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Unusual C25 Steroids Produced by a Sponge-Derived *Penicillium citrinum*

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Experimental Procedure

General Experimental Procedures. The NMR spectra were recorded at 500 and 125.7 MHz for ^{1}H and ^{13}C, respectively. UV/vis measurements were performed with a diode array detector. HPLC was performed with columns of 4μm ODS.

Biological Materials. The fungus (strain no. 991084) was isolated from an Axinellida sponge (coll. no. 99108) collected using SCUBA off the coast of Papua New Guinea on December 1999 by the same techniques described previously[1]. The strain was identified as a *Penicillium citrinum* based on the analyses of both the 25S ribosomal DNA sequence and its fruiting body. This fungus is maintained in a cryopreserved state at UCSC.

Culture conditions. The fungal strain was grown in a liquid medium (20 L) containing 3.5% Czapek-Dox broth and 0.5% yeast extract in filtered Monterey Bay seawater adjusted to pH 7.4 at 180 rpm for 28 days at room temperature (25˚C).

Disk Diffusion Soft Agar Colony Formation Assay. An *in vitro* cell-based assay was employed to identify solid tumor selectivity for original extracts, extract partition fractions, and pure compounds. The differential cytotoxicity is expressed by observing a zone differential between any solid tumor cell (Colon38, ColonH116, Lung H125) and either leukemia cells (L1210 or CEM) or normal cells (CFU-GM). The sample is designated as "solid tumor selective" if the zone units of solid tumor – normal cell or leukemia cells is greater than 250 units.

Extraction and Isolation. The culture was filtered under suction and the broth was extracted with equal volumes of EtOAc three times. The combined extract was evaporated to give a crude extract (465 mg). The organic extract was applied on reversed phase HPLC with MeOH-H_2O (1:1 to 1:0) to give 16 fractions. Fraction 9 and 15 were purified by reversed phase HPLC to afford **1** (3.8 mg) and **2** (15.4 mg), respectively.

Isocyclocitrinol A (1). Obtained as an amorphous powder. $[\alpha]_D$ +136.0 (*c* 0.05, $CHCl_3$); λ_{max} (MeOH)/nm 243 (log ε 3.94); ^{1}H and ^{13}C NMR data are listed in Table 1; HRESI-TOF-MS: *m/z* 401.2682 $[M+H]^+$ (calcd for $C_{25}H_{37}O_4$, 401.2686).

22-Acetylisocyclocitrinol A (2). Colorless crystals from MeOH. Mp. 209-210˚C. $[\alpha]_D$ +128.0 (*c* 0.15, $CHCl_3$); λ_{max} (MeOH)/nm 243 (log ε 3.88); ^{1}H and ^{13}C NMR data are listed in Table S1; HRESI-TOF-MS: *m/z* 443.2790 $[M+H]^+$ (calcd for $C_{27}H_{39}O_5$, 443.2792).

X-ray crystallography of 2. The single crystal X-ray analysis was conducted as follows. Suitable crystals were obtained from MeOH by the vapor diffusion method. This crystal (0.40 x 0.30 x 0.20 mm^3) was mounted on a Bruker SMART diffractometer (MoKα; -100˚C). A

hemisphere of data was taken using a narrow-scan routine (1406 frames, 0.3˚ steps ω-scan, exposure time was 30 s/frame, $2\theta_{max}$ = 49.42˚). Raw data was integrated with the Bruker SAINT+ program[2] to yield a total 11733 reflections, of which 6914 were independent (R_{int} = 2.09 %, completeness 91.8 %) and 1793 with I > 2σ(I). Data were collected for absorption using SADABS program (min. and max. transmission are 0.9671 and 0.9833, respectively).[3] The structure was solved by direct methods and refined by full matrix least square on F^2 techniques using anisotropic displacement parameters for all non-hydrogen atoms.[4] All hydrogen atoms were found in the difference Fourier map and refine isotropically. At final convergence, R_1 = 4.70 % and GOF = 1.144 for 441 parameters. Additional information about these data includes crystal data and structure refinement in Table S2, atomic coordinates in Table S3, bond length and angles in Table S4, anisotropic displacement parameters in Table S5, hydrogen coordinates in Table S6.

Alkaline hydrolysis of 2. To a solution of **2** (3.8 mg) in MeOH (1.0 mL), ammonium hydoxide (600 μL) was added and left at 50˚C for 3 h. The reaction mixture was evaporated in a vacuum under reduced pressure to give a residue that was purified by a reversed phase HPLC using MeCN–H_2O (13:7) to afford **1** (2.0 mg). The ^1H and ^{13}C NMR spectra and the optical rotation ($[\alpha]^{26}_D$ +110.0˚; *c* 0.04, $CHCl_3$) of the reaction product were identical with those of **1** isolated from the fungal extract. HRESI-TOF-MS: *m/z* 401.2681 $[M+H]^+$ (calcd for $C_{25}H_{37}O_3$, 401.2686).

