Supporting information

A Divergent and Concise Total Synthesis of (-)-Lycoposerramine R and (+)-Lycopladine A

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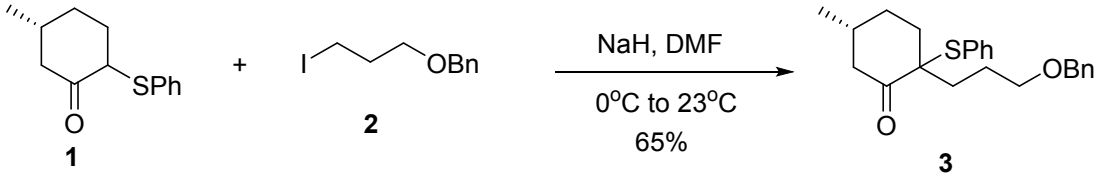
General Information

All reactions involving air or moisture sensitive reagents or intermediates were carried out under a nitrogen atmosphere with dry solvents under anhydrous conditions, unless otherwise noted. All the chemicals purchased commercially were used without further purification. Tetrahydrofuran and toluene were distilled from sodium/benzophenone. Dichloromethane was distilled from calcium hydride. Yields refer to isolated compounds, unless otherwise stated. Reactions were monitored by using thin-layer chromatography (TLC) carried out on 0.25 mm Tsingdao silica gel plates (60F-254) using Tsingdao silica gel (60, particle size0.040–0.063 mm). And the silica gel from the same company was also used for flash column chromatography. NMR spectra were recorded on a Brüker AVANCE 400 (^{1}H: 400 MHz, ^{13}C:100MHz) or a Brüker AVANCE 500 (1H: 500 MHz, 13C: 125 MHz) instrument. Chemical shifts were reported in parts per million (ppm) with respect to the residual solvents $CDCl_3$ (^{1}H NMR: δ =7.26; ^{13}C NMR: δ = 77.16) and CD_3OD (^{1}H NMR: δ =3.31; ^{13}C NMR: δ = 49.00). Peak multiplicities were reported as follows: s = singlet, d =doublet, t= triplet, q = quartet, dd = doublet of doublets, td = triplet of doublets, dt = doublet of triplets, ddd = doublet of doublet of doublets, m = multiplet, br = broad signal. Optical rotations were measured on a WZZ-2S automatic polarimeter. High resolution mass spectra (HRMS) were recorded on an Agilent Mass spectrometer using ESI-TOF (electrospray ionization-time of flight).

Experimental data

Total synthesis of (-)-lycoposerramine R(1)

Synthesis of compound 3



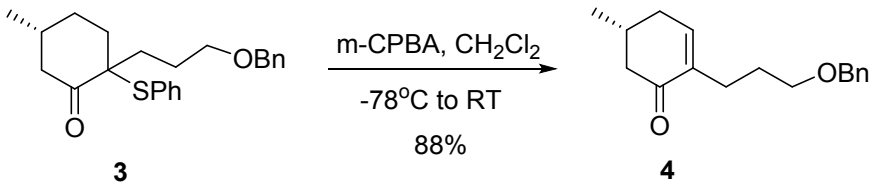
Thioether **1**[1] (20.0 g, 90.8 mmol) was dissolved in DMF (450 mL) and cooled to 0°C. Solid NaH (3.99 g, 60% oil dispersion, 99.9 mmol) was added in portions over a period of five minutes with extensive gas evolution. After 60 minutes the iodo compound **2**[2] (27.6 g, 99.9 mmol) was added neat, dropwise over a period of ten minutes. The cooling bath was removed and the solution was stirred for 1 hour. The reaction mixture was diluted with NH_4Cl (aq., 1.5 L) and EtOAc (0.75 L). The organic phase was separated and the aqueous phase was extracted with EtOAc (3 × 500 mL). The combined organic extracts were washed with brine (500 mL), dried over Na_2SO_4, filtered, and concentrated. The crude material was purified by using silica gel chromatography (25/1, petroleum ether/EtOAc) to afford a diastereomeric mixture of ketones **3** as a viscous yellow oil (21.7 g, 65%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.40 – 7.17 (m, 10H), 4.51 – 4.42 (m, 2H), 3.49 – 3.37 (m, 2H), 3.24 (dd, *J* = 14.2, 5.3 Hz, 0.72H), 3.11 (dd, *J* = 14.2, 12.6 Hz, 0.28H), 2.33 – 2.24 (m, 1H), 2.20 – 1.98 (m, 3H), 1.94 – 1.61 (m, 4H), 1.59 – 1.45 (m, 2H), 1.07 (d, *J* = 5.8 Hz, 0.83H), 0.95 (d, *J* = 7.0 Hz, 2.17H).

^{13}C NMR (125 MHz, $CDCl_3$) δ 208.04, 207.06, 138.59, 136.58, 136.11, 130.62, 130.37, 129.25, 129.09, 128.80, 128.70, 128.31, 128.29, 72.87, 70.52, 70.31, 61.95, 60.15, 45.90, 45.16, 35.60, 34.44, 33.67, 31.96, 31.33, 30.93, 29.74, 28.00, 24.17, 23.99, 22.14, 19.74.

HRMS (ESI) m/z: calculated for $C_{23}H_{29}O_2S$ $[M+H]^+$ 369.1888, found 369.1892.

Synthesis of compound 4



The diastereomeric mixture of ketones **3** (20.0 g, 54.3 mmol) was dissolved in CH_2Cl_2 (360 mL) and placed in a –78°C bath. A solution of *m*-CPBA (11.2 g, 55.4 mmol) in CH_2Cl_2 (180 mL) was added over over a period of 1 hour to the solution at –78°C. The cooling bath was removed and the solution was stirred for 10 hours where upon the solution became clear. The reaction mixture was then diluted with $NaHSO_3$ (10% aq.,

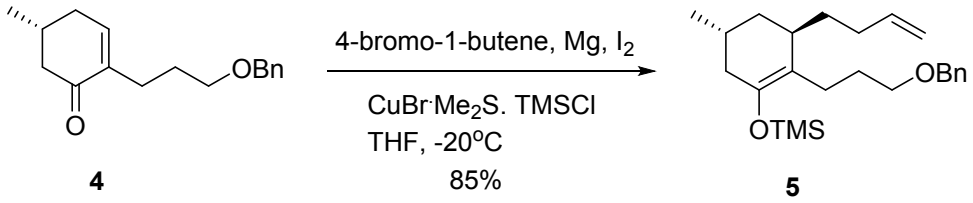
200 mL) and extracted with CH_2Cl_2 (3 × 400 mL). The combined organic extracts were washed with brine (200 mL), dried over Na_2SO_4, filtered, and concentrated. The crude product was purified by using silica gel chromatography (20/1, petroleum ether/EtOAc) to afford enone **4** as a light yellow oil (12.3 g, 88%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.37 – 7.26 (m, 5H), 6.68 – 6.63 (m, 1H), 4.49 (s, 2H), 3.46 (t, *J* = 6.4 Hz, 2H), 2.51 – 2.43 (m, 1H), 2.37 (dt, *J* = 18.3, 4.4 Hz, 1H), 2.27 (t, *J* = 7.6 Hz, 2H), 2.20 – 1.94 (m, 3H), 1.72 (tt, *J* = 13.0, 6.4 Hz, 2H), 1.03 (d, *J* = 6.3 Hz, 3H).

^{13}C NMR (125 MHz, $CDCl_3$) δ 199.58, 144.53, 138.92, 138.63, 128.31, 127.69, 127.47, 72.82, 69.74, 46.67, 34.37, 30.61, 28.54, 26.13, 21.15.

HRMS (ESI) m/z: calculated for $C_{17}H_{23}O_2$ $[M+H]^+$ 259.1698, found 259.1693.

Synthesis of compound 5



4 **5**

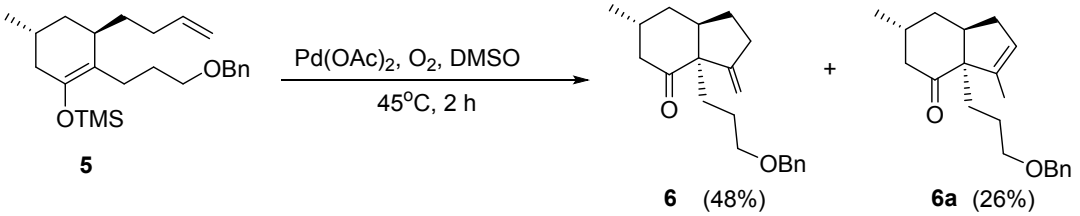
Magnesium turnings (1.2g, 46.5 mmol) were stirred under an argon atmosphere. Iodine crystals (15 mg) were added followed by freshly distilled THF (78 mL). 4-bromo-1-butene (6.3 g, 46.5 mmol) was diluted with anhydrous THF (15 mL), a portion (2 mL) of the above solution was added directly to the THF suspension to start the reaction (heat was required to initiate), then the left over was added dropwise to the above suspension over over a period of 20 mins with heating. After the addition was complete, the mixture was then refluxed for 1.5 h. Copper bromide dimethyl sulfide complex (297 mg, 1.4 mmol) was dissolved in anhydrous THF (45 mL) under an argon atmosphere. The solution was then cooled to –20°C and the Grignard solution was added via syringe over over a period of 5 mins. After 30 mins at –20°C a mixture of **4** (6.0g, 23.2 mmol) and TMSCl (5.1 g, 46.5 mmol) in THF(20 mL) was added (20 mins) and the reaction stirred for 15 min. at –20°C before being warmed up to room temperature. The reaction mixture was then treated with Et_3N (20 mL) sat. NH_4Cl (60 mL) solution and the organic layer was separated. The aqueous solution was extracted with EtOAc (3 × 60 mL) and the organic extracts were washed with brine (100 mL), dried over Na_2SO_4, filtered, and concentrated. The crude product was purified by using silica gel chromatography (100/1, petroleum ether/EtOAc) to afford **5** as a colorless oil (7.6 g, 85%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.37 – 7.25 (m, 5H), 5.90 – 5.70 (m, 1H), 5.05 – 4.91 (m, 2H), 4.51 (s, 2H), 3.46 (t, *J* = 6.7 Hz, 2H), 2.44 – 2.30 (m, 1H), 2.20 – 1.93 (m, 4H), 1.90 – 1.79 (m, 2H), 1.76 (ddd, *J* = 9.0, 6.6, 3.0 Hz, 1H), 1.72 – 1.62 (m, 2H), 1.62 – 1.53 (m, 2H), 1.27 (dtd, *J* = 14.6, 9.9, 5.0 Hz, 1H), 1.16 (td, *J* = 12.4, 5.5 Hz, 1H), 0.94 (d, *J* = 6.5 Hz, 3H), 0.16 (s, 9H).

^{13}C NMR (125 MHz, $CDCl_3$) δ 143.68, 139.12, 138.87, 128.27, 127.54, 127.35, 118.74, 114.25, 72.74 70.77, 38.90, 35.48, 34.51, 32.21, 28.24, 24.81, 24.54, 21.81, 0.80.

HRMS (ESI) m/z: calculated for $C_{24}H_{39}O_2Si$ $[M+H]^+$ 387.2719, found 387.2721.

Synthesis of compound 6



5 **6** (48%) **6a** (26%)

The silyl enol ether **5** (6.5 g, 16.8 mmol) was dissolved in dry DMSO (170 ml) and stirred under an oxygen atmosphere. $Pd(OAc)_2$ (377 mg, 1.7 mmol) was added in one portion and resulting the mixture was heated to 45°C and stirred at that temperature for 2h. The reaction was diluted with sat. $NaHCO_3$ (500 mL) solution and EtOAc (300 mL). The organic phase was separated and the aqueous phase was extracted with EtOAc (3 × 300 mL). The organic extracts were combined and washed with brine (800 mL), dried over Na_2SO_4, filtered, and concentrated. The crude product was purified by using silica gel chromatography (25/1, petroleum ether/EtOAc) to afford **6** as a light yellow oil (2.5 g, 48%) in addition to **6a** (1.4 g, 26%).

For 6: ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.39 – 7.21 (m, 5H), 5.02 (s, 1H), 4.77 (s, 1H), 4.49 (s, 2H), 3.53 – 3.36 (m, 2H), 2.58 – 2.43 (m, 3H), 2.43 – 2.30 (m, 1H), 2.26 – 2.13 (m, 1H), 2.08 (dd, *J* = 14.7, 7.0 Hz, 1H), 1.91 – 1.76 (m, 2H), 1.75 – 1.65 (m, 1H), 1.61 – 1.43 (m, 5H), 0.96 (d, *J* = 6.8 Hz, 3H).

^{13}C NMR (125 MHz, $CDCl_3$) δ 212.28, 153.50, 138.60, 128.34, 127.63, 127.48, 108.45, 72.86, 70.74, 62.82, 46.09, 42.63, 34.08, 32.08, 30.32, 29.31, 28.74, 25.50, 20.33.

