

Electronic Supporting Information

Synthesis of Two Diastereomeric C₁–C₂₂ Fragments of Spirastrellolide A

Ian Paterson,* Edward A. Anderson, Stephen M. Dalby, Julien Genovino, Jong Ho Lim and Christian Moessner

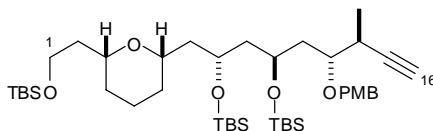
University Chemical Laboratory, Lensfield Road, Cambridge CB2 1EW, UK.

General Experimental Details

Thin layer chromatography was carried out on commercial glass backed silica gel 60 F254 plates. Visualization of chromatograms was accomplished using ultraviolet light (254 nm) and/or heating the plate after staining with either a solution of 20% ceric ammonium molybdate w/v in H₂O or 20% potassium permanganate w/v in H₂O. Melting points were measured on a Shandon melting point apparatus and are uncorrected. Optical rotations were measured with a Perkin-Elmer 241 polarimeter at 589 nm (sodium D line) and concentrations (c) are reported in g/100 mL. Infrared (IR) spectra were recorded on a Perkin-Elmer 1620 FT-IR spectrophotometer with internal calibration. Only selected, characteristic IR absorption data are provided for each compound. NMR spectra were recorded using deuteriochloroform (CDCl₃), deuterobenzene (C₆D₆) or deuteromethanol (CD₃OD) as the solvent. Chemical shifts (δ) are given in parts per million (ppm) from tetramethylsilane ($\delta = 0$) and were measured relative to the signal of the solvent in which the sample was analysed (CDCl₃: δ 7.26, ¹H NMR; δ 77.0, ¹³C NMR. C₆D₆: δ 7.15, ¹H NMR; δ 128.8, ¹³C NMR). Coupling constants (*J* values) are given in Hertz (Hz) and are reported to the nearest 0.1 Hz. ¹H NMR spectral data are tabulated in the order: number of protons, multiplicity (br, broad; s, singlet; d, doublet; dd, doublet of doublets; t, triplet; q, quartet; m, multiplet), coupling constant and proton assignment where applicable.

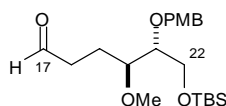
Characterisation data

(2*S*,6*R*)-2-[(2*R*,4*R*,6*R*,7*S*)-2,4-Bis-(*tert*-butyl-dimethyl-silanyloxy)-6-(4-methoxy-benzyloxy)-7-methyl-non-8-ynyl]-6-[2-(*tert*-butyl-dimethyl-silanyloxy)-ethyl]-tetrahydropyran (**5**)



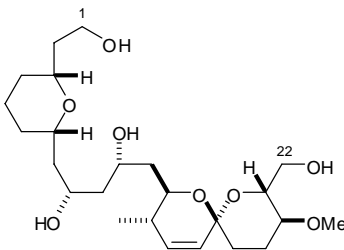
R_f 0.38 (9:1 40-60 petroleum ether / ether); [α]_D²⁰ +4.9 (c 0.79, CHCl₃); **¹H NMR** (500 MHz, CDCl₃) δ 7.28 (2H, d, *J* = 8.6 Hz, ArH), 6.86 (2H, d, *J* = 8.6 Hz, ArH), 4.47 (2H, q, *J* = 8.4 Hz, OCH₂Ar), 4.00-3.90 (1H, m, H9), 3.90-3.83 (1H, m, H11), 3.80 (3H, s, OMe), 3.69 (2H, t, *J* = 6.9 Hz, H1), 3.59-3.51 (1H, m, H13), 3.44-3.32 (2H, m, H3, H7), 2.90-2.76 (1H, m, H14), 2.08 (1H, d, *J* = 2.5 Hz, H16), 1.88-1.67 (4H, m, H2, H5eq., 2 x H12), 1.67-1.33 (8H, m, H2, H4eq., H5ax., H6eq., 2 x H8, 2 x H10), 1.22-1.11 (2H, m, H4ax., H6ax.), 1.15 (3H, d, *J* = 7.0 Hz, Me14), 0.87 (27H, s, 3 x *t*-BuSi), 0.07 (6H, s, 2 x MeSi), 0.06 (3H, s, MeSi), 0.03 (3H, s, MeSi), 0.03 (3H, s, MeSi), 0.02 (3H, s, MeSi); **¹³C NMR** (125 MHz, CDCl₃) δ 159.0, 130.9, 129.1, 113.7, 86.2, 77.8, 74.4, 73.7, 70.7, 69.8, 68.0, 66.7, 60.1, 55.3, 47.3, 45.0, 39.9, 39.1, 32.2, 31.7, 28.9, 25.9, 23.8, 18.3, 18.1, 15.2, -3.7, -4.0, -4.0, -4.3, -5.3; **IR** (thin film, ν_{\max} /cm⁻¹) 2929, 2857, 1614, 1514, 1472, 1463, 1249, 1079, 835, 773; **HRMS** calc. for C₄₃H₈₀O₆Si₃ [M + H]⁺ 777.5335, found 777.5335.

