

Electronic Supplementary Information

Ancistrocyclinones A and B, unprecedented pentacyclic N,C-coupled naphthylisoquinoline alkaloids, from the Chinese liana *Ancistrocladus tectorius*

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Table 1: ^1H and ^{13}C NMR data of ancistrocyclinone A (**5**) and B (**6**) in MeOD (400 MHz and 150 MHz).^a

Position	5		6	
	δ_{H}	δ_{C}	δ_{H}	δ_{C}
1		148.6		148.8
3	5.98 (m)	55.3	5.94 (m)	55.1
4	3.21 (dd, 16.9, 1.7) 3.56 (dd, 16.6, 5.6)	34.3	3.13 (dd, 16.7, 1.7) 3.51 (dd, 15.6, 5.1)	34.2
5	6.80 (d, 2.2)	108.4	6.60 (s)	108.5
6		168.2		167.2
7	6.82 (d, 2.2)	99.5	6.68 (d, 2.2)	100.2
8		162.9		162.9
9		109.7		110.3
10		139.4		139.5
1'		141.0		141.1
2'		146.0		146.0
3'	6.91 (d, 1.3)	136.7	6.90 (d, 1.4)	136.6
4'		184.2		184.3
5'		163.9		163.7
6'	8.15 (d, 10.0)	122.5	8.12 (d, 10.0)	122.2
7'	8.93 (d, 10.0)	127.4	8.90 (d, 10.1)	127.3
8'		132.8		132.8
9'		126.4		126.2
10'		115.1		115.2
11'	9.19 (s)	125.0	9.17 (s)	125.0
3-CH ₃	1.50 (d, 6.9)	16.7	1.49 (d, 6.9)	16.6
6-OCH ₃	4.01 (s)	56.7		
8-OCH ₃	4.12 (s)	57.2	4.08 (s)	57.0
2'-CH ₃	2.64 (d, 1.4)	18.7	2.63 (d, 1.4)	18.7
5'-OCH ₃	4.26 (s)	57.9	4.25 (s)	57.9

^a Multiplicities and coupling constants J (Hz) are shown in parentheses, δ values are given in ppm.

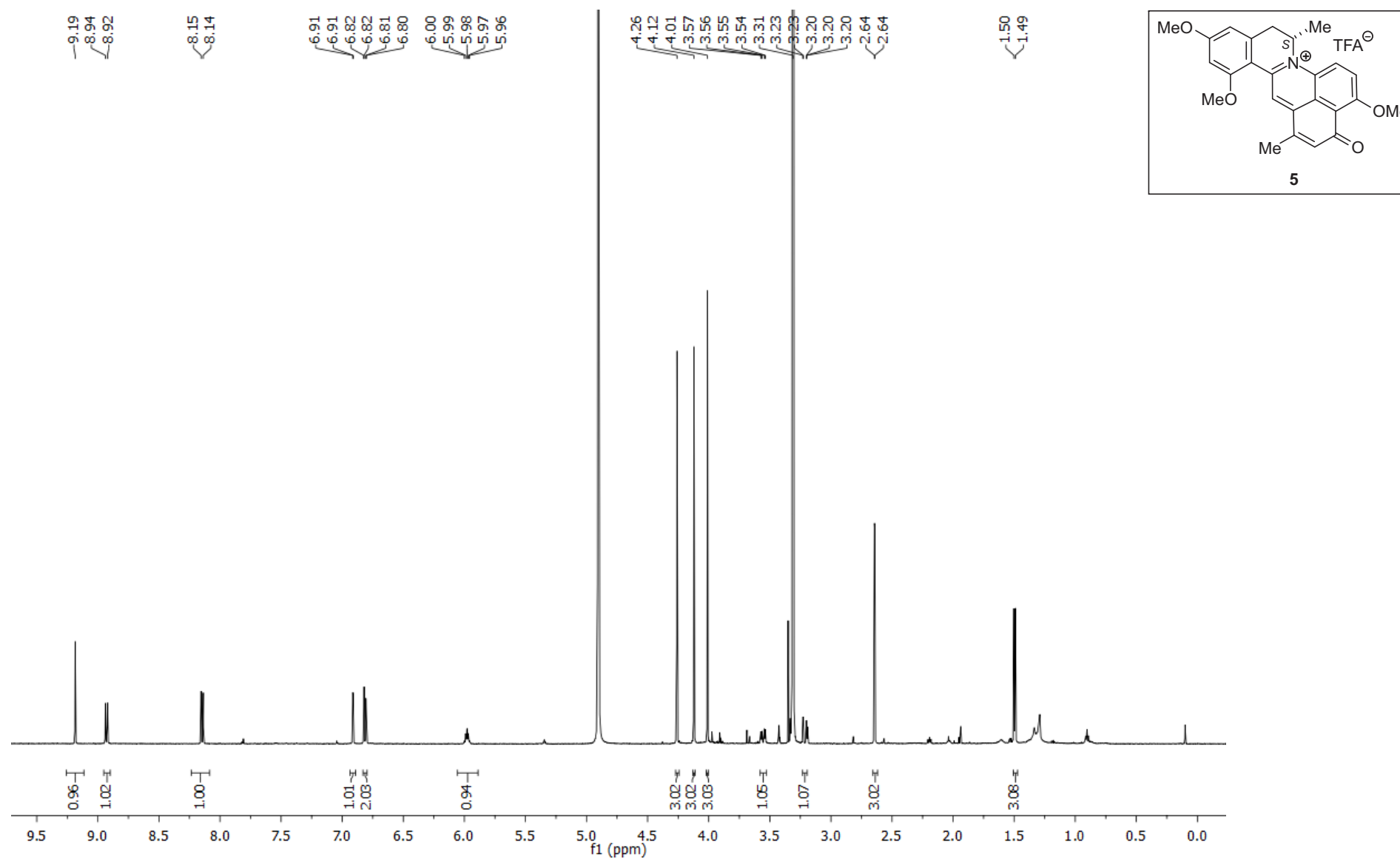


Figure 1: ^1H NMR spectrum of ancistrocyclinone A (5) in MeOD .

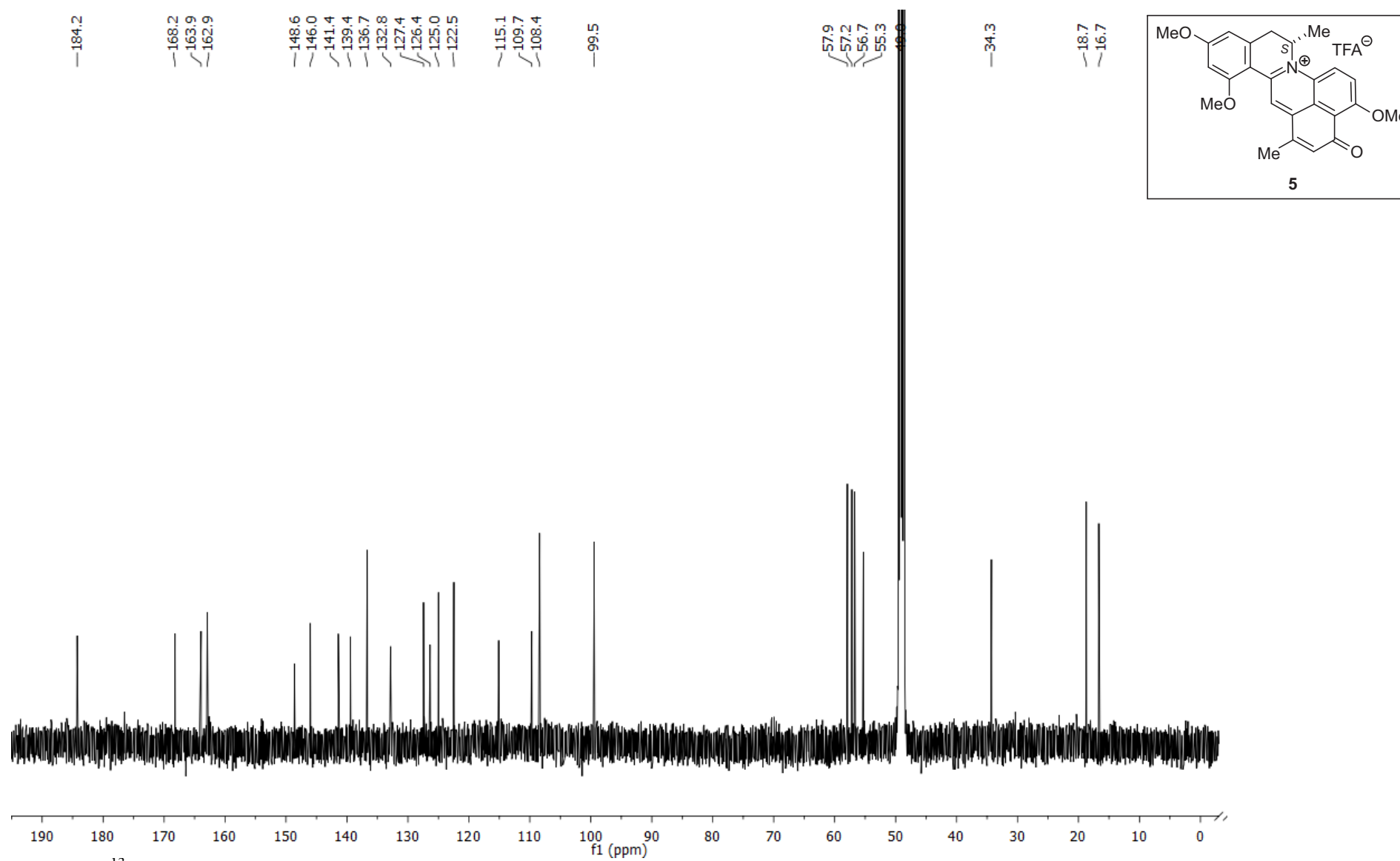


Figure 2: ^{13}C NMR spectrum of ancistrocyclinone A (5) in MeOD.

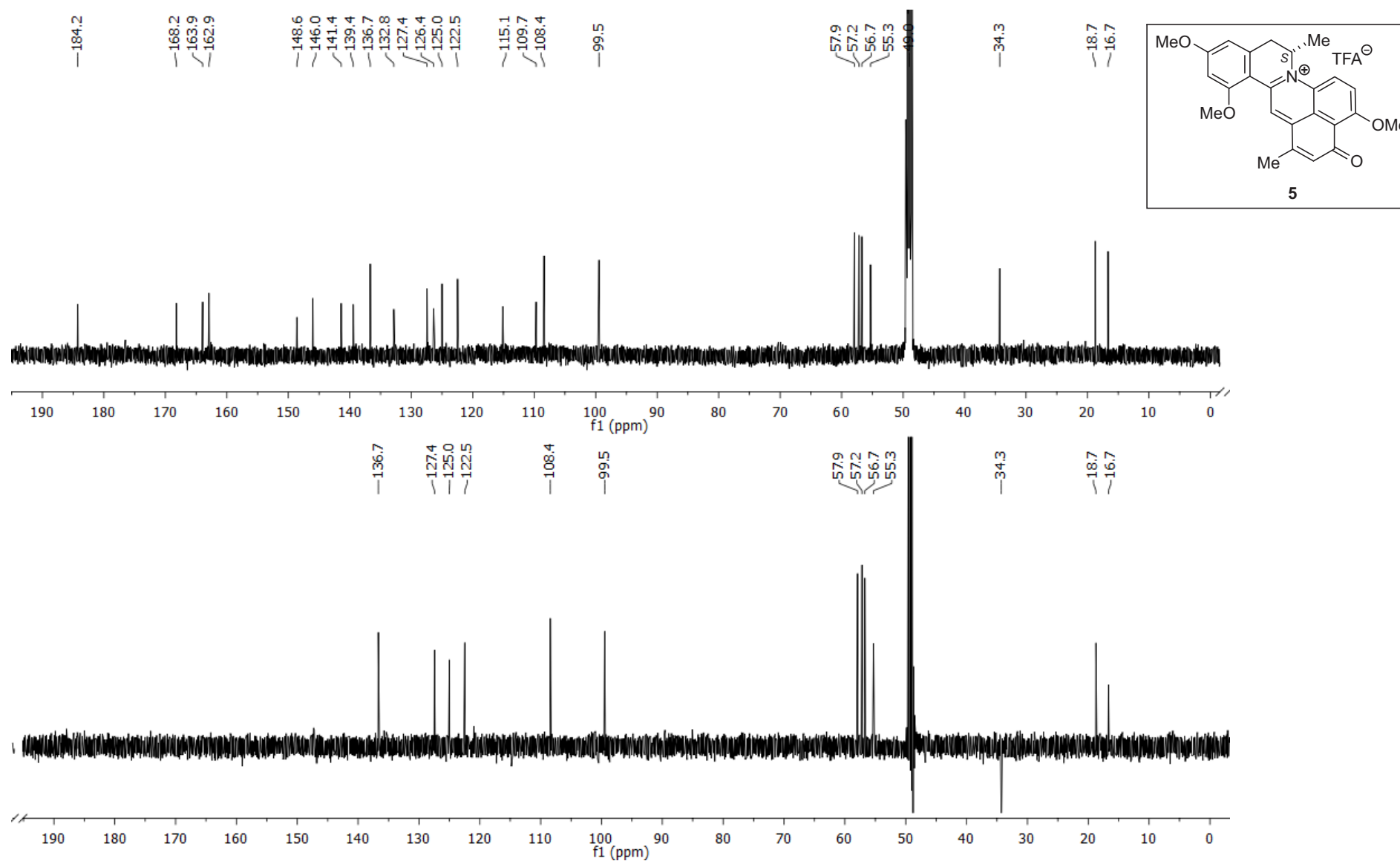


Figure 3: DEPT NMR spectrum of ancistrocyclinone A (5) in MeOD.

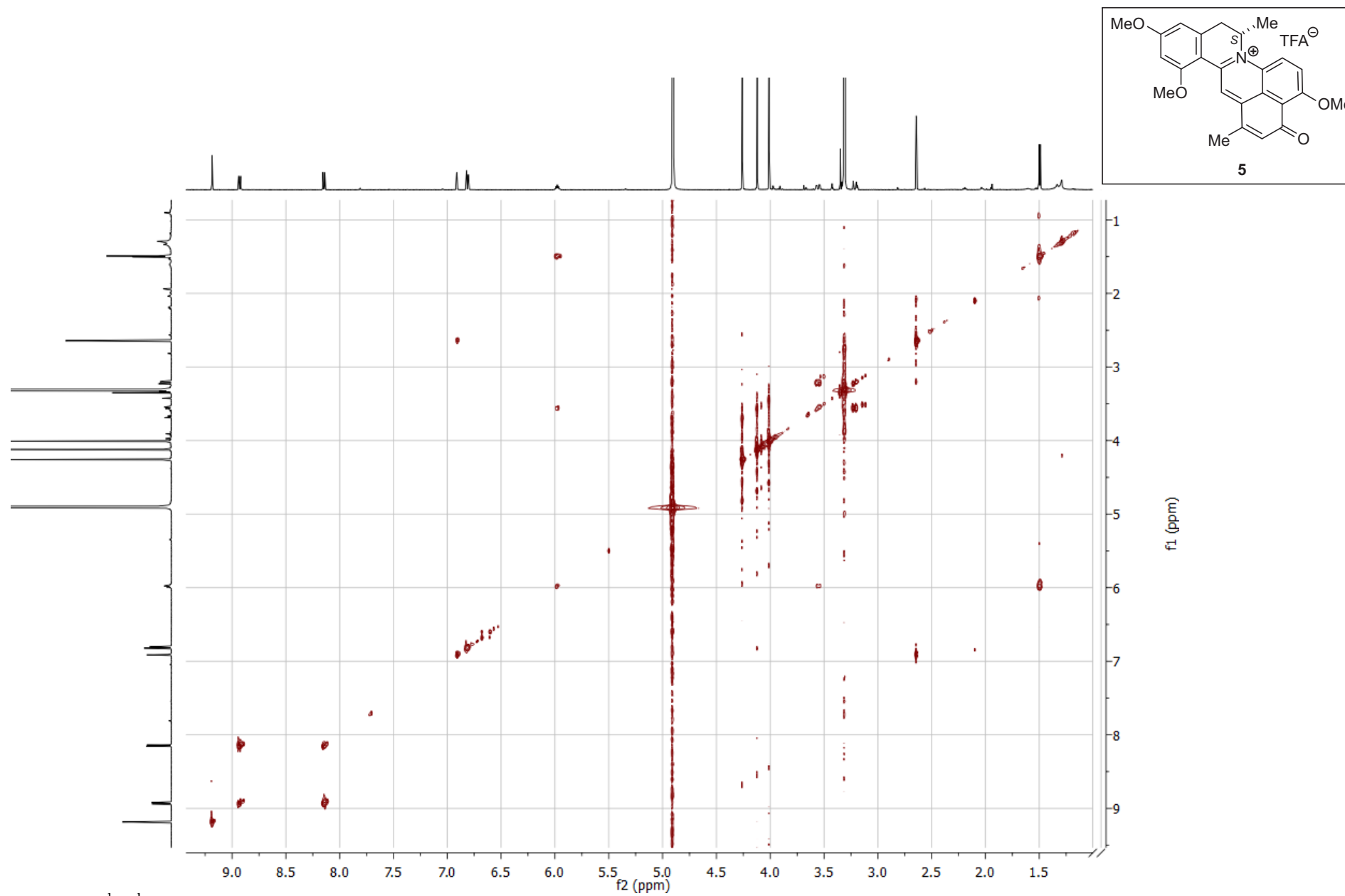


Figure 4: ^1H , ^1H -COSY spectrum of ancistrocyclinone A (5) in MeOD.

