Supporting Information

Lonimacranaldes A-C, Three Iridoids with Novel Skeleton from *Lonicera macranthoides*

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[#] These authors contributed equally to this work.

List of Supporting Information

1. UPLC-Q-TOF-MS analysis

Preparation of sample solution: The dried flower buds of *L. macranthoides* (50 g) were extracted using 70% MeOH by ultrasonic extraction at room temperature for 45 minutes. Then the extract was concentrated in vacuo and filtered for further UPLC-Q/TOF-MS analysis.

Analysis conditions: UPLC-Q/TOF-MS analysis was performed using Waters Acquity UPLC SynaptTM MS systems (Waters, Milford, USA) accompanied with a ACQUITY UPLC BEH C18 column (2.1 mm × 50 mm, 1.7 μm) at negative ion mode. A gradient program with the mobile phase (10% to 15% CH_3OH at 0–3 min, 15% to 30% CH_3OH at 3–7 min, 30% to 100% CH_3OH at 7–10 min, 100% CH_3OH at 10-11.5 min) was used as eluent at flow rate of 0.4 mL/min.

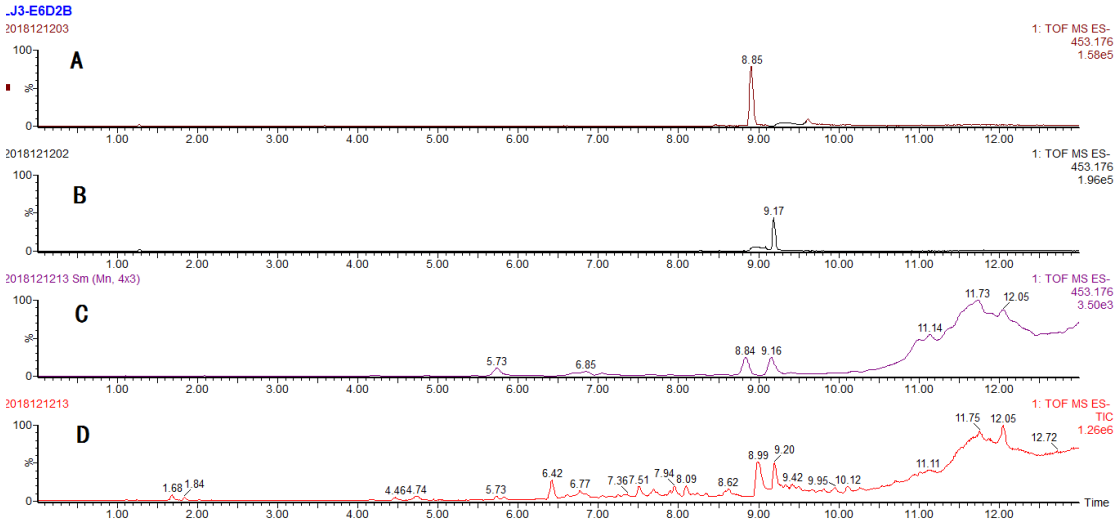


Figure S1. UPLC-QTOF/MS analysis of the 70% methanol extract of *L. macranthoides* (A: TIC of standand of compound **1**; B: TIC of standand of compound **2**; C: extracted ion chromatogram of ion 453.1761, Peak I: retention time: 8.84 min, m/z 453.1745 $[M-H]^-$; Peak II: retention time 9.16 min, m/z 453.1761 $[M-H]^-$ D: Total ion chromatogram;)

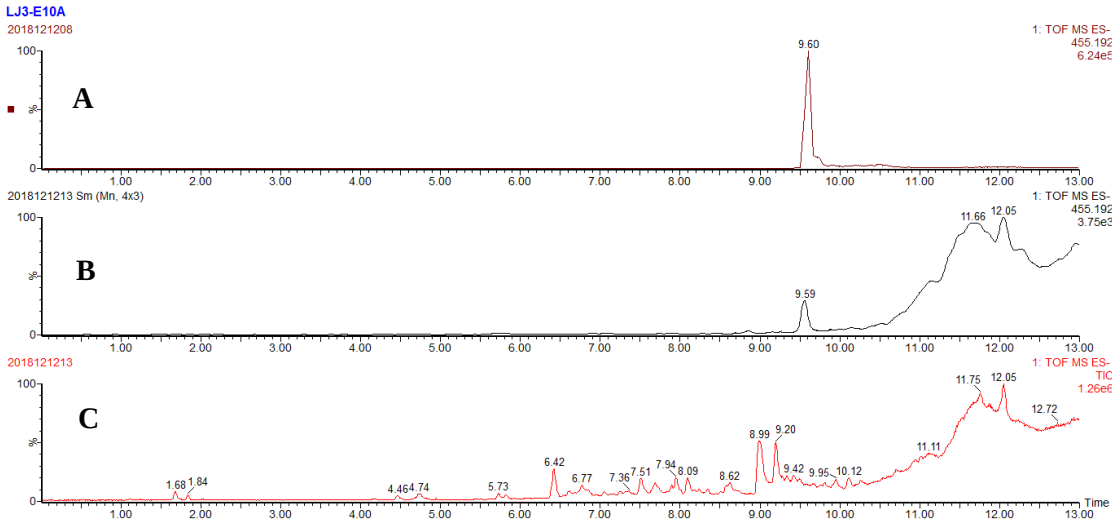


Figure S2. (A: TIC of standand of compound **3**; B: extracted ion chromatogram of ion 455.1917, Peak III: retention time: 9.59 min, m/z 455.1918 $[M-H]^-$; C: Total ion chromatogram;)

2. Acid Hydrolysis and HPLC Analysis of Sugar

The absolute configuration of the sugar moieties was determined according to the reported method. Compounds **1** (1.5 mg) was hydrolyzed with HCl (2 mL, 2M) for 2 h at 90 ℃. After extracting with EtOAc, the H_2O layer was evaporated in vacuum to furnish a monosaccharide residue. The residue was dissolved in pyridine (1.0 mL) containing L-cysteine methyl ester hydrochloride (2.5 mg) and heated at 60 ℃. One hour later, *o*-tolyl isothiocyanate (10 μL) was added and further reacted at 60 ℃ for 1 h. Then, the reaction mixture was directly analyzed by the HPLC system and detected with a UV detector at the wavelength of 250 nm on a C18 column at 35 ℃. The mobile phase was CH_3CN−H_2O−HCOOH (25:75:0.1, v/v/v) at a flow rate of 0.8 mL/min. The standard monosaccharides, namely D-glucose, and L-glucose, were subjected to the same method. As a result, the sugar moiety of **1** was determined to be D-glucose by comparing retention time with glycosyl derivatization in HPLC chromatograph (**Figure S3**).

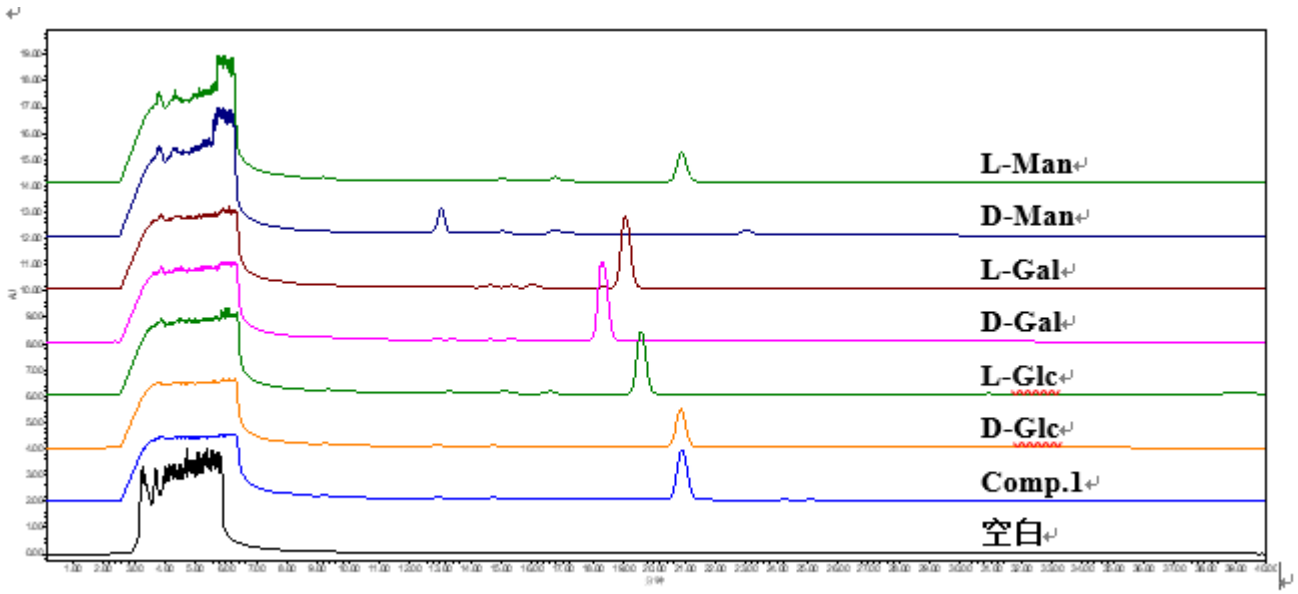
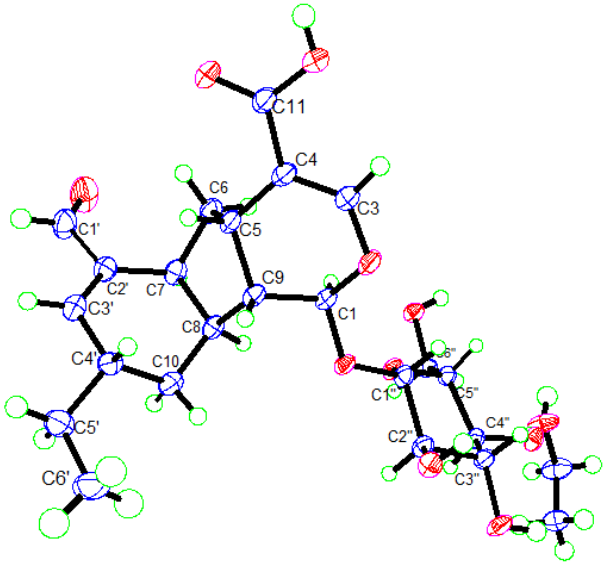


Figure S3. HPLC chromatograph for the derivatives of compound 1 and monosaccharides (250 nm)

3. Single X-ray Diffraction Analysis and Crystallographic Data for lonimacranalde A (1)



Crytallographic data for **1** have been deposited with the Cambridge Crystallographic Data Centre as supplementary publication no. CCDC 1877498. Copies of the data can be obtained, free of charge, on application to the Director, CCDC, 12 Union Road, Cambridge CB2 IEZ, UK (fax: +44-(0)1223-336033 or email: deposit@ccdc.cam.ac.uk).

