

## Supplementary Materials

# Syntheses, Glycosidase Inhibitory Activities, and *in silico* Docking Studies of Pericosine E Analogs Methoxy-Substituted at C6

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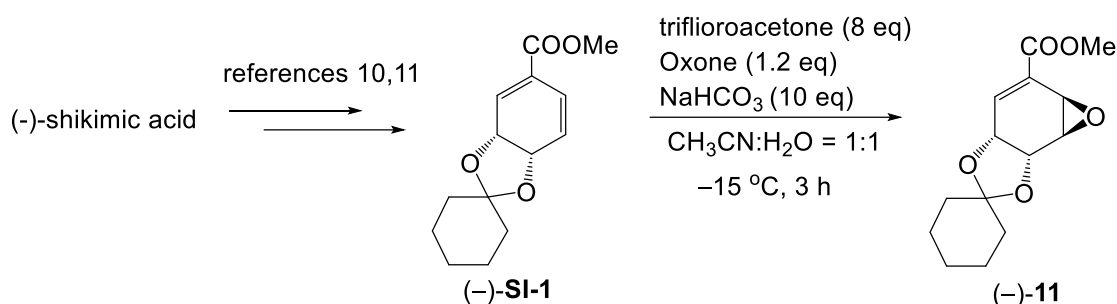
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## 1. Modified preparation of *anti*-epoxide (-)-11 by TFDO oxidation of diene (-)-SI-1

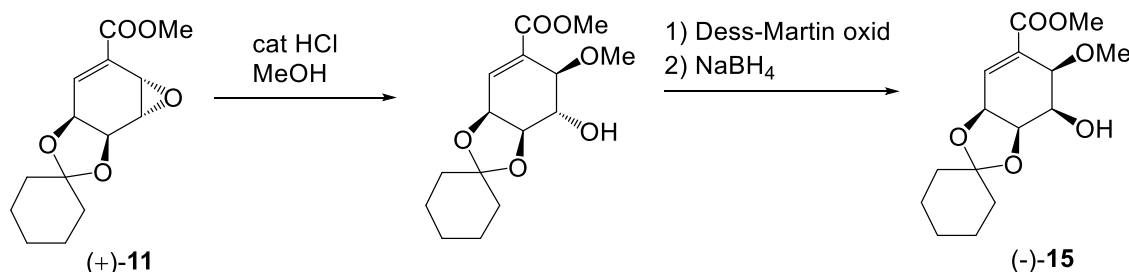
To a solution of diene (-)-SI-1 (108.6 mg, 0.43 mmol) in CH<sub>3</sub>CN (7.0 mL) and H<sub>2</sub>O (7.0 mL) included in a micro-wave vial (10-20 mL), was added powdered NaHCO<sub>3</sub> (364 mg, 4.3 mmol) with stirring. The reaction vial was cooled at -15 °C, then 1,1,1-trifluoroacetone (0.31 mL, 3.4 mmol) and Oxone (320 mg, 0.52 mmol) were added successively without stirring. After sealing the vial, the reaction mixture was kept at -15 °C for 3 h with stirring vigorously. The reaction mixture was poured into a beaker including 20 mL of *tert*-butyl methyl ether (TBME) to make a suspension. After filtration over celite under reduced pressure, saturated aqueous NaHCO<sub>3</sub> (50 mL) was added to the filtrate. The mixture was extracted with TBME, then the organic layer was dried over MgSO<sub>4</sub>, filtered, and evaporated to give a residue, which was purified by silica gel column chromatography (eluent; Hexane : AcOEt = 19:1) to afford (-)-11 (83.9 mg, 0.32 mmol) in 74% yield.

\*This procedure reduced cost of this step to 1/6 compared to the previous method [10, 11].



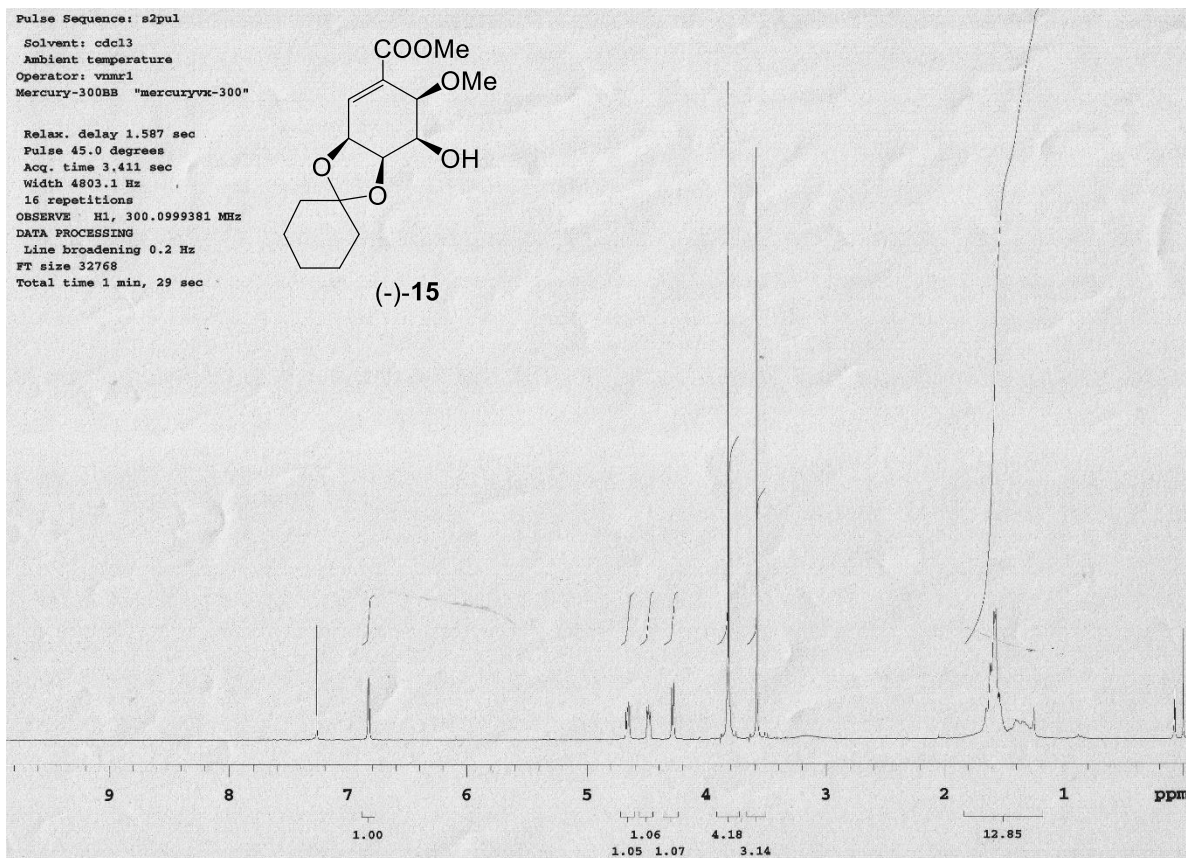
## 2. Synthesis of (-)-15

*Anti*-epoxide (+)-11 (107.3 mg, 0.40 mmol) was converted to (-)-15 (57.4 mg, 46% in 3 steps) by the same procedure in the literature [13]. (-)-15: Colorless oil; [ $\alpha$ ]<sub>D</sub><sup>20</sup> -15.1 (*c* 0.49, CHCl<sub>3</sub>); IR  $\nu_{\text{max}}$  (film) 3497 (OH), 1724 (C=O), 1653 (C=C) cm<sup>-1</sup>; <sup>1</sup>H-NMR (300 MHz; CDCl<sub>3</sub>)  $\delta$  1.25-1.70 (10H, m), 3.17 (1H, *d*, *J* = 11.5 Hz, 5-OH), 3.58 (3H, *s*, 6-OMe), 3.82 (3H, *s*, COOMe), 3.83 (1H, *m*, H-5), 4.28 (1H, *d*, *J* = 5.2 Hz, H-6), 4.48 (1H, *dd*, *J* = 5.6, 3.2 Hz, H-3), 4.66 (1H, *ddd*, *J* = 5.6, 3.5, 0.6 Hz, H-4), 6.83 (1H, *dd*, *J* = 3.2, 0.9 Hz, H-2); <sup>13</sup>C-NMR (75.5 MHz; CDCl<sub>3</sub>)  $\delta$  23.7, 23.9, 24.9, 35.7, 37.2, 52.2, 61.2, 68.0, 72.1, 72.9, 74.2, 111.7, 130.0, 137.8, 166.7; HREIMS *m/z* calcd for C<sub>15</sub>H<sub>22</sub>O<sub>6</sub> (M)<sup>+</sup> 298.1416, found 298.1420.



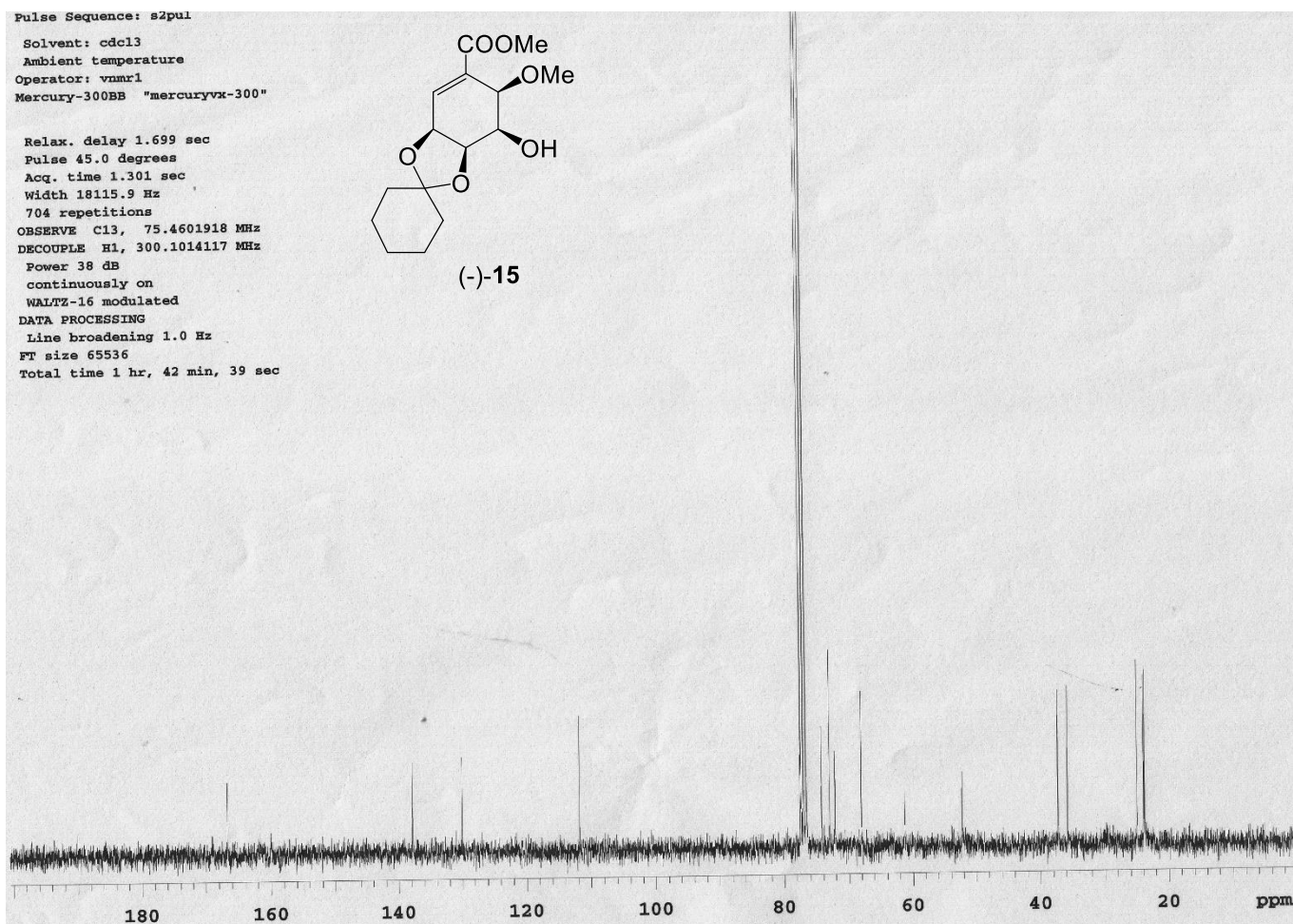
### 3. <sup>1</sup>H- and <sup>13</sup>C-NMR spectra of new compounds

Figure S1: <sup>1</sup>H- NMR spectrum of (-)-15 in CDCl<sub>3</sub> (300 MHz),



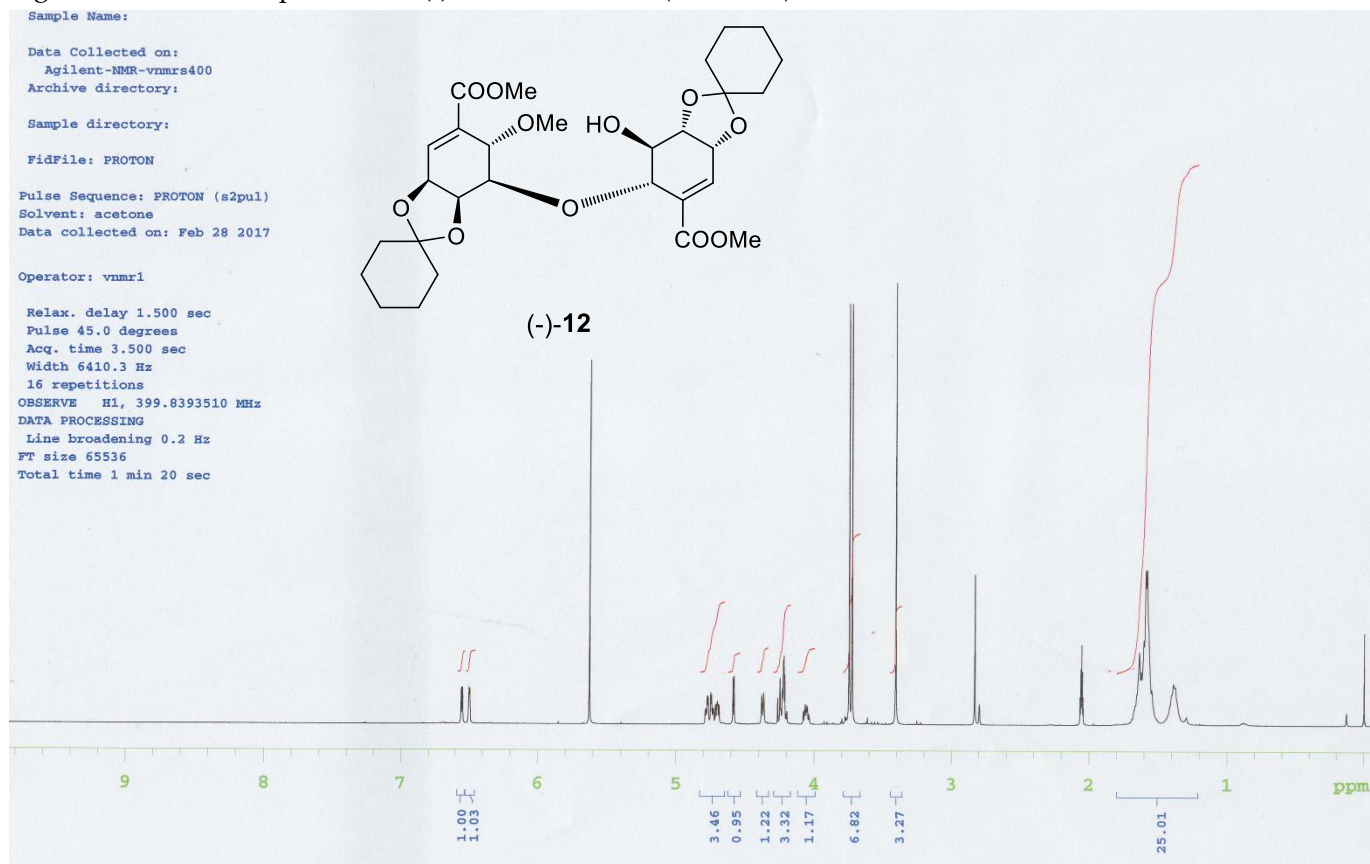
| INDEX | F1 (ppm) | F2 (ppm) | DELTA (ppm) |
|-------|----------|----------|-------------|
| 1     | 2181.1   | 7.268    | 134.4       |
| 2     | 2051.5   | 6.836    | 70.2        |
| 3     | 2050.6   | 6.833    | 71.7        |
| 4     | 2048.3   | 6.825    | 73.8        |
| 5     | 2047.4   | 6.822    | 67.7        |
| 6     | 1402.8   | 4.674    | 33.3        |
| 7     | 1402.2   | 4.672    | 33.9        |
| 8     | 1399.5   | 4.664    | 36.8        |
| 9     | 1398.6   | 4.661    | 38.2        |
| 10    | 1397.2   | 4.656    | 45.1        |
| 11    | 1396.3   | 4.653    | 42.8        |
| 12    | 1393.7   | 4.644    | 40.8        |
| 13    | 1393.1   | 4.642    | 39.9        |
| 14    | 1350.3   | 4.499    | 39.6        |
| 15    | 1347.1   | 4.489    | 41.7        |
| 16    | 1344.7   | 4.481    | 34.7        |
| 17    | 1341.5   | 4.470    | 33.2        |
| 18    | 1287.5   | 4.290    | 62.0        |
| 19    | 1282.3   | 4.273    | 66.9        |
| 20    | 1145.7   | 3.818    | 767.6       |
| 21    | 1141.0   | 3.802    | 41.0        |
| 22    | 1074.7   | 3.581    | 690.1       |
| 23    | 494.8    | 1.649    | 37.7        |
| 24    | 485.5    | 1.618    | 89.3        |
| 25    | 482.8    | 1.609    | 86.0        |
| 26    | 476.4    | 1.587    | 149.8       |
| 27    | 473.4    | 1.578    | 142.7       |
| 28    | 471.7    | 1.572    | 152.3       |
| 29    | 462.9    | 1.542    | 56.1        |
| 30    | 459.4    | 1.531    | 42.0        |
| 31    | 421.3    | 1.404    | 23.8        |
| 32    | 417.5    | 1.391    | 22.9        |
| 33    | 406.0    | 1.353    | 22.0        |
| 34    | 376.1    | 1.253    | 37.7        |
| 35    | 21.1     | 0.070    | 60.0        |
| 36    | -0.0     | -0.000   | 129.0       |

Figure S2: <sup>13</sup>C- NMR spectrum of (-)-15 in CDCl<sub>3</sub> (75.5 MHz)



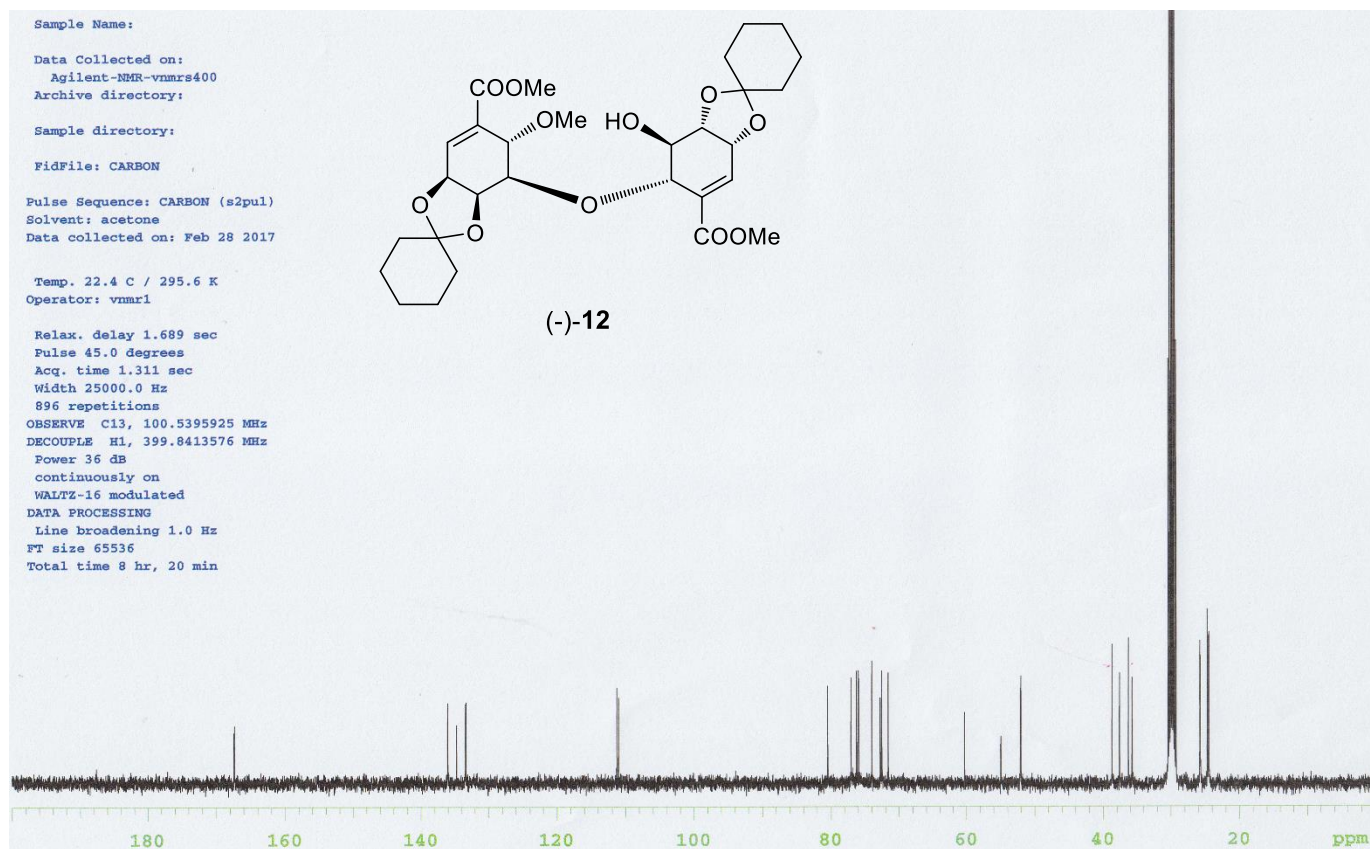
| INDEX | FREQUENCY | FFM     | DELTA |
|-------|-----------|---------|-------|
| 1     | 12576.3   | 166.661 | 14.6  |
| 2     | 10397.5   | 137.788 | 18.2  |
| 3     | 9812.6    | 130.036 | 19.1  |
| 4     | 8432.6    | 111.749 | 27.1  |
| 5     | 5842.5    | 77.425  | 168.5 |
| 6     | 5810.4    | 77.000  | 178.9 |
| 7     | 5778.4    | 76.575  | 177.9 |
| 8     | 5598.1    | 74.187  | 24.4  |
| 9     | 5503.6    | 72.934  | 39.5  |
| 10    | 5441.1    | 72.106  | 19.4  |
| 11    | 5130.4    | 67.989  | 31.1  |
| 12    | 4618.5    | 61.204  | 10.9  |
| 13    | 3937.4    | 52.178  | 14.8  |
| 14    | 2807.9    | 37.210  | 30.8  |
| 15    | 2694.0    | 35.701  | 31.7  |
| 16    | 1880.7    | 24.924  | 36.5  |
| 17    | 1801.7    | 23.876  | 33.6  |
| 18    | 1790.1    | 23.722  | 34.7  |

Figure S3: <sup>1</sup>H- NMR Spectrum of (-)-12 in acetone-d<sub>6</sub> (400 MHz)



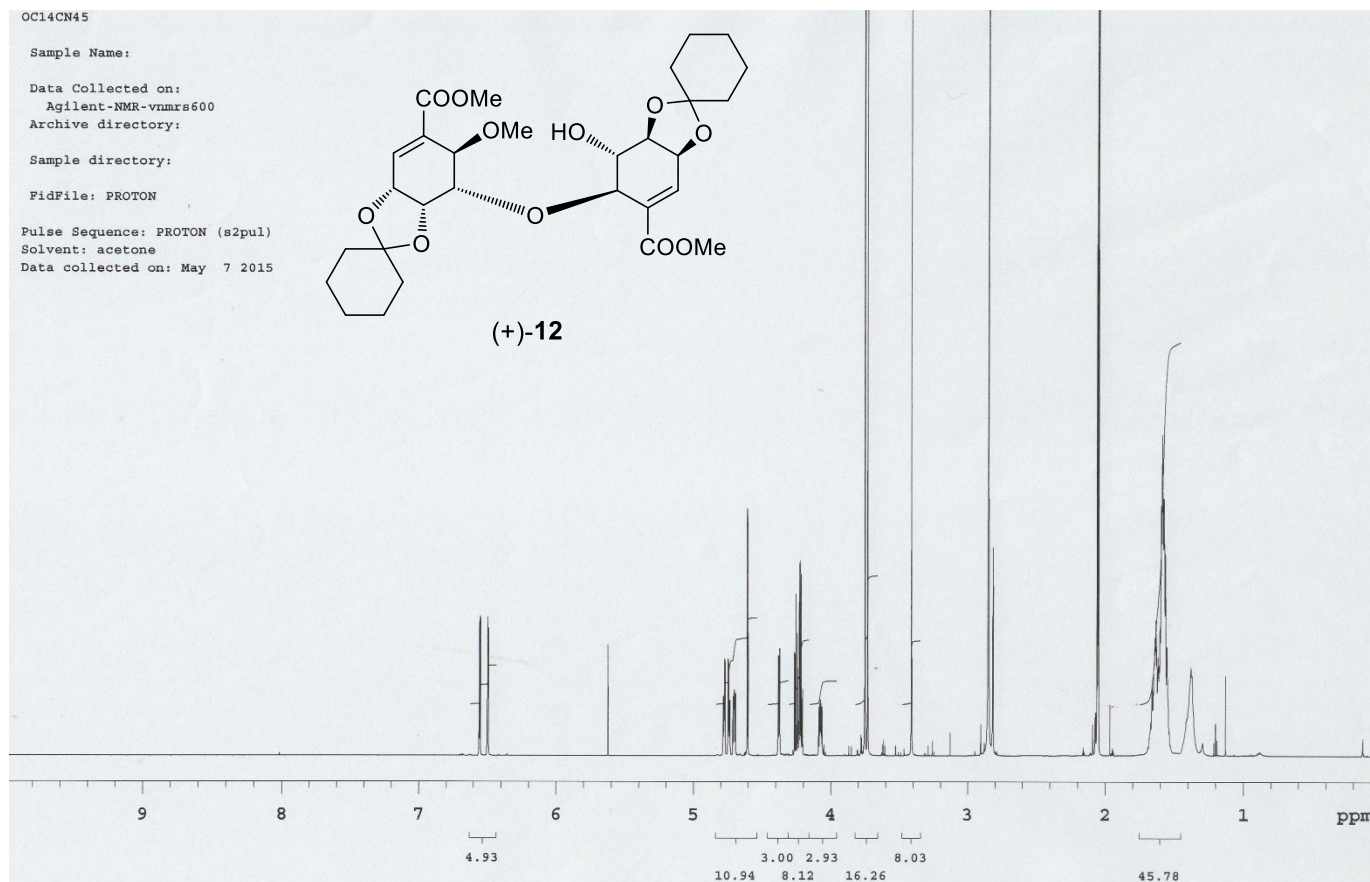
| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|-------|--------|-------|-----------|--------|--------|
| 1     | 2622.0    | 6.558 | 20.6   | 36    | 1692.7    | 4.234 | 21.7   | 71    | 641.1     | 1.603  | 50.7   |
| 2     | 2620.8    | 6.555 | 21.9   | 37    | 1689.6    | 4.226 | 38.5   | 72    | 635.2     | 1.589  | 92.9   |
| 3     | 2618.4    | 6.549 | 21.8   | 38    | 1688.1    | 4.222 | 41.6   | 73    | 631.7     | 1.580  | 93.2   |
| 4     | 2617.1    | 6.545 | 21.3   | 39    | 1685.5    | 4.215 | 30.1   | 74    | 618.0     | 1.546  | 21.2   |
| 5     | 2598.5    | 6.499 | 22.2   | 40    | 1681.4    | 4.205 | 5.9    | 75    | 559.7     | 1.400  | 18.6   |
| 6     | 2597.5    | 6.496 | 19.1   | 41    | 1678.9    | 4.199 | 8.1    | 76    | 554.8     | 1.388  | 24.9   |
| 7     | 2596.0    | 6.492 | 21.1   | 42    | 1631.9    | 4.081 | 7.2    | 77    | 548.9     | 1.373  | 22.9   |
| 8     | 2249.7    | 5.626 | 218.3  | 43    | 1628.6    | 4.073 | 8.2    | 78    | 522.1     | 1.306  | 3.2    |
| 9     | 1914.8    | 4.789 | 7.8    | 44    | 1626.4    | 4.068 | 12.0   | 79    | 516.8     | 1.293  | 5.1    |
| 10    | 1913.8    | 4.786 | 8.5    | 45    | 1625.3    | 4.065 | 9.2    | 80    | 51.4      | 0.129  | 7.7    |
| 11    | 1912.0    | 4.782 | 8.5    | 46    | 1622.9    | 4.059 | 9.2    | 81    | -0.0      | -0.000 | 55.7   |
| 12    | 1911.1    | 4.780 | 8.9    | 47    | 1621.5    | 4.055 | 11.0   |       |           |        |        |
| 13    | 1909.1    | 4.775 | 16.3   | 48    | 1619.8    | 4.051 | 10.2   |       |           |        |        |
| 14    | 1907.9    | 4.772 | 17.5   | 49    | 1616.3    | 4.042 | 6.2    |       |           |        |        |
| 15    | 1906.4    | 4.768 | 17.2   | 50    | 1614.3    | 4.037 | 4.3    |       |           |        |        |
| 16    | 1905.2    | 4.765 | 16.1   | 51    | 1519.8    | 3.801 | 3.4    |       |           |        |        |
| 17    | 1898.3    | 4.748 | 19.2   | 52    | 1510.6    | 3.778 | 4.7    |       |           |        |        |
| 18    | 1896.0    | 4.742 | 17.8   | 53    | 1508.7    | 3.773 | 3.9    |       |           |        |        |
| 19    | 1892.7    | 4.734 | 9.7    | 54    | 1507.1    | 3.769 | 3.7    |       |           |        |        |
| 20    | 1890.7    | 4.729 | 9.4    | 55    | 1498.5    | 3.748 | 252.8  |       |           |        |        |
| 21    | 1885.2    | 4.715 | 10.9   | 56    | 1490.3    | 3.727 | 252.4  |       |           |        |        |
| 22    | 1884.3    | 4.713 | 11.4   | 57    | 1445.3    | 3.615 | 3.5    |       |           |        |        |
| 23    | 1881.5    | 4.706 | 11.9   | 58    | 1363.5    | 3.410 | 265.2  |       |           |        |        |
| 24    | 1880.4    | 4.703 | 13.0   | 59    | 1132.1    | 2.831 | 90.4   |       |           |        |        |
| 25    | 1879.2    | 4.700 | 13.5   | 60    | 1118.6    | 2.798 | 12.3   |       |           |        |        |
| 26    | 1878.2    | 4.697 | 12.4   | 61    | 825.5     | 2.065 | 17.1   |       |           |        |        |
| 27    | 1875.3    | 4.690 | 11.7   | 62    | 823.4     | 2.059 | 33.8   |       |           |        |        |
| 28    | 1874.5    | 4.688 | 11.3   | 63    | 821.2     | 2.054 | 48.4   |       |           |        |        |
| 29    | 1834.4    | 4.588 | 28.4   | 64    | 819.1     | 2.049 | 32.5   |       |           |        |        |
| 30    | 1831.1    | 4.579 | 29.2   | 65    | 816.7     | 2.043 | 17.0   |       |           |        |        |
| 31    | 1751.6    | 4.381 | 17.1   | 66    | 674.3     | 1.686 | 4.2    |       |           |        |        |
| 32    | 1746.2    | 4.367 | 18.5   | 67    | 665.3     | 1.664 | 12.2   |       |           |        |        |
| 33    | 1705.9    | 4.266 | 15.7   | 68    | 660.6     | 1.652 | 18.8   |       |           |        |        |
| 34    | 1699.2    | 4.250 | 27.2   | 69    | 653.8     | 1.635 | 43.7   |       |           |        |        |
| 35    | 1696.3    | 4.242 | 9.0    | 70    | 648.7     | 1.622 | 32.1   |       |           |        |        |

