Supplementary Material (ESI) for Chemical Communications

Supporting Information

Total Synthesis of Proposed Structure of Iriomoteolide-1a

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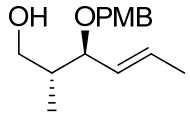
Contents:

General Information:

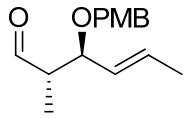
All reagents and solvents were commercial grade and purified prior to use when necessary. TLC was performed on Silica Gel 60 F_{254} from EMD. Visualization was performed by ultraviolet light and/or by staining with potassium permanganate. Flash Chromatography was performed using Silica Gel 60 (particle size 40-63μm). All ^{1}H & ^{13}C NMR spectra were recorded at 400 MHz and 100 MHz (Varian), respectively, at room temperature. Optical rotations were measured on JASCO p-2000 polarimeter. High-resolution mass spectrometry (HRMS) data was obtained from Thermo Electron LTQ-FT hybrid linear ion trap - Fourier transform ion cyclotron resonance mass spectrometer. IR spectra were recorded as thin films on Thermo Nicolet IR200 and are reported at 23 °C in wavenumbers (cm^{-1}).

Experimental procedure:



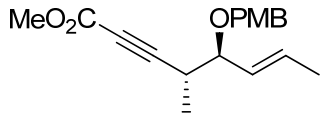
(2R,3S,*E*)-3-(4-methoxybenzyloxy)-2-methylhex-4-en-1-ol (5). To a stirred solution of diol **4** (159 mg, 1.22 mmol) in CH_2Cl_2 (12 mL) was added PPTS (15 mg, 0.06 mmol, 0.05 equiv) and 4-methoxybenzaldehyde dimethyl acetal (267 mg, 1.47 mmol, 1.2 equiv). The reaction was stirred overnight and quenched with Et_3N. The solvent was removed under reduced pressure and the resulting residue was purified by Flash chromatography (4.5% EtOAc/hexane) to afford actal (283 mg, 93%). $[\alpha]_D^{20}$= -44.5 (*c*=0.80, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 7.42 (d, 2H, *J* = 8.7 Hz), 6.87 (d, 2H, *J* = 8.7 Hz), 5.80 (qd, 1H, *J* = 6.6 Hz, 15.3 Hz), 5.52 (m, 1H), 5.48 (s, 1H), 4.14 (dd, 1H, *J* = 4.6 Hz, 11.4 Hz), 3.82 (m, 1H), 3.79 (s, 3H), 3.51 (t, 1H, *J* = 11.2 Hz), 1.83-1.92 (m, 1H), 1.73 (dd, 3H, *J* = 1.5 Hz, 6.4 Hz), 0.75 (d, 3H, *J* = 6.8 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 160.1, 131.4, 130.5, 129.7, 127.8, 113.8, 101.4, 84.9, 73.3, 55.5, 34.3, 18.1, 12.7; HRMS $C_{15}H_{20}O_3$ $[M+Na]^+$ calc'd 271.1305, found. 271.1304; IR ν_{max} (film) 3074, 2977, 2835, 1641, 1516, 1378, 1249, 1170, 1033, 917, 825 cm^{-1}.

To a stirred solution of acetal (46 mg, 0.19 mmol) in CH_2Cl_2 (2 mL) was added DIBAL-H (1.2 M in toluene, 0.47 mL, 0.56 mmol, 3 equiv) at -78 °C. After the addition, the reaction was warmed to 0 °C. After 30 min at 0 °C, the reaction was quenched with MeOH and stirred for 30 min at 23 °C. The solid was removed through filtration and the filtrate was concentrated under reduced pressure. The resulting residue was purified by Flash chromatography (10-12% EtOAc/hexane) to afford **5** (43 mg, 92%) as a colorless oil. $[\alpha]_D^{20}$=72.0 (*c*=1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 7.23 (d, 2H, *J* = 8.6 Hz), 6.87 (d, 2H, *J* = 8.6 Hz), 5.65 (qd, 1H, *J* = 6.4 Hz, 15.3 Hz), 5.35 (ddd, 1H, *J* = 1.6 Hz, 8.6 Hz, 15.3 Hz), 4.53 (d, 1H, *J* = 11.4 Hz), 4.24 (d, 1H, *J* = 11.4 Hz), 3.80 (s, 3H), 3.52-3.64 (m, 3H), 3.15 (dd, 1H, *J* = 3.5 Hz, 8.2 Hz), 1.80-1.86 (m, 1H), 1.77 (dd, 3H, *J* = 1.6 Hz, 6.4 Hz), 0.77 (d, 3H, *J* = 7.0 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 159.4, 130.9, 130.6, 130.5, 129.7, 114.1, 86.3, 69.7, 68.0, 55.5, 40.1, 18.0, 14.1; HRMS $C_{15}H_{22}O_3$ $[M+Na]^+$ calc'd 273.1461, found. 273.1459; IR ν_{max} (film) 3439, 3074, 2977, 2835, 1614, 1512, 1378, 1249, 1033, 917, 825 cm^{-1}.



(2S,3S,*E*)-3-(4-methoxybenzyloxy)-2-methylhex-4-enal (6). To a stirred solution of **5** (40 mg, 0.16 mmol) in CH_2Cl_2 (5 mL) was added $NaHCO_3$ (134 mg, 1.6 mmol, 10 equiv) and the Dess-Martin reagent (103 mg, 0.24 mmol, 1.5 equiv). After 1 h, the reaction was quenched with sat. Na_2SO_3 and sat. $NaHCO_3$, extracted with CH_2Cl_2 (3 x 10 mL), dried over $MgSO_4$, and concentrated under reduced pressure. The

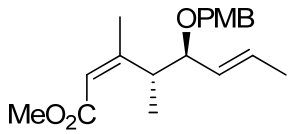
resulting residue was purified by Flash chromatography (4% EtOAc/hexane) to afford **6** (114 mg, 86%) as a colorless oil. $[\alpha]_D^{20}$=80.7 (*c*=1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 9.68 (d, 1H, *J* = 2.7 Hz), 7.20 (d, 2H, *J* = 8.6 Hz), 6.87 (d, 2H, *J* = 8.6 Hz), 5.73 (qd, 1H, *J* = 6.4 Hz, 15.3 Hz), 5.36 (ddd, 1H, *J* = 1.6 Hz, 8.6 Hz, 15.3 Hz), 4.52 (d, 1H, *J* = 11.4 Hz), 4.26 (d, 1H, *J* = 11.4 Hz), 3.86 (t, 1H, *J* = 8.6 Hz), 3.80 (s, 3H), 2.51-2.55 (m, 1H), 1.78 (d, 3H, *J* = 6.4 Hz), 0.97 (d, 3H, *J* = 7.0 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 204.7, 159.4, 131.8, 130.5, 129.6, 129.1, 114.0, 80.8, 69.7, 55.5, 51.0, 18.0, 11.0; HRMS $C_{15}H_{20}O_3$ $[M+Na]^+$ calc'd 271.1305, found. 271.1308; IR ν_{max} (film) 2923, 2856, 1726, 1605, 1512, 1454, 1249, 1036, 969, 822 cm^{-1}.



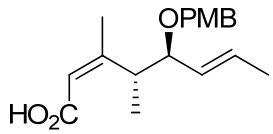
(4R,5S,*E*)-methyl 5-(4-methoxybenzyloxy)-4-methyloct-6-en-2-ynoate (7). To a stirred solution of CBr_4 (93 mg, 0.28 mmol, 2 equiv) in CH_2Cl_2 (0.3 mL) was added Ph_3P (147 mg, 0.56 mmol, 4 equiv) in CH_2Cl_2 (0.3 mL) solution at 0 °C. The mixture was stirred 10 min at rt. and recooled to 0 °C. Aldehyde **6** (35 mg, 0.14 mmol) in CH_2Cl_2 (0.3 mL) was added. After 2h, the reaction was quenched with sat. $NaHCO_3$ and extracted with CH_2Cl_2 (3 x 10 mL), dried over $MgSO_4$, and concentrated under reduced pressure. The resulting residue was purified by Flash chromatography (1-2% EtOAc/hexane) to afford dibromoalkene (50 mg, 88%) as a colorless oil. $[\alpha]_D^{20}$=5.6 (*c*=1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 7.23 (d, 2H, *J* = 8.6 Hz), 6.87 (d, 2H, *J* = 8.6 Hz), 6.30 (d, 1H, *J* = 9.4 Hz), 5.64 (qd, 1H, *J* = 6.4 Hz, 15.3 Hz), 5.33 (ddd, 1H, *J* = 1.4 Hz, 8.4 Hz, 15.3 Hz), 4.52 (d, 1H, *J* = 11.6 Hz), 4.22 (d, 1H, *J* = 11.6 Hz), 3.81 (s, 3H), 3.53 (dd, 1H, *J* = 5.7 Hz, 8.4 Hz), 2.58-2.63 (m, 1H), 1.76 (dd, 3H, *J* = 1.4 Hz, 6.4 Hz), 0.98 (d, 3H, *J* = 7.0 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 159.2, 141.4, 131.0, 130.7, 129.7, 129.5, 113.9, 88.5, 82.0, 69.5, 55.5, 43.5, 18.1, 15.5; HRMS $C_{16}H_{20}Br_2O_2$ $[M+Na]^+$ calc'd 424.9722, found. 424.9722**;** IR ν_{max} (film) 2923, 2856, 1587, 1512, 1454, 1249, 1036, 980, 822 cm^{-1}.

To a stirred solution of dibromoalkene (48 mg, 0.12 mmol) in THF (1 mL) was added *n*-BuLi (2.4 M in Hexane, 0.11 mL, 0.26 mmol, 2.2 equiv) at -78 °C. After 30 min, the reaction was treated with methyl chloroformate (22 mg, 0.24 mmol, 2 equiv) and warmed to rt over 2.5 h. The reaction was quenched with sat. NH_4Cl and extracted with Et_2O (3 x 10 mL), dried over $MgSO_4$, and concentrated under reduced pressure. The resulting residue was purified by Flash chromatography (3-5% EtOAc/hexane) to afford **7** (33 mg, 91%) as a colorless oil. $[\alpha]_D^{20}$=38.7 (*c*=1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 7.27 (d, 2H, *J* = 8.6 Hz), 6.86 (d, 2H, *J* = 8.6 Hz), 5.70 (qd, 1H, *J* = 6.4 Hz, 15.3 Hz), 5.38 (ddd, 1H, *J* = 1.6 Hz, 8.4 Hz, 15.3 Hz), 4.56 (d, 1H, *J* = 11.6 Hz), 4.31 (d, 1H, *J* = 11.6 Hz), 3.80 (s, 3H), 3.77 (s, 3H), 3.66 (dd, 1H, *J* = 6.6 Hz, 8.2 Hz), 2.70-2.77 (m, 1H), 1.77 (dd, 3H, *J* = 1.6 Hz, 6.4 Hz), 1.16 (d, 3H, *J* = 7.0 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 159.3, 154.5, 131.7, 130.6, 129.6, 128.7, 113.9, 91.7, 81.2, 73.9, 69.8,

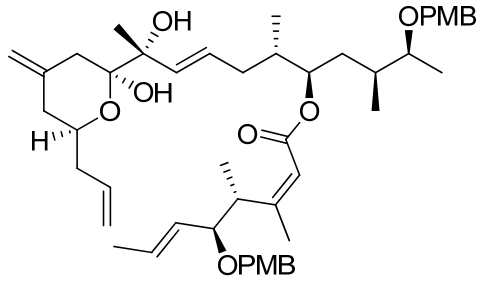
55.5, 52.8, 32.0, 18.1, 16.0; HRMS $C_{18}H_{22}O_4$ $[M+Na]^+$ calc'd 325.1410, found. 325.1408; IR ν_{max} (film) 2940, 2840, 2238, 1717, 1610, 1512, 1436, 1254, 1169, 1036, 970, 828 cm^{-1}.



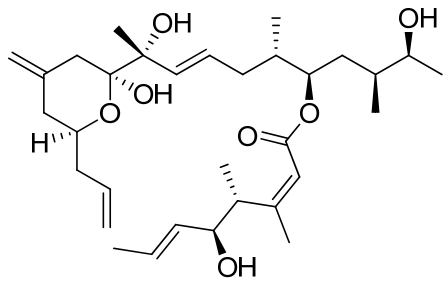
(2*Z*,4R,5S,6*E*)-methyl 5-(4-methoxybenzyloxy)-3,4-dimethylocta-2,6-dienoate (8). To a stirred suspension of CuI (57 mg, 0.3 mmol, 3 equiv) in THF (1 mL) was added MeLi (2.2 M in Hexane, 0.27 mL, 0.6 mmol, 6 equiv) at 0 °C. After 15 min, the reaction was cooled to -50 °C and treated with **7** (32 mg, 0.1 mmol) in THF (1 mL) solution. After 1.5 h, the reaction was quenched with AcOH (33μL) and sat. NH_4Cl, extracted with Et_2O (3 x 10 mL), dried over $MgSO_4$, and concentrated under reduced pressure. The resulting residue was purified by Flash chromatography (3% EtOAc/hexane) to afford **8** (30 mg, 90%). $[\alpha]_D^{20}$= -25.2 (*c*=0.5, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 7.19 (d, 2H, *J* = 8.6 Hz), 6.84 (d, 2H, *J* = 8.6 Hz), 5.67 (s, 1H), 5.64-5.69 (m, 1H), 5.33 (ddd, 1H, *J* = 1.6 Hz, 8.6 Hz, 15.3 Hz), 4.48 (d, 1H, *J* = 11.6 Hz), 4.21 (d, 1H, *J* = 11.6 Hz), 4.02-4.06 (m, 1H), 3.79 (s, 3H), 3.65 (s, 3H), 3.59 (t, 1H, *J* = 9.0 Hz), 1.77 (dd, 3H, *J* = 1.6 Hz, 6.4 Hz), 1.72 (d, 3H, *J* = 1.2 Hz), 0.93 (d, 3H, *J* = 7.0 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 166.9, 163.1, 159.1, 131.1, 130.9, 130.8, 129.6, 117.1, 113.8, 82.0, 69.2, 55.5, 51.0, 39.3, 20.3, 18.0, 15.8; HRMS $C_{19}H_{26}O_4$ $[M+Na]^+$ calc'd 341.1723, found. 341.1719; IR ν_{max} (film) 2949, 2856, 1717, 1641, 1512, 1454, 1245, 1036, 970, 822 cm^{-1}.