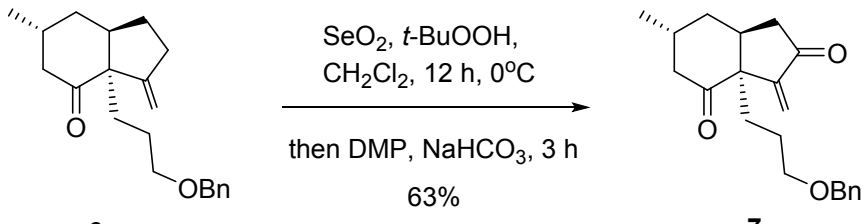
HRMS (ESI) m/z: calculated for $C_{21}H_{29}O_2$ $[M+H]^+$ 313.2168, found 313.2175.

For 6a: **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.37 – 7.27 (m, 5H), 5.47 (d, J = 36.3 Hz, 1H), 4.49 (s, 2H), 3.52 – 3.41 (m, 2H), 2.60 – 2.45 (m, 2H), 2.38 (ddd, J = 16.2, 5.7, 1.7 Hz, 1H), 2.19 – 2.01 (m, 2H), 1.91 (dd, J = 16.3, 9.7 Hz, 1H), 1.75 (dd, J = 12.1, 9.0 Hz, 1H), 1.68 – 1.62 (m, 1H), 1.60 (d, J = 1.6 Hz, 3H), 1.59 – 1.56 (m, 2H), 1.48 – 1.38 (m, 2H), 0.95 (d, J = 6.6 Hz, 3H).

^{13}C NMR (125 MHz, $CDCl_3$) δ 215.22, 141.35, 138.55, 128.33, 127.99, 127.62, 127.49, 72.94, 70.82, 64.85, 47.24, 42.26, 37.60, 36.76, 30.48, 26.76, 24.80, 21.94, 14.06.

HRMS (ESI) m/z: calculated for C21H29O2 $[M+H]^+$ 313.2168, found 313.2153.

Synthesis of compound 7



6 **7**

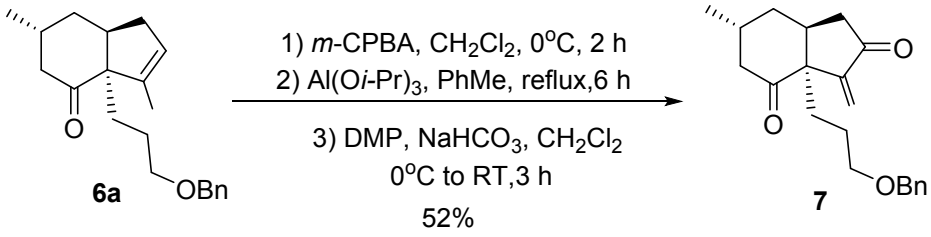
A mixture of *tert*-butyl hydroperoxide(5-6 M solution in anhydrous decane, 2.7 mL, 14.8mmol), SeO_2 (411 mg, 3.7 mmol) in CH_2Cl_2 (24 mL) was stirred at room temperature for 1 h. The reaction was cooled to 0°C and compound **6** (2.3 g, 7.4 mmol) was cannulated into the reaction flask containiing CH_2Cl_2 (12 mL). The reaction mixture was stirred for 12 hours at 0°C before TLC analysis showed full conversion. $NaHCO_3$ (1.2 g, 14.8 mmol) and Dess-Martin periodinane (3.8 g, 8.9 mmol) were added sequentially at that temperature. The colorless suspension was stirred at room temperature for 3 h before TLC analysis indicated full conversion. A 1:1 mixture of saturated aq. $NaHCO_3$ and 10% aq. $Na_2S_2O_3$ (30 mL) was added and the biphasic mixture was stirred vigorously until two clear phases formed. Extraction with EtOAc (3 × 50 mL) and the combined organic extracts were washed with brine (100 mL), dried over Na_2SO_4, filtered, and concentrated. The crude product was purified by using silica gel chromatography (10/1, petroleum ether/EtOAc) to afford **7** as a colorless oil (1.5 g, 63%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 7.36 – 7.27 (m, 5H), 6.21 (s, 1H), 5.28 (s, 1H), 4.49 (s, 2H), 3.49 – 3.43 (m, 2H), 2.72 – 2.69 (m, 1H), 2.58 – 2.46 (m, 2H), 2.18 (dd, *J* = 18.6, 5.5 Hz, 3H), 1.97 (dd, *J* = 18.7, 6.8 Hz, 1H), 1.79 – 1.56 (m, 5H), 1.02 (d, *J* = 5.9 Hz, 3H).

^{13}C NMR (125 MHz, $CDCl_3$) δ 210.18, 204.09, 146.60, 138.39, 128.37, 127.61, 127.59, 120.84, 72.98, 70.16, 59.95, 45.75, 42.21, 36.28, 34.61, 32.63, 28.21, 25.37, 20.56.

HRMS (ESI) m/z: calculated for $C_{21}H_{27}O_3$ $[M+H]^+$ 327.1960, found 327.1968.

Conversion of compound 6a to 7



A solution of **6a** (1.2 g, 3.8 mmol) in CH_2Cl_2 (28 mL) was cooled to 0°C, and a solution of 85% *m*-CPBA (810 mg, 4 mmol) in CH_2Cl_2 (10 mL) was added dropwise to the solution at 0°C. The solution was stirred at that temperature for 2 h before a 1:1 mixture of saturated aq. $NaHCO_3$ and 10% aq. $Na_2S_2O_3$ (30mL) was added and the biphasic mixture was stirred vigorously until two clear phases formed. Extraction with CH_2Cl_2 (3 × 30 mL) and the combined organic extracts were washed with brine (60 mL), dried over Na_2SO_4, filtered, and concentrated under reduced pressure to afford the corresponding crude epoxide, which was immediately dissolved in dry toluene (40 mL), and Al(O*i*-Pr)$_3$ (776 mg) was added in one portion. The mixture was refluxed for 6 h before being cooled to room temperature. Saturated aq. $NaHCO_3$ was added. Extracted with EtOAc (3 × 50 mL) and the combned organic extracts were washed with brine (100 mL), dried over Na_2SO_4, filtered, and concentrated. The

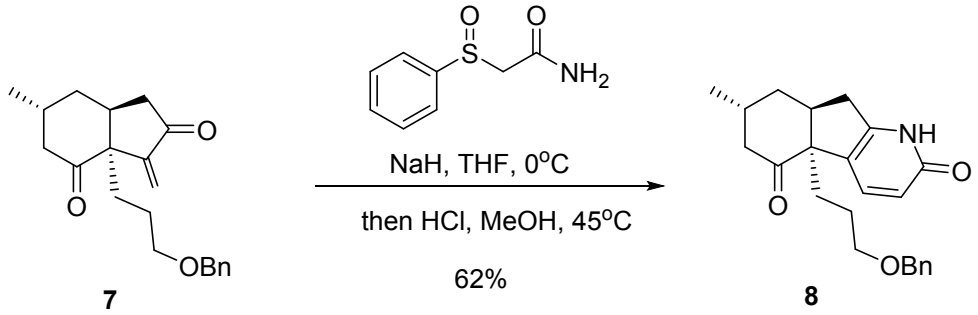
residue was dissolved in CH_2Cl_2 (30 mL), $NaHCO_3$ (638 mg, 7.6 mmol) and Dess-Martin periodinane (1.9 g, 4.6 mmol) were added sequentially at that temperature. The colorless suspension was stirred for 3 h before TLC analysis indicated full conversion. A 1:1 mixture of saturated aq. $NaHCO_3$ and 10% aq. $Na_2S_2O_3$ (30 mL) was added and the biphasic mixture was stirred vigorously until two clear phases formed. After extraction with EtOAc (3 × 50 mL), the combined organic extracts were washed with brine (100 mL), dried over Na_2SO_4, filtered, and concentrated. The crude product was purified by using silica gel chromatography (10/1, petroleum ether/EtOAc) to afford **7** as a colorless oil (643 mg, 52%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 7.36 – 7.27 (m, 5H), 6.21 (s, 1H), 5.28 (s, 1H), 4.49 (s, 2H), 3.49 – 3.43 (m, 2H), 2.72 – 2.69 (m, 1H), 2.58 – 2.46 (m, 2H), 2.18 (dd, *J* = 18.6, 5.5 Hz, 3H), 1.97 (dd, *J* = 18.7, 6.8 Hz, 1H), 1.79 – 1.56 (m, 5H), 1.02 (d, *J* = 5.9 Hz, 3H).

^{13}C NMR (125 MHz, $CDCl_3$) δ 210.18, 204.09, 146.60, 138.39, 128.37, 127.61, 127.59, 120.84, 72.98, 70.16, 59.95, 45.75, 42.21, 36.28, 34.61, 32.63, 28.21, 25.37, 20.56.

HRMS (ESI) m/z: calculated for $C_{21}H_{27}O_3$ $[M+H]^+$ 327.1960, found 327.1968.

Synthesis of compound 8



7 **8**

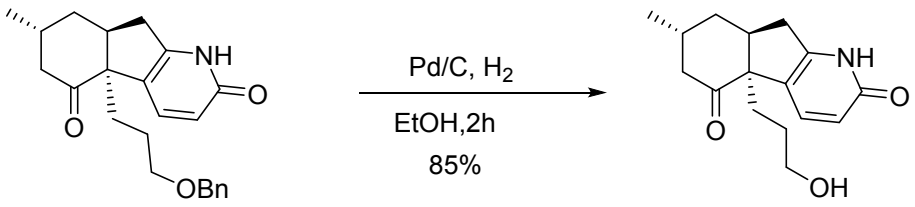
To a stirred solution of **7** (500 mg, 1.5 mmol) and 2-(phenylsufinyl)acetamide[3] (561 mg, 3.0 mmol) in tetrahydrofuran (15 mL) was added sodium hydride (60% purity, 72 mg, 1.8 mmol) at 0°C. After consumption of the starting material, methanolic hydrogen chloride (5% HCl in methanol, 5 mL) was added to the reaction mixture at 0°C. After being stirred for 18 h at 45°C, the solvent was removed in vacuo, and the residue was partitioned between EtOAc and saturated aqueous $NaHCO_3$. The organic layer was washed with brine, dried over Na_2SO_4, filtered and concentrated. The crude product was purified by using silica gel chromatography (20/1, CH_2Cl_2/MeOH) to afford **8** as a colorless oil (347 mg, 62%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 7.40 (d, *J* = 9.2 Hz, 1H), 7.35 – 7.27 (m, 5H), 6.40 (d, *J* = 9.2 Hz, 1H), 4.47 (s, 2H), 3.43 (t, *J* = 6.3 Hz, 2H), 3.03 (dd, *J* = 17.0, 8.7 Hz, 1H), 2.85 (dd, *J* = 5.3, 3.0 Hz, 1H), 2.70 (dd, *J* = 16.9, 7.9 Hz, 1H), 2.41 – 2.31 (m, 1H), 2.04 (t, *J* = 11.1 Hz, 2H), 1.98 – 1.91 (m, 1H), 1.83 – 1.66 (m, 3H), 1.66 – 1.39 (m, 3H), 1.02 (d, *J* = 5.9 Hz, 3H).

^{13}C NMR (125 MHz, $CDCl_3$) δ 213.41, 166.14, 148.40, 139.85, 138.37, 128.38, 127.61, 127.60, 121.08, 117.35, 73.00, 70.15, 60.05, 47.02, 42.01, 35.24, 35.00, 33.45, 27.27, 25.30, 21.82.

HRMS (ESI) m/z: calculated for $C_{23}H_{28}NO_3$ $[M+H]^+$ 366.2069, found 366.2071.

Synthesis of compound 9



8 **9**

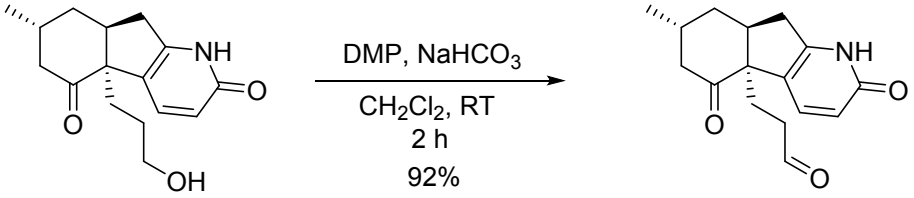
A solution of **8** (200 mg, 0.55 mmol) in 5.5 mL ethanol was degassed by sparging with H_2. The solution was charged with 220 mg 10% Pd/C. The mixture was stirred at room temperature for 2 h, filtered over celite and concentrated. The crude product was purified by silica gel chromatography (10/1, CH_2Cl_2/MeOH) to afford **9** as a white foam (128 mg, 85%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 7.40 (d, *J* = 9.2 Hz, 1H), 6.40 (d, *J* = 9.2 Hz, 1H), 3.61 (t, *J* = 6.3 Hz, 2H), 3.05 (dd, *J* = 17.0, 8.7 Hz, 1H), 2.90 – 2.83 (m, 1H), 2.70 (dd, *J* = 17.0, 7.8 Hz, 1H), 2.43 – 2.33 (m, 1H), 2.08 – 2.01 (m, 2H), 1.98 – 1.91 (m, 1H), 1.83 – 1.68 (m, 3H), 1.67 – 1.39 (m, 3H), 1.02 (d, *J* = 5.9 Hz, 3H).

^{13}C NMR (125 MHz, $CDCl_3$) δ 213.43, 166.12, 148.51, 139.77, 121.09, 117.39, 62.67, 60.03, 46.97, 42.02, 35.31, 35.10, 33.08, 28.06, 27.25, 21.79.

