Supporting Information: Isolation of Isotrichophycin C and Trichophycins G-I from a Collection of *Trichodesmium thiebautii*

Kelly M. McManus, Riley D. Kirk, Christopher W. Via, James Lotti, Alexandre F. Roduit, Roberta Teta, Silvia Scarpato, Alfonso Mangoni, Matthew J. Bertin

Contents

Table S1. NMR Data for Trichophycin G (**2**) (500 MHz for ^{1}H NMR, $CDCl_3$).

pos	δ_H (*J* in Hz)	TOCSY
1a	5.17, m	2
1b	5.14, m	2
2	5.84, m	1, 3b
3a	2.32, m	2, 3b, 4
3b	2.10, m	2, 3a, 4
4	3.47, ovlp[a]	3a, 3b, 5
5	1.63, m	4, 6a, 6b, 22
6a	1.42, ddd (13.5, 8.6, 4.6)	5, 6b
6b	1.00, ddd (14.2, 9.2, 5.6)	5, 6a, 7
7	1.54, ovlp	21
8a	1.35, ovlp	7, 8b
8b	1.19, m	8a, 9b
9a	1.50, ovlp	
9b	1.45, m	
10	3.79, m	9a, 9b, 11a, 11b
11a	2.39, dd (13.7, 8.8)	10, 11b
11b	2.28, dd (13.5, 4.2)	10, 11a
12		
13	3.47, ovlp	20
14		
15	7.18, d (7.4)	16
16	7.31, t (7.4)	17
17	7.24, m	
18	7.31, t (7.4)	
19	7.18, d (7.4)	18
20	6.00, s	13
21	0.91, ovlp	7
22	0.91, ovlp	5

[a]overlapping signals

Table S2. NMR Data for Trichophycin H (**3**) (500 MHz for ^{1}H NMR, $CDCl_3$).

pos	δ_C, type	δ_H (*J* in Hz)	HMBC	COSY	$\Delta\delta$ ^{13}C[a]
1a	117.9, CH_2	5.15, m		2	0.0
1b		5.13, m		2	
2	135.6, CH	5.87, m		1, 3a, 3b	0.0
3a	39.0, CH_2	2.26, m		4	0.1
3b		2.17, m		4	
4	73.9, CH	3.56, dt (8.5, 4.0)		3a, 3b, 5	0.0
5	37.8, CH	1.54, ovlp[b]		4, 27	0.0
6a	33.0, CH_2	1.45, m		6b	0.0
6b		1.26, ovlp		6a	
7a	27.4, CH_2	1.41, ovlp		7b	0.0
7b		1.35, ovlp		7a	
8a	26.7	1.42, ovlp			0.0
8b		1.32, m			
9	34.6, CH_2	1.42, ovlp	10, 11	8b	0.0
10	74.5, CH	3.50 dt (7.6, 4.0)		9, 11	0.0
11	35.2, CH	1.61, m		10, 26	0.0
12a	40.8, CH_2	1.41, ovlp	10, 25, 26	11, 13	0.0
12b		1.02, dt (14.1, 7.4)	10, 25, 26	11, 12a	
13	29.8, CH	1.57, ovlp		14a, 25	0.0
14a	32.6, CH_2	1.42, ovlp		14b	0.1
14b		1.26, ovlp		14a, 15a	
15a	34.8, CH_2	1.55, ovlp		15b	0.0
15b		1.44, ovlp		15a	
16	70.6, CH	3.82, m		15a, 17a, 17b	0.1
17a	38.2, CH_2	2.46, dd (13.6, 8.7)	16, 18, 19, 24	16, 17b	0.0
17b		2.36, dd (13.6, 4.4)	16, 18, 24	16, 17a	
18	139.0, C				
19	34.2, CH_2	2.28, m	18, 20, 21, 24	20	
20	26.3, CH_2	1.68, m	18, 19, 21, 22	19a, 19b	
21	17.8, CH_2	2.20	19, 22	20	
22	83.5, C				
23	68.8, CH	1.98, t (2.7)		21	
24	114.9, CH	5.99, s	18	19a	
25	20.4, CH_3	0.90, ovlp	12, 13	13	0.0
26	14.0, CH_3	0.86, d (6.8)	10, 11, 12	11	0.1
27	14.0, CH_3	0.91, ovlp	4, 5, 6	5	0.1

[a]$\Delta\delta$ ^{13}C (trichophycin A-**3**)

[b]overlapping signals

Table S3. NMR Data for Trichophycin I (**4**) (500 MHz for ^{1}H NMR, $CDCl_3$)

pos	**δ_C, type**	**δ_H (*J* in Hz)**	**HMBC**	**COSY**
1a	117.3, CH_2	5.07, m	3	2, 3
1b		5.03, m	3	2, 3
2	134.1, CH	5.71, m		1a, 1b, 3
3	35.8, CH_2	2.27, m	1, 2, 4	2, 4
4	76.6, CH	4.80, ddd (8.0, 5.9, 4.5)	2	3, 5
5	36.0, CH	1.67, m		4, 17
6a	29.2, CH_2	1.50, m		6b, 7
6b		1.17, m		5, 6a, 7
7	27.6, CH_2	2.14, m	6, 8, 16	6a, 6b
8	141.9, C			
9	41.2, CH_2	3.36, m	7, 8, 10, 11/15, 16	16
10	138.2, C			
11/15	128.9, CH	7.15, d (7.4)	9, 13	9, 12/14
12/14	128.5, CH	7.30, t (7.4)	10	11/15
13	126.6, CH	7.22, t (7.4)		
16	114.2, CH	5.84, s	7, 8, 9	9
17	15.2, CH_3	0.90, d (6.8)	4, 5, 6	5
18	170.7, C			
19	21.2, CH_3	2.02, s	18	

Table S4. NMR Data for Proposed Chlorovinylidene Configuration

Molecule	**Configuration**	**^{13}C NMR C-17[a]**
Trichophycin A	*Z*	38.2
Isotrichophycin C (**1**)	*Z*	38.2
Trichophycin H (**3**)	*Z*	38.2
Smenlactone B	*Z*	38.9
Smenlactone C	*Z*	38.9
Isomalyngamide K	*Z*	39.0
Trichophycin B	*E*	42.7
Trichophycin C	*E*	42.8
Trichophycin D	*E*	43.1
Trichophycin E	*E*	43.1
Malyngamide K	*E*	44.0

[a]C-17 in trichophycin A

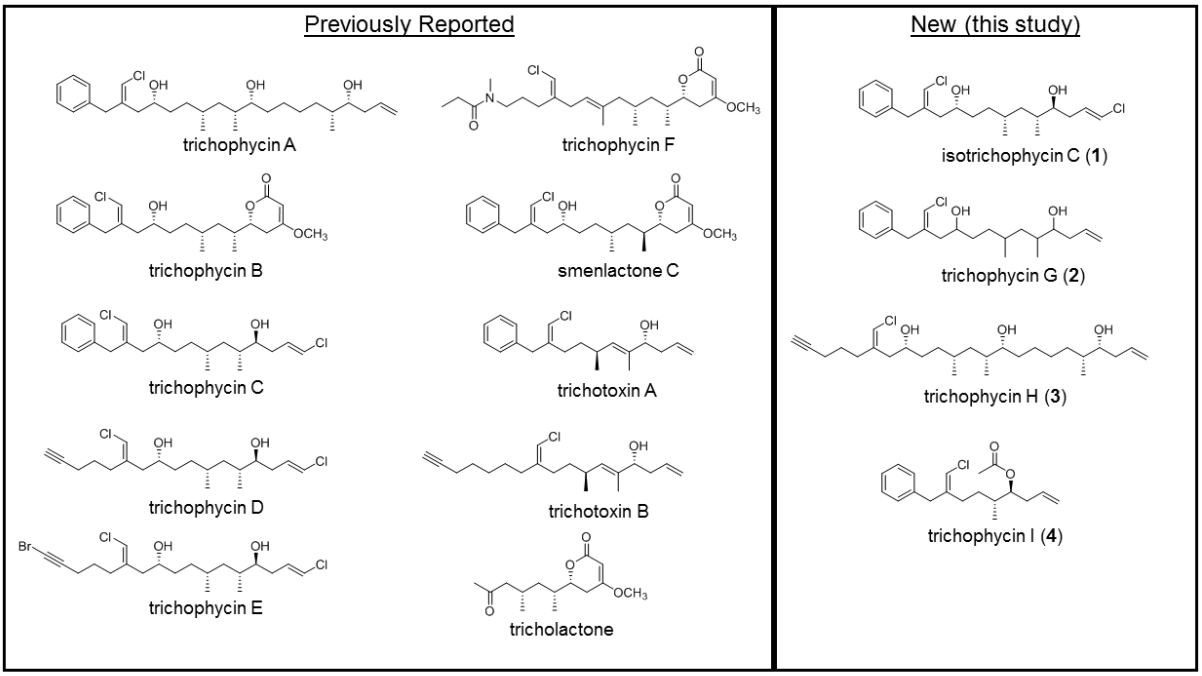

Figure S1. Previously reported polyketide metabolites from *Trichodesmium* 2014 collection and new metabolites from this report. In this report, we address the absolute configuration of the previously published trichophycin A.

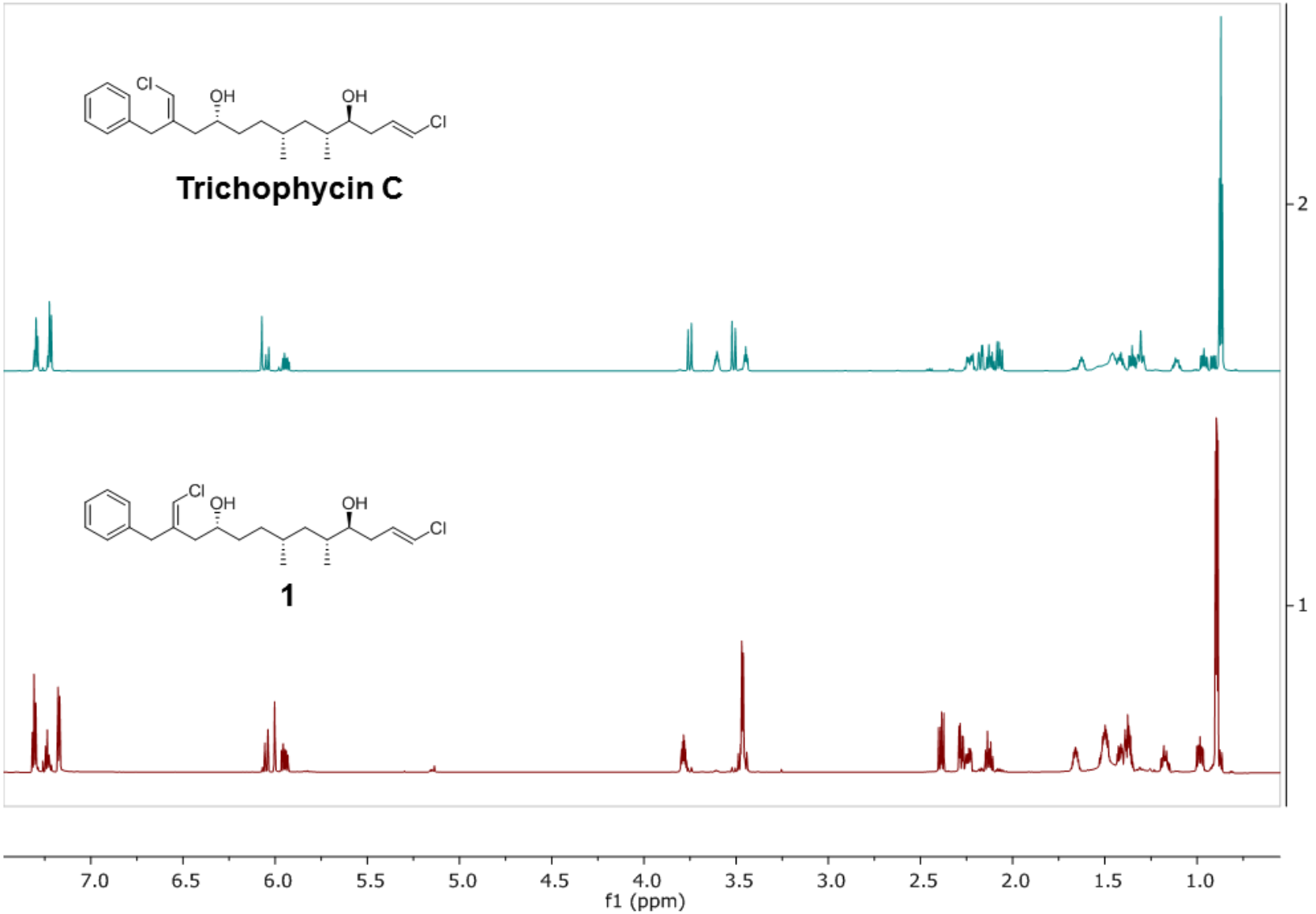

Figure S2. Comparison of ^{1}H NMR spectra: trichophycin C and isotrichophycin C (**1**) (800 MHz, $CDCl_3$).

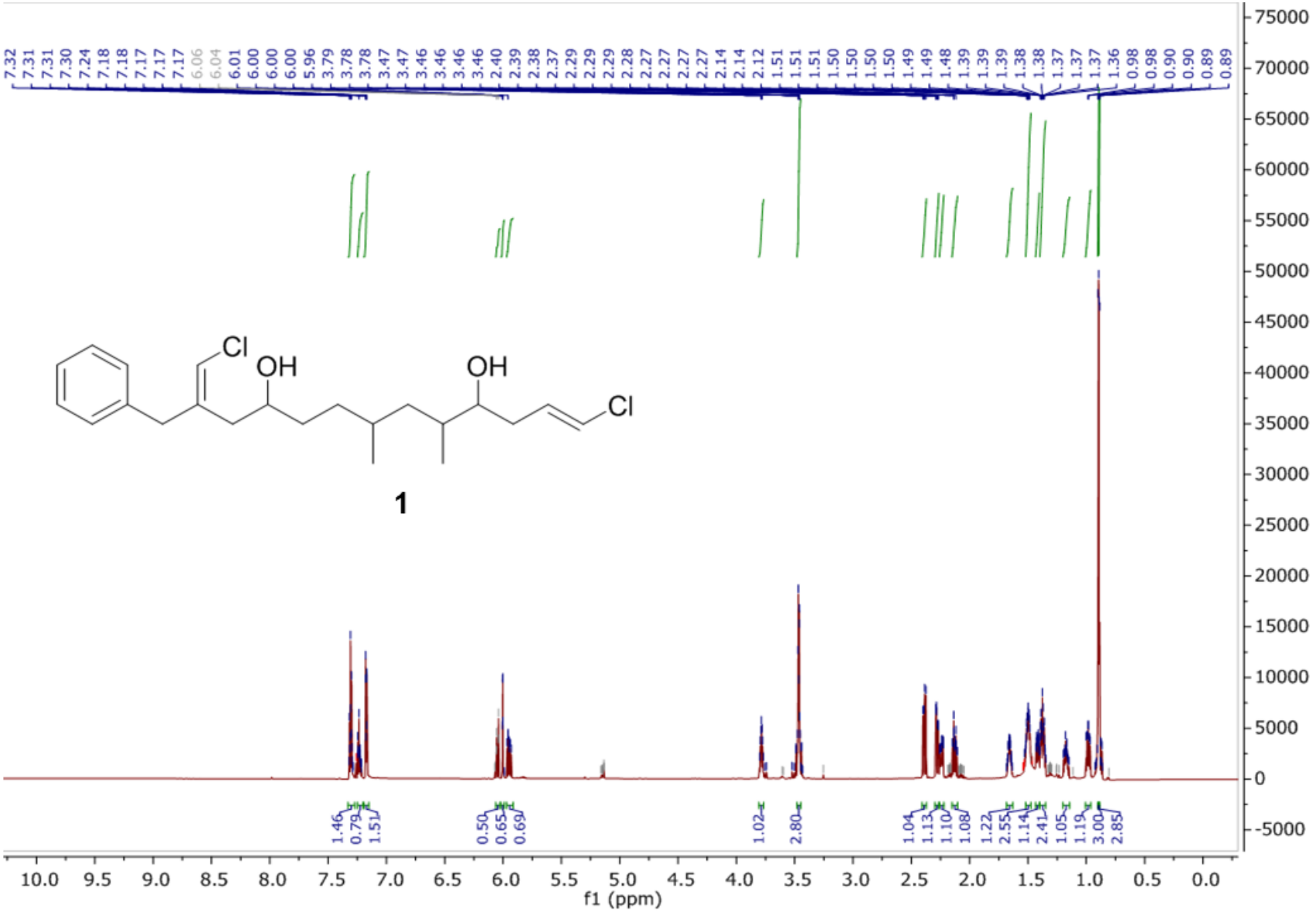

Figure S3. ^{1}H NMR spectrum of isotrichophycin C (**1**) (800 MHz, $CDCl_3$).

