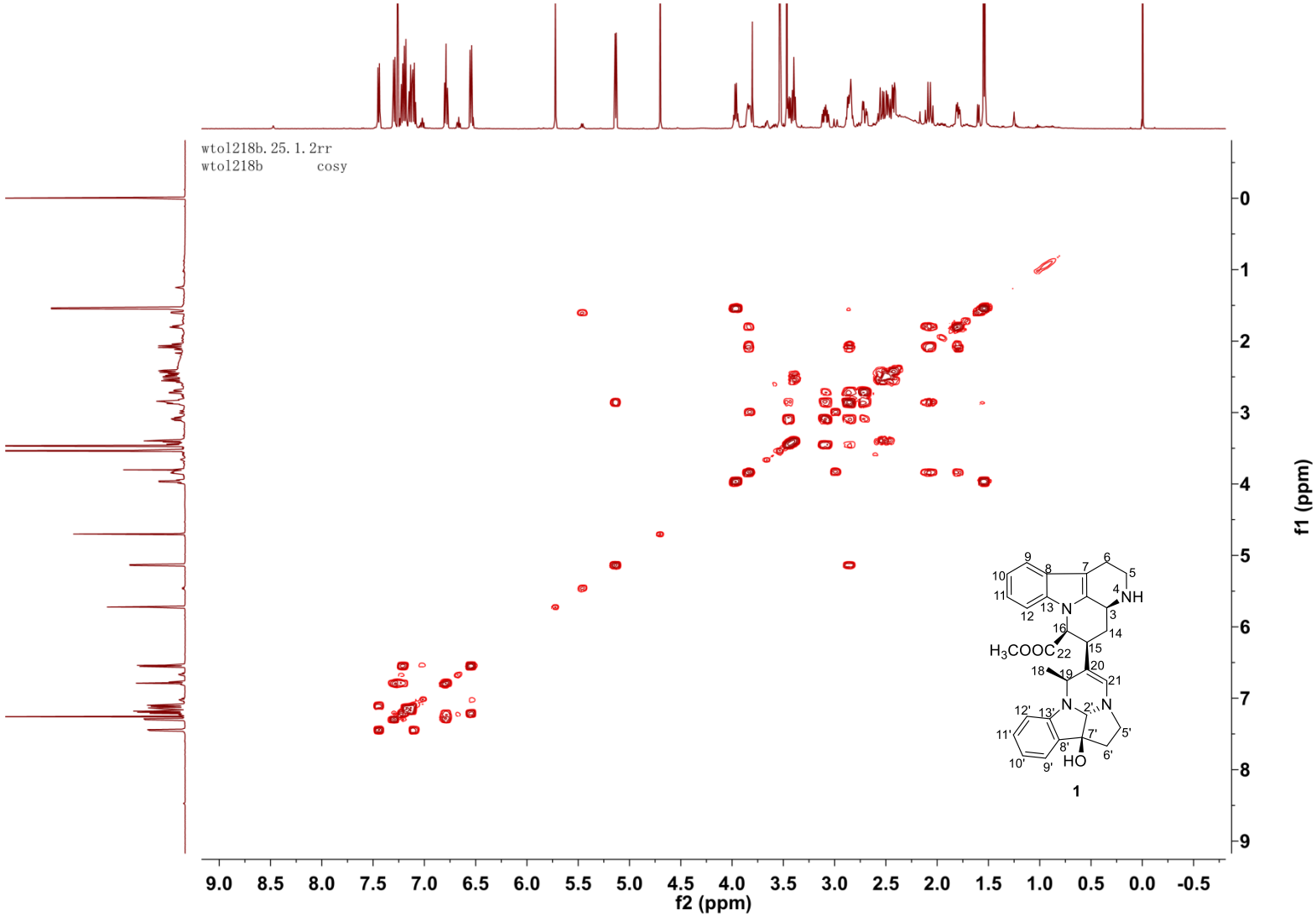
S5 ^{1}H NMR spectrum of compound **1** in $CDCl_3$ (500 MHz)



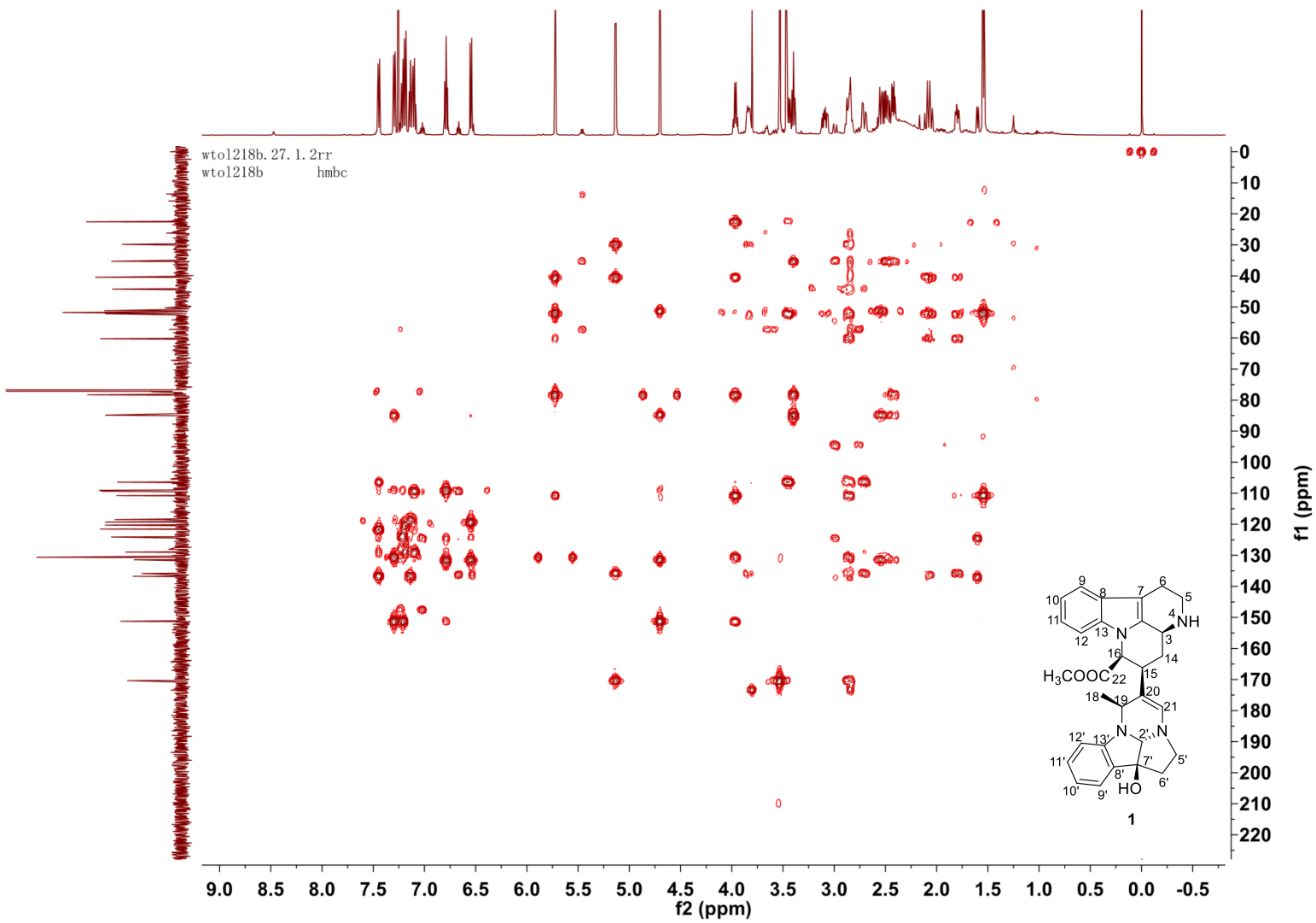
S6 ^{13}C NMR spectrum of compound **1** in $CDCl_3$ (125 MHz)



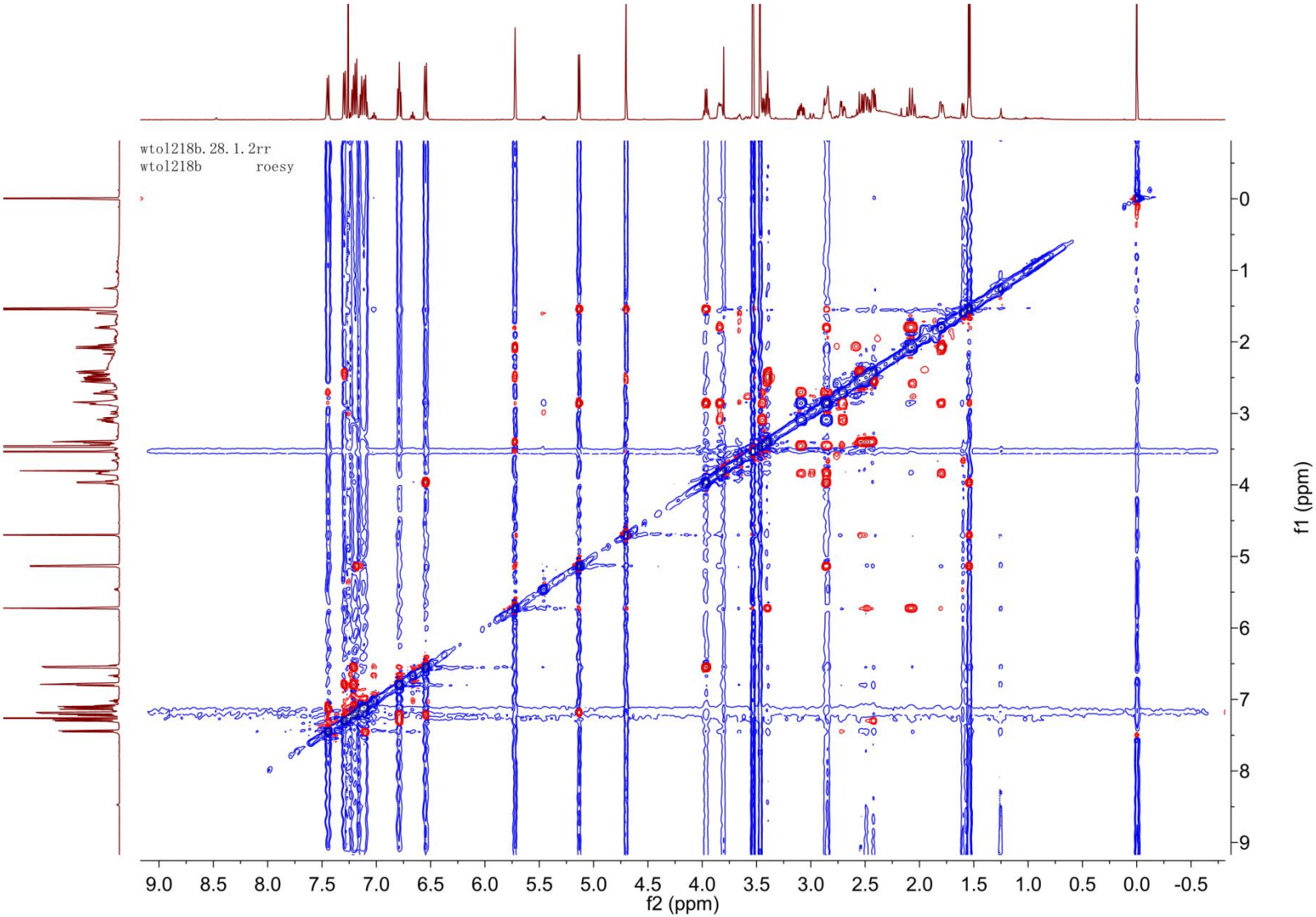
S7 HSQC spectrum of compound **1** in $CDCl_3$ (500 MHz)



S8 ^{1}H-^{1}H COSY spectrum of compound **1** in $CDCl_3$ (500 MHz)



S9 HMBC spectrum of compound **1** in $CDCl_3$ (500 MHz)



S10 ROESY spectrum of compound **1** in $CDCl_3$ (500 MHz)

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C	4	10	100	Na	1	0	0	Cl	1	0	0	Pd	2	0	0	Na
N	3	0	10	Mg	2	0	0	Cu	2	0	0	Ag	1	0	0	
O	2	0	30	Si	4	0	0	Se	2	0	0	I	3	0	0	

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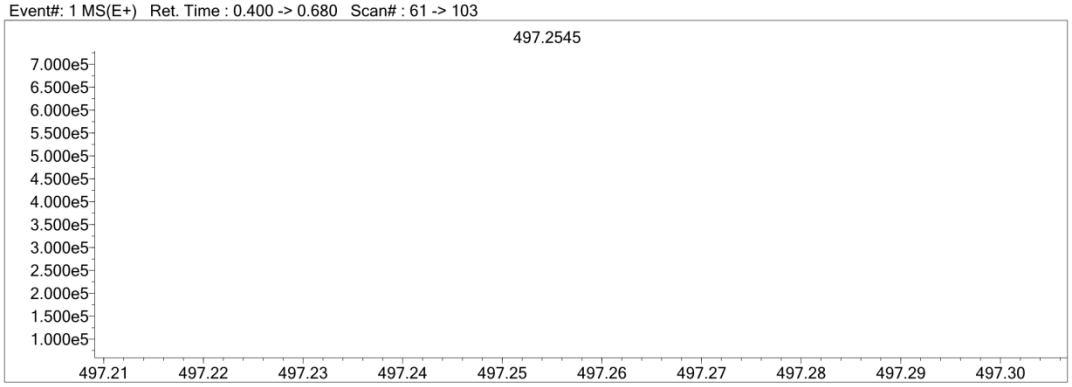
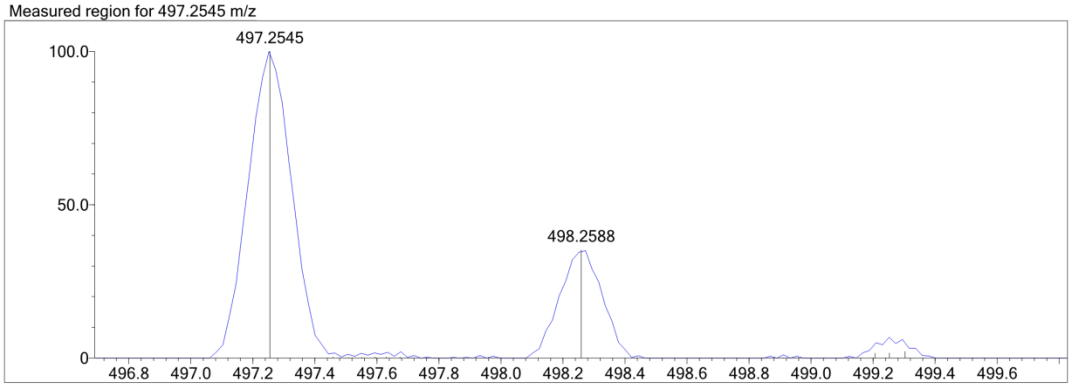
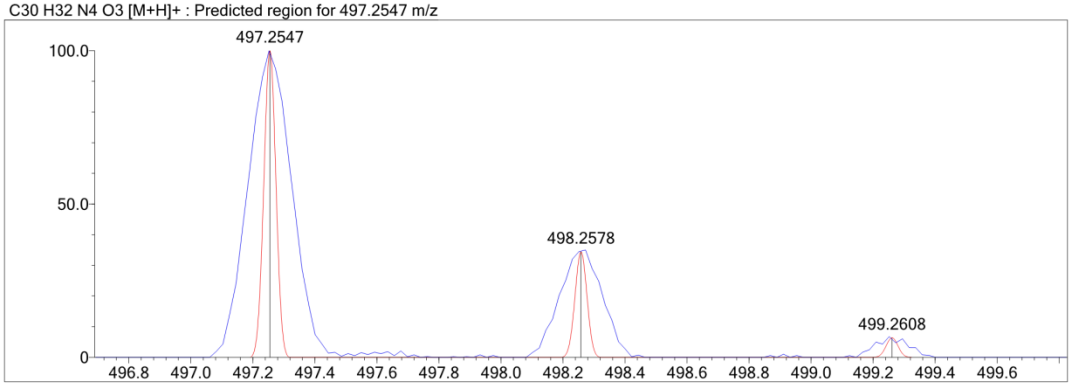


Measured region for 497.2545 m/z

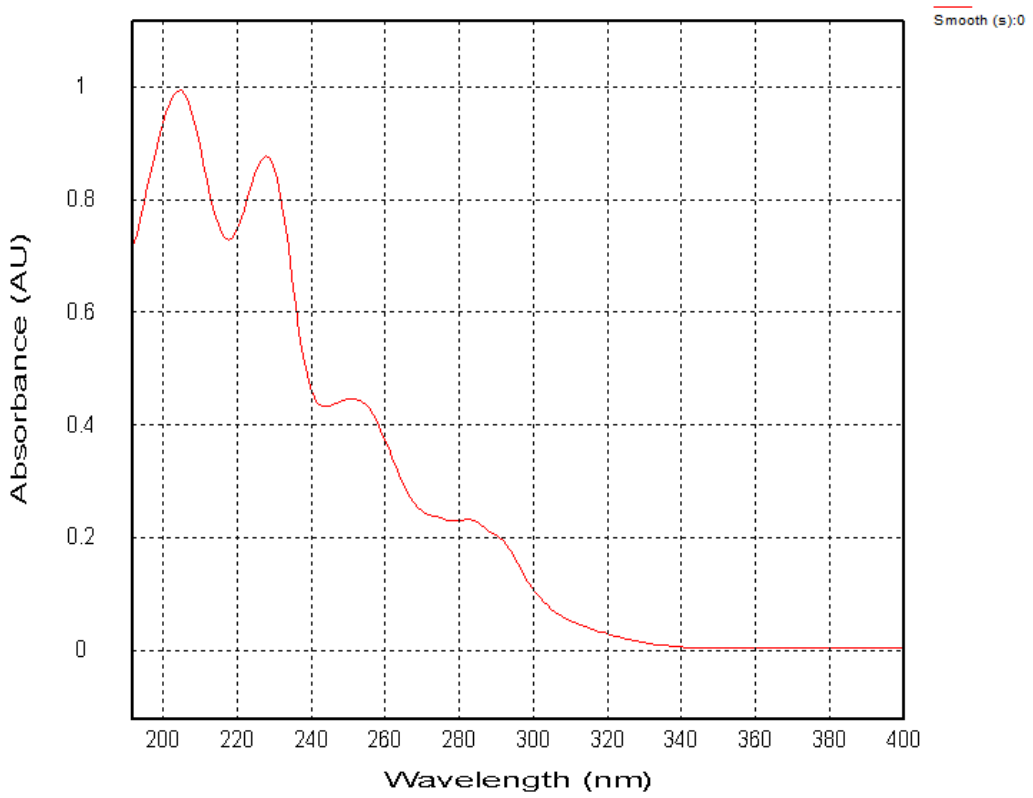


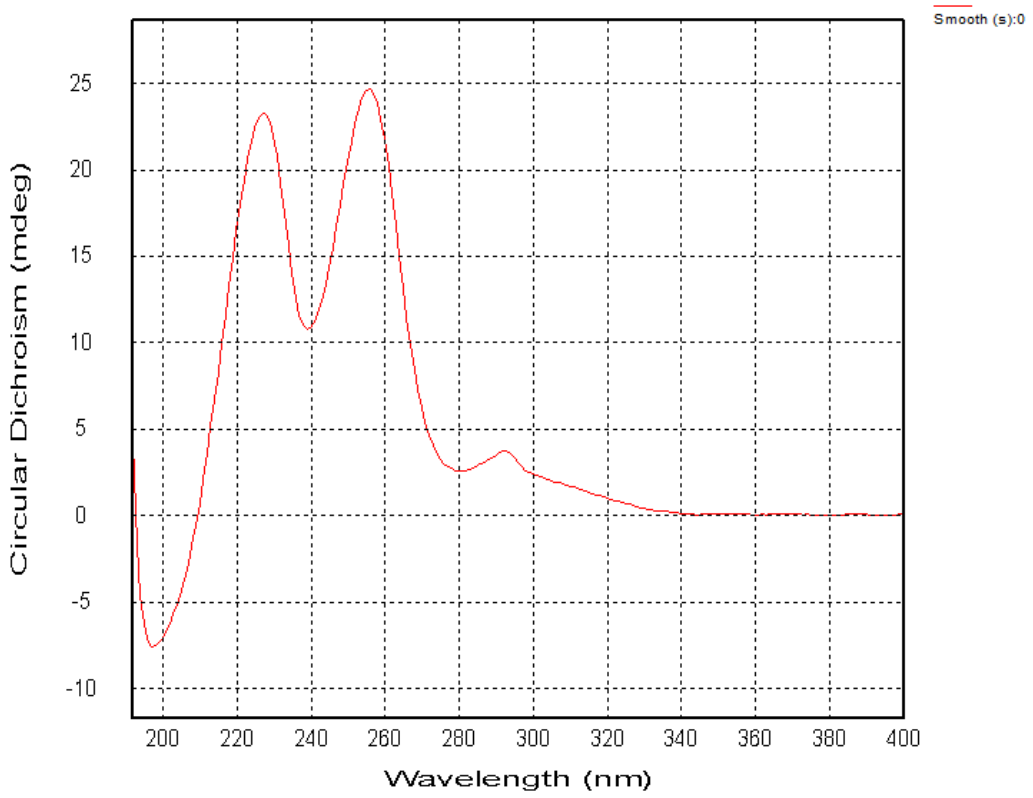
C30 H32 N4 O3 [M+H]+ : Predicted region for 497.2547 m/z