Figure S4:  $^{13}\text{C}$ -NMR Spectrum of (-)-12 in acetone- $d_6$  (100 MHz)



| INDEX | FREQUENCY | PPM     | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|---------|--------|-------|-----------|--------|--------|
| 1     | 16833.6   | 167.432 | 9.3    | 36    | 2464.4    | 24.511 | 28.7   |
| 2     | 16829.8   | 167.394 | 10.9   | 37    | 2460.5    | 24.473 | 29.0   |
| 3     | 13681.1   | 136.077 | 15.2   |       |           |        |        |
| 4     | 13549.1   | 134.764 | 11.2   |       |           |        |        |
| 5     | 13414.1   | 133.421 | 15.0   |       |           |        |        |
| 6     | 13410.3   | 133.383 | 15.3   |       |           |        |        |
| 7     | 11194.7   | 111.346 | 18.5   |       |           |        |        |
| 8     | 11169.5   | 111.096 | 16.3   |       |           |        |        |
| 9     | 8091.0    | 80.476  | 18.7   |       |           |        |        |
| 10    | 7746.2    | 77.046  | 20.1   |       |           |        |        |
| 11    | 7661.5    | 76.204  | 21.4   |       |           |        |        |
| 12    | 7632.5    | 75.916  | 21.7   |       |           |        |        |
| 13    | 7437.2    | 73.973  | 23.4   |       |           |        |        |
| 14    | 7315.9    | 72.766  | 16.5   |       |           |        |        |
| 15    | 7292.2    | 72.531  | 21.7   |       |           |        |        |
| 16    | 7197.6    | 71.590  | 21.1   |       |           |        |        |
| 17    | 6066.2    | 60.336  | 13.3   |       |           |        |        |
| 18    | 5529.1    | 54.994  | 8.9    |       |           |        |        |
| 19    | 5239.9    | 52.118  | 18.3   |       |           |        |        |
| 20    | 5232.3    | 52.042  | 21.0   |       |           |        |        |
| 21    | 3894.9    | 38.740  | 26.5   |       |           |        |        |
| 22    | 3783.5    | 37.632  | 21.2   |       |           |        |        |
| 23    | 3649.2    | 36.296  | 27.8   |       |           |        |        |
| 24    | 3594.3    | 35.750  | 20.1   |       |           |        |        |
| 25    | 3060.2    | 30.438  | 82.5   |       |           |        |        |
| 26    | 3041.1    | 30.248  | 264.7  |       |           |        |        |
| 27    | 3022.1    | 30.059  | 484.7  |       |           |        |        |
| 28    | 3002.2    | 29.861  | 587.1  |       |           |        |        |
| 29    | 2983.2    | 29.672  | 523.4  |       |           |        |        |
| 30    | 2964.1    | 29.482  | 230.4  |       |           |        |        |
| 31    | 2944.3    | 29.285  | 86.6   |       |           |        |        |
| 32    | 2593.3    | 25.794  | 27.1   |       |           |        |        |
| 33    | 2584.9    | 25.710  | 24.8   |       |           |        |        |
| 34    | 2485.0    | 24.716  | 33.4   |       |           |        |        |
| 35    | 2482.7    | 24.694  | 32.1   |       |           |        |        |

Figure S5: <sup>1</sup>H- NMR Spectrum of (+)-12 in acetone-d<sub>6</sub> (600 MHz)



OC14CN45

| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|-------|--------|-------|-----------|-------|--------|
| 1     | 3934.4    | 6.558 | 26.0   | 51    | 2531.2    | 4.219 | 38.0   | 101   | 956.6     | 1.595 | 48.7   |
| 2     | 3933.0    | 6.556 | 26.6   | 52    | 2528.3    | 4.214 | 35.4   | 102   | 951.9     | 1.587 | 62.4   |
| 3     | 3930.6    | 6.552 | 27.3   | 53    | 2524.4    | 4.208 | 11.1   | 103   | 949.6     | 1.583 | 49.5   |
| 4     | 3929.4    | 6.550 | 27.0   | 54    | 2521.8    | 4.204 | 13.0   | 104   | 945.2     | 1.576 | 50.0   |
| 5     | 3898.6    | 6.499 | 16.2   | 55    | 2452.0    | 4.087 | 9.6    | 105   | 939.3     | 1.566 | 39.3   |
| 6     | 3897.7    | 6.497 | 26.9   | 56    | 2448.4    | 4.081 | 10.2   | 106   | 932.0     | 1.554 | 21.3   |
| 7     | 3896.9    | 6.496 | 18.3   | 57    | 2446.4    | 4.078 | 10.7   | 107   | 927.0     | 1.545 | 11.1   |
| 8     | 3896.0    | 6.494 | 17.5   | 58    | 2445.2    | 4.076 | 11.0   | 108   | 921.4     | 1.536 | 5.0    |
| 9     | 3894.8    | 6.492 | 24.8   | 59    | 2442.3    | 4.072 | 10.4   | 109   | 846.9     | 1.432 | 71.0   |
| 10    | 3893.9    | 6.491 | 15.0   | 60    | 2441.7    | 4.070 | 10.1   | 110   | 844.2     | 1.407 | 7.5    |
| 11    | 3373.1    | 5.623 | 21.6   | 61    | 2439.6    | 4.067 | 9.7    | 111   | 827.5     | 1.379 | 17.4   |
| 12    | 2869.2    | 4.783 | 10.9   | 62    | 2436.4    | 4.061 | 9.6    | 112   | 823.4     | 1.373 | 15.7   |
| 13    | 2868.1    | 4.781 | 11.7   | 63    | 2266.5    | 3.778 | 4.2    | 113   | 775.6     | 1.293 | 2.6    |
| 14    | 2866.6    | 4.778 | 11.0   | 64    | 2263.6    | 3.773 | 3.6    | 114   | 727.1     | 1.212 | 2.6    |
| 15    | 2865.1    | 4.776 | 11.0   | 65    | 2250.7    | 3.752 | 13.3   | 115   | 720.1     | 1.200 | 6.4    |
| 16    | 2863.7    | 4.774 | 18.3   | 66    | 2248.3    | 3.748 | 354.0  | 116   | 713.1     | 1.189 | 3.1    |
| 17    | 2862.2    | 4.771 | 18.9   | 67    | 2236.6    | 3.728 | 418.9  | 117   | 677.0     | 1.128 | 15.6   |
| 18    | 2860.7    | 4.769 | 18.7   | 68    | 2167.6    | 3.613 | 3.1    | 118   | 77.2      | 0.129 | 3.5    |
| 19    | 2859.6    | 4.767 | 18.3   | 69    | 2045.9    | 3.410 | 368.3  | 119   | 0.0       | 0.000 | 91.3   |
| 20    | 2847.5    | 4.747 | 17.3   | 70    | 1954.9    | 3.259 | 3.0    |       |           |       |        |
| 21    | 2846.9    | 4.746 | 18.9   | 71    | 1875.7    | 3.127 | 4.6    |       |           |       |        |
| 22    | 2844.9    | 4.742 | 17.3   | 72    | 1741.0    | 2.902 | 6.2    |       |           |       |        |
| 23    | 2844.0    | 4.741 | 18.0   | 73    | 1709.0    | 2.849 | 2887.4 |       |           |       |        |
| 24    | 2841.9    | 4.737 | 10.9   | 74    | 1693.1    | 2.822 | 4.2    |       |           |       |        |
| 25    | 2841.1    | 4.736 | 10.9   | 75    | 1689.0    | 2.816 | 40.6   |       |           |       |        |
| 26    | 2839.0    | 4.732 | 10.9   | 76    | 1254.2    | 2.091 | 6.2    |       |           |       |        |
| 27    | 2838.4    | 4.732 | 10.4   | 77    | 1253.3    | 2.089 | 3.4    |       |           |       |        |
| 28    | 2825.5    | 4.710 | 11.1   | 78    | 1252.4    | 2.088 | 3.2    |       |           |       |        |
| 29    | 2824.6    | 4.709 | 11.7   | 79    | 1245.6    | 2.076 | 3.0    |       |           |       |        |
| 30    | 2822.0    | 4.704 | 11.7   | 80    | 1244.8    | 2.075 | 7.5    |       |           |       |        |
| 31    | 2820.8    | 4.702 | 12.7   | 81    | 1242.4    | 2.071 | 8.5    |       |           |       |        |
| 32    | 2819.6    | 4.700 | 13.0   | 82    | 1241.2    | 2.069 | 3.3    |       |           |       |        |
| 33    | 2818.5    | 4.698 | 12.4   | 83    | 1240.4    | 2.068 | 7.9    |       |           |       |        |
| 34    | 2815.8    | 4.694 | 12.2   | 84    | 1236.8    | 2.062 | 99.3   |       |           |       |        |
| 35    | 2814.7    | 4.692 | 12.2   | 85    | 1234.8    | 2.058 | 182.3  |       |           |       |        |
| 36    | 2763.0    | 4.606 | 48.1   | 86    | 1232.4    | 2.054 | 295.5  |       |           |       |        |
| 37    | 2759.5    | 4.600 | 46.4   | 87    | 1230.4    | 2.051 | 180.6  |       |           |       |        |
| 38    | 2627.7    | 4.380 | 19.6   | 88    | 1228.0    | 2.047 | 98.3   |       |           |       |        |
| 39    | 2626.6    | 4.378 | 12.7   | 89    | 1180.2    | 1.967 | 10.0   |       |           |       |        |
| 40    | 2623.3    | 4.373 | 12.4   | 90    | 1008.0    | 1.680 | 3.6    |       |           |       |        |
| 41    | 2622.2    | 4.371 | 20.9   | 91    | 1003.8    | 1.670 | 6.6    |       |           |       |        |
| 42    | 2621.0    | 4.369 | 12.9   | 92    | 996.5     | 1.661 | 13.6   |       |           |       |        |
| 43    | 2557.3    | 4.263 | 20.1   | 93    | 988.6     | 1.648 | 17.3   |       |           |       |        |
| 44    | 2550.9    | 4.252 | 31.5   | 94    | 987.1     | 1.645 | 17.8   |       |           |       |        |
| 45    | 2544.4    | 4.241 | 23.9   | 95    | 984.2     | 1.641 | 23.0   |       |           |       |        |
| 46    | 2542.6    | 4.238 | 13.2   | 96    | 980.1     | 1.634 | 26.4   |       |           |       |        |
| 47    | 2541.5    | 4.236 | 6.8    | 97    | 976.6     | 1.628 | 21.3   |       |           |       |        |
| 48    | 2537.1    | 4.229 | 22.6   | 98    | 970.7     | 1.618 | 19.2   |       |           |       |        |
| 49    | 2535.9    | 4.227 | 37.5   | 99    | 965.1     | 1.609 | 17.6   |       |           |       |        |
| 50    | 2534.7    | 4.225 | 22.5   | 100   | 961.9     | 1.603 | 25.3   |       |           |       |        |



Figure S6:  $^{13}\text{C}$ -NMR Spectrum of (+)-12 in acetone- $d_6$  (125 MHz)

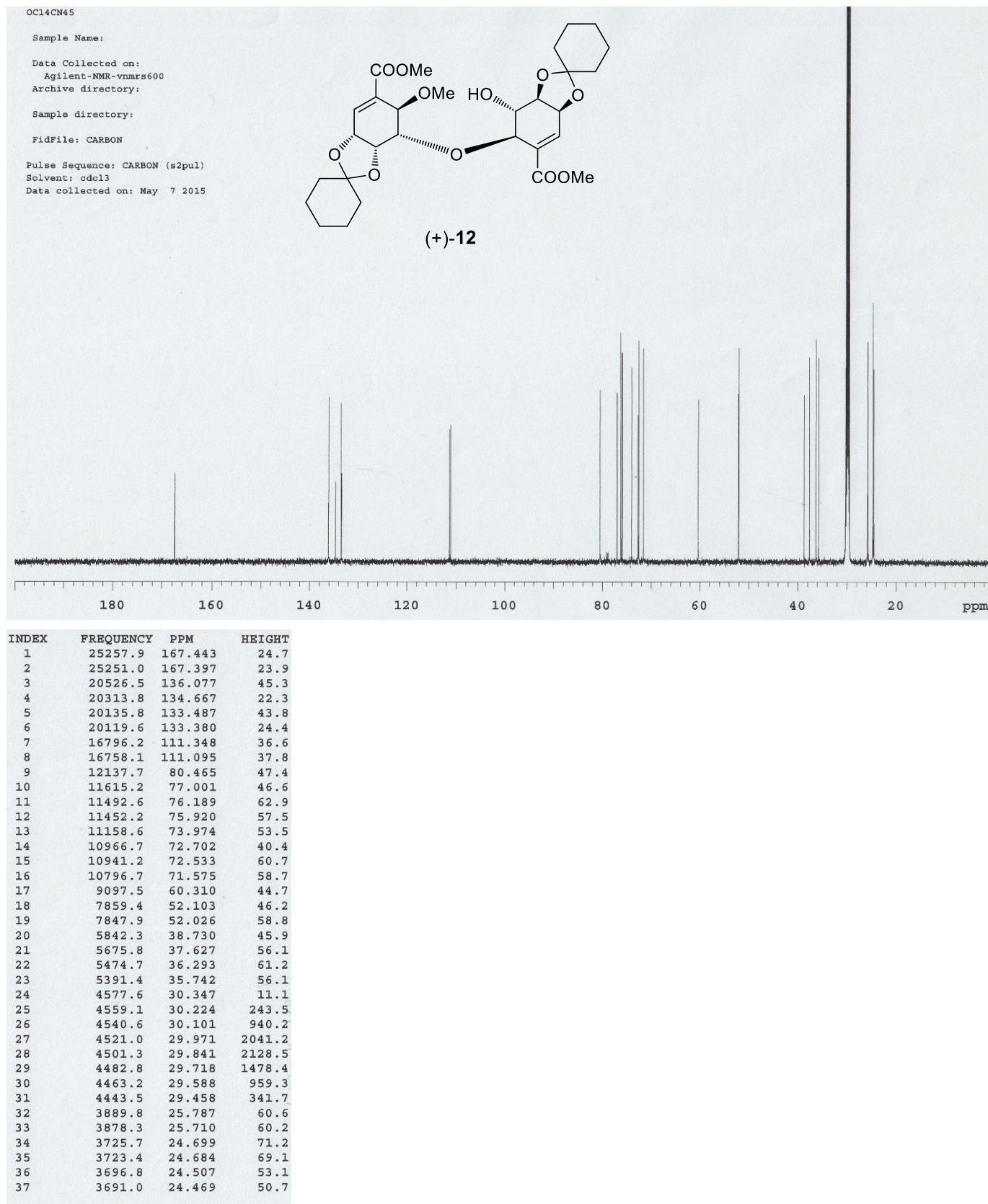
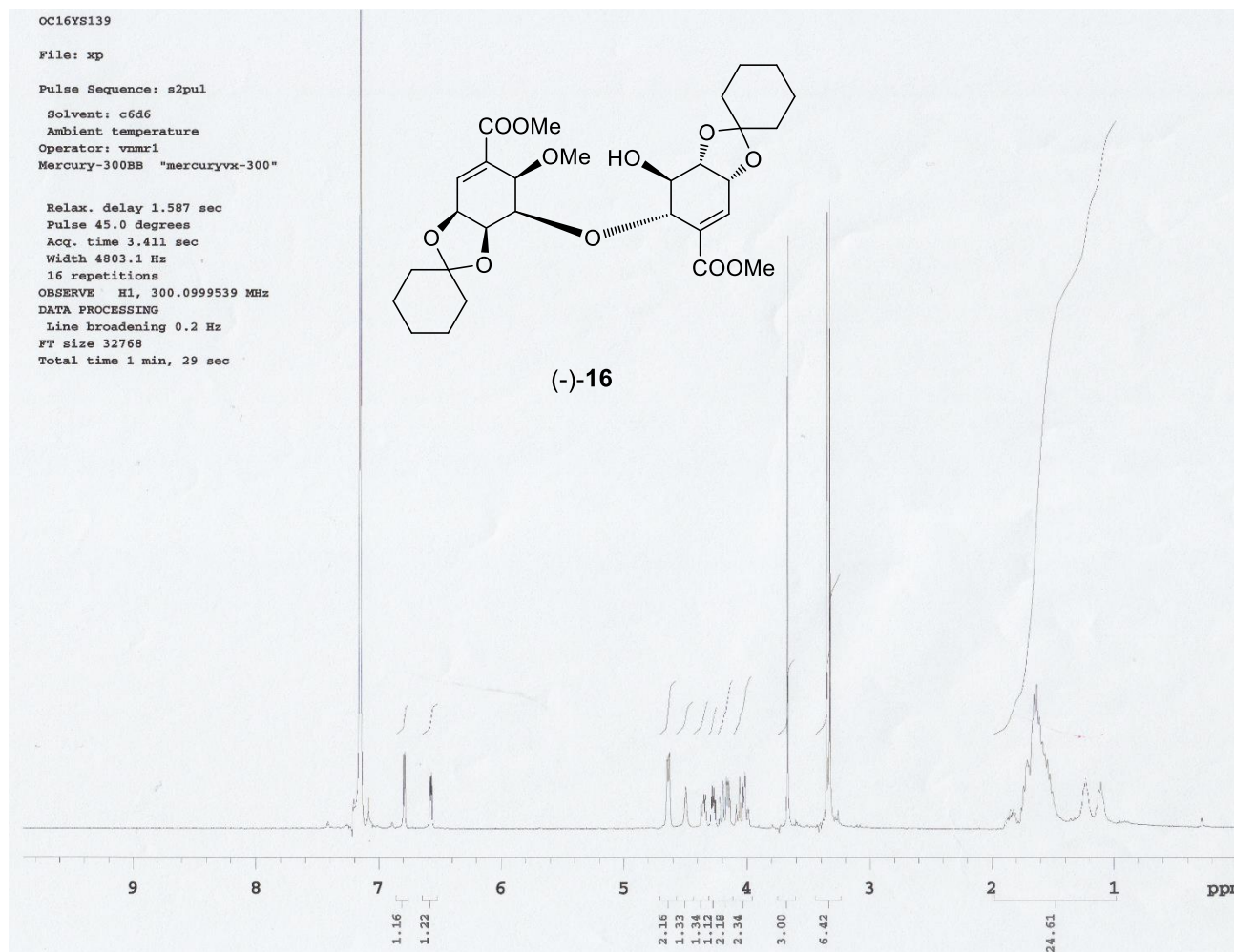
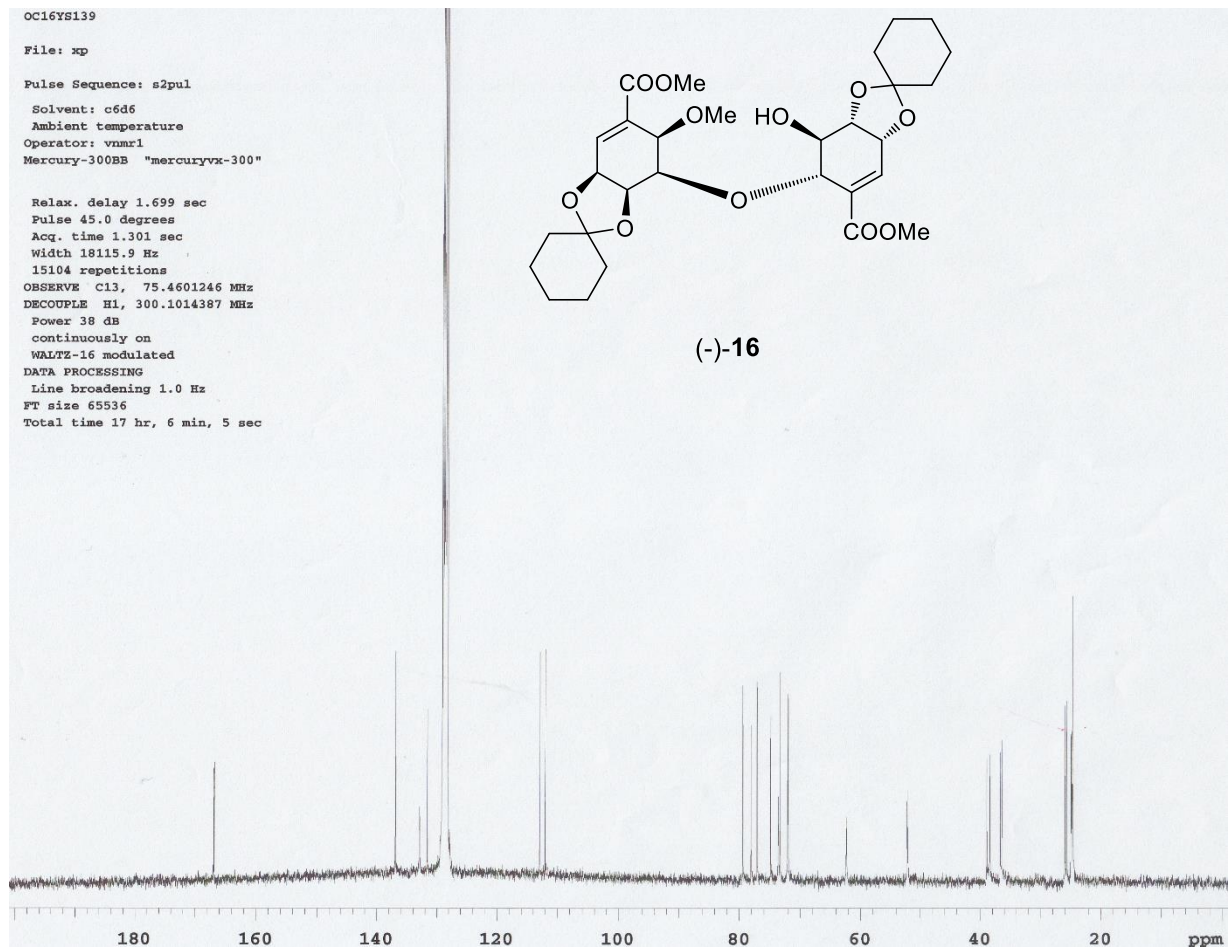


Figure S7: <sup>1</sup>H- NMR Spectrum of (-)-16 in C<sub>6</sub>D<sub>6</sub> (300 MHz)



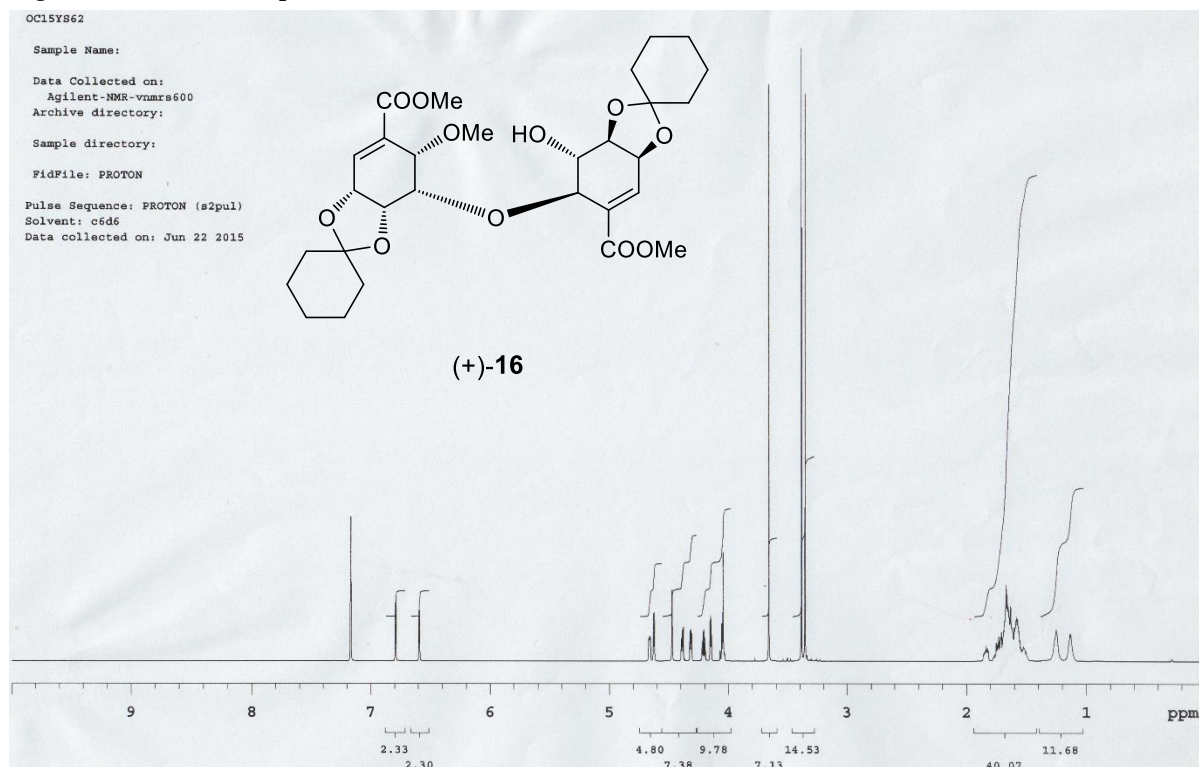
| INDEX | FREQUENCY | FFR   | DEGSI  | ANGLE | FREQUENCY | FFR   | DEGSI |
|-------|-----------|-------|--------|-------|-----------|-------|-------|
| 1     | 2161.8    | 7.204 | 17.5   | 42    | 554.5     | 1.848 | 12.1  |
| 2     | 2145.7    | 7.150 | 1278.3 | 43    | 549.8     | 1.832 | 10.7  |
| 3     | 2125.5    | 7.083 | 18.1   | 44    | 546.8     | 1.822 | 12.1  |
| 4     | 2039.3    | 6.795 | 41.4   | 45    | 542.4     | 1.808 | 10.4  |
| 5     | 2036.4    | 6.786 | 42.6   | 46    | 527.2     | 1.757 | 13.2  |
| 6     | 1975.1    | 6.581 | 29.4   | 47    | 521.6     | 1.738 | 24.7  |
| 7     | 1973.6    | 6.577 | 29.7   | 48    | 513.1     | 1.710 | 38.3  |
| 8     | 1971.6    | 6.570 | 31.6   | 49    | 508.7     | 1.695 | 35.7  |
| 9     | 1969.8    | 6.564 | 28.0   | 50    | 497.0     | 1.656 | 72.5  |
| 10    | 1394.3    | 4.646 | 38.6   | 51    | 489.4     | 1.631 | 77.9  |
| 11    | 1392.9    | 4.641 | 39.9   | 52    | 483.5     | 1.611 | 60.7  |
| 12    | 1389.7    | 4.631 | 41.4   | 53    | 476.8     | 1.589 | 47.9  |
| 13    | 1388.5    | 4.627 | 42.6   | 54    | 469.1     | 1.563 | 41.6  |
| 14    | 1348.9    | 4.495 | 24.2   | 55    | 463.6     | 1.545 | 38.7  |
| 15    | 1309.9    | 4.365 | 15.1   | 56    | 456.8     | 1.522 | 31.0  |
| 16    | 1306.1    | 4.352 | 16.6   | 57    | 450.7     | 1.502 | 21.6  |
| 17    | 1304.1    | 4.345 | 20.3   | 58    | 370.1     | 1.233 | 28.4  |
| 18    | 1299.7    | 4.331 | 20.0   | 59    | 337.5     | 1.125 | 22.6  |
| 19    | 1300.2    | 4.333 | 20.0   | 60    | 332.2     | 1.107 | 26.6  |
| 20    | 1286.8    | 4.288 | 21.4   |       |           |       |       |
| 21    | 1283.2    | 4.276 | 25.7   |       |           |       |       |
| 22    | 1280.3    | 4.266 | 23.8   |       |           |       |       |
| 23    | 1276.8    | 4.255 | 20.0   |       |           |       |       |
| 24    | 1265.7    | 4.217 | 19.3   |       |           |       |       |
| 25    | 1257.2    | 4.189 | 27.1   |       |           |       |       |
| 26    | 1250.1    | 4.166 | 26.5   |       |           |       |       |
| 27    | 1248.9    | 4.162 | 29.6   |       |           |       |       |
| 28    | 1245.7    | 4.151 | 28.8   |       |           |       |       |
| 29    | 1244.5    | 4.147 | 27.4   |       |           |       |       |
| 30    | 1241.3    | 4.136 | 24.3   |       |           |       |       |
| 31    | 1225.8    | 4.085 | 15.1   |       |           |       |       |
| 32    | 1217.6    | 4.057 | 29.3   |       |           |       |       |
| 33    | 1209.1    | 4.029 | 26.1   |       |           |       |       |
| 34    | 1204.7    | 4.014 | 32.1   |       |           |       |       |
| 35    | 1196.8    | 3.988 | 13.0   |       |           |       |       |
| 36    | 1101.2    | 3.669 | 314.4  |       |           |       |       |
| 37    | 1010.3    | 3.367 | 12.5   |       |           |       |       |
| 38    | 1005.3    | 3.350 | 326.6  |       |           |       |       |
| 39    | 998.3     | 3.327 | 333.3  |       |           |       |       |
| 40    | 985.1     | 3.283 | 8.7    |       |           |       |       |
| 41    | 977.8     | 3.258 | 12.1   |       |           |       |       |

Figure S8: <sup>13</sup>C-NMR Spectrum of (-)-16 in C<sub>6</sub>D<sub>6</sub> (75.5 MHz)



