Supporting Information

Antifungal metabolites from *Myxococcus stipitatus* GXUA 01510 for the control of sugarcane Pokkah boeng disease caused by *Fusarium sacchari*

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Table of Contents

Figure S25 ^{1}H NMR spectrum of phenalamide G (**4**) in CD_3OD (600 MHz)

Figure S26 ^{13}C NMR spectrum of phenalamide G (**4**) in CD_3OD (150 MHz)

Figure S27 HSQC spectrum of phenalamide G (**4**) in CD_3OD

Figure S28 HMBC spectrum of phenalamide G (**4**) in CD_3OD

Figure S29 ^{1}H-^{1}H COSY spectrum of phenalamide G (**4**) in CD_3OD

Figure S30 NOESY spectrum of phenalamide G (**4**) in CD_3OD

Figure S31 IR spectrum of phenalamide G (**4**)

Figure S32. HPLC purity chromatograms of the isolated new compounds and potent active.

Table S1. ^{1}H NMR and ^{13}C NMR data of compounds **1** (in $CDCl_3$), **3** and phenalamide A$_2$[1] (in CD_3OD).

Position	**1**			**3**			**phenalamide A$_2$**	
	δ_C	δ_H (J in Hz)	Position	δ_C	δ_H (J in Hz)	Position	δ_C	δ_H (J in Hz)
*	—	—	1	171.8	—	1	171.8	—
*	—	—	2	131.3	—	2	130.6	—
*	—	—	3	135.0	6.93, d (9.4)	3	135.2	6.96, d (9.1)
*	—	—	4	139.4	6.56-6.59, m	4	128.4	6.58, m
*	—	—	5	128.9	6.60, d (14.7)	5	139.9	6.58, m
*	—	—	6	129.0	6.39, d (14.7)	6	127.6	6.40, m
*	—	—	7	133.3	6.41-6.45, m	7	127.7	6.29, m
*	—	—	8	136.5	6.41-6.45, m	8	137.8	6.40, m
1	195.4	9.43, s	9	142.1	5.97, d (14.7)	9	141.0	6.40, m
2	139.7	—	10	83.7	—	10	135.4	—
3	157.1	6.46, dd (9.6, 1.4)	11	85.1	3.66, d (9.4)	11	138.9	5.61, d (9.5)
4	37.2	2.85-2.94, m	12	43.7	2.00-2.04, m	12	37.8	2.82, qdd (6.8, 9.7, 6.6)
5	81.9	3.86, d (8.0)	13	89.4	3.86, d (9.8)	13	82.6	3.84, d (6.6)
6	133.9	—	14	133.6	—	14	136.3	—
7	135.4	5.24, d (9.6)	15	137.0	5.31, d (9.3)	15	134.1	5.27, d (9.4)
8	31.7	2.38-2.47, m	16	33.0	2.43-2.50, m	16	32.8	2.45, m
9	38.9	1.53-1.70, m	17a	40.5	1.54-1.60, m	17a	40.8	1.55, m
			17b		1.65-1.72, m	17b		1.67, m
10	33.9	2.52-2.62, m	18a	34.8	2.64-2.69, m	18a	34.9	2.64, m
			18b		2.54-2.61, m	18b		2.53, m
11	142.5	—	19	143.9	—	19	144.0	—
12	128.4	7.12-7.19, m	20	129.4	7.19, d (7.2)	20	129.4	7.16, d (6.8)
13	128.3	7.23-7.29, m	21	129.3	7.23-7.28, m	21	129.2	7.24, t (7.5)
14	125.7	7.12-7.19, m	22	126.6	7.15, t (7.2)	22	126.5	7.14, t (7.1)
15	128.3	7.23-7.29, m	23	129.3	7.23-7.28, m	23	129.2	7.24, t (7.5)
16	128.4	7.12-7.19, m	24	129.4	7.19, d (7.2)	24	129.4	7.16, d (6.8)
2-Me	9.6	1.79, d (1.4)	2-Me	13.1	1.99, s	2-Me	13.1	2.01, d (1.0)
4-Me	16.6	0.95, d (6.8)	10-Me	22.3	1.29, s	10-Me	12.9	1.84, s
6-Me	11.5	1.60, d (1.4)	12-Me	13.9	0.99, d (6.5)	12-Me	18.3	0.97, d (6.8)
8-Me	21.0	0.98, d (6.8)	14-Me	11.3	1.63, s	14-Me	12.6	1.61, d (1.0)
*	—	—	16-Me	21.4	0.98, d (6.5)	16-Me	21.5	1.00, d (6.6)
*	—	—	1'-Me	17.1	1.19, d (6.8)	1'-Me	17.1	1.22, d (6.7)
*	—	—	1'	49.8	4.04-4.09, m	1'		4.1, qdd (6.7, 5.5, 11.0)
*	—	—	2'	66.1	3.50-3.58, m	2'	66.1	3.56, ddd (5.5, 11.0, 16.5)

1. W. Trowitzsch-Kienast, E. Forche, V. Wray, H. Reichenbach, E. Jurkiewicz, G. Hunsmann and G. Höfle, *Liebigs Ann. Chem.*, 2006, **1992**, 659-664.

'*' represents that the space left out corresponds to other similar signals of another compound.

^{1}H NMR (500 MHz) and ^{13}C NMR (125 MHz) for compound 1; ^{1}H NMR (600 MHz) and ^{13}C NMR (150 MHz) for compound 3 and phenalamide A2.

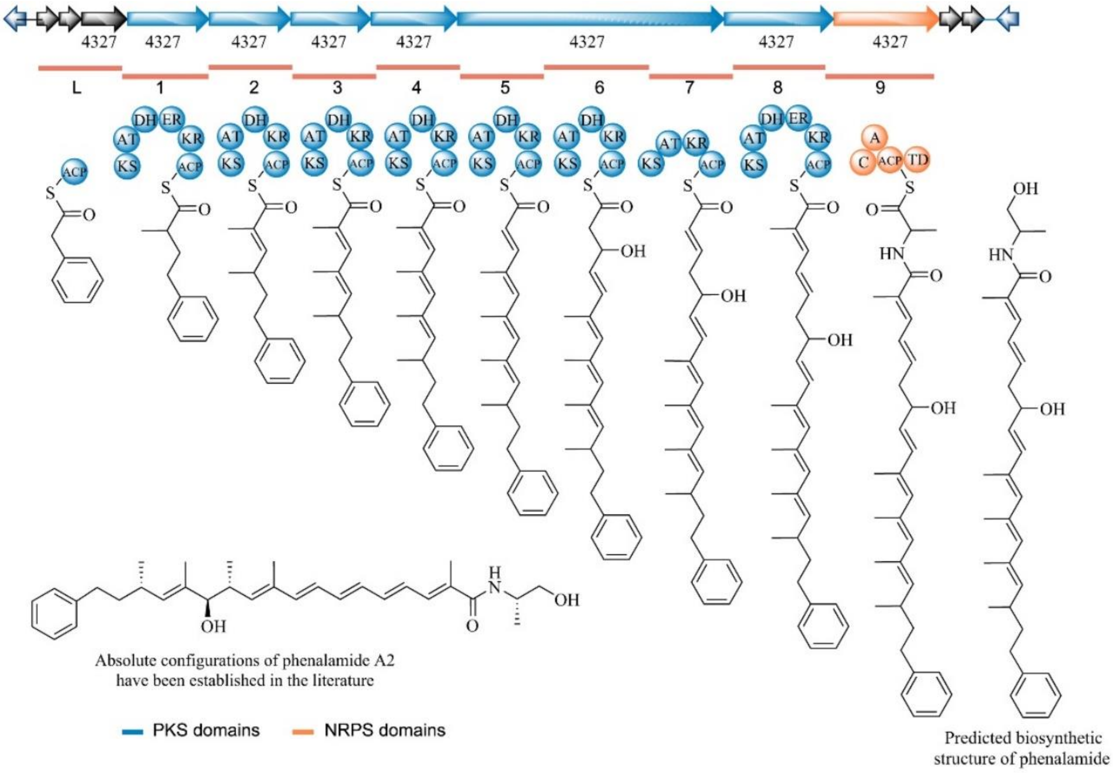
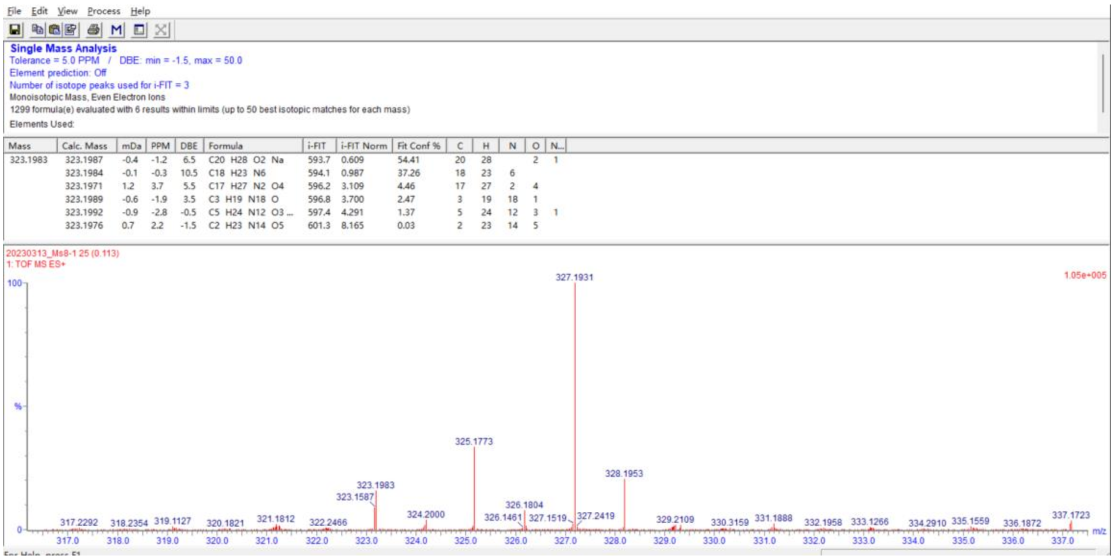


Figure S1 Predicted biosynthetic structure of phenalamide [2].

2. S. Park, H. Hyun, J. S. Lee and K. Cho, *J. Microbiol. Biotechnol.*, 2016, **26**, 1636-1642.



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
1299 formula(e) evaluated with 6 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:

Mass	Calc. Mass	mDa	PPM	DBE	Formula	i-FIT	i-FIT Norm	Fit Conf %	C	H	N	O	N...
323.1983	323.1987	-0.4	-1.2	6.5	C20 H28 O2 Na	593.7	0.609	54.41	20	28		2	1
	323.1984	-0.1	-0.3	10.5	C18 H23 N6	594.1	0.987	37.26	18	23	6		
	323.1971	1.2	3.7	5.5	C17 H27 N2 O4	596.2	3.109	4.46	17	27	2	4	
	323.1989	-0.6	-1.9	3.5	C3 H19 N18 O	596.8	3.700	2.47	3	19	18	1	
	323.1992	-0.9	-2.8	-0.5	C5 H24 N12 O3 ...	597.4	4.291	1.37	5	24	12	3	1
	323.1976	0.7	2.2	-1.5	C2 H23 N14 O5	601.3	8.165	0.03	2	23	14	5	

Figure S2 HRESI-MS spectrum of phenalamide D (**1**).

