Electronic supplementary information for

Dammarane-type Triterpenoids as 11β-HSD1 Inhibitors from *Homonoia riparia*

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Table S1. Preliminary assay results of tested compounds against human 11β-HSD1 at 10 μM.

Compds no.	Expt.1	Expt.2	Expt.3	Average	SD
1	61.07%	60.88%	57.17%	59.70%	2.20%
3	44.06%	45.04%	40.13%	43.08%	2.60%
4	59.28%	52.93%	58.92%	57.04%	3.57%
5	72.12%	74.49%	77.83%	74.81%	2.87%
6	75.86%	80.61%	72.67%	76.38%	4.00%
7	58.39%	55.57%	50.80%	54.92%	3.84%
8	71.06%	65.30%	67.13%	67.83%	2.94%
9	40.59%	37.70%	40.68%	39.66%	1.69%
Glycyrrhetinic acid 1 nM	14.83%	11.14%	11.62%	12.53%	2.00%
Glycyrrhetinic acid 10 nM	44.66%	45.00%	45.18%	44.94%	0.26%
Glycyrrhetinic acid 100 nM	95.15%	99.83%	91.85%	95.61%	4.01%

Table S2. Preliminary assay results of tested compounds against mouse 11β-HSD1 at 10 μM.

Compds no.	Expt.1	Expt.2	Expt.3	Average	SD
1	33.05%	36.23%	30.55%	33.28%	2.85%
3	91.72%	85.55%	90.98%	89.42%	3.36%
4	64.36%	61.30%	53.63%	59.76%	5.53%
5	78.62%	89.05%	80.36%	82.68%	5.58%
6	77.18%	79.88%	71.84%	76.30%	4.09%
7	56.67%	57.78%	48.83%	54.43%	4.88%
8	70.88%	71.75%	65.67%	69.44%	3.29%
9	43.89%	43.26%	39.64%	42.26%	2.30%
Glycyrrhetinic acid 1 nM	16.88%	15.73%	19.69%	17.43%	2.04%
Glycyrrhetinic acid 10 nM	54.05%	55.13%	60.39%	56.53%	3.39%
Glycyrrhetinic acid 100 nM	89.37%	90.45%	92.69%	90.83%	1.69%

Table S3. X-ray crystallographic data for horipenoid E (**5**).

Empirical formula	$C_{30}H_{52}O_4 \cdot H_2O$
Formula weight	494.73
Temperature	296(2) K
Wavelength	1.54178 Å
Crystal system	Orthorhombic
Space group	P 2(1)2(1)2(1)
Unit cell dimensions	a = 10.5637(3) Å α= 90° b = 13.2734(3) Å β= 90° c = 20.6274(5) Å γ= 90°
Volume	2892.30(13) $Å^3$
Z	4
Density (calculated)	1.136 Mg/m^3
Absorption coefficient	0.588 mm^{-1}
F(000)	1096
Crystal size	0.300 × 0.200 × 0.150 mm^3
Theta range for data collection	3.960 to 69.482°.
Index ranges	-12<=h<=12, -16<=k<=15, -24<=l<=24
Reflections collected	21688
Independent reflections	5337 [R(int) = 0.0630]
Completeness to theta = 67.679°	99.6 %
Absorption correction	Semi-empirical from equivalents
Max. and min. transmission	0.7532 and 0.4678
Refinement method	Full-matrix least-squares on F2
Data / restraints / parameters	5337 / 0 / 328
Goodness-of-fit on F^2	1.037
Final R indices [I>2sigma(I)]	R1 = 0.0606, wR2 = 0.1672
R indices (all data)	R1 = 0.0674, wR2 = 0.1746
Absolute structure parameter	-0.08(13)
Extinction coefficient	n/a
Largest diff. peak and hole	0.415 and -0.215 $e.Å^{-3}$

[a] Colorless crystals of **5** were obtained in methanol with trace of water.

Figure S1. ^{1}H NMR spectrum of horipenoid A (**1**) in C_5D_5N

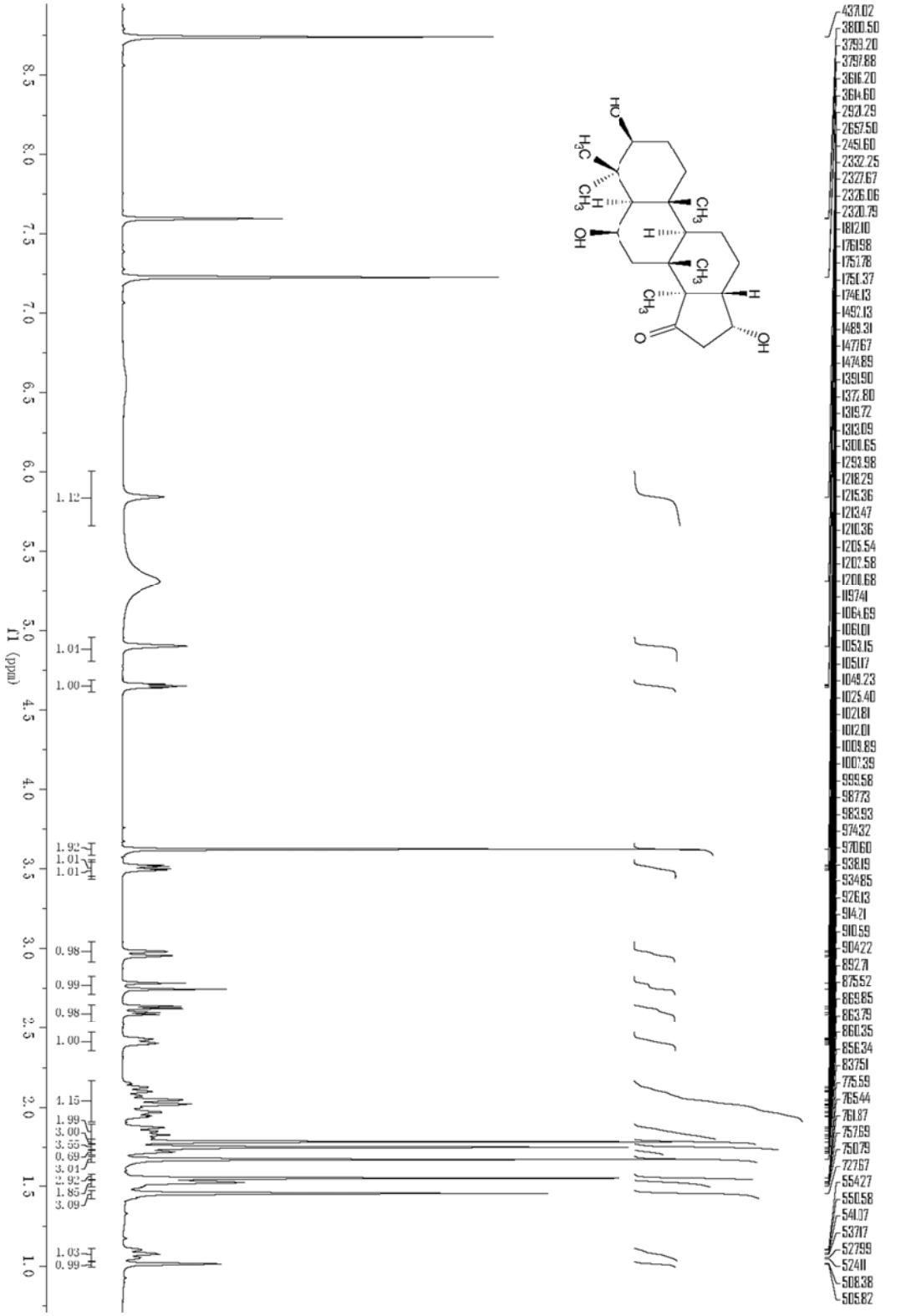


Figure S2. ^{13}C NMR spectrum of horipenoid A (**1**) in C_5D_5N

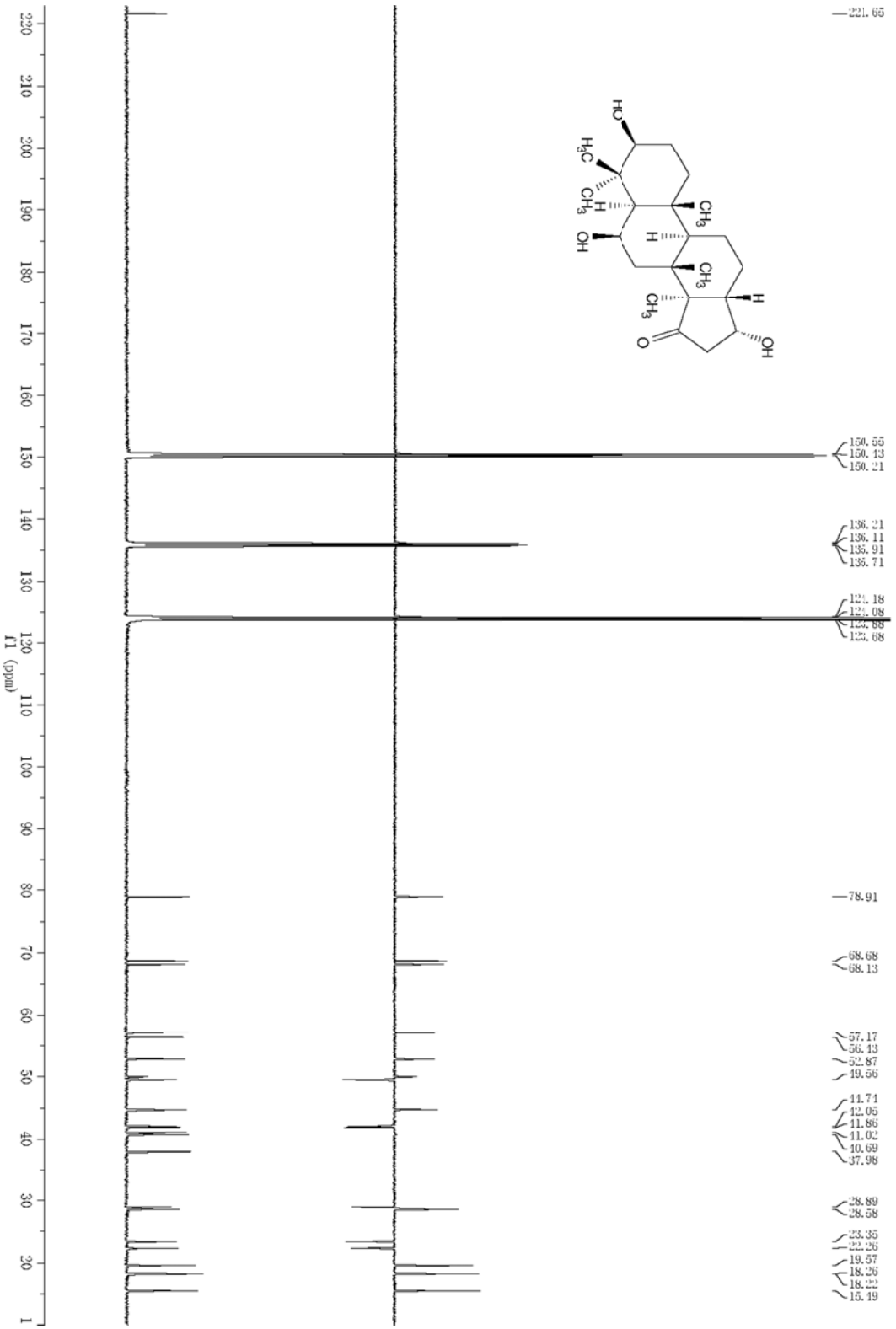


Figure S3. ^{1}H-^{1}HCOSY spectrum of horipenoid A (**1**) in C_5D_5N

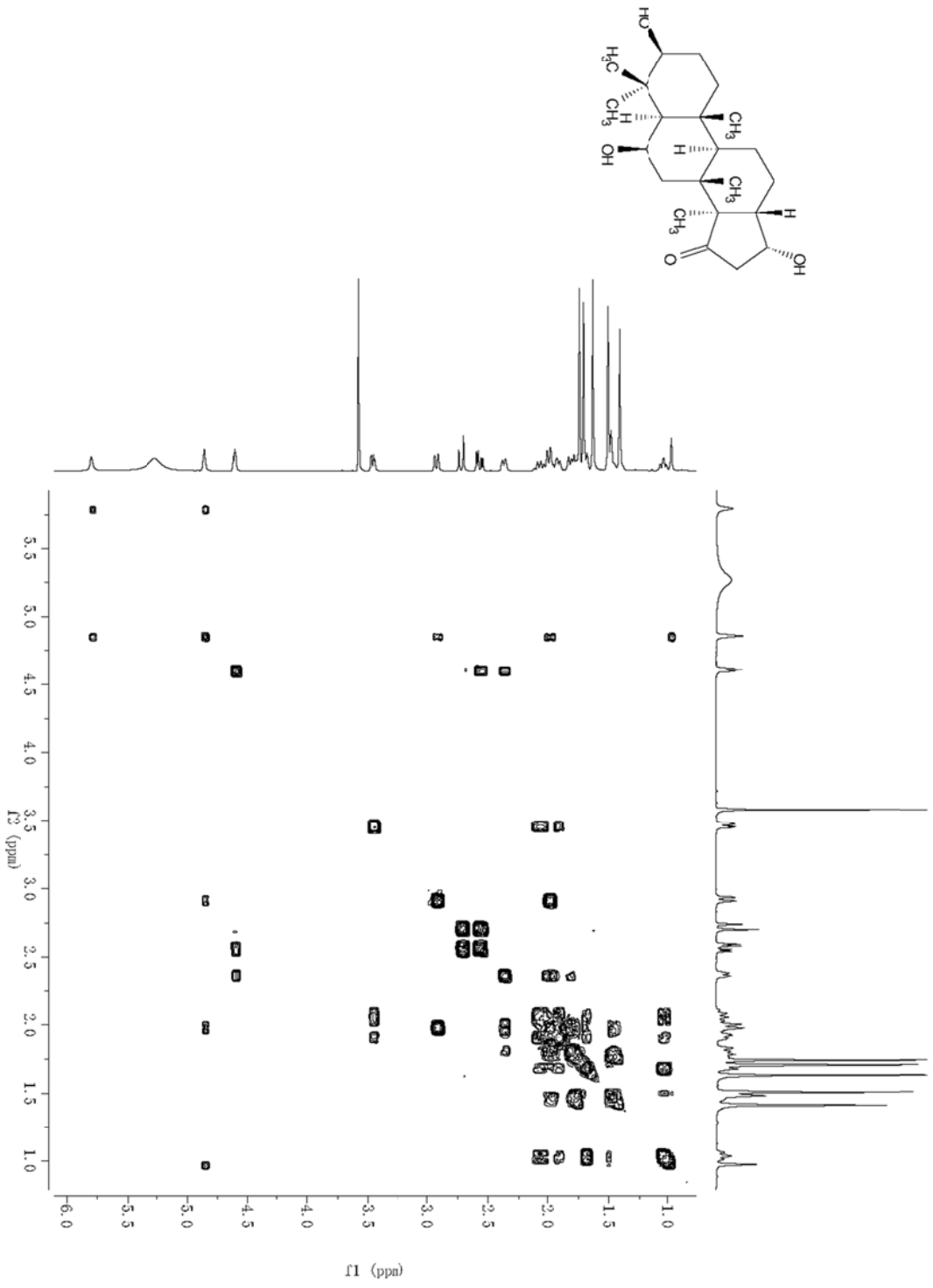


Figure S4. HSQC spectrum of horipenoid A (**1**) in C_5D_5N

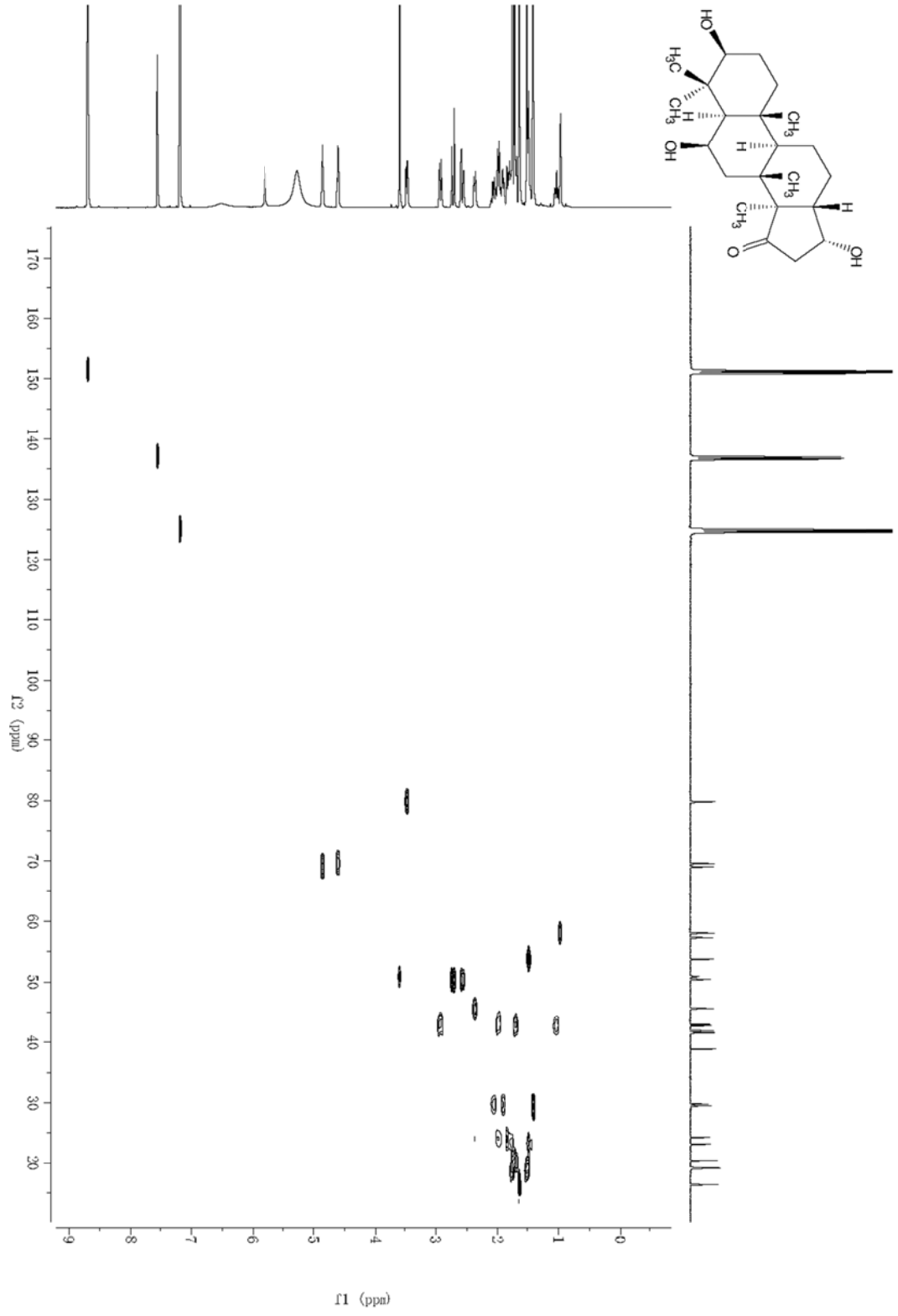


Figure S5. HMBC spectrum of horipenoid A (**1**) in C_5D_5N

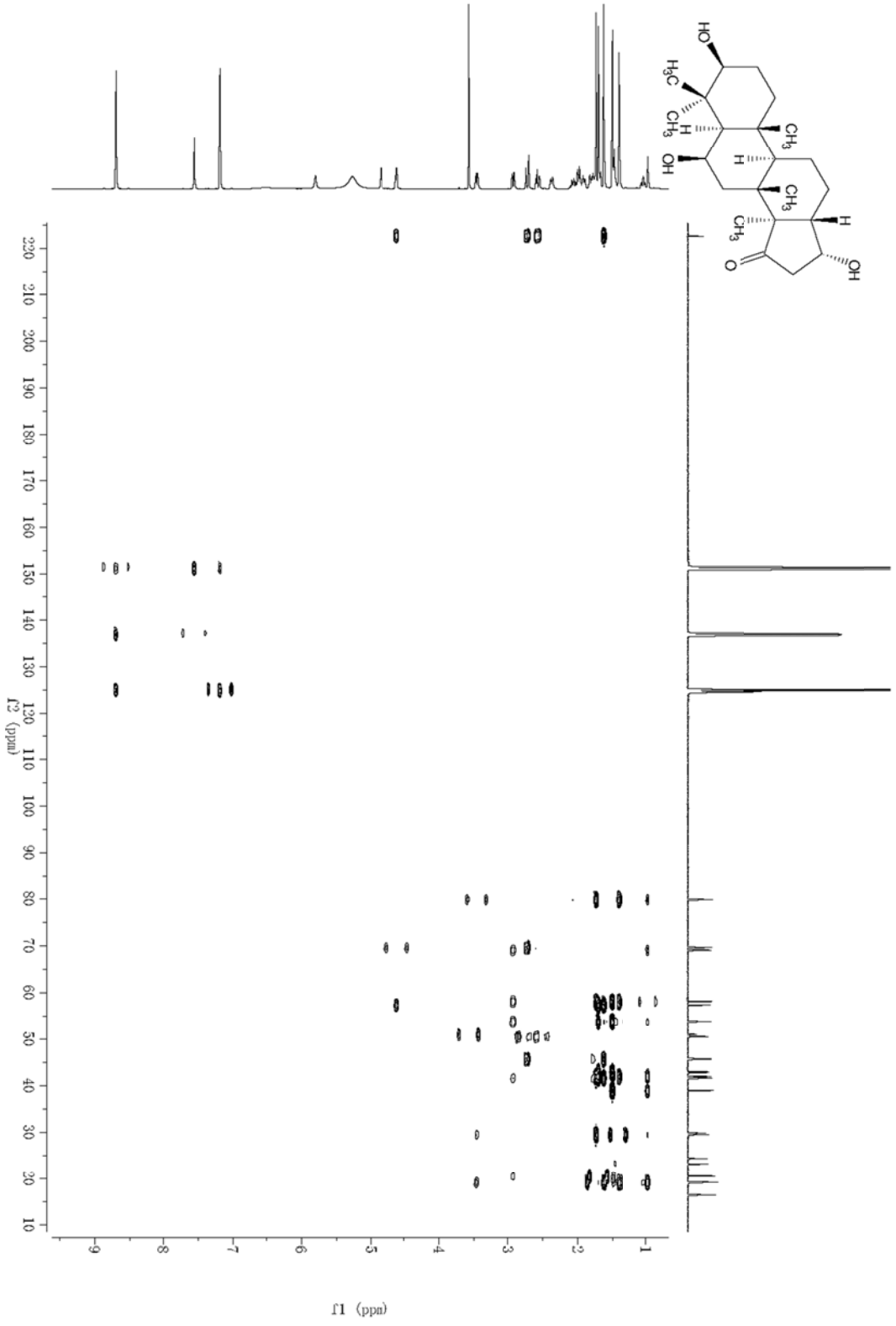


Figure S6. ROESY spectrum of horipenoid A (**1**) in C_5D_5N

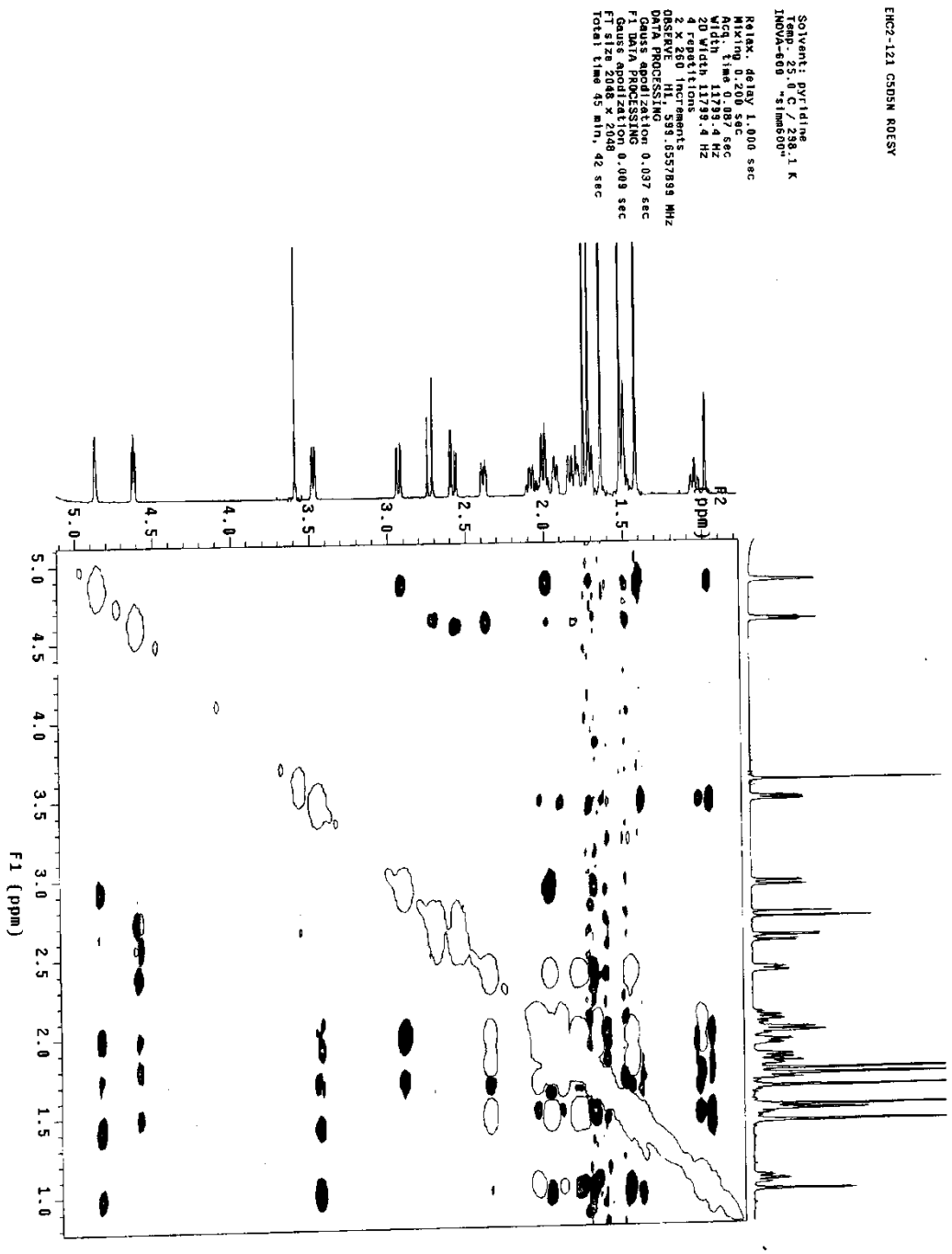


Figure S7. ESI(+)MS spectrum of horipenoid A (**1**)

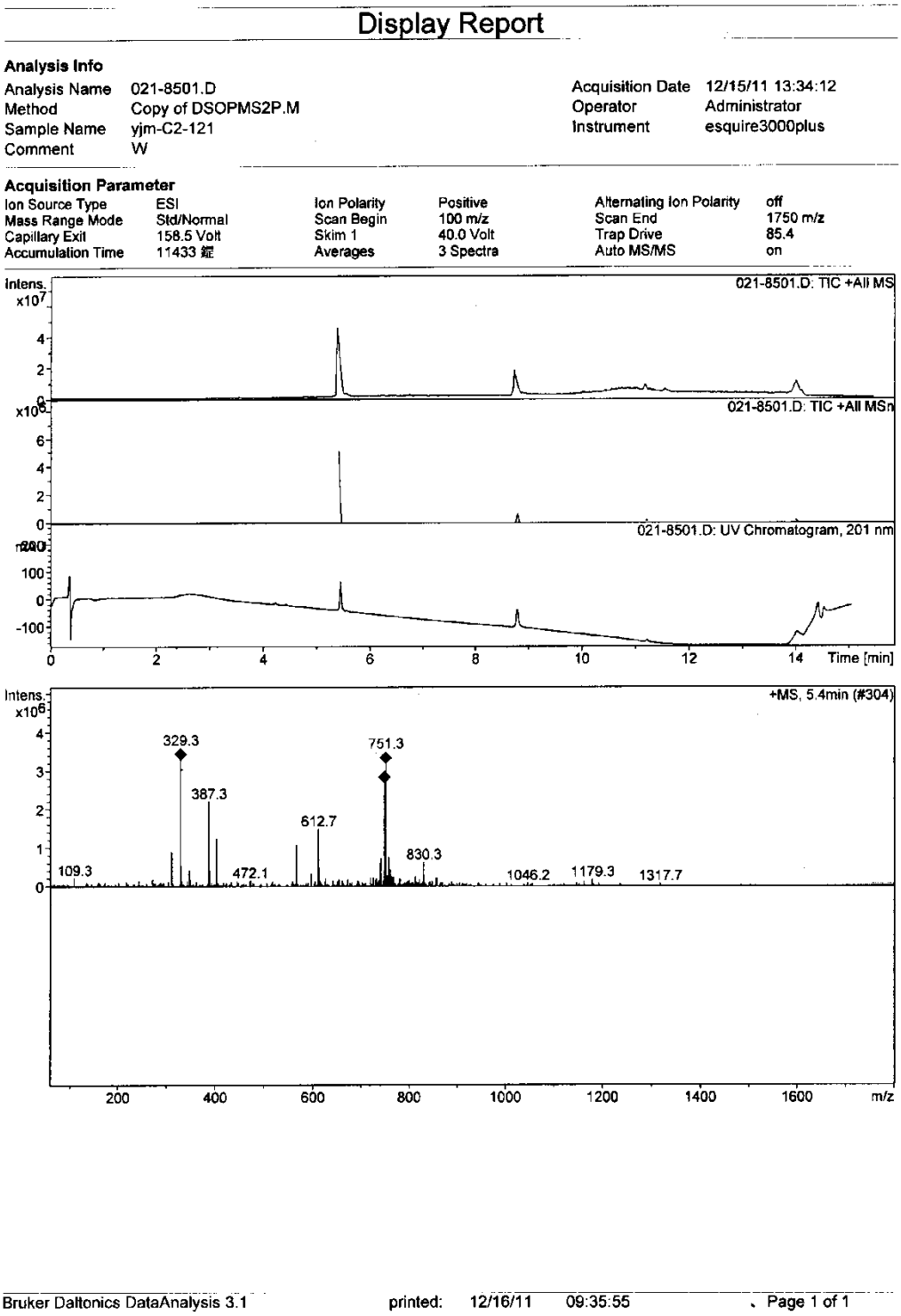


Figure S8. HRESI(−)MS spectrum of horipenoid A (**1**)

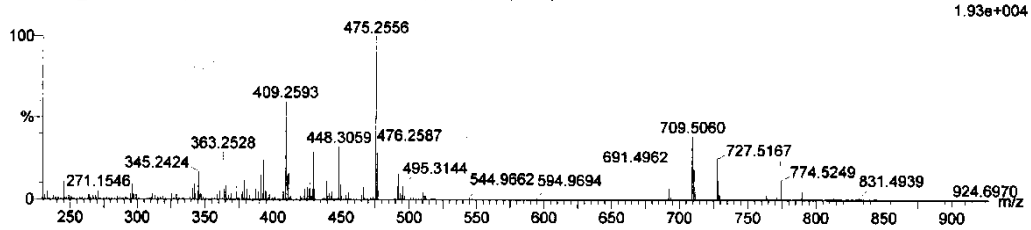
Elemental Composition Report **Page 1**

Single Mass Analysis
Tolerance = 5.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
64 formula(e) evaluated with 1 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:
C: 10-50 H: 1-80 O: 0-30

EHC2-121 LCT PXE KE324 09-Mar-2012 13:37:10

EHC2-121_20120309 14 (0.301) AM2 (Ar,11500.0,0.00,0.70); ABS; Cm (14:34) 1: TOF MS ES- 1.93e+004



Minimum:				-1.5			
Maximum:		5.0	5.0	50.0			
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	i-FIT (Norm)	Formula
363.2528	363.2535	-0.7	-1.9	5.5	196.2	0.0	C22 H35 O4

