SUPPORTING INFORMATION FOR

Synthesis of Antimicrobial Natural Products Targeting FtsZ: (±)-Dichamanetin and (±)-2’’’-Hydroxy-5’’-benzylisouvarinol-B

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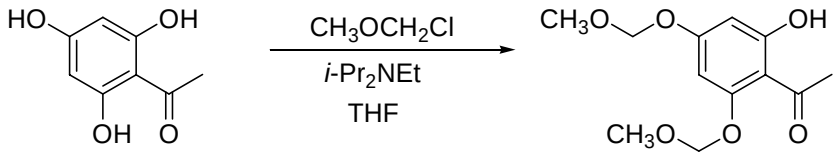
General Methods:

^{1}H NMR spectra were obtained on a Varian Unity Inova 500 spectrometer (500 MHz). Chemical shifts (δ) are reported in parts per million (ppm) relative to residual solvent ($CHCl_3$, s, δ 7.26 or CH_3COCH_3, δ 2.05). Multiplicities are given as: s (singlet), d (doublet), t (triplet), dd (doublet of doublets), m (multiplet), br s (broad singlet). Proton-decoupled ^{13}C NMR spectra were obtained on a Varian Unity Inova 500 spectrometer (125 MHz). ^{13}C chemical shifts are reported relative to $CDCl_3$ (t, δ 77.0) unless otherwise noted. IR frequencies are given in cm^{-1} and spectra were obtained on a Perkin-Elmer Model 2000 FT-IR spectrophotometer. Tandem high performance liquid chromatography/mass spectral (LCMS) analyses were performed on a Micromass Platform LCZ mass spectrometer or a Micromass Platform LCT mass spectrometer in atmospheric pressure chemical ionization (APCI) mode after separation performed on a Waters Alliance 2690 separations module. The actual separations were performed on a Waters Symmetry® C_{18} 3.5 μm, 2.1 x 50 mm column with a flow rate of 0.4 mL/min and a 12 min gradient of 15-100% CH_3CN in H_2O, with a constant 0.1% formic acid buffer using a Waters 996 photodiode array detector.

Silica gel chromatographic purifications were performed by flash chromatography with silica gel (EMD, 40–63 μm) packed in glass columns; the eluting solvent for each purification was determined by thin layer chromatography (TLC). Analytical TLC was performed on glass plates coated with 0.25 mm silica gel and visualized by ultraviolet light or by staining with cerric ammonium molybdate stain followed by gentle heating.

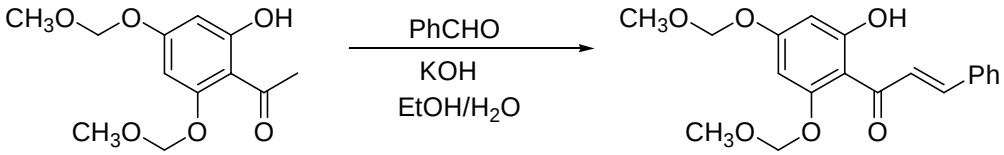
Manipulations under an inert atmosphere were carried out using standard Schlenk line techniques. Tetrahydrofuran (THF), dichloromethane (CH_2Cl_2), and toluene ($PhCH_3$) were dried by passage through a column of activated alumina (as described in *Organometallics* **1996**, *15*, 1518–1520). Microwave reactions were performed using Emrys™ Optimizer (Biotage, formerly Personal Chemistry) in a septa capped 0.5-2 mL Smith™ process vial with stirring. Unless otherwise specified, all commercially available reagents were used as received.

Experimental Procedures:



5

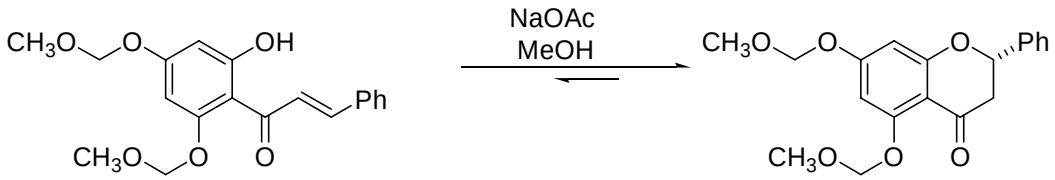
2',4'-Bis(methoxymethoxy)-6'-hydroxyacetophenone[1]. To a cooled (0 °C) solution of 2',4',6'-trihydroxyacetophenone monohydrate **5** (1.4 g, 7.5 mmol, 1.0 equiv) and *N*,*N*-diisopropylethylamine (13.1 mL, 75.0 mmol, 10.0 equiv) in 50 mL of dry THF was added dropwise chloromethylmethyl ether (1.3 mL, 16.5 mmol, 2.2 equiv) under an atmosphere of argon. The mixture was allowed to stir for 12 h after which it was quenched with 20 mL of water and extracted with EtOAc (3×25 mL). The combined organic layers were washed with 5% aqueous HCl, water, and brine, dried over anhydrous sodium sulfate, filtered and concentrated. The crude product was purified by flash column chromatography (0 to 15% EtOAc/hexanes) to yield the title compound as a white solid (1.4 g, 73%). The spectroscopic data (^{1}H and ^{13}C NMR) were consistent with that reported in the literature.



6

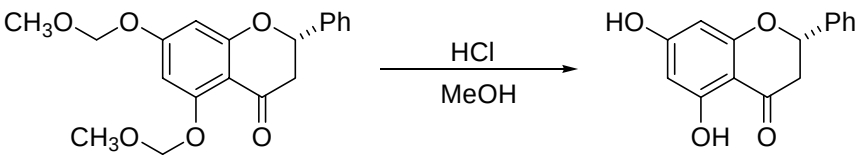
2',4'-Bis(methoxymethoxy)-6'-hydroxychalcone[2] (6). To a cooled (0 °C) solution of KOH (3.22 g, 57.6 mmol, 24.0 equiv) in EtOH-H_2O (1:1 v/v, 10 mL) was added dropwise a cooled (0 °C) mixture of benzaldehyde (0.25 mL, 2.45 mmol, 1.02 equiv) and 2',4'-bis(methoxymethoxy)-6'-hydroxyacetophenone (0.614 g, 2.4 mmol, 1.0 equiv) in EtOH (5 mL). The reaction mixture was stirred at this temperature (0 °C) for 12 h and then for additional 36 h at rt. The mixture was then diluted with ether (20 mL) and the

organic layer was separated. The aqueous layer was further extracted with ether (3×25 mL). The combined organic extracts were washed with 5% aqueous HCl, water, and brine solution, dried over Na_2SO_4, filtered, and concentrated. The crude product was purified by flash column chromatography (0 to 20% EtOAc/hexanes) to yield **6** (0.700 g, 85%) as an orange solid. The spectroscopic data (^{1}H and ^{13}C NMR) were consistent with that reported in the literature.



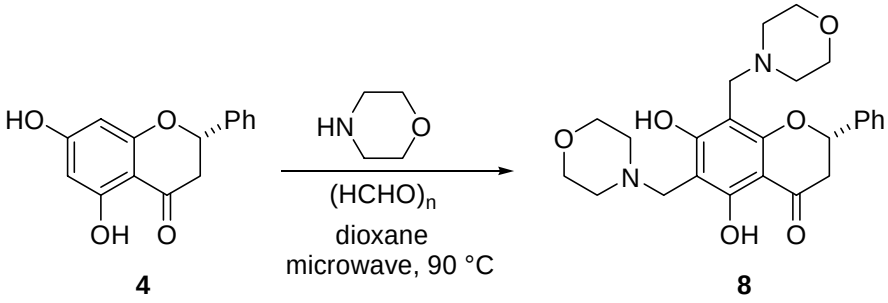
6 **7**

(±)-2',4'-Bis(methoxymethoxy)flavanone (7). A solution of **6** (0.7 g, 2.0 mmol, 1.0 equiv) and anhydrous sodium acetate (2.25 g, 27.4 mmol, 13.7 equiv) in 400 mL of MeOH was refluxed under an atmosphere of argon for 48 h. After cooling, the solvent was removed in *vacuo* and H_2O (40 mL) was added to the resulting residue. The aqueous phase was extracted with EtOAc (4×50 mL). The combined organic layers were dried over anhydrous sodium sulfate, filtered, and concentrated. The crude product was purified by flash column chromatography (0 to 30% EtOAc/hexanes) to yield **7** (0.502 g, 72%) as a off-white solid (R_F 0.20 in 30% EtOAc in Hexanes) plus unreacted starting material **5** (0.198 g, 28%): ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.44-7.37 (m, 5H), 6.44 (d, J = 11.1 Hz, 2H), 5.43 (d, J = 8.1 Hz, 1H), 5.27 (s, 2H), 5.17 (s, 2H), 3.53 (s, 3H), 3.47 (s, 3H), 3.04 (apparently dd, 1H), 2.81 (d, J = 10.2 Hz, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 189.0, 164.4, 163.2, 159.5, 138.7, 128.7, 128.6, 126.0, 107.3, 98.1, 97.4, 95.0, 94.0, 79.0, 56.5, 56.4, 45.8; IR ($CDCl_3$) 2958, 2905, 2828, 1680, 1573, 1436, 1148 cm^{-1}; MS (ESI-neg.) *m/z* calcd for $C_{19}H_{20}O_6$ $(M + Na)^+$ 367.12, found 367.88.



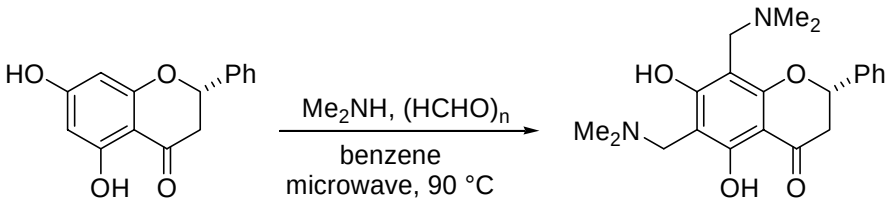
7 **4**

(±)-Pinocembrin[3] (4). A solution of **7** (0.42 g, 1.2 mmol, 1.0 equiv) and 6N HCl (2.2 mL, 13.2 mmol, 11.0 equiv) in MeOH (10 mL) was refluxed for 30 min. After cooling, the solvent was removed in *vacuo* and the resulting residue was directly subjected to flash column chromatography (0 to 20% EtOAc/hexanes) to yield **4** (0.282 g, 90%) as a white solid. The spectroscopic data (^{1}H and ^{13}C NMR) were consistent with that reported in the literature.



4 **8**

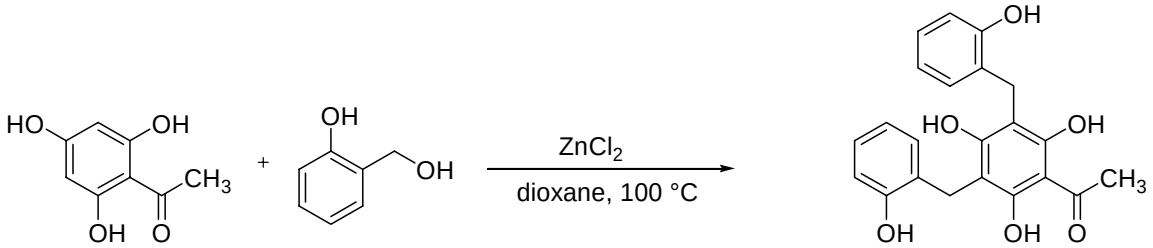
5,7-Dihydroxy-6,8-di((1-morpholino)-methyl)-flavanone (8). Pinocembrin **4** (70 mg, 0.27 mmol, 1.0 equiv), paraformaldehyde (33 mg, 1.09 mmol, 4.0 equiv), morpholine (58 µL, 0.65 mmol, 2.4 equiv), and anhydrous dioxane (2 mL) were mixed in a Smith™ process vial and sealed. The reaction mixture was heated in a microwave reactor at 90 °C for 10 minutes. After cooling to ambient temperature, the solvent was evaporated in *vacuo*. The crude product was subjected to flash column chromatography (EtOAc and then 20% MeOH/EtOAc) to yield **8** (90 mg, 73%) as a yellow oil: ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.43-7.36 (m, 5H), 5.40 (dd, *J* = 3.5, 9.5 Hz, 1H), 3.75 (m, 13H), 3.05 (dd, *J* = 13.0, 4.5 Hz, 1H), 2.84 (dd, *J* = 3.0, 14.0 Hz, 1H), 2.61-2.56 (two s, 8H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 195.5, 167.4, 161.5, 159.8, 138.6, 128.8, 128.6, 125.8, 101.6, 101.5, 101.0, 78.8, 66.6, 66.5, 52.8, 51.4, 51.3, 43.2; IR ($CDCl_3$) 3418, 2959, 1634, 1544 cm^{-1}; MS (ESI) *m/z* calcd for $C_{25}H_{30}N_2O_6$ $(M + H)^+$ 455.22, found 455.03.