(2*Z*,4R,5S,6*E*)-5-(4-methoxybenzyloxy)-3,4-dimethylocta-2,6-dienoic acid (3). To a stirred solution of **8** (64 mg, 0.2 mmol) in MeOH (1 mL) and THF (1 mL) was added LiOH (1 M, 2 mL, 2 mmol, 10 equiv), after 60 h at rt, the pH value was adjusted to 2-3 with 1 M HCl and the mixture was extracted with Et_2O, dried over $MgSO_4$, and concentrated under reduced pressure. The resulting residue was purified by Flash chromatography (25% EtOAc/hexane) to afford acid **3** (58 mg, 95%). $[\alpha]_D^{20}$=-5.2 (*c*=0.38, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 7.16 (d, 2H, *J* = 8.6 Hz), 6.86 (d, 2H, *J* = 8.6 Hz), 5.79 (s, 1H), 5.70 (qd, 1H, *J* = 6.4 Hz, 15.3 Hz), 5.32 (ddd, 1H, *J* = 1.6 Hz, 8.6 Hz, 15.3 Hz), 4.58 (d, 1H, *J* = 11.6 Hz), 4.26 (d, 1H, *J* = 11.6 Hz), 3.80 (s, 3H), 3.54 (t, 1H, *J* = 9.6 Hz), 3.32-3.42 (m, 1H), 1.80 (dd, 3H, *J* = 1.5 Hz, 6.4 Hz), 1.64 (d, 3H, *J* = 1.6 Hz), 0.89 (d, 3H, *J* = 6.8 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 169.4, 159.5, 157.9, 132.2, 129.9, 129.7, 129.6, 119.7, 114.0, 81.4, 69.5, 55.5, 40.8, 19.3, 18.1, 15.4; HRMS $C_{18}H_{24}O_4$ $[M+Na]^+$ calc'd 327.1567, found. 327.1565; IR ν_{max} (film) 2940, 2870, 1686, 1632, 1512, 1454, 1249, 1036, 970, 822 cm^{-1}.

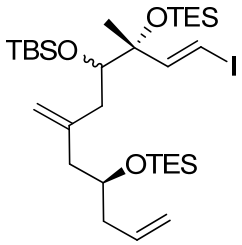


Synthesis of (9). To a stirred solution of Acid **3** (18 mg, 0.06 mmol, 1.5 equiv) in THF (0.8 mL) was added Et_3N (16 mg, 0.16 mmol, 4 equiv) and 2,4,6-trichlorobenzoylchloride (24 mg, 0.1 mmol, 2.5 equiv) at rt. After 4 h at rt, the solid was removed and the filtrate was transferred to a solution of **2** (20 mg, 0.04 mmol) and DMAP (8 mg, 0.064 mmol, 1.6 equiv) in toluene (3 mL). After 18 h at rt, the mixture was quenched with sat. $NaHCO_3$ and diluted with Et_2O, the organic layer was washed with H_2O, brine, dried over $MgSO_4$ and concentrated under reduced pressure. The resulting residue was purified by Flash chromatography (14.5-15% EtOAc/hexane) to afford **9** (16 mg, 53%). $[\alpha]_D^{20}$= -4.2 (*c*=1.3, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ (ppm): 7.25 (d, 2H, *J* = 8.4 Hz), 7.19 (d, 2H, *J* = 8.4 Hz), 7.86 (t, 4H, *J* = 9.0 Hz), 5.61-5.82 (m, 5H), 5.32 (dd, 1H, *J* = 8.4 Hz, 15.3 Hz), 5.03-5.09 (m, 2H), 4.89-4.93 (m, 1H), 4.85 (s, 1H), 4.81 (s, 1H), 4.48 (d, 1H, *J* = 11.6 Hz), 4.47 (d, 1H, *J* = 11.6 Hz), 4.34 (d, 1H, *J* = 11.6 Hz), 4.19 (d, 1H, *J* = 11.6 Hz), 4.02-4.08 (m, 1H), 3.86-3.94 (m, 1H), 3.79 (s, 6H), 3.59 (t, 1H, *J* = 8.8 Hz), 3.47-3.54 (m, 1H), 3.13 (s, 1H), 2.42 (s, 1H), 2.17-2.31 (m, 6H), 1.79-1.91 (m, 4H), 1.76 (d, 3H, *J* = 6.4 Hz), 1.73 (s, 3H), 1.30-1.42 (m, 2H), 1.27 (s, 3H), 1.09 (d, 3H, *J* = 6.2 Hz), 0.93 (d, 3H, *J* = 7.0 Hz), 0.90 (d, 3H, *J* = 6.8 Hz), 0.84 (d, 3H, *J* = 6.6 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 166.3, 162.4, 159.2, 159.0, 141.9, 134.7, 134.1, 131.5, 131.2, 130.9, 130.7, 129.4, 129.3, 129.1, 117.9, 117.3, 114.0, 113.8, 111.3, 99.4, 82.1, 77.4, 76.6, 75.3, 70.7, 70.5, 69.1, 55.5, 40.4, 39.6, 39.3, 38.0, 37.1, 35.3, 35.1. 33.6, 21.4, 20.4, 18.0, 16.6, 15.9, 15.8, 15.4; HRMS $C_{48}H_{68}O_9$ $[M+Na]^+$ calc'd 811.4756, found. 811.8744**;** IR ν_{max} (film) 3506, 3074, 2967, 2932, 1708, 1641, 1614, 1512, 1454, 1378, 1245, 1160, 1040, 974, 822 cm^{-1}.

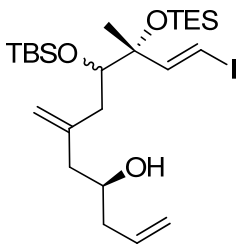


Synthesis of (10). To a stirred solution of **9** (26 mg, 0.033 mmol) in CH_2Cl_2 (1 mL) + pH=7 buffer (0.5 mL) was added DDQ (30 mg, 0.13 mmol, 4 equiv) at rt. After 30 min, the reaction was quenched with sat. $NaHCO_3$ solution and extracted with CH_2Cl_2 (3 x 10 mL). The combined organic layer was dried over $MgSO_4$, and concentrated under reduced pressure. The resulting residue was purified by Flash

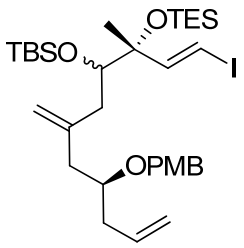
chromatography (30-33% EtOAc/hexane) to afford **10** (13.5 mg, 75%) as a colorless oil. $[\alpha]_D^{20}$= -38.3 (*c*=0.85, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 5.64-5.80 (m, 5H), 5.32 (dd, 1H, *J* = 7.6 Hz, 15.3 Hz), 5.03-5.11 (m, 2H), 4.97-5.01 (m, 1H), 4.85 (s, 1H), 4.82 (s, 1H), 3.88-3.93 (m, 1H), 3.78-3.84 (m, 2H), 3.68-3.74 (m, 1H), 3.19 (s, 1H), 2.69 (b, 1H), 2.60 (s, 1H), 2.17-2.34 (m, 6H), 1.74-1.99 (m, 4H), 1.88 (s, 3H), 1.71 (d, 3H, *J* = 6.4 Hz), 1.33-1.61 (m, 2H), 1.29 (s, 3H), 1.12 (d, 3H, *J* = 6.2 Hz), 0.93 (d, 3H, *J* = 6.8 Hz), 0.90 (d, 3H, *J* = 6.8 Hz), 0.87 (d, 3H, *J* = 7.0 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 167.6, 161.6, 141.9, 134.8, 134.4, 133.2, 128.7, 128.6, 119.0, 117.3, 111.4, 99.4, 77.3, 75.9, 75.8, 70.7, 69.8, 41.4, 40.4, 39.5, 38.0, 36.9, 36.2, 35.5, 33.5, 21.5, 20.3, 20.1, 18.0, 15.8, 15.5, 15.1; HRMS $C_{32}H_{52}O_7$ $[M+Na]^+$ calc'd 571.3605, found. 571.3597**;** IR ν_{max} (film) 3439, 2967, 2923, 1694, 1637, 1450, 1374, 1245, 1160, 1009, 969 cm^{-1}.



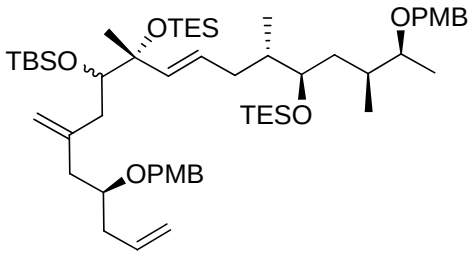
Synthesis of (12). To a stirred solution of **11** (304 mg, 0.52 mmol) in CH_2Cl_2 (2.6 mL) was added 2,6-lutidine (139 mg, 1.3 mmol, 2.5 equiv) and TBSOTf (206 mg, 0.78 mmol, 1.5 equiv) at 0 °C and stirred 1.5 h at 23 °C. The mixture was quenched with sat. $NaHCO_3$, the aqueous layer was extracted with CH_2Cl_2 (3 x 30 mL) and the combined organic layer was dried over $MgSO_4$ and concentrated under reduced pressure. The resulting residue was purified by Flash chromatography (0.4% EtOAc/hexane) to afford **12** (319 mg, 88%). ^{1}H NMR (400 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 6.59 (d, 1H, *J* = 14.6 Hz), 6.19 (d, 1H, *J* = 14.6 Hz), 5.77-5.88 (m, 1H), 5.03-5.06 (m, 2H), 4.84 (s, 1H), 4.83 (s, 1H), 3.77-3.82 (m, 1H), 3.49-3.57 (m, 1H), 2.42 (d, 1H, *J* = 14.4 Hz), 2.11-2.27 (m, 4H), 1.84 (dd, 1H, *J* = 8.4, 14.4 Hz), 1.31 (s, 3H), 0.84-0.97 (m, 27H), 0.55-0.63 (m, 12H), 0.03 (s, 3H), -0.04 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 150.0, 143.5, 135.5, 117.2, 115.4, 81.3, 78.4, 75.9, 70.8, 44.9, 42.2, 40.3, 26.4, 25.0, 18.4, 7.4, 7.2, 7.0, 5.3, -3.1, -3.8**;** HRMS $C_{31}H_{63}IO_3Si_3$ $[M+Na]^+$ calc'd 717.3022, found. 717.3045; IR ν_{max} (film) 3074, 2954, 2875, 1641, 1605, 1413, 1254, 1192, 1098, 1000, 836, 741 cm^{-1}.



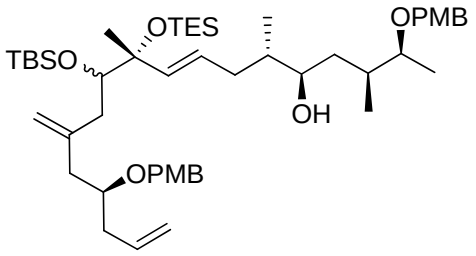
Synthesis of (13). To a stirred solution of **12** (319 mg, 0.46 mmol) in THF (4.6 mL) was added 1.4 mL of a HF·Py solution consisting of 1.7 mL 70% HF·Py : 4 mL THF : 1.7 mL pyridine. After 30 min, the reaction was quenched with sat. $NaHCO_3$ and extracted with Et_2O. The combined organic layer was washed with H_2O and brine, dried over $MgSO_4$ and concentrated under reduced pressure. The resulting residue was purified by Flash chromatography (1.5% EtOAc/hexane) to afford **13** (234 mg, 88%). ^{1}H NMR (400 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 6.59 (d, 1H, *J* = 14.6 Hz), 6.19 (d, 1H, *J* = 14.6 Hz), 5.77-5.89 (m, 1H), 5.11-5.16 (m, 2H), 4.96 (s, 1H), 4.91 (s, 1H), 3.68-3.73 (m, 1H), 3.47-3.50 (m, 1H), 2.50 (d, 1H, *J* = 14.4 Hz), 2.17-2.27 (m, 3H), 2.01-2.07 (m, 1H), 1.89 (dd, 1H, *J* = 8.8, 14.4 Hz), 1.84 (d, 1H, *J* = 2.2 Hz), 1.33 (s, 3H), 0.85-0.97 (m, 18H), 0.59 (q, 6H, *J* = 8.0 Hz), 0.04 (s, 3H), -0.02 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 149.7, 143.5, 135.0, 118.0, 116.9, 81.2, 77.7, 75.9, 67.8, 43.7, 41.8, 39.8, 26.3, 25.4, 18.4, 7.4, 7.0, -2.9, -3.7**;** HRMS $C_{25}H_{49}IO_3Si_2$ $[M+Na]^+$ calc'd 603.2157, found. 603.2168**;** IR ν_{max} (film) 3457, 3074, 2954, 2878, 1641, 1601, 1463, 1254, 1192, 1098, 1000, 836, 738 cm^{-1}.



Synthesis of (14). To a stirred solution of **13** (234 mg, 0.4 mmol) and $PMBO(C{=}NH)CCl_3$ (226 mg, 0.8 mmol, 2 equiv) in Toluene (4 mL) was added $Sc(OTf)_3$ (16 mg, 0.032 mmol, 0.08 equiv). After 3 h, the solvent was removed. The resulting residue was purified by Flash chromatography (1% EtOAc/hexane) to afford **14** (206 mg, 73%). (Containing impurity) ^{1}H NMR (400 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 7.25 (d, 2H, *J* = 8.6 Hz), 6.86 (d, 2H, *J* = 8.6 Hz), 6.59 (d, 1H, *J* = 14.4 Hz), 6.18 (d, 1H, *J* = 14.4 Hz), 5.81-5.91 (m, 1H), 5.06-5.11 (m, 2H), 4.88 (s, 2H), 4.43-4.50 (m, 2H), 3.80 (s, 1H), 3.50-3.56 (m, 2H), 2.45 (d, 1H, *J* = 14.4 Hz), 2.27-2.38 (m, 3H), 2.12 (dd, 1H, *J* = 5.6, 14.4 Hz), 1.87 (dd, 1H, *J* = 8.4, 14.4 Hz), 1.31 (s, 3H), 0.85-0.97 (m, 18H), 0.59 (q, 6H, *J* = 8.0 Hz), 0.03 (s, 3H), -0.02 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm):159.3, 150.0, 143.5, 135.3, 133.9, 129.5, 117.3, 115.3, 114.1, 81.3, 78.1, 77.9, 76.0, 71.2, 55.5, 41.8, 40.3, 39.0, 26.4, 25.0, 18.4, 7.4, 7.0, -3.1, -3.8**;** HRMS $C_{33}H_{57}IO_4Si_2$ $[M+Na]^+$ calc'd 723.2732, found. 723.2746**;** IR ν_{max} (film) 3070, 2954, 2878, 1641, 1601, 1463, 1249, 1192, 1098, 1005, 836, 738 cm^{-1}.