HRMS (ESI) m/z: calculated for $C_{16}H_{22}NO_3$ $[M+H]^+$ 276.1600, found 276.1605.

Synthesis of compound 10



9 **10**

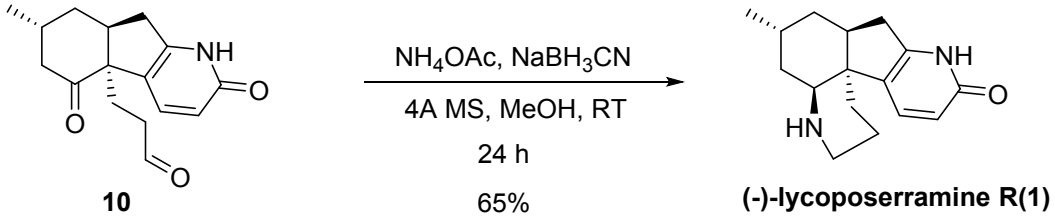
To a solution of **9** (100 mg, 0.36 mmol) in CH_2Cl_2 (3.6 mL) was added $NaHCO_3$ and the Dess-Martin reagent (297 mg, 0.7 mmol) sequentially at room temperature. The resulting mixture was stirred at the same temperature for 2 h and it was then quenched with sat. aq. $Na_2S_2O_3$ (5 mL) and sat. aq. $NaHCO_3$ (5 mL) and extracted with CH_2Cl_2 (5 mL x 3). The combined organic layers were dried over Na_2SO_4, filtered and concentrated. The crude product was purified by silica gel chromatography (15/1, CH_2Cl_2/MeOH) to afford **10** as a slight yellow oil (91 mg, 92%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 9.74 (s, 1H), 7.35 (d, *J* = 9.1 Hz, 1H), 6.42 (d, *J* = 9.1 Hz, 1H), 3.09 (dd, *J* = 15.2, 6.5 Hz, 1H), 2.79 – 2.63 (m, 2H), 2.49 – 2.35 (m, 3H), 2.23 – 2.13 (m, 1H), 2.10 – 1.98 (m, 3H), 1.80 (d, *J* = 14.1 Hz, 1H), 1.65 (d, *J* = 9.0 Hz, 1H), 1.03 (d, *J* = 5.3 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 212.63, 200.55, 166.11, 149.02, 139.34, 120.21, 117.71, 59.57, 46.64, 42.04,, 35.38, 35.08, 29.68, 27.94, 27.23, 21.62.

HRMS (ESI) m/z: calculated for $C_{16}H_{20}NO_3$ $[M+H]^+$ 274.1443, found 274.1442.

Synthesis of (-)-lycoposerramine R(1)



10 **(-)-lycoposerramine R(1)**

A flame-dried round-bottom flask was charged with ketoaldehyde **10** (25 mg, 0.09 mmol) in MeOH (1.8 mL) , followed by addition of NH_4OAc (69 mg, 0.9 mmol), 4A MS (200 mg) and $NaBH_3CN$ (57 mg, 0.9 mmol) respectively. The reaction mixture was stirred at room temperature for 24 h. The reaction was diluted with saturated aq. $NaHCO_3$ (10mL) and the aqueous phase was extracted with CH_2Cl_2 (3×8 mL). The combined organic phases were washed with saturated aq. $NaHCO_3$ (5 mL), then dried over K_2CO_3 and concentrated. The crude product was purified by silica gel chromatography (CH_2Cl_2:MeOH =19:1 + 0.5% aq. NH_3) to afford **(-)-lycoposerramine R(1)** as a slight yellow gel (15 mg, 65%). $[\alpha]_D^{25}$ -26 (0.2, $CHCl_3$).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.32 (d, *J* = 9.1 Hz, 1H), 6.34 (d, *J* = 9.1 Hz, 1H), 3.20 (dd, *J* = 17.1, 6.9 Hz, 2H), 2.92 (dd, *J* = 12.1, 4.7 Hz, 1H), 2.79 (td, *J* = 11.4, 2.7 Hz, 1H), 2.33 (d, *J* = 16.8 Hz, 1H), 2.19 (dd, *J* = 13.8, 6.8 Hz, 1H), 1.81 – 1.72 (m, 1H), 1.69 – 1.65 (m, 1H), 1.59 –1.39 (m, 5H), 1.28 – 1.16 (m, 2H), 0.96 (d, *J* = 7.0 Hz, 3H).

^{13}C NMR (125 MHz, $CDCl_3$) δ 166.06, 150.41, 143.26, 124.43, 114.80, 57.14, 49.32, 47.93, 41.83, 38.10, 36.08, 35.98, 34.71, 25.56, 22.77, 20.55.

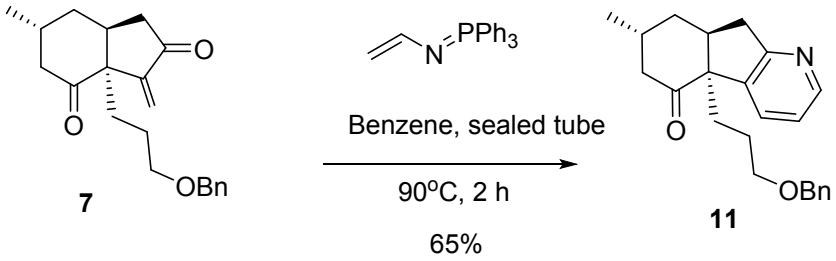
HRMS (ESI) m/z: calculated for $C_{16}H_{23}N_2O$ $[M+H]^+$ 259.1810, found 259.1806.

Comparison of natural[4] and synthetic (-)-LycoposerramineR

δ_H (ppm)		δ_C (ppm)	
Natural	Synthetic	Natural	Synthetic
(400 MHz, $CDCl_3$)	(400 MHz, $CDCl_3$)	(100 MHz, $CDCl_3$)	(125 MHz, $CDCl_3$)
8.33 (d, 9.2, 1H)	8.32 (d, 9.1, 1H)	165.8	166.06
6.34 (d, 9.2, 1H)	6.34 (d, 9.1, 1H)	150.4	150.41
3.17 – 3.23 (m, 2H)	3.20 (dd, 17.1, 6.9, 2H)	143.3	143.26
2.92 (dd, 12.1, 4.8, 1H)	2.92 (dd, 12.1, 4.7, 1H)	124.5	124.43
2.80 (ddd, 11.6, 3.0, 1H)	2.79 (td, 11.4, 2.7, 1H)	115.0	114.80
2.33 (d, 17.0, 1H)	2.33 (d, 16.8, 1H)	57.1	57.14
2.19 (ddd, 6.9, 6.9, 1H)	2.19 (dd, 13.8, 6.8, 1H)	49.4	49.32
1.72– 1.79 (m, 1H)	1.72 – 1.81 (m,1H)	47.8	47.93
1.66– 1.69 (m, 1H)	1.65 – 1.69 (m, 1H)	42.0	41.83
1.47– 1.55(m, 1H)	1.39 – 1.59 (m, 5H)	38.1	38.10
1.42– 1.50 (m, 1H)	from above	36.2	36.08
1.41– 1.59 (m, 2H)	from above	36.0	35.98
1.39– 1.50 (m, 1H)	from above	34.6	34.71
1.20– 1.25 (m, 2H)	1.16 – 1.28 (m, 2H)	25.6	25.56
0.96 (d, 6.9, 3H)	0.96 (d, 7.0, 3H)	22.7	22.77
		20.6	20.55

Total synthesis of (+)-lycopladine A(2)

Synthesis of compound 11



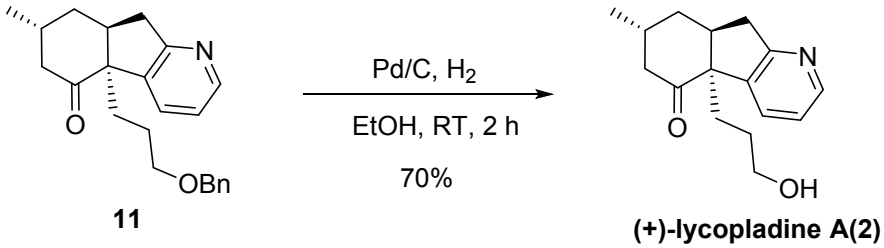
A flame-dried tube was charged with **7** (100 mg, 0.31 mmol) in dry benzene (3 ml) followed by addition of (*N*-Vinylimino)phosphorene[5] (186 mg, 0.62 mmol). The tube then was sealed and heated at 90°C for 2 h before cooled to room temperature. The reaction mixture was then diluted with saturated aq. $NaHCO_3$ (5 mL) and EtOAc (5 mL). The organic phase was separated and the aqueous phase was extracted with EtOAc (3 × 5mL). The organic extracts were washed with brine (15 mL), dried over Na_2SO_4, filtered, and concentrated. The crude material was purified by silica gel chromatography (2/1, petroleum ether/EtOAc) to afford **11** as a slight yellow oil (69 mg, 65%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 8.38 (d, *J* = 4.7 Hz, 1H), 7.52 (d, *J* = 7.6 Hz, 1H), 7.31 (td, *J* = 14.8, 7.4 Hz, 5H), 7.12 – 7.07 (m, 1H), 4.46 (s, 2H), 3.43 (t, *J* = 6.0 Hz, 2H), 3.16 (dd, *J* = 16.2, 7.8 Hz, 1H), 2.93 – 2.79 (m, 2H), 2.35 (d, *J* = 12.4 Hz, 1H), 2.20 – 1.97 (m, 3H), 1.82 (dd, *J* = 18.0, 8.6 Hz, 2H), 1.75 – 1.57 (m, 2H), 1.47 (m, 1H), 1.04 (d, *J* = 5.7 Hz, 3H).

^{13}C NMR (125 MHz, $CDCl_3$) δ 212.63, 163.44, 148.76, 138.39, 137.72, 133.55, 128.38, 127.60, 121.57, 72.98, 70.22, 61.32, 46.90, 41.47, 38.66, 34.72, 33.38, 27.81, 25.50, 21.60.

HRMS (ESI) m/z: calculated for $C_{23}H_{28}NO_2$ $[M+H]^+$ 350.2120, found 350.2106.

Synthesis of (+)-lycopladine A(2)



A solution of **11** (50mg, 0.14 mmol) in 1.5 mL ethanol was degassed by sparging with H_2. The solution was charged with 100 mg 10% Pd/C. The mixture was stirred at room temperature for 2 h, filtered over celite and concentrated. The crude product was purified by silica gel chromatography (20/1, CH_2Cl_2/MeOH) to afford **(+)-lycopladine A(2)** as a white solid (25 mg, 70%). $[\alpha]_D^{23}$ + 135 (0.5, MeOH).

^{1}H NMR (400 MHz, MeOD) δ 8.29 (dd, *J* = 5.0, 1.4 Hz, 1H), 7.66 (dd, *J* = 7.7, 1.4 Hz, 1H), 7.24 (dd, *J* = 7.6, 5.1 Hz, 1H), 3.56 – 3.49 (m, 2H), 3.08 (dd, *J* = 16.2, 8.1 Hz, 1H), 3.00 – 2.92 (m, 1H), 2.82 (dd, *J* = 16.2, 8.8 Hz, 1H), 2.29 (dd, *J* = 12.5, 5.2 Hz, 2H), 2.15 – 2.02 (m, 2H), 1.93 – 1.80 (m, 3H), 1.56 (m, 1H), 1.40 – 1.31 (m,1H), 1.08 (d, *J* = 6.5 Hz, 3H).
^{13}C NMR (125 MHz, MeOD) δ 214.70, 164.36, 148.79, 140.03, 136.12, 123.06, 62.85, 62.73, 47.77, 43.49, 38.65, 34.89, 33.45, 29.54, 29.15, 22.02.
HRMS (ESI) m/z: calculated for $C_{16}H_{22}NO_2$ $[M+H]^+$ 260.1651, found 260.1657.