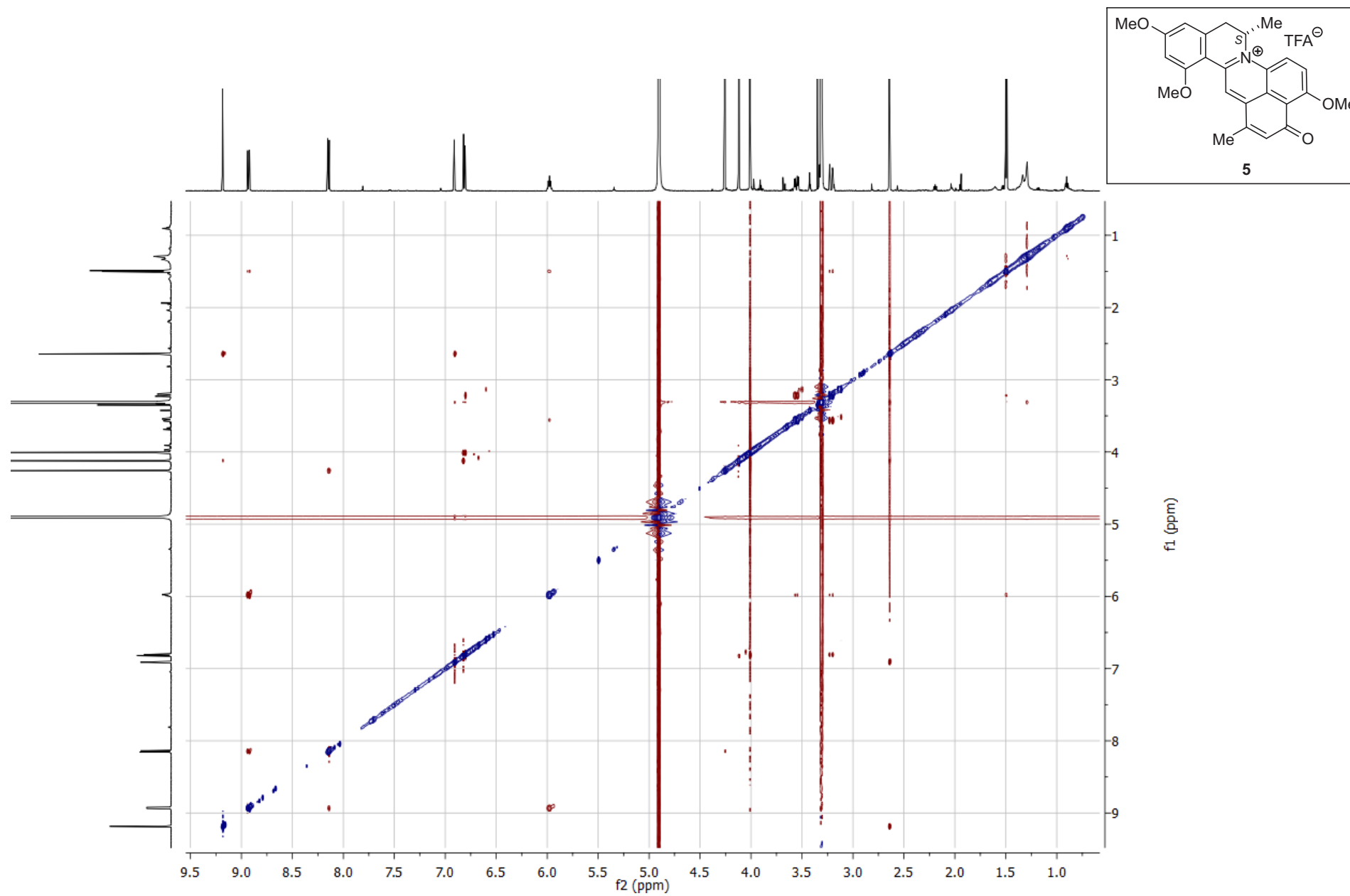


Figure 5: NOESY spectrum of ancistrocyclinone A (5) in MeOD.

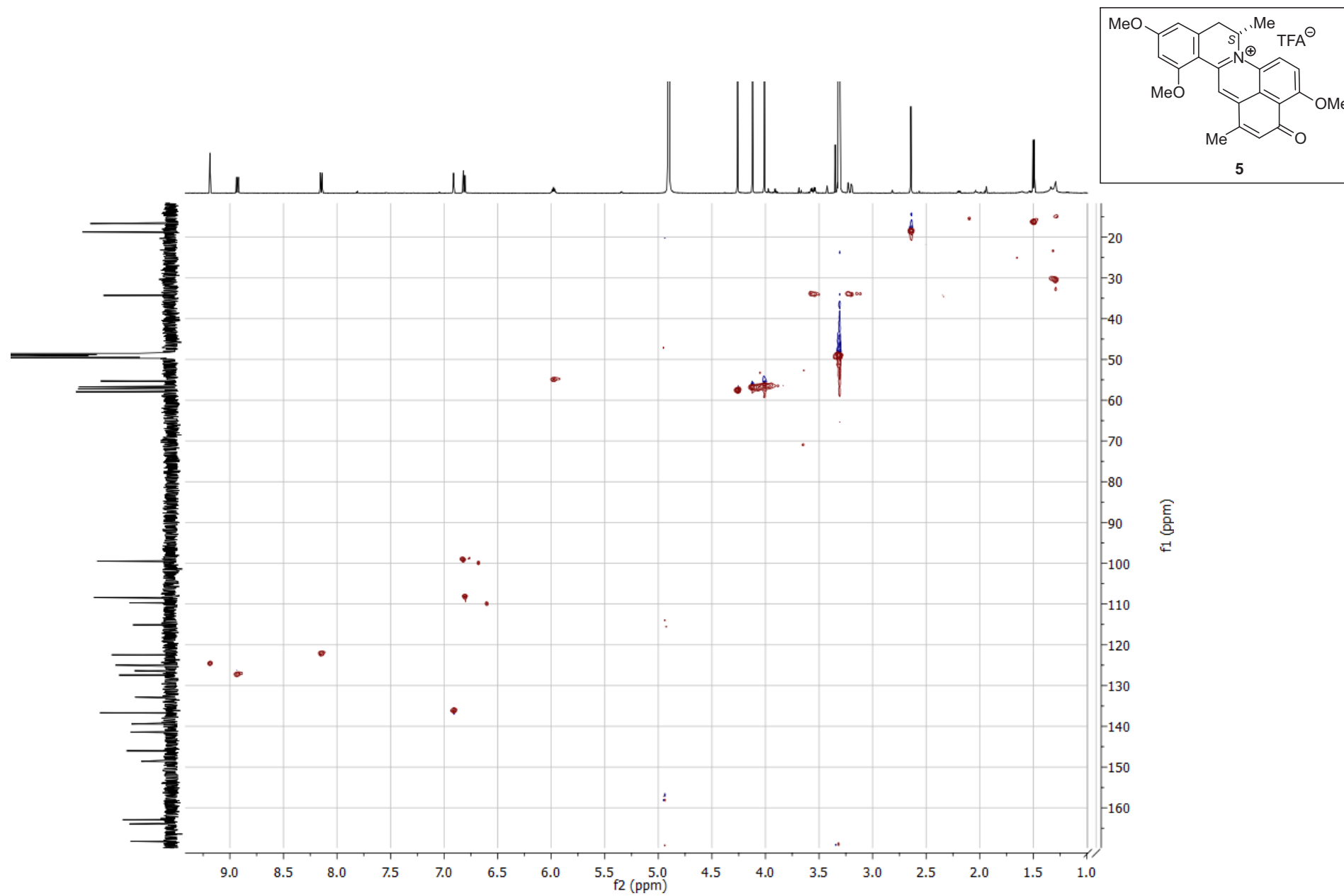


Figure 6: HSQC spectrum of ancistrocyclinone A (5) in MeOD.

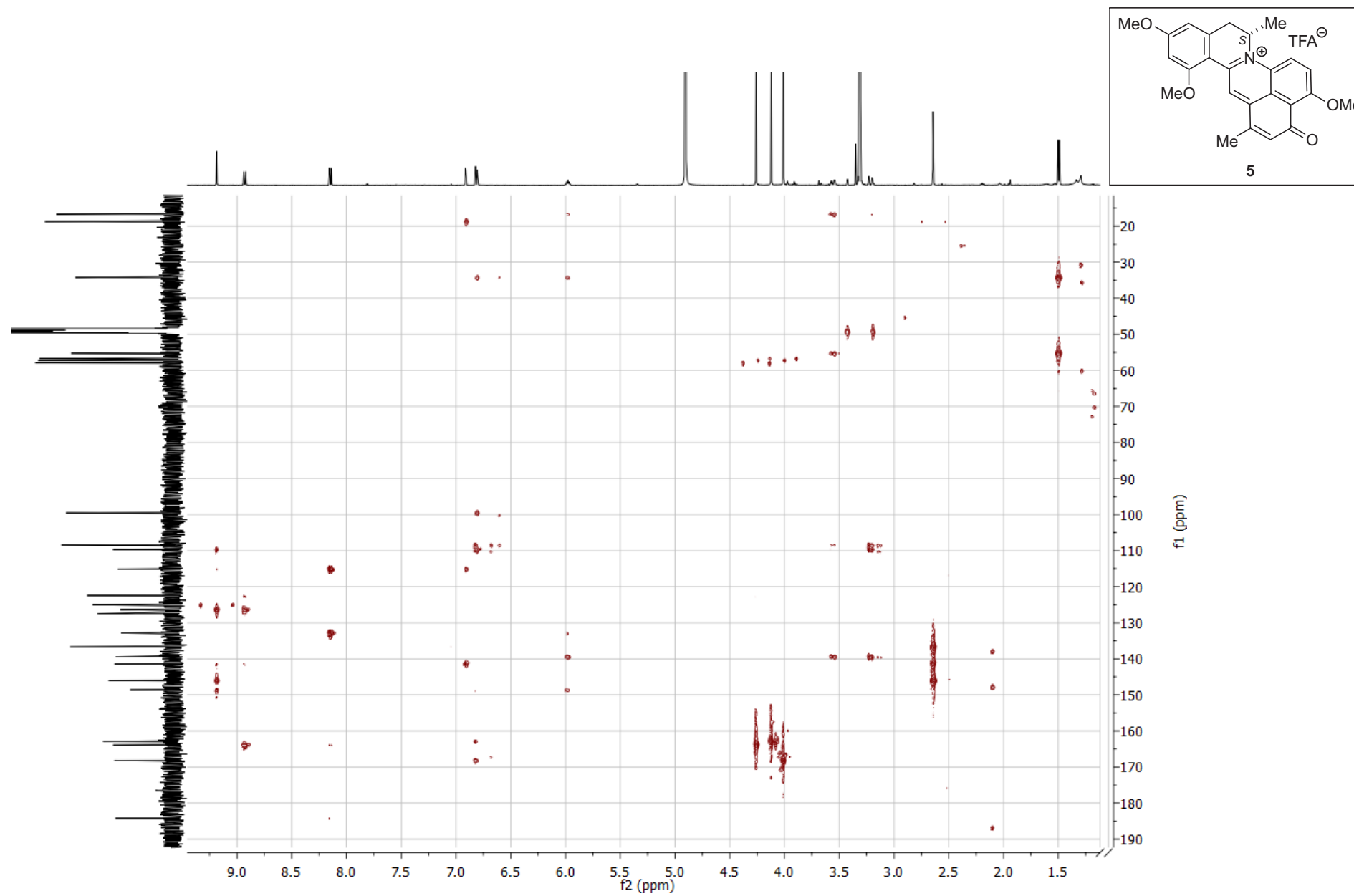


Figure 7: HMBC spectrum of ancistrocyclinone A (5) in MeOD.

Mass Spectrum Molecular Formula Report

Analysis Info

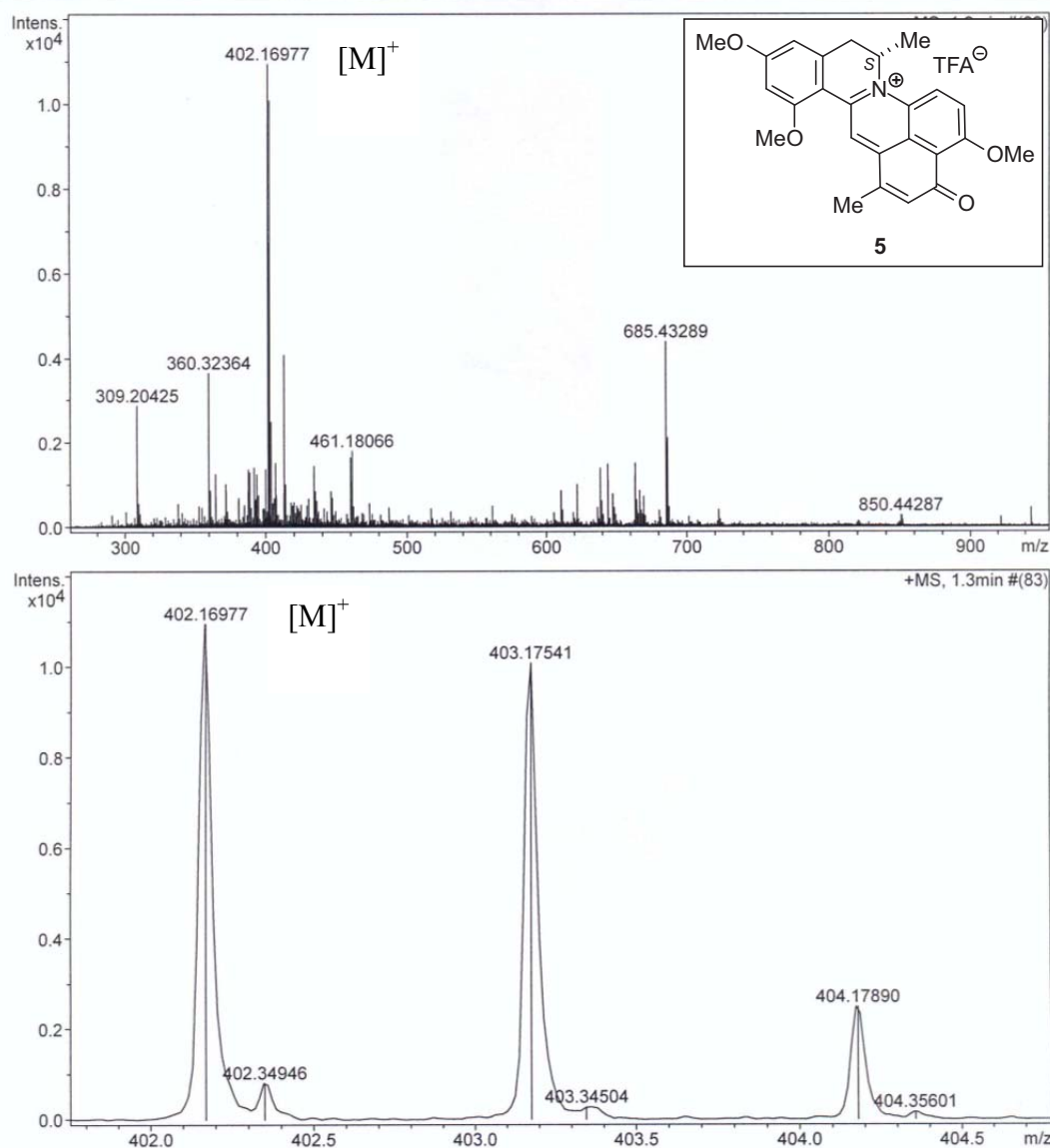
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 Comment Minjuan Xu
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Acquisition Date 27.11.2007 15:04:11

Operator Administrator
 Instrument micrOTOF 88

Acquisition Parameter

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Scan End	1050 m/z	Skimmer 1	50.0 V	Set Reflector	1300 V
		Hexapole 1	22.0 V	Set Flight Tube	9000 V
				Set Detector TOF	2100 V



Sum Formula	Sigma	m/z	Err [ppm]	Mean Err [ppm]	rdb	N Rule	e ⁻
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Figure 8: HRESI mass spectrum of ancistrocyclinone A (5).

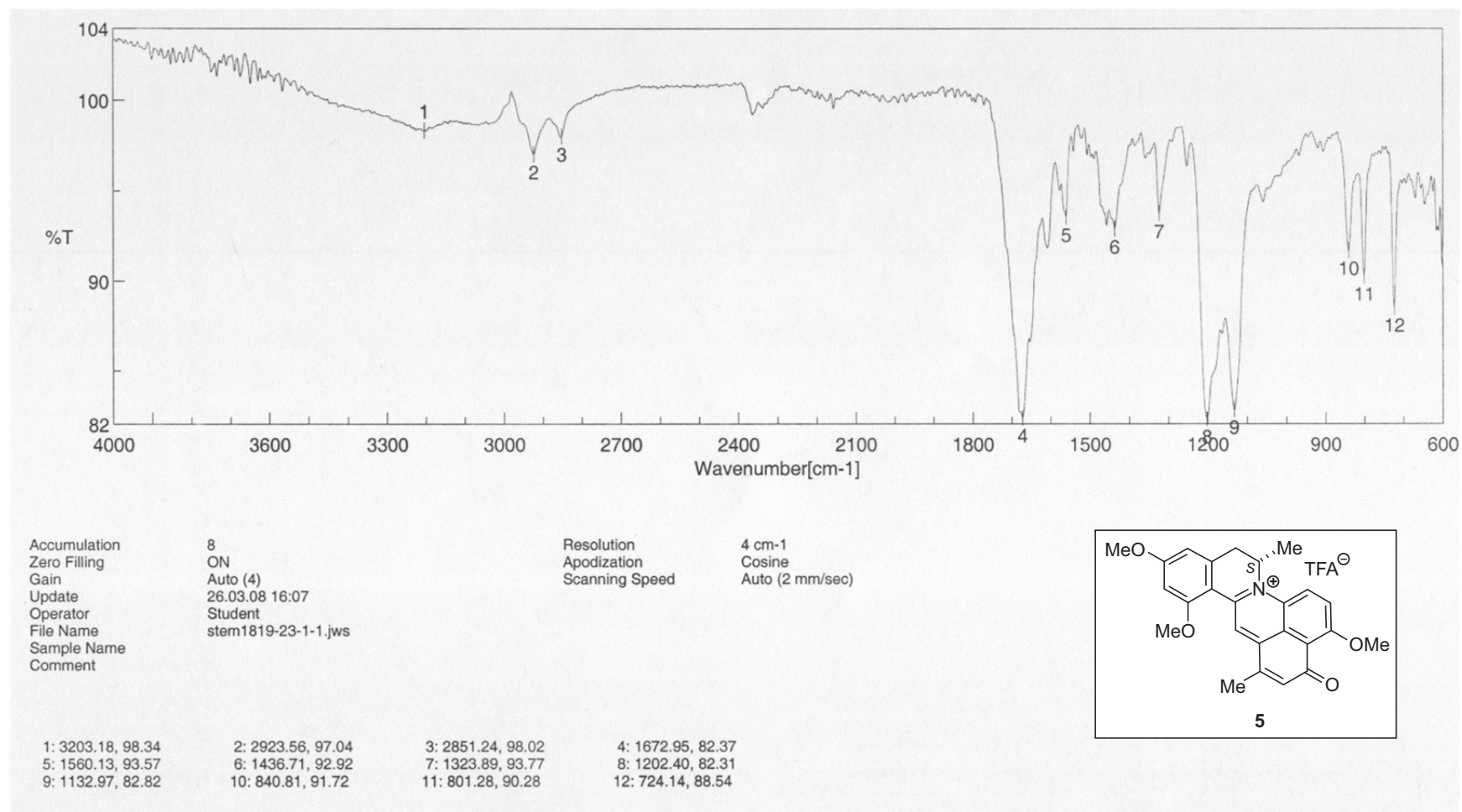


Figure 9: IR spectrum of ancistrocyclinone A (5).

