

Supplementary Materials

Effects of the Bark Resin Extract of *Garcinia nigrolineata* on Chronic Stress-Induced Memory Deficit in Mice Model and the *In Vitro* Monoamine Oxidases and β -Amyloid Aggregation Inhibitory Activities of Its Prenylated Xanthone Constituents

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Figure S1. ^1H NMR spectrum of cowagarcinone C (DMSO-*d*6, 300 MHz).

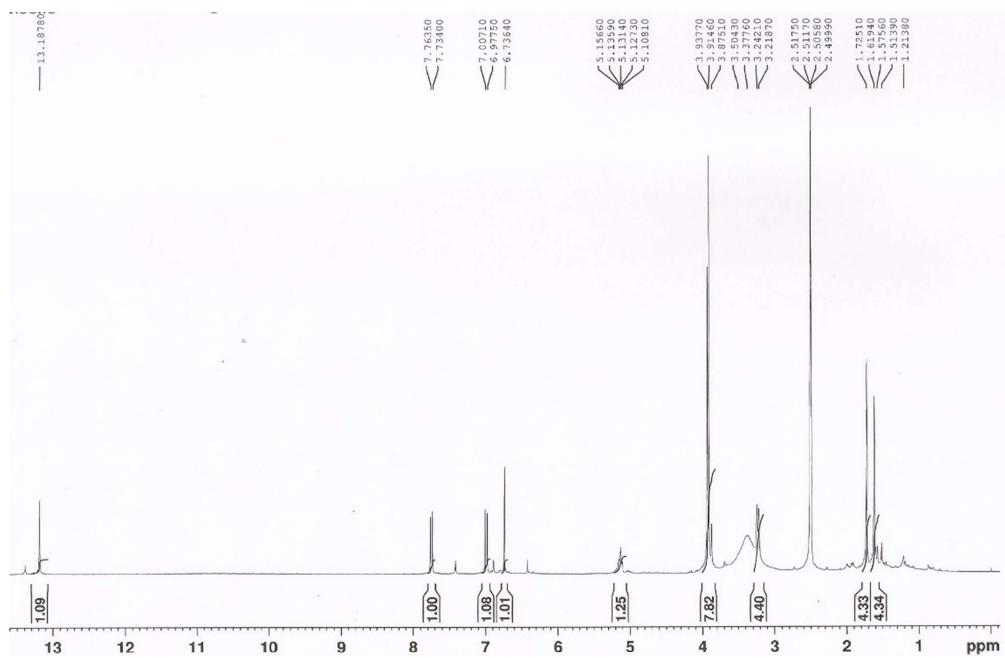


Figure S2. ^{13}C NMR spectrum of cowagarcinone C (DMSO-*d*6, 75MHz).

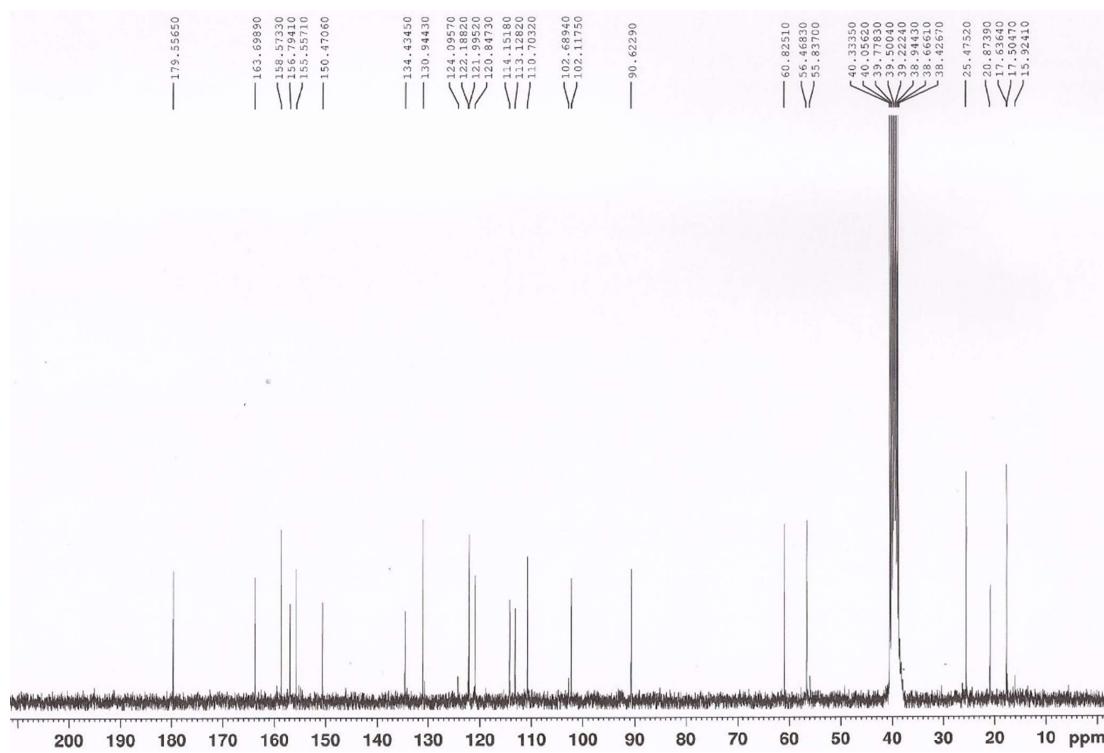


Figure S3. COSY spectrum of cowagarcinone C (DMSO-*d*6, 300 MHz).

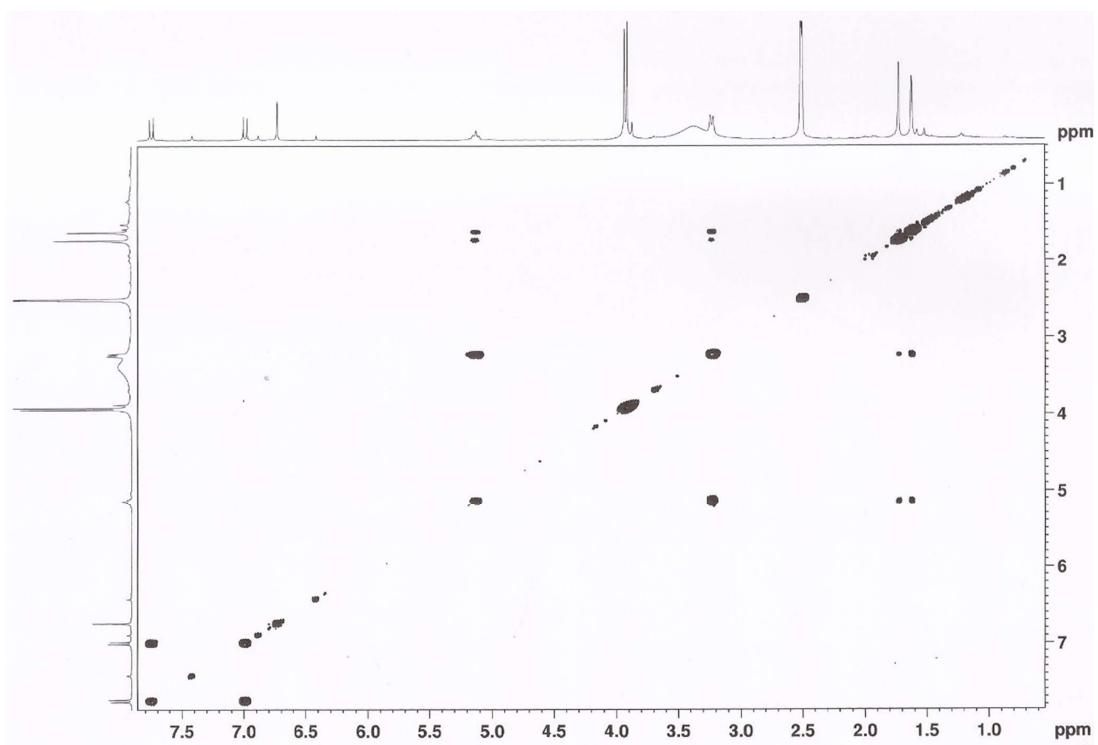


Figure S4. HSQC spectrum of cowagarcinone C (DMSO-*d*6, 300 MHz).

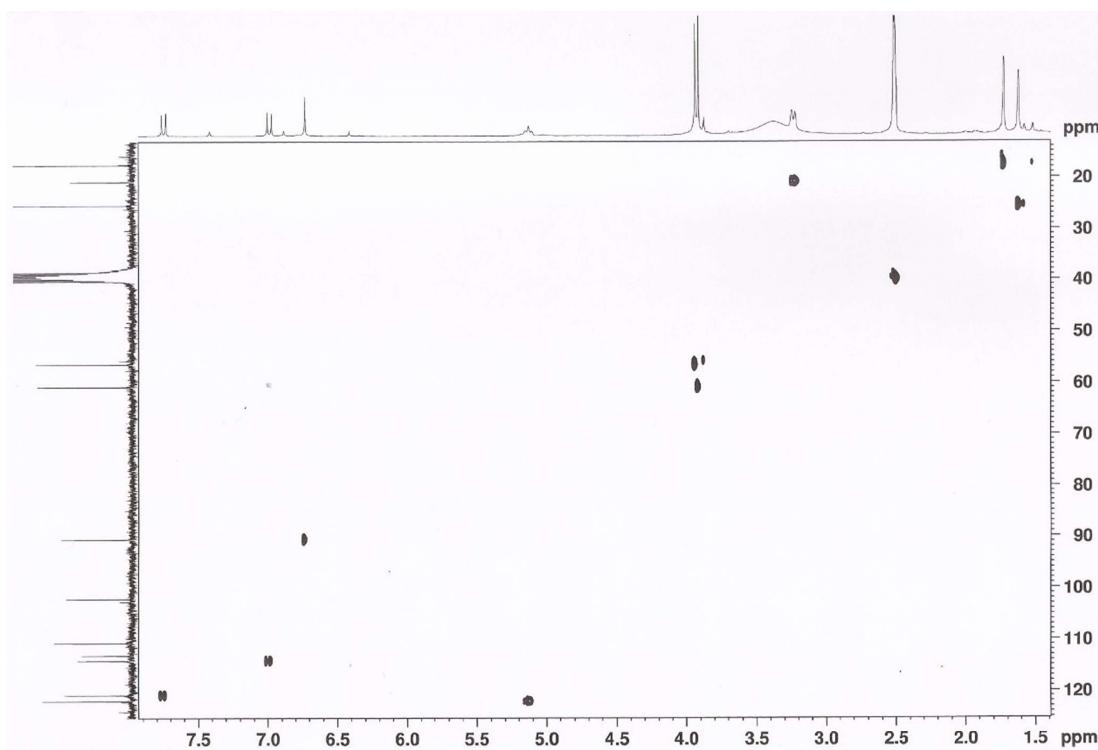


Figure S5. HMBC spectrum of cowagarcinone C (DMSO-*d*6, 300 MHz).

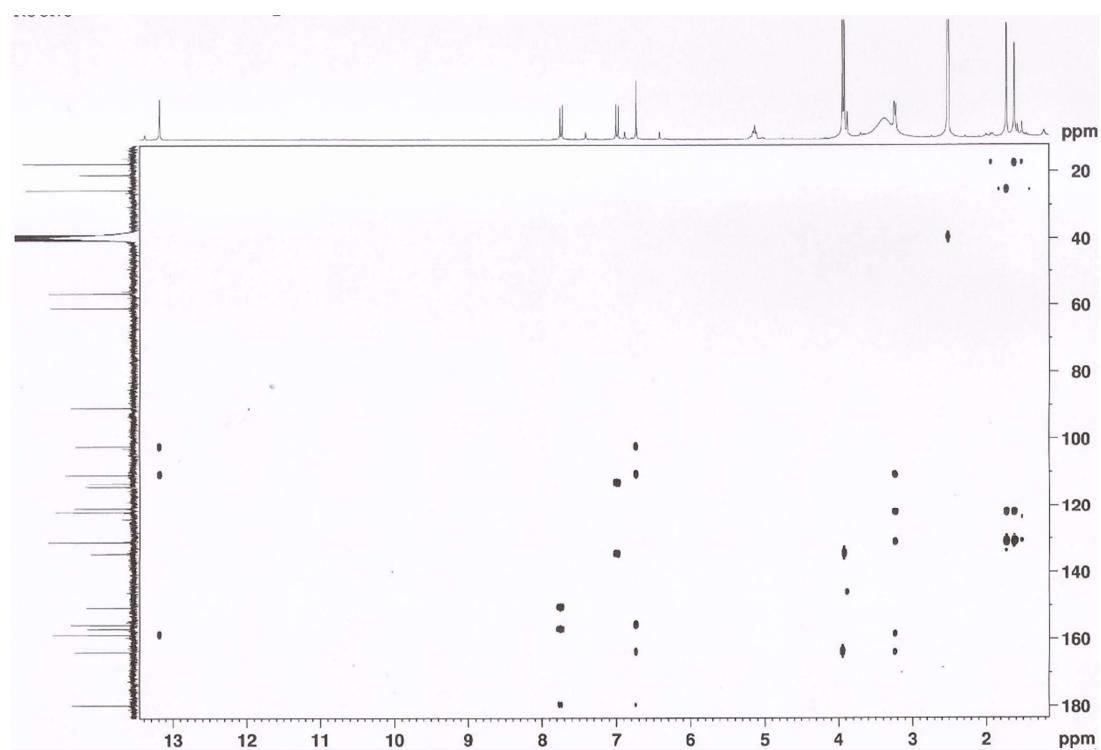


Figure S6. ¹HNMR spectrum of cowaxanthone (DMSO-*d*6, 300 MHz).

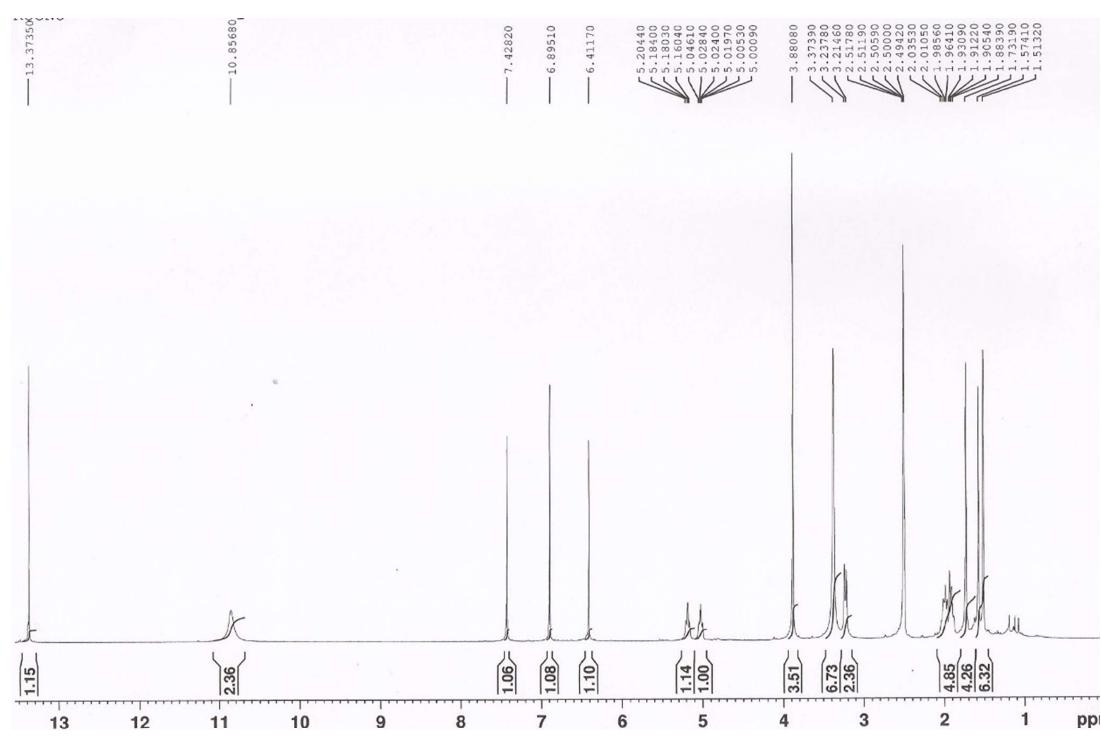


Figure S7. ^{13}C NMR spectrum of cowaxanthone (DMSO-*d*6, 75 MHz).

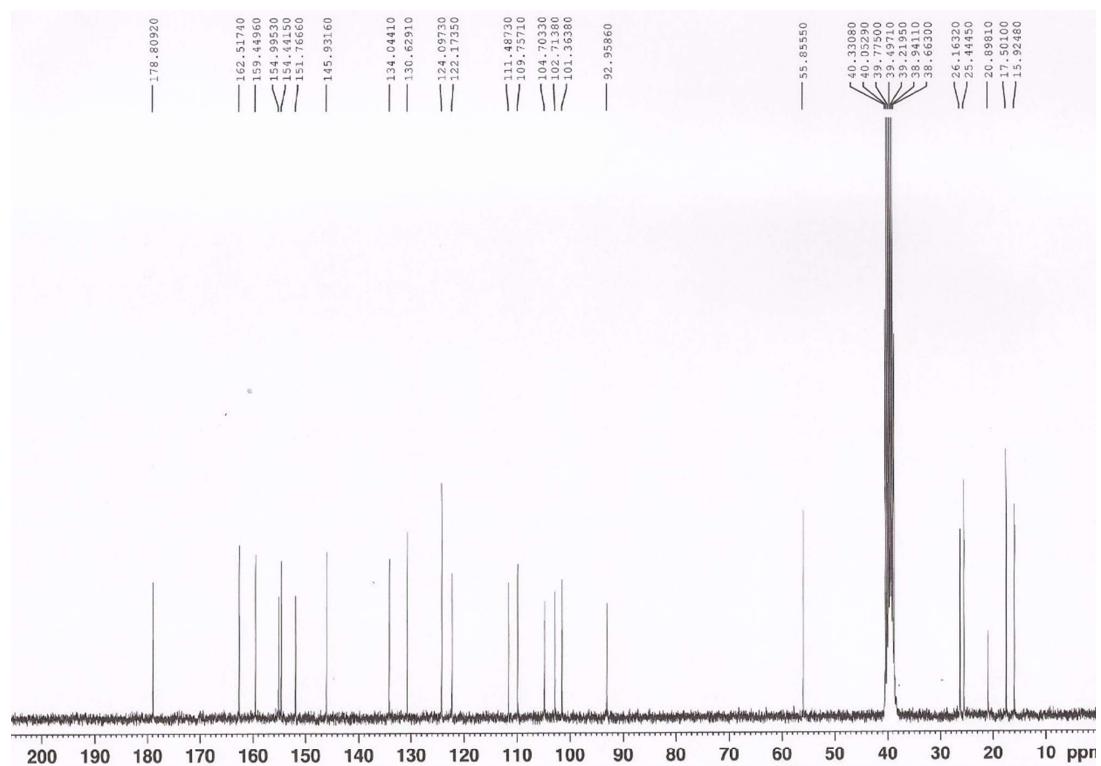


Figure S8. COSY spectrum of cowaxanthone (DMSO-*d*6, 300 MHz).

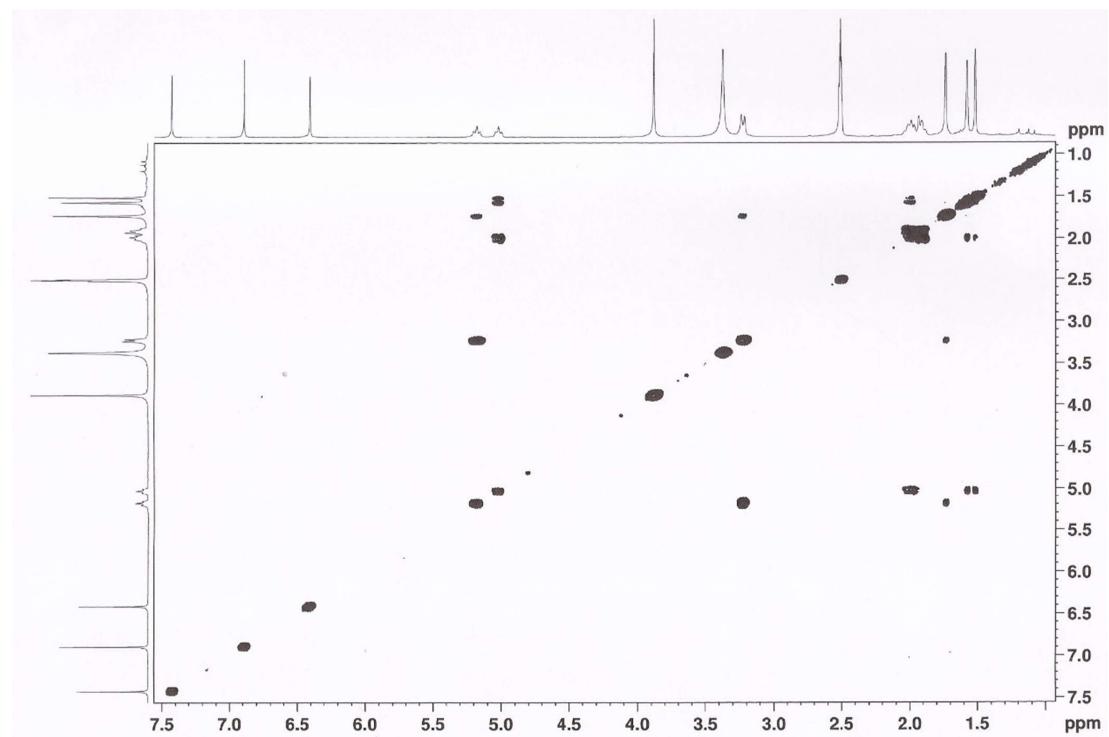


Figure S9. HSQC spectrum of cowaxanthone (DMSO-*d*6, 300 MHz).