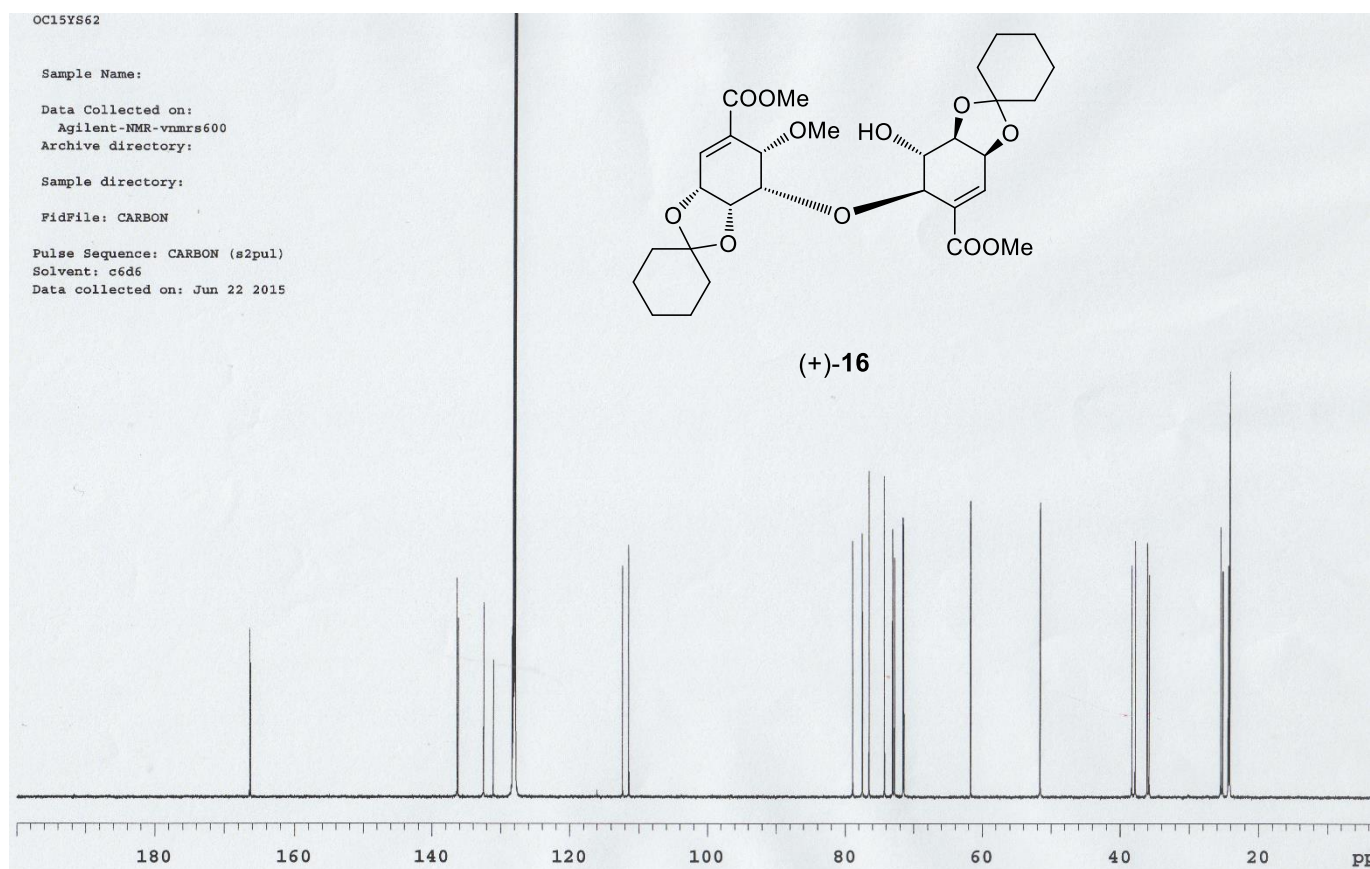
| INDEX | FREQUENCY | FFM     | DELTA  |
|-------|-----------|---------|--------|
| 1     | 12594.9   | 166.908 | 23.6   |
| 2     | 12586.1   | 166.791 | 24.9   |
| 3     | 10328.7   | 136.877 | 47.6   |
| 4     | 10027.4   | 132.884 | 15.7   |
| 5     | 9930.1    | 131.595 | 35.6   |
| 6     | 9745.5    | 129.148 | 133.0  |
| 7     | 9729.5    | 128.935 | 2049.1 |
| 8     | 9705.7    | 128.620 | 2051.6 |
| 9     | 9694.6    | 128.473 | 77.1   |
| 10    | 9681.4    | 128.298 | 2060.4 |
| 11    | 9650.4    | 127.887 | 11.2   |
| 12    | 8523.1    | 112.949 | 47.4   |
| 13    | 8453.5    | 112.026 | 48.0   |
| 14    | 5991.6    | 79.401  | 40.5   |
| 15    | 5890.4    | 78.060  | 32.5   |
| 16    | 5815.8    | 77.071  | 41.4   |
| 17    | 5649.4    | 74.866  | 34.2   |
| 18    | 5554.3    | 73.606  | 17.9   |
| 19    | 5533.8    | 73.335  | 43.3   |
| 20    | 5437.6    | 72.060  | 21.2   |
| 21    | 5432.1    | 71.987  | 38.8   |
| 22    | 4701.8    | 62.308  | 13.7   |
| 23    | 3931.1    | 52.095  | 19.0   |
| 24    | 2936.5    | 38.915  | 25.6   |
| 25    | 2898.9    | 38.417  | 26.4   |
| 26    | 2765.1    | 36.644  | 26.9   |
| 27    | 2746.3    | 36.395  | 29.4   |
| 28    | 1961.8    | 25.998  | 36.5   |
| 29    | 1939.7    | 25.705  | 37.4   |
| 30    | 1883.3    | 24.958  | 30.6   |
| 31    | 1873.9    | 24.834  | 31.3   |
| 32    | 1864.5    | 24.709  | 58.9   |

Figure S9: <sup>1</sup>H- NMR Spectrum of (+)-16 in C<sub>6</sub>D<sub>6</sub> (600 MHz)



| NDEX | FREQUENCY | PPM   | HEIGHT | NDEX | FREQUENCY | PPM   | HEIGHT |
|------|-----------|-------|--------|------|-----------|-------|--------|
| 1    | 4300.9    | 7.169 | 125.6  | 51   | 1103.6    | 1.840 | 14.0   |
| 2    | 4076.4    | 6.795 | 50.5   | 52   | 1099.2    | 1.832 | 10.5   |
| 3    | 4075.9    | 6.794 | 54.7   | 53   | 1095.4    | 1.826 | 11.4   |
| 4    | 4073.2    | 6.790 | 55.3   | 54   | 1091.6    | 1.820 | 9.3    |
| 5    | 4072.6    | 6.789 | 52.0   | 55   | 1051.1    | 1.752 | 16.7   |
| 6    | 3956.4    | 6.595 | 39.2   | 56   | 1046.7    | 1.745 | 14.5   |
| 7    | 3955.0    | 6.593 | 37.0   | 57   | 1042.9    | 1.738 | 16.5   |
| 8    | 3952.9    | 6.589 | 44.5   | 58   | 1038.2    | 1.731 | 21.9   |
| 9    | 3951.4    | 6.587 | 35.8   | 59   | 1032.9    | 1.722 | 17.1   |
| 10   | 2799.7    | 4.667 | 20.0   | 60   | 1029.7    | 1.716 | 21.6   |
| 11   | 2798.8    | 4.666 | 18.8   | 61   | 1025.3    | 1.709 | 26.0   |
| 12   | 2797.1    | 4.663 | 21.6   | 62   | 1020.0    | 1.700 | 17.4   |
| 13   | 2793.8    | 4.657 | 22.5   | 63   | 1015.6    | 1.693 | 27.4   |
| 14   | 2792.1    | 4.654 | 19.4   | 64   | 1010.3    | 1.684 | 35.1   |
| 15   | 2790.9    | 4.652 | 21.2   | 65   | 1002.7    | 1.671 | 66.4   |
| 16   | 2775.6    | 4.627 | 41.8   | 66   | 998.0     | 1.664 | 58.1   |
| 17   | 2770.9    | 4.619 | 42.7   | 67   | 991.8     | 1.653 | 47.2   |
| 18   | 2682.9    | 4.472 | 62.0   | 68   | 987.7     | 1.646 | 39.2   |
| 19   | 2636.5    | 4.395 | 19.3   | 69   | 980.1     | 1.634 | 48.0   |
| 20   | 2635.7    | 4.394 | 20.2   | 70   | 975.1     | 1.625 | 29.3   |
| 21   | 2632.1    | 4.388 | 21.9   | 71   | 972.7     | 1.622 | 28.9   |
| 22   | 2629.5    | 4.383 | 29.7   | 72   | 961.9     | 1.603 | 29.5   |
| 23   | 2625.7    | 4.377 | 30.6   | 73   | 957.5     | 1.596 | 30.0   |
| 24   | 2592.8    | 4.322 | 25.5   | 74   | 953.1     | 1.589 | 35.8   |
| 25   | 2592.2    | 4.321 | 26.3   | 75   | 949.6     | 1.583 | 38.9   |
| 26   | 2589.6    | 4.317 | 27.8   | 76   | 945.2     | 1.576 | 37.0   |
| 27   | 2589.0    | 4.316 | 28.0   | 77   | 941.1     | 1.569 | 30.3   |
| 28   | 2587.0    | 4.312 | 27.1   | 78   | 936.9     | 1.562 | 26.2   |
| 29   | 2586.4    | 4.311 | 26.2   | 79   | 932.3     | 1.554 | 18.9   |
| 30   | 2583.7    | 4.307 | 24.4   | 80   | 927.9     | 1.547 | 12.6   |
| 31   | 2531.8    | 4.220 | 18.0   | 81   | 922.3     | 1.537 | 10.1   |
| 32   | 2529.7    | 4.217 | 12.5   | 82   | 918.5     | 1.531 | 10.1   |
| 33   | 2525.0    | 4.209 | 25.9   | 83   | 914.9     | 1.525 | 13.3   |
| 34   | 2523.0    | 4.206 | 27.9   | 84   | 910.5     | 1.518 | 10.8   |
| 35   | 2516.2    | 4.194 | 20.8   | 85   | 908.2     | 1.514 | 11.6   |
| 36   | 2492.8    | 4.155 | 35.5   | 86   | 902.9     | 1.505 | 8.7    |
| 37   | 2489.8    | 4.150 | 40.1   | 87   | 750.9     | 1.252 | 27.8   |
| 38   | 2488.4    | 4.148 | 37.4   | 88   | 747.7     | 1.246 | 25.4   |
| 39   | 2485.1    | 4.143 | 32.0   | 89   | 682.0     | 1.137 | 24.5   |
| 40   | 2441.7    | 4.070 | 9.4    | 90   | 677.5     | 1.129 | 23.2   |
| 41   | 2440.8    | 4.069 | 9.0    | 91   | 0.0       | 0.000 | 74.3   |
| 42   | 2433.5    | 4.057 | 32.7   |      |           |       |        |
| 43   | 2432.6    | 4.055 | 33.3   |      |           |       |        |
| 44   | 2426.1    | 4.044 | 94.6   |      |           |       |        |
| 45   | 2419.4    | 4.033 | 7.9    |      |           |       |        |
| 46   | 2195.2    | 3.659 | 500.7  |      |           |       |        |
| 47   | 2031.5    | 3.386 | 532.5  |      |           |       |        |
| 48   | 2013.3    | 3.356 | 492.6  |      |           |       |        |
| 49   | 1111.8    | 1.853 | 8.0    |      |           |       |        |
| 50   | 1108.3    | 1.848 | 8.7    |      |           |       |        |

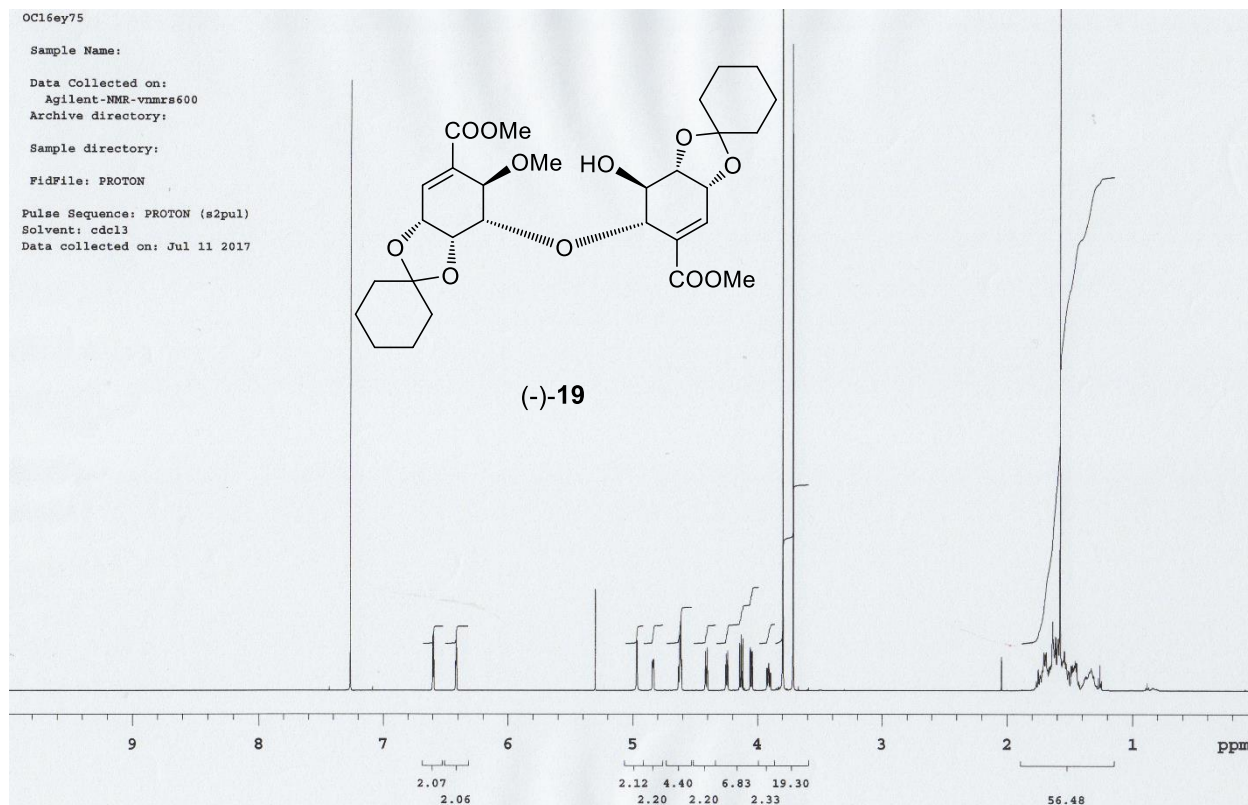
Figure S10:  $^{13}\text{C}$ -NMR Spectrum of (+)-16 in  $\text{C}_6\text{D}_6$  (150 MHz)



OC15YS62

| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 25094.9   | 166.364 | 32.6   |
| 2     | 25075.3   | 166.233 | 26.0   |
| 3     | 20569.3   | 136.362 | 42.4   |
| 4     | 20542.7   | 136.185 | 34.7   |
| 5     | 19980.9   | 132.461 | 37.6   |
| 6     | 19768.2   | 131.051 | 26.5   |
| 7     | 19357.9   | 128.330 | 33.1   |
| 8     | 19339.4   | 128.208 | 701.4  |
| 9     | 19326.6   | 128.124 | 21.4   |
| 10    | 19315.1   | 128.047 | 729.3  |
| 11    | 19302.4   | 127.963 | 26.0   |
| 12    | 19290.8   | 127.886 | 738.7  |
| 13    | 16947.7   | 112.352 | 44.8   |
| 14    | 16811.3   | 111.448 | 48.8   |
| 15    | 11897.2   | 78.871  | 49.5   |
| 16    | 11683.4   | 77.453  | 51.1   |
| 17    | 11535.4   | 76.473  | 63.1   |
| 18    | 11195.6   | 74.220  | 62.1   |
| 19    | 11019.9   | 73.055  | 51.8   |
| 20    | 10980.5   | 72.794  | 46.3   |
| 21    | 10791.0   | 71.537  | 54.1   |
| 22    | 10772.5   | 71.415  | 52.7   |
| 23    | 9305.5    | 61.690  | 57.4   |
| 24    | 7783.1    | 51.597  | 55.7   |
| 25    | 7777.4    | 51.559  | 57.0   |
| 26    | 5782.2    | 38.332  | 44.9   |
| 27    | 5708.2    | 37.842  | 49.6   |
| 28    | 5443.5    | 36.087  | 49.2   |
| 29    | 5399.5    | 35.795  | 43.0   |
| 30    | 3836.7    | 25.435  | 52.3   |
| 31    | 3795.0    | 25.159  | 43.8   |
| 32    | 3677.1    | 24.377  | 44.8   |
| 33    | 3658.6    | 24.254  | 45.0   |
| 34    | 3640.1    | 24.132  | 82.3   |
| 35    | 0.0       | 0.000   | 10.6   |

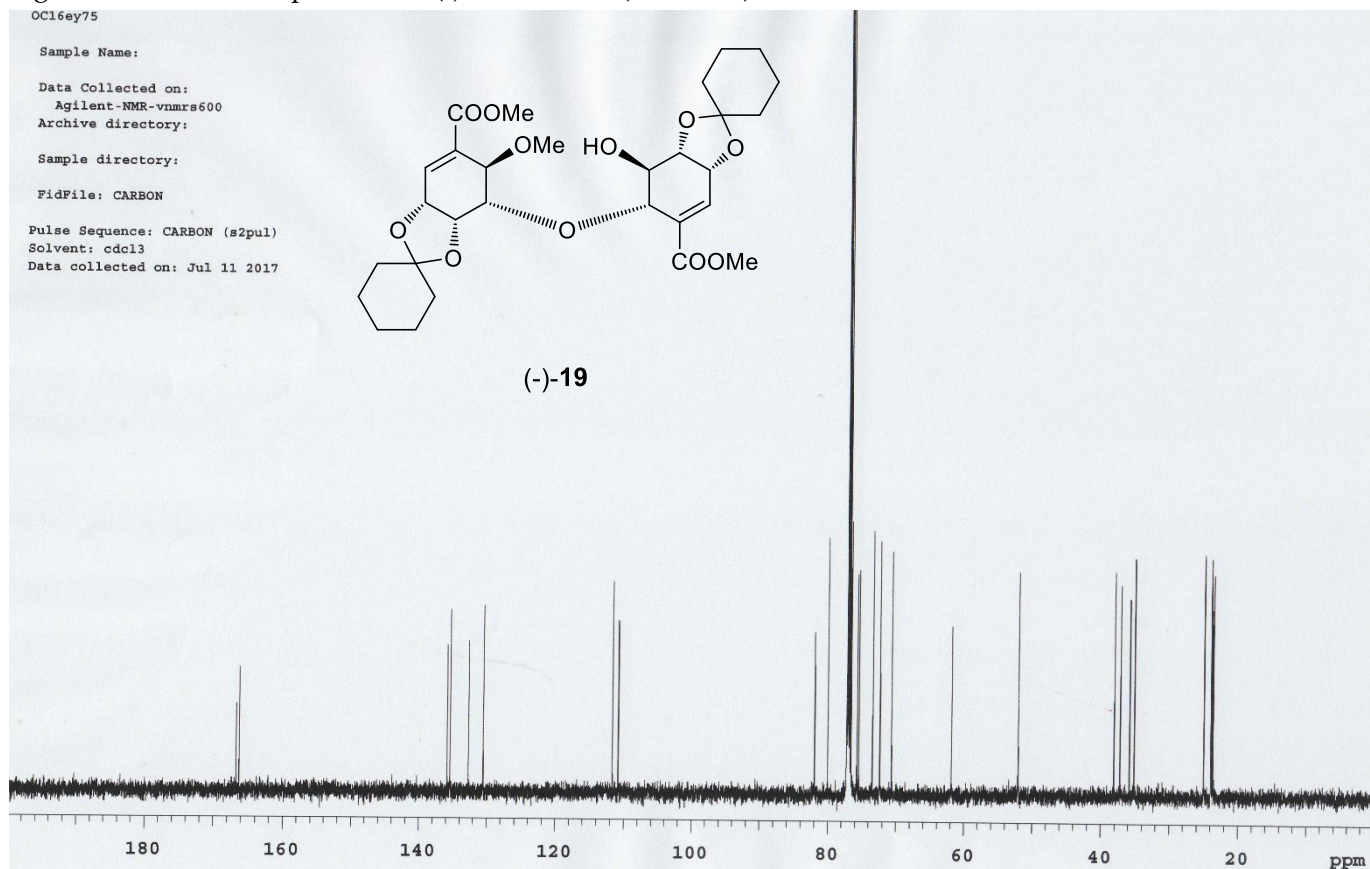
Figure S11: <sup>1</sup>H- NMR Spectrum of (-)-19 in CDCl<sub>3</sub> (600 MHz)



OC16ey75

| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|-------|--------|-------|-----------|--------|--------|
| 1     | 4357.3    | 7.263 | 397.1  | 51    | 2355.1    | 3.926 | 14.6   | 101   | 854.2     | 1.424  | 4.2    |
| 2     | 3960.5    | 6.602 | 35.3   | 52    | 2352.5    | 3.922 | 14.4   | 102   | 829.5     | 1.383  | 7.7    |
| 3     | 3958.8    | 6.599 | 37.1   | 53    | 2349.6    | 3.917 | 5.5    | 103   | 826.3     | 1.377  | 8.9    |
| 4     | 3956.4    | 6.595 | 38.0   | 54    | 2347.5    | 3.913 | 15.4   | 104   | 822.3     | 1.371  | 9.6    |
| 5     | 3954.4    | 6.592 | 35.4   | 55    | 2345.7    | 3.910 | 17.9   | 105   | 818.7     | 1.365  | 9.0    |
| 6     | 3852.0    | 6.421 | 19.4   | 56    | 2345.2    | 3.909 | 17.9   | 106   | 805.5     | 1.343  | 12.4   |
| 7     | 3850.5    | 6.419 | 29.0   | 57    | 2343.1    | 3.906 | 14.1   | 107   | 801.4     | 1.336  | 13.3   |
| 8     | 3848.7    | 6.416 | 39.2   | 58    | 2338.4    | 3.898 | 11.7   | 108   | 799.6     | 1.333  | 13.5   |
| 9     | 3847.6    | 6.414 | 28.6   | 59    | 2335.8    | 3.894 | 11.7   | 109   | 797.9     | 1.330  | 14.7   |
| 10    | 3845.8    | 6.411 | 19.3   | 60    | 2277.4    | 3.796 | 584.0  | 110   | 794.3     | 1.324  | 12.3   |
| 11    | 3180.3    | 5.301 | 65.9   | 61    | 2276.5    | 3.795 | 545.9  | 111   | 794.9     | 1.325  | 12.3   |
| 12    | 2980.7    | 4.969 | 33.0   | 62    | 2227.8    | 3.714 | 421.1  | 112   | 788.5     | 1.314  | 9.9    |
| 13    | 2978.1    | 4.964 | 32.4   | 63    | 1227.5    | 2.046 | 22.1   | 113   | 784.9     | 1.308  | 9.4    |
| 14    | 2905.3    | 4.843 | 16.0   | 64    | 1060.2    | 1.767 | 6.4    | 114   | 762.9     | 1.272  | 8.6    |
| 15    | 2903.9    | 4.841 | 19.9   | 65    | 1050.8    | 1.752 | 14.0   | 115   | 755.9     | 1.260  | 16.8   |
| 16    | 2901.8    | 4.837 | 17.8   | 66    | 1042.3    | 1.737 | 10.3   | 116   | 753.0     | 1.255  | 4.8    |
| 17    | 2900.3    | 4.835 | 18.7   | 67    | 1039.9    | 1.734 | 9.7    | 117   | 748.6     | 1.248  | 6.5    |
| 18    | 2898.3    | 4.831 | 20.7   | 68    | 1032.0    | 1.720 | 12.9   | 118   | 530.2     | 0.884  | 4.9    |
| 19    | 2897.1    | 4.829 | 16.4   | 69    | 1029.1    | 1.715 | 13.6   | 119   | 3.2       | 0.005  | 11.4   |
| 20    | 2779.4    | 4.633 | 15.1   | 70    | 1023.8    | 1.707 | 25.1   | 120   | -0.0      | -0.000 | 409.2  |
| 21    | 2778.3    | 4.631 | 15.7   | 71    | 1019.7    | 1.700 | 16.5   | 121   | -3.2      | -0.005 | 9.5    |
| 22    | 2775.0    | 4.626 | 17.2   | 72    | 1013.5    | 1.690 | 25.2   |       |           |        |        |
| 23    | 2772.7    | 4.622 | 37.0   | 73    | 1006.5    | 1.678 | 14.1   |       |           |        |        |
| 24    | 2770.9    | 4.619 | 30.8   | 74    | 999.7     | 1.667 | 15.5   |       |           |        |        |
| 25    | 2769.8    | 4.617 | 28.1   | 75    | 995.6     | 1.660 | 15.3   |       |           |        |        |
| 26    | 2767.7    | 4.614 | 49.5   | 76    | 992.4     | 1.654 | 16.5   |       |           |        |        |
| 27    | 2765.9    | 4.611 | 22.9   | 77    | 988.9     | 1.648 | 16.2   |       |           |        |        |
| 28    | 2764.8    | 4.609 | 20.5   | 78    | 983.0     | 1.639 | 44.9   |       |           |        |        |
| 29    | 2763.0    | 4.606 | 16.6   | 79    | 968.6     | 1.615 | 35.5   |       |           |        |        |
| 30    | 2651.5    | 4.420 | 14.3   | 80    | 959.2     | 1.599 | 29.6   |       |           |        |        |
| 31    | 2649.7    | 4.417 | 25.7   | 81    | 956.3     | 1.594 | 34.0   |       |           |        |        |
| 32    | 2648.0    | 4.414 | 14.1   | 82    | 947.8     | 1.580 | 920.6  |       |           |        |        |
| 33    | 2643.0    | 4.406 | 16.1   | 83    | 941.3     | 1.569 | 20.6   |       |           |        |        |
| 34    | 2641.2    | 4.403 | 27.8   | 84    | 936.4     | 1.561 | 18.0   |       |           |        |        |
| 35    | 2639.5    | 4.400 | 14.5   | 85    | 933.1     | 1.555 | 19.6   |       |           |        |        |
| 36    | 2552.3    | 4.255 | 16.2   | 86    | 932.0     | 1.554 | 19.6   |       |           |        |        |
| 37    | 2550.9    | 4.252 | 23.9   | 87    | 926.1     | 1.544 | 25.8   |       |           |        |        |
| 38    | 2549.1    | 4.249 | 16.0   | 88    | 922.0     | 1.537 | 18.7   |       |           |        |        |
| 39    | 2544.7    | 4.242 | 17.7   | 89    | 918.2     | 1.531 | 17.5   |       |           |        |        |
| 40    | 2543.2    | 4.239 | 26.1   | 90    | 915.5     | 1.526 | 15.5   |       |           |        |        |
| 41    | 2541.8    | 4.237 | 16.5   | 91    | 905.8     | 1.510 | 13.2   |       |           |        |        |
| 42    | 2486.6    | 4.145 | 31.1   | 92    | 894.4     | 1.491 | 16.6   |       |           |        |        |
| 43    | 2480.1    | 4.134 | 29.9   | 93    | 890.3     | 1.484 | 15.9   |       |           |        |        |
| 44    | 2477.5    | 4.130 | 36.4   | 94    | 886.8     | 1.478 | 16.7   |       |           |        |        |
| 45    | 2471.0    | 4.119 | 33.9   | 95    | 882.7     | 1.471 | 15.0   |       |           |        |        |
| 46    | 2469.3    | 4.116 | 7.1    | 96    | 878.6     | 1.465 | 15.4   |       |           |        |        |
| 47    | 2435.0    | 4.059 | 28.1   | 97    | 875.3     | 1.459 | 19.7   |       |           |        |        |
| 48    | 2432.9    | 4.056 | 26.7   | 98    | 871.8     | 1.453 | 18.2   |       |           |        |        |
| 49    | 2426.7    | 4.045 | 25.4   | 99    | 867.1     | 1.445 | 18.3   |       |           |        |        |
| 50    | 2424.4    | 4.041 | 25.7   | 100   | 858.9     | 1.432 | 5.8    |       |           |        |        |

Figure S12:  $^{13}\text{C}$ -NMR Spectrum of (-)-19 in  $\text{CDCl}_3$  (150 MHz)



OC16ey75

| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 25141.0   | 166.669 | 16.9   |
| 2     | 25078.5   | 166.255 | 24.0   |
| 3     | 20494.0   | 135.862 | 28.6   |
| 4     | 20425.8   | 135.410 | 35.5   |
| 5     | 20013.1   | 132.674 | 29.4   |
| 6     | 19687.1   | 130.513 | 36.4   |
| 7     | 16844.6   | 111.669 | 41.3   |
| 8     | 16712.8   | 110.795 | 33.6   |
| 9     | 12362.9   | 81.958  | 31.6   |
| 10    | 12070.4   | 80.019  | 50.0   |
| 11    | 11646.2   | 77.207  | 784.7  |
| 12    | 11613.8   | 76.992  | 708.7  |
| 13    | 11582.6   | 76.785  | 780.7  |
| 14    | 11554.9   | 76.602  | 53.3   |
| 15    | 11420.8   | 75.713  | 43.1   |
| 16    | 11380.3   | 75.444  | 43.8   |
| 17    | 11077.5   | 73.437  | 51.5   |
| 18    | 10916.8   | 72.371  | 49.4   |
| 19    | 10659.0   | 70.662  | 47.5   |
| 20    | 9329.6    | 61.850  | 33.0   |
| 21    | 7855.8    | 52.079  | 43.7   |
| 22    | 7851.1    | 52.048  | 41.5   |
| 23    | 5748.4    | 38.109  | 43.8   |
| 24    | 5614.3    | 37.220  | 41.2   |
| 25    | 5404.0    | 35.825  | 38.6   |
| 26    | 5298.8    | 35.127  | 46.5   |
| 27    | 3766.0    | 24.966  | 47.3   |
| 28    | 3761.3    | 24.935  | 39.6   |
| 29    | 3612.2    | 23.947  | 46.5   |
| 30    | 3607.6    | 23.916  | 43.1   |
| 31    | 3584.5    | 23.763  | 36.5   |
| 32    | 3562.5    | 23.617  | 43.3   |

Figure S13: <sup>1</sup>H-NMR Spectrum of (+)-19 in CDCl<sub>3</sub> (400 MHz)