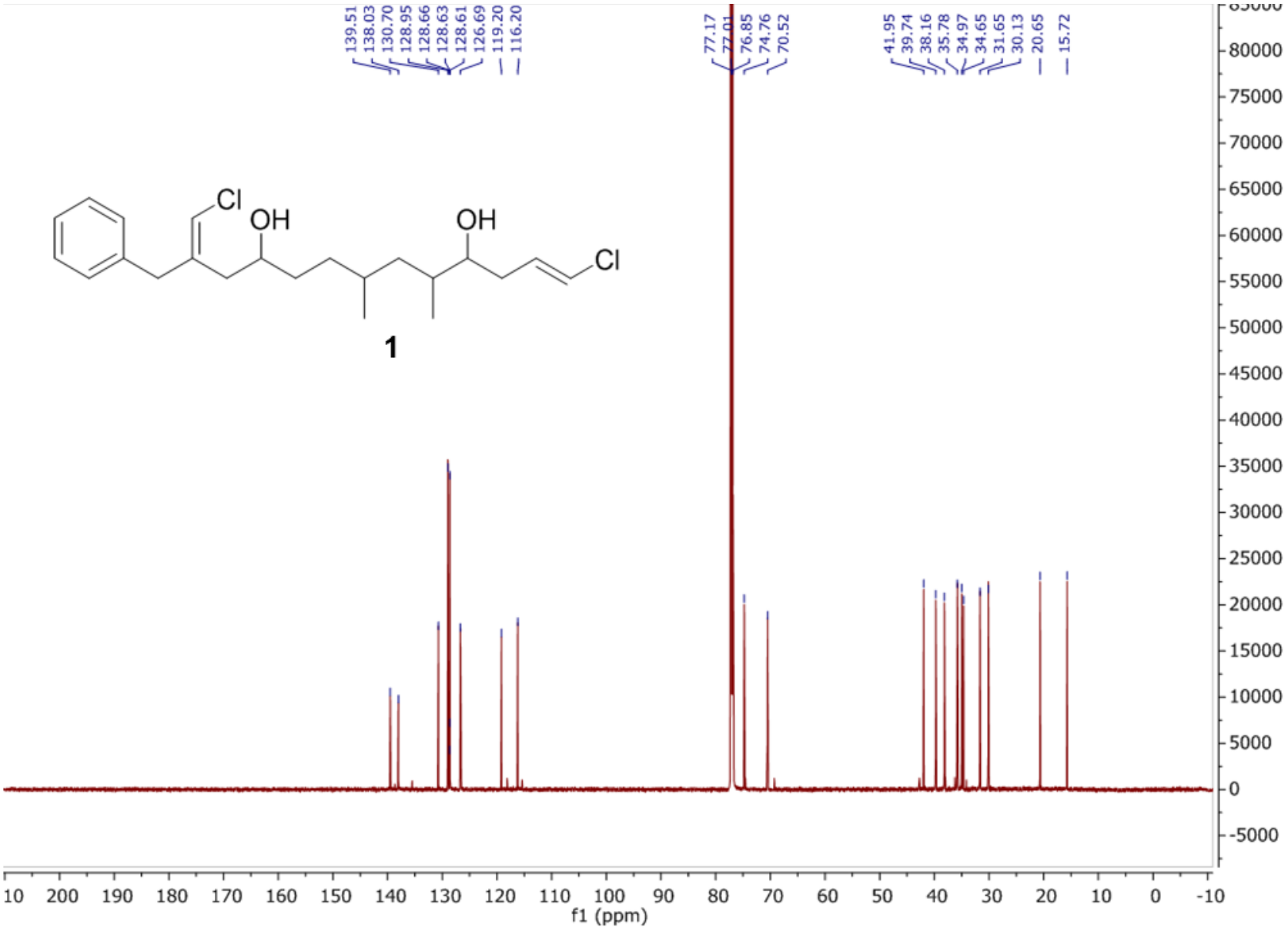

Figure S4. ^{13}C NMR spectrum of **1** (200 MHz, $CDCl_3$).

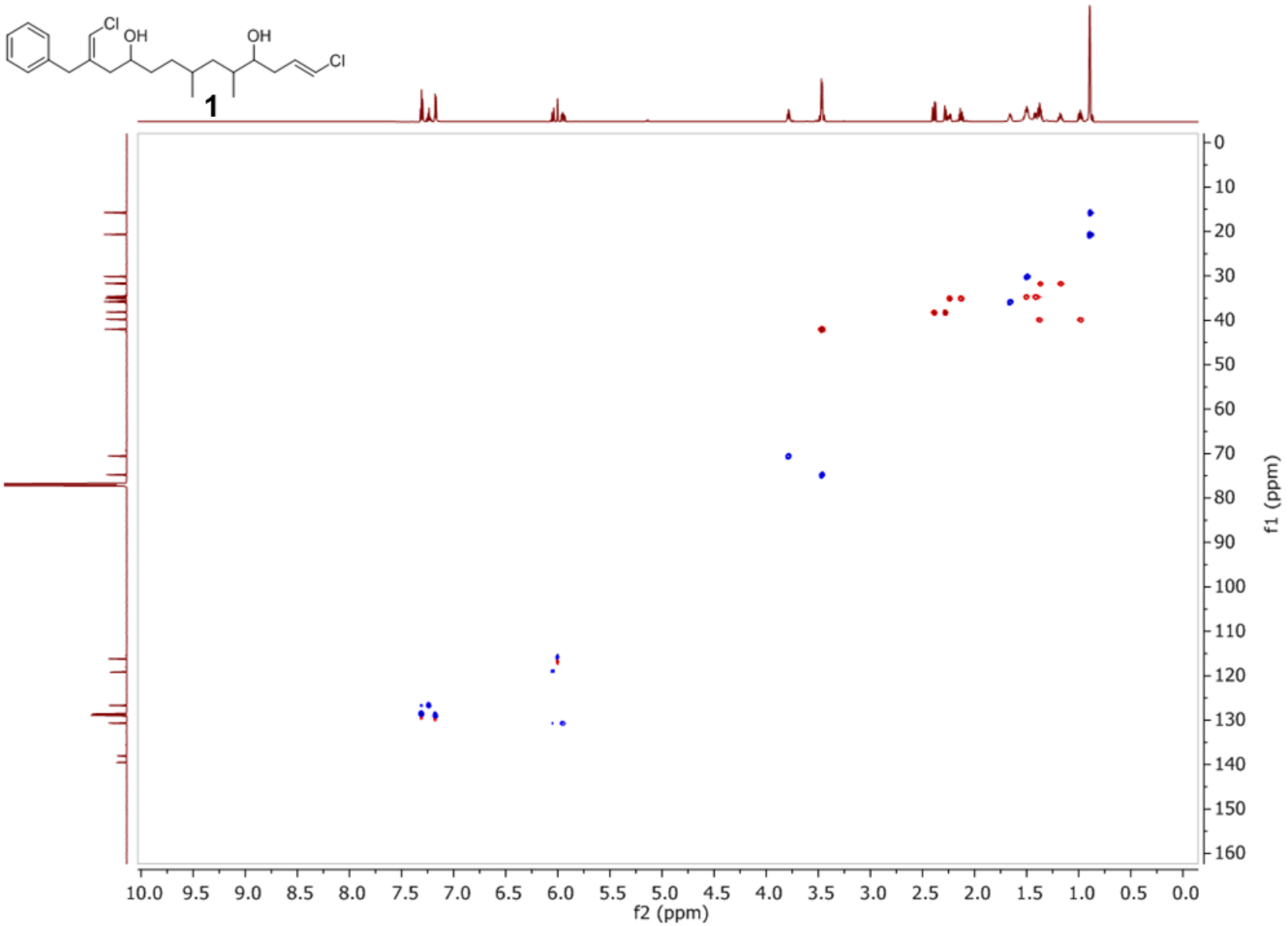

Figure S5. HSQC spectrum of **1**.

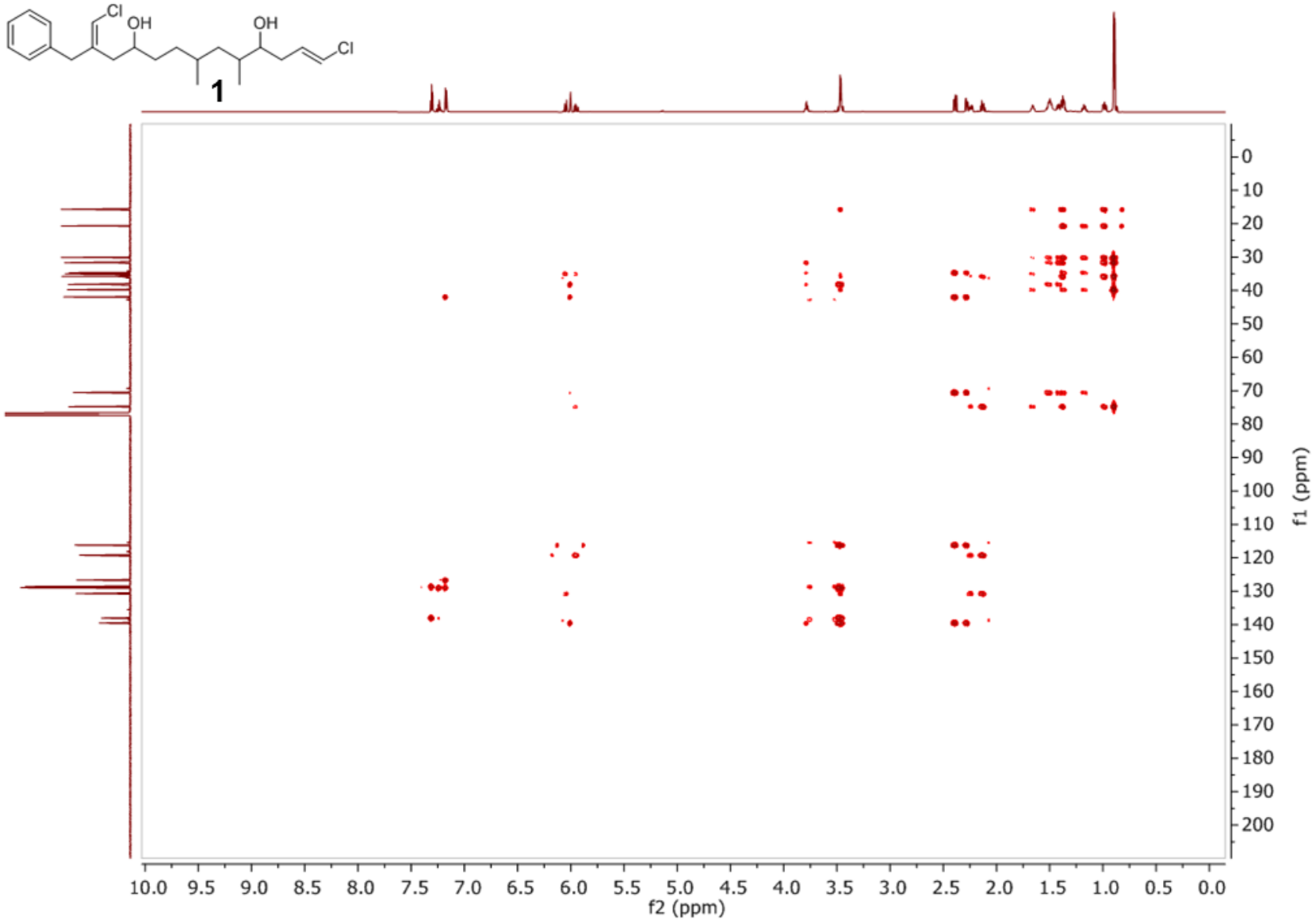

Figure S6. HMBC spectrum of **1**.

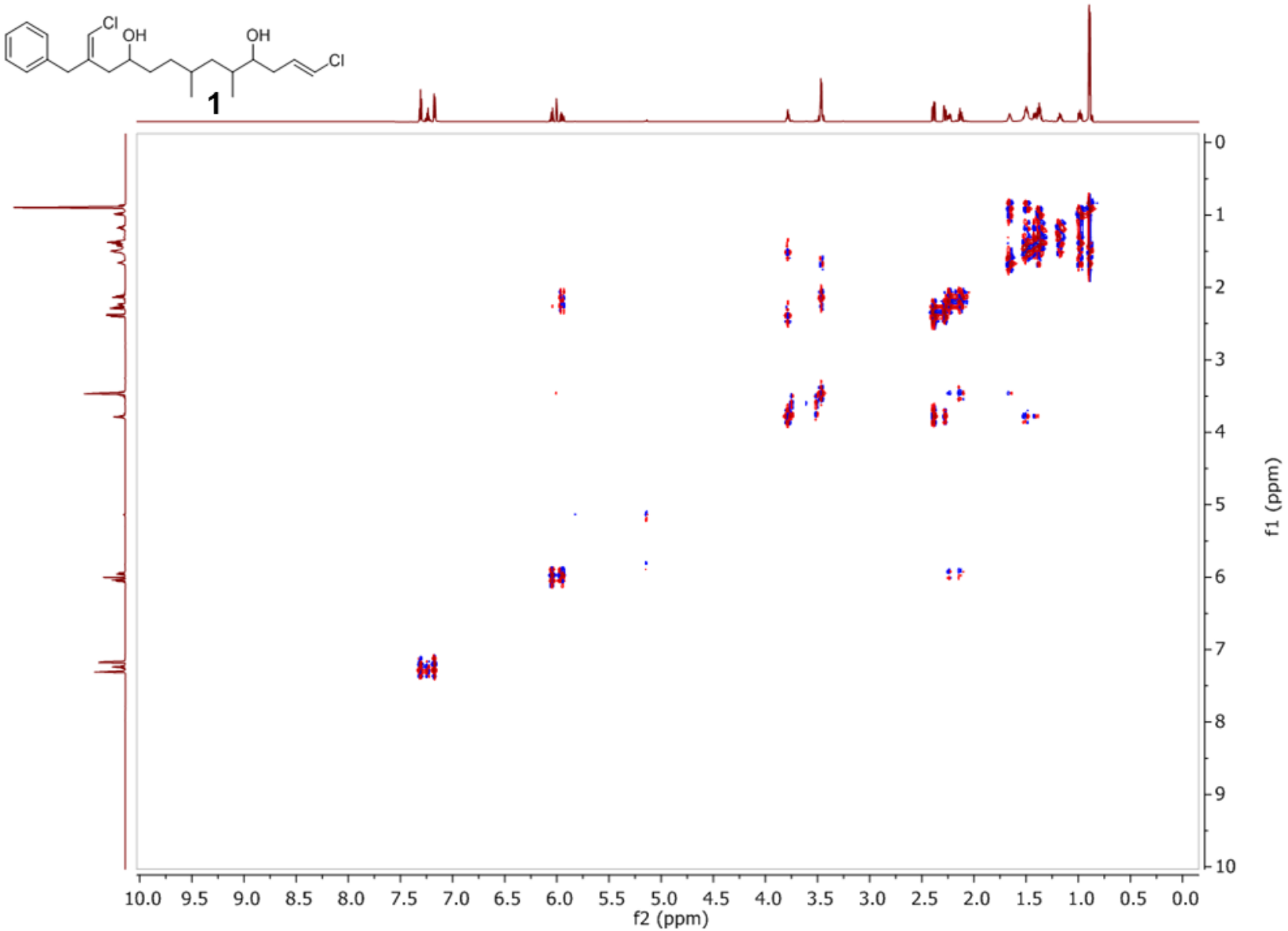

Figure S7. DQF-COSY spectrum of **1**.