Formation of the (*R*)- and (*S*)-MTPA esters (4a and 4b) from 2. (*R*)-MTPA (15 mg), dicyclohexylcarbodiimide (20 mg) and 4-(dimethylamino)pyridine (10 mg) were added to a CH_2Cl_2 solution (1 mL) of **2** (3.5 mg), and the reaction mixture was left at room temperature overnight. The solvent was evaporated in a vacuum under reduced pressure and the MeOH soluble portion of the residue was purified by a reversed phase HPLC using MeOH–H_2O (4:1) to afford ester **4a** (2.2 mg). The same reaction with **2** (5.5 mg) using (*S*)-MTPA (10 mg) gave ester **4b** (2.7 mg).

(*R*)-MTPA ester (4a). Obtained as white powder. ^1H NMR ($CDCl_3$) δ 0.87 (3H, s, CH_3-21), 1.34 (3H, s, CH_3-19), 1.47-1.67 (4H, m, H11α, H12α, H15α, 15β), 1.74-1.96 (4H, m, H11β, H16α, H16β, H17), 1.76 (3H, d, *J*=6.3 Hz, CH_3-25), 1.81 (1H, m, H4β), 2.10 (3H, s, $COCH_3$), 2.13 (1H, ddd, *J*=12.3, 6.4, 2.5 Hz, H14), 2.19 (1H, m, H12β), 2.41 (1H, m, H2α), 2.58 (1H, d, *J*=13.7 Hz, H18a), 2.63 (1H, m, H2β), 2.64 (1H, dd, *J*=13.7, 6.2Hz, H18b), 2.79 (1H, m, H5), 2.84 (1H, dd, *J*=12.4, 5.7 Hz, H9), 2.89 (1H, brd, *J*=12.9 Hz, H4α), 3.57 (3H, s, OMe), 4.84 (1H, brt, *J*=11.4 Hz, H3), 5.10 (1H, d, *J*=7.3 Hz, H22), 5.46 (1H, ddq, *J*=15.2, 6.7, 1.4 Hz, H23), 5.63 (1H, dd, *J*=7.8, 6.4 Hz, H1), 5.64 (1H, s, H7), 5.83 (1H, dq, *J*=15.1, 6.7 Hz,

H24), 7.42 (3H, m, ArH), 7.56 (2H, m, ArH); HRESI-TOF-MS: *m/z* 681.3027 $[M+Na]^+$ (calcd for $C_{37}H_{45}F_3O_7Na$, 681.3010).

(*S*)-MTPA ester (4b). Obtained as white powder. ^1H NMR ($CDCl_3$) δ 0.86 (3H, s, CH_3-19), 1.33 (3H, s, CH_3-21), 1.48-1.67 (4H, m, H11α, H12α, H15α, 15β), 1.74-1.97 (4H, m, H11β, H16α, H16β, H17), 1.77 (3H, d, *J*=6.3 Hz, CH_3-25), 1.86 (1H, m, H4β), 2.10 (3H, s, CO**CH_3**), 2.14 (1H, ddd, *J*=12.3, 6.4, 2.5 Hz, H14), 2.19 (1H, m, H12β), 2.31 (1H, m, H2α), 2.53 (1H, m, H2β), 2.56 (1H, d, *J*=13.7 Hz, H18a), 2.64 (1H, dd, *J*=13.7, 6.3 Hz, H18b), 2.81 (1H, m, H5), 2.84 (1H, dd, *J*=12.2, 5.8 Hz, H9), 2.96 (1H, brd, *J*=12.9 Hz, H4α), 3.58 (3H, s, OMe), 4.85 (1H, brt, *J*=11.4 Hz, H3), 5.09 (1H, d, *J*=7.3Hz, H22), 5.46 (1H, ddq, *J*=15.2, 6.7, 1.4 Hz, H23), 5.62 (1H, dd, *J*=7.8, 6.4 Hz, H1), 5.64 (1H, s, H7), 5.83 (1H, dq, *J*=15.1, 6.7 Hz, H24), 7.41 (3H, m, ArH), 7.54 (2H, m, ArH). HRESI-TOF-MS: *m/z* 681.3020 $[M+H]^+$ (calcd for $C_{37}H_{45}F_3O_7Na$, 681.3010).