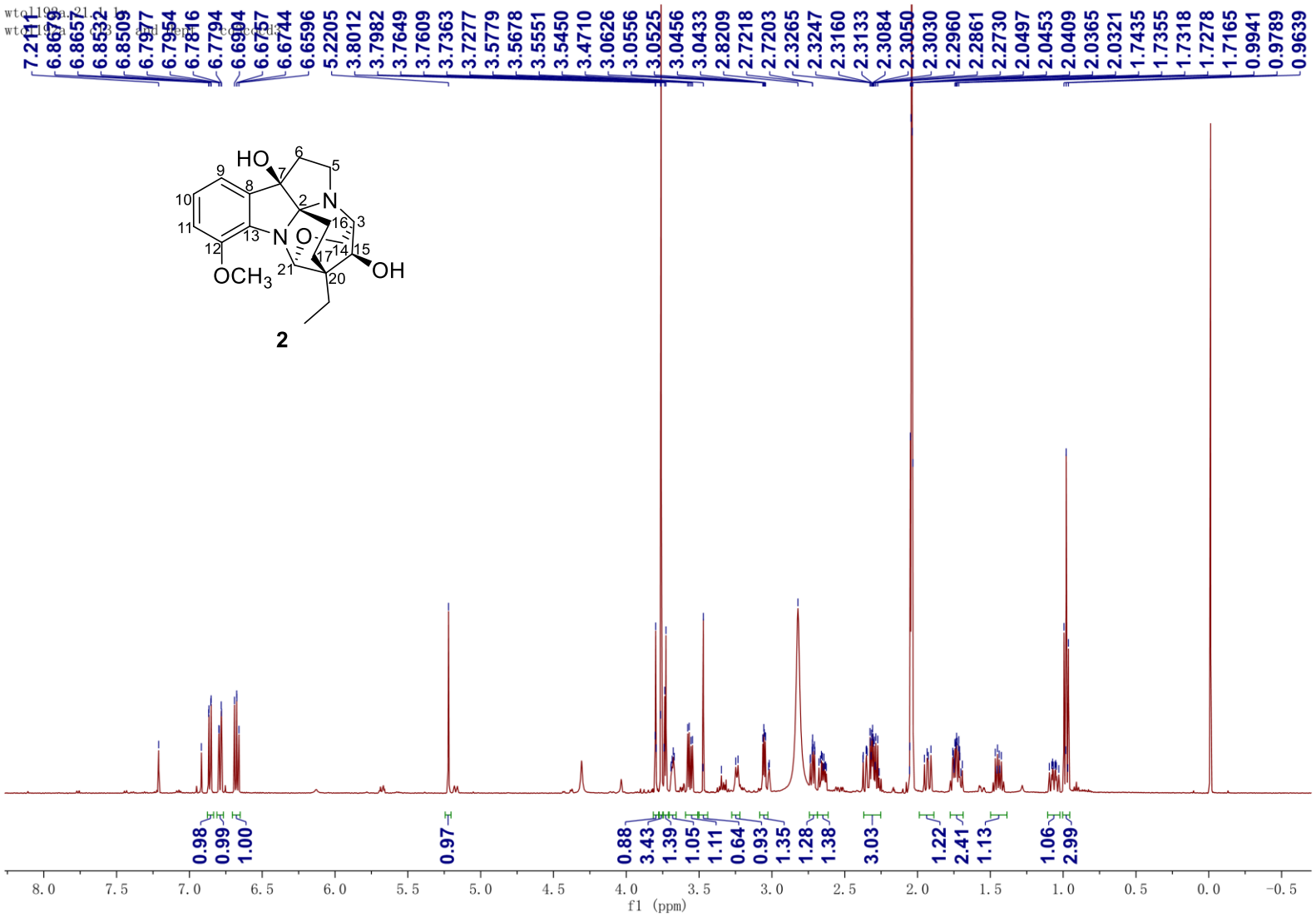
Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	DBE
C30 H32 N4 O3	[M+H]+	497.2545	497.2547	-0.2	-0.40	17.0

S11 HRESIMS spectrum of compound **1**

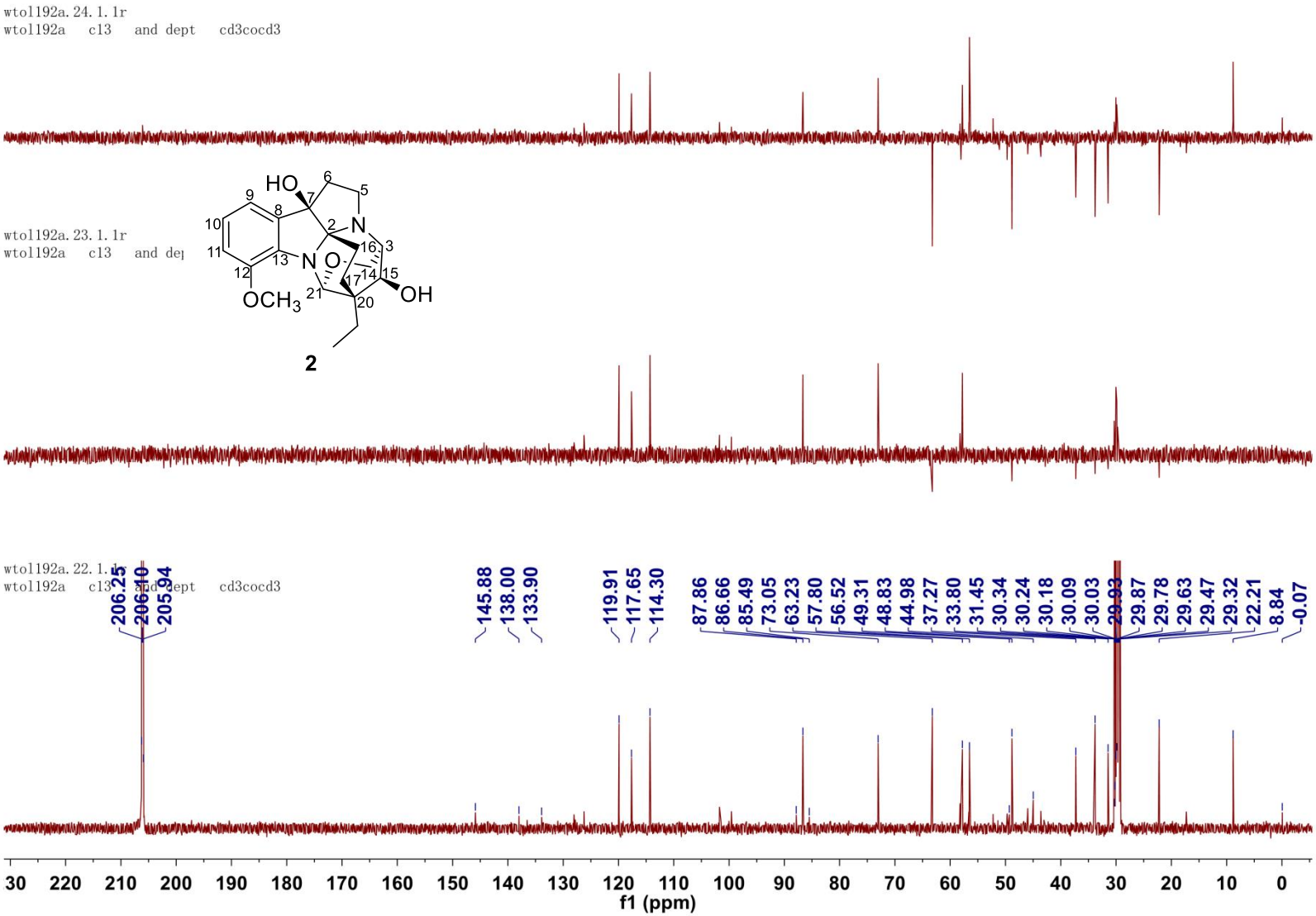




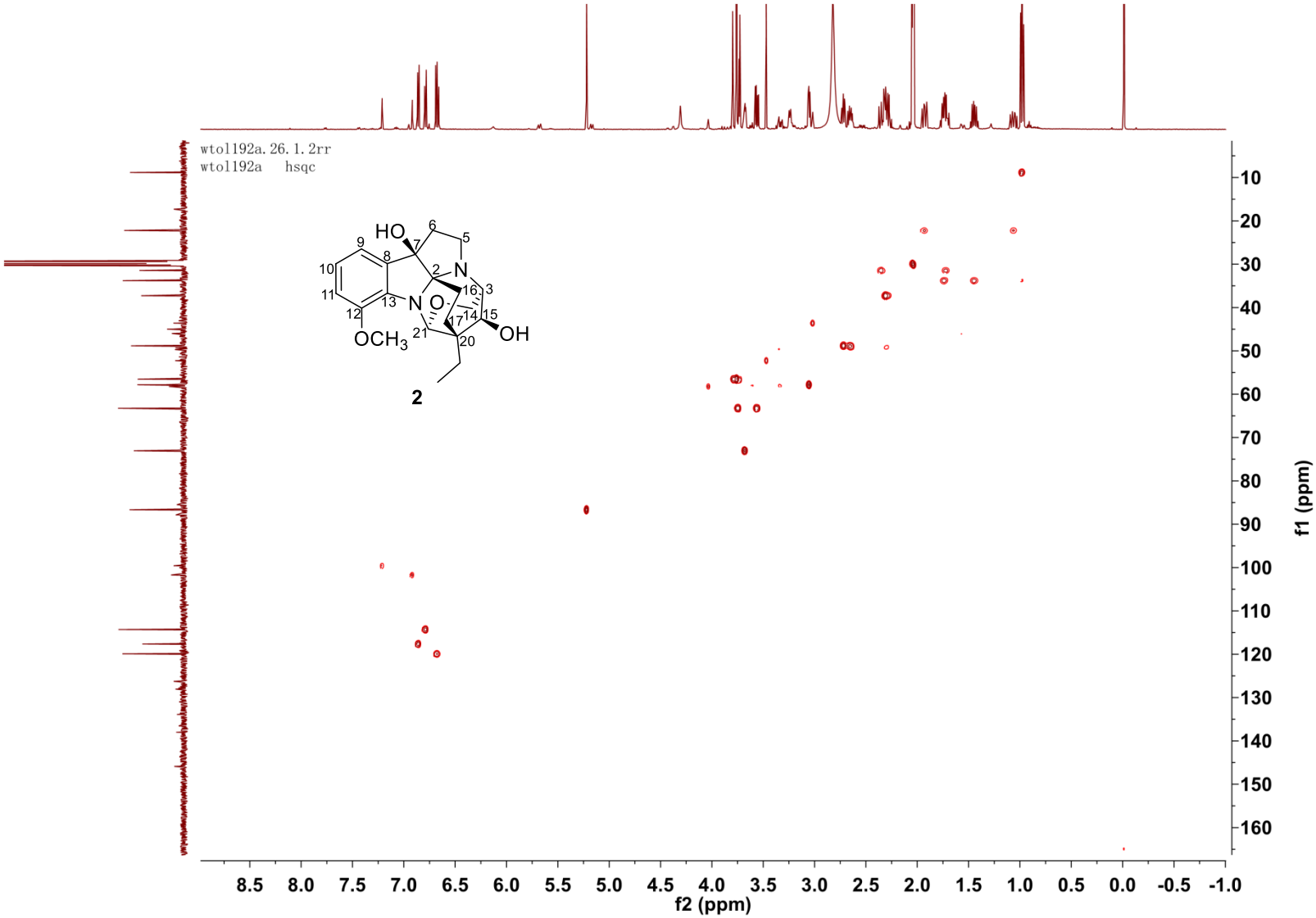
S12 UV and CD spectrum of compound **1** in MeOH



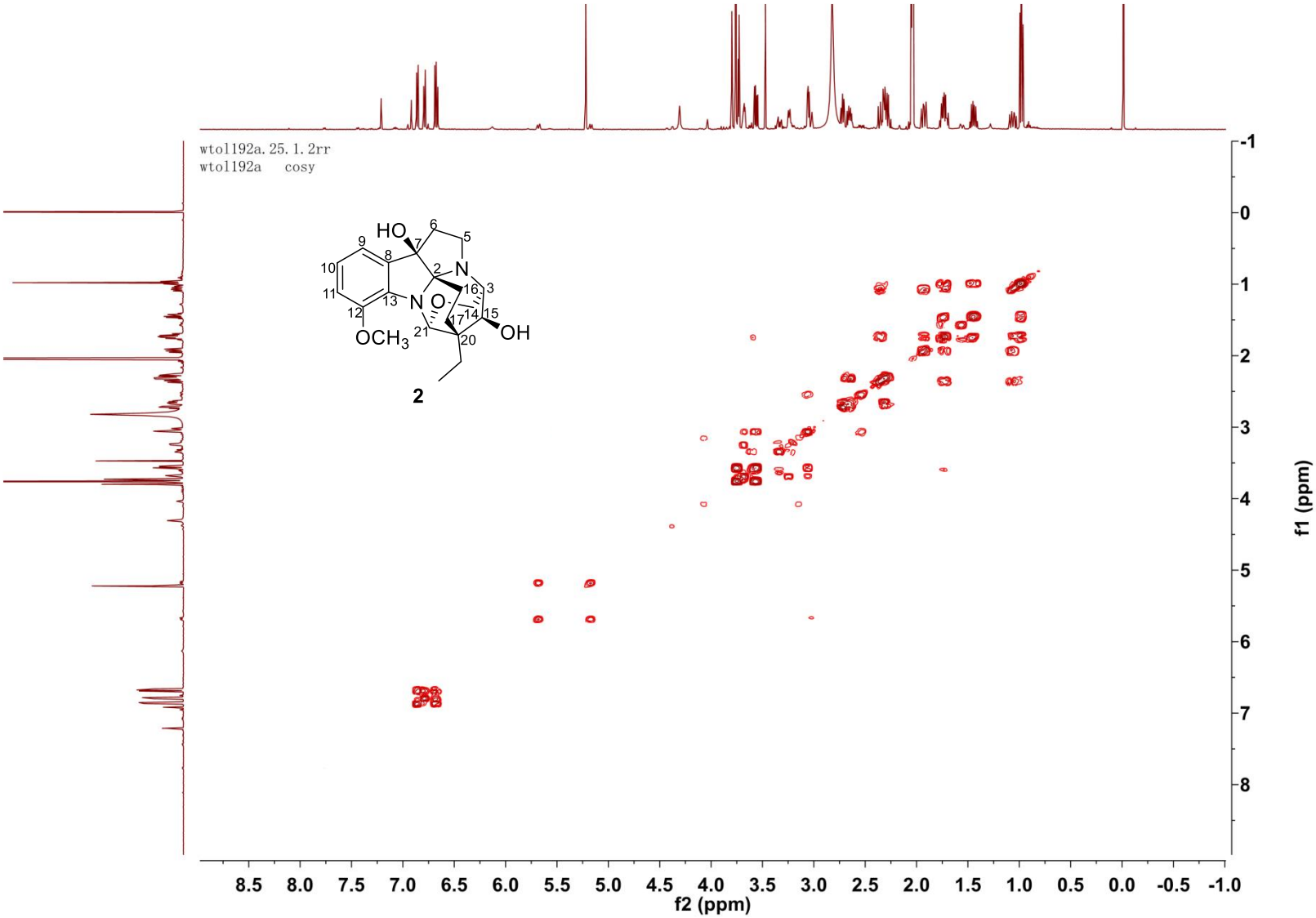
S13 ^{1}H NMR spectrum of compound **2** in CD_3ODCD_3 (500 MHz)



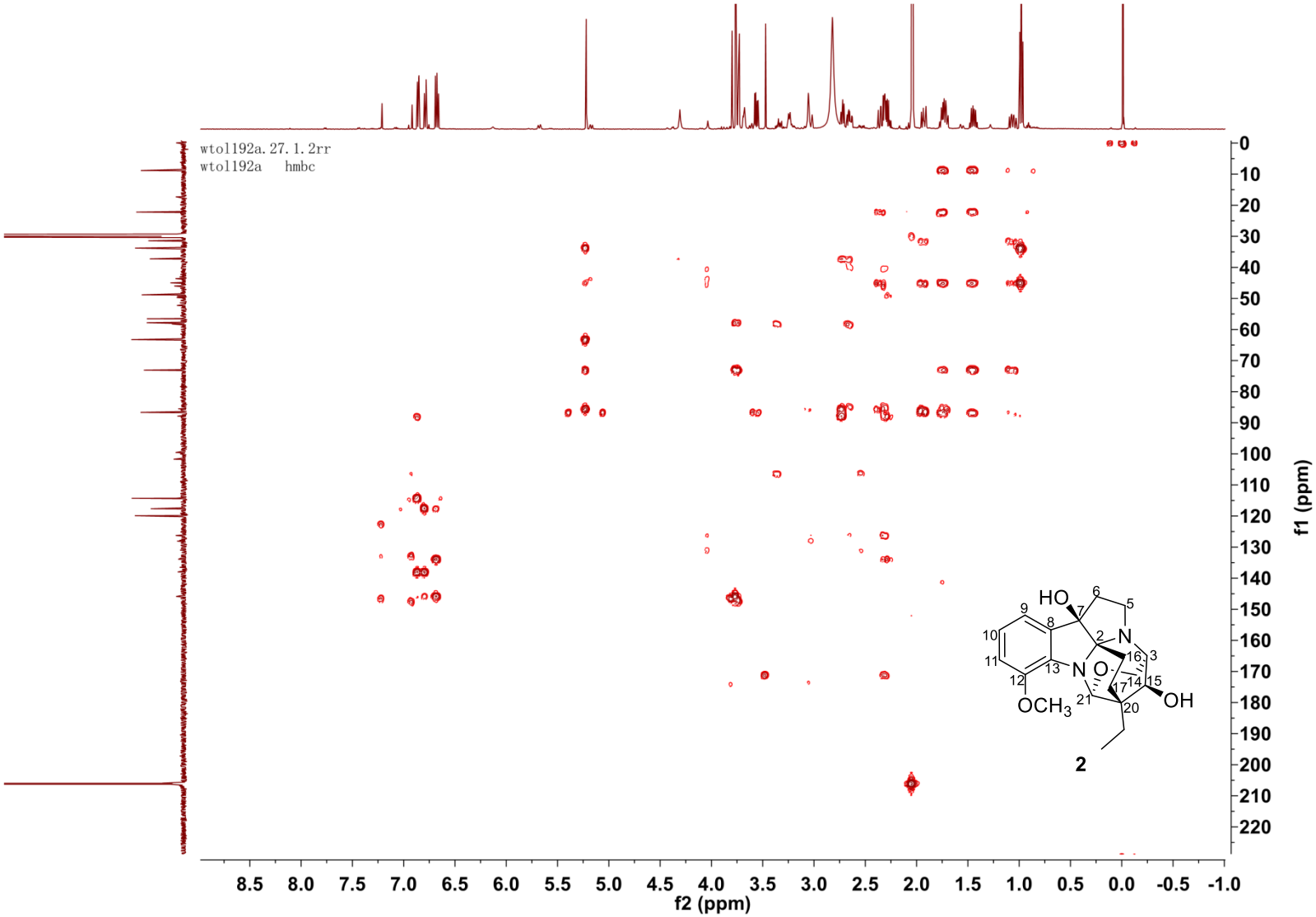
S14 ^{13}C NMR spectrum of compound **2** in CD_3ODCD_3 (125 MHz)