Table S1 Crystal data and structure refinement for **1**

Identification code	E6D2A
Empirical formula	C_{22} H_{30} O_{10}, C_2 H_6 O

Formula weight	500.53
Temperature/K	149.94(10)
Crystal system	monoclinic
Space group	$P2_1$
a/Å	13.1270(2)
b/Å	7.98020(10)
c/Å	13.2754(2)
α/°	90
β/°	116.561(2)
γ/°	90
Volume/Å^3	1243.90(4)
Z	2
ρ_{calc}g/cm^3	1.336
μ/mm^{-1}	0.888
F(000)	536.0
Crystal size/mm^3	0.15 × 0.12 × 0.1
Radiation	CuKα (λ = 1.54184)
2Θ range for data collection/°	7.444 to 148.328
Index ranges	-15 ≤ h ≤ 16, -9 ≤ k ≤ 9, -16 ≤ l ≤ 16
Reflections collected	23017
Independent reflections	4915 [R_{int} = 0.0511, R_{sigma} = 0.0275]
Data/restraints/parameters	4915/1/327
Goodness-of-fit on F^2	1.042
Final R indexes [I>=2σ (I)]	R_1 = 0.0360, wR_2 = 0.0889
Final R indexes [all data]	R_1 = 0.0371, wR_2 = 0.0899
Largest diff. peak/hole / e Å^{-3}	0.18/-0.30
Flack/Hooft parameter	-0.01(8)/0.00(5)

4. The NMR, HRESIMS, UV, IR, and CD spectra of 1-3

4.1 Figure S4-S14. For lonimacranalde A (1)

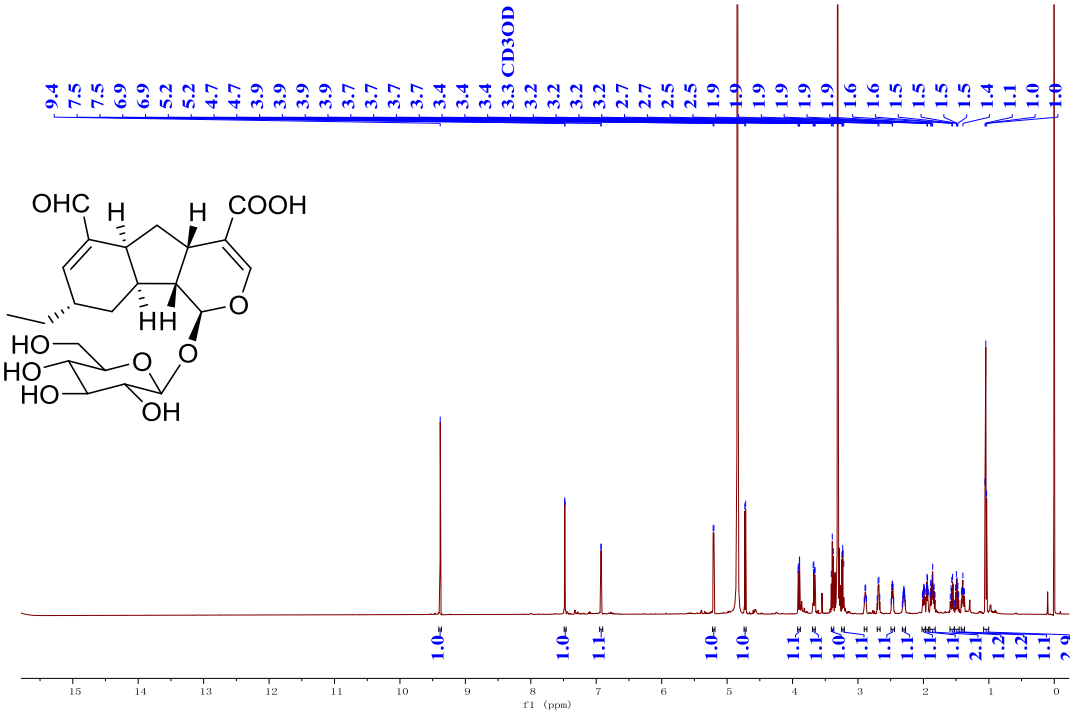


Figure S4. ^{1}H-NMR spectrum of **1** (600 MHZ, in CD_3OD)

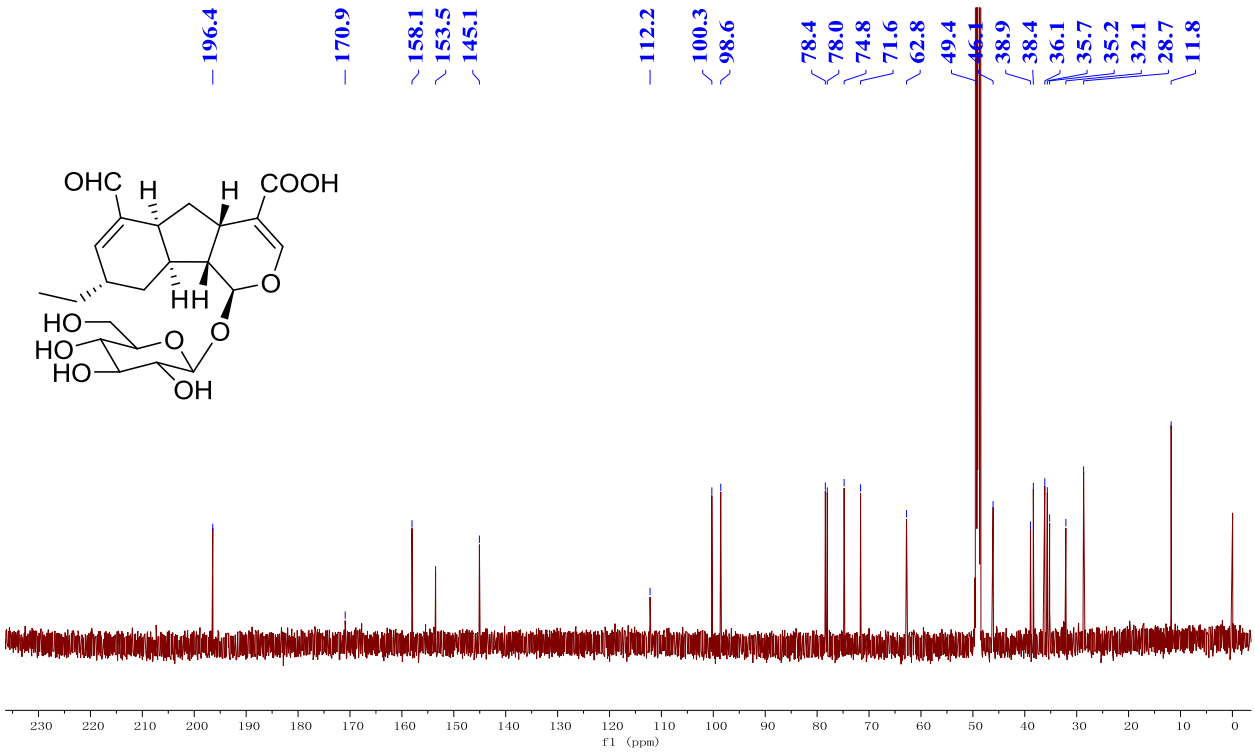


Figure S5. ^{13}C-NMR spectrum of **1** (150 MHZ, in CD_3OD)

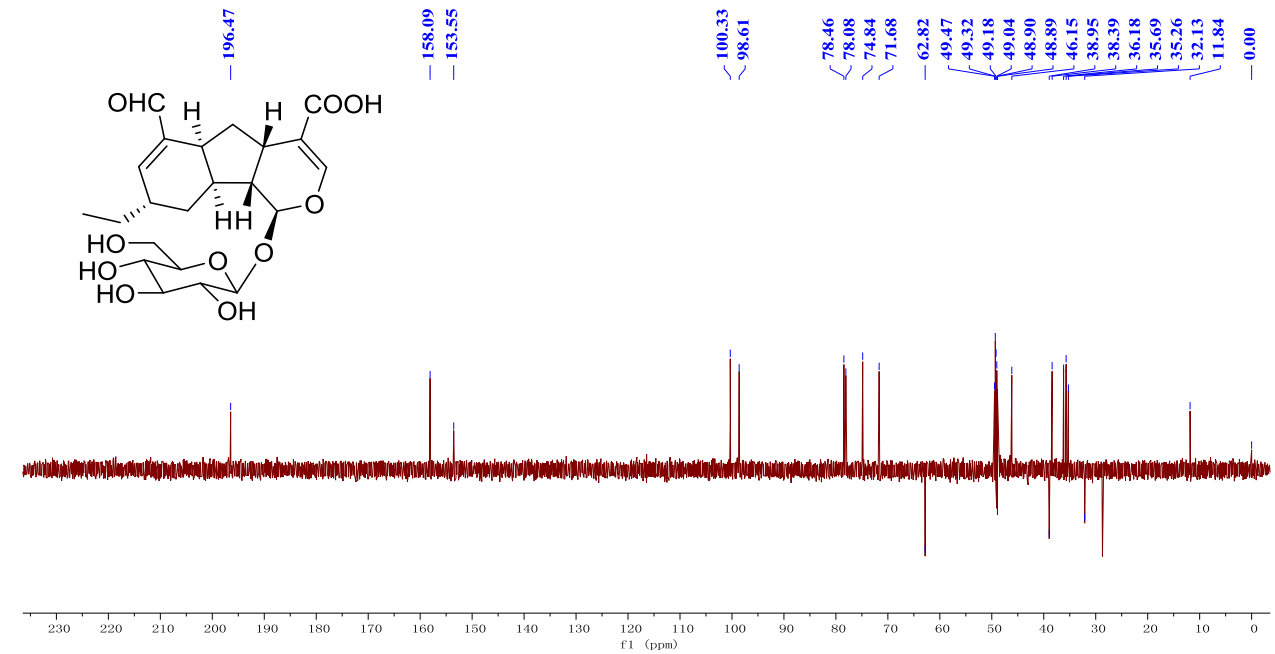


Figure S6. DEPT-135 spectrum of **1** (150 MHZ, in CD_3OD)

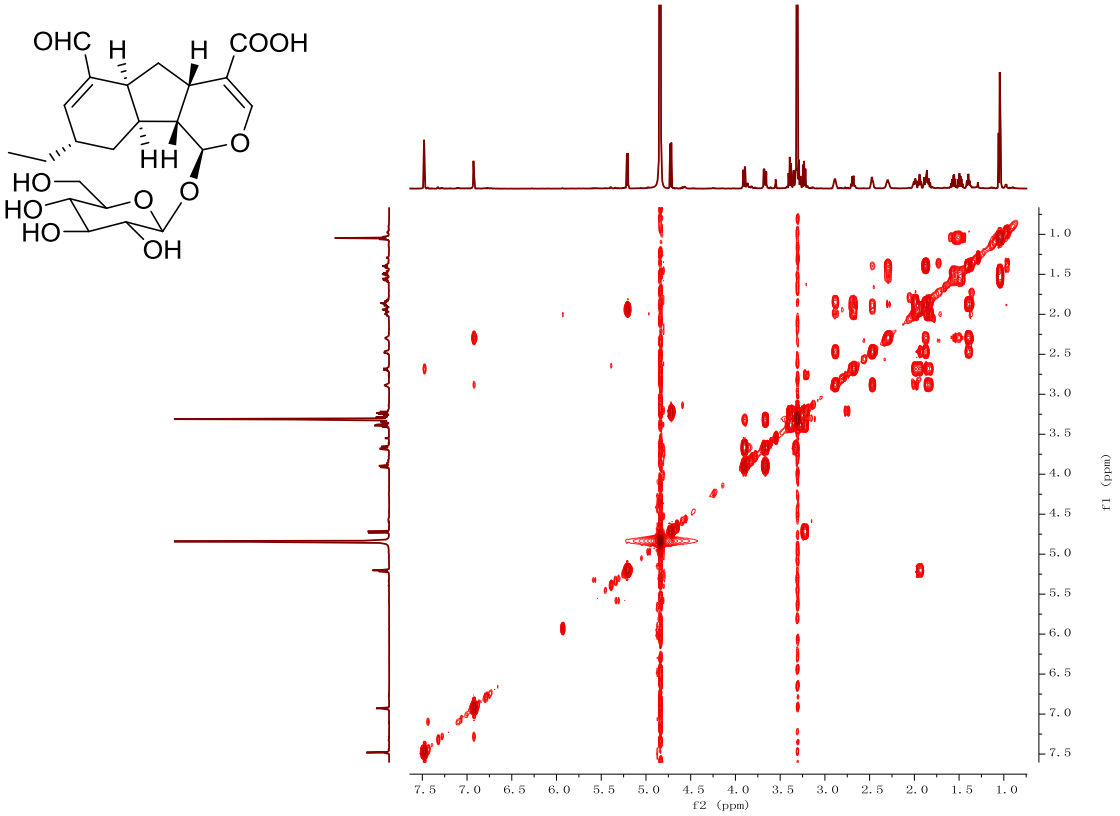


Figure S7. ^1H-^1H COSY spectrum of **1** (inCD_3OD)