Figure S1. ^{1}H NMR spectrum of **1**

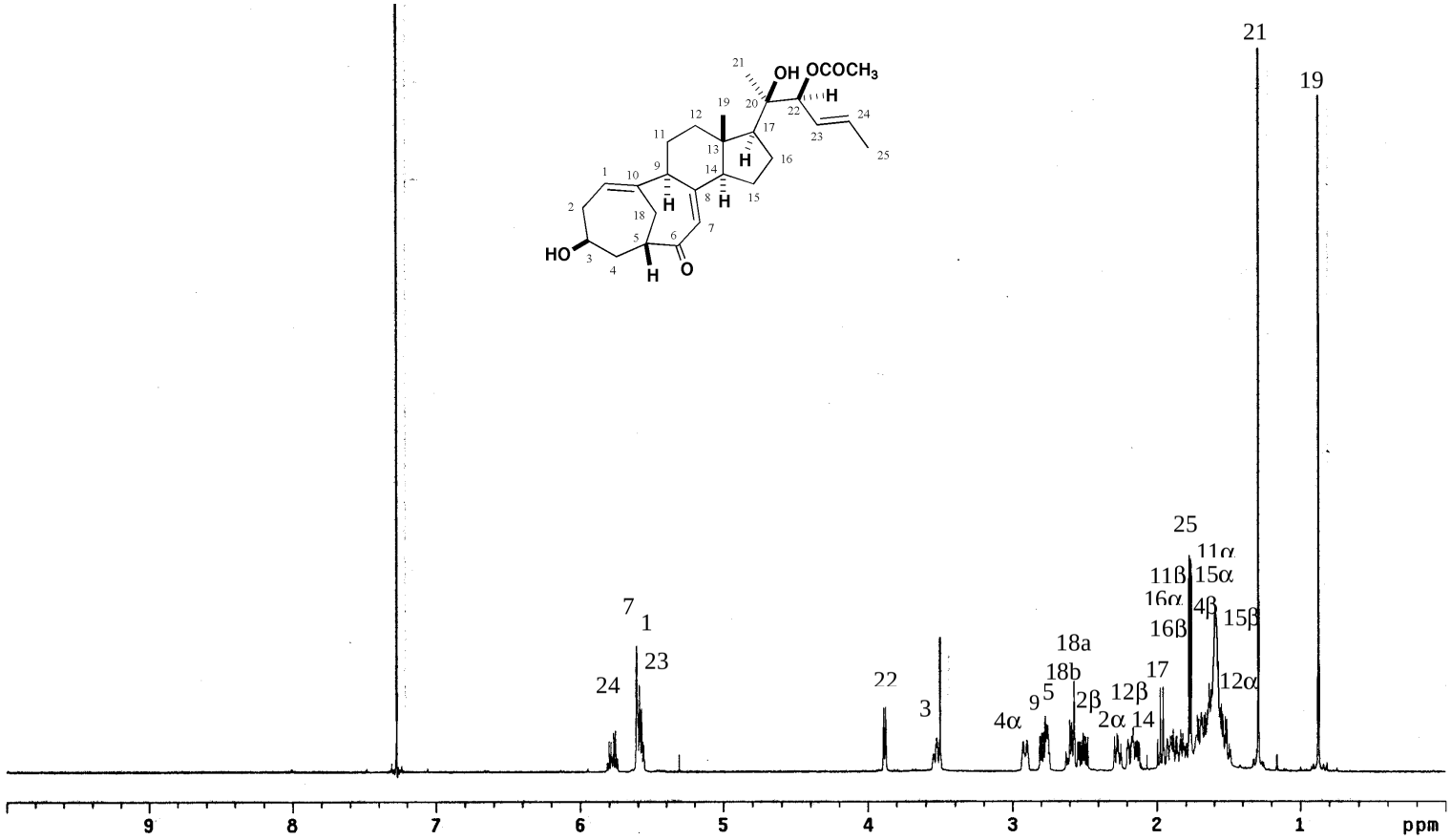

Figure S2. ^{13}C NMR spectrum of **1**

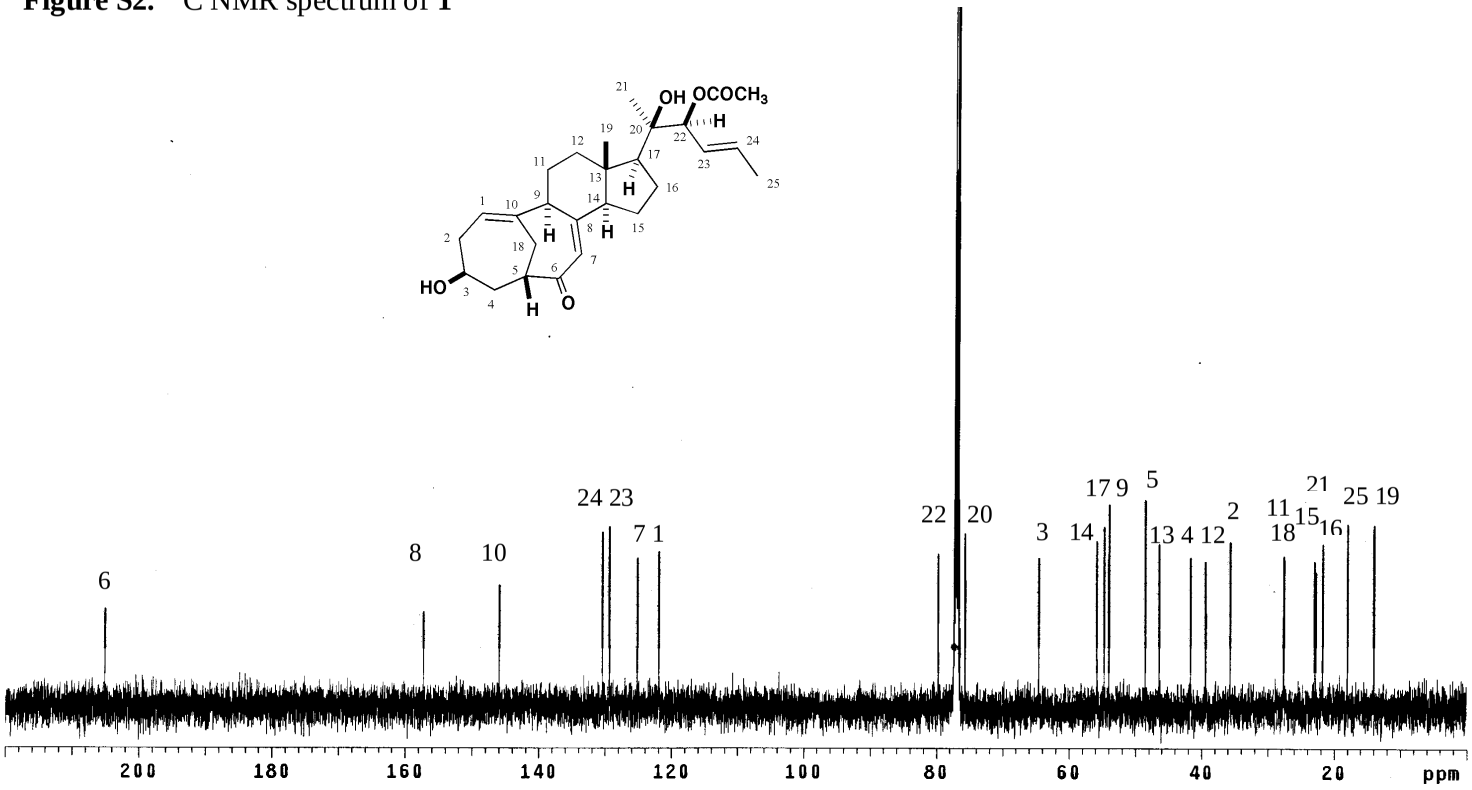

Figure S3. ^{1}H NMR spectrum of **2**

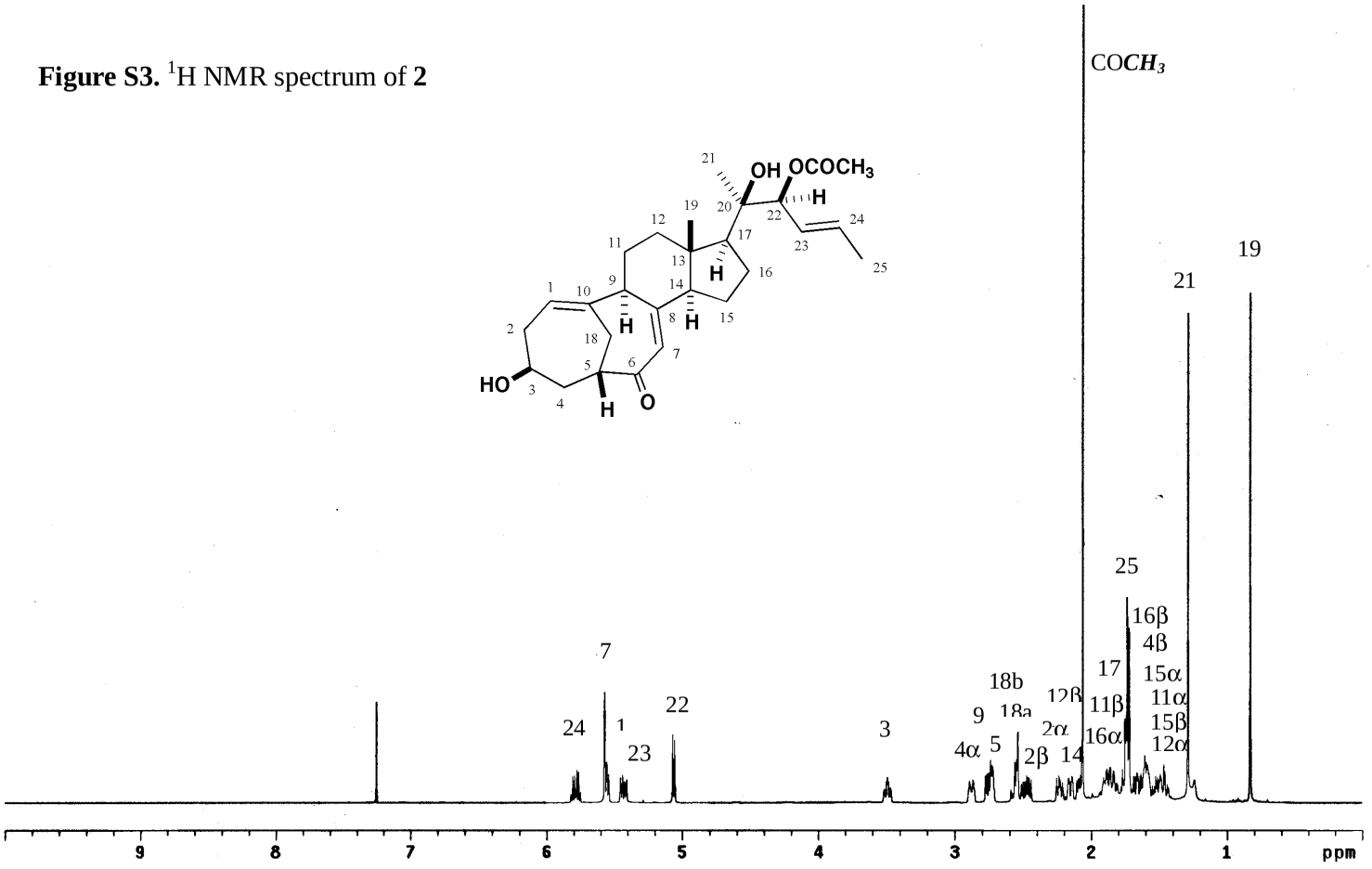

Figure S4. ^{13}C NMR spectrum of **2**

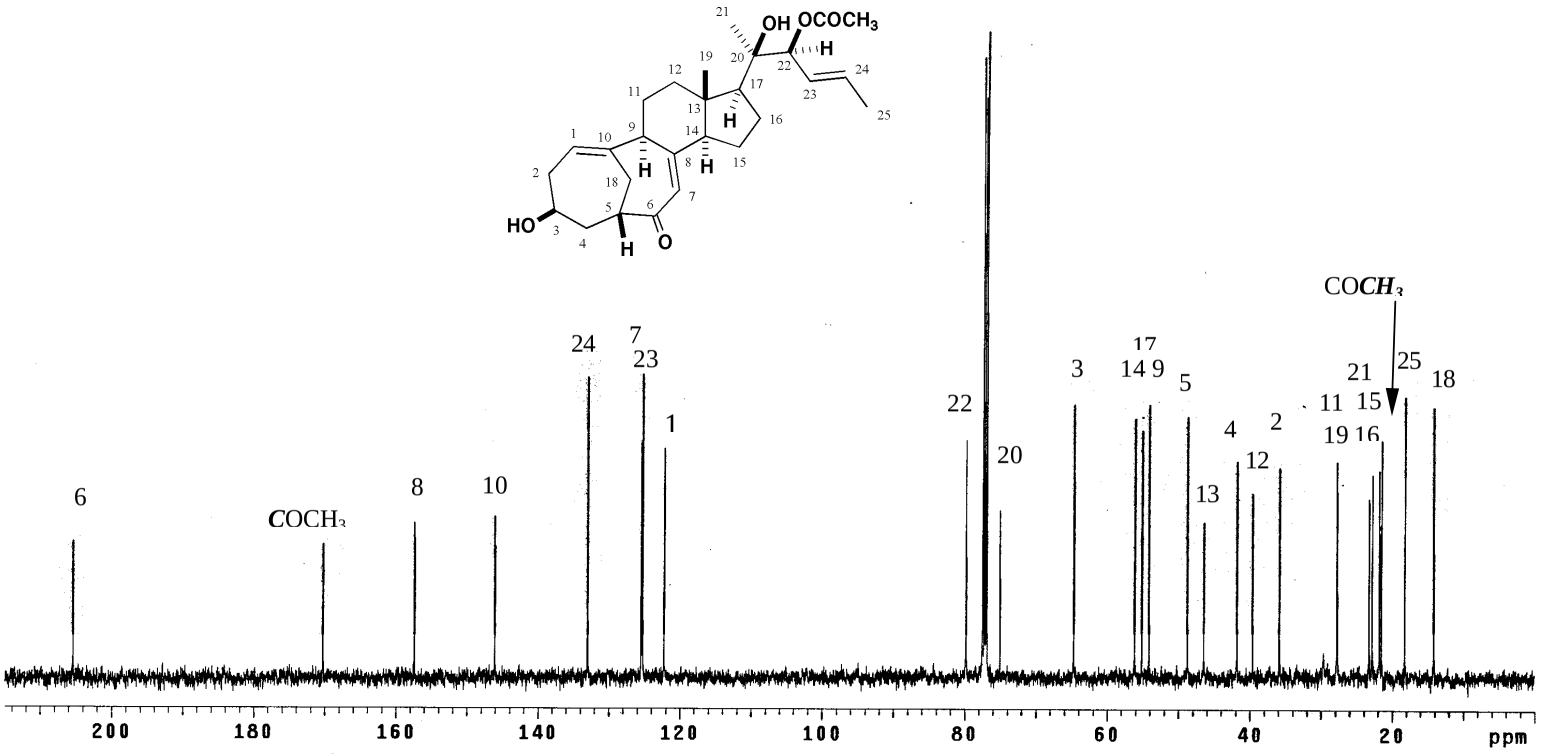

Table S1. Comparison of ^{13}C NMR data between isocyclocitrinol A (**1**) and revised structure of cyclocitrinol