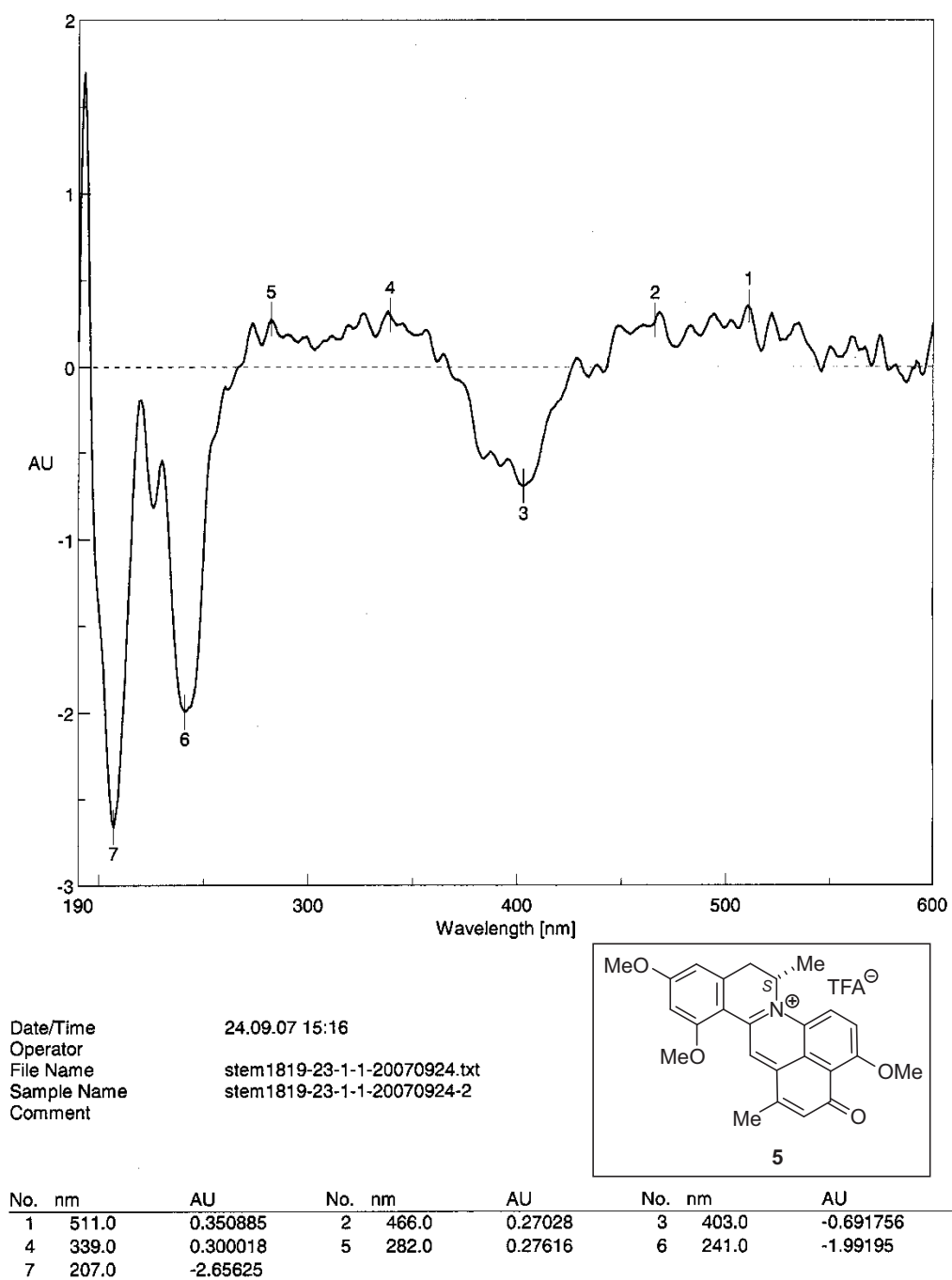
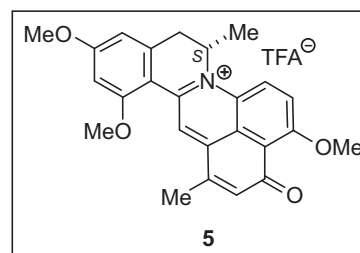
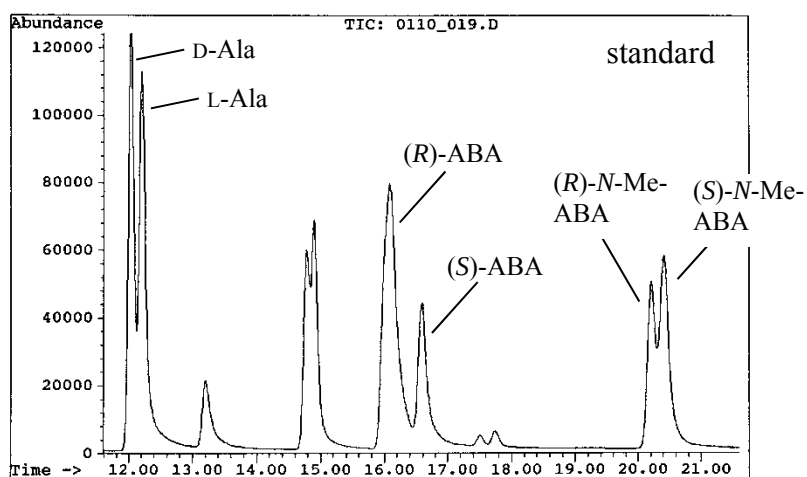
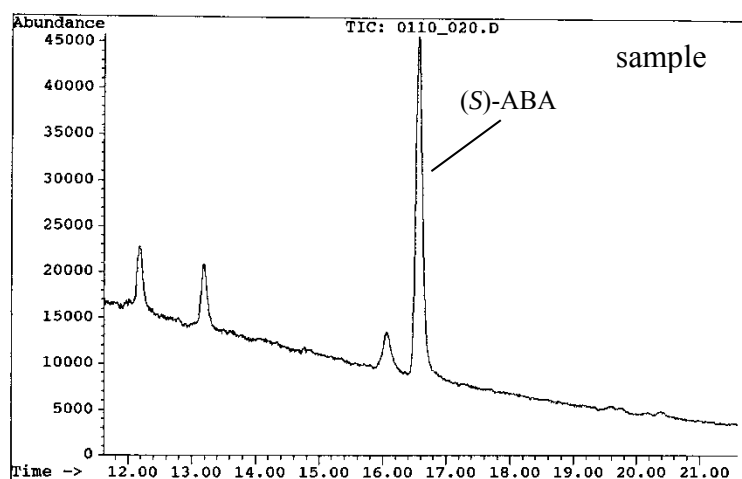


Figure 10: ECD spectrum of ancistrocyclinone A (5).



Ala = Alanine

N-Me-Ala = *N*-Methylalanine

ABA = 3-Aminobutyric acid

N-Me-ABA = *N*-Methyl-3-aminobutyric acid

Figure 11: Oxidative degradation products of ancistrocyclinone A (5).

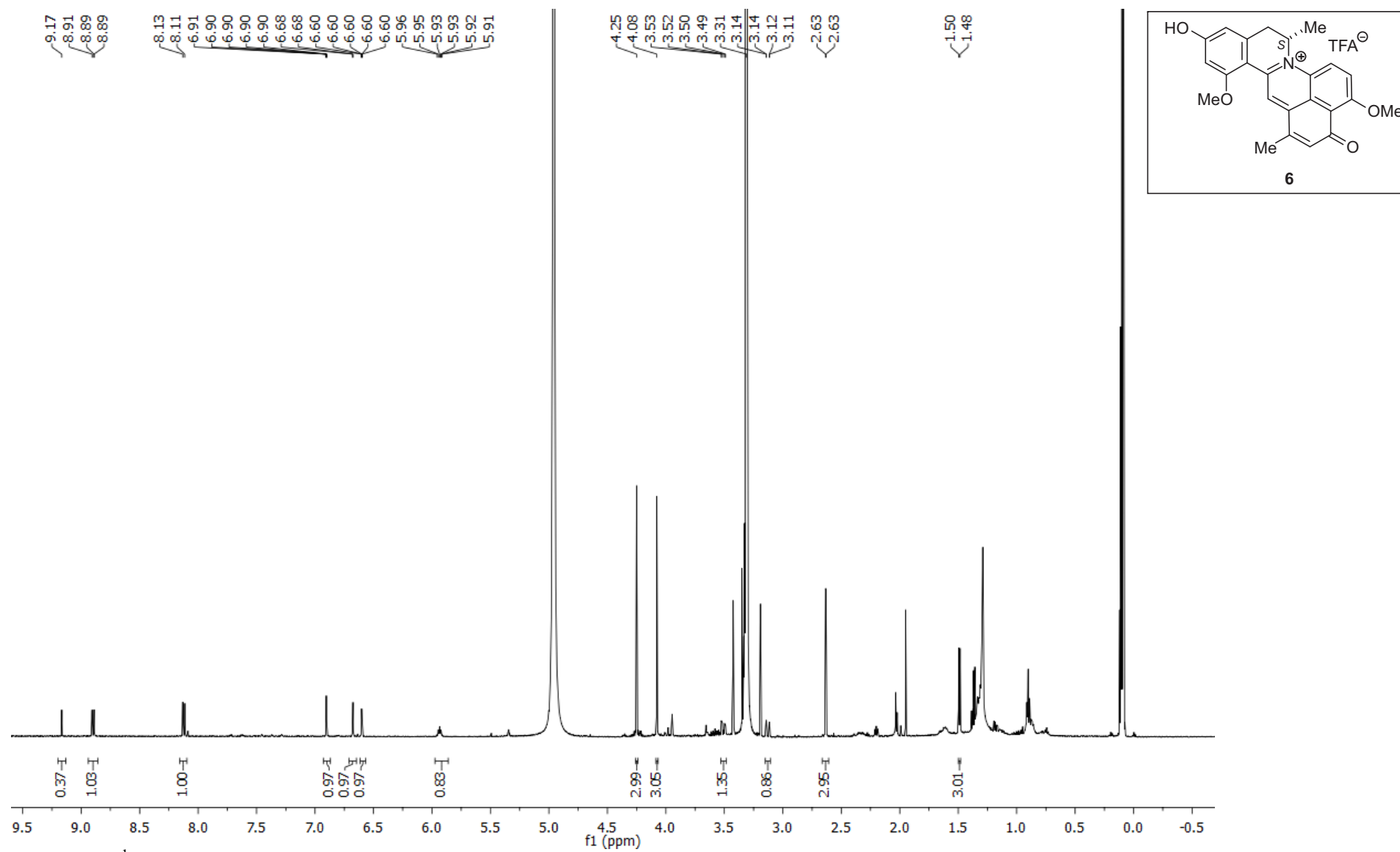


Figure 12: ^1H NMR spectrum of ancistrocyclinone B (**6**) in MeOD .

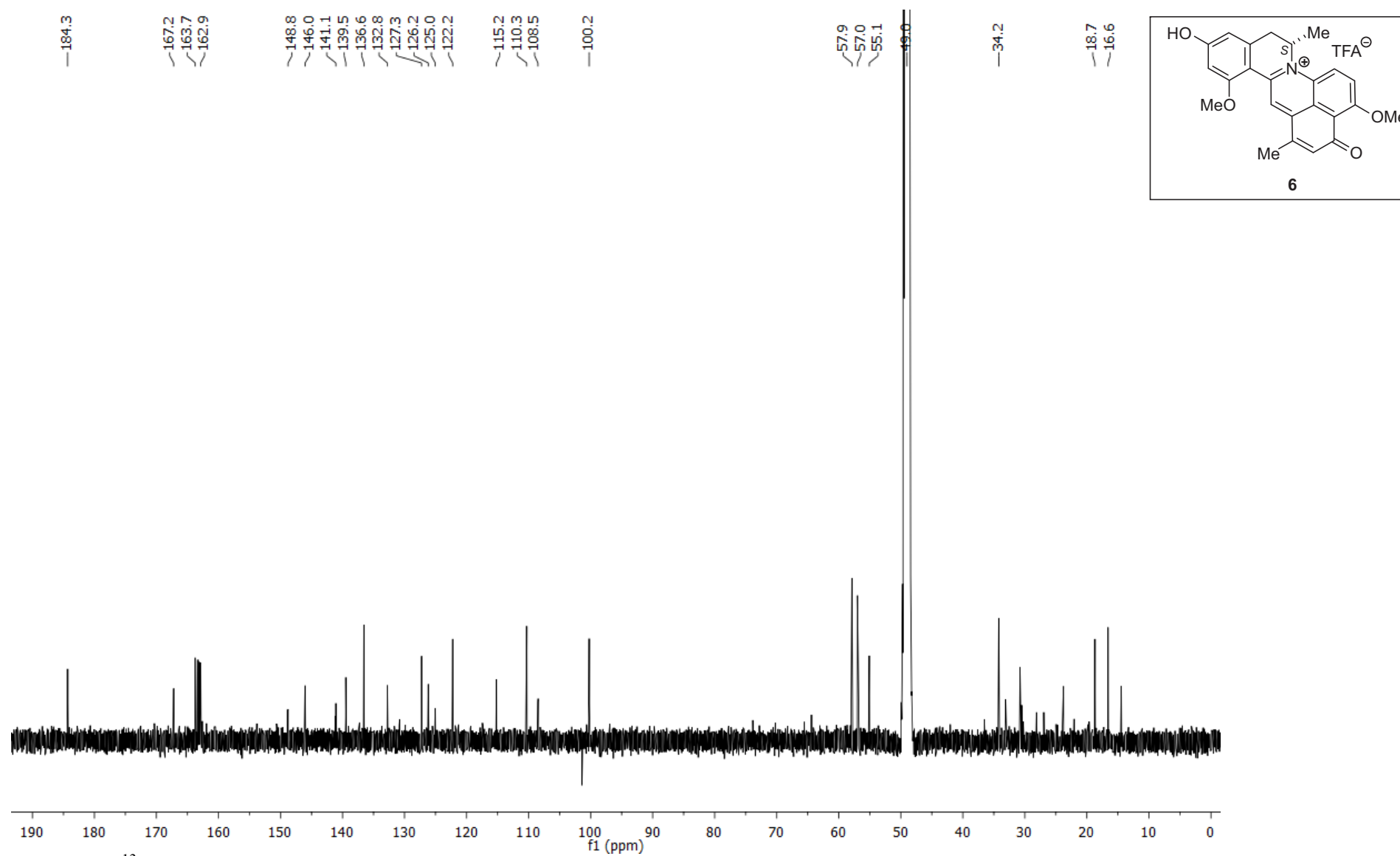


Figure 13: ^{13}C NMR spectrum of ancistrocyclinone B (**6**) in MeOD.

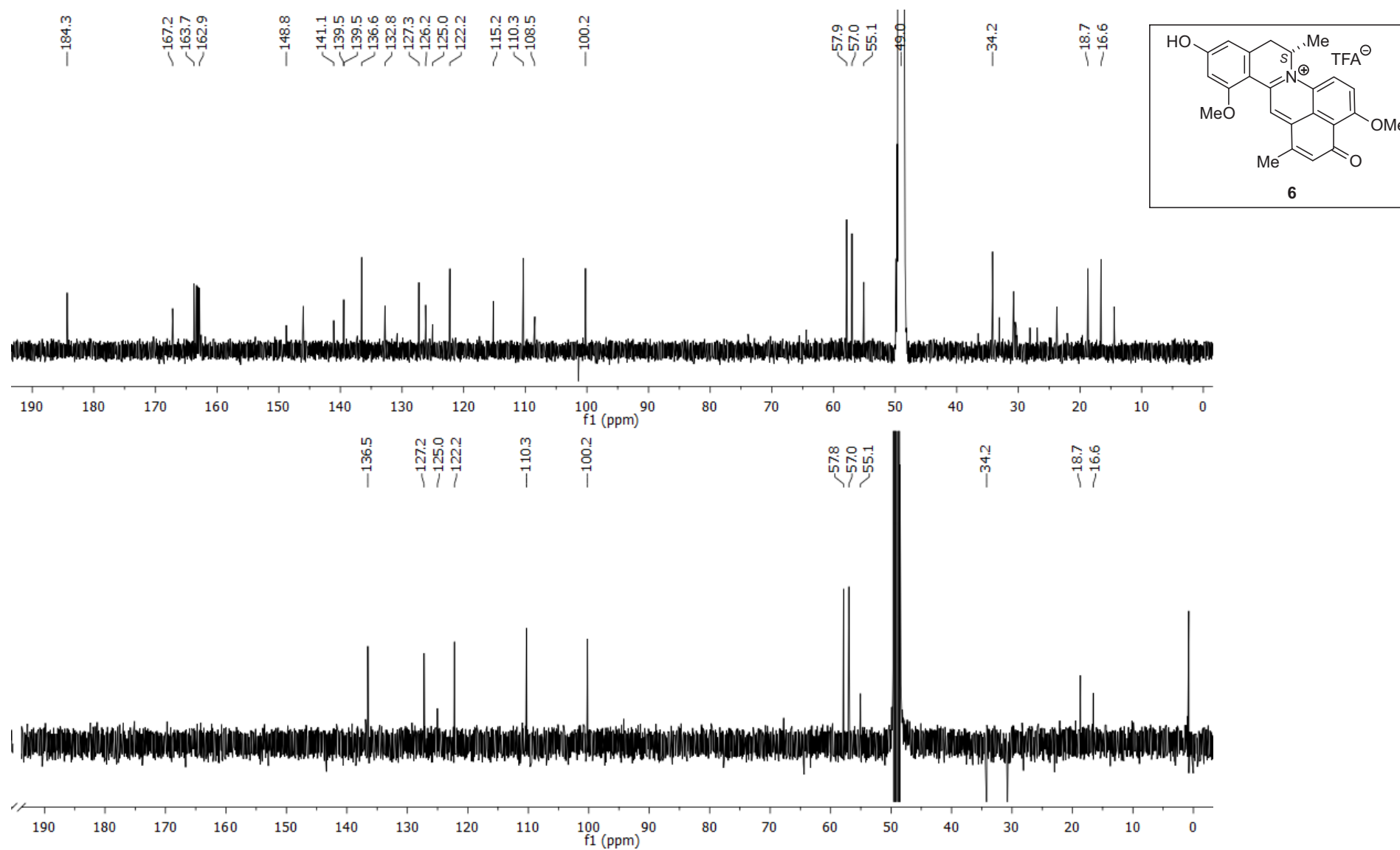


Figure 124: DEPT NMR spectrum of ancistrocyclinone B (6) in MeOD.