Figure S9. IR spectrum of horipenoid A (**1**)

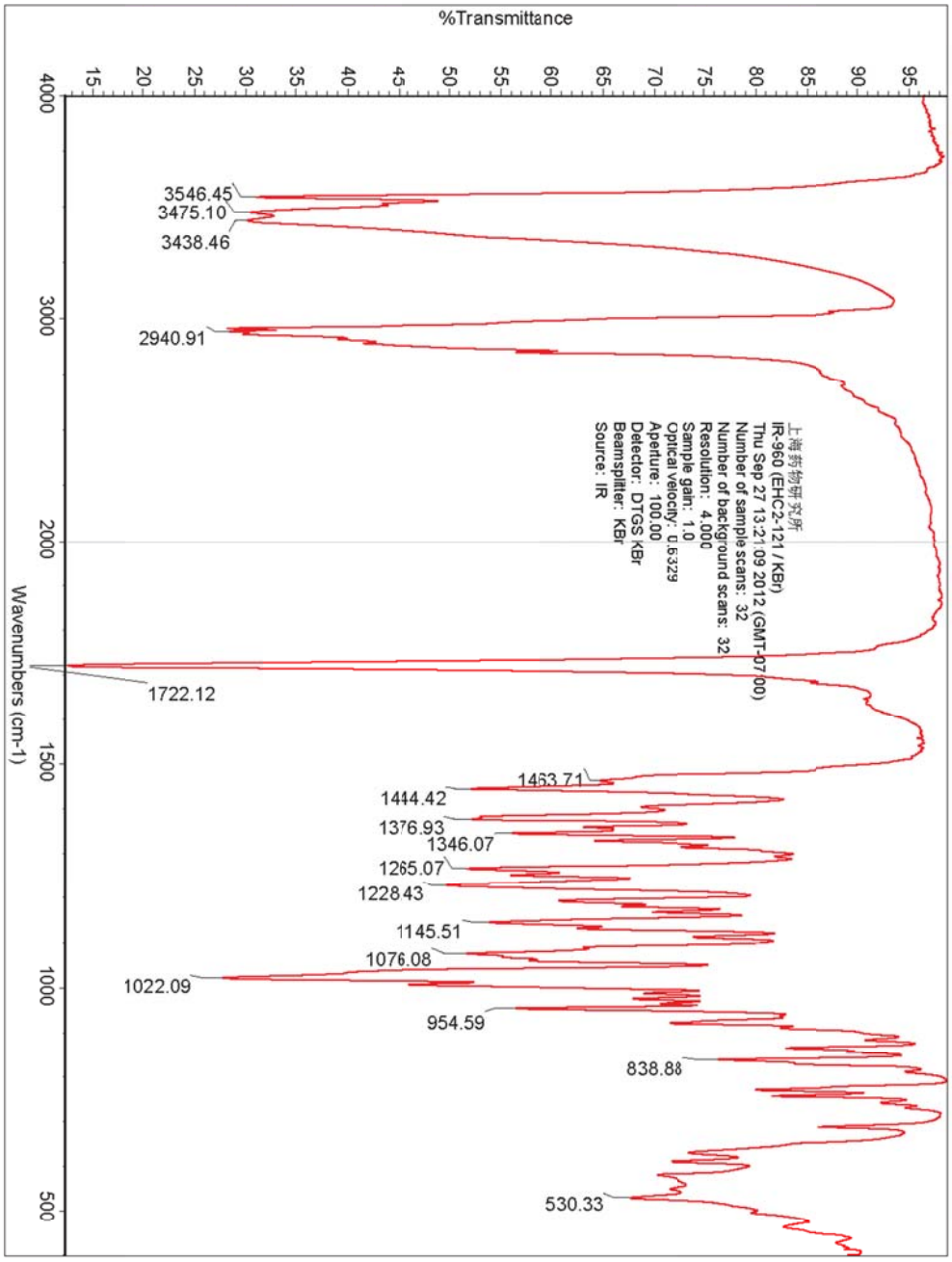


Figure S10. ^{1}H NMR spectrum of horipenoid B (**2**) in CD_3OD

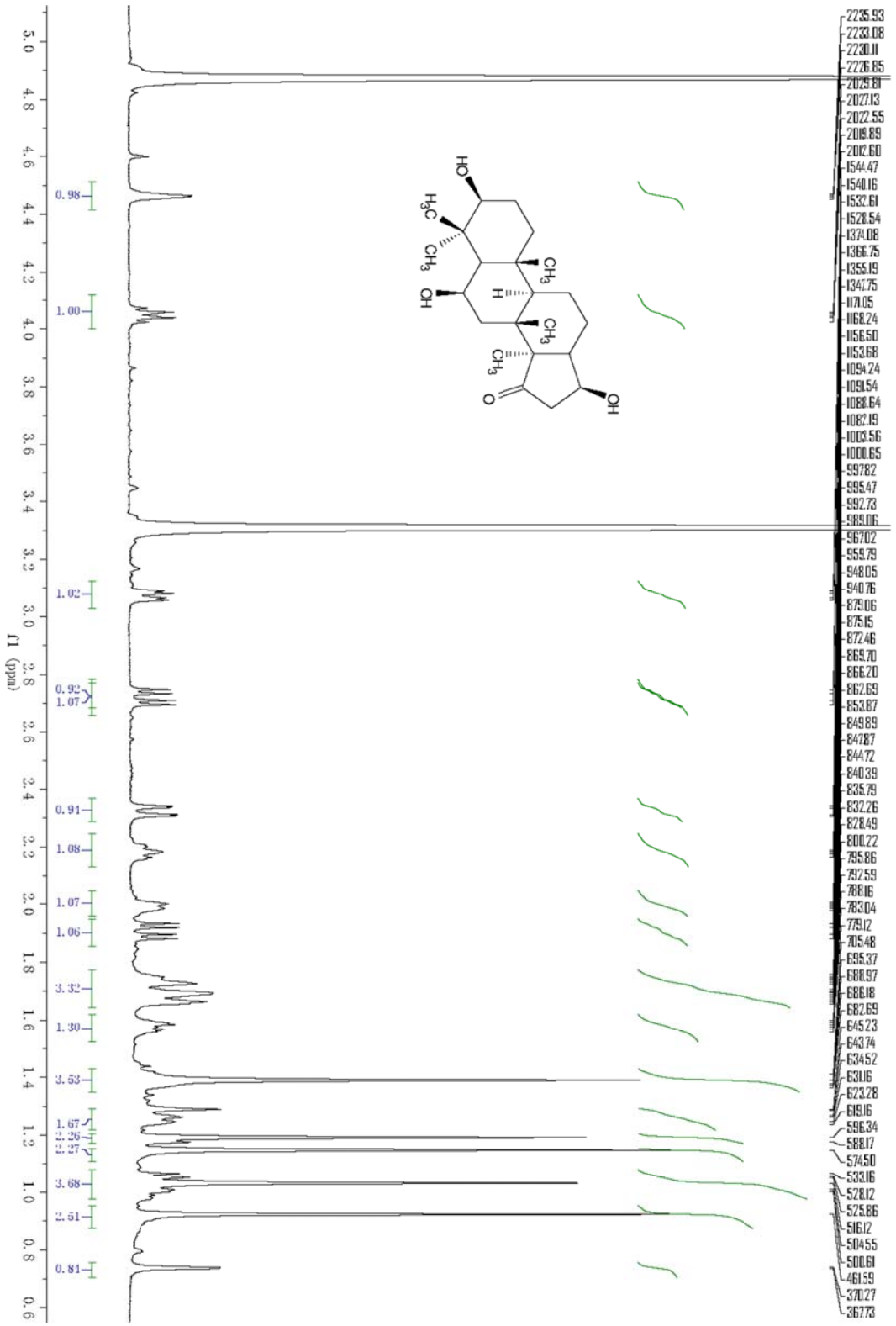


Figure S11. ^{13}C NMR spectrum of horipenoid B (**2**) in CD_3OD

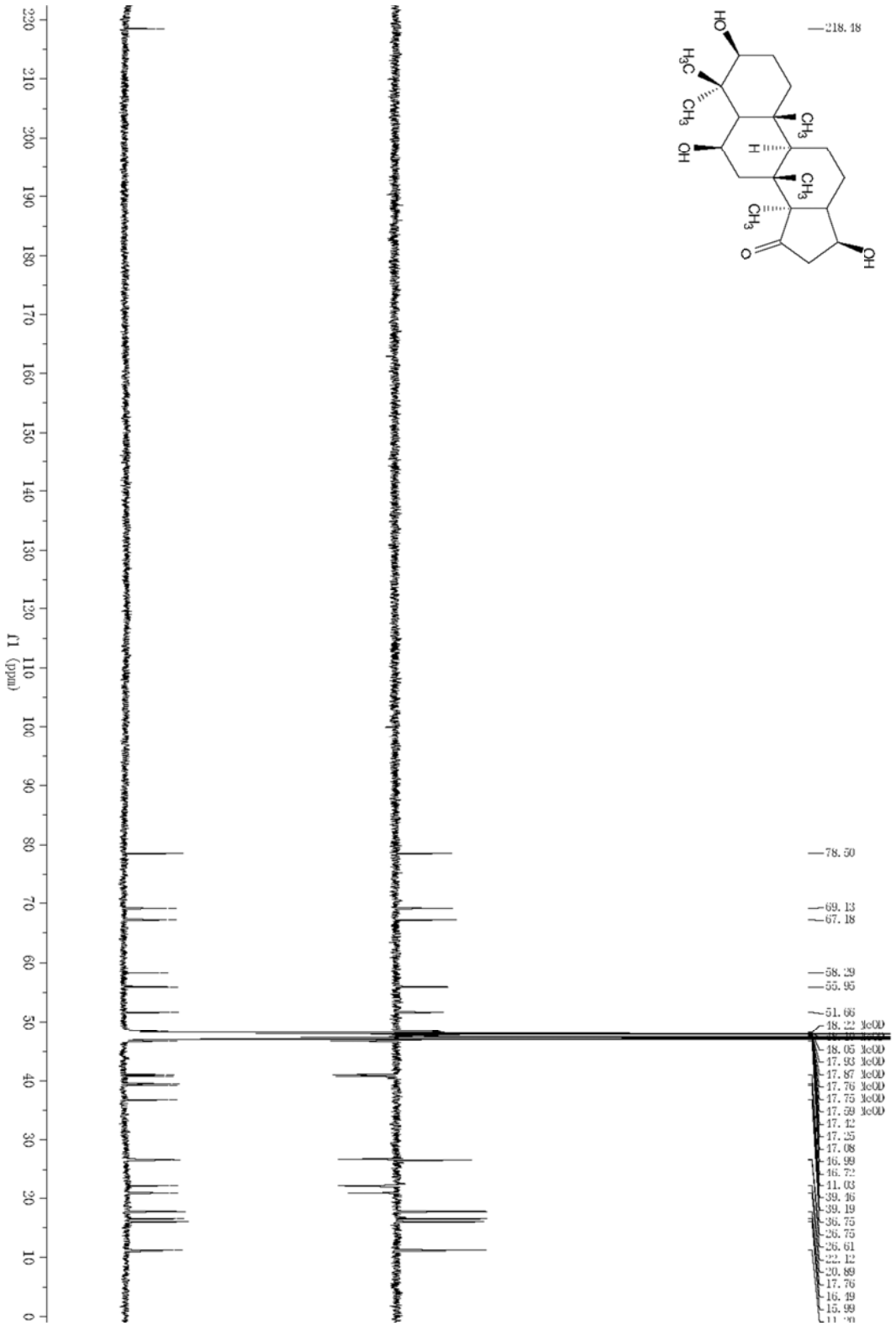


Figure S12. HSQC spectrum of horipenoid B (**2**) in CD_3OD

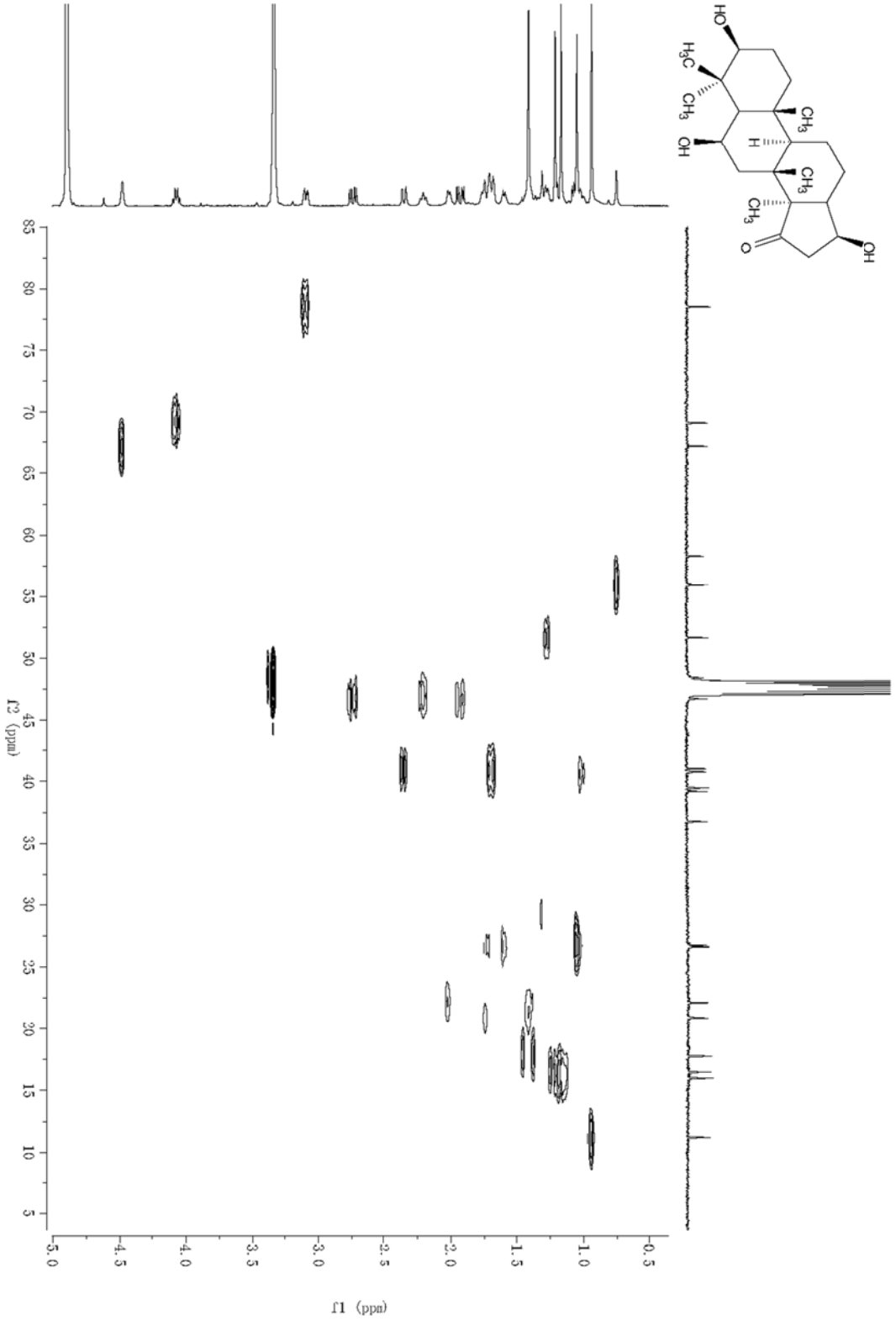


Figure S13. HMBC spectrum of horipenoid B (**2**) in CD_3OD

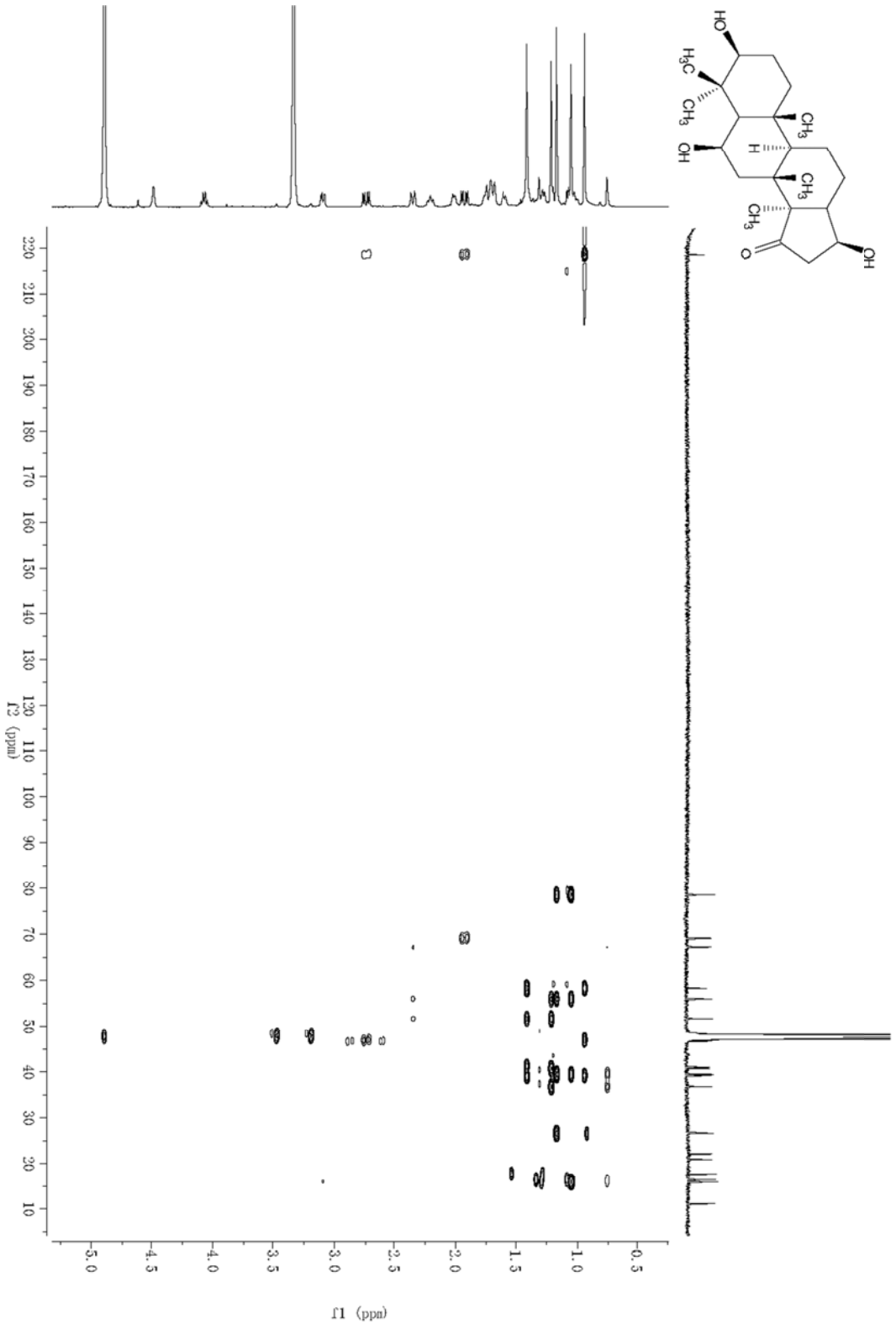


Figure S14. ROESY spectrum of horipenoid B (**2**) in CD_3OD

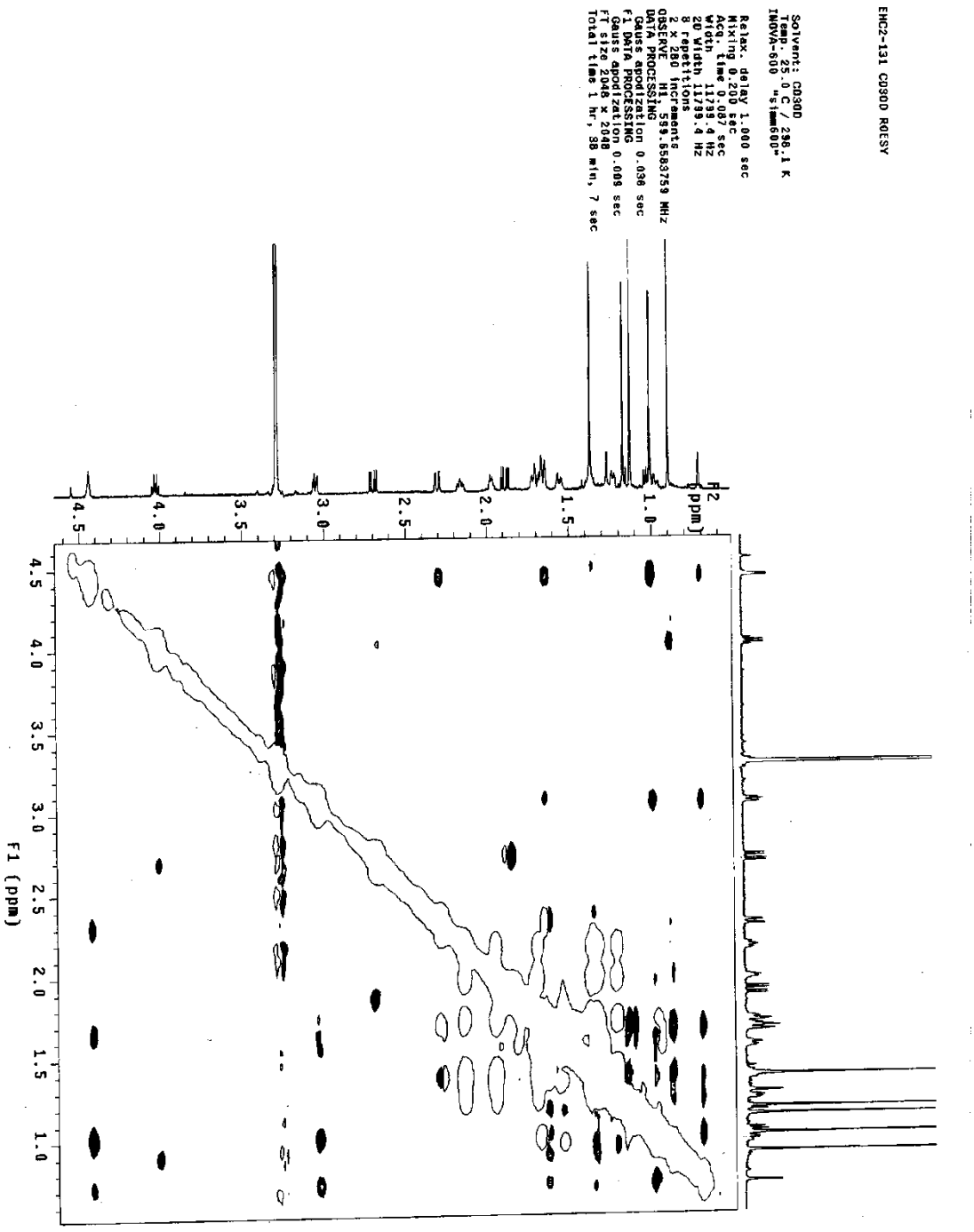


Figure S15. EIMS spectrum of horipenoid B (**2**)

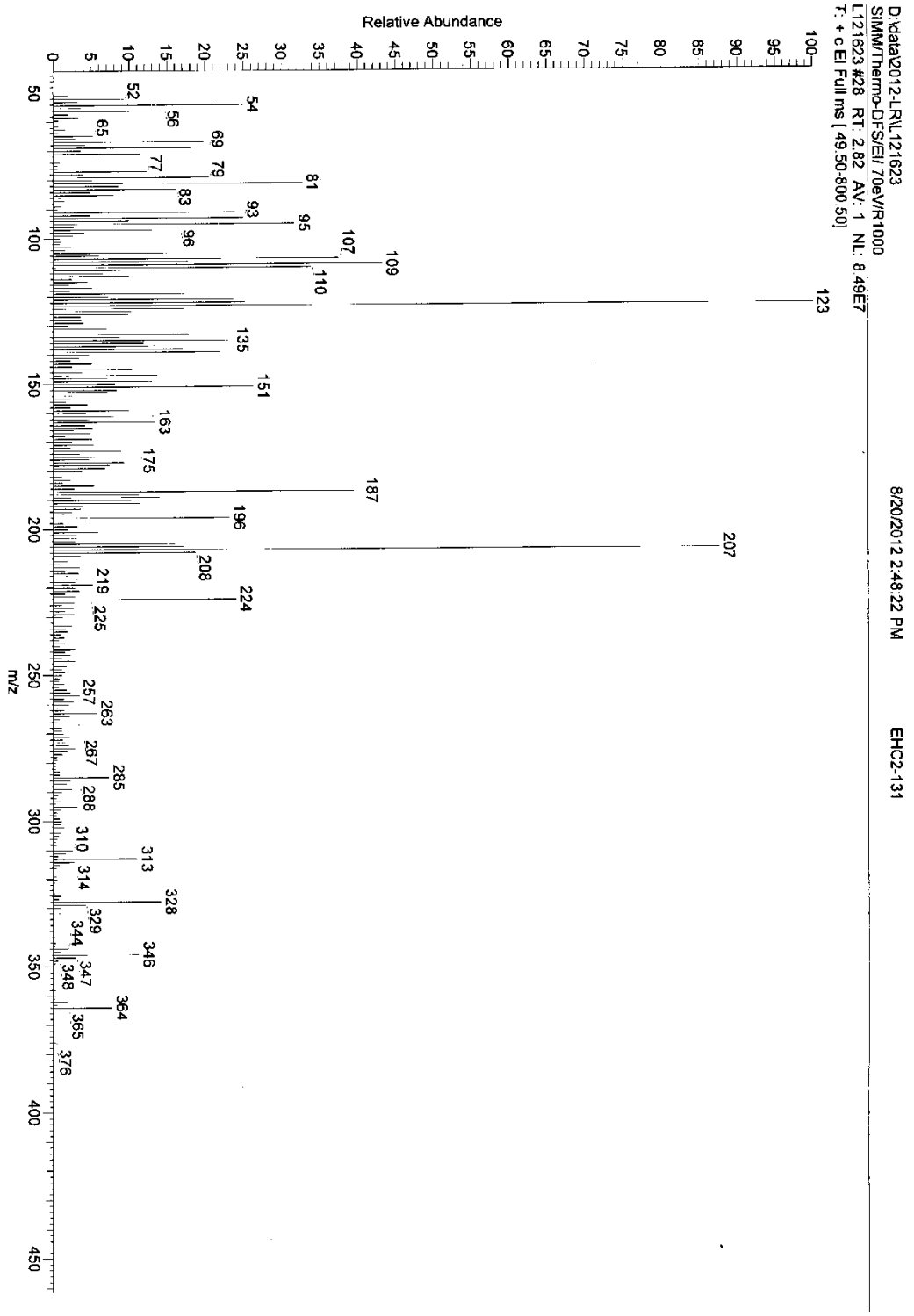


Figure S16. HREIMS spectrum of horipenoid B (**2**)

```
LIST:  h120743-c1                                  25-Sep-12   Elapse:  05:36.9      27
Samp:  EC2-131                                                 Start :  16:36:31     28
Comm:  Finnigan/MAT95//70eV/Tsou:220c/R:10000
Mode:  EI +VE +LMR  BSCAN (EXP) UP HR NRM                      Study :  S/N: PT200712-01-01
Oper:  WANG_J@SIMM.CAS                                         Inlet :
Limt: (   0 )      .      .
    : ( 441 ) C23.H100.O4
Peak:  1000.00  mmu     R+D:  -2.0 > 60.0
Data:  CMASS : converted
```

Mass		Intensity (202125)	%RA	%RIC	Delta (mmu)	R+D	Composition
71.04881	*	242531	9.62	0.49	0.9	1.5	C4.H7.O
77.03811	*	205891	8.16	0.42	1.0	4.5	C6.H5
79.05358	*	418283	16.58	0.85	1.2	3.5	C6.H7
81.06792	*	805305	31.93	1.64	2.5	2.5	C6.H9
83.04740	*	217947	8.64	0.44	2.3	2.5	C5.H7.O
85.06372	*	205477	8.15	0.42	1.6	1.5	C5.H9.O
91.05422	*	418874	16.61	0.85	0.6	4.5	C7.H7
93.07084	*	619743	24.57	1.26	-0.4	3.5	C7.H9
94.07702	*	215938	8.56	0.44	1.2	3.0	C7.H10
95.08595	*	652423	25.87	1.33	0.1	2.5	C7.H11
96.09263	*	219306	8.69	0.45	1.3	2.0	C7.H12
97.06484	*	273143	10.83	0.56	0.5	2.5	C6.H9.O
105.0675	*	421829	16.72	0.86	2.9	4.5	C8.H9
107.0833	*	908074	36.00	1.85	2.8	3.5	C8.H11
108.0899	*	294595	11.68	0.60			
109.0626	*	399904	15.85	0.81	2.7	3.5	C7.H9.O
109.0988	*	723693	28.69	1.47	2.9	2.5	C8.H13
110.0707	*	848978	33.66	1.73	2.5	3.0	C7.H10.O
111.0779	*	276275	10.95	0.56			
113.0585	*	238985	9.47	0.49	1.7	2.5	C6.H9.O2
119.0855	*	484649	19.21	0.99	0.6	4.5	C9.H11
121.1013	*	562006	22.28	1.14	0.4	3.5	C9.H13
122.1087	*	464438	18.41	0.94	0.8	3.0	C9.H14
123.0805	*	619152	24.55	1.26	0.4	3.5	C8.H11.O
123.1169	*	2522350	100.00	5.13	0.5	2.5	C9.H15
124.1199	*	231657	9.18	0.47			
126.0675	*	351386	13.93	0.71	0.6	3.0	C7.H10.O2
133.1009	*	471943	18.71	0.96	0.8	4.5	C10.H13
134.1075	*	210087	8.33	0.43	2.1	4.0	C10.H14
135.0806	*	265697	10.53	0.54	0.4	4.5	C9.H11.O
135.1167	*	396477	15.72	0.81	0.7	3.5	C10.H15
137.0954	*	259964	10.31	0.53	1.3	3.5	C9.H13.O
138.0675	*	525839	20.85	1.07	0.6	4.0	C8.H10.O2
139.0750	*	480571	19.05	0.98	0.9	3.5	C8.H11.O2
145.1010	*	290931	11.53	0.59	0.7	5.5	C11.H13
147.1165	*	315751	12.52	0.64	0.9	4.5	C11.H15
149.1323	*	234671	9.30	0.48	0.7	3.5	C11.H17
151.1124	*	550423	21.82	1.12	-0.1	3.5	C10.H15.O
159.1176	*	259019	10.27	0.53	-0.2	5.5	C12.H15
161.1331	*	215819	8.56	0.44	0.0	4.5	C12.H17
163.1127	*	288744	11.45	0.59	-0.4	4.5	C11.H15.O
173.1334	*	218183	8.65	0.44	-0.4	5.5	C13.H17
175.1485	*	209082	8.29	0.43	0.1	4.5	C13.H19
187.1487	*	1029694	40.82	2.09	0.0	5.5	C14.H19
188.1539	*	290754	11.53	0.59	2.6	5.0	C14.H20
189.1643	*	338622	13.42	0.69	0.0	4.5	C14.H21
190.1709	*	242176	9.60	0.49	1.3	4.0	C14.H22
196.1464	*	618147	24.51	1.26	0.0	3.0	C12.H20.O2
205.1599	*	409833	16.25	0.83	-0.7	4.5	C14.H21.O
206.1671	*	314865	12.48	0.64	0.0	4.0	C14.H22.O
207.1756	*	2245838	89.04	4.57	-0.7	3.5	C14.H23.O
208.1805	*	454096	18.00	0.92	2.2	3.0	C14.H24.O
224.1406	*	559819	22.19	1.14	0.7	4.0	C13.H20.O3
313.2204	*	310196	12.30	0.63			
328.2400	*	367520	14.57	0.75	0.3	7.0	C22.H32.O2
346.2512	*	253346	10.04	0.52	-0.4	6.0	C22.H34.O3

Figure S17. IR spectrum of horipenoid B (**2**)