ɔosition	**1**	**3a**[a]
1	121.9 (d)	122.2 (d)
2	35.7 (t)	36.2 (t)
3	64.6 (d)	63.3 (d)
4	41.7 (t)	41.6 (t)
5	48.5 (d)	48.3 (d)
6	205.1 (s)	204.3 (s)
7	125.2 (d)	124.7 (d)
8	157.3 (s)	157.3 (s)
9	54.0 (d)	53.5 (d)
10	146.0 (s)	145.9 (s)
11	27.7 (t)	27.4 (t)
12	39.4 (t)	39.0 (t)
13	46.4 (s)	46.1 (s)
14	55.8 (d)	55.5 (d)
15	22.8 (t)	22.5 (t)
16	21.8 (t)	22.3 (t)
17	54.7 (d)	60.1 (d)
18	27.6 (t)	27.7 (t)
19	14.0 (q)	14.5 (q)
20	75.7 (s)	73.5 (s)
21	23.0 (q)	29.1 (q)
22	79.8 (d)	136.2 (d)
23	129.4 (d)	131.2 (d)
24	130.4 (d)	66.5 (d)
25	18.0 (q)	24.2 (q)

[a]Data from the literature (see Figure 1), original atom numbering of **3a** and our revised numbering of **3b**

Table S2. Crystal data and structure refinement for **2**.