4 **9**

5,7-Dihydroxy-6,8-di((dimethylamino)-methyl)-flavanone (9). Pinocembrin **4** (14.5 mg, 0.057 mmol, 1.0 equiv), paraformaldehyde (4.1 mg, 0.136 mmol, 2.4 equiv), dimethylamine (2M in THF) (0.07 mL, 0.136 mmol, 2.4 equiv), and reagent grade benzene (2 mL) were mixed in a Smith™ process vial and sealed. The reaction mixture was heated in a microwave reactor at 90 °C for 10 minutes. After cooling to ambient temperature, the mixture was diluted with water (3 mL) and extracted with CH_2Cl_2 (3×10 mL). The organic layers were combined, washed with the brine solution (5 mL), dried over Na_2SO_4, and concentrated. The purification of this compound using silica gel column chromatography proved to be difficult due to high polarity. The LC-MS analysis and the crude ^{1}H NMR confirmed the presence of **9** and thus reactions with **9** were performed without further purification.

2,4,6-Trihydroxy-3,5-di(2'-hydroxybenzyl)-acetophenone (11).

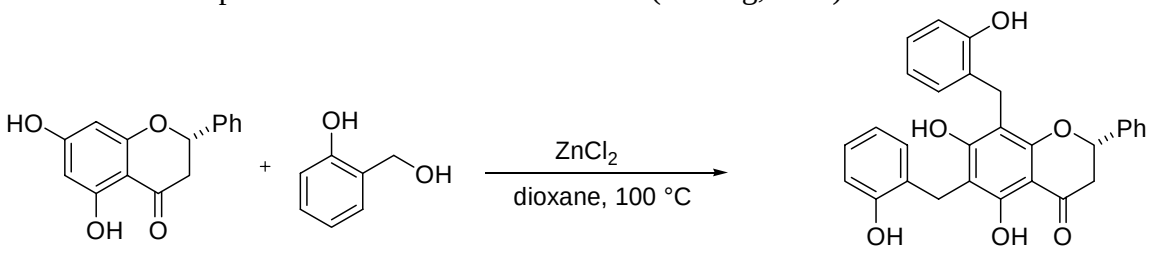


5 **10** **11**

A solution of 2,4,6-trihydroxyacetophenone monohydrate **5** (200 mg, 1.07 mmol, 1.0 equiv), 2-hydroxybenzyl alcohol **10** (266 mg, 2.14 mmol, 2.0 equiv), and anhydrous $ZnCl_2$ (176 mg, 1.28 mmol, 1.2 equiv) in anhydrous dioxane (2 mL) was heated at 100 °C for 24 h under an atmosphere of argon. After cooling, the solvent was removed in *vacuo* and the crude product was purified by flash column chromatography (0 to 30% EtOAc/Hexanes) to afford **11** as a light yellow solid which on recrystallization with

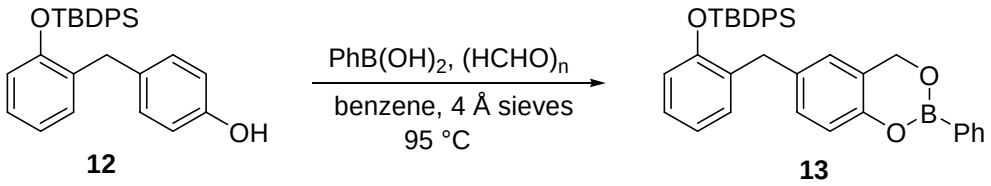
acetone/hexanes provided **11** as an off-white solid (200 mg, 49%), R_F 0.23 (30% EtOAc in Hexanes): ^{1}H NMR (500 MHz, CD_3COCD_3) δ 11.79 (br s, 1H), 9.72 (br s, 3H), 7.48 (d, *J* = 7.5 Hz, 2H), 7.07 (t, *J* = 7.5 Hz, 2H), 6.94 (d, *J* = 8.0 Hz, 2H), 6.84 (t, *J* = 7.5 Hz, 2H), 3.94 (s, 4H), 2.66 (s, 3H); ^{13}C NMR (125 MHz, CD_3COCD_3) δ 205.5, 162.0, 161.6, 154.5, 133.1, 129.2, 129.1, 122.6, 116.6, 108.5, 107.2, 34.1, 24.0; IR (acetone) 3254, 1698, 1458, 1367, 1301, 1239, 1108, 755 cm^{-1}; MS (ESI-neg.) *m/z* calcd for $C_{22}H_{20}O_6$ (M - H)$^-$ 379.12, found 379.03.

Procedure for microwave reactions: A solution of 2,4,6-trihydroxyacetophenone monohydrate **5** (200 mg, 1.07 mmol, 1.0 equiv), 2-hydroxybenzyl alcohol **10** (266 mg, 2.14 mmol, 2.0 equiv), and anhydrous $ZnCl_2$ (176 mg, 1.28 mmol, 1.2 equiv) in anhydrous dioxane (2 mL) were mixed in a Smith™ process vial and sealed. The reaction mixture was heated in a microwave reactor at 130 °C for 1 h. The solvent was removed in *vacuo* and the crude product was purified by flash column chromatography (0 to 30% EtOAc/Hexanes) to afford **11** as a light yellow solid which on recrystallization with acetone/hexanes provided **11** as an off-white solid (200 mg, 49%).



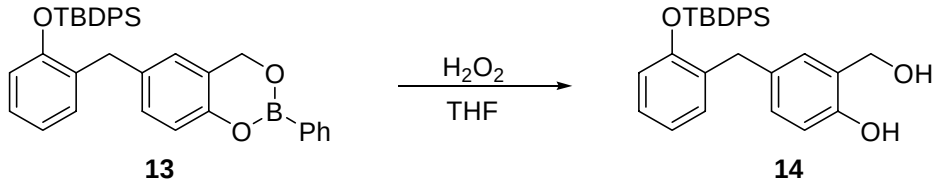
(±)-Dichamanetin[4] (2). A solution of **4** (60 mg, 0.23 mmol, 1.0 equiv), 2-hydroxybenzyl alcohol **10** (61 mg, 0.48 mmol, 2.1 equiv), and anhydrous $ZnCl_2$ (67 mg, 0.48 mmol, 2.1 equiv) in anhydrous dioxane (2 mL) was heated at 100 °C for 24 h under an atmosphere of argon. After cooling, the solvent was removed in *vacuo* and the crude product was purified by flash column chromatography (0 to 30% EtOAc/Hexanes) to afford **2** (65 mg, 59%) as a light yellow solid, R_F 0.32 (30% EtOAc in Hexanes): ^{1}H NMR (500 MHz, CD_3COCD_3) δ 12.73 (s, 1H), 9.15 (br s, 2H), 7.59 (d, *J* = 7.5 Hz, 2H),7.46-7.38 (m, 3H),

7.23-7.22 (m, 1H), 7.09-7.07 (m, 1H), 7.04-6.99 (m, 2H), 6.86 (t, *J* = 7.5 Hz, 2H), 6.77-6.69 (m, 2H), 5.64 (dd, *J* = 2.5, 10.0 Hz, 2H), 3.92-3.91 (two s, 4H), 3.23 (dd, *J* = 13.0, 4.0 Hz, 1H), 2.90 (dd, *J* = 3.0, 14.0 Hz, 1H); ^{13}C NMR (125 MHz, CD_3COCD_3) δ 198.7, 163.6, 161.7, 160.6, 155.6, 141.2, 132.3, 132.1, 130.6, 130.5, 130.4, 129.03, 128.99, 128.7, 128.67, 128.3, 122.1, 122.0, 116.9, 116.8, 109.6, 108.7, 104.5, 81.0, 44.6, 24.4, 23.7; IR ($CDCl_3$) 3427, 1631, 1489, 1457 cm^{-1}; MS (ESI) *m/z* calcd for $C_{29}H_{24}O_6$ $(M + H)^+$ 469.17, found 469.98.



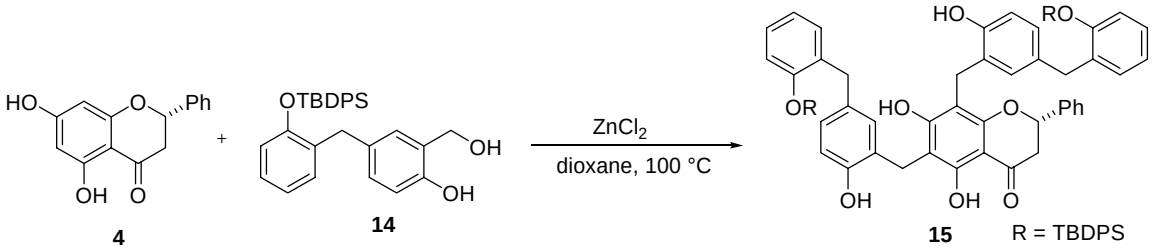
12 **13**

1-*tert*-Butyldiphenylsilyloxy-2'-hydroxymethyl-2,4'-methylene diphenol (13). A solution of **12** (416 mg, 0.95 mmol, 1.0 equiv), phenylboronic acid (307 mg, 1.05 mmol, 1.1 equiv), paraformaldehyde (286 mg, 9.5 mmol, 10.0 equiv), and propanoic acid (0.04 mL, 0.95 mmol, 1.0 equiv) in anhydrous benzene (10 mL) was refluxed in the presence of 4 Å molecular sieves for 24 h under an atmosphere of argon. Additional paraformaldehyde (60 mg) was added at intervals of 2 h. After cooling, the mixture was concentrated and 5 mL of H_2O was added. Extraction with ether (5×10 mL), washing with aqueous Na_2CO_3 and water, and evaporation of the solvent afforded a residue which was purified by flash column chromatography (0 to 10% EtOAc/Hexanes) to afford the dioxaborin **13** (411 mg, 78%) as a white solid, R_F 0.62 (30% EtOAc in Hexanes): ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.98 (d, *J* = 7.0 Hz, 2H), 7.69 (d, *J* = 7.0 Hz, 4H), 7.51-7.35 (m, 9H), 7.12-7.02 (m, 3H), 6.85-6.81 (m, 3H), 6.49-6.47 (m, 1H), 5.17 (s, 2H), 4.14 (s, 2H), 1.02 (s, 9H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 153.5, 147.5, 136.1, 135.6, 134.5, 132.9, 131.6, 131.0, 130.9, 130.2, 129.3, 128.0, 127.9, 127.3, 125.1, 122.5, 121.2, 119.2, 118.0, 116.7, 63.2, 35.9, 26.7, 19.7; IR ($CDCl_3$) 3053, 3072, 2957, 2931, 2858, 1600, 1492, 1326, 1256 cm^{-1}; MS (ESI) *m/z* calcd for $C_{36}H_{35}BO_3Si$ 554.24, found 554.98.