(4*S*,5*R*)-6-(*tert*-Butyl-dimethyl-silanyloxy)-4-methoxy-5-(4-methoxy-benzyloxy)-hexanal (**7**)



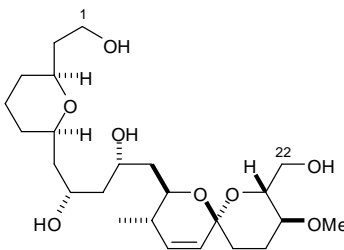
R_f 0.52 (1:1 30-40 petroleum ether / ether); [α]_D²⁰ -21.4 (c 1.32, CHCl₃); **¹H NMR** (500 MHz, CDCl₃) δ 9.71 (1H, t, *J* = 2.0 Hz, H17), 7.26 (2H, d, *J* = 8.6 Hz, ArH), 6.87 (2H, d, *J* = 8.6 Hz, ArH), 4.64 (1H, d, *J* = 11.4 Hz, OCH₂H_bAr), 4.56 (1H, d, *J* = 11.4 Hz, OCH_aH_bAr), 3.80 (3H, s, MeOAr), 3.72 (2H, dd, *J* = 5.0, 2.6 Hz, H22), 3.52-3.44 (1H, m, H21), 3.34-3.24 (1H, m, H20), 3.31 (3H, s, MeO), 2.50-2.35 (2H, m, H18), 1.94-1.84 (2H, m, H19), 0.90 (9H, s, *t*-BuSi), 0.06 (6H, s, 2 x MeSi); **¹³C NMR** (125 MHz, CDCl₃) δ 202.5, 159.16, 130.76, 129.40, 113.73, 80.27, 79.35, 72.29, 62.55, 57.78, 55.27, 40.11, 25.88, 22.69, 18.23, -5.41, -5.44; **IR** (thin film, ν_{\max} /cm⁻¹) 2929, 2856, 1725, 1613, 1513, 1464, 1249, 1091, 1036, 837; **HRMS** calc. for C₂₁H₄₀O₅NSi [M + NH₄]⁺ 414.2670, found 414.2667.

(2*S*,4*S*)-1-[(2*S*,6*R*)-6-(2-Hydroxy-ethyl)-tetrahydro-pyran-2-yl]-5-((2*R*,3*S*,6*R*,8*R*,9*S*)-8-hydroxymethyl-9-methoxy-3-methyl-1,7-dioxo-spiro[5.5]undec-4-en-2-yl)-pentane-2,4-diol
(**3**)