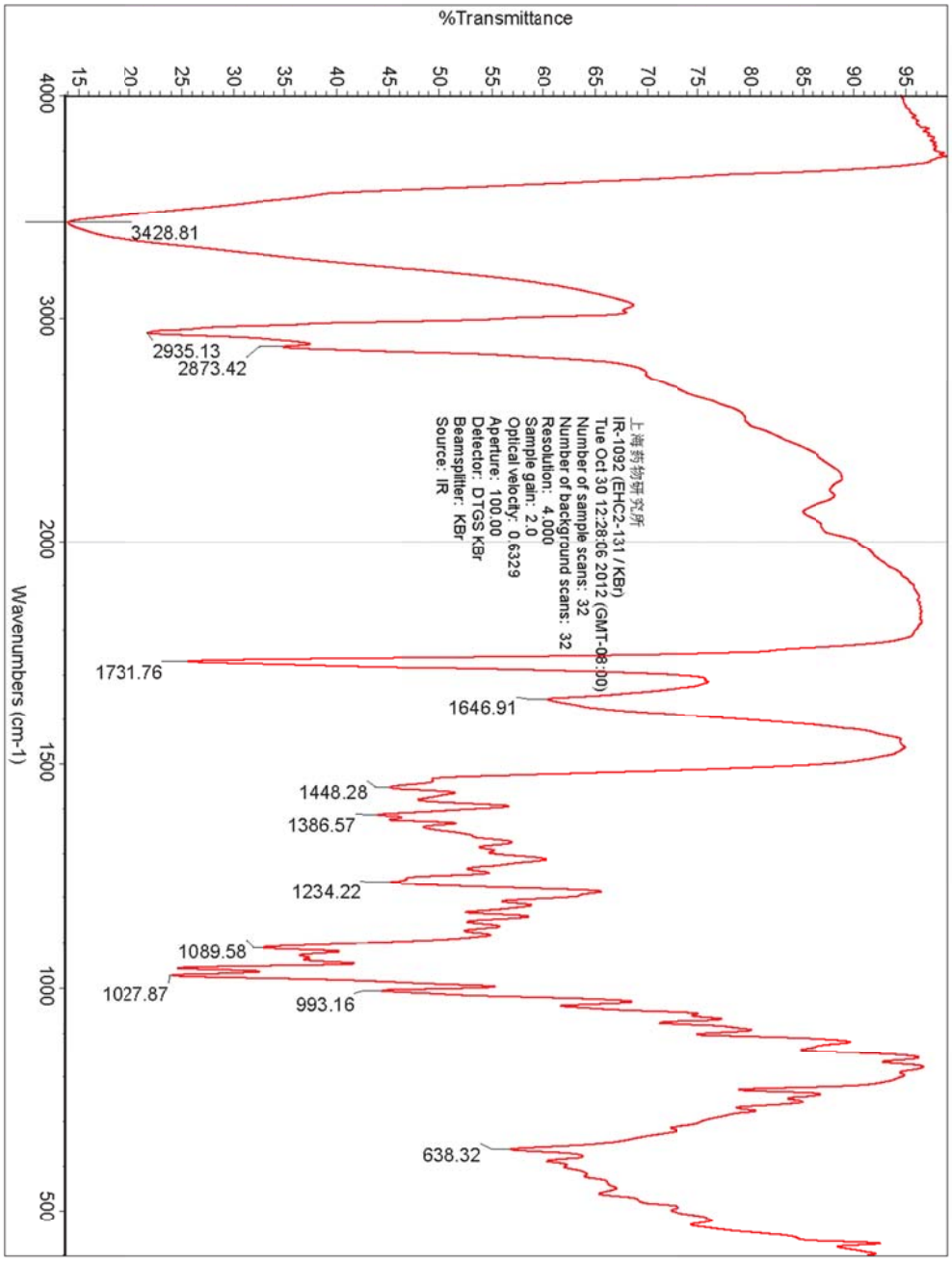


Figure S18. ^{1}H NMR spectrum of horipenoid C (**3**) in $CDCl_3$

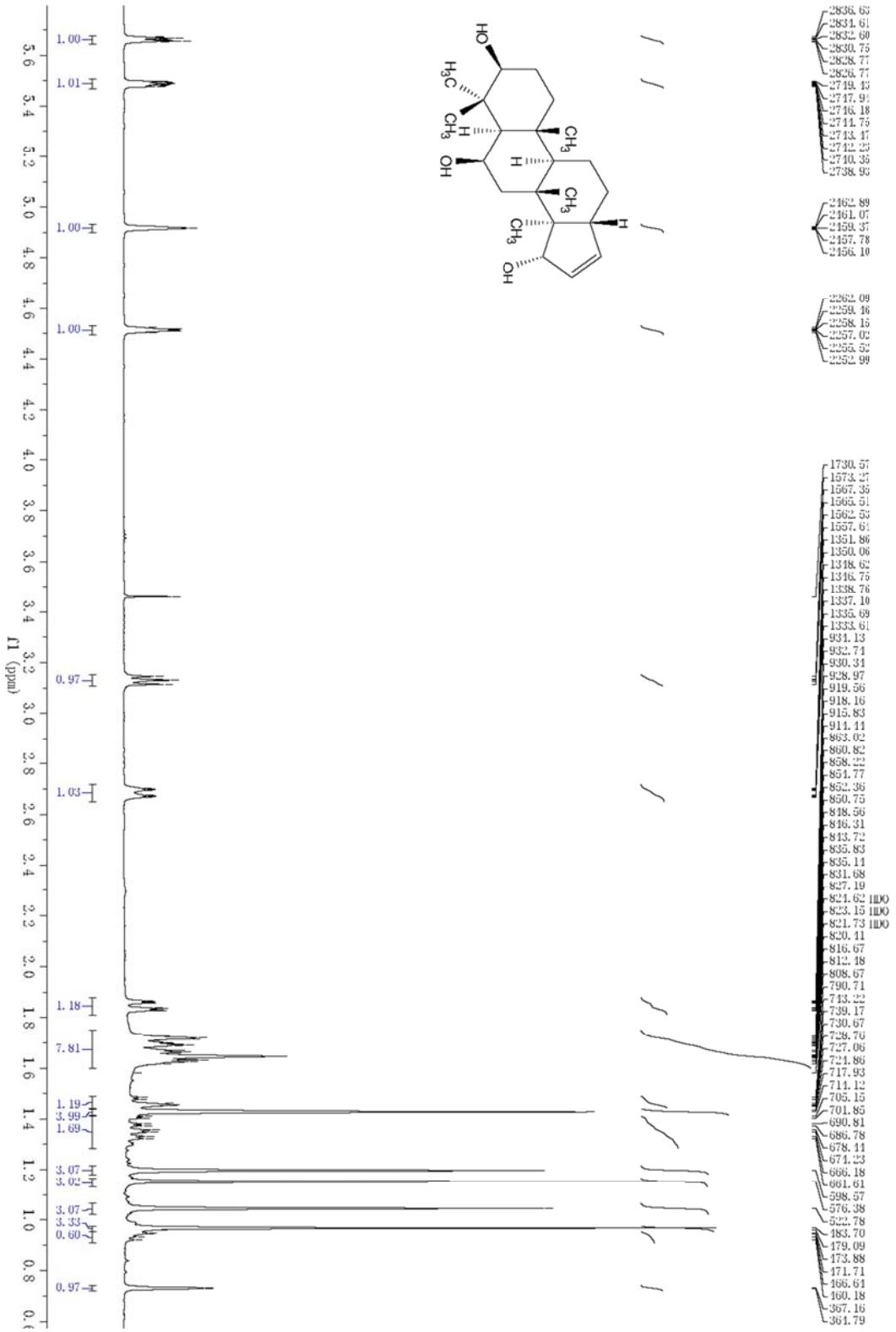


Figure S19. ^{13}C NMR spectrum of horipenoid C (**3**) in $CDCl_3$

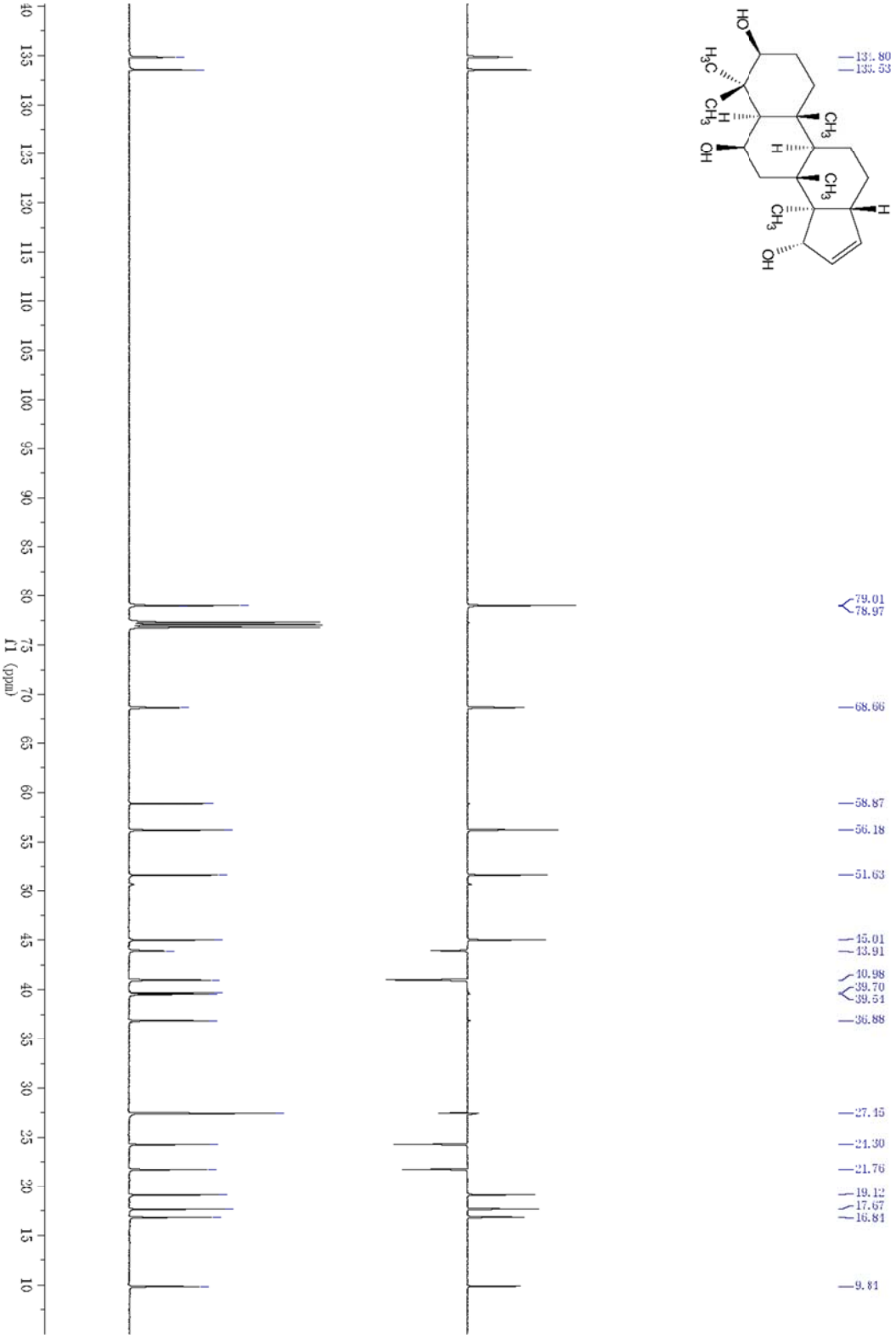


Figure S20. ^{1}H-^{1}HCOSY spectrum of horipenoid C (**3**) in $CDCl_3$

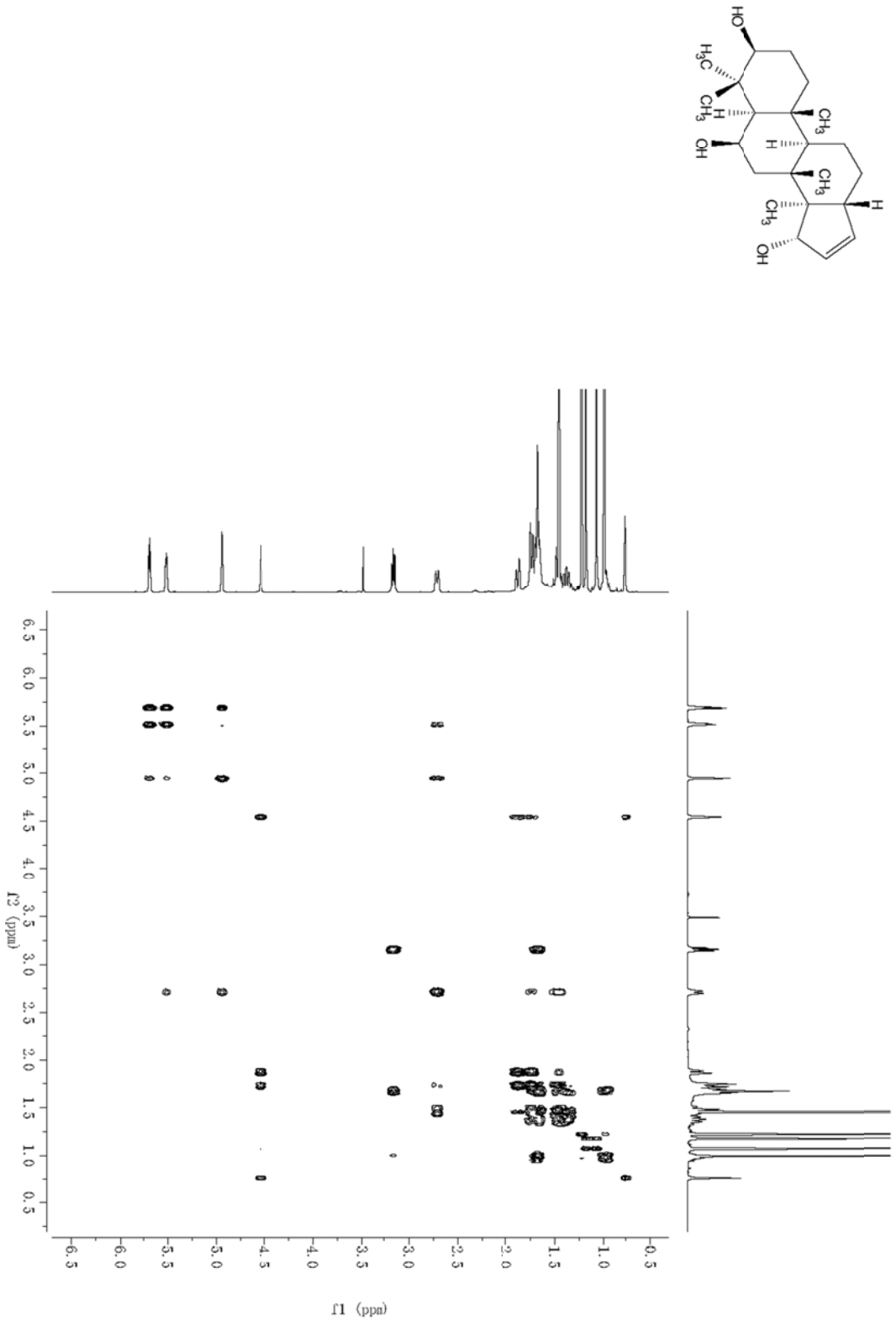


Figure S21. HSQC spectrum of horipenoid C (**3**) in $CDCl_3$

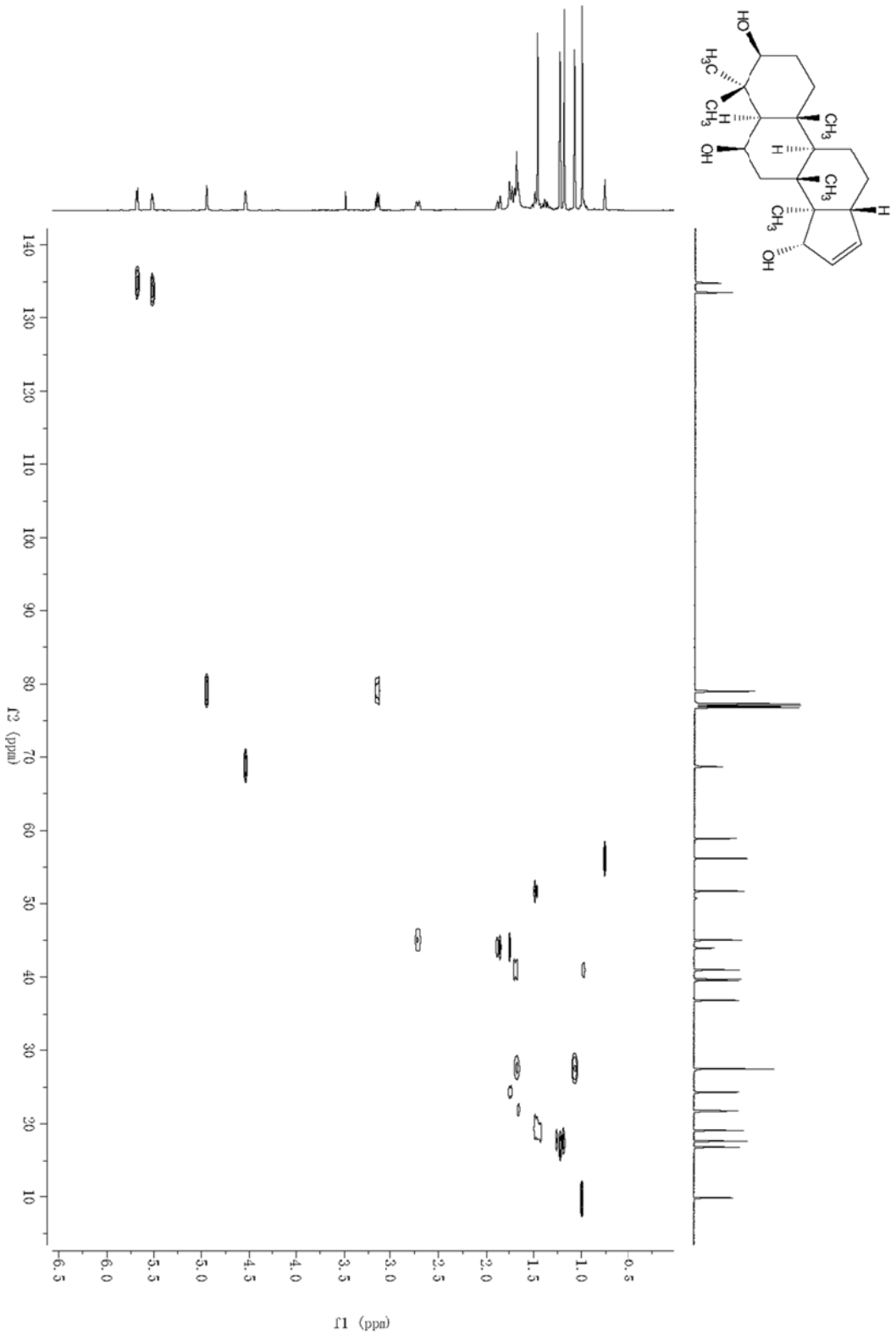


Figure S22. HMBC spectrum of horipenoid C (**3**) in $CDCl_3$

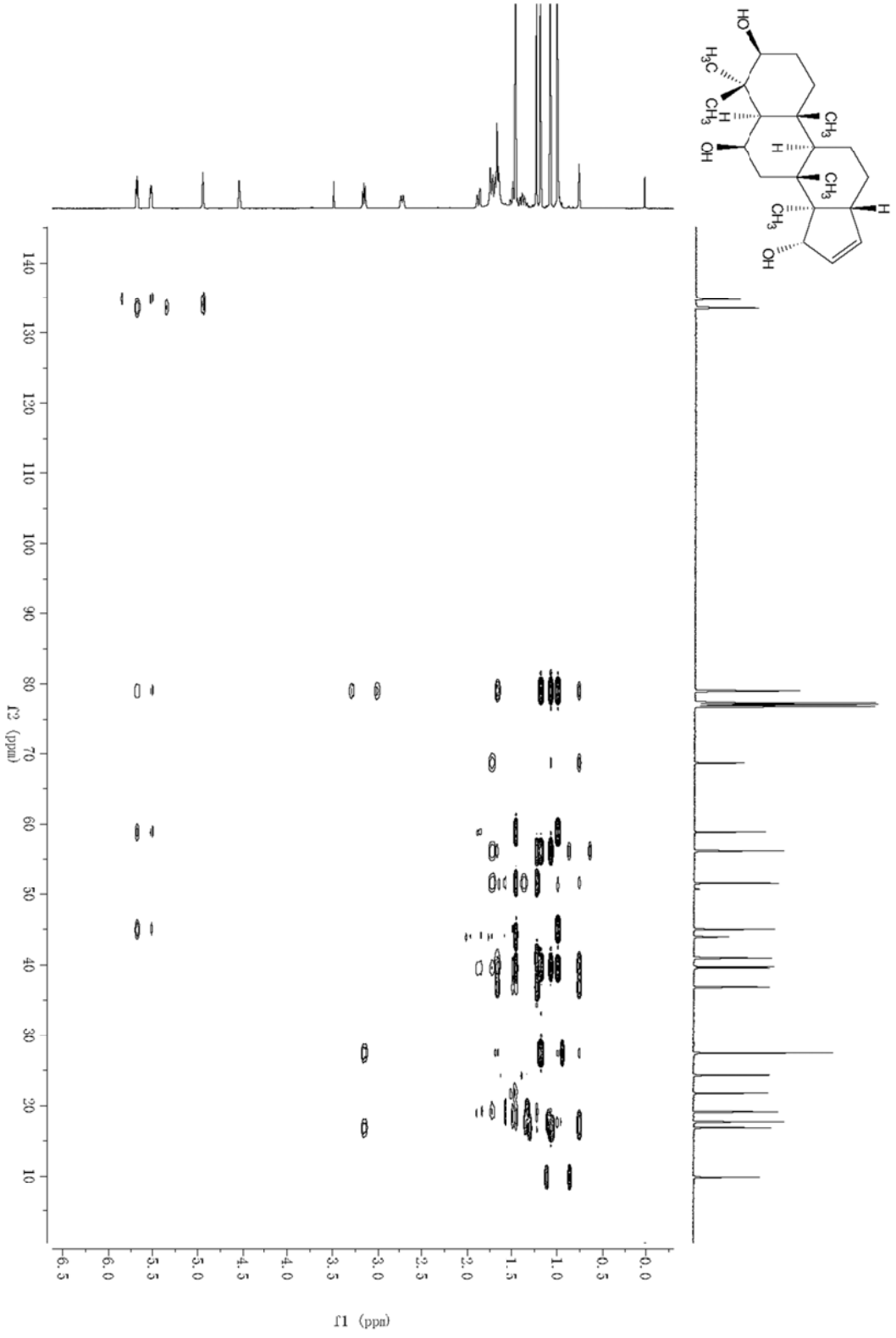


Figure S23. ROESY spectrum of horipenoid C (**3**) in $CDCl_3$

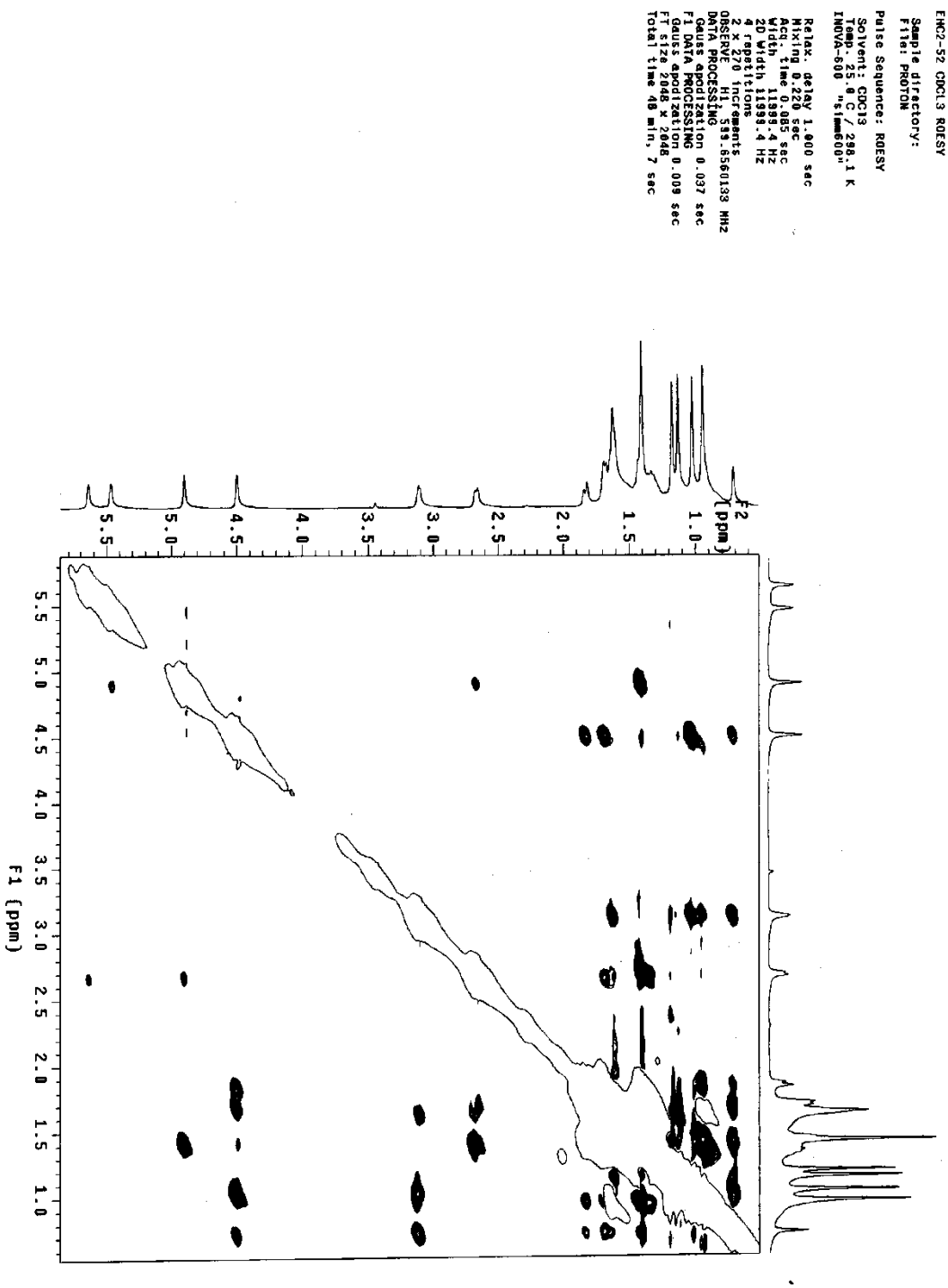


Figure S24. ESI(+)MS spectrum of horipenoid C (**3**)

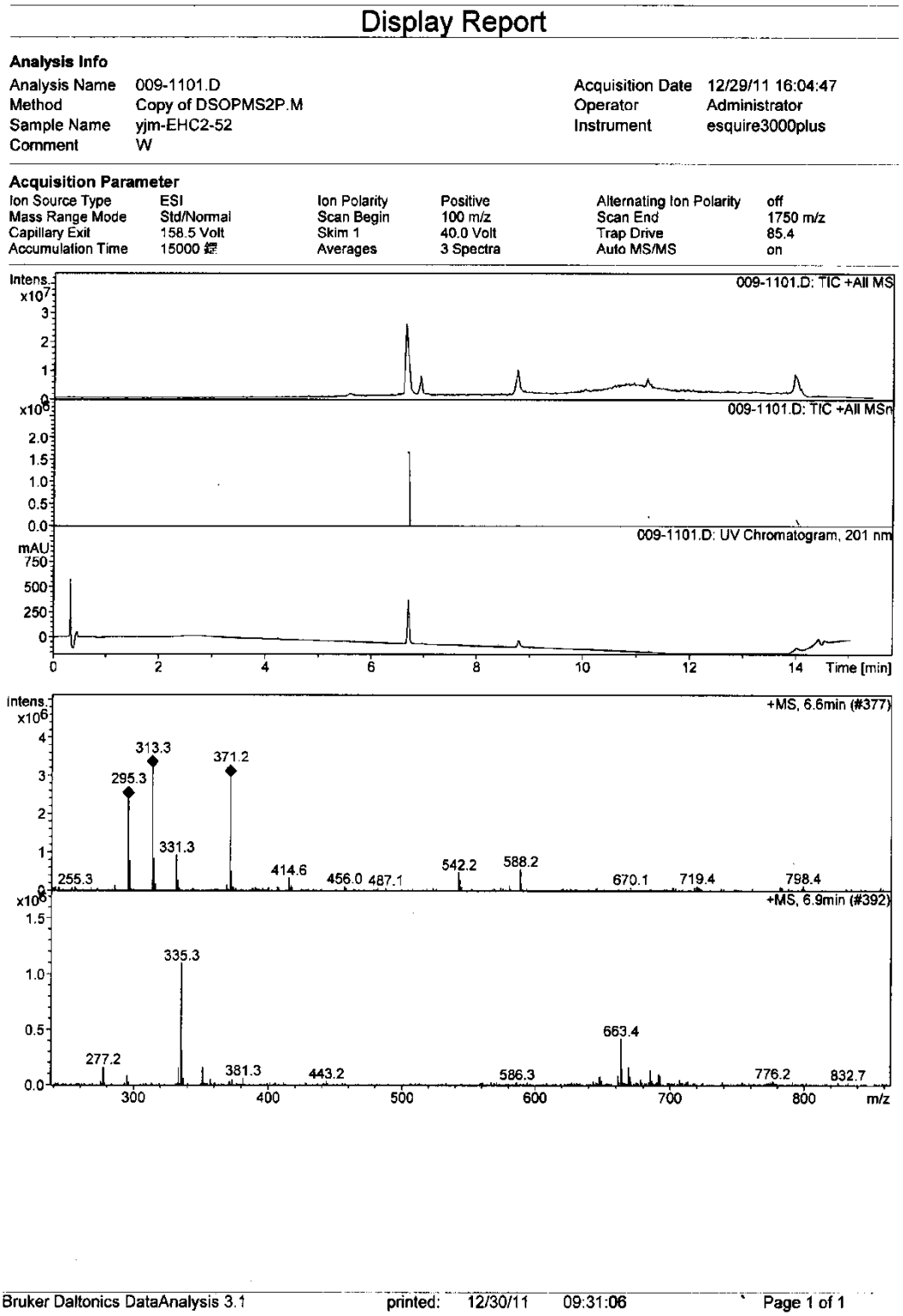


Figure S25. ESI(−)MS spectrum of horipenoid C (**3**)