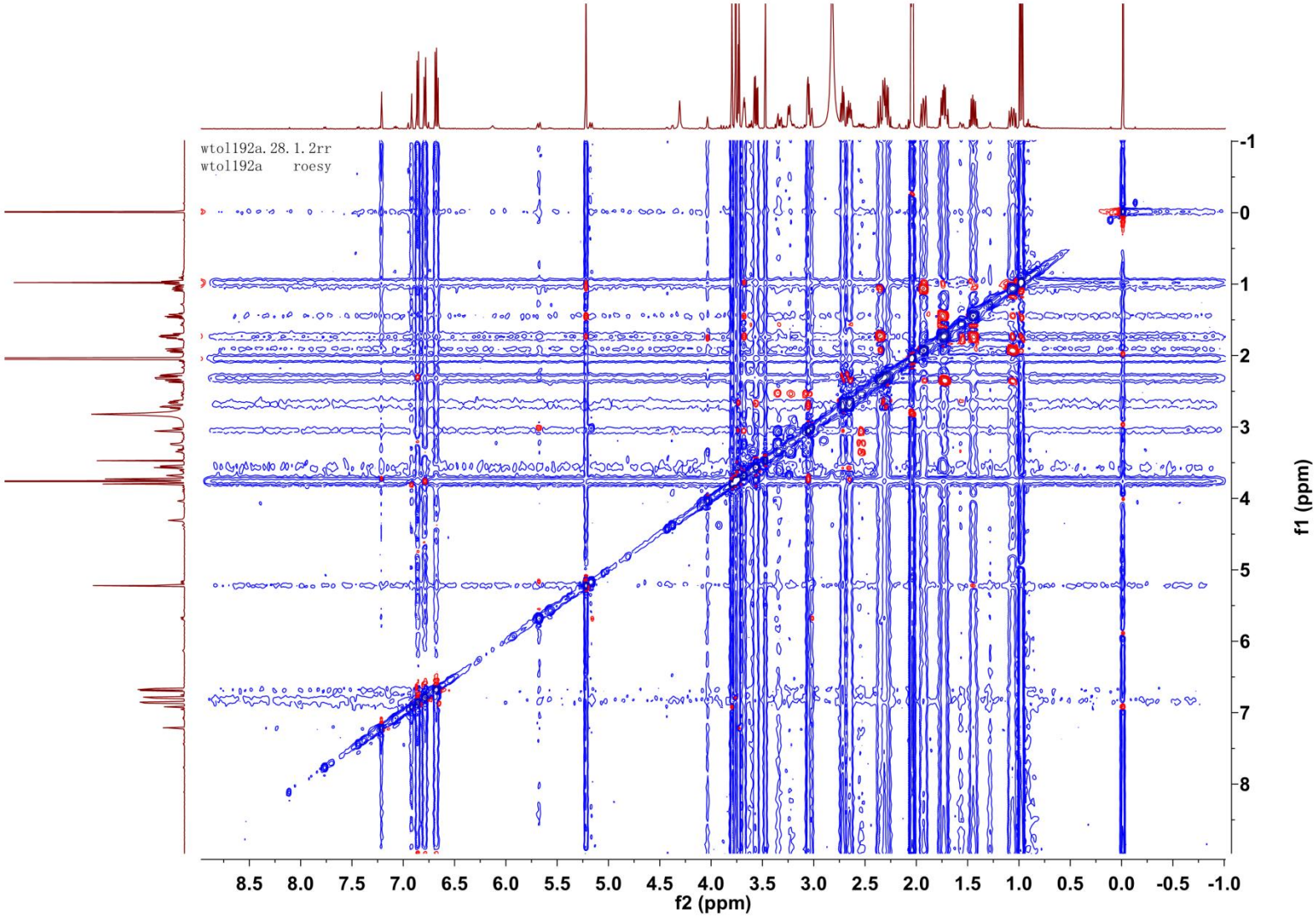
S15 HSQC spectrum of compound **2** in CD_3ODCD_3 (500 MHz)



S16 ^{1}H-^{1}H COSY spectrum of compound **2** in CD_3ODCD_3 (500 MHz)



S17 HMBC spectrum of compound **2** in CD_3ODCD_3 (500 MHz)



S18 ROESY spectrum of compound **2** in CD_3ODCD_3 (500 MHz)

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N	3	0	10	Mg	2	0	0	Cu	2	0	0	Ag	1	0	0	
O	2	0	20	Si	4	0	0	Se	2	0	0	I	3	0	0	

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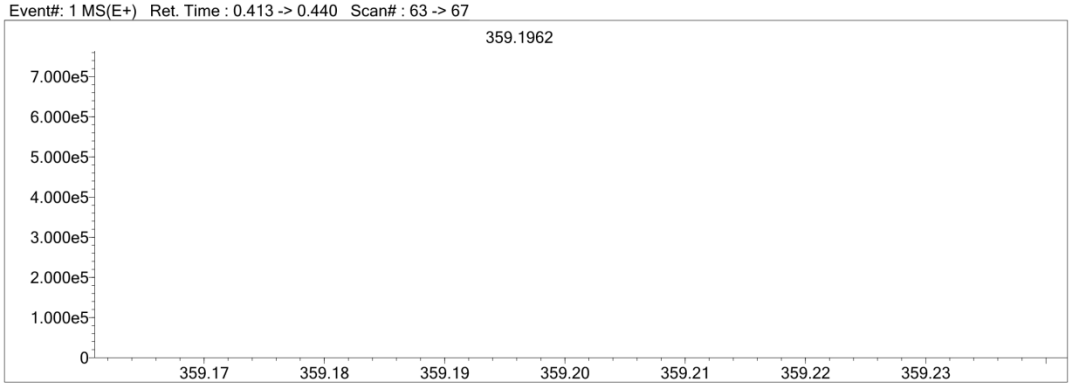
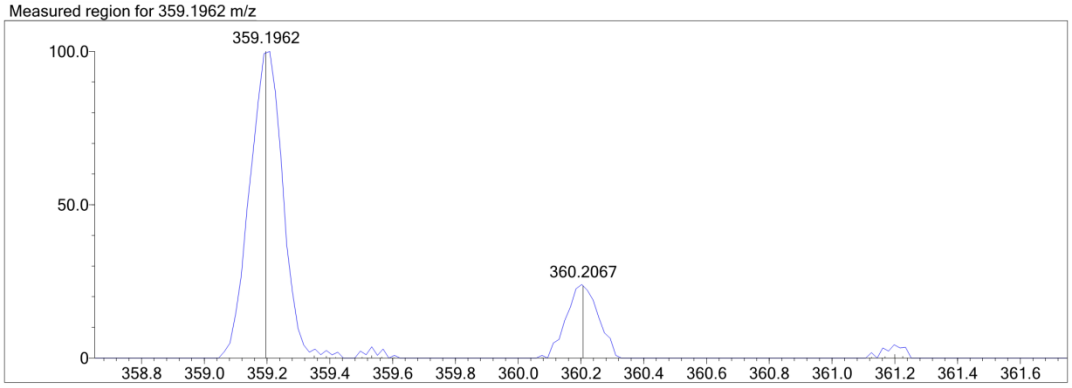
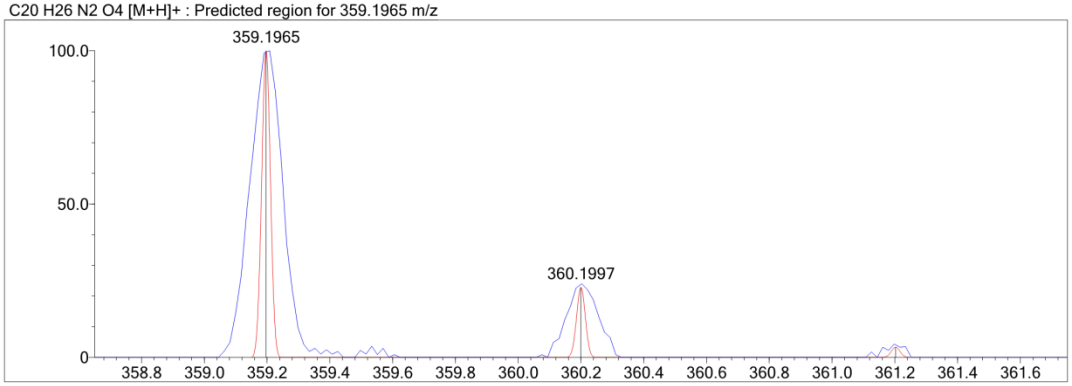


Measured region for 359.1962 m/z



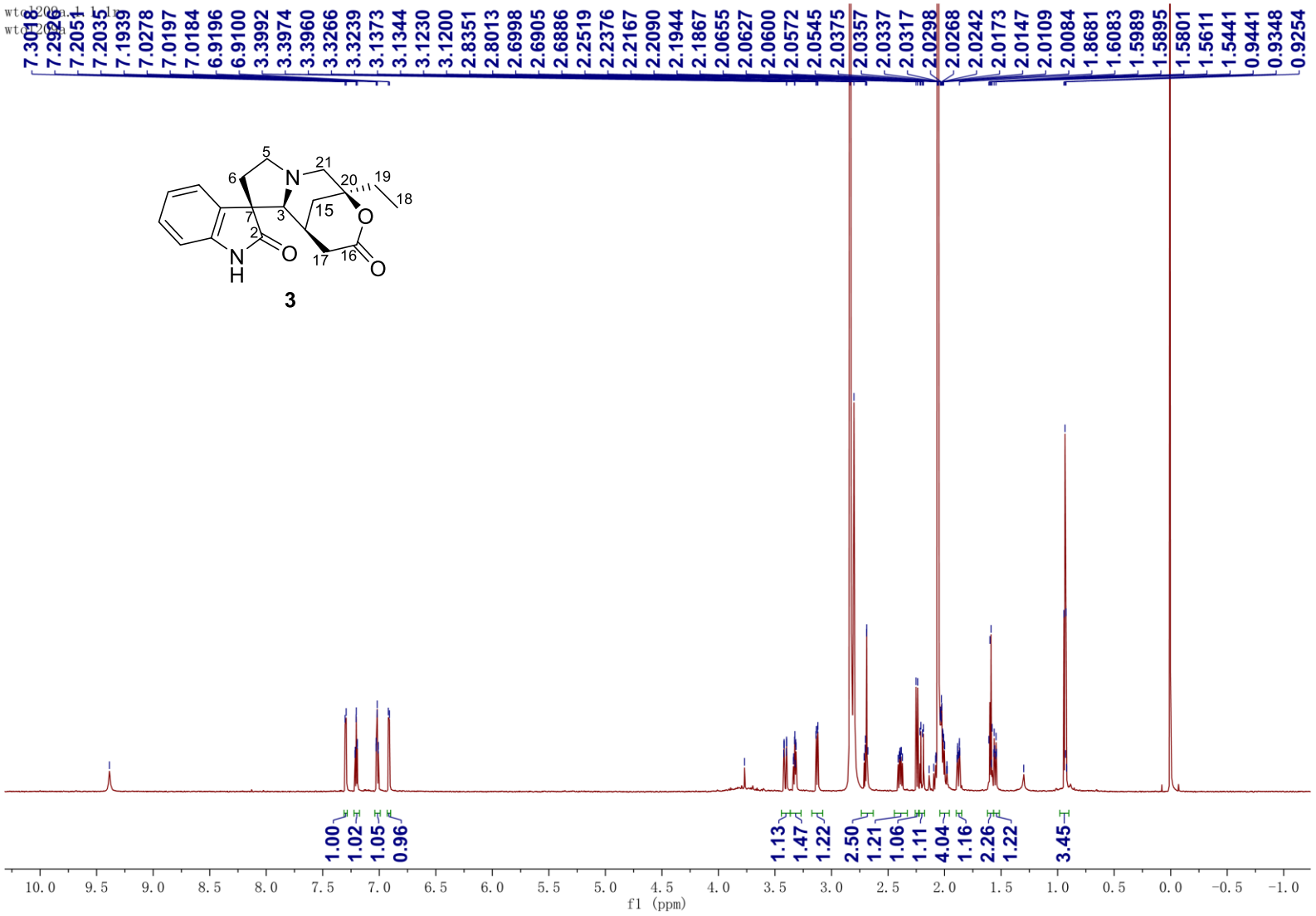
C20 H26 N2 O4 [M+H]+ : Predicted region for 359.1965 m/z



Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	DBE
C20 H26 N2 O4	[M+H]+	359.1962	359.1965	-0.3	-0.84	9.0

S19 HRESIMS spectrum of compound **2**

S20 UV and CD spectrum of compound **2** in MeOH



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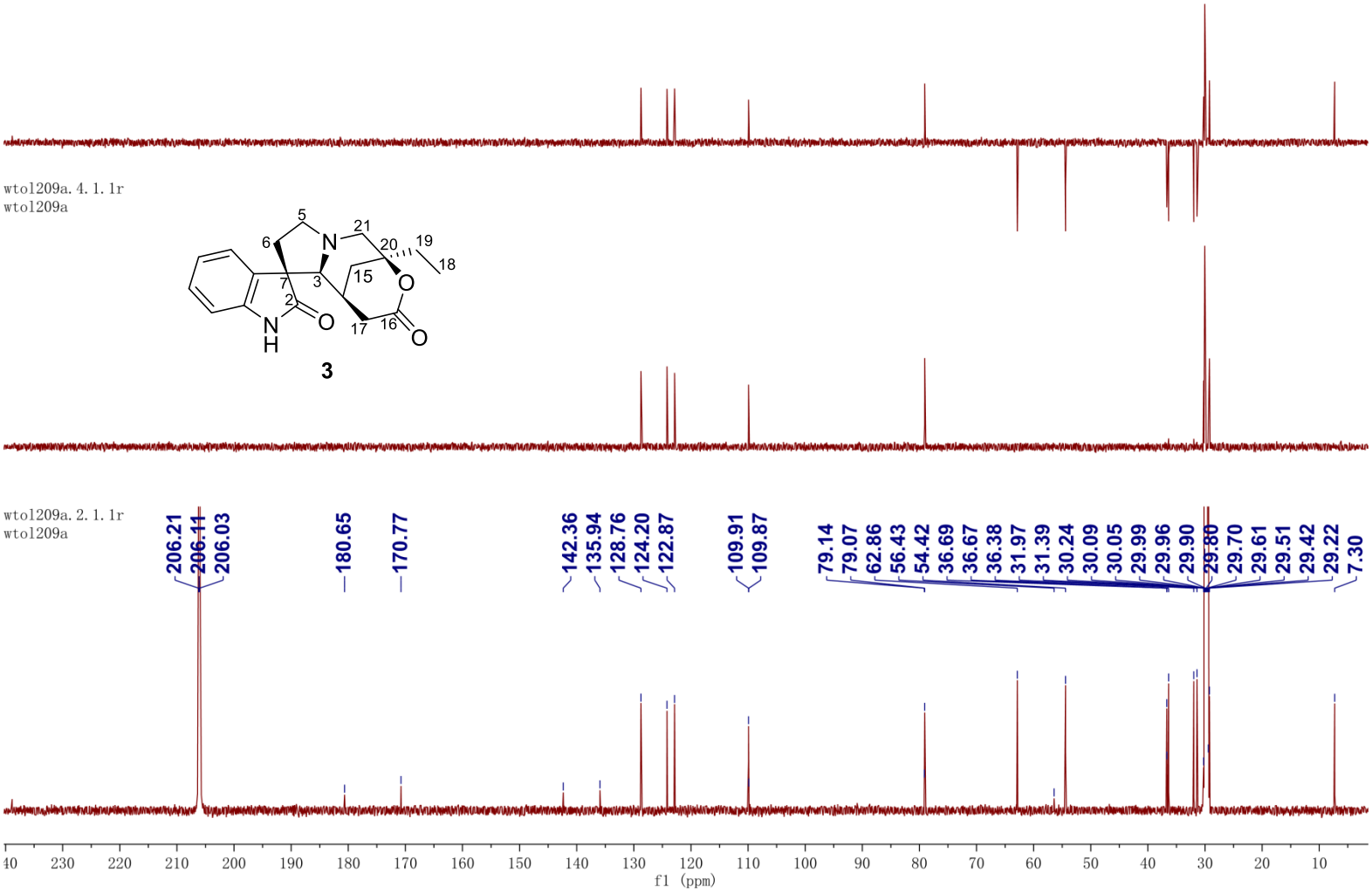
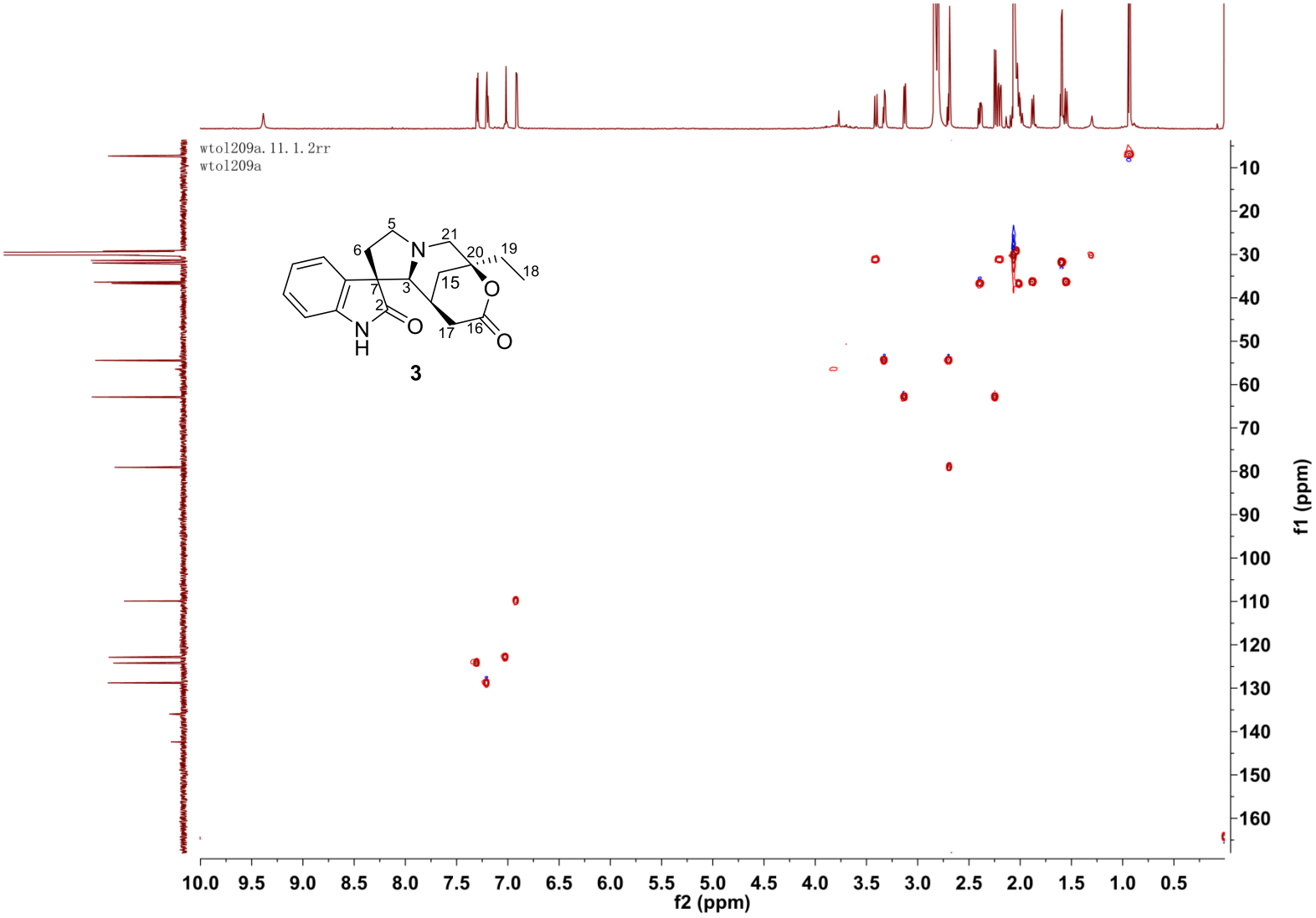
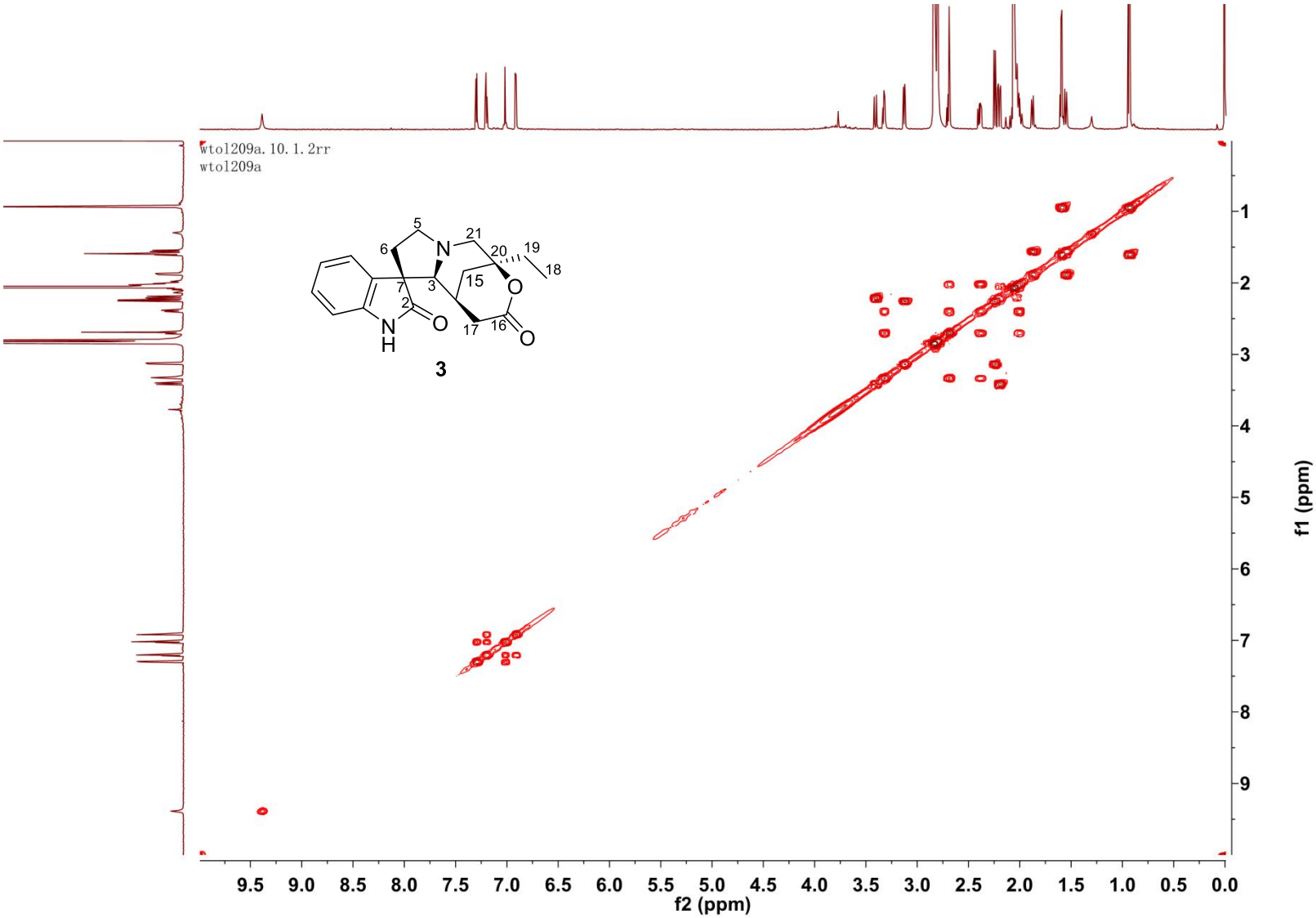
S21 ^{1}H NMR spectrum of compound **3** in CD_3ODCD_3 (800 MHz)