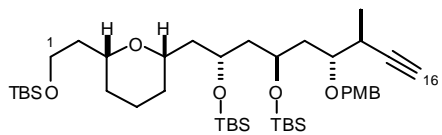


R_f 0.44 (9:1 ethyl acetate / methanol); [α]_D²⁰ +39.4 (c 0.16, CHCl₃); **¹H NMR** (500 MHz, C₆D₆) δ 5.56 (2H, unresolved ABq, H15, H16), 4.59 (1H, t, *J* = 9.4 Hz, H11), 4.41 (1H, t, *J* = 9.5 Hz, H9), 4.14-4.07 (2H, m, H13, H21), 4.03-3.97 (1H, dd, *J* = 11.4, 3.2 Hz, H22), 3.93-3.86 (1H, m, H1), 3.81-3.75 (1H, dd, *J* = 11.3, 5.8 Hz, H22), 3.72-3.65 (2H, m, H1, H7), 3.50 (1H, t, *J* = 10.9 Hz, H3), 3.00-2.91 (1H, m, H20), 2.98 (3H, s, MeO), 2.03-1.95 (1H, m, H14), 1.95-1.88 (1H, m, H12), 1.88-1.82 (1H, m, H19), 1.82-1.76 (1H, m, H18), 1.74-1.63 (2H, m, H10, H19), 1.63-1.40 (6H, m, 2 x H2, H5eq., 2 x H8, H10, 2 x H12), 1.40-1.26 (3H, m, H5aq., H6eq., H18), 1.22-1.12 (2H, m, H4eq., H6ax.), 