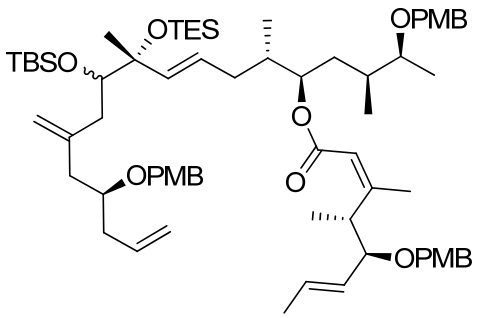


Synthesis of (16). To a stirred solution of alkyl iodide **15** (41 mg, 0.078 mmol, 1.1 equiv) in Et_2O (0.8 mL) was added 9-MeO-9-BBN (1 M in hexane, 0.2 mL, 0.2 mmol, 2.8 equiv). The mixture was cooled to -78 °C and treated with *t*-BuLi (1.6 M in pentane, 0.1 mL, 0.16 mmol, 2.3 equiv). After 5 min, THF (0.8 mL) was added dropwise. The reaction was warmed to 23 °C and stirred for 1 h. In another flask, (dppf)$PdCl_2$ (2.9 mg, 0.0036 mmol, 0.05 equiv), $AsPh_3$ (3.1 mg, 0.01 mmol, 0.15 equiv), $CsCO_3$ (92 mg, 0.28 mmol, 4 equiv), H_2O (31 mg, 1.7 mmol, 24 equiv) was added to a solution of **14** (50 mg, 0.071 mmol) in DMF (1.3 mL), the alkyl boronate solution was transferred to the DMF solution. The reaction was strirred overnight and quenched with pH=7 buffer and 30% H_2O_2. After 30 min, the mixture was diluted with Et_2O. The organic layer was washed with H_2O, brine, and dried over $MgSO_4$. After concentration under reduced pressure, the resulting residue was purified by Flash chromatography (1-1.8% EtOAc/hexane) to afford **16** (57 mg, 84%) as a colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 7.23-7.25 (m, 4H), 6.83-6.86 (m, 4H), 5.81-5.91 (m, 1H), 5.44-5.56 (m, 2H), 5.05-5.10 (m, 2H), 4.85 (s, 2H), 4.50 (d, 1H *J* = 11.6 Hz), 4.44 (s, 2H), 4.35 (d, 1H, *J* = 11.6 Hz), 3.78 (s, 6H), 3.62-3.67 (m, 1H), 3.51-3.60 (m, 2H), 3.35-3.42 (m, 1H), 2.52 (d, 1H, *J* = 14.4 Hz), 2.21-2.37 (m, 3H), 2.11-2.19 (m, 2H), 1.86 (dd, 1H, *J* = 8.6. 14.4 Hz), 1.76-1.83 (m, 1H), 1.58-1.65 (m, 3H), 1.30 (s, 3H), 1.18-1.25 (m, 1H), 1.13 (d, 3H, *J* = 6.2 Hz), 0.82-0.97 (m, 33H), 0.54-0.61 (m, 12H), 0.03 (s, 3H), -0.03 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 159.3, 159.2, 144.1, 135.4, 134.8, 131.5, 131.2, 129.4, 129.3, 128.9, 117.1, 114.9, 113.9, 78.7, 78.1, 77.3, 77.1, 74.9, 71.2, 70.5, 55.48, 55.46, 41.5, 40.6, 39.1, 38.9, 36.2, 35.4, 34.9, 26.4, 25.6, 18.5, 16.7, 15.9, 15.5, 7.5, 7.3, 7.1, 5.5, -3.1, -3.7**;** HRMS $C_{56}H_{98}O_7Si_3$ $[M+Na]^+$ calc'd 989.6513, found. 989.6536**;** IR ν_{max} (film): 2963, 2932, 2878, 1614, 1512, 1463, 1249, 1098, 1005, 836, 742 cm^{-1}.



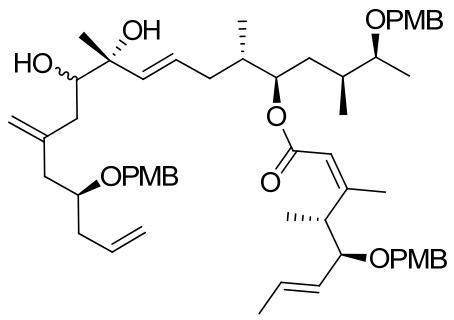
Synthesis of (17). To a stirred solution of **16** (202 mg, 0.21 mmol) in THF (3 mL) was added 1 mL of a HF·Py solution consisting of 1.7 mL 70% HF·Py : 4 mL THF : 1.7 mL pyridine. After 45 min, the reaction

was quenched with sat. $NaHCO_3$ and extracted with Et_2O. The combined organic layer was washed with H_2O and brine, dried over $MgSO_4$ and concentrated under reduced pressure. The resulting residue was purified by Flash chromatography (8-10% EtOAc/hexane) to afford **17** (154 mg, 86%). ^{1}H NMR (400 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 7.23-7.25 (m, 4H), 6.83-6.86 (m, 4H), 5.81-5.91 (m, 1H), 5.46-5.57 (m, 2H), 5.04-5.10 (m, 2H), 4.85 (s, 2H), 4.54 (d, 1H, *J* = 11.6 Hz), 4.45 (s, 2H), 4.36 (d, 1H, *J* = 11.6 Hz), 3.79 (s, 6H), 3.47-3.60 (m, 4H), 2.66 (d, 1H, *J* = 4.8 Hz), 2.52 (d, 1H, *J* = 14.6 Hz), 2.28-2.37 (m, 4H), 2.11-2.16 (dd, 1H, *J* = 5.4, 14.2 Hz), 1.95-2.05 (m, 1H), 1.80-1.90 (m, 2H), 1.56-1.67 (m, 2H), 1.30 (s, 3H), 1.18-1.25 (m, 1H), 1.13 (d, 3H, *J* = 6.2 Hz), 0.82-0.95 (m, 24H), 0.56 (q, 6H, *J* = 7.8 Hz), 0.03 (s, 3H), -0.03 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 159.3, 159.2, 144.1, 135.4, 135.1, 131.2, 130.9, 129.5, 129.3, 128.5, 117.2, 114.9, 114.0, 113.9, 78.7, 78.2, 78.1, 77.0, 73.2, 71.2, 70.5, 55.49, 55.46, 41.5, 40.6, 39.5, 39.0, 36.8, 35.8, 34.5, 26.4, 25.6, 18.5, 17.6, 15.8, 14.7, 7.5, 7.1, -3.1, -3.7**;** HRMS $C_{50}H_{84}O_7Si_2$ $[M+Na]^+$ calc'd 875.5648, found. 875.5663**;** IR ν_{max} (film): 3460, 2963, 2932, 2878, 1614, 1512, 1463, 1249, 1098, 1005, 836, 742 cm^{-1}.

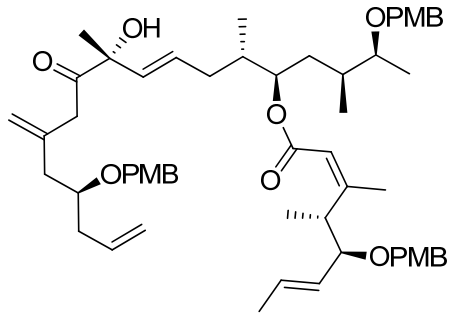


Synthesis of (18). To a stirred solution of Acid **3** (82 mg, 0.27 mmol, 1.5 equiv) in THF (2 mL) was added Et_3N (73 mg, 0.72 mmol, 4 equiv) and 2, 4, 6-trichlorobenzoylchloride (110 mg, 0.45 mmol, 2.5 equiv) at rt. After 4 h at rt, the solid was removed and the filtrate was transferred to a solution of **17** (154 mg, 0.18 mmol) and DMAP (35 mg, 0.29 mmol, 1.6 equiv) in Toluene (6 mL). After 12 h at rt, the mixture was quenched with sat. $NaHCO_3$ and diluted with Et_2O, the organic layer was washed with H_2O, brine, dried over $MgSO_4$ and concentrated under reduced pressure. The resulting residue was purified by Flash chromatography (4-4.5% EtOAc/hexane) to afford **18** (191 mg, 93%). ^{1}H NMR (400 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 7.15-7.25 (m, 6H), 6.82-6.85 (m, 6H), 5.80-5.90 (m, 1H), 5.60-5.66 (m, 2H), 5.43-5.53 (m, 2H), 5.32 (dd, 1H, *J* = 8.4, 15.4 Hz), 5.04-5.09 (m, 2H), 4.92-4.97 (m, 1H), 4.85 (s, 2H), 4.44-4.48 (m, 4H), 4.35 (d, 1H, *J* = 11.6 Hz), 4.20 (d, 1H, *J* = 11.6 Hz), 4.03-4.10 (m, 1H), 3.78 (s, 9H), 3.45-3.61 (m, 4H), 2.51 (d, 1H, *J* = 14.2 Hz), 2.17-2.34 (m, 4H), 2.12 (dd, 1H, *J* = 5.4, 14.2 Hz), 1.85 (dd, 1H, *J* = 8.6, 14.6 Hz), 1.72-1.77 (m, 3H), 1.74 (d, 3H, *J* = 6.4 Hz), 1.72 (s, 3H), 1.58-1.63 (m, 1H), 1.33-1.40 (m, 1H), 1.30 (s, 3H), 1.09 (d, 3H, *J* = 6.2 Hz), 0.81-0.95 (m, 27H), 0.57 (q, 6H, *J* = 7.8 Hz), 0.02 (s, 3H), -0.04 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 166.3, 162.3, 159.3, 159.2, 159.1, 144.1, 135.4, 135.3, 131.6, 131.22, 131.18, 130.9, 130.6, 129.5, 129.4, 129.3, 128.1,

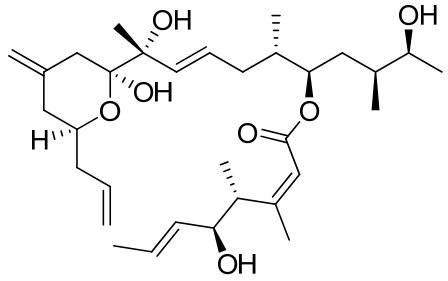
117.9, 117.2, 114.9, 113.9, 113.7, 82.0, 78.6, 78.1, 77.0, 76.7, 75.7, 71.2, 70.5, 69.2, 55.49, 55.45, 41.5, 40.6, 39.3, 39.1, 37.3, 35.3, 35.2, 33.6, 26.4, 25.8, 20.5, 18.5, 18.0, 16.6, 16.0, 15.8, 15.5, 7.5, 7.1, -3.0, -3.7**;** HRMS $C_{68}H_{106}O_{10}Si_2$ $[M+Na]^+$ calc'd 1161.7217, found. 1161.7261**;** IR ν_{max} (film) 2958, 2932, 2874, 1708, 1641, 1614, 1512, 1459, 1249, 1089, 1036, 831, 742 cm^{-1}.



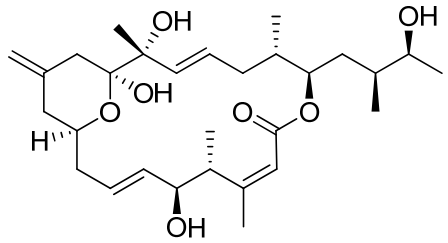
Synthesis of (19). To a stirred solution of **18** (191 mg, 0.17 mmol) in THF (1.2 mL) was added TBAF (1 M in THF, 0.5 mmol, 3 equiv) at rt. After 8 h, the reaction was quenched with sat. $NaHCO_3$ and extracted with Et_2O. The combined organic layer was washed with H_2O and brine, dried over $MgSO_4$ and concentrated under reduced pressure. The resulting residue was purified by Flash chromatography (12-25% EtOAc/hexane) to afford **19** (144 mg, 94%). ^1H NMR (400 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 7.15-7.25 (m, 6H), 6.82-6.86 (m, 6H), 5.78-5.90 (m, 1H), 5.60-5.70 (m, 3H), 5.44 (d, 1H, *J* =15.6 Hz), 5.32 (dd, 1H, *J* = 8.6, 15.4 Hz), 5.06-5.10 (m, 2H), 4.95 (s, 1H), 4.93 (s, 1H), 4.86-4.90 (m, 1H), 4.40-4.52 (m, 4H), 4.33 (d, 1H, *J* = 11.6 Hz), 4.18 (d, 1H, *J* = 11.6 Hz), 4.02-4.10 (m, 1H), 3.78 (s, 9H), 3.56-3.62 (m, 2H), 3.45-3.53 (m, 2H), 2.70 (b, 1H), 2.23-2.39 (m, 6H), 2.11-2.16 (m, 1H), 2.00-2.07 (m, 1H), 1.81-1.88 (m, 1H), 1.74-1.80 (m, 1H), 1.75 (d, 3H, *J* = 6.2 Hz), 1.73 (s, 3H), 1.57-1.66 (m, 1H), 1.28-1.34 (m, 1H), 1.13 (s, 3H), 1.07 (d, 3H, *J* = 5.2 Hz), 0.92 (d, 3H, *J* = 7.6 Hz), 0.89 (d, 3H, *J* = 6.6 Hz), 0.83 (d, 3H, *J* = 6.6 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) (data for major diastereomer) δ (ppm): 166.3, 162.6, 159.4, 159.2, 144.3, 136.5, 135.0, 131.6, 131.2, 130.9, 130.8, 130.7, 129.7, 129.4, 129.3, 128.2, 117.9, 117.5, 115.0, 114.0, 113.9, 113.8, 82.1, 77.1, 76.6, 75.13, 75.11, 74.9, 70.8, 70.4, 69.2, 55.5, 40.4, 39.3, 38.4, 38.3, 37.1, 35.2, 35.1, 33.7, 22.6, 20.3, 18.0, 16.5, 16.0, 15.9, 15.5**;** HRMS $C_{56}H_{78}O_{10}$ $[M+Na]^+$ calc'd 933.5487, found. 933.5501; IR ν_{max} (film) 3497, 2967, 2927, 2869, 1708, 1641, 1610, 1512, 1459, 1245, 1169, 1031, 822 cm^{-1}.