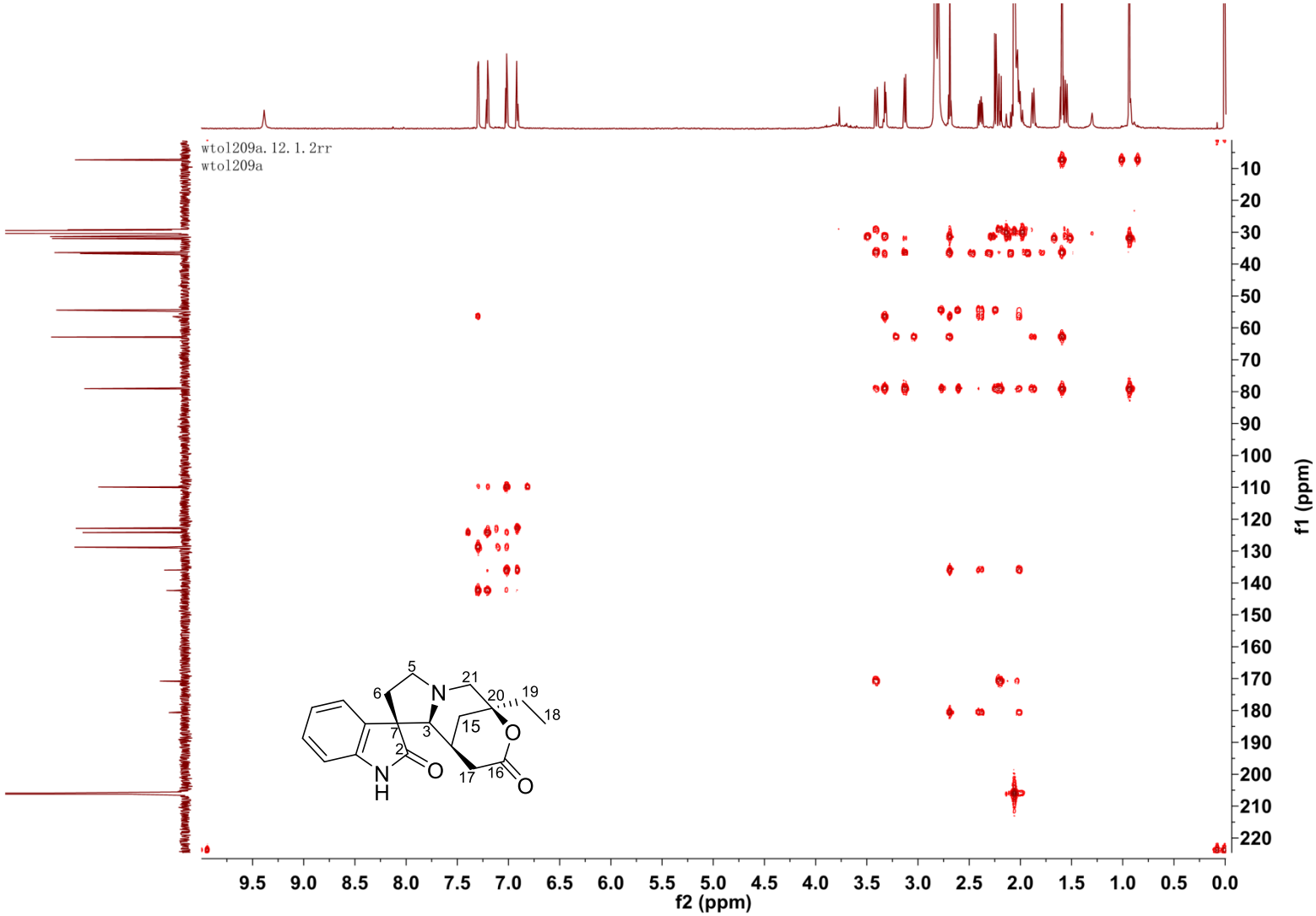
S22 ^{13}C NMR spectrum of compound **3** in CD_3ODCD_3 (200 MHz)



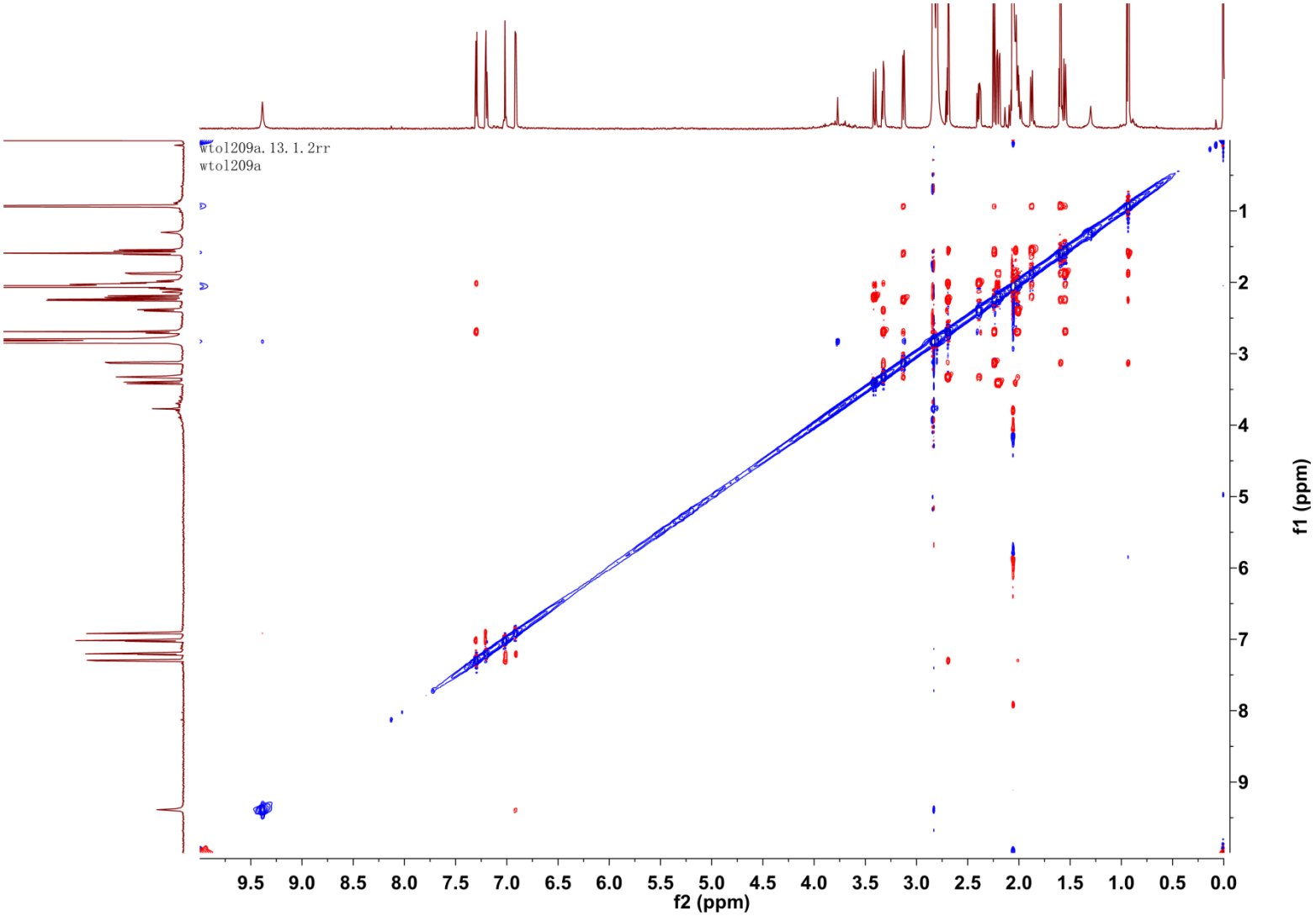
S23 HSQC spectrum of compound **3** in CD_3ODCD_3 (800 MHz)



S24 ^{1}H-^{1}H COSY spectrum of compound **3** in CD_3ODCD_3 (800 MHz)



S25 HMBC spectrum of compound **3** in CD_3ODCD_3 (800 MHz)



S26 ROESY spectrum of compound **3** in CD_3ODCD_3 (800 MHz)

Formula Predictor Report - wtol-209a.lcd

Data File: E:\DATA\2019\0107\wtol-209a.lcd

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N	3	0	10	Mg	2	0	0	Cu	2	0	0	Ag	1	0	0	
O	2	0	20	Si	4	0	0	Se	2	0	0	I	3	0	0	

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Max Isotopes: all
MSn Iso RI (%): 75.00

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Apply N Rule: yes
Isotope RI (%): 1.00
MSn Logic Mode: OR

Electron Ions: both
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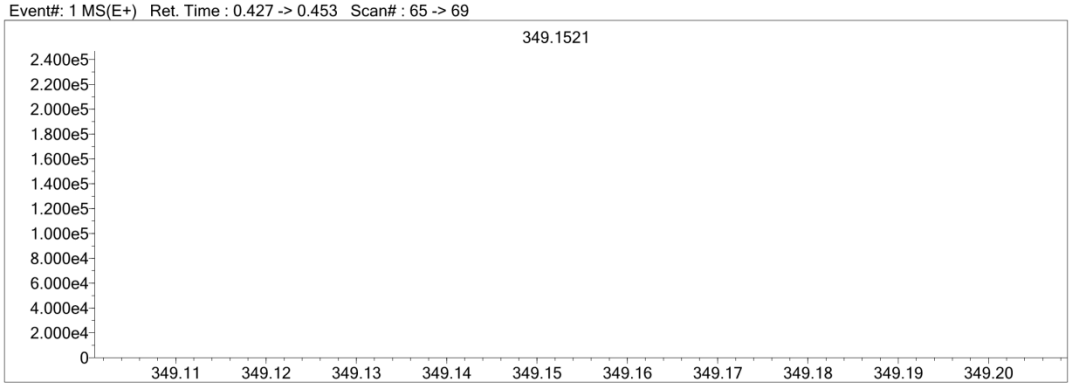
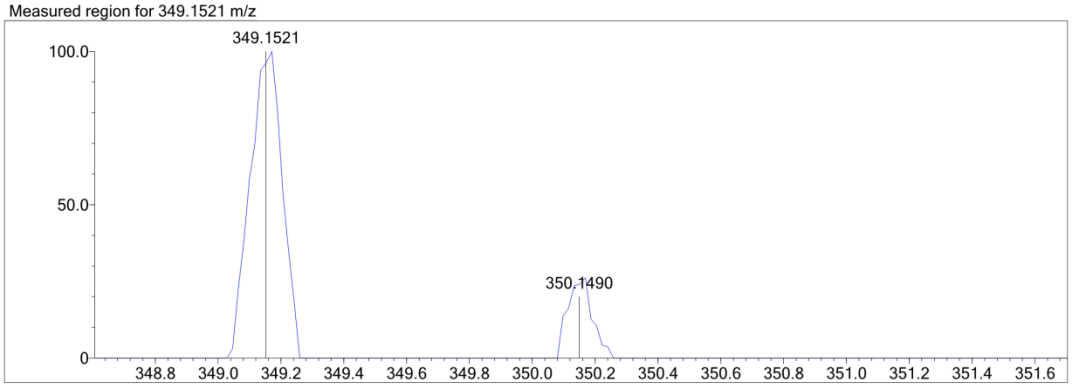
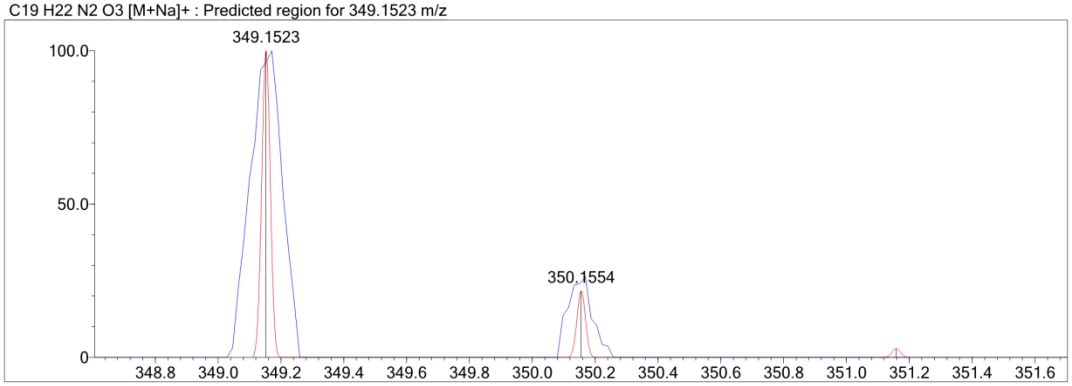


Measured region for 349.1521 m/z

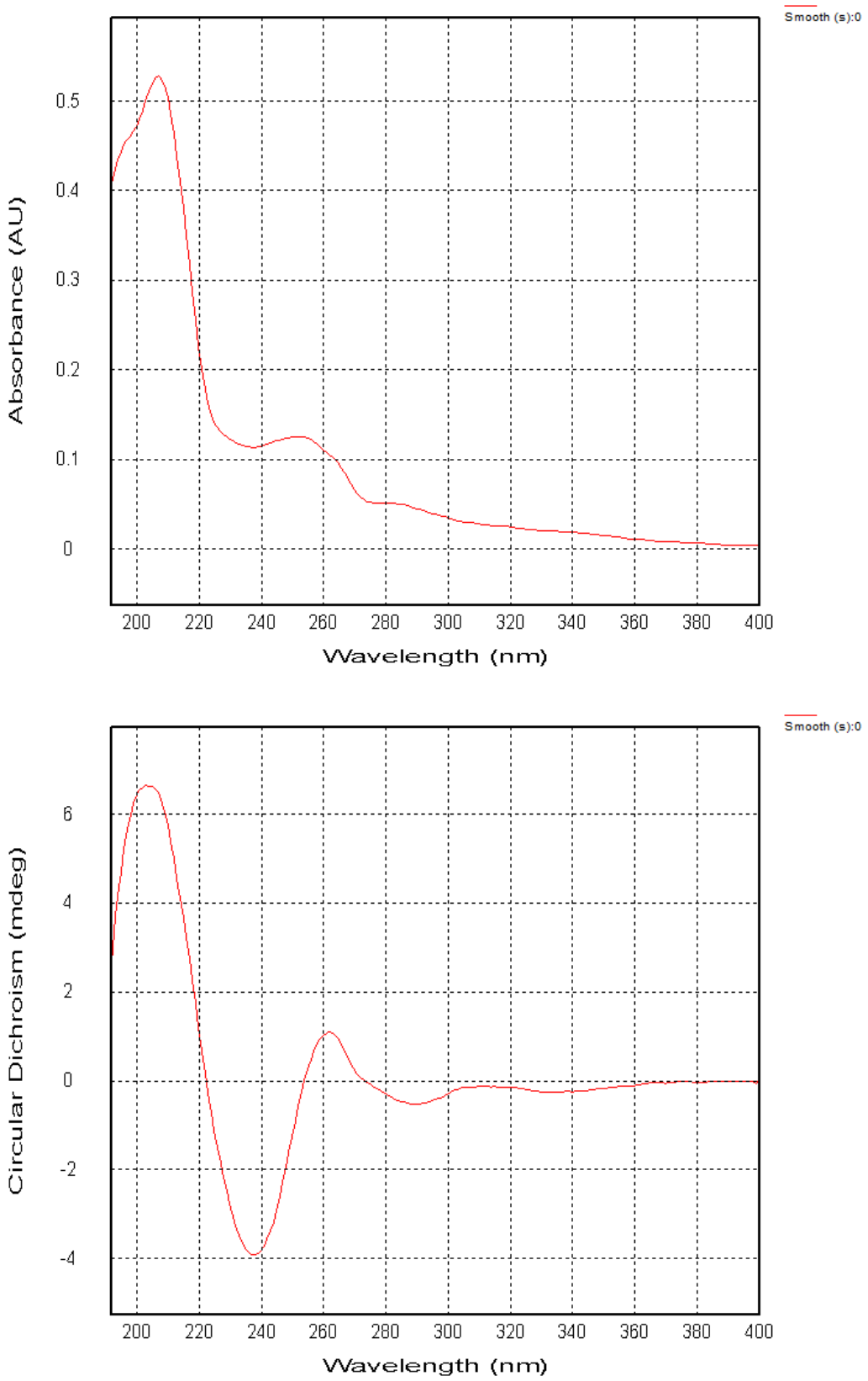


C19 H22 N2 O3 [M+Na]+ : Predicted region for 349.1523 m/z



Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	DBE
C19 H22 N2 O3	[M+Na]+	349.1521	349.1523	-0.2	-0.57	10.0