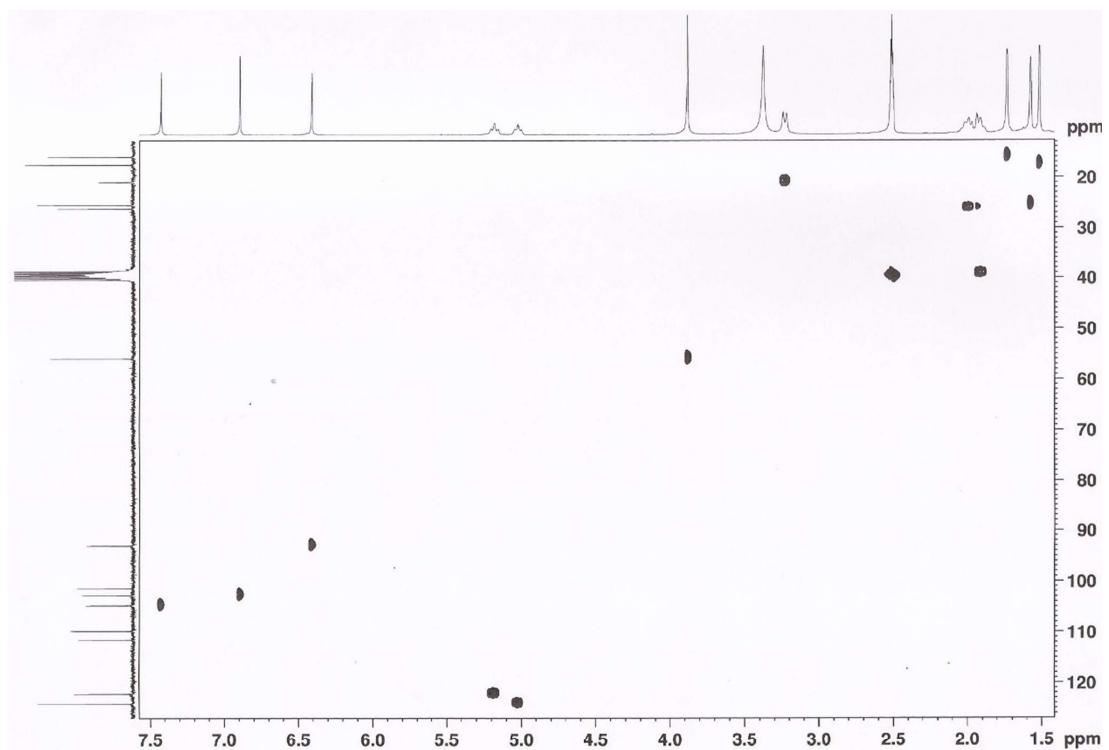


Figure S10. HMBC spectrum of cowaxanthone (DMSO-*d*6, 300 MHz).

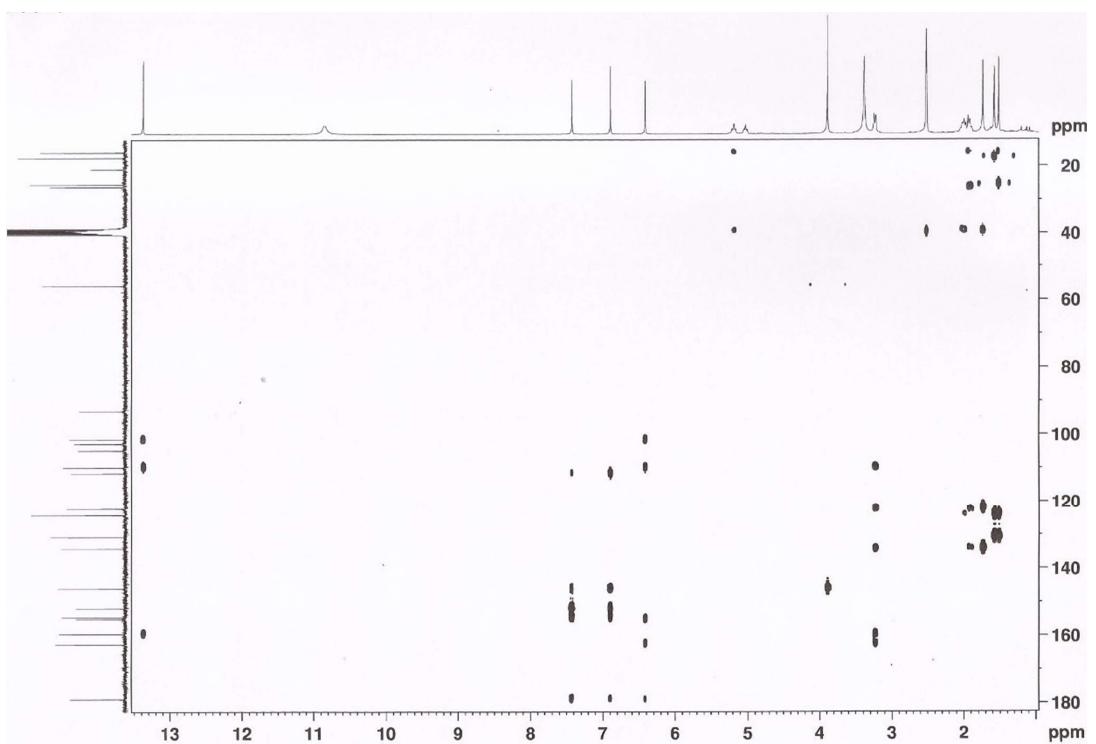


Figure S11. ^1H NMR spectrum of α -mangostin (CDCl_3 , 300 MHz).

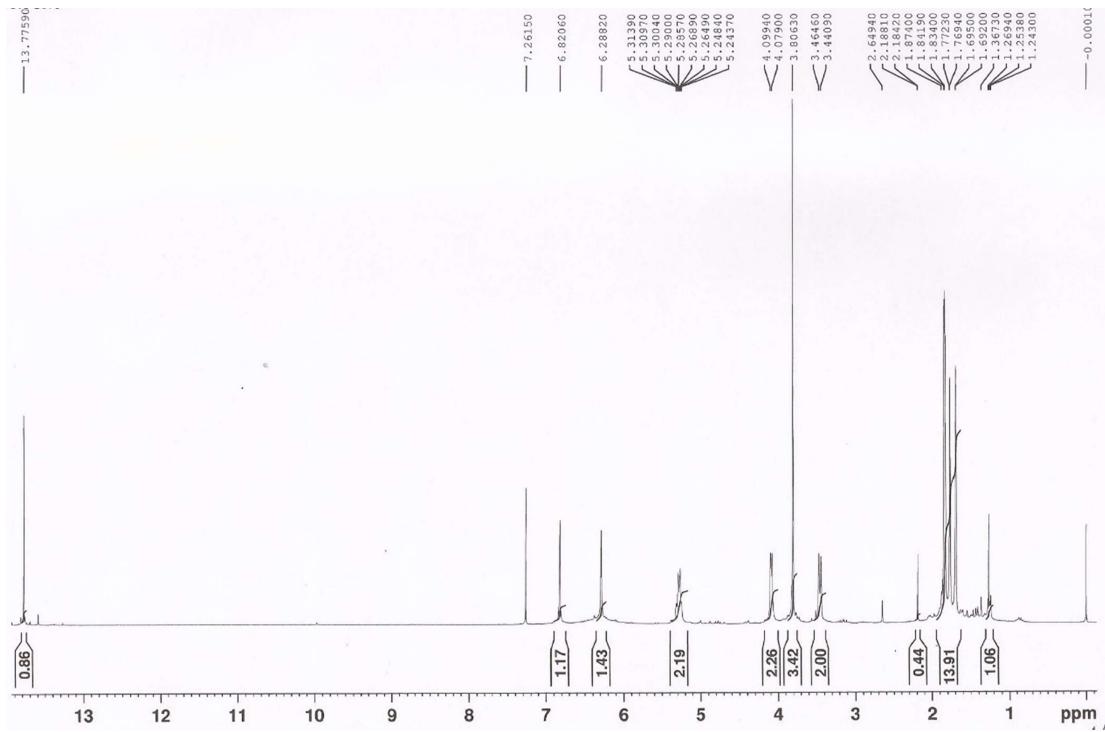


Figure S12. ^{13}C NMR spectrum of α -mangostin (CDCl_3 , 75 MHz).

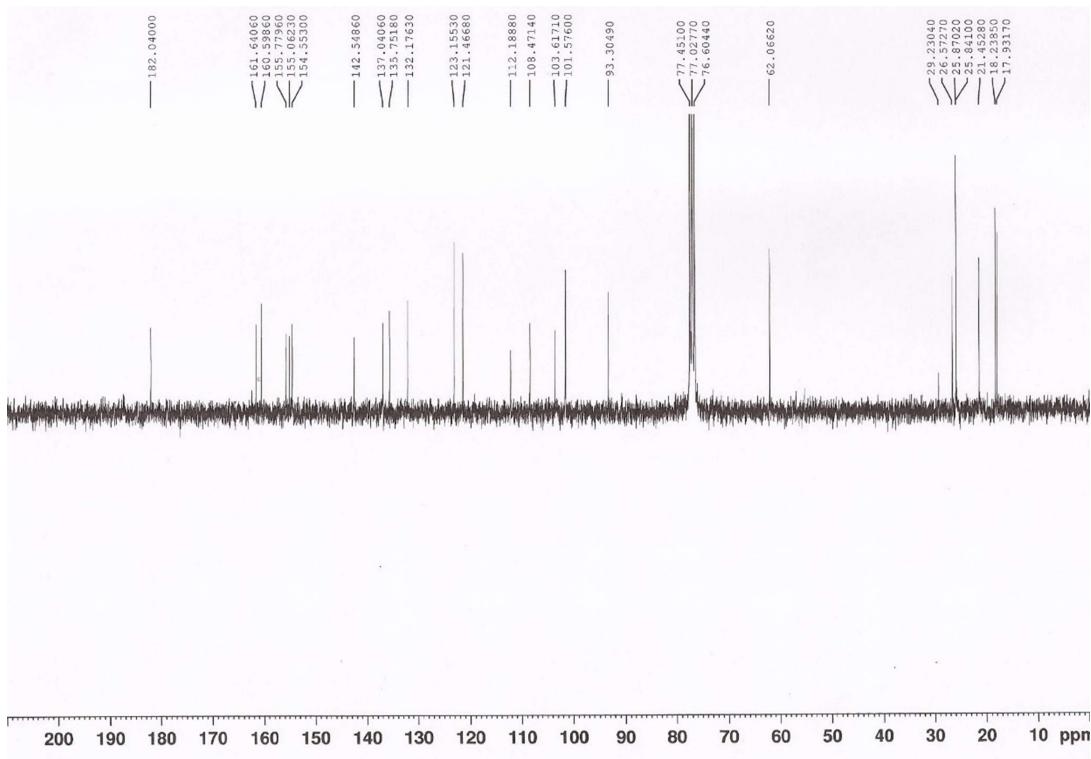


Figure S13. COSY spectrum of α -mangostin (CDCl_3 , 300 MHz).

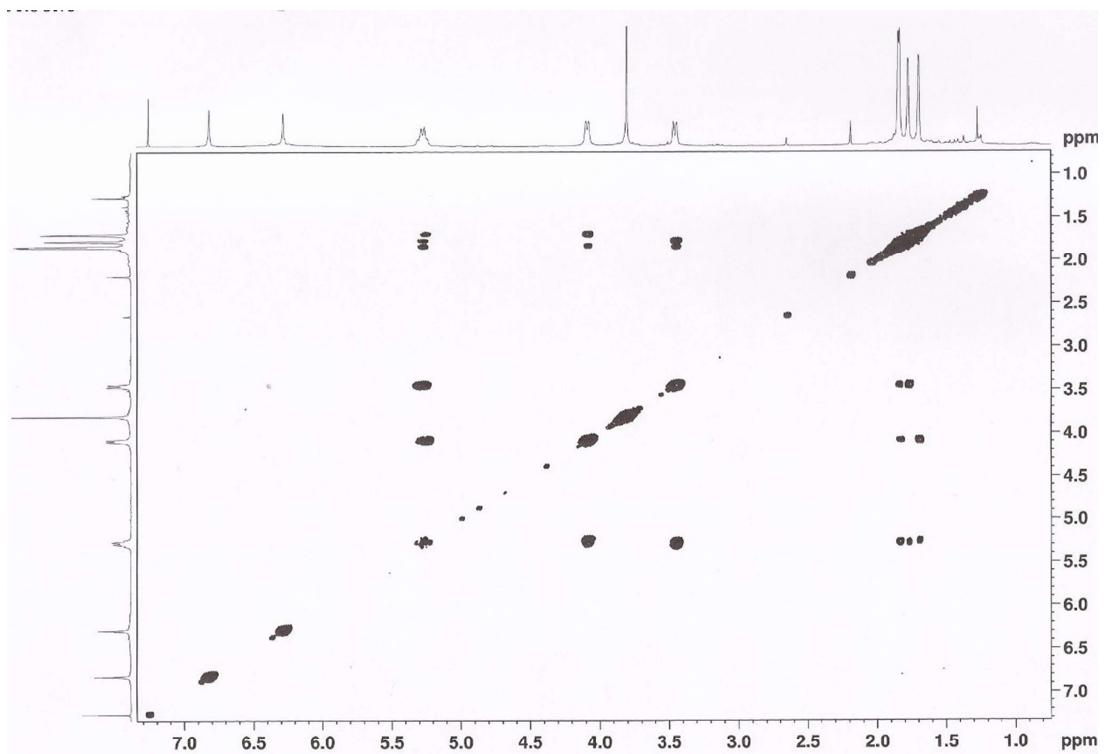


Figure S14. HSQC spectrum of α -mangostin (CDCl_3 , 300 MHz).

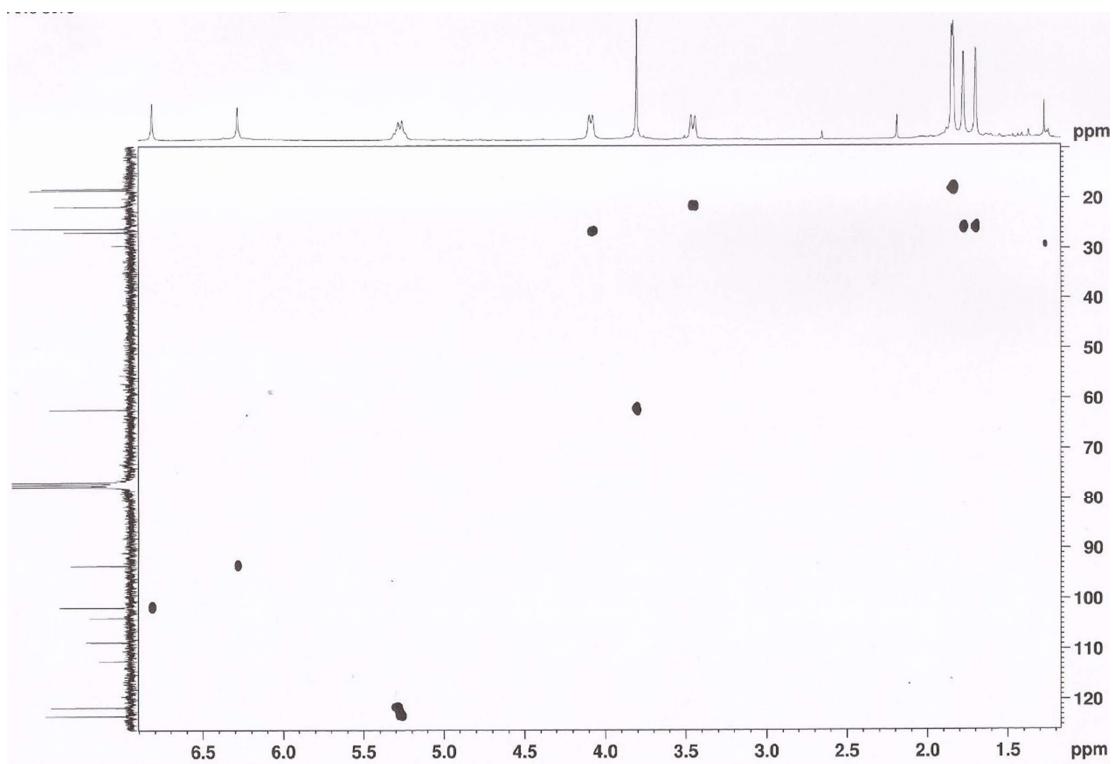


Figure S15. HMBC spectrum of α -mangostin (CDCl_3 , 300 MHz).

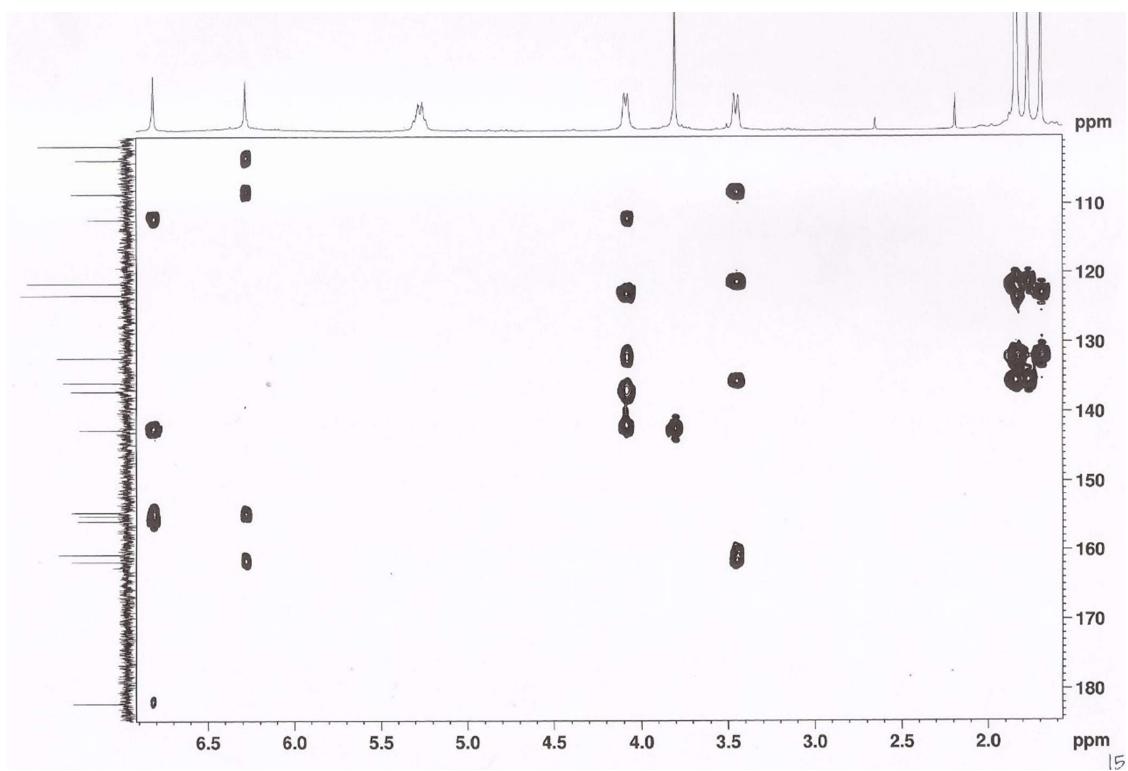


Figure S16. ^1H NMR spectrum of cowaxanthone B (CDCl_3 , 300 MHz).