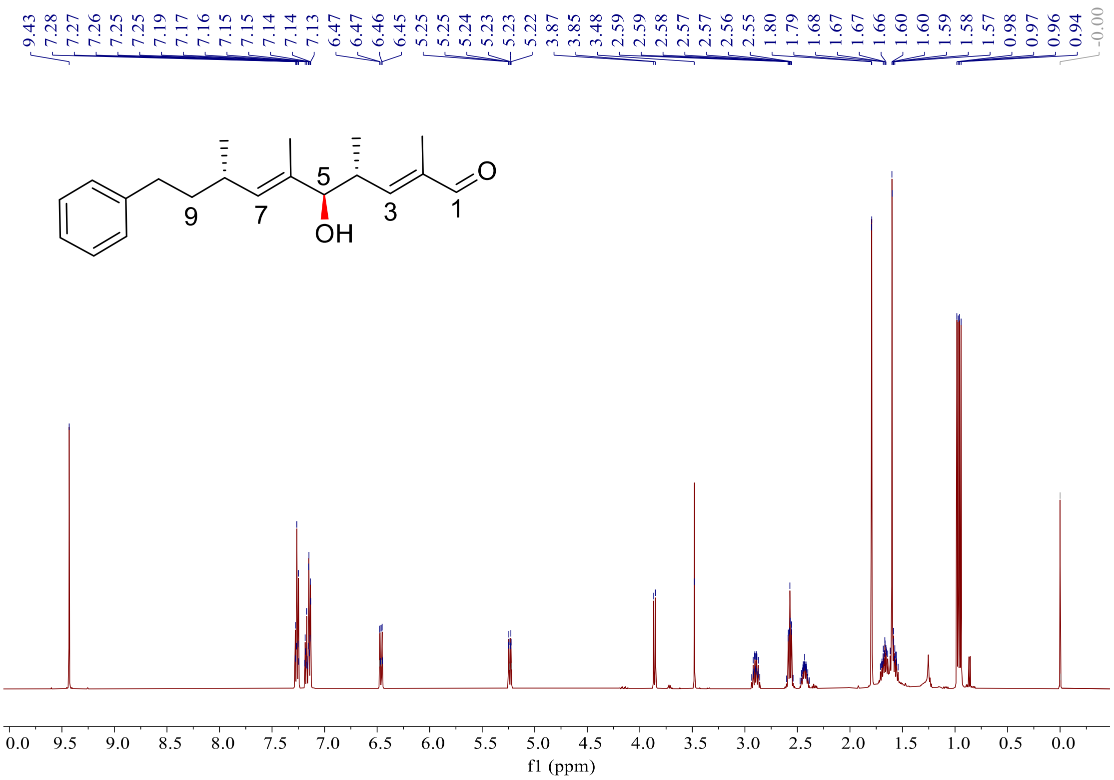


Figure S3 ^{1}H NMR spectrum of phenalamide D (**1**) in $CDCl_3$ (500 MHz).

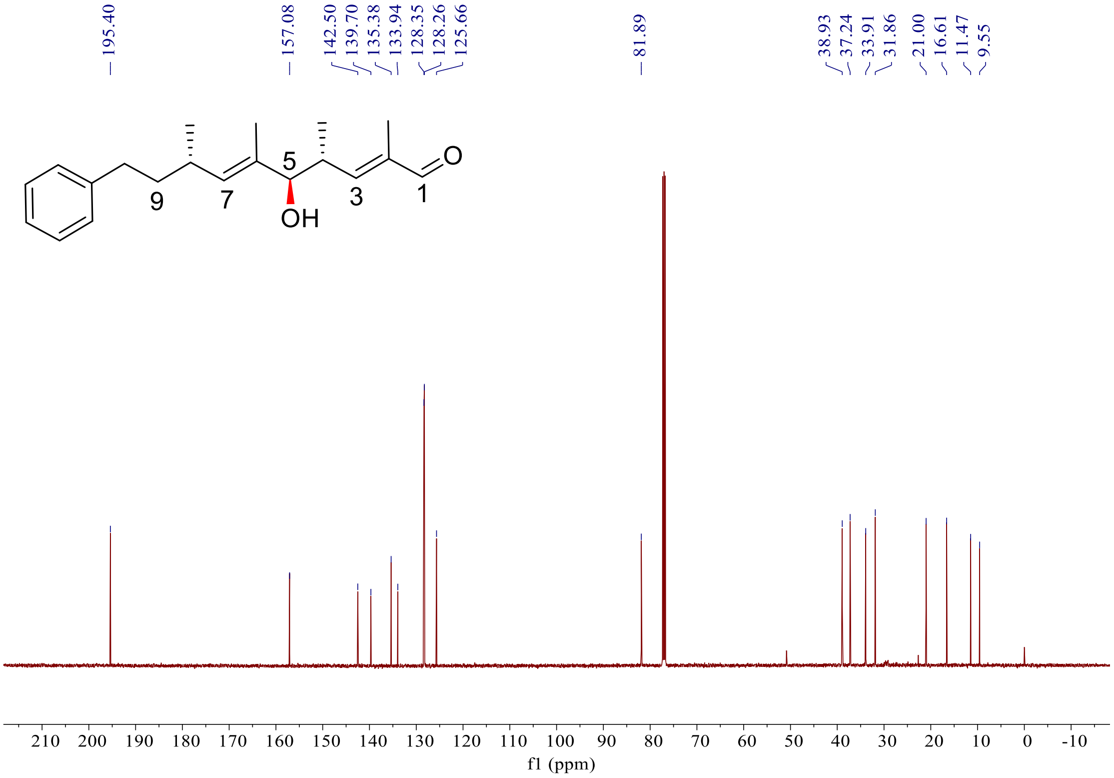


Figure S4 ^{13}C NMR spectrum of phenalamide D (**1**) in $CDCl_3$ (125 MHz).

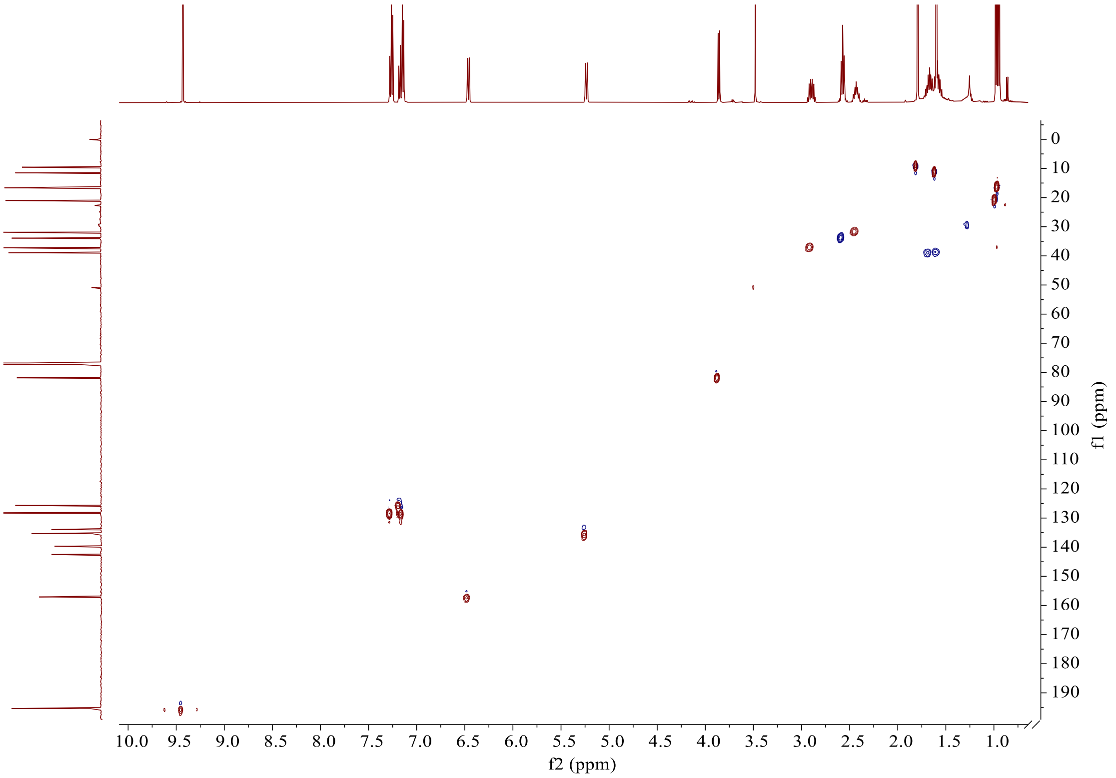


Figure S5 HSQC spectrum of phenalamide D (**1**) in CDCl$_3$.

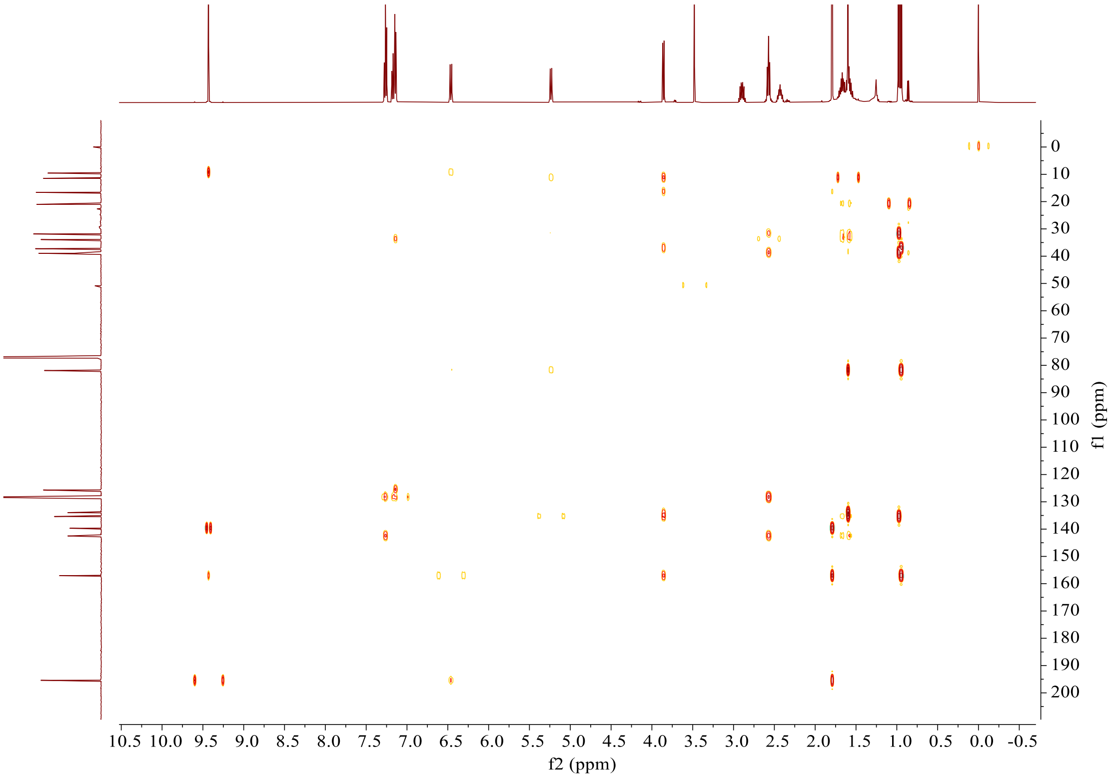


Figure S6 HMBC spectrum of phenalamide D (**1**) in CDCl$_3$.

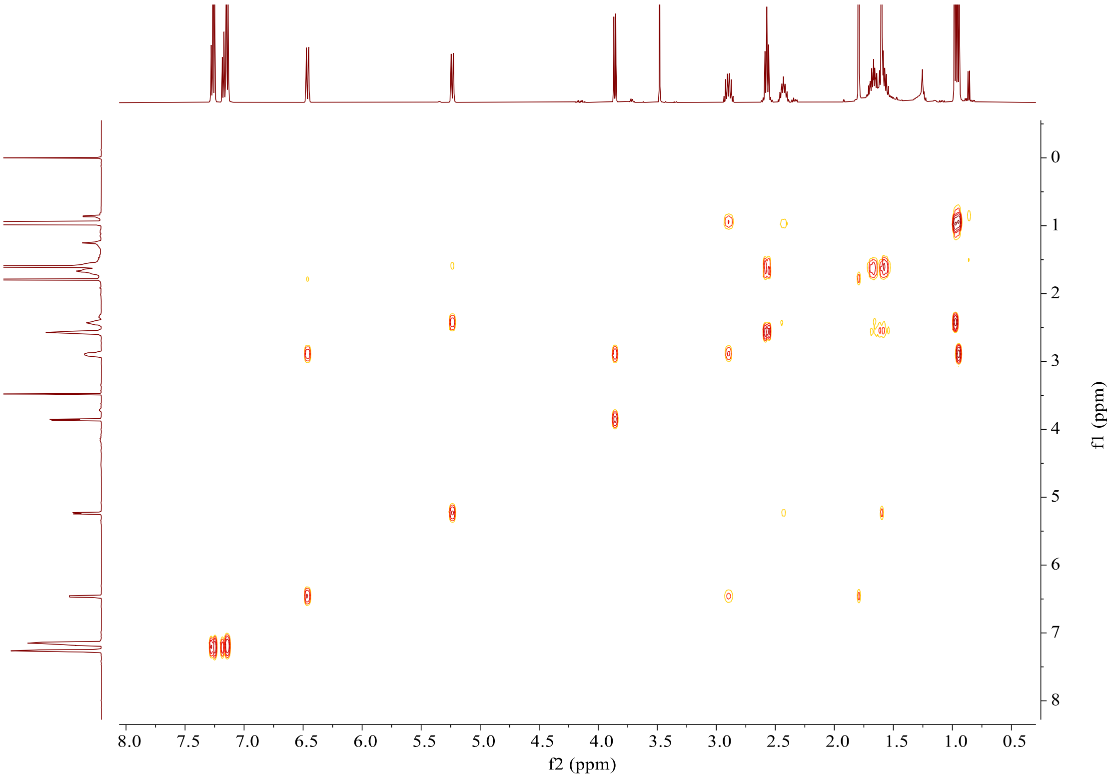


Figure S7 ^{1}H-^{1}H COSY spectrum of phenalamide D (**1**) in CDCl$_3$.