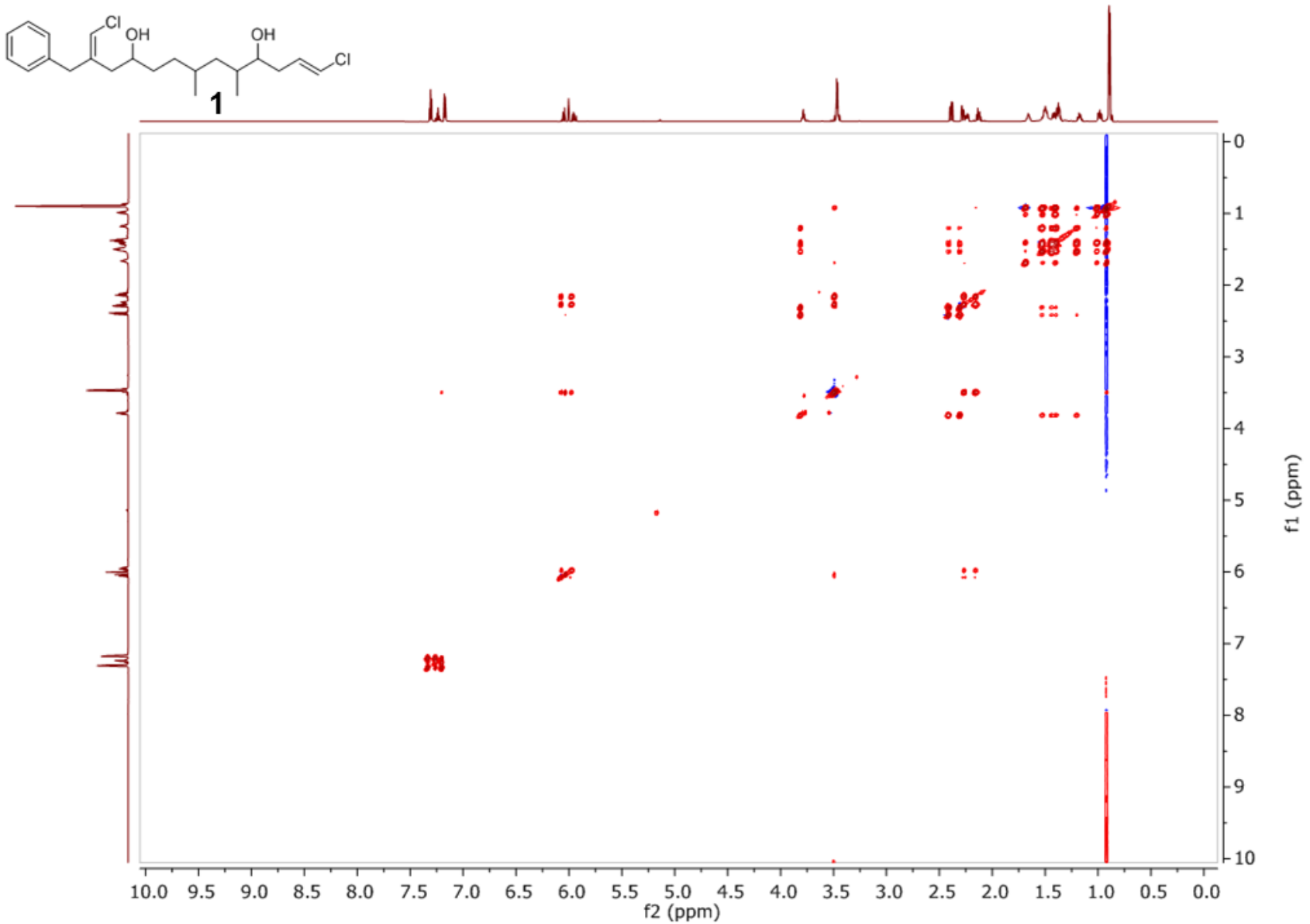

Figure S8. TOCSY spectrum of **1**.

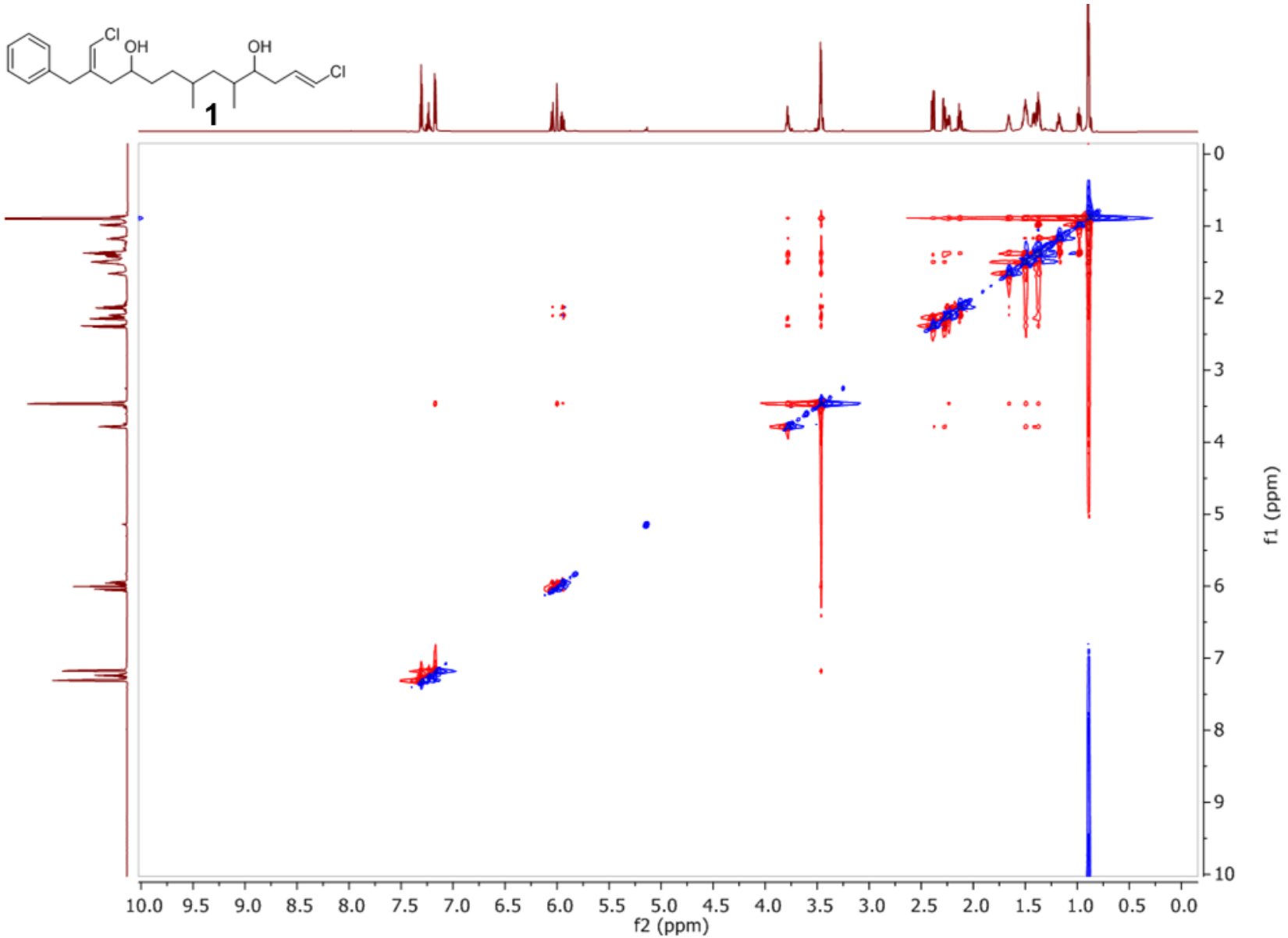

Figure S9. NOESY spectrum of **1**.

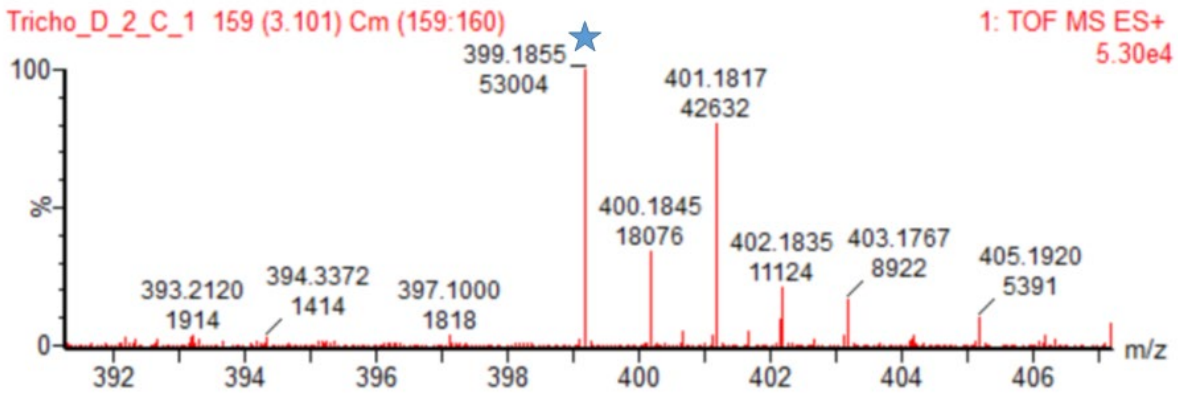

Figure S10. HRESIMS of **1**.

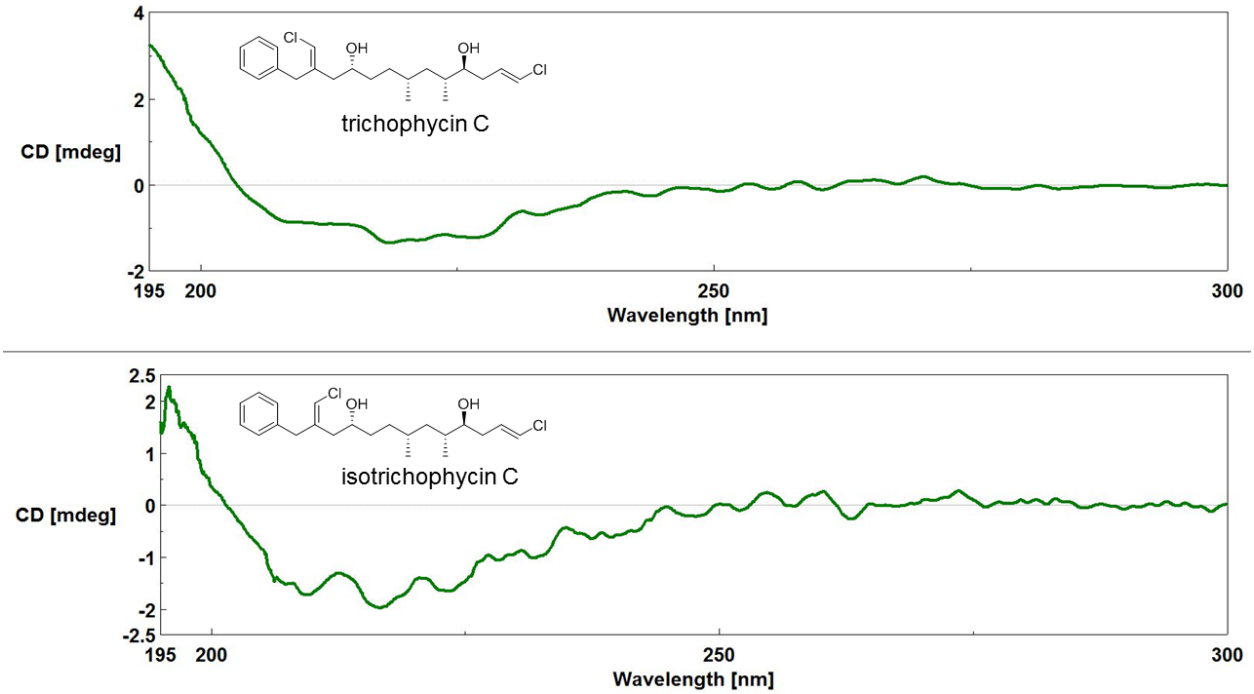

Figure S11. Comparison of trichophycin C and isotrichophycin C (**1**) ECD spectra (0.4 mg/mL, CH_3CN).

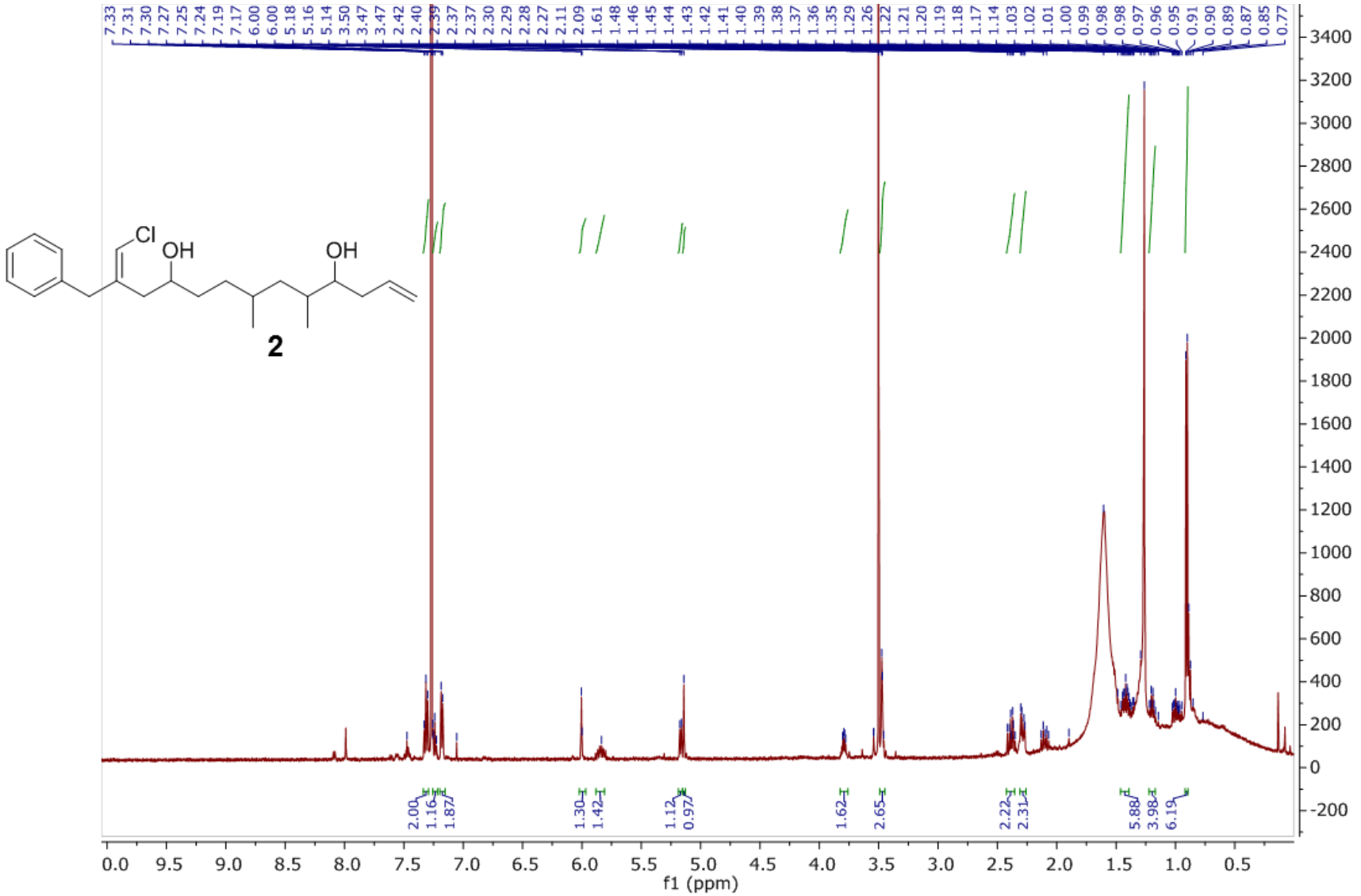

Figure S12. ^{1}H NMR spectrum of trichophycin G (**2**) (500 MHz, $CDCl_3$).