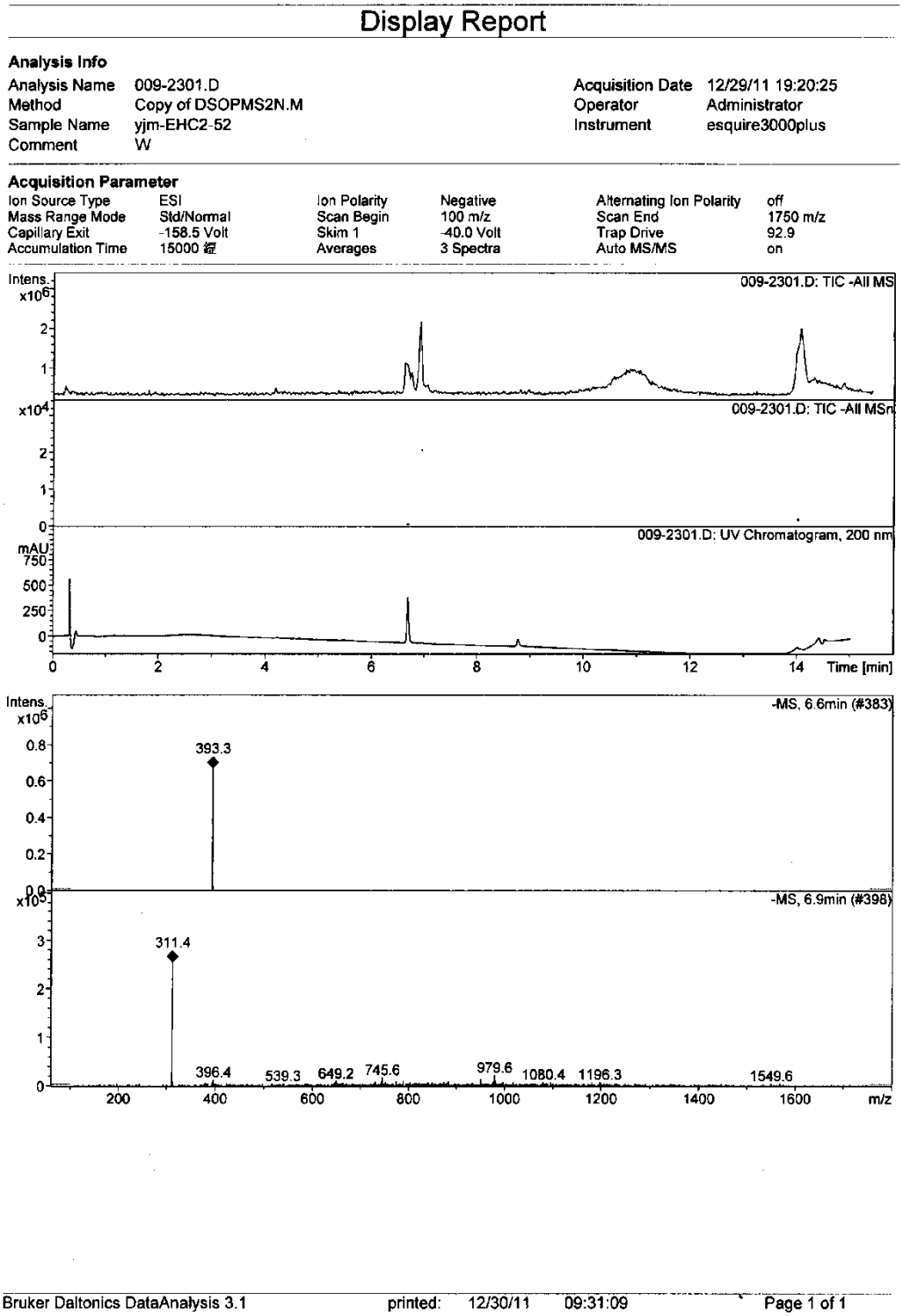


Figure S26. HRESI(−)MS spectrum of horipenoid C (**3**)

Elemental Composition Report **Page 1**

Single Mass Analysis
Tolerance = 5.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
76 formula(e) evaluated with 1 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:
C: 10-50 H: 1-80 O: 0-30

EHC2-52 LCT PXE KE324 09-Mar-2012 14:18:02

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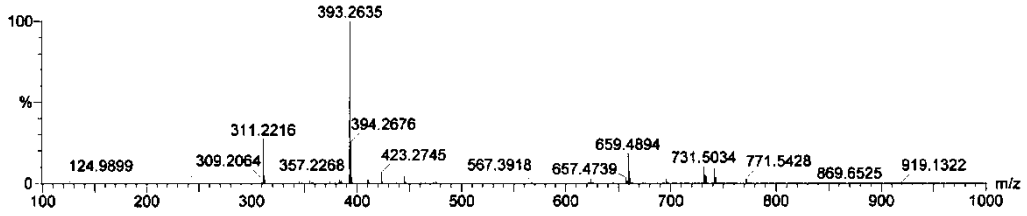


Minimum:				-1.5			
Maximum:		5.0	5.0	50.0			
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	i-FIT (Norm)	Formula
393.2635	393.2641	-0.6	-1.5	5.5	165.7	0.0	C23 H37 O5

Figure S27. IR spectrum of horipenoid A (**3**)

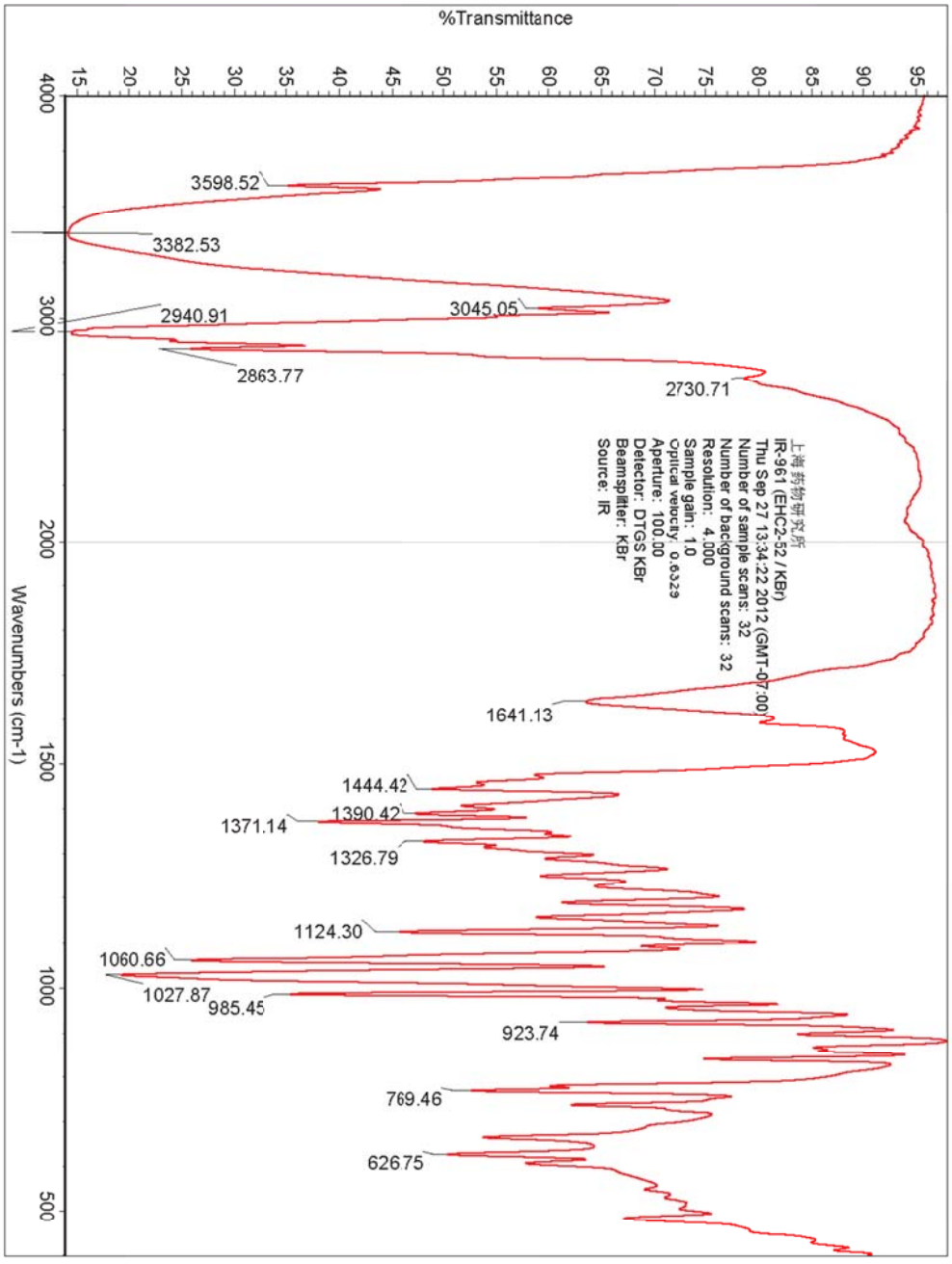


Figure S28. ^{1}H NMR spectrum of horipenoid D (**4**) in $CDCl_3$

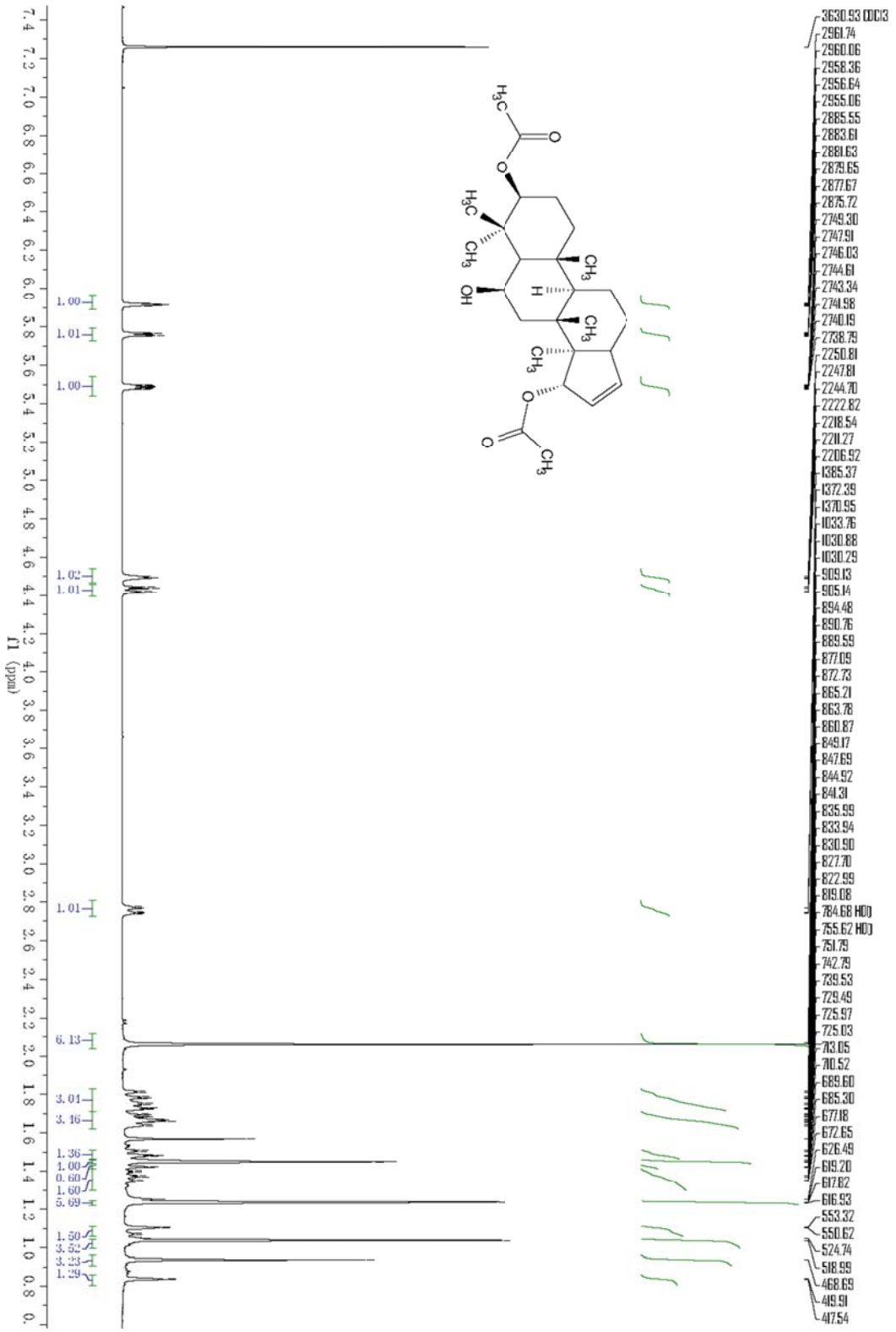


Figure S29. ^{13}C NMR spectrum of horipenoid D (**4**) in $CDCl_3$

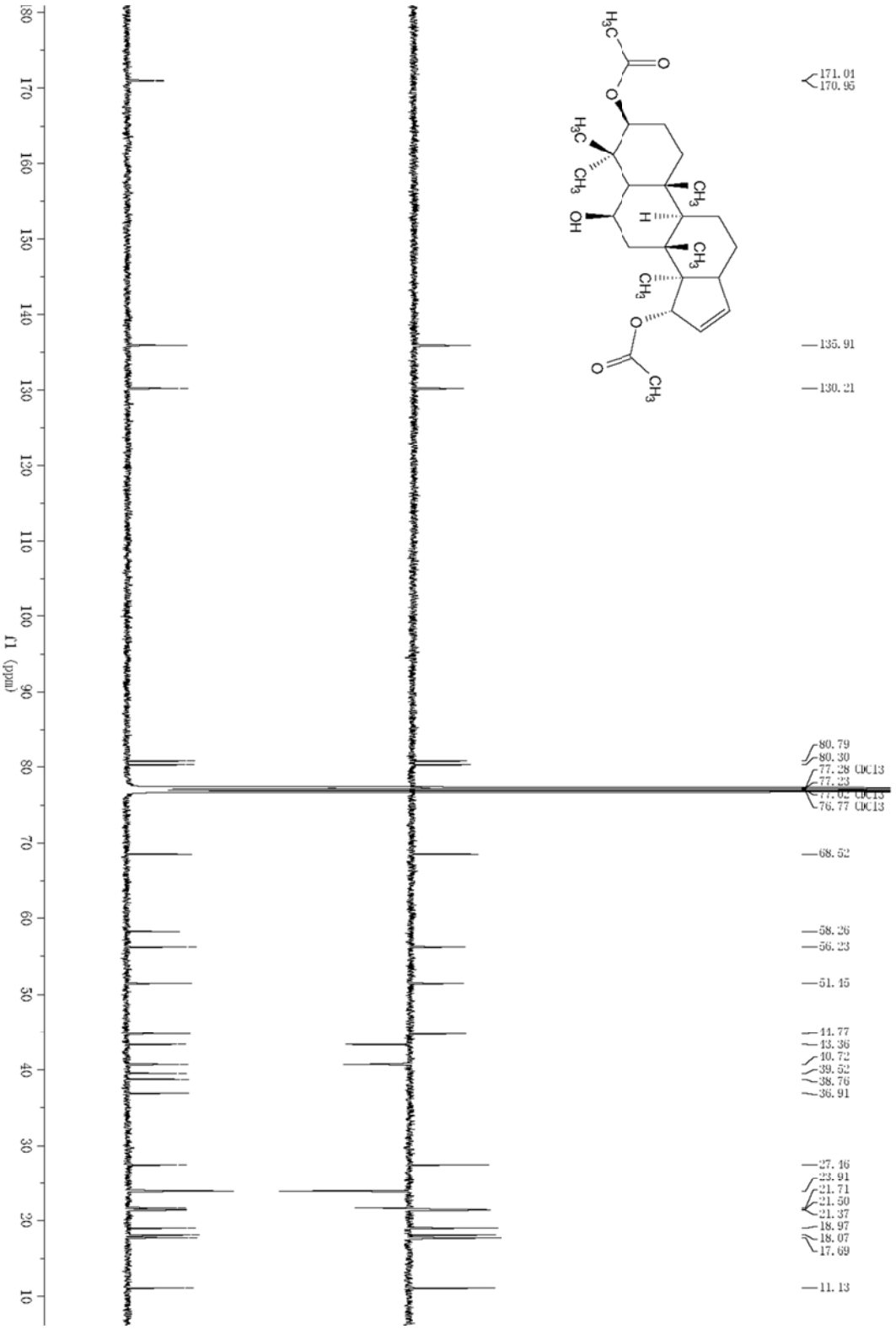


Figure S30. HSQC spectrum of horipenoid D (**4**) in $CDCl_3$

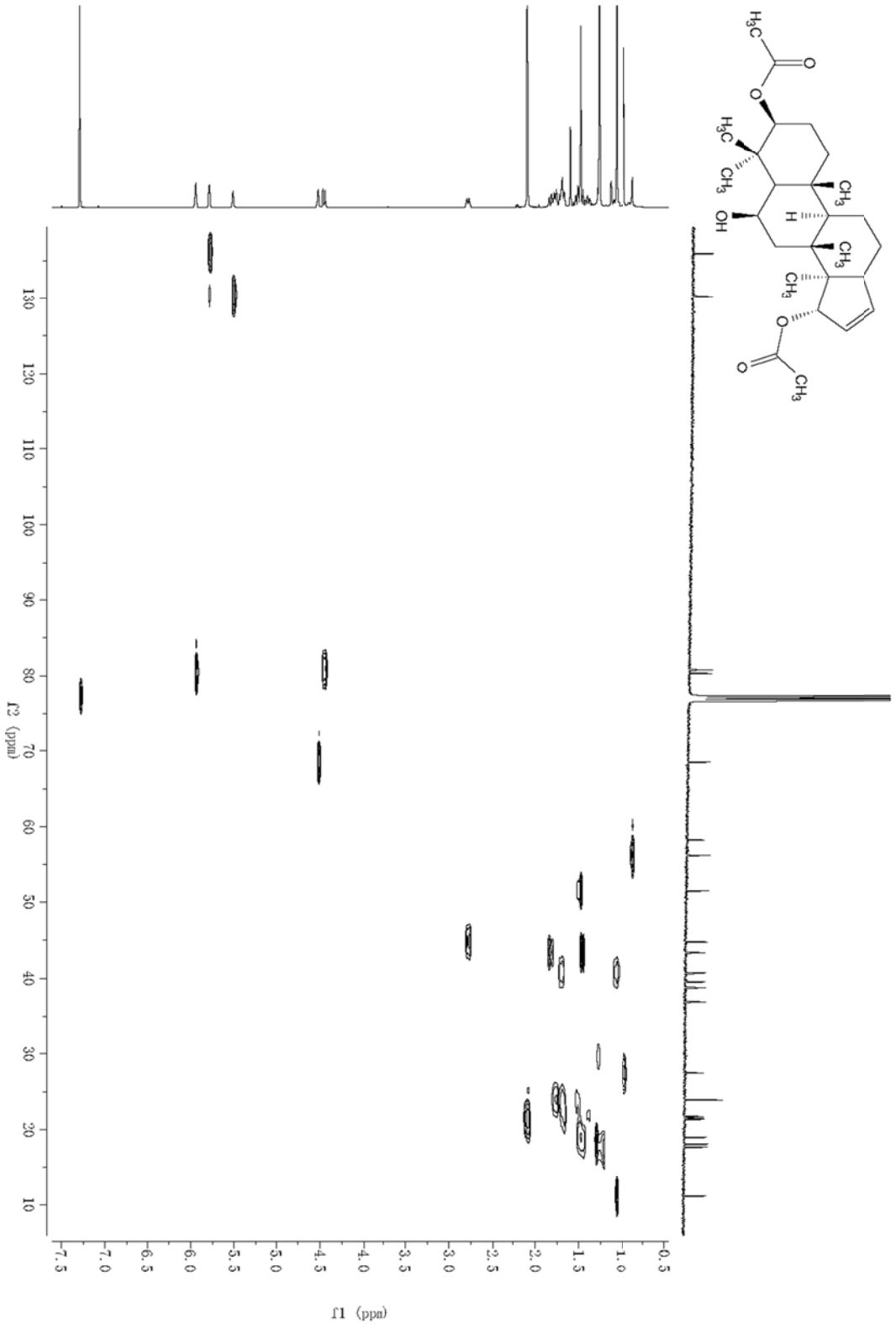


Figure S31. HMBC spectrum of horipenoid D (**4**) in $CDCl_3$

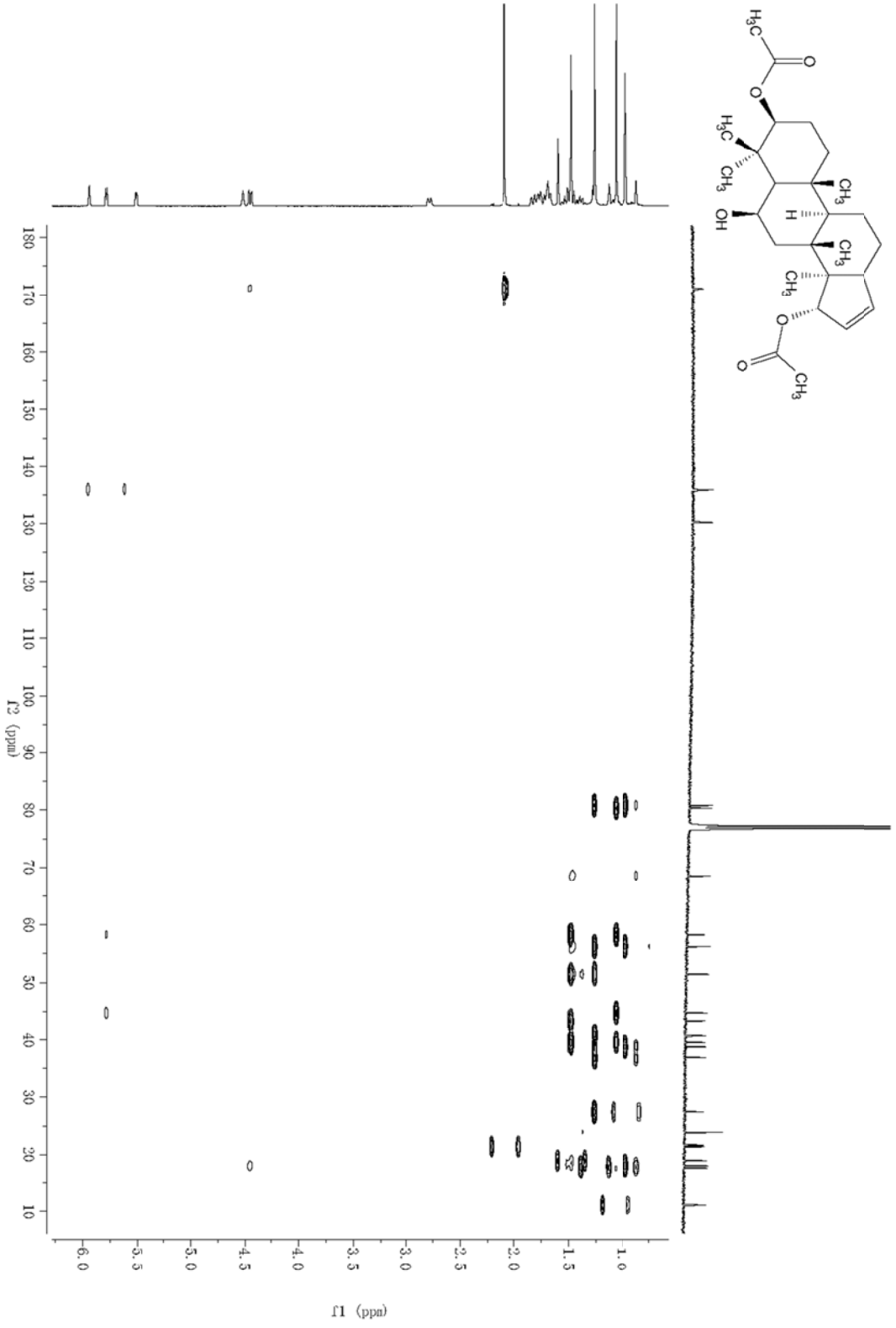


Figure S32. ESI(+)MS spectrum of horipenoid D (**4**)

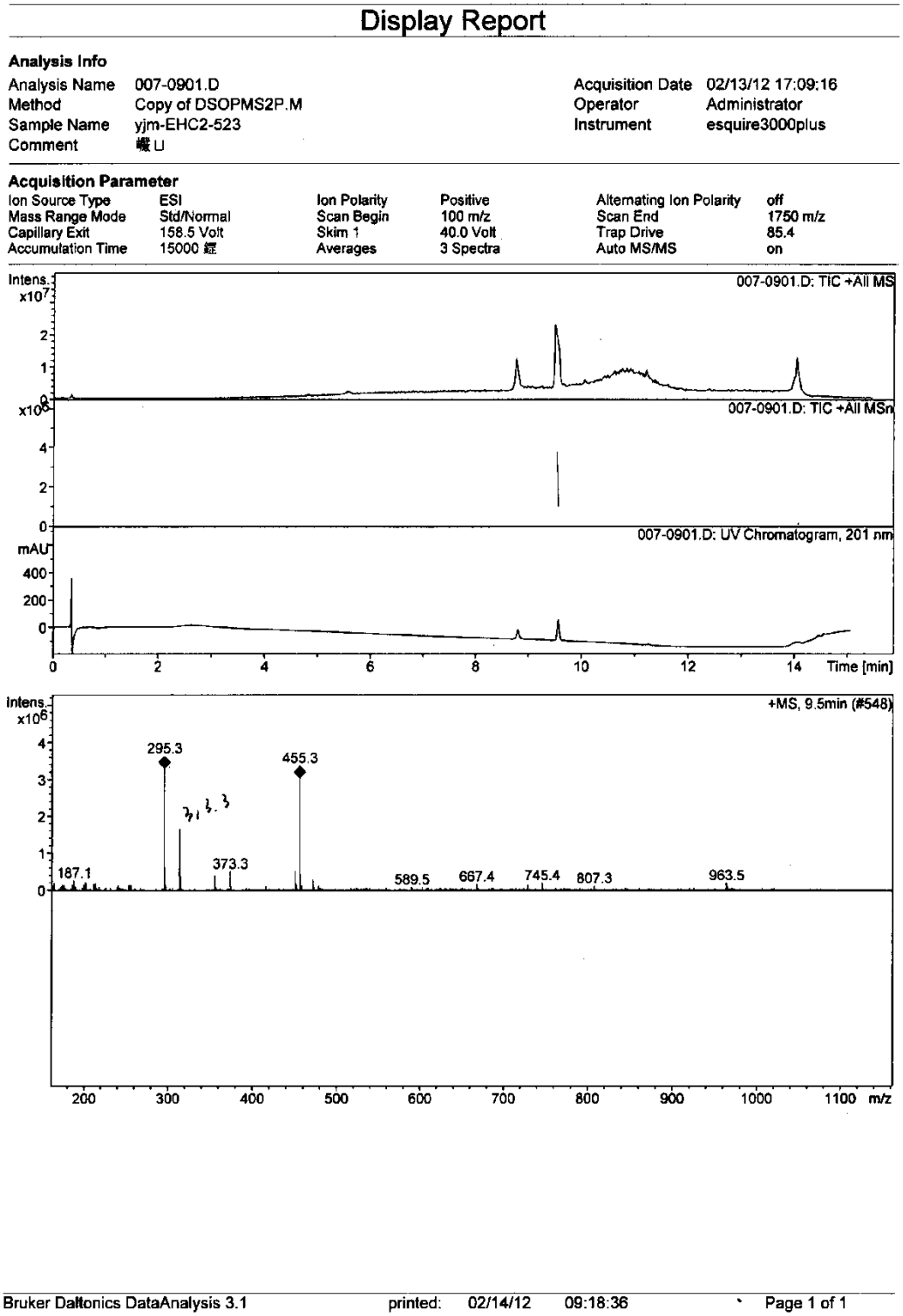


Figure S33. HRESI(−)MS spectrum of horipenoid D (**4**)

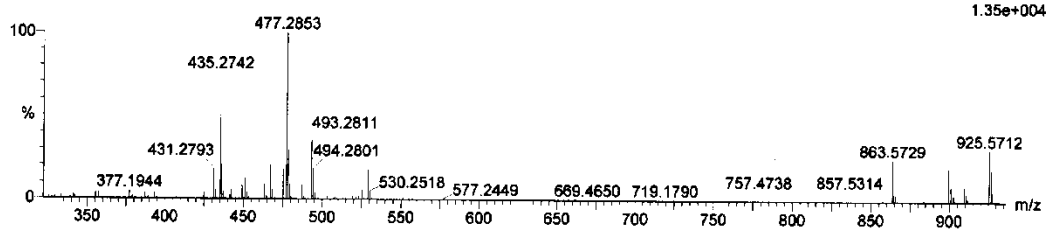
Elemental Composition Report **Page 1**

Single Mass Analysis
Tolerance = 10.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
109 formula(e) evaluated with 1 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:
C: 10-80 H: 1-110 O: 0-30

EHC2-523 LCT PXE KE324 09-Mar-2012 15:28:04

EHC2-523_20120309 31 (0.671) AM2 (Ar,10000.0,0.00,1.00); ABS; Cm (25:48) 1: TOF MS ES- 1.35e+004



Minimum:				-1.5			
Maximum:		5.0	10.0	50.0			
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	i-FIT (Norm)	Formula
477.2853	477.2852	0.1	0.2	7.5	125.8	0.0	C27 H41 O7

Figure S34. IR spectrum of horipenoid D (**4**)