13 **14**

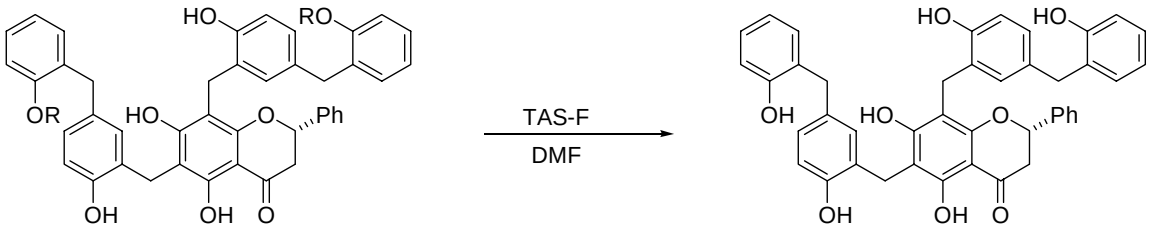
To a cooled (0 °C) solution of dioxaborin **13** (225 mg,) in dry THF (2 mL) was added 30% H_2O_2 solution (1 mL) dropwise. The reaction mixture was allowed to warm to rt in 4 h after which cold H_2O (2 mL) was added. The mixture was extracted with ether (10×10 mL). The combined extracts were washed with aqueous $NaHSO_3$, dried over anhydrous Na_2SO_4, and concentrated to give a residue which was purified by flash column chromatography (0 to 30% EtOAc/Hexanes) to afford **14** (188 mg, 99%) as a colorless viscous oil, R_F 0.41 (30% EtOAc in Hexanes): ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.72 (d, *J* = 8.0 Hz, 4H), 7.44-7.36 (m, 7H), 7.19 (br s, 1H), 7.12 (d, *J* = 8.5 Hz, 1H), 7.06-7.04 (m, 1H), 6.92 (br s, 1H), 6.86-6.80 (m, 3H), 6.50-6.48 (m, 1H), 4.79 (s, 2H), 4.12 (s, 2H), 1.06 (s, 9H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 154.1, 153.2, 135.4, 132.7, 132.5, 131.1, 130.6, 129.9, 129.8, 128.2, 127.8, 126.9, 124.5, 120.9, 118.9, 116.4, 64.6, 35.3, 26.5, 19.4; IR ($CDCl_3$) 3403, 3071, 2931, 2857, 1490, 1254 cm^{-1}; MS (ESI) *m/z* calcd for $C_{30}H_{32}O_3Si$ $(M + Na)^+$ 491.20, found 491.00.



4 **14** **15**

(±)-2”’,2””-Bis(*tert*-butyldiphenylsilyloxy)-5”-benzylisouvarinol-B (15). A solution of **4** (90 mg, 0.35 mmol, 1.0 equiv), **14** (378 mg, 0.81 mmol, 2.3 equiv), and anhydrous $ZnCl_2$ (96 mg, 0.70 mmol, 2.0 equiv) in anhydrous dioxane (3 mL) was heated at 100 °C for 22 h under an atmosphere of argon. After cooling, the solvent was removed in *vacuo* and the crude product was purified by flash column chromatography (0 to 30% EtOAc/Hexanes) to afford **15** (374 mg, 92%) as a white solid, R_F 0.3 (30% EtOAc in

Hexanes): ^{1}H NMR (500 MHz, $CDCl_3$) δ 12.63 (s, 1H), 9.97 (br s, 1H), 8.02 (br s, 1H), 7.78-7.74 (m, 8H), 7.47-7.33 (m, 19H), 7.09-7.08 (m, 1H), 6.96-6.73 (m, 9H), 6.53-6.62 (m, 2H), 5.42 (d, *J* = 7.8 Hz, 1H), 4.17 (s, 2H), 4.04 (s, 2H), 3.98 (s, 2H), 3.91 (s, 2H), 3.14-3.07 (m, 1H), 2.84 (d, *J* = 9.9 Hz, 1H), 1.07 (s, 9H), 1.06 (s, 9H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 196.4, 160.1, 159.5, 158.4, 153.2, 150.5, 150.3, 138.4, 135.4, 135.3, 133.7, 133.2, 132.7, 132.6, 132.5, 131.4, 131.3, 130.8, 130.3, 129.9, 129.8, 128.9, 128.3, 128.1, 127.7, 126.7, 126.6, 126.4, 126.2, 120.81, 120.78, 118.7, 118.6, 115.6, 115.5, 108.6, 107.3, 103.1, 79.5, 43.4, 35.4, 35.3, 26.45, 26.40, 23.3, 22.5, 19.4, 19.3; IR ($CDCl_3$) 3249, 3071, 2931, 2857, 1631, 1490, 1452, 1254, 1112, 909 cm^{-1}; MS (ESI-neg.) *m/z* calcd for $C_{75}H_{72}O_8Si_2$ $(M - H)^-$ 1155.47, found 1155.56.



15 R = TBDPS **3**

(±)-2’’’-Hydroxy-5’’-benzylisouvarinol-B[5] (3). To a solution of **15** (65 mg, 0.056 mmol, 1.0 equiv) in anhydrous DMF (3 mL) at rt was added TAS-F (78 mg, 0.28 mmol, 5.0 equiv) under an atmosphere of argon. The reaction was stirred for 24 h at rt. The reaction mixture was diluted with EtOAc (15 mL) and washed with $NaHCO_3$ (5 mL), saturated LiCl (5×2 mL) and brine (5 mL) solution. The crude product was purified by flash column chromatography (0 to 50% EtOAc/Hexanes) to afford **3** as a light yellow solid which on recrystallization with $CHCl_3$/hexanes afforded a white solid (24.4 mg, 64%), R_F 0.42 (50% EtOAc in Hexanes): ^{1}H NMR (500 MHz, $CDCl_3$) δ 12.77 (s, 1H), 9.36 (br s, 1H), 7.44-7.42 (m, 6H), 7.19-7.07 (m, 4H), 6.95-6.89 (m, 3H), 6.83-6.80 (m, 3H), 6.73 (d, *J* = 8.0 Hz, 2H), 6.64 (d, *J* = 8.0 Hz, 1H), 5.33 (dd, *J* = 2.5, 11.0 Hz, 2H), 5.06 (br s, 1H), 4.74 (br s, 1H), 3.91 (s, 2H), 3.81 (s, 2H), 3.74-3.72 (two s, 4H), 3.03 (dd,

J = 13.5, 3.5 Hz, 1H), 2.75 (dd, *J* = 2.5, 14.5 Hz, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 196.7, 161.5, 158.8, 158.6, 153.9, 153.8, 152.6, 150.9, 138.6, 132.6, 132.5, 132.2, 131.3, 130.9, 129.3, 129.2, 128.4, 128.3, 128.2, 128.0, 127.62, 127.59, 126.7, 126.6, 126.5, 121.6, 121.2, 116.9, 116.4, 115.9, 108.6, 107.7, 103.0, 79.9, 43.6, 36.6, 35.8, 23.8, 23.3; IR ($CDCl_3$) 3396, 2925, 1631, 1455, 908, 734 cm^{-1}; MS (ESI-neg.) *m/z* calcd for $C_{43}H_{36}O_8$ $(M - H)^-$ 679.23, found 679.12.

^{1}H NMR Comparison

Natural (2’’’-Hydroxy-5”-benzylisouvarinol-B), ^{1}H NMR, $CDCl_3$, 300 MHz	**Synthetic (2’’’-Hydroxy-5”-benzylisouvarinol-B), ^{1}H NMR, $CDCl_3$, 500 MHz**
Not reported	12.77 (1H, s)
Not reported	9.36 (1H, br s)
6.63-7.8 (19H, m)	7.44-7.42 (6H, m), 7.19-7.07 (4H, m), 6.95-6.89 (3H, m), 6.83-6.80 (3H, m), 6.73 (2H, d), 6.64 (1H, d)
5.73 (1H, dd)	5.33 (1H, dd)
Not reported	5.06 (1H, br s)
Not reported	4.74 (1H, br s)
4.00, 3.97, 3.87, 3.80 (8H, 4s)	3.91, 3.81, 3.74, 3.72 (8H, 4s)
3.04 (1H, dd)	3.03 (1H, dd)
2.74 (1H, dd)	2.75 (1H, dd)

GTPase Assay:

Untagged *E. coli* FtsZ was expressed from pET-3Z^{+} in BL21(λDE3) cells (RayChaudhuri, D.; Park, J. T. *Nature* **1992**, *359*, 251-254) and purified using a two-step ammonium sulfate fractionation (Romberg, L.; Simon, M.; Erickson, H. P. *J. Biol. Chem.* **2001**, *276*, 11743-11753). FtsZ GTPase assay was performed essentially as described by Margalit *et al*. (Margalit, D. N.; Romberg, L.; Mets, R. B.; Hebert, A. M.; Mitchsion, T. J.; Kirschner, M. W.; RayChaudhuri, D. *Proc. Natl. Acad. Sci. U.S.A.* **2004**, *101*, 11821-11826). Briefly, 2 μM *E. coli* FtsZ in polymerization buffer (4-morpholinepropanesulfonic acid, pH 6.5, 50 mM KCl, 5 mM $MgCl_2$) was preincubated with or without varying concentrations of test compounds (in dimethyl sulfoxide, DMSO) such that the DMSO concentrations in the samples were ~2%. The control tubes received 2% DMSO alone. After a 5-min preincubation at 25 °C, the reactions were initiated by adding 0.5 mM GTP. Aliquots were withdrawn after 5, 15 and 25 minute intervals and quenched with 50 mM EDTA before color development with the malachite green solution [2 volumes malachite green (0.8 mg/ml)/1 volume polyvinyl alcohol (23.2 mg/ml)/1 volume ammonium molybdate (57.2 mg/ml in $2H_2O$:3HCl)/ 2 volumes H_2O]. IC_{50} values were determined from the relative slopes of GTP hydrolysis at different inhibitor concentrations compared to the control with DMSO only.

Compound	**IC_{50} (μM)**
(±)-Dichamanetin (2)	12.5 ± 0.5
(±)-2’’’-Hydroxy-5’’-benzylisouvarinol-B (3)	8.3 ± 0.5
2,4,6-Trihydroxy-3,5-di(2’-hydroxybenzyl)-acetophenone (11)	60.4 ± 2.2

References

1. Choi, Y-J.; Shim, P-J.; Ko, B-S.; Kim, H-D. *Heterocycles* **1996**, *43*, 1223-1228.

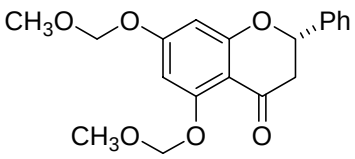
2. Litkei, G.; Gulácsi, K.; Antus, S.; Blaskó, G. *Liebigs Ann.* **1995**, 1711-1715.