Synthesis of (20). To a stirred solution of **19** (144 mg, 0.16 mmol) in CH_2Cl_2 (1.6 mL) was added (*i*-Pr)$_2$NEt (165 mg, 1.28 mmol, 8 equiv), DMSO (0.18 mL) and SO_3·Py (102 mg, 0.64 mmol, 4 equiv) at 0 °C. After 30 min at rt., the reaction was quenched with sat. $NaHCO_3$ and diluted with Et_2O. The organic layer was washed successively with H_2O, brine, and dried over $MgSO_4$. After concentration under reduced pressure, the resulting residue was purified by Flash chromatography (24-30% Et_2O/hexane) to afford **20** (110 mg, 70%) as a colorless oil. $[\alpha]_D^{20}$= -11.8 (*c*=1.5, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 7.15-7.25 (m, 6H), 6.82-6.86 (m, 6H), 5.61-5.85 (m, 4H), 5.42 (d, 1H, *J* =15.2 Hz), 5.32 (dd, 1H, *J* = 8.6, 15.4 Hz), 5.05-5.10 (m, 2H), 5.01 (s, 1H), 4.87 (s, 1H), 4.84-4.92 (m, 1H), 4.45-4.51 (m, 3H), 4.39 (d, 1H, *J* = 11.2 Hz), 4.32 (d, 1H *J* = 11.6 Hz), 4.19 (d, 1H, *J* = 11.6 Hz), 4.01-4.09 (m, 1H), 3.86 (s, 1H), 3.78 (s, 9H), 3.47-3.61 (m, 3H), 3.22-3.32 (m, 2H), 2.23-2.33 (m, 4H), 2.12-2.20 (m, 1H), 1.60-1.80 (m, 3H), 1.75 (d, 3H, *J* = 6.6 Hz), 1.73 (s, 3H), 1.56-1.62 (m, 1H), 1.34 (s, 3H), 1.28-1.34 (m, 1H), 1.08 (d, 3H, *J* = 6.2 Hz), 0.93 (d, 3H, *J* = 7.0 Hz), 0.89 (d, 3H, *J* = 6.4 Hz), 0.79 (d, 3H, *J* = 6.6 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 210.1, 166.2, 162.6, 159.4, 159.2, 159.0, 140.0, 134.8, 132.5, 131.5, 131.4, 131.2, 130.90, 130.86, 130.75, 129.6, 129.4, 129.29, 128.26, 117.8, 117.5, 117.2, 114.0, 113.9, 113.8, 82.1, 79.2, 77.1, 76.6, 75.2, 70.7, 70.4, 69.2, 55.50, 55.48, 43.7, 40.5, 39.3, 38.4, 36.9, 35.2, 34.9, 33.6, 25.0, 20.4, 18.0, 16.5, 15.9, 15.8, 15.5**;** HRMS $C_{56}H_{76}O_{10}$ $[M+Na]^+$ calc'd 931.5331, found. 931.5323; IR ν_{max} (film) 3470, 2954, 2927, 2869, 1715, 1708, 1641, 1610, 1512, 1459, 1245, 1169, 1031, 822 cm^{-1}.



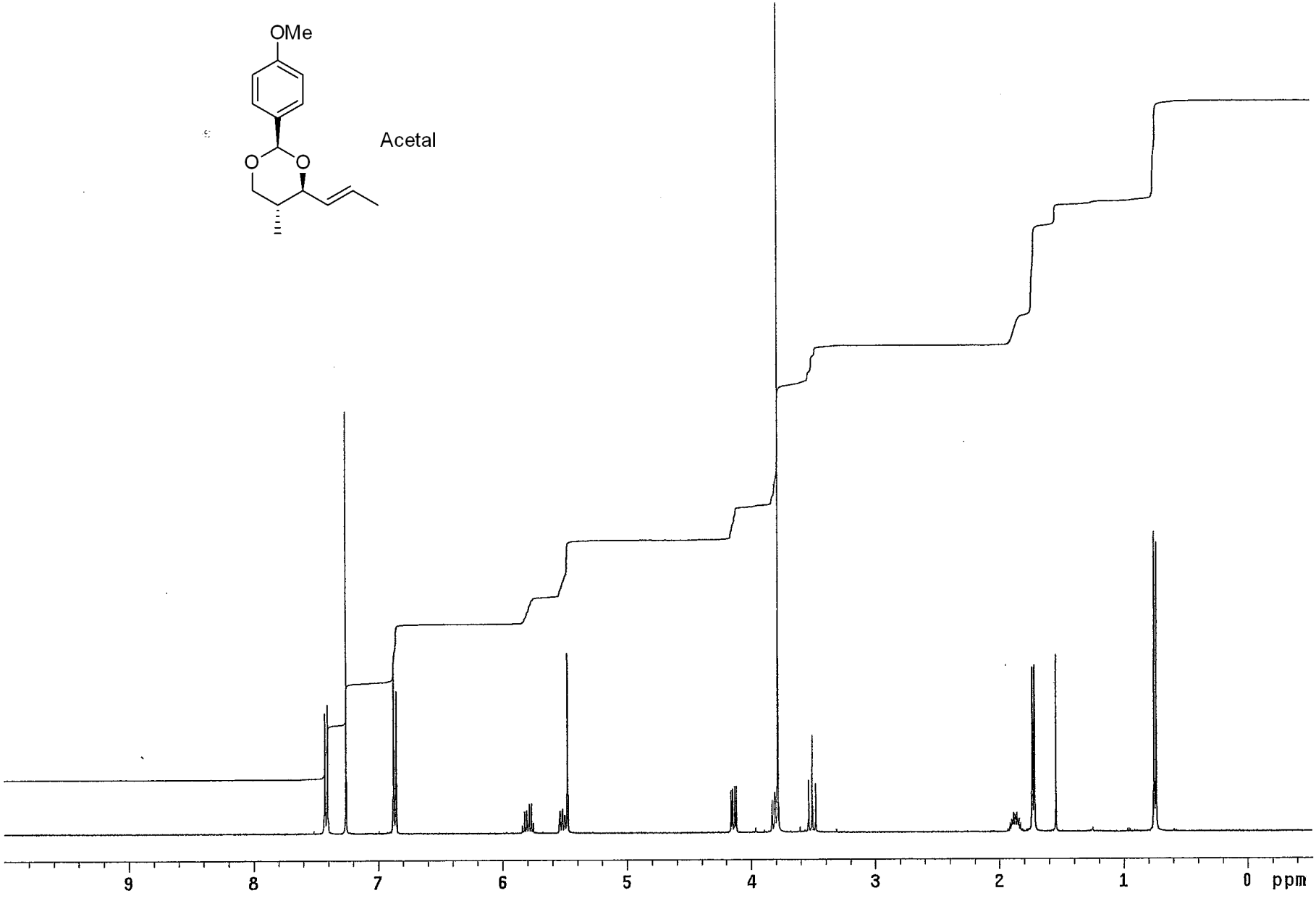
Synthesis of (10). To a stirred solution of **20** (110 mg, 0.12 mmol) in CH_2Cl_2 (6 mL) + pH=7 buffer (3 mL) was added DDQ (158 mg, 0.72 mmol, 6 equiv) at rt. After 20 min, the reaction was quenched with sat. $NaHCO_3$ solution and extracted with CH_2Cl_2 (3 x 20 mL). The combined organic layer was dried over $MgSO_4$, and concentrated under reduced pressure. The resulting residue was purified by Flash chromatography (30-33% EtOAc/hexane) to afford **10** (44mg, 67%) as a colorless oil.



Synthesis of (1). To a stirred solution of **10** (18.8 mg, 0.034 mmol) in CH_2Cl_2 (34 mL) was added 2nd generation Grubbs catalyst (3 mg, 0.0034mmol, 0.1 equiv) at rt. After 3 h, the solvent was removed under reduced pressure. The resulting residue was purified by Flash chromatography (35-45% EtOAc/hexane) to afford (*E*)-isomer **1** (9 mg, 52%) and (*Z*)-isomer **21** (3.6 mg, 21%).

(*E*)-isomer **1** : $[\alpha]_D^{20}$= -27.8 (*c*=0.3, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 5.79-5.89 (m, 3H), 5.77 (s, 1H), 5.67 (dd, 1H, *J* = 6.8 Hz, 15.5 Hz), 4.95-5.01 (m, 1H), 4.85 (s, 1H), 4.83 (s, 1H), 3.92-4.06 (m, 3H), 3.80-3.86 (m, 1H), 3.25 (s, 1H), 2.63 (s, 1H), 2.09-2.34 (m, 7H), 1.82-2.02 (m, 2H), 1.93 (s, 3H), 1.78 (ddd, 1H, *J* = 3.4, 7.8, 14.2 Hz), 1.42-1.55 (m, 1H), 1.25-1.35 (m, 1H), 1.31 (s, 3H), 1.09 (d, 3H, *J* = 6.6 Hz), 1.07 (d, 3H, *J* = 7.8 Hz), 0.98 (d, 3H, *J* = 7.0 Hz), 0.87 (d, 3H, *J* = 6.8 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 166.6(C), 160.3(C), 142.0(C), 135.2(CH), 133.0(CH), 129.9(CH), 127.5(CH), 119.2(CH), 111.1(CH_2), 99.4(C), 77.4(C), 75.3(CH), 74.7(CH), 70.6(CH), 69.6(CH), 41.0(CH), 40.0(CH_2), 38.1(CH_2), 37.7(CH_2), 37.0(CH), 35.9(CH), 34.54(CH_2), 34.50(CH_2), 21.1(CH_3), 20.9(CH_3), 20.3(CH_3), 16.2(CH_3), 16.0(CH3), 15.2(CH3); HRMS $C_{29}H_{46}O_7$ $[M+Na]^+$ calc'd 529.3136, found. 529.3129; IR ν_{max} (film) 3452, 2963, 2923, 2869, 1694, 1632, 1450, 1383, 1218, 1156, 965 cm^{-1}.

(*Z*)-isomer **21**: $[\alpha]_D^{20}$= -29.1 (*c*=0.4, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 5.81-5.87 (m, 2H), 5.77 (s, 1H), 5.55-5.67 (m, 2H), 4.85-4.91 (m, 1H), 4.86 (s, 1H), 4.84 (s, 1H), 4.27-4.38 (m, 1H), 4.18-4.25 (m, 1H), 3.90-3.99 (m, 1H), 3.77-3.82 (m, 1H), 3.73 (s, 1H), 2.18-2.46 (m, 6H), 1.87-2.00 (m, 3H), 1.95 (s, 3H), 1.78 (dd, 1H, *J* = 8.2, 12.4 Hz), 1.42-1.50 (m, 1H), 1.25-1.35 (m, 1H), 1.26 (s, 3H), 1.09 (d, 3H, *J* = 5.5 Hz), 1.08 (d, 3H, *J* = 6.2 Hz), 0.95 (d, 3H, *J* = 6.8 Hz), 0.83 (d, 3H, *J* = 6.8 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 166.3(C), 162.8(C), 142.0(C), 135.5(CH), 132.7(CH), 129.8(CH), 125.7(CH), 118.4(CH), 111.2(CH_2), 100.0(C), 77.7(C), 73.3(CH), 71.7(CH), 70.8(CH), 69.5(CH), 40.4(CH_2), 39.7(CH), 37.7(CH), 37.0(CH_2), 35.9(CH), 34.7 (CH_2), 34.6(CH_2), 34.2(CH_2), 22.8(CH_3), 22.0(CH_3), 20.3(CH_3), 15.51(CH_3), 15.46(CH_3), 15.42(CH_3); HRMS $C_{29}H_{46}O_7$ $[M+Na]^+$ calc'd 529.3136, found. 529.3135; IR ν_{max} (film) 3439, 2967, 2923, 2869, 1694, 1632, 1450, 1383, 1205, 1160, 965 cm^{-1}.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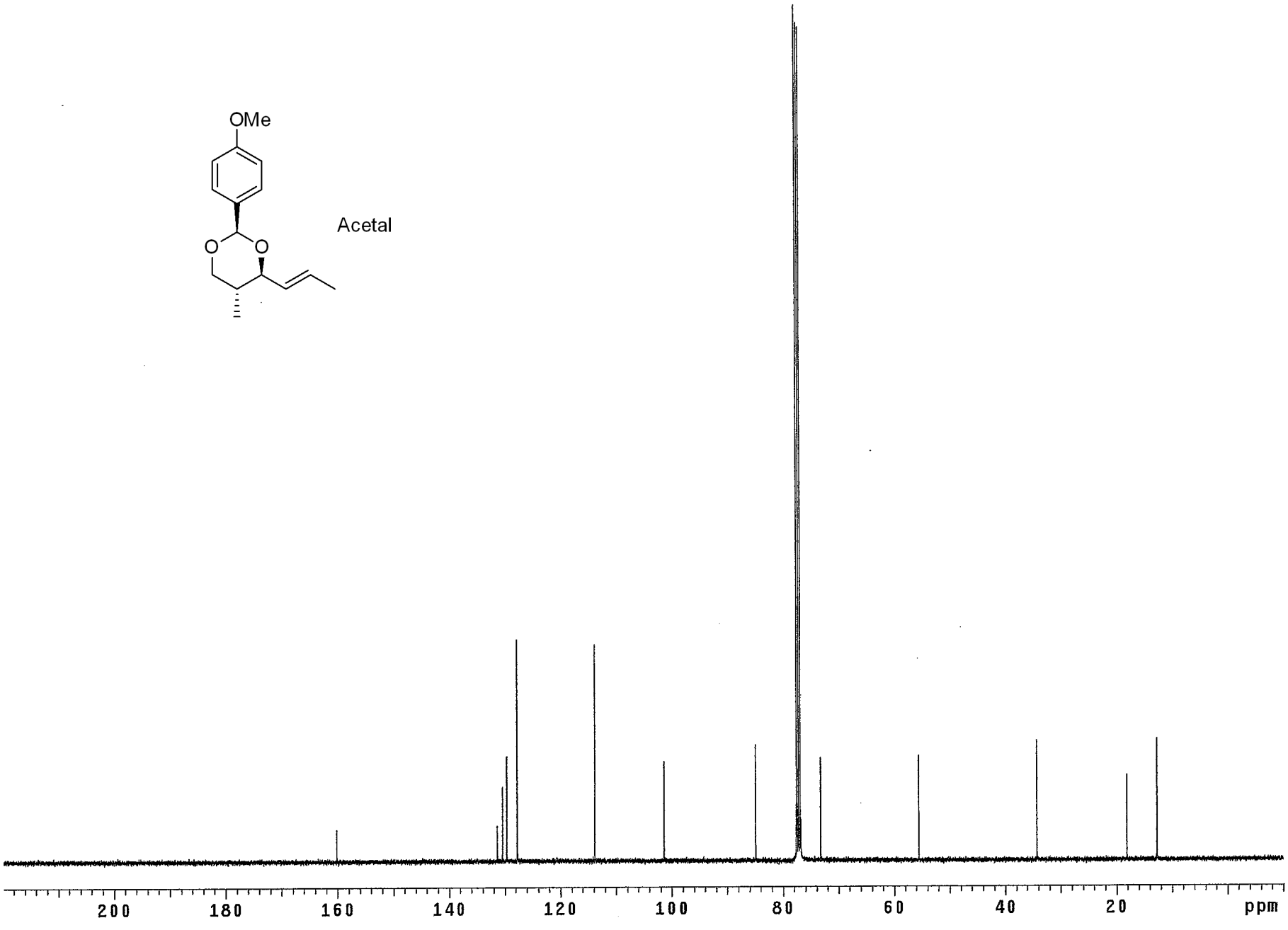
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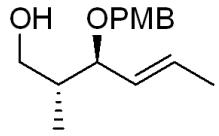