Comparison of natural[6] and synthetic (+)-lycopladine A

δ_H (ppm)		δ_C (ppm)	
Natural	Synthetic	Natural	Synthetic
(400 MHz, CD_3OD)	(400 MHz, CD_3OD)	(100 MHz,CD_3OD)	(125 MHz, CD_3OD)
8.30 (dd, 5.0, 1.4, 1H)	8.29 (dd, 5.0, 1.4, 1H)	214.6	214.70
7.67 (dd, 7.7, 1.4, 1H)	7.66 (dd, 7.7, 1.4, 1H)	164.3	164.36
7.24 (dd, 7.6, 5.1, 1H)	7.24 (dd, 7.6, 5.1, 1H)	148.8	148.79
3.53 (m, 2H)	3.56 – 3.49 (m, 2H)	140.0	140.03
3.09 (dd, 16.5, 8.2, 1H)	3.08 (dd, 16.2, 8.1, 1H)	136.1	136.12
2.97 (m, 1H)	3.00 – 2.92 (m, 1H)	123.0	123.06
2.83 (dd, 16.5, 9.1, 1H)	2.82 (dd, 16.2, 8.8, 1H)	62.8	62.85
2.29 (m, 2H)	2.29 (dd, 12.5, 5.2, 2H)	62.7	62.73
2.12 (m, 1H)	2.15 – 2.02 (m, 2H)	47.7	47.77
2.06 (ddd, 13.6, 13.6, 4.6, 1H)	from above	43.5	43.49
1.90 (m, 1H)	1.93 – 1.80 (m, 3H)	38.6	38.65
1.88 (m, 1H)	from above	34.8	34.89
1.83 (m, 1H)	from above	33.4	33.45
1.56 (m, 1H)	1.56 (m, 1H)	29.5	29.54
1.35 (m, 1H)	1.40 – 1.31 (m, 1H)	29.1	29.15
1.08 (d, 6.5, 3H)	1.08 (d, 6.5, 3H)	22.0	22.02

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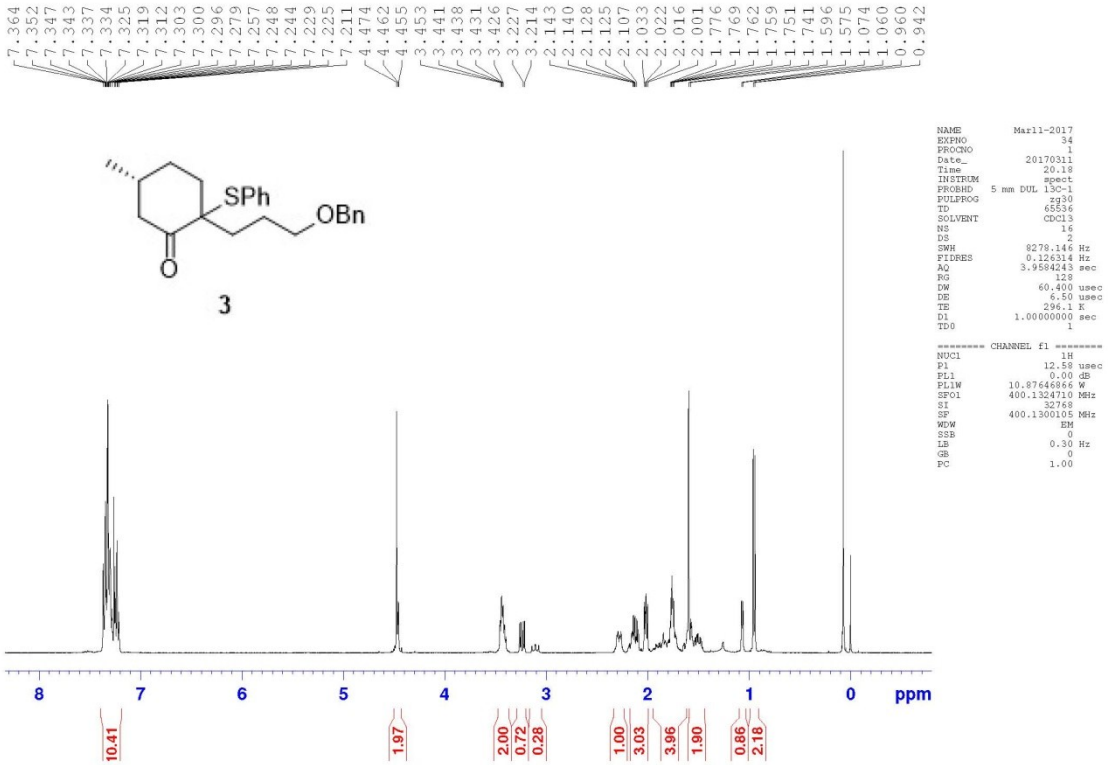