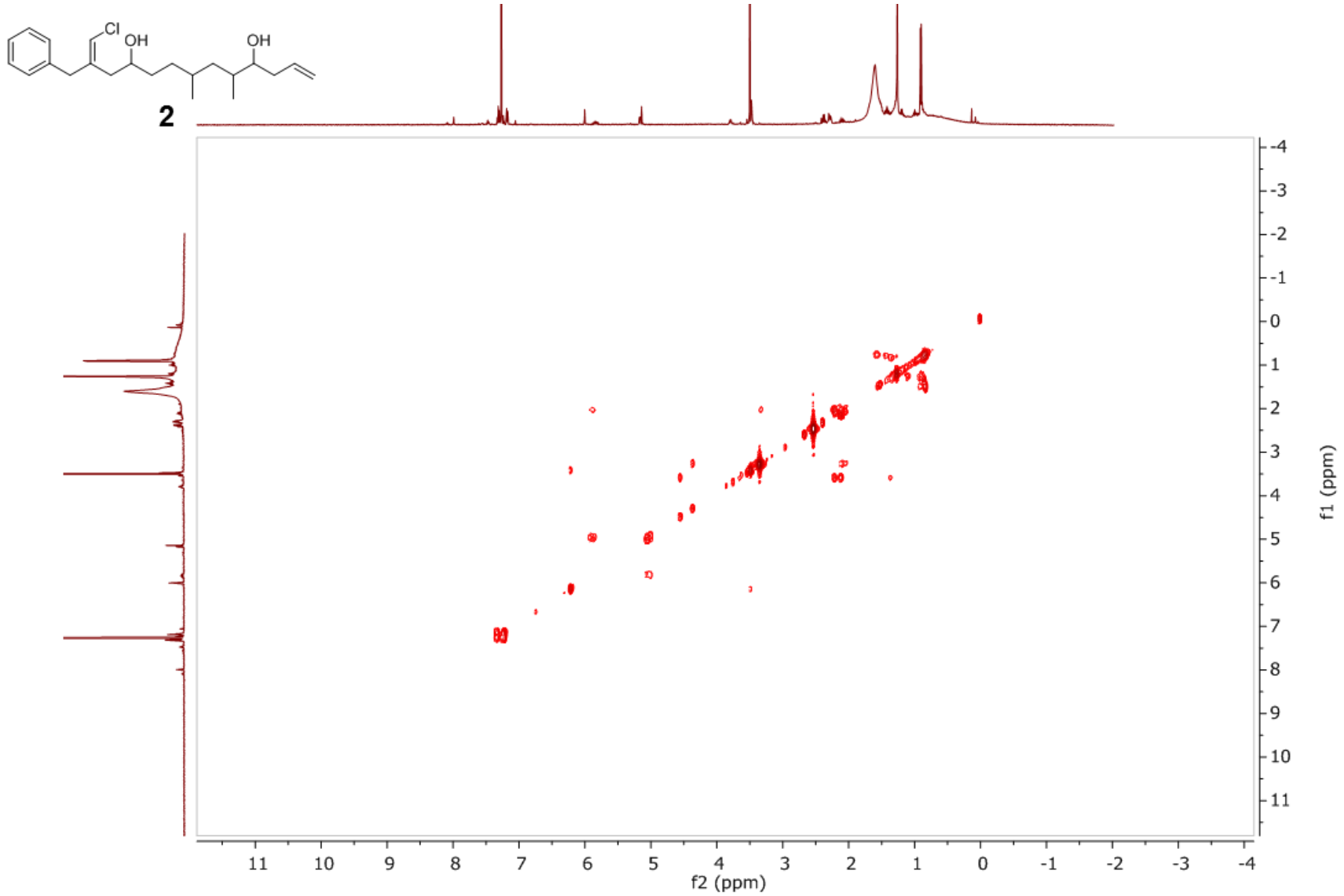

Figure S13. COSY spectrum of **2**.

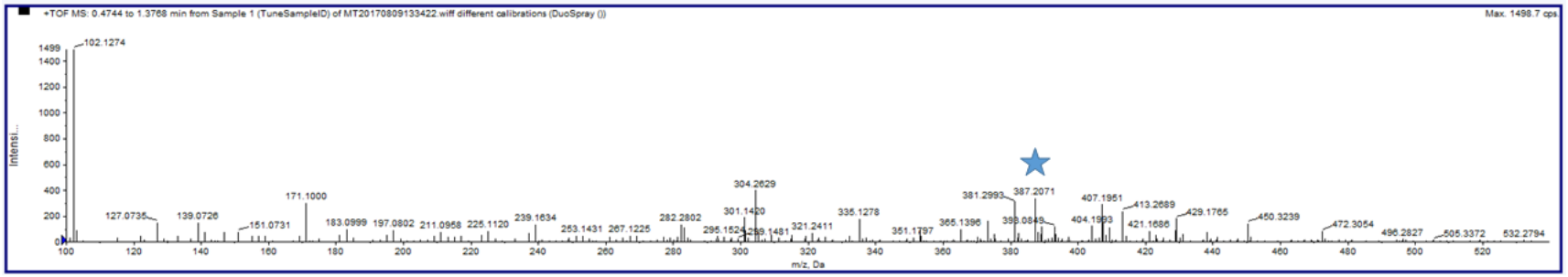

Figure S14. HRESIMS of **2**.

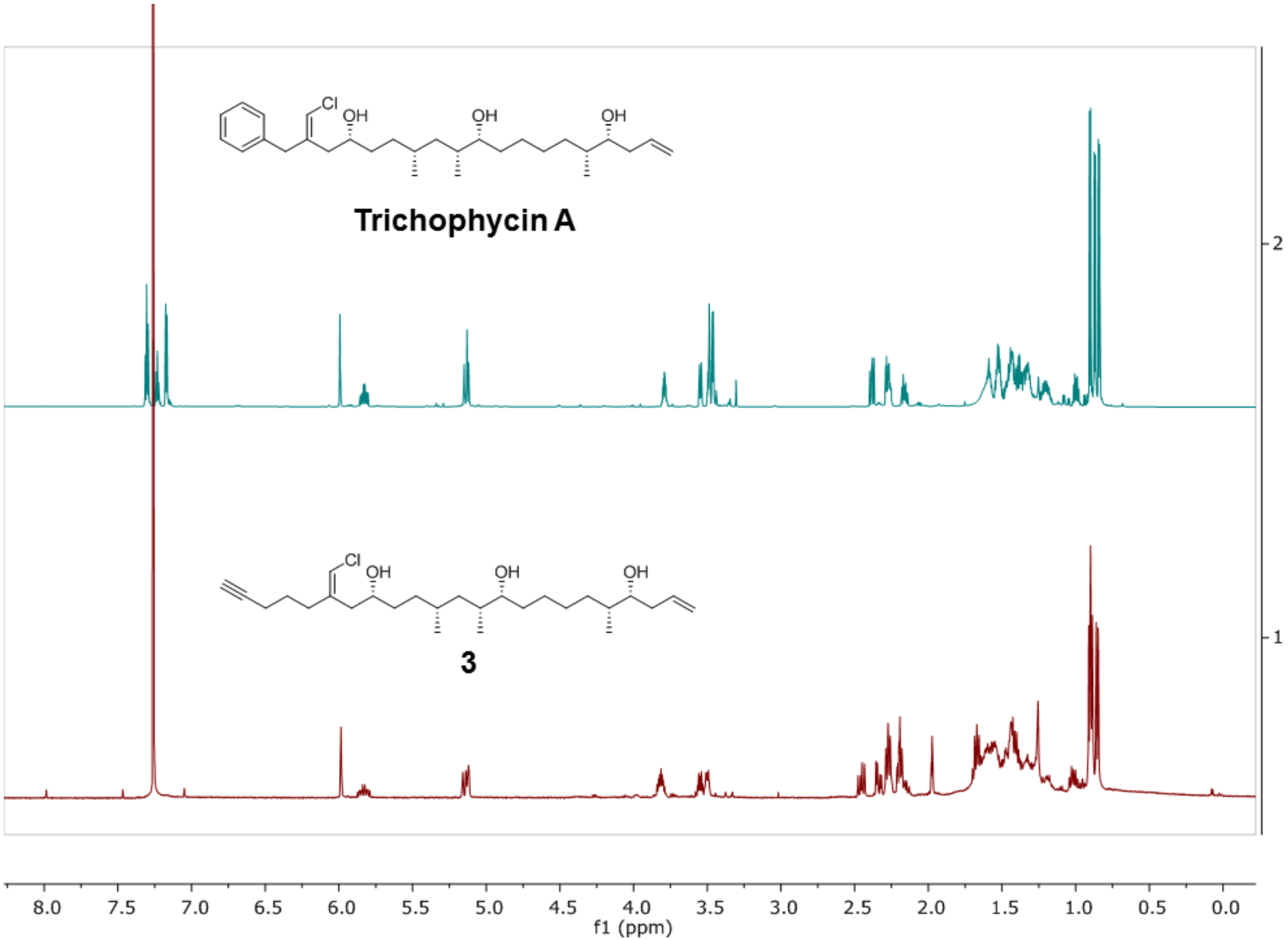

Figure S15. Comparison of ^{1}H NMR spectra: trichophycin A (800 MHz, $CDCl_3$) and trichophycin H (**3**) (500 MHz, $CDCl_3$).

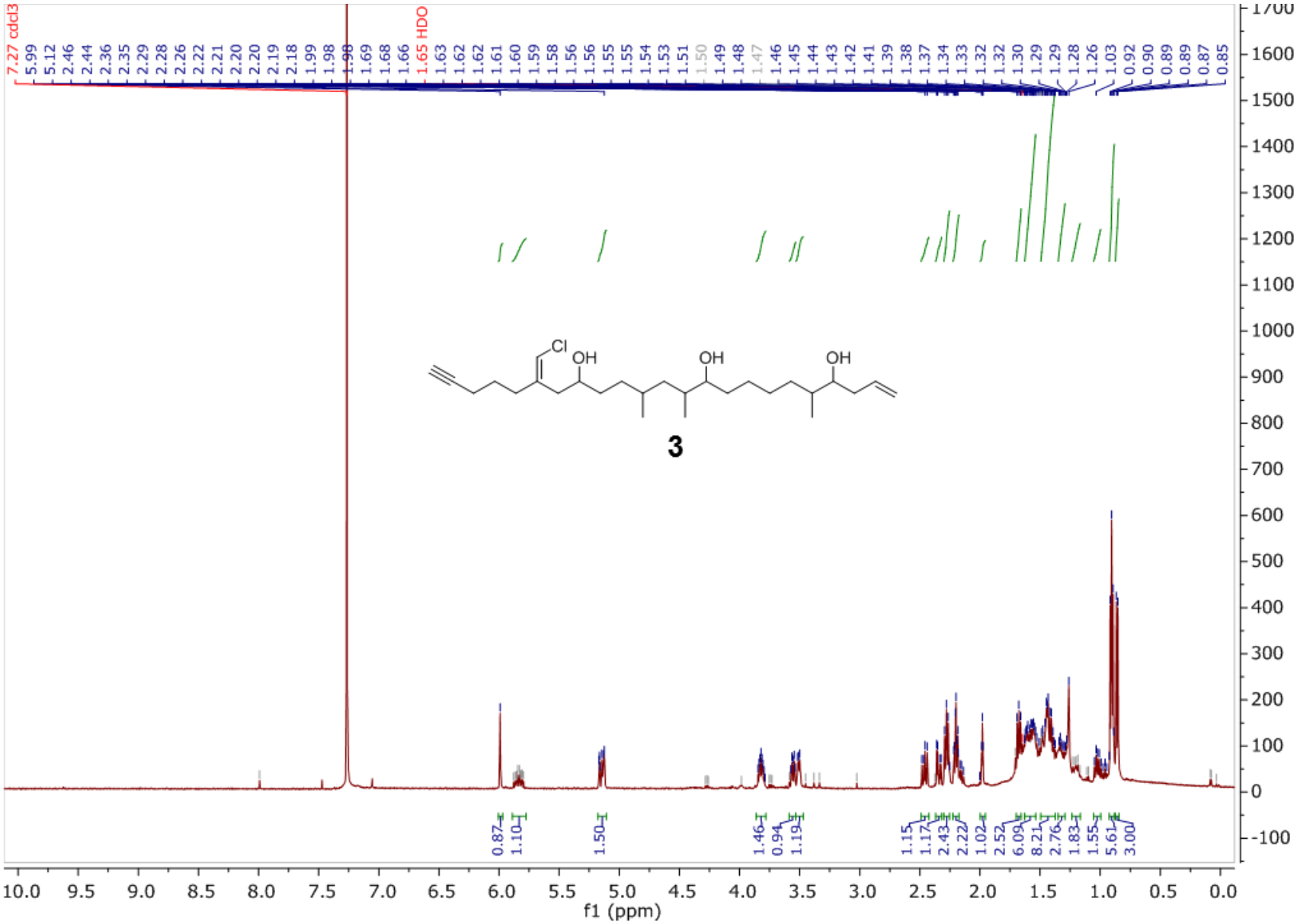

Figure S16. ^{1}H NMR of trichophycin H (**3**) (500 MHz, $CDCl_3$).