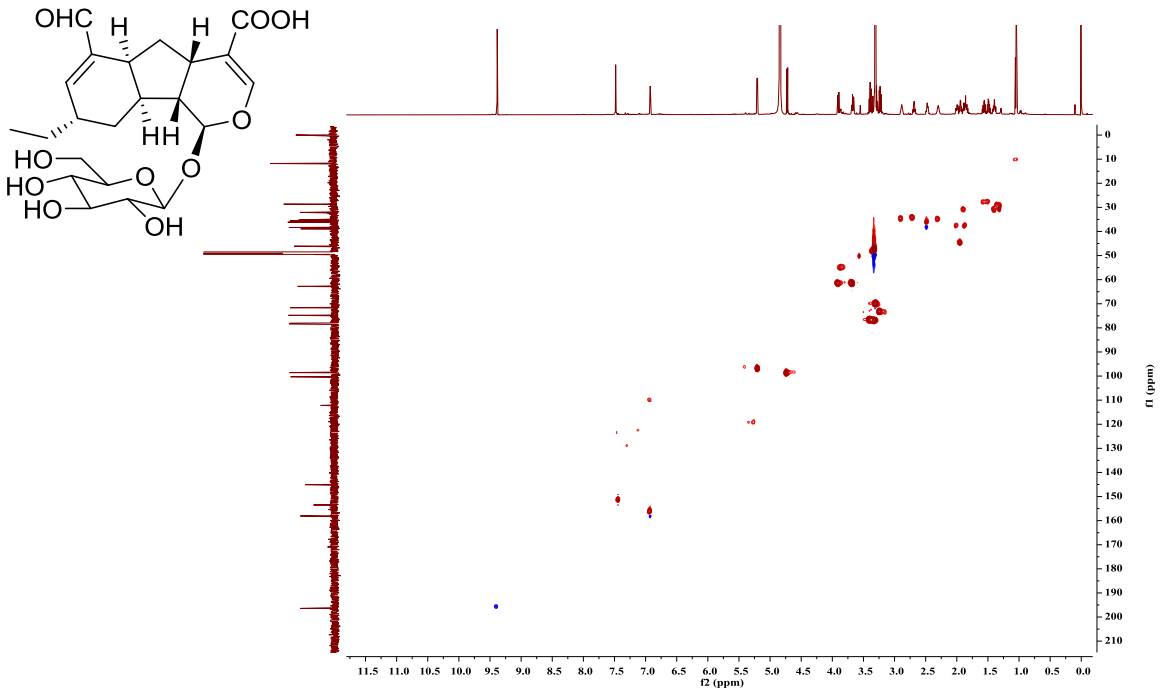


Figure S8. HSQC spectrum of **1** (in CD_3OD)

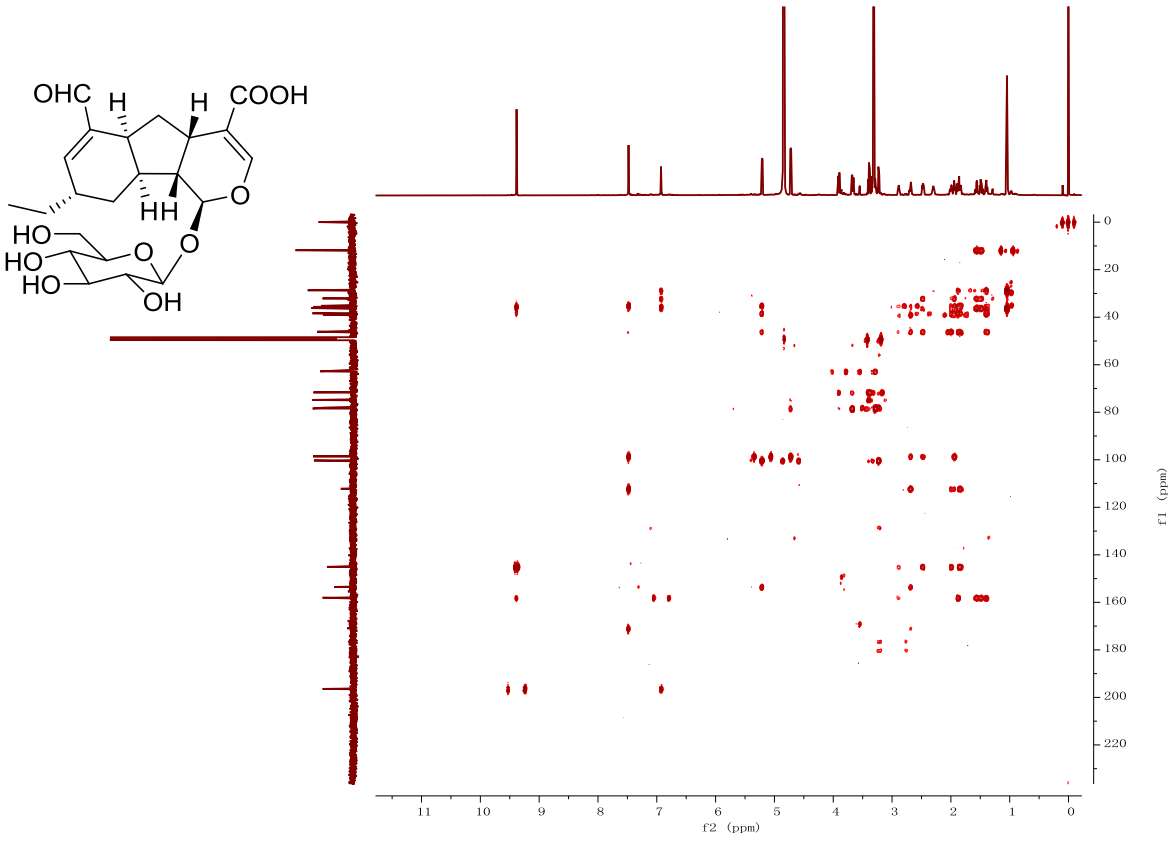


Figure S9. HMBC spectrum of **1** (in CD_3OD)

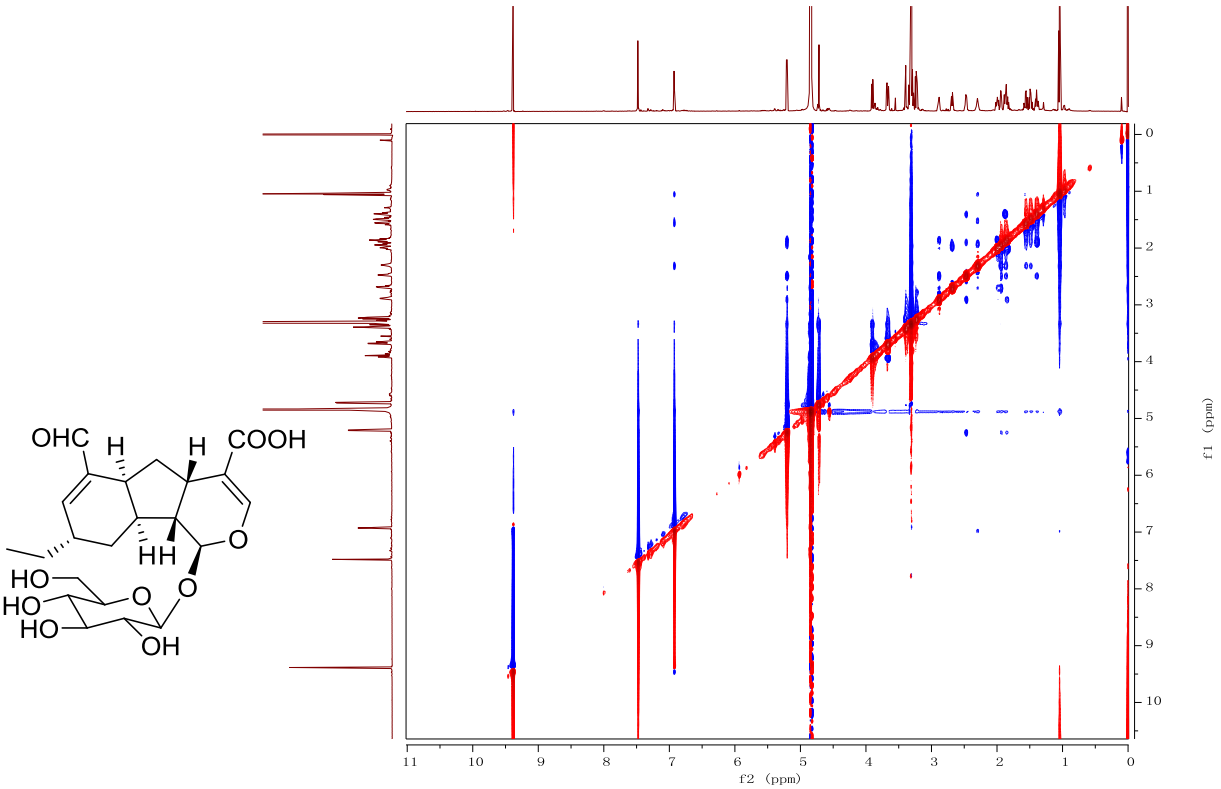


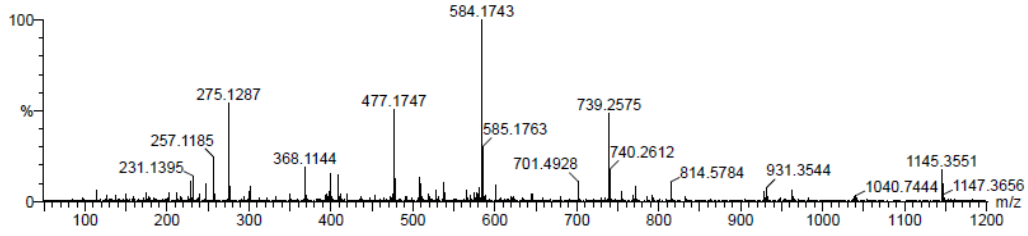
Figure S10. NOESY spectrum of **1** (in CD_3OD)

Elemental Composition Report **Page 1**

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, Even Electron Ions
217 formula(e) evaluated with 4 results within limits (up to 20 best isotopic matches for each mass)
Elements Used:
C: 0-100 H: 0-200 O: 0-100 Na: 0-1
LJ3-E6D2A
2016041105 42 (0.348)

1: TOF MS ES+
2.87e+004



Minimum:				-1.5				
Maximum:		5.0	10.0	50.0				
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
477.1747	477.1737	1.0	2.1	7.5	208.5	0.063	93.88	C22 H30 O10 Na
	477.1761	-1.4	-2.9	10.5	211.2	2.830	5.90	C24 H29 O10
	477.1795	-4.8	-10.1	-1.5	215.1	6.750	0.12	C15 H34 O15 Na
	477.1702	4.5	9.4	19.5	215.3	6.871	0.10	C31 H25 O5