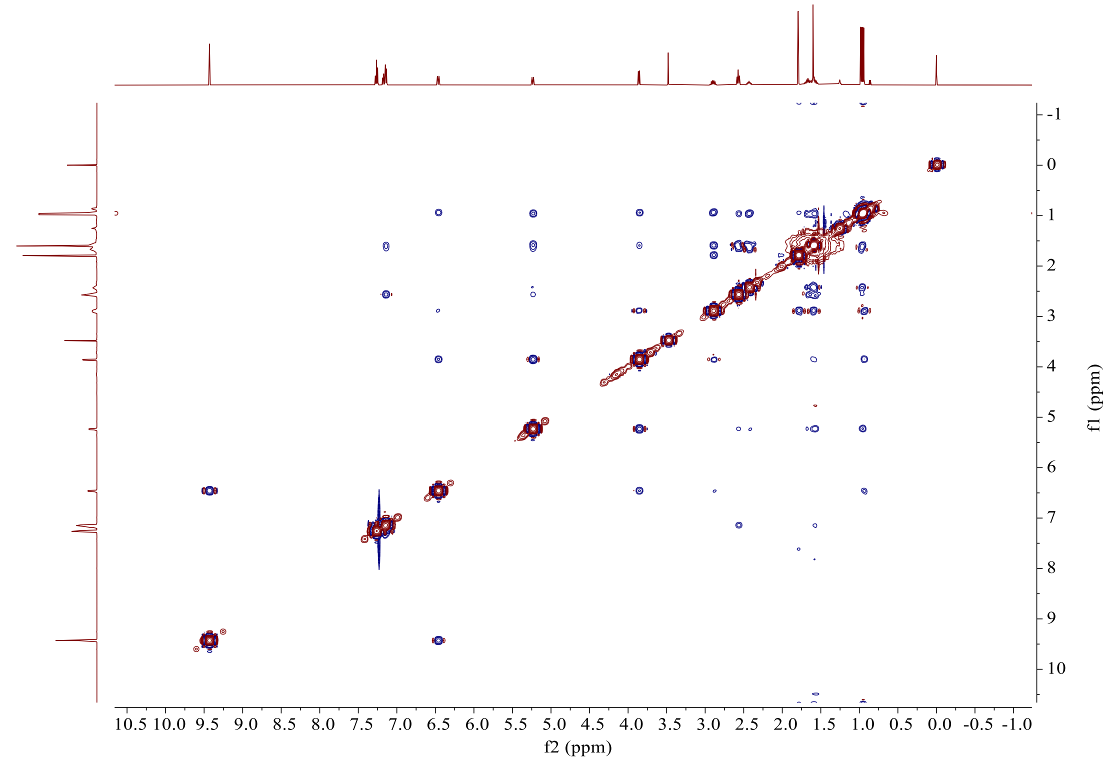


Figure S8 NOESY spectrum of phenalamide D (**1**) in CDCl$_3$.

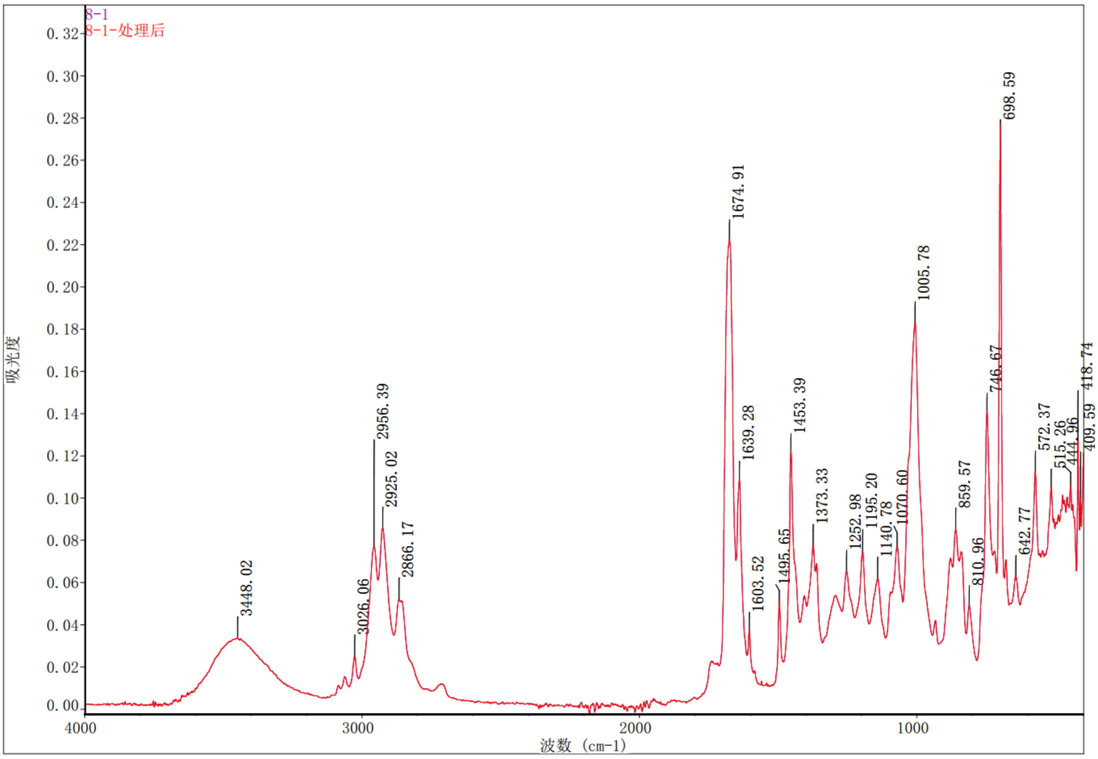
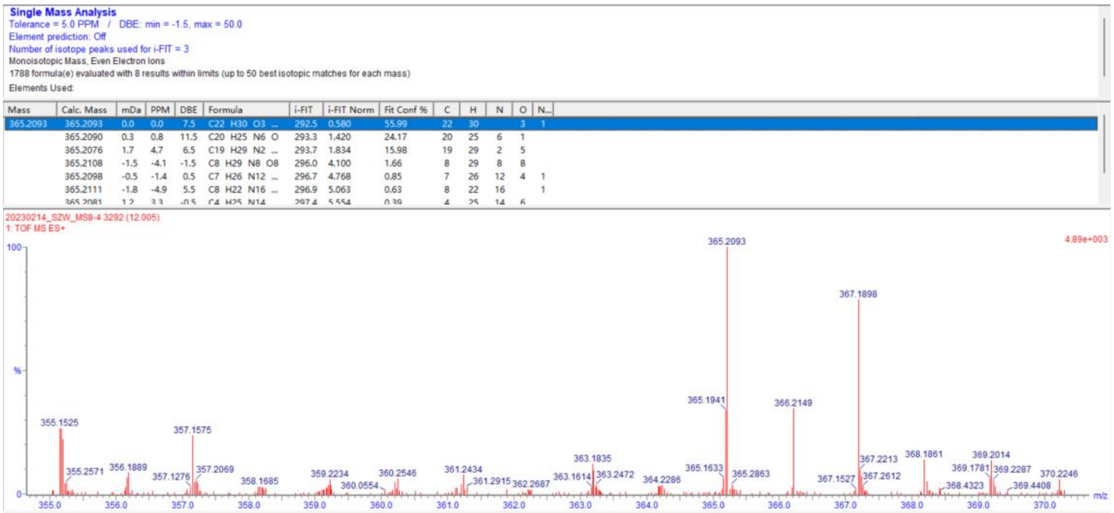


Figure S9 IR spectrum of phenalamide D (**1**).



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
1788 formula(e) evaluated with 8 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:

Mass	Calc. Mass	mDa	PPM	DBE	Formula	i-FIT	i-FIT Norm	Fit Conf %	C	H	N	O	N...
365.2093	365.2093	0.0	0.0	7.5	C22 H30 O3 ...	292.5	0.580	55.99	22	30		3	1
	365.2090	0.3	0.8	11.5	C20 H25 N6 O	293.3	1.420	24.17	20	25	6	1	
	365.2076	1.7	4.7	6.5	C19 H29 N2 ...	293.7	1.834	15.98	19	29	2	5	
	365.2108	-1.5	-4.1	-1.5	C8 H29 N8 O8	296.0	4.100	1.66	8	29	8	8	
	365.2098	-0.5	-1.4	0.5	C7 H26 N12 ...	296.7	4.768	0.85	7	26	12	4	1
	365.2111	-1.8	-4.9	5.5	C8 H22 N16 ...	296.9	5.063	0.63	8	22	16		1
	365.2081	1.2	3.3	-0.5	C4 H25 N14	297.4	5.554	0.39	4	25	14	6	

20230214_SZW_MS8-4 3292 (12.005)
1: TOF MS ES+

Figure S10 HRESI-MS spectrum of phenalamide E (**2**).

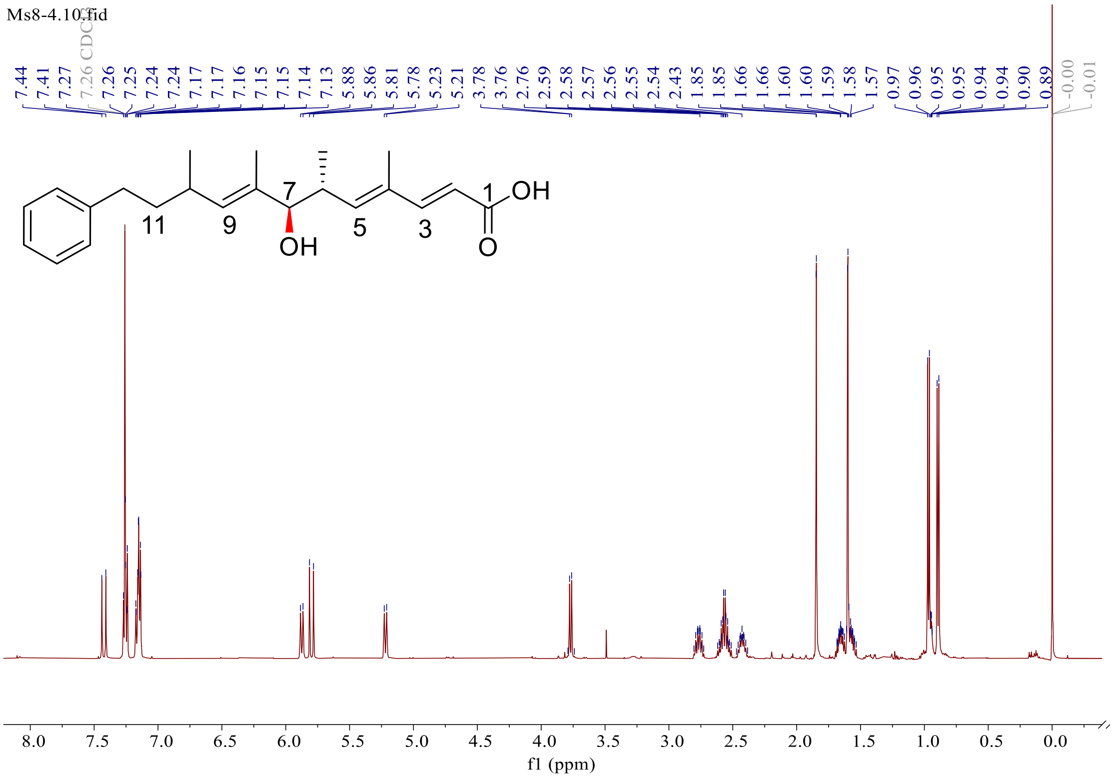


Figure S11 ^{1}H NMR spectrum of phenalamide E (**2**) in $CDCl_3$ (500 MHz).