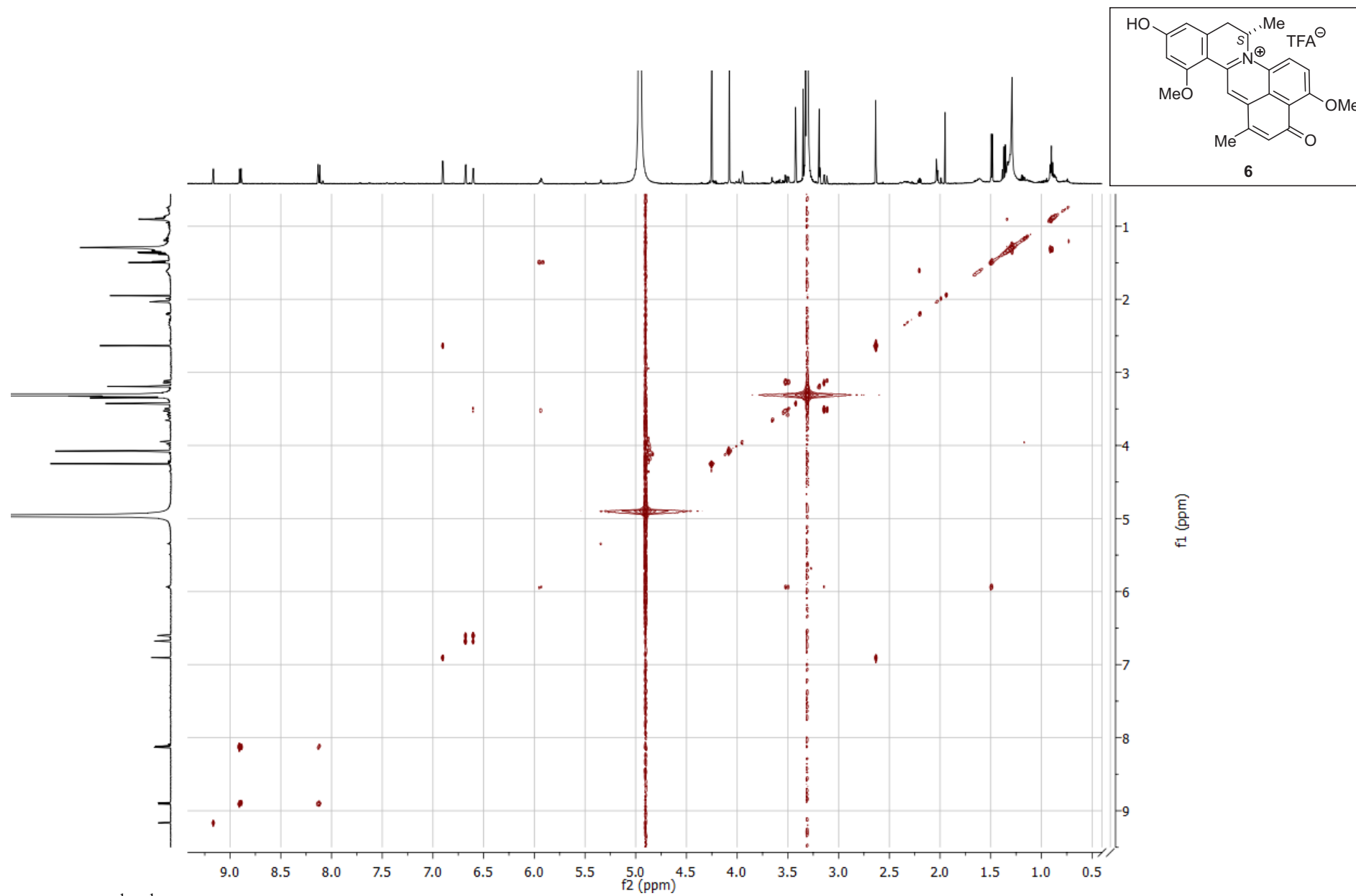


Figure 15: ^1H , ^1H -COSY spectrum of ancistrocyclinone B (**6**) in MeOD .

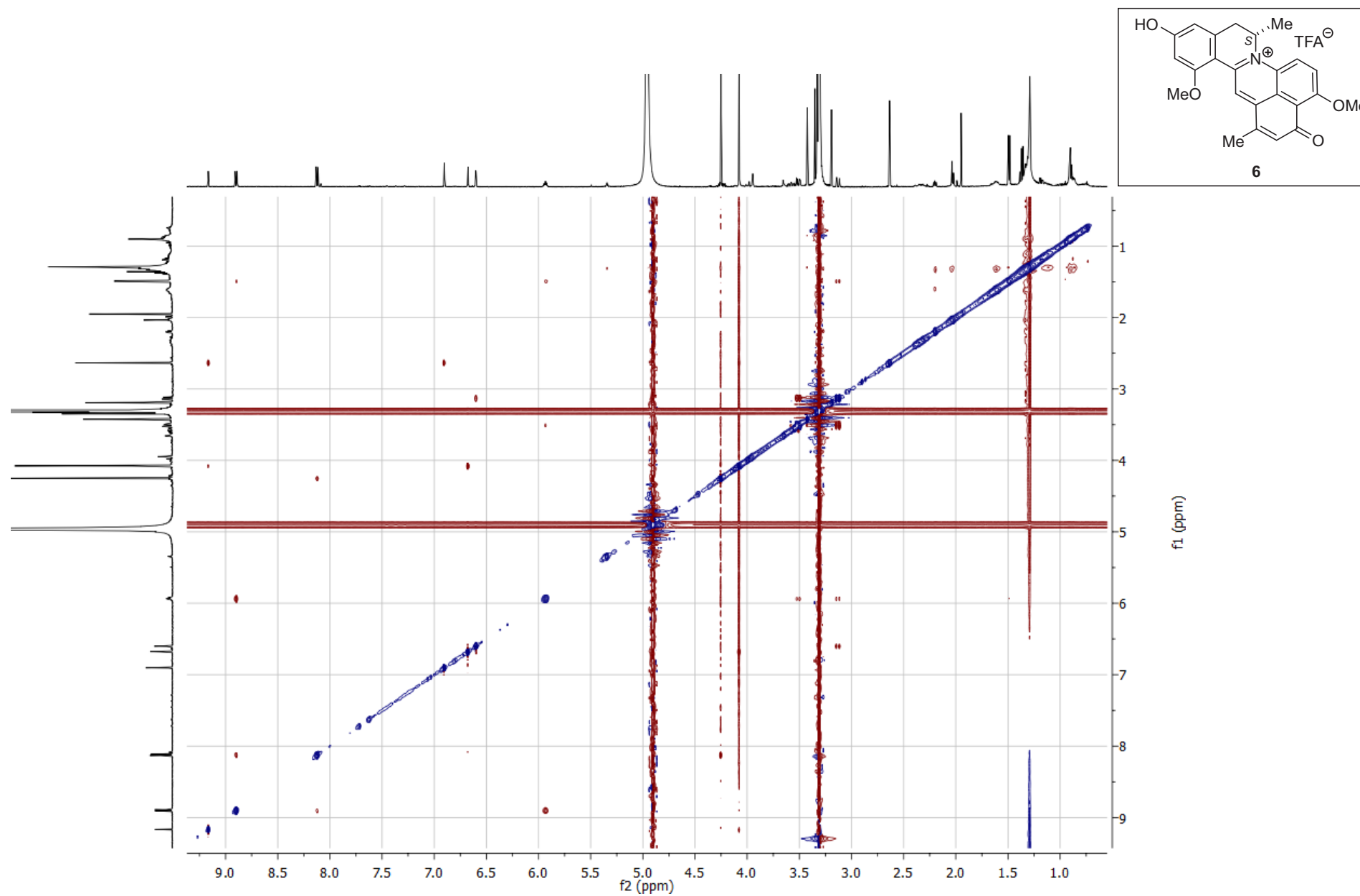
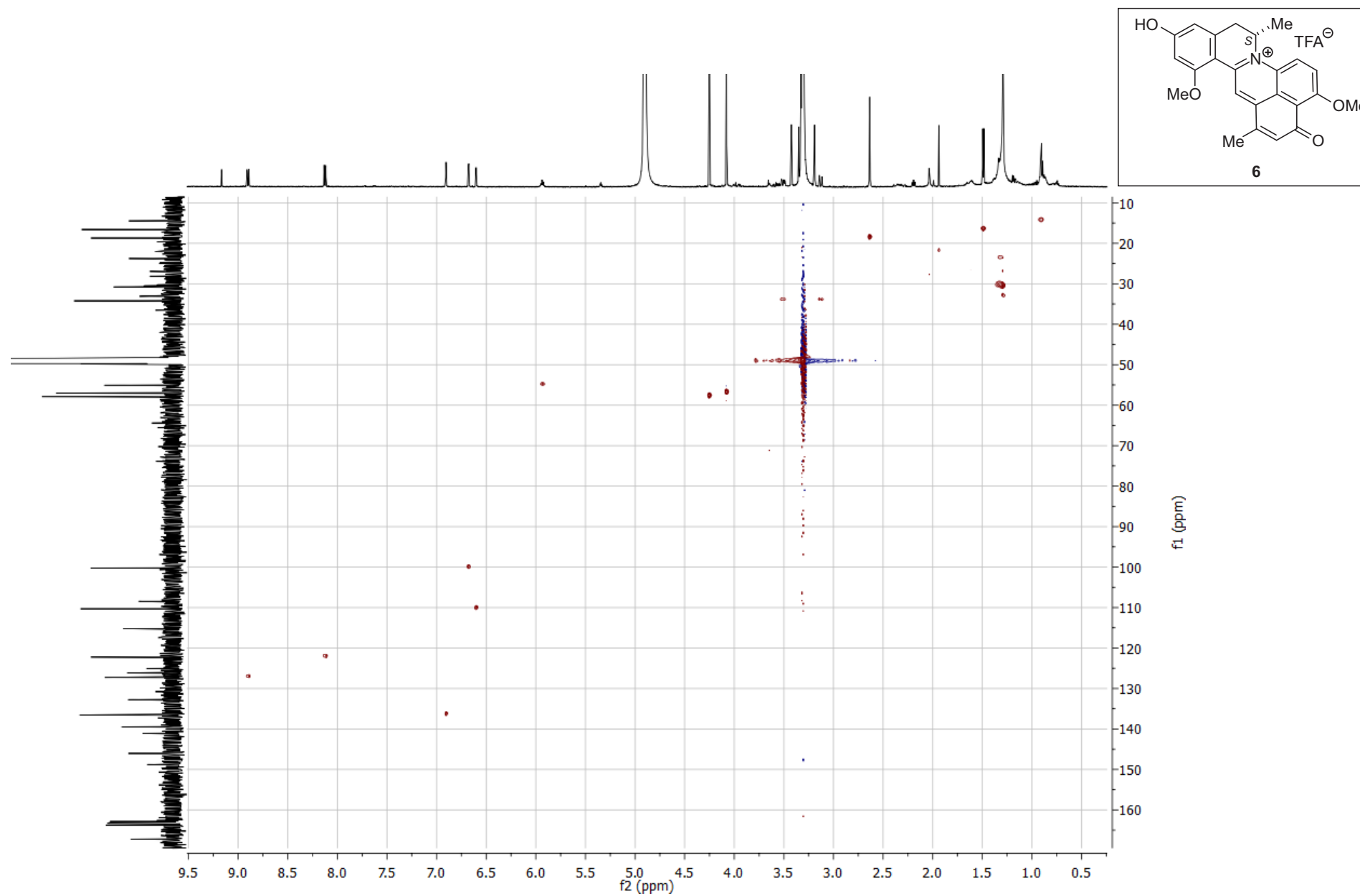


Figure 16: NOESY spectrum of ancistrocyclinone B (6) in MeOD.



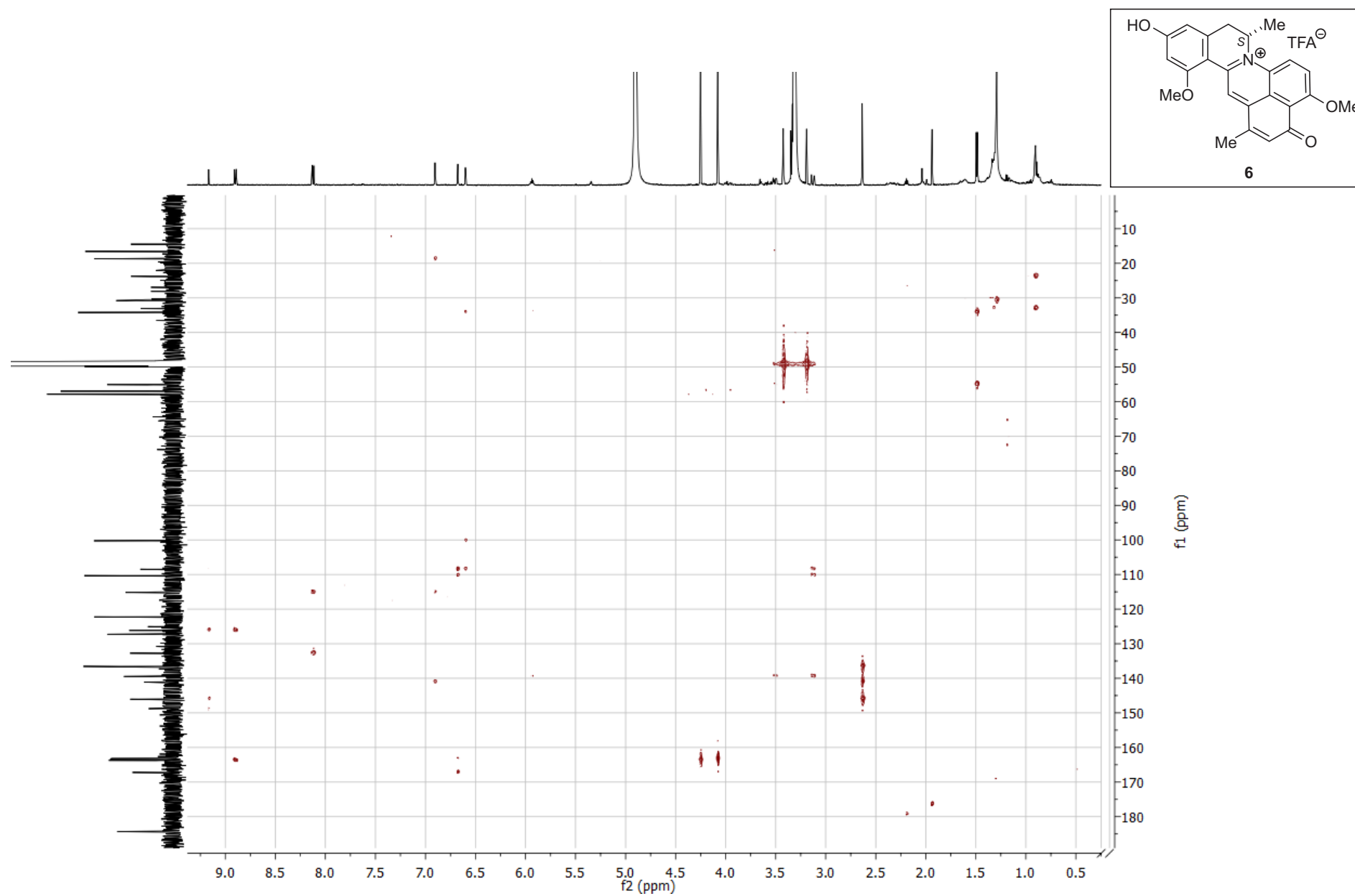


Figure 18: HMBC spectrum of ancistrocyclinone B (6) in MeOD.

Mass Spectrum Molecular Formula Report

Analysis Info

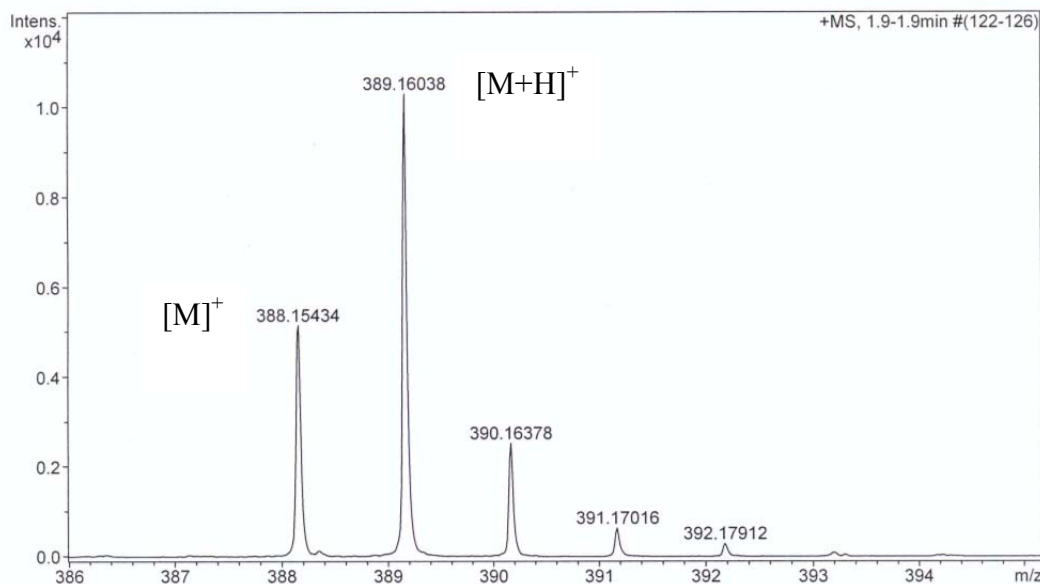
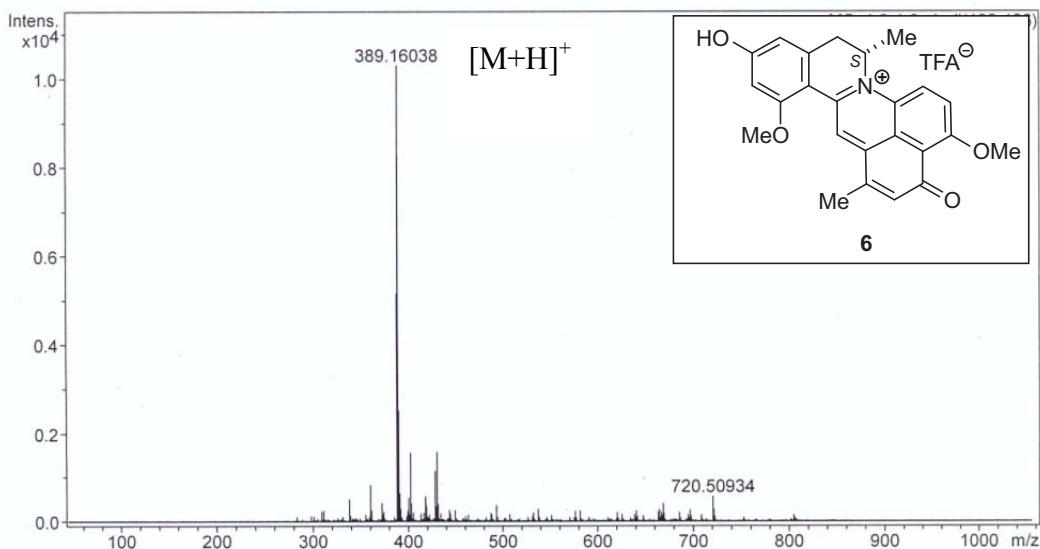
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Acquisition Date 13.02.2008 14:34:27

Operator Administrator
 Instrument micrOTOF 88

Acquisition Parameter

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Scan Begin	50 m/z	Hexapole RF	350.0 V	Set Pulsar Push	400 V
Scan End	1050 m/z	Skimmer 1	50.0 V	Set Reflector	1300 V
		Hexapole 1	22.0 V	Set Flight Tube	9000 V
				Set Detector TOF	2150 V



Sum Formula	Sigma	m/z	Err [ppm]	Mean Err [ppm]	rdb	N Rule	e ⁻
C 24 H 22 N 1 O 4	0.53	388.15433	-0.01	-5.66	14.50	ok	even
C 22 H 20 N 4 O 3	0.53	388.15299	-3.47	-9.70	15.00	-	odd
C 27 H 20 N 2 O 1	0.51	388.15701	6.90	1.23	19.00	-	odd
C 21 H 24 O 7	0.54	388.15165	-6.91	-12.52	10.00	-	odd
C 19 H 22 N 3 O 6	0.55	388.15031	-10.37	-16.61	10.50	ok	even

Figure 19: HRESI mass spectrum of ancistrocyclinone B (**6**).