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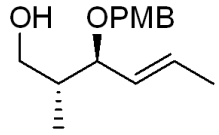

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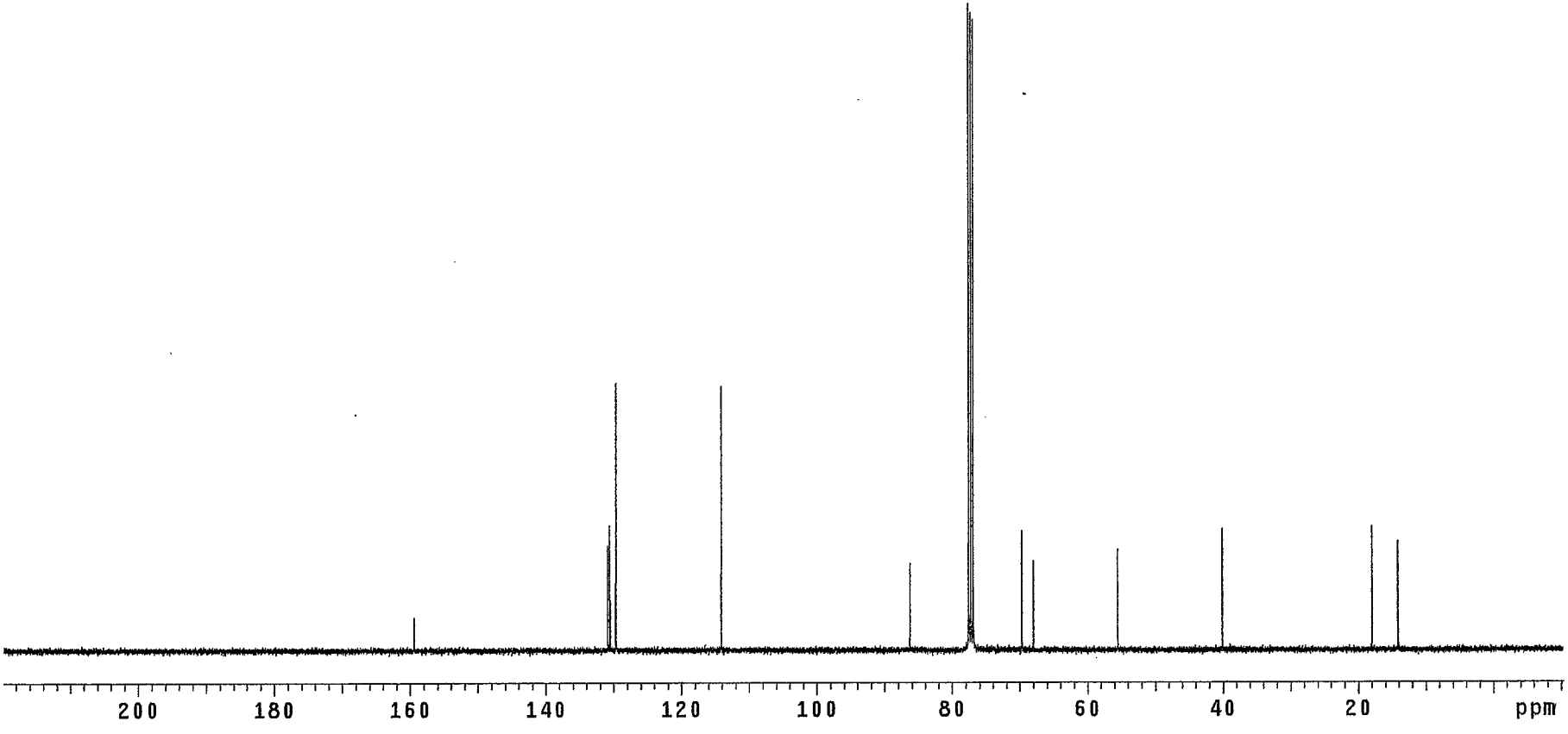

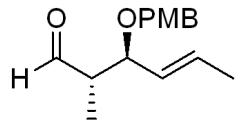

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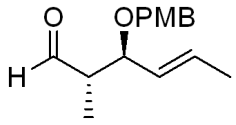

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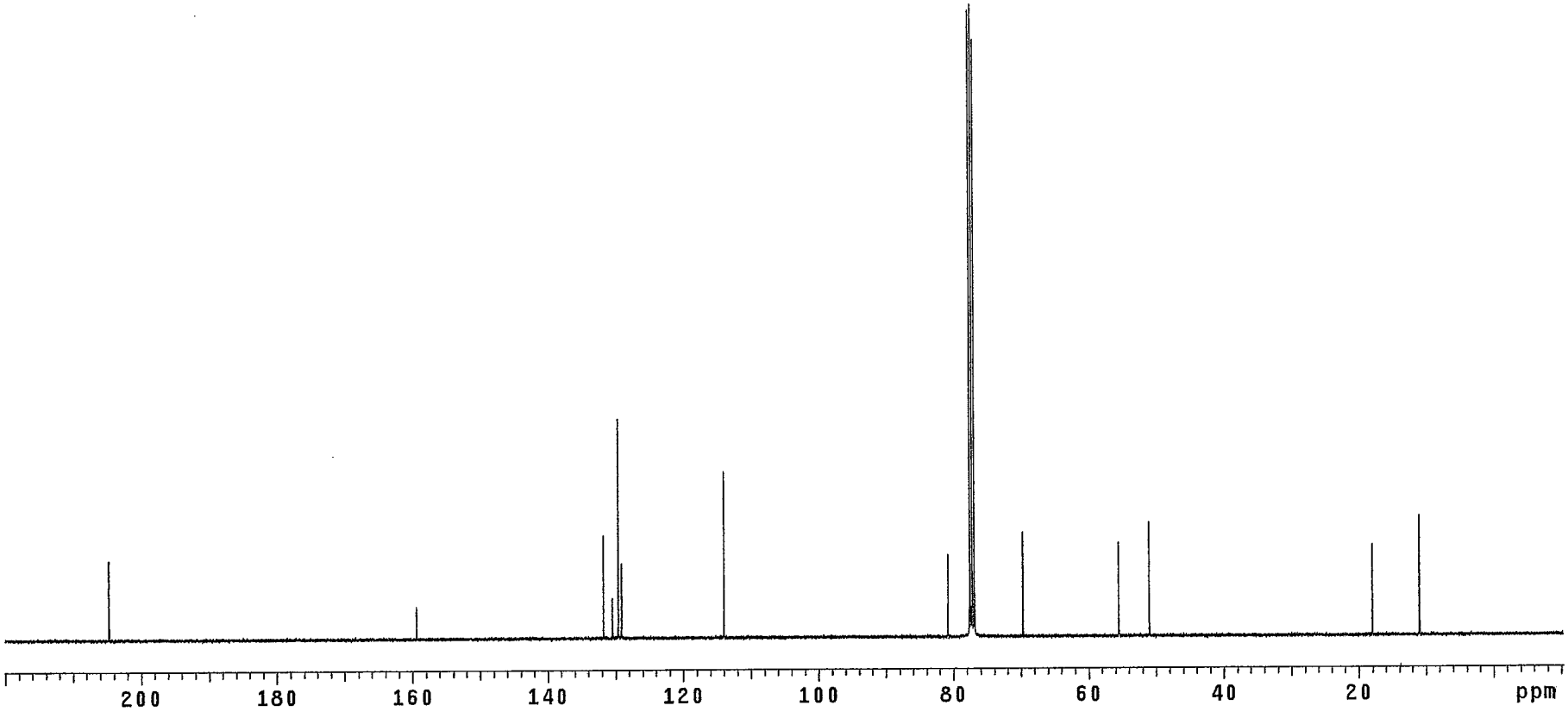

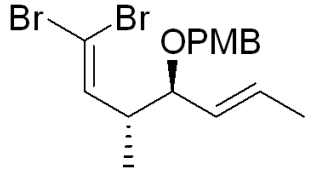

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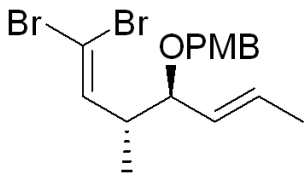

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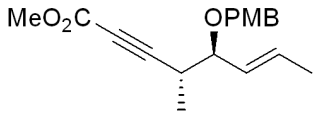

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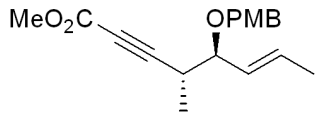

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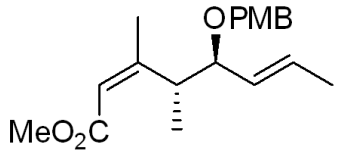

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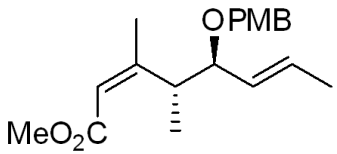

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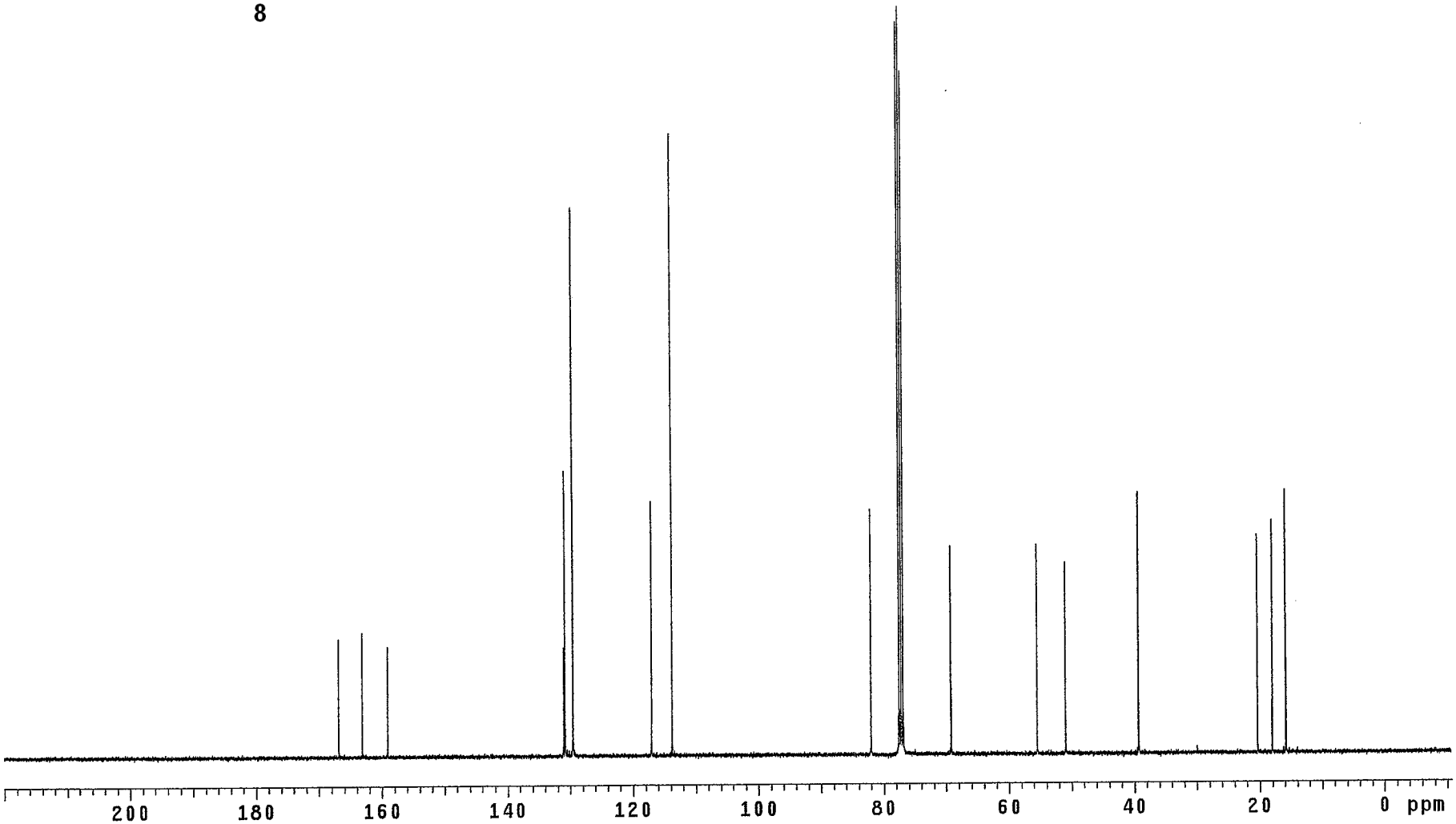

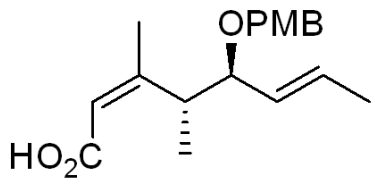

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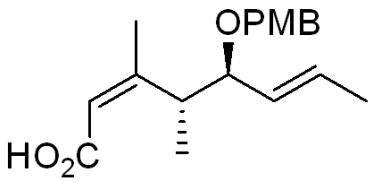