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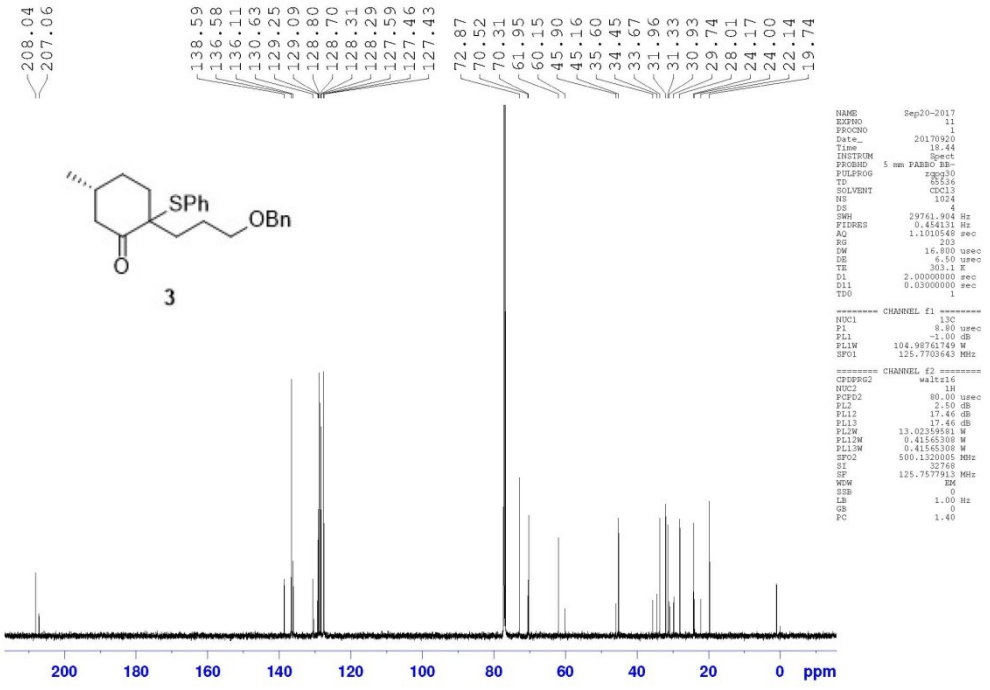
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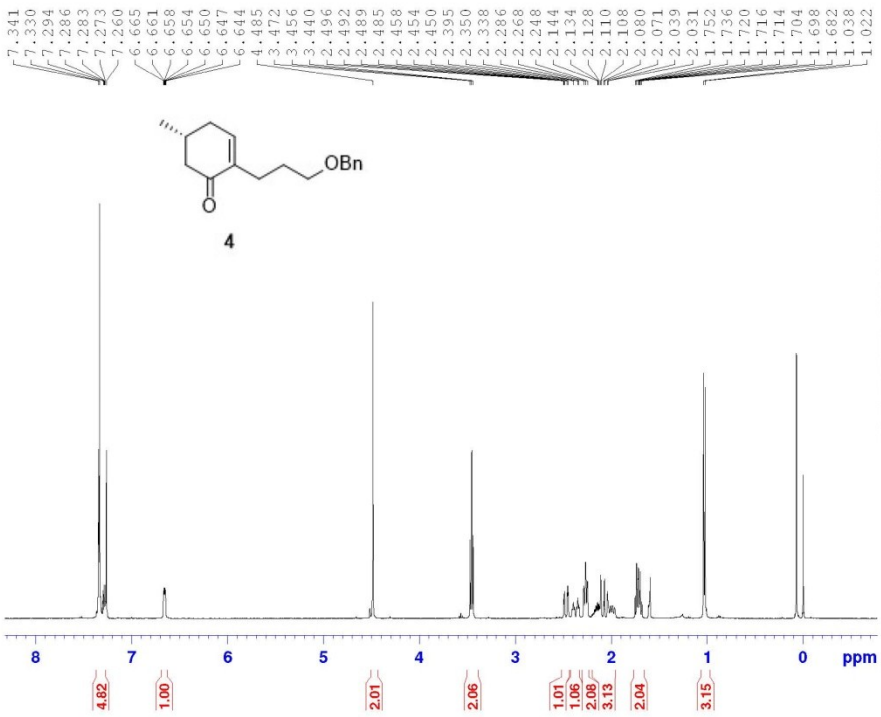
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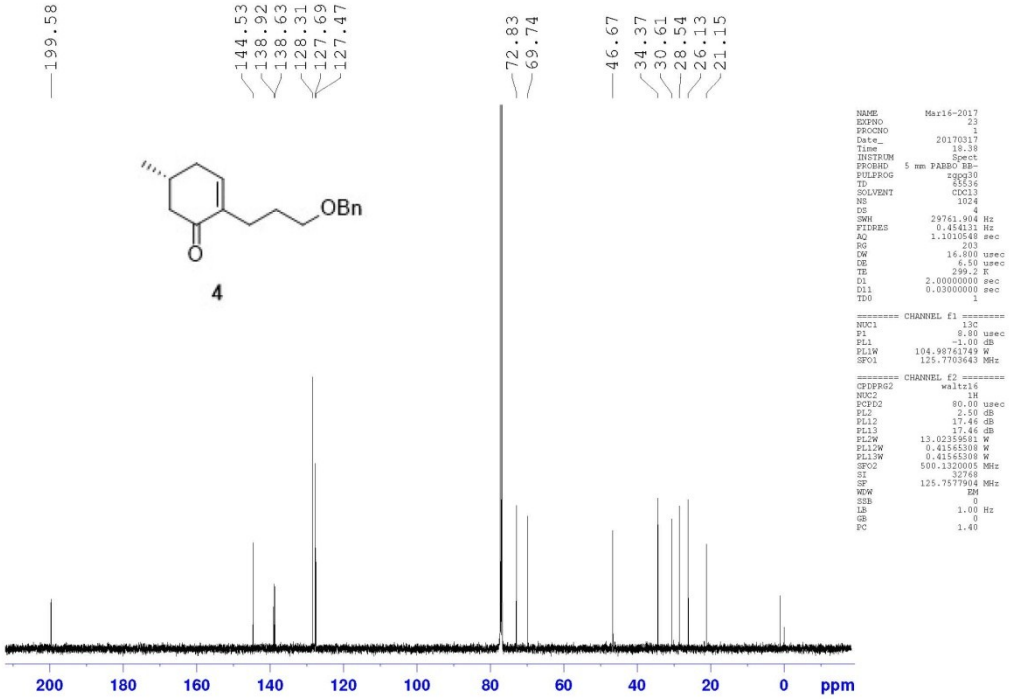
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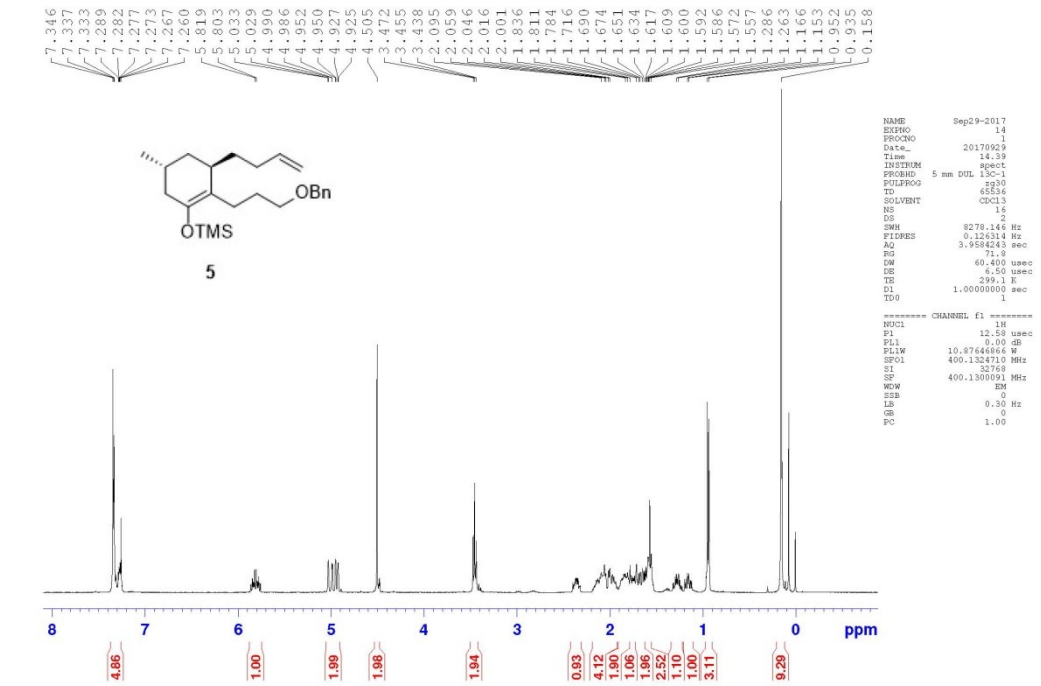
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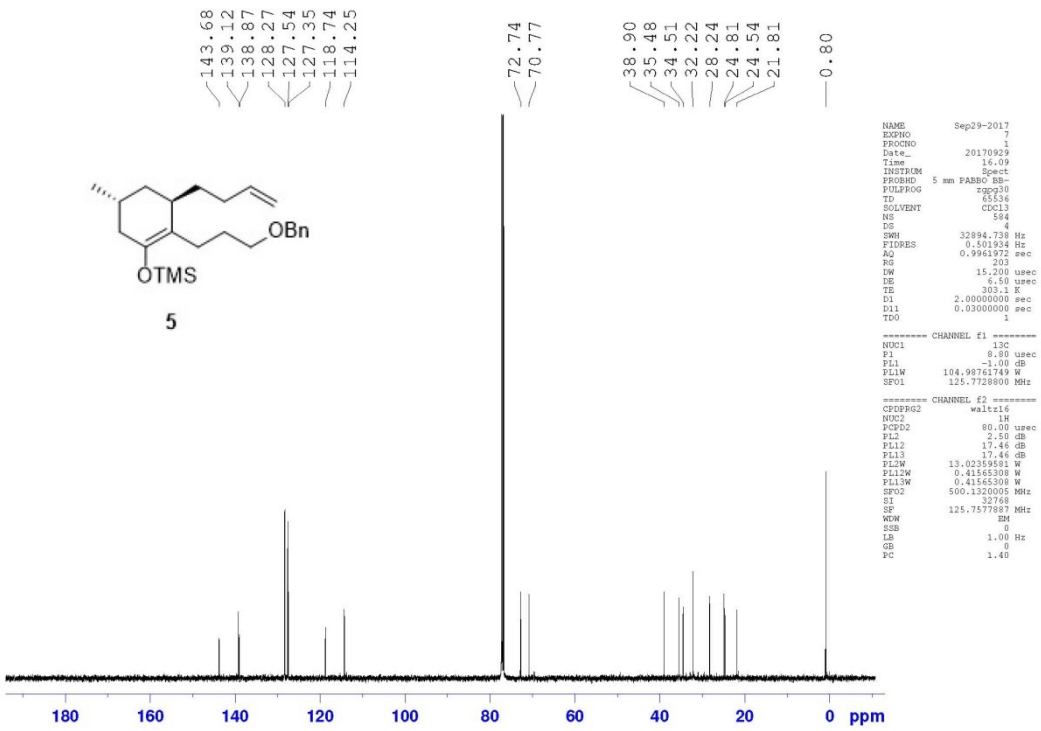
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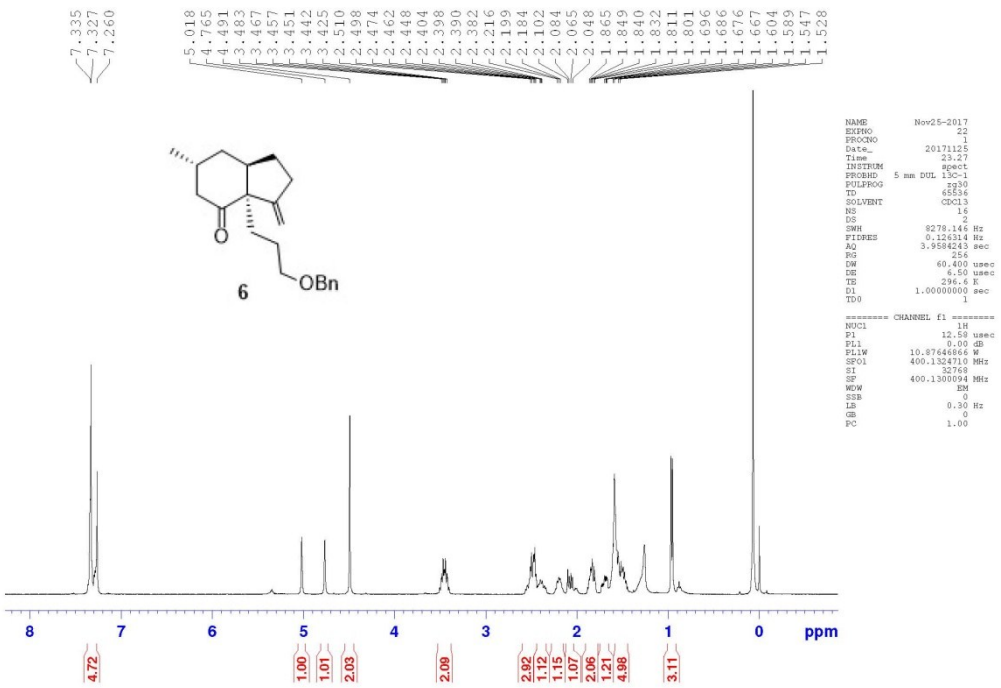
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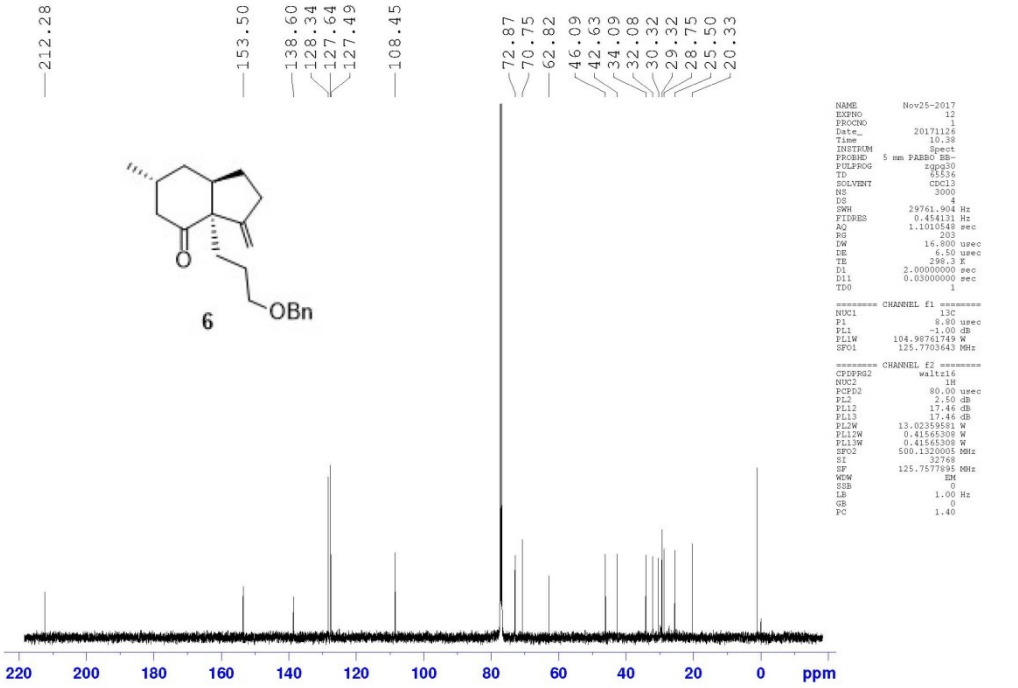
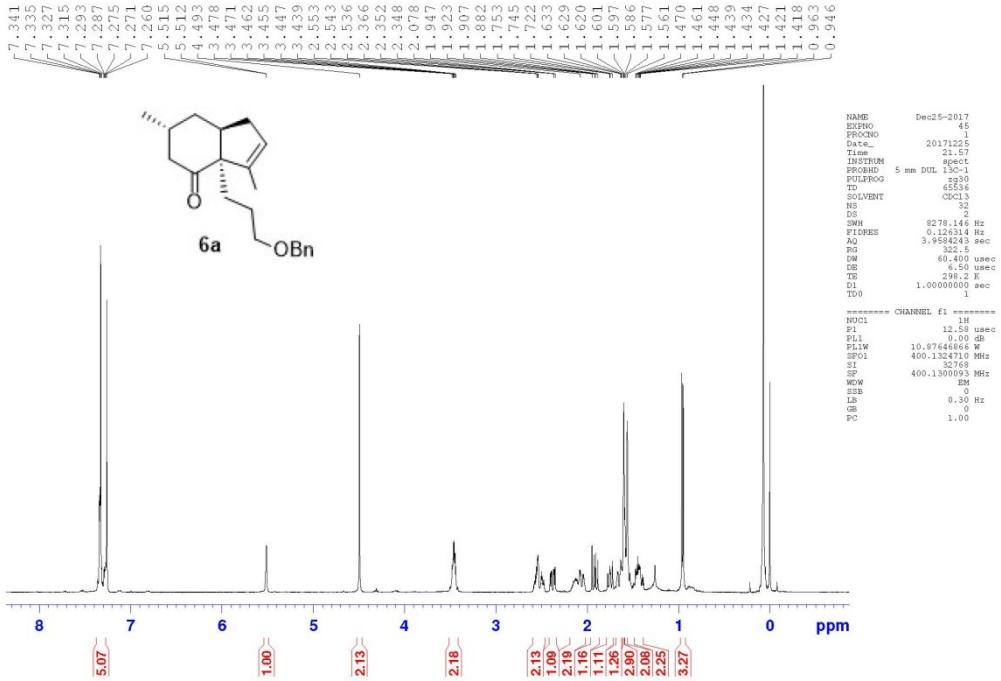
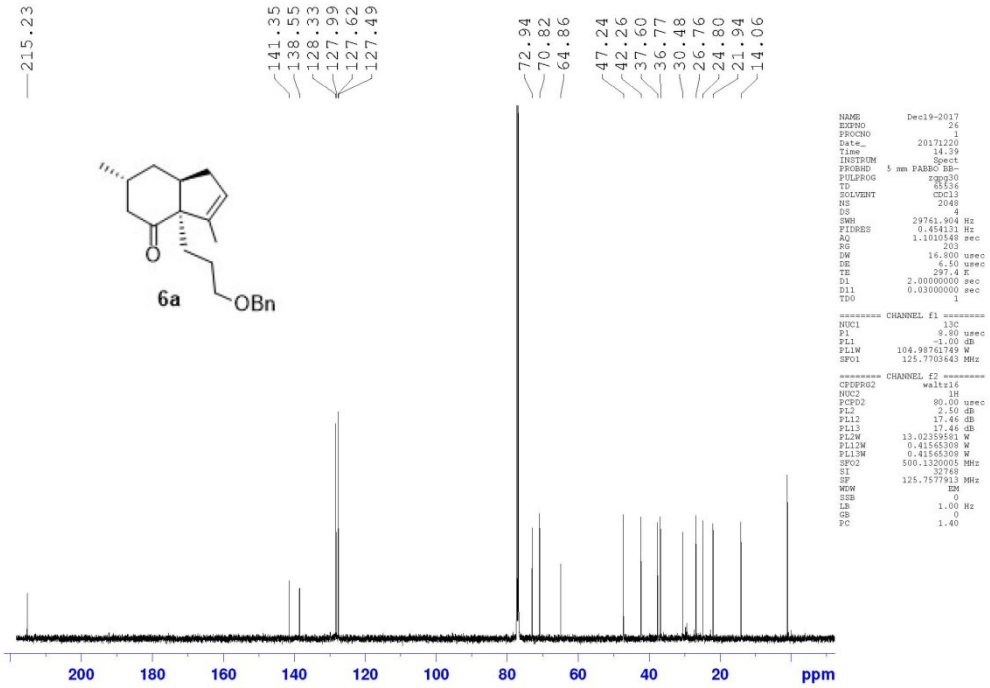
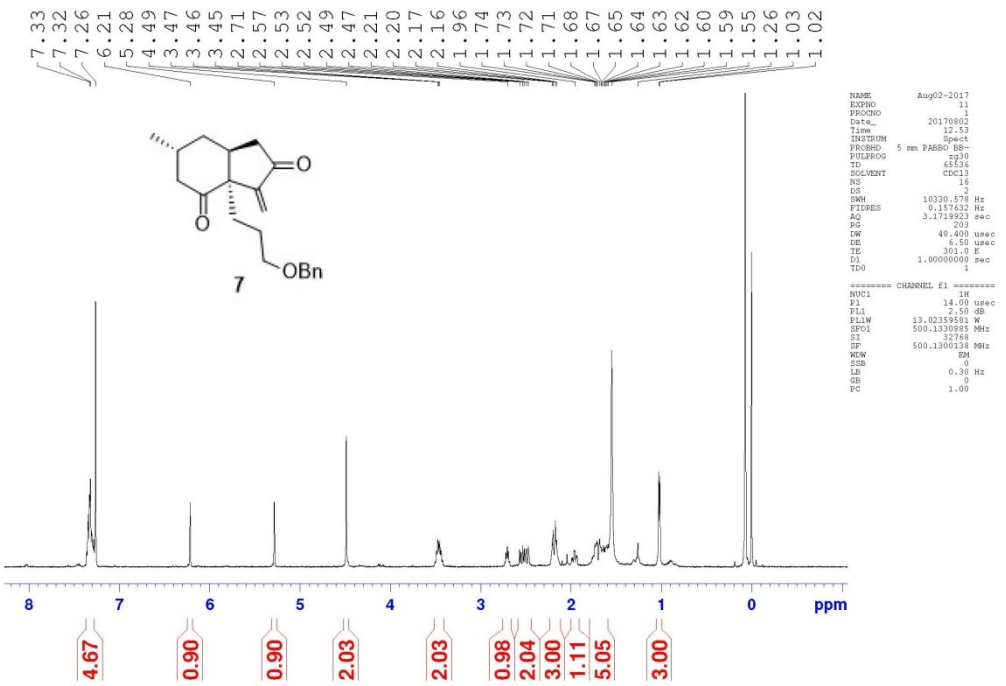
DW 60.400 usec
DE 6.50 usec
TE 296.6 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.50 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300094 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
8
7
6
5
4
3
2
1
0
ppm
4.72
1.00
1.01
2.03
2.09
2.92
1.12
1.15
1.07
2.06
1.21
4.98
3.11