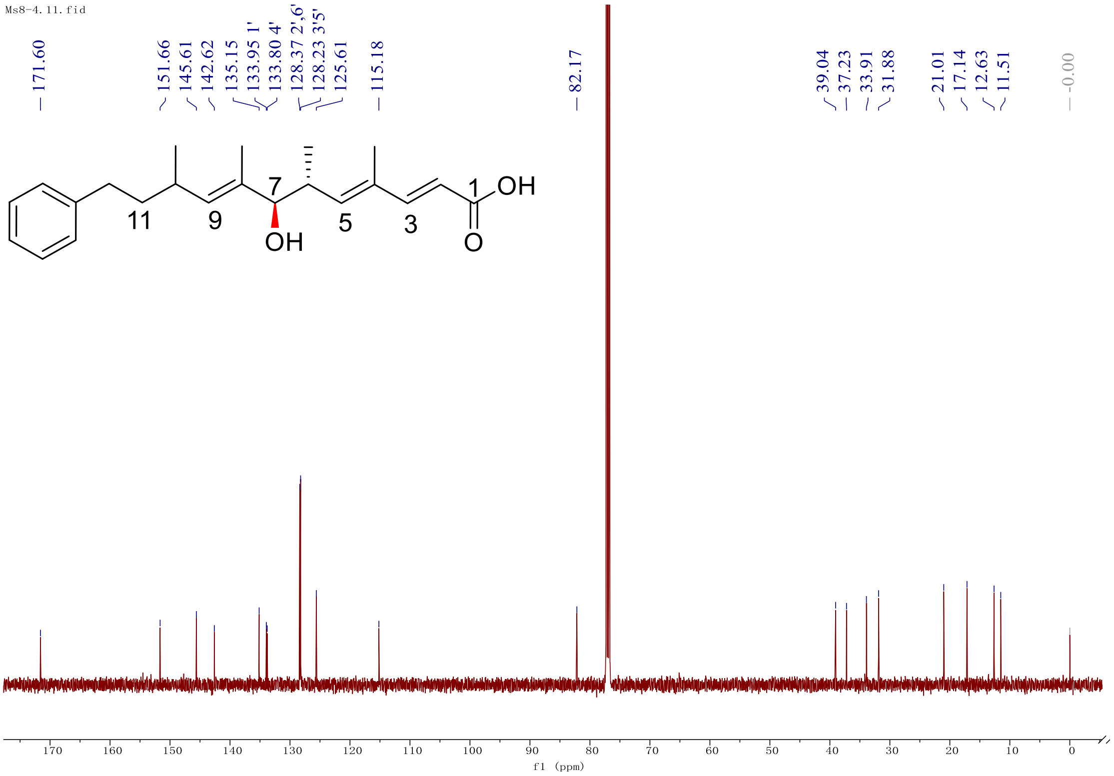


Figure S12 ^{13}C NMR spectrum of phenalamide E (**2**) in $CDCl_3$ (125 MHz).

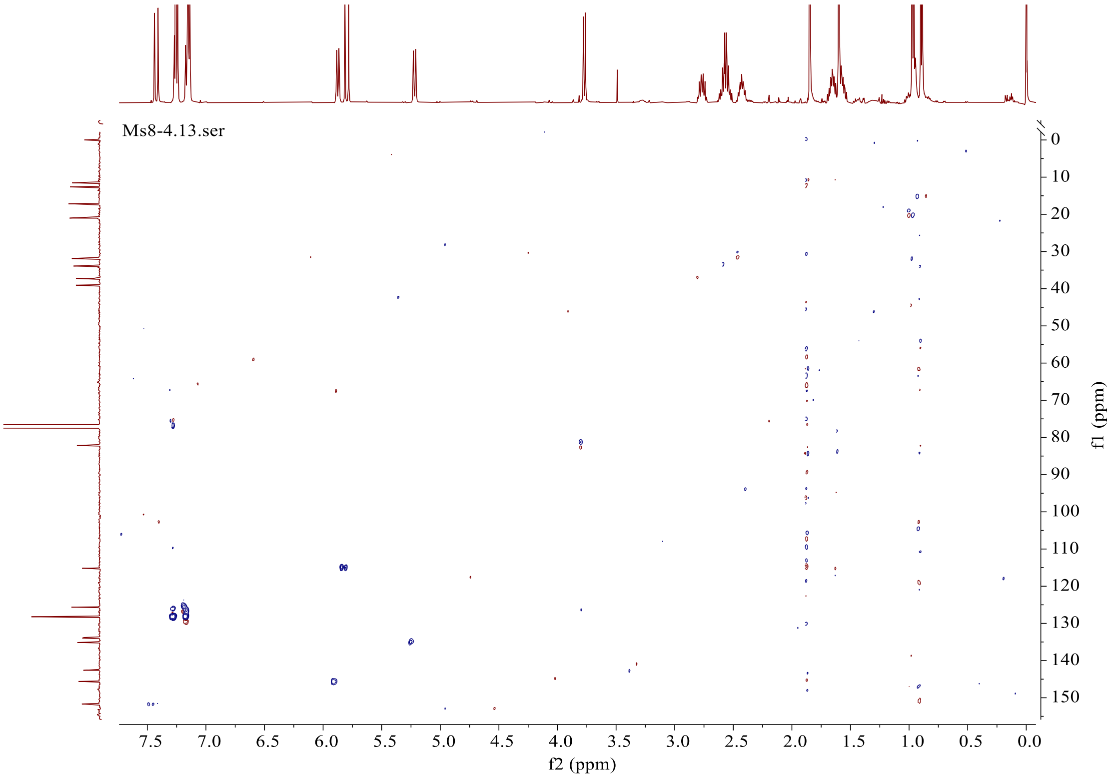


Figure S13 HSQC spectrum of phenalamide E (**2**) in $CDCl_3$.

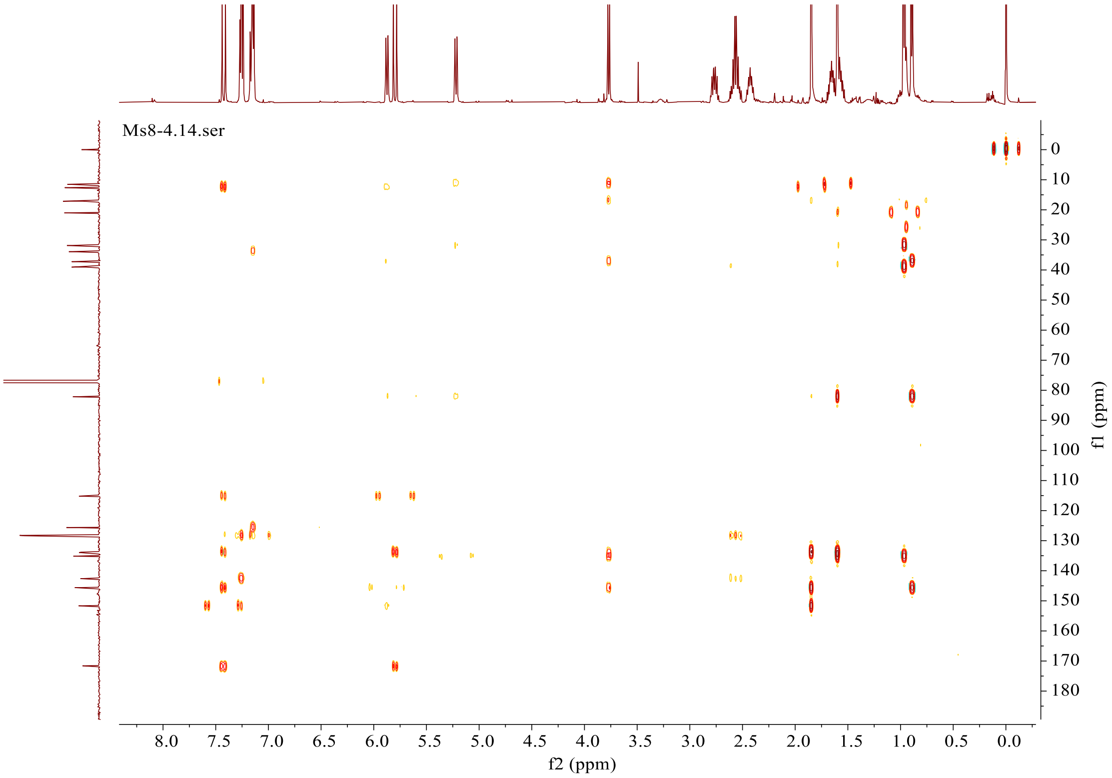


Figure S14 HMBC spectrum of phenalamide E (**2**) in $CDCl_3$.

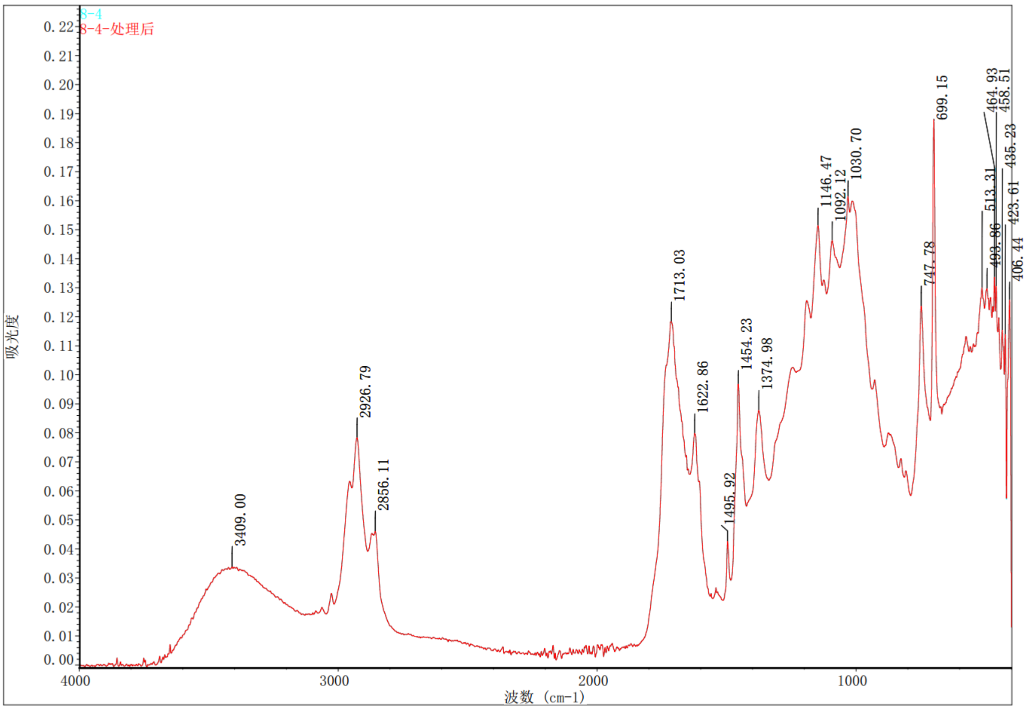
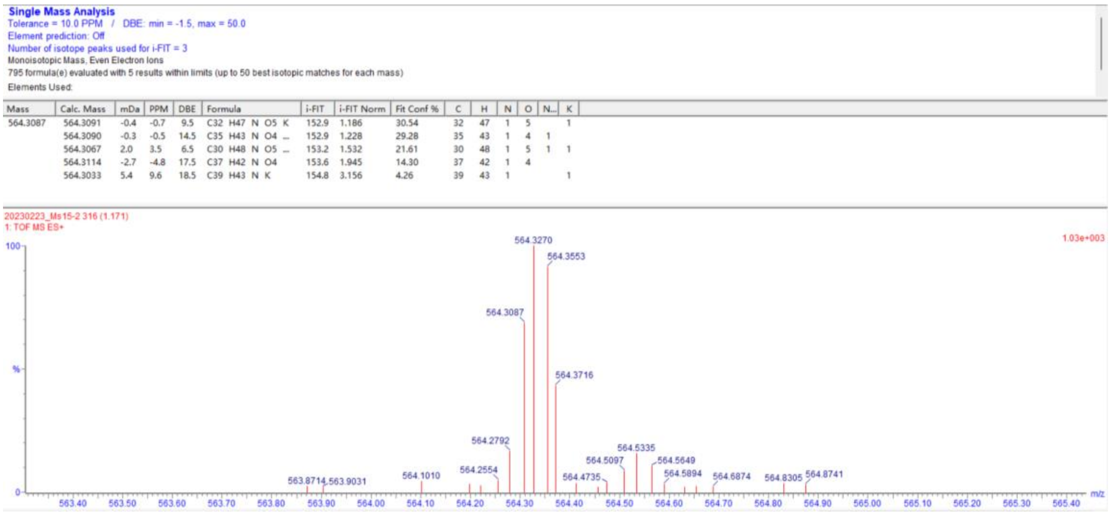


Figure S15 IR spectrum of phenalamide E (**2**).