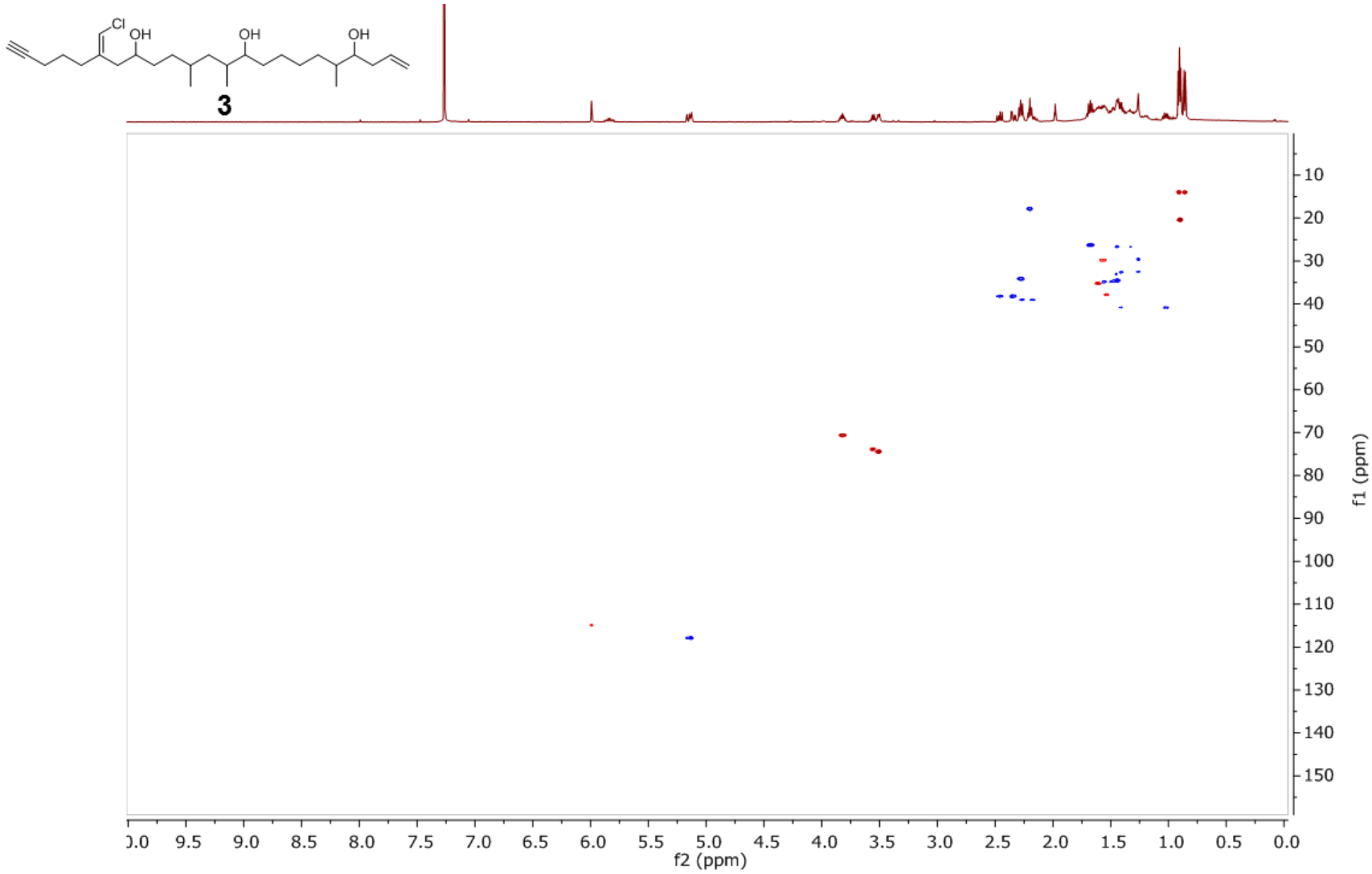

Figure S17. HSQC spectrum of **3**.

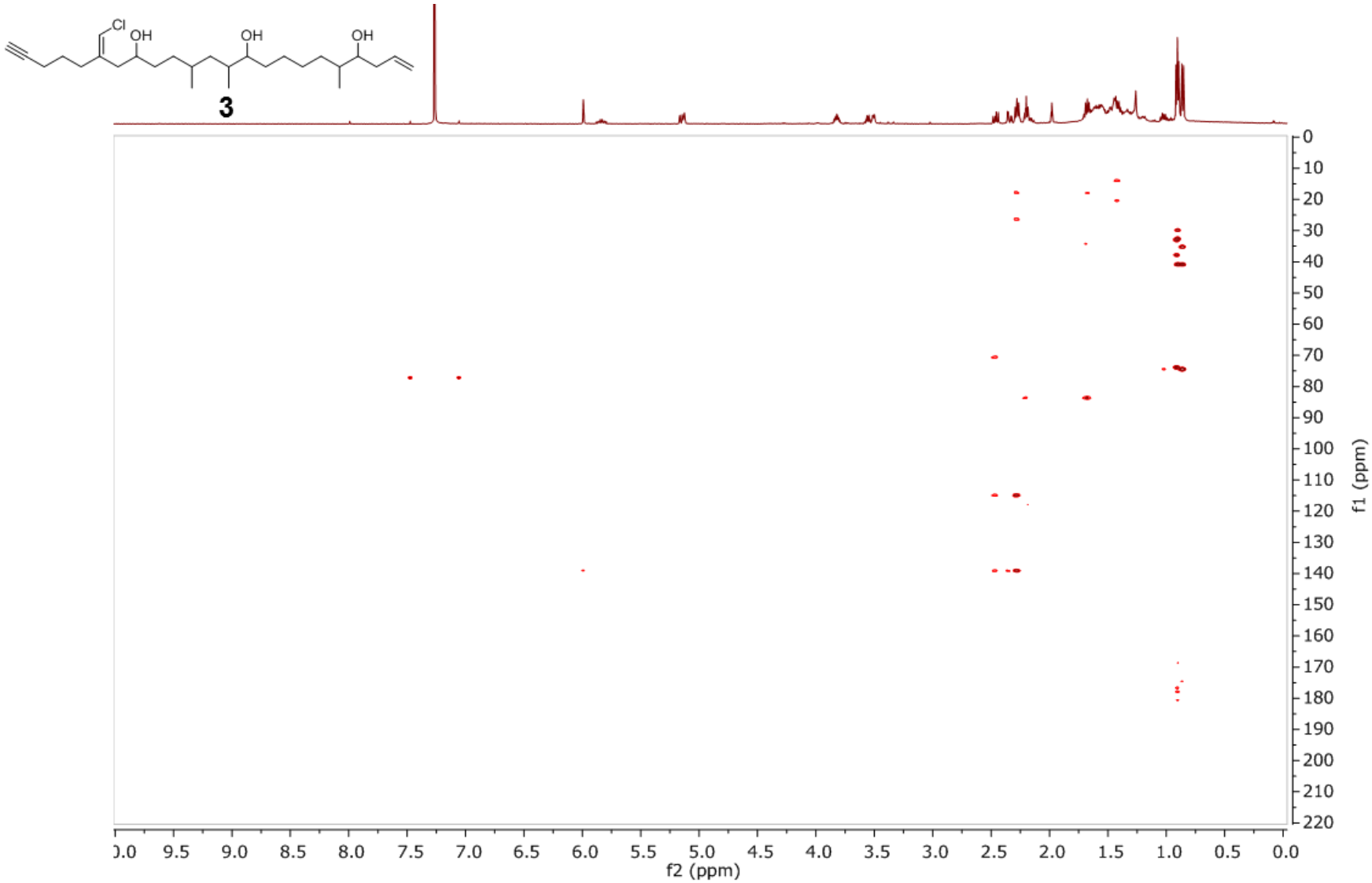

Figure S18. HMBC spectrum of **3**.

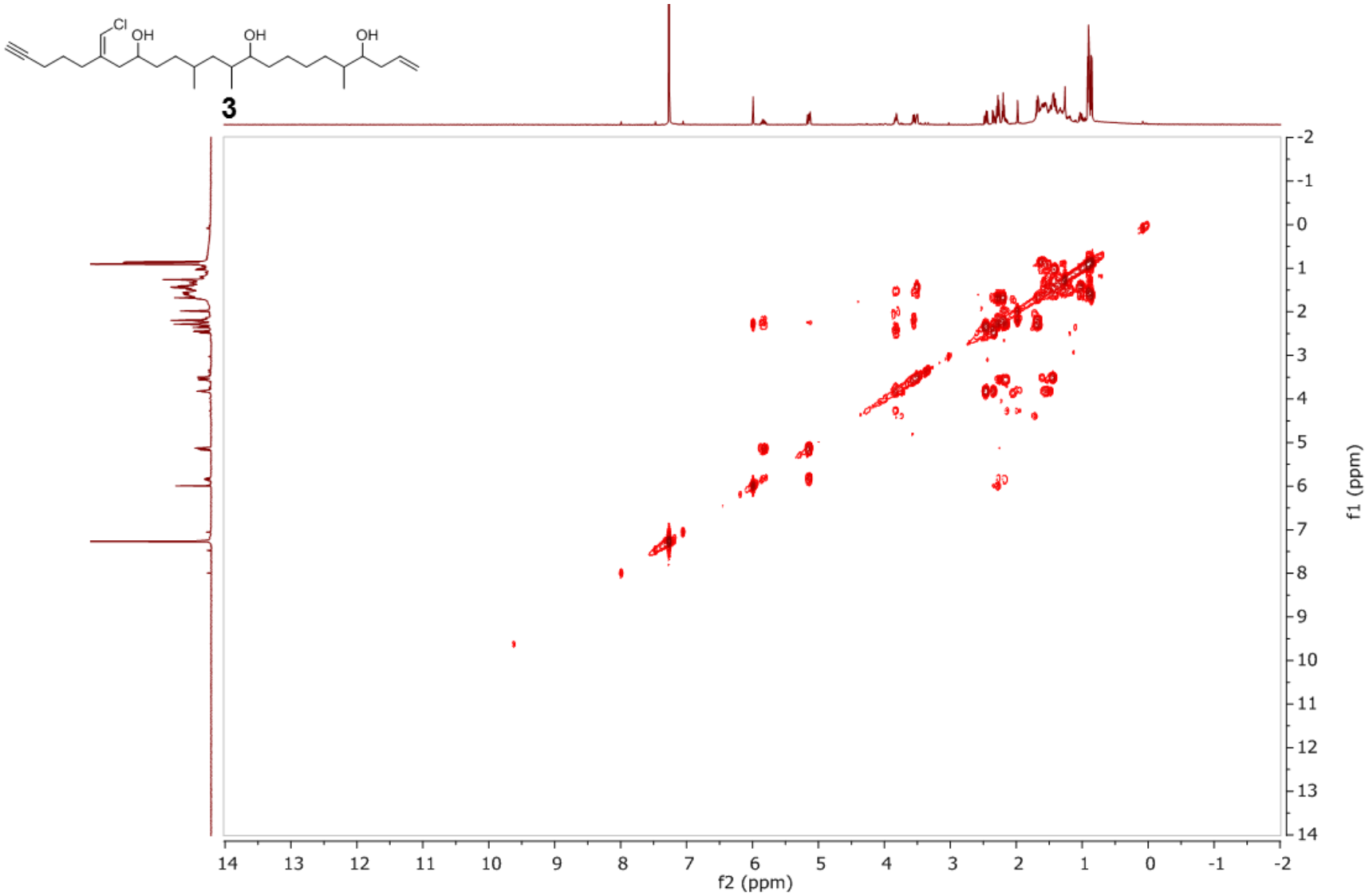

Figure S19. COSY spectrum of **3**.

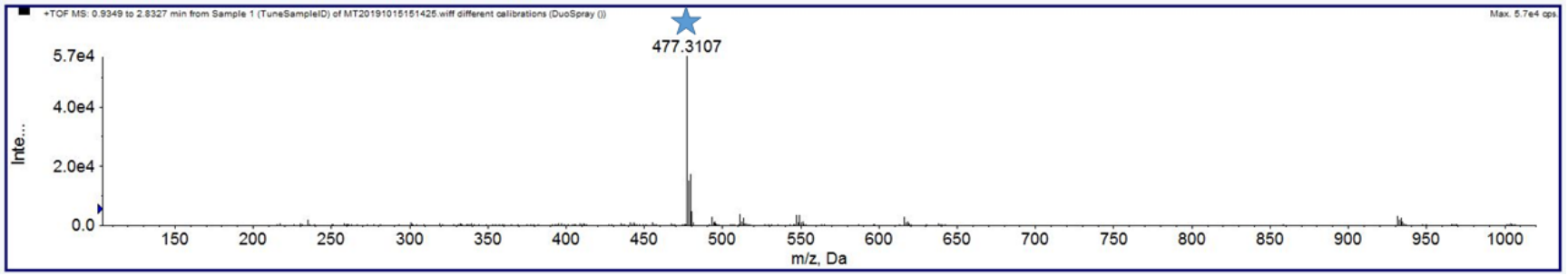

Figure S20. HRESIMS of **3**.

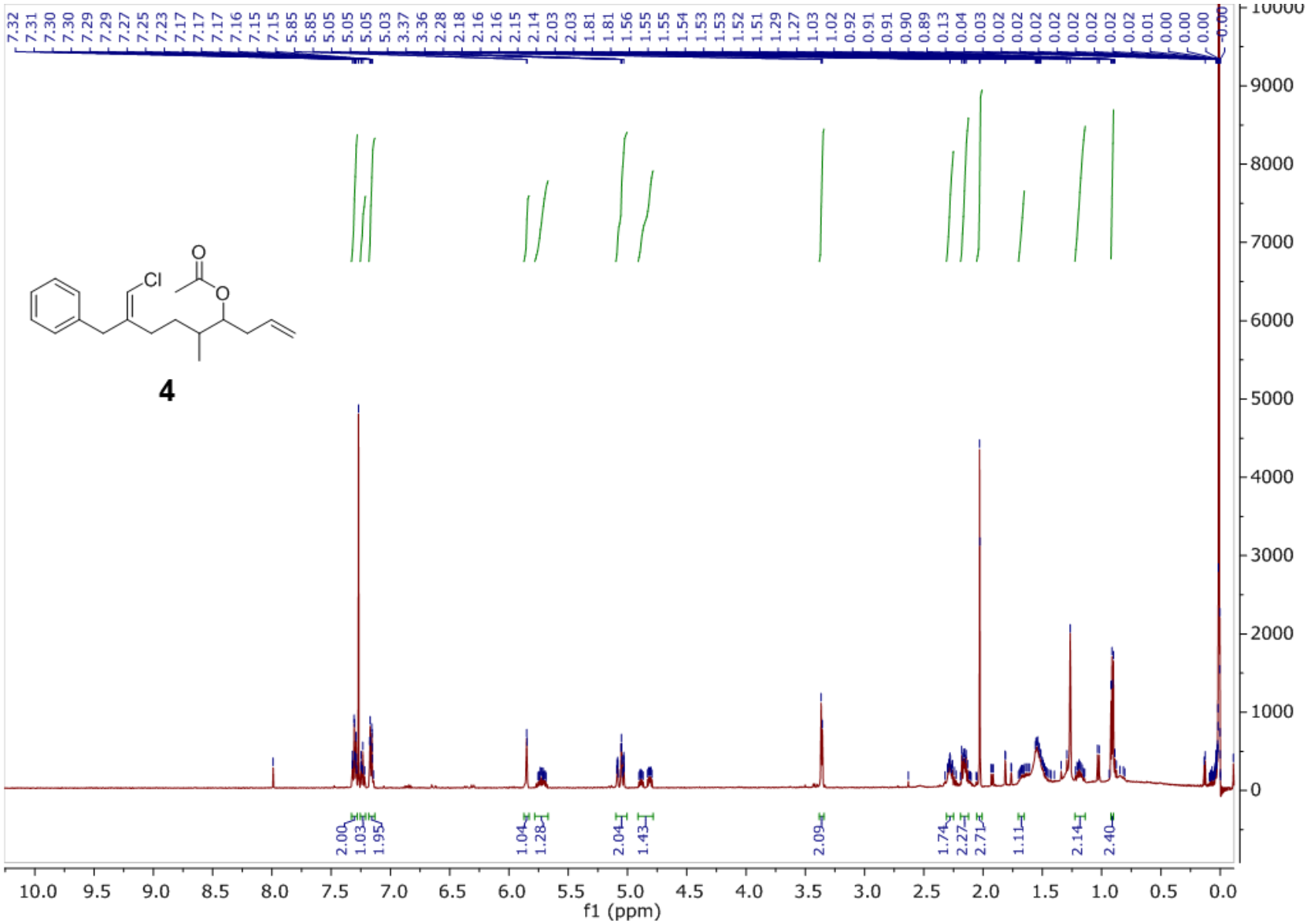

Figure S21. ^{1}H NMR of trichophycin I (**4**) (500 MHz, $CDCl_3$).