Figure S11. HR-ESI-MS spectrum of **1**

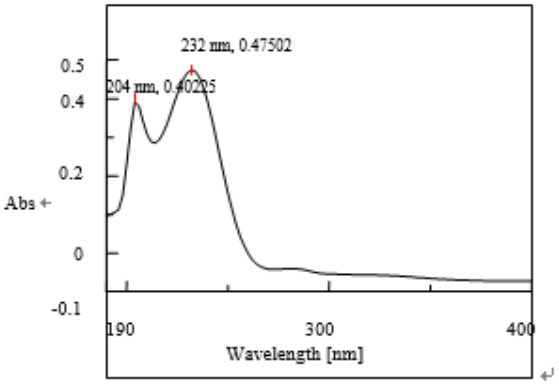


Figure S12. UV spectrum of **1** (in CH_3OH)

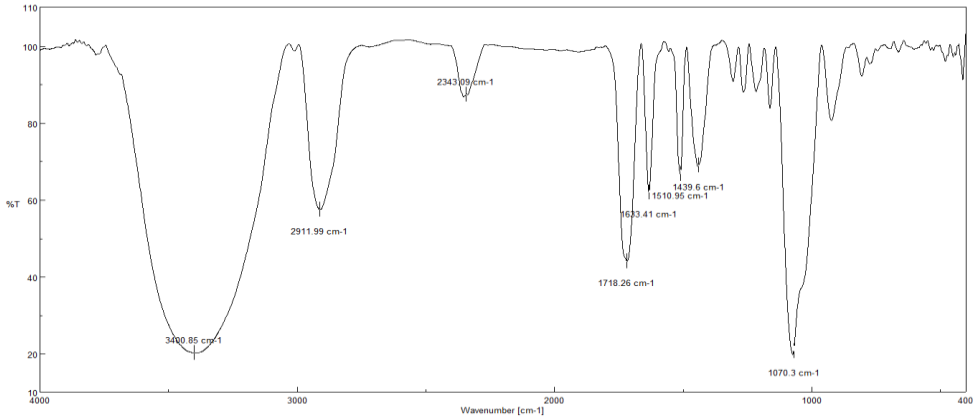


Figure S13. IR spectrum of **1** (in KBr)

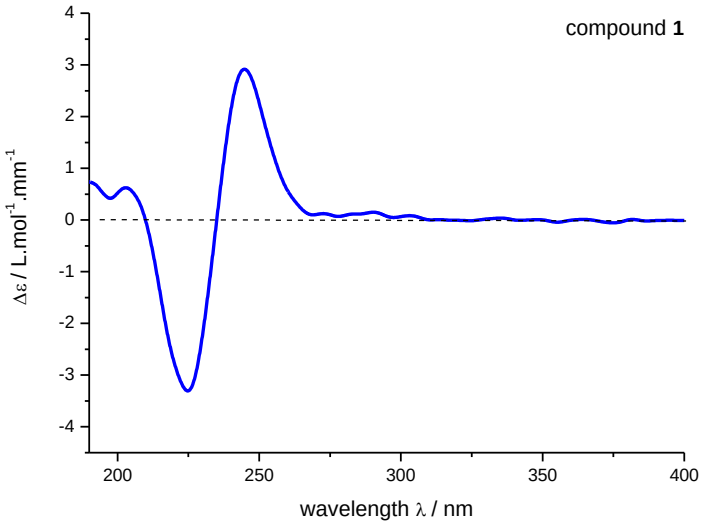


Figure S14. Experimental CD spectrum of **1** (in CH_3OH)

4.2 Figure S15-S25. For lonimacranalde B (2)

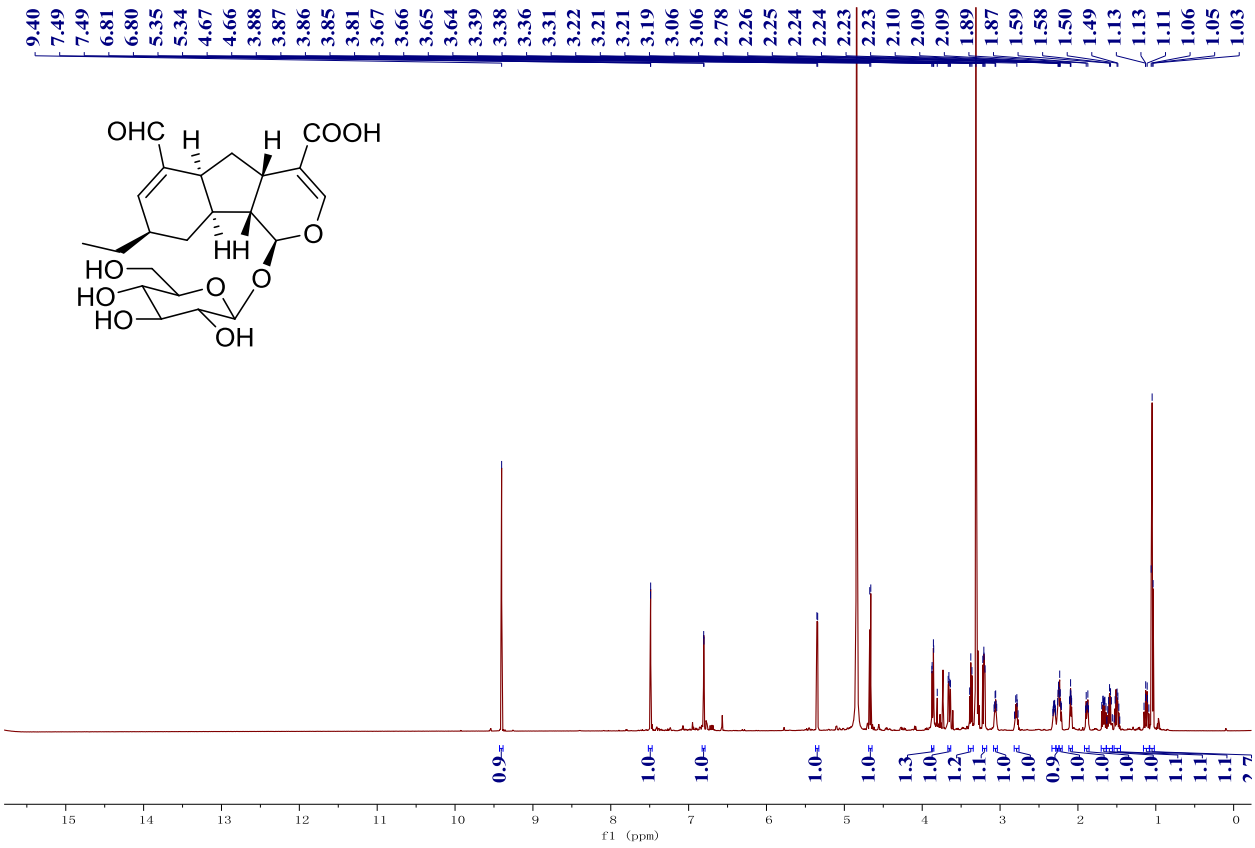


Figure S15. ^{1}H-NMR spectrum of **2** (600 MHZ, in CD_3OD)

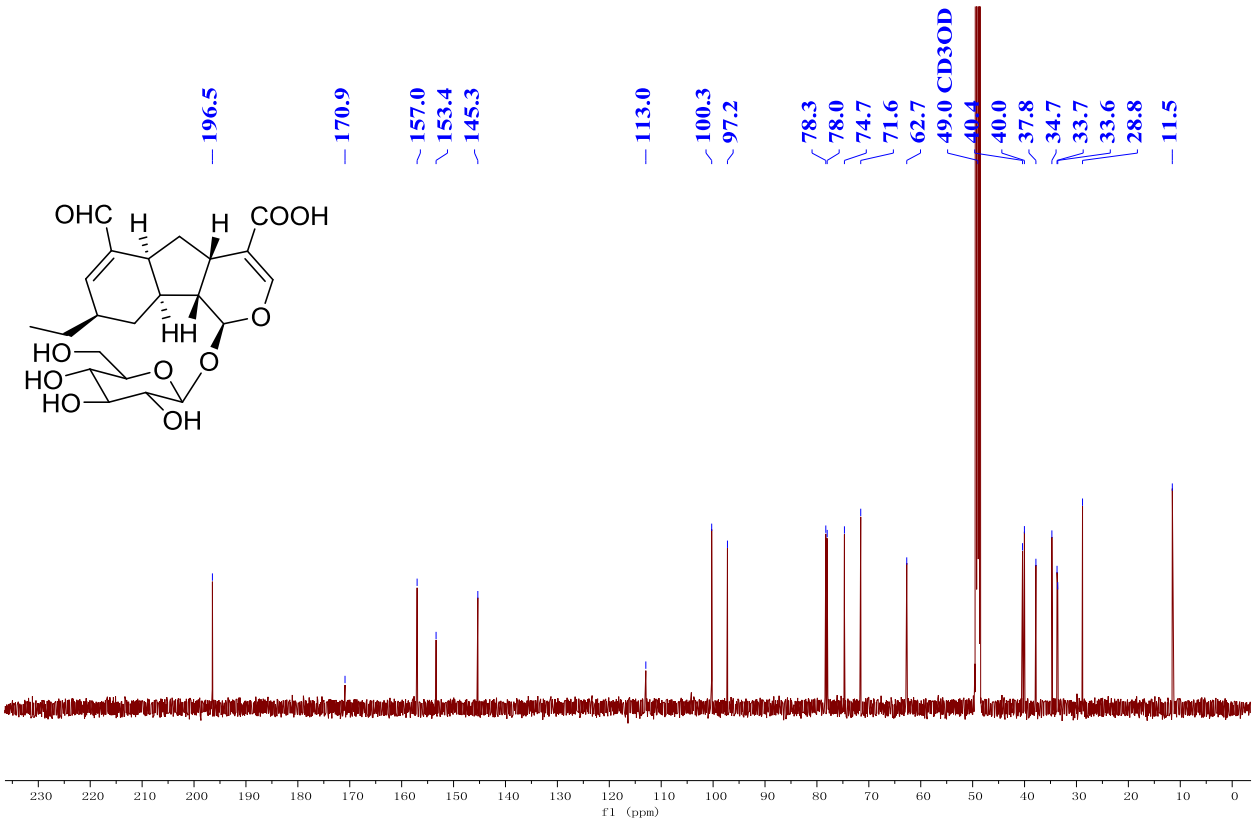


Figure S16. ^{13}C-NMR spectrum of **2** (150 MHZ, in CD_3OD)