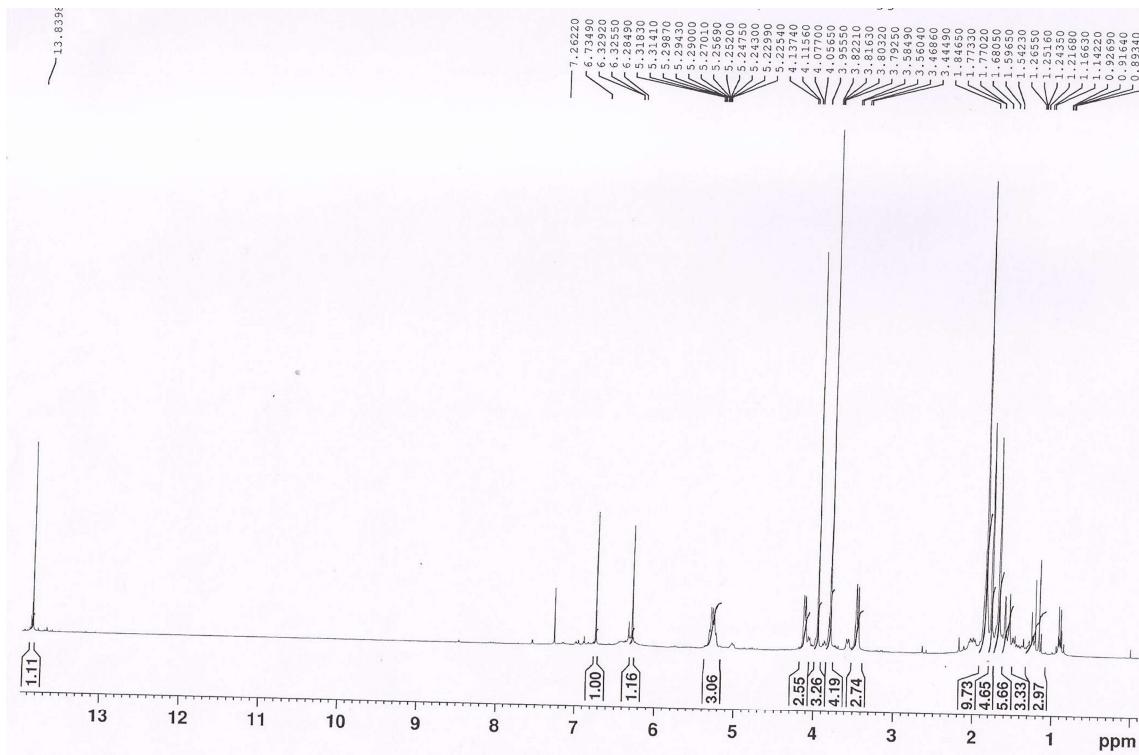


Figure S17. ^{13}C NMR spectrum of cowaxanthone B (CDCl_3 , 75 MHz).

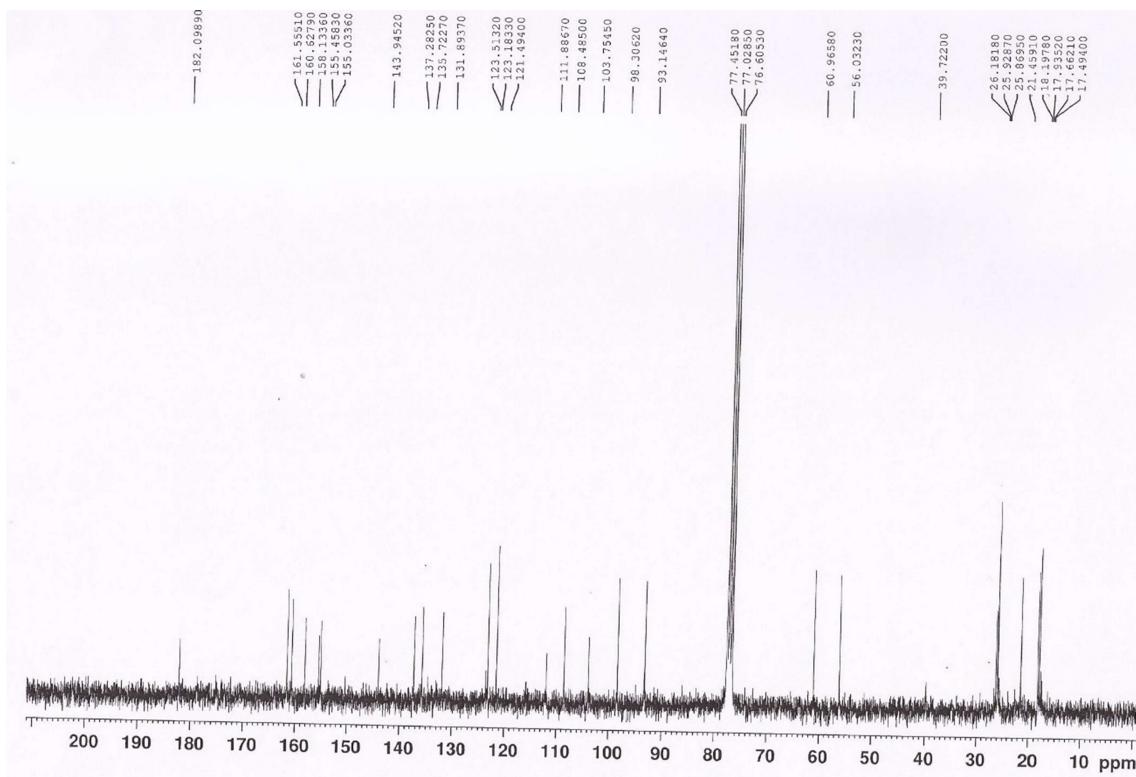


Figure S18. COSY spectrum of cowaxanthone B (CDCl_3 , 300 MHz).

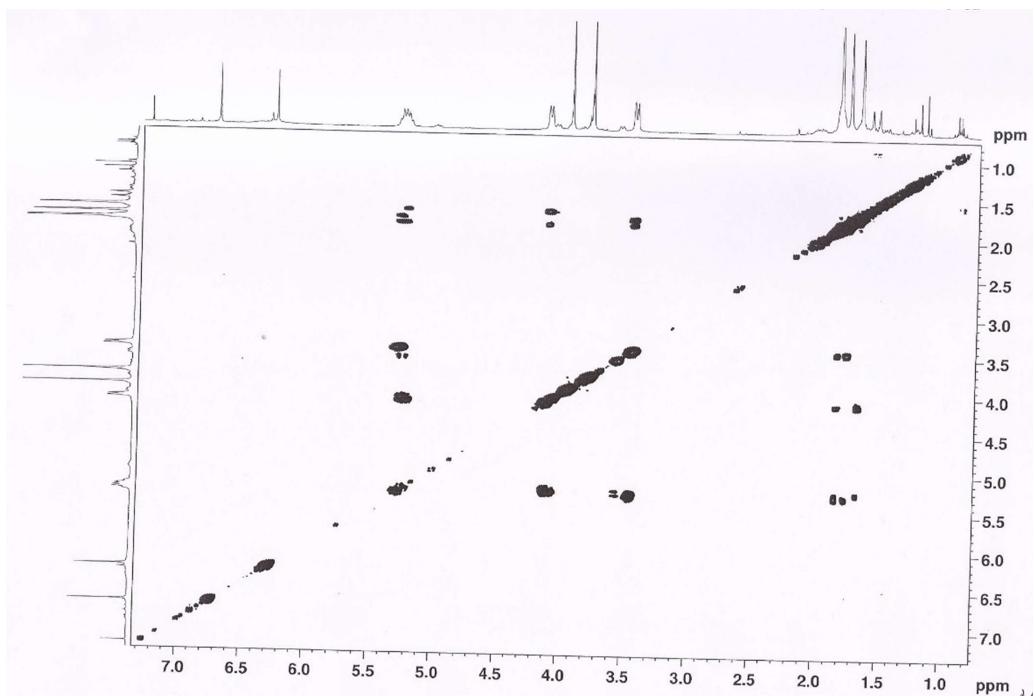


Figure S19. HSQC spectrum of cowaxanthone B (CDCl_3 , 300 MHz).

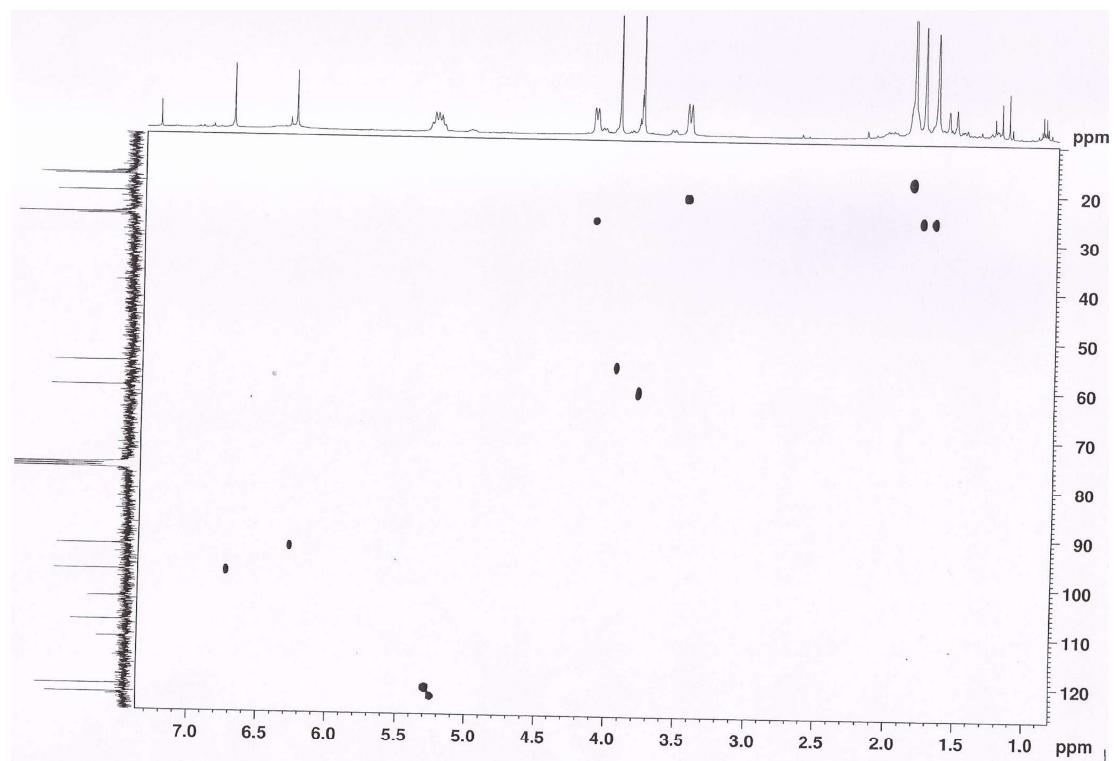


Figure S20. HSMBc spectrum of cowaxanthone B (CDCl_3 , 300 MHz).

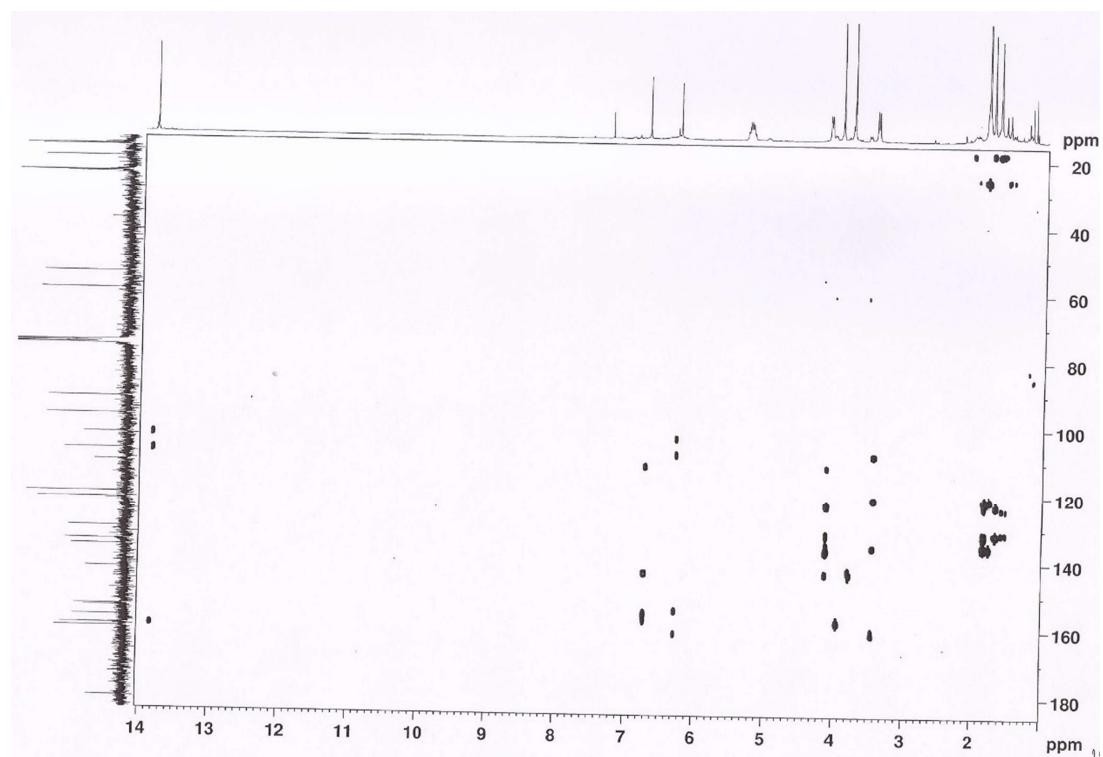


Figure S21. ^1H NMR spectrum of cowanin (DMSO-*d*6, 300 MHz).

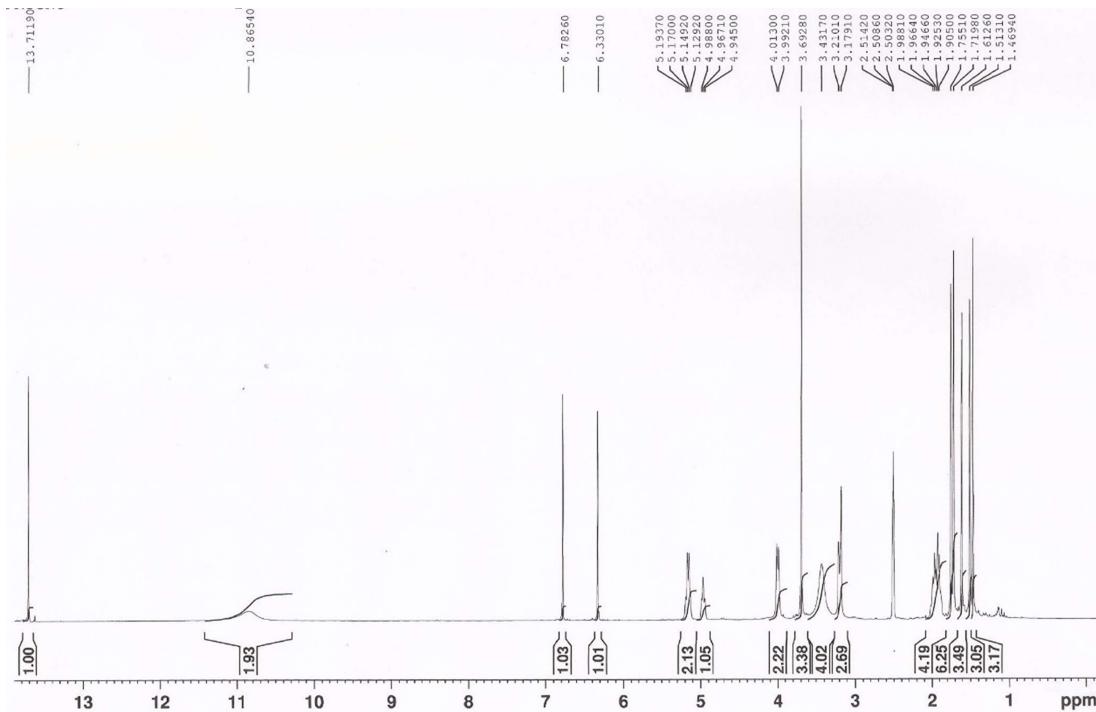


Figure S22. ^{13}C NMR spectrum of cowanin (DMSO-*d*6, 75 MHz).

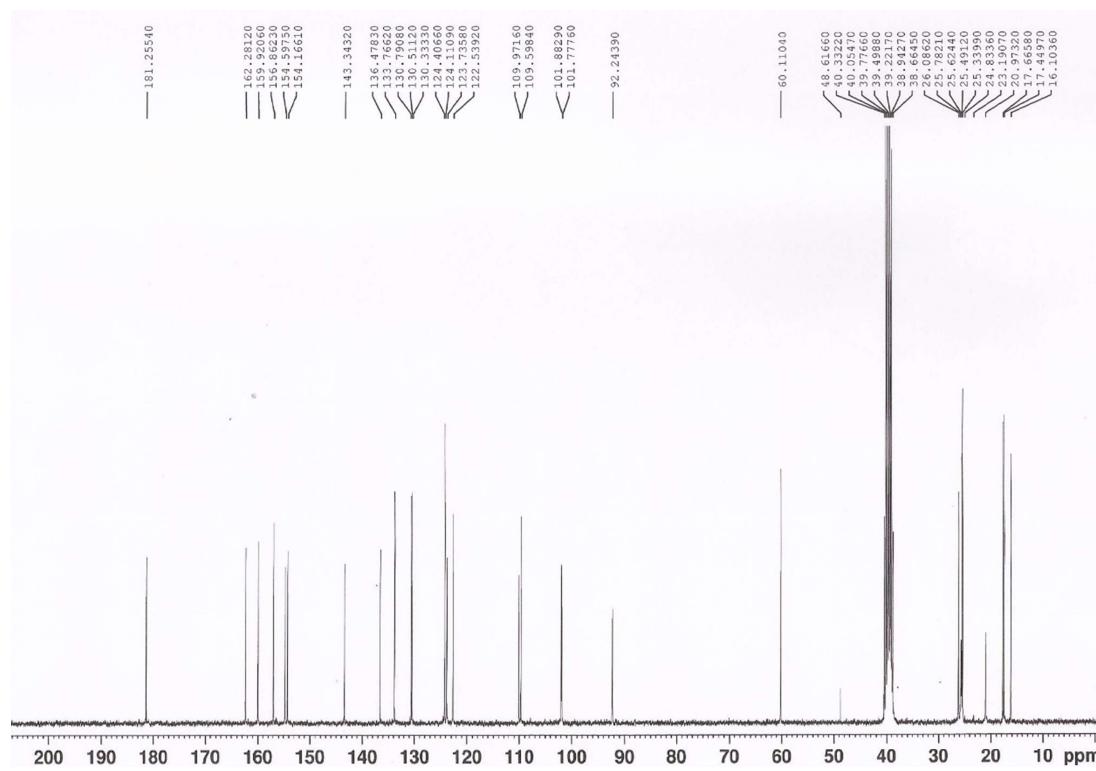


Figure S23. COSY spectrum of cowanin (DMSO-*d*6, 300 MHz).