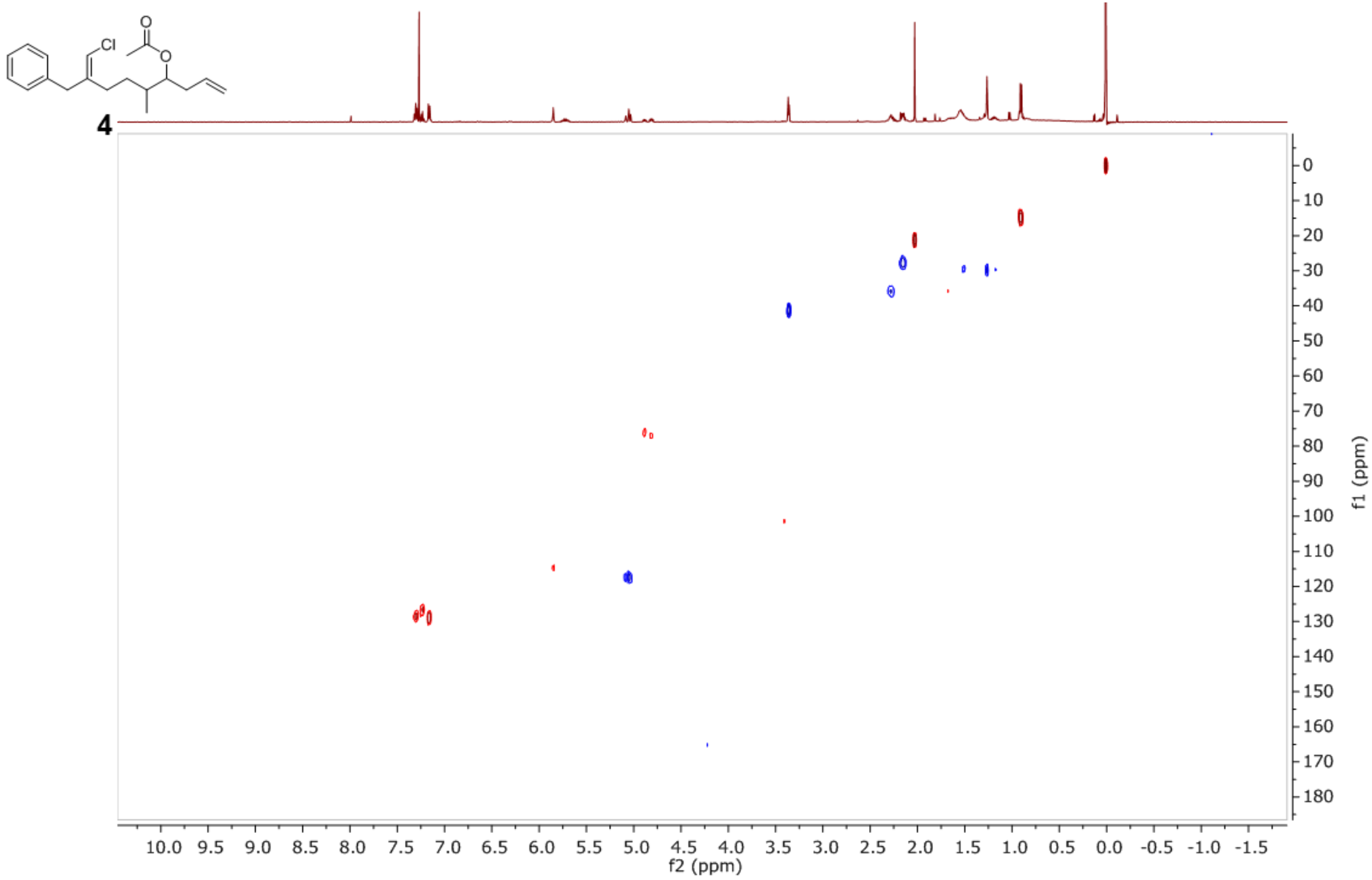

Figure S22. HSQC of **4**.

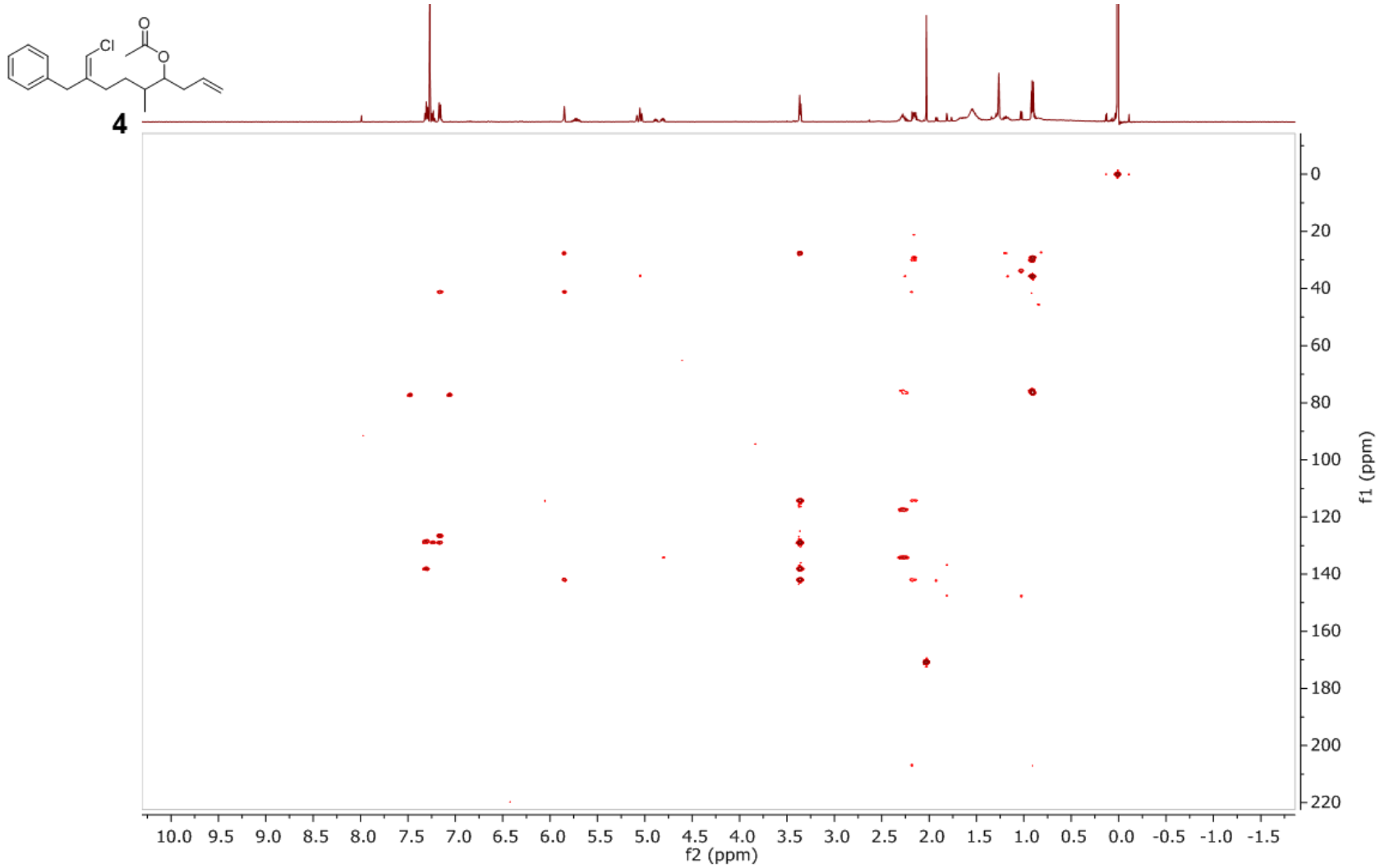

Figure S23. HMBC of **4**.

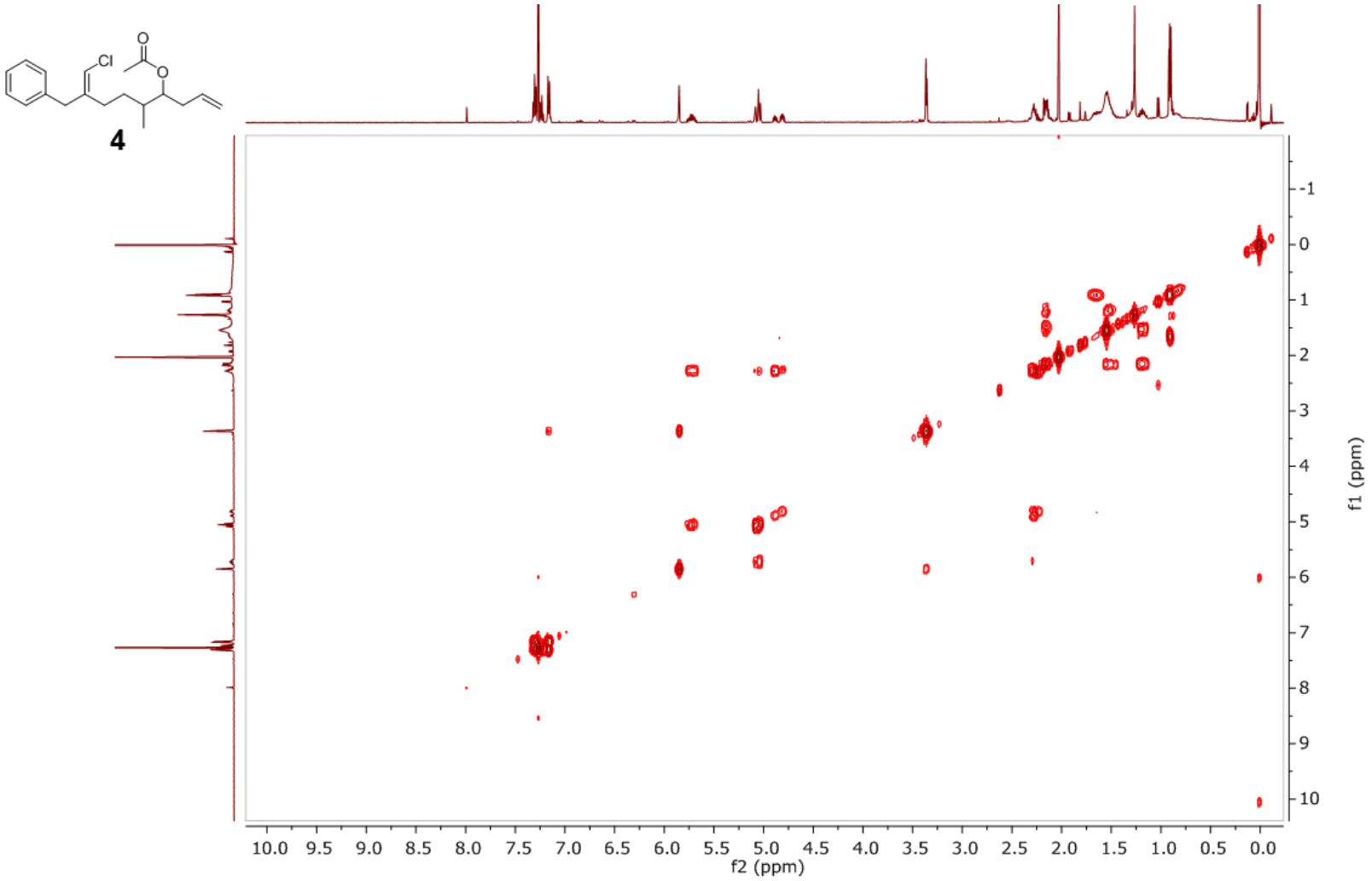

Figure S24. COSY of **4**.

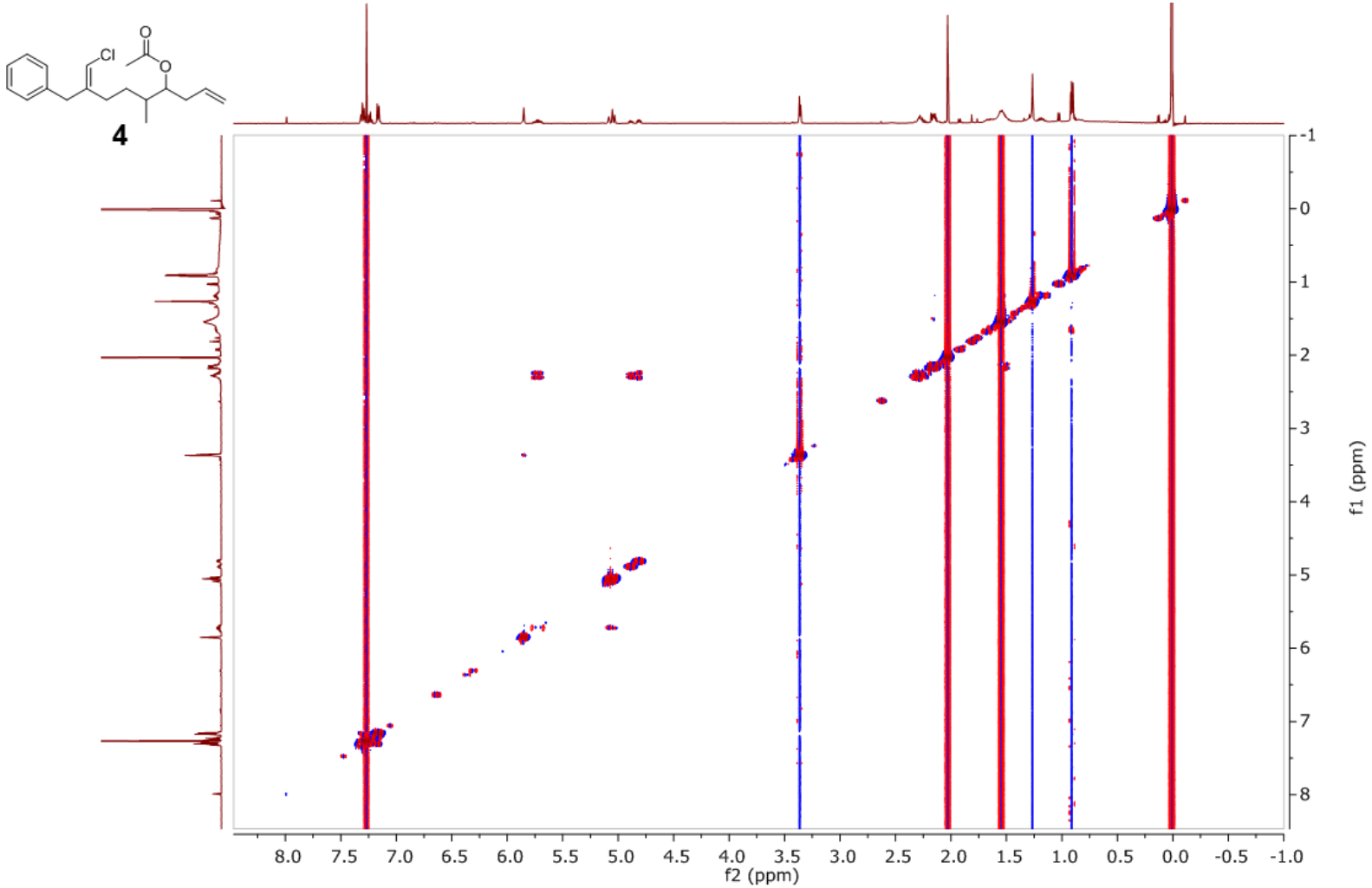

Figure S25. NOESY of **4**.

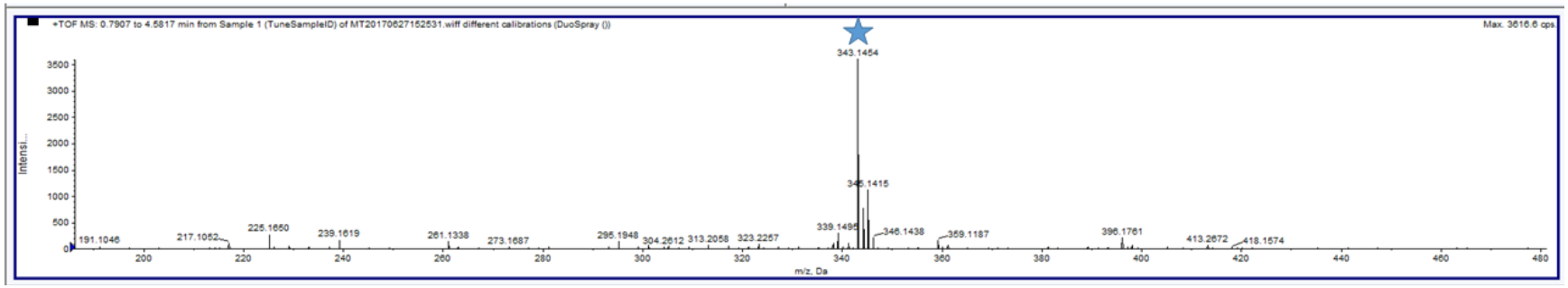

Figure S26. HRESIMS of **4**.