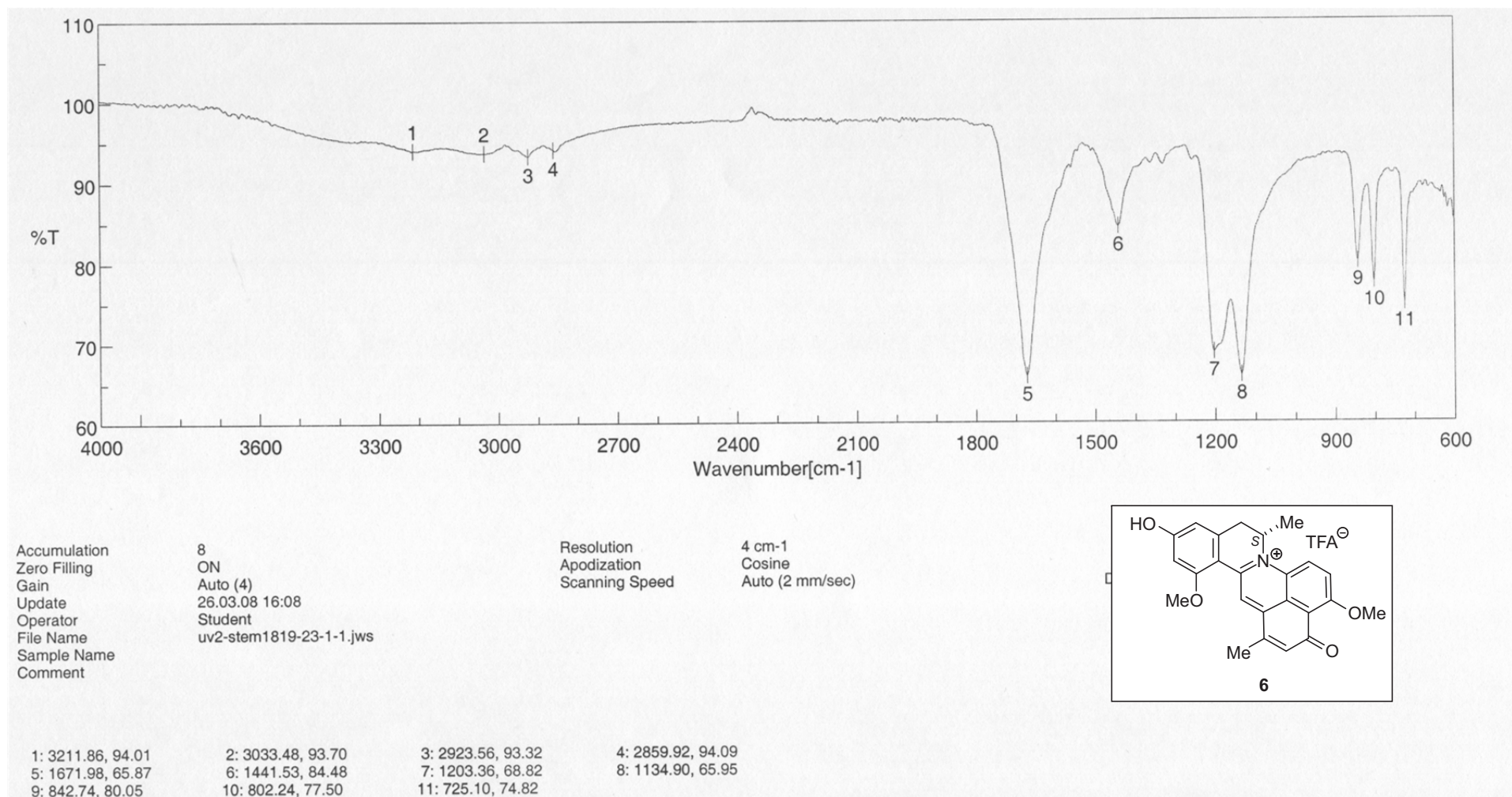
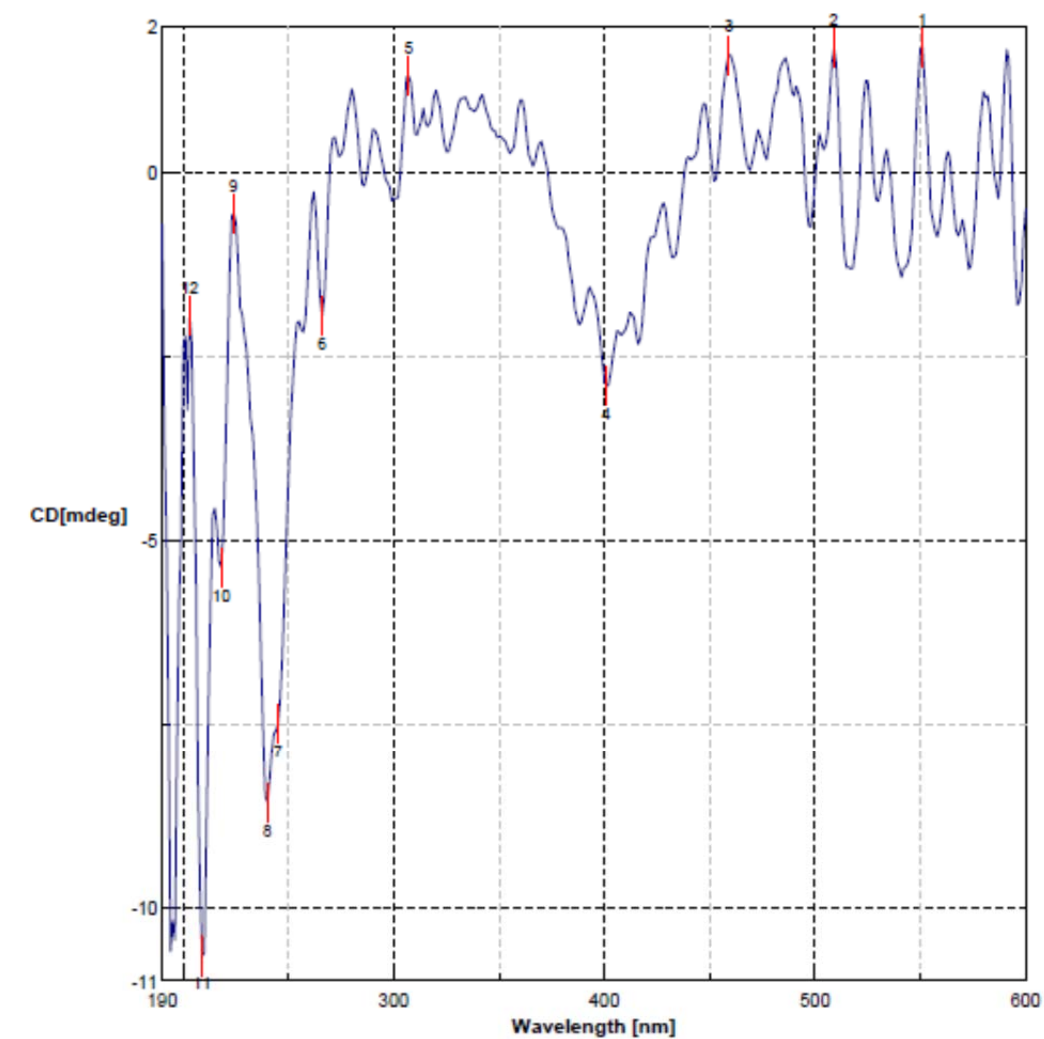
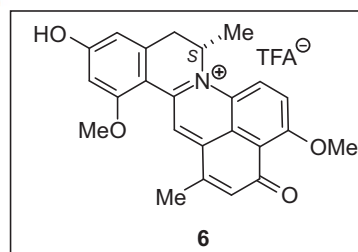


Figure 20: IR spectrum of ancistrocyclinone B (6).

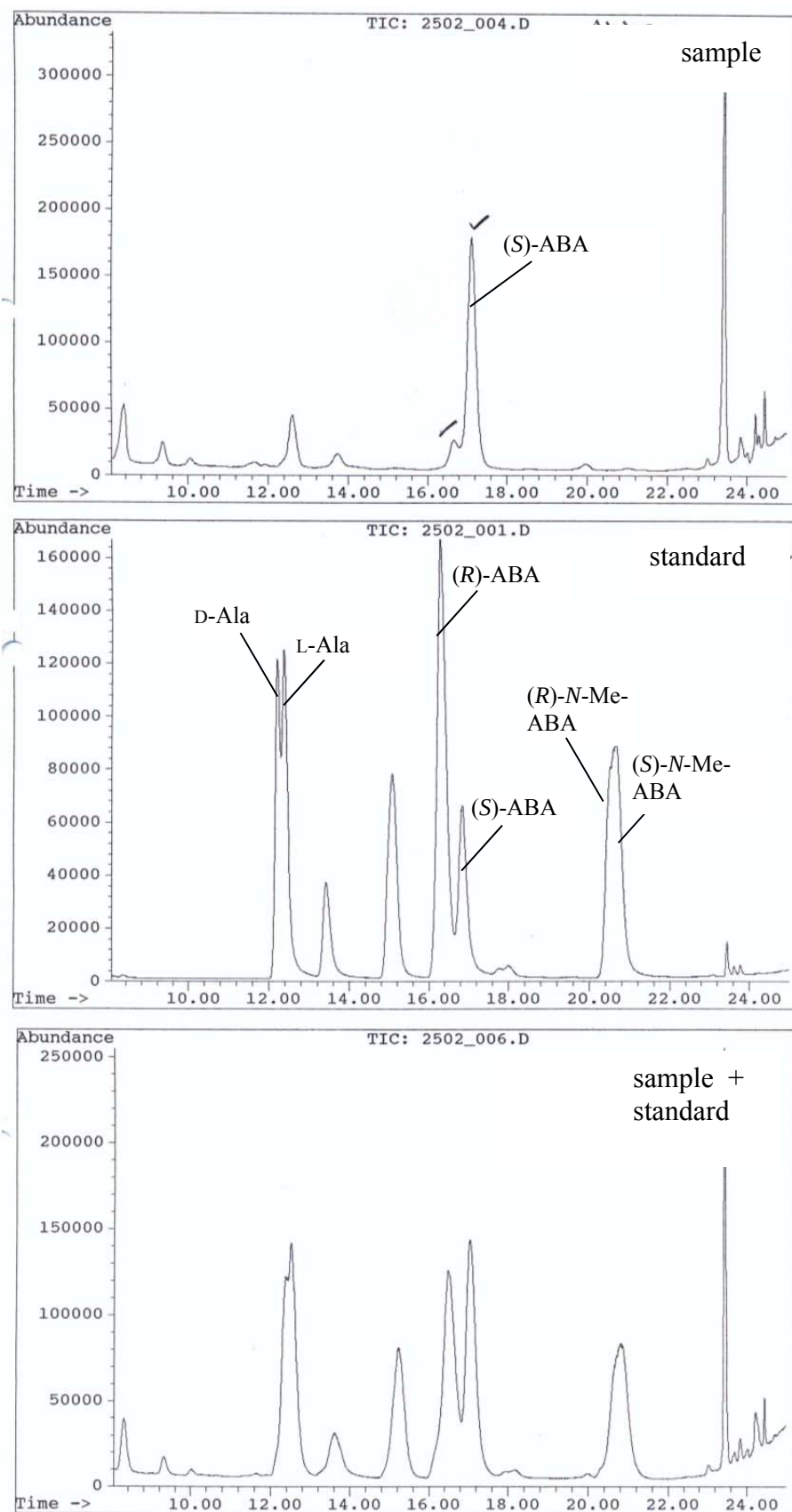


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 Sample Name uv2-stem1819-23-1-online
 Comment 29% Acn



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1	551	1.70496	2	509	1.69526	3	459	1.6025
4	401	-2.90238	5	307	1.31756	6	266	-1.93574
7	245	-7.48303	8	240	-8.56929	9	224	-0.546478
10	218	-5.36389	11	209	-10.6614	12	203	-1.9435

Figure 21: ECD spectrum of ancistrocyclinone B (**6**).



Ala = Alanine

N-Me-Ala = *N*-Methylalanine

ABA = 3-Aminobutyric acid

N-Me-ABA = *N*-Methyl-3-aminobutyric acid

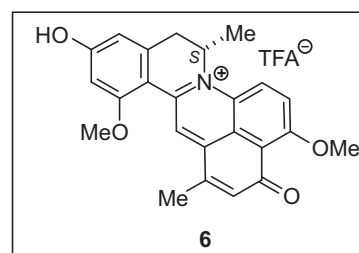


Figure 22: Oxidative degradation products of ancistrocyclinone B (**6**).

Table 2: Oxidation of 4'-O-demethylancistrocladinium A (**8**) to **5**.

Entry	Oxidizing agent	Yield 11 [%]	Yield 5 [%]
1	Fremy salt	-	-
2	O ₂	-	-
3	Pb(OAc) ₄	23	36
4	Ag ₂ O	-	-
5	MnO ₂	-	-
6	H ₂ O ₂	-	-
7	K ₂ Cr ₂ O ₄	-	-
8	K ₃ [Fe(CN) ₆]	-	-
9	KClO ₄	-	-

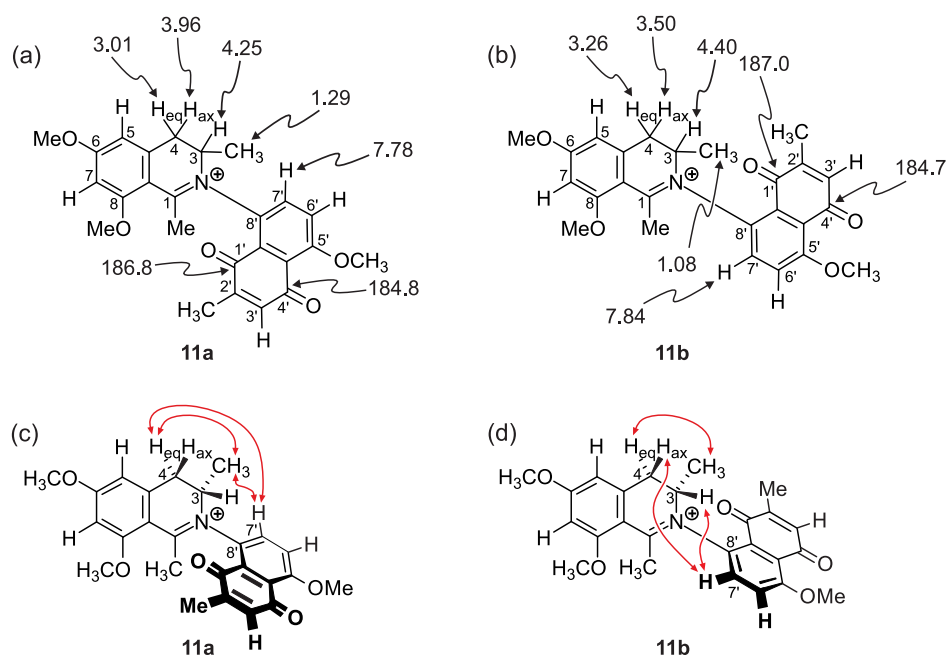


Figure 23: Selected NMR data of chinones **11a** and **11b**: (A) ^1H and ^{13}C NMR data (δ in ppm) of **11a**, and (b) of **11b**, (c) NOESY (double red arrows) correlations indicative of the relative configurations at the biaryl axes in **11a**, and (d) in **11b**.

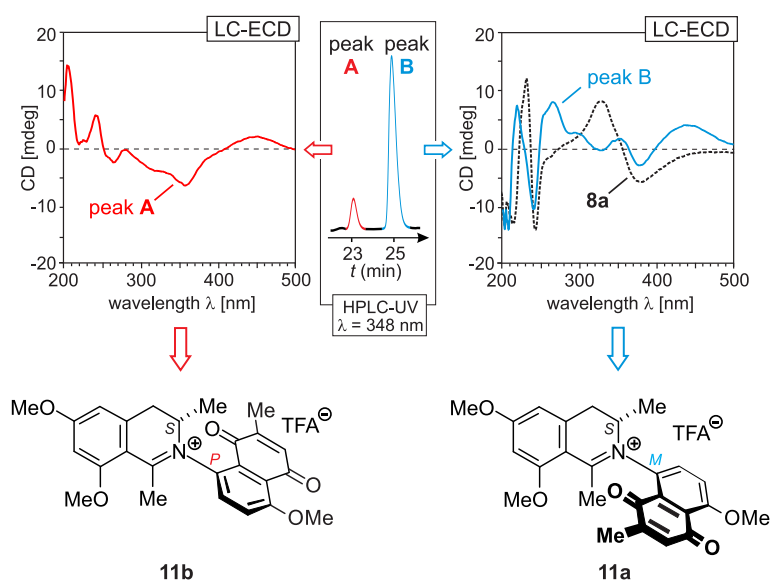


Figure 24: Assignment of the absolute axial configuration of the two atropo-diastereomers of **11** by LC-ECD coupling and by comparison of the LC-ECD spectra of peak **A** (left) and peak **B** (right) with the ECD curve of 4'-O-demethylancistrocladinium A (**8a**).