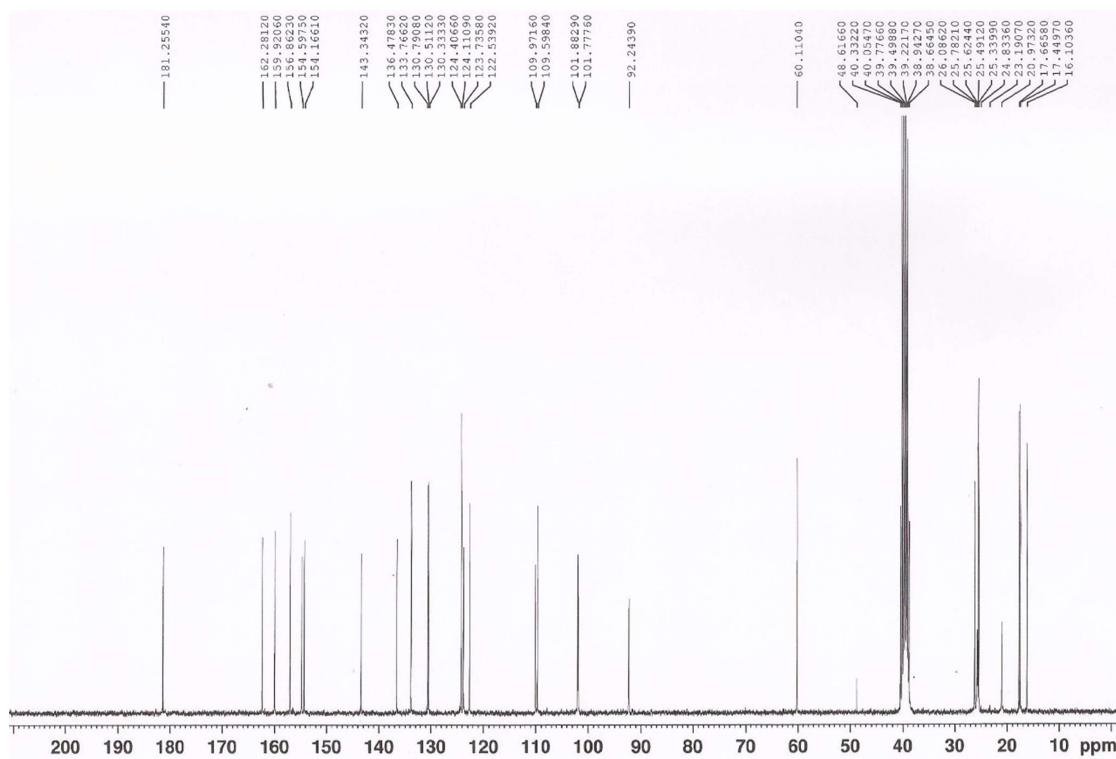


Figure S24. HSQC spectrum of cowanin (DMSO-*d*6, 300 MHz).

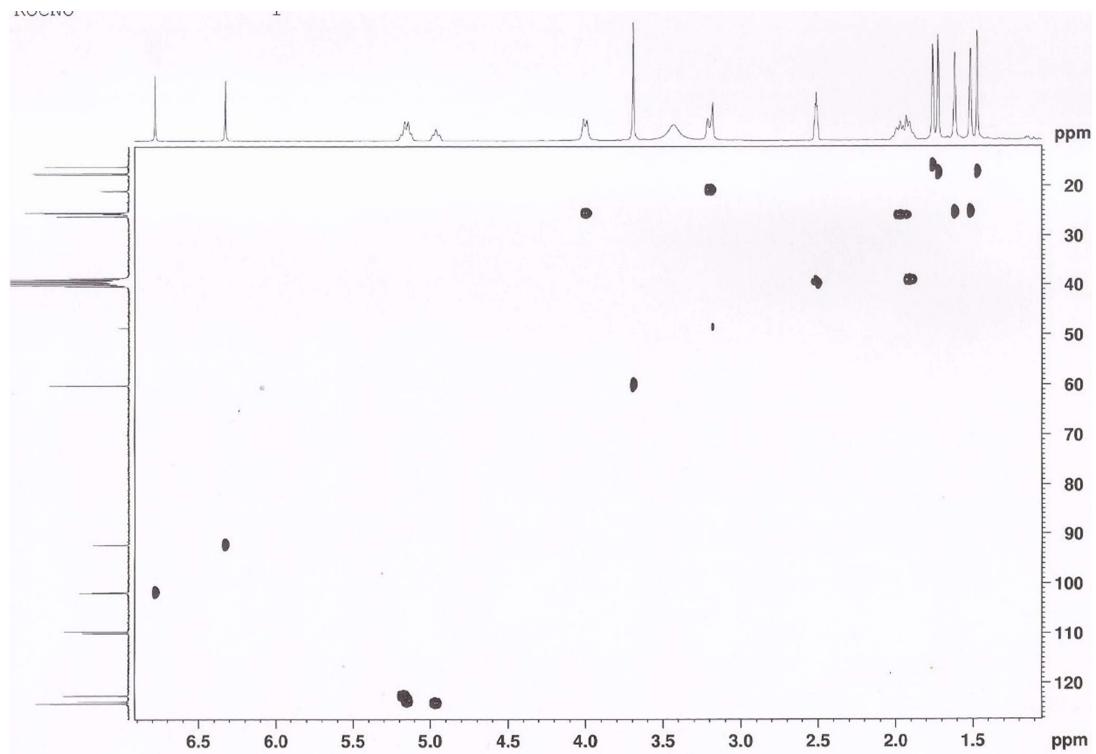


Figure S25. HMBC spectrum of cowanin (DMSO-*d*6, 300 MHz).

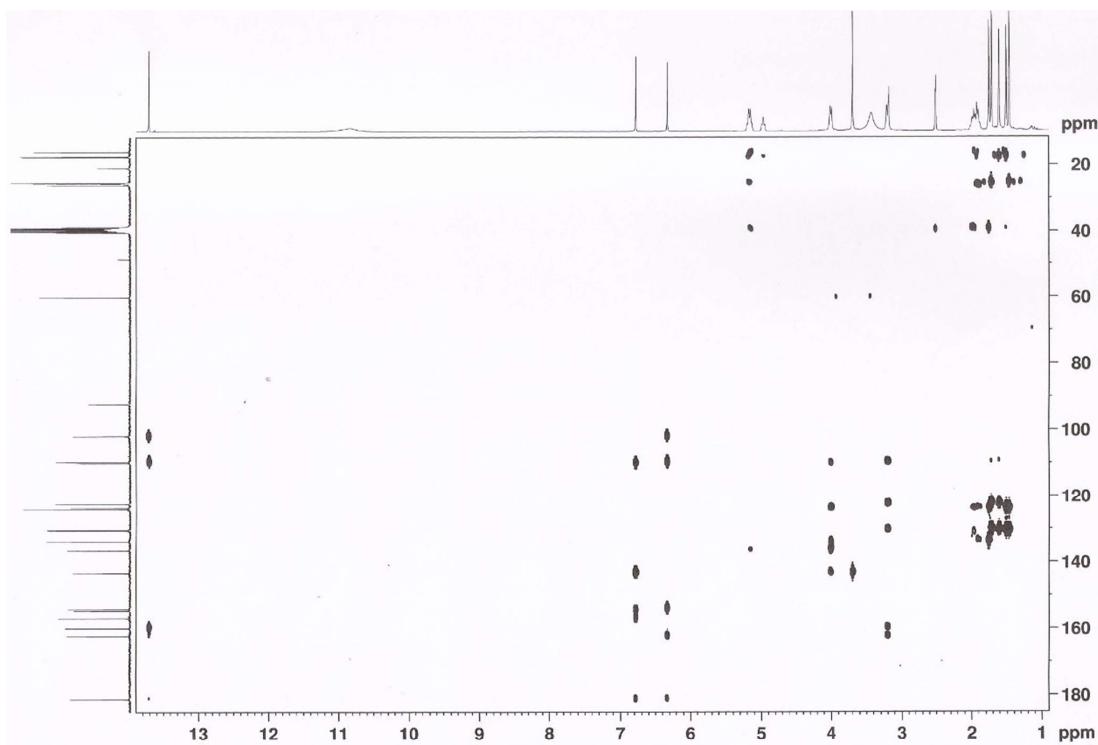


Figure S26. ¹H spectrum of fuscaxanthone A (DMSO-*d*6, 300 MHz).

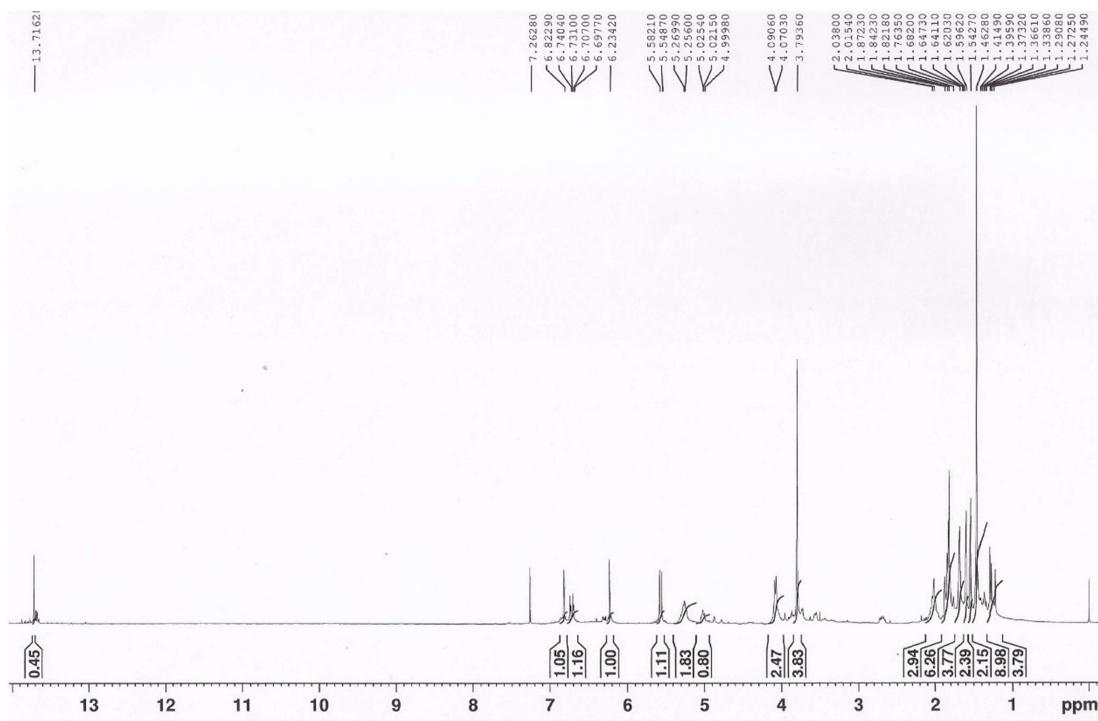


Figure S27. ^{13}C NMR spectrum of fuscaxanthone A (DMSO-*d*6, 75 MHz).

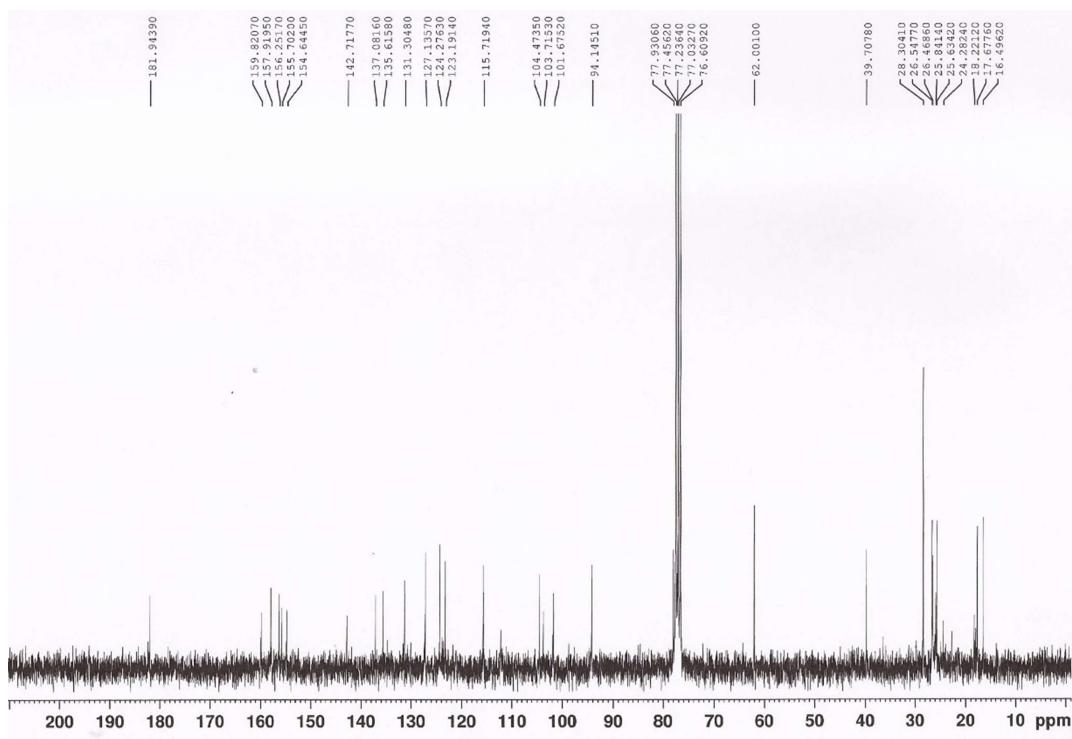


Figure S28. COSY spectrum of fuscaxanthone A (DMSO-*d*6, 300 MHz).

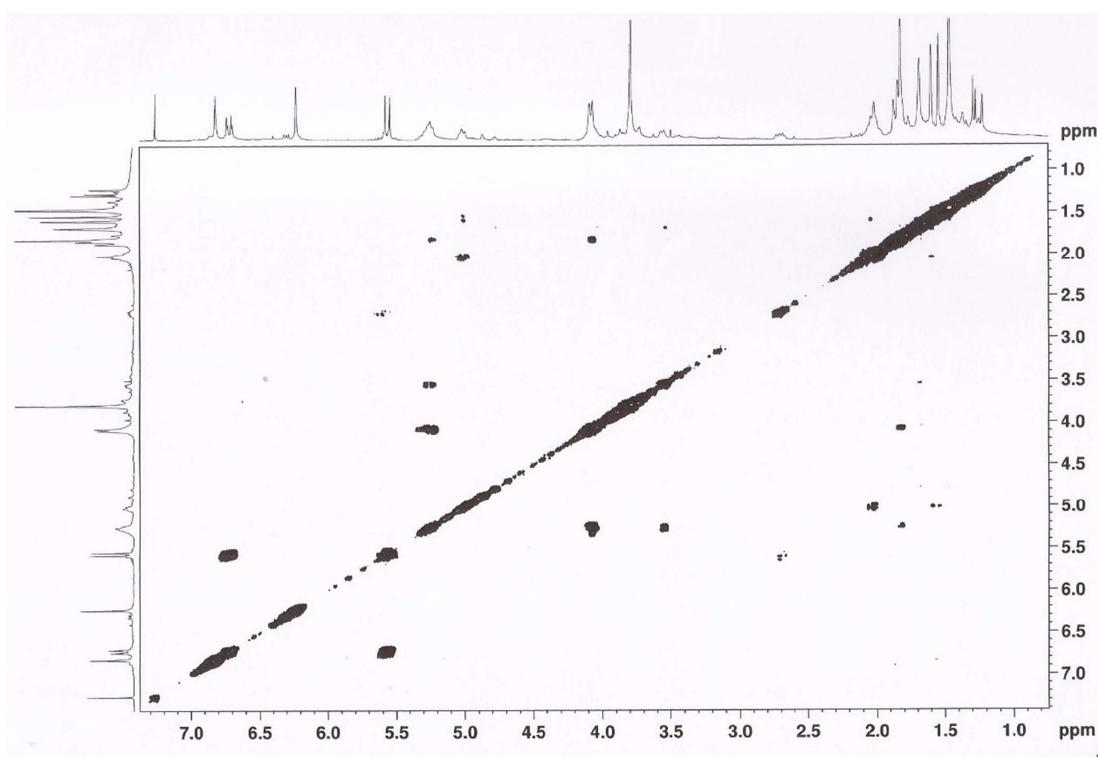


Figure S29. HSQC spectrum of fuscaxanthone A (DMSO-*d*6, 300 MHz).

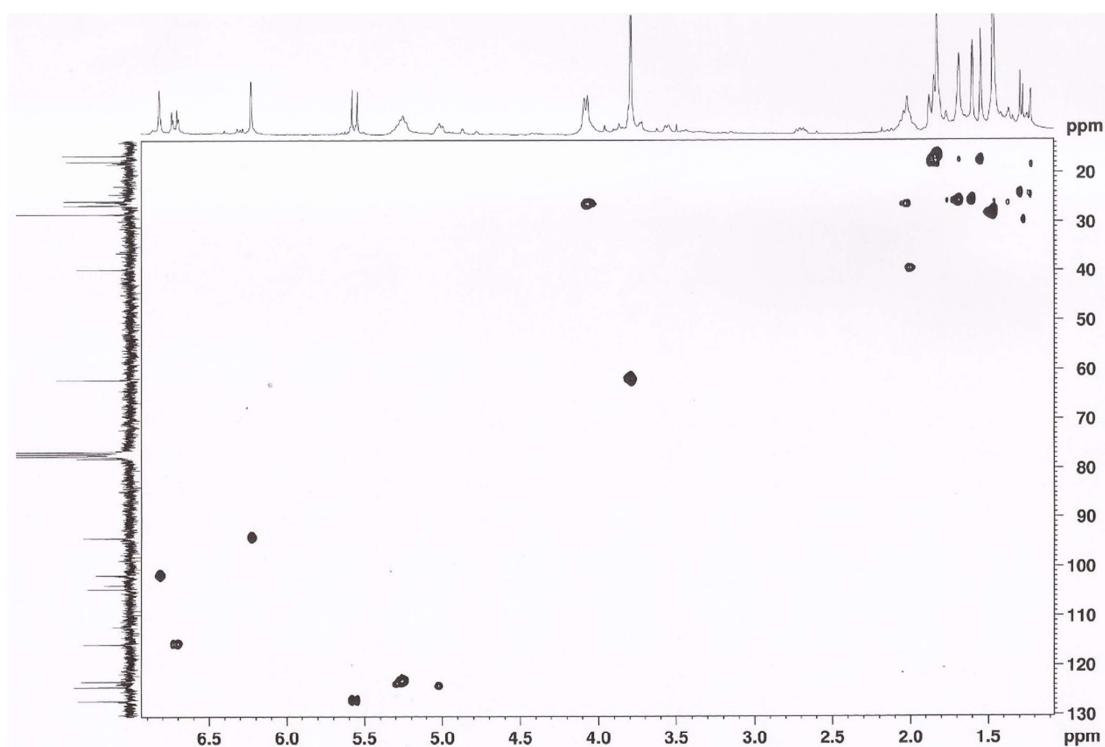


Figure S30. HMBC spectrum of fuscaxanthone A (DMSO-*d*6, 300 MHz).

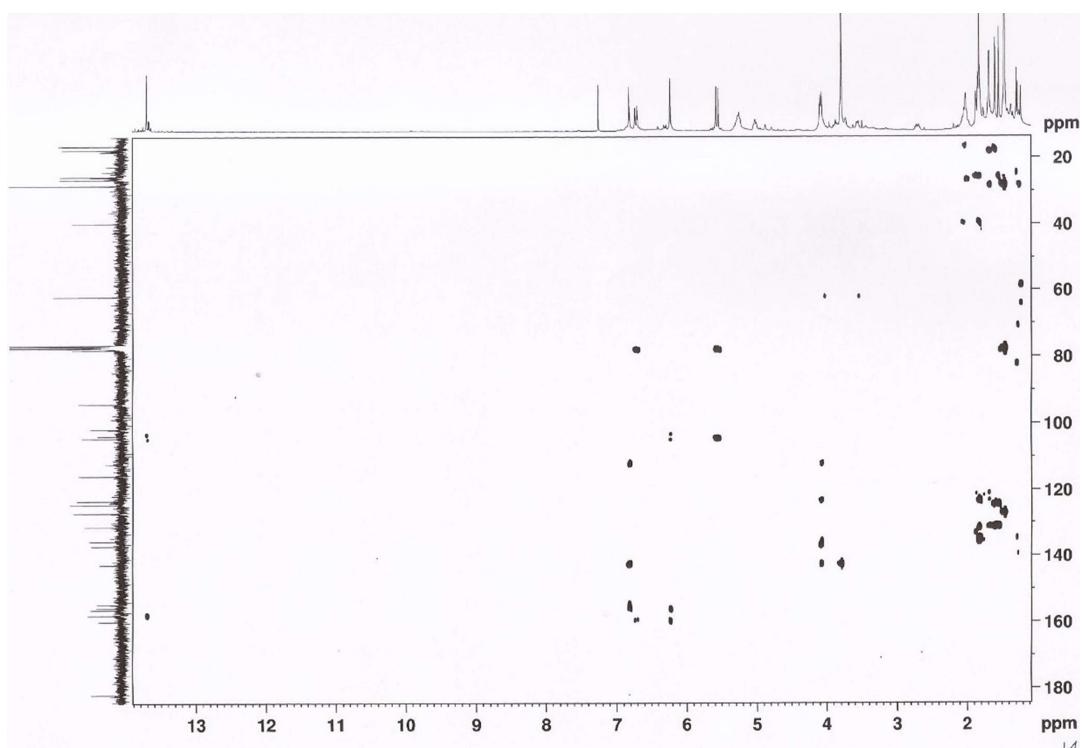


Figure S31. ^1H NMR spectrum of fuscaxanthone B (DMSO-*d*6, 300 MHz).