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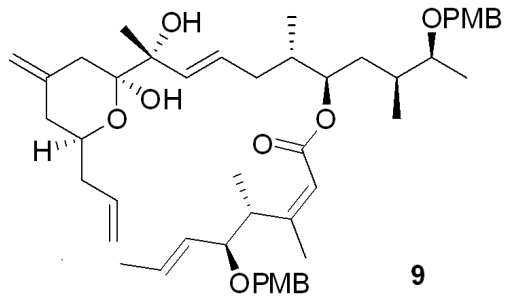

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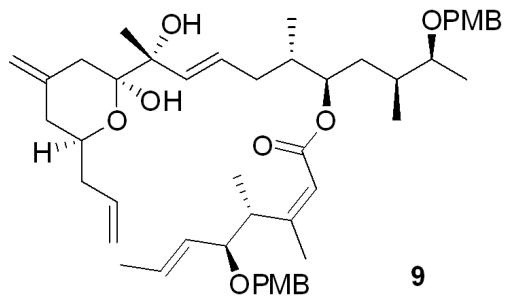

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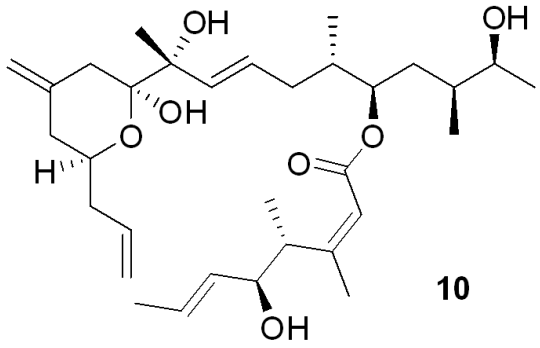

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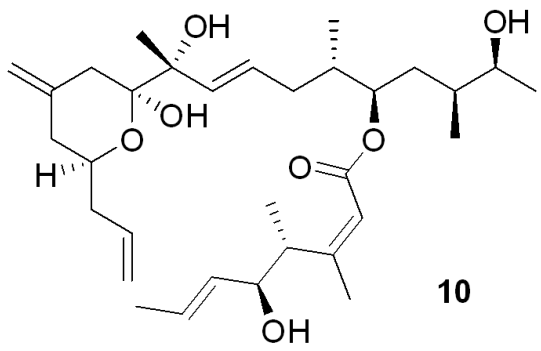

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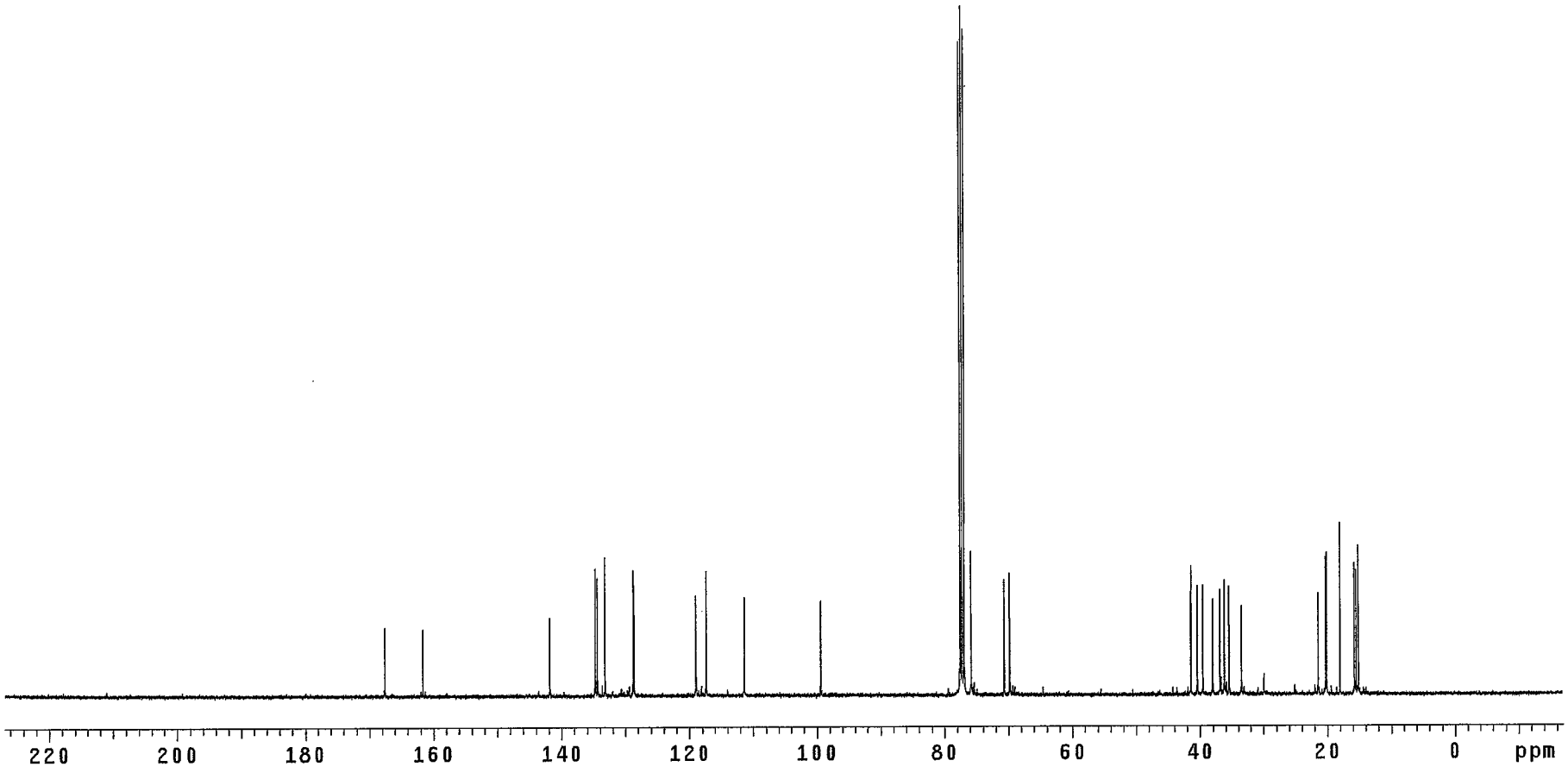

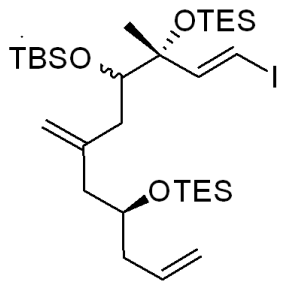

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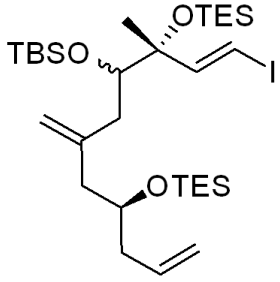

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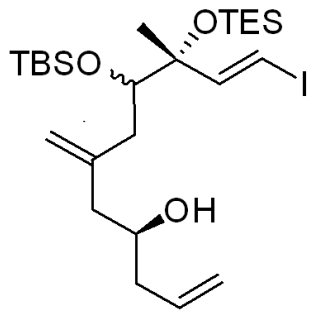

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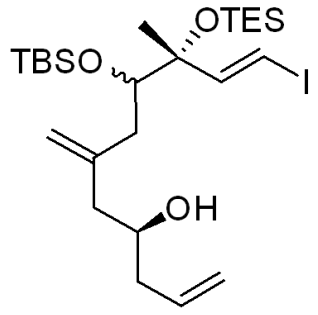

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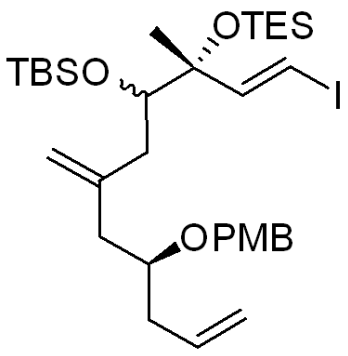

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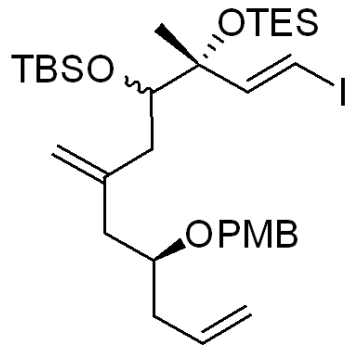

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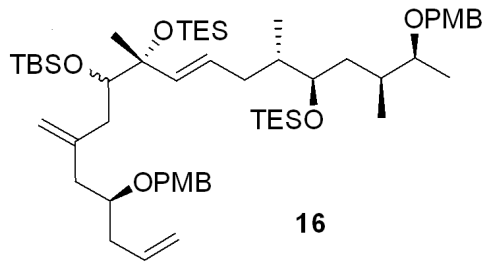

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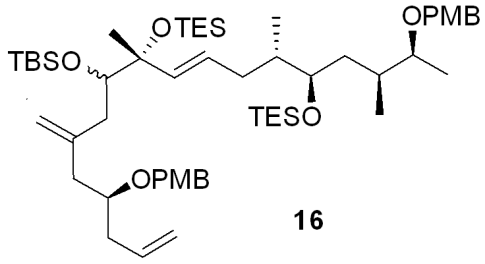

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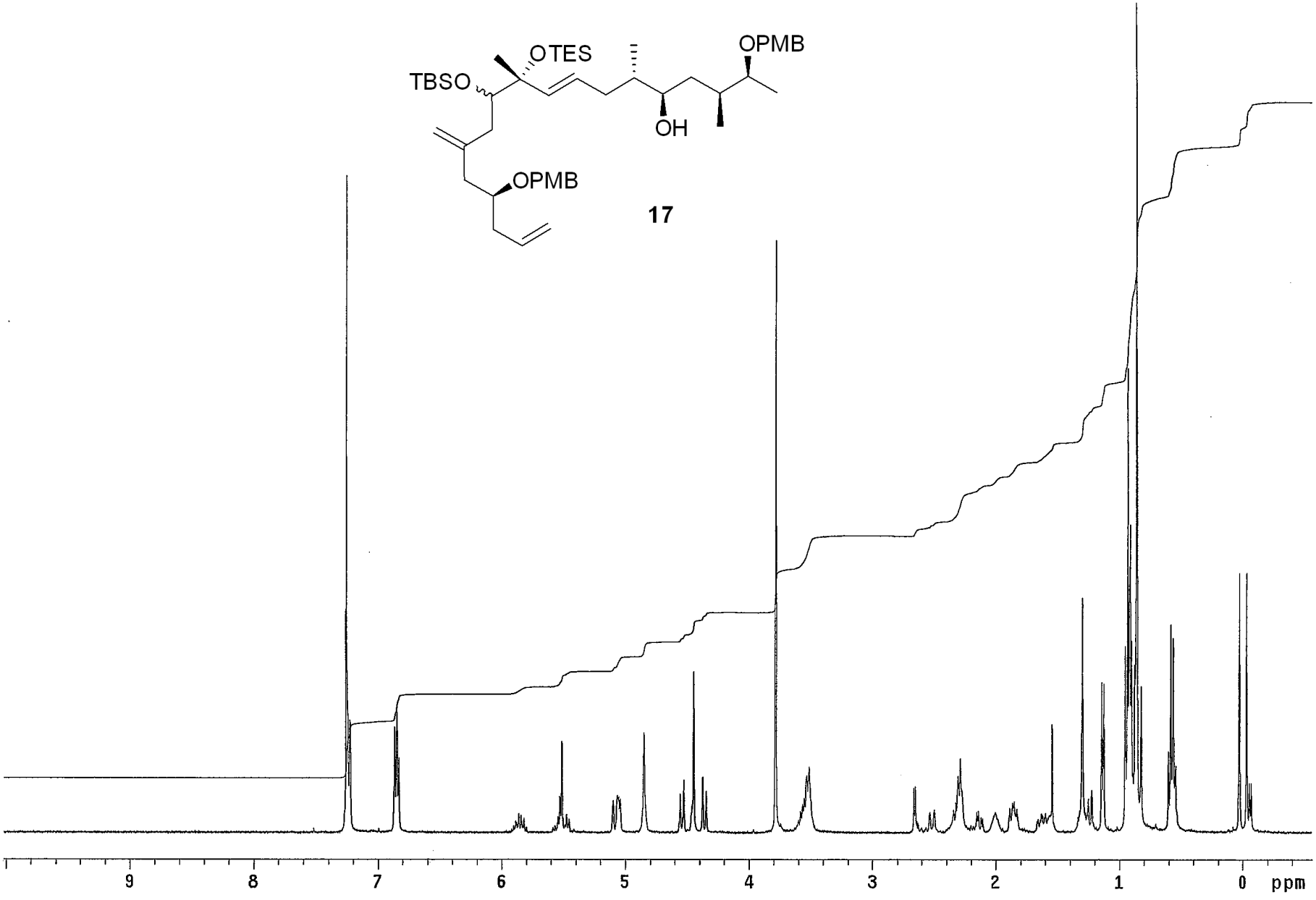
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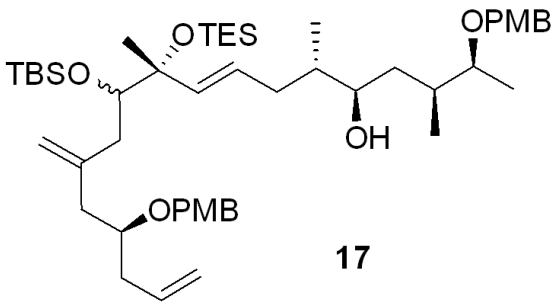