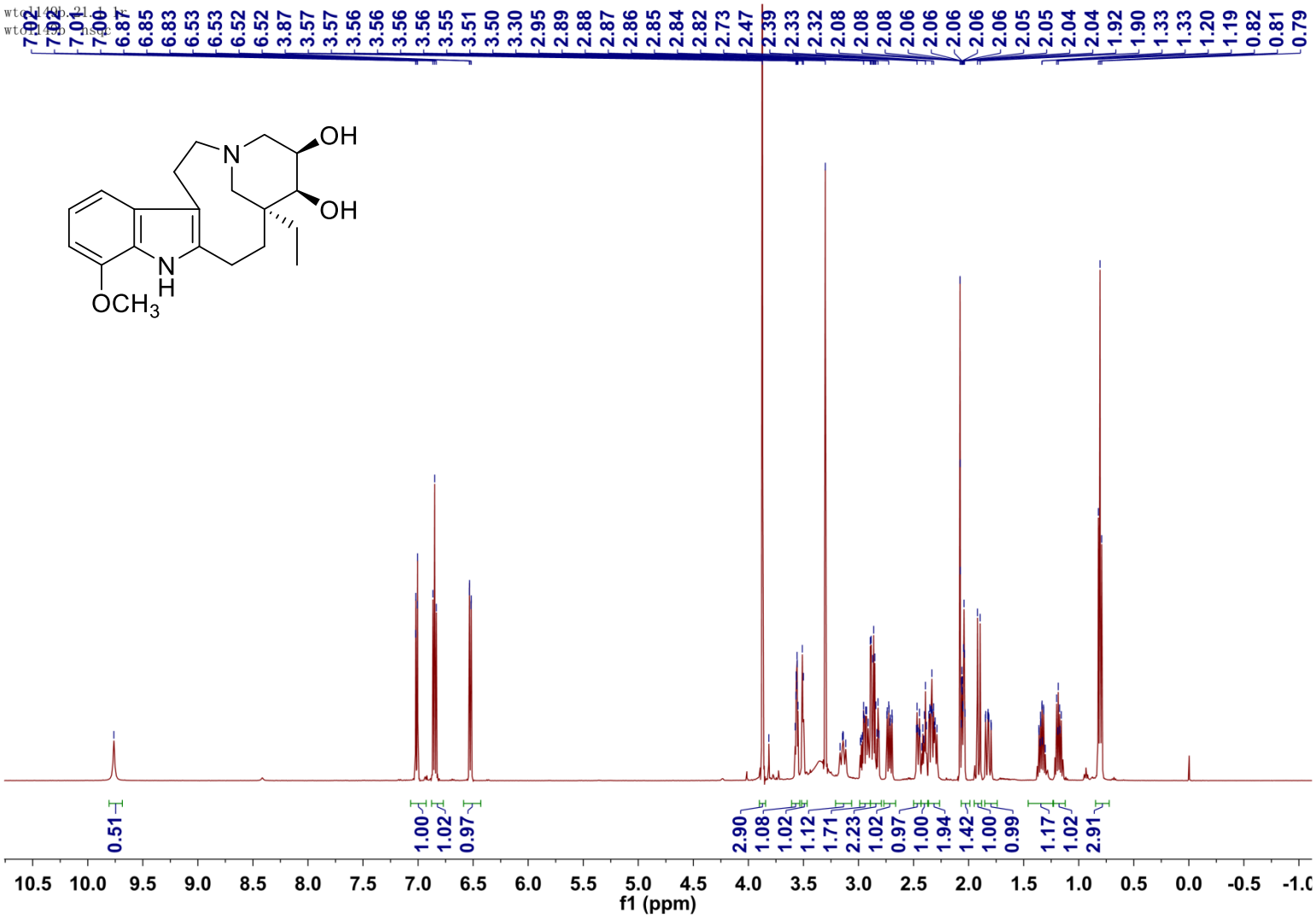
S27 HRESIMS spectrum of compound **3**



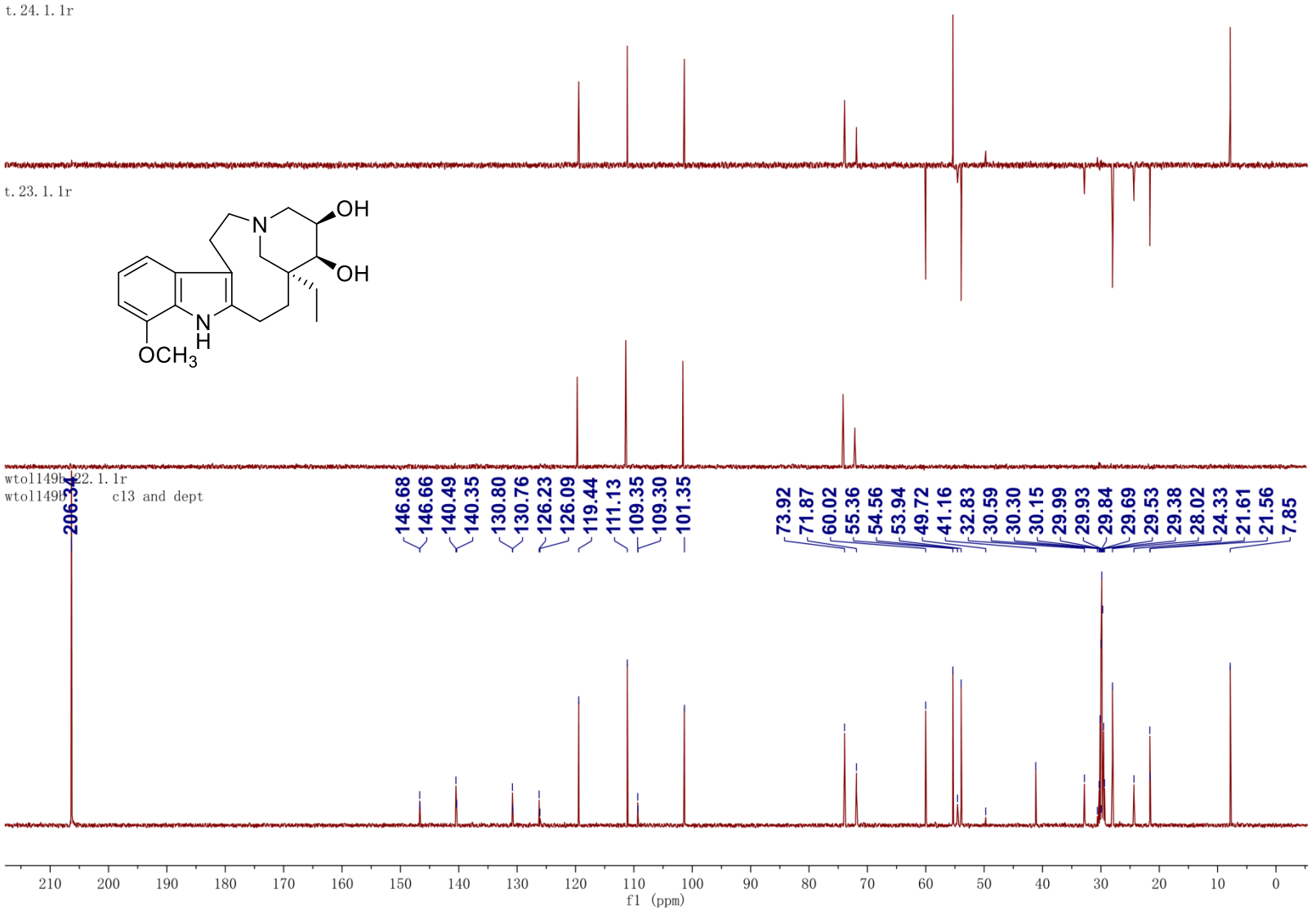
S28 UV and CD spectrum of compound **3** in MeOH

S29. Table S1. ^{1}H and ^{13}C NMR spectroscopic assignments of **4** (acetone-$d_{6)}$ in 500 MHz and 125 MHz (*J* in Hz).

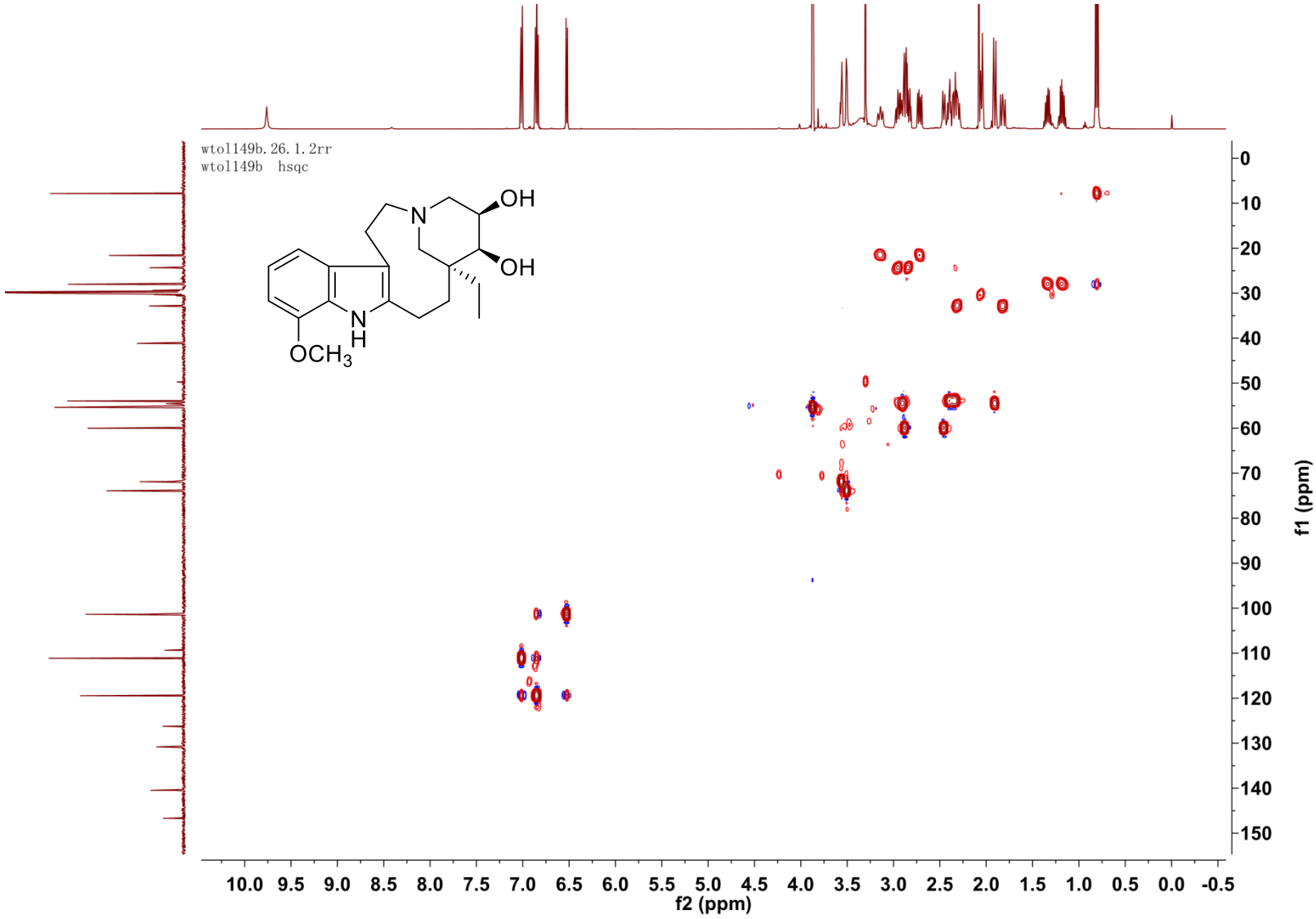
No.	**4**	
	δ_H	δ_C
2		140.4 s
3	2.45 (m)	53.9 t
	2.88 (overlap)	
5	2.33 (overlap)	60.0 t
	2.40 m	
6	2.84 (overlap)	24.3 t
	2.95 m	
7		109.3 s
8		126.2 s
9	7.01 (d, 7.7)	111.1 s
10	6.85 (t, 7.7)	119.4 d
11	6.52 (d, 7.7)	101.4 d
12		146.6 s
12-OCH_3	3.87 s	55.4 q
13		130.8 s
14	3.56 (m)	
15	3.51 (d, 4.9)	73.9 d
16	2.72 (m)	21.6 t
	3.15 m	
17	1.82 (dd, 10.8, 5.2)	32.8 t
	2.32 (overlap)	
18	0.81 (t, 7.5, 3H)	7.9 q
19	1.18 (m)	28.0 t
	1.33 (m)	
20		41.2 s
21	1.91 (d, 12.1)	54.6 t
	2.90 (overlap)	



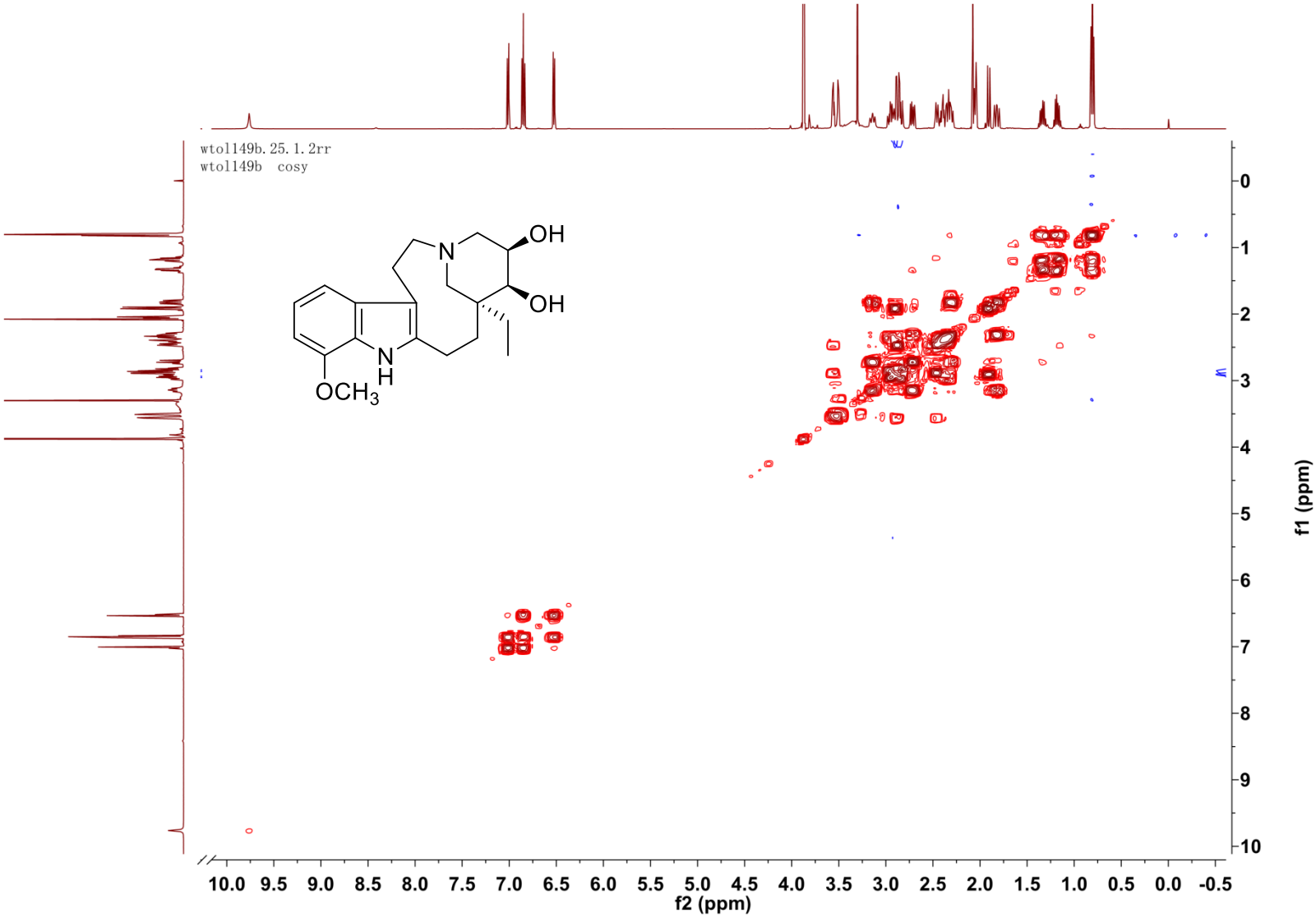
S30 ^{1}H NMR spectrum of compound **4** in CD_3ODCD_3 (500 MHz)