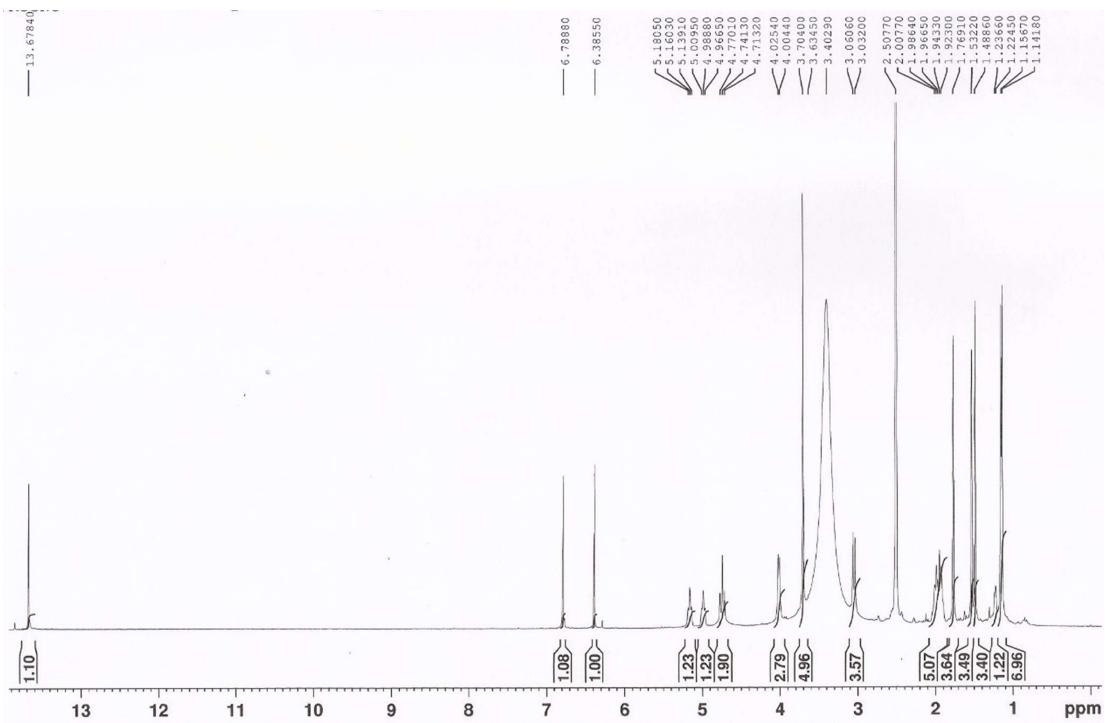


Figure S32. $^1\text{COSY}$ spectrum of fuscaxanthone B (DMSO-*d*6, 300 MHz).

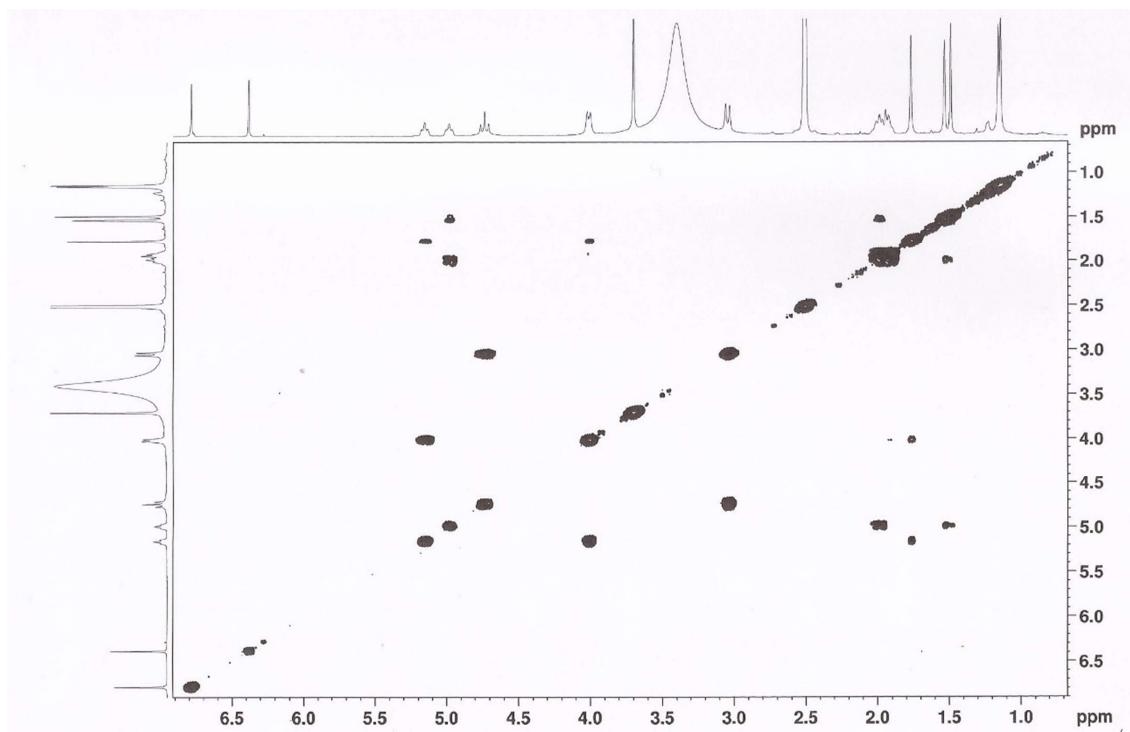


Figure S33. ^{13}C NMR spectrum of fuscaxanthone B (DMSO-*d*6, 300 MHz).

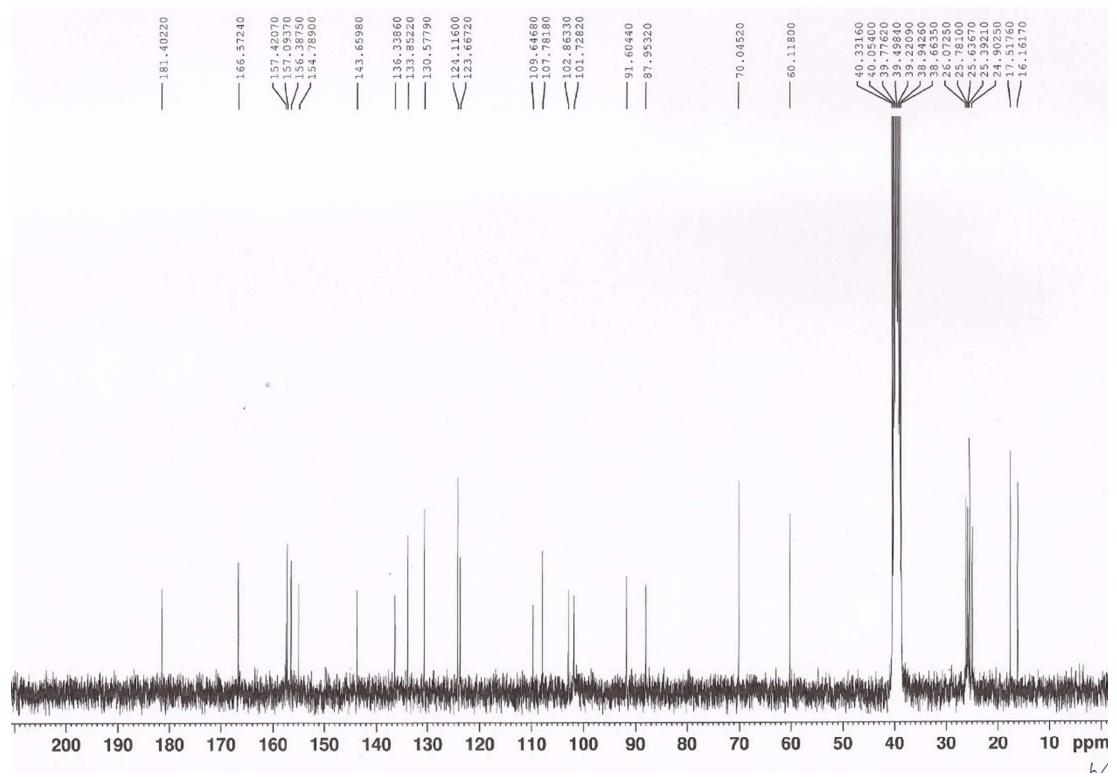


Figure S34. HSQC spectrum of fuscaxanthone B (DMSO-*d*6, 300 MHz).

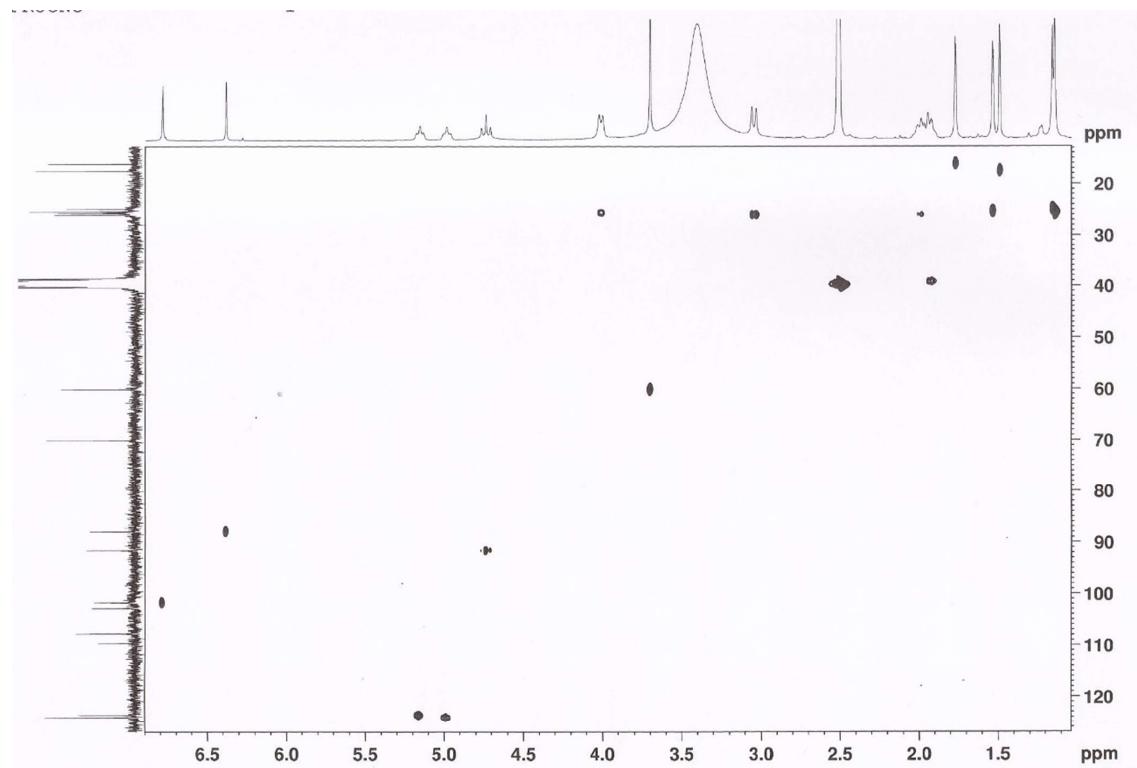


Figure S35. HMBC spectrum of fuscaxanthone B (DMSO-*d*6, 300 MHz).

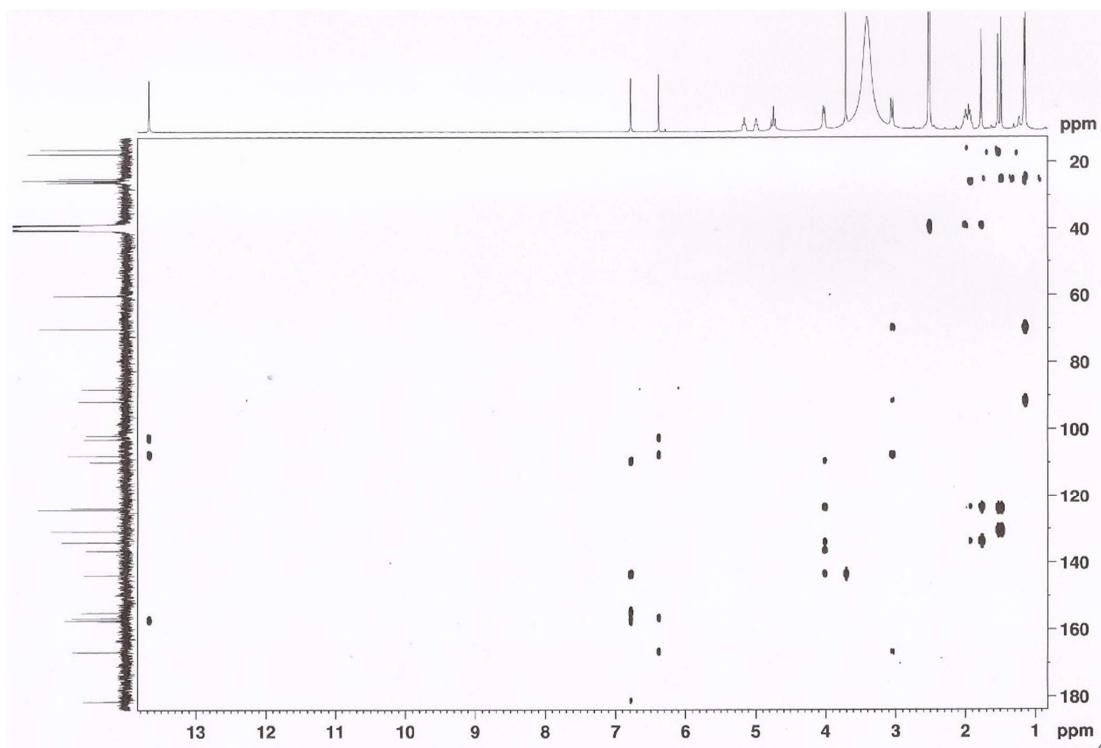


Figure S36. ¹H NMR spectrum of xanthochymusxanthone A (CDCl₃, 500 MHz).

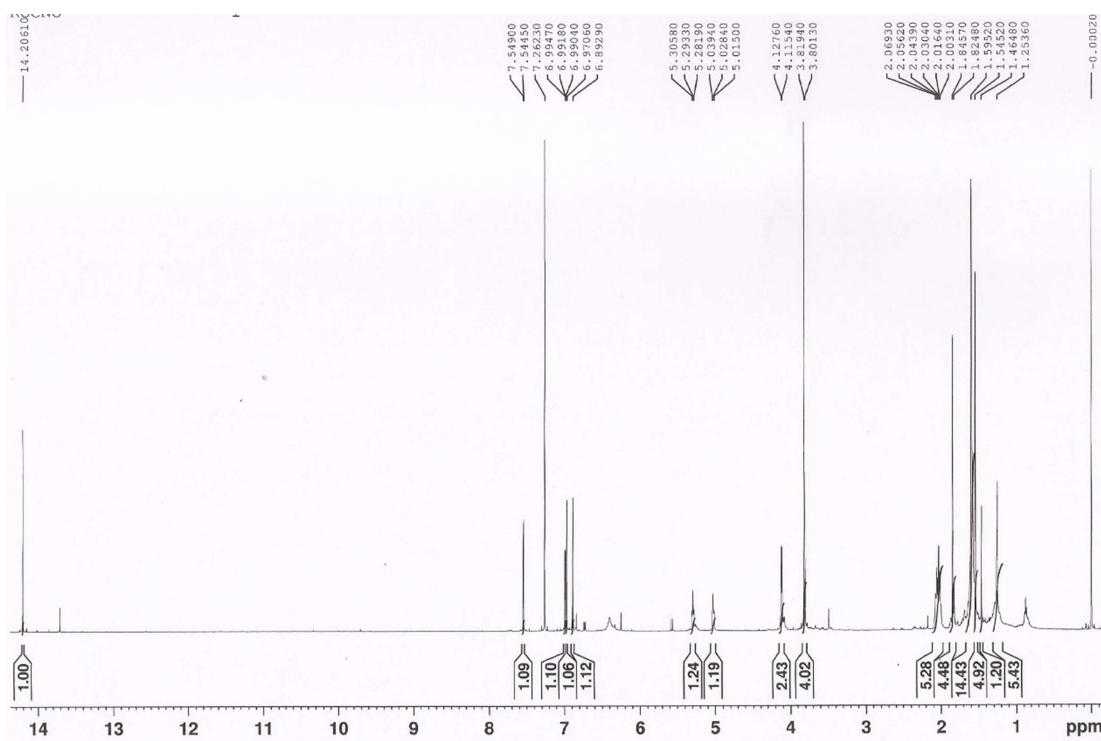


Figure S37. ^{13}C NMR spectrum of xanthochymusxanthone A (CDCl_3 , 125 MHz).

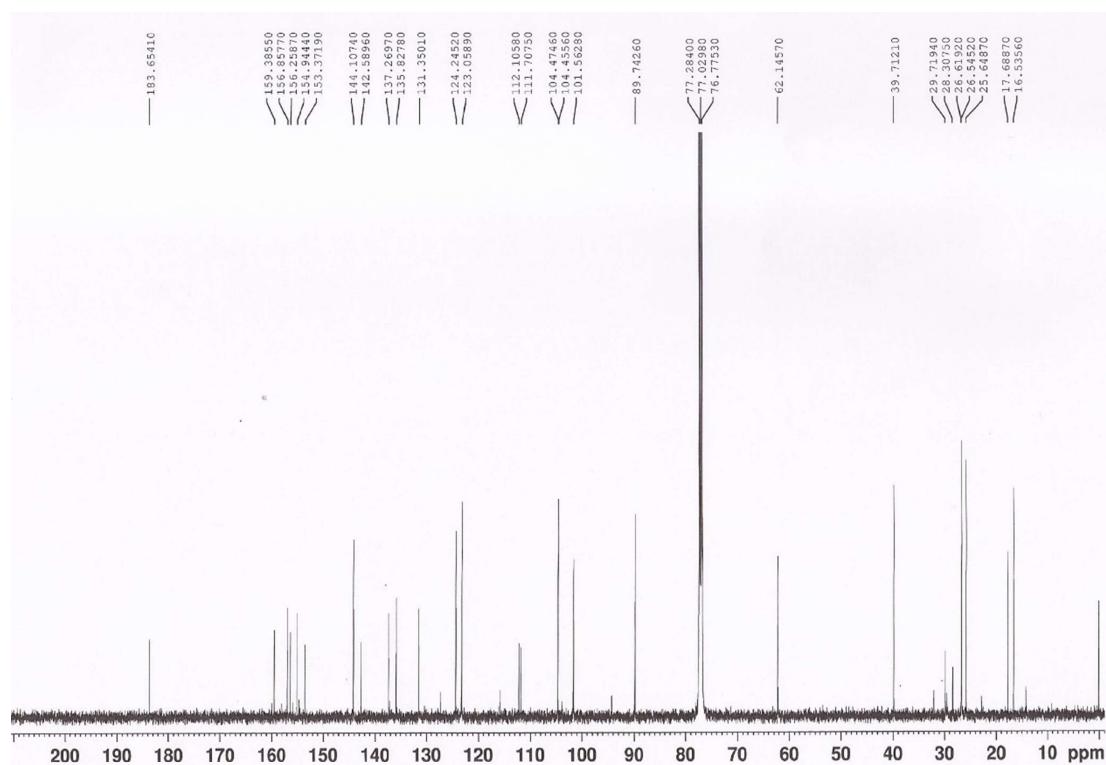


Figure S38. COSY spectrum of xanthochymusxanthone A (CDCl_3 , 500 MHz).