Identification code	22-acetylisocyclocitrinol A	
Empirical formula	C27 H38 O5	
Formula weight	442.57	
Temperature	173(2) K	
Wavelength	0.71073 Å	
Crystal system	Monoclinic	
Space group	P2(1)	
Unit cell dimensions	a = 10.753(2) Å	α= 90°.
	b = 6.5087(15) Å	β= 93.235(5)°.
	c = 16.864(4) Å	γ = 90°.
Volume	1178.4(5) $Å^3$	
Z	2	
Density (calculated)	1.247 Mg/m^3	
Absorption coefficient	0.084 mm^{-1}	
F(000)	480	
Crystal size	0.40 x 0.30 x 0.20 mm^3	
Theta range for data collection	2.42 to 31.68°.	
Index ranges	-15<=h<=15, -9<=k<=9, -24<=l<=23	
Reflections collected	11733	
Independent reflections	6914 [R(int) = 0.0209]	
Completeness to theta = 31.68°	91.8 %	
Absorption correction	SADABS	
Max. and min. transmission	0.9833 and 0.9671	
Refinement method	Full-matrix least-squares on F^2	
Data / restraints / parameters	6914 / 1 / 441	
Goodness-of-fit on F^2	1.144	
Final R indices [I>2sigma(I)]	R1 = 0.0470, wR2 = 0.1141	
R indices (all data)	R1 = 0.0516, wR2 = 0.1165	
Absolute structure parameter	0.1(8)	
Largest diff. peak and hole	0.377 and -0.260 $e.Å^{-3}$	

Table S3. Atomic coordinates (x 10^4) and equivalent isotropic displacement parameters ($Å^2$x 10^3) for **2**. U(eq) is defined as one third of the trace of the orthogonalized U^{ij} tensor.

	x	y	z	U(eq)
O(1)	7511(1)	2793(2)	6174(1)	28(1)
O(2)	9142(1)	-870(2)	8108(1)	24(1)
O(3)	6330(1)	-1309(2)	12710(1)	27(1)
O(4)	8546(1)	2114(2)	13765(1)	26(1)
O(5)	10352(1)	474(3)	14008(1)	50(1)
C(1)	7644(2)	4583(2)	8310(1)	20(1)
C(2)	7257(2)	4540(3)	7434(1)	22(1)
C(3)	7701(1)	2585(2)	7020(1)	19(1)
C(4)	7010(1)	625(2)	7225(1)	20(1)
C(5)	6986(1)	56(2)	8106(1)	18(1)
C(6)	8278(1)	-339(2)	8499(1)	17(1)
C(7)	8449(1)	-347(2)	9389(1)	17(1)
C(8)	8179(1)	1115(2)	9916(1)	15(1)
C(9)	7667(1)	3236(2)	9698(1)	17(1)
C(10)	7183(1)	3320(2)	8841(1)	17(1)
C(11)	6661(2)	3970(2)	10258(1)	20(1)
C(12)	6988(2)	3582(2)	11144(1)	19(1)
C(13)	7326(1)	1315(2)	11291(1)	14(1)
C(14)	8473(1)	843(2)	10794(1)	16(1)
C(15)	8935(1)	-1239(2)	11112(1)	19(1)
C(16)	8737(2)	-1113(3)	12012(1)	22(1)
C(17)	7899(1)	804(2)	12139(1)	16(1)
C(18)	6277(1)	1646(2)	8586(1)	18(1)
C(19)	6233(1)	-101(3)	11038(1)	19(1)
C(20)	7044(1)	543(3)	12837(1)	19(1)
C(21)	6169(2)	2366(3)	12935(1)	28(1)
C(22)	7882(1)	198(3)	13614(1)	21(1)
C(23)	7158(2)	-297(3)	14327(1)	24(1)
C(24)	6904(2)	-2177(3)	14559(1)	33(1)
C(25)	6131(3)	-2675(5)	15252(1)	46(1)
C(26)	9777(2)	2039(4)	13939(1)	32(1)
C(27)	10290(2)	4180(5)	14018(2)	49(1)