3. Bick, I. R. C.; Brown, R. B.; Hillis, W. E. *Aust. J. Chem.* **1971**, *25*, 449-451.

4. Lasswell, W. L., Jr.; Hufford, C. D. *J. Org. Chem.* **1977**, *42*, 1295-1302.

5. Anam, E. M. *Indian J. Chem.* **1999**, *33B,* 1009-1011.

NMR SPECTRA



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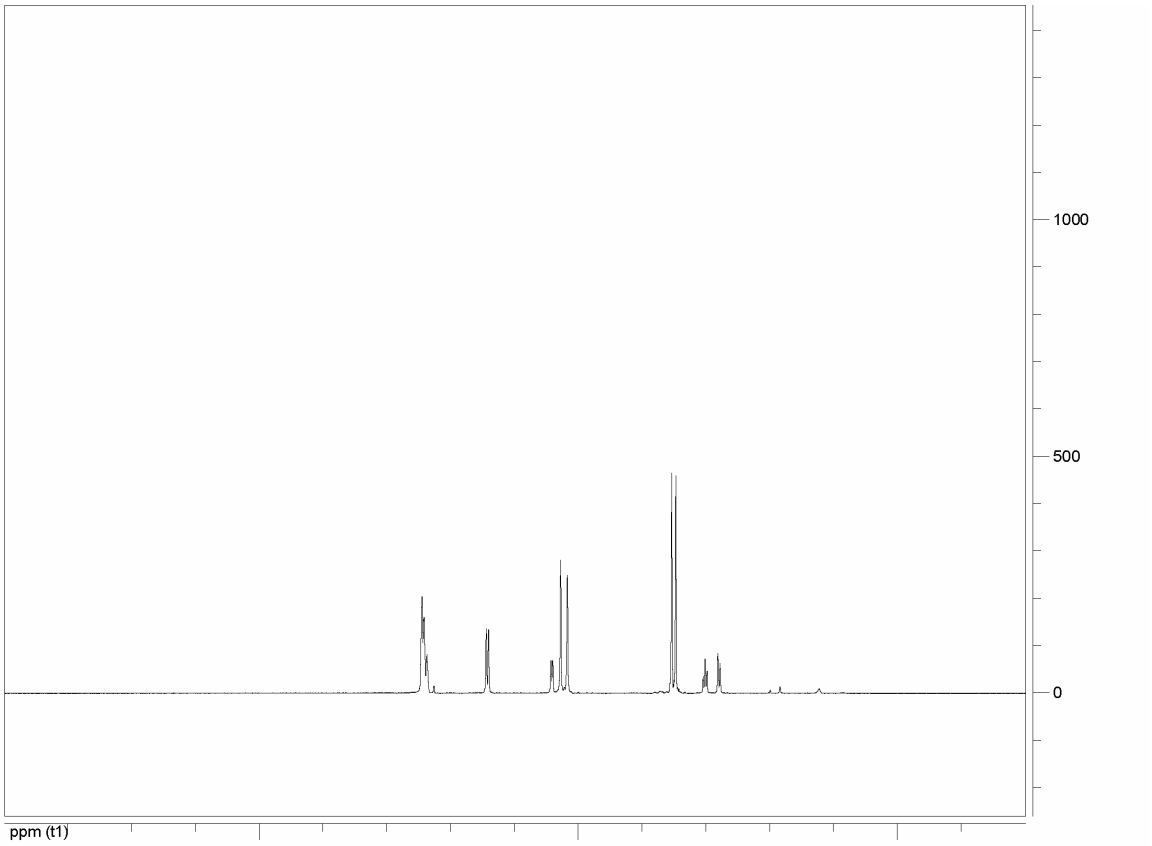
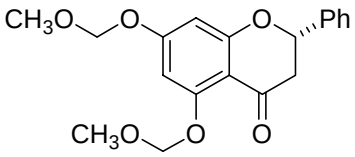
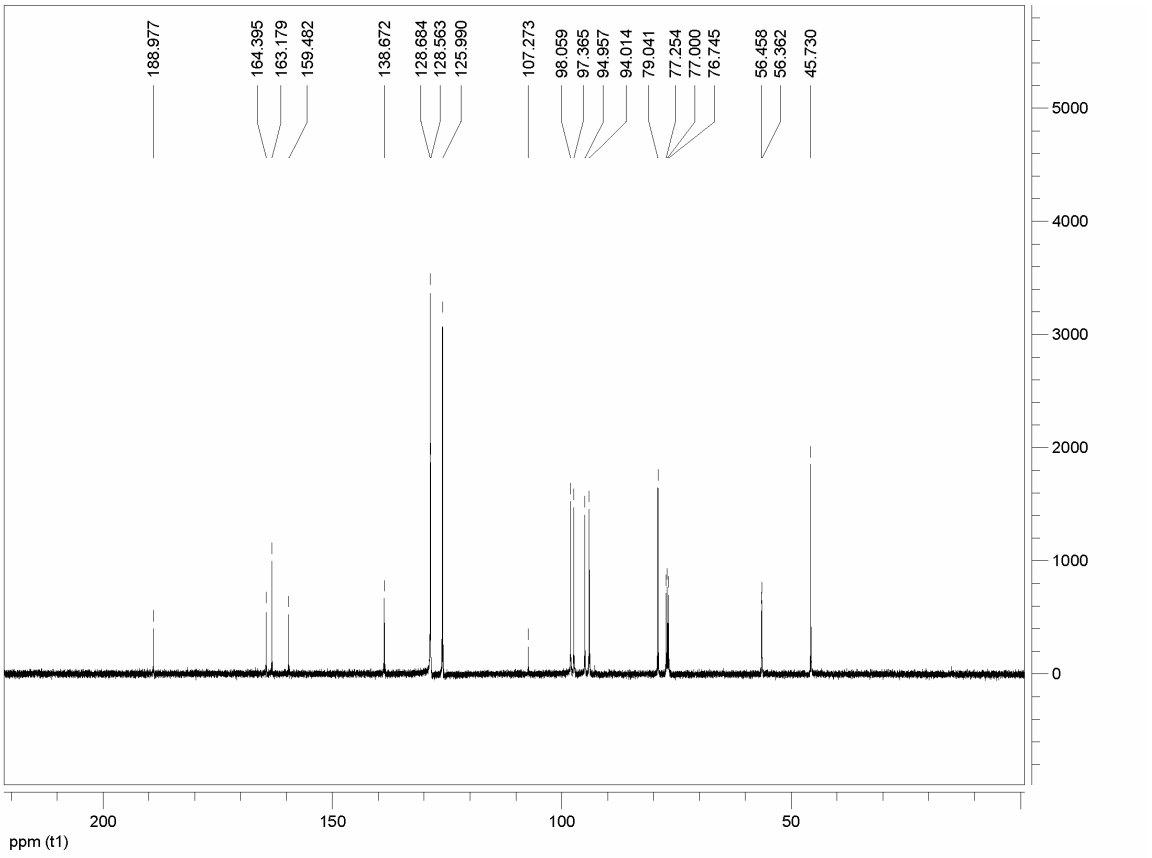
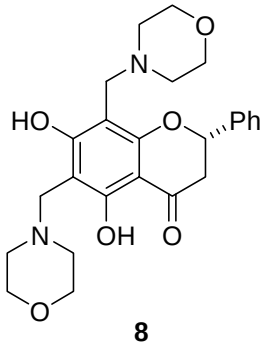


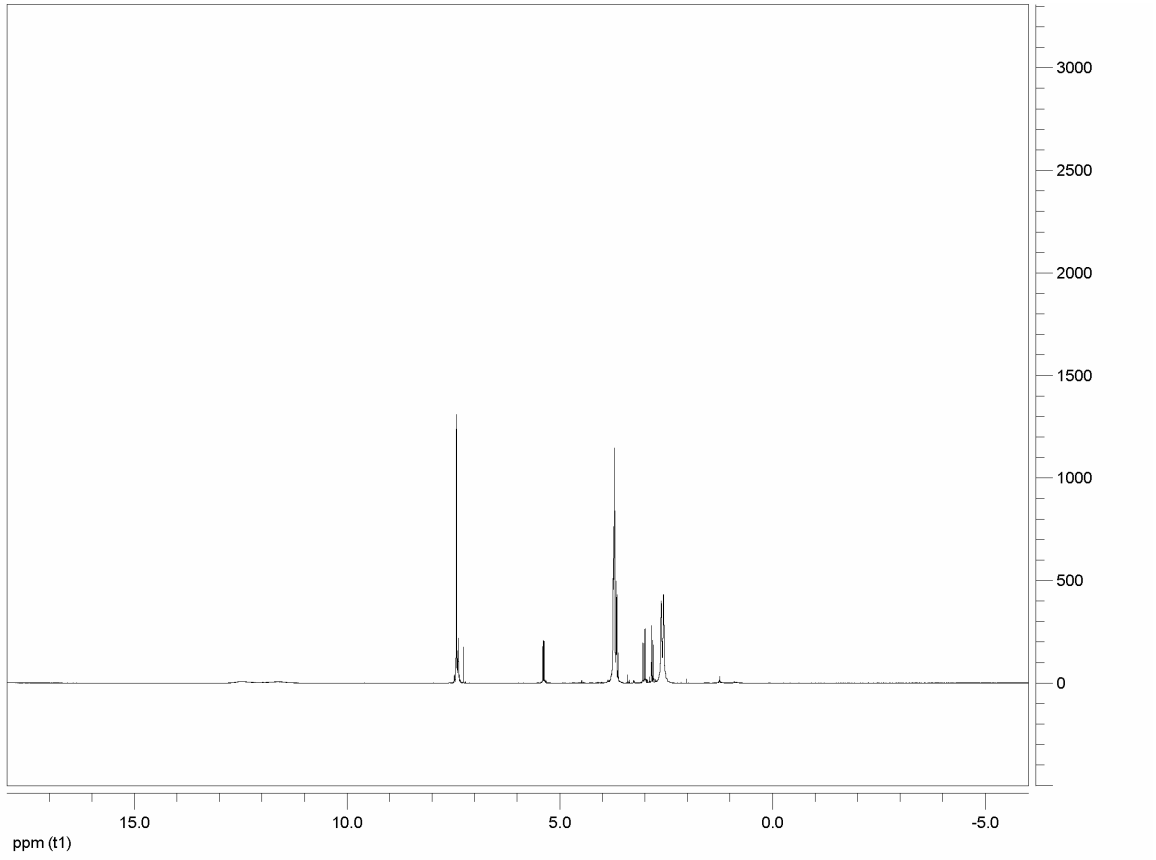

CH3O
O
O
Ph
CH3O
O
O

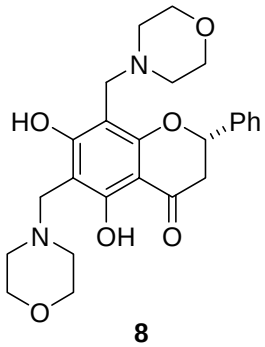
7


188.977
164.395
163.179
159.482
138.672
128.684
128.563
125.990
107.273
98.059
97.365
94.957
94.014
79.041
77.254
77.000
76.745
56.458
56.362
45.730
5000
4000
3000
2000
1000
0
200
150
100
50
ppm (t1)

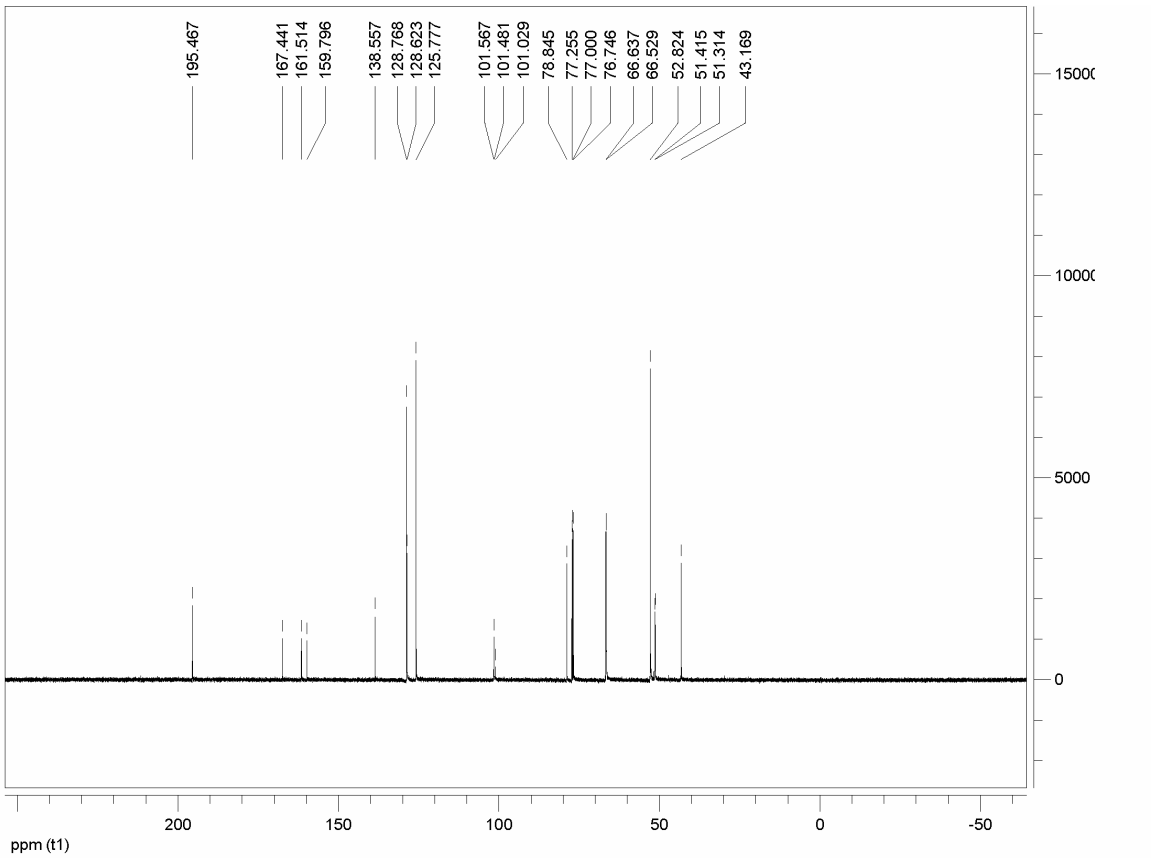

O
N
HO
O
Ph
N
OH
O
O

8


3000
2500
2000
1500
1000
500
0
15.0
10.0
5.0
0.0
-5.0
ppm (t1)