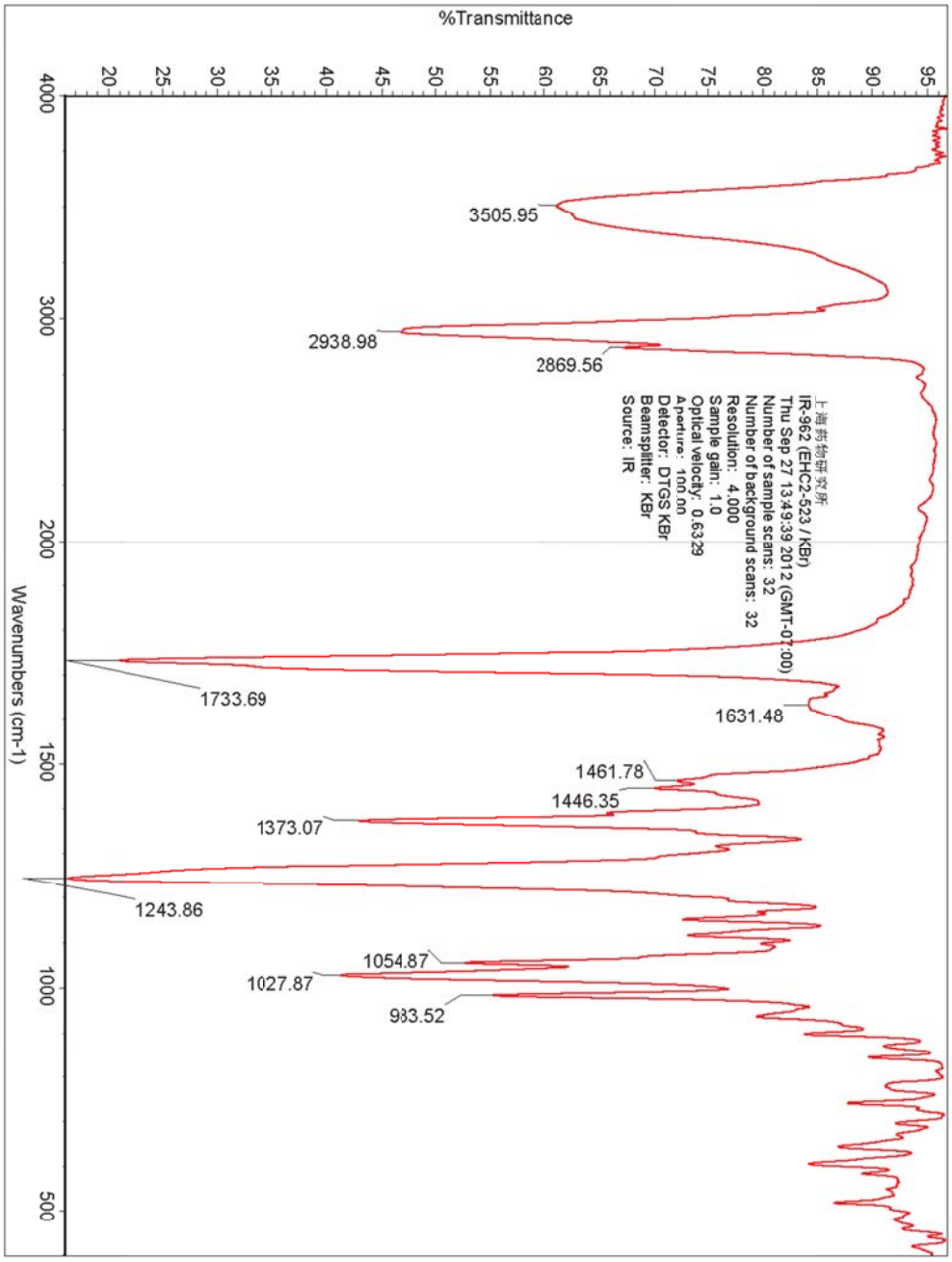


Figure S35. ^{1}H NMR spectrum of horipenoid E (**5**) in C_5D_5N

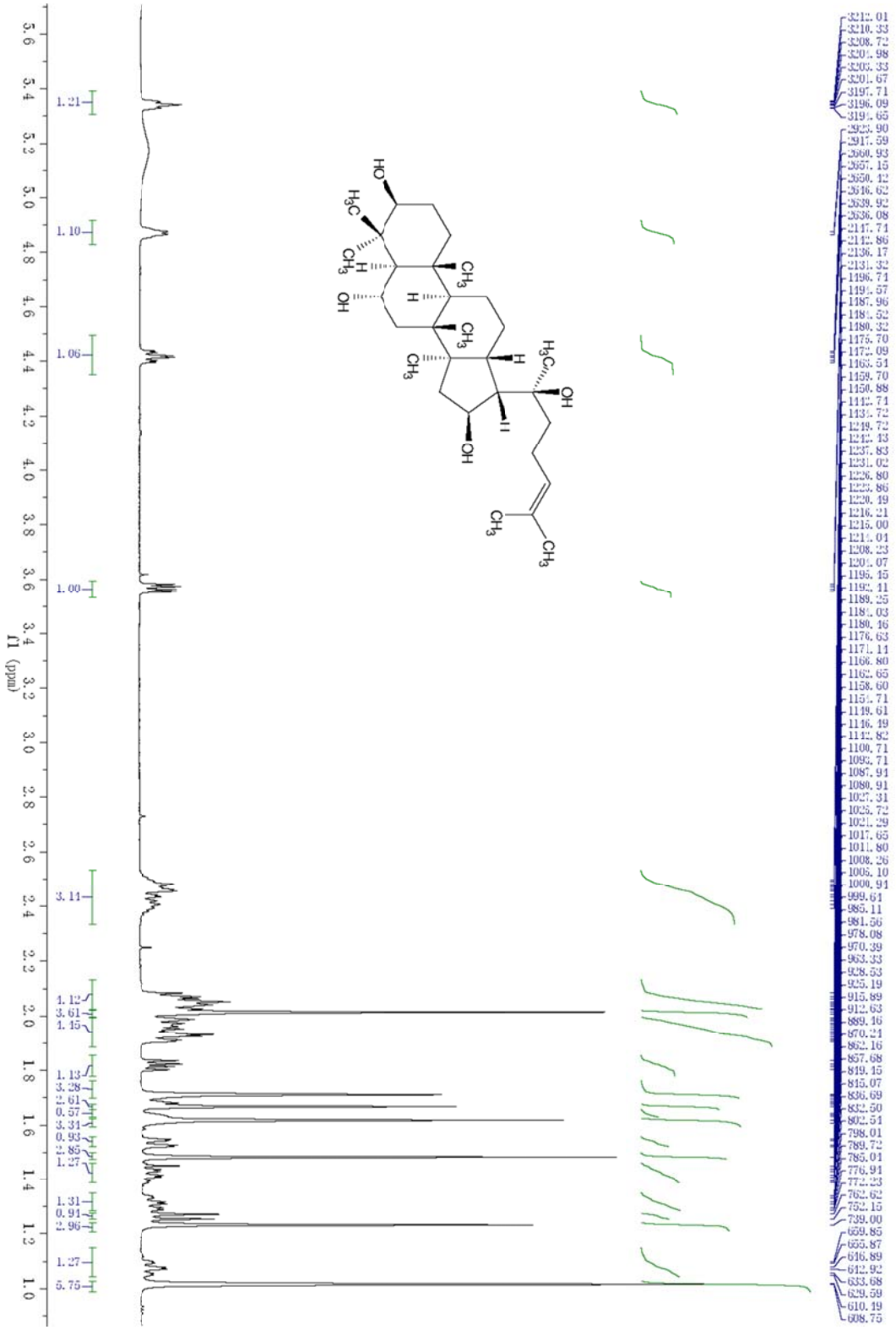


Figure S36. ^{13}C NMR spectrum of horipenoid E (**5**) in C_5D_5N

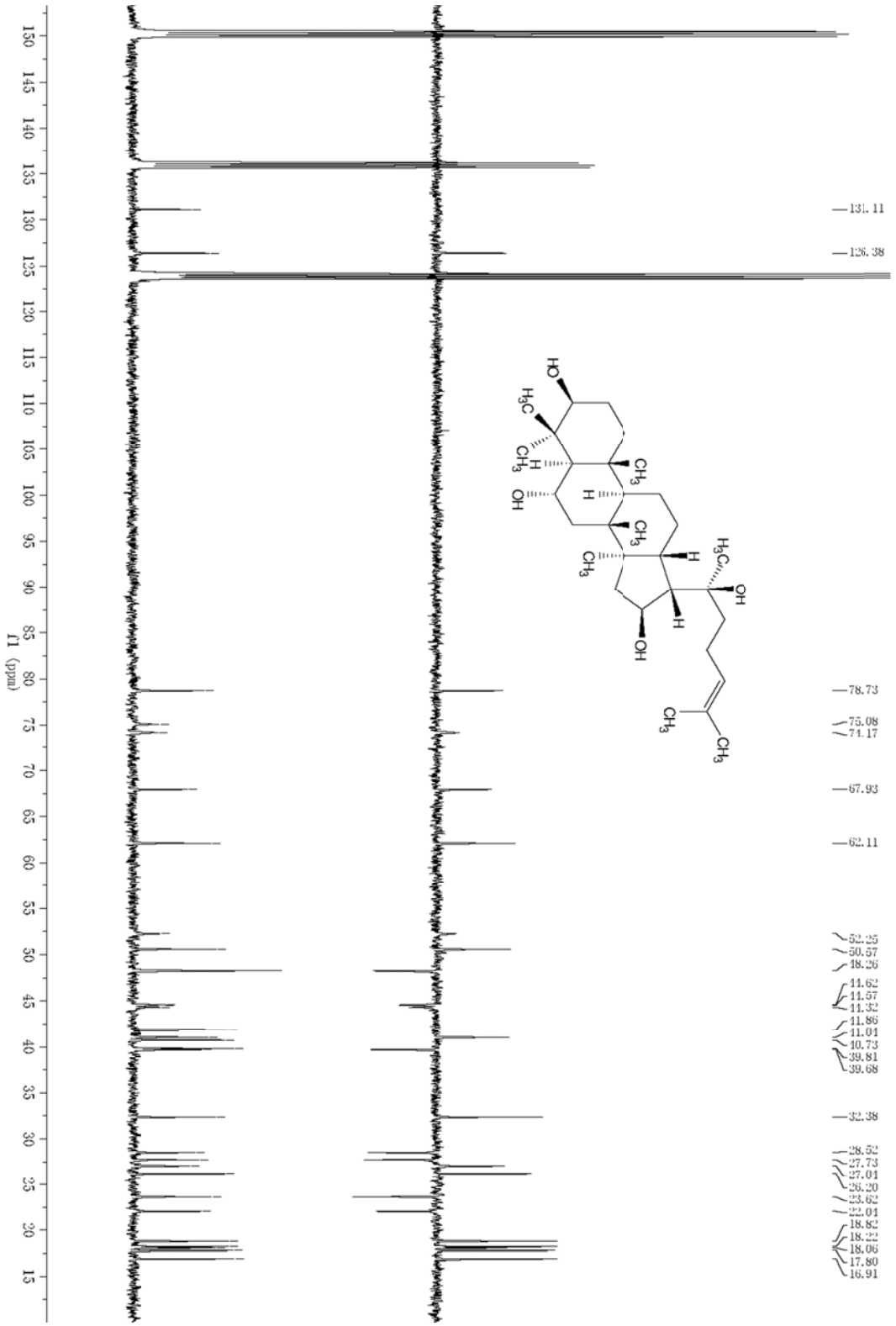


Figure S37. ^{1}H-^{1}HCOSY spectrum of horipenoid E (**5**) in C_5D_5N

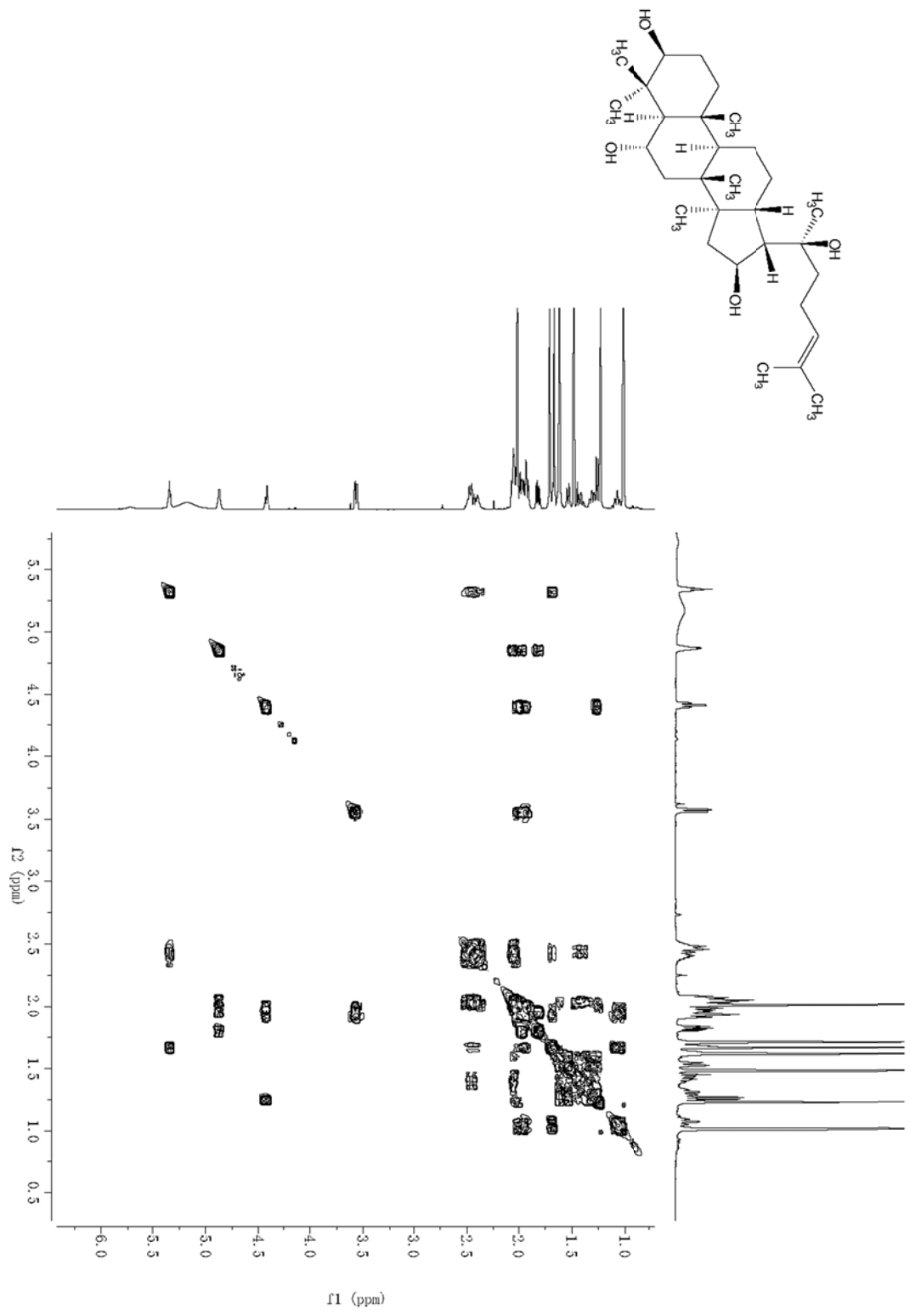


Figure S38. HSQC spectrum of horipenoid E (**5**) in C_5D_5N

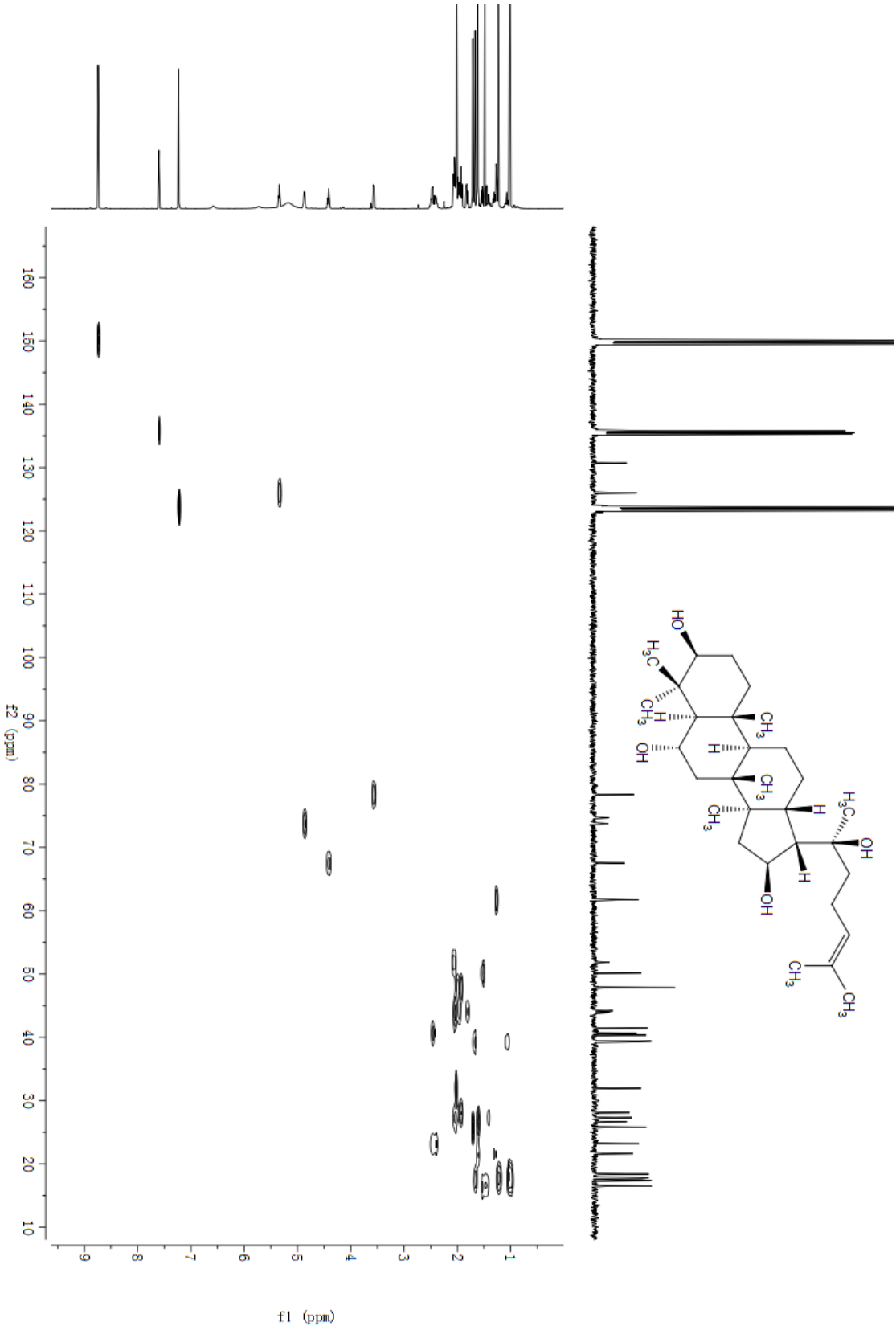


Figure S39. HMBC spectrum of horipenoid E (**5**) in C_5D_5N

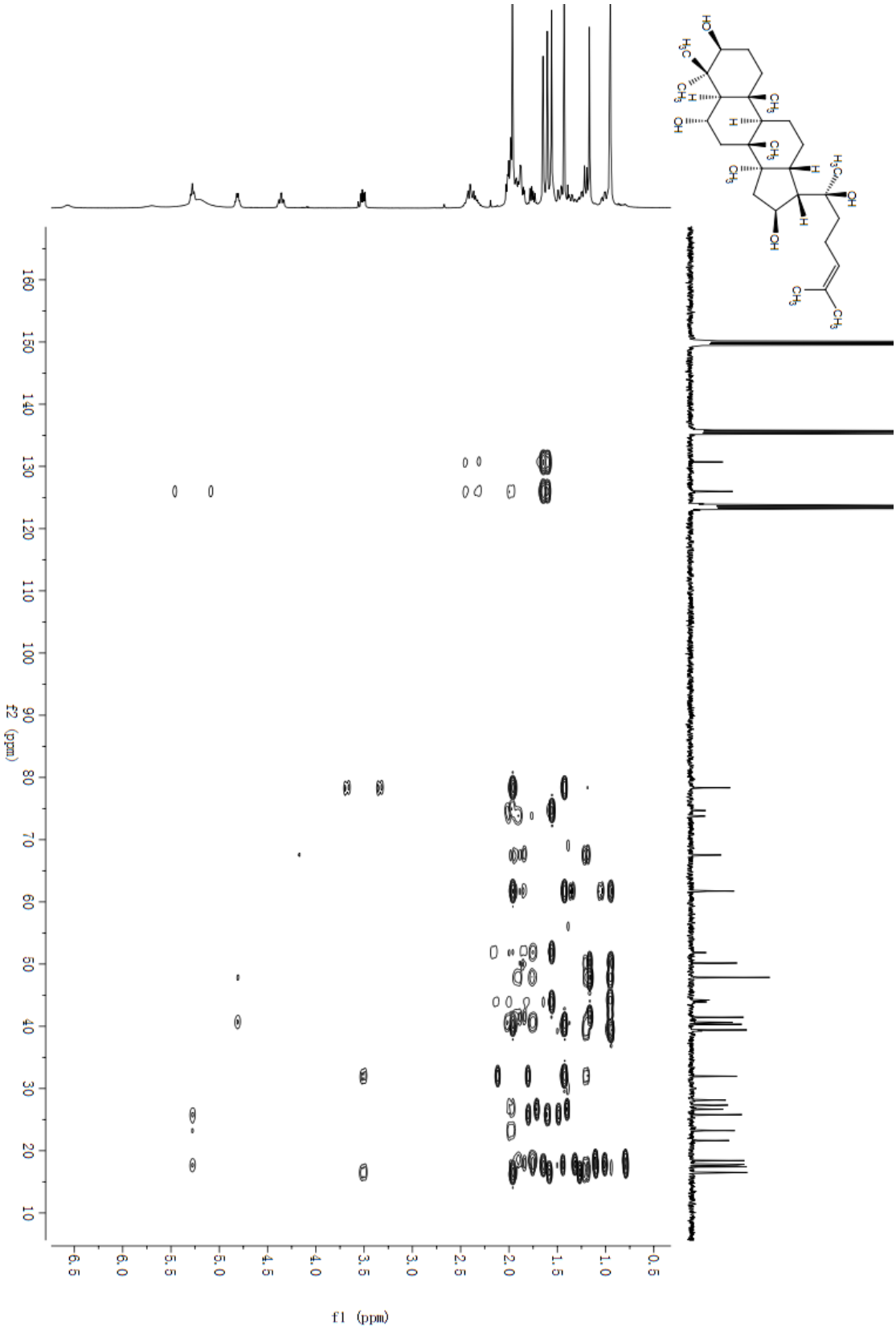


Figure S40. ROESY spectrum of horipenoid E (**5**) in C_5D_5N

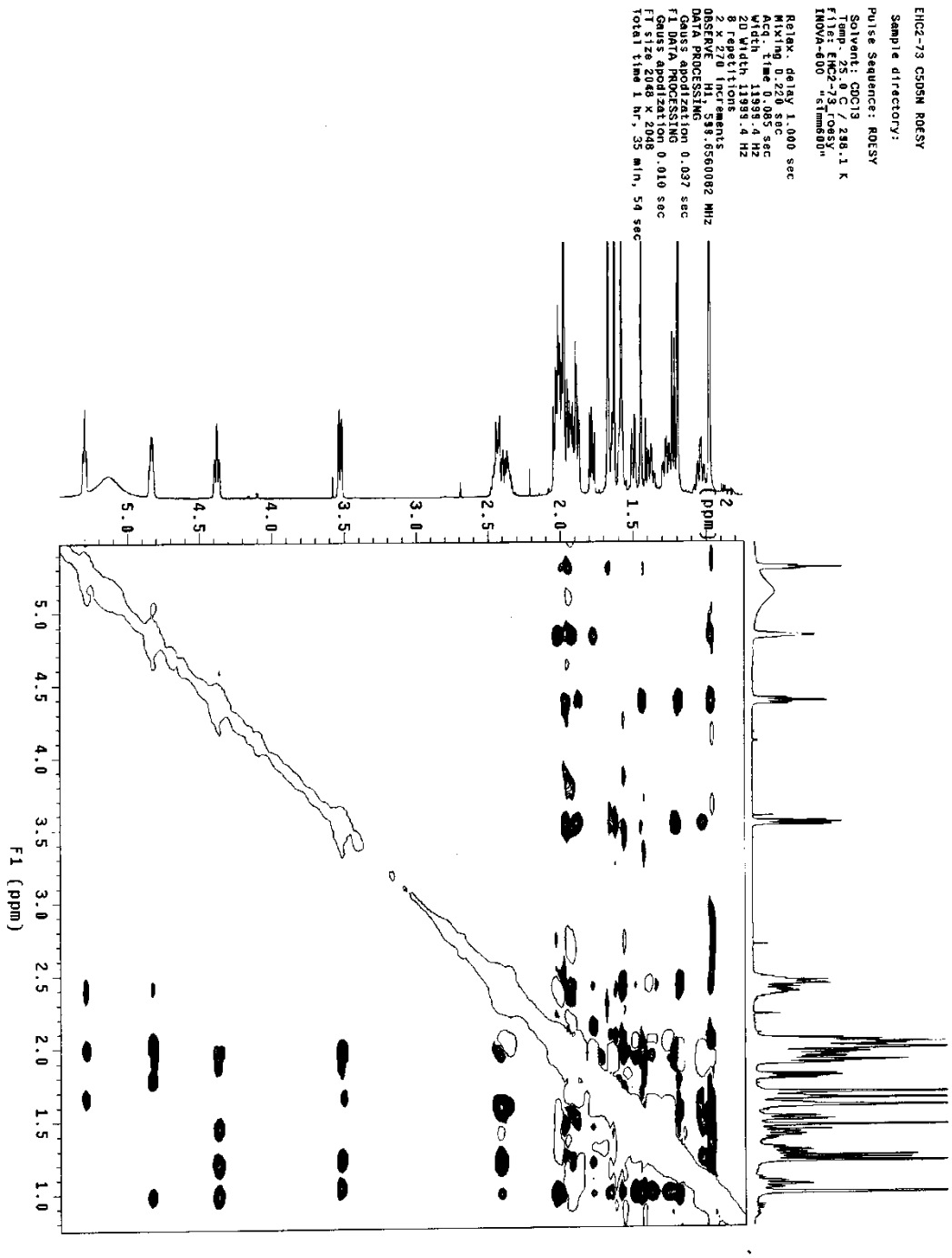


Figure S41. ESI(+)MS spectrum of horipenoid E (**5**)

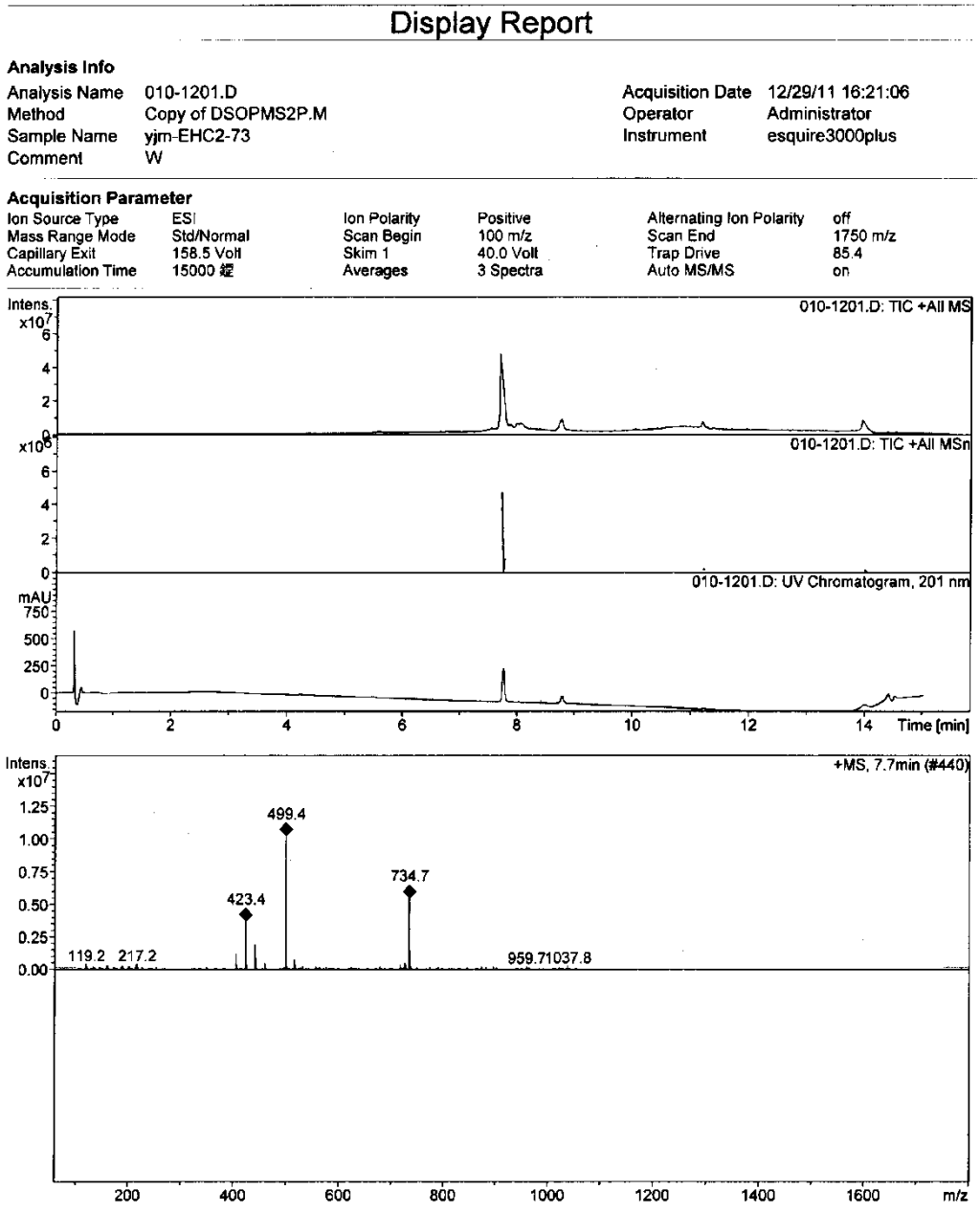


Figure S42. ESI(−)MS spectrum of horipenoid E (**5**)

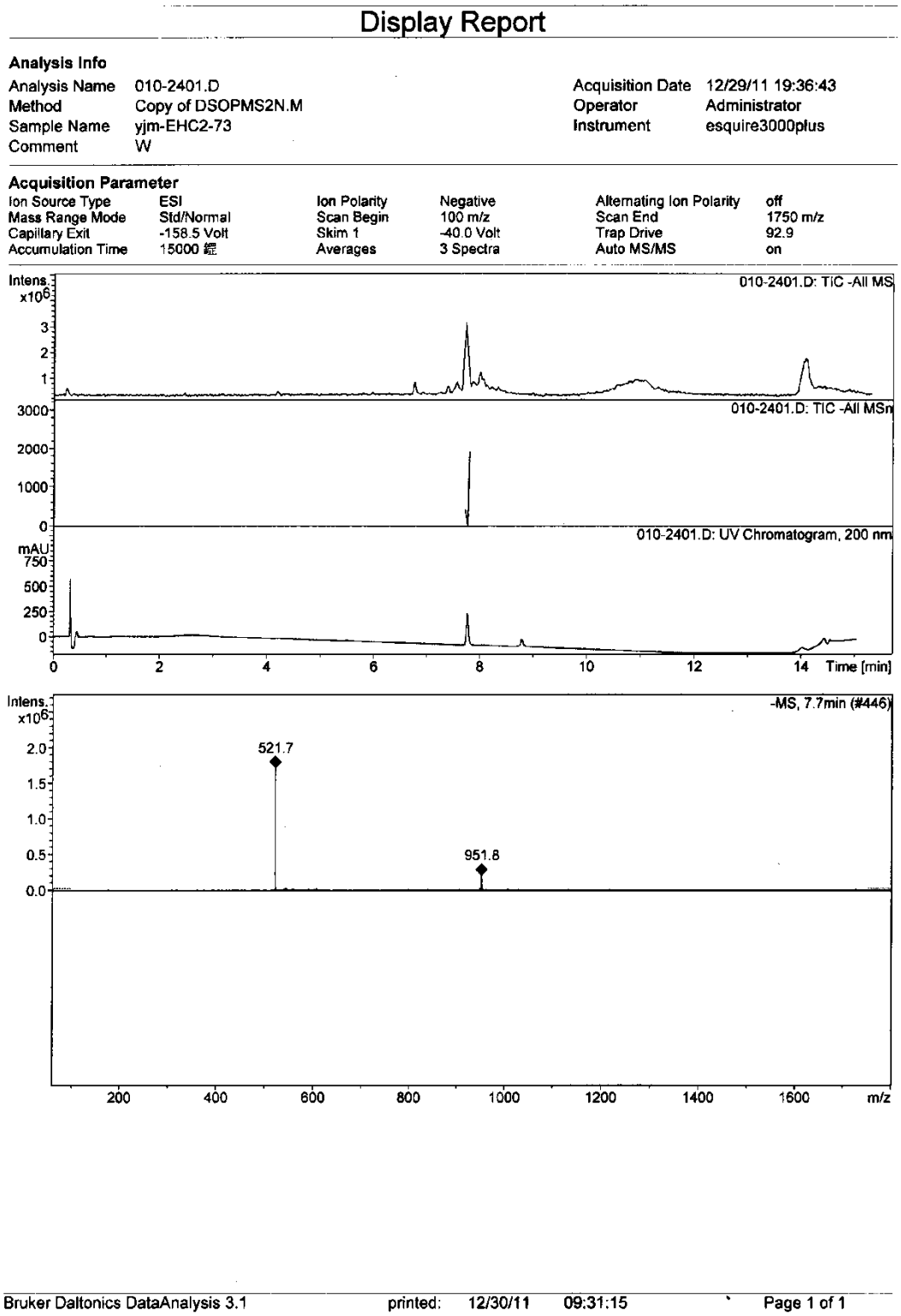


Figure S43. HRESI(−)MS spectrum of horipenoid E (**5**)

Elemental Composition Report **Page 1**

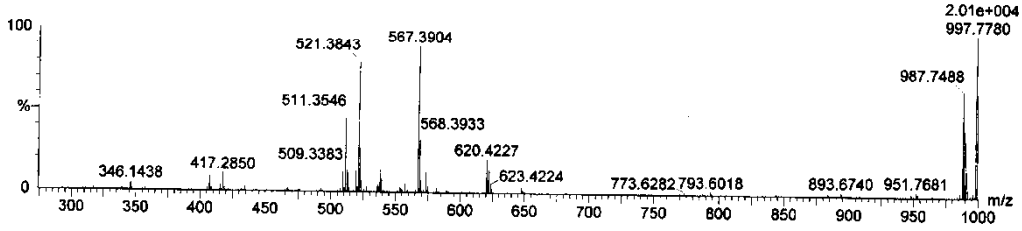
Single Mass Analysis
Tolerance = 5.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
126 formula(e) evaluated with 1 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:
C: 10-50 H: 1-80 O: 0-30
EHC2-73

LCT PXE KE324

09-Mar-2012
14:11:59
1: TOF MS ES-
2.01e+004
997.7780

EHC2-73_20120309 24 (0.512) AM2 (Ar,10000.0,0.00,1.00); ABS; Cm (6:25)



Minimum:				-1.5			
Maximum:		5.0	5.0	50.0			
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	i-FIT (Norm)	Formula
521.3843	521.3842	0.1	0.2	5.5	135.3	0.0	C31 H53 O6

Figure S44. IR spectrum of horipenoid E (**5**)