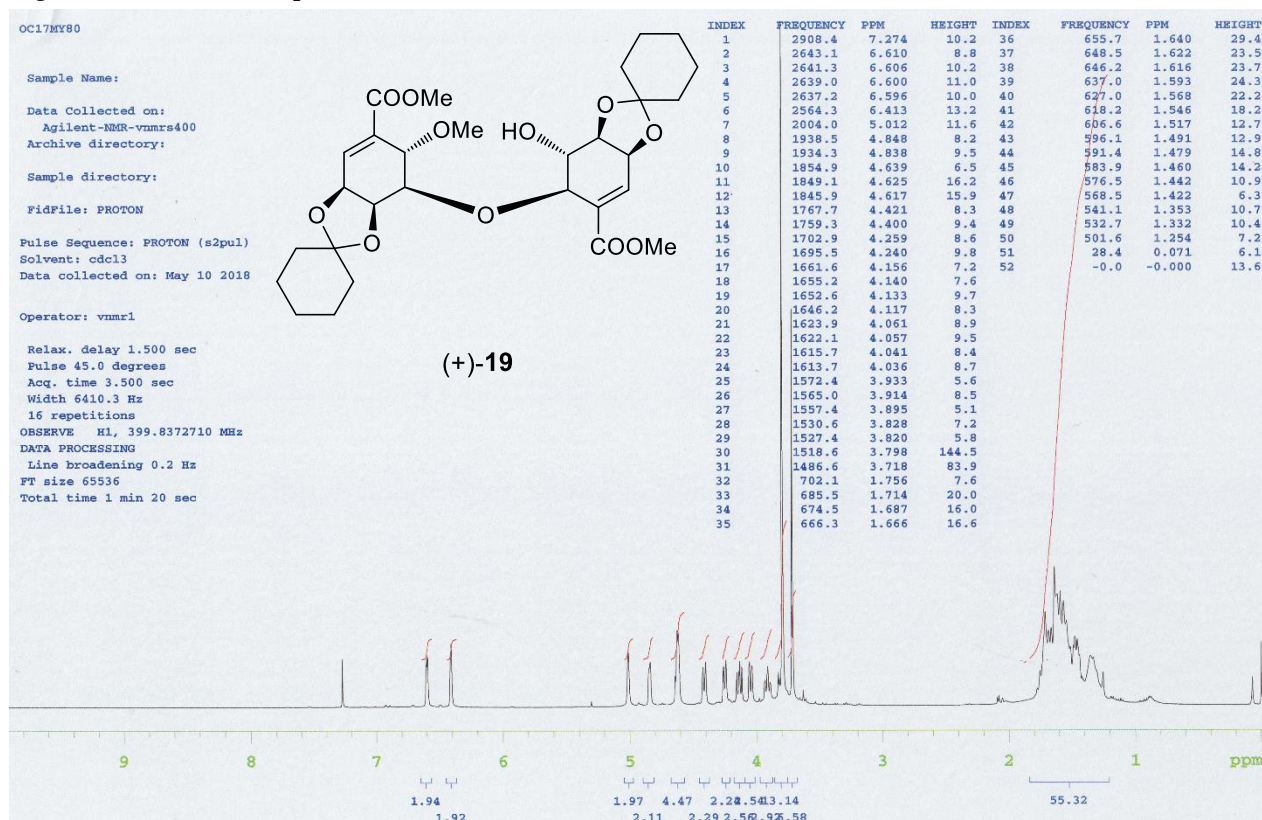


Figure S14: <sup>13</sup>C-NMR Spectrum of (+)-19 in CDCl<sub>3</sub> (100 MHz)

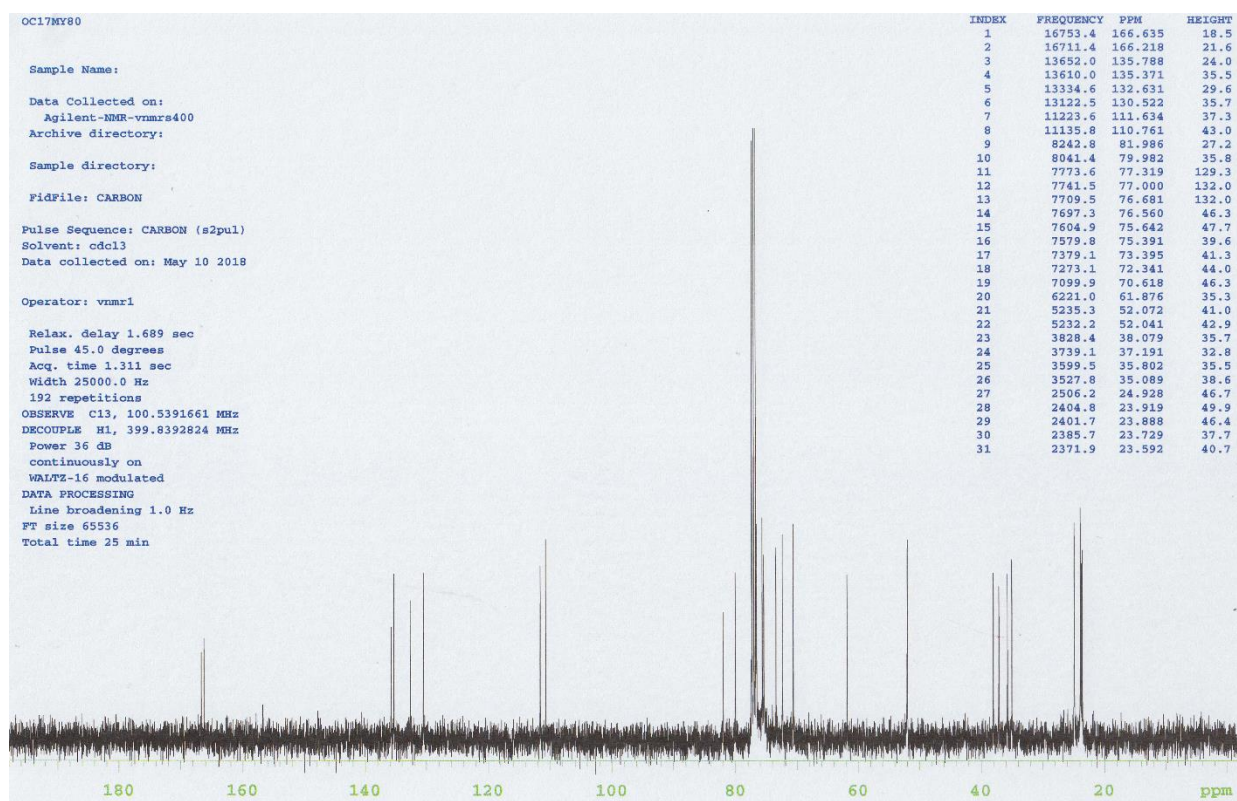
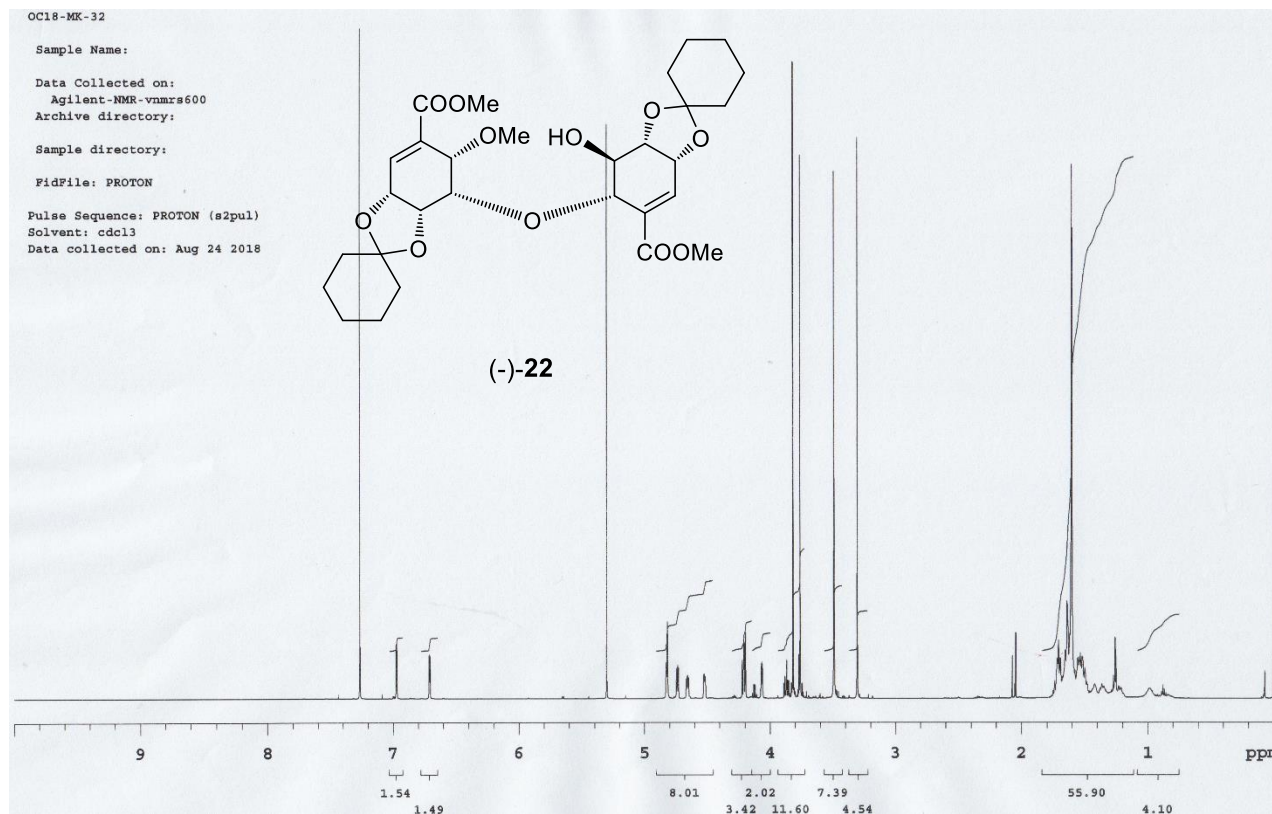


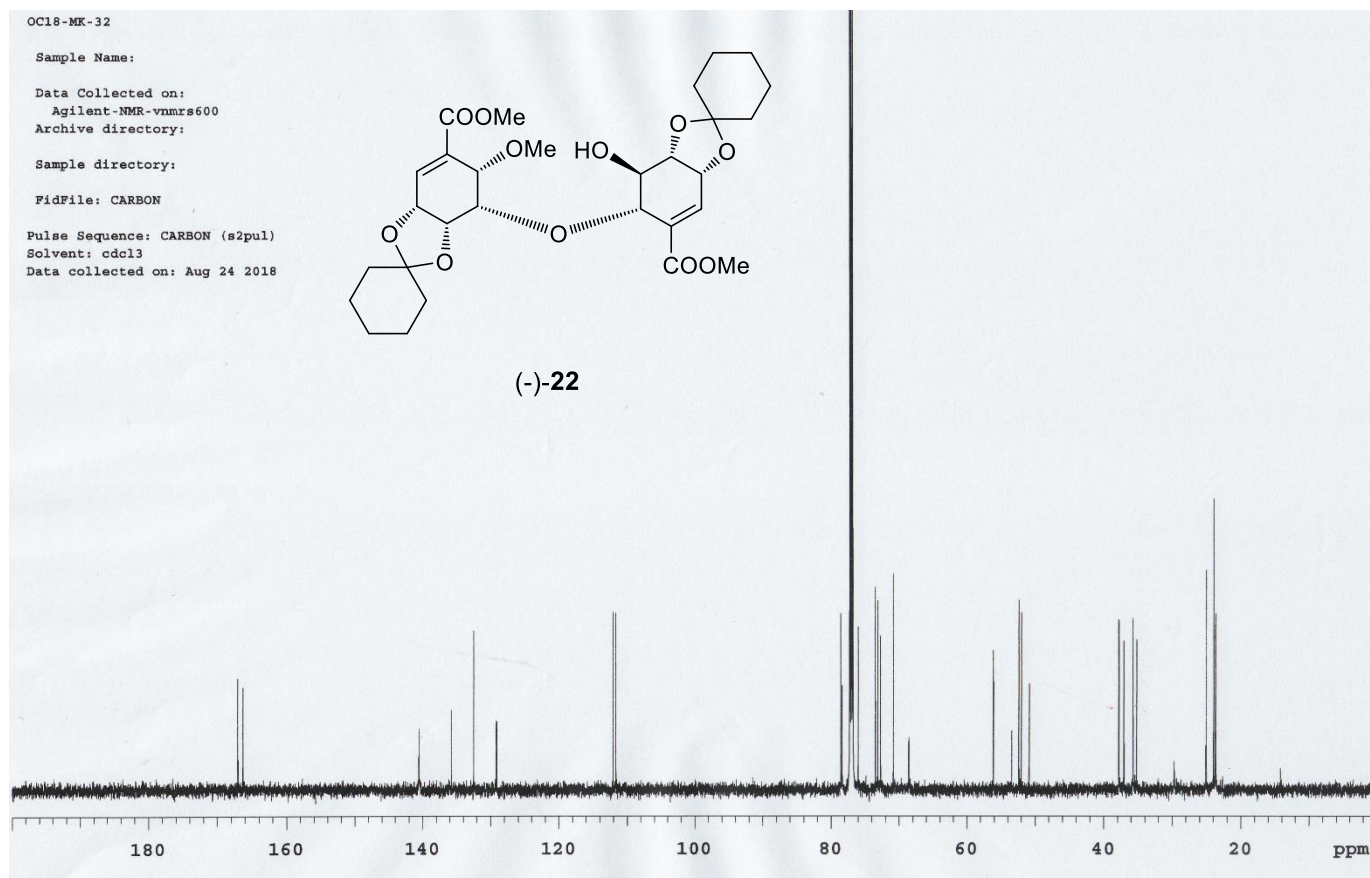


Figure S15: <sup>1</sup>H- NMR Spectrum of (-)-22 in CDCl<sub>3</sub> (600 MHz)



| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|--------|--------|
| 1     | 4357.9    | 7.264 | 454.2  | 51    | 2255.0    | 3.761  | 368.6  |
| 2     | 4185.9    | 6.978 | 36.4   | 52    | 2245.7    | 3.743  | 10.8   |
| 3     | 4185.0    | 6.976 | 36.9   | 53    | 2094.3    | 3.491  | 357.7  |
| 4     | 4182.1    | 6.971 | 37.7   | 54    | 1983.1    | 3.306  | 380.3  |
| 5     | 4181.5    | 6.970 | 33.1   | 55    | 1244.2    | 2.074  | 29.4   |
| 6     | 4028.3    | 6.715 | 29.4   | 56    | 1231.9    | 2.053  | 10.1   |
| 7     | 4026.3    | 6.712 | 30.2   | 57    | 1227.5    | 2.046  | 45.0   |
| 8     | 4024.5    | 6.709 | 29.6   | 58    | 1041.7    | 1.736  | 12.2   |
| 9     | 4022.5    | 6.705 | 28.9   | 59    | 1034.4    | 1.724  | 18.3   |
| 10    | 3180.3    | 5.301 | 389.7  | 60    | 1031.4    | 1.719  | 27.5   |
| 11    | 2894.8    | 4.825 | 24.8   | 61    | 1029.1    | 1.715  | 26.8   |
| 12    | 2889.5    | 4.817 | 52.6   | 62    | 1024.4    | 1.708  | 39.7   |
| 13    | 2845.5    | 4.743 | 20.9   | 63    | 1015.9    | 1.693  | 27.9   |
| 14    | 2841.7    | 4.737 | 21.3   | 64    | 1003.9    | 1.673  | 15.2   |
| 15    | 2839.6    | 4.733 | 23.1   | 65    | 991.8     | 1.653  | 33.1   |
| 16    | 2835.8    | 4.727 | 21.0   | 66    | 983.6     | 1.640  | 66.2   |
| 17    | 2799.1    | 4.666 | 13.4   | 67    | 970.7     | 1.618  | 44.6   |
| 18    | 2797.9    | 4.664 | 13.6   | 68    | 962.5     | 1.604  | 362.0  |
| 19    | 2794.1    | 4.658 | 15.1   | 69    | 946.3     | 1.578  | 19.7   |
| 20    | 2792.4    | 4.655 | 16.0   | 70    | 932.3     | 1.554  | 28.2   |
| 21    | 2791.5    | 4.653 | 14.9   | 71    | 928.7     | 1.548  | 25.6   |
| 22    | 2788.5    | 4.648 | 14.9   | 72    | 923.7     | 1.540  | 27.7   |
| 23    | 2787.4    | 4.646 | 14.1   | 73    | 920.5     | 1.534  | 31.1   |
| 24    | 2715.2    | 4.526 | 16.7   | 74    | 916.1     | 1.527  | 22.8   |
| 25    | 2714.0    | 4.524 | 14.5   | 75    | 911.1     | 1.519  | 28.8   |
| 26    | 2712.2    | 4.521 | 17.0   | 76    | 908.5     | 1.514  | 28.5   |
| 27    | 2709.3    | 4.516 | 15.6   | 77    | 898.8     | 1.498  | 21.0   |
| 28    | 2708.1    | 4.514 | 13.1   | 78    | 890.0     | 1.484  | 11.3   |
| 29    | 2707.6    | 4.513 | 13.3   | 79    | 853.3     | 1.422  | 10.1   |
| 30    | 2706.4    | 4.511 | 14.8   | 80    | 826.0     | 1.377  | 7.0    |
| 31    | 2532.1    | 4.221 | 26.4   | 81    | 817.5     | 1.363  | 10.2   |
| 32    | 2525.3    | 4.210 | 41.0   | 82    | 808.1     | 1.347  | 8.3    |
| 33    | 2523.0    | 4.206 | 39.1   | 83    | 804.9     | 1.342  | 8.0    |
| 34    | 2515.9    | 4.194 | 44.8   | 84    | 763.2     | 1.272  | 15.8   |
| 35    | 2476.6    | 4.128 | 9.7    | 85    | 755.9     | 1.260  | 41.6   |
| 36    | 2469.6    | 4.117 | 9.5    | 86    | 752.7     | 1.255  | 33.3   |
| 37    | 2442.6    | 4.072 | 21.7   | 87    | 748.9     | 1.248  | 19.9   |
| 38    | 2439.6    | 4.067 | 25.3   | 88    | 738.0     | 1.230  | 8.6    |
| 39    | 2438.5    | 4.065 | 24.5   | 89    | 735.1     | 1.225  | 7.8    |
| 40    | 2435.5    | 4.060 | 20.5   | 90    | 727.1     | 1.212  | 7.5    |
| 41    | 2334.6    | 3.892 | 10.5   | 91    | 724.8     | 1.208  | 6.8    |
| 42    | 2328.7    | 3.882 | 15.3   | 92    | 591.3     | 0.986  | 7.1    |
| 43    | 2320.2    | 3.868 | 26.3   | 93    | 528.2     | 0.880  | 9.6    |
| 44    | 2311.7    | 3.854 | 12.6   | 94    | 521.1     | 0.869  | 6.6    |
| 45    | 2311.1    | 3.853 | 12.5   | 95    | 42.0      | 0.070  | 18.8   |
| 46    | 2297.6    | 3.830 | 11.0   | 96    | 3.2       | 0.005  | 10.2   |
| 47    | 2296.4    | 3.828 | 7.4    | 97    | -0.0      | -0.000 | 327.1  |
| 48    | 2290.0    | 3.817 | 431.9  | 98    | -3.2      | -0.005 | 12.6   |
| 49    | 2282.9    | 3.806 | 7.5    |       |           |        |        |
| 50    | 2261.8    | 3.770 | 30.0   |       |           |        |        |

Figure S16:  $^{13}\text{C}$ -NMR Spectrum of (-)-**22** in  $\text{CDCl}_3$  (150 MHz)



OC18-MK-32

| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 25186.0   | 166.968 | 21.9   |
| 2     | 25078.5   | 166.255 | 20.1   |
| 3     | 21195.6   | 140.514 | 12.0   |
| 4     | 20475.5   | 135.739 | 15.5   |
| 5     | 19978.4   | 132.444 | 31.1   |
| 6     | 19473.2   | 129.095 | 13.4   |
| 7     | 16900.0   | 112.037 | 34.9   |
| 8     | 16839.9   | 111.638 | 34.7   |
| 9     | 11848.5   | 78.548  | 34.6   |
| 10    | 11820.7   | 78.364  | 20.4   |
| 11    | 11646.2   | 77.207  | 963.6  |
| 12    | 11615.0   | 77.000  | 962.6  |
| 13    | 11582.6   | 76.785  | 1009.2 |
| 14    | 11457.7   | 75.958  | 31.9   |
| 15    | 11079.7   | 73.452  | 39.7   |
| 16    | 11026.6   | 73.099  | 37.0   |
| 17    | 10965.3   | 72.693  | 30.2   |
| 18    | 10682.1   | 70.816  | 42.2   |
| 19    | 10337.6   | 68.532  | 10.2   |
| 20    | 8462.6    | 56.102  | 27.3   |
| 21    | 8055.7    | 53.404  | 11.6   |
| 22    | 7898.5    | 52.362  | 37.2   |
| 23    | 7843.0    | 51.994  | 34.7   |
| 24    | 7674.3    | 50.876  | 20.8   |
| 25    | 5701.0    | 37.794  | 33.2   |
| 26    | 5588.9    | 37.051  | 29.1   |
| 27    | 5386.6    | 35.710  | 33.6   |
| 28    | 5306.8    | 35.181  | 29.4   |
| 29    | 3770.6    | 24.996  | 43.0   |
| 30    | 3608.7    | 23.924  | 56.8   |
| 31    | 3568.3    | 23.655  | 32.2   |
| 32    | 3557.9    | 23.586  | 34.4   |

Figure S17: <sup>1</sup>H-NMR Spectrum of (+)-22 in CDCl<sub>3</sub> (400 MHz)

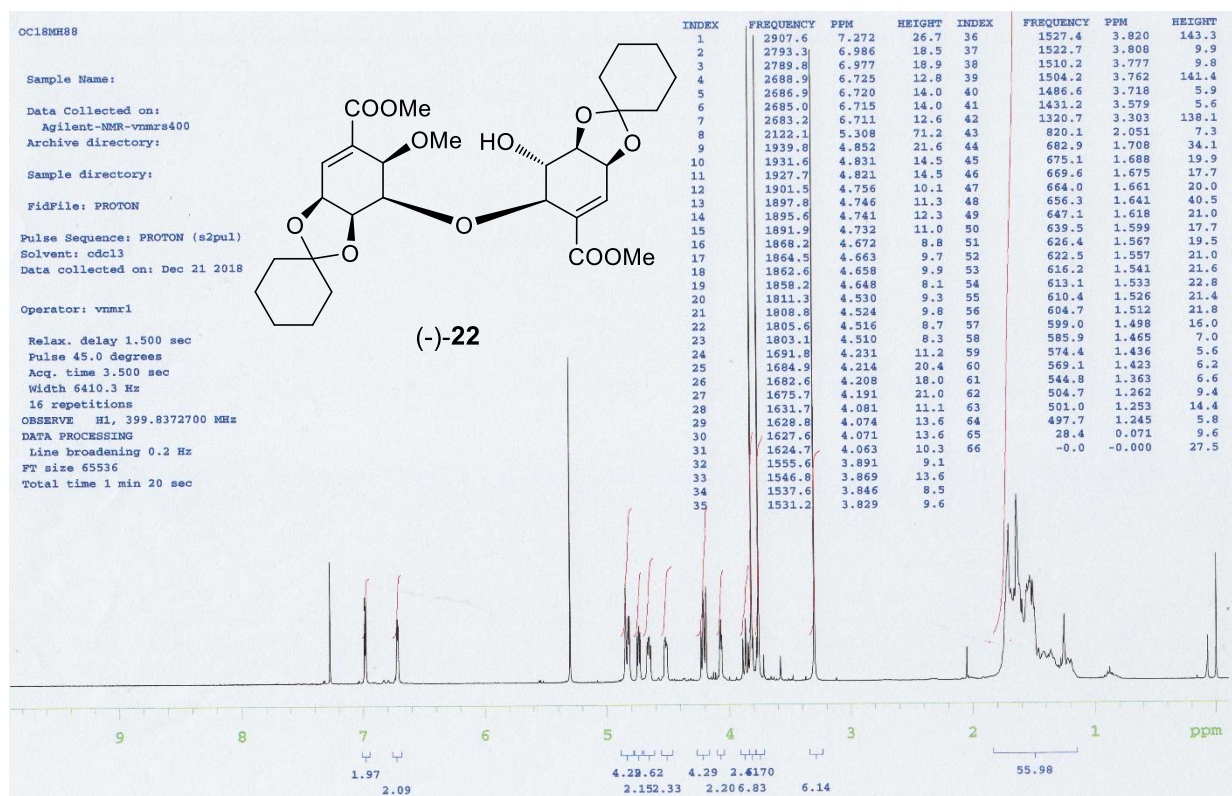


Figure S18: <sup>13</sup>C-NMR Spectrum of (+)-22 in CDCl<sub>3</sub> (100 MHz)

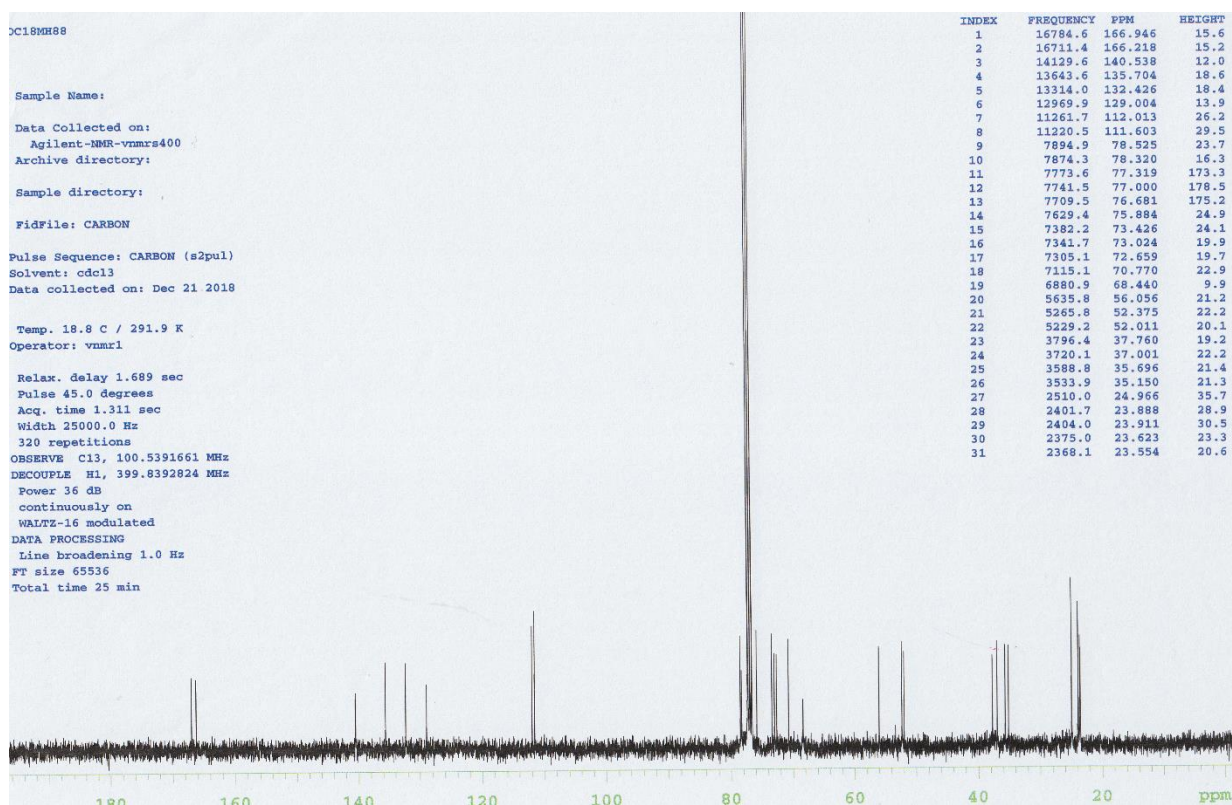
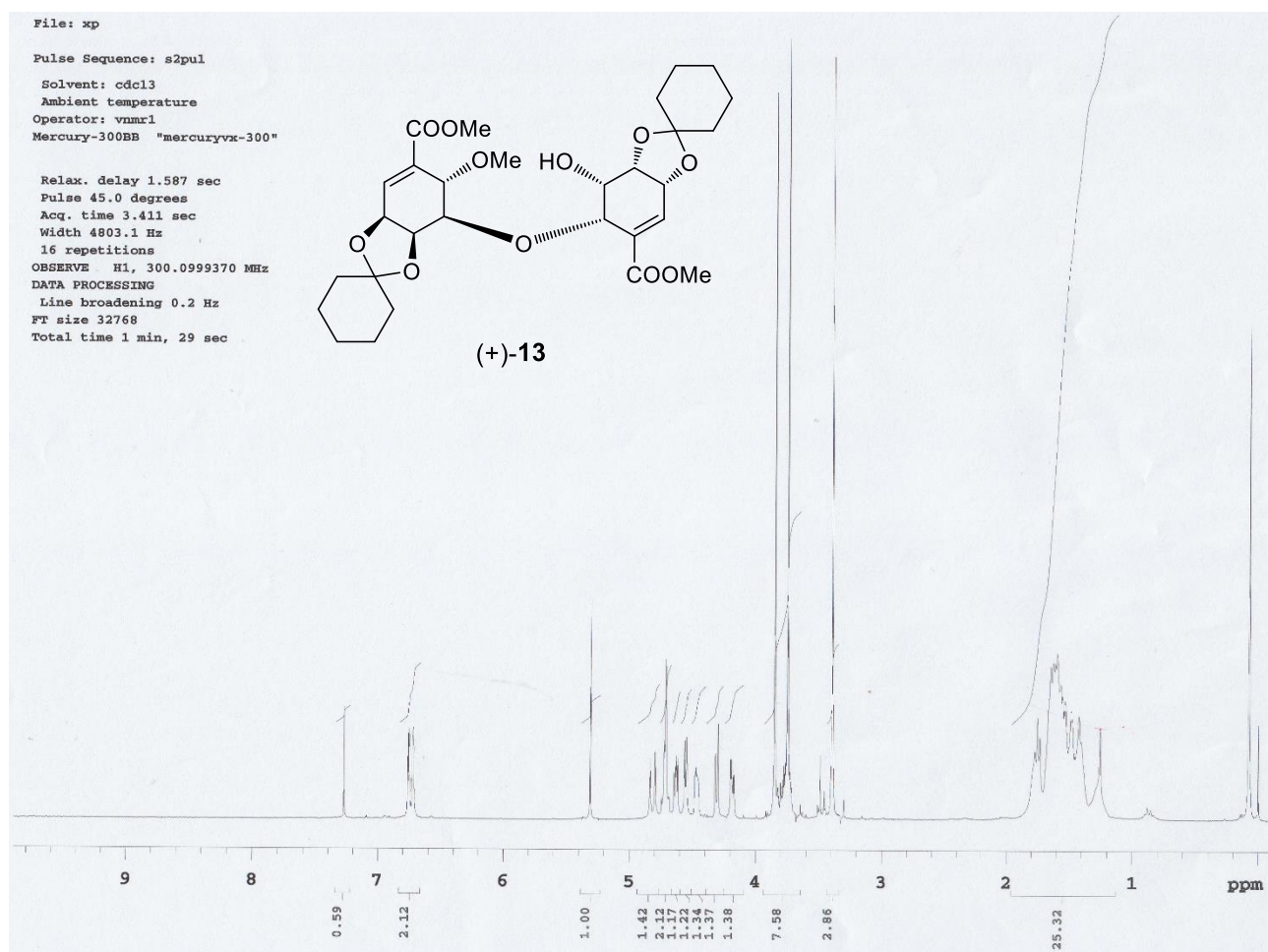
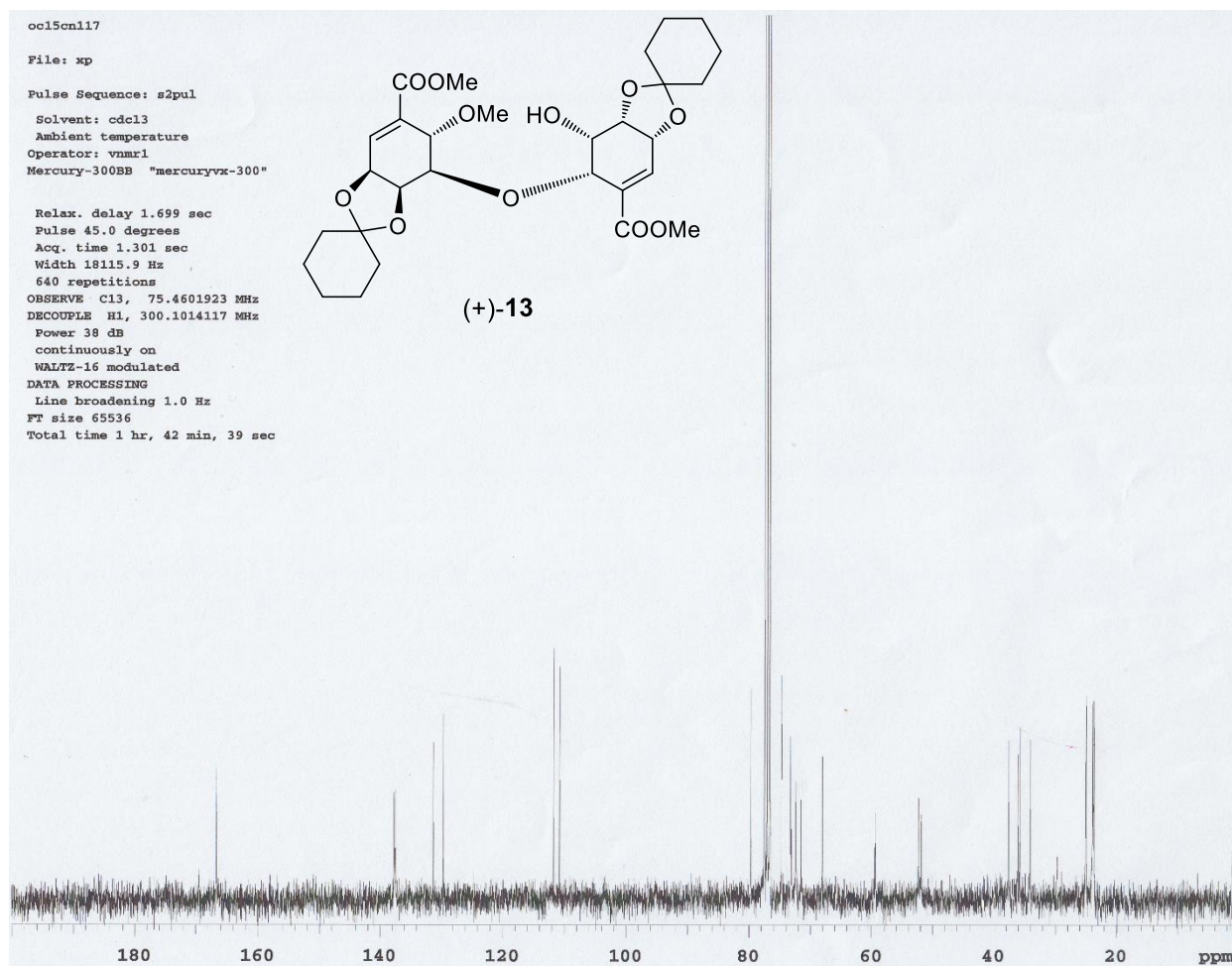