1.12-1.04 (1H, m, H4ax.), 0.80 (3H, d, *J* = 7.2 Hz, Me14); **¹³C NMR** (125 MHz, C₆D₆) δ 136.1 (C15), 130.5 (C16), 94.6 (C17), 77.1 (C3), 76.9 (C20), 75.4 (C7), 74.6 (C21), 71.5 (C13), 65.9 (C9), 65.1 (C11), 64.4 (C22), 60.8 (C1), 56.5 (MeO), 46.5 (C10), 45.1 (C8), 41.9 (C12), 39.9 (C2), 35.8 (C14), 34.9 (C18), 32.9 (C4), 31.0 (C6), 24.9 (C19), 24.7 (C5), 17.5 (Me14); **IR** (thin film, ν_{max} /cm⁻¹) 3422, 2928, 1092, 1039, 984; **HRMS** calc. for C₂₄H₄₃O₈ [M + H]⁺ 459.2952, found 459.2955.

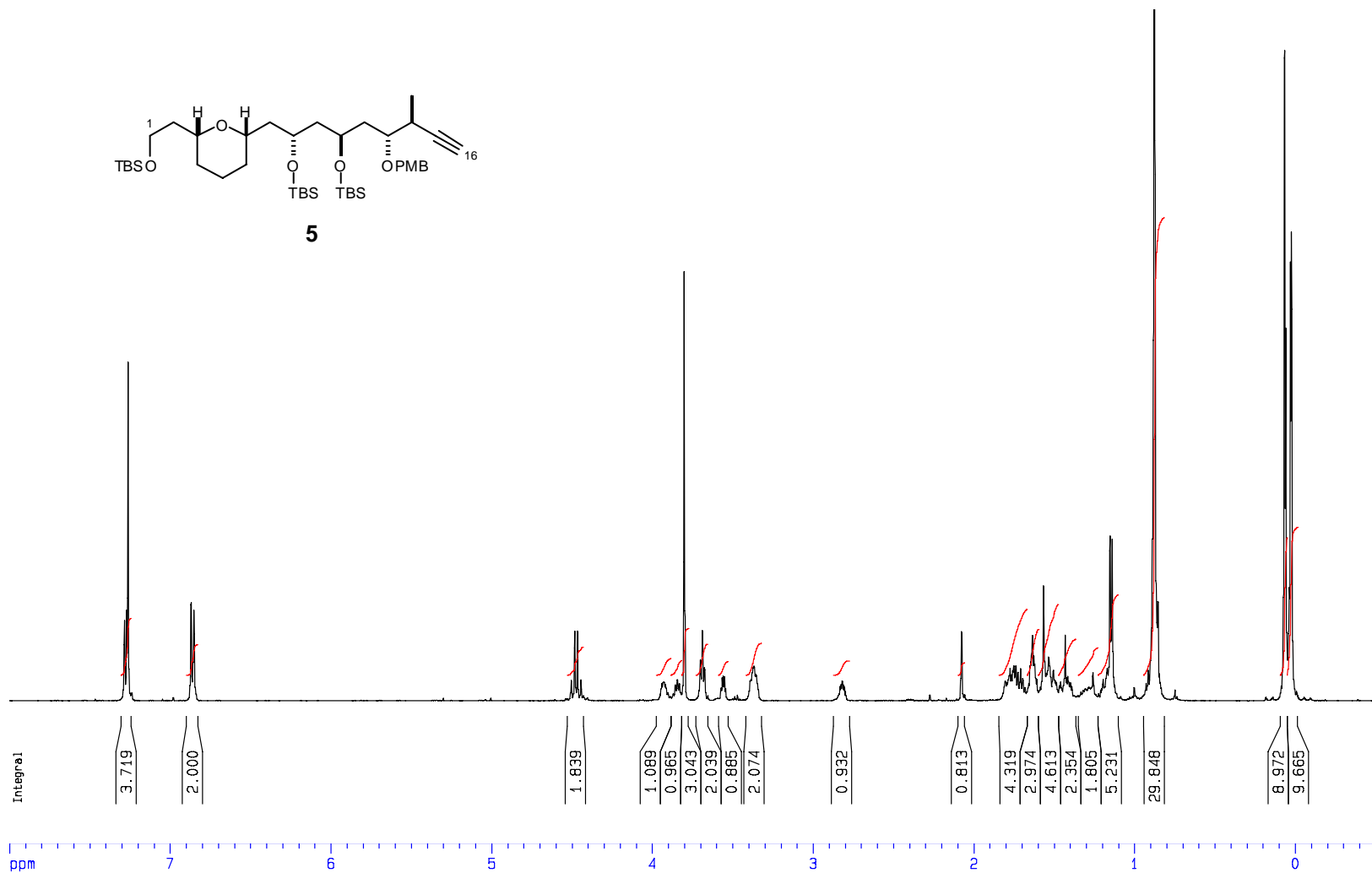
(2*S*,4*S*)-1-[(2*R*,6*S*)-6-(2-Hydroxy-ethyl)-tetrahydro-pyran-2-yl]-5-((2*R*,3*S*,6*R*,8*R*,9*S*)-8-hydroxymethyl-9-methoxy-3-methyl-1,7-dioxaspiro[5.5]undec-4-en-2-yl)-pentane-2,4-diol
(4)