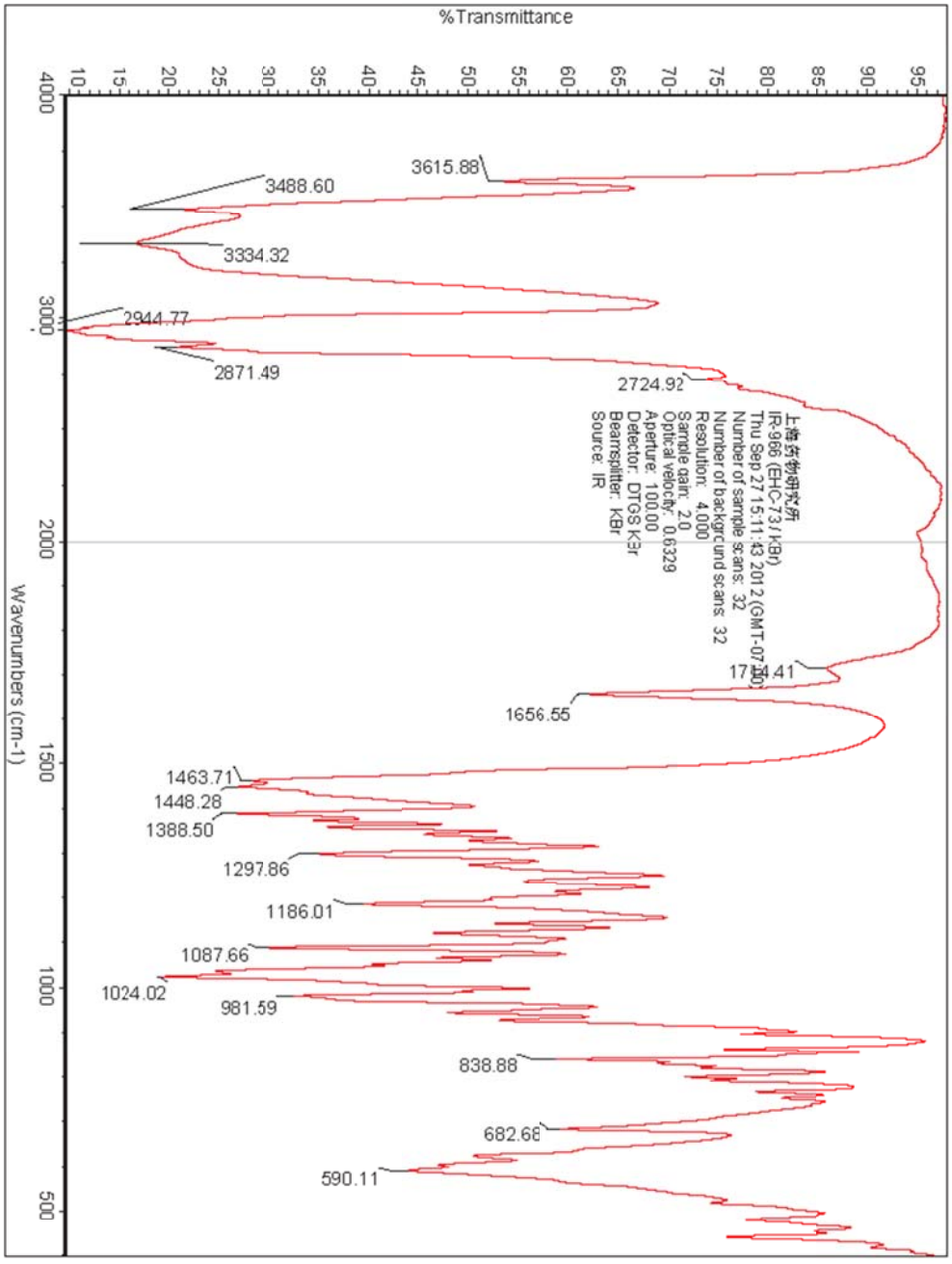


Figure S45. ^{1}H NMR spectrum of horipenoid F (**6**) in C_5D_5N

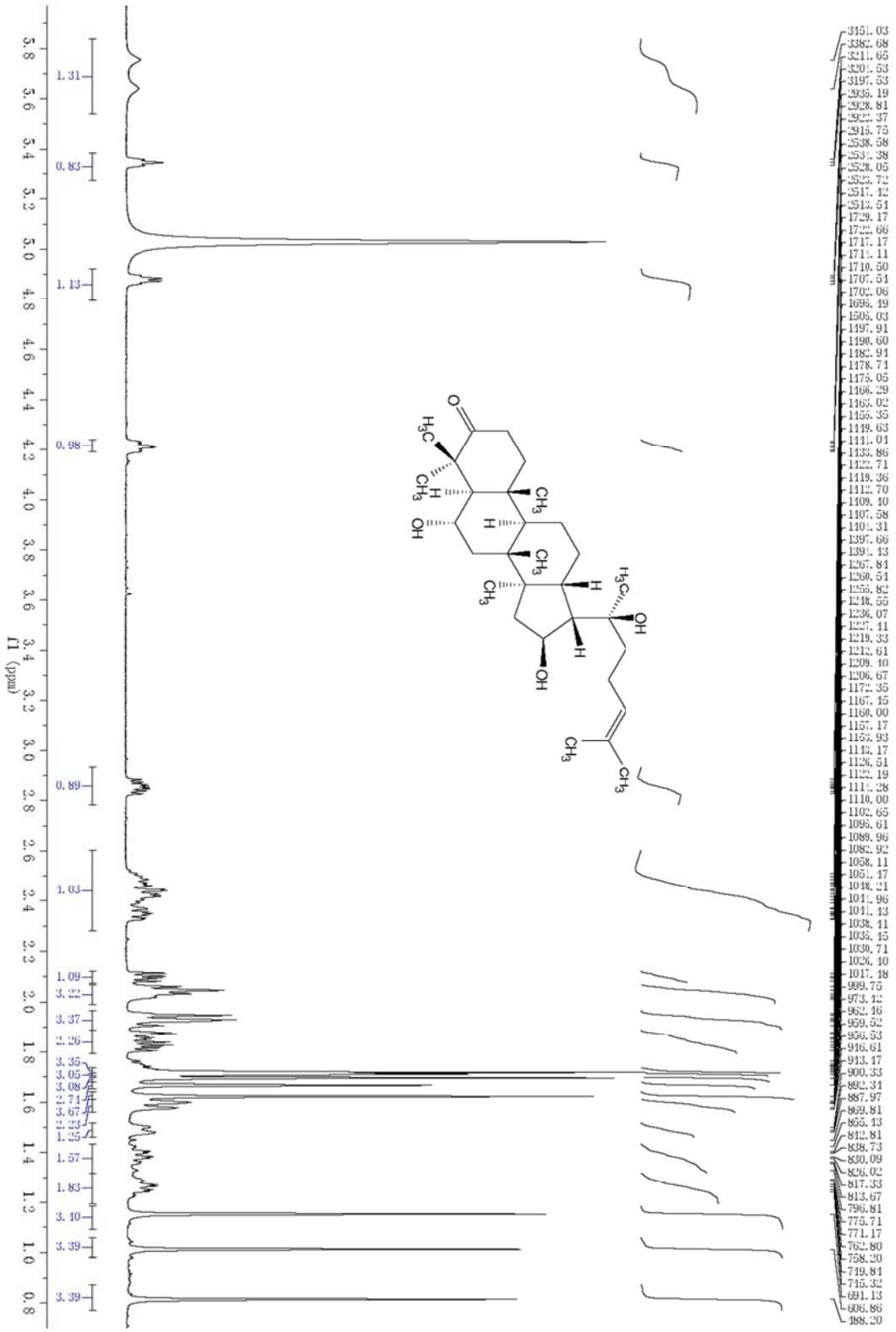


Figure S46. ^{13}C NMR spectrum of horipenoid F (**6**) in C_5D_5N

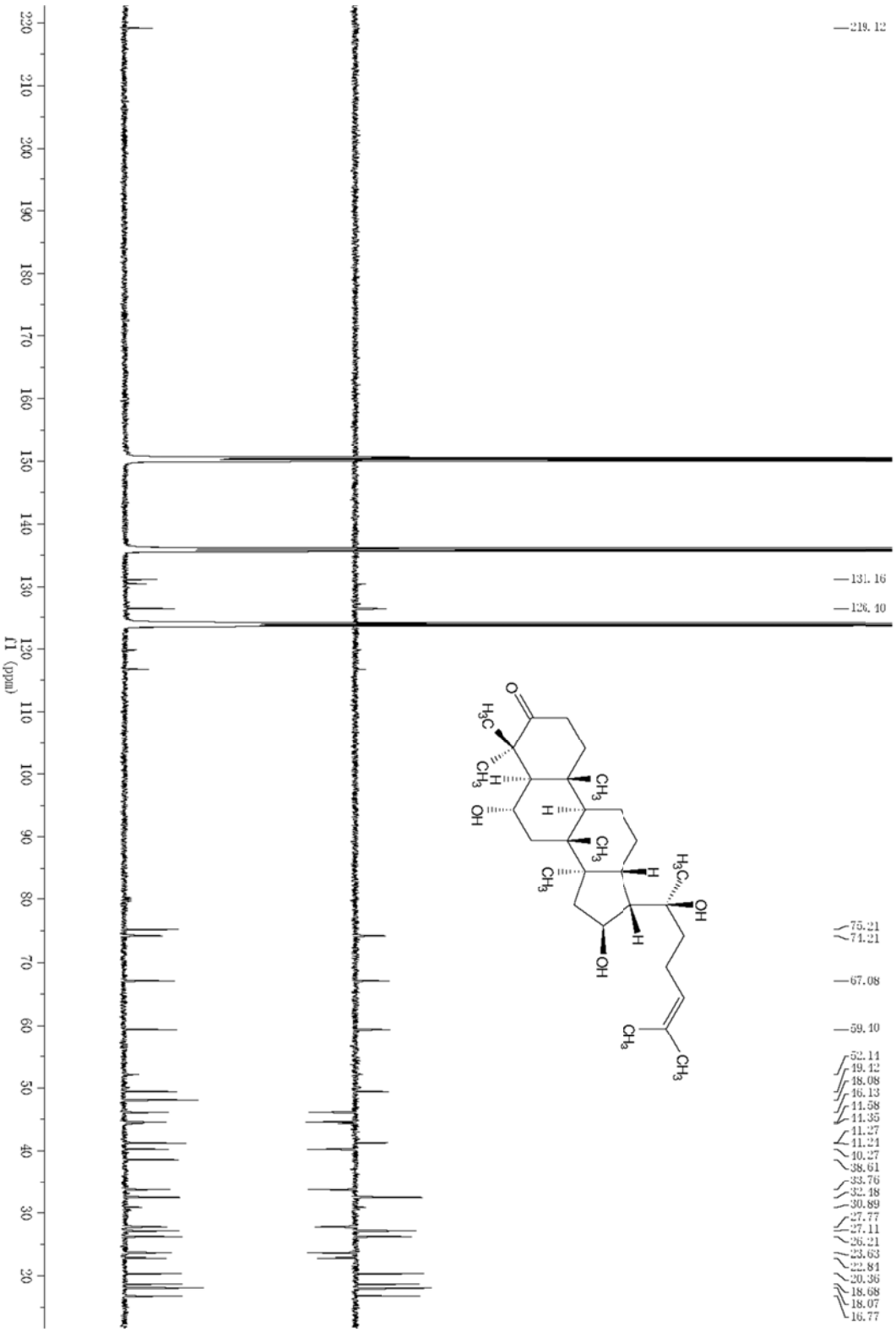


Figure S47. HSQC spectrum of horipenoid F (**6**) in C_5D_5N

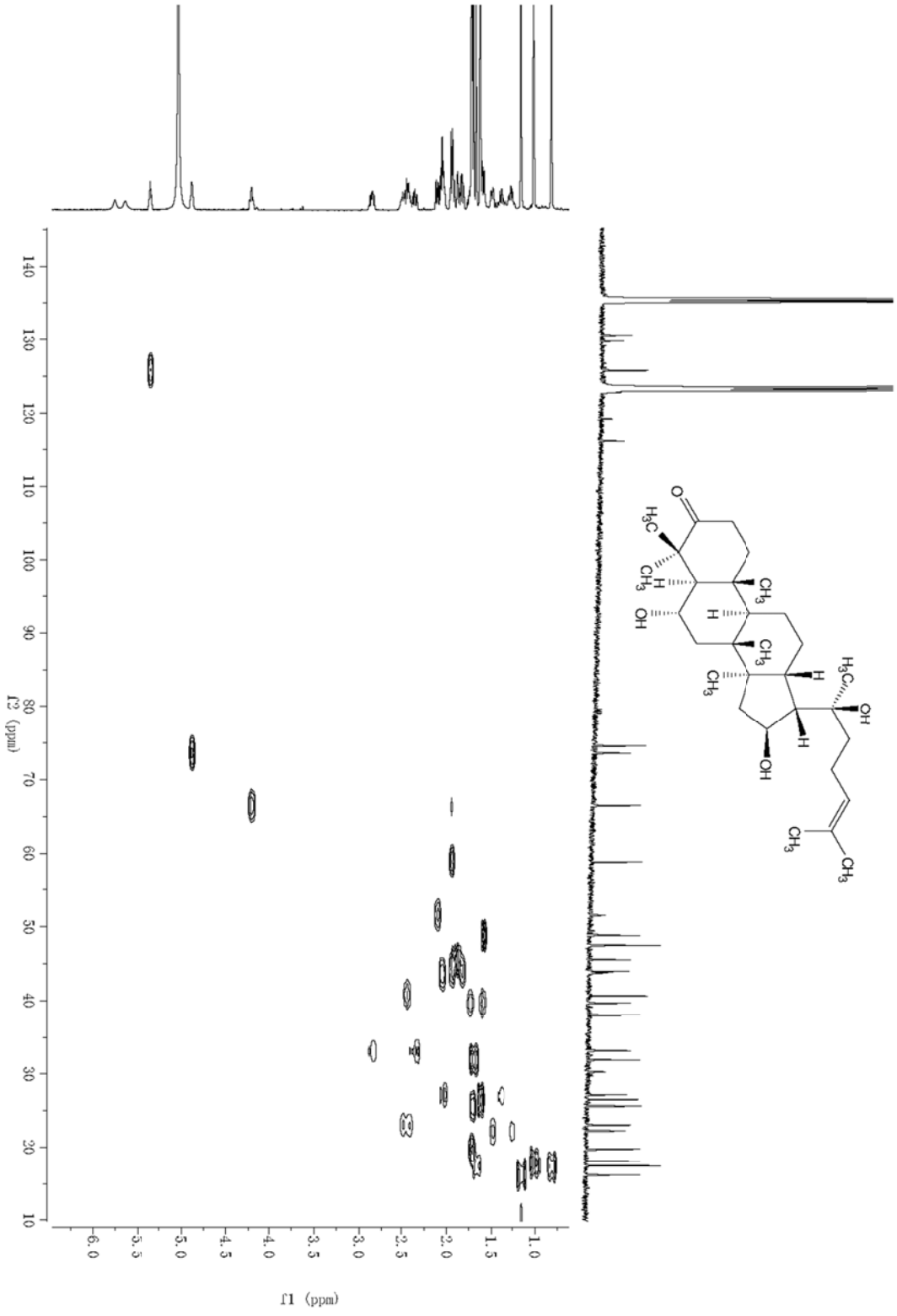


Figure S48. HMBC spectrum of horipenoid F (**6**) in C_5D_5N

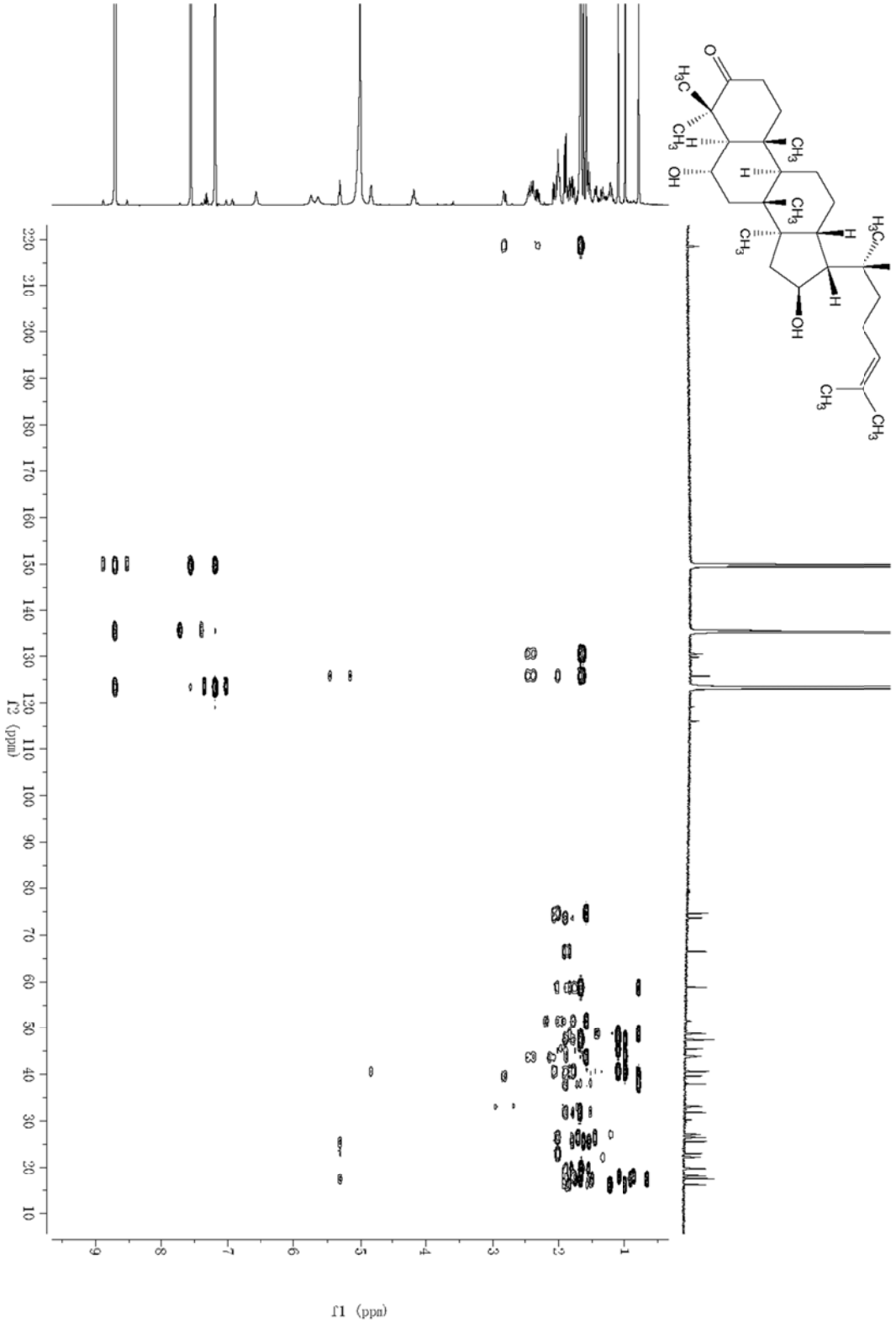


Figure S49. ROESY spectrum of horipenoid F (**6**) in C_5D_5N

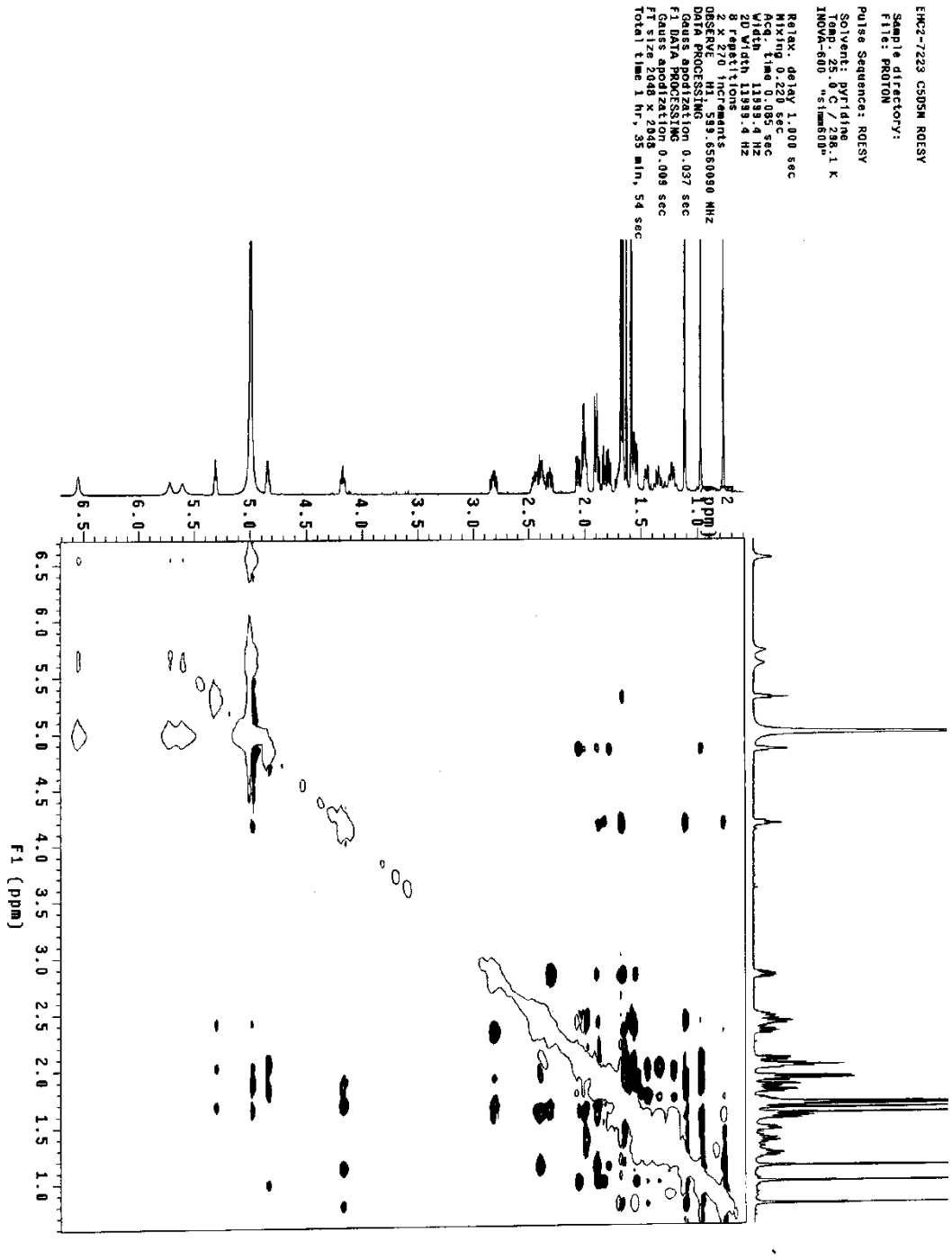


Figure S50 ESI(+)MS spectrum of horipenoid F (**6**)

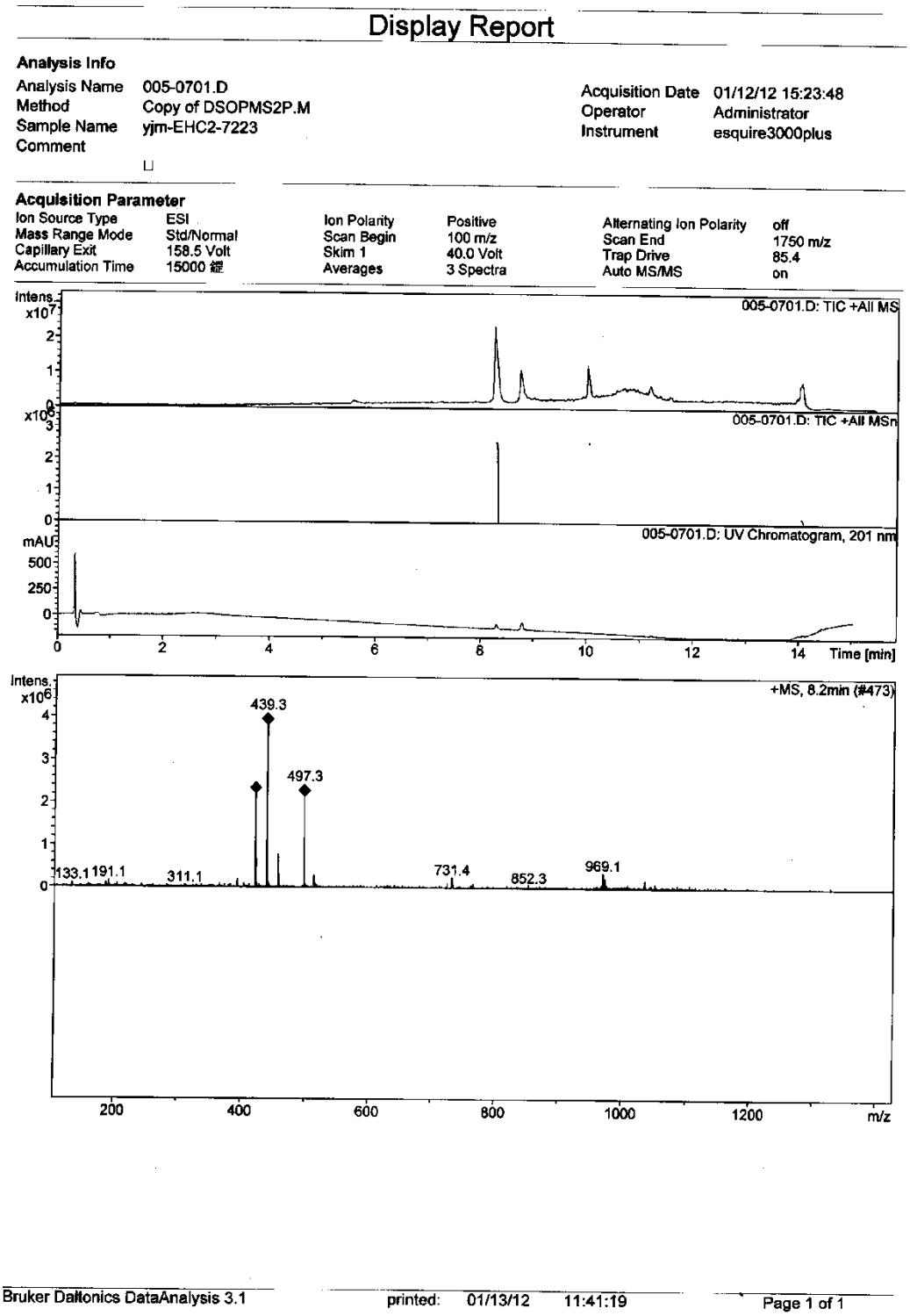


Figure S51. ESI(−)MS spectrum of horipenoid F (**6**)

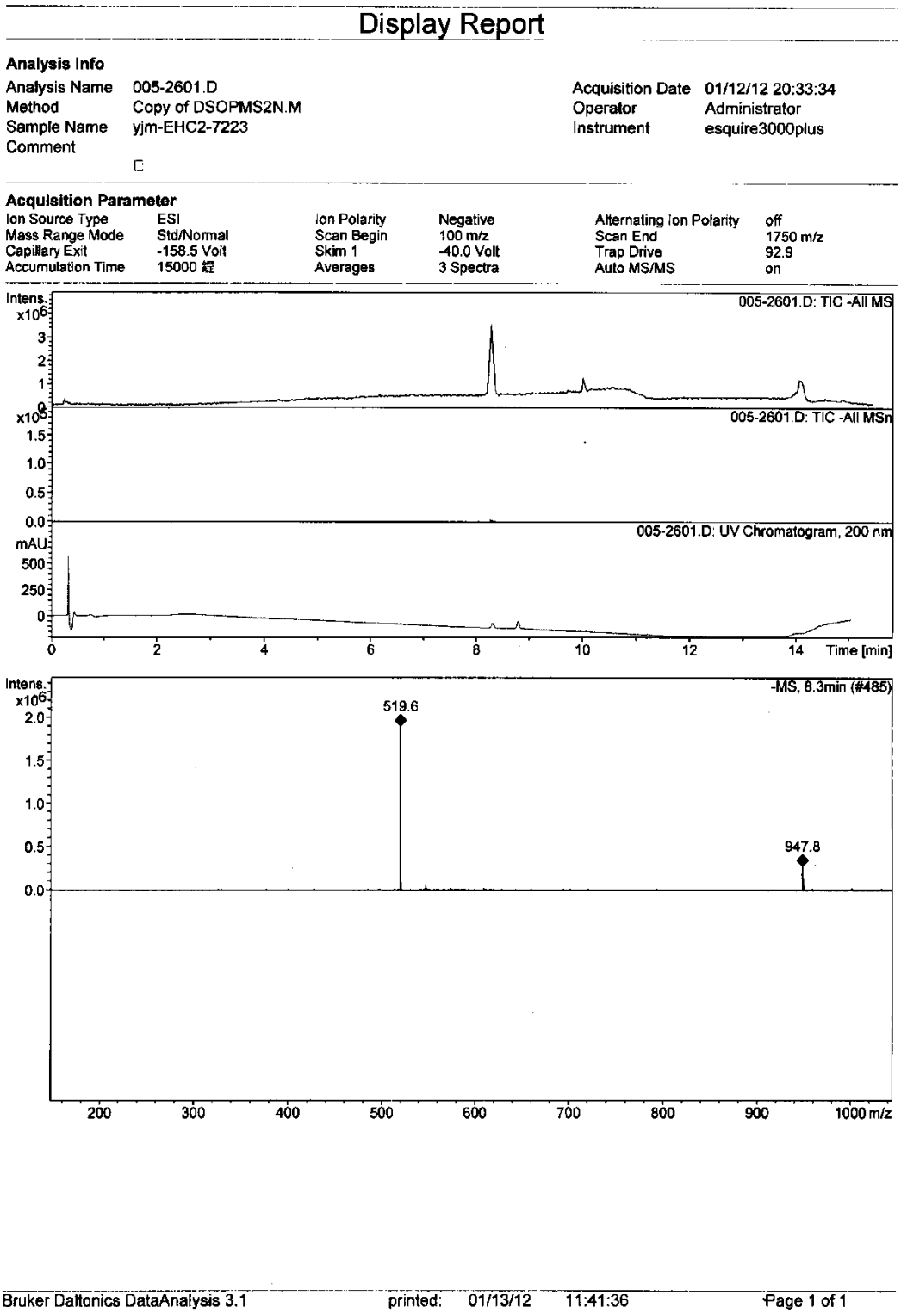


Figure S52. HRESI(−)MS spectrum of horipenoid F (**6**)

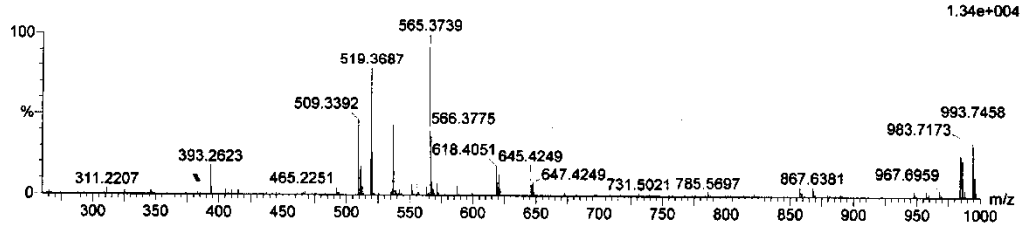
Elemental Composition Report **Page 1**

Single Mass Analysis
Tolerance = 5.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
121 formula(e) evaluated with 1 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:
C: 10-50 H: 1-80 O: 0-30

EHC2-7223 LCT PXE KE324 09-Mar-2012 14:24:20

EHC2-7223_20120309 6 (0.124) AM2 (Ar,10000.0,0.00,1.00); ABS; Cm (5:19) 1: TOF MS ES- 1.34e+004



Minimum:				-1.5			
Maximum:		5.0	5.0	50.0			
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	i-FIT (Norm)	Formula
519.3687	519.3686	0.1	0.2	6.5	95.7	0.0	C31 H51 O6

Figure S53. IR spectrum of horipenoid F (**6**)