Figure S19: <sup>1</sup>H- NMR Spectrum of (+)-13 in CDCl<sub>3</sub> (300 MHz)



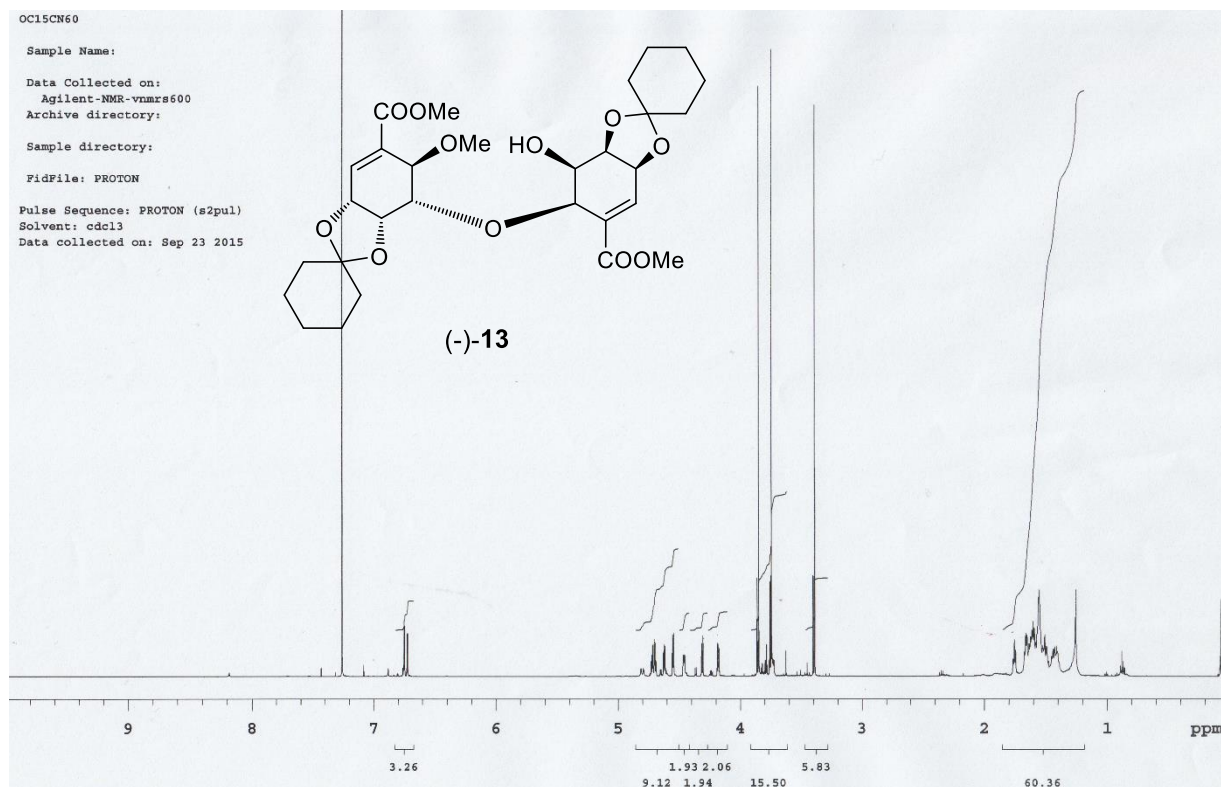
| LNMR | FREQURVCI | FFH   | REASBL | LNMR | FREQURVCI | FFH   | REASBL |
|------|-----------|-------|--------|------|-----------|-------|--------|
| 1    | 2182.3    | 7.272 | 23.2   | 42   | 1018.1    | 3.393 | 153.0  |
| 2    | 2028.9    | 6.761 | 17.2   | 43   | 531.8     | 1.772 | 14.9   |
| 3    | 2028.3    | 6.759 | 18.0   | 44   | 525.6     | 1.752 | 21.4   |
| 4    | 2025.7    | 6.750 | 18.9   | 45   | 519.8     | 1.732 | 17.7   |
| 5    | 2025.1    | 6.748 | 17.7   | 46   | 494.3     | 1.647 | 31.7   |
| 6    | 2016.3    | 6.719 | 19.1   | 47   | 487.2     | 1.624 | 32.3   |
| 7    | 1592.1    | 5.305 | 44.7   | 48   | 483.1     | 1.610 | 32.3   |
| 8    | 1450.5    | 4.834 | 13.2   | 49   | 479.0     | 1.596 | 34.2   |
| 9    | 1438.8    | 4.794 | 14.5   | 50   | 469.3     | 1.564 | 28.0   |
| 10   | 1417.1    | 4.722 | 16.8   | 51   | 465.8     | 1.552 | 25.8   |
| 11   | 1413.6    | 4.710 | 32.9   | 52   | 459.4     | 1.531 | 24.7   |
| 12   | 1393.4    | 4.643 | 10.3   | 53   | 445.6     | 1.485 | 22.8   |
| 13   | 1390.1    | 4.632 | 11.7   | 54   | 435.3     | 1.451 | 13.8   |
| 14   | 1388.1    | 4.625 | 13.7   | 55   | 426.5     | 1.421 | 21.7   |
| 15   | 1384.6    | 4.614 | 13.1   | 56   | 376.4     | 1.254 | 19.4   |
| 16   | 1368.7    | 4.561 | 16.7   | 57   | 21.4      | 0.071 | 100.2  |
| 17   | 1363.8    | 4.544 | 17.4   | 58   | 0.0       | 0.000 | 20.2   |
| 18   | 1344.1    | 4.479 | 10.6   |      |           |       |        |
| 19   | 1341.2    | 4.469 | 11.7   |      |           |       |        |
| 20   | 1338.6    | 4.460 | 10.2   |      |           |       |        |
| 21   | 1335.6    | 4.451 | 9.3    |      |           |       |        |
| 22   | 1295.5    | 4.317 | 14.3   |      |           |       |        |
| 23   | 1289.6    | 4.297 | 20.2   |      |           |       |        |
| 24   | 1260.0    | 4.199 | 13.3   |      |           |       |        |
| 25   | 1256.8    | 4.188 | 13.2   |      |           |       |        |
| 26   | 1254.1    | 4.179 | 10.9   |      |           |       |        |
| 27   | 1250.6    | 4.167 | 10.2   |      |           |       |        |
| 28   | 1155.3    | 3.850 | 145.9  |      |           |       |        |
| 29   | 1148.6    | 3.827 | 7.8    |      |           |       |        |
| 30   | 1147.1    | 3.822 | 7.5    |      |           |       |        |
| 31   | 1140.7    | 3.801 | 8.5    |      |           |       |        |
| 32   | 1138.0    | 3.792 | 8.1    |      |           |       |        |
| 33   | 1133.9    | 3.779 | 12.4   |      |           |       |        |
| 34   | 1131.0    | 3.769 | 10.3   |      |           |       |        |
| 35   | 1128.9    | 3.762 | 12.4   |      |           |       |        |
| 36   | 1124.5    | 3.747 | 156.6  |      |           |       |        |
| 37   | 1119.6    | 3.731 | 10.7   |      |           |       |        |
| 38   | 1117.5    | 3.724 | 8.8    |      |           |       |        |
| 39   | 1114.6    | 3.714 | 7.4    |      |           |       |        |
| 40   | 1046.9    | 3.488 | 13.9   |      |           |       |        |
| 41   | 1036.9    | 3.455 | 6.7    |      |           |       |        |

Figure S20: <sup>13</sup>C-NMR Spectrum of (+)-13 in CDCl<sub>3</sub> (75.5 MHz)



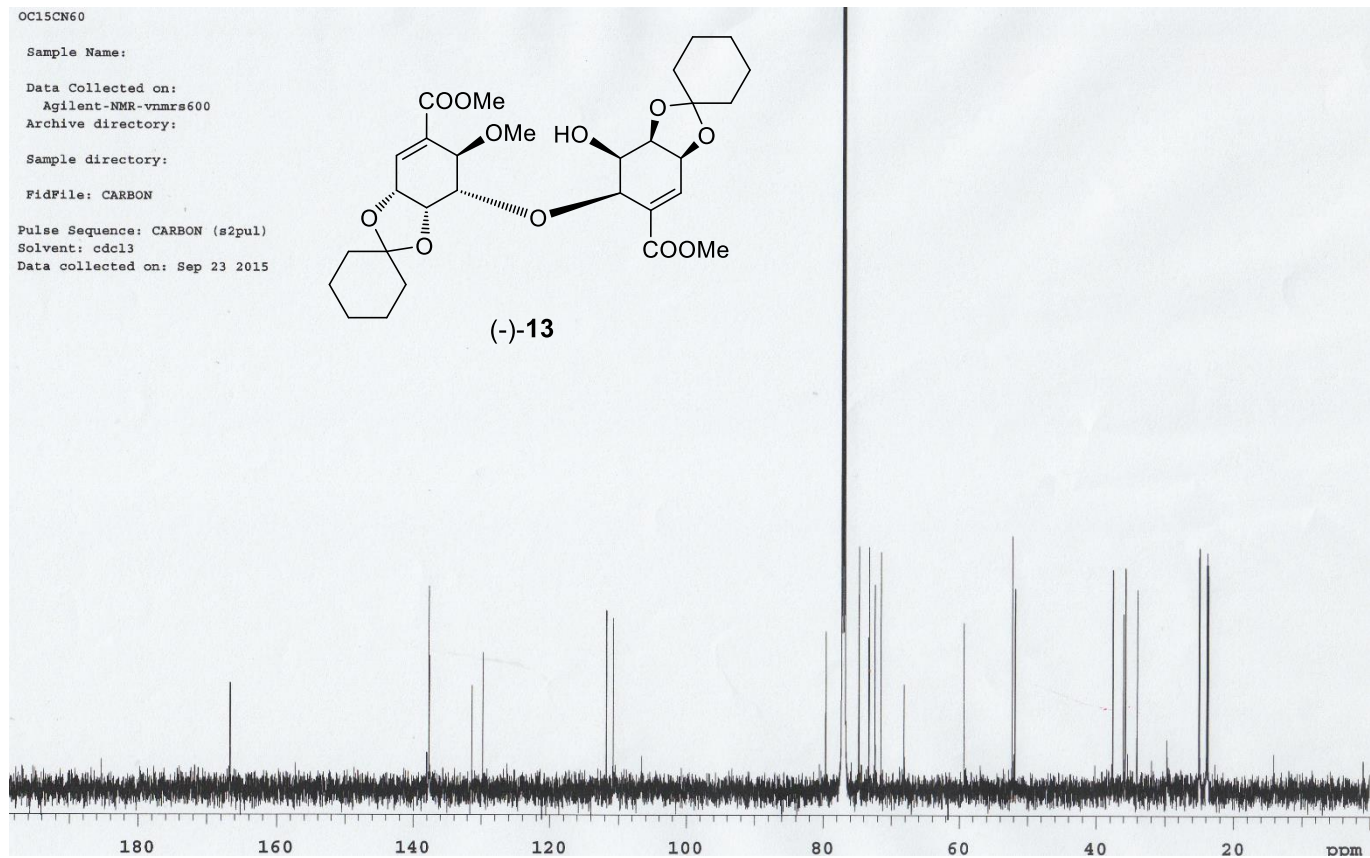
| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 12577.4   | 166.676 | 29.0   |
| 2     | 12574.1   | 166.632 | 30.8   |
| 3     | 10389.2   | 137.678 | 22.0   |
| 4     | 10375.9   | 137.502 | 22.5   |
| 5     | 9907.6    | 131.296 | 32.0   |
| 6     | 9785.5    | 129.677 | 37.8   |
| 7     | 8431.0    | 111.727 | 51.1   |
| 8     | 8358.5    | 110.768 | 47.4   |
| 9     | 6011.1    | 79.660  | 43.0   |
| 10    | 5842.5    | 77.425  | 212.4  |
| 11    | 5810.4    | 77.000  | 224.5  |
| 12    | 5778.4    | 76.575  | 217.2  |
| 13    | 5635.7    | 74.685  | 35.8   |
| 14    | 5631.9    | 74.634  | 45.7   |
| 15    | 5524.1    | 73.205  | 33.3   |
| 16    | 5459.9    | 72.355  | 24.1   |
| 17    | 5393.6    | 71.476  | 24.9   |
| 18    | 5132.6    | 68.018  | 29.2   |
| 19    | 4477.5    | 59.336  | 17.7   |
| 20    | 3946.2    | 52.295  | 20.7   |
| 21    | 3914.7    | 51.878  | 17.5   |
| 22    | 2835.0    | 37.569  | 32.5   |
| 23    | 2719.4    | 36.038  | 29.7   |
| 24    | 2694.5    | 35.708  | 35.2   |
| 25    | 2568.5    | 34.038  | 32.6   |
| 26    | 1886.3    | 24.997  | 41.6   |
| 27    | 1879.6    | 24.909  | 39.5   |
| 28    | 1802.2    | 23.883  | 39.9   |
| 29    | 1796.2    | 23.803  | 40.4   |
| 30    | 1787.9    | 23.693  | 40.6   |
| 31    | 1782.9    | 23.627  | 35.1   |
| 32    | 75.1      | 0.996   | 14.4   |

Figure S21: <sup>1</sup>H- NMR Spectrum of (-)-13 in CDCl<sub>3</sub> (600 MHz)



| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|-------|--------|-------|-----------|--------|--------|
| 1     | 4458.8    | 7.433 | 7.1    | 51    | 2621.0    | 4.369 | 6.7    | 101   | 904.4     | 1.508  | 34.5   |
| 2     | 4355.8    | 7.261 | 1458.3 | 52    | 2615.1    | 4.359 | 7.5    | 102   | 898.2     | 1.497  | 22.7   |
| 3     | 4249.9    | 7.084 | 9.2    | 53    | 2588.7    | 4.315 | 27.4   | 103   | 895.9     | 1.493  | 24.8   |
| 4     | 4129.8    | 6.884 | 6.6    | 54    | 2582.6    | 4.305 | 33.7   | 104   | 884.7     | 1.475  | 12.5   |
| 5     | 4058.0    | 6.764 | 6.7    | 55    | 2546.2    | 4.244 | 4.9    | 105   | 870.6     | 1.451  | 16.3   |
| 6     | 4057.1    | 6.763 | 6.7    | 56    | 2512.4    | 4.188 | 27.5   | 106   | 864.2     | 1.441  | 22.4   |
| 7     | 4054.7    | 6.759 | 8.4    | 57    | 2508.9    | 4.182 | 26.6   | 107   | 855.7     | 1.426  | 24.4   |
| 8     | 4053.6    | 6.757 | 9.1    | 58    | 2506.5    | 4.178 | 24.2   | 108   | 850.4     | 1.418  | 18.1   |
| 9     | 4052.7    | 6.756 | 38.5   | 59    | 2502.7    | 4.172 | 23.3   | 109   | 845.7     | 1.410  | 25.1   |
| 10    | 4051.5    | 6.754 | 46.1   | 60    | 2317.0    | 3.862 | 81.3   | 110   | 841.3     | 1.402  | 20.4   |
| 11    | 4049.2    | 6.750 | 40.9   | 61    | 2314.9    | 3.859 | 28.3   | 111   | 779.1     | 1.299  | 8.0    |
| 12    | 4048.3    | 6.748 | 41.8   | 62    | 2308.5    | 3.848 | 488.1  | 112   | 752.7     | 1.255  | 71.6   |
| 13    | 4039.5    | 6.734 | 6.8    | 63    | 2297.3    | 3.830 | 7.2    | 113   | 535.2     | 0.892  | 8.7    |
| 14    | 4035.9    | 6.728 | 35.3   | 64    | 2290.6    | 3.818 | 10.6   | 114   | 528.2     | 0.880  | 20.9   |
| 15    | 4033.6    | 6.724 | 35.3   | 65    | 2289.4    | 3.816 | 7.0    | 115   | 520.9     | 0.868  | 12.3   |
| 16    | 2886.6    | 4.812 | 6.5    | 66    | 2276.8    | 3.795 | 13.5   | 116   | 513.5     | 0.856  | 6.7    |
| 17    | 2874.8    | 4.792 | 6.8    | 67    | 2273.3    | 3.789 | 4.9    | 117   | 47.2      | 0.079  | 7.9    |
| 18    | 2837.5    | 4.730 | 12.4   | 68    | 2272.1    | 3.787 | 13.3   | 118   | 46.4      | 0.077  | 7.3    |
| 19    | 2833.4    | 4.723 | 11.8   | 69    | 2269.5    | 3.783 | 26.4   | 119   | 45.5      | 0.076  | 9.1    |
| 20    | 2831.1    | 4.719 | 25.8   | 70    | 2267.7    | 3.780 | 9.5    | 120   | 44.9      | 0.075  | 13.5   |
| 21    | 2827.6    | 4.713 | 26.6   | 71    | 2256.2    | 3.761 | 12.8   | 121   | 41.4      | 0.069  | 63.3   |
| 22    | 2821.4    | 4.703 | 29.4   | 72    | 2253.6    | 3.757 | 78.3   | 122   | 3.2       | 0.005  | 13.2   |
| 23    | 2820.5    | 4.702 | 30.7   | 73    | 2246.0    | 3.744 | 518.6  | 123   | 0.0       | 0.000  | 566.8  |
| 24    | 2819.1    | 4.699 | 30.1   | 74    | 2242.2    | 3.738 | 19.4   | 124   | -3.2      | -0.005 | 12.1   |
| 25    | 2818.2    | 4.698 | 27.7   | 75    | 2238.1    | 3.731 | 13.8   |       |           |        |        |
| 26    | 2815.0    | 4.692 | 13.2   | 76    | 2236.3    | 3.728 | 13.7   |       |           |        |        |
| 27    | 2814.1    | 4.691 | 13.2   | 77    | 2233.4    | 3.723 | 13.4   |       |           |        |        |
| 28    | 2812.6    | 4.688 | 12.4   | 78    | 2174.7    | 3.625 | 21.2   |       |           |        |        |
| 29    | 2811.4    | 4.687 | 11.3   | 79    | 2103.1    | 3.506 | 5.0    |       |           |        |        |
| 30    | 2791.8    | 4.654 | 5.4    | 80    | 2070.8    | 3.452 | 11.1   |       |           |        |        |
| 31    | 2787.7    | 4.647 | 5.7    | 81    | 2040.9    | 3.402 | 83.3   |       |           |        |        |
| 32    | 2777.1    | 4.629 | 19.2   | 82    | 2033.5    | 3.390 | 472.7  |       |           |        |        |
| 33    | 2776.2    | 4.628 | 20.0   | 83    | 1058.7    | 1.765 | 14.5   |       |           |        |        |
| 34    | 2773.9    | 4.624 | 20.0   | 84    | 1052.9    | 1.755 | 30.2   |       |           |        |        |
| 35    | 2773.0    | 4.622 | 21.6   | 85    | 1046.7    | 1.745 | 21.5   |       |           |        |        |
| 36    | 2771.5    | 4.620 | 26.2   | 86    | 1003.9    | 1.673 | 20.3   |       |           |        |        |
| 37    | 2770.9    | 4.619 | 25.5   | 87    | 997.7     | 1.663 | 35.7   |       |           |        |        |
| 38    | 2768.3    | 4.615 | 25.0   | 88    | 991.5     | 1.653 | 34.1   |       |           |        |        |
| 39    | 2767.4    | 4.613 | 24.7   | 89    | 981.3     | 1.636 | 27.0   |       |           |        |        |
| 40    | 2766.2    | 4.611 | 5.8    | 90    | 975.1     | 1.625 | 32.7   |       |           |        |        |
| 41    | 2762.1    | 4.604 | 5.1    | 91    | 967.8     | 1.613 | 38.2   |       |           |        |        |
| 42    | 2731.6    | 4.553 | 34.3   | 92    | 961.6     | 1.603 | 45.4   |       |           |        |        |
| 43    | 2726.6    | 4.545 | 36.0   | 93    | 955.4     | 1.593 | 39.6   |       |           |        |        |
| 44    | 2680.0    | 4.467 | 17.6   | 94    | 948.1     | 1.580 | 28.0   |       |           |        |        |
| 45    | 2678.8    | 4.465 | 12.9   | 95    | 942.5     | 1.571 | 37.4   |       |           |        |        |
| 46    | 2677.9    | 4.464 | 13.2   | 96    | 935.2     | 1.559 | 65.4   |       |           |        |        |
| 47    | 2677.0    | 4.463 | 17.9   | 97    | 931.4     | 1.553 | 71.3   |       |           |        |        |
| 48    | 2675.9    | 4.461 | 13.4   | 98    | 915.8     | 1.527 | 23.5   |       |           |        |        |
| 49    | 2674.4    | 4.458 | 16.4   | 99    | 913.5     | 1.523 | 25.3   |       |           |        |        |
| 50    | 2671.5    | 4.453 | 17.7   | 100   | 909.7     | 1.516 | 22.9   |       |           |        |        |

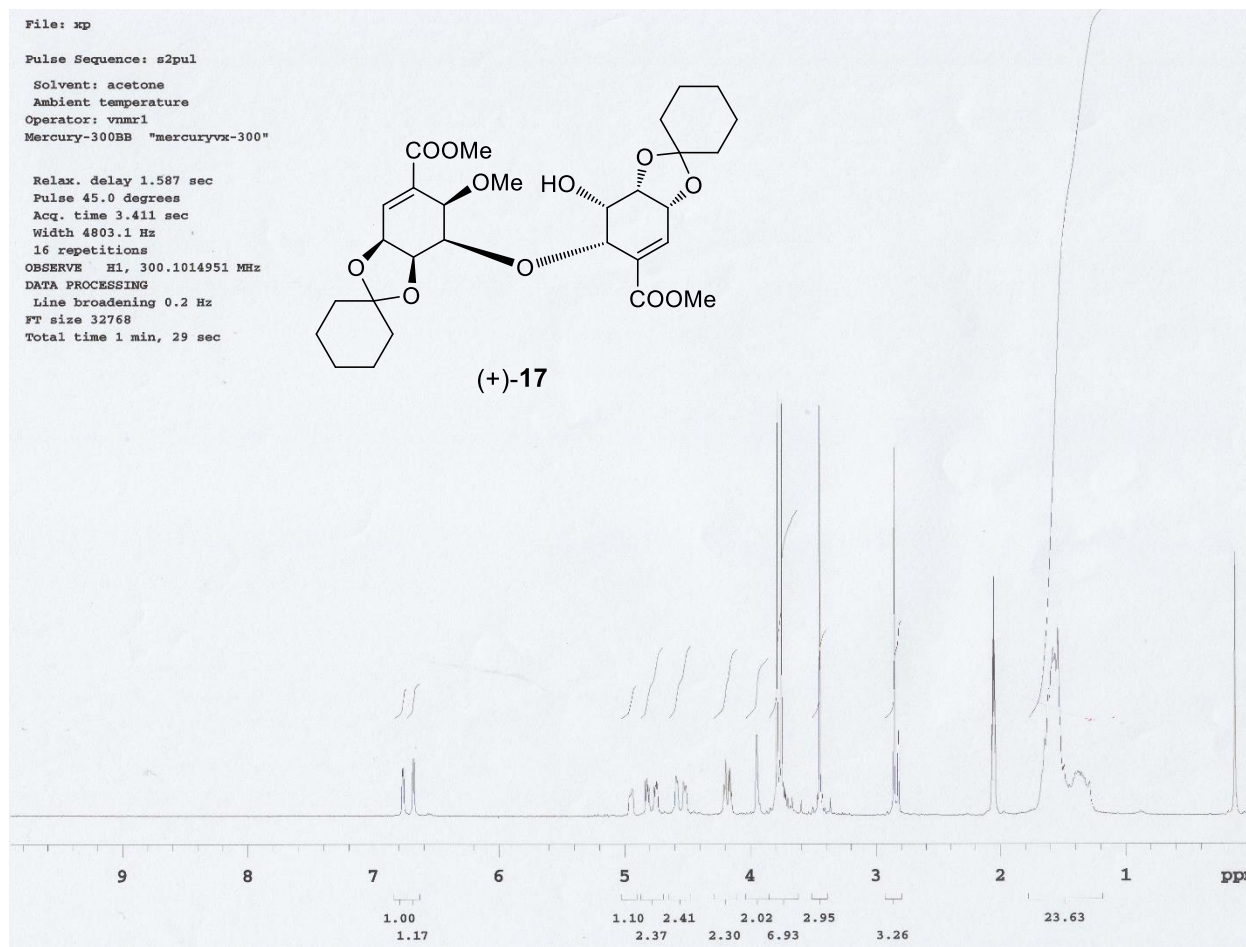
Figure S22:  $^{13}\text{C}$ -NMR Spectrum of (-)-13 in  $\text{CDCl}_3$  (150 MHz)



OC15CN60

| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 25145.6   | 166.699 | 20.6   |
| 2     | 25137.5   | 166.646 | 20.7   |
| 3     | 20771.4   | 137.701 | 39.5   |
| 4     | 20763.3   | 137.648 | 25.9   |
| 5     | 19810.8   | 131.333 | 20.0   |
| 6     | 19573.8   | 129.762 | 26.5   |
| 7     | 16857.3   | 111.753 | 34.8   |
| 8     | 16711.6   | 110.788 | 33.2   |
| 9     | 12006.9   | 79.598  | 30.8   |
| 10    | 11646.2   | 77.207  | 2305.3 |
| 11    | 11615.0   | 77.000  | 2467.8 |
| 12    | 11582.6   | 76.785  | 2471.3 |
| 13    | 11270.5   | 74.716  | 37.9   |
| 14    | 11263.6   | 74.670  | 47.3   |
| 15    | 11054.3   | 73.283  | 29.6   |
| 16    | 11046.2   | 73.230  | 47.2   |
| 17    | 10920.2   | 72.394  | 39.9   |
| 18    | 10783.8   | 71.490  | 46.3   |
| 19    | 10275.2   | 68.118  | 20.4   |
| 20    | 8942.4    | 59.282  | 32.5   |
| 21    | 7884.7    | 52.270  | 49.4   |
| 22    | 7819.9    | 51.841  | 39.1   |
| 23    | 5673.3    | 37.610  | 42.9   |
| 24    | 5436.3    | 36.039  | 34.3   |
| 25    | 5394.7    | 35.764  | 43.2   |
| 26    | 5133.5    | 34.032  | 39.0   |
| 27    | 3779.8    | 25.058  | 45.3   |
| 28    | 3766.0    | 24.966  | 47.1   |
| 29    | 3608.7    | 23.924  | 43.8   |
| 30    | 3597.2    | 23.847  | 46.2   |
| 31    | 3579.8    | 23.732  | 43.8   |
| 32    | 3570.6    | 23.671  | 41.7   |