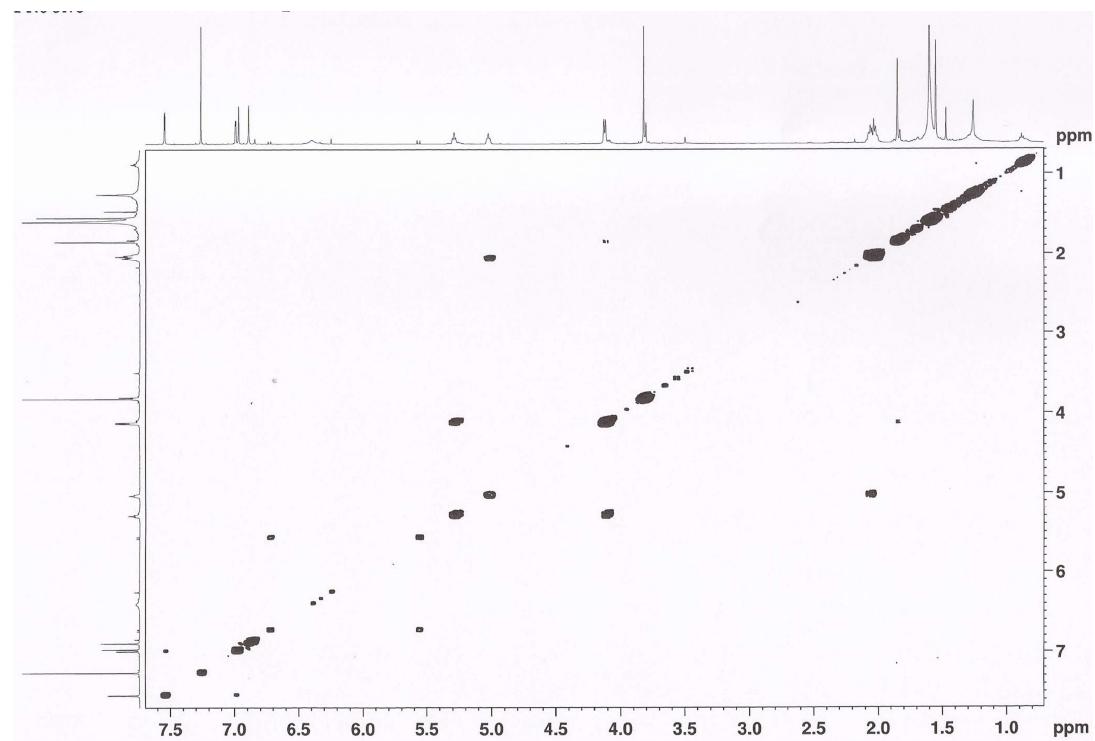


Figure S39. HSQC spectrum of xanthochymusxanthone A (CDCl_3 , 500 MHz).

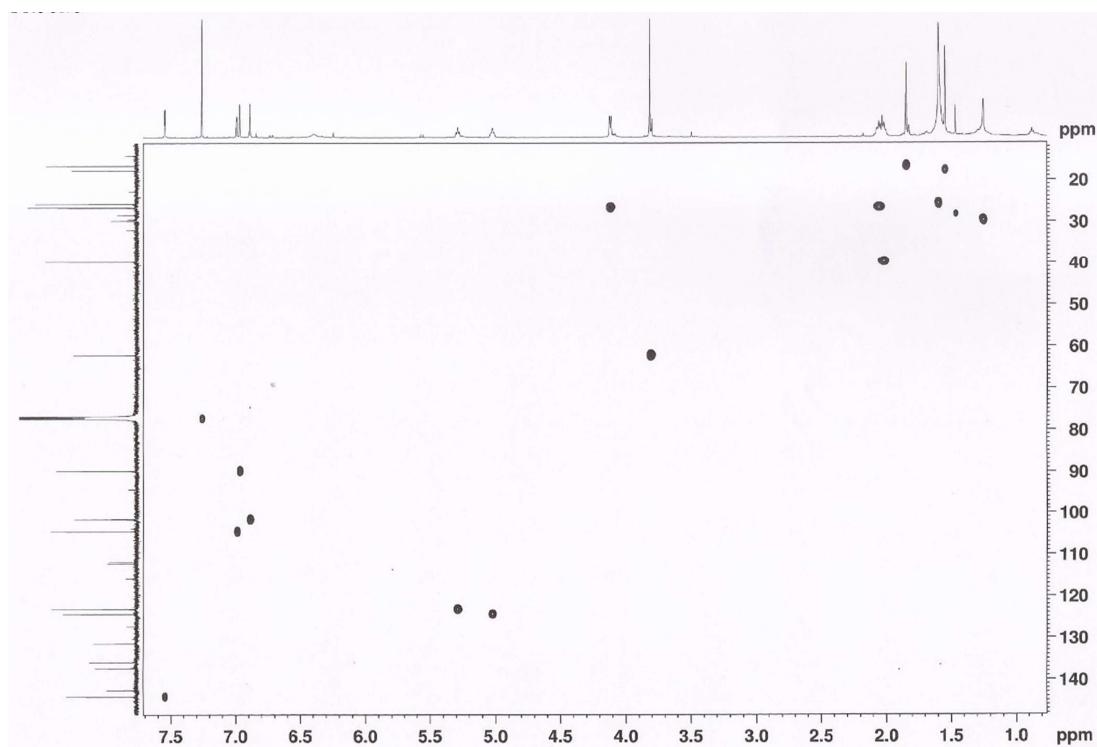


Figure S40. HMBC spectrum of xanthochymusxanthone A (CDCl_3 , 500 MHz).

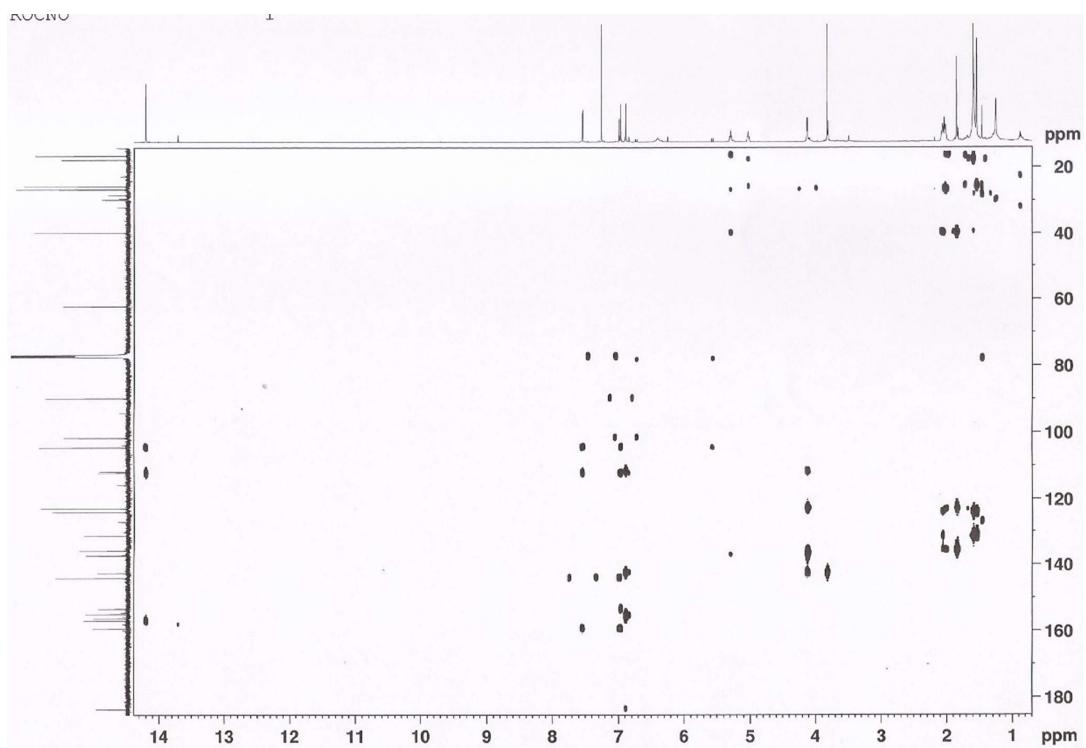


Figure S41. ^1H NMR spectrum of 7-*O*-methylgarcinone E (CDCl_3 , 300 MHz).

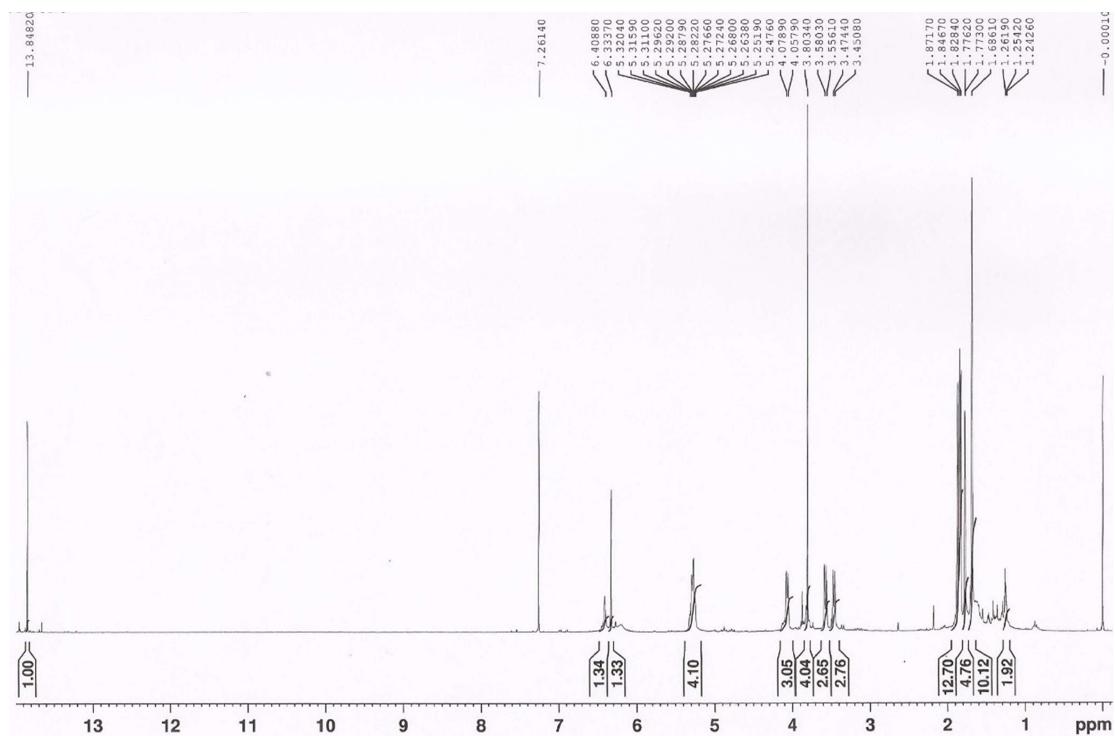


Figure S42. ^{13}C NMR spectrum of 7-*O*-methylgarcinone E (CDCl_3 , 75 MHz).

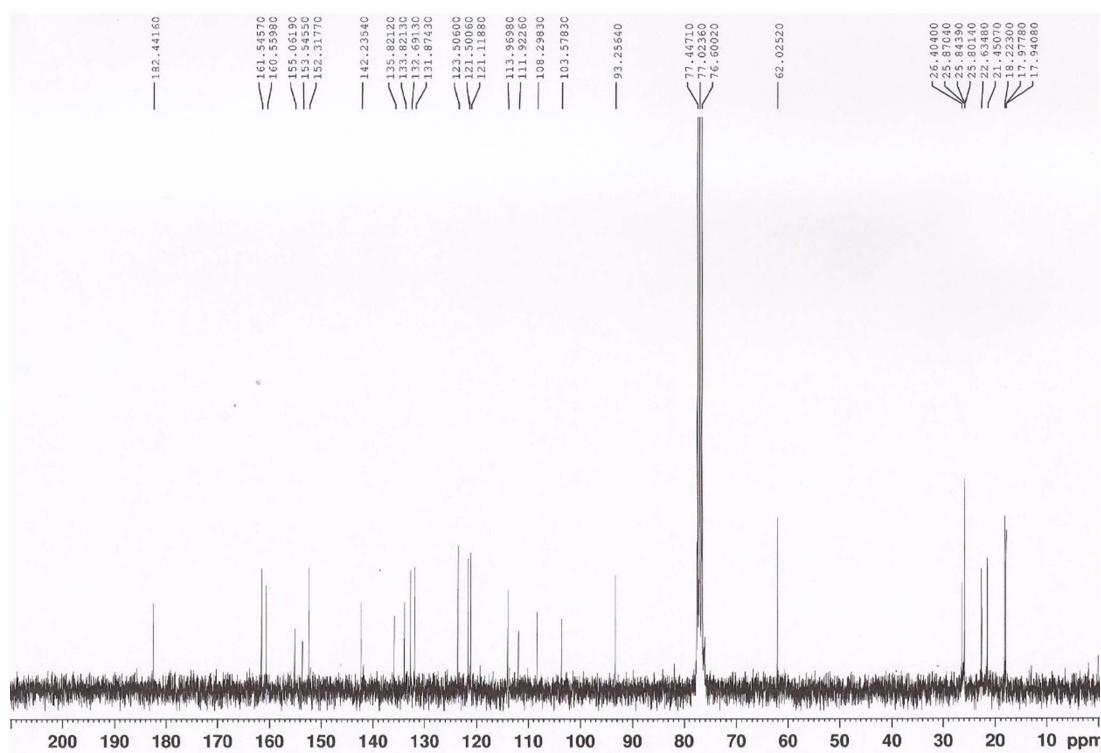


Figure S43. COSY spectrum of 7-*O*-methylgarcinone E (CDCl_3 , 300 MHz).

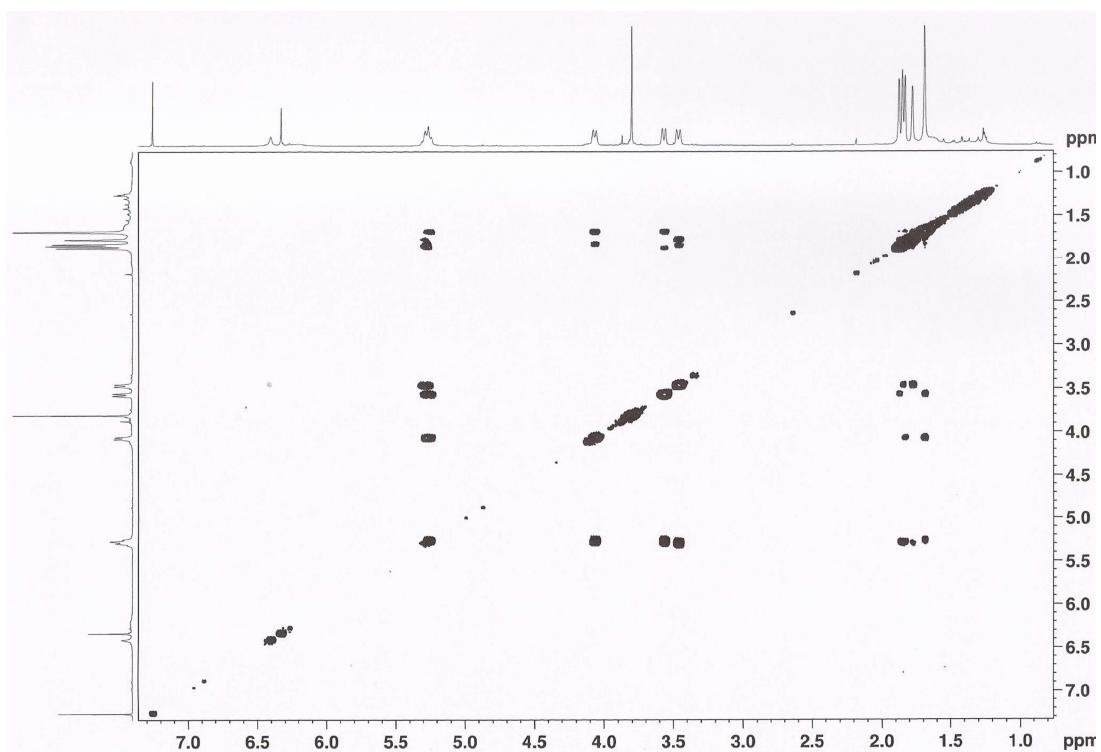


Figure S44. HSQC spectrum of 7-*O*-methylgarcinone E (CDCl_3 , 300 MHz).

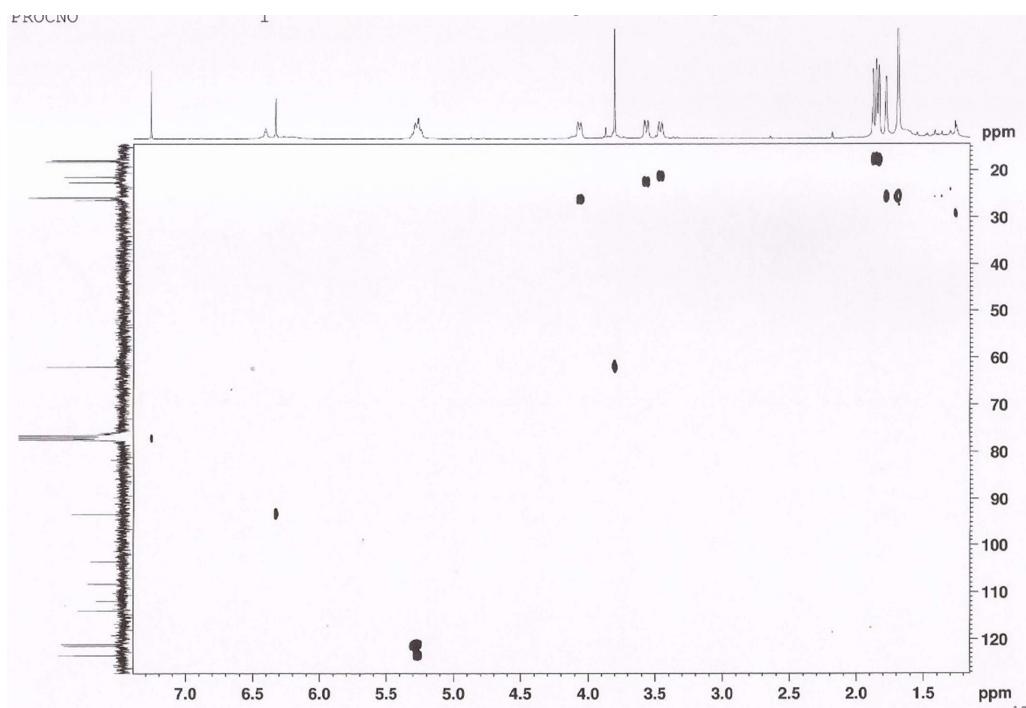


Figure S45. HMBC spectrum of 7-*O*-methylgarcinone E (CDCl_3 , 300 MHz).

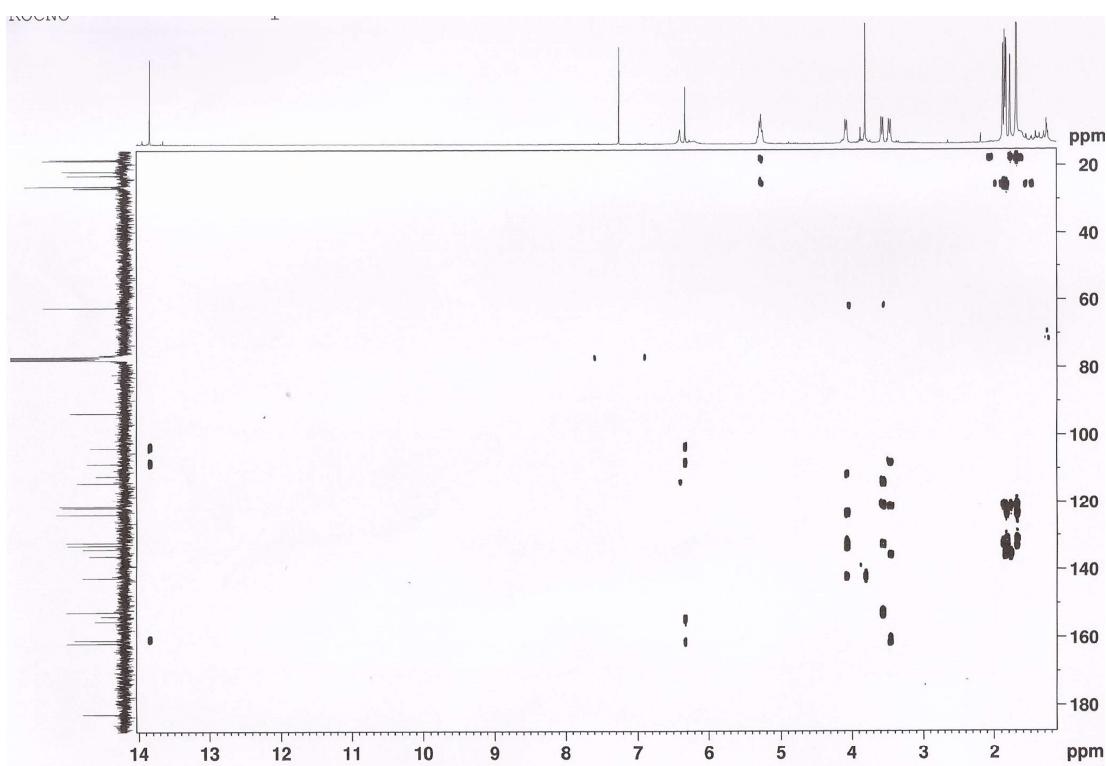


Figure S 46. ^1H NMR spectrum of cowagarcione A (CDCl_3 , 500 MHz).