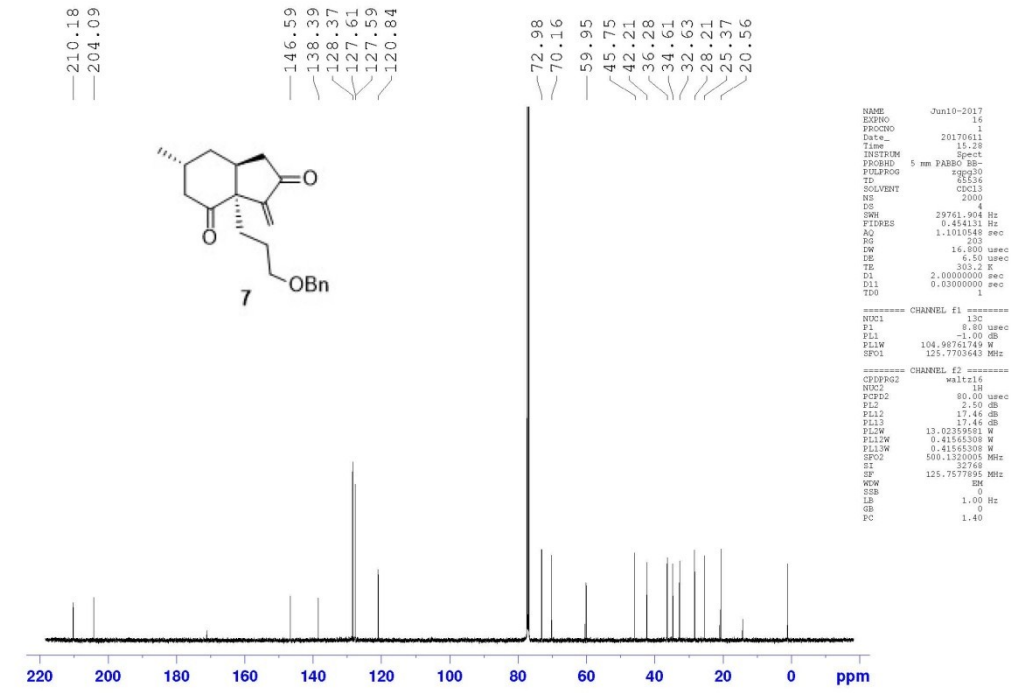

212.28
153.50
138.60
128.34
127.64
127.49
108.45
72.87
70.75
62.82
46.09
42.63
34.09
32.08
30.32
29.32
28.75
25.50
20.33
OBn
6
NAME Nov25-2017
EXPNO 12
PROCNO 1
Date_ 20171126
Time 10.38
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 3000
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 203
DW 16.800 usec
DE 6.50 usec
TE 298.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
PL1 -1.00 dB
PL1W 104.98761749 W
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 2.50 dB
PL12 17.46 dB
PL13 17.46 dB
PL2W 13.02359581 W
PL12W 0.41565308 W
PL13W 0.41565308 W
SFO2 500.1320005 MHz
SI 32768
SF 125.7577895 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
220
200
180
160
140
120
100
80
60
40
20
0
ppm


7.341
7.335
7.327
7.315
7.293
7.287
7.275
7.271
7.260
5.515
5.512
4.493
3.478
3.471
3.462
3.455
3.447
3.439
2.553
2.543
2.536
2.366
2.352
2.348
2.078
1.947
1.923
1.907
1.882
1.753
1.745
1.722
1.633
1.629
1.620
1.601
1.597
1.586
1.577
1.561
1.470
1.461
1.448
1.439
1.434
1.427
1.421
1.418
0.963
0.946
6a
OBn
8
7
6
5
4
3
2
1
0
ppm
5.07
1.00
2.13
2.18
2.13
1.09
2.19
1.16
1.11
1.26
2.90
2.08
2.25
3.27

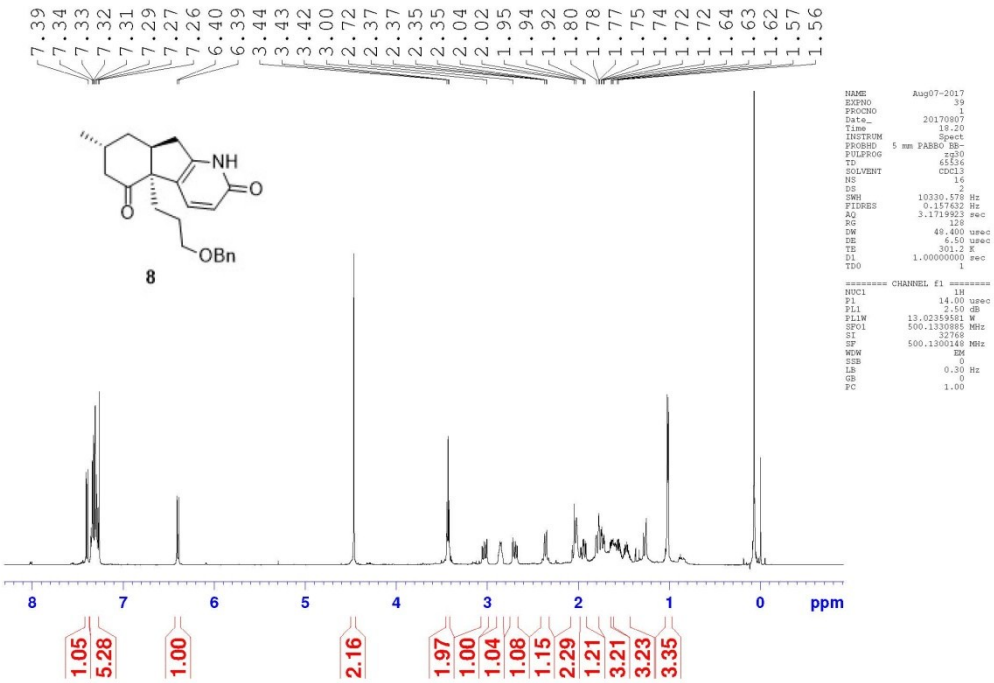

215.23
141.35
138.55
128.33
127.99
127.62
127.49
72.94
70.82
64.86
47.24
42.26
37.60
36.77
30.48
26.76
24.80
21.94
14.06
6a
OBn
200
180
160
140
120
100
80
60
40
20
ppm

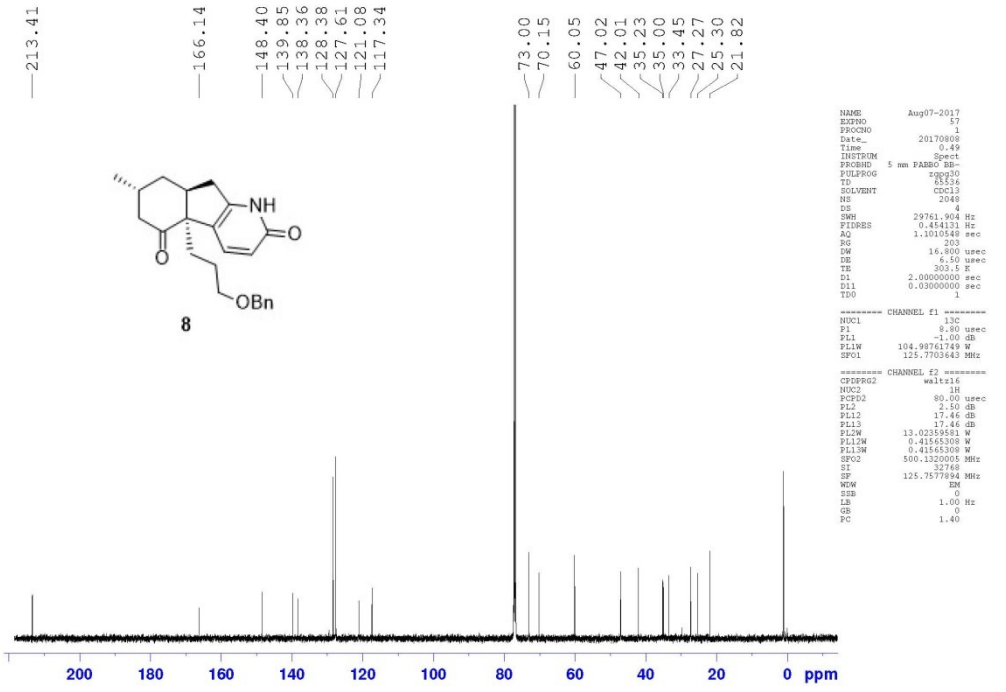


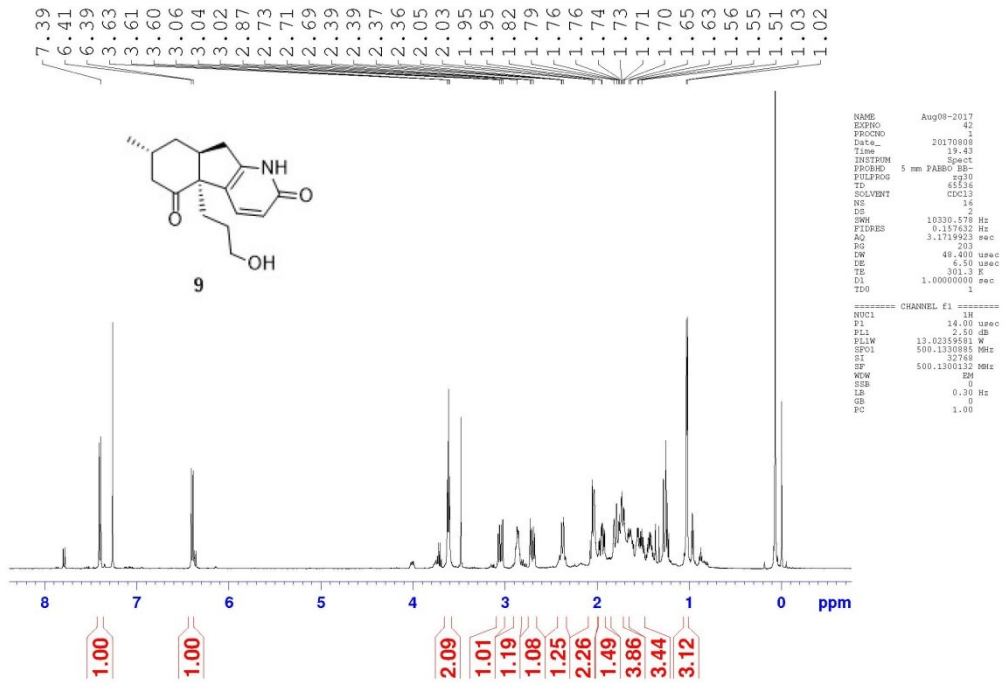

```
NAME            Aug02-2017
EXPNO               11
PROCNO               1
Date_            20170802
Time                12.53
INSTRUM             Spect
PROBHD   5 mm PABBO BB-
PULPROG            zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             10330.578 Hz
FIDRES          0.157632 Hz
AQ              3.1719923 sec
RG                   203
DW                 48.400 usec
DE                  6.50 usec
TE                301.0 K
D1              1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 1H
P1                14.00 usec
PL1                2.50 dB
PL1W          13.02359581 W
SFO1          500.1330885 MHz
SI                 32768
SF            500.1300139 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```

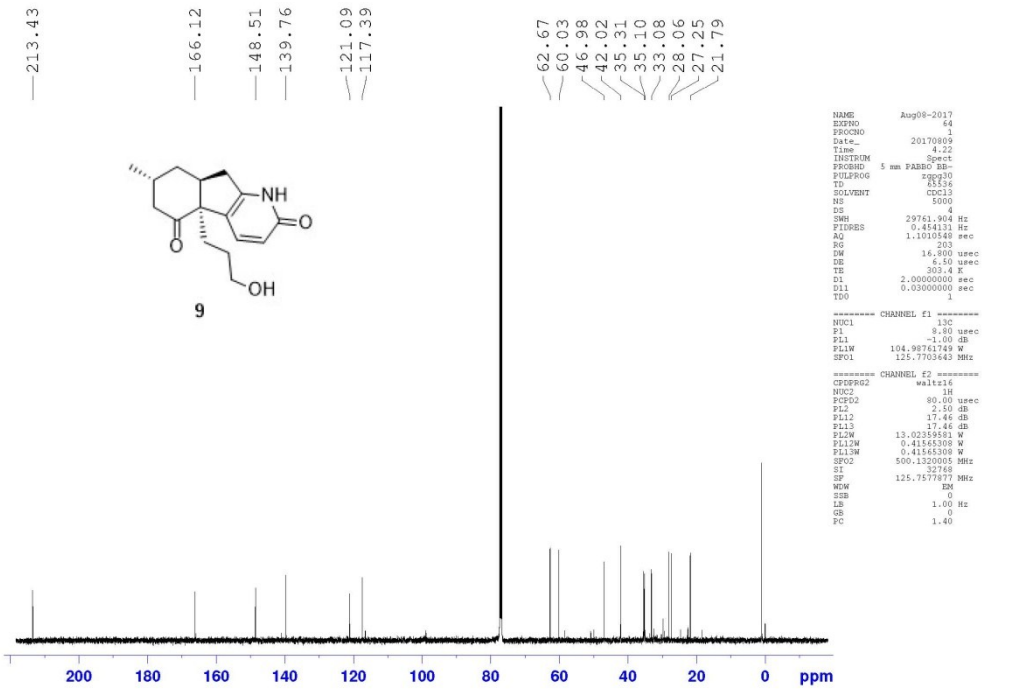


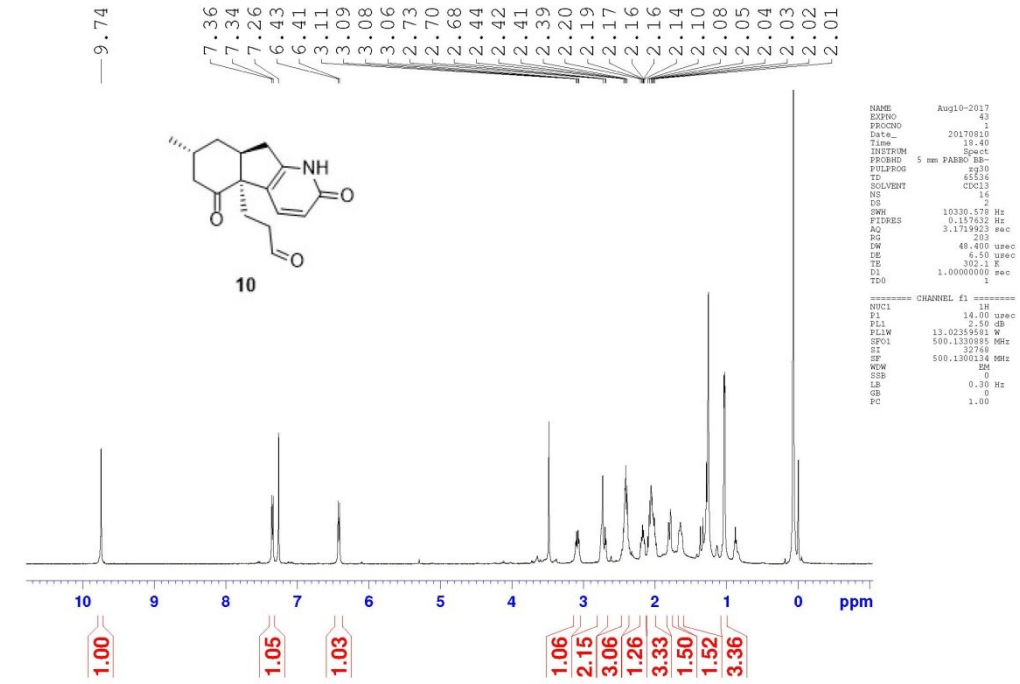