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
795 formula(e) evaluated with 5 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:

Mass	Calc. Mass	mDa	PPM	DBE	Formula	i-FIT	i-FIT Norm	Fit Conf %	C	H	N	O	N...	K
564.3087	564.3091	-0.4	-0.7	9.5	C32 H47 N O5 K	152.9	1.186	30.54	32	47	1	5		1
	564.3090	-0.3	-0.5	14.5	C35 H43 N O4 ...	152.9	1.228	29.28	35	43	1	4	1	
	564.3067	2.0	3.5	6.5	C30 H48 N O5 ...	153.2	1.532	21.61	30	48	1	5	1	1
	564.3114	-2.7	-4.8	17.5	C37 H42 N O4	153.6	1.945	14.30	37	42	1	4		
	564.3033	5.4	9.6	18.5	C39 H43 N K	154.8	3.156	4.26	39	43	1			1

20230223_Ms15-2 316 (1.171)
1: TOF MS ES+

Figure S16 HRESI-MS spectrum of phenalamide F (**3**).

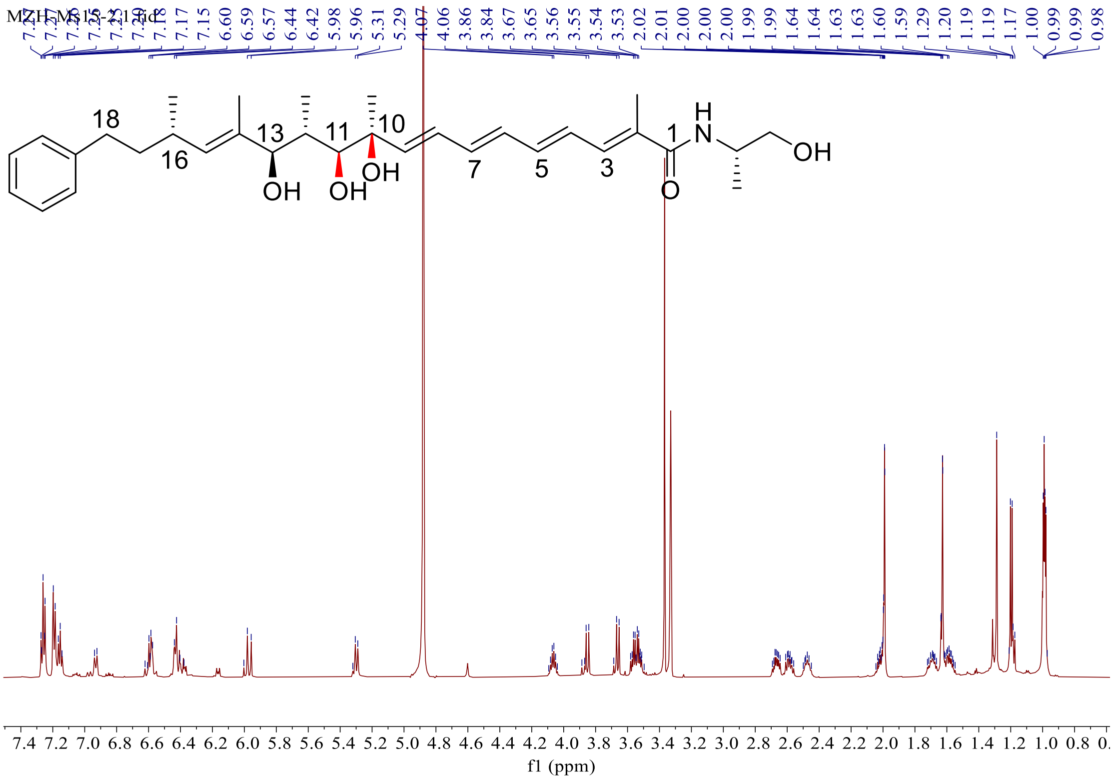


Figure S17 ^{1}H NMR spectrum of phenalamide F (**3**) in CD_3OD (600 MHz).

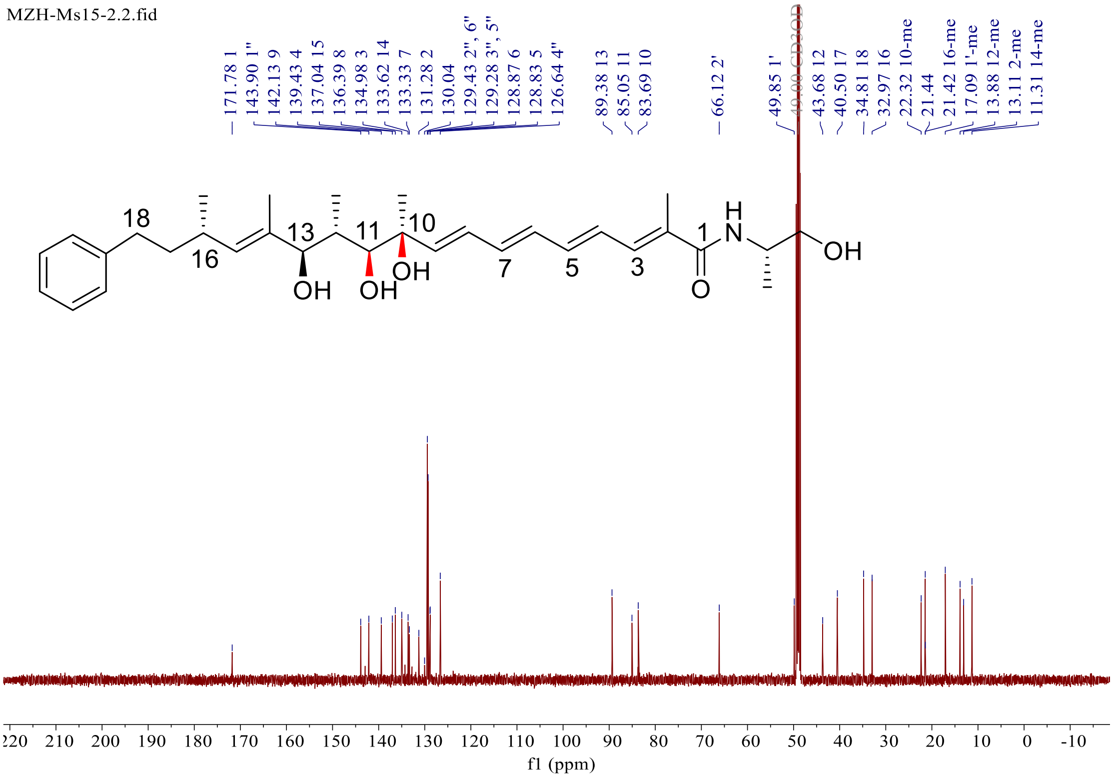


Figure S18 ^{13}C NMR spectrum of phenalamide F (**3**) in CD_3OD (150 MHz).

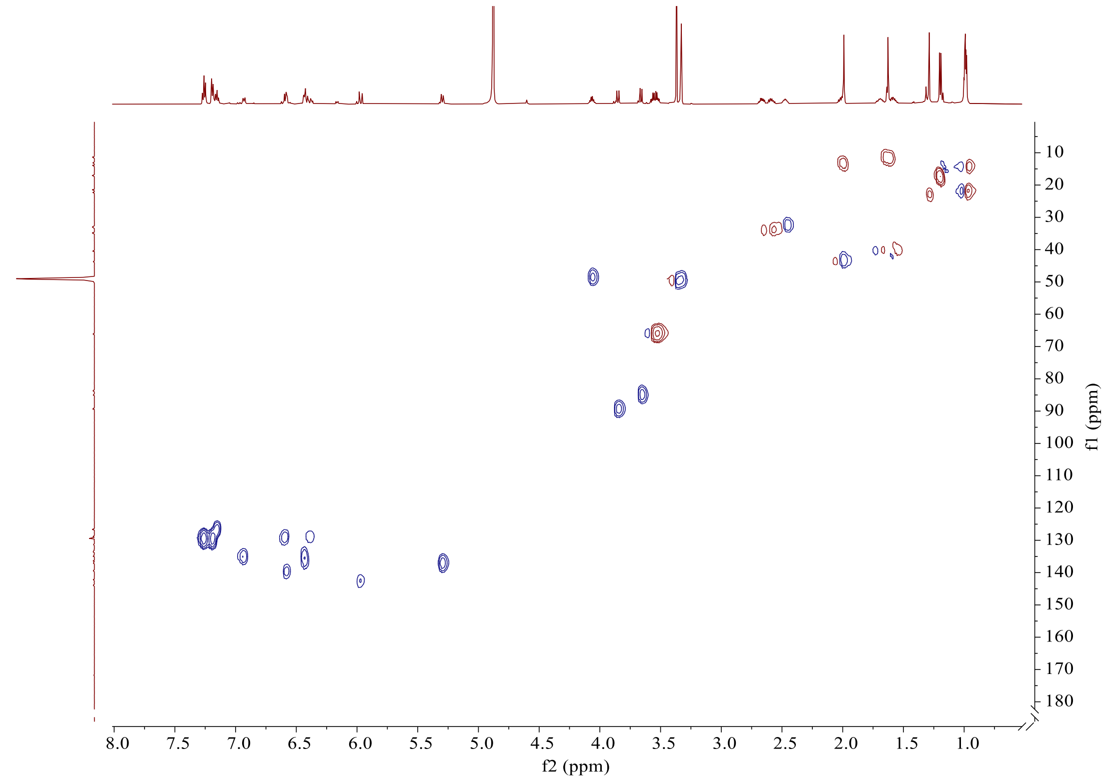


Figure S19 HSQC spectrum of phenalamide F (**3**) in CD$_3$OD.

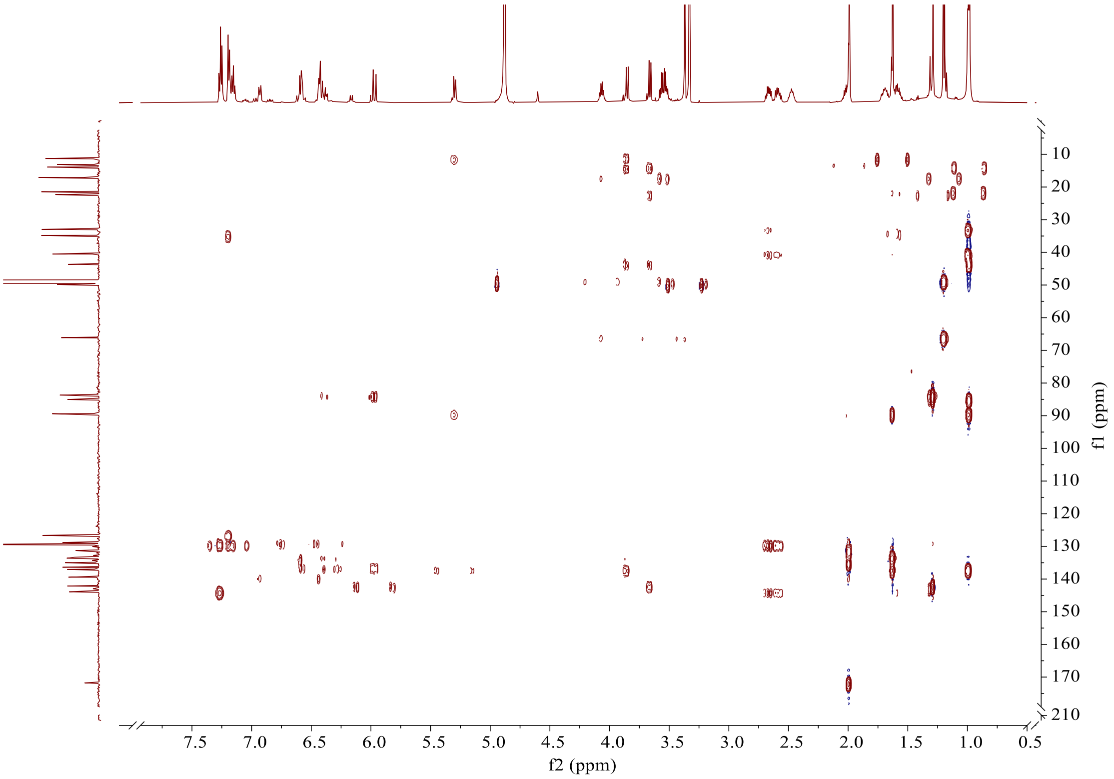


Figure S20 HMBC spectrum of phenalamide F (**3**) in CD$_3$OD.