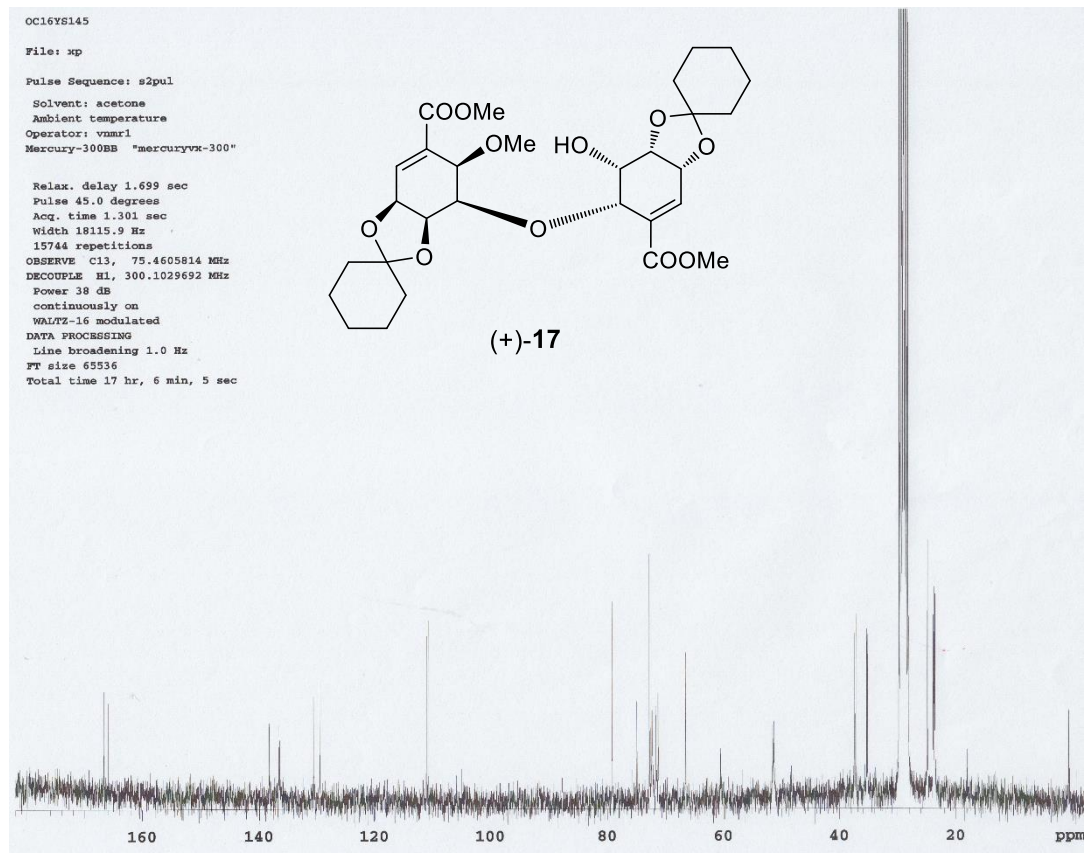
Figure S23: <sup>1</sup>H- NMR Spectrum of (+)-17 in acetone-d<sub>6</sub> (300 MHz)



| INVER | FREQVARI | FFI   | DELTA | INVER | FREQVARI | FFI    | DELTA |
|-------|----------|-------|-------|-------|----------|--------|-------|
| 1     | 2032.2   | 6.772 | 18.2  | 42    | 616.8    | 2.055  | 87.3  |
| 2     | 2029.5   | 6.763 | 18.6  | 43    | 614.5    | 2.047  | 64.0  |
| 3     | 2007.5   | 6.690 | 21.7  | 44    | 612.4    | 2.041  | 33.8  |
| 4     | 2004.0   | 6.678 | 22.1  | 45    | 494.0    | 1.646  | 29.3  |
| 5     | 1482.5   | 4.940 | 10.8  | 46    | 485.2    | 1.617  | 46.7  |
| 6     | 1450.2   | 4.833 | 14.0  | 47    | 474.9    | 1.583  | 61.6  |
| 7     | 1446.7   | 4.821 | 14.7  | 48    | 469.9    | 1.566  | 59.5  |
| 8     | 1444.1   | 4.812 | 12.5  | 49    | 463.2    | 1.543  | 68.9  |
| 9     | 1440.6   | 4.800 | 11.4  | 50    | 447.9    | 1.493  | 19.5  |
| 10    | 1429.1   | 4.762 | 11.7  | 51    | 435.3    | 1.451  | 12.2  |
| 11    | 1426.2   | 4.752 | 12.5  | 52    | 420.7    | 1.402  | 16.7  |
| 12    | 1423.9   | 4.745 | 13.9  | 53    | 415.4    | 1.384  | 17.3  |
| 13    | 1420.9   | 4.735 | 12.9  | 54    | 411.0    | 1.370  | 17.0  |
| 14    | 1377.0   | 4.588 | 15.7  | 55    | 406.6    | 1.355  | 16.8  |
| 15    | 1373.1   | 4.576 | 14.1  | 56    | 387.8    | 1.292  | 13.4  |
| 16    | 1358.8   | 4.528 | 13.5  | 57    | 39.0     | 0.130  | 96.1  |
| 17    | 1353.5   | 4.510 | 12.2  | 58    | -0.0     | -0.000 | 60.3  |
| 18    | 1262.0   | 4.205 | 12.6  |       |          |        |       |
| 19    | 1258.2   | 4.193 | 21.5  |       |          |        |       |
| 20    | 1250.9   | 4.168 | 17.8  |       |          |        |       |
| 21    | 1248.0   | 4.158 | 18.4  |       |          |        |       |
| 22    | 1243.9   | 4.145 | 10.0  |       |          |        |       |
| 23    | 1184.4   | 3.947 | 30.5  |       |          |        |       |
| 24    | 1176.7   | 3.921 | 5.6   |       |          |        |       |
| 25    | 1136.0   | 3.785 | 153.9 |       |          |        |       |
| 26    | 1130.4   | 3.767 | 21.2  |       |          |        |       |
| 27    | 1125.7   | 3.751 | 151.5 |       |          |        |       |
| 28    | 1121.0   | 3.736 | 12.8  |       |          |        |       |
| 29    | 1117.5   | 3.724 | 11.0  |       |          |        |       |
| 30    | 1115.2   | 3.716 | 9.2   |       |          |        |       |
| 31    | 1110.5   | 3.700 | 7.7   |       |          |        |       |
| 32    | 1100.8   | 3.668 | 7.7   |       |          |        |       |
| 33    | 1079.4   | 3.597 | 6.7   |       |          |        |       |
| 34    | 1040.4   | 3.467 | 8.7   |       |          |        |       |
| 35    | 1035.1   | 3.449 | 149.2 |       |          |        |       |
| 36    | 1028.7   | 3.428 | 8.9   |       |          |        |       |
| 37    | 1009.9   | 3.365 | 7.5   |       |          |        |       |
| 38    | 856.9    | 2.855 | 133.8 |       |          |        |       |
| 39    | 846.6    | 2.821 | 31.9  |       |          |        |       |
| 40    | 620.9    | 2.069 | 34.0  |       |          |        |       |
| 41    | 618.9    | 2.062 | 64.5  |       |          |        |       |

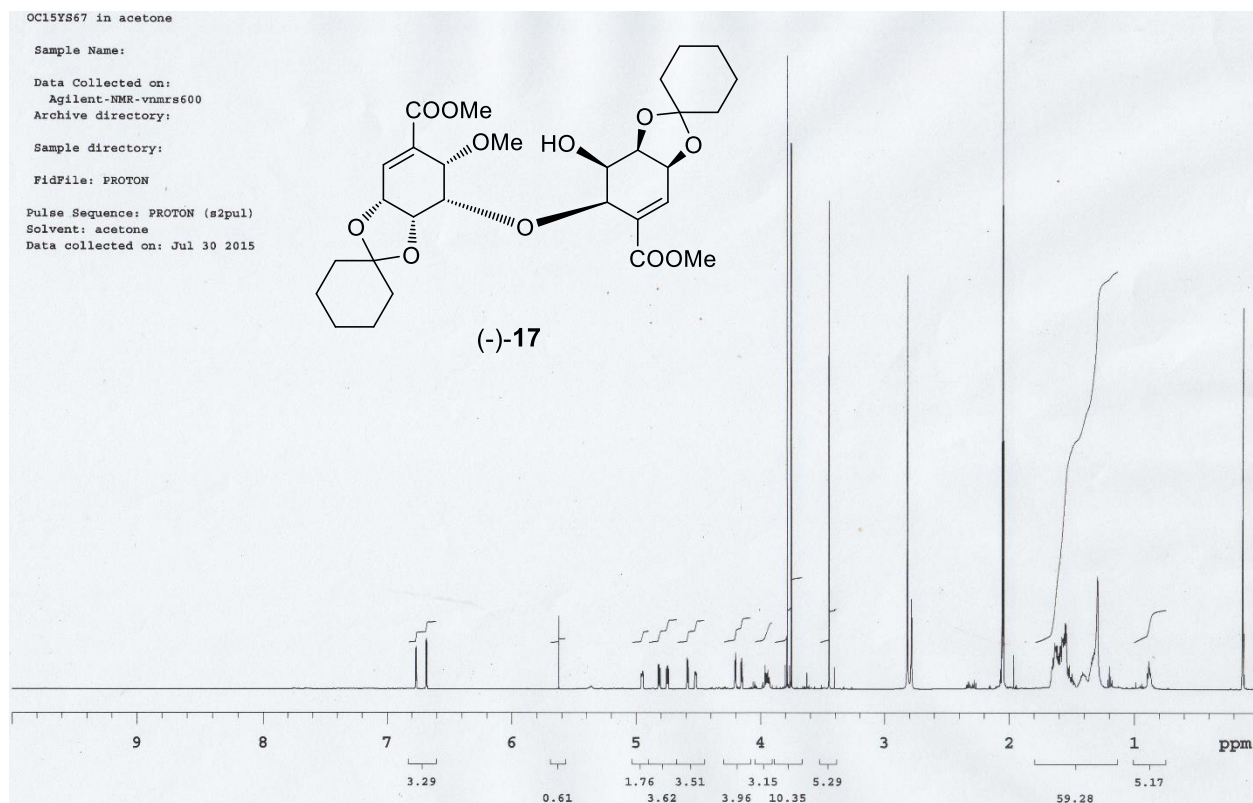


Figure S24: <sup>13</sup>C-NMR Spectrum of (+)-17 in acetone-d<sub>6</sub> (75.5 MHz)



| INDBA | FREQUENCY | FFM     | DELTA  | INDBA | FREQUENCY | FFM    | DELTA  |
|-------|-----------|---------|--------|-------|-----------|--------|--------|
| 1     | 16267.6   | 215.578 | 7.9    | 42    | 4252.9    | 56.360 | -8.4   |
| 2     | 15511.2   | 205.555 | 70.0   | 43    | 3888.6    | 51.532 | 14.4   |
| 3     | 15491.3   | 205.292 | 4691.5 | 44    | 3872.0    | 51.312 | 15.2   |
| 4     | 15470.9   | 205.021 | 73.5   | 45    | 3687.9    | 48.872 | -6.8   |
| 5     | 12571.7   | 166.601 | 22.0   | 46    | 3341.3    | 44.278 | -8.6   |
| 6     | 12520.3   | 165.919 | 19.4   | 47    | 3101.3    | 41.099 | -7.8   |
| 7     | 12105.1   | 160.417 | -6.9   | 48    | 2828.2    | 37.479 | 35.3   |
| 8     | 11540.6   | 152.937 | -7.6   | 49    | 2809.4    | 37.230 | 39.7   |
| 9     | 11333.9   | 150.197 | -7.9   | 50    | 2667.9    | 35.355 | 36.4   |
| 10    | 10564.3   | 139.998 | -8.5   | 51    | 2654.1    | 35.172 | 35.3   |
| 11    | 10431.6   | 138.240 | 15.1   | 52    | 2241.6    | 29.706 | 585.4  |
| 12    | 10323.3   | 136.804 | -7.5   | 53    | 2222.3    | 29.450 | 1765.7 |
| 13    | 10301.1   | 136.511 | 14.4   | 54    | 2202.9    | 29.193 | 3518.9 |
| 14    | 10004.3   | 132.577 | -8.2   | 55    | 2183.6    | 28.937 | 4113.7 |
| 15    | 9850.6    | 130.540 | 21.0   | 56    | 2164.2    | 28.680 | 3523.5 |
| 16    | 9820.7    | 130.144 | -7.5   | 57    | 2144.9    | 28.424 | 1766.1 |
| 17    | 9767.6    | 129.441 | 25.0   | 58    | 2125.5    | 28.168 | 586.8  |
| 18    | 9317.6    | 123.477 | -9.0   | 59    | 1872.9    | 24.819 | 57.0   |
| 19    | 8793.0    | 116.524 | -8.1   | 60    | 1799.9    | 23.852 | 39.5   |
| 20    | 8377.8    | 111.022 | 35.2   | 61    | 1789.4    | 23.713 | 46.1   |
| 21    | 8358.4    | 110.766 | 38.6   | 62    | 1783.3    | 23.633 | 48.8   |
| 22    | 8090.8    | 107.220 | -8.1   | 63    | 1776.1    | 23.537 | 44.7   |
| 23    | 7967.5    | 105.586 | -7.8   | 64    | 1393.0    | 18.460 | -8.1   |
| 24    | 7324.6    | 97.065  | -8.7   | 65    | 1357.1    | 17.984 | 8.7    |
| 25    | 6685.5    | 88.596  | -9.4   | 66    | 1176.3    | 15.588 | -7.3   |
| 26    | 6284.1    | 83.277  | -8.9   | 67    | 839.0     | 11.119 | -8.5   |
| 27    | 5975.6    | 79.189  | 42.9   | 68    | 267.9     | 3.551  | -8.5   |
| 28    | 5800.4    | 76.866  | -8.0   | 69    | 38.0      | 0.503  | 17.6   |
| 29    | 5652.7    | 74.910  | 19.9   | 70    | -48.3     | -0.640 | -8.9   |
| 30    | 5588.6    | 74.060  | -6.7   |       |           |        |        |
| 31    | 5490.2    | 72.756  | 53.6   |       |           |        |        |
| 32    | 5468.1    | 72.463  | 17.8   |       |           |        |        |
| 33    | 5453.2    | 72.265  | 17.9   |       |           |        |        |
| 34    | 5402.9    | 71.599  | 18.7   |       |           |        |        |
| 35    | 5375.8    | 71.240  | 21.8   |       |           |        |        |
| 36    | 5272.9    | 69.877  | -7.6   |       |           |        |        |
| 37    | 5019.2    | 66.514  | 31.0   |       |           |        |        |
| 38    | 4883.7    | 64.719  | -8.3   |       |           |        |        |
| 39    | 4667.0    | 61.847  | -8.4   |       |           |        |        |
| 40    | 4564.2    | 60.485  | 8.8    |       |           |        |        |
| 41    | 4344.1    | 57.569  | -7.6   |       |           |        |        |

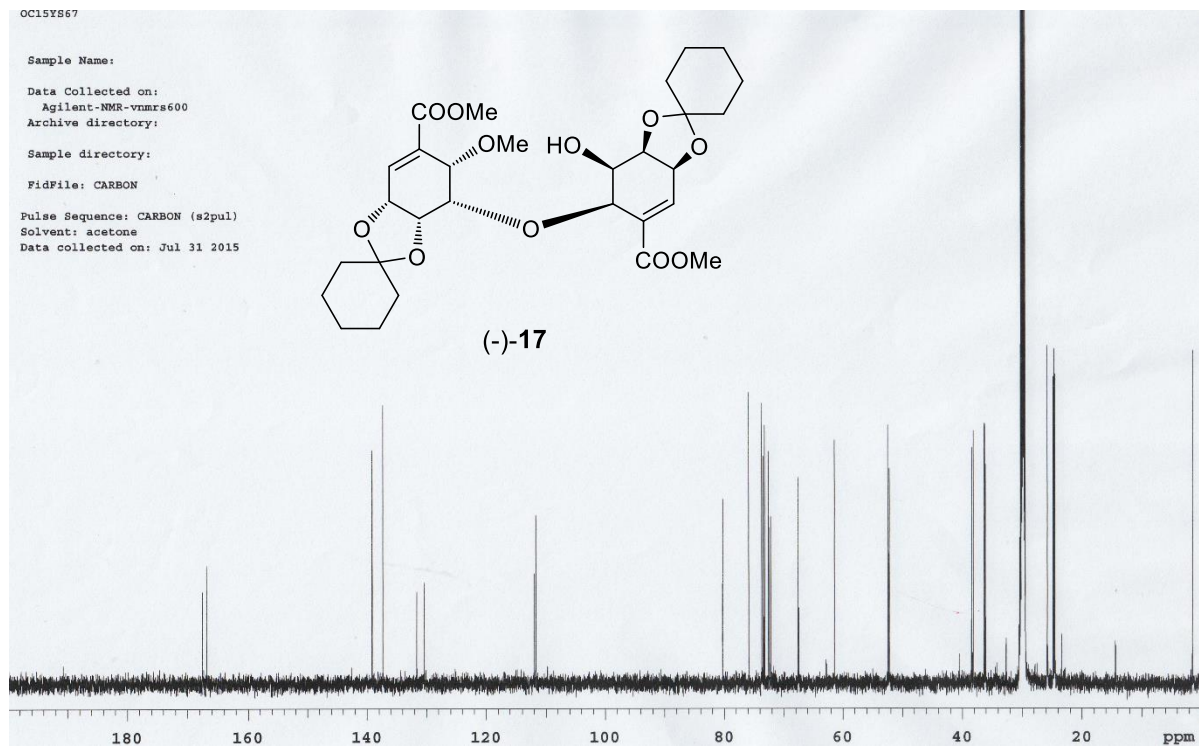
Figure S25: <sup>1</sup>H-NMR Spectrum of (-)-17 in acetone-d<sub>6</sub> (600 MHz)



OC15YS67 in acetone

| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|-------|--------|-------|-----------|--------|--------|
| 1     | 4061.8    | 6.771 | 36.8   | 51    | 2364.5    | 3.942 | 17.3   | 101   | 897.6     | 1.496  | 14.1   |
| 2     | 4060.6    | 6.769 | 38.1   | 52    | 2361.0    | 3.936 | 10.1   | 102   | 894.4     | 1.491  | 9.0    |
| 3     | 4058.5    | 6.765 | 36.3   | 53    | 2358.4    | 3.931 | 10.2   | 103   | 889.4     | 1.483  | 7.6    |
| 4     | 4057.7    | 6.764 | 34.8   | 54    | 2355.7    | 3.927 | 10.8   | 104   | 860.9     | 1.435  | 8.1    |
| 5     | 4011.9    | 6.688 | 43.7   | 55    | 2280.0    | 3.801 | 21.8   | 105   | 858.0     | 1.430  | 9.3    |
| 6     | 4011.0    | 6.686 | 44.6   | 56    | 2270.6    | 3.785 | 566.7  | 106   | 854.2     | 1.424  | 12.6   |
| 7     | 4008.4    | 6.682 | 45.6   | 57    | 2258.9    | 3.765 | 21.4   | 107   | 851.0     | 1.419  | 12.9   |
| 8     | 4007.5    | 6.680 | 42.2   | 58    | 2250.4    | 3.751 | 488.9  | 108   | 847.7     | 1.413  | 15.5   |
| 9     | 3373.7    | 5.624 | 65.9   | 59    | 2176.1    | 3.628 | 14.8   | 109   | 844.8     | 1.408  | 13.9   |
| 10    | 2974.6    | 4.958 | 13.8   | 60    | 2069.0    | 3.449 | 437.3  | 110   | 841.3     | 1.402  | 14.1   |
| 11    | 2973.1    | 4.956 | 12.6   | 61    | 2042.9    | 3.405 | 19.9   | 111   | 834.5     | 1.391  | 12.3   |
| 12    | 2971.6    | 4.954 | 14.3   | 62    | 1690.2    | 2.817 | 370.9  | 112   | 827.5     | 1.379  | 8.9    |
| 13    | 2969.6    | 4.950 | 12.4   | 63    | 1670.0    | 2.784 | 80.7   | 113   | 822.2     | 1.371  | 7.7    |
| 14    | 2968.4    | 4.948 | 16.3   | 64    | 1395.0    | 2.325 | 7.6    | 114   | 815.8     | 1.360  | 13.1   |
| 15    | 2967.0    | 4.946 | 14.5   | 65    | 1366.8    | 2.278 | 9.0    | 115   | 809.0     | 1.349  | 19.8   |
| 16    | 2965.5    | 4.943 | 16.2   | 66    | 1243.9    | 2.073 | 16.6   | 116   | 806.4     | 1.344  | 24.4   |
| 17    | 2893.0    | 4.822 | 21.7   | 67    | 1241.5    | 2.070 | 18.5   | 117   | 801.7     | 1.336  | 28.3   |
| 18    | 2892.4    | 4.822 | 22.1   | 68    | 1239.5    | 2.066 | 17.2   | 118   | 797.9     | 1.330  | 30.9   |
| 19    | 2889.5    | 4.817 | 22.4   | 69    | 1236.0    | 2.060 | 221.5  | 119   | 793.2     | 1.322  | 33.4   |
| 20    | 2888.9    | 4.816 | 22.6   | 70    | 1233.9    | 2.057 | 433.0  | 120   | 776.1     | 1.294  | 101.4  |
| 21    | 2886.8    | 4.812 | 19.5   | 71    | 1231.6    | 2.053 | 657.5  | 121   | 760.3     | 1.267  | 8.0    |
| 22    | 2886.3    | 4.811 | 19.5   | 72    | 1229.5    | 2.050 | 433.2  | 122   | 727.1     | 1.212  | 8.9    |
| 23    | 2882.7    | 4.805 | 19.0   | 73    | 1227.2    | 2.046 | 222.6  | 123   | 719.8     | 1.200  | 20.8   |
| 24    | 2852.5    | 4.755 | 18.0   | 74    | 1223.9    | 2.040 | 7.9    | 124   | 712.8     | 1.188  | 11.6   |
| 25    | 2851.6    | 4.754 | 19.3   | 75    | 1179.6    | 1.966 | 30.9   | 125   | 707.2     | 1.179  | 8.7    |
| 26    | 2849.6    | 4.750 | 19.6   | 76    | 1001.2    | 1.669 | 7.8    | 126   | 537.3     | 0.896  | 14.8   |
| 27    | 2848.7    | 4.749 | 20.0   | 77    | 995.6     | 1.660 | 20.7   | 127   | 535.2     | 0.892  | 12.7   |
| 28    | 2847.2    | 4.746 | 21.5   | 78    | 994.5     | 1.658 | 19.2   | 128   | 531.7     | 0.886  | 21.1   |
| 29    | 2846.4    | 4.745 | 20.8   | 79    | 989.8     | 1.650 | 28.2   | 129   | 530.5     | 0.884  | 25.6   |
| 30    | 2844.3    | 4.741 | 19.7   | 80    | 985.7     | 1.643 | 28.7   | 130   | 529.1     | 0.882  | 21.2   |
| 31    | 2843.4    | 4.740 | 18.8   | 81    | 982.1     | 1.637 | 41.6   | 131   | 528.2     | 0.880  | 24.0   |
| 32    | 2753.6    | 4.590 | 28.4   | 82    | 978.0     | 1.630 | 37.9   | 132   | 527.0     | 0.879  | 15.5   |
| 33    | 2748.6    | 4.582 | 26.3   | 83    | 973.6     | 1.623 | 39.2   | 133   | 525.0     | 0.875  | 19.6   |
| 34    | 2715.8    | 4.527 | 16.0   | 84    | 969.5     | 1.616 | 39.3   | 134   | 522.9     | 0.872  | 14.2   |
| 35    | 2713.4    | 4.523 | 16.1   | 85    | 965.4     | 1.609 | 30.1   | 135   | 520.9     | 0.868  | 14.9   |
| 36    | 2710.5    | 4.518 | 15.4   | 86    | 960.7     | 1.601 | 32.6   | 136   | 518.5     | 0.864  | 10.4   |
| 37    | 2708.1    | 4.514 | 14.7   | 87    | 956.6     | 1.595 | 38.8   | 137   | 77.5      | 0.129  | 341.5  |
| 38    | 2524.2    | 4.208 | 19.2   | 88    | 952.8     | 1.588 | 39.3   | 138   | 75.7      | 0.126  | 60.6   |
| 39    | 2523.0    | 4.206 | 25.8   | 89    | 947.2     | 1.579 | 47.3   | 139   | 74.8      | 0.125  | 59.0   |
| 40    | 2522.1    | 4.204 | 21.3   | 90    | 942.5     | 1.571 | 44.9   | 140   | 73.7      | 0.123  | 50.2   |
| 41    | 2519.8    | 4.200 | 25.9   | 91    | 939.0     | 1.565 | 46.5   | 141   | 69.8      | 0.116  | 14.0   |
| 42    | 2518.9    | 4.199 | 33.1   | 92    | 935.8     | 1.560 | 49.9   | 142   | 3.5       | 0.006  | 8.0    |
| 43    | 2494.8    | 4.159 | 24.5   | 93    | 931.4     | 1.553 | 59.9   | 143   | 0.0       | 0.000  | 385.6  |
| 44    | 2491.9    | 4.154 | 26.4   | 94    | 927.0     | 1.545 | 57.8   | 144   | -3.2      | -0.005 | 11.9   |
| 45    | 2490.7    | 4.152 | 27.9   | 95    | 924.0     | 1.540 | 34.9   |       |           |        |        |
| 46    | 2487.8    | 4.147 | 18.9   | 96    | 919.0     | 1.532 | 20.6   |       |           |        |        |
| 47    | 2377.1    | 3.963 | 21.6   | 97    | 914.9     | 1.525 | 19.0   |       |           |        |        |
| 48    | 2371.9    | 3.954 | 14.2   | 98    | 910.5     | 1.518 | 21.5   |       |           |        |        |
| 49    | 2369.5    | 3.950 | 13.9   | 99    | 906.4     | 1.511 | 11.1   |       |           |        |        |
| 50    | 2367.2    | 3.946 | 14.5   | 100   | 901.4     | 1.503 | 11.5   |       |           |        |        |

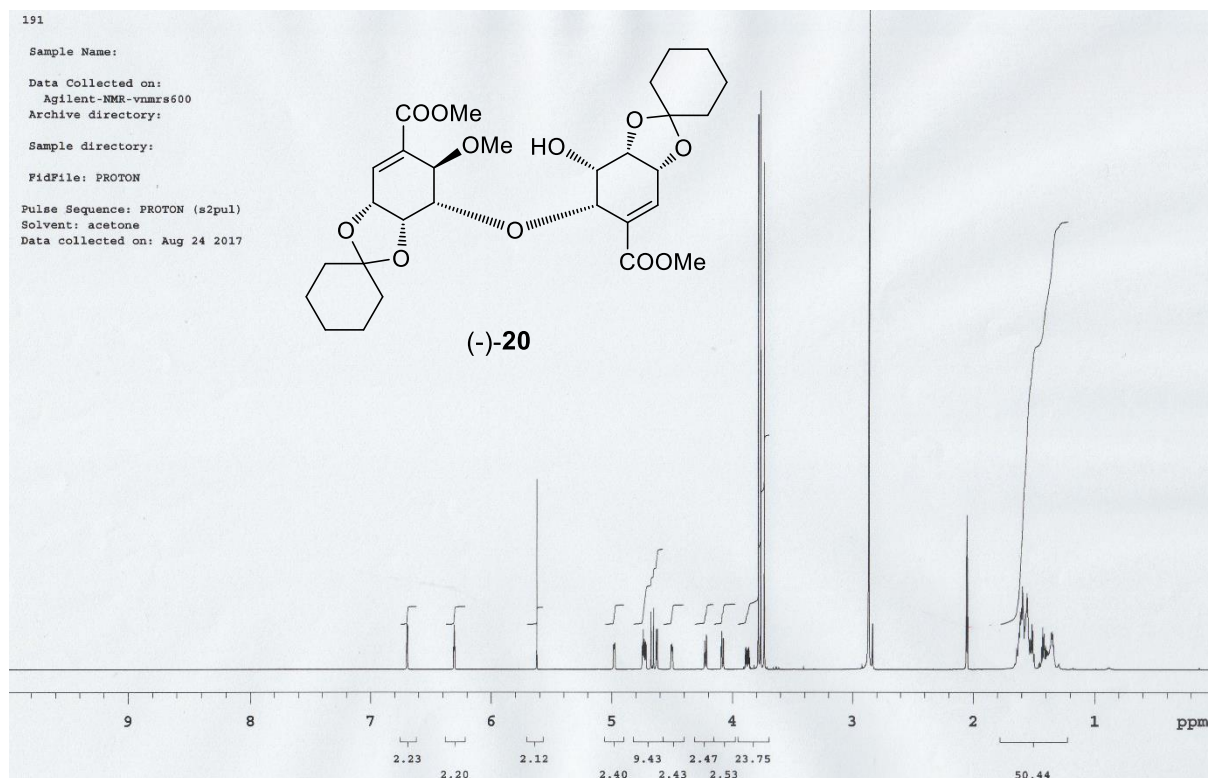
Figure S26:  $^{13}\text{C}$ -NMR Spectrum of (-)-17 in acetone- $d_6$  (150 MHz)