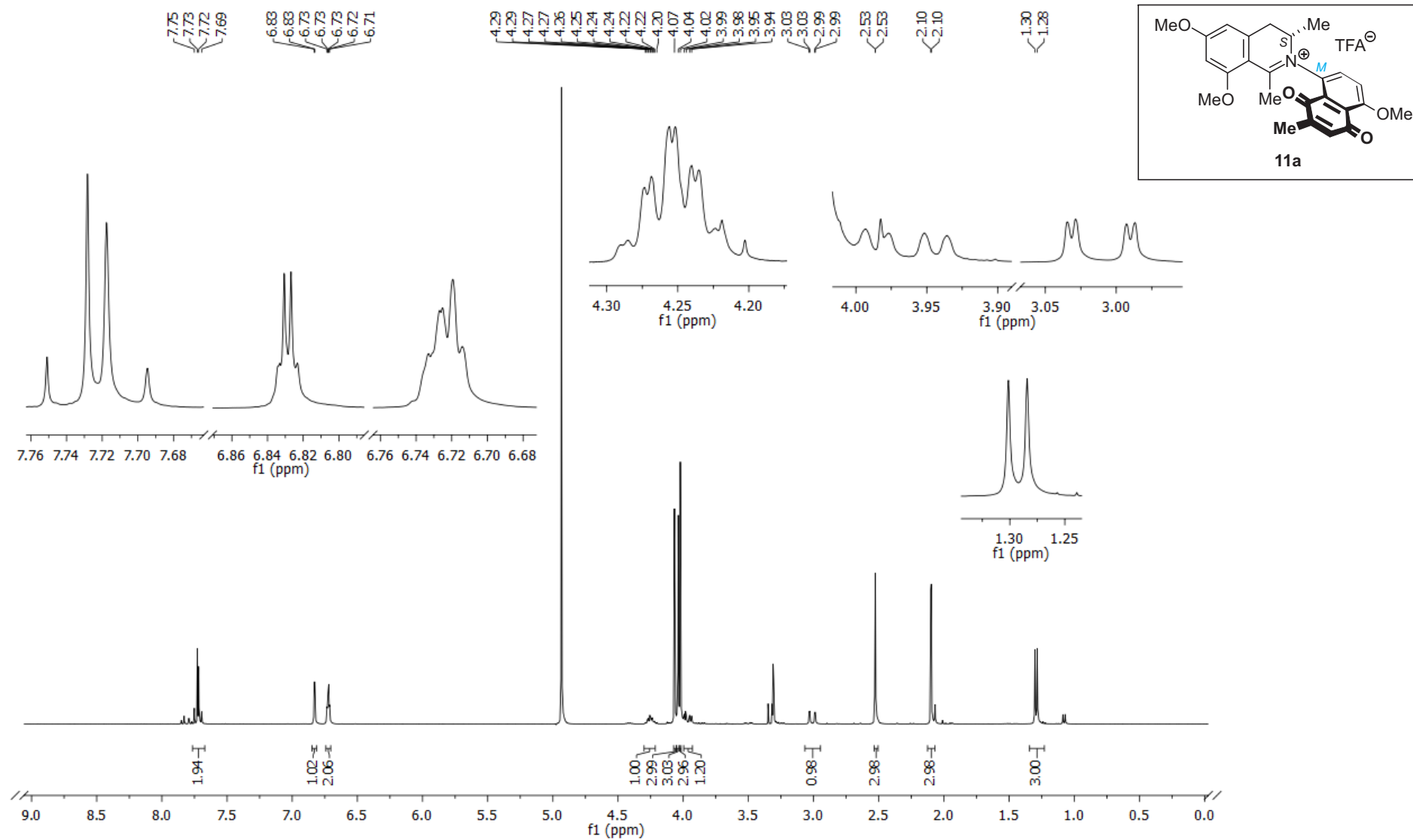


Figure 25: ^1H NMR spectrum of quinone **11a** (major compound) in MeOD.

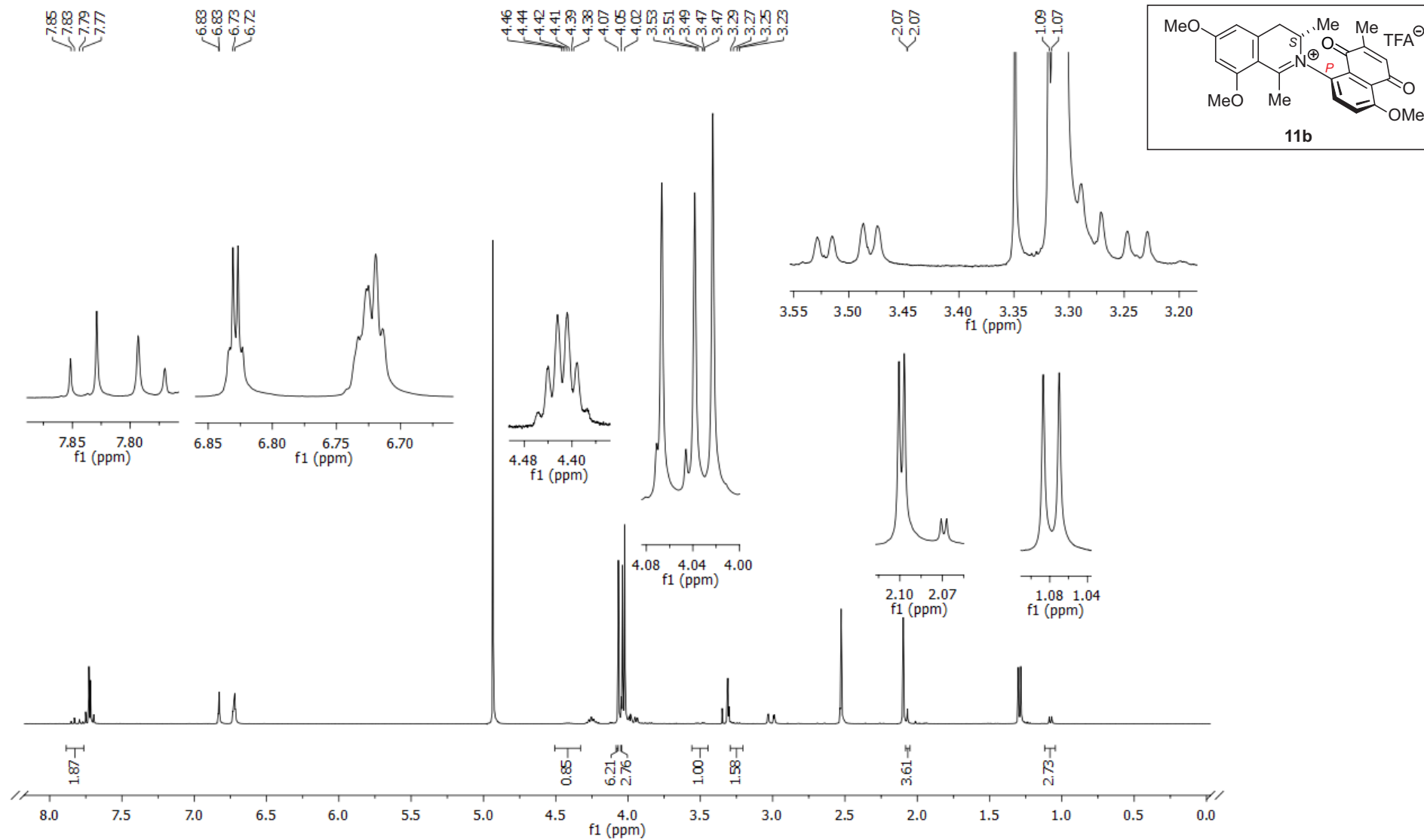


Figure 26: ^1H NMR spectrum of chinone **11b** (minor compound) in MeOD .

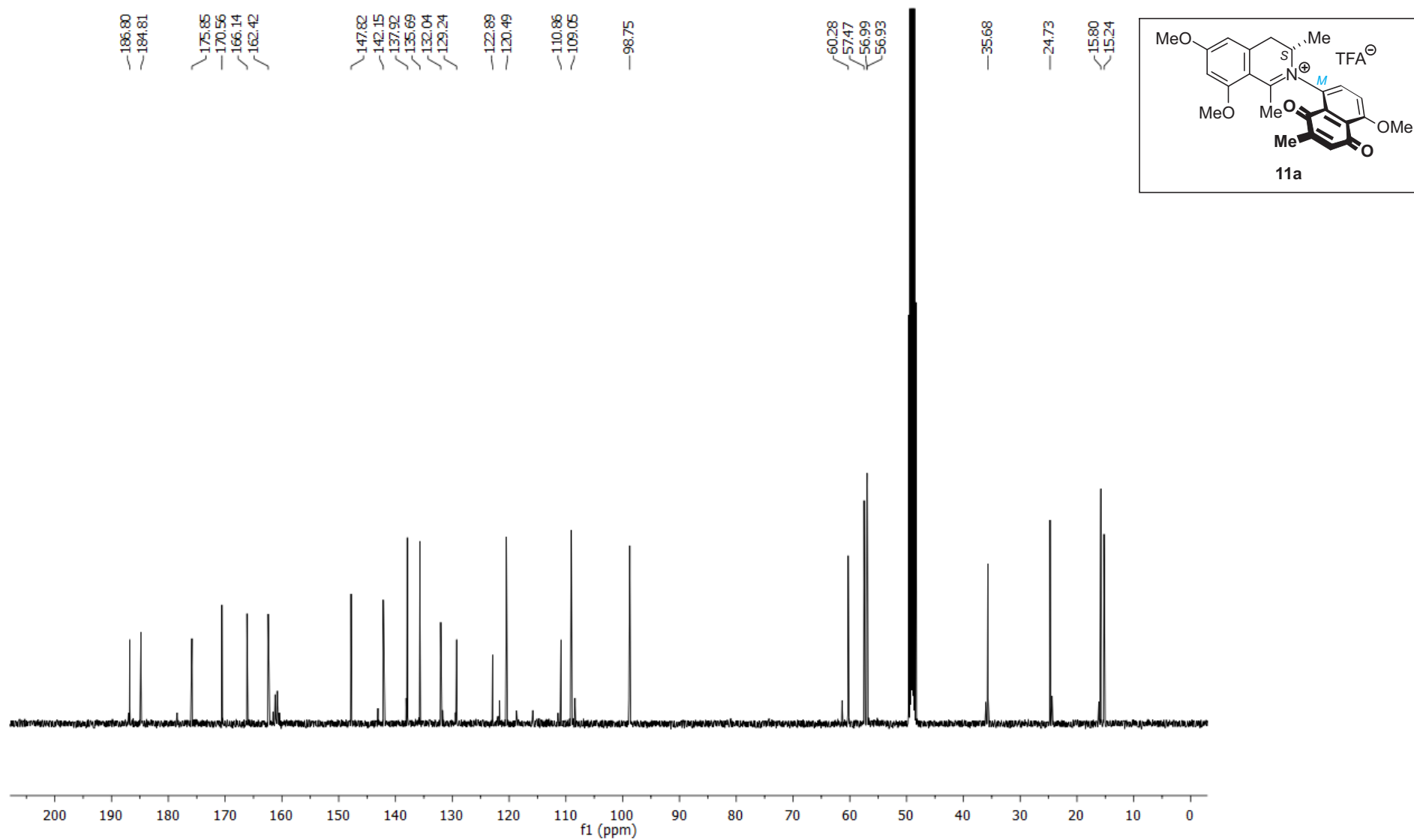


Figure 27: ^{13}C NMR spectrum of quinone **11a** (major compound) in MeOD.

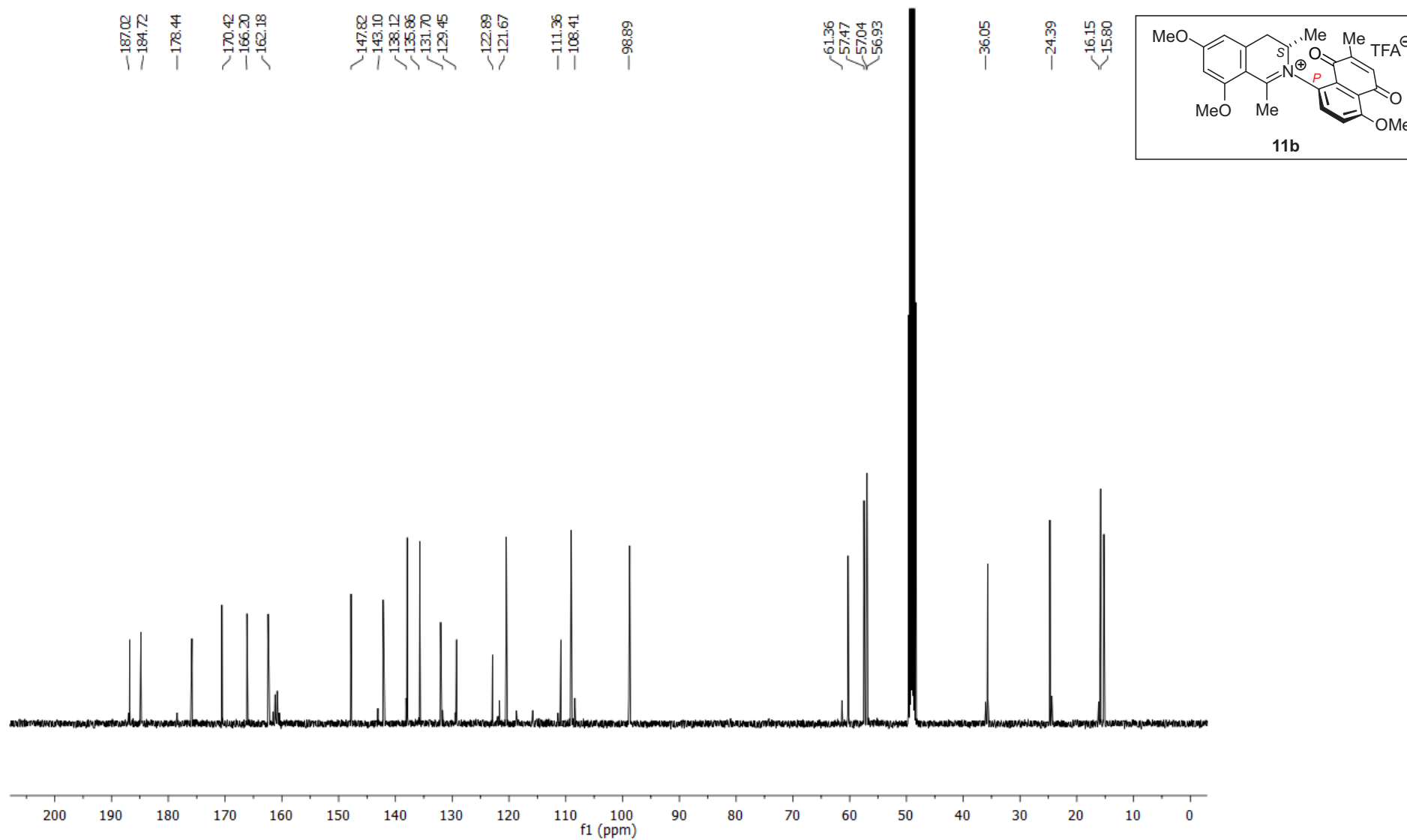


Figure 28: ¹³C NMR spectrum of chinone **11b** (minor compound) in MeOD.

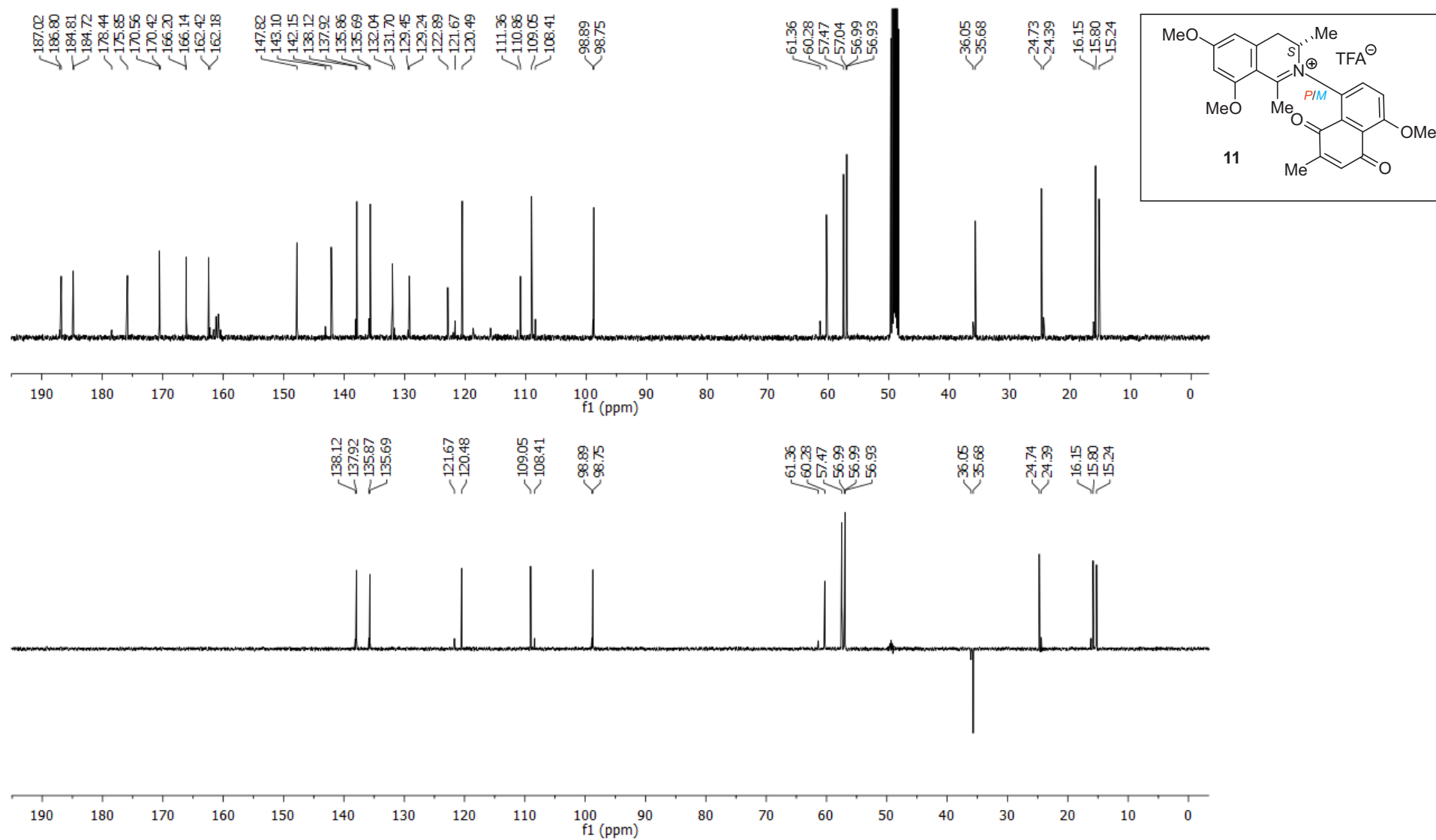


Figure 29: DEPT NMR spectrum of quinone **11** in MeOD.