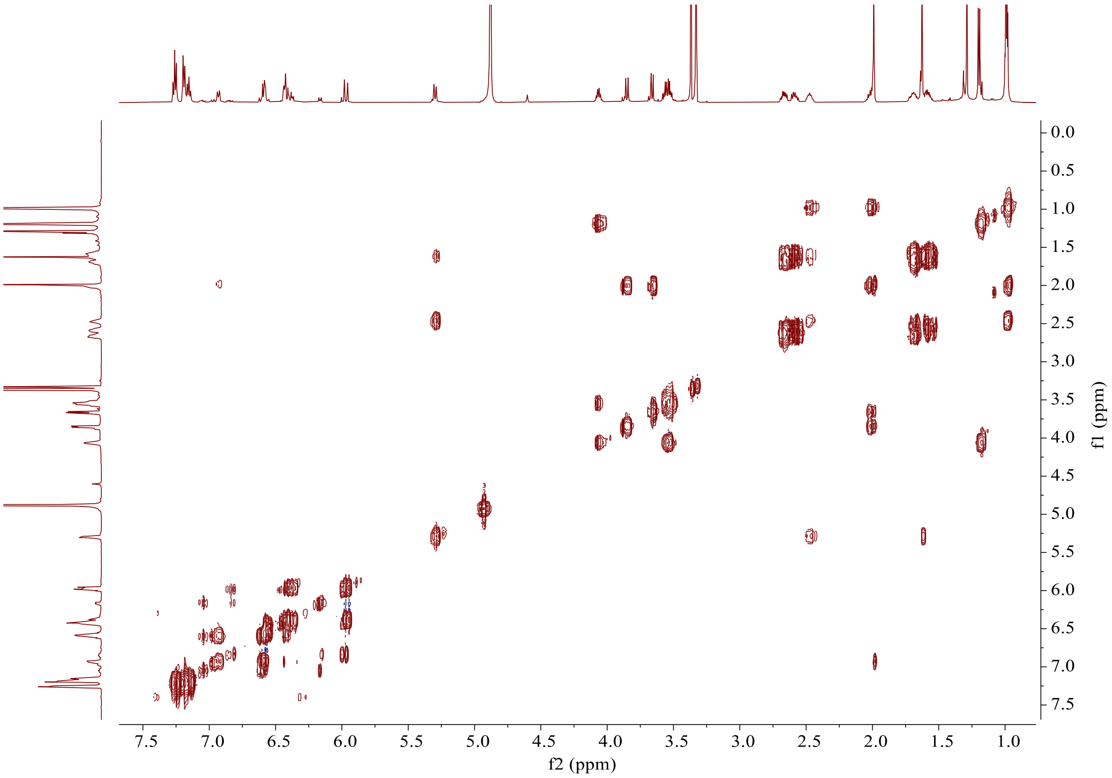


Figure S21 ^{1}H-^{1}H COSY spectrum of phenalamide F (**3**) in CD_3OD.

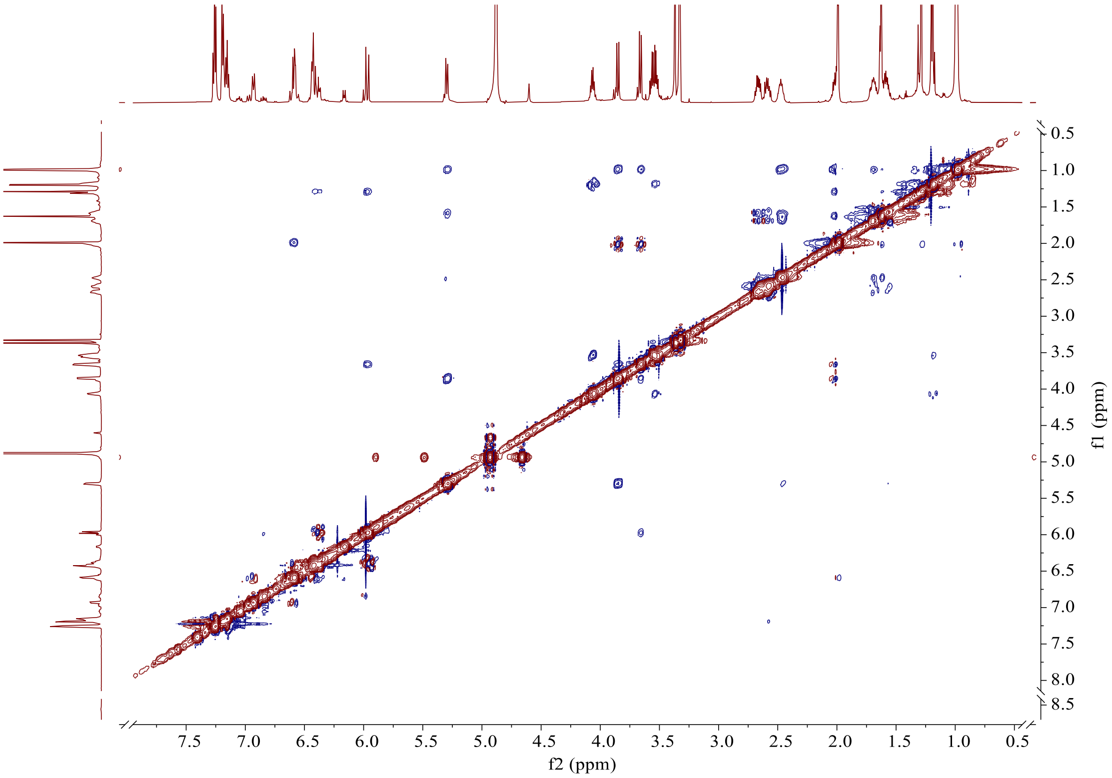


Figure S22 NOESY spectrum of phenalamide F (**3**) in CD_3OD.

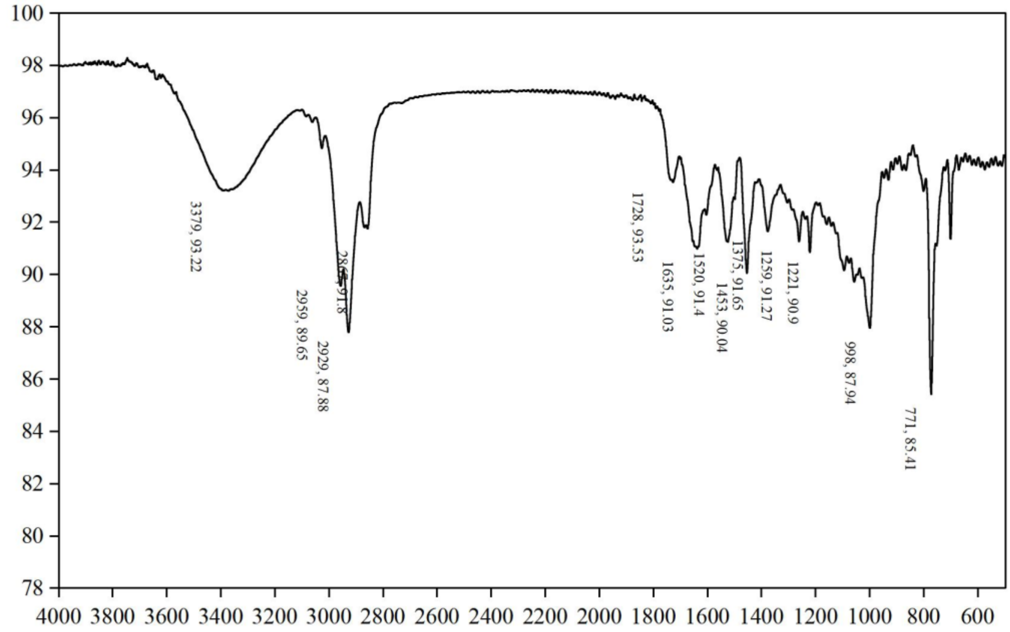
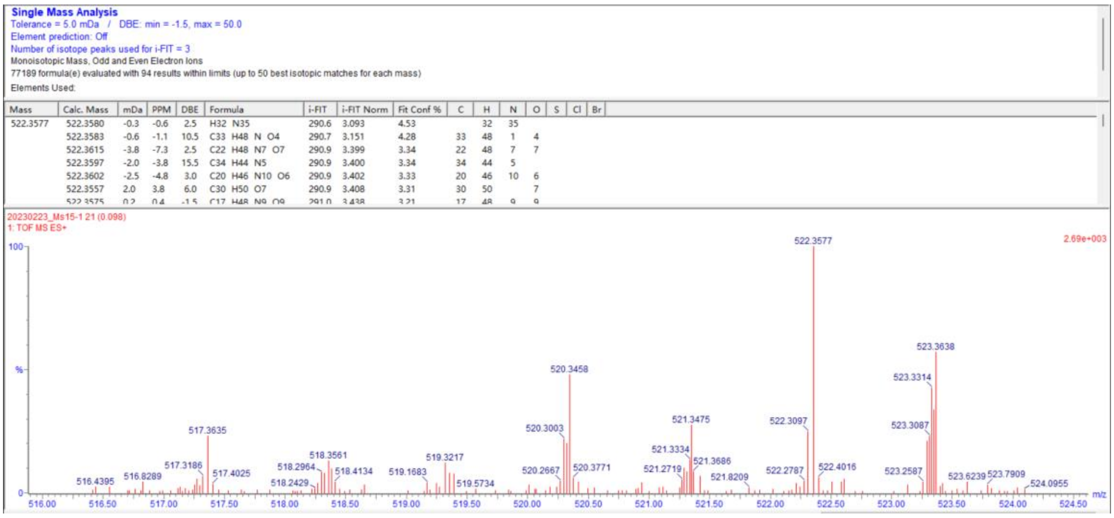


Figure S23 IR spectrum of phenalamide F (**3**).



Single Mass Analysis
Tolerance = 5.0 mDa / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3
Monoisotopic Mass, Odd and Even Electron Ions
77189 formula(e) evaluated with 94 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:

Mass	Calc. Mass	mDa	PPM	DBE	Formula	i-FIT	i-FIT Norm	Fit Conf %	C	H	N	O	S	Cl	Br
522.3577	522.3580	-0.3	-0.6	2.5	H32 N35	290.6	3.093	4.53		32	35				
	522.3583	-0.6	-1.1	10.5	C33 H48 N O4	290.7	3.151	4.28	33	48	1	4			
	522.3615	-3.8	-7.3	2.5	C22 H48 N7 O7	290.9	3.399	3.34	22	48	7	7			
	522.3597	-2.0	-3.8	15.5	C34 H44 N5	290.9	3.400	3.34	34	44	5				
	522.3602	-2.5	-4.8	3.0	C20 H46 N10 O6	290.9	3.402	3.33	20	46	10	6			
	522.3557	2.0	3.8	6.0	C30 H50 O7	290.9	3.408	3.31	30	50		7			
	522.3575	0.2	0.4	-1.5	C17 H48 N9 O9	291.0	3.438	3.21	17	48	9	9			

20230223_Ms15-1 21 (0.098)
1: TOF MS ES+

Figure S24 HRESI-MS spectrum of phenalamide G (**4**).