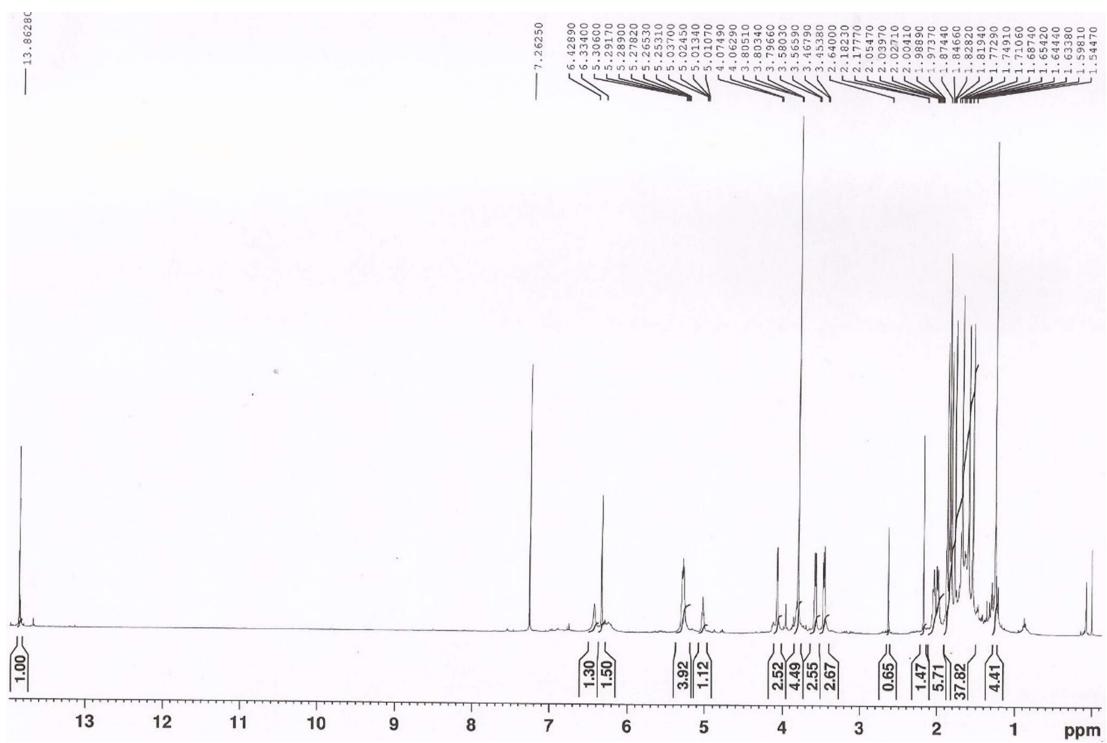


Figure S47. ^{13}C NMR spectrum of cowagarcione A (CDCl_3 , 125 MHz).

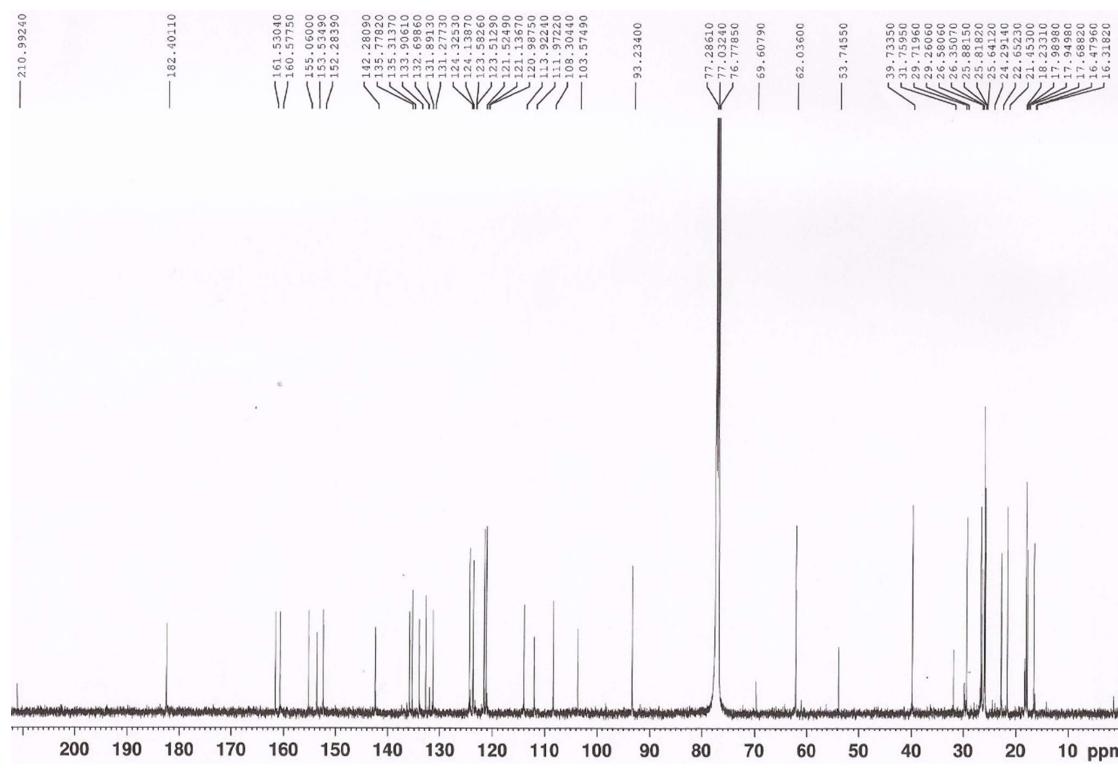


Figure S48. COSY spectrum of cowagarcione A (CDCl_3 , 500 MHz).

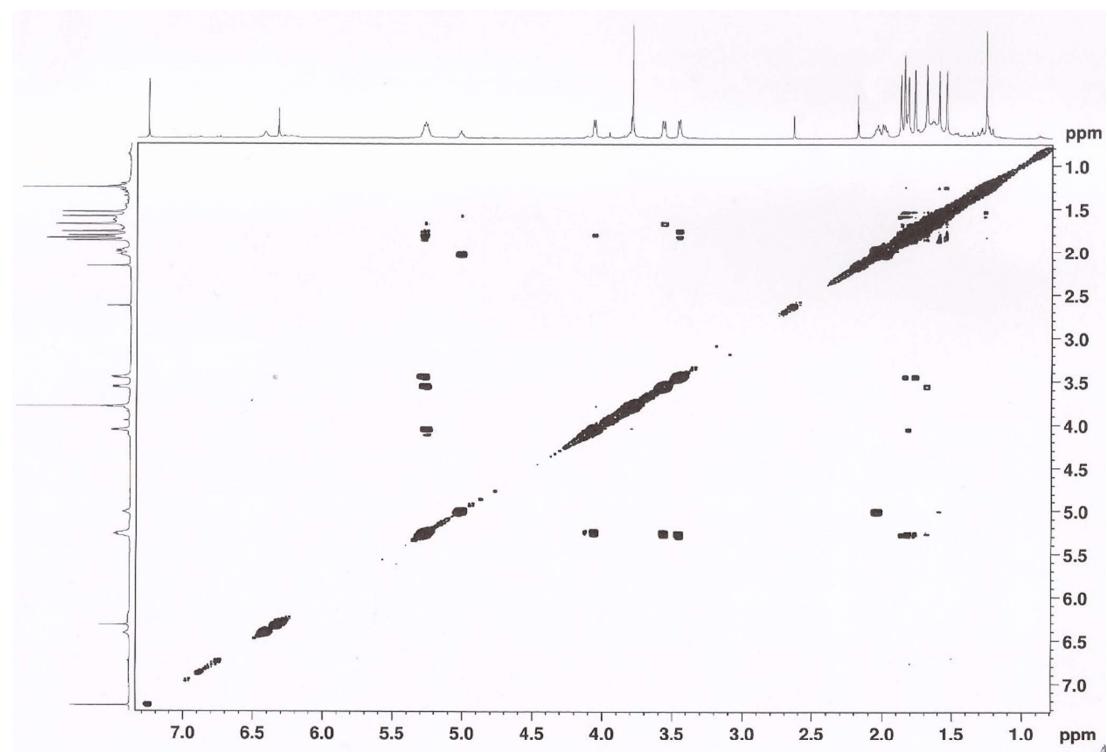


Figure S 49. HSQC spectrum of cowagarcione A (CDCl_3 , 500 MHz).

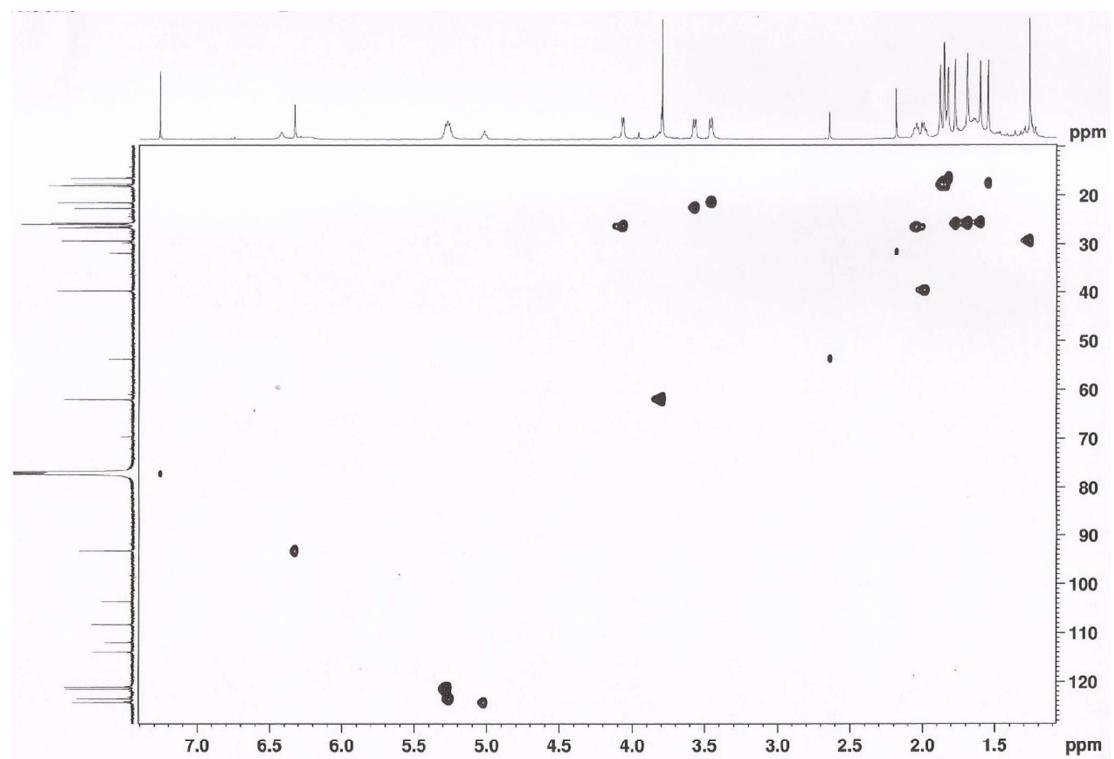


Figure S 50. HMBC spectrum of cowagarcione A (CDCl_3 , 500 MHz).

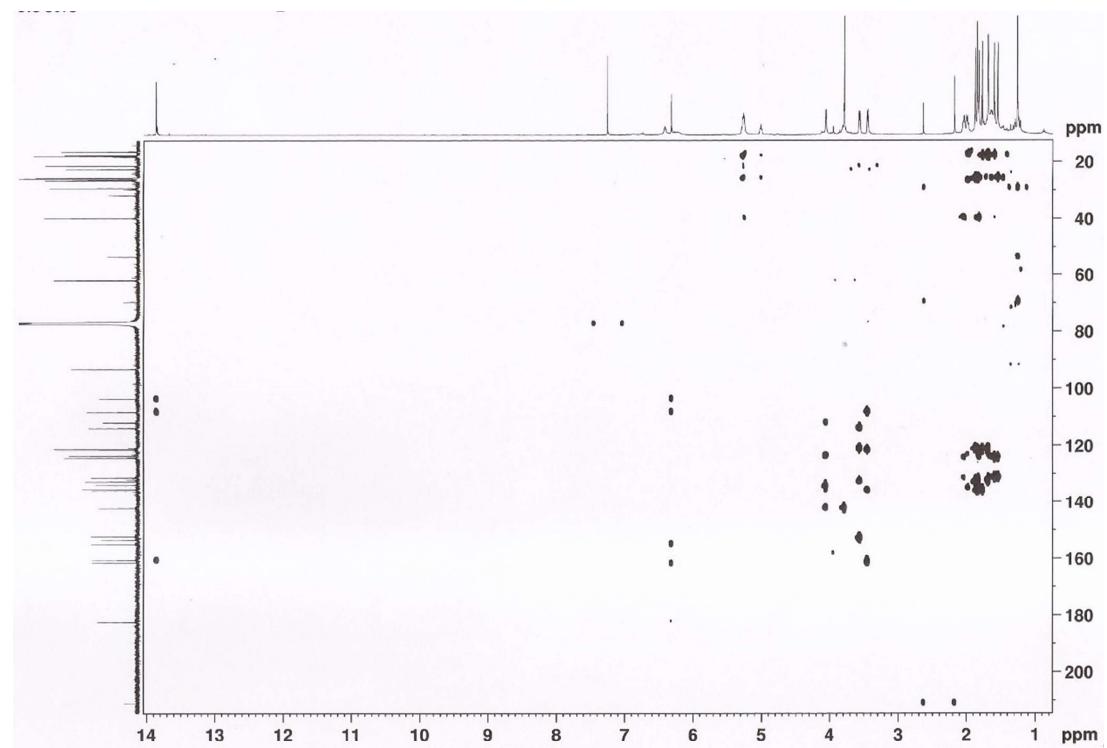
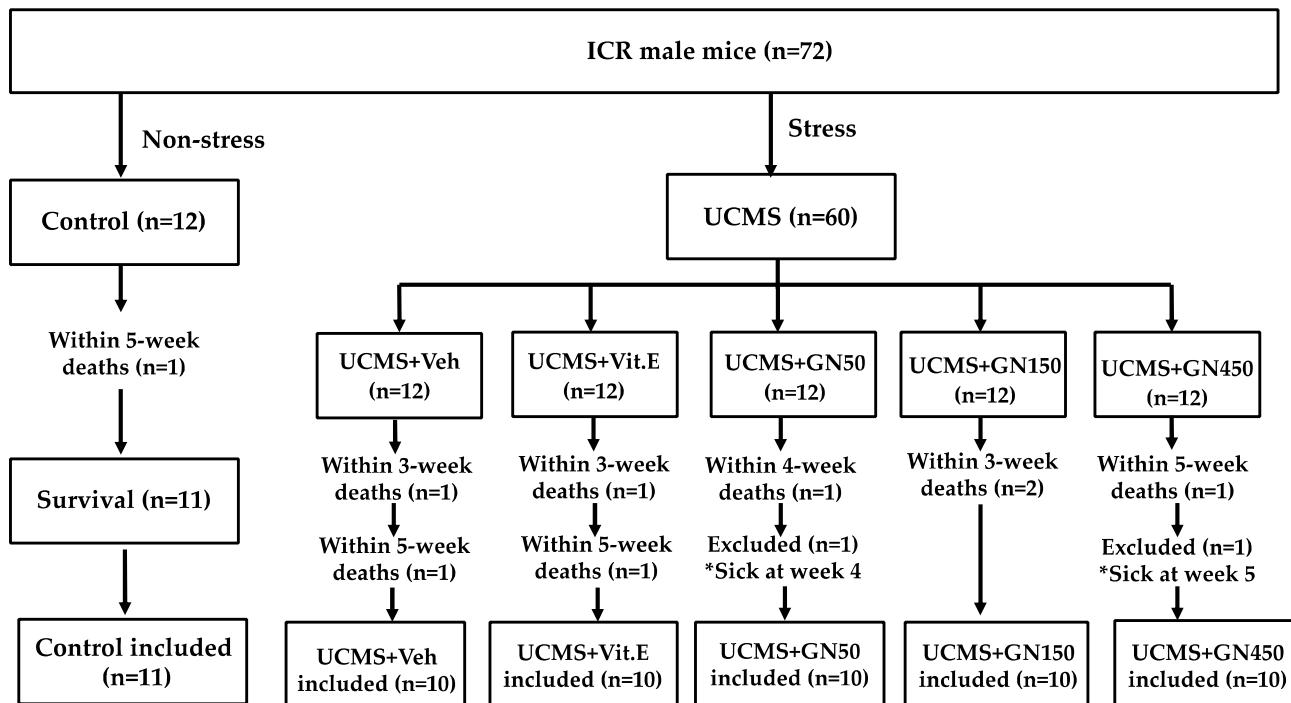


Figure S 51. A flow chart of the experimental protocol with the number of animals used, died, and included in this study*.



*All animal exclusions, along with the rationale for animal exclusions were summarized in a flowchart describing attrition in each group (ARRIVE guidelines 2.0).

Table S1. ^1H and ^{13}C NMR (300 and 75 MHz, CDCl_3) and HMBC assignments of cowagarcinone C (**1**).

Position	δ_{C} , type	δ_{H} (J in Hz)	COSY	HMBC
1	158.6, C			
2	110.7, C			
3	163.7, C			
4	90.6, CH	6.74, s	-	C-2, 3, 4a, 9 (w), 9a
4a	155.6, C			
5	134.4, C			
6	156.8, C			
7	114.2, CH	6.99, d (8.9)	H-8	C-5, 8a
8	120.8, CH	7.55, d (8.9)	H-7	C-6, 910a
8a	113.1, C			

9	179.6, C			
9a	102.1, C			
10a	150.5, C			
OMe-3	56.5, CH ₃	3.94, s		C-3
OMe-5	60.8, CH ₃	3.91, s		C-5
1'	20.9, CH ₂	3.23, d (7.0)	H-2', H ₃ -4', H ₃ -5'	C-2, 2', 3'
2'	122.0, CH	5.13, m	H-1', H ₃ -4', H ₃ -5'	
3'	130.9, C			
4'	25.5, CH ₃	1.62, s	H-1', 2'	C-2', 3', 5'
5'	17.6, CH ₃	1.73, s	H-1', 2'	C-2', 3', 4'
OH-1	-	13.19, s		C-1, 2, 9a

Table S2. ¹H and ¹³C NMR (300 and 75 MHz, CDCl₃) and HMBC assignments of cowaxanthone (**2**).

Position	δ_{C} , Type	δ_{H} (J in Hz)	COSY	HMBC
1	159.4, C			
2	109.8, C			
3	162.5, C			
4	93.0, CH	6.41, s		C-2, 3, 4a, 9, 9a
4a	155.0, C			
5	102.7, CH	6.90. s		C-6, 7, 8a, 9, 10a
6	151.8, C			
7	145.9, C			
8	104.7, CH	7.43, s		C-6, 7, 8a, 9, 10a
8a	111.5, C			
9	178.8, CO			
9a	101.4, C			
10a	154.4, C			
OMe-7	55.9, OMe	3.88, s		C-7
1'	20.9, CH ₂	3.23, d (7.0)	H-2', Me-10	C-1, 2, 3, 2', 3'
2'	122.2, CH	5.18, m	H-1', Me-10,	
3'	134.0, C			

4'	39.2, CH ₂	1.91, m		C-2', 3'
5'	26.2, CH ₂	2.01, m	H-6', 4', Me-8', 9'	C-4', 6'
6'	124.1, CH	5.02, m	H-5', Me-8', 9'	
7'	130.6, C			
8'	25.4, CH ₃	1.57, s	H-5', 6'	C-6', 7', 9'
9'	17.5, CH ₃	1.51, s	H-5', 6'	C-6', 7', 8'
10'	15.9, CH ₃	1.73, s	H-1', 2'	C-2', 3', 4'
OH-1	-	13.37, s		C-1, 2, 9a
OH-3/6	-	10.86, brs		

Table S3. ¹H and ¹³C NMR (300 and 75 MHz, CDCl₃) and HMBC assignments of α -mangostin (**3**)

Position	δ_{C} , Type	δ_{H} (<i>J</i> in Hz)	COSY	HMBC
1	160.6, C			
2	108.5, C			
3	161.6, C			
4	93.3, CH	6.29, s		C-2,3,4a, 9a
4a	155.1, C			
5	101.6, CH	6.83, s		C-6,7,8a,9 (w), 10a
6	154.6, C			
7	142.5, C			
8	137.0, C			
8a	112.2, C			
9	182.0, CO			
9a	103.6, C			
10a	155.8, C			
OMe-7	62.1, OCH ₃	3.81, s		C-7
1'	21.5, CH ₂	3.45, d (7.1)	H-2', Me-4', 5'	C-1, 2, 2', 3, 3'
2'	121.5, CH	5.29, m	H-1', Me-4', 5'	
3'	135.8, C			
4'	25.9, CH ₃	1.77, d (0.9)		C-2', 3', 5'
5'	18.2, CH ₃	1.84, s		C-2', 3', 4'

1"	26.6, CH ₂	4.09, d (6.7)	H-2", Me-4", 5"	C-2", 3", 7,8,8a
2"	123.2, CH	5.27, s	H-1", Me-4", 5"	
3"	135.8, C			
4"	25.8, CH ₃	1.69, d (0.9)		C-2", 3", 5"
5"	17.9 CH ₃	1.83, s		C-2", 3", 4"
OH-1	-	13.77, s		C-1,2,9a

Table S4. ¹H and ¹³C NMR (300 and 75 MHz, CDCl₃) and HMBC assignments of cowanxanthone B (**4**).