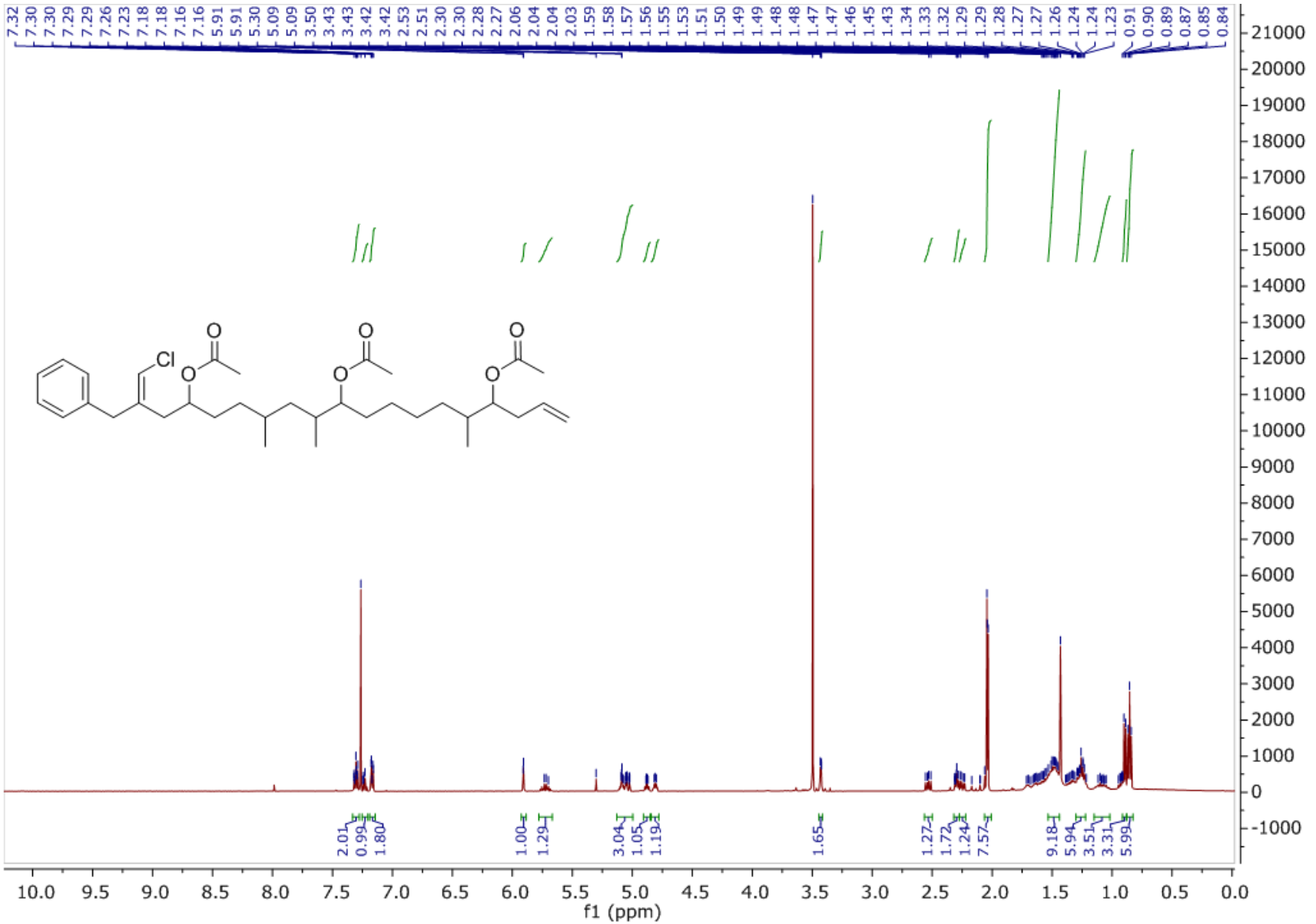

Figure S27. ^{1}H NMR of trichophycin A triacetate (500 MHz, $CDCl_3$).

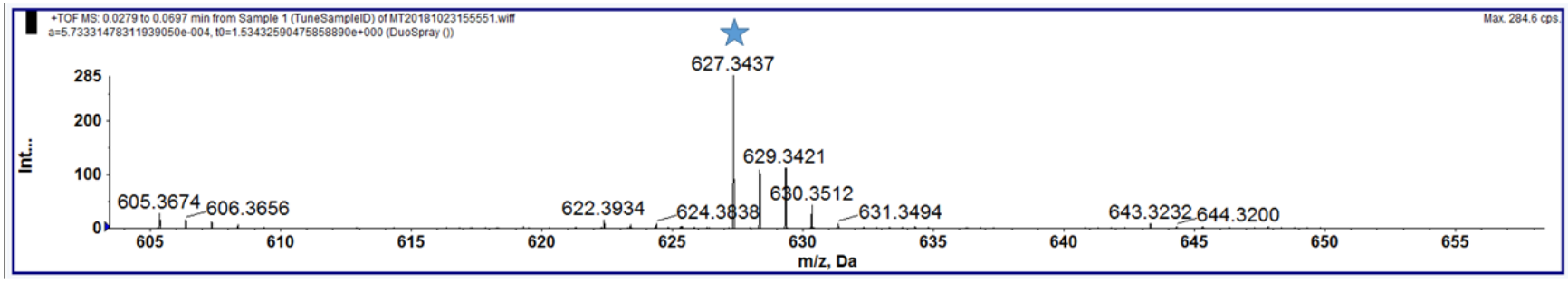

Figure S28. HRESIMS of trichophycin A triacetate.

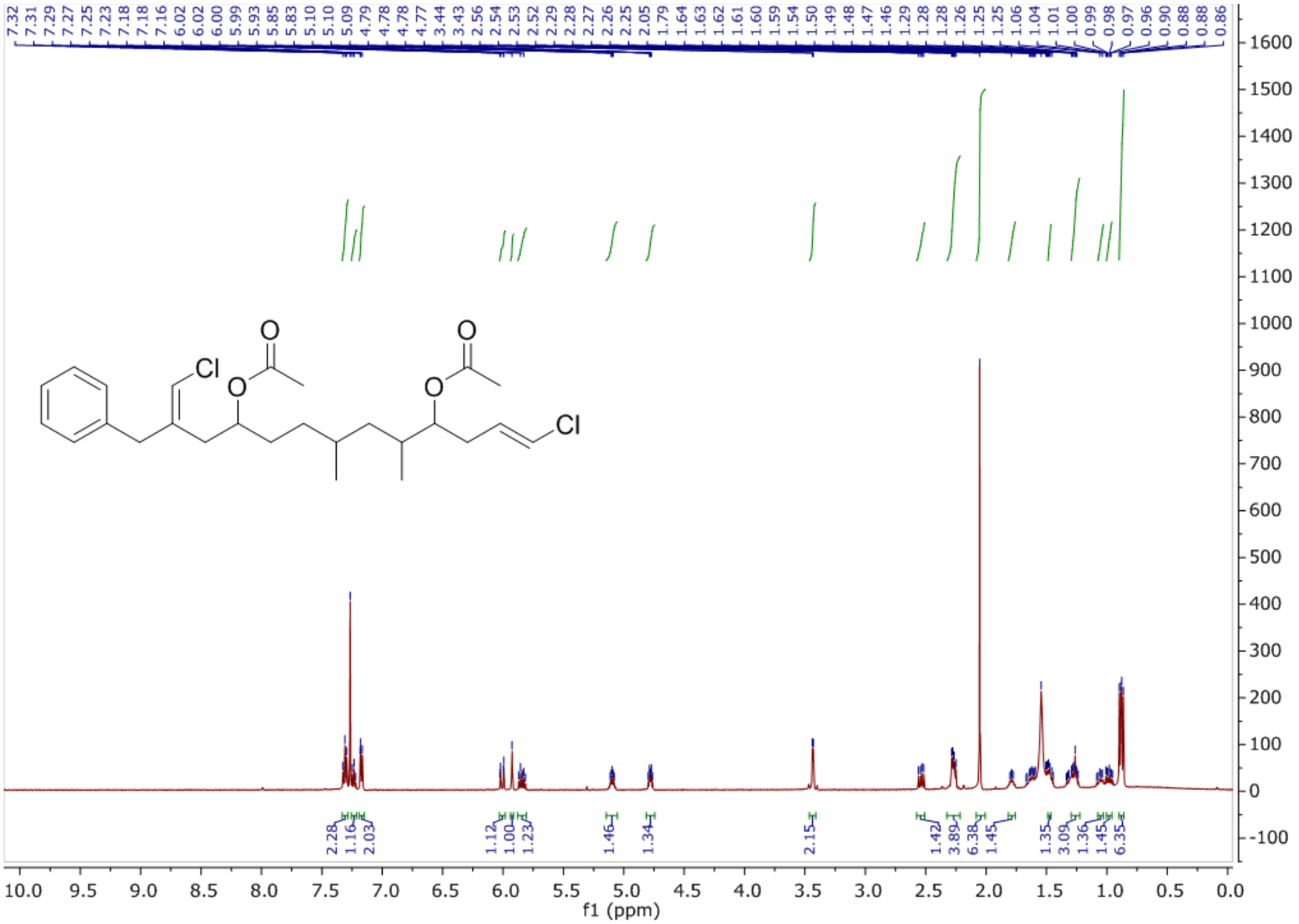

Figure S29. ^{1}H NMR of isotrichophycin C diacetate (500 MHz, $CDCl_3$).

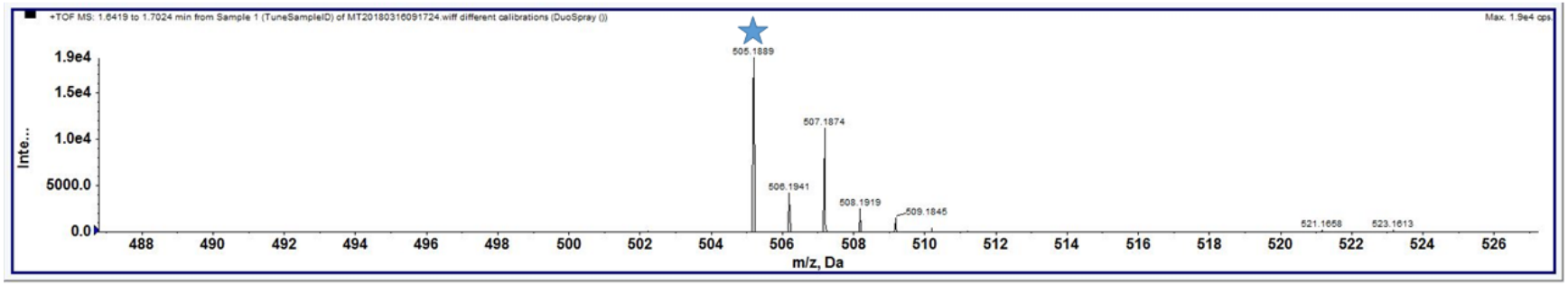

Figure S30. HRESIMS of isotrichophycin C diacetate.

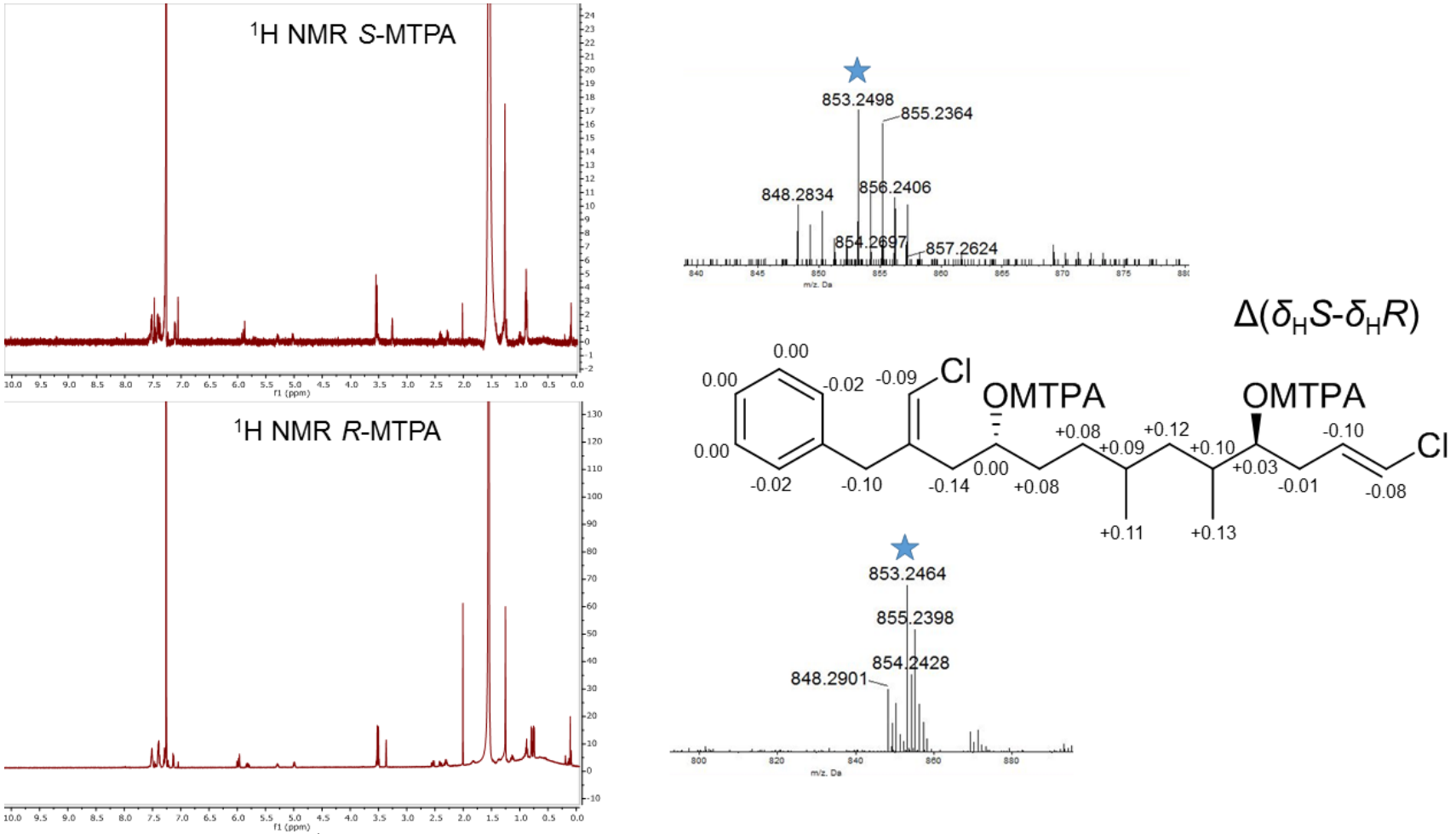

Figure S31. Comparison of ^{1}H NMR spectra of *S*-MTPA and *R*-MTPA esters of isotrichophycin C (**1**) with Δ δS-δR values noted (500 MHz, $CDCl_3$) as well as HRESIMS values.