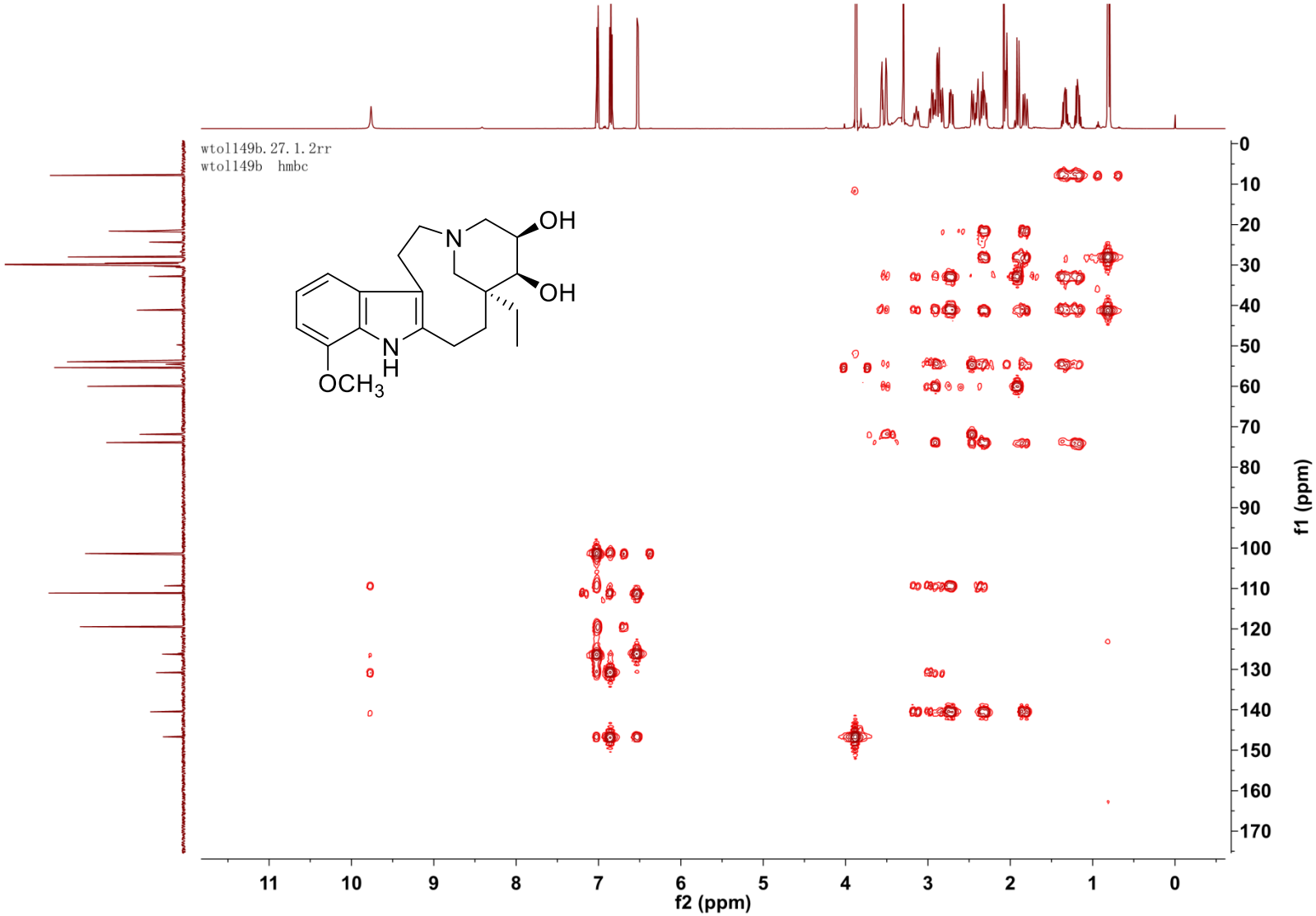
S31 ^{13}C NMR spectrum of compound **4** in CD_3ODCD_3 (125 MHz)



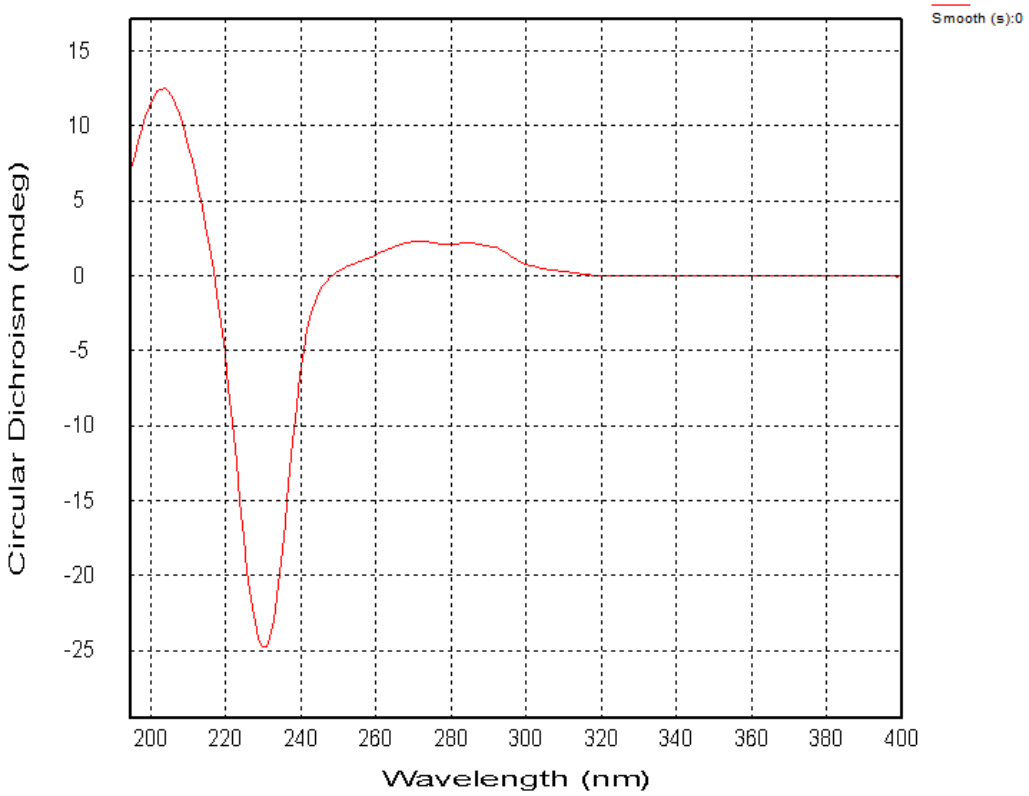
S32 HSQC spectrum of compound **4** in CD_3ODCD_3 (500 MHz)



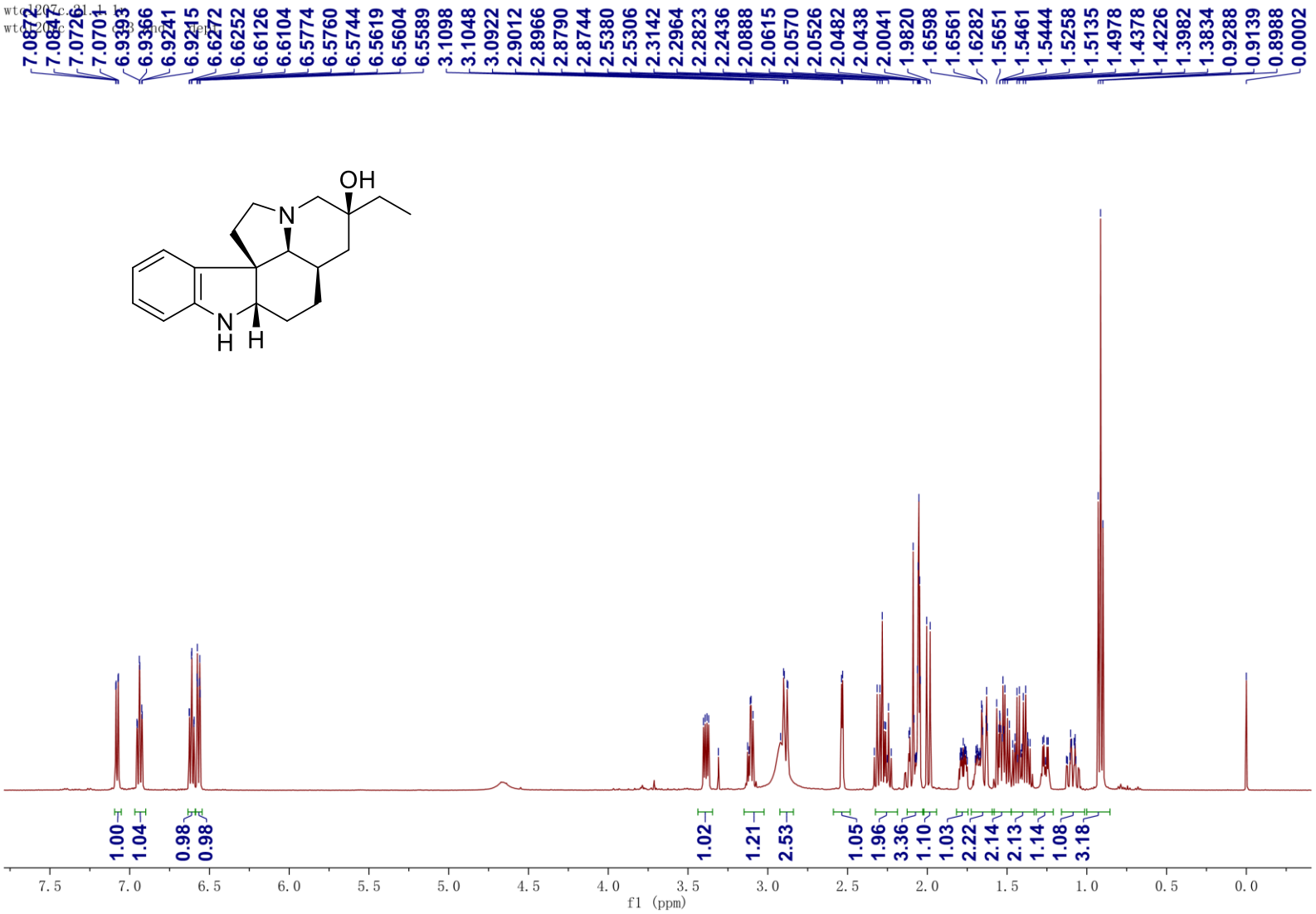
S33 ^{1}H-^{1}H COSY spectrum of compound **4** in CD_3ODCD_3 (500 MHz)



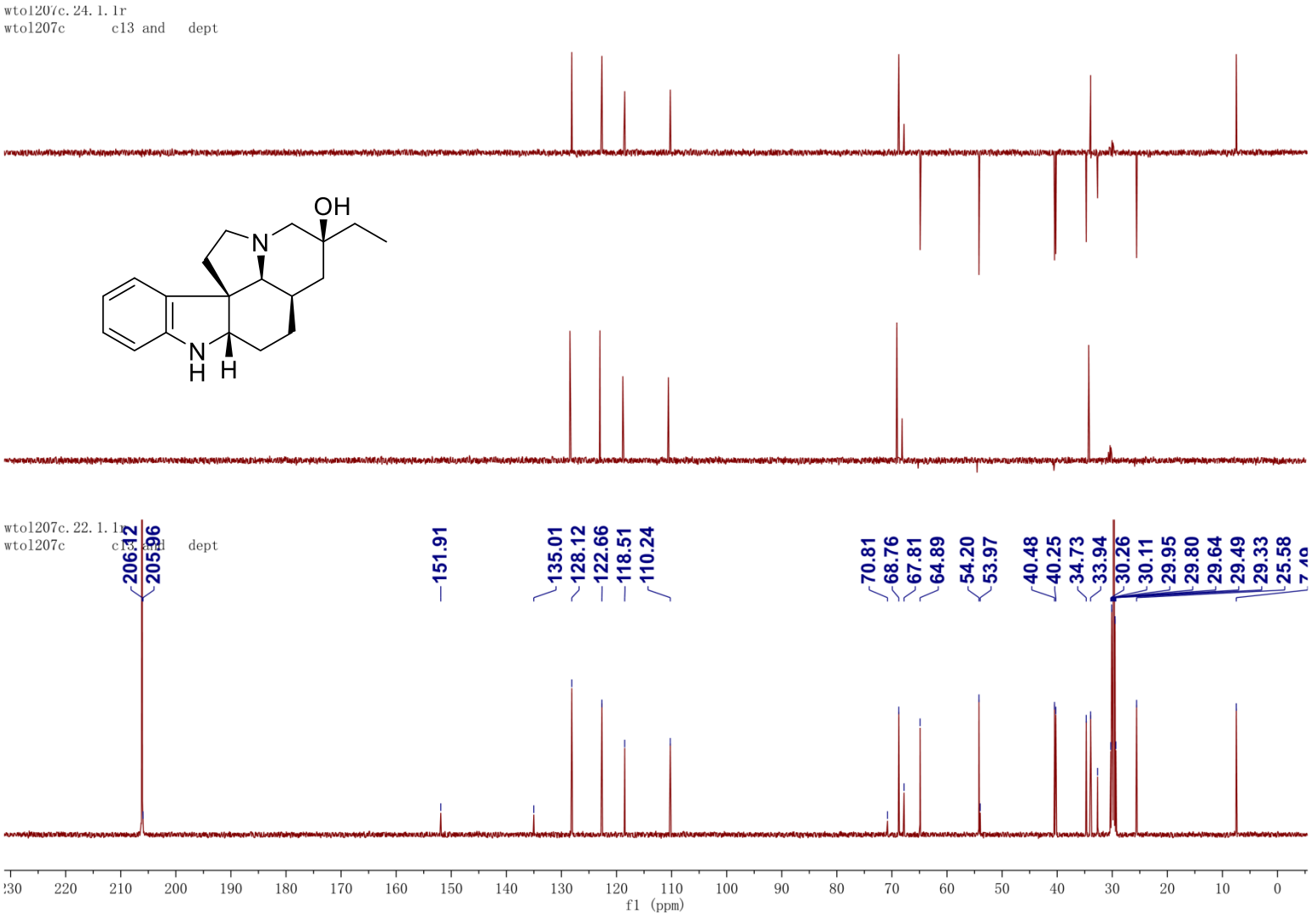
S34 HMBC spectrum of compound **4** in CD_3ODCD_3 (500 MHz)



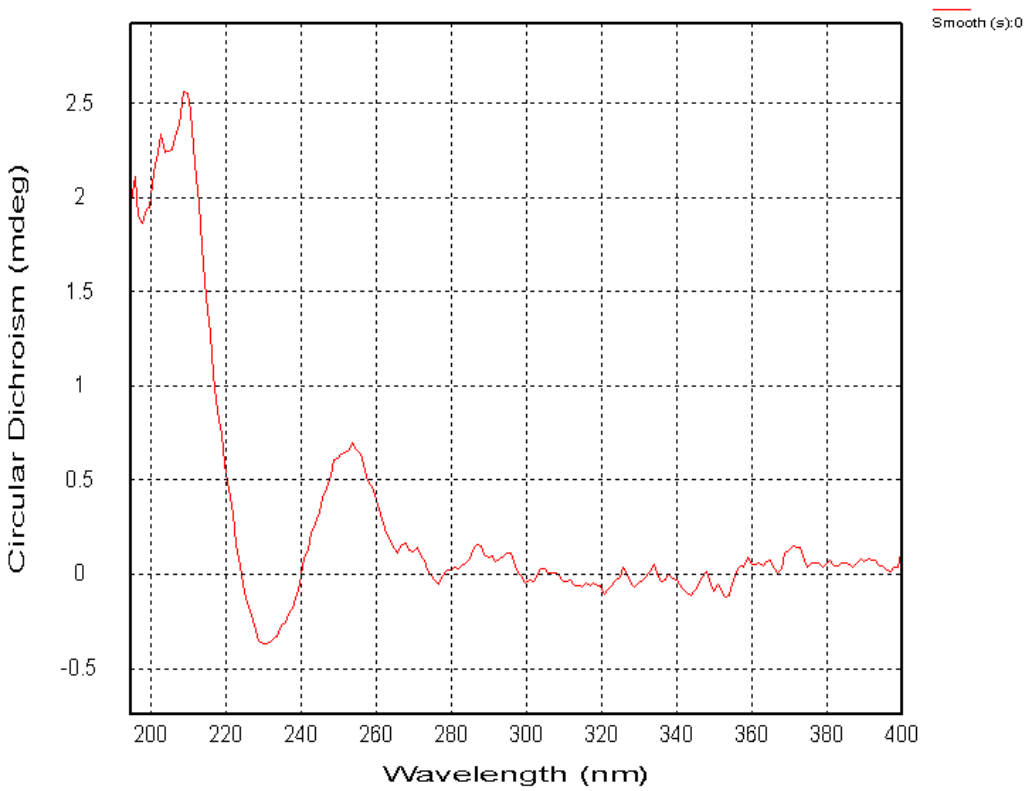
S35 CD spectrum of compound **4** in MeOH



S36 ^{1}H NMR spectrum of compound **5** in CD_3ODCD_3 (500 MHz)



S37 ^{13}C NMR spectrum of compound **5** in CD_3ODCD_3 (500 MHz)



S38 CD spectrum of compound **5** in MeOH

S39. ECD Computational details of compound 1.

The initial conformational analysis of the compounds **1-5** were executed by employing Monte Carlo searching algorithm via the MMFF94 molecular mechanics force field[1], with the aid of the SPARTAN'16 program package, leading to afford a panel of relatively favored conformations in an energy range of 3 kcal/mol above the global minimum. The force field minimum energy conformers thus obtained were subsequently optimized by applying the density functional theory (DFT) with the B3LYP/6-31G(d) level in vacuum, implemented in the Gaussian 09 software package[2]. Harmonic vibrational frequencies were also performed to confirm no imaginary frequencies of the finally optimized conformers. These predominant conformers were subjected to theoretical calculation of ECD by utilizing Time-dependent density functional theory (TDDFT) calculations at the B3LYP/6-311g (2d, p) level in MeOH using the Polarizable Continuum Model (PCM) solvent model. The energies, oscillator strengths, and rotational strengths of each conformers were carried out with Gaussian 09 software package. The oretical calculations of ECD spectra for each conformer were then approximated by the Gaussian distribution. The final ECD spectrum of the individual conformers was summed up on the basis of Boltzmann-weighed population contribution by the SpecDisv 1.64[3].

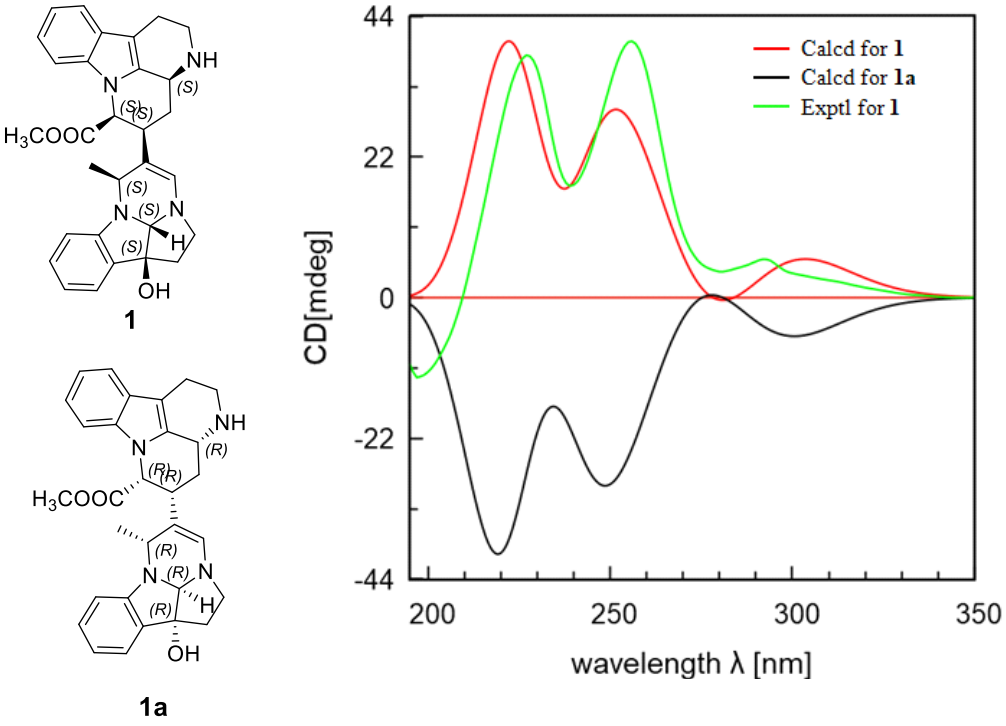


Figure S1. Experimental and calculated ECD spectra of **1 and 1a** (green line, experimentally recorded in methanol; red line **1**, calculated for 3*S*, 15*S*, 16*S*, 19*S*, 2′*S*, 7′*S*.; black line **1a** , calculated for 3*R*, 15*R*, 16*R*, 19*R*, 2′*R*, 7′*R*; configuration in methanol σ = 0.30 ev, and UV shift 0 nm).