Position	δ_{C} , Type	δ_{H} (<i>J</i> in Hz)	COSY	HMBC
1	160.6, C			
2	108.5, C			
3	161.6, C			
4	93.1, CH	6.32, d (1.0)		C-2, 3, 4a, 9a
4a	155.0, C			
5	98.3, CH	6.73, s		C-4a, 6, 7, 8a, 10a
6	158.1, C			
7	143.9, C			
8	137.3, C			
8a	111.9, C			
9	182.1, CO			
9a	103.8, C			
10a	155.5, C			
OMe-6	56.0, OCH ₃	3.96, s		C-6
OMe-7	61.0, OCH ₃	3.79, s		C-7
1'	21.5, CH ₂	3.46, d (7.1)	H-2', Me-4', 5'	C-1, 2, 2', 3, 3'
2'	121.5, CH	5.29, m	H ₂ -1', Me-4', 5'	
3'	135.7, C			
4'	26.0, CH ₃	1.77, d (0.9)		C-2', 3', Me-5'
5'	18.2, CH ₃	1.85, s		C-2', 3', Me-4'
1"	26.2, CH ₂	4.13, d (6.5)	H-2", Me-4", 5"	C-2", 3", 7, 8, 8a
2"	123.2, CH	5.22, m	H ₂ -1", Me-4", 5"	

3"	131.9, C			
4"	25.9, CH ₃	1.68, s		C-2", 3", Me-5"
5"	17.9, CH ₃	1.85, s		C-2", 3", Me-4"
OH-1	-	13.84s		C-1, 2, 9a

Table S5. ¹H and ¹³C NMR data of (300 and 75 MHz, DMSO-d6) and HMBC assignment of cowanin (**5**).

Position	δ_{C} , Type	δ_{H} (<i>J</i> in Hz)	COSY	HMBC
1	159.9, C			
2	109.6, C			
3	162.3, C			
4	92.2, CH	6.33, s		C-2, 3, 4a, 9, 9a
4a	154.2			
5	101.8, CH	6.78, s		C-6, 7, 8a, 9, 10a
6	156.9, C			
7	143.3, C			
8	136.5, C			
8a	110.0, C			
9	181.3, CO			
9a	101.9, C			
10a	154.6, C			
OMe-7	60.1, CH ₃	3.69, s		C-7
1'	20.2, CH ₂	3.19, m	H-2', Me-4", 5"	1, 2, 2', 3, 3'
2'	122.5, CH	5.17, t (7.1)	H-1', Me-4', 5'	
3'	130.3, C			
4'	25.5, CH ₃	1.61, s	H-1', 2'	C2', 3', 5'
5'	17.7, CH ₃	1.72, s	H-1', 2'	C-2', 3', 4'
1"	25.6, CH ₂	4.00, d (6.3)	H-2", Me-10"	C-2", 3", 7, 8, 8a
2"	123.7, CH	5.15, t (6.3)	H-1", Me-10"	C-8
3"	133.8, C			
4"	39.2, CH ₂	1.92, m	H-5", 6"	C-5", 6", 10"
5"	26.1, CH ₂	1.96, m	H-4", 6", Me-8", 9"	C-4", 6", 10"
6"	124.1, CH	4.97,d (6.3)	H-5", Me-8", 9"	
7"	130.5, C			
8"	25.3, CH ₃	1.51, s	H-5", 6"	C-6", 7", 9"
9"	17.4, CH ₃	1.47, s	H-1", 5"	C-6", 7", 8"
10"	16.1, CH ₃	1.76, s	H-1", 2"	C-2", 3", 4"
OH-1		13.71, s		C-1, 2, 9a,
OH-3/7		10.86, brs		

Table S6. ¹H and ¹³C NMR data of (300 and 75 MHz, CDCl₃) and HMBC assignment of fuscxanthone A (**6**).

Position	δ_{C} , Type	δ_{H} (<i>J</i> in Hz)	COSY	HMBC
1	157.9, C			
2	104.6, C			

3	159.8, C			
4	94.1, CH	6.23, s		C-2, 3, 4a, 9a
4a	155.7, C			
5	101.7, C	6.82, s		C-6, 7, 8a, 9, 10a
6	156.3, C			
7	142.7, C			
8	137.1, C			
8a	113.0, C			
9	181.9, CO			
9a	103.7, C			
1'	115.7, CH	6.72, d (10.0)	H-2'	C-3, 3'
2'	127.1, CH	5.57, d (10.0)	H-1'	C-2, 3'
3'	77.9, C			
4'	28.3, CH ₃	1.46, s		
5'	28.3, CH ₃	1.46, s		
1''	26.6, CH ₂	4.08, d (6.1)	H-2'', Me-10''	C-2'', 3'', 7, 8, 8a
2''	123.2, CH	5.27, m	H-1'', Me-10''	
3''	135.6, C			
4''	39.7, CH ₂	2.02, m		C-5''
5''	26.5 CH ₂	2.04, m		C-4'', Me-10''
6''	124.3, CH	5.02,m	Me-8'', 9''H-4'',	
7''	131.1, C			
8''	25.6, CH ₃	1.60, s		Me-9''
9''	17.7, CH ₃	1.54, s		Me-8''
10''	16.5, CH ₃	1.82, s		C-4'', 5''
OMe-7	62.0, CH ₃	3.79, s		C-7
OH-1	-	13.72, s		C-1, 2, 9a

Table S7. ¹H and ¹³C NMR (300 and 75 MHz, DMSO-d₆) and HMBC assignment of fuscxanthone B (7).

Position	δ_{C} , Type	δ_{H} (J in Hz)	COSY	HMBC
1	157.4, C			
2	107.8, C			
3	166.6, C			
4	88.0, CH	6.39, s		C-2, 3, 4a, 9a
4a	156.4, C			
5	101.7, CH	6.73, s		C-6, 7, 8a, 9, 10a
6	157.1, C			
7	143.7, C			
8	136.3, C			
8a	109.6, C			
9	181.4, CO			
9a	102.9, C			
10a	154.8, C			
1'	26.1, CH ₂	3.05, d (8.6)		C-2, 3, 3', 4'
2'	91.6, CH	4.74, t (8.6)		
3'	70.0, C-3'			
4'	24.9, CH ₃	1.14,s		C-C-2', 3', 5'
5'	25.8, CH ₃	1.16, s		C-2', 3', 4'

1"	25.6, CH ₂	4.01, d (6.3)	H-2", Me-10"	C-2", 3", 7, 8, 8a
2"	123.6, CH	5.16 t (6.1)	H-1", Me-10"	
3"	133.9, C			
4"	39.2, CH ₂	1.94, m		C-2", 3", 5"
5"	26.1, CH ₂	1.99, m	H-6"	C-4"
6"	124.1, CH	4.99, t (6.7)	H-5", Me-8", 9"	
7"	130.6, C			
8"	25.4, CH ₃	1.53, s	H-6"	C-6", 7", 9"
9"	17.5, CH ₃	1.49, s	H-6"	C-6", 7", 8"
10"	16.2, CH ₃	1.77, s	H-2"	C-2", 3", 4"
OMe-7	60.1, OCH ₃	3.70, s		C-7
OH-1	-	13.68s		C-1, 2, 4a

Table S8. ¹H and ¹³C NMR (500 and 125 MHz, CDCl₃) and HMBC assignment of xanthochymusxanthone A (**8**).

Position	δ_{C} , Type	δ_{H} (<i>J</i> in Hz)	COSY	HMBC
1	156.9, C			
2	112.1, C			
3	159.4, C			
4	89.7, CH	6.97, s		C-4a, 9a
4a	153.3, C			C-6, 7, 8a, 9
5	101.6, CH	6.89, s		
6	156.3, C			
7	142.6, C			
8	137.3, C			
8a	111.7, C			
9	183.7, CO			
9a	104.5, C			
10a	154.9, C			
11	104.5, CH	6.99, dd (2.3, 0.8)	H-12	C-3, C-12
12	144.2, CH	7.55, d (2.3)	H-11	C-2, 3, 11
1'	26.6, CH ₂	4.12, d (6.6)	H-2'	C-7, 8, 8a
2'	123.1, CH	5.29, t (6.3)	H-1'	C-8
3'	135.8, C			
4'	39.2, CH ₂	2.02, m	H-5'	C-2', 3'
5'	26.5, CH ₂	2.06, m	H-4', 6'	C-6', 7'
6'	124.2, CH	5.03, t (6.7)	H-5'	
7'	131.4, C			
8'	25.6, CH ₃	1.60, s		C-6', 7'
9'	17.7, CH ₃	1.55, s		C-6', 7'
10'	16.5, CH ₃	1.85, s		C-2', 3'
OMe-7	62.1, OCH ₃	3.82, s		C-7
OH-1	-	14.24, s		C-1, 2, 9a

Table S9. ^1H and ^{13}C NMR (500 and 125 MHz, CDCl_3) and HMBC assignment of 7-*O*-methylgarcinone E (**9**).

Position	δ_{C} , Type	δ_{H} (J in Hz)	COSY	HMBC
1	160.6, C			
2	103.6, C			
3	161.5, C			
4	93.3, CH	6.33, s		C-2, 3, 4a, 9a
4a	152.3, C			
5	114.0, C			
6	153.1, C			
7	142.2, C			
8	133.8, C			
8a	111.9, C			
9	182.4, CO			
9a	108.3, C			
10a	152.3, C			
1'	21.5, CH_2	3.46, d (7.1)	H-2'. Me-4', 5'	C-1, 2, 3, 2', 3'
2'	121.5, CH	5.29, m		
3'	135.8, C			
4'	25.8, CH_3	1.77, d (0.1)		C-2', 3'
5'	18.0, CH_3	1.85, s		C-3'
1''	22.6, CH_2	3.57, d (7.3)	H-2''. Me-4'', 5''	C-2'', 3'', 5, 10a
2''	121.1, CH	5.27, m		
3''	132.7, C			
4''	25.8, CH_3	1.60, s		C-2'', 3''
5''	18.2, CH_3	1.87, s		C-2'', 3''
1'''	26.4, CH_2	4.07, d (6.3)	H-2'''. Me-4''', 5'''	C-2''', 7, 8, 8a
2'''	123.5, CH	5.27, m		
3'''	131.9			
4'''	26.0, CH_3	1.60, s		C-2''', 3''''
5'''	17.9, CH_3	1.83, s		C-2''', 3''''
OMe-7	62.0, OCH_3	3.80, s		C-7
OH-1	-	13.85, s		C-1, 2, 9a
OH-6	-	6.41, brs		C-5

Table S10. ^1H and ^{13}C NMR (500 and 125 MHz, CDCl_3) and HMBC assignment of cowagarcinone A (**10**).

Position	δ_{C} , Type	δ_{H} (J in Hz)	COSY	HMBC
1	160.6, C			
2	108.3, C			
3	161.5, C			
4	93.2, CH	6.33s		C-2, 3, 4a, 9a
4a	155.1			
5	113.9, C			
6	152.3, C			
7	142.3, C			

8	133.9, C			
8a	112.0, C			
9	182.4CO			
9a	103.6, C			
10a	153.5, C			
1'	21.5, CH ₂		H-2'	C-2, 2', 3'
2'	121.5, CH	5.29, m	H-1'	
3'	135.8, C			
4'	25.9, CH ₃	1.77,s		C-2', 3'
5'	17.9, CH ₃	1.85, s		C-2', 3'
1''	22.7, CH ₂	3.57, d (7.2)	H-2'', Me-4''	C-5, 2'', 3''
2''	121.1, CH	5.26, m	H-1''	
3''	132.7, C			
4''	25.8, CH ₃	1.69, s	H-5'''	C-2'', 3''
5''	18.0, CH ₃	1.87, s	H-4''', 6'''	C-2'', 3''
1'''	26.4, CH ₂	4.07, d (6.0)	H-2''', Me-10'''	C-2''', 7, 8, 9a
2'''	123.6, CH	5.26, m		
3'''	135.3, C			
4'''	39.7, CH ₂	1.99, m	H-5'''	C-3'''
5'''	26.6, CH ₂	2.04, m	H-4'''	C-4'''
6'''	124.3, CH	5.02,m		
7'''	1313, C			
8'''	25.6, CH ₃	1.60,s		C-6''', 7'''
9'''	17.7, CH ₂	1.54, s		C-6''', 7'''
10'''	16.5, CH ₃	1.82, s		C-2''', 3'''
OMe-7	62.0, OCH ₃	3.80, s		C-7
OH-1		13.86, s		C-1, 2, 9a

1. Statistical Analysis Effect of GN bark resin on UCMS-Induced Cognitive Deficit Behavioral Using Y-maze test

Table S11. One-way analysis of variance (ANOVA) test of Y-maze test.

Group comparison	Statistical Analysis	
non-stress group vs. CMS + vehicle group	Paired <i>t</i> -test	
		<i>P</i> <0.001
	ANOVA followed by Tukey's post hoc test	
All group	<i>P</i>	<i>F</i> (DF _{between group} , DF _{residual})
UCMS + vehicle group vs. CMS + Vit E 100 group	<0.001	
UCMS + vehicle group vs. CMS + GN50 group	<0.001	
UCMS + vehicle group vs. CMS + GN150 group	0.081	
		<i>F</i> (4,46)=10.448

UCMS + vehicle group vs. CMS + GN450 group	<0.001	
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2. *Statistical Analysis Effect of GN bark resin on UCMS-Induced Cognitive Deficit Behavioral Using Novel Object Recognition Test (NORT)*

Table S12. One-way analysis of variance (ANOVA) test of novel object recognition test (NORT).

Group comparison	Statistical Analysis	
The sample phase trial	ANOVA followed by Tukey's post hoc test	
	Not significant $P=0.329$	
The test phase trial	Statistical Analysis	
non-stress group vs. CMS + vehicle group	Paired <i>t</i> -test $P < 0.001$	
All group	ANOVA followed by Tukey's post hoc test	
UCMS + vehicle group vs. CMS + Vit E 100 group	P	F ($DF_{\text{between group}}$, DF_{residual})
UCMS + vehicle group vs. CMS + GN50 group	0.721	$F(4,46)=10.448$
UCMS + vehicle group vs. CMS + GN150 group	0.035	
UCMS + vehicle group vs. CMS + GN450 group	<0.001	
UCMS + GN 50 vs. UCMS + 450 group	0.006	

3. *Statistical Analysis Effect of GN bark resin on UCMS-Induced Cognitive Deficit Behavioral Using Morris Water Maze Test (MWMT)*

Table S13.1. One-Way Repeated Measures ANOVA test of MWMT on the training test.

Day 1		
Group comparison	Statistical Analysis	
non-stress group vs. CMS + vehicle group	Paired <i>t</i> -test Not significant $P = 0.187$	
All group	ANOVA followed by Tukey's post hoc test	
UCMS + vehicle group vs. CMS + Vit E 100 group	P	F ($DF_{\text{between subject}}$, $DF_{\text{between treatment}}$, DF_{residual})
UCMS + vehicle group vs. CMS + GN50 group	0.876	$F(10,4,36)=0.876$
UCMS + vehicle group vs. CMS + GN150 group	-	

UCMS + vehicle group vs. CMS + GN450 group	-	
Day 2		
Group comparison		Statistical Analysis
non-stress group vs. CMS + vehicle group		Paired <i>t-test</i> <0.001
All group	0.451	
UCMS + vehicle group vs. CMS + Vit E 100 group	-	
UCMS + vehicle group vs. CMS + GN50 group	-	
UCMS + vehicle group vs. CMS + GN150 group	-	
UCMS + vehicle group vs. CMS + GN450 group	-	
Day 3		
Group comparison		Statistical Analysis
non-stress group vs. CMS + vehicle group		Paired <i>t-test</i> <0.001
All group	<0.001	
UCMS + vehicle group vs. CMS + Vit E 100 group	<0.001	
UCMS + vehicle group vs. CMS + GN50 group	<0.001	
UCMS + vehicle group vs. CMS + GN150 group	<0.001	
UCMS + vehicle group vs. CMS + GN450 group	<0.001	
Day 4		
Group comparison		Statistical Analysis
non-stress group vs. CMS + vehicle group		Paired <i>t-test</i> <0.001
All group	<0.001	
UCMS + vehicle group vs. CMS + Vit E 100 group	<0.001	
UCMS + vehicle group vs. CMS + GN50 group	<0.001	
UCMS + vehicle group vs. CMS + GN150 group	<0.001	
UCMS + vehicle group vs. CMS + GN450 group	<0.001	

Day 5			
Group comparison	Statistical Analysis		
non-stress group vs. CMS + vehicle group	Paired <i>t</i> -test $P <0.001$		
	ANOVA followed by Tukey's post hoc test		
All group	$P <0.001$	$F(10,4,36)=17.495$	
UCMS + vehicle group vs. CMS + Vit E 100 group	<0.001		
UCMS + vehicle group vs. CMS + GN50 group	<0.001		
UCMS + vehicle group vs. CMS + GN150 group	<0.001		
UCMS + vehicle group vs. CMS + GN450 group	<0.001		

Table S13.2 One-way analysis of variance (ANOVA) test of MWMT on the probe test.

Group comparison	Statistical Analysis	
non-stress group vs. CMS + vehicle group	Paired <i>t</i> -test $P <0.001$	
	ANOVA followed by Tukey's post hoc test	
All group	$P <0.001$	$F(4,46)=9.958$
UCMS + vehicle group vs. CMS + Vit E 100 group	<0.001	
UCMS + vehicle group vs. CMS + GN50 group	0.283	
UCMS + vehicle group vs. CMS + GN150 group	<0.05	
UCMS + vehicle group vs. CMS + GN450 group	<0.001	

4. Statistical Analysis Effect of GN bark resin on the UCMS-Induced Changes Lipid peroxidation in the Frontal cortex and Hippocampus

Table S14.1 One-way analysis of variance (ANOVA) test of UCMS-Induced lipid peroxidation in frontal cortex.

Group comparison	Statistical Analysis	
non-stress group vs. CMS + vehicle group	Paired <i>t</i> -test $P <0.001$	
	ANOVA followed by Tukey's post hoc test	
All group	$P <0.001$	$F(4,16)=12.979$
UCMS + vehicle group vs. CMS + Vit E 100 group	<0.001	

UCMS + vehicle group vs. CMS + GN50 group	<0.05	
UCMS + vehicle group vs. CMS + GN150 group	<0.05	
UCMS + vehicle group vs. CMS + GN450 group	<0.001	

Table S14.2 One-way analysis of variance (ANOVA) test of UCMS-Induced lipid peroxidation in hippocampus.

Group comparison	Statistical Analysis	
non-stress group vs. CMS + vehicle group	Paired <i>t</i> -test <i>P</i> <0.001	
	ANOVA followed by Tukey's post hoc test	
	<i>P</i>	<i>F</i> (DF _{between group} , DF _{residual})
All group	<0.001	<i>F</i> (4,16)=30.151
UCMS + vehicle group vs. CMS + Vit E 100 group	<0.001	
UCMS + vehicle group vs. CMS + GN50 group	<0.001	
UCMS + vehicle group vs. CMS + GN150 group	<0.001	
UCMS + vehicle group vs. CMS + GN450 group	<0.001	
UCMS + GN 50 vs. UCMS + 450 group	0.008	