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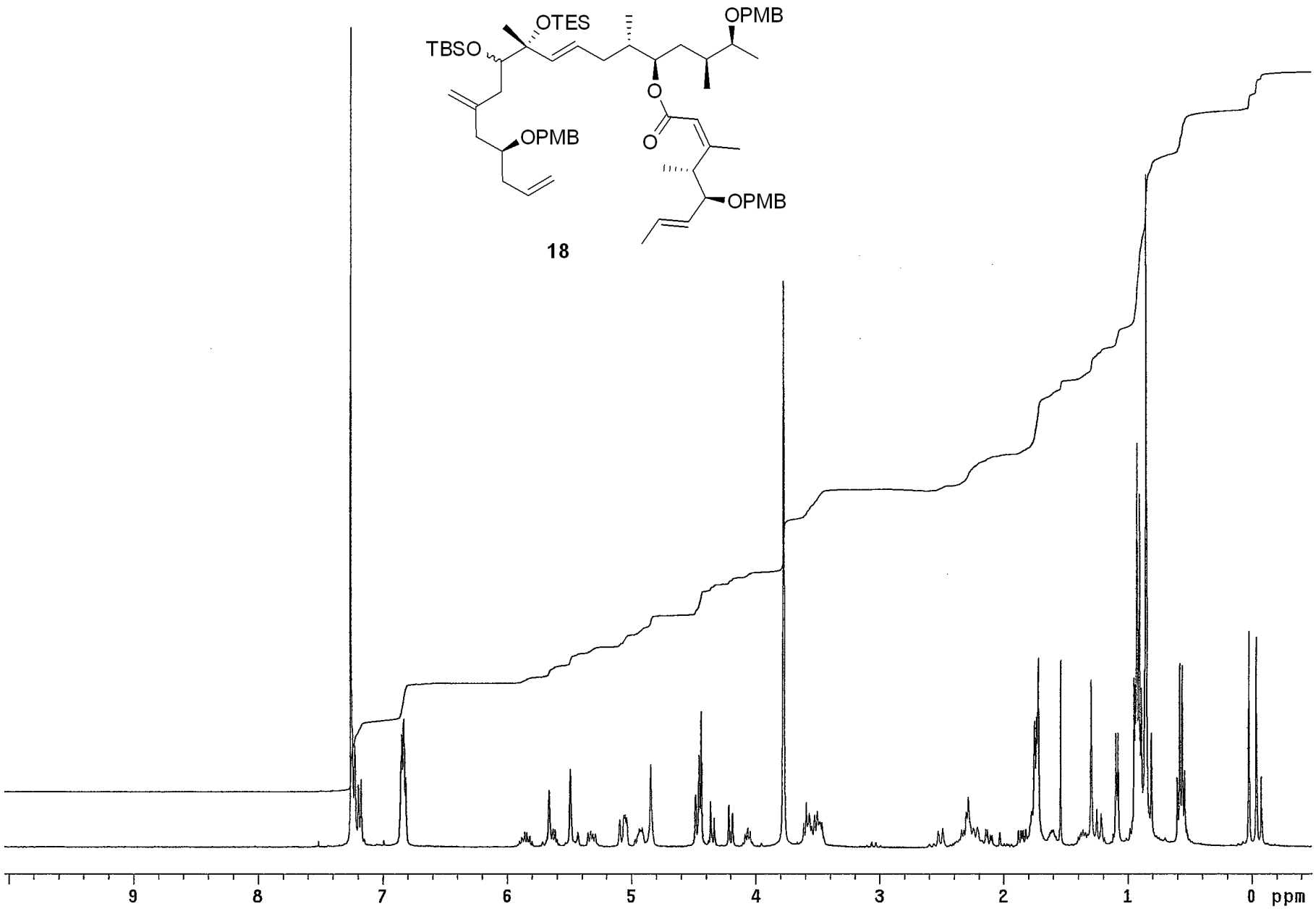

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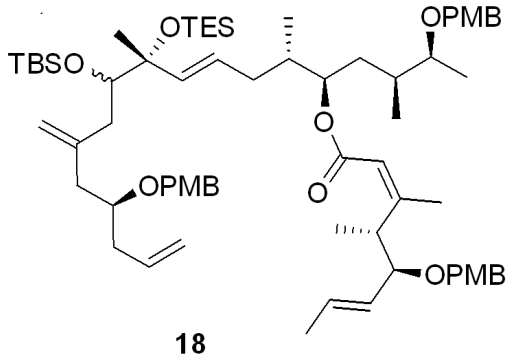
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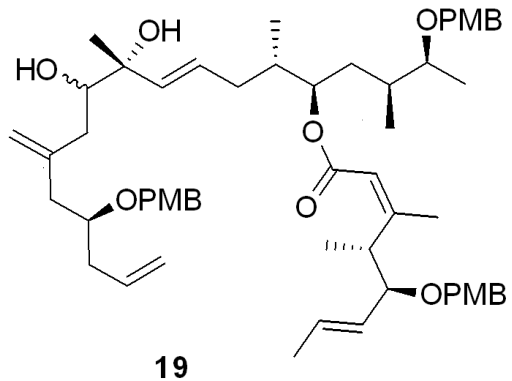

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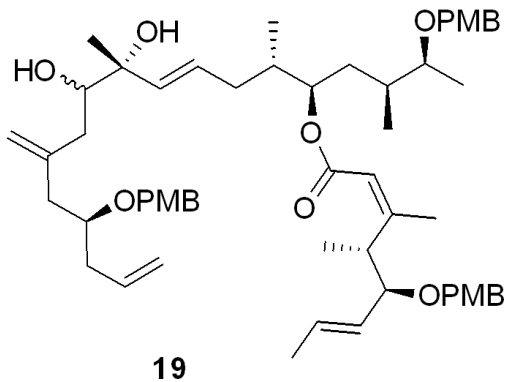

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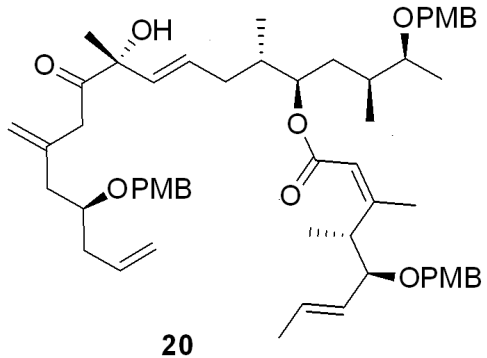

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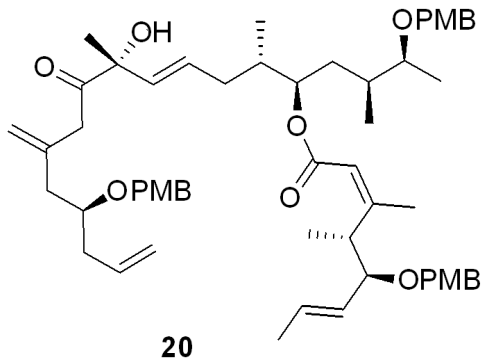

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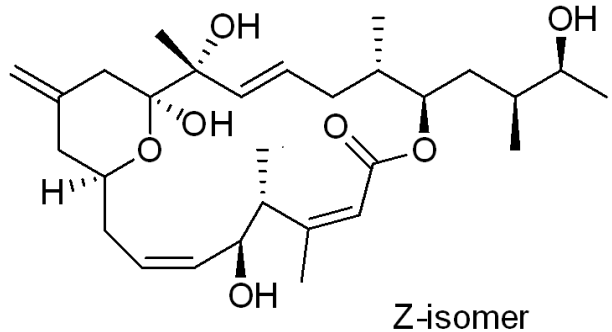

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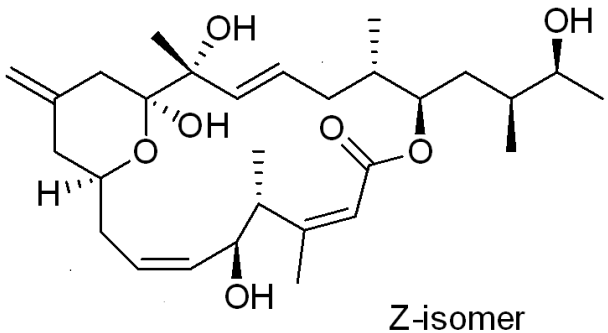

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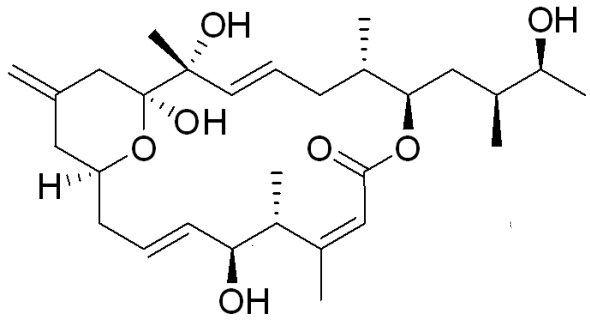
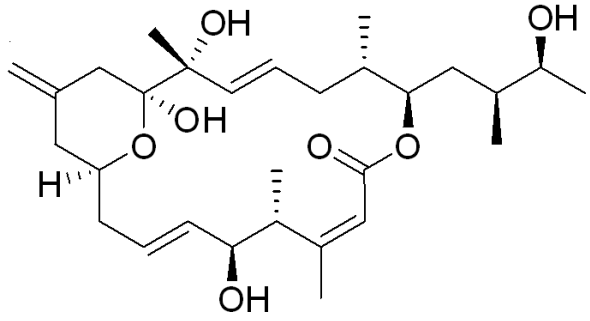
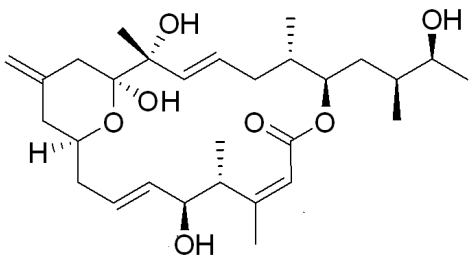