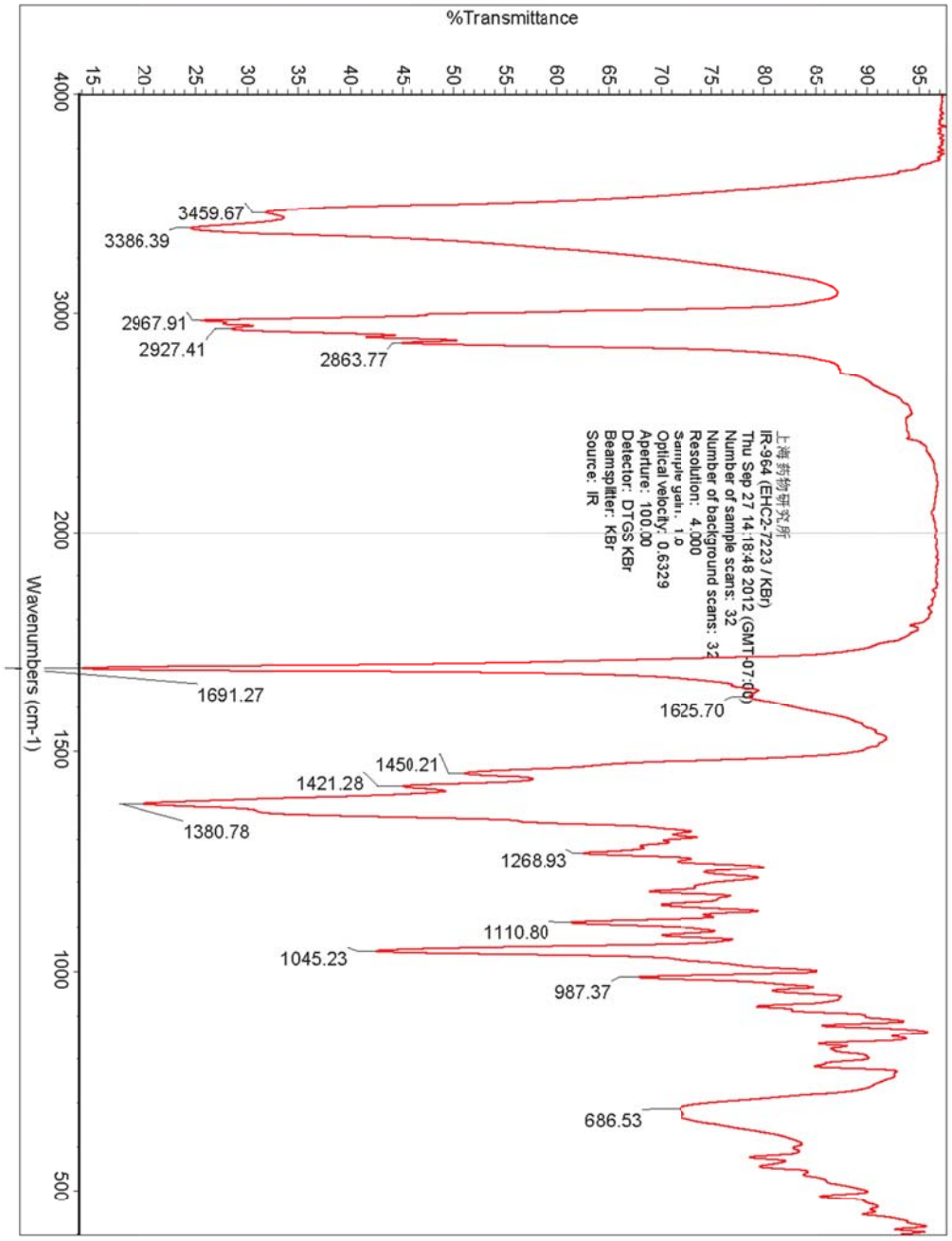


Figure S54. ^{1}H NMR spectrum of horipenoid G (**7**) in C_5D_5N

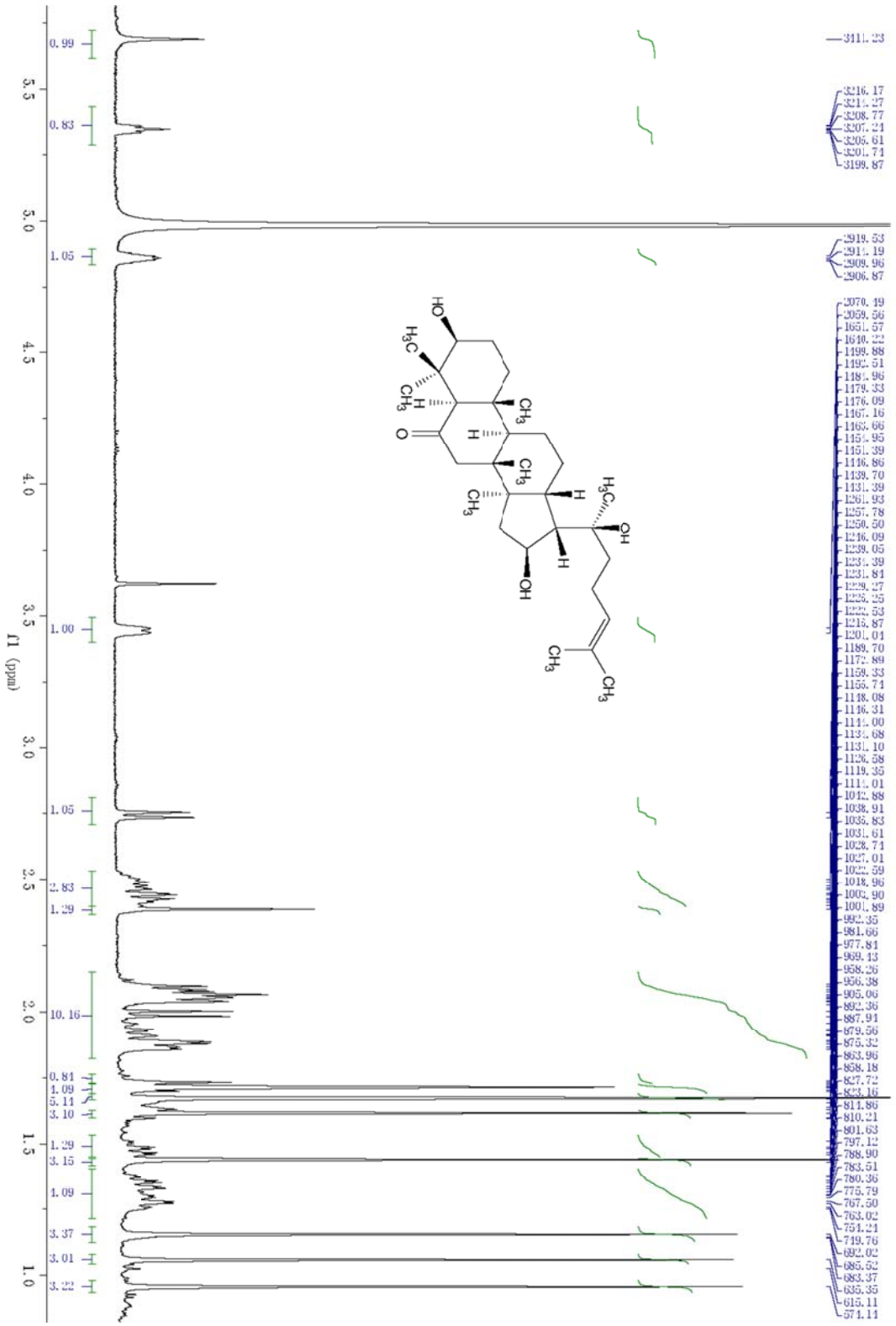


Figure S55. ^{13}C NMR spectrum of horipenoid G (**7**) in C_5D_5N

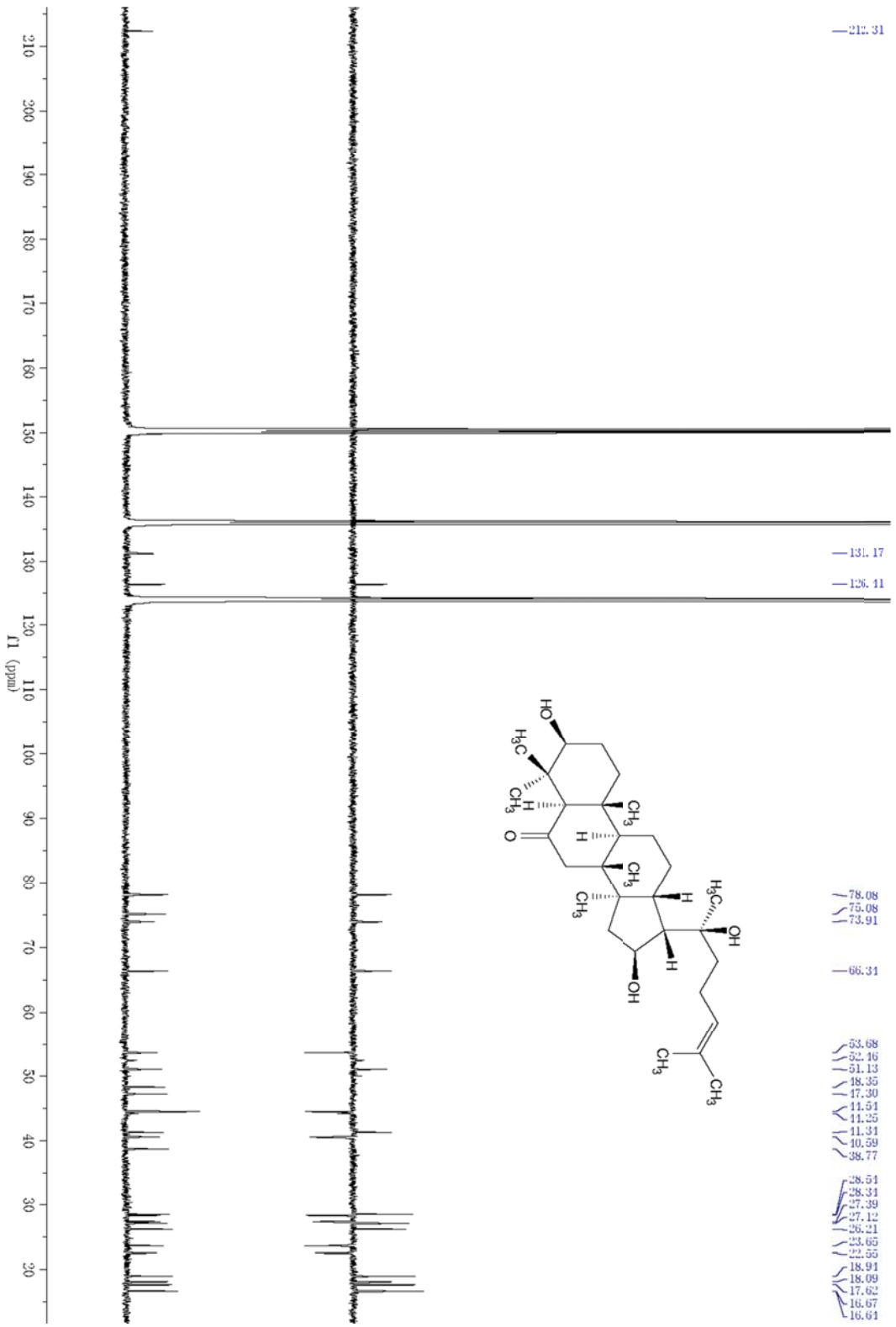


Figure S56. HSQC spectrum of horipenoid G (**7**) in C_5D_5N

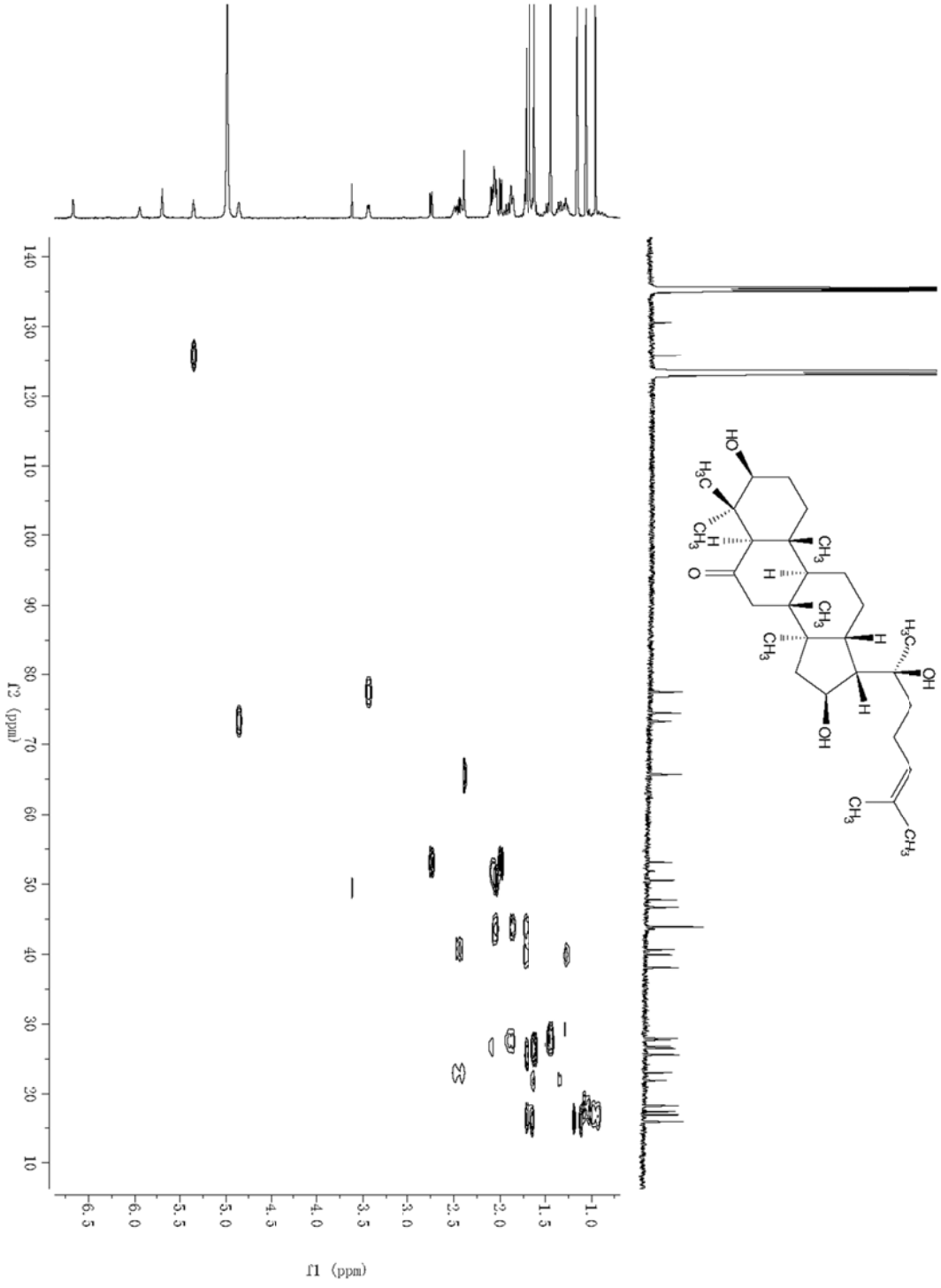


Figure S57. HMBC spectrum of horipenoid G (**7**) in C_5D_5N

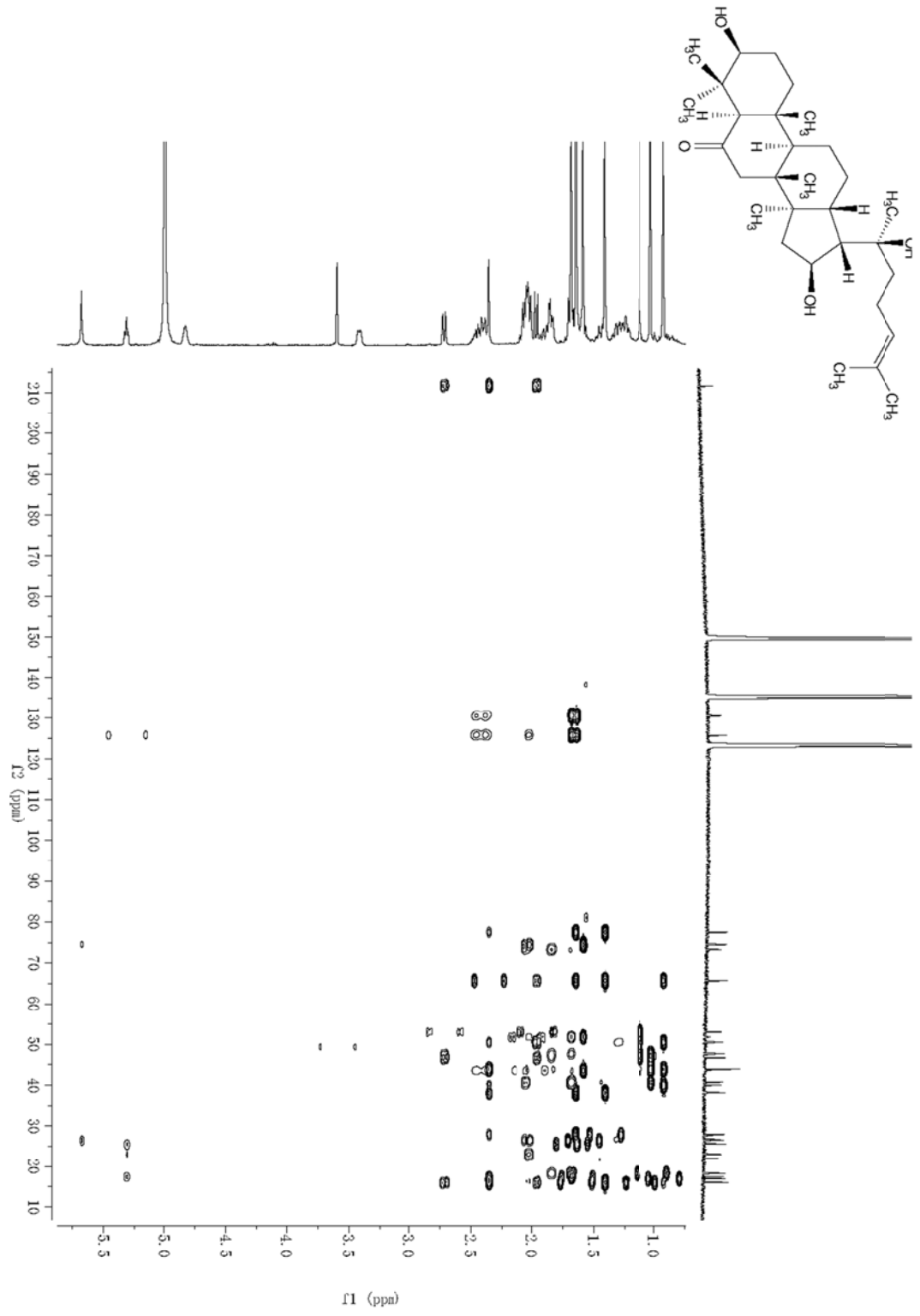


Figure S58. ROESY spectrum of horipenoid G (**7**) in C_5D_5N

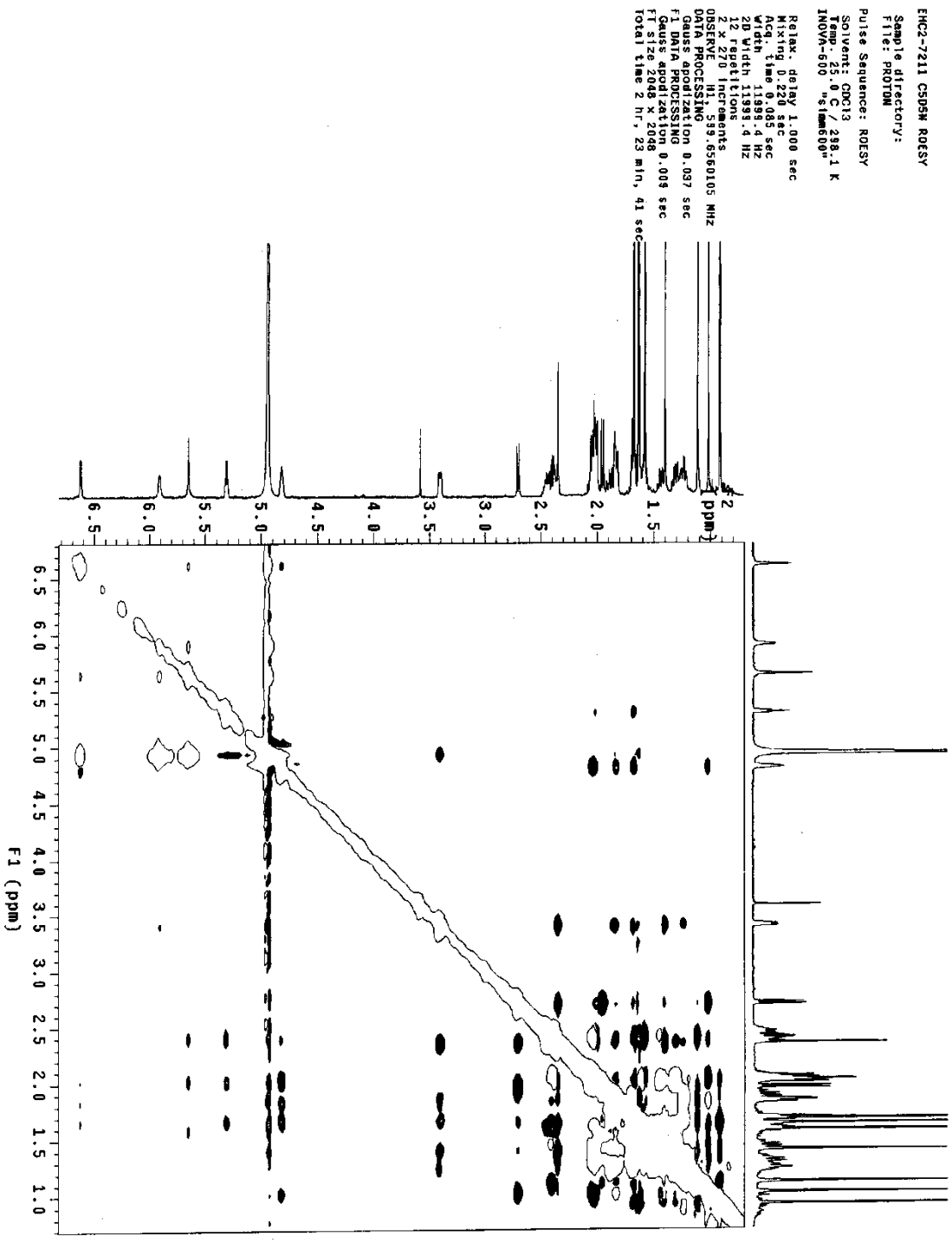


Figure S59. ESI(+)MS spectrum of horipenoid G (**7**)

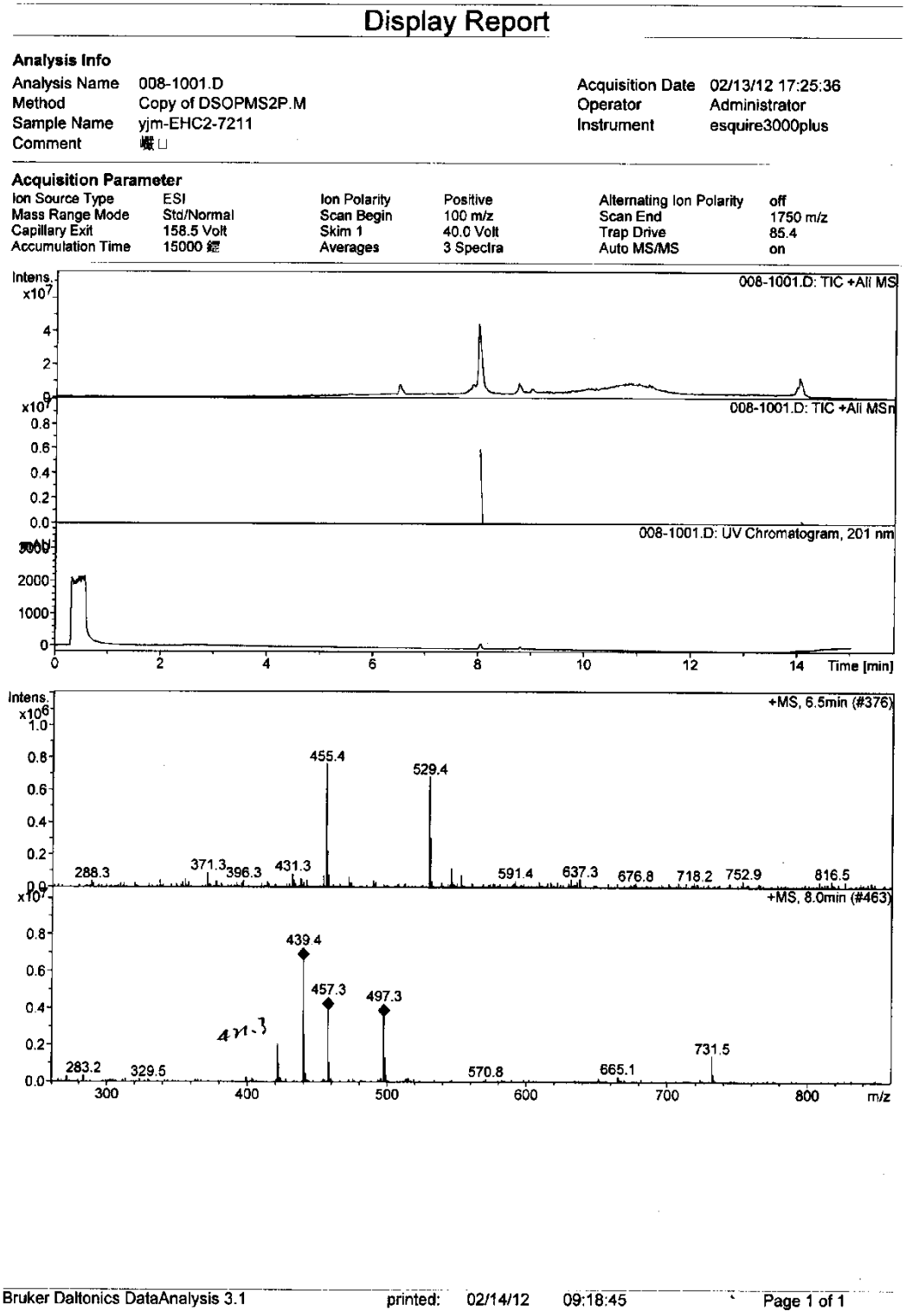


Figure S60. ESI(−)MS spectrum of horipenoid G (**7**)

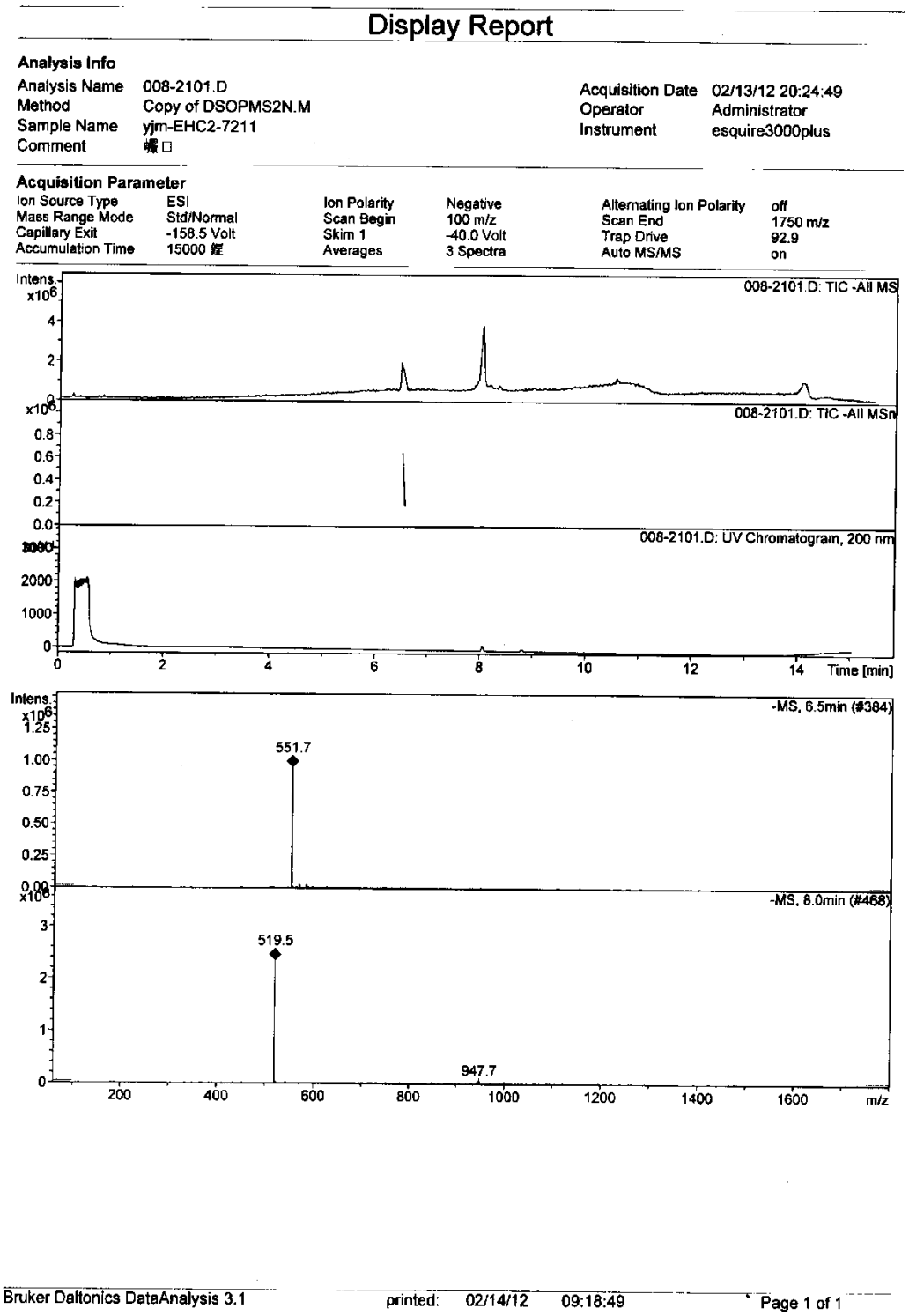


Figure S61. HRESI(−)MS spectrum of horipenoid G (**7**)

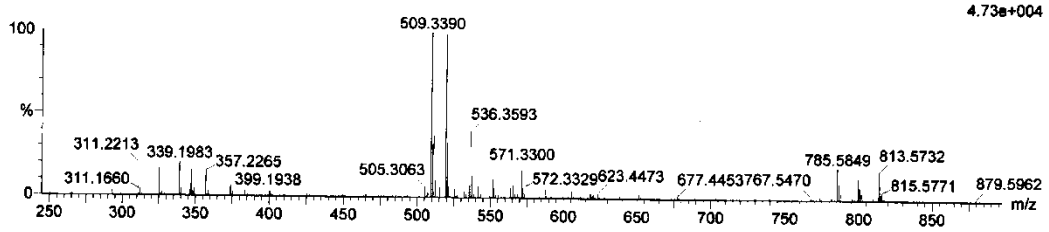
Elemental Composition Report **Page 1**

Single Mass Analysis
Tolerance = 5.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
121 formula(e) evaluated with 1 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:
C: 10-80 H: 1-110 O: 0-30

EHC2-7211 LCT PXE KE324 09-Mar-2012 14:49:14

EHC2-7211_20120309 16 (0.318) AM2 (Ar,10000.0,0.00,1.00); ABS; Cm (8:33) 1: TOF MS ES- 4.73e+004



Minimum:				-1.5			
Maximum:		5.0	5.0	50.0			
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	i-FIT (Norm)	Formula
519.3689	519.3686	0.3	0.6	6.5	172.7	0.0	C31 H51 O6

Figure S62. IR spectrum of horipenoid G (**7**)