O
N
HO
O
Ph
N
OH
O
O

8


195.467
167.441
161.514
159.796
138.557
128.768
128.623
125.777
101.567
101.481
101.029
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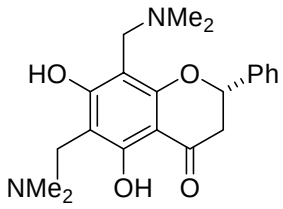
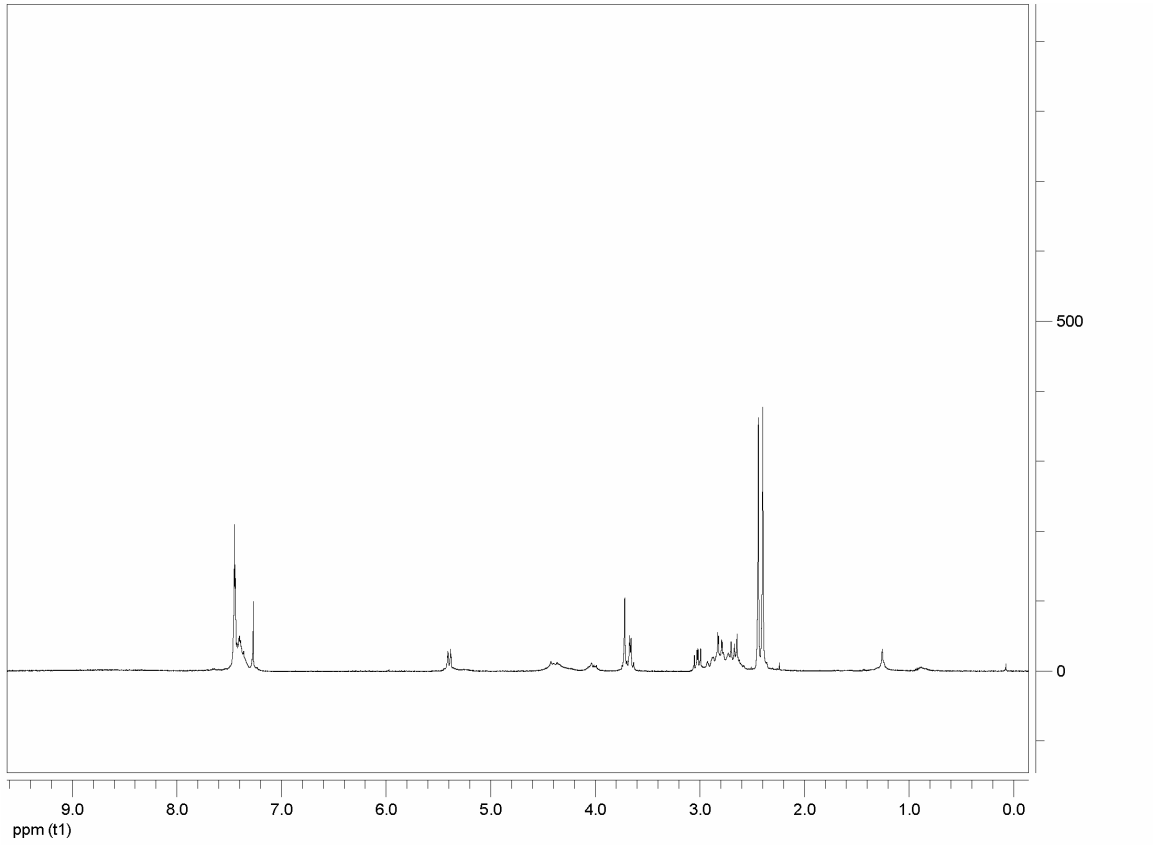
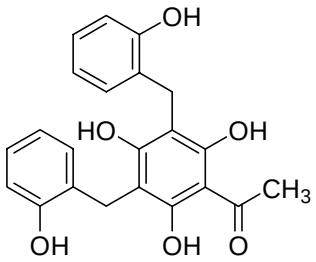
77.255
77.000
76.746
66.637
66.529
52.824
51.415
51.314
43.169
15000
10000
5000
0
200
150
100
50
0
-50
ppm (t1)

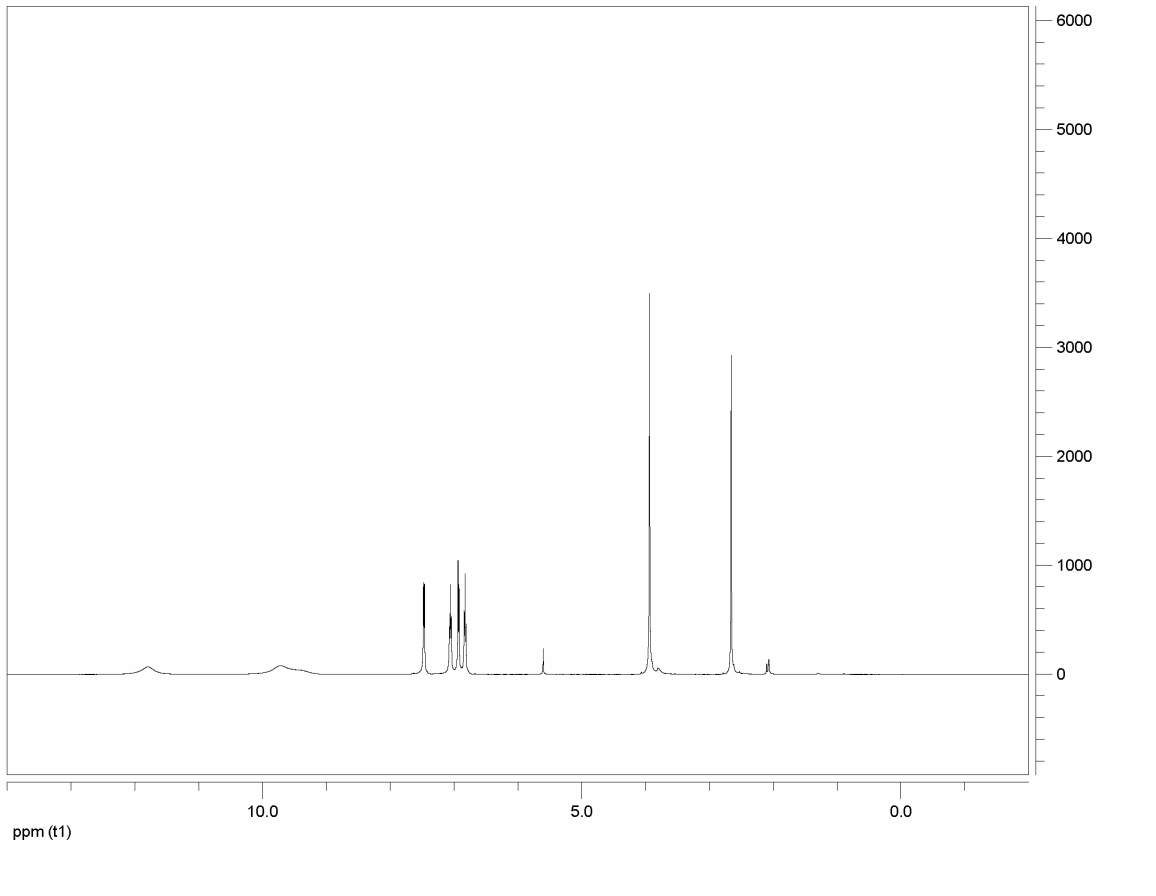


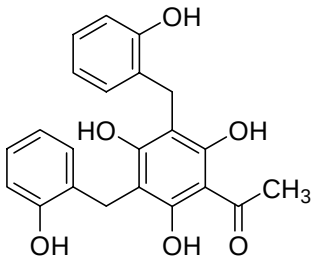
9



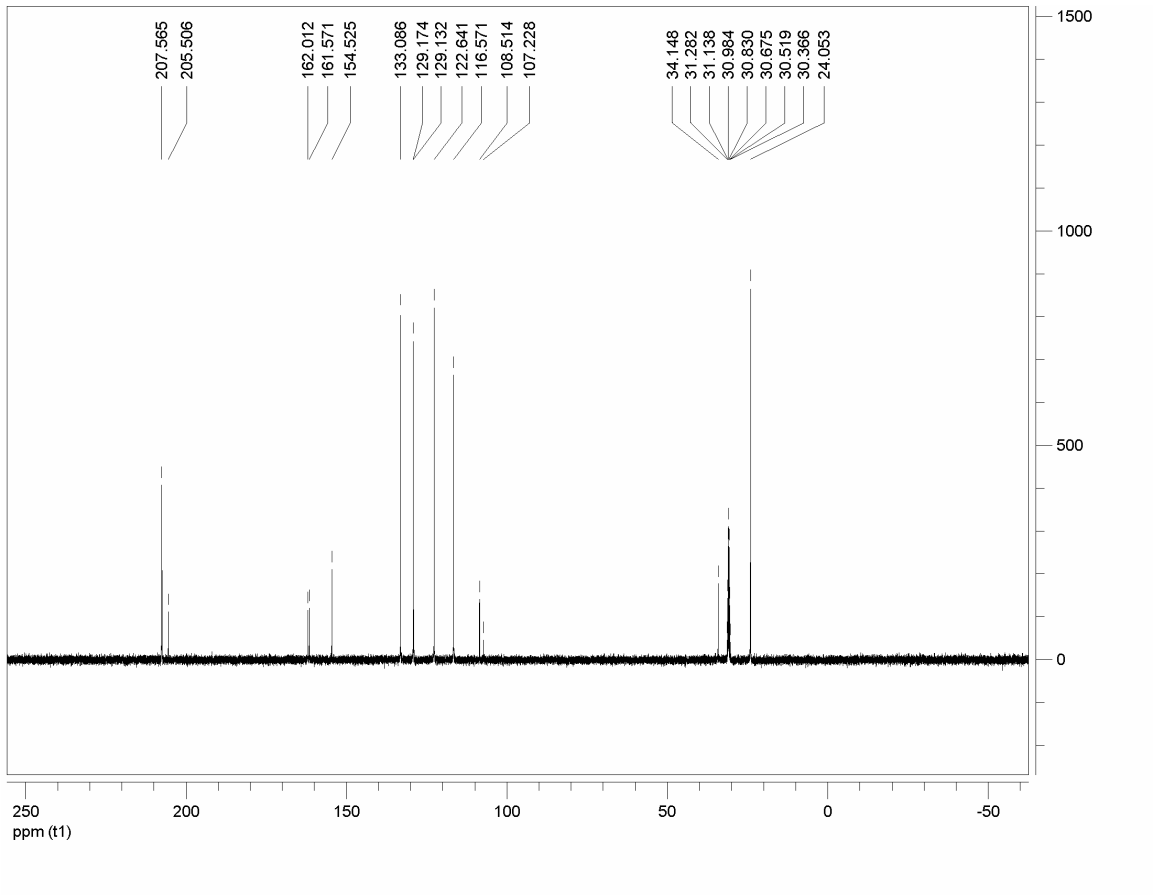

OH
HO
OH
CH3
OH
OH
O

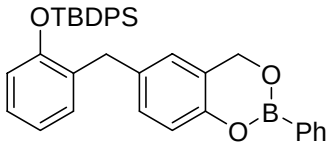
11


6000
5000
4000
3000
2000
1000
0
10.0
5.0
0.0
ppm (t1)