```
NAME            Jun10-2017
EXPNO                16
PROCNO                1
Date_            20170611
Time                15.28
INSTRUM             Spect
PROBHD   5 mm PABBO BB-
PULPROG          zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  2000
DS                     4
SWH             29761.904 Hz
FIDRES          0.454131 Hz
AQ              1.1010548 sec
RG                   203
DW                 16.800 usec
DE                  6.50 usec
TE                303.2 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                13C
P1                 8.80 usec
PL1               -1.00 dB
PL1W        104.98761749 W
SFO1        125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                 1H
PCPD2             80.00 usec
PL2                2.50 dB
PL12              17.46 dB
PL13              17.46 dB
PL2W          13.02359581 W
PL12W          0.41565308 W
PL13W          0.41565308 W
SFO2          500.1320005 MHz
SI                 32768
SF            125.7577896 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

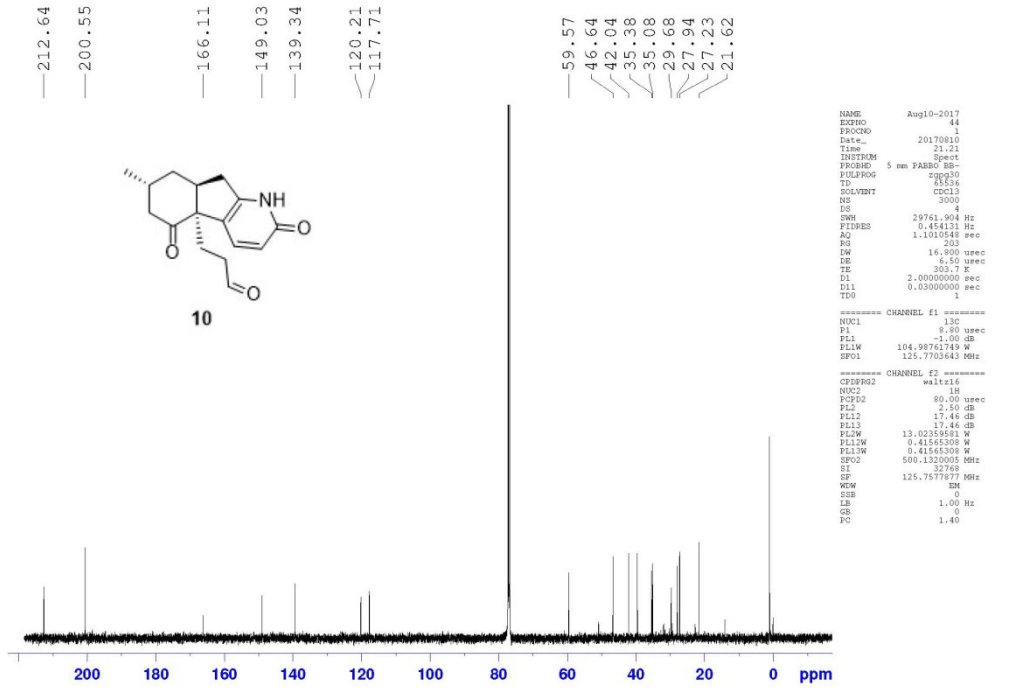

7.39
7.34
7.33
7.32
7.31
7.29
7.27
7.26
6.40
6.39
3.44
3.43
3.42
3.00
2.72
2.37
2.37
2.35
2.35
2.04
2.02
1.95
1.94
1.92
1.80
1.78
1.77
1.75
1.74
1.72
1.72
1.64
1.63
1.62
1.57
1.56
NH
O
O
OBn
8
8
7
6
5
4
3
2
1
0
ppm
1.05
5.28
1.00
2.16
1.97
1.00
1.04
1.08
1.15
2.29
1.21
3.21
3.23
3.35

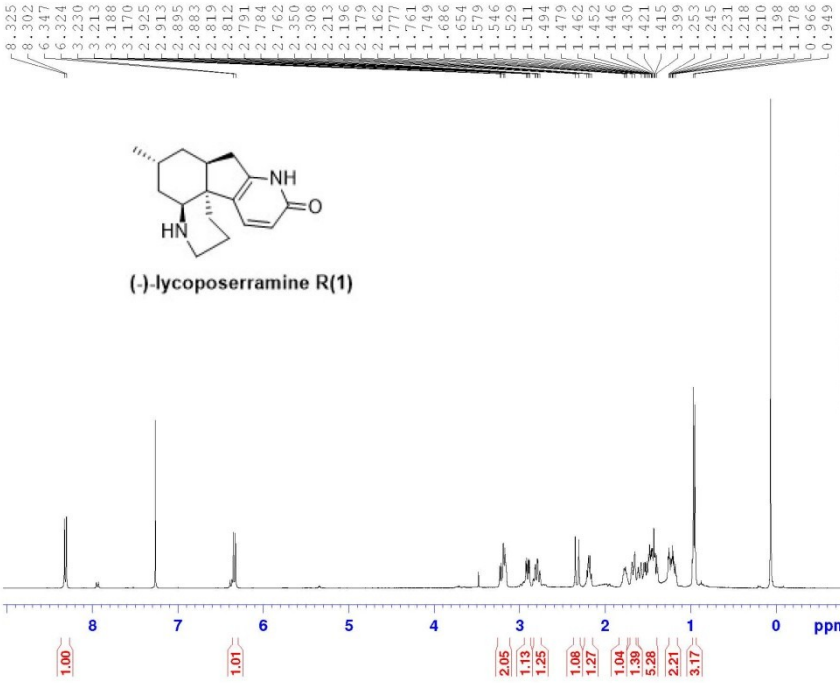

213.41
166.14
148.40
139.85
138.36
128.38
127.61
121.08
117.34
73.00
70.15
60.05
47.02
42.01
35.23
35.00
33.45
27.27
25.30
21.82
NH
O
O
OBn
8
200
180
160
140
120
100
80
60
40
20
0
ppm

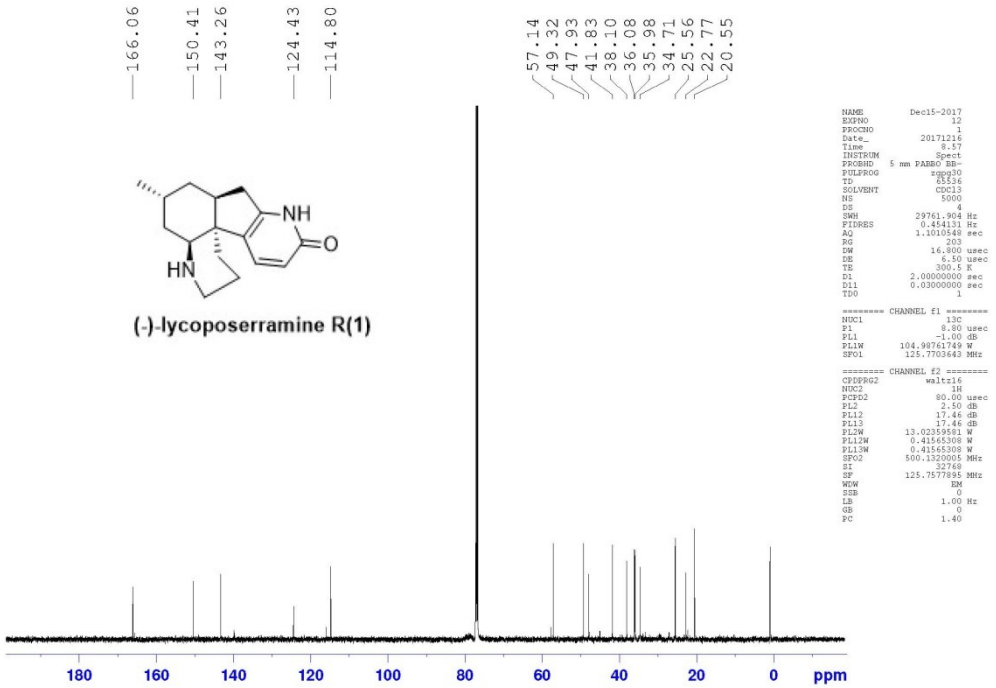

7.39
6.41
6.39
3.63
3.61
3.60
3.06
3.04
3.02
2.87
2.73
2.71
2.69
2.39
2.39
2.37
2.36
2.05
2.03
1.95
1.95
1.82
1.79
1.76
1.76
1.74
1.73
1.71
1.70
1.65
1.63
1.56
1.55
1.51
1.03
1.02
NH
O
O
OH
9
NAME Aug08-2017
EXPNO 42
PROCNO 1
Date_ 20170809
Time 19.43
INSTRUM Spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 203
DW 48.400 usec
DE 6.50 usec
TE 301.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 14.00 usec
PL1 2.50 dB
PL1W 13.02359581 W
SFO1 500.1330885 MHz
SI 32768
SF 500.1300132 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
8
7
6
5
4
3
2
1
0
ppm
1.00
1.00
2.09
1.01
1.19
1.08
1.25
2.26
1.49
3.86
3.44
3.12

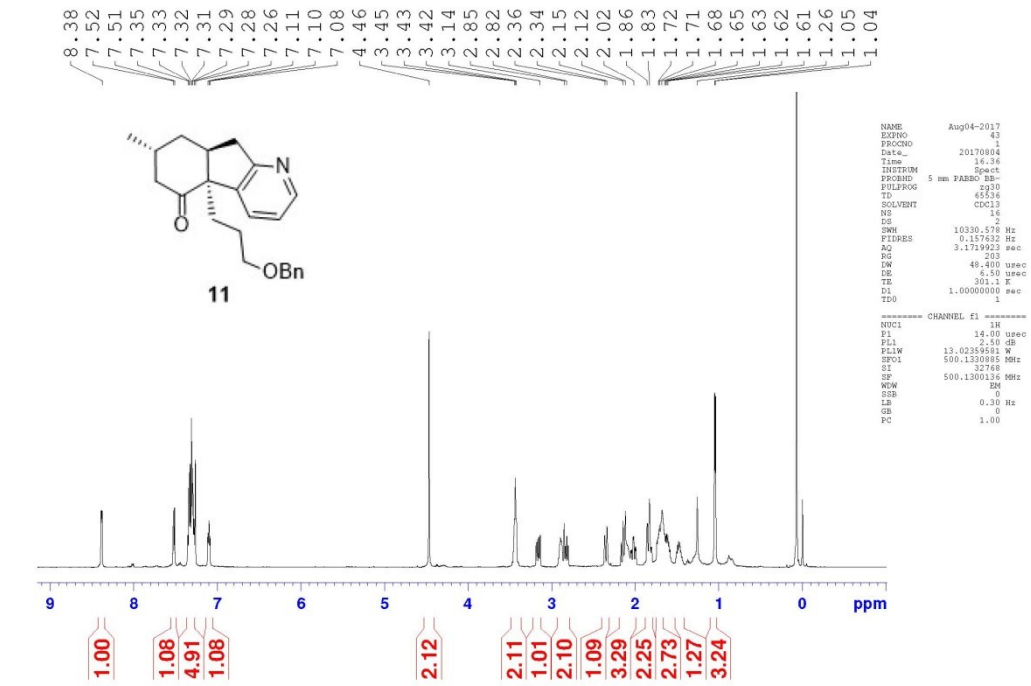

213.43
166.12
148.51
139.76
121.09
117.39
62.67
60.03
46.98
42.02
35.31
35.10
33.08
28.06
27.25
21.79
NH
O
O
OH
9
NAME Aug08-2017
EXPNO 64
PROCNO 1
Date_ 20170809
Time 4.22
INSTRUM Spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 5000
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010540 sec
RG 203
DW 16.800 usec
DE 6.50 usec
TE 303.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
PL1 -1.00 dB
PL1W 104.98761749 W
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 2.50 dB
PL12 17.46 dB
PL13 17.46 dB
PL2W 13.02359581 W
PL12W 0.41565308 W
PL13W 0.41565308 W
SFO2 500.1320005 MHz
SI 32768
SF 125.7577877 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
0
ppm