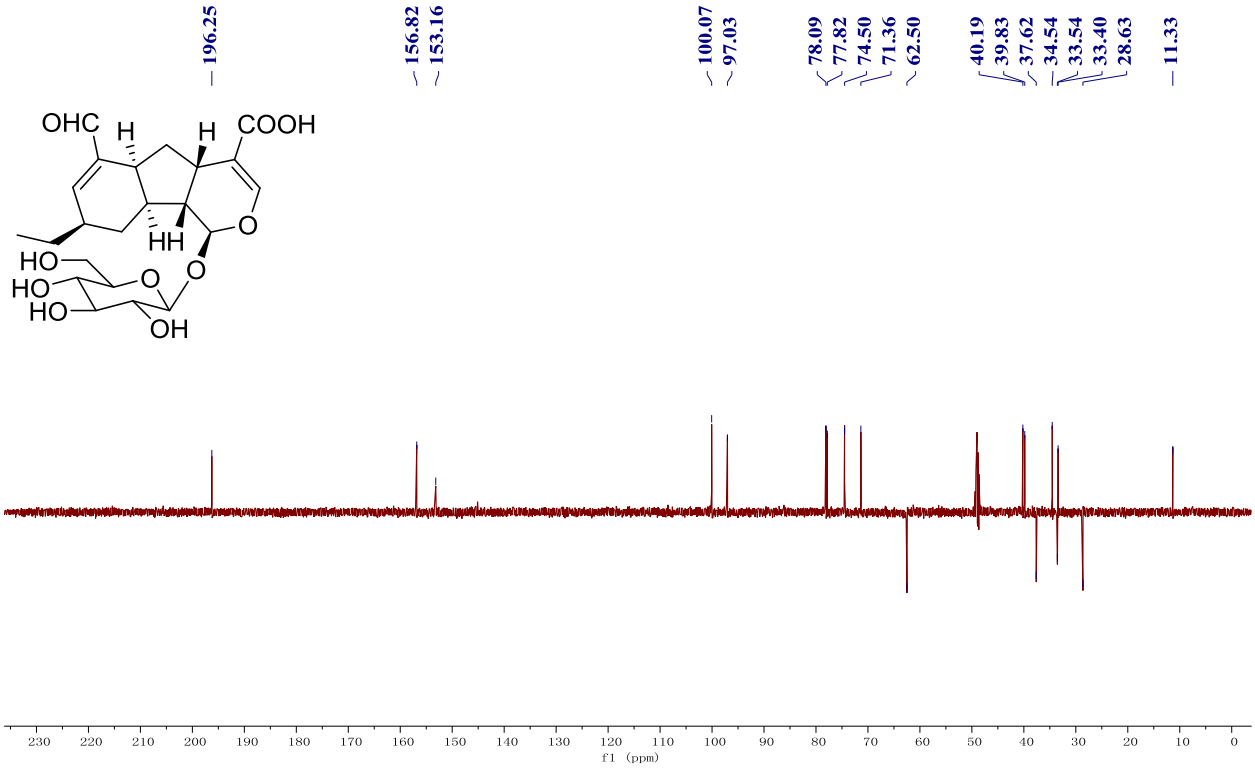


Figure S17. DEPT-135 spectrum of **2** (150 MHZ, in CD_3OD)

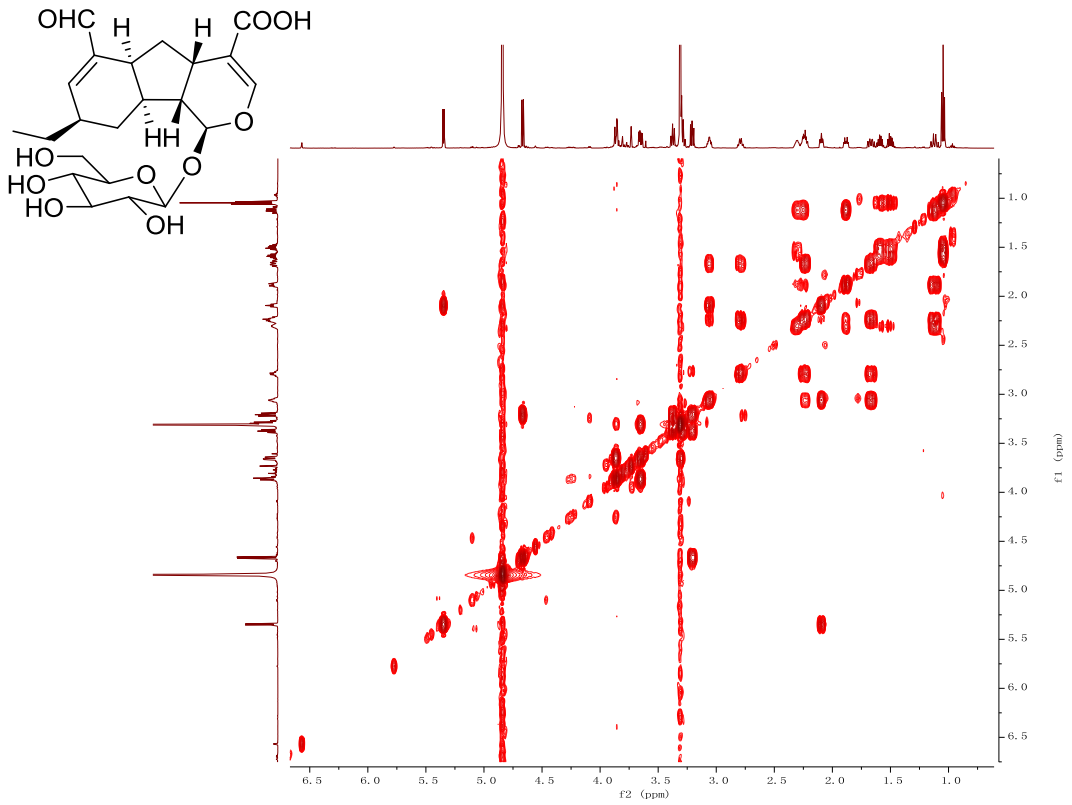


Figure S18. ^{1}H-^{1}H COSY spectrum of **2** (inCD_3OD)

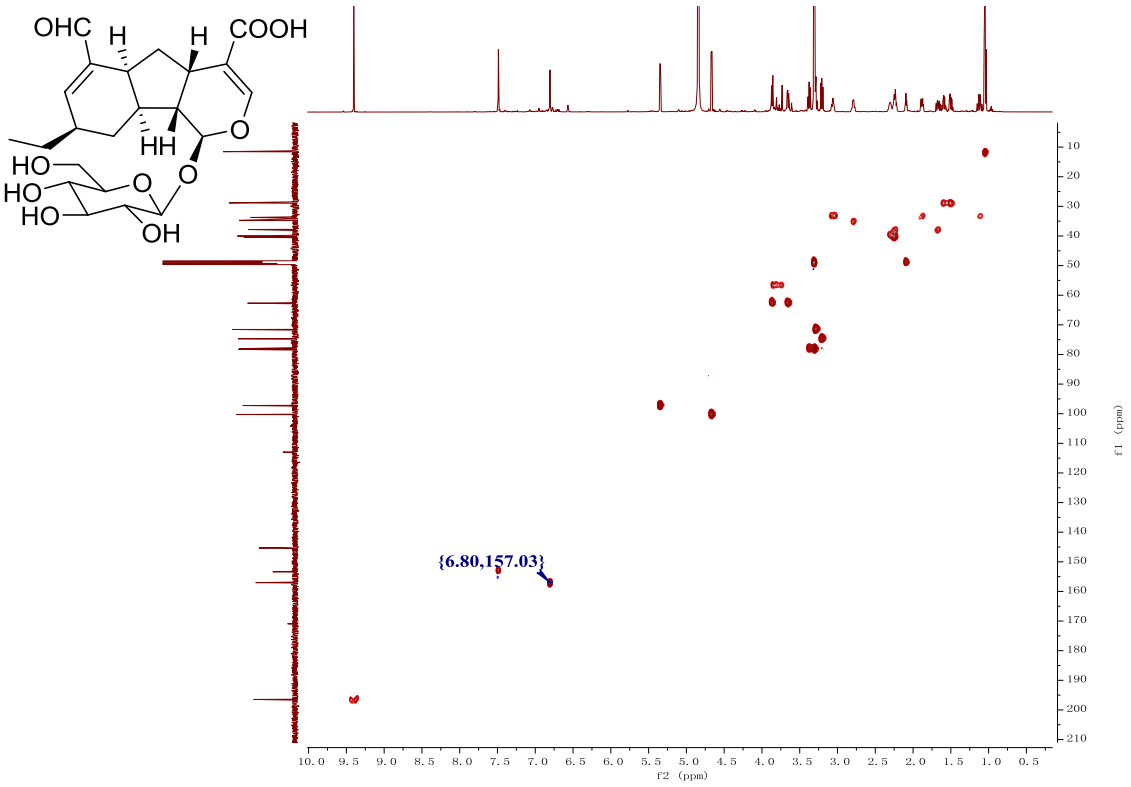


Figure S19. HSQC spectrum of **2** (in CD_3OD)

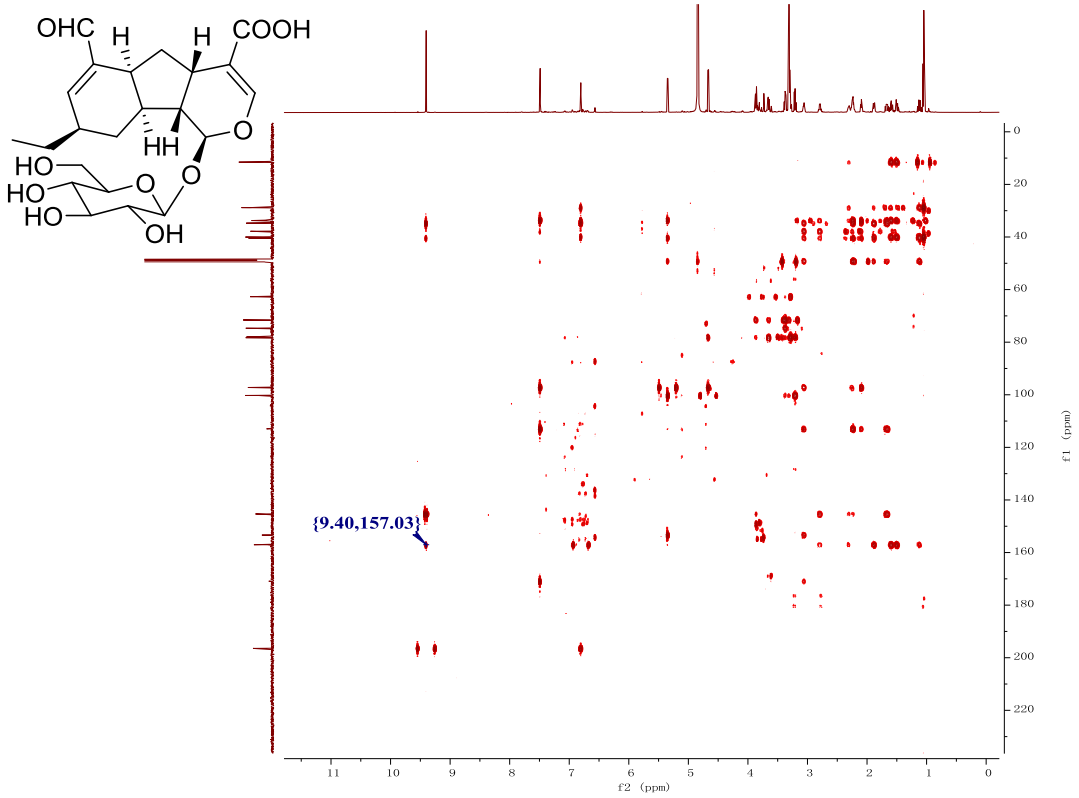


Figure S20. HMBC spectrum of **2** (in CD_3OD)