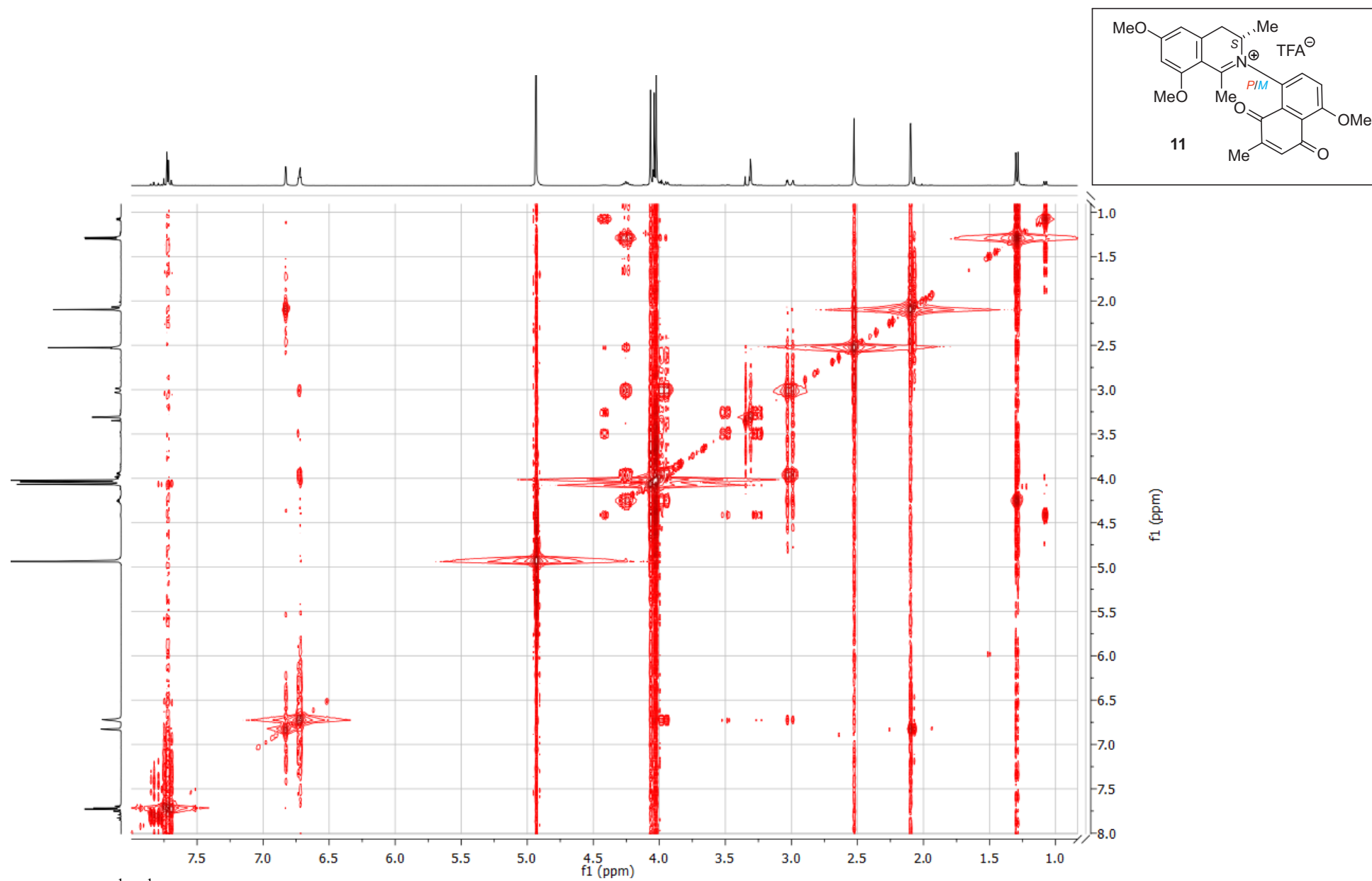


Figure 30: ^1H , ^1H -COSY spectrum of chinone **11** in MeOD.

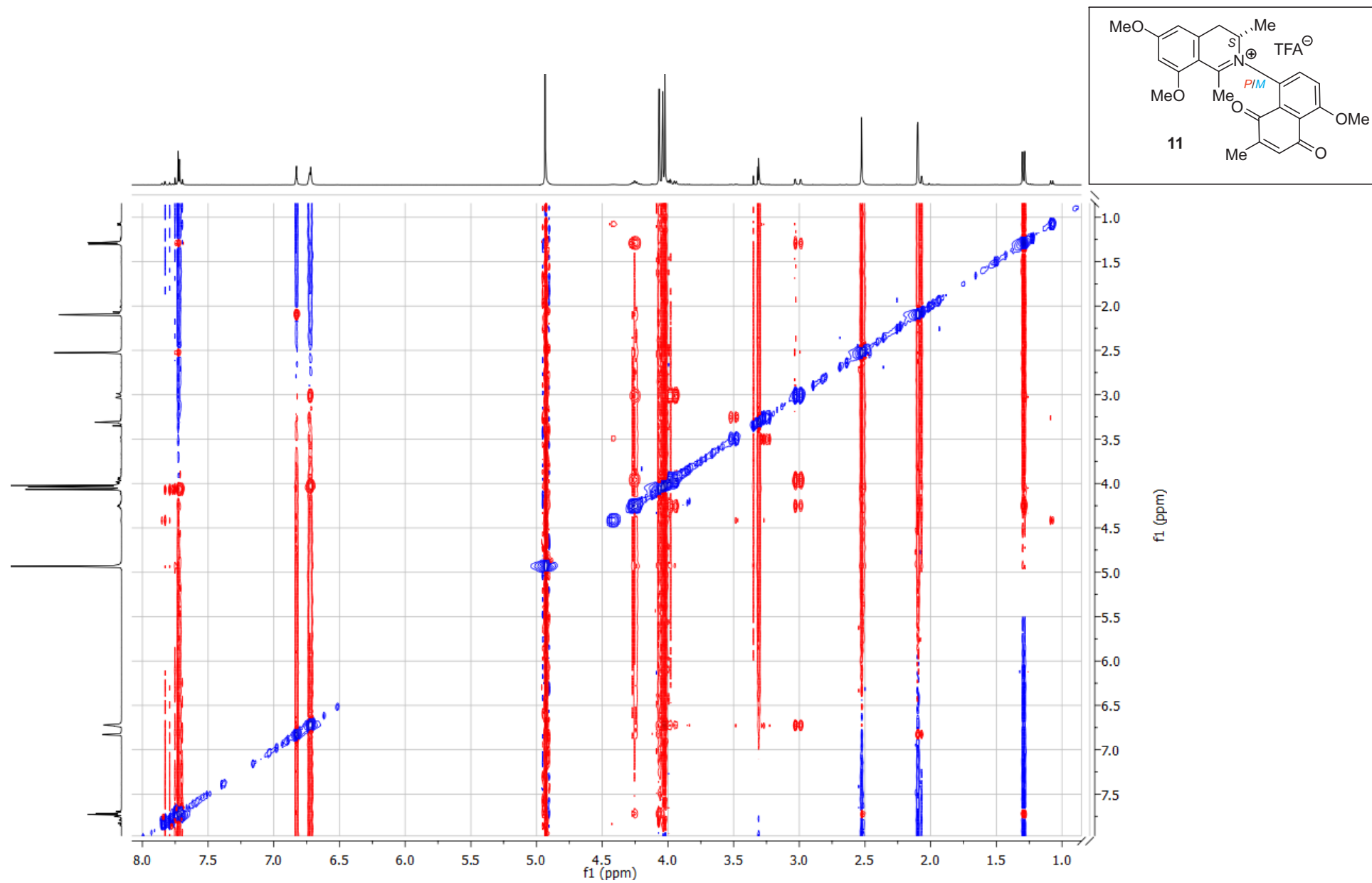


Figure 31: NOESY spectrum of chinone **11** in MeOD.

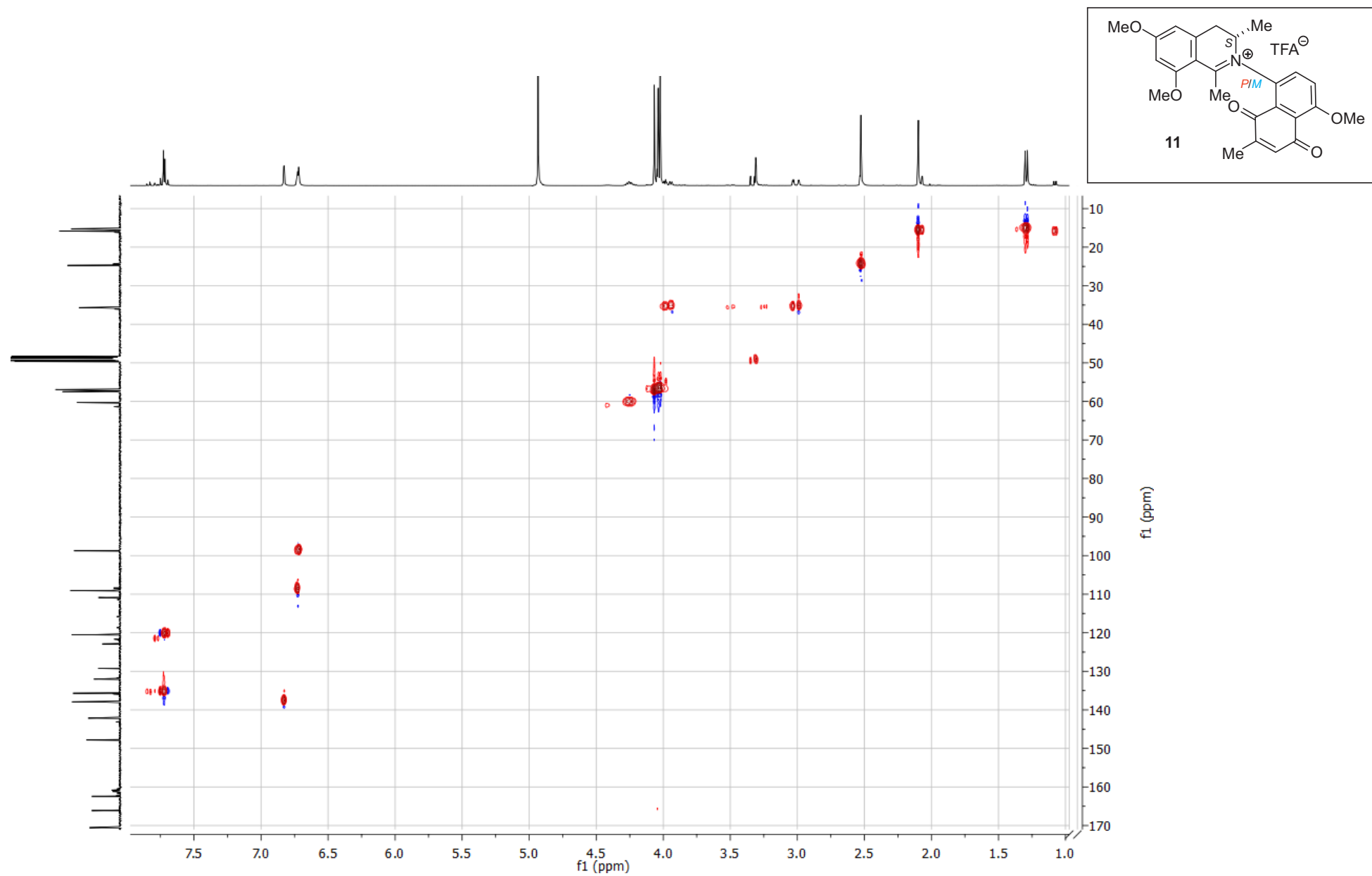


Figure 32: HSQC spectrum of chinone **11** in MeOD.

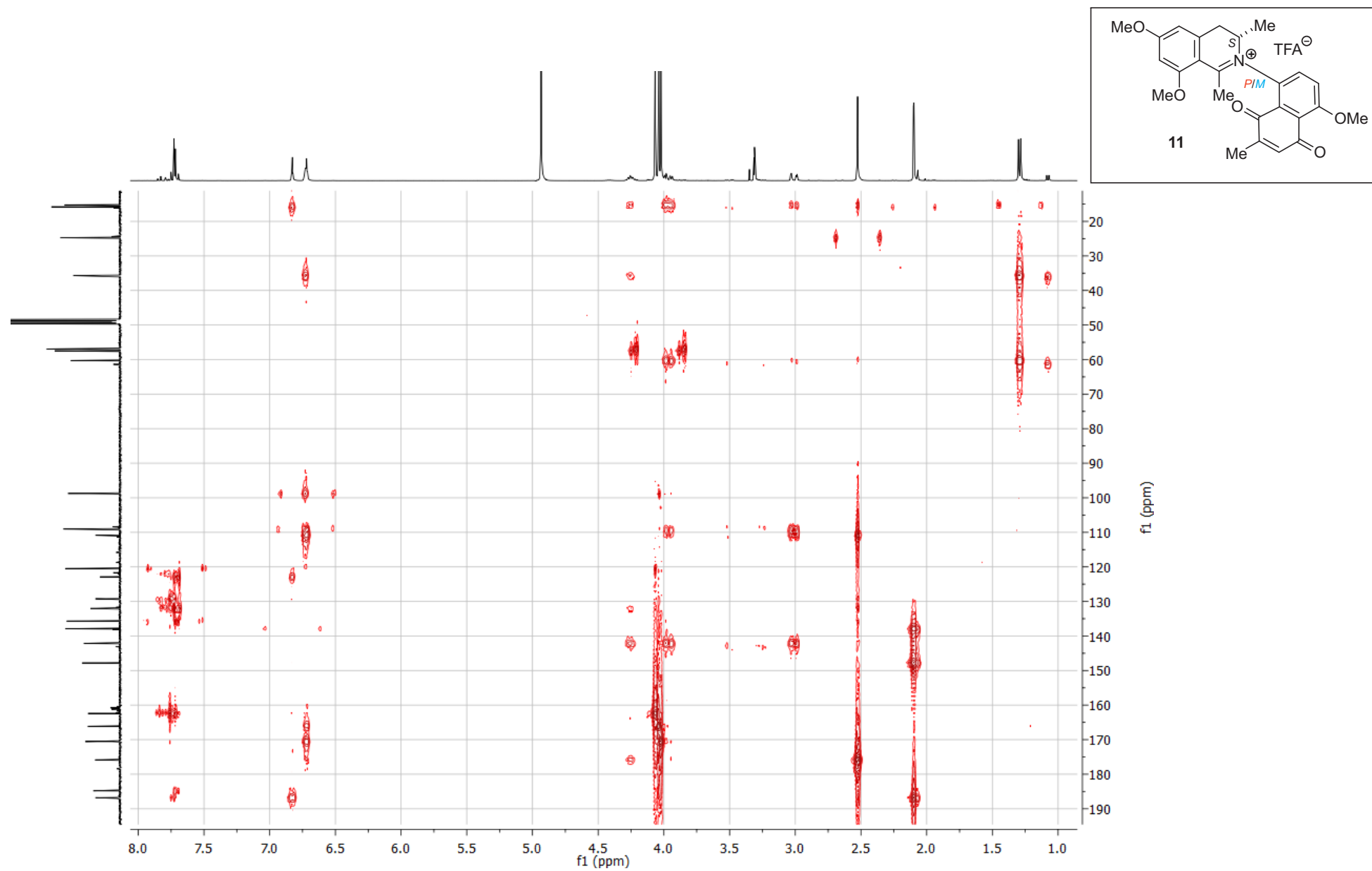


Figure 33: HMBC spectrum of chinone **11** in MeOD.

Mass Spectrum SmartFormula Report

Analysis Info

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 Sample Name 2017_3629_BRI_A-Chinon
 Comment Seupel Raina
 A-Chinon
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Acquisition Date 12/1/2017 12:53:57 PM
 Operator J.Adelmann
 Instrument microTOF-Q III 8228888.20516

Acquisition Parameter

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Scan End	2500 m/z	Set Hexapole RF	200.0 Vpp	Set Divert Valve	Source

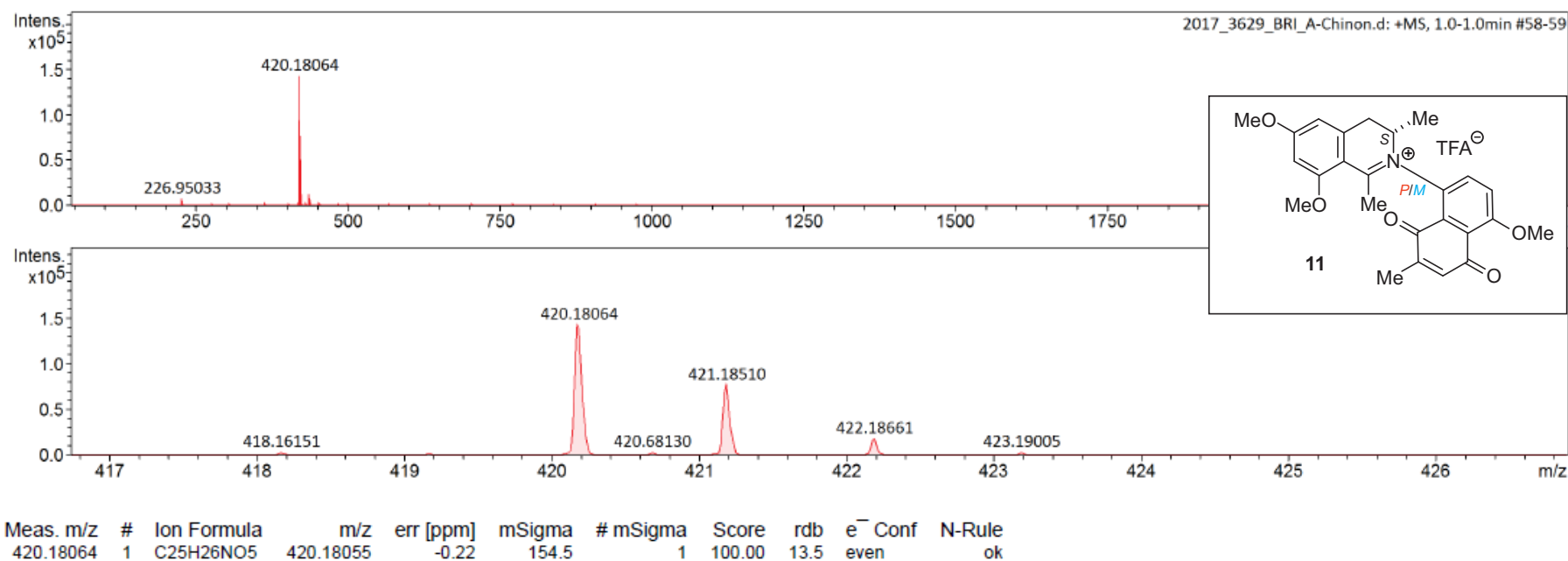


Figure 34: HRESI mass spectrum of chinone **11**.