Table S2. B3LYP/6-311G (2d, p) optimized lowest energy 3D conformers and energy analysis for **1a-1f**

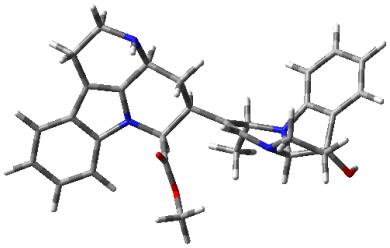
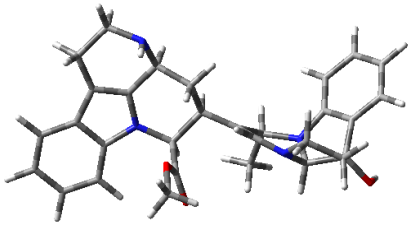
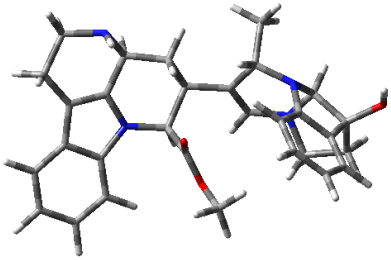
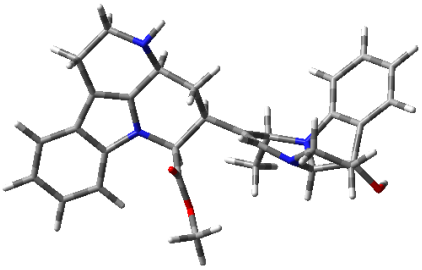
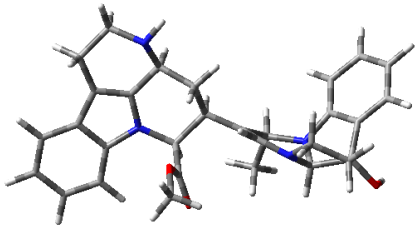
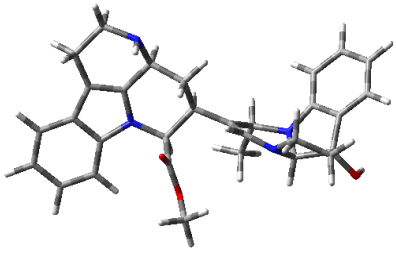
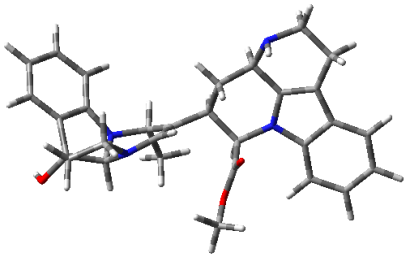
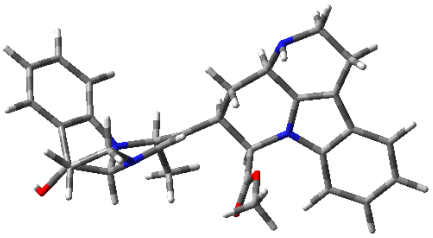
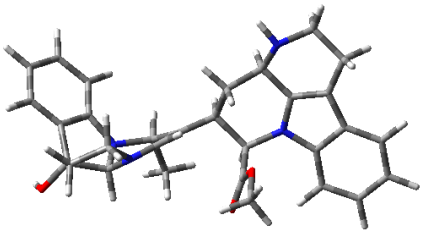
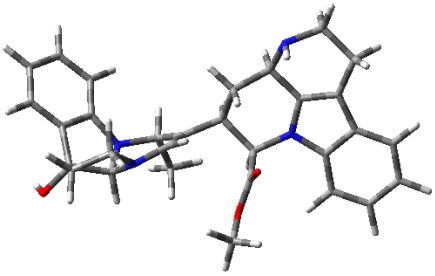
NO.	Conformers 3D conformers	Free energy E (Hartree)	Boltzmann distribution
1a		-1607.068782	42.49%
1b		-1607.067159	7.06%
1c		-1607.064611	0.60%
1d		-1607.067506	5.17%
1e		-1607.066633	2.19%
1f		-1607.068782	42.49%

Table S3. B3LYP/6-311G (2d, p) optimized lowest energy 3D conformers and energy analysis for **1aa-1ad**

	Conformers	Free energy	
NO.	3D conformers	E (Hartree)	Boltzmann distribution
1aa		-1607.068782	45.09%
1ab		-1607.067159	7.50%
1ac		-1607.066961	2.32%
1ad		-1607.068782	45.09%

S40. ECD Computational details of compound 2

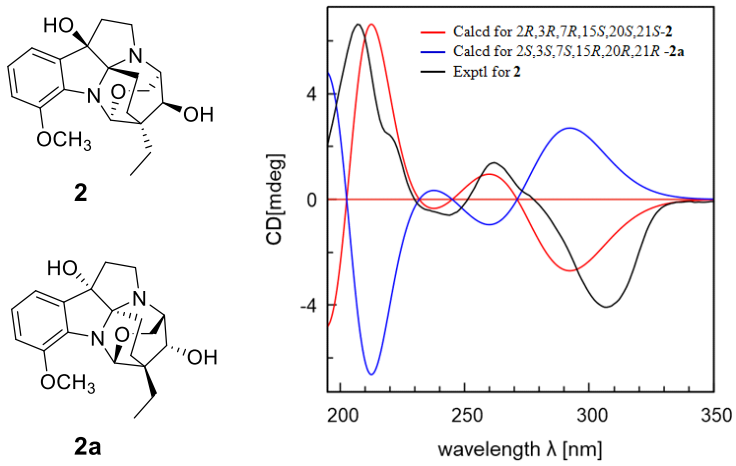
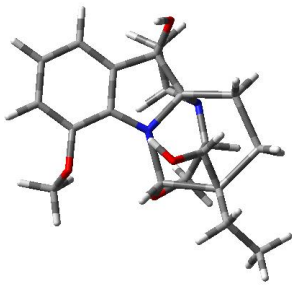
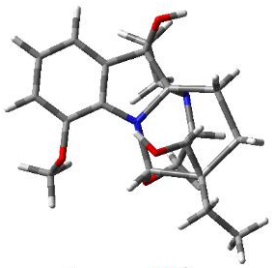
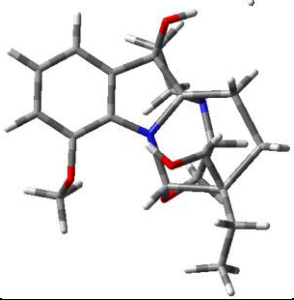


Figure S2. Experimental and calculated ECD spectra of **2 and 2a** (green line, experimentally recorded in methanol; red line **2**, calculated for 2*R*, 3*R*, 7*R*, 15*S*, 20*S*, 21*S*; blue line **2a** , calculated for 2*S*, 3*S*, 7*S*, 15*R*, 20*R*, 21*R*; configuration in methanol σ = 0.20 ev, and UV shift 0 nm).

Table S4. B3LYP/6-311G (2d, p) optimized lowest energy 3D conformers and energy analysis for **2a-2e**

NO.	Conformers 3D conformers	Free energy E (Hartree)	Boltzmann distribution
2a		-1188.081553	52.22%
2b		-1188.079931	3.70%
2c		-1188.079565	4.42%

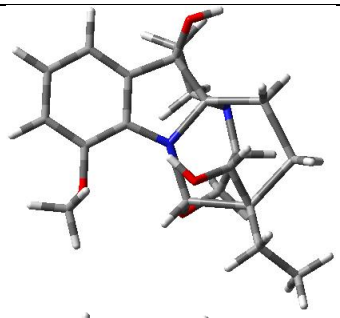
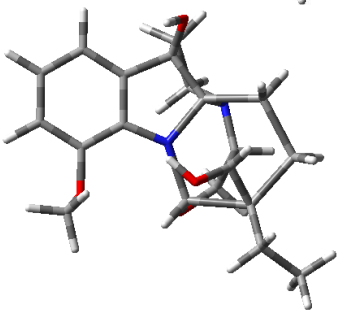
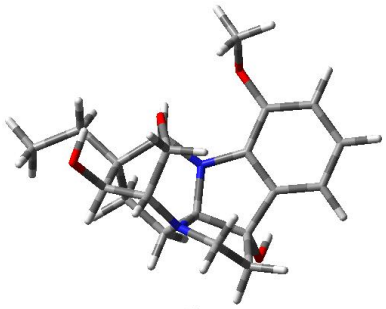
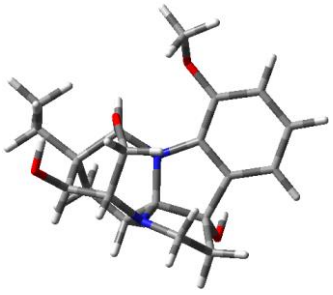
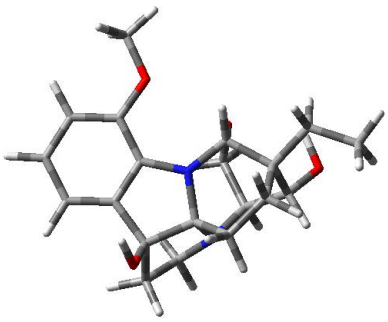
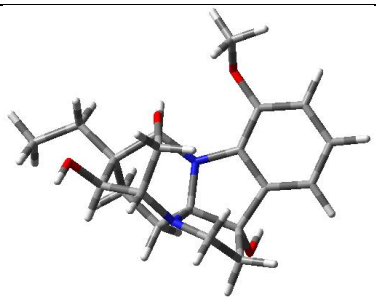
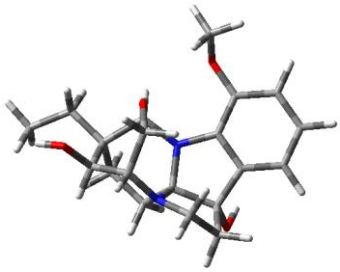
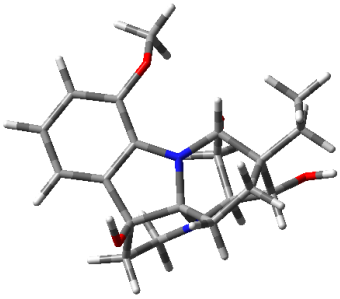
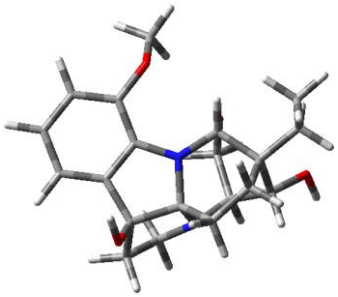
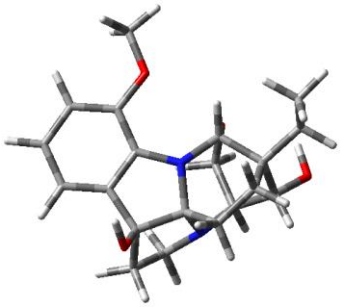
2d		-1188.079931	3.70%
2e		-1188.081796	35.95%

Table S5. B3LYP/6-311G (2d, p) optimized lowest energy 3D conformers and energy analysis for **2aa-2ah**

NO.	Conformers 3D conformers	Free energy E (Hartree)	Boltzmann distribution
2aa		-1188.110601	19.29%
2ab		-1188.109362	5.31%
2ac		-1188.111753	57.29%

2ad		-1188.108028	0.61%
2ae		-1188.107654	0.47%
2af		-1188.108036	0.81%
2ag		-1188.107045	0.23%
2ah		-1188.110524	16.00%

S41. ECD Computational details of compound 3

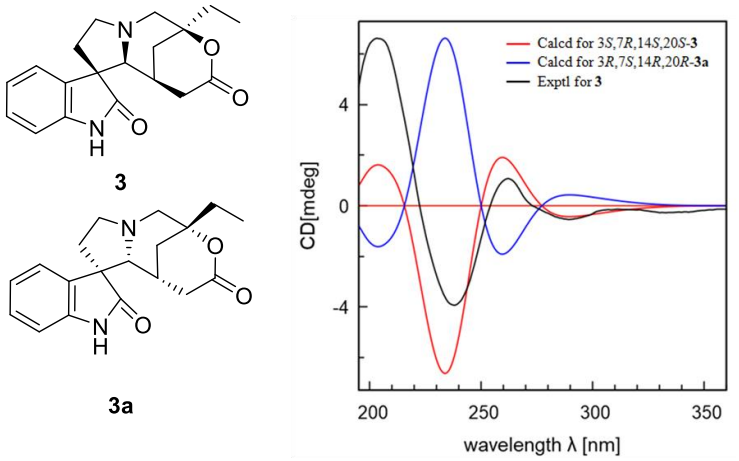
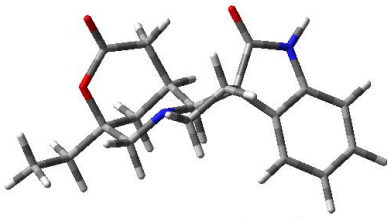
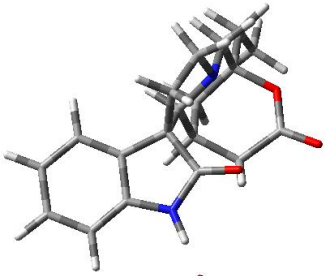
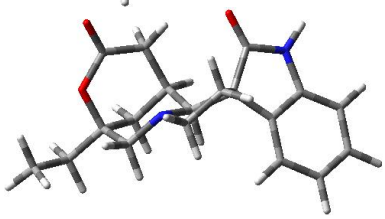
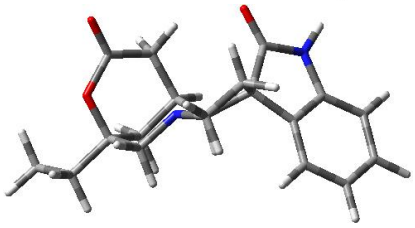


Figure S3. Experimental and calculated ECD spectra of **3** and **3a** (black line, experimentally recorded in methanol; red line **3**, calculated for 3*S*, 7*R*, 14*S*, 20*S*, blue line **3a**, calculated for 3*R*, 7*S*, 14*R*, 20*R*; configuration in methanol σ = 0.35 ev, and UV shift 10 nm).

Table S6. B3LYP/6-311G (2d, p) optimized lowest energy 3D conformers and energy analysis for **3a-3f**

	Conformers	Free energy	
NO.	3D conformers	E (Hartree)	Boltzmann distribution
3a		-1072.446217	23.31%
3b		-1072.446231	23.47%
3c		-1072.446217	23.30%
3d		-1072.446231	23.48%

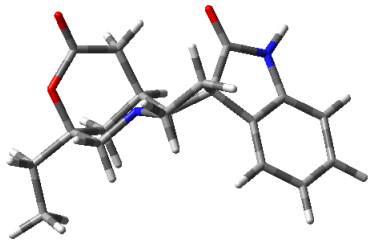
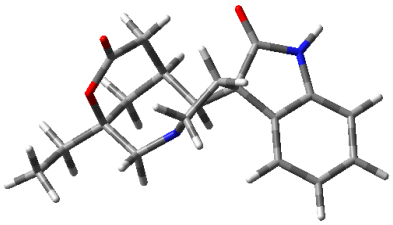
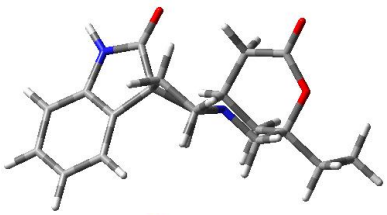
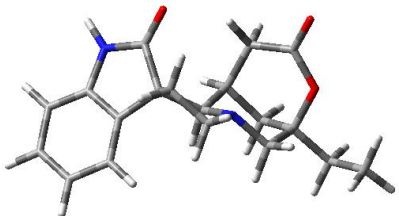
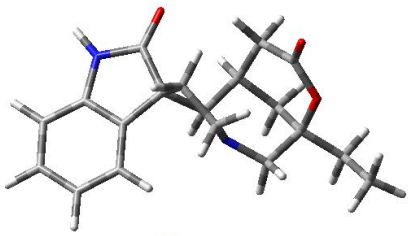
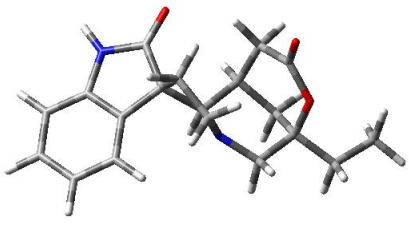
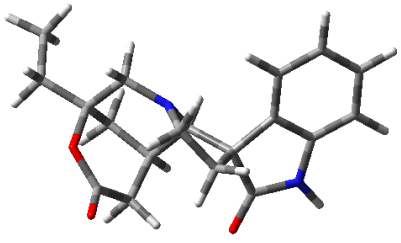
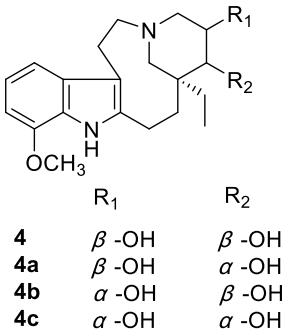
3e		-1072.444731	4.96%
3f		-1072.443237	1.48%

Table S7. B3LYP/6-311G (2d, p) optimized lowest energy 3D conformers and energy analysis for **3aa-3ac**

	Conformers	Free energy	
NO.	3D conformers	E (Hartree)	Boltzmann distribution
3aa		-1072.446231	46.54%
3ab		-1072.446217	46.20%
3ac		-1072.443237	2.94%
3ad		-1072.443410	3.35%
3ae		-1072.441918	0.77%

S42. ECD Computational details of compound 4



	R_1	R_2
4	β -OH	β -OH
4a	β -OH	α -OH
4b	α -OH	β -OH
4c	α -OH	α -OH

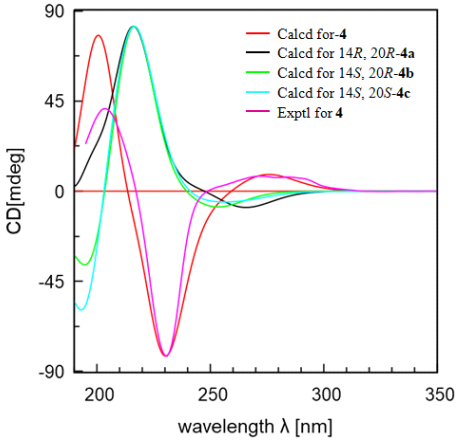
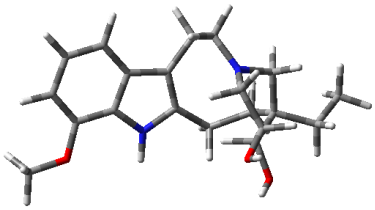
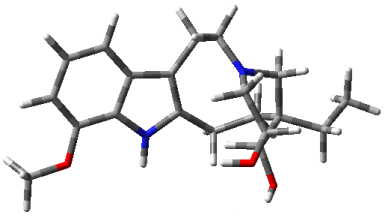
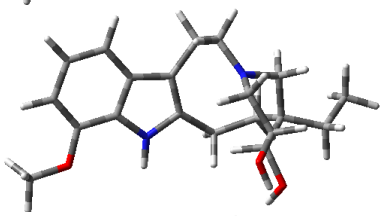
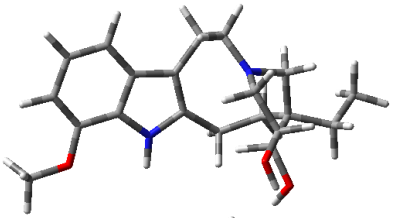
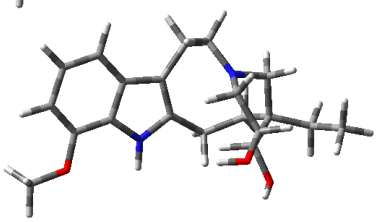


Figure S4. Experimental and calculated ECD spectra for the four candidate configurations of compound **4** (**4**-**4c**) (configuration in methanol σ = 0.2 ev, and UV shift 5 nm).