proposed structure of Iriomoteolide-1a

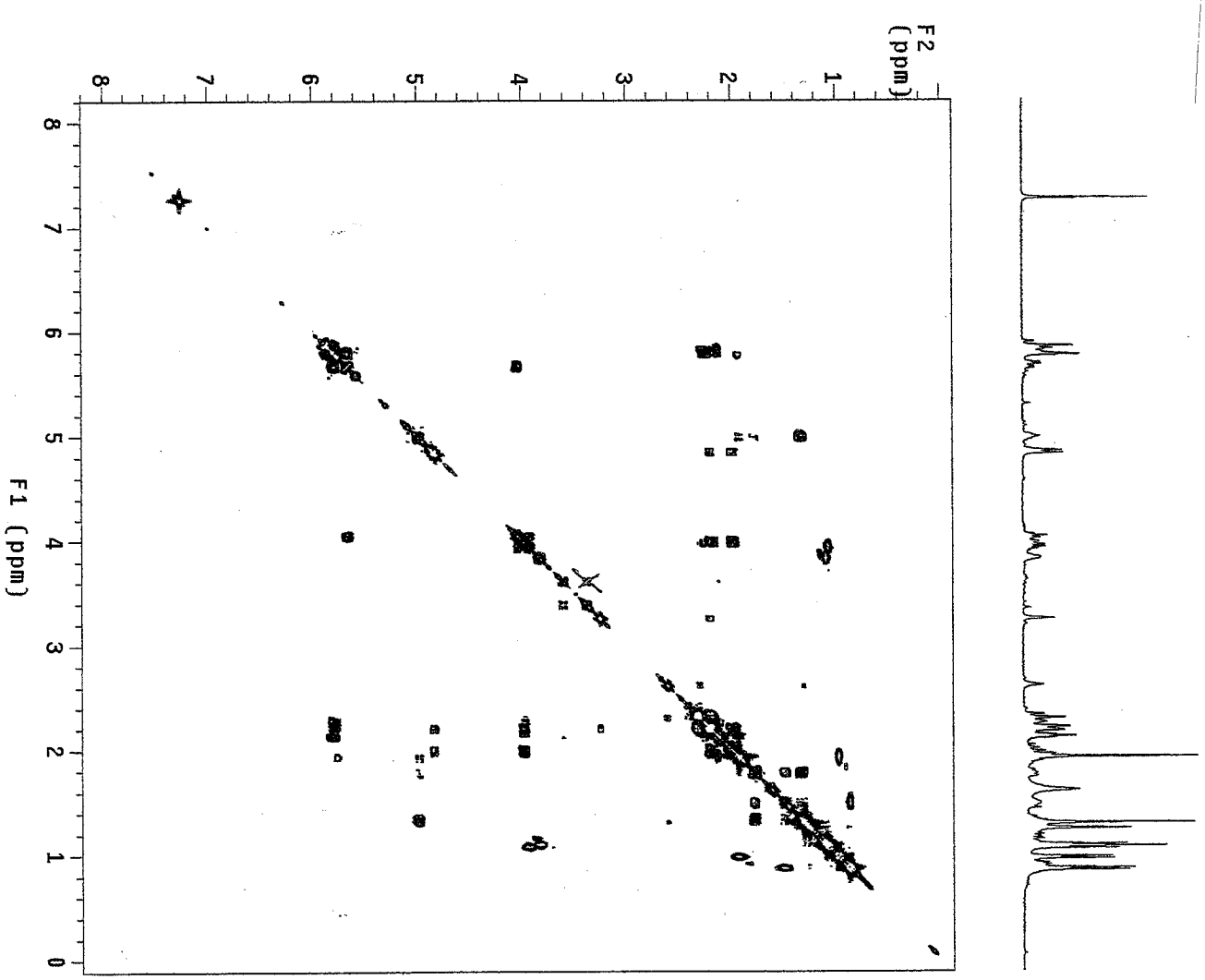


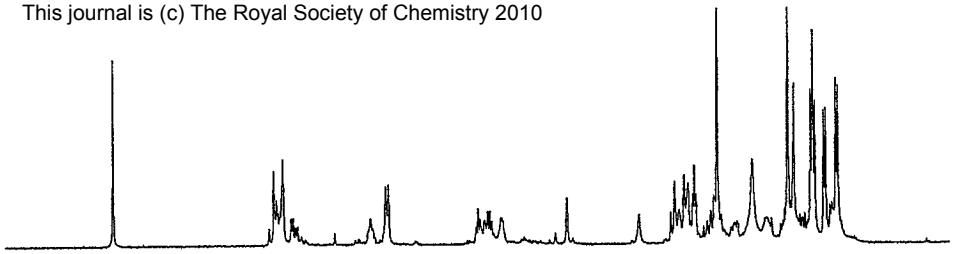
proposed structure of Iriomoteolide-1a

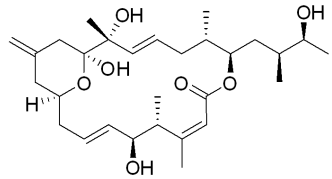


proposed structure of Iriomoteolide-1a

COSY Spectrum







proposed structure of Iriomoteolide-1a

HSQC Spectrum

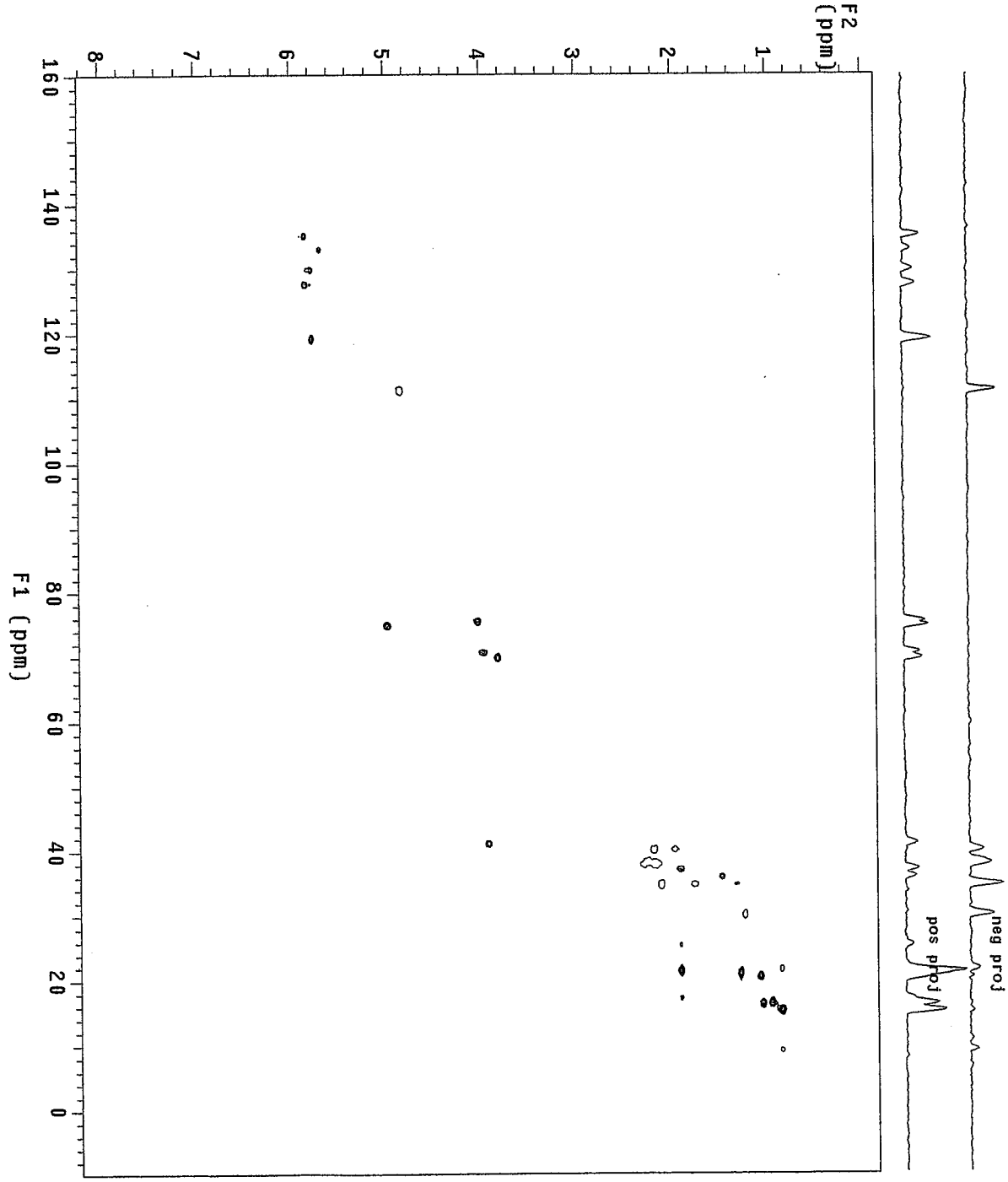
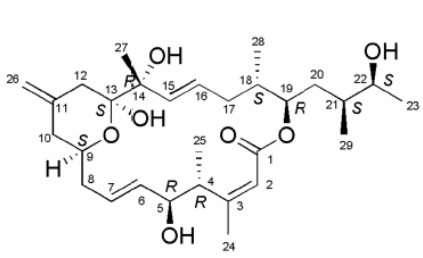
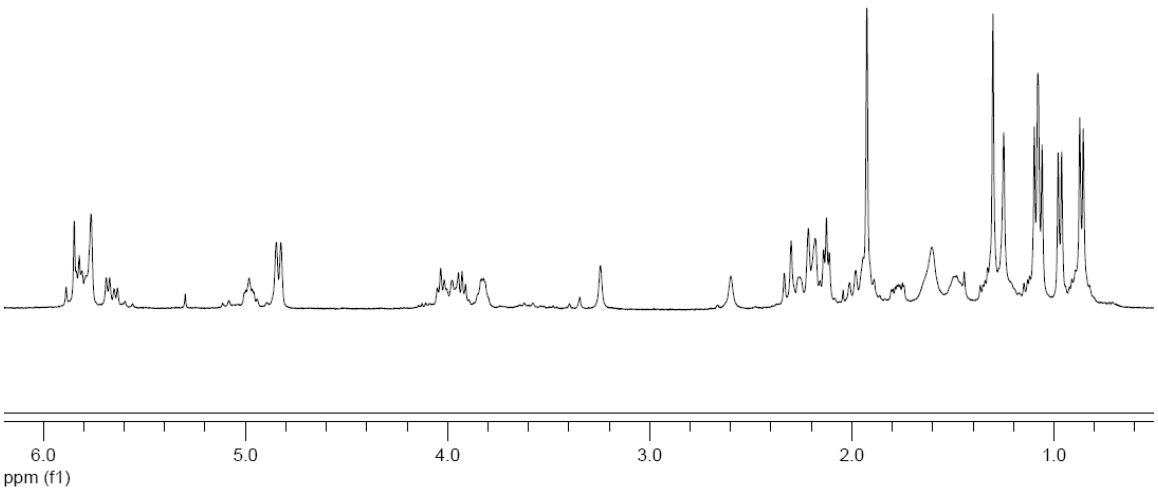


Figure S1. ^{1}H NMR Spectrum of Iriomoteolide-1a (**1**) in $CDCl_3$.



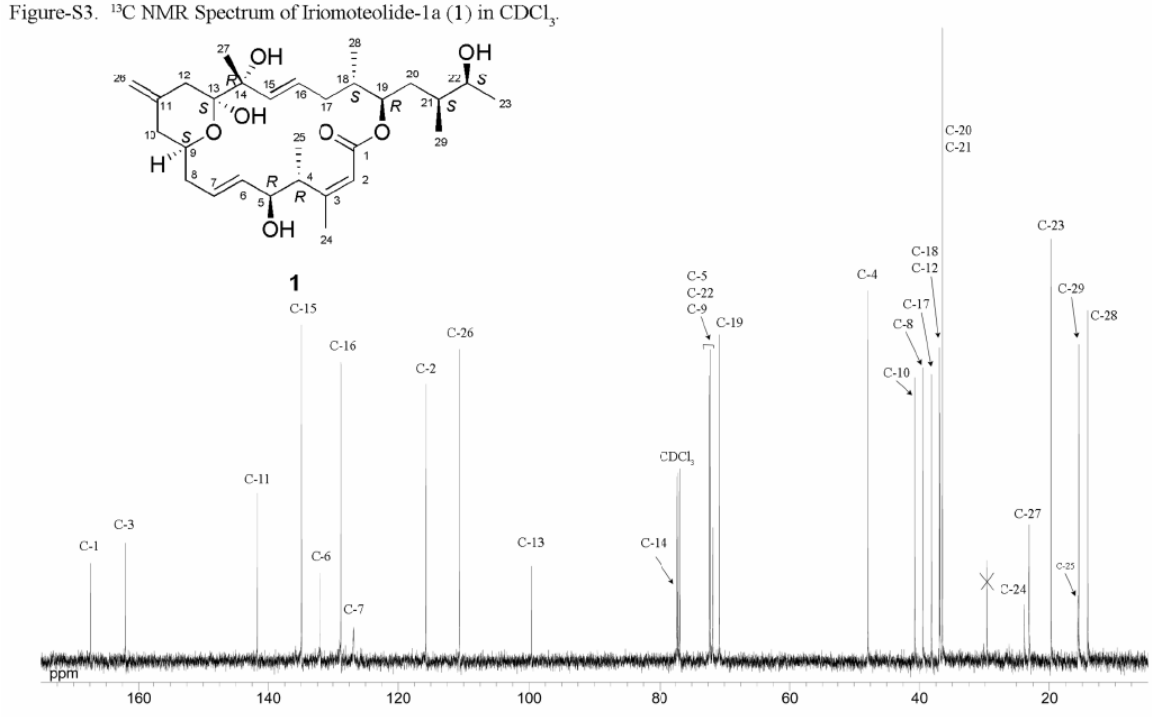
1

Natural

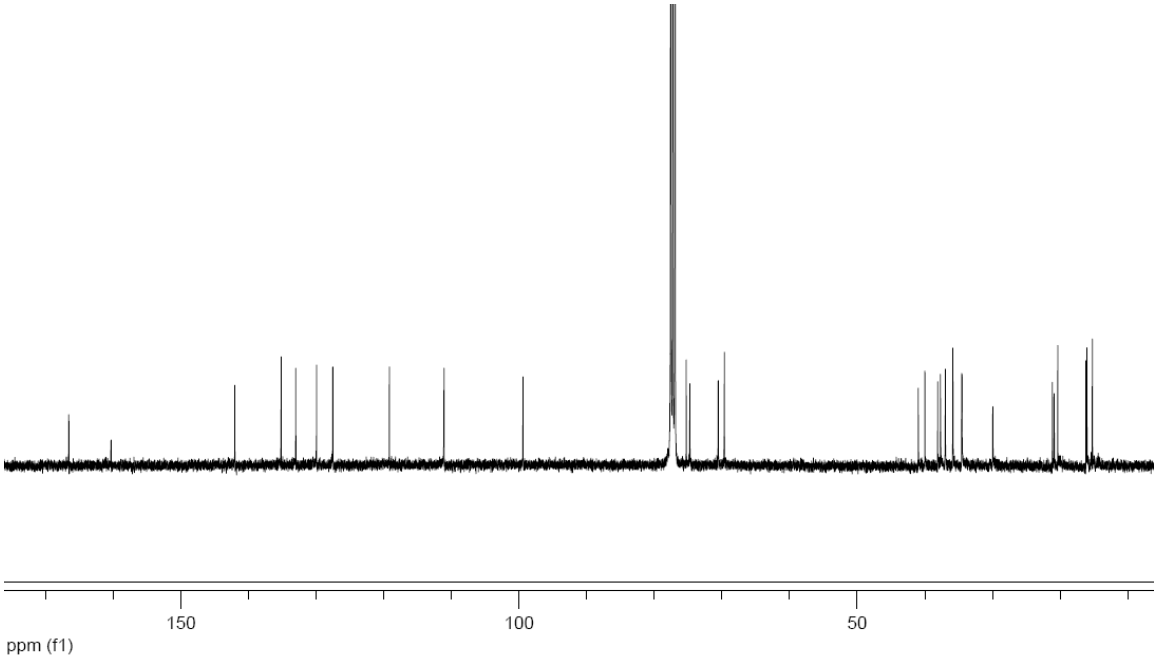


Synthetic

Figure-S3. ^{13}C NMR Spectrum of Iriomoteolide-1a (1) in $CDCl_3$.



Natural

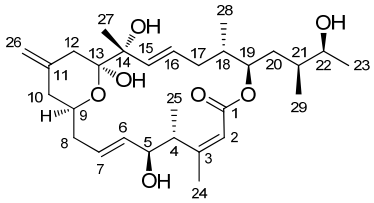


Synthetic

TABLE 1. ^{1}H and ^{13}C NMR ($CDCl_3$) data for natural and synthetic iriomoteolide-1a (1)

Position	^{1}H Natural	^{1}H Synthetic	^{13}C Natural	^{13}C Synthetic	$J_{natural}$	$J_{synthetic}$
1			167.4	166.6		
2	5.72	5.77	115.8	119.2	*brs*	*s*
3			162.0	160.3		
4	2.46	3.92-3.96	47.9	41.0	*dq, 2.9, 7.3*	*m*
5	4.28	4.02-4.06	72.3	75.3	*m*	*m*
6	5.57	5.67	132.0	133.0	*dd, 4.1, 15.7*	*dd, 6.8, 15.5*
7	5.68	5.79-5.89	126.8	127.5[a]	*m*	*m*
8a	2.18	2.09-2.34	39.5	38.1	*m*	*m*
8b	2.00				*m*	
9	3.81	3.97-4.01	71.8	70.6	*brt, 11.5*	*m*
10a	2.21		40.7	40.0	*brd, 12.7*	
10b	1.90				*brt, 12.3*	
11			141.7	142.0		
12a	2.40	2.09-2.34	36.88	37.7	*d, 13.6*	*m*
12b	2.26				*brd, 13.6*	
13	3.52	3.25	99.7	99.4	*brd, 1.9*	*s*
14			77.2	77.4		
15	5.68	5.79-5.89	134.9	135.2	*brd, 15.5*	*m*
16	5.76	5.79-5.89	128.8	129.9[a]	*ddd, 3.1, 10.8, 15.5*	*m*
17a	2.15	2.09-2.15	38.2	34.54	*m*	*m*
17b	1.96				*dt, 14.1, 11.6*	
18	1.82	1.82-1.92	36.94	37.0	*m*	*m*
19	5.11	4.95-5.01	70.8	74.7	*m*	*m*
20a	1.80	1.78	36.5	34.50	*ddd, 4.4, 8.7, 13.8*	*ddd, 3.4, 7.8, 14.2*
20b	1.15	1.25-1.35			*ddd, 4.4, 8.8, 13.8*	*m*
21	1.40	1.42-1.53	36.5	35.9	*m*	*m*
22	3.58	3.80-3.86	72.2	69.9	*quint, 6.3*	*m*
23	1.11	1.09	19.8	20.3	*d, 6.3*	*d, 6.6*
24	2.12	1.93	23.8	21.1	*s*	*s*
25	1.24	1.07	15.6	16.0	*d, 7.3*	*d, 7.8*
26a	4.82	4.85	110.6	111.1	*brs*	*s*
26b		4.83				*s*
27	1.25	1.31	23.1	20.9	*s*	*s*
28	0.99	0.98	14.2	16.2	*d, 6.8*	*d, 7.0*
29	0.91	0.87	15.5	15.2	*d, 6.7*	*d, 6.8*

[a] these two carbons may be interchangeable.



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