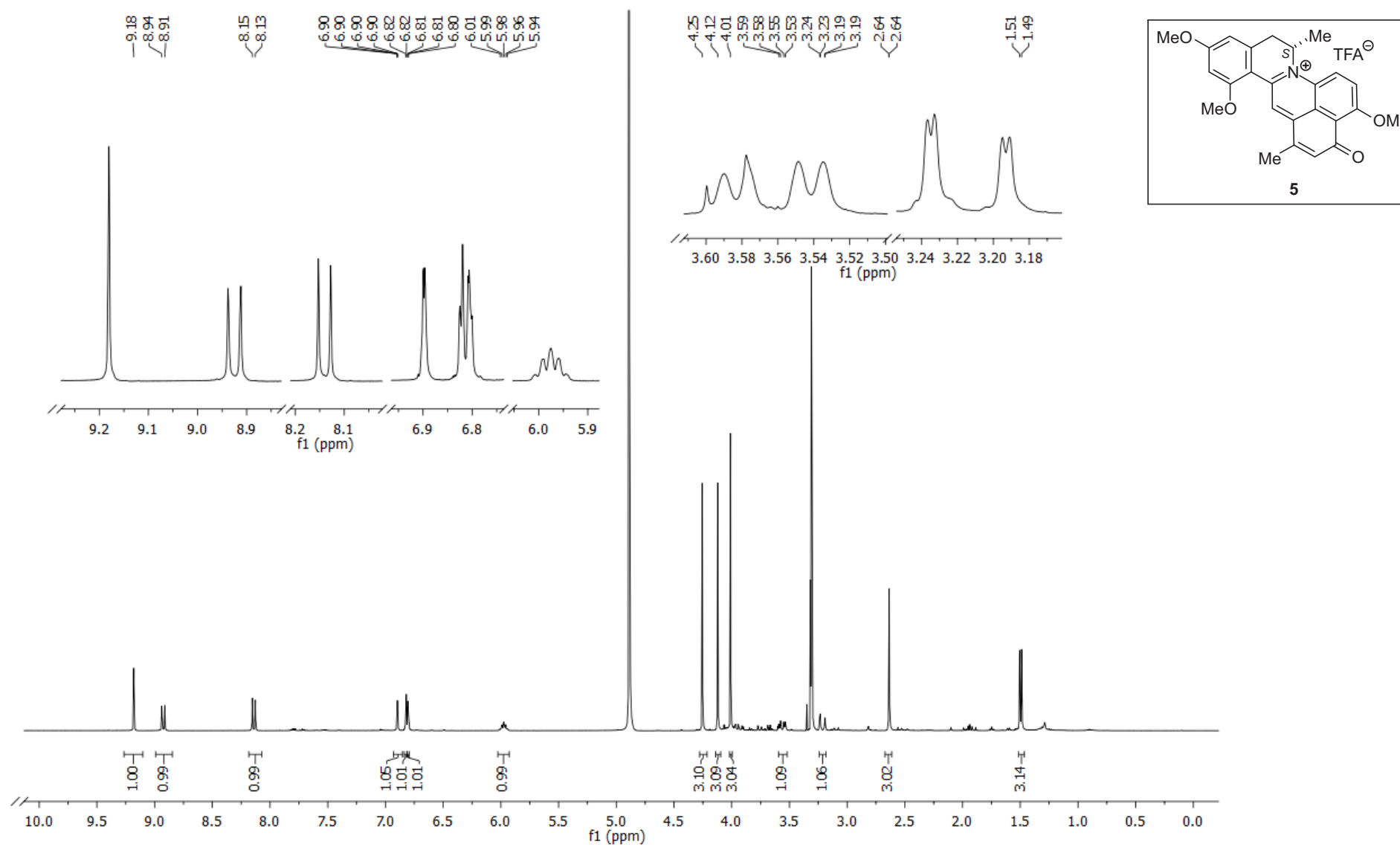


Figure 35: ^1H NMR spectrum of synthetic ancistrocyclinone A (5) in MeOD .

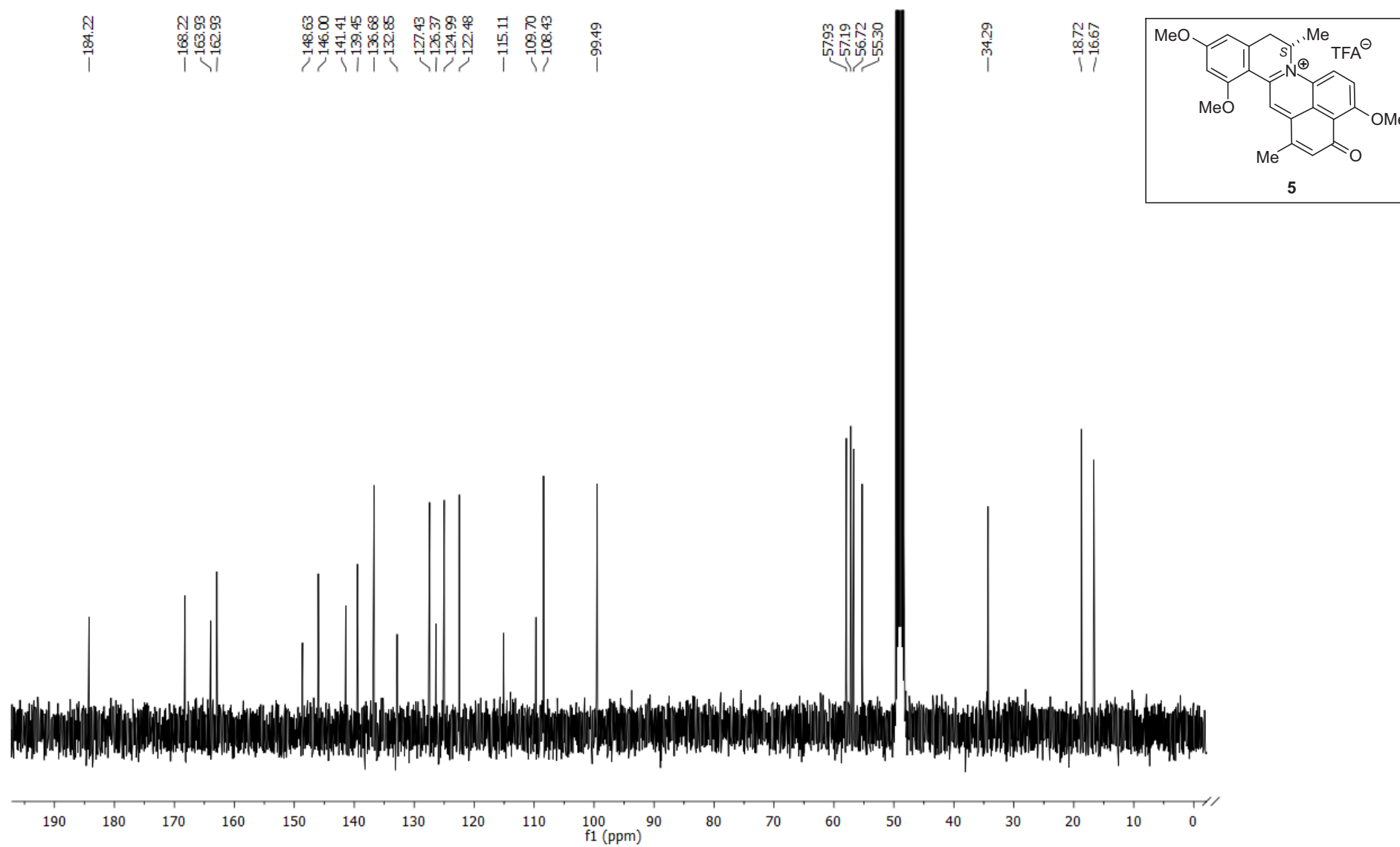


Figure 36: ^{13}C NMR spectrum of synthetic ancistrocyclinone A (5) in MeOD.

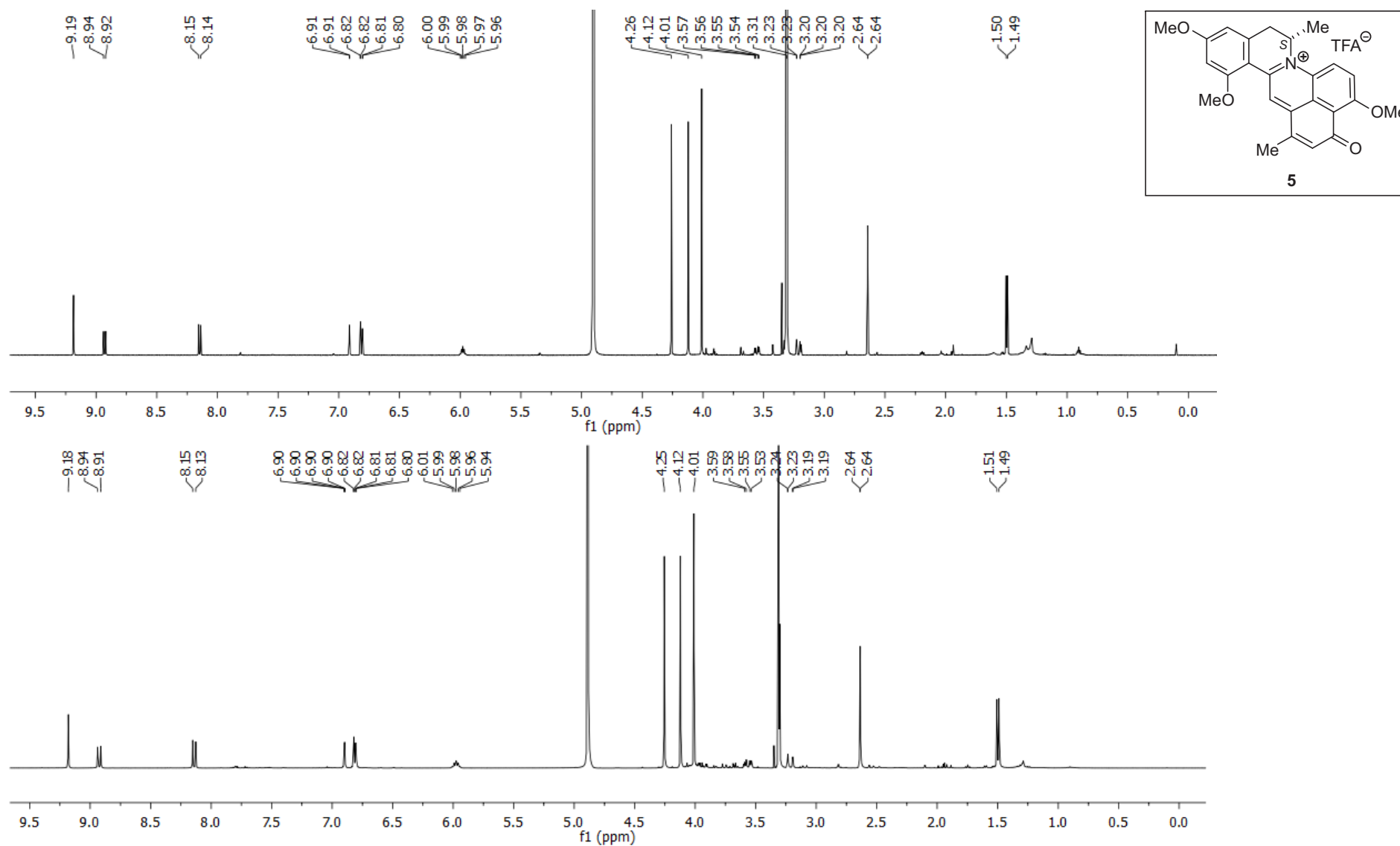


Figure 37: Comparison of the ¹H NMR spectra of isolated (top) and synthetic (bottom) ancistrocyclinone A (5).

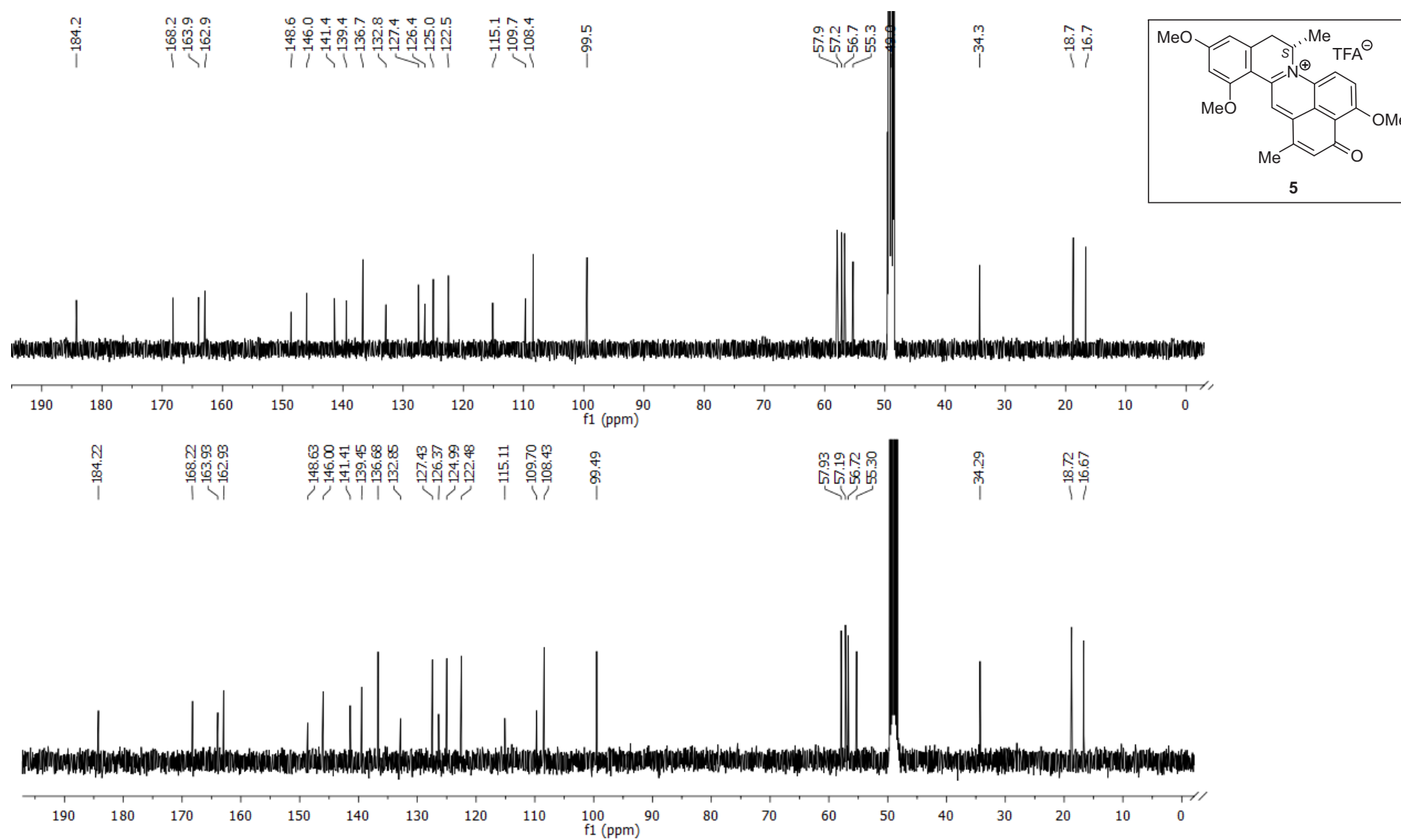


Figure 38: Comparison of the ¹³C NMR spectra of isolated (top) and synthetic (bottom) ancistrocyclinone A (5).

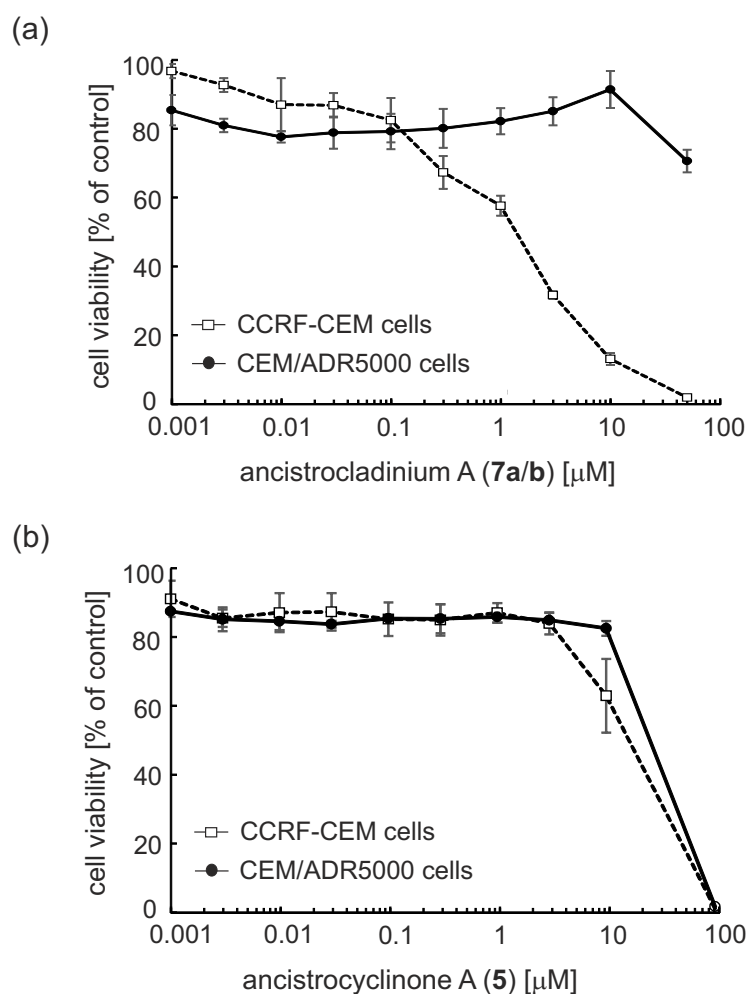


Figure 39: Cytotoxic activities of ancistrocladinium A (**7a/b**) and ancistrocyclinone A (**5**) against parental drug-sensitive CCRF-CEM leukemia cells and their multi-drug resistant subline, CEM/ADR5000. The compounds were dissolved in DMSO (< 1%) and cell culture medium at concentrations of 0.001, 0.003, 0.01, 0.03, 0.1, 0.3, 1, 3, 10, and 100 μM . Cell viability was assessed by the resazurin assay. Mean values and standard deviation of three independent experiments with each six parallel measurements are shown.