OC15Y867

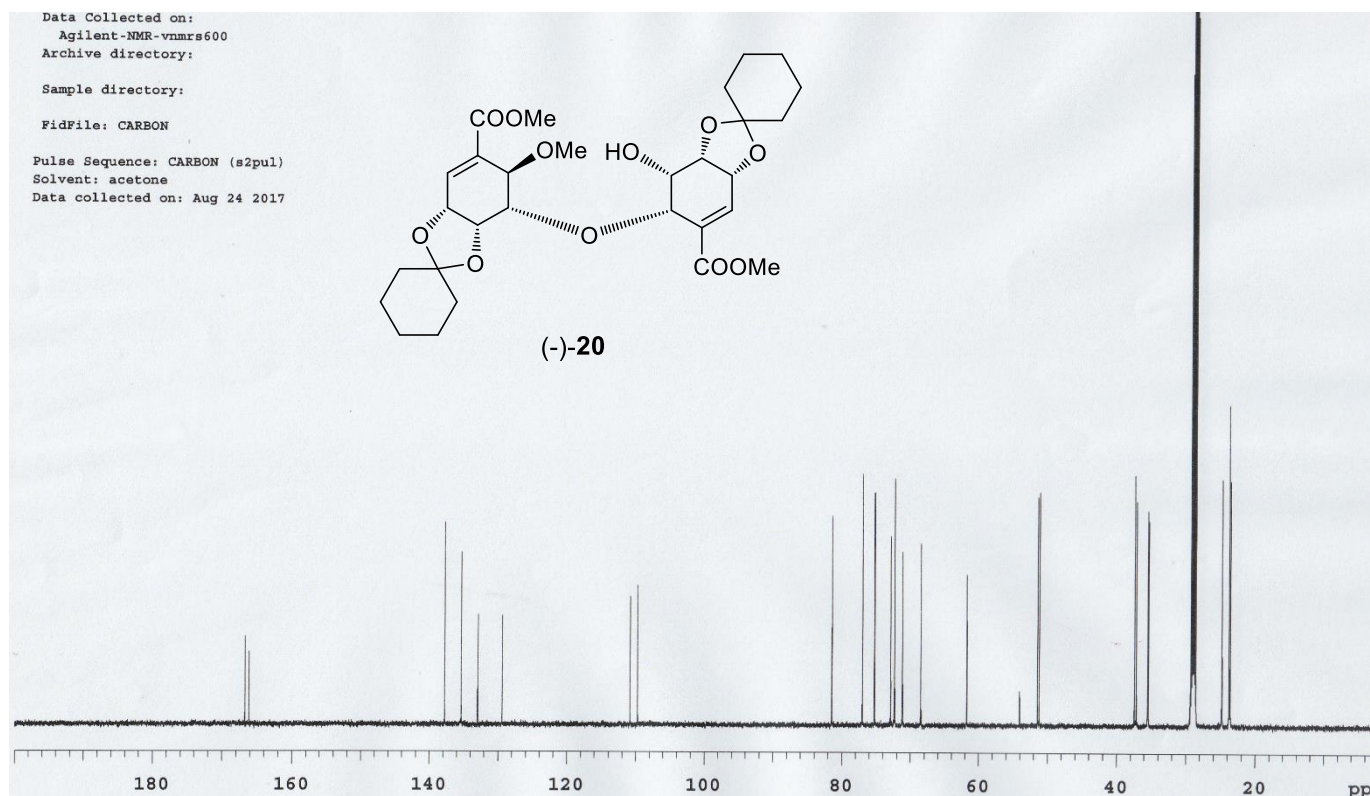
| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 31112.9   | 206.258 | 68.6   |
| 2     | 31093.3   | 206.128 | 5439.8 |
| 3     | 31072.4   | 205.990 | 77.0   |
| 4     | 25268.3   | 167.512 | 20.9   |
| 5     | 25163.1   | 166.815 | 26.8   |
| 6     | 20987.8   | 139.135 | 52.6   |
| 7     | 20715.0   | 137.327 | 62.7   |
| 8     | 19849.1   | 131.587 | 21.0   |
| 9     | 19668.8   | 130.391 | 23.1   |
| 10    | 16884.1   | 111.930 | 25.0   |
| 11    | 16844.8   | 111.670 | 38.1   |
| 12    | 12101.8   | 80.227  | 41.7   |
| 13    | 11434.8   | 75.805  | 65.5   |
| 14    | 11110.0   | 73.652  | 63.1   |
| 15    | 11069.6   | 73.384  | 51.3   |
| 16    | 11037.2   | 73.169  | 58.2   |
| 17    | 10935.5   | 72.495  | 52.3   |
| 18    | 10884.6   | 72.158  | 20.2   |
| 19    | 10881.1   | 72.135  | 37.8   |
| 20    | 10187.6   | 67.537  | 46.5   |
| 21    | 10171.4   | 67.429  | 17.4   |
| 22    | 9261.6    | 61.398  | 54.9   |
| 23    | 7910.3    | 52.440  | 58.3   |
| 24    | 7875.6    | 52.210  | 48.6   |
| 25    | 5796.0    | 38.424  | 53.1   |
| 26    | 5756.7    | 38.163  | 56.9   |
| 27    | 5471.2    | 36.270  | 58.5   |
| 28    | 5444.6    | 36.094  | 49.4   |
| 29    | 4924.4    | 32.646  | 10.6   |
| 30    | 4584.6    | 30.393  | 33.0   |
| 31    | 4577.6    | 30.347  | 32.7   |
| 32    | 4559.1    | 30.224  | 565.7  |
| 33    | 4540.6    | 30.101  | 1492.4 |
| 34    | 4521.0    | 29.971  | 3756.1 |
| 35    | 4501.3    | 29.841  | 4543.1 |
| 36    | 4481.7    | 29.711  | 3261.1 |
| 37    | 4463.2    | 29.588  | 1537.3 |
| 38    | 4443.5    | 29.458  | 638.3  |
| 39    | 3888.7    | 25.779  | 75.9   |
| 40    | 3884.1    | 25.749  | 66.0   |
| 41    | 3737.2    | 24.775  | 68.9   |
| 42    | 3717.6    | 24.645  | 75.2   |
| 43    | 3708.3    | 24.584  | 53.2   |
| 44    | 3693.3    | 24.484  | 69.6   |
| 45    | 3519.9    | 23.335  | 11.4   |
| 46    | 2165.1    | 14.353  | 8.9    |
| 47    | 2167.4    | 14.369  | 9.9    |
| 48    | 212.7     | 1.410   | 74.8   |
| 49    | -0.0      | -0.000  | 21.0   |

Figure S27: <sup>1</sup>H- NMR Spectrum of (-)-20 in acetone-d<sub>6</sub> (600 MHz)



| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|-------|--------|-------|-----------|--------|--------|
| 1     | 4018.3    | 6.698 | 45.6   | 51    | 2527.1    | 4.213 | 19.6   | 101   | 830.1     | 1.384  | 17.2   |
| 2     | 4017.5    | 6.697 | 48.5   | 52    | 2453.7    | 4.090 | 41.6   | 102   | 820.2     | 1.367  | 22.2   |
| 3     | 4015.4    | 6.693 | 47.9   | 53    | 2451.4    | 4.086 | 40.4   | 103   | 814.3     | 1.357  | 34.3   |
| 4     | 4014.2    | 6.692 | 46.4   | 54    | 2445.2    | 4.076 | 33.5   | 104   | 808.7     | 1.348  | 35.3   |
| 5     | 3786.5    | 6.312 | 25.7   | 55    | 2442.9    | 4.072 | 33.2   | 105   | 802.8     | 1.338  | 22.4   |
| 6     | 3785.1    | 6.309 | 38.6   | 56    | 2334.0    | 3.891 | 25.9   | 106   | -0.0      | -0.000 | 74.3   |
| 7     | 3783.6    | 6.307 | 49.1   | 57    | 2331.1    | 3.886 | 26.8   |       |           |        |        |
| 8     | 3782.1    | 6.305 | 39.3   | 58    | 2329.0    | 3.882 | 24.8   |       |           |        |        |
| 9     | 3780.4    | 6.302 | 23.9   | 59    | 2326.1    | 3.877 | 23.2   |       |           |        |        |
| 10    | 3374.0    | 5.624 | 238.1  | 60    | 2321.7    | 3.870 | 24.9   |       |           |        |        |
| 11    | 2991.0    | 4.986 | 19.3   | 61    | 2318.7    | 3.865 | 26.4   |       |           |        |        |
| 12    | 2989.5    | 4.983 | 24.6   | 62    | 2316.7    | 3.862 | 24.5   |       |           |        |        |
| 13    | 2987.5    | 4.980 | 21.2   | 63    | 2313.8    | 3.857 | 22.9   |       |           |        |        |
| 14    | 2986.3    | 4.978 | 22.4   | 64    | 2269.5    | 3.783 | 754.1  |       |           |        |        |
| 15    | 2984.3    | 4.975 | 25.7   | 65    | 2258.3    | 3.764 | 812.1  |       |           |        |        |
| 16    | 2982.8    | 4.972 | 20.4   | 66    | 2255.1    | 3.759 | 8.1    |       |           |        |        |
| 17    | 2847.5    | 4.747 | 27.2   | 67    | 2240.1    | 3.734 | 635.4  |       |           |        |        |
| 18    | 2845.8    | 4.744 | 28.1   | 68    | 1719.5    | 2.866 | 2581.2 |       |           |        |        |
| 19    | 2844.6    | 4.742 | 29.3   | 69    | 1699.6    | 2.833 | 44.4   |       |           |        |        |
| 20    | 2842.5    | 4.738 | 45.5   | 70    | 1237.4    | 2.063 | 64.9   |       |           |        |        |
| 21    | 2840.8    | 4.735 | 26.8   | 71    | 1235.1    | 2.059 | 151.6  |       |           |        |        |
| 22    | 2839.6    | 4.733 | 27.2   | 72    | 1233.0    | 2.055 | 191.0  |       |           |        |        |
| 23    | 2837.0    | 4.729 | 29.3   | 73    | 1230.7    | 2.051 | 150.6  |       |           |        |        |
| 24    | 2836.1    | 4.728 | 28.2   | 74    | 1228.6    | 2.048 | 63.1   |       |           |        |        |
| 25    | 2833.7    | 4.724 | 25.1   | 75    | 985.7     | 1.643 | 20.5   |       |           |        |        |
| 26    | 2832.9    | 4.722 | 28.5   | 76    | 981.8     | 1.637 | 12.1   |       |           |        |        |
| 27    | 2831.4    | 4.720 | 27.9   | 77    | 977.4     | 1.629 | 23.5   |       |           |        |        |
| 28    | 2830.5    | 4.718 | 30.1   | 78    | 974.2     | 1.624 | 34.0   |       |           |        |        |
| 29    | 2828.5    | 4.715 | 27.7   | 79    | 968.6     | 1.615 | 53.7   |       |           |        |        |
| 30    | 2827.3    | 4.713 | 27.4   | 80    | 962.5     | 1.604 | 56.4   |       |           |        |        |
| 31    | 2803.8    | 4.674 | 65.2   | 81    | 957.5     | 1.596 | 77.3   |       |           |        |        |
| 32    | 2791.2    | 4.653 | 70.1   | 82    | 954.6     | 1.591 | 57.6   |       |           |        |        |
| 33    | 2777.4    | 4.630 | 41.0   | 83    | 951.3     | 1.586 | 48.9   |       |           |        |        |
| 34    | 2772.4    | 4.621 | 41.4   | 84    | 946.3     | 1.577 | 36.8   |       |           |        |        |
| 35    | 2705.2    | 4.509 | 15.3   | 85    | 941.3     | 1.569 | 46.8   |       |           |        |        |
| 36    | 2704.3    | 4.508 | 26.7   | 86    | 938.4     | 1.564 | 53.8   |       |           |        |        |
| 37    | 2703.2    | 4.506 | 18.8   | 87    | 934.6     | 1.558 | 70.5   |       |           |        |        |
| 38    | 2702.3    | 4.505 | 18.6   | 88    | 930.8     | 1.552 | 57.1   |       |           |        |        |
| 39    | 2701.4    | 4.503 | 27.4   | 89    | 927.3     | 1.546 | 29.1   |       |           |        |        |
| 40    | 2700.2    | 4.501 | 21.3   | 90    | 923.7     | 1.540 | 27.5   |       |           |        |        |
| 41    | 2698.8    | 4.499 | 25.8   | 91    | 916.7     | 1.528 | 29.7   |       |           |        |        |
| 42    | 2697.6    | 4.497 | 16.5   | 92    | 910.8     | 1.518 | 44.1   |       |           |        |        |
| 43    | 2697.0    | 4.496 | 16.9   | 93    | 905.0     | 1.509 | 38.2   |       |           |        |        |
| 44    | 2695.8    | 4.494 | 24.9   | 94    | 899.1     | 1.499 | 15.5   |       |           |        |        |
| 45    | 2694.9    | 4.492 | 13.4   | 95    | 869.8     | 1.450 | 7.8    |       |           |        |        |
| 46    | 2539.1    | 4.233 | 16.0   | 96    | 862.7     | 1.438 | 22.3   |       |           |        |        |
| 47    | 2537.4    | 4.230 | 30.1   | 97    | 856.5     | 1.428 | 40.8   |       |           |        |        |
| 48    | 2535.6    | 4.227 | 16.7   | 98    | 849.5     | 1.416 | 34.1   |       |           |        |        |
| 49    | 2530.6    | 4.218 | 20.2   | 99    | 842.8     | 1.405 | 23.4   |       |           |        |        |
| 50    | 2528.9    | 4.215 | 36.5   | 100   | 836.3     | 1.394 | 18.1   |       |           |        |        |

Figure S28:  $^{13}\text{C}$ -NMR Spectrum of (-)-20 in acetone- $d_6$  (150 MHz)



| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 25143.6   | 166.685 | 17.1   |
| 2     | 25052.3   | 166.080 | 14.2   |
| 3     | 20779.8   | 137.756 | 39.2   |
| 4     | 20415.7   | 135.342 | 33.5   |
| 5     | 20046.9   | 132.898 | 21.5   |
| 6     | 19518.6   | 129.396 | 21.2   |
| 7     | 16718.9   | 110.835 | 25.0   |
| 8     | 16552.4   | 109.732 | 27.2   |
| 9     | 12283.4   | 81.431  | 40.6   |
| 10    | 11611.8   | 76.979  | 48.8   |
| 11    | 11345.9   | 75.216  | 45.2   |
| 12    | 10992.2   | 72.871  | 36.8   |
| 13    | 10911.3   | 72.335  | 47.9   |
| 14    | 10906.7   | 72.304  | 42.5   |
| 15    | 10734.4   | 71.162  | 33.7   |
| 16    | 10334.5   | 68.511  | 35.4   |
| 17    | 9314.9    | 61.752  | 29.4   |
| 18    | 8155.5    | 54.065  | 6.9    |
| 19    | 7763.6    | 51.468  | 44.4   |
| 20    | 7726.6    | 51.222  | 45.3   |
| 21    | 5649.3    | 37.451  | 48.6   |
| 22    | 5607.7    | 37.175  | 43.6   |
| 23    | 5359.2    | 35.528  | 41.8   |
| 24    | 5346.5    | 35.444  | 39.8   |
| 25    | 4422.8    | 29.321  | 126.2  |
| 26    | 4404.4    | 29.198  | 313.8  |
| 27    | 4384.7    | 29.068  | 808.9  |
| 28    | 4365.1    | 28.937  | 1004.1 |
| 29    | 4345.4    | 28.807  | 741.2  |
| 30    | 4326.9    | 28.685  | 323.3  |
| 31    | 4307.3    | 28.554  | 137.2  |
| 32    | 3742.0    | 24.807  | 47.8   |
| 33    | 3737.4    | 24.776  | 45.3   |
| 34    | 3584.8    | 23.765  | 62.3   |
| 35    | 3561.7    | 23.611  | 47.5   |
| 36    | 3559.3    | 23.596  | 43.5   |

Figure S29: <sup>1</sup>H-NMR Spectrum of (+)-20 in acetone-d<sub>6</sub> (400 MHz)

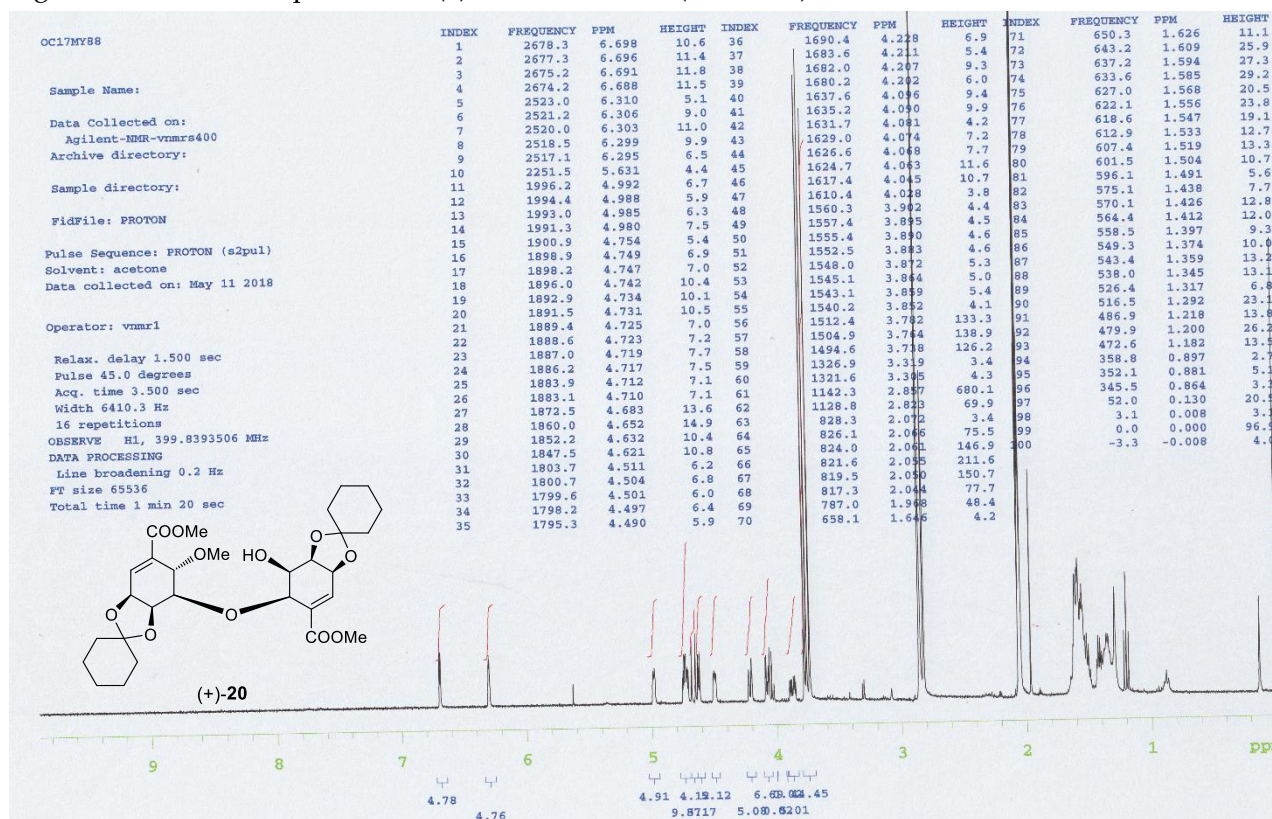


Figure S29: <sup>13</sup>C-NMR Spectrum of (+)-20 in acetone-d<sub>6</sub> (100 MHz)

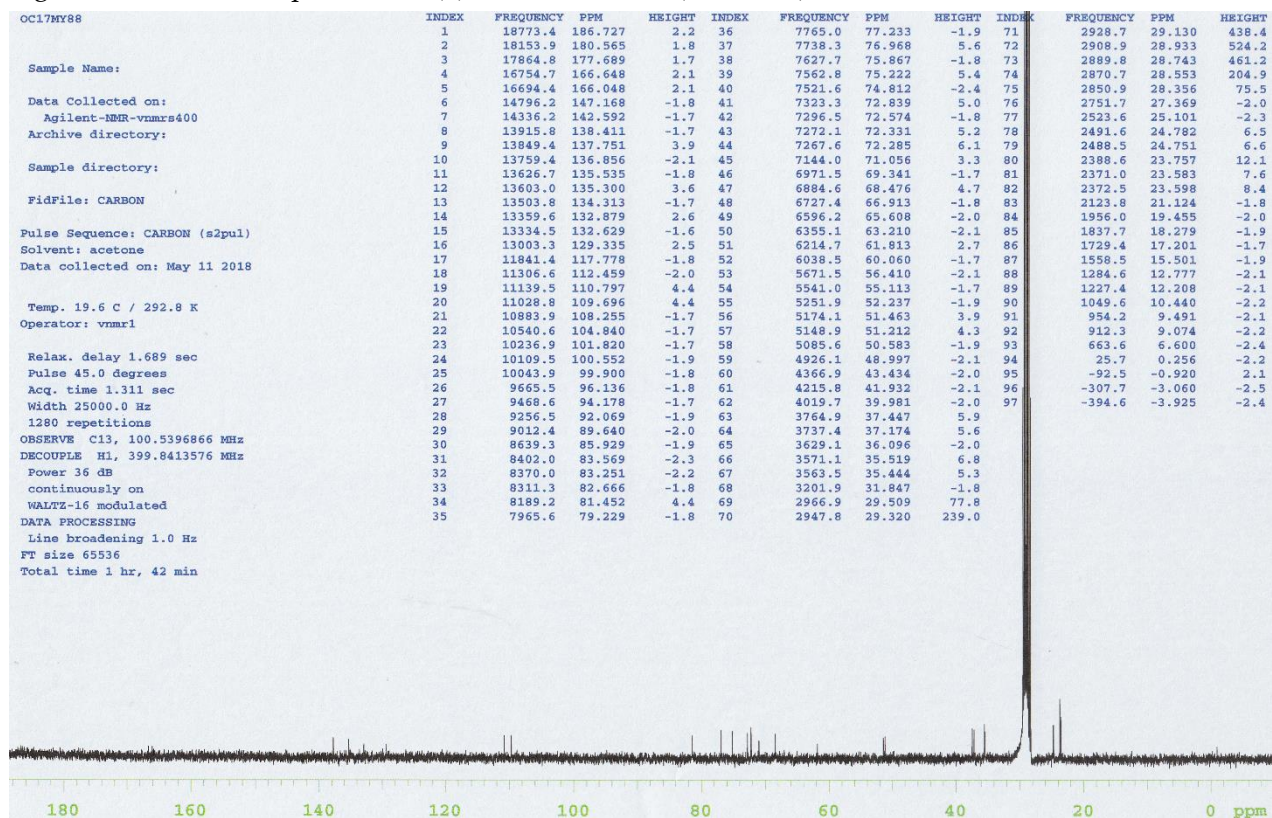
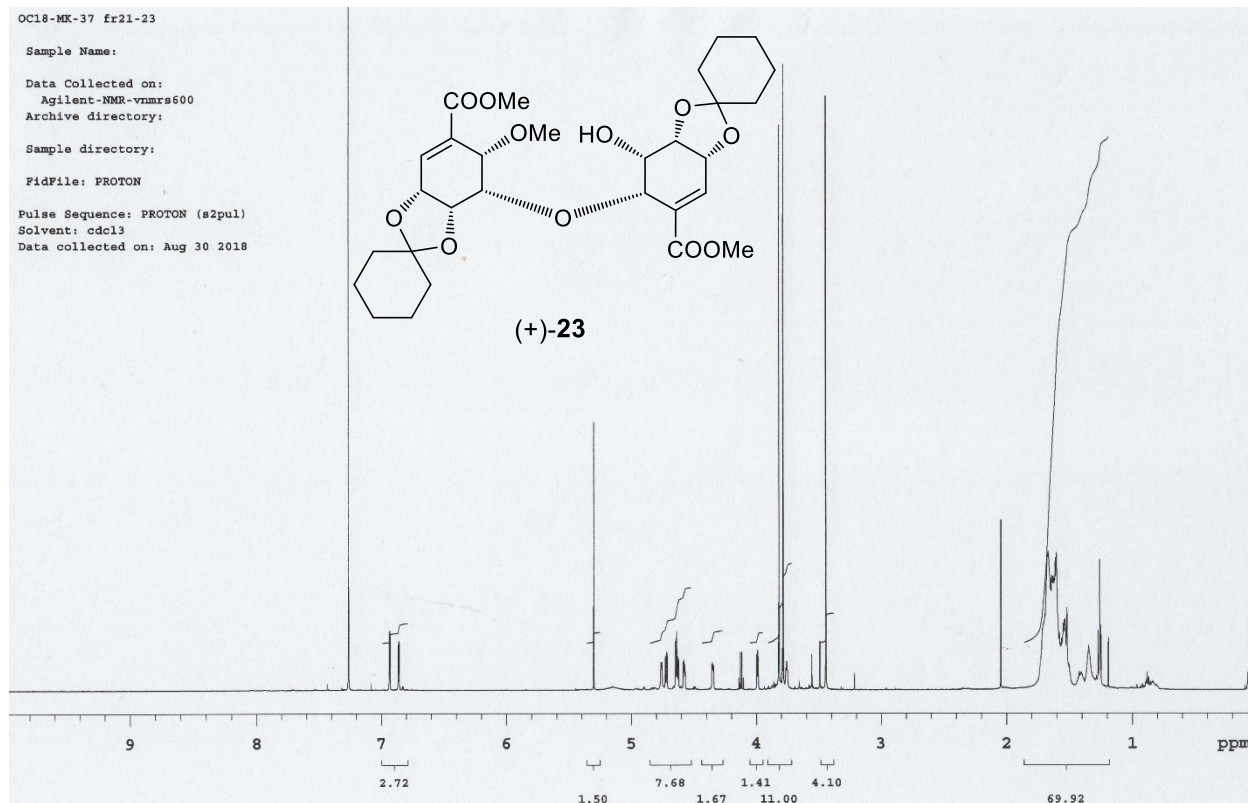


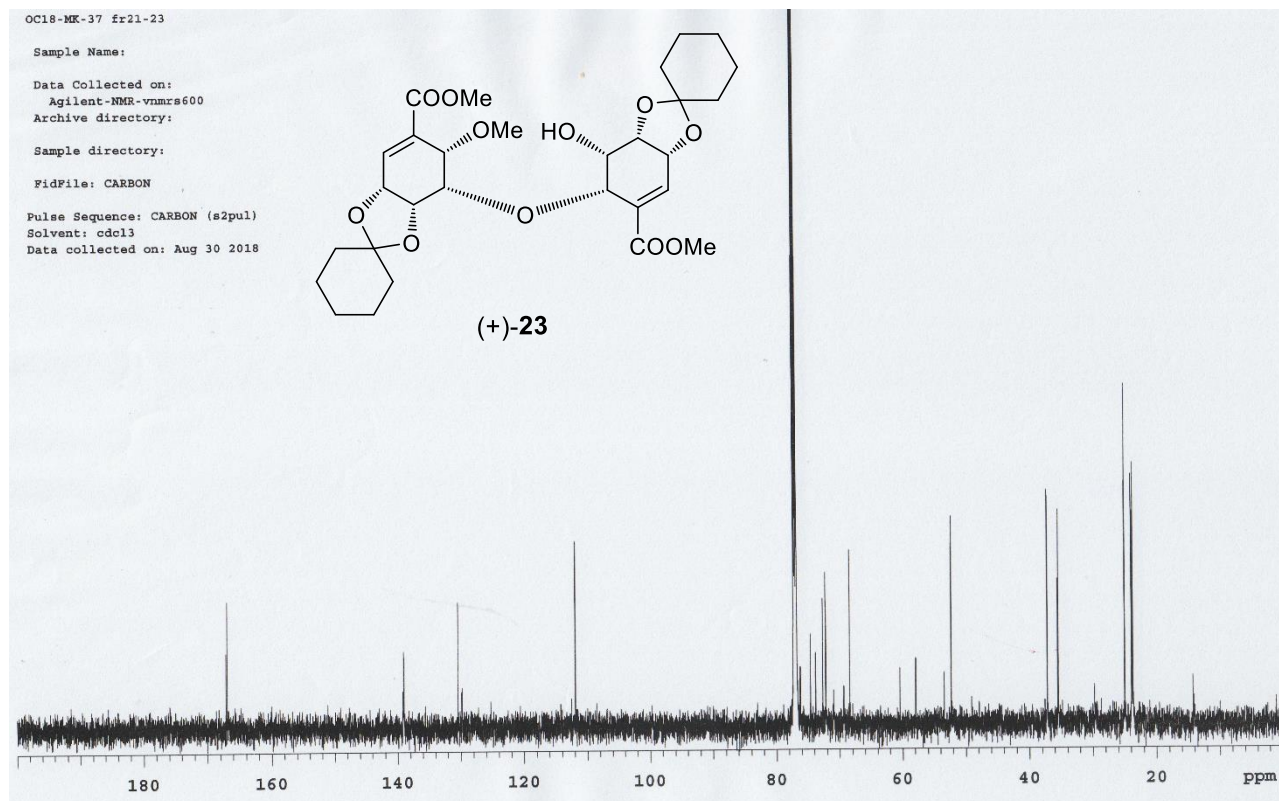
Figure S31: <sup>1</sup>H- NMR Spectrum of (+)-23 in CDCl<sub>3</sub> (600 MHz)



OC18-MK-37 fr21-23

| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|--------|--------|
| 1     | 4356.7    | 7.262 | 748.4  | 51    | 1227.2    | 2.046  | 101.8  |
| 2     | 4162.7    | 6.939 | 32.1   | 52    | 1025.0    | 1.709  | 39.5   |
| 3     | 4161.8    | 6.938 | 35.2   | 53    | 1027.4    | 1.696  | 45.1   |
| 4     | 4158.9    | 6.933 | 35.7   | 54    | 1005.0    | 1.675  | 80.8   |
| 5     | 4158.0    | 6.931 | 32.6   | 55    | 1001.5    | 1.669  | 83.1   |
| 6     | 4118.4    | 6.865 | 27.2   | 56    | 988.9     | 1.648  | 63.5   |
| 7     | 4117.8    | 6.864 | 29.2   | 57    | 984.5     | 1.641  | 68.2   |
| 8     | 4115.2    | 6.860 | 29.3   | 58    | 980.7     | 1.635  | 67.9   |
| 9     | 4114.3    | 6.858 | 28.2   | 59    | 976.9     | 1.628  | 68.2   |
| 10    | 3179.7    | 5.300 | 160.6  | 60    | 971.0     | 1.619  | 66.9   |
| 11    | 2857.2    | 4.763 | 16.7   | 61    | 967.5     | 1.613  | 78.9   |
| 12    | 2852.8    | 4.756 | 16.8   | 62    | 962.5     | 1.604  | 82.1   |
| 13    | 2835.8    | 4.727 | 19.7   | 63    | 948.4     | 1.581  | 34.3   |
| 14    | 2832.3    | 4.721 | 20.6   | 64    | 941.1     | 1.569  | 28.1   |
| 15    | 2830.2    | 4.718 | 23.1   | 65    | 936.7     | 1.561  | 31.3   |
| 16    | 2826.4    | 4.711 | 21.9   | 66    | 930.2     | 1.551  | 40.0   |
| 17    | 2786.5    | 4.645 | 29.5   | 67    | 923.7     | 1.540  | 42.0   |
| 18    | 2781.2    | 4.636 | 35.2   | 68    | 921.1     | 1.535  | 42.7   |
| 19    | 2776.8    | 4.629 | 19.3   | 69    | 917.9     | 1.530  | 36.2   |
| 20    | 2775.0    | 4.626 | 20.0   | 70    | 911.7     | 1.520  | 49.4   |
| 21    | 2771.5    | 4.620 | 18.5   | 71    | 900.6     | 1.501  | 15.2   |
| 22    | 2749.8    | 4.584 | 17.1   | 72    | 853.0     | 1.422  | 11.2   |
| 23    | 2746.6    | 4.578 | 18.0   | 73    | 845.1     | 1.409  | 10.5   |
| 24    | 2743.6    | 4.574 | 15.5   | 74    | 841.3     | 1.402  | 10.6   |
| 25    | 2740.7    | 4.569 | 14.8   | 75    | 838.4     | 1.397  | 9.4    |
| 26    | 2632.5    | 4.355 | 15.7   | 76    | 808.4     | 1.348  | 26.6   |
| 27    | 2609.5    | 4.350 | 16.7   | 77    | 791.7     | 1.320  | 10.6   |
| 28    | 2606.6    | 4.345 | 15.3   | 78    | 770.6     | 1.285  | 8.6    |
| 29    | 2603.7    | 4.340 | 14.4   | 79    | 762.6     | 1.271  | 35.5   |
| 30    | 2483.7    | 4.140 | 7.4    | 80    | 755.6     | 1.260  | 78.2   |
| 31    | 2476.3    | 4.128 | 22.9   | 81    | 752.7     | 1.255  | 39.0   |
| 32    | 2469.3    | 4.116 | 22.8   | 82    | 748.6     | 1.248  | 32.8   |
| 33    | 2461.9    | 4.104 | 7.3    | 83    | 714.2     | 1.191  | 31.2   |
| 34    | 2397.7    | 3.997 | 21.4   | 84    | 527.9     | 0.880  | 10.7   |
| 35    | 2394.7    | 3.992 | 23.9   | 85    | 520.9     | 0.868  | 7.6    |
| 36    | 2393.0    | 3.989 | 24.0   | 86    | 41.4      | 0.069  | 43.2   |
| 37    | 2390.3    | 3.985 | 20.0   | 87    | 3.2       | 0.005  | 20.5   |
| 38    | 2292.9    | 3.822 | 28.3   | 88    | -0.3      | -0.000 | 596.1  |
| 39    | 2289.4    | 3.816 | 338.2  | 89    | -3.5      | -0.006 | 20.7   |
| 40    | 2283.5    | 3.807 | 7.4    |       |           |        |        |
| 41    | 2273.3    | 3.789 | 25.2   |       |           |        |        |
| 42    | 2269.2    | 3.783 | 375.1  |       |           |        |        |
| 43    | 2258.6    | 3.765 | 8.5    |       |           |        |        |
| 44    | 2255.7    | 3.760 | 13.4   |       |           |        |        |
| 45    | 2252.4    | 3.755 | 17.2   |       |           |        |        |
| 46    | 2248.9    | 3.749 | 12.2   |       |           |        |        |
| 47    | 2133.0    | 3.556 | 21.3   |       |           |        |        |
| 48    | 2094.3    | 3.491 | 29.2   |       |           |        |        |
| 49    | 2065.5    | 3.443 | 355.8  |       |           |        |        |
| 50    | 1928.5    | 3.215 | 9.9    |       |           |        |        |