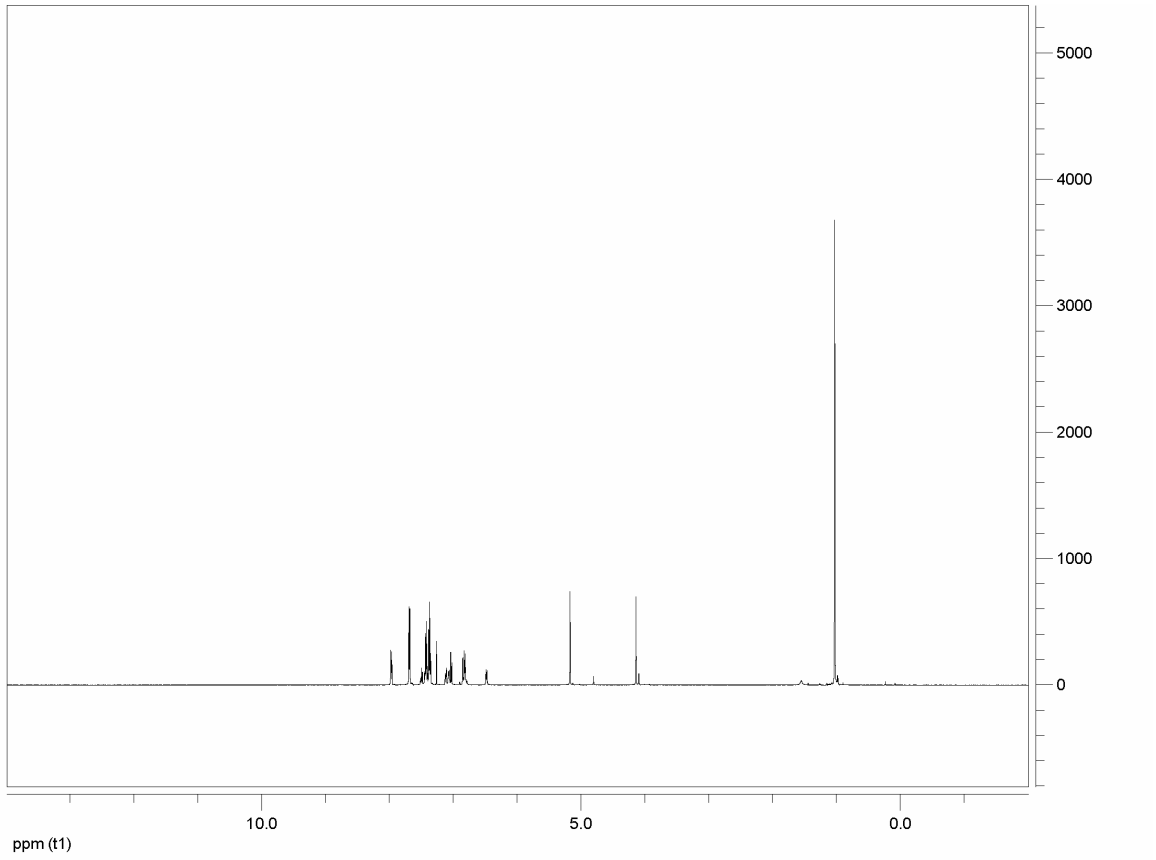

OH
HO
OH
CH3
OH
OH
O

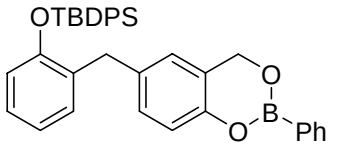
11


207.565
205.506
162.012
161.571
154.525
133.086
129.174
129.132
122.641
116.571
108.514
107.228
34.148
31.282
31.138
30.984
30.830
30.675
30.519
30.366
24.053
1500
1000
500
0
250
200
150
100
50
0
-50
ppm (t1)

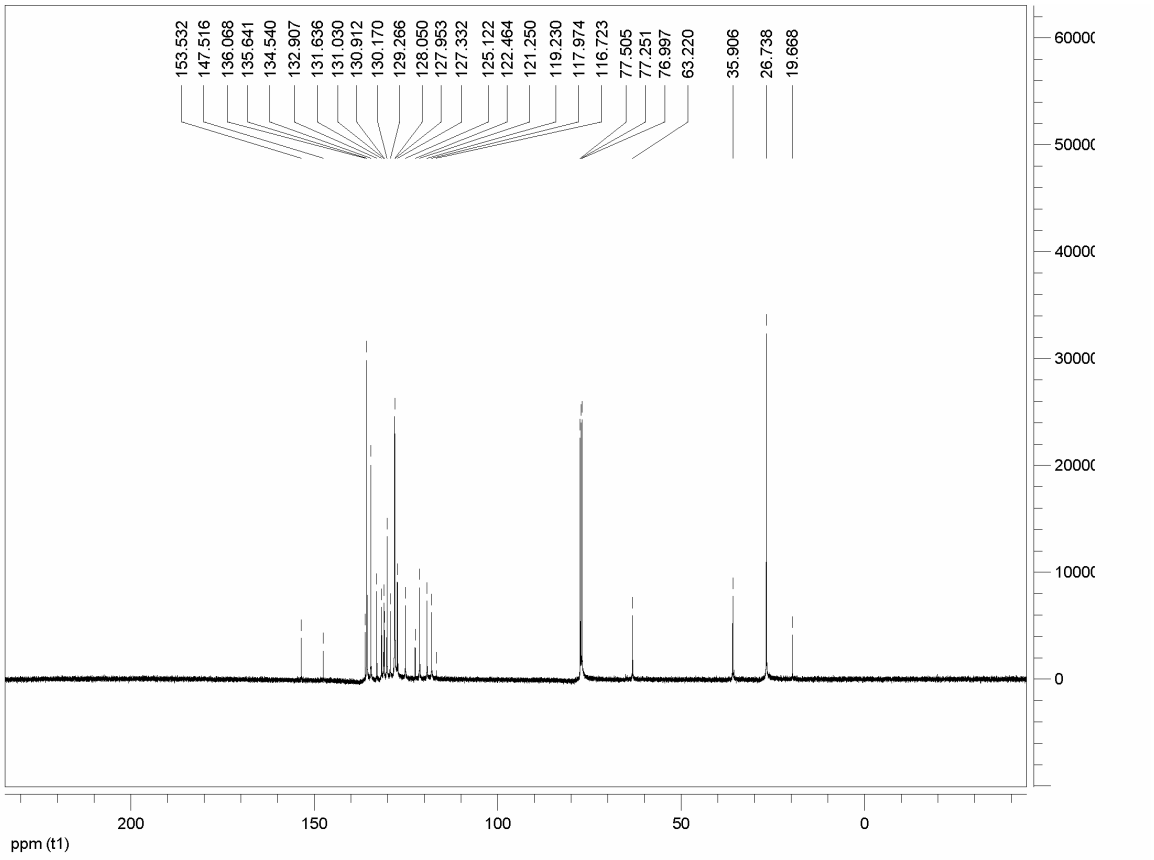


13




OTBDPS
O
B
O
Ph

13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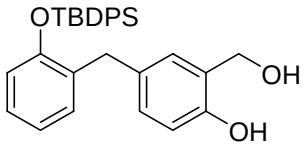
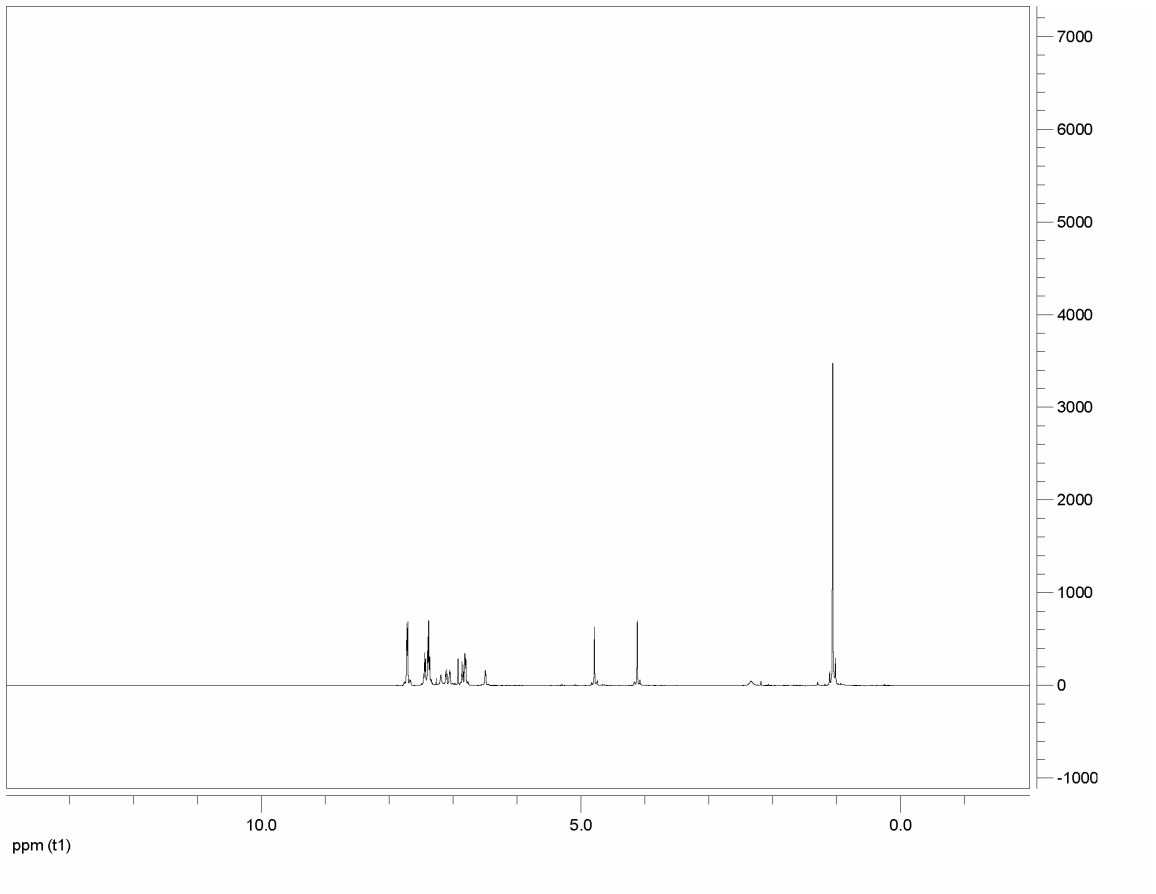
147.516
136.068
135.641
134.540
132.907
131.636
131.030
130.912
130.170
129.266
128.050
127.953
127.332
125.122
122.464
121.250
119.230
117.974
116.723
77.505
77.251
76.997
63.220
35.906
26.738
19.668
60000
50000
40000
30000
20000
10000
0
200
150
100
50
0
ppm (t1)


OTBDPS
OH
OH

14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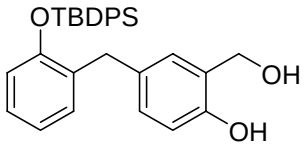
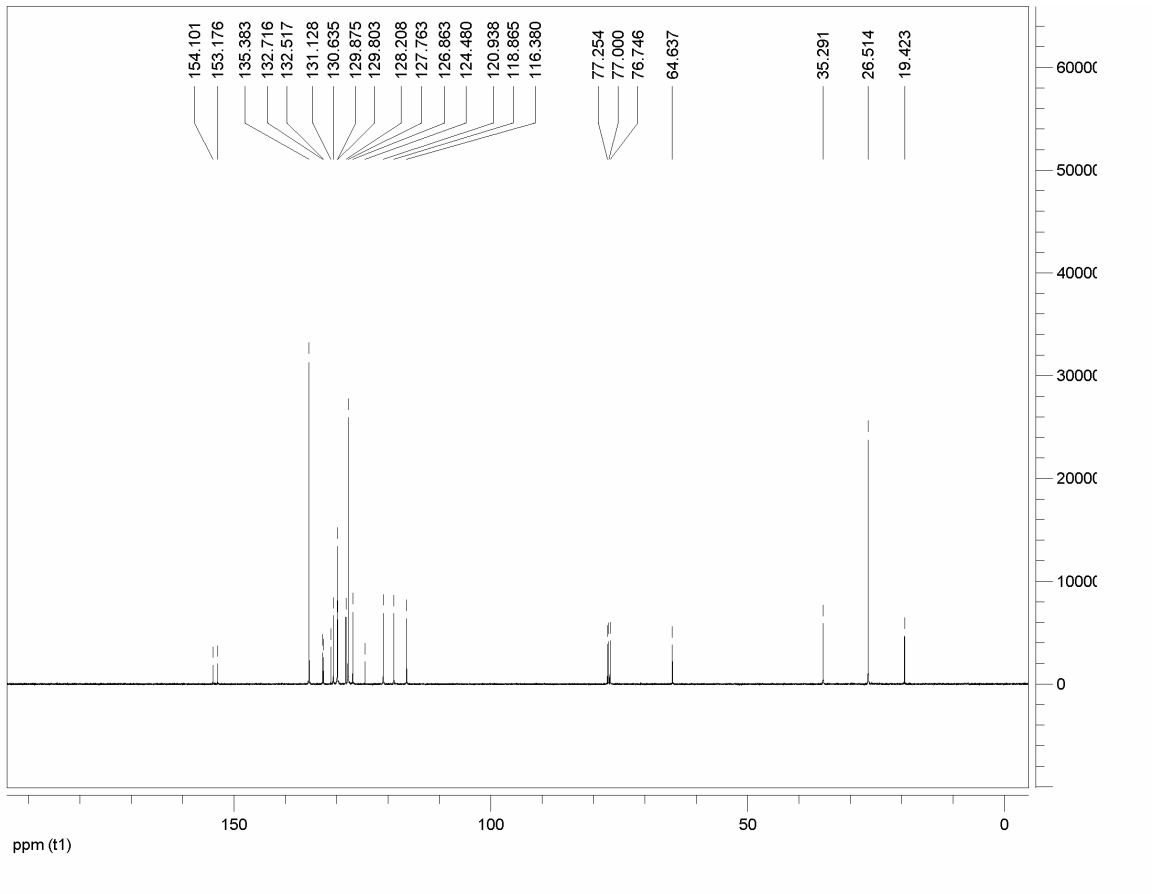
6000
5000
4000
3000
2000
1000
0
-1000
10.0
5.0
0.0
ppm (t1)