Table S4. Bond lengths [Å] and angles [°] for **2**

O(1)-C(3)	1.4354(19)
O(2)-C(6)	1.2197(19)
O(3)-C(20)	1.4387(19)
O(4)-C(26)	1.340(2)
O(4)-C(22)	1.452(2)
O(5)-C(26)	1.194(3)
C(1)-C(10)	1.332(2)
C(1)-C(2)	1.513(2)
C(2)-C(3)	1.540(2)
C(3)-C(4)	1.526(2)
C(4)-C(5)	1.533(2)
C(5)-C(6)	1.527(2)
C(5)-C(18)	1.542(2)
C(6)-C(7)	1.501(2)
C(7)-C(8)	1.345(2)
C(8)-C(14)	1.506(2)
C(8)-C(9)	1.523(2)
C(9)-C(10)	1.509(2)
C(9)-C(11)	1.551(2)
C(10)-C(18)	1.509(2)
C(11)-C(12)	1.535(2)
C(12)-C(13)	1.537(2)
C(13)-C(19)	1.535(2)
C(13)-C(17)	1.561(2)
C(13)-C(14)	1.560(2)
C(14)-C(15)	1.530(2)
C(15)-C(16)	1.547(2)
C(16)-C(17)	1.561(2)
C(17)-C(20)	1.543(2)
C(20)-C(21)	1.529(2)
C(20)-C(22)	1.563(2)
C(22)-C(23)	1.503(2)
C(23)-C(24)	1.318(3)
C(24)-C(25)	1.507(3)
C(26)-C(27)	1.502(3)
C(26)-O(4)-C(22)	118.50(15)
C(10)-C(1)-C(2)	123.60(14)
C(1)-C(2)-C(3)	112.52(13)
O(1)-C(3)-C(4)	105.08(12)
O(1)-C(3)-C(2)	109.99(12)
C(4)-C(3)-C(2)	114.88(13)
C(3)-C(4)-C(5)	117.16(12)
C(6)-C(5)-C(4)	113.38(12)
C(6)-C(5)-C(18)	110.50(12)
C(4)-C(5)-C(18)	112.51(12)
O(2)-C(6)-C(7)	119.10(13)
O(2)-C(6)-C(5)	120.95(14)
C(7)-C(6)-C(5)	119.45(12)
C(8)-C(7)-C(6)	129.73(13)
C(7)-C(8)-C(14)	121.66(13)
C(7)-C(8)-C(9)	124.77(13)
C(14)-C(8)-C(9)	113.36(12)
C(10)-C(9)-C(8)	111.35(12)
C(10)-C(9)-C(11)	110.92(12)
C(8)-C(9)-C(11)	112.79(12)
C(1)-C(10)-C(9)	123.04(14)
C(1)-C(10)-C(18)	120.86(13)

C(9)-C(10)-C(18)	115.43(12)
C(12)-C(11)-C(9)	114.33(12)
C(11)-C(12)-C(13)	110.76(12)
C(19)-C(13)-C(12)	111.16(12)
C(19)-C(13)-C(17)	112.56(12)
C(12)-C(13)-C(17)	115.50(12)
C(19)-C(13)-C(14)	110.35(12)
C(12)-C(13)-C(14)	106.81(12)
C(17)-C(13)-C(14)	99.63(11)
C(8)-C(14)-C(15)	119.62(12)
C(8)-C(14)-C(13)	112.11(11)
C(15)-C(14)-C(13)	103.73(12)
C(14)-C(15)-C(16)	103.67(12)
C(15)-C(16)-C(17)	106.88(12)
C(20)-C(17)-C(13)	120.06(12)
C(20)-C(17)-C(16)	112.96(12)
C(13)-C(17)-C(16)	104.18(11)
C(10)-C(18)-C(5)	107.65(12)
O(3)-C(20)-C(21)	109.83(13)
O(3)-C(20)-C(17)	108.35(12)
C(21)-C(20)-C(17)	113.15(13)
O(3)-C(20)-C(22)	106.41(12)
C(21)-C(20)-C(22)	110.51(13)
C(17)-C(20)-C(22)	108.34(11)
O(4)-C(22)-C(23)	108.39(13)
O(4)-C(22)-C(20)	106.17(12)
C(23)-C(22)-C(20)	113.62(12)
C(24)-C(23)-C(22)	124.19(17)
C(23)-C(24)-C(25)	124.2(2)
O(5)-C(26)-O(4)	123.5(2)
O(5)-C(26)-C(27)	126.64(19)
O(4)-C(26)-C(27)	109.8(2)

Symmetry transformations used to generate equivalent atoms:

Table S5. Anisotropic displacement parameters ($Å^2 x\ 10^3$) for **2**. The anisotropic displacement factor exponent takes the form: $-2\pi^2[\ h^2 a^{*2} U^{11} + ... + 2\ h\ k\ a^*\ b^*\ U^{12}\ ]$