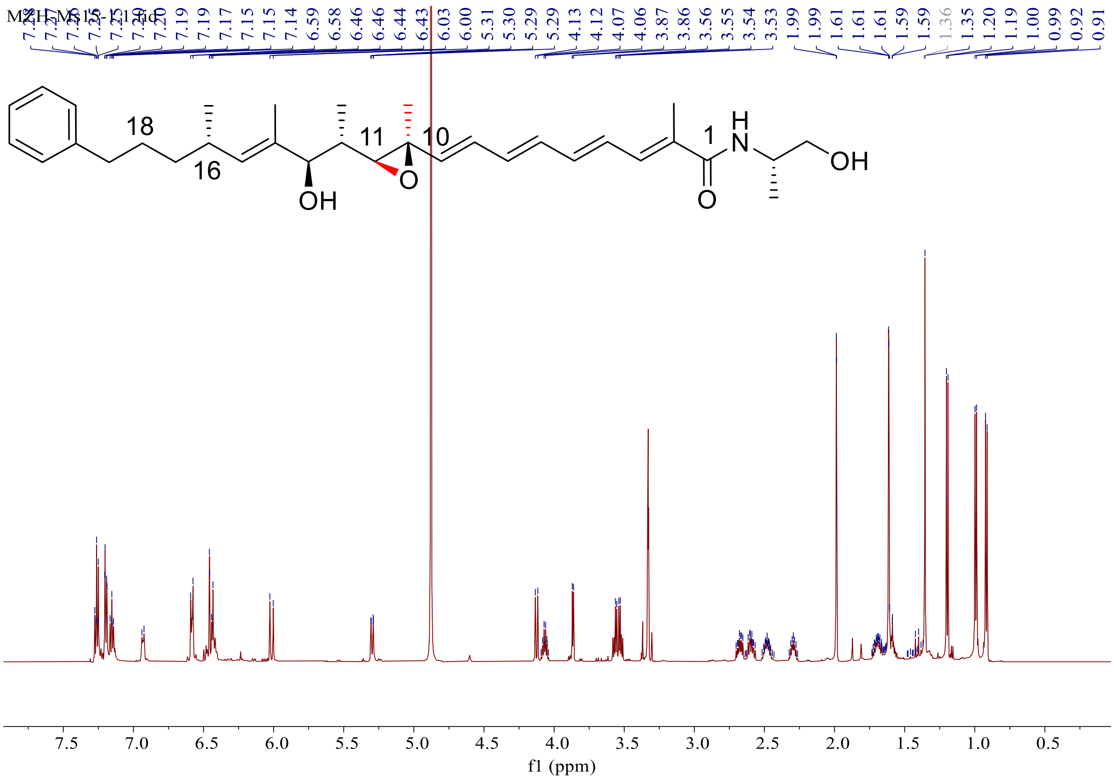


Figure S25 ^{1}H NMR spectrum of phenalamide G (**4**) in CD_3OD (600 MHz).

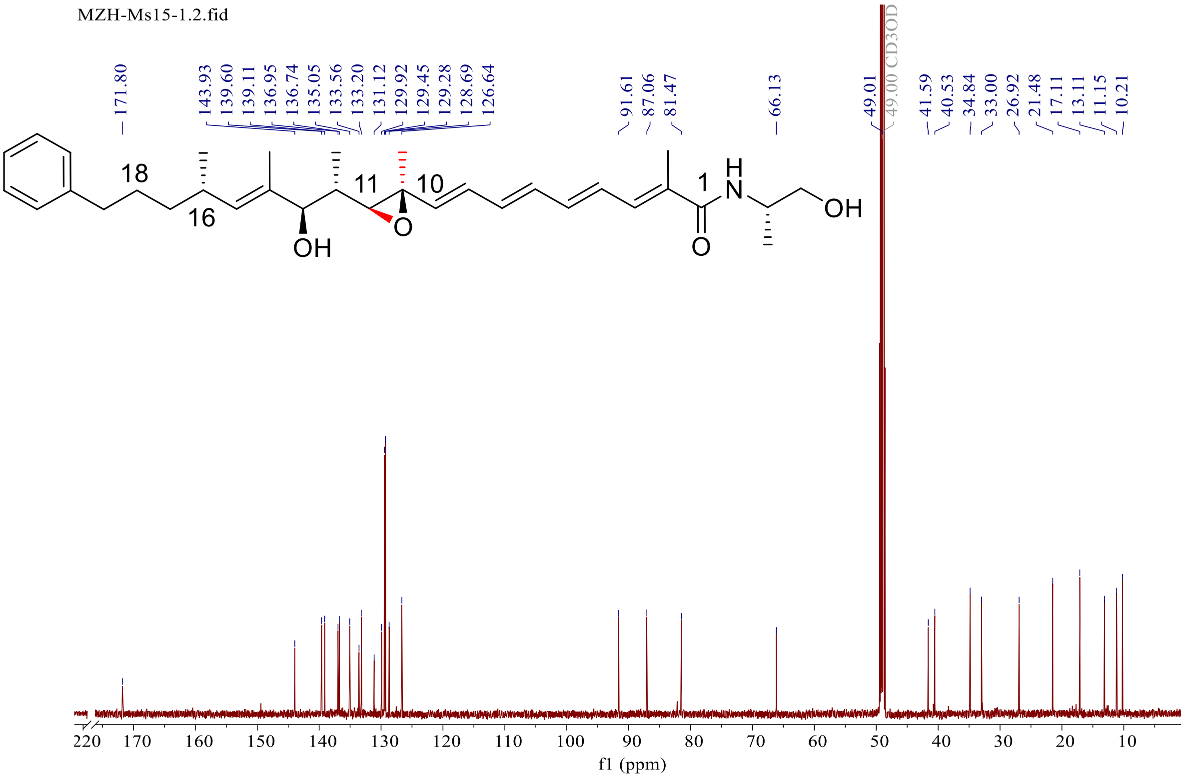


Figure S26 ^{13}C NMR spectrum of phenalamide G (**4**) in CD_3OD (150 MHz).

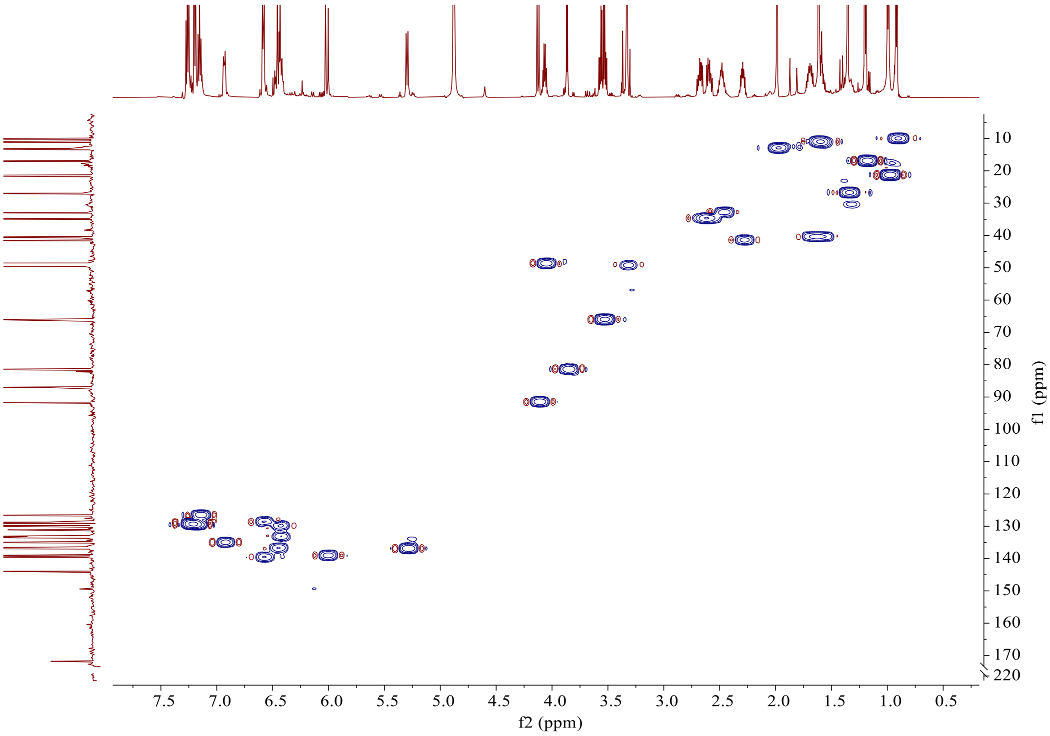


Figure S27 HSQC spectrum of phenalamide G (**4**) in CD_3OD.

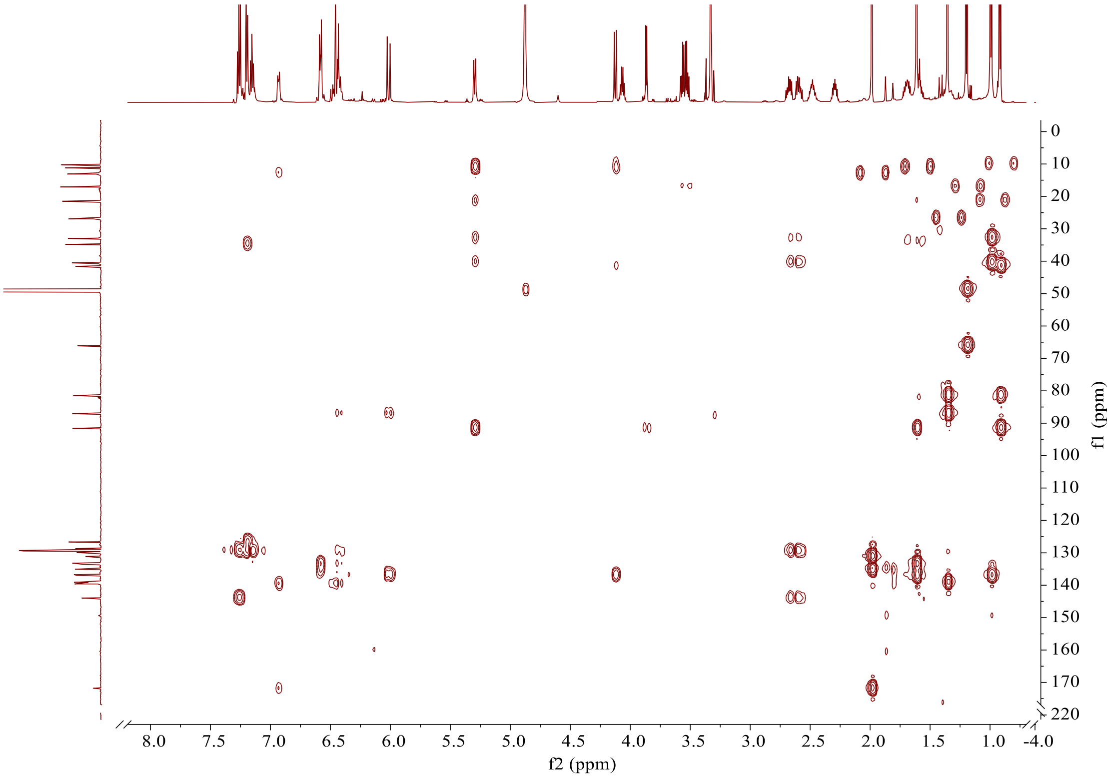


Figure S28 HMBC spectrum of phenalamide G (**4**) in CD_3OD.

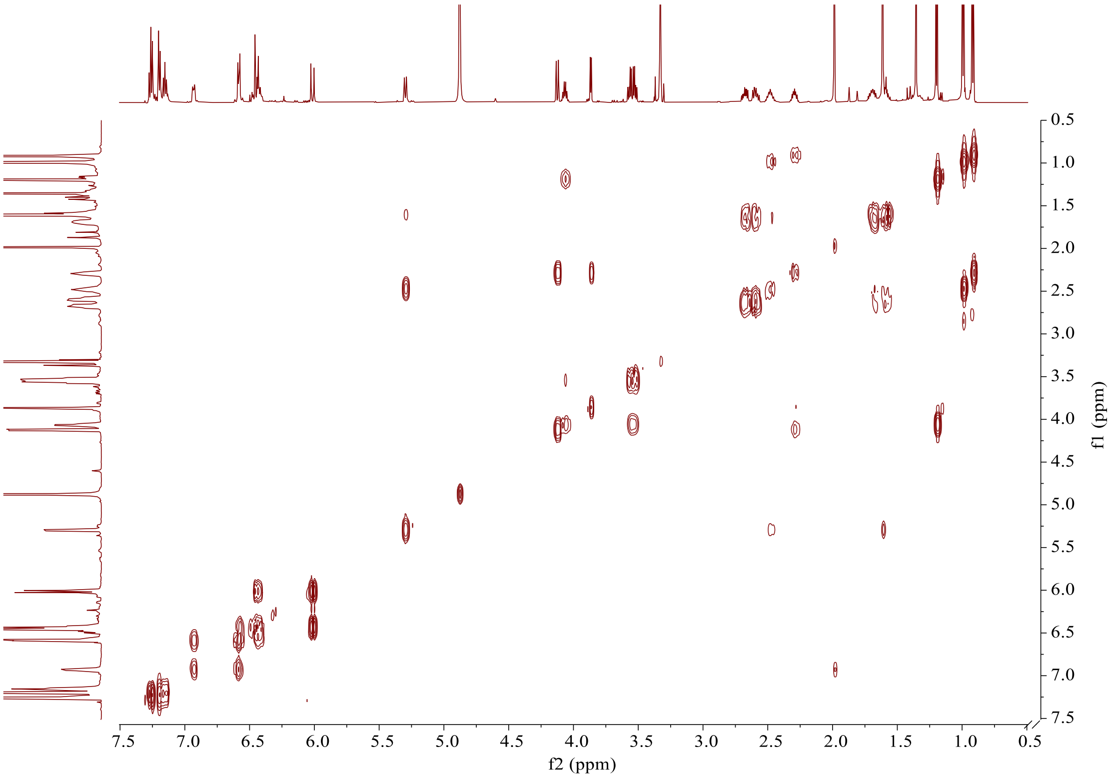


Figure S29 ^{1}H-^{1}H COSY spectrum of phenalamide G (**4**) in CD_3OD.