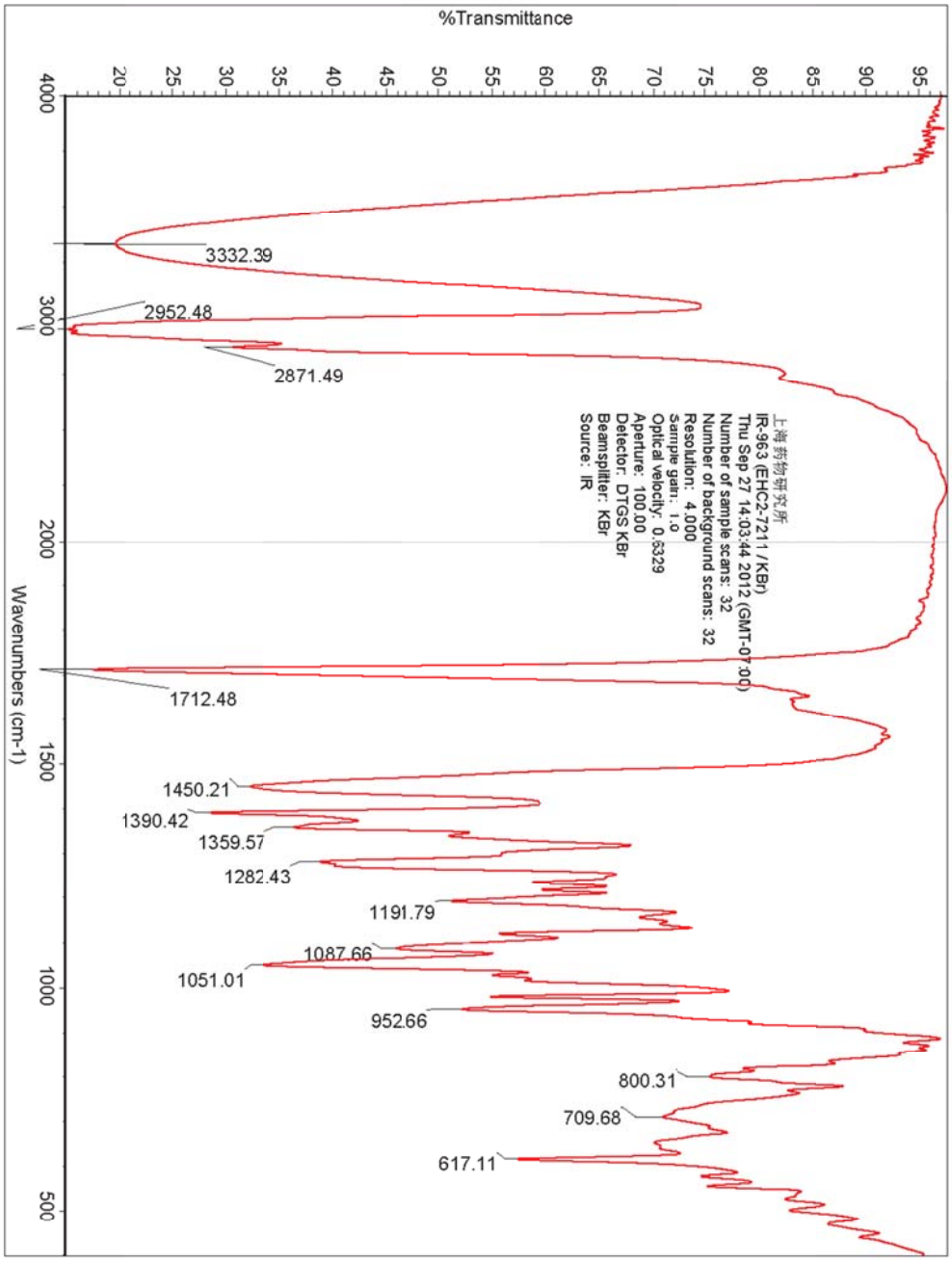


Figure S63. ^{1}H NMR spectrum of horipenoid H (**8**) in C_5D_5N

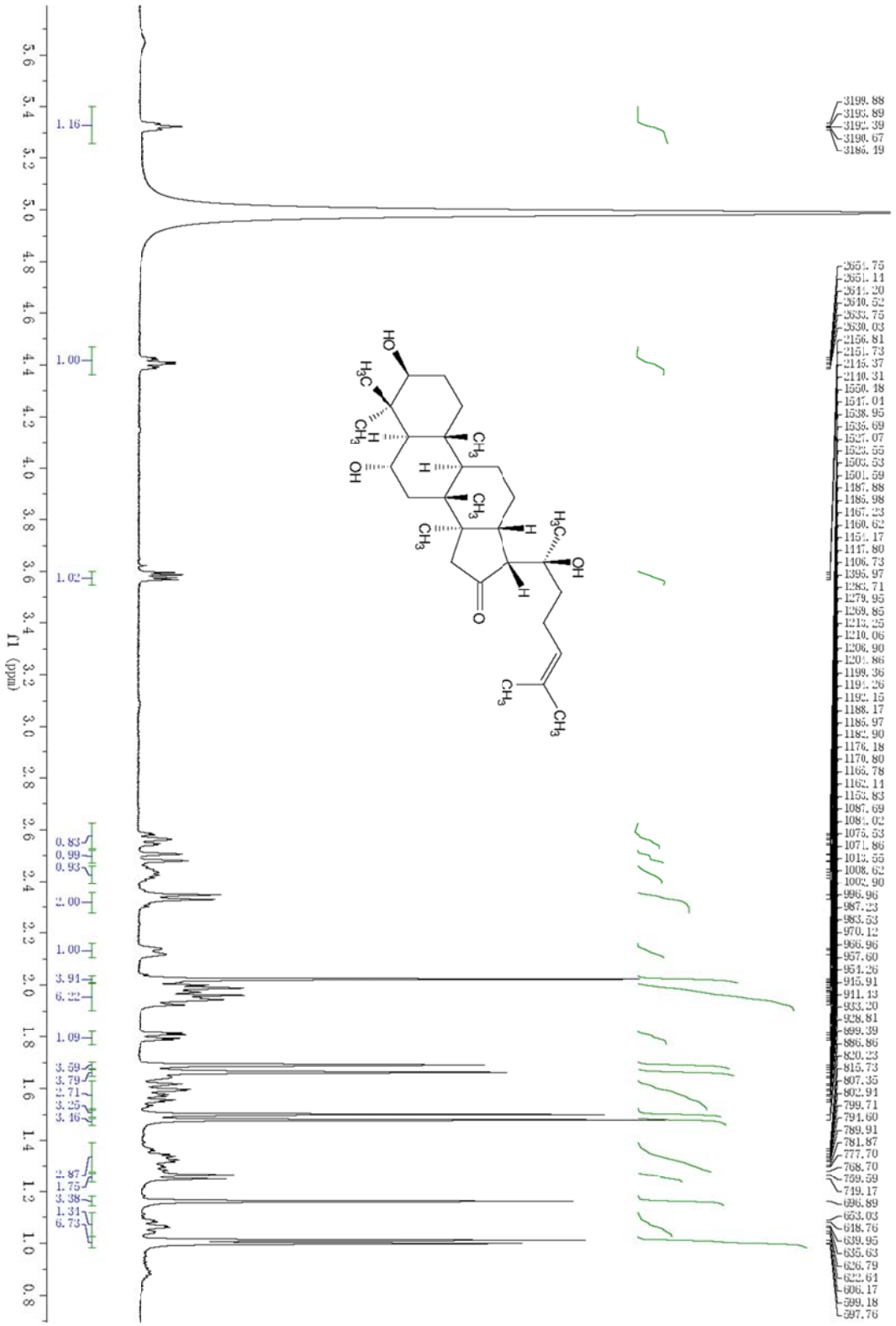


Figure S64. ^{13}C NMR spectrum of horipenoid H (**8**) in C_5D_5N

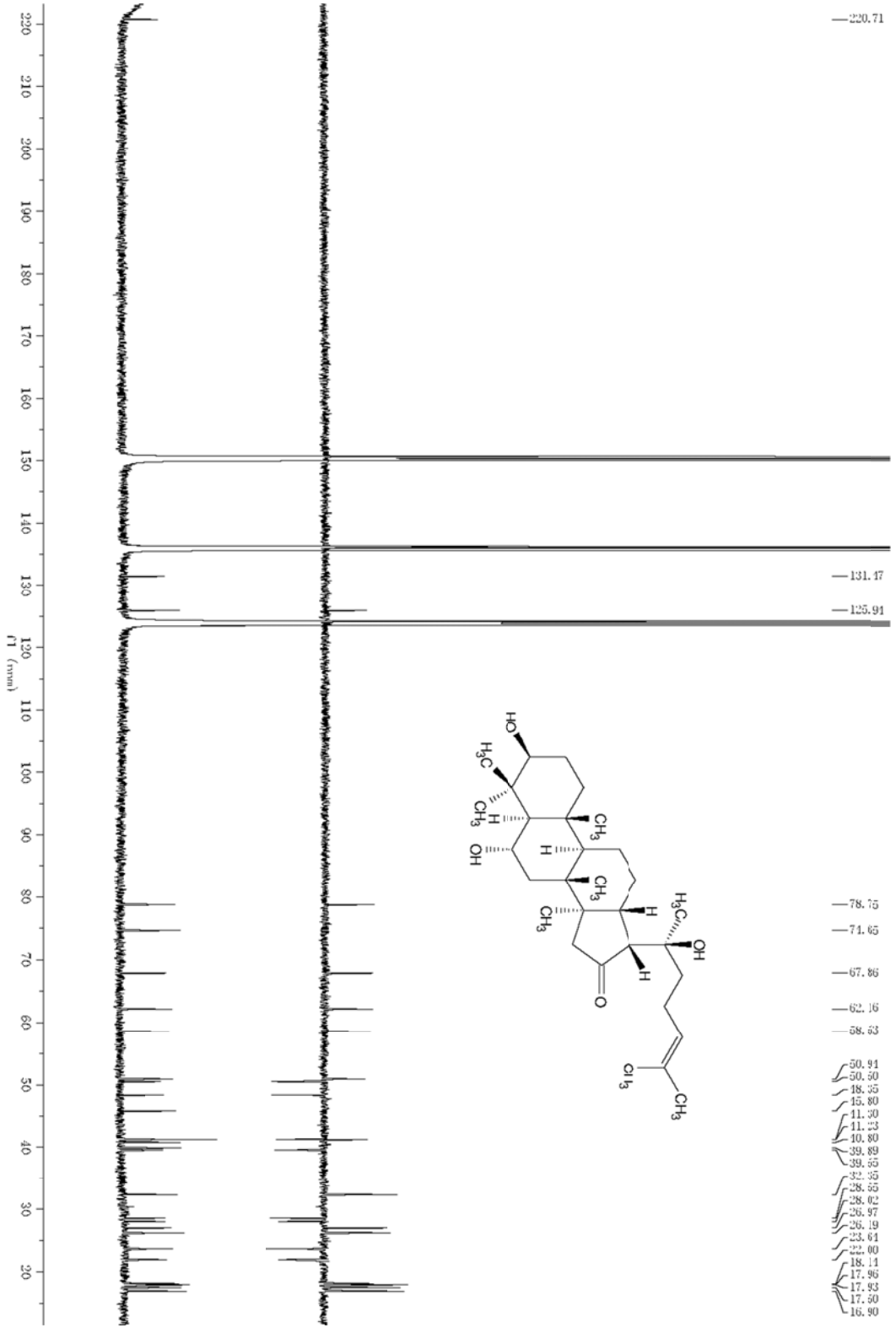


Figure S65. HSQC spectrum of horipenoid H (**8**) in C_5D_5N

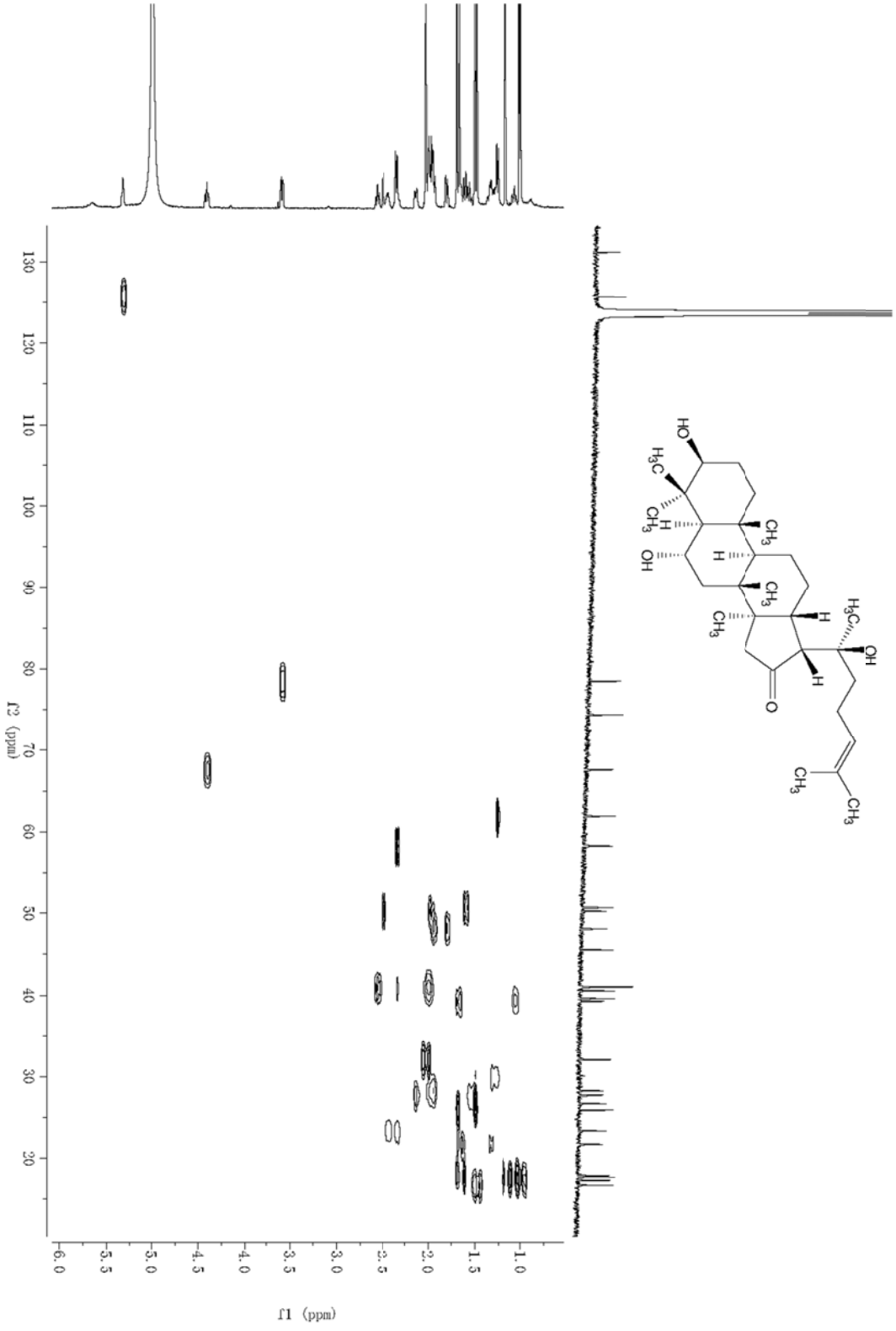


Figure S66. HMBC spectrum of horipenoid H (**8**) in C_5D_5N

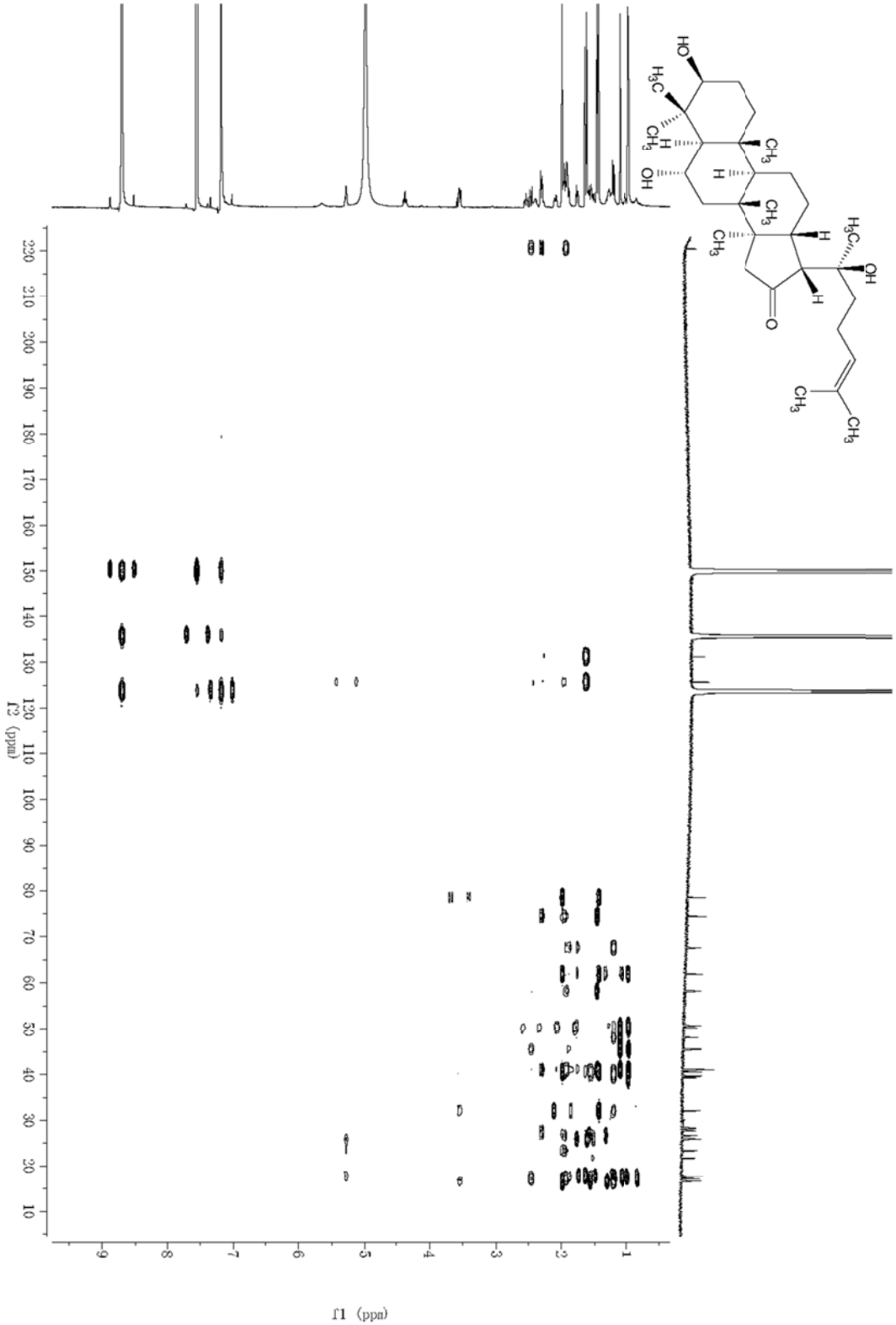


Figure S67 ROESY spectrum of horipenoid H (**8**) in C_5D_5N

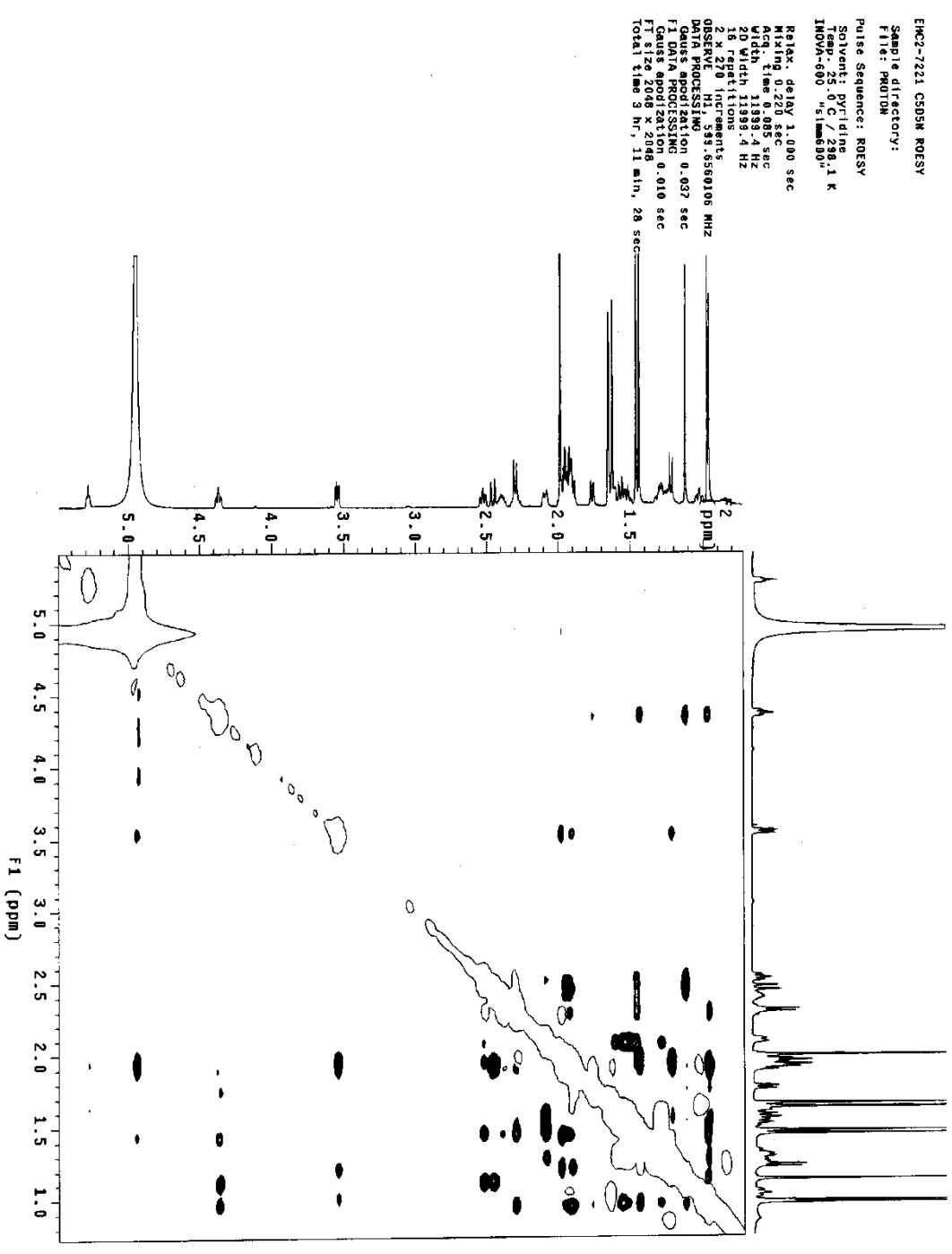


Figure S68. ESI(+)MS spectrum of horipenoid H (**8**)

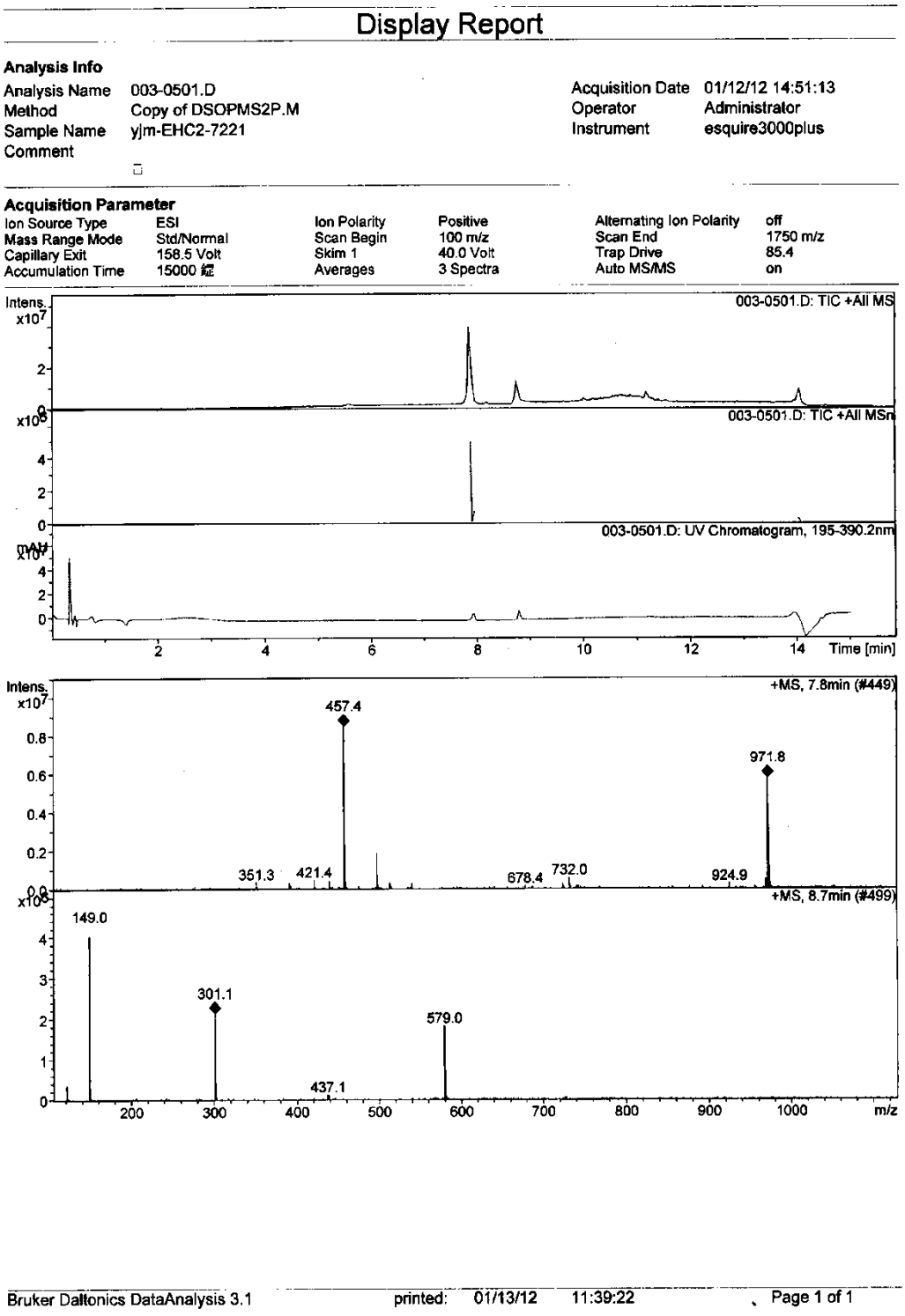


Figure S69. ESI(−)MS spectrum of horipenoid H (**8**)

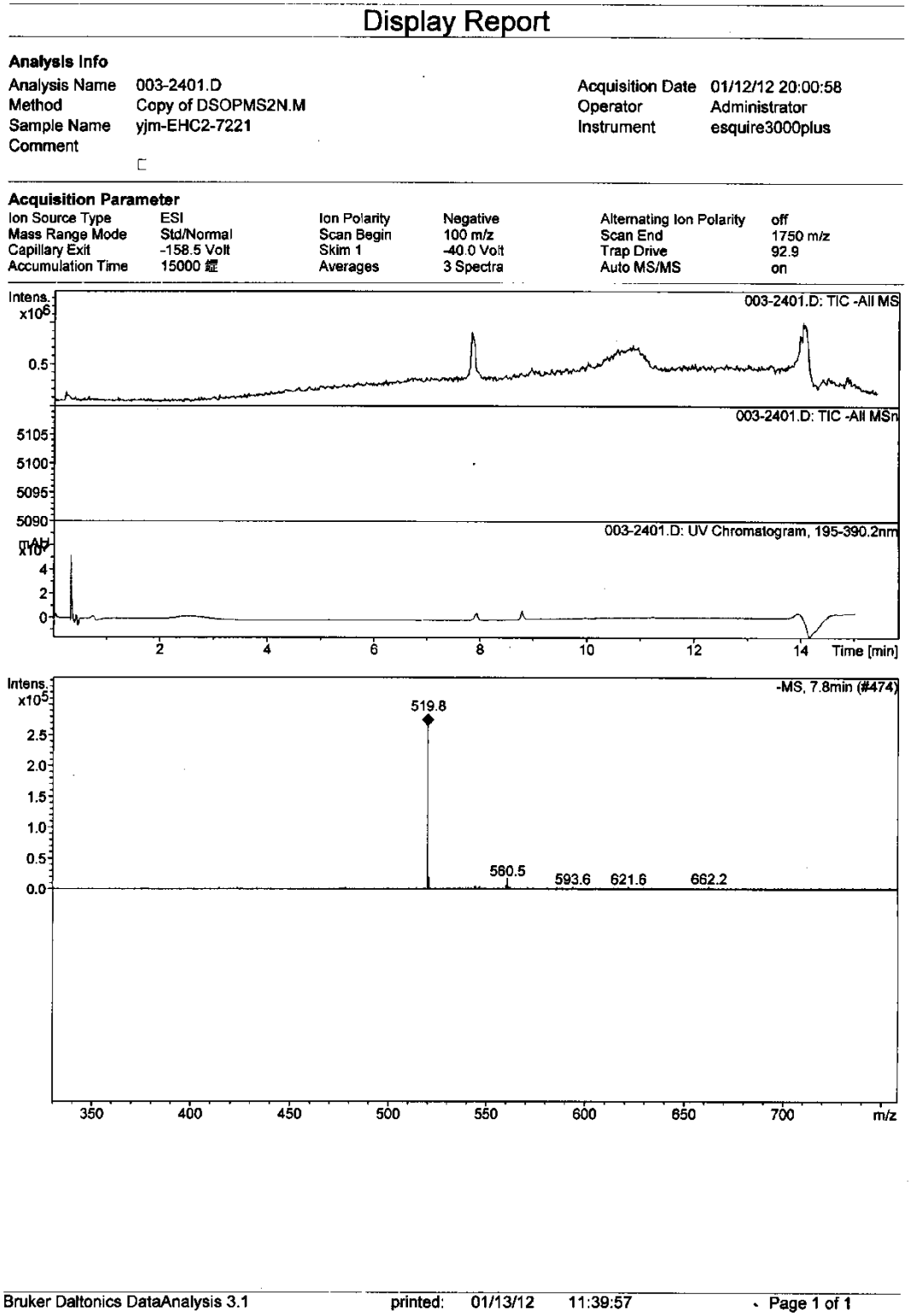


Figure S70. HRESI(−)MS spectrum of horipenoid H (**8**)

Elemental Composition Report **Page 1**

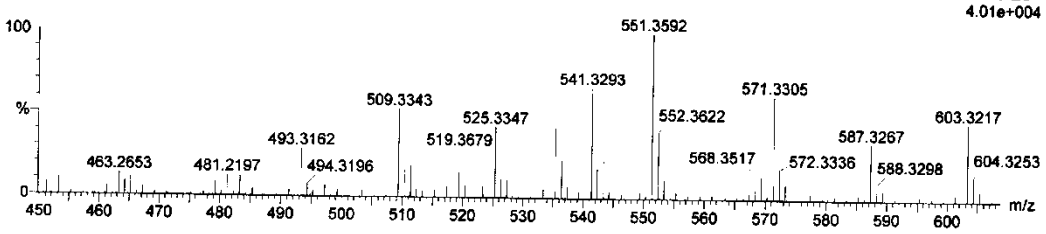
Single Mass Analysis
Tolerance = 5.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
121 formula(e) evaluated with 1 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:
C: 10-80 H: 1-110 O: 0-30
EHC2-7221

LCT PXE KE324

09-Mar-2012
14:56:45
1: TOF MS ES-
4.01e+004

EHC2-7221_20120309 8 (0.158) AM2 (Ar,10000.0,0.00,1.00); ABS; Cm (5:29)



Minimum:				-1.5					
Maximum:		5.0	5.0	50.0					
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	i-FIT (Norm)	Formula		
519.3679	519.3686	-0.7	-1.3	6.5	108.8	0.0	C31	H51	O6

Figure S71. IR spectrum of horipenoid H (**8**)