OTBDPS
OH
OH

14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153.176
135.383
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131.128
130.635
129.875
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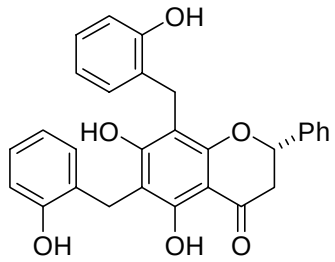
128.208
127.763
126.863
124.480
120.938
118.865
116.380
77.254
77.000
76.746
64.637
35.291
26.514
19.423
60000
50000
40000
30000
20000
10000
0
150
100
50
0
ppm (t1)



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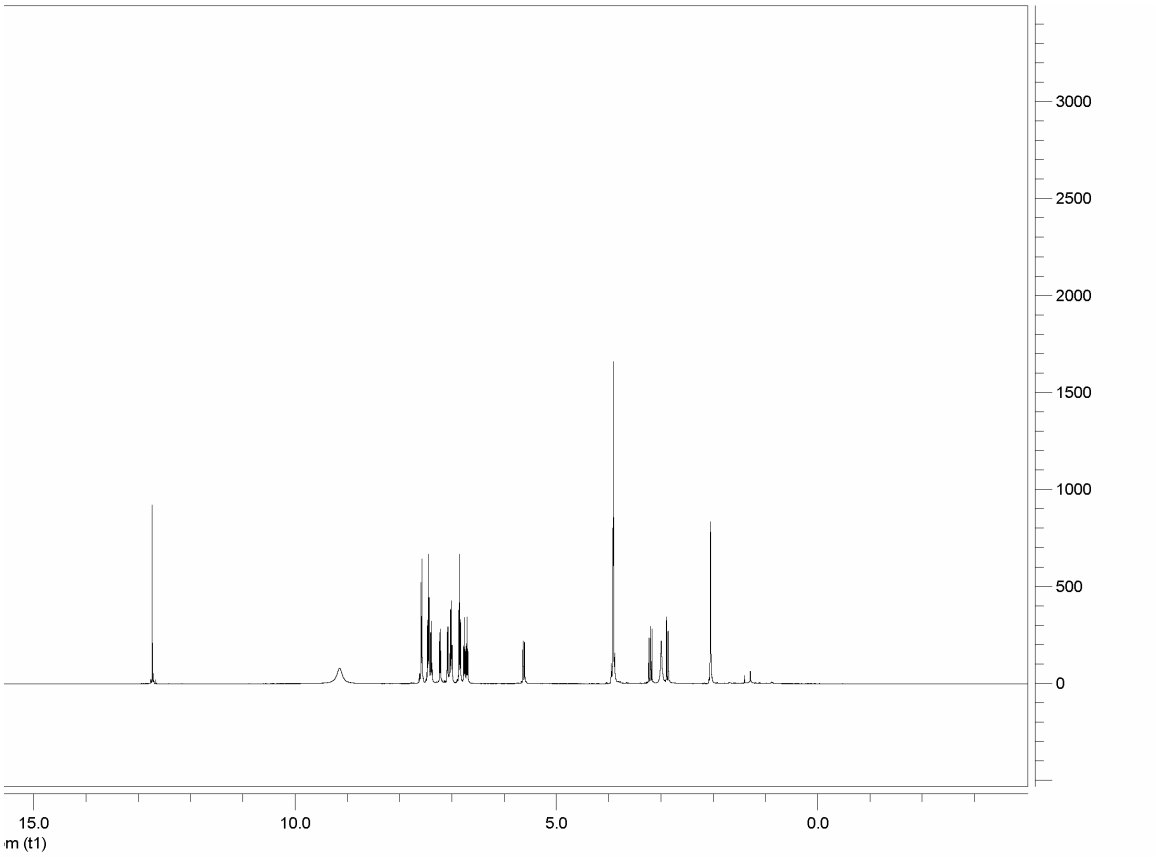
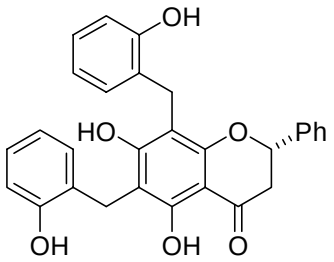
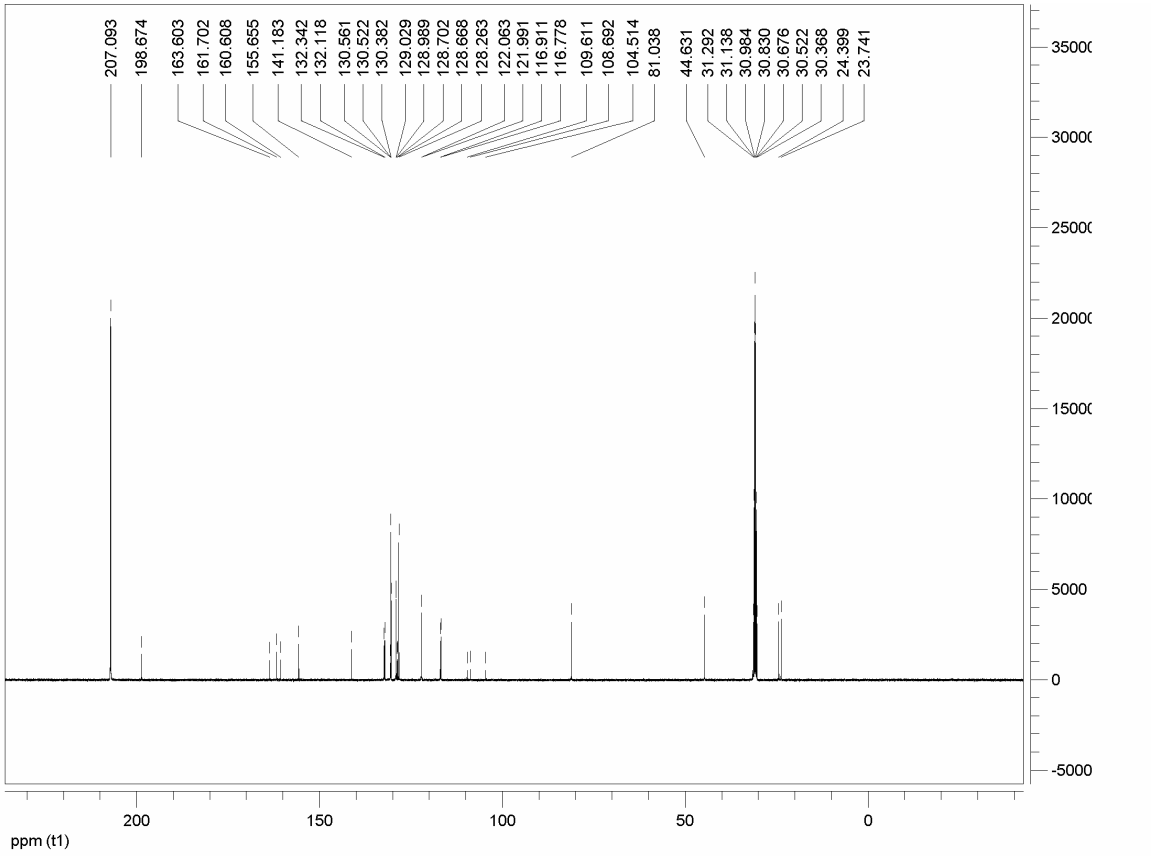



OH
HO
O
Ph
OH
OH
O

2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155.655
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132.342
132.118
130.561
130.522
130.382
129.029
128.989
128.702
128.668
128.263
122.063
121.991
116.911
116.778
109.611
108.692
104.514
81.038
44.631
31.292
31.138
30.984
30.830
30.676
30.522
30.368
24.399
23.741
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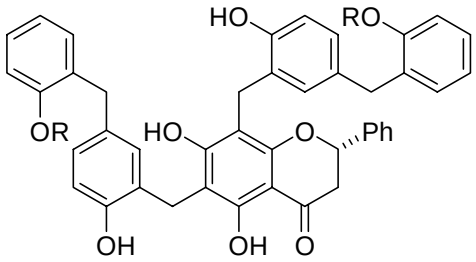
30000
25000
20000
15000
10000
5000
0
-5000
200
150
100
50
0
ppm (t1)



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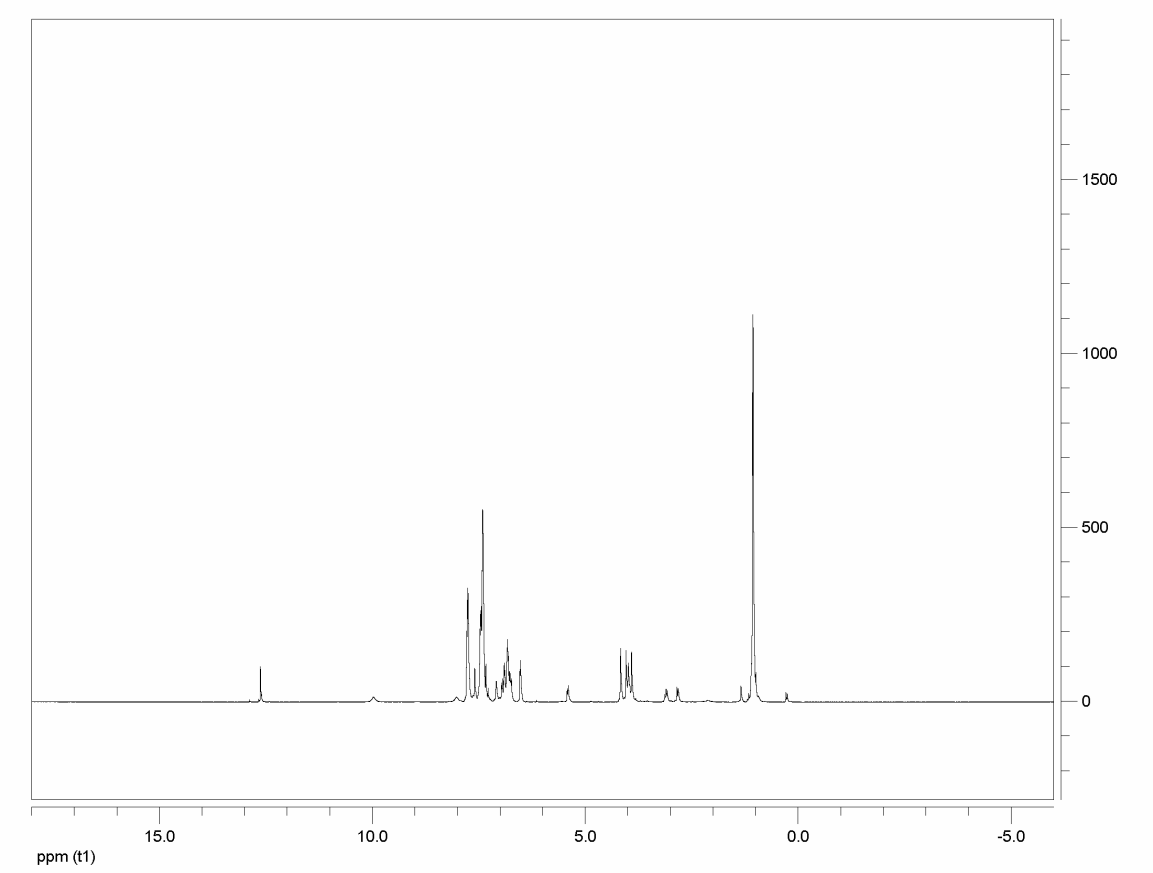
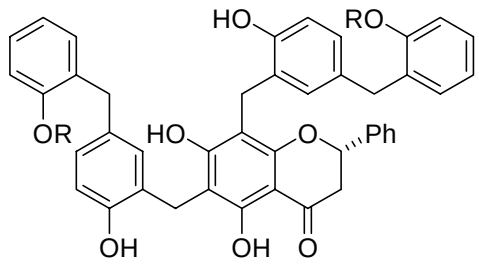
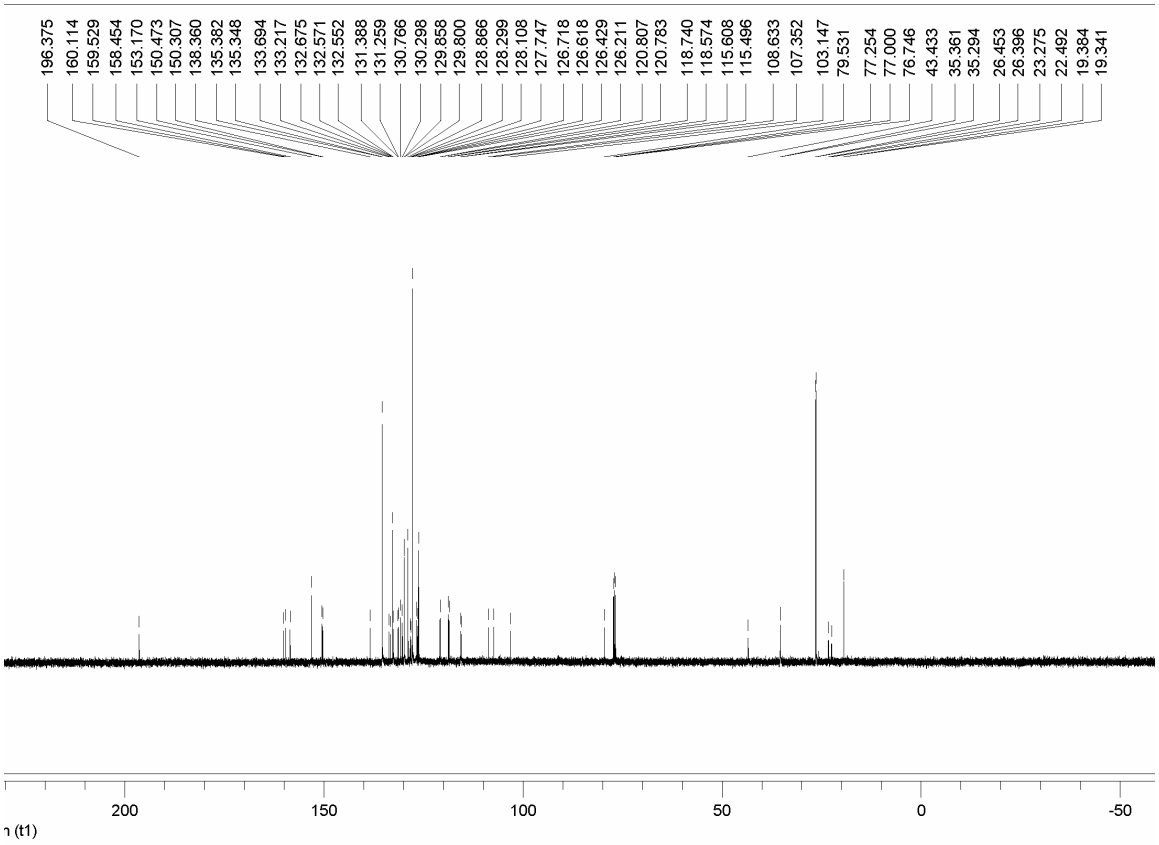