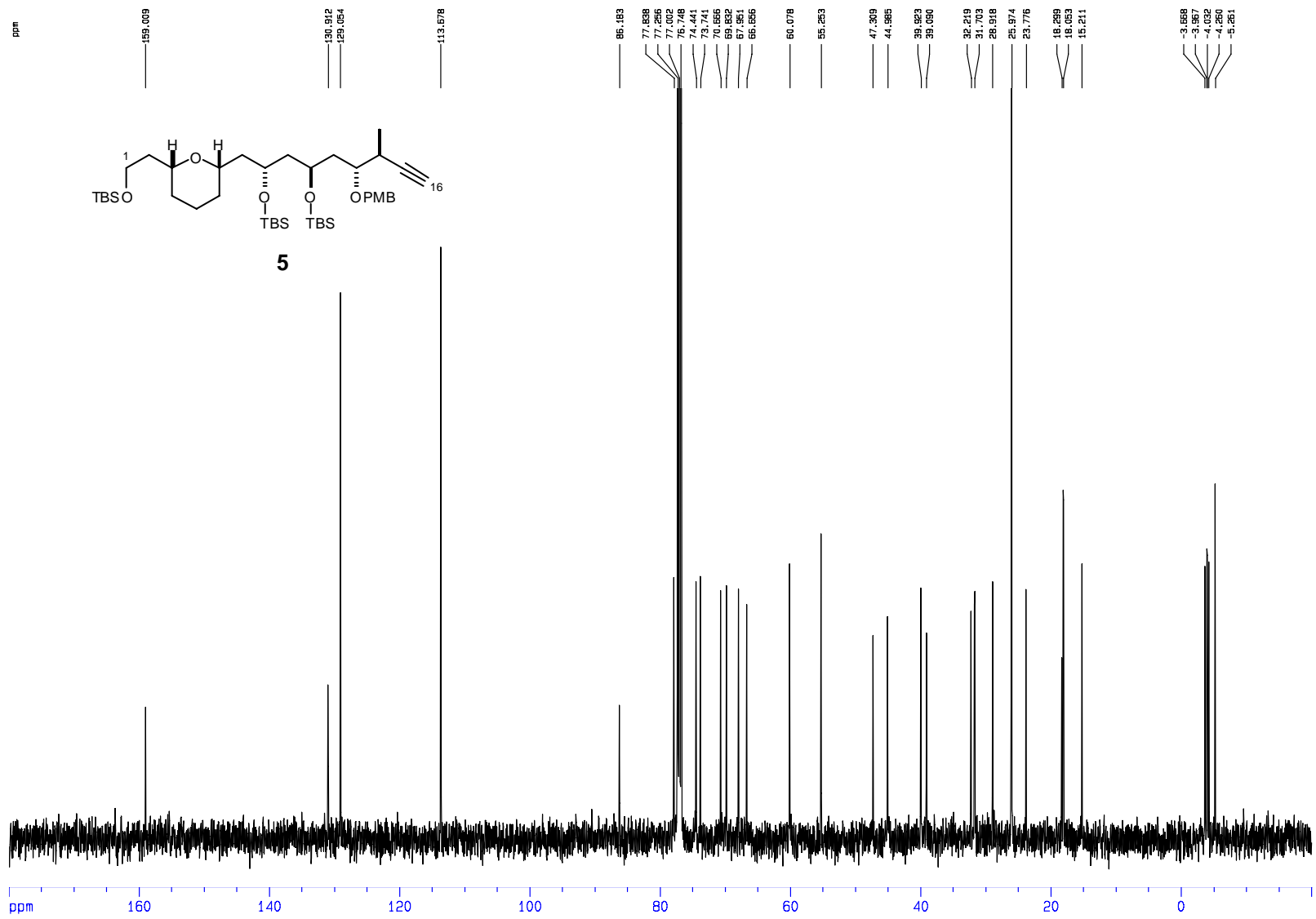


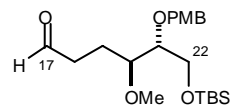
R_f 0.38 (9:1 ethyl acetate / methanol); **[α]_D²⁰** +42.2 (c 0.09, CHCl₃); **¹H NMR** (500 MHz, C₆D₆) δ 5.58 (2H, unresolved ABq, H15, H16), 4.66-4.59 (1H, m, H11), 4.27-4.21 (1H, m, H9), 4.18-4.10 (2H, m, H13, H21), 4.06-4.01 (1H, dd, *J* = 11.4, 2.9 Hz, H22), 3.83-3.78 (1H, dd, *J* = 11.3, 6.0 Hz, H22), 3.62-3.52 (1H, m, H1), 3.52-3.45 (1H, m, H1), 3.36-3.26 (2H, m, H3, H7), 3.02-2.92 (1H, m, H20), 3.00 (3H, s, MeO), 2.09-2.01 (1H, m, H14), 1.94-1.87 (1H, m, H12), 1.87-1.80 (2H, m, H18, H19), 1.76-1.68 (2H, m, H8, H19), 1.65-1.54 (3H, m, 2 x H10, H12), 1.52-1.42 (3H, m, H2, H5eq., H18), 1.41-1.33 (1H, m, H2), 1.28 (1H, td, *J* = 14.3, 2.9 Hz, H8), 1.22-1.14 (3H, m, H4eq., H5ax., H6eq.), 1.10-0.97 (2H, m, H4ax., H6ax.), 0.80 (3H, d, *J* = 7.2 Hz, Me14); **¹³C NMR** (125 MHz, C₆D₆) δ 136.0 (C15), 130.0 (C16), 94.8 (C17), 79.5 (C7), 77.1 (C3), 76.6 (C20), 75.2 (C21), 71.8 (C13), 70.1 (C9), 65.7 (C11), 64.1 (C22), 60.6 (C1), 56.6 (MeO), 45.6 (C10), 44.2 (C8), 41.8 (C12), 39.6 (C2), 35.7 (C14), 35.0 (C18), 32.7 (C6 or C4), 32.4 (C6 or C4), 25.2 (C19), 24.4 (C5), 17.5 (Me14); **IR** (thin film, ν_{max}/cm⁻¹) 3422, 2928, 1092, 1039, 984; **HRMS** calc. for C₂₄H₄₃O₈ [M + H]⁺ 459.2952, found 459.2950.