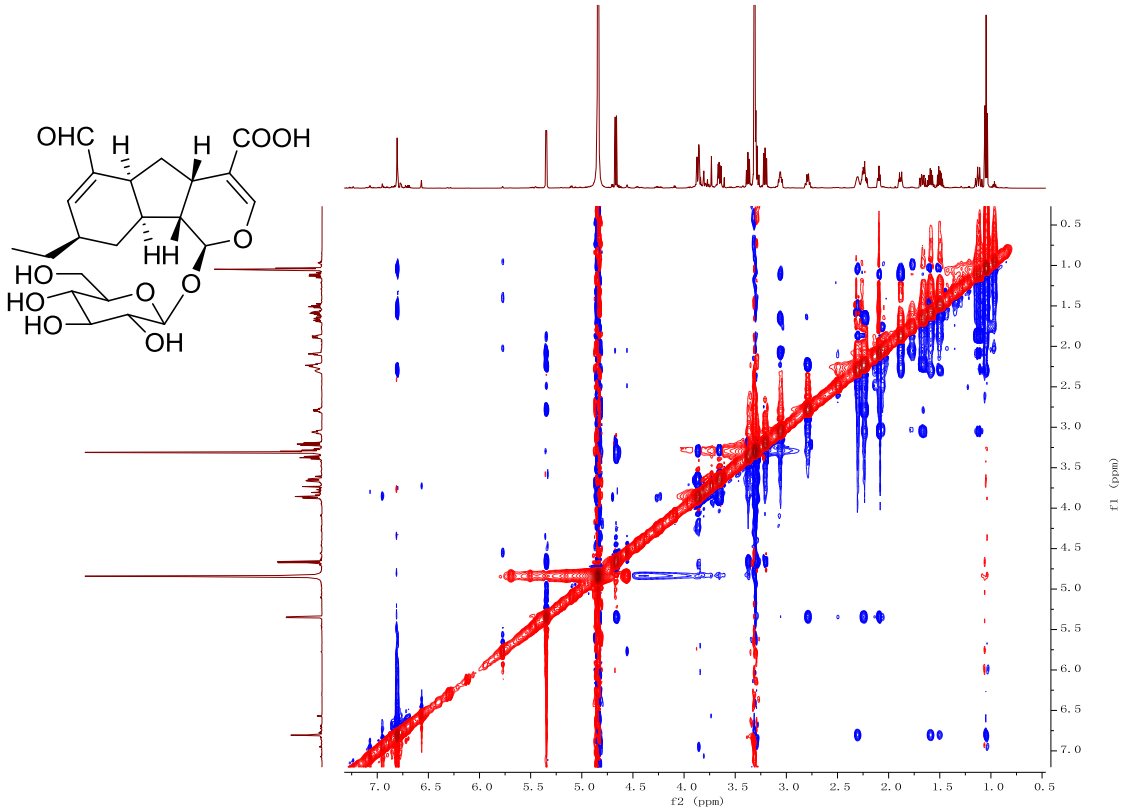


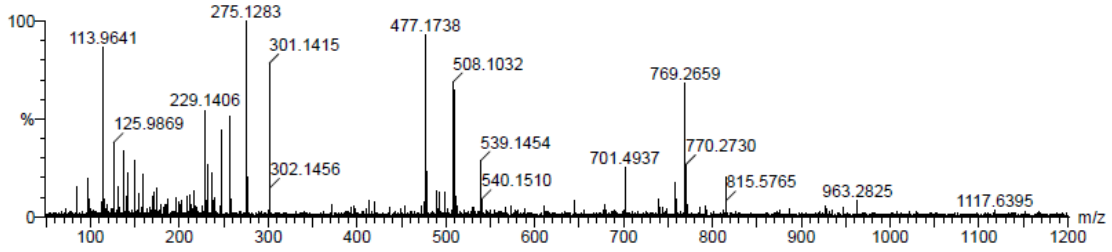
Figure S21. NOESY spectrum of **2** (in CD_3OD)

Elemental Composition Report **Page 1**

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, Even Electron Ions
217 formula(e) evaluated with 3 results within limits (up to 20 best isotopic matches for each mass)
Elements Used:
C: 0-100 H: 0-200 O: 0-100 Na: 0-1
LJ3-E6D2B
2016041106 46 (0.389)

1: TOF MS ES+
4.05e+003



Minimum:				-1.5				
Maximum:		5.0	10.0	50.0				
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
477.1738	477.1737	0.1	0.2	7.5	109.5	0.186	83.00	C22 H30 O10 Na
	477.1761	-2.3	-4.8	10.5	111.1	1.812	16.34	C24 H29 O10
	477.1702	3.6	7.5	19.5	114.3	5.014	0.66	C31 H25 O5

Figure S22. HR-ESI-MS spectrum of **2**

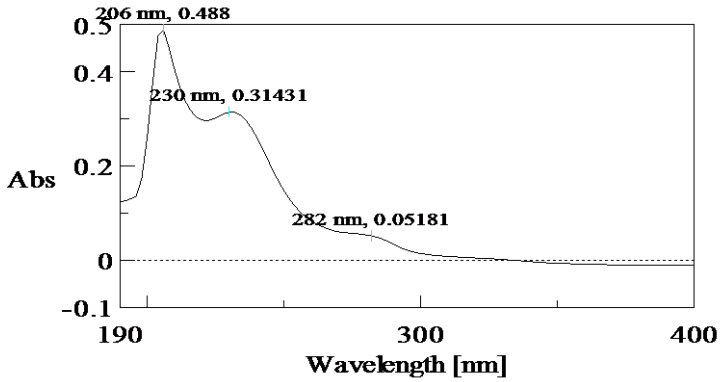


Figure S23. UV spectrum of **2** (in CH_3OH)

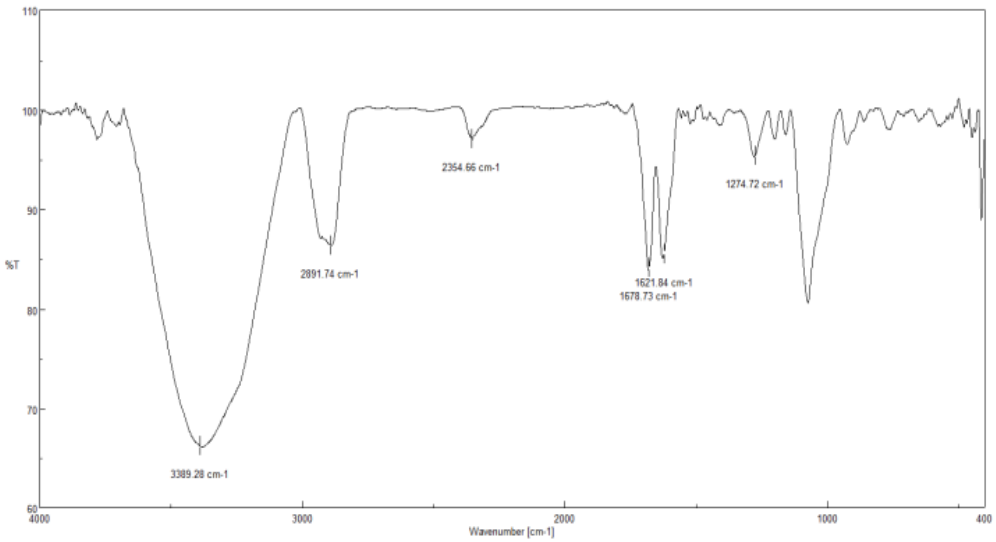


Figure S24. IR spectrum of **2** (in KBr)

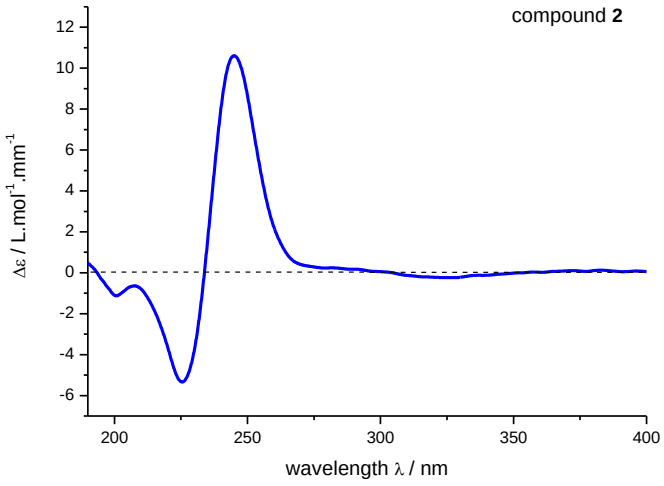


Figure S25. Experimental CD spectrum of **2** (in CH_3OH)

4.3 Figure S26-S36. For lonimacranalde C (3)

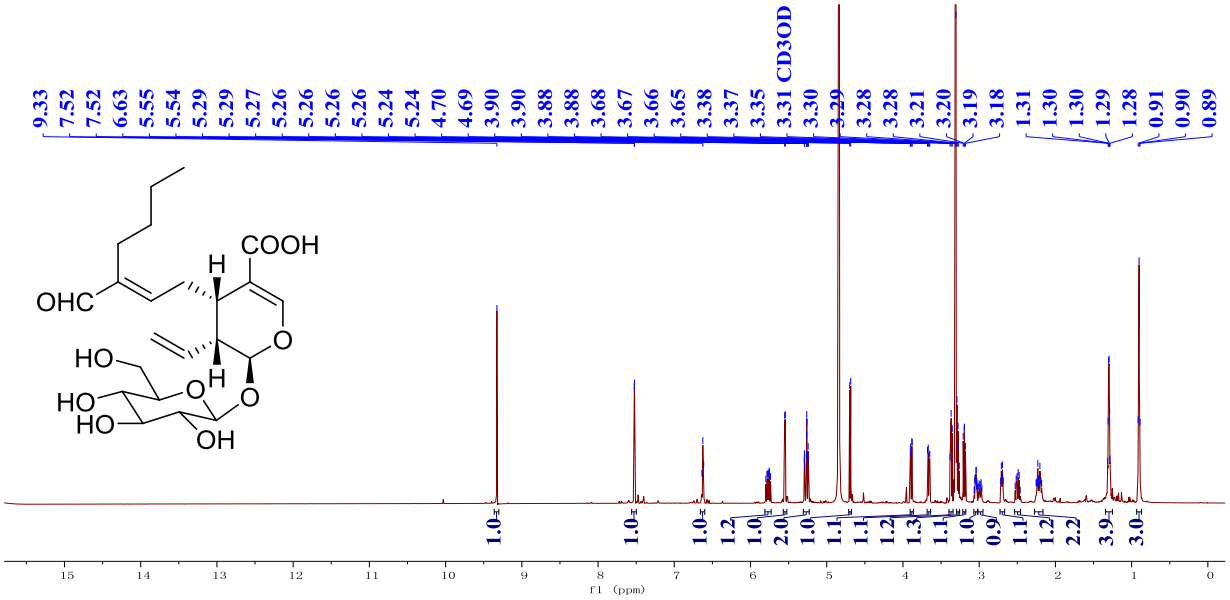


Figure S26. ^{1}H-NMR spectrum of **3** (600 MHZ, in CD_3OD)