HO
RO
OR
HO
O
Ph
OH
OH
O

15 R = TBDPS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158.454
153.170
150.473
150.307
138.360
135.382
135.348
133.694
133.217
132.675
132.571
132.552
131.388
131.259
130.766
130.298
129.858
129.800
128.866
128.299
128.108
127.747
126.718
126.618
126.429
126.211
120.807
120.783
118.740
118.574
115.608
115.496
108.633
107.352
103.147
79.531
77.254
77.000
76.746
43.433
35.361
35.294
26.453
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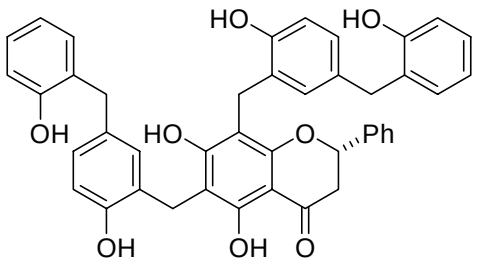
23.275
22.492
19.384
19.341
200
150
100
50
0
-50
ı (t1)



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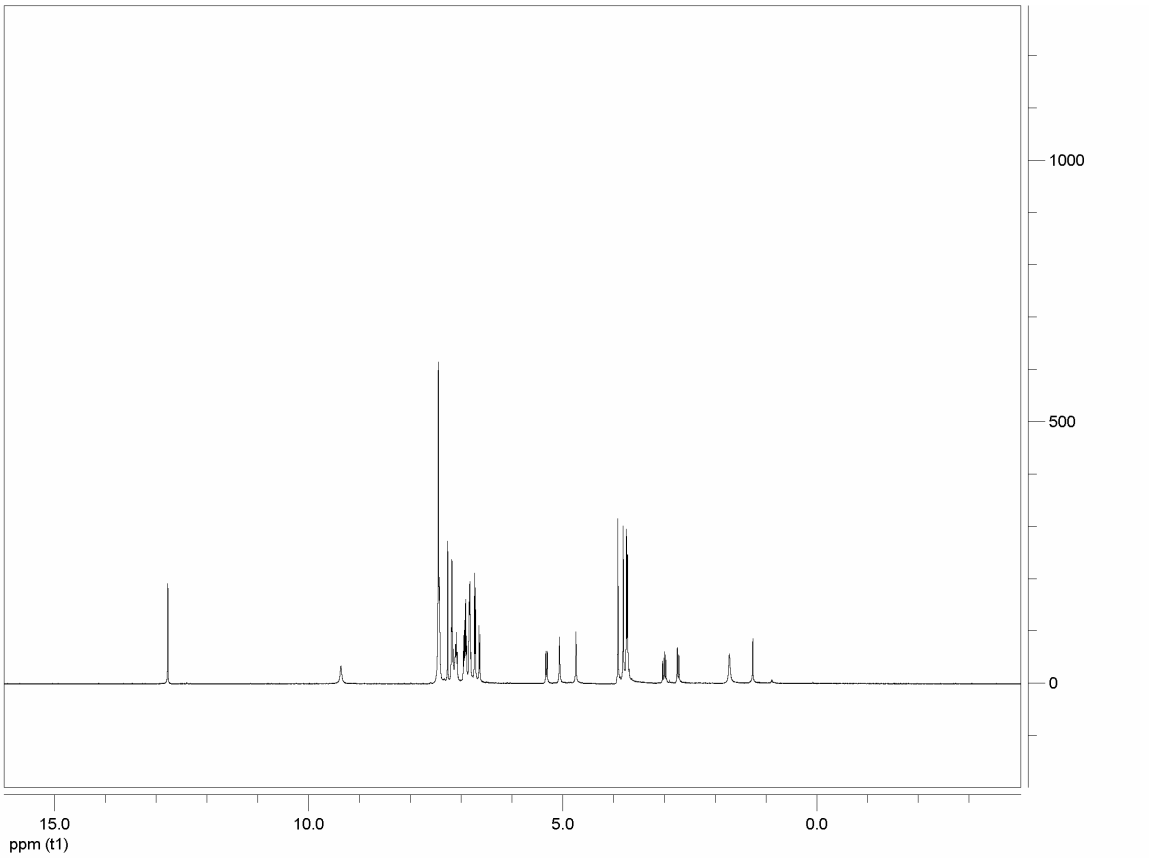
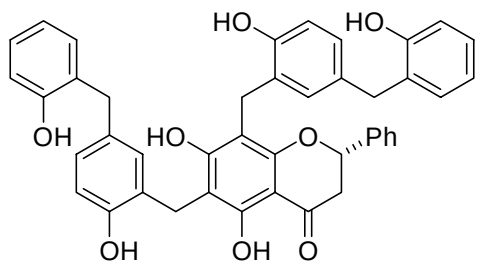
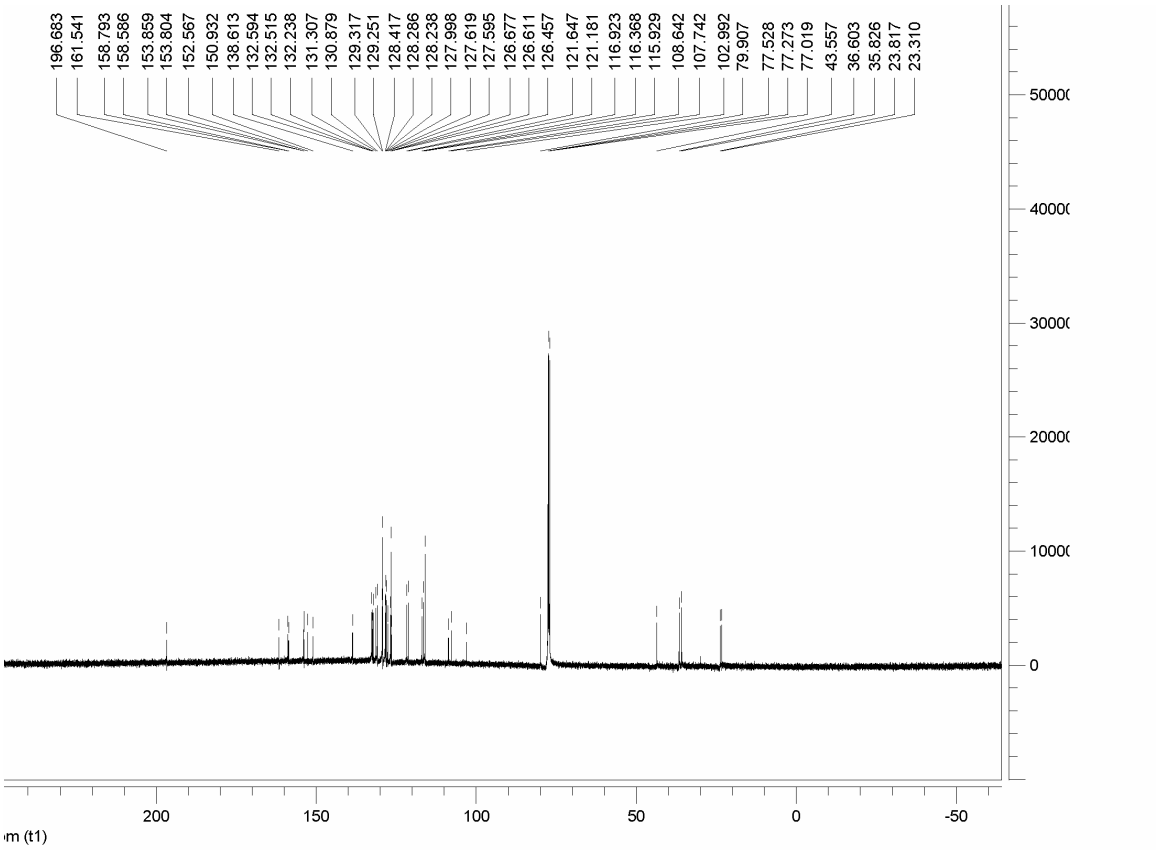



HO
HO
OH
HO
O
Ph
OH
OH
O

3


196.683
161.541
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158.586
153.859
153.804
152.567
150.932
138.613
132.594
132.515
132.238
131.307
130.879
129.317
129.251
128.417
128.286
128.238
127.998
127.619
127.595
126.677
126.611
126.457
121.647
121.181
116.923
116.368
115.929
108.642
107.742
102.992
79.907
77.528
77.273
77.019
43.557
36.603
35.826
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20000
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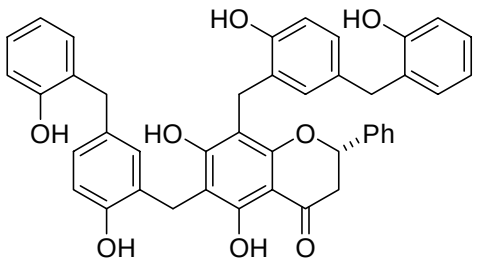
0
200
150
100
50
0
-50
m (t1)



3

Added 2 drops of D_2O, NMR taken after 1 day