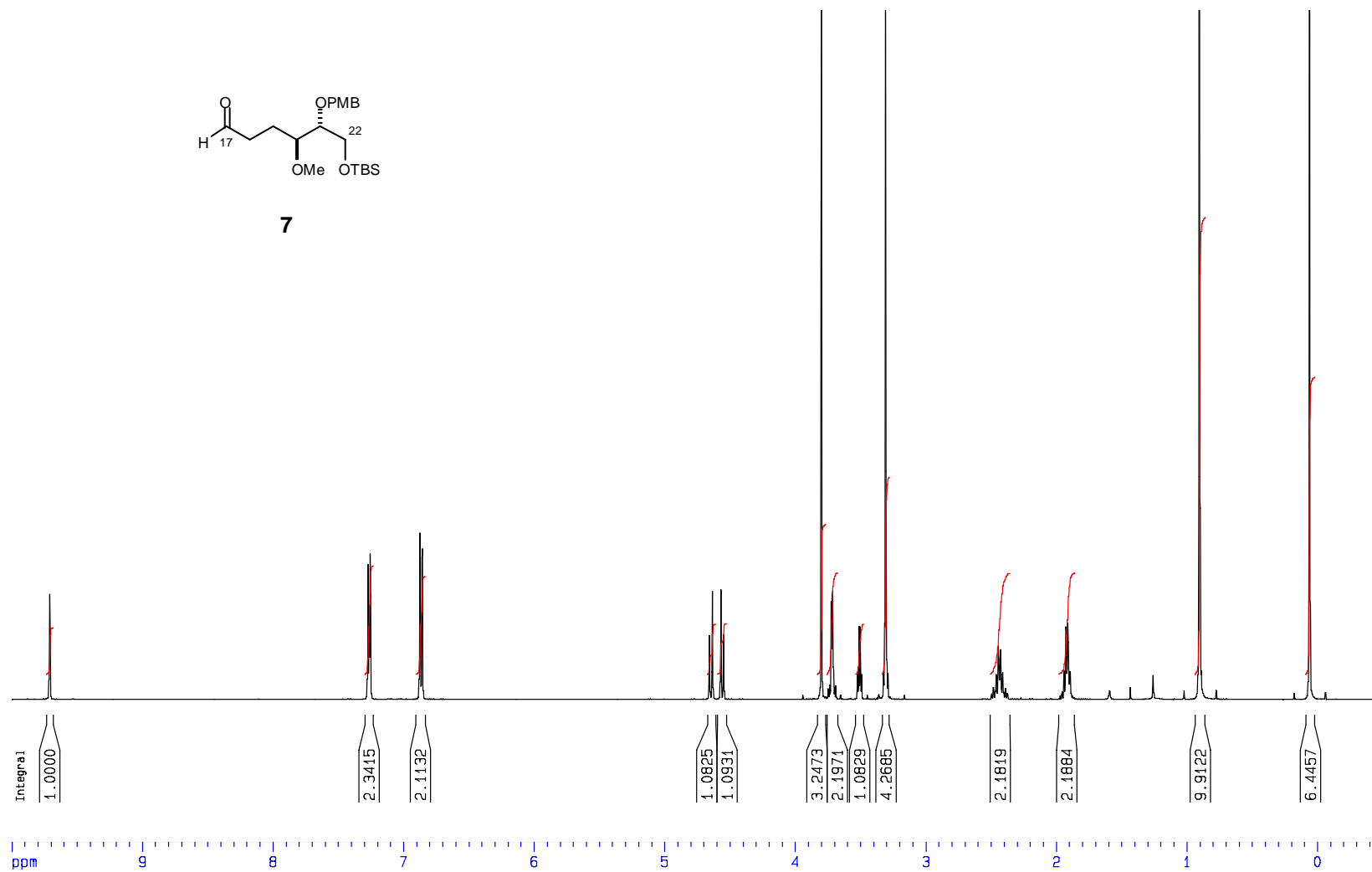
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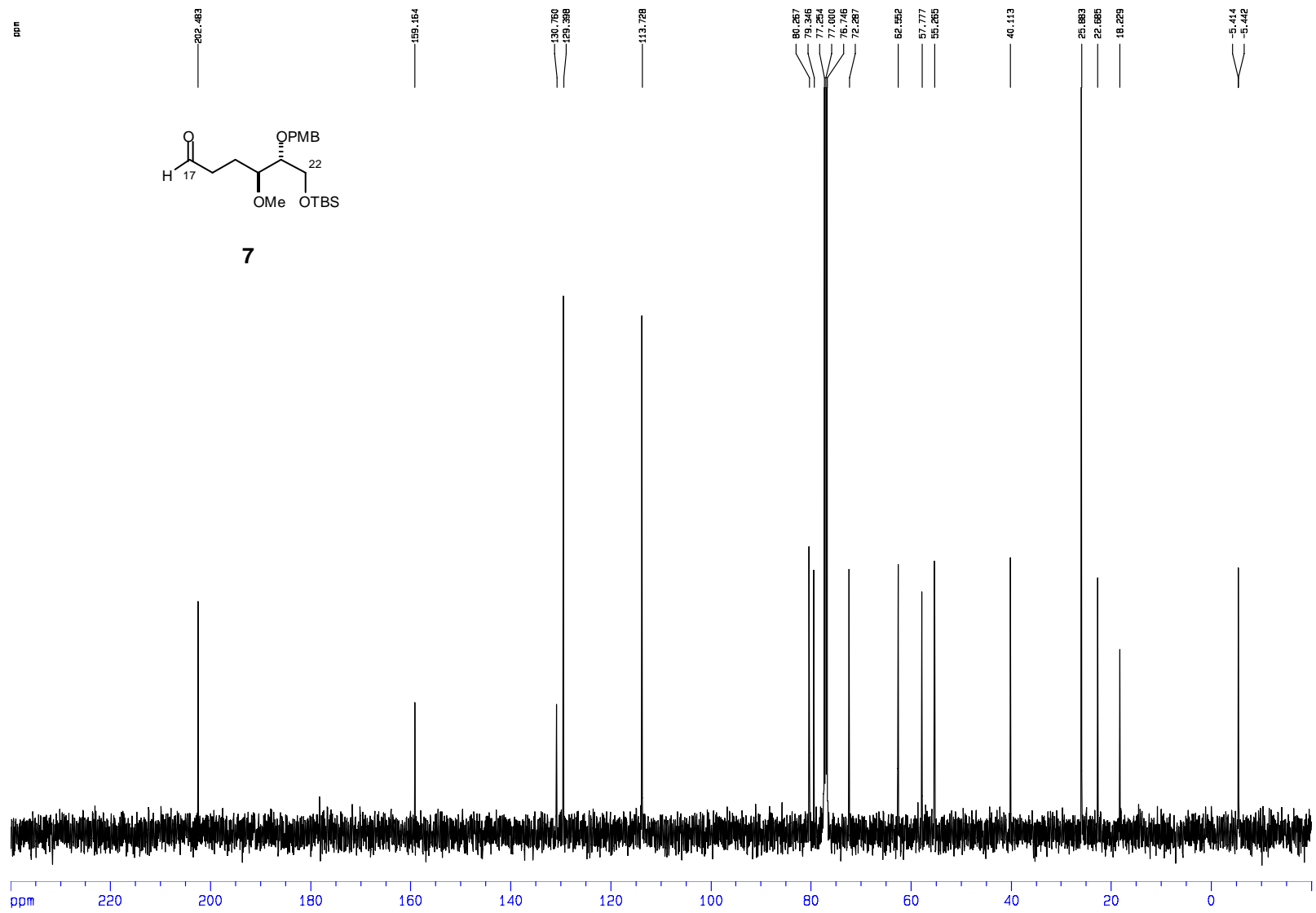


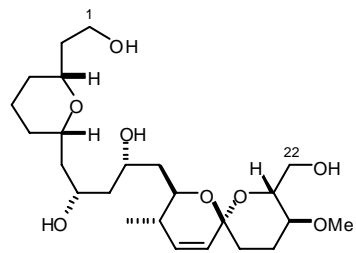




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