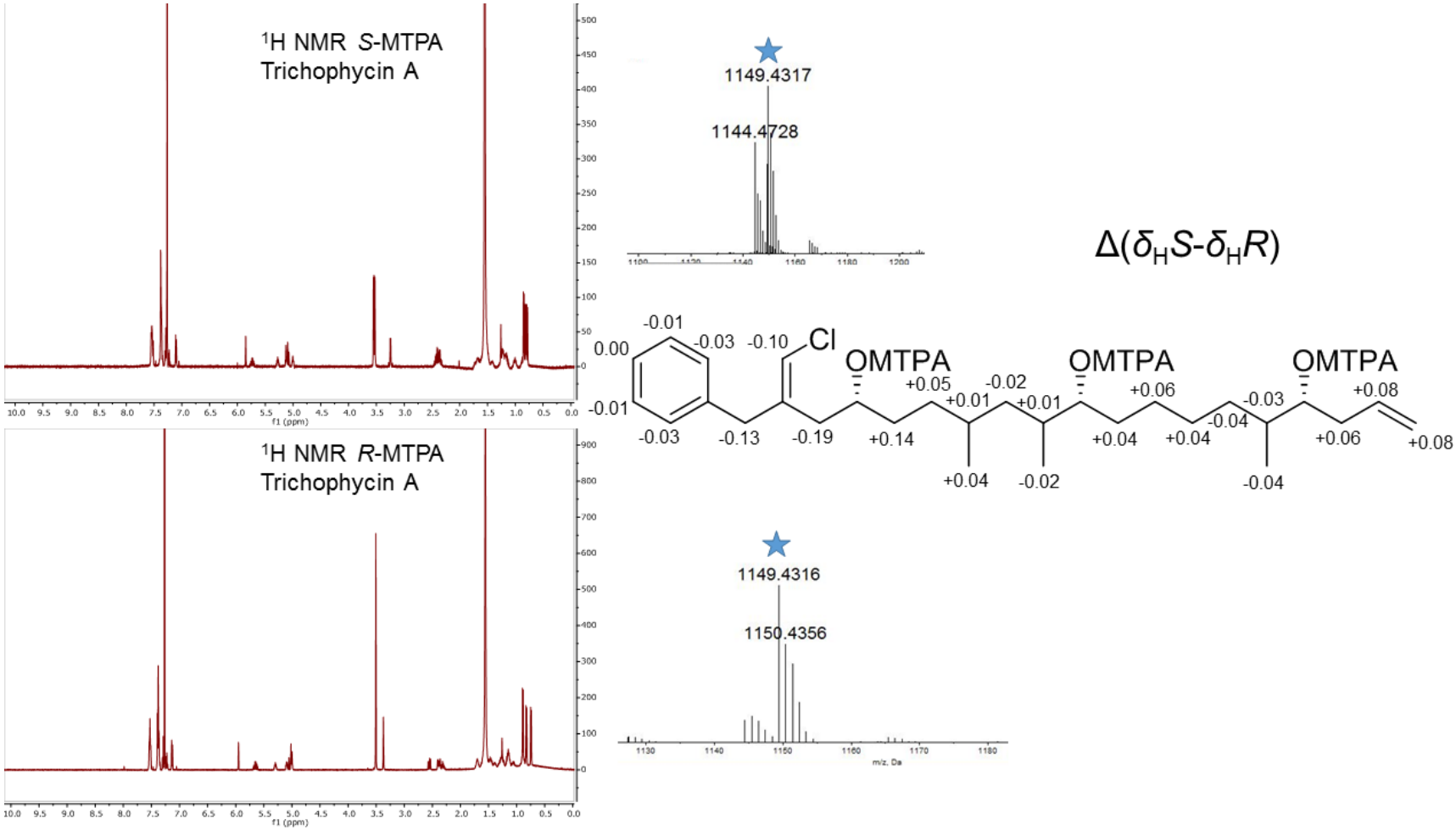

Figure S32. Comparison of ^{1}H NMR spectra of *S*-MTPA and *R*-MTPA esters of trichophycin A with partial Δ δS-δR values noted (500 MHz, $CDCl_3$) as well as HRESIMS values.

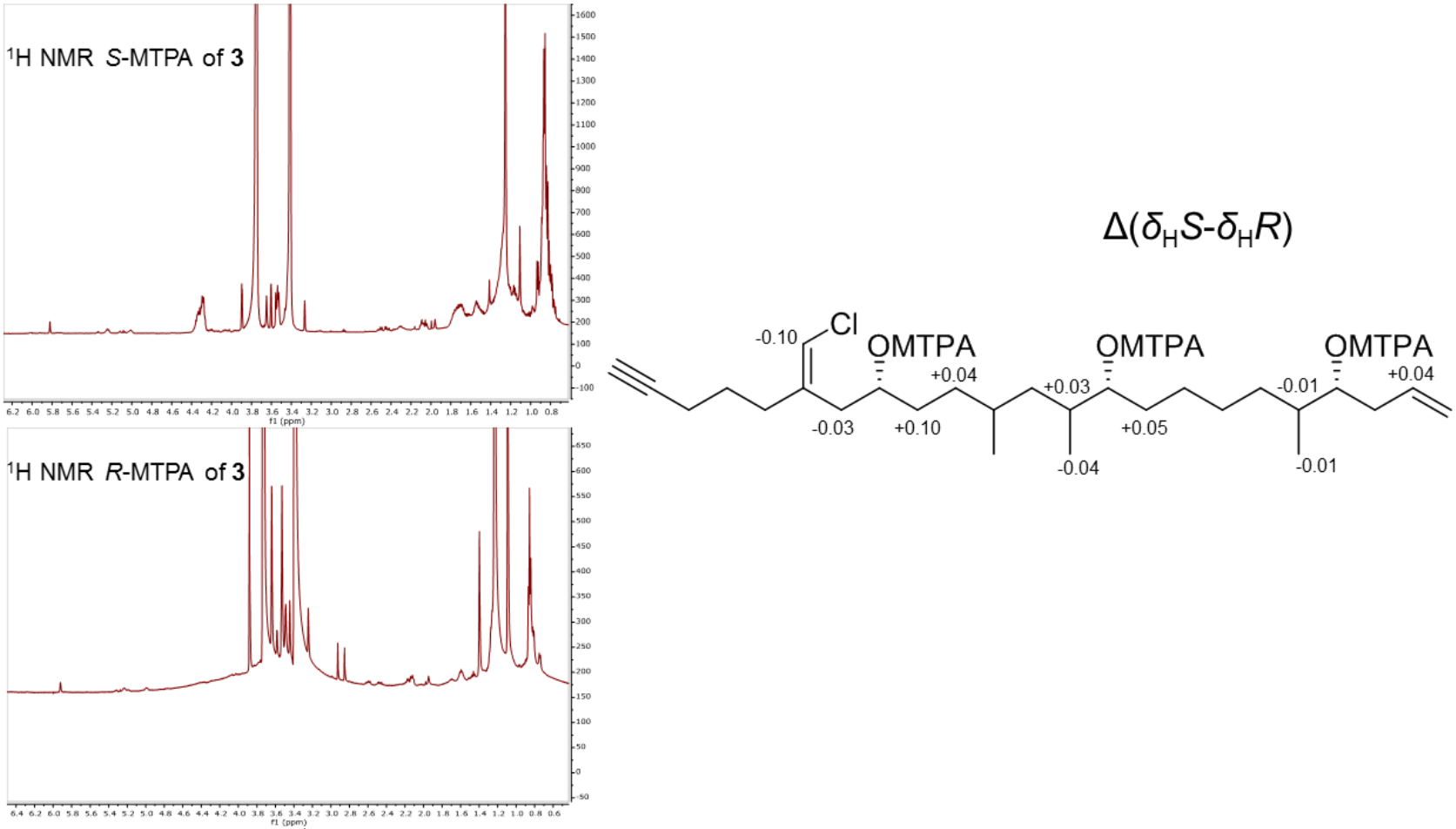

Figure S33. Comparison of ^{1}H NMR spectra of *S*-MTPA and *R*-MTPA esters of **3** with partial Δ *δS-δR* values noted (500 MHz, $CDCl_3$).

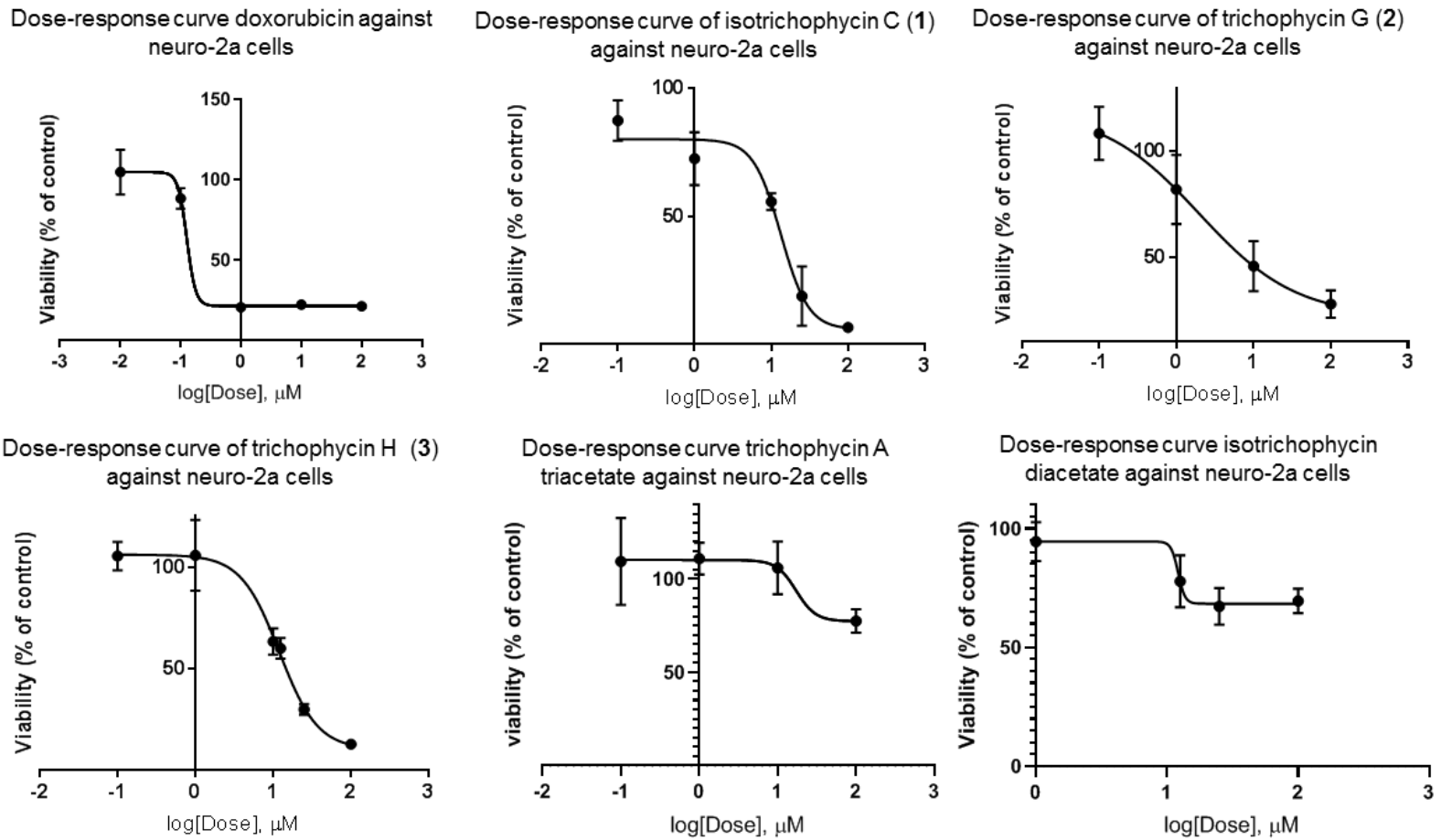

Figure S34. EC_{50} curves of doxorubicin, **1-3**, trichophycin A triacetate and isotrichophycin C diacetate.

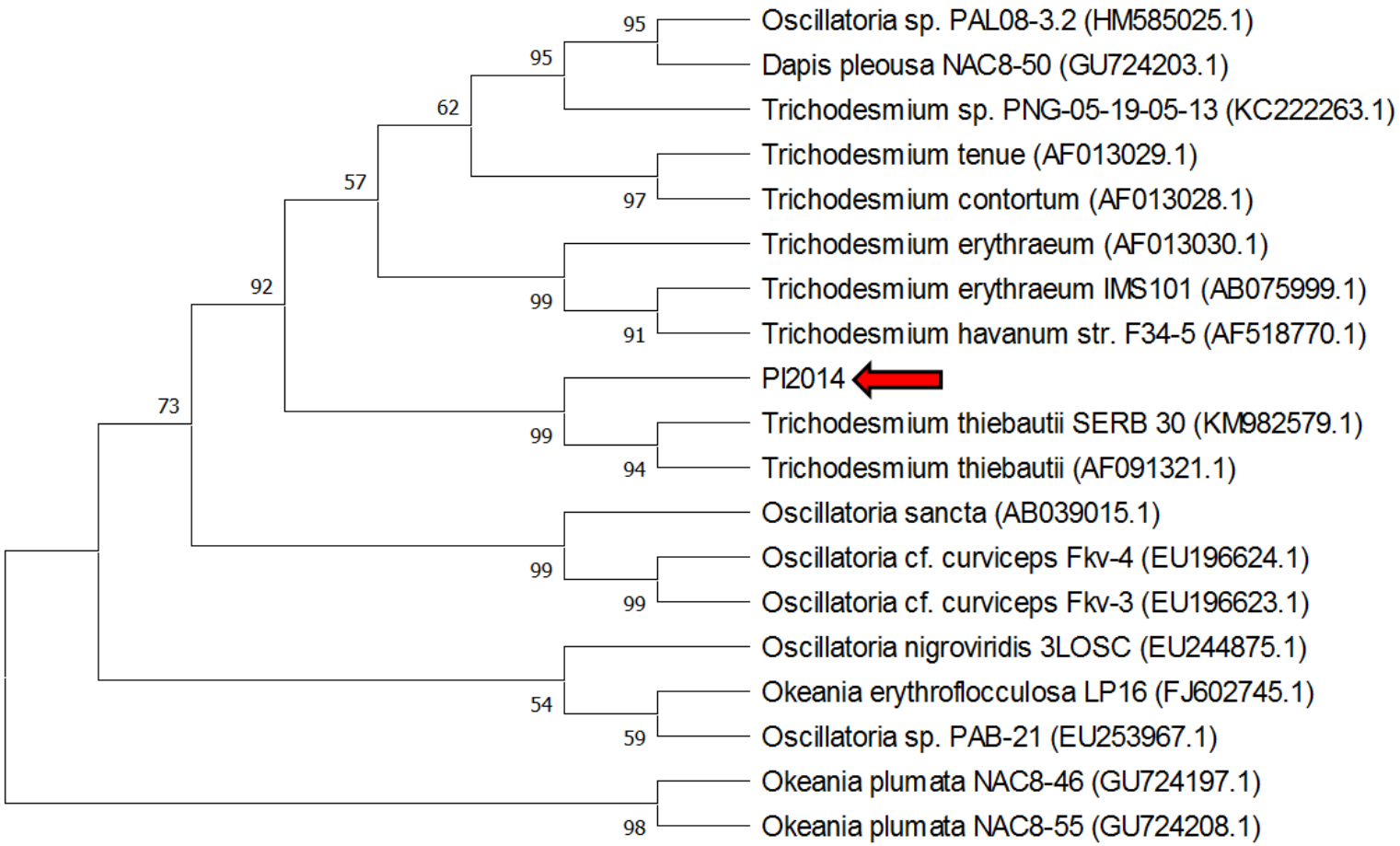

Figure S35. 16S rRNA phylogenetic tree aligning *Trichodesmium* species in this study (PI2014, red arrow) with *T. thiebautii* strains. The tree was created using the Maximum Likelihood method and the Tamura-Nei model. The bootstrap consensus tree is inferred from 1000 replicates and the percentage of replicate trees in which the associated taxa clustered together in the bootstrap test are shown next to branches. Analysis was conducted in MEGA. Genbank accession numbers of sequences are noted in parentheses.