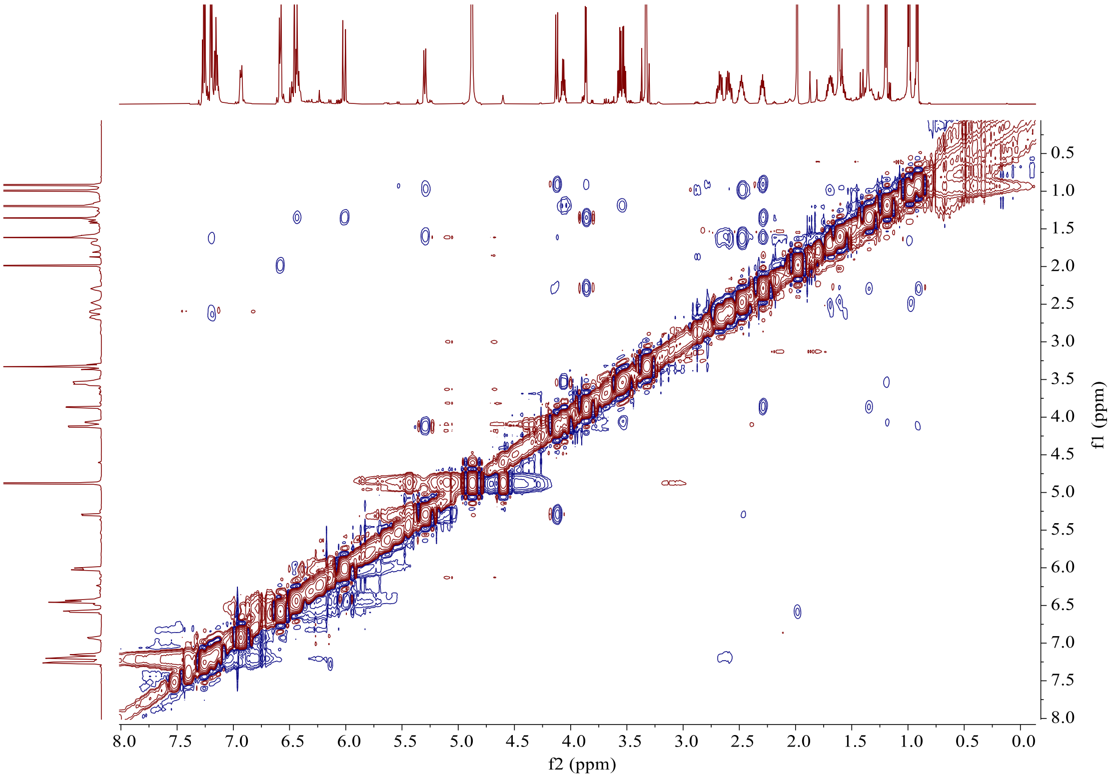


Figure S30 NOESY spectrum of phenalamide G (**4**) in CD_3OD.

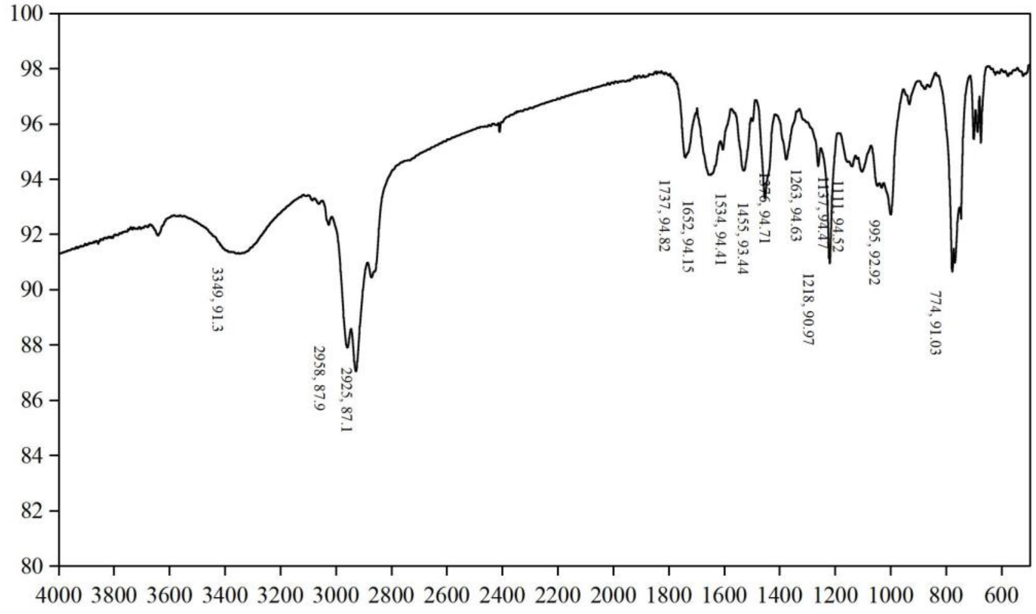
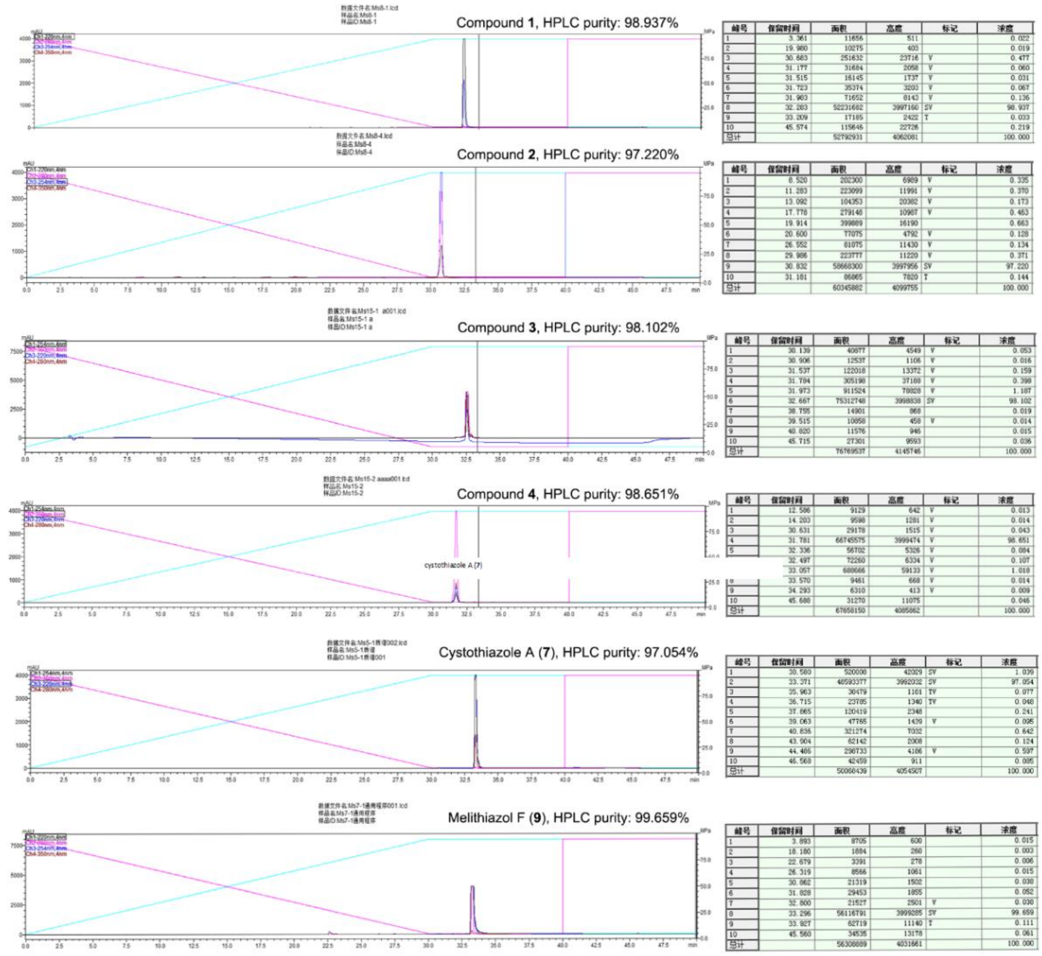


Figure S31 IR spectrum of phenalamide G (**4**).



Compound **1**, HPLC purity: 98.937%

峰号	保留时间	面积	高度	标记	浓度
1	3.361	11656	511		0.022
2	19.980	10275	403		0.019
3	30.683	251632	23716	V	0.477
4	31.177	31684	2058	V	0.060
5	31.515	16145	1737	V	0.031
6	31.723	35374	3203	V	0.067
7	31.983	71652	8143	V	0.136
8	32.283	52231682	3997160	SV	98.937
9	33.209	17185	2422	T	0.033
10	45.574	115646	22726		0.219
总计		52792931	4062081		100.000

Compound **2**, HPLC purity: 97.220%

峰号	保留时间	面积	高度	标记	浓度
1	8.520	202300	6989	V	0.335
2	11.283	223099	11991	V	0.370
3	13.092	104353	20382	V	0.173
4	17.778	279148	10987	V	0.463
5	19.914	399889	16190		0.663
6	20.600	77075	4792	V	0.128
7	26.552	81075	11430	V	0.134
8	29.986	223777	11220	V	0.371
9	30.832	58668300	3997956	SV	97.220
10	31.181	86865	7820	T	0.144
总计		60345882	4099755		100.000

Compound **3**, HPLC purity: 98.102%

峰号	保留时间	面积	高度	标记	浓度
1	30.139	40877	4549	V	0.053
2	30.906	12537	1106	V	0.016
3	31.537	122018	13372	V	0.159
4	31.784	305198	37188	V	0.398
5	31.973	911524	78828	V	1.187
6	32.667	75312748	3998838	SV	98.102
7	38.755	14901	868		0.019
8	39.515	10858	458	V	0.014
9	40.820	11576	946		0.015
10	45.715	27301	9593		0.036
总计		76769537	4145746		100.000

Compound **4**, HPLC purity: 98.651%

峰号	保留时间	面积	高度	标记	浓度
1	12.586	9129	642	V	0.013
2	14.203	9598	1281	V	0.014
3	30.631	29178	1515	V	0.043
4	31.781	66745575	3999474	V	98.651
5	32.336	56702	5326	V	0.084
	32.497	72260	6334	V	0.107
	33.057	688666	59133	V	1.018
	33.570	9461	668	V	0.014
9	34.293	6310	413	V	0.009
10	45.688	31270	11075		0.046
总计		67658150	4085862		100.000

Cystothiazole A (**7**), HPLC purity: 97.054%

峰号	保留时间	面积	高度	标记	浓度
1	30.580	520008	42029	SV	1.039
2	33.371	48593377	3992032	SV	97.054
3	35.963	38479	1161	TV	0.077
4	36.715	23785	1340	TV	0.048
5	37.865	120419	2348		0.241
6	39.063	47765	1439	V	0.095
7	40.836	321274	7032		0.642
8	43.904	62142	2008		0.124
9	44.485	298733	4186	V	0.597
10	46.569	42459	911		0.085
总计		50068439	4054507		100.000

Melithiazol F (**9**), HPLC purity: 99.659%

峰号	保留时间	面积	高度	标记	浓度
1	3.893	8705	600		0.015
2	18.180	1884	260		0.003
3	22.679	3391	278		0.006
4	26.319	8566	1061		0.015
5	30.862	21319	1502		0.038
6	31.828	29453	1855		0.052
7	32.800	21527	2501	V	0.038
8	33.296	56116791	3999285	SV	99.659
9	33.927	62719	11140	T	0.111
10	45.560	34535	13178		0.061
总计		56308889	4031661		100.000

Figure S32. HPLC purity chromatograms of the isolated new compounds and potent active.