Figure S32:  $^{13}\text{C}$ -NMR Spectrum of (+)-23 in  $\text{CDCl}_3$  (150 MHz)



OC18-MK-37 fr21-23

| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 25202.2   | 167.075 | 15.9   |
| 2     | 25173.3   | 166.883 | 26.8   |
| 3     | 20969.1   | 139.012 | 16.1   |
| 4     | 19667.5   | 130.383 | 26.4   |
| 5     | 19577.3   | 129.785 | 8.4    |
| 6     | 16875.8   | 111.876 | 39.2   |
| 7     | 16872.3   | 111.853 | 20.6   |
| 8     | 11647.3   | 77.215  | 2319.7 |
| 9     | 11615.0   | 77.000  | 2418.9 |
| 10    | 11582.6   | 76.785  | 2144.9 |
| 11    | 11490.1   | 76.172  | 12.4   |
| 12    | 11247.4   | 74.563  | 19.3   |
| 13    | 11124.8   | 73.751  | 15.3   |
| 14    | 10958.4   | 72.647  | 26.7   |
| 15    | 10887.9   | 72.180  | 32.3   |
| 16    | 10696.0   | 70.908  | 7.4    |
| 17    | 10455.5   | 69.314  | 8.2    |
| 18    | 10314.5   | 68.379  | 37.0   |
| 19    | 9110.0    | 60.394  | 12.0   |
| 20    | 8729.7    | 57.872  | 14.0   |
| 21    | 8056.9    | 53.412  | 11.0   |
| 22    | 7890.4    | 52.309  | 38.2   |
| 23    | 7881.2    | 52.247  | 44.0   |
| 24    | 5607.4    | 37.174  | 49.4   |
| 25    | 5356.6    | 35.511  | 30.5   |
| 26    | 5345.0    | 35.434  | 45.2   |
| 27    | 4479.2    | 29.694  | 8.2    |
| 28    | 3764.8    | 24.958  | 71.6   |
| 29    | 3605.3    | 23.901  | 52.5   |
| 30    | 3589.1    | 23.793  | 44.8   |
| 31    | 3579.8    | 23.732  | 41.4   |
| 32    | 3568.3    | 23.655  | 55.0   |
| 33    | 2139.5    | 14.184  | 10.2   |



Figure S33: <sup>1</sup>H-NMR Spectrum of (-)-23 in CDCl<sub>3</sub> (400 MHz)

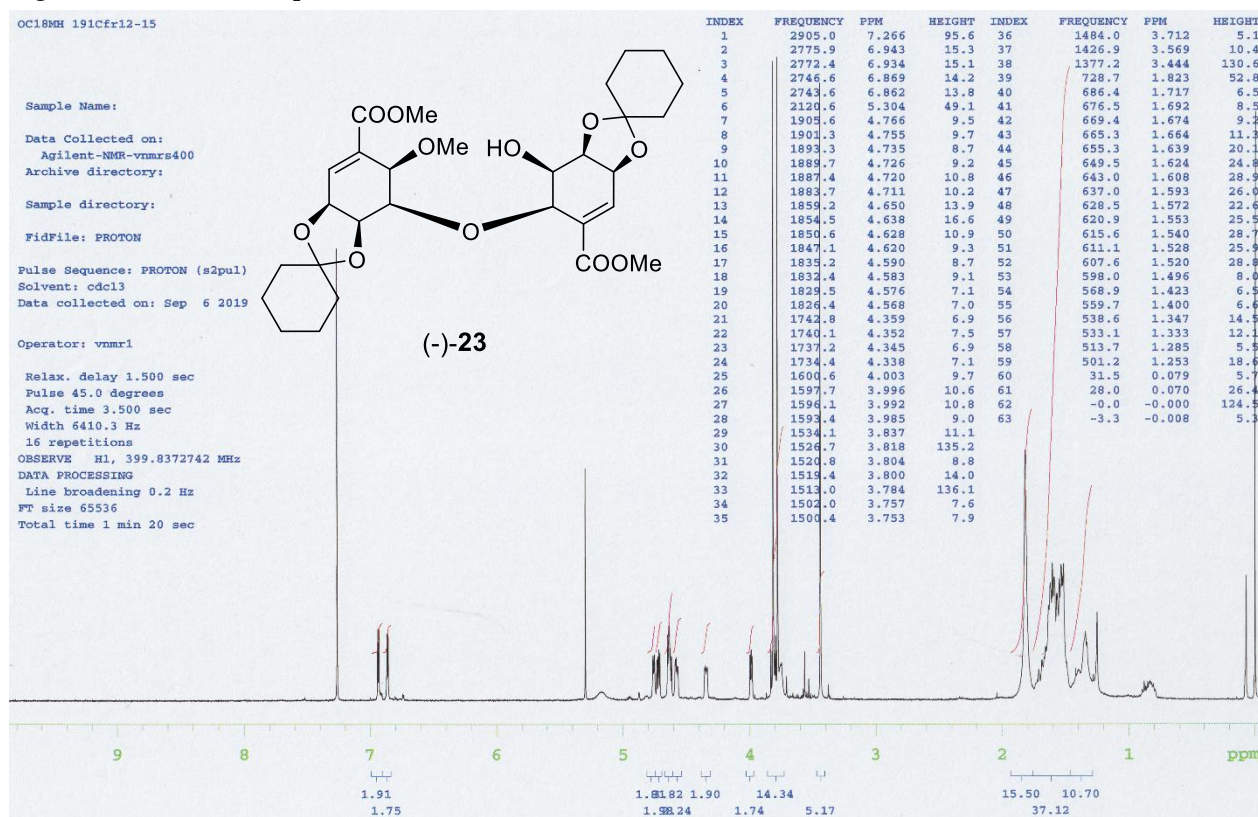


Figure S34: <sup>13</sup>C-NMR Spectrum of (-)-23 in CDCl<sub>3</sub> (100 MHz)

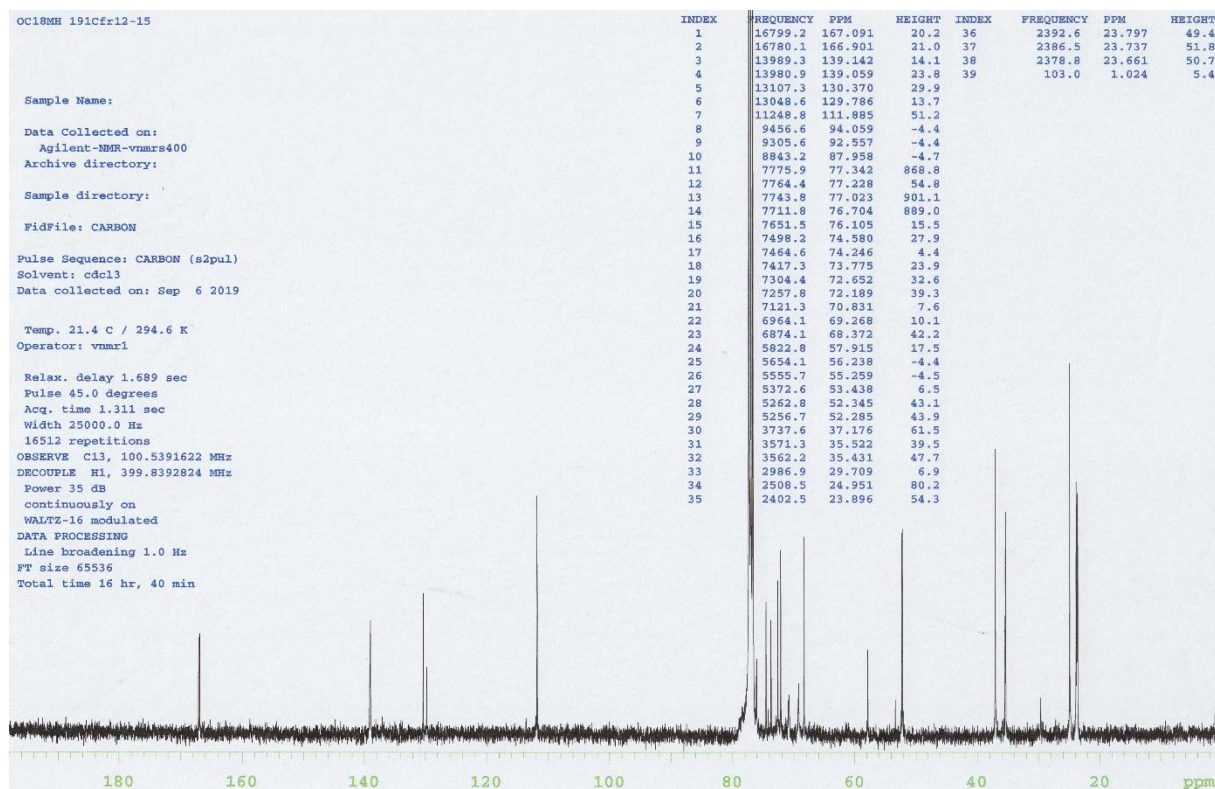
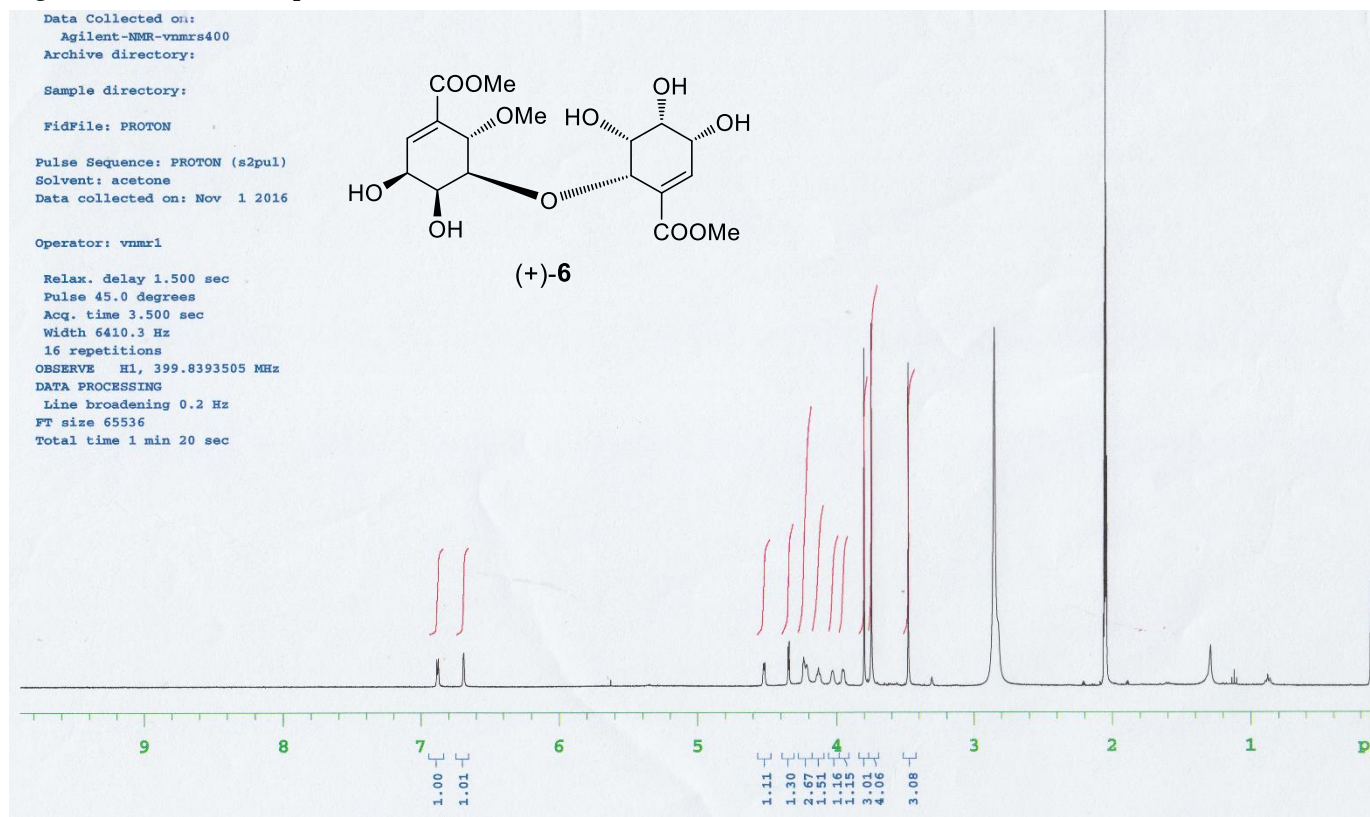
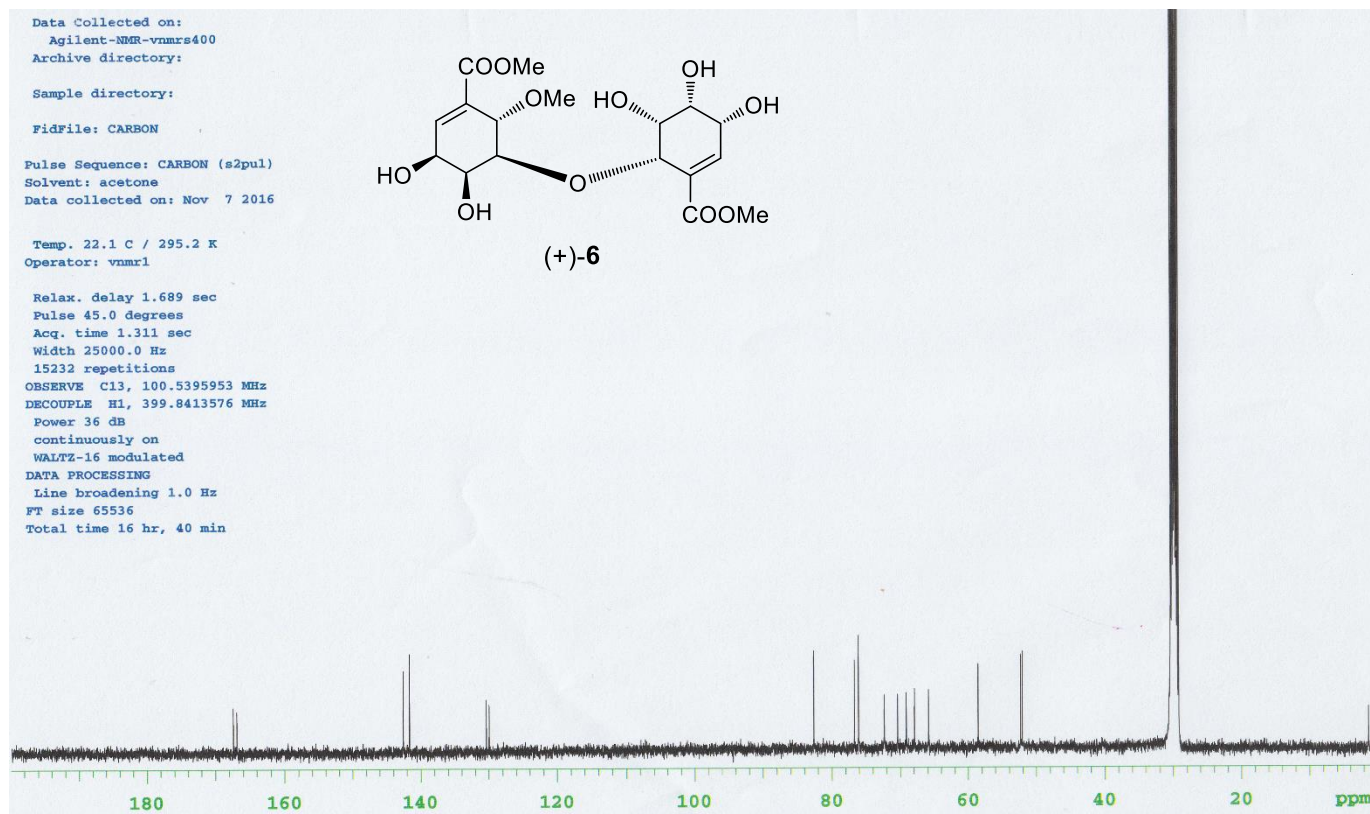


Figure S35: <sup>1</sup>H- NMR Spectrum of (+)-6 in acetone-d<sub>6</sub>(400 MHz)



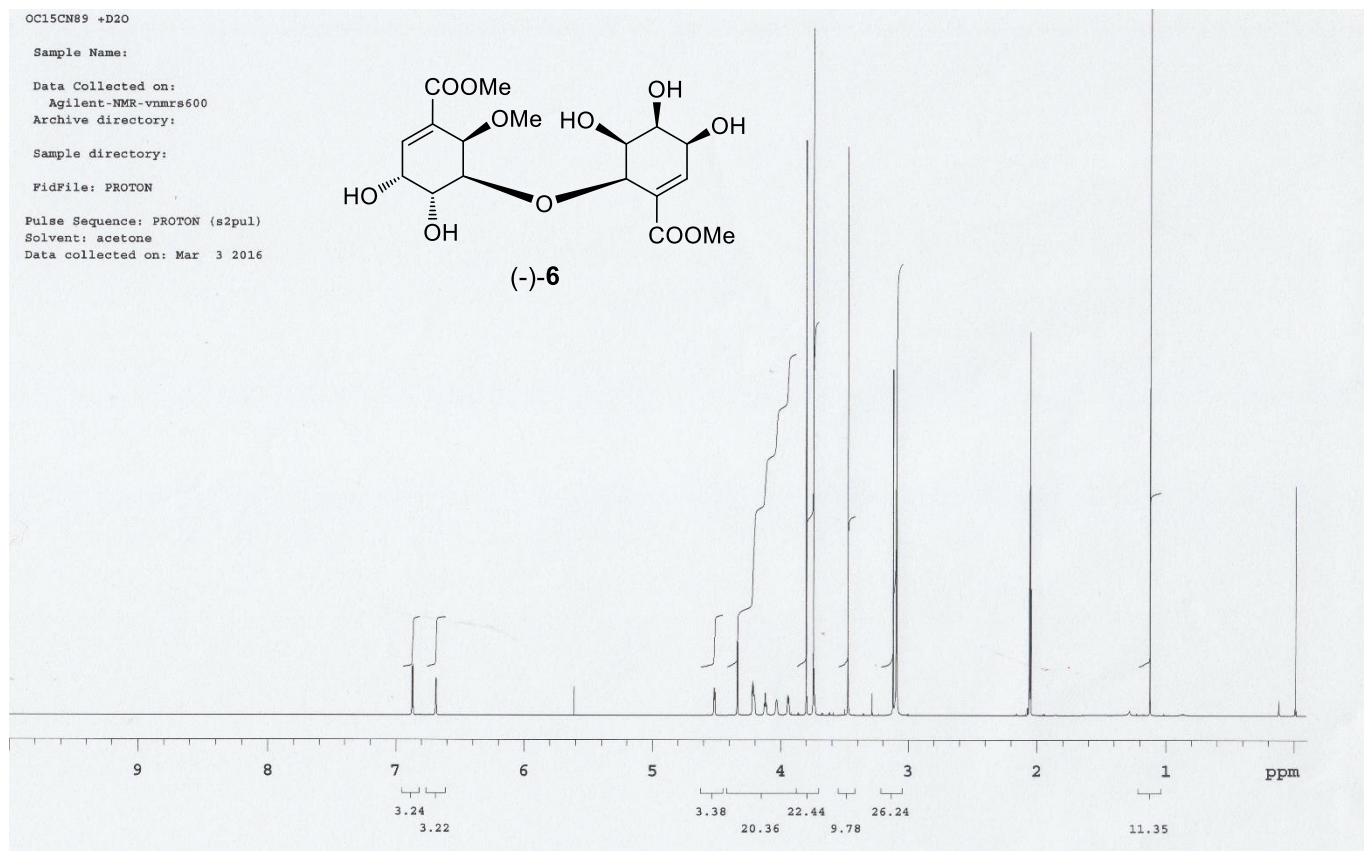
| INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|--------|--------|
| 1     | 2754.2    | 6.888  | 30.0   |
| 2     | 2749.7    | 6.877  | 30.9   |
| 3     | 2676.4    | 6.694  | 39.2   |
| 4     | 1811.3    | 4.530  | 26.3   |
| 5     | 1807.4    | 4.520  | 27.7   |
| 6     | 1740.3    | 4.352  | 46.0   |
| 7     | 1737.2    | 4.345  | 52.4   |
| 8     | 1695.1    | 4.239  | 34.0   |
| 9     | 1692.7    | 4.234  | 29.0   |
| 10    | 1686.7    | 4.218  | 25.4   |
| 11    | 1657.3    | 4.145  | 13.8   |
| 12    | 1652.6    | 4.133  | 21.6   |
| 13    | 1612.7    | 4.033  | 18.4   |
| 14    | 1583.4    | 3.960  | 20.0   |
| 15    | 1580.3    | 3.952  | 19.0   |
| 16    | 1521.0    | 3.804  | 390.4  |
| 17    | 1500.1    | 3.752  | 419.2  |
| 18    | 1392.3    | 3.482  | 373.6  |
| 19    | 1323.6    | 3.310  | 10.9   |
| 20    | 1142.8    | 2.858  | 414.2  |
| 21    | 828.3     | 2.072  | 12.3   |
| 22    | 826.1     | 2.066  | 260.6  |
| 23    | 823.8     | 2.060  | 507.6  |
| 24    | 821.6     | 2.055  | 785.3  |
| 25    | 819.5     | 2.050  | 542.2  |
| 26    | 817.3     | 2.044  | 265.6  |
| 27    | 516.5     | 1.292  | 46.4   |
| 28    | 455.2     | 1.139  | 9.9    |
| 29    | 448.2     | 1.121  | 19.1   |
| 30    | 441.1     | 1.103  | 9.9    |
| 31    | 352.3     | 0.881  | 12.9   |
| 32    | 52.6      | 0.132  | 133.1  |
| 33    | 49.9      | 0.125  | 21.1   |
| 34    | 0.0       | 0.000  | 330.6  |
| 35    | -3.3      | -0.008 | 11.2   |

Figure S36:  $^{13}\text{C}$ -NMR Spectrum of (+)-6 in acetone- $d_6$  (100 MHz)



| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 16838.4   | 167.480 | 9.2    |
| 2     | 16787.3   | 166.972 | 8.3    |
| 3     | 14343.6   | 142.666 | 19.1   |
| 4     | 14249.7   | 141.732 | 23.9   |
| 5     | 13115.2   | 130.448 | 11.4   |
| 6     | 13074.0   | 130.039 | 9.9    |
| 7     | 8314.1    | 82.694  | 23.8   |
| 8     | 7717.4    | 76.760  | 21.7   |
| 9     | 7658.7    | 76.176  | 27.7   |
| 10    | 7281.0    | 72.420  | 12.3   |
| 11    | 7084.2    | 70.462  | 12.4   |
| 12    | 6956.8    | 69.195  | 12.9   |
| 13    | 6837.0    | 68.003  | 13.9   |
| 14    | 6630.2    | 65.947  | 13.7   |
| 15    | 5891.7    | 58.601  | 20.1   |
| 16    | 5265.4    | 52.371  | 22.8   |
| 17    | 5240.9    | 52.128  | 23.7   |
| 18    | 3073.4    | 30.569  | 14.8   |
| 19    | 3057.4    | 30.410  | 435.5  |
| 20    | 3038.3    | 30.220  | 1337.8 |
| 21    | 3019.3    | 30.031  | 2363.7 |
| 22    | 2999.4    | 29.833  | 3048.0 |
| 23    | 2980.3    | 29.644  | 2595.9 |
| 24    | 2960.5    | 29.446  | 1181.0 |
| 25    | 2941.4    | 29.257  | 438.2  |
| 26    | 139.9     | 1.392   | 9.0    |
| 27    | -2.0      | -0.020  | 6.8    |

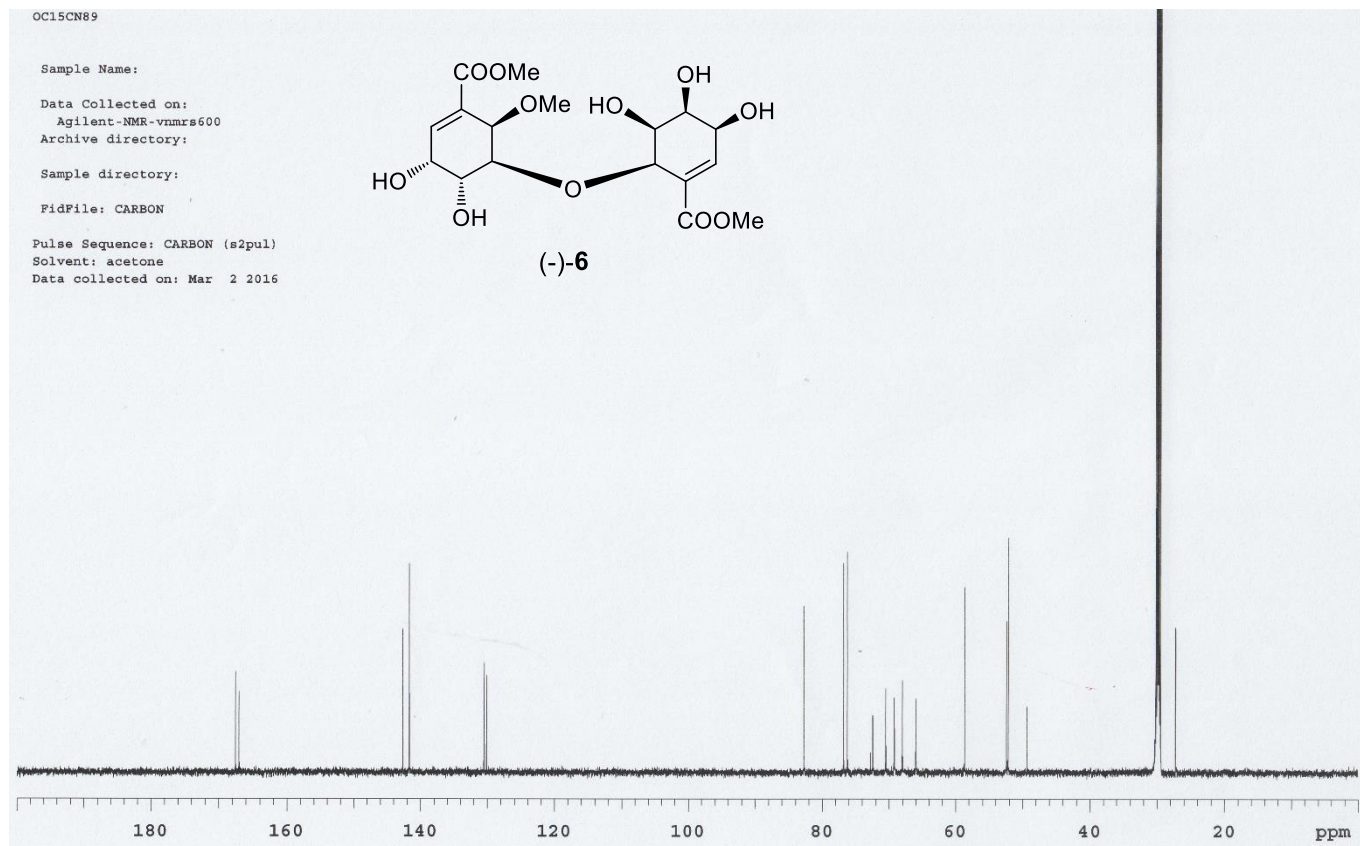
Figure S37: <sup>1</sup>H- NMR Spectrum of (-)-6 in acetone-d<sub>6</sub> (600 MHz)



OC15CN89 +D2O

| INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|--------|--------|
| 1     | 4124.3    | 6.875  | 85.6   |
| 2     | 4119.6    | 6.867  | 89.0   |
| 3     | 4011.9    | 6.688  | 64.3   |
| 4     | 4010.7    | 6.686  | 65.5   |
| 5     | 3366.6    | 5.612  | 50.5   |
| 6     | 2710.2    | 4.518  | 48.7   |
| 7     | 2706.1    | 4.511  | 49.1   |
| 8     | 2602.5    | 4.338  | 117.6  |
| 9     | 2599.3    | 4.333  | 129.2  |
| 10    | 2532.1    | 4.221  | 45.1   |
| 11    | 2529.8    | 4.217  | 60.2   |
| 12    | 2526.8    | 4.212  | 56.0   |
| 13    | 2522.4    | 4.205  | 37.0   |
| 14    | 2475.5    | 4.126  | 21.7   |
| 15    | 2470.5    | 4.118  | 40.1   |
| 16    | 2465.8    | 4.110  | 23.3   |
| 17    | 2418.3    | 4.031  | 28.4   |
| 18    | 2367.2    | 3.946  | 33.6   |
| 19    | 2365.4    | 3.943  | 35.7   |
| 20    | 2362.2    | 3.938  | 33.5   |
| 21    | 2360.4    | 3.935  | 29.9   |
| 22    | 2278.3    | 3.798  | 1006.7 |
| 23    | 2249.2    | 3.749  | 18.2   |
| 24    | 2244.8    | 3.742  | 1202.3 |
| 25    | 2239.3    | 3.733  | 37.1   |
| 26    | 2083.1    | 3.472  | 994.9  |
| 27    | 2077.9    | 3.464  | 13.3   |
| 28    | 1971.3    | 3.286  | 39.4   |
| 29    | 1873.9    | 3.124  | 20.5   |
| 30    | 1872.2    | 3.121  | 605.7  |
| 31    | 1869.8    | 3.117  | 18.8   |
| 32    | 1856.0    | 3.094  | 608.4  |
| 33    | 1243.9    | 2.074  | 13.6   |
| 34    | 1241.9    | 2.070  | 14.3   |
| 35    | 1239.5    | 2.066  | 13.5   |
| 36    | 1236.3    | 2.061  | 224.8  |
| 37    | 1233.9    | 2.057  | 395.5  |
| 38    | 1231.9    | 2.053  | 670.6  |
| 39    | 1229.5    | 2.050  | 404.1  |
| 40    | 1227.5    | 2.046  | 222.0  |
| 41    | 674.6     | 1.125  | 37.0   |
| 42    | 672.9     | 1.122  | 2200.2 |
| 43    | 670.5     | 1.118  | 27.7   |
| 44    | 70.5      | 0.117  | 27.2   |
| 45    | -4.4      | -0.007 | 12.9   |
| 46    | -7.6      | -0.013 | 402.2  |