Table S8. B3LYP/6-311G (2d, p) optimized lowest energy 3D conformers and energy analysis for **4a**-**4f.**

	Conformers	Free energy	
NO.	3D conformers	E (Hartree)	Boltzmann distribution
4a		-1114.085917	12.66%
4b		-1114.08684	57.09%
4c		-1114.084846	3.55%
4d		-1114.084431	2.40%
4e		-1114.085391	11.64%

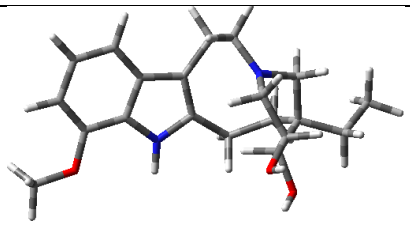
4f		-1114.085917	12.67%

Table S9. B3LYP/6-311G (2d, p) optimized lowest energy 3D conformers and energy analysis for **4aa-4ad**

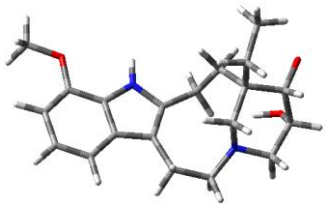
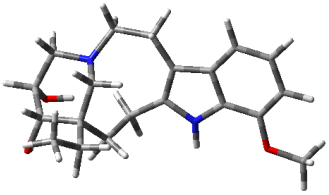
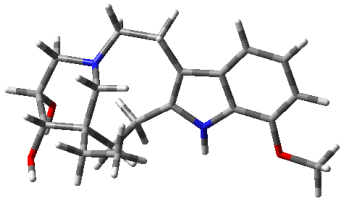
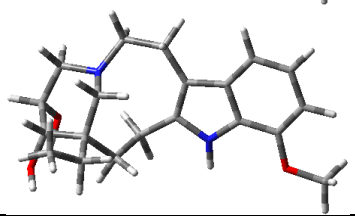
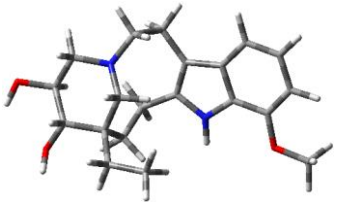
	Conformers	Free energy	
NO.	3D conformers	E (Hartree)	Boltzmann distribution
4aa		-1114.09437	48.59%
4ab		-1114.093174	13.44%
4ac		-1114.094166	27.61%
4ad		-1114.093225	10.37%

Table S10. B3LYP/6-311G (2d, p) optimized lowest energy 3D conformers and energy analysis for **4ba-4bd**

	Conformers	Free energy	
NO.	3D conformers	E (Hartree)	Boltzmann distribution
4ba		-1114.10312	43.57%

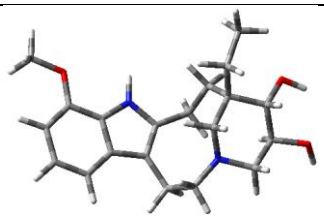
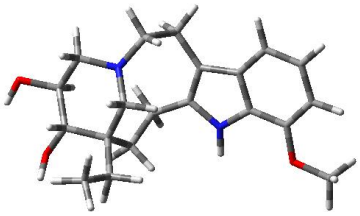
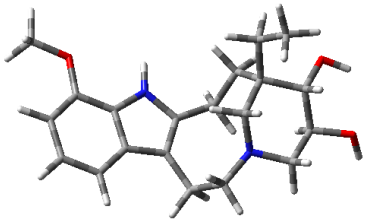
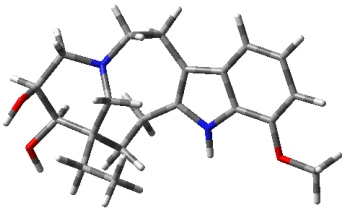
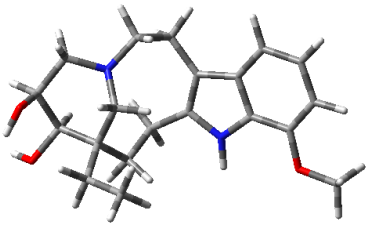
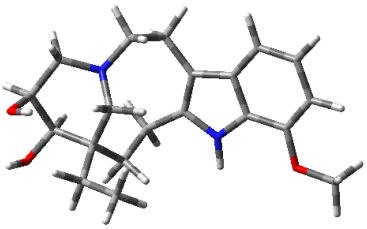
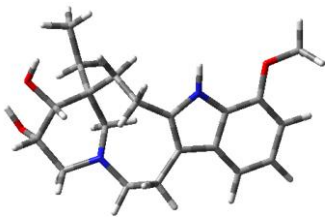
4bb		-1114.102682	28.05%
4bc		-1114.101692	9.89%
4bd		-1114.102312	10.49%

Table S11. B3LYP/6-311G (2d, p) optimized lowest energy 3D conformers and energy analysis for **4ca-4cd**

Conformers		Free energy	
NO.	3D conformers	E (Hartree)	Boltzmann distribution
4ca		-1114.097457	27.07%
4cb		-1114.097812	30.47%
4cc		-1114.097536	37.09%
4cd		-1114.096018	5.37%

S43. ECD Computational details of compound 5

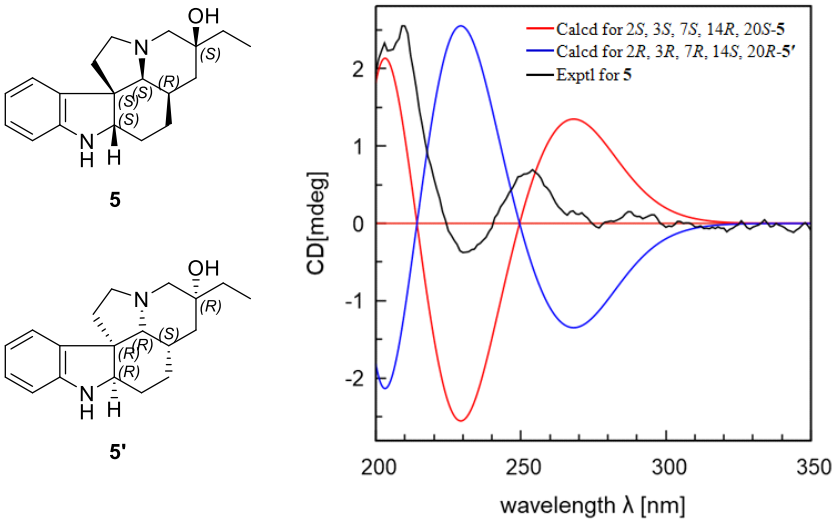
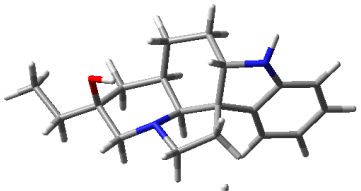
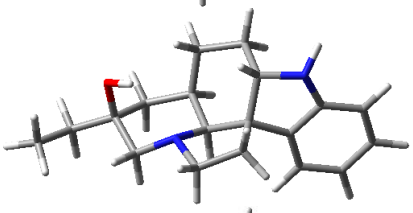
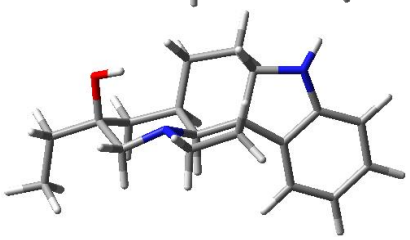
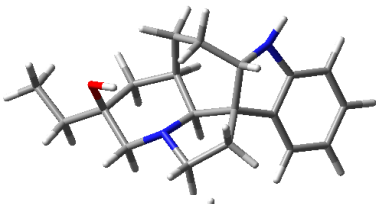
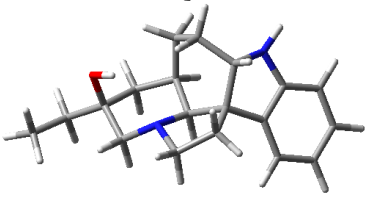


Figure S5. Experimental and calculated ECD spectra for 5 and 5′ (configuration in methanol σ = 0.3 ev, and UV shift -5 nm).

Table S12. B3LYP/6-311G (2d, p) optimized lowest energy 3D conformers and energy analysis for **5a-5e**

NO.	Conformers 3D conformers	Free energy E (Hartree)	Boltzmann distribution
5a		-924.3685405	37.78%
5b		-924.3687359	48.12%
5c		-924.3670582	8.25%
5d		-924.3660137	2.42%
5e		-924.3663049	3.43%

S44. NMR computational details of compound 3

The initial conformational analysis of the compound **3** was executed by employing Monte Carlo searching algorithm via the MMFF94 molecular mechanics force field[1], with the aid of the SPARTAN'16 program package, leading to afford a panel of relatively favored conformations in an energy range of 3 kcal/mol above the global minimum. The force field minimum energy conformers thus obtained were subsequently optimized by applying the density functional theory (DFT) with the B3LYP/6-31G(d) level in vacuum, implemented in the Gaussian 09 software package[2]. Harmonic vibrational frequencies were also performed to confirm no imaginary frequencies of the finally optimized conformers. Gauge-Independent Atomic Orbital (GIAO) calculations of NMR chemical shifts were accomplished by DFT at the mPW1PW91/6-311+g (d, p) level in Acetone with the PCM solvent model in Gaussian 09 software. NMR chemical shifts of TMS were calculated in the same level and used as the references. Regression analysis of calculated versus experimental NMR chemical shifts of **3** was carried out. Linear correlation coefficients (R^2) and Root-mean-square deviation (RMSD) were calculated for the evaluation of the results.

After Boltzmann weighing of the predicted chemical shift of each isomers, the DP4+ parameters were calculated using the excel file provided by Ariel M. Sarotti. [3]

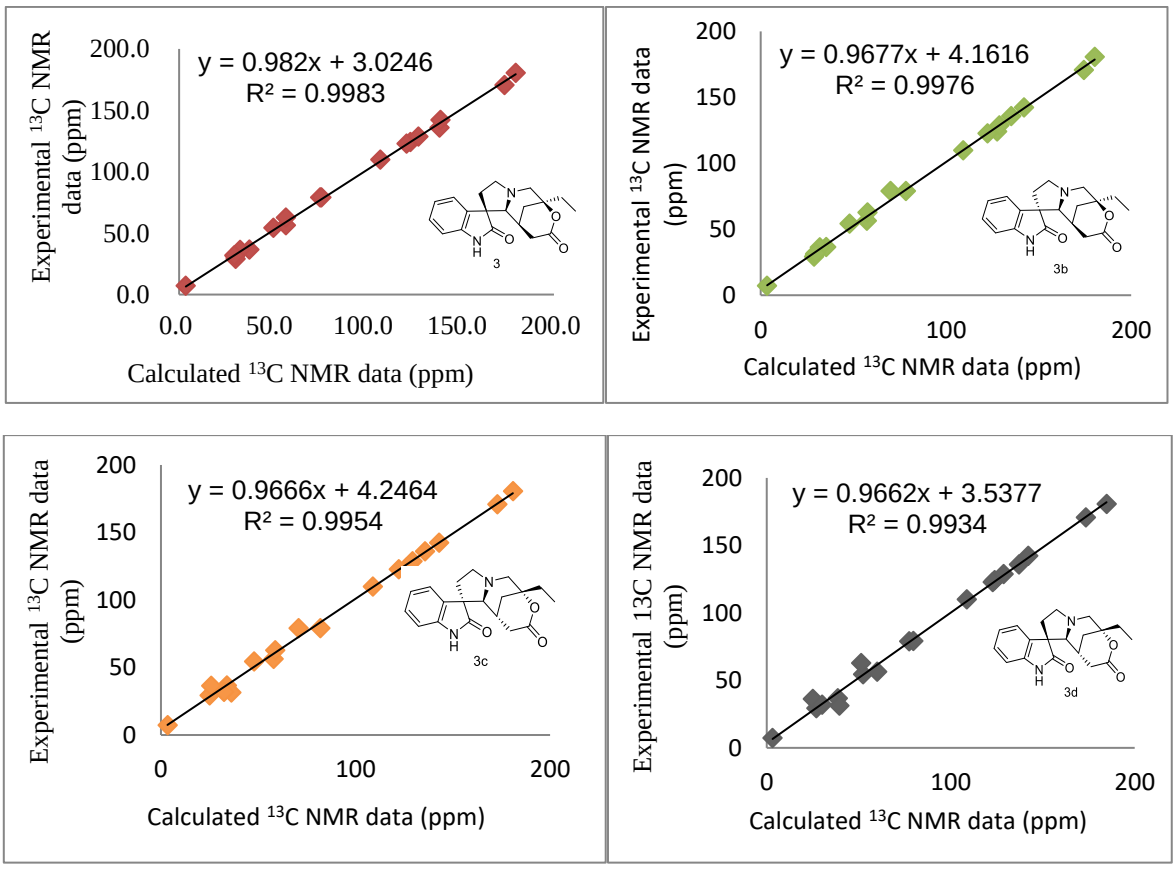
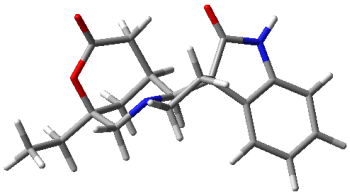
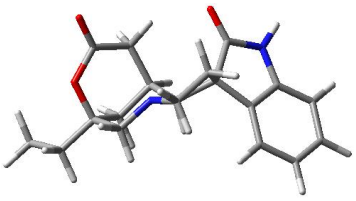
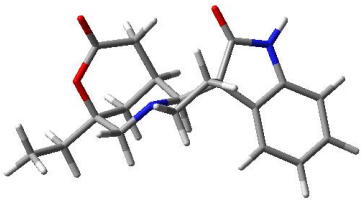
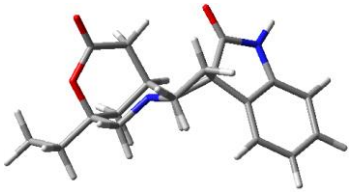
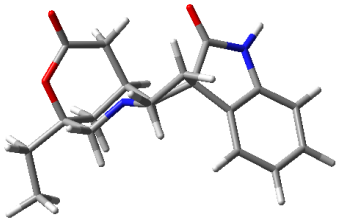


Figure S6. Correlation plots of experimental and calculated ^{13}C-NMR chemical shifts for **3**.

Table S13. Linear correlation coefficients (R^2) and root-mean-square deviation (RMSD) analyses of the calculated and experimental NMR data of **3** and its possible configurations.

Candidate configurations	R^2	RMSD
3	0.9983	2.1356
3b	0.9976	2.5209
3c	0.9954	3.4677
3d	0.9934	4.1684

Table S14. Energy analyses of conformers 3α-3γ

NO.	3D comformers	Free energy		
		E (Hartree)	ΔE (Kcal/mol)	Boltzmann distribution
3α		--1072.134164	0.3351	15.11%
3β		-1072.134697	0.0006	25.58%
3χ		-1072.134164	0.3351	15.11%
3δ		-1072.134698	0	26.60%
3ε		-1072.133502	0.7505	7.49%

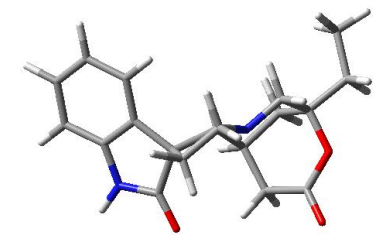
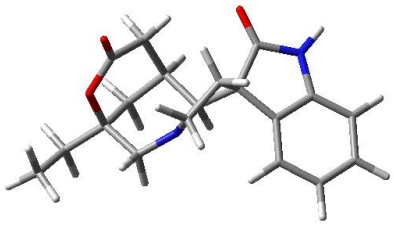
3ϕ		-1072.133504	0.7492	7.51%
3γ		-1072.132051	1.6610	1.61%

Table S15. Energy analyses of conformers 3ba-3bc

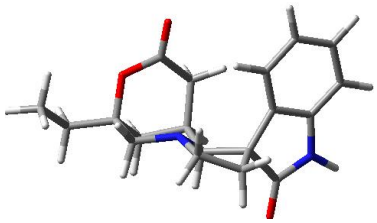
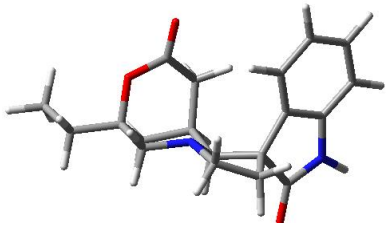
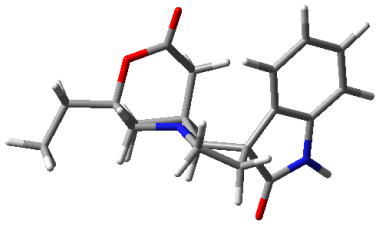
NO.	3D comformers	Free energy		
		E (Hartree)	ΔE (Kcal/mol)	Boltzmann distribution
3ba		-1072.136807	0.2290	34.72%
3bc		-1072.137172	0	51.12%
3bc		-1072.135961	0.7599	14.16%

Table S16. Energy analyses of conformers 3ca-3cc

NO.	3D comformers	Free energy		
		E (Hartree)	ΔE (Kcal/mol)	Boltzmann distribution

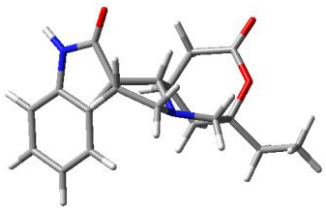
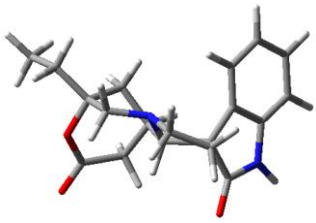
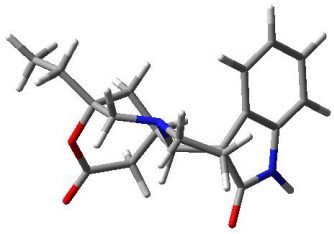
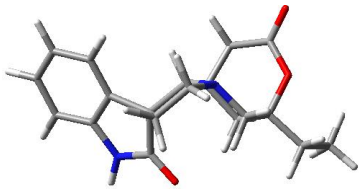
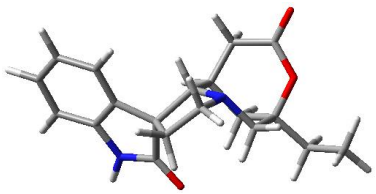
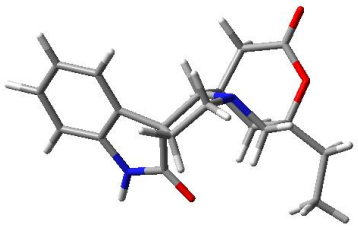
3ca		-1072.133217	0	37.41%
3cc		-1072.133048	0.1060	31.28%
3cc		-1072.133049	0.1054	31.31%

Table S17. Energy analyses of conformers 3da-3dc

NO	3D comformers	E (Hartree)	Free energy ΔE (Kcal/mol)	Boltzmann distribution
3da		-1072.133748	0	32.41%
3dc		-1072.133578	0.1067	27.07%
3dc		-1072.132919	0.5202	13.46%

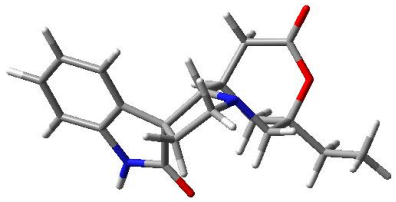
3dd		-1072.133578	0.1067	27.07%

Table S18. DP4+ results of candidate configurations **3** (Isomer **1**), **3b** (Isomer **2**), **3c** (Isomer **3**) and **3d** (Isomer **4**)

	A	B	C	D	E	F	G	H
1	Functional		Solvent?		Basis Set		Type of Data	
2	mPW1PW91		PCM		6-311+G(d,p)		Unscaled Shifts	
3								
4			Isomer 1	Isomer 2	Isomer 3	Isomer 4	Isomer 5	Isomer 6
5	sDP4+ (H data)		99.83%	0.00%	0.02%	0.15%	–	–
6	sDP4+ (C data)		82.94%	17.06%	0.00%	0.00%	–	–
7	sDP4+ (all data)		100.00%	0.00%	0.00%	0.00%	–	–
8	uDP4+ (H data)		99.02%	0.00%	0.16%	0.82%	–	–
9	uDP4+ (C data)		19.50%	80.45%	0.04%	0.00%	–	–
10	uDP4+ (all data)		99.99%	0.01%	0.00%	0.00%	–	–
11	DP4+ (H data)		100.00%	0.00%	0.00%	0.00%	–	–
12	DP4+ (C data)		54.11%	45.89%	0.00%	0.00%	–	–
13	DP4+ (all data)		100.00%	0.00%	0.00%	0.00%	–	–

References

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