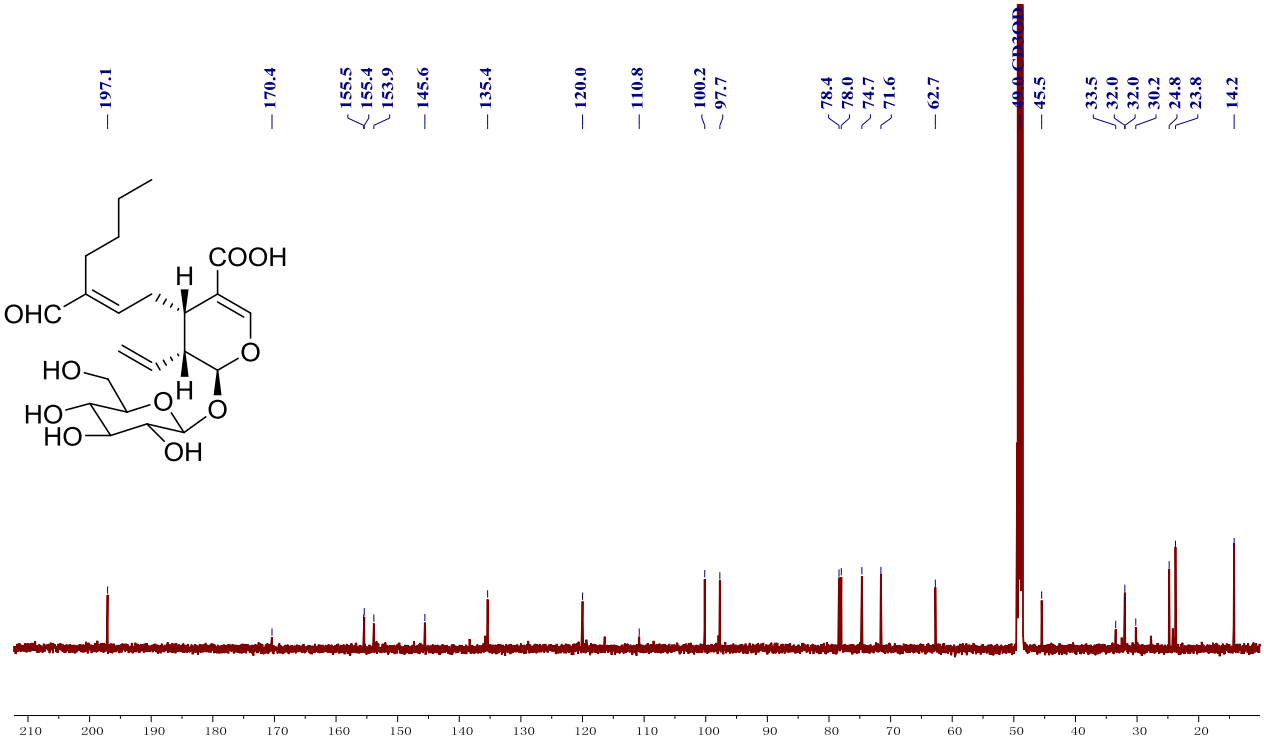


Figure S27. ^{13}C-NMR spectrum of **3** (150 MHZ, in CD_3OD)

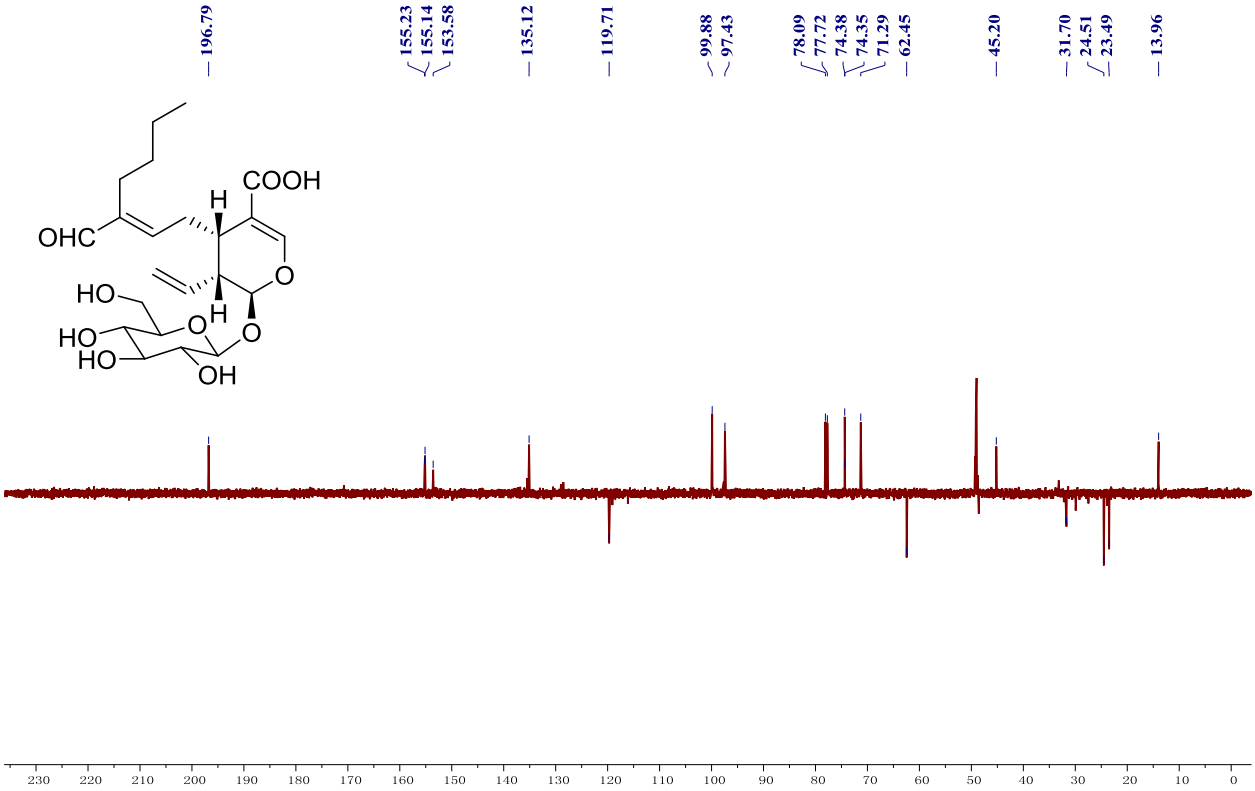


Figure S28. DEPT-135 spectrum of **3** (150 MHZ, in CD_3OD)

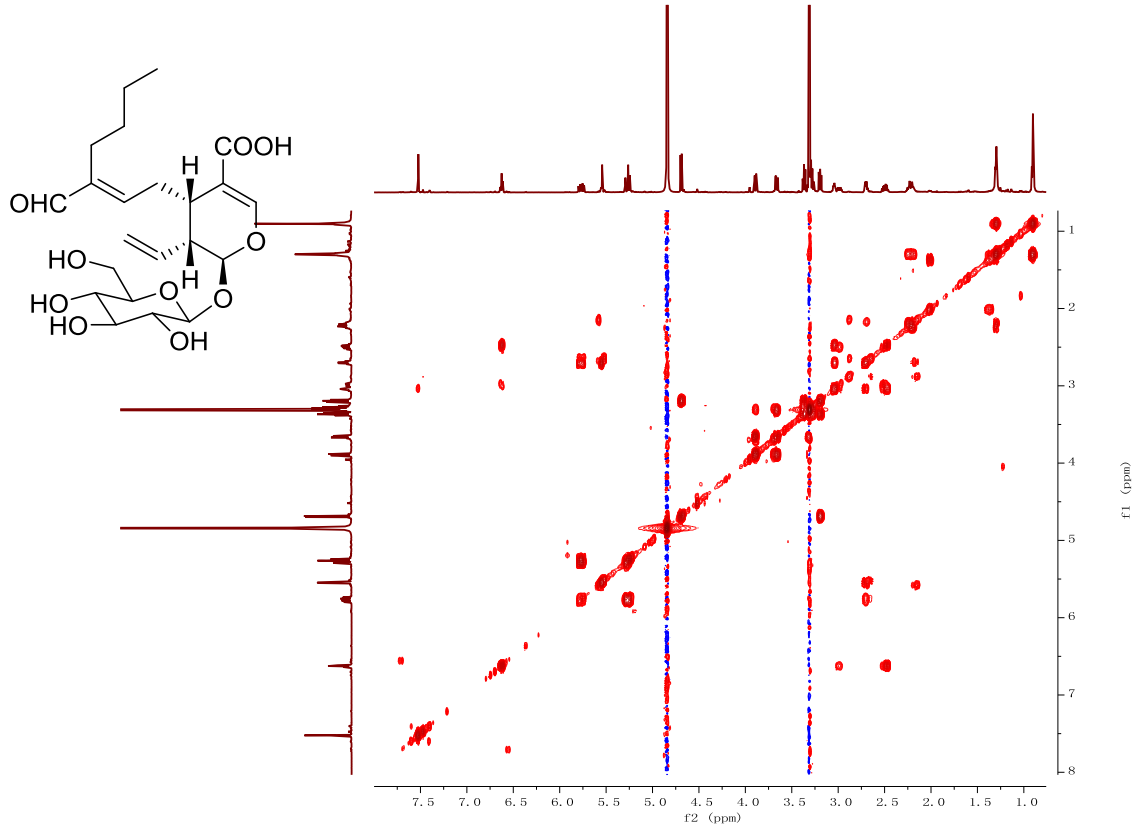


Figure S29. ^1H-^1H COSY spectrum of **3** (inCD_3OD)

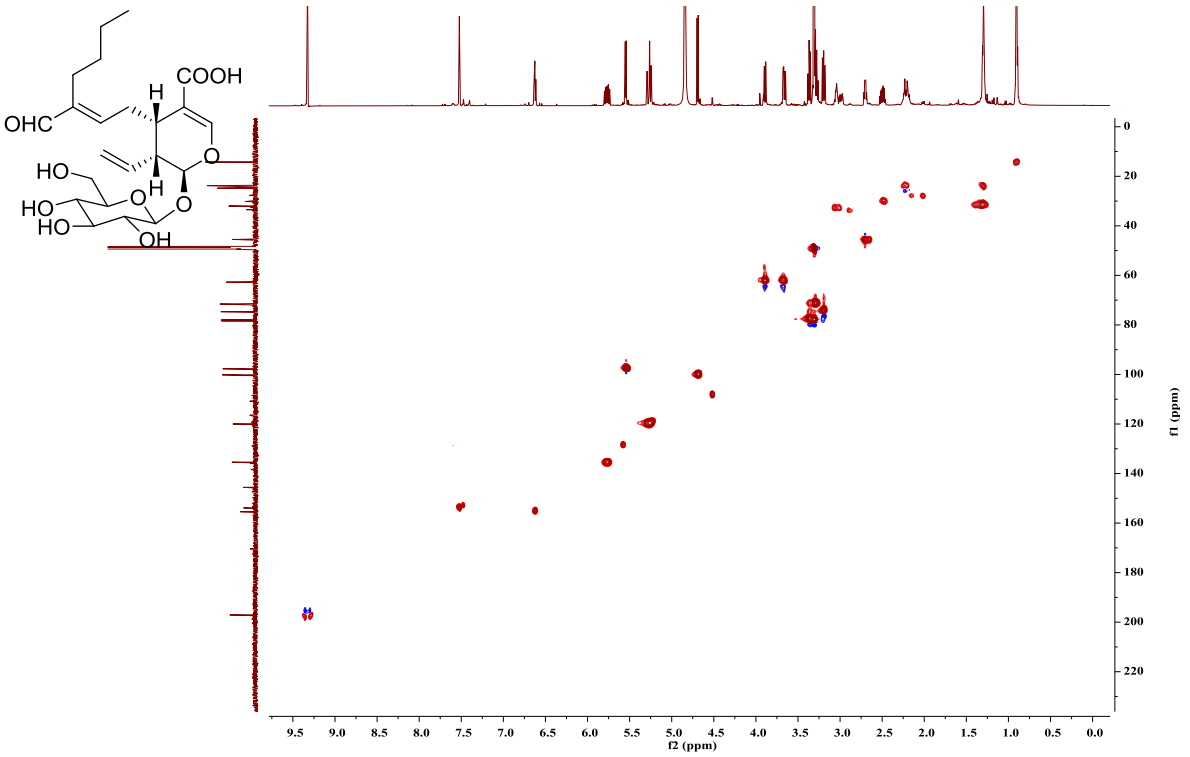


Figure S30. HSQC spectrum of **3** (in CD_3OD)