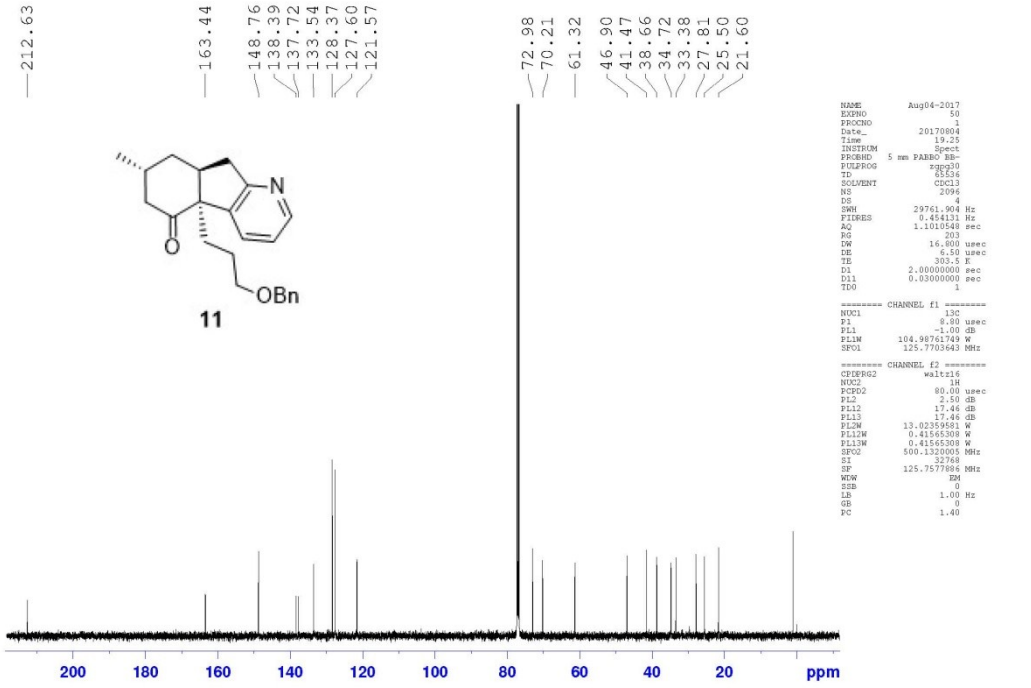

9.74
7.36
7.34
7.26
6.43
6.41
3.11
3.09
3.08
3.06
2.73
2.70
2.68
2.44
2.42
2.41
2.39
2.20
2.19
2.17
2.16
2.16
2.14
2.10
2.08
2.05
2.04
2.03
2.02
2.01
NH
O
O
O
10
10 9 8 7 6 5 4 3 2 1 0 ppm
1.00
1.05
1.03
1.06
2.15
3.06
1.26
3.33
1.50
1.52
3.36

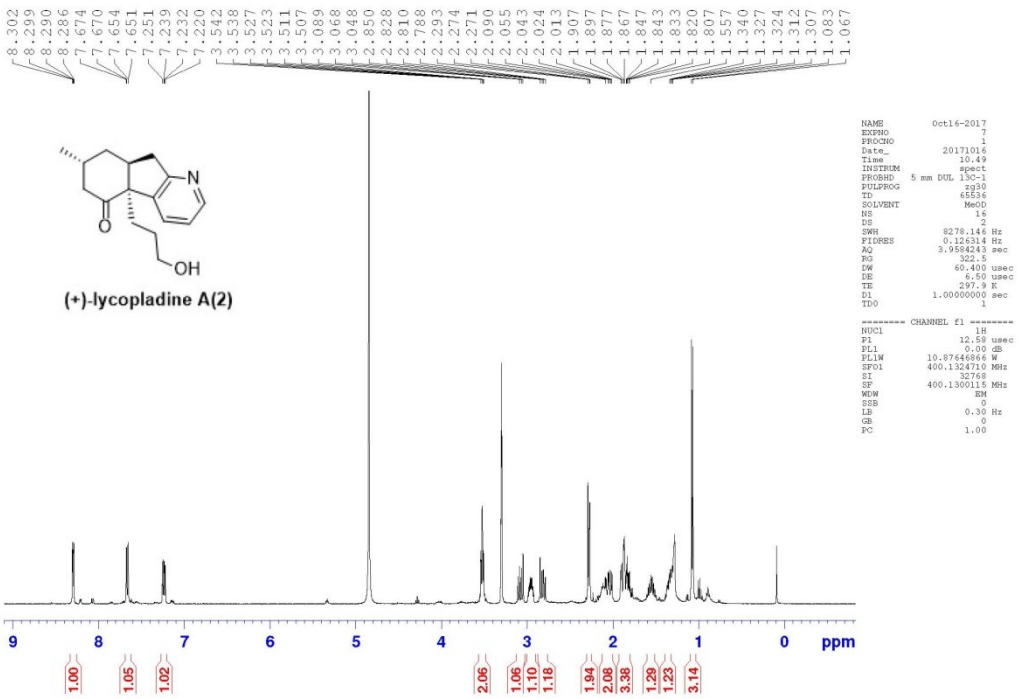

212.64
200.55
166.11
149.03
139.34
120.21
117.71
59.57
46.64
42.04
35.38
35.08
29.68
27.94
27.23
21.62
NH
O
O
O
10
200 180 160 140 120 100 80 60 40 20 0 ppm

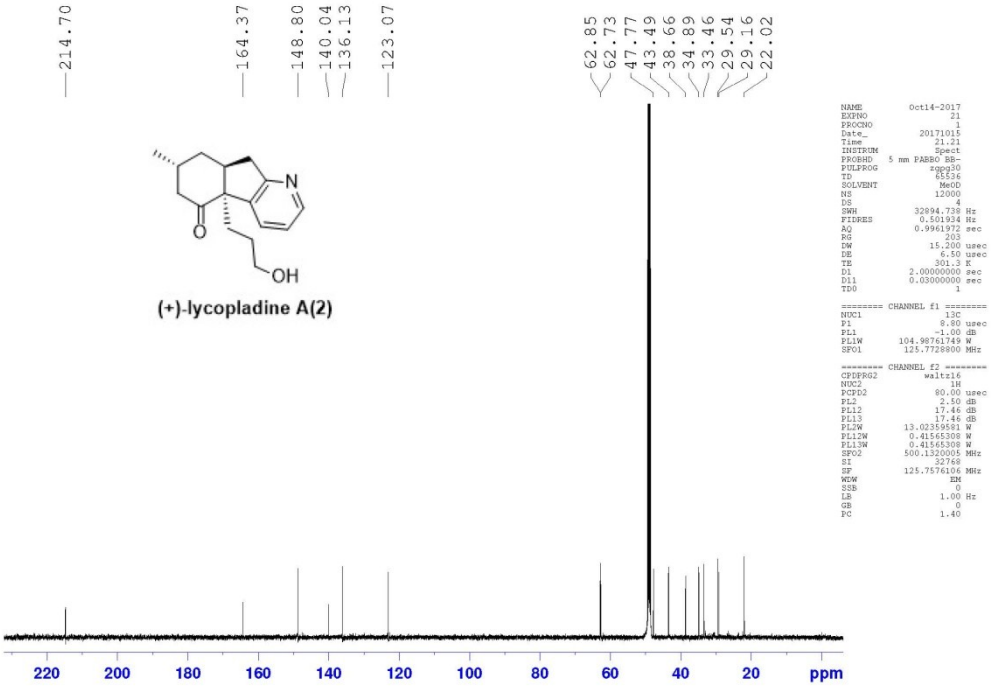

8.325
8.302
6.347
6.324
3.230
3.213
3.188
3.170
2.925
2.913
2.895
2.883
2.819
2.812
2.791
2.784
2.762
2.350
2.308
2.213
2.196
2.179
2.162
1.777
1.761
1.749
1.686
1.654
1.579
1.546
1.529
1.511
1.494
1.479
1.462
1.452
1.446
1.430
1.421
1.415
1.399
1.253
1.245
1.231
1.218
1.210
1.198
1.178
0.966
0.949
NH
O
HN
(-)-lycoposerramine R(1)
NAME Dec15-2017
EXPNO 45
PROCNO 1
Date_ 20171215
Time 20.59
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 161.3
DW 60.400 usec
DE 6.50 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.97646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300094 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
8
7
6
5
4
3
2
1
0
ppm
1.00
1.01
2.05
1.13
1.25
1.08
1.27
1.04
1.39
5.28
2.21
3.17


166.06
150.41
143.26
124.43
114.80
57.14
49.32
47.93
41.83
38.10
36.08
35.98
34.71
25.56
22.77
20.55
NH
O
HN
(-)-lycoposerramine R(1)
NAME Dec15-2017
EXPNO 12
PROCNO 1
Date_ 20171216
Time 8.57
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 5000
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 203
DW 16.800 usec
DE 6.50 usec
TE 300.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
PL1 -1.00 dB
PL1W 104.99761749 W
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 2.50 dB
PL12 17.46 dB
PL13 17.46 dB
PL2W 13.02359581 W
PL12W 0.41565308 W
PL13W 0.41565308 W
SFO2 500.1320005 MHz
SI 32768
SF 125.7577895 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
0
ppm


8.38
7.52
7.51
7.35
7.33
7.32
7.31
7.29
7.28
7.26
7.11
7.10
7.08
4.46
3.45
3.43
3.42
3.14
2.85
2.82
2.36
2.34
2.15
2.12
2.02
1.86
1.83
1.72
1.71
1.68
1.65
1.63
1.62
1.61
1.26
1.05
1.04
N
O
OBn
11
NAME Aug04-2017
EXPNO 43
PROCNO 1
Date_ 20170804
Time 16.36
INSTRUM Spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 203
DW 48.400 usec
DE 6.50 usec
TE 301.1 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 14.00 usec
PL1 2.50 dB
PL1W 13.02359581 W
SFO1 500.1330885 MHz
SI 32768
SF 500.1300136 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
0
ppm
1.00
1.08
4.91
1.08
2.12
2.11
1.01
2.10
1.09
3.29
2.25
2.73
1.27
3.24


212.63
163.44
148.76
138.39
137.72
133.54
128.37
127.60
121.57
72.98
70.21
61.32
46.90
41.47
38.66
34.72
33.38
27.81
25.50
21.60
N
O
OBn
11
NAME Aug04-2017
EXPNO 50
PROCNO 1
Date_ 20170804
Time 19.25
INSTRUM Spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2096
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 203
DW 16.800 usec
DE 6.50 usec
TE 303.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PL1 -1.00 dB
PL1W 104.98761749 W
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 2.50 dB
PL12 17.46 dB
PL13 17.46 dB
PL2W 13.02359581 W
PL12W 0.41565308 W
PL13W 0.41565308 W
SFO2 500.1320005 MHz
SI 32768
SF 125.7577896 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
ppm


8.302
8.299
8.290
8.286
7.674
7.670
7.654
7.651
7.251
7.239
7.232
7.220
3.542
3.538
3.527
3.523
3.511
3.507
3.089
3.068
3.048
2.850
2.828
2.810
2.788
2.293
2.274
2.271
2.090
2.055
2.043
2.024
2.013
1.907
1.897
1.877
1.867
1.847
1.843
1.833
1.820
1.807
1.557
1.340
1.327
1.324
1.312
1.307
1.083
1.067
N
O
OH
(+)-lycopladine A(2)
NAME 0ct16-2017
EXPNO 7
PROCNO 1
Date_ 20171016
Time 10.49
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT MeOD
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 322.5
DW 60.400 usec
DE 6.50 usec
TE 297.9 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300115 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
0
ppm
1.00
1.05
1.02
2.06
1.06
1.10
1.18
1.94
2.08
3.38
1.29
1.23
3.14


214.70
164.37
148.80
140.04
136.13
123.07
62.85
62.73
47.77
43.49
38.66
34.89
33.46
29.54
29.16
22.02
N
O
OH
(+)-lycopladine A(2)
NAME 0ct14-2017
EXPNO 21
PROCNO 1
Date_ 20171015
Time 21.21
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT MeOD
NS 12000
DS 4
SWH 32894.738 Hz
FIDRES 0.501934 Hz
AQ 0.9961972 sec
RG 203
DW 15.200 usec
DE 6.50 usec
TE 301.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
PL1 -1.00 dB
PL1W 104.98761749 W
SFO1 125.7728800 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 2.50 dB
PL12 17.46 dB
PL13 17.46 dB
PL2W 13.02359581 W
PL12W 0.41565308 W
PL13W 0.41565308 W
SFO2 500.1320005 MHz
SI 32768
SF 125.75756106 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
220
200
180
160
140
120
100
80
60
40
20
ppm