	U^{11}	U^{22}	U^{33}	U^{23}	U^{13}	U^{12}
O(1)	38(1)	27(1)	18(1)	1(1)	2(1)	-2(1)
O(2)	25(1)	25(1)	22(1)	1(1)	6(1)	7(1)
O(3)	26(1)	35(1)	21(1)	2(1)	1(1)	-14(1)
O(4)	22(1)	32(1)	24(1)	-2(1)	-2(1)	-6(1)
O(5)	24(1)	72(1)	54(1)	-10(1)	-4(1)	7(1)
C(1)	26(1)	11(1)	21(1)	-1(1)	1(1)	2(1)
C(2)	31(1)	17(1)	19(1)	2(1)	0(1)	4(1)
C(3)	21(1)	18(1)	19(1)	0(1)	1(1)	2(1)
C(4)	23(1)	17(1)	19(1)	-2(1)	1(1)	-1(1)
C(5)	18(1)	13(1)	21(1)	-2(1)	1(1)	-1(1)
C(6)	21(1)	10(1)	22(1)	1(1)	2(1)	1(1)
C(7)	17(1)	14(1)	21(1)	2(1)	2(1)	2(1)
C(8)	12(1)	14(1)	18(1)	1(1)	2(1)	-1(1)
C(9)	18(1)	12(1)	19(1)	-1(1)	2(1)	0(1)
C(10)	18(1)	12(1)	20(1)	-3(1)	1(1)	6(1)
C(11)	26(1)	16(1)	19(1)	-1(1)	2(1)	7(1)
C(12)	24(1)	15(1)	18(1)	-2(1)	3(1)	4(1)
C(13)	14(1)	14(1)	16(1)	-1(1)	1(1)	0(1)
C(14)	13(1)	16(1)	18(1)	1(1)	2(1)	0(1)
C(15)	18(1)	20(1)	20(1)	1(1)	3(1)	5(1)
C(16)	23(1)	24(1)	19(1)	4(1)	1(1)	7(1)
C(17)	13(1)	19(1)	17(1)	-1(1)	2(1)	-1(1)
C(18)	16(1)	18(1)	20(1)	-1(1)	2(1)	1(1)
C(19)	15(1)	23(1)	18(1)	-1(1)	0(1)	-5(1)
C(20)	15(1)	24(1)	18(1)	0(1)	0(1)	-3(1)
C(21)	22(1)	39(1)	23(1)	1(1)	4(1)	8(1)
C(22)	17(1)	27(1)	18(1)	-1(1)	0(1)	-1(1)
C(23)	20(1)	34(1)	18(1)	1(1)	1(1)	1(1)
C(24)	36(1)	36(1)	28(1)	4(1)	5(1)	-3(1)
C(25)	54(1)	49(1)	34(1)	13(1)	12(1)	-6(1)
C(26)	21(1)	57(1)	18(1)	-6(1)	3(1)	-8(1)
C(27)	39(1)	68(2)	38(1)	-6(1)	0(1)	-30(1)

Table S6. Hydrogen coordinates (x 10^4) and isotropic displacement parameters ($Å^2$x 10^3) for **2**.

	x	y	z	U(eq)
H(1O)	8070(20)	3490(40)	6050(14)	28(6)
H(3O)	6040(20)	-1440(50)	13080(17)	41(7)
H(1)	8270(20)	5460(40)	8484(13)	26(5)
H(2B)	7616(18)	5680(40)	7166(13)	20(5)
H(2A)	6347(19)	4610(30)	7351(11)	19(5)
H(3)	8587(17)	2430(30)	7152(11)	16(4)
H(4B)	7312(19)	-530(40)	6926(12)	22(5)
H(4A)	6133(19)	760(30)	7009(12)	21(5)
H(5)	6577(16)	-1210(30)	8142(11)	14(4)
H(7)	8836(19)	-1440(40)	9552(13)	26(5)
H(9)	8341(18)	4180(30)	9765(11)	17(5)
H(11B)	5896(17)	3400(30)	10102(11)	10(4)
H(11A)	6576(19)	5320(40)	10165(13)	23(5)
H(12B)	6273(18)	3990(30)	11456(11)	17(4)
H(12A)	7720(20)	4340(40)	11323(12)	25(5)
H(14)	9060(20)	1830(30)	10955(12)	20(5)
H(15B)	8450(20)	-2310(40)	10884(13)	28(5)
H(15A)	9750(20)	-1530(40)	10981(13)	33(6)
H(16B)	8340(20)	-2420(40)	12177(14)	36(6)
H(16A)	9513(17)	-970(30)	12314(11)	14(4)
H(17)	8397(17)	1900(30)	12248(11)	15(5)
H(18B)	5612(18)	2130(30)	8240(12)	20(5)
H(18A)	5890(20)	970(40)	9042(13)	25(5)
H(19C)	6079(19)	-90(30)	10502(13)	21(5)
H(19B)	6448(18)	-1440(40)	11192(12)	21(5)
H(19A)	5431(18)	370(30)	11276(12)	20(5)
H(21C)	5559(18)	2350(40)	12504(12)	19(5)
H(21B)	5740(20)	2270(40)	13422(15)	38(6)
H(21A)	6645(19)	3580(40)	12960(13)	25(5)
H(26)	8473(17)	-820(30)	13545(11)	14(4)
H(23)	6860(20)	880(40)	14622(14)	31(6)
H(24)	7220(30)	-3280(50)	14259(17)	47(7)
H(25C)	6450(30)	-3730(60)	15580(20)	62(9)
H(25B)	5440(30)	-3470(50)	15040(20)	63(10)
H(25A)	5920(30)	-1510(60)	15534(19)	62(9)
H(27C)	11180(30)	4170(60)	14220(19)	72(10)
H(27B)	9810(40)	5060(80)	14310(30)	108(15)
H(27A)	10270(30)	4740(60)	13520(20)	80(11)

[1] Varoglu, M.; Crews, P. *J. Nat. Prod.* **2000**, *63*, 41-43.

[2] SMART & SAINT Software Reference manuals, version 5.042; Bruker Analytical X-ray Systems. Madison WI, 1998.

[3] Sheldrick G.M. SADABS, *a software for empirical absorption correction*; University of Gottingen, Germany, 2000.

[4] Sheldrick G.M, SHELXTL Reference Manual, version 5.1; Bruker Analytical X-ray Systems. Madison WI, 1997.