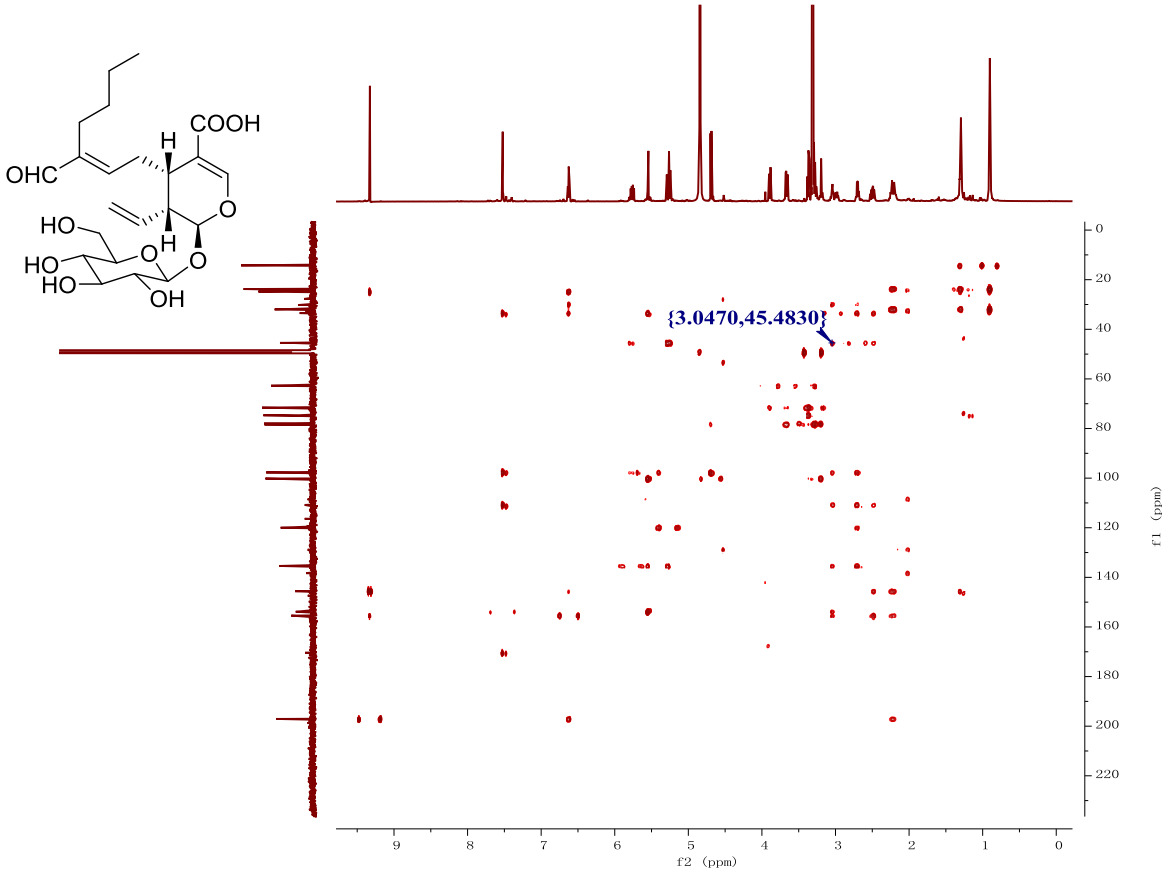


Figure S31. HMBC spectrum of **3** (in CD_3OD)

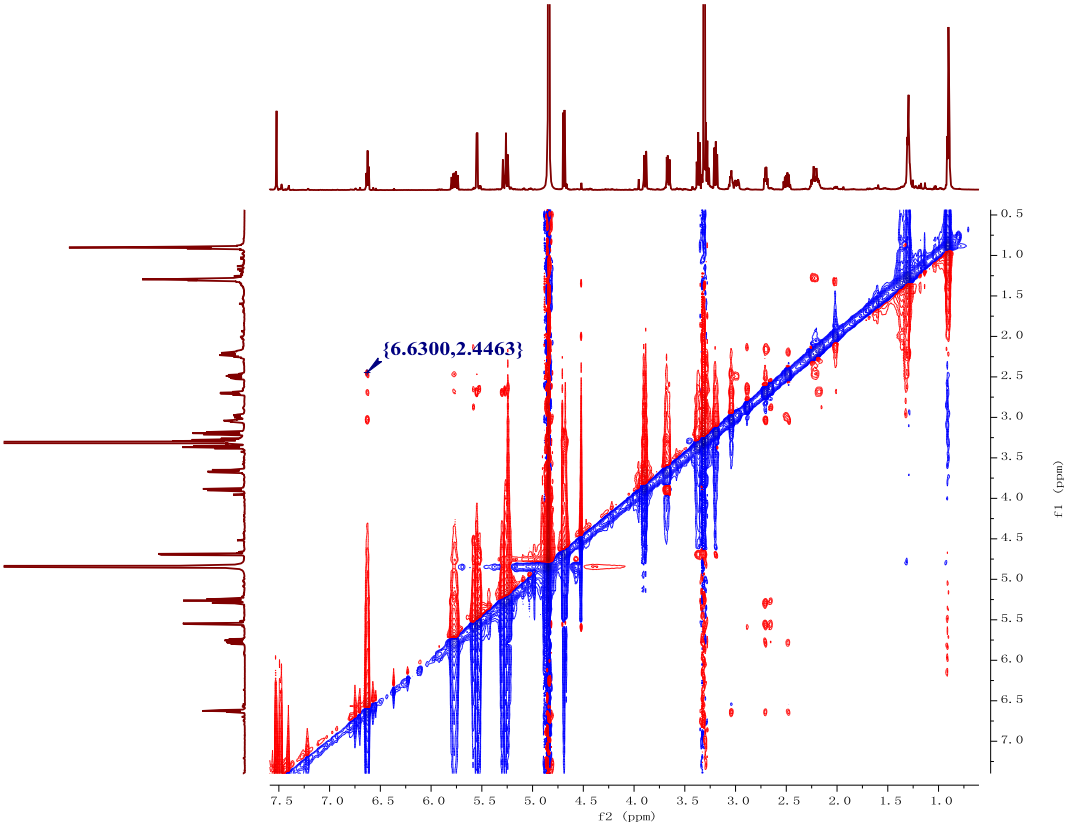


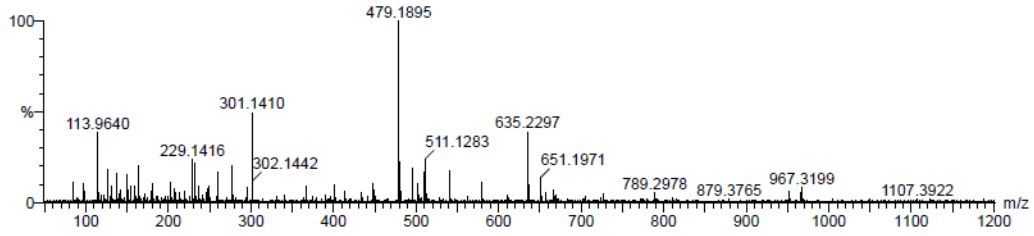
Figure S32. NOESY spectrum of **3** (in CD_3OD)

Elemental Composition Report **Page 1**

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, Even Electron Ions
229 formula(e) evaluated with 3 results within limits (up to 20 best isotopic matches for each mass)
Elements Used:
C: 0-100 H: 0-200 O: 0-100 Na: 0-1
LJ3-E10A
2016041108 68 (0.565)

1: TOF MS ES+
7.75e+003



Minimum:				-1.5				
Maximum:		5.0	10.0	50.0				
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
479.1895	479.1893	0.2	0.4	6.5	114.8	0.144	86.59	C22 H32 O10 Na
	479.1917	-2.2	-4.6	9.5	116.6	2.028	13.16	C24 H31 O10
	479.1858	3.7	7.7	18.5	120.6	5.979	0.25	C31 H27 O5

Figure S33. HR-ESI-MS spectrum of **3**

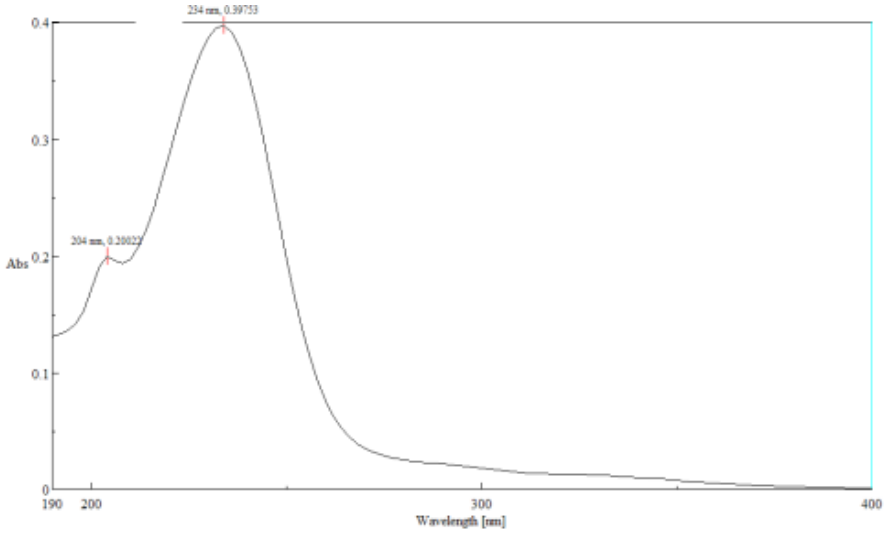


Figure S34. UV spectrum of **3** (in CH_3OH)

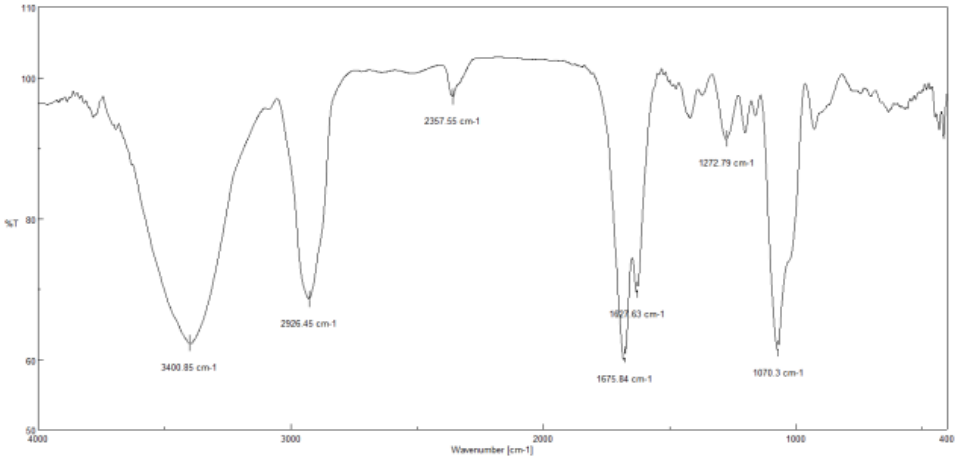


Figure S35. IR spectrum of **3** (in KBr)

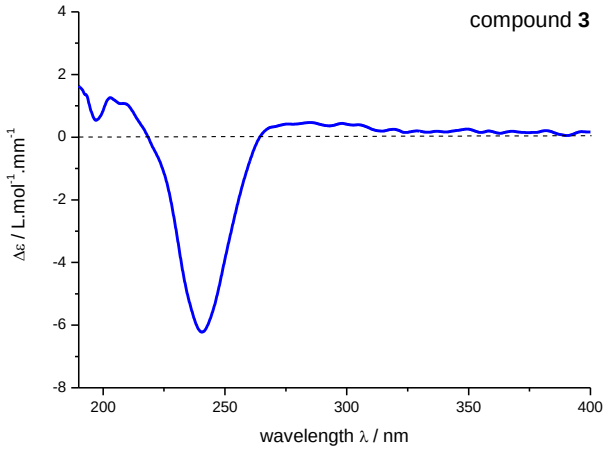


Figure S36. Experimental CD spectrum of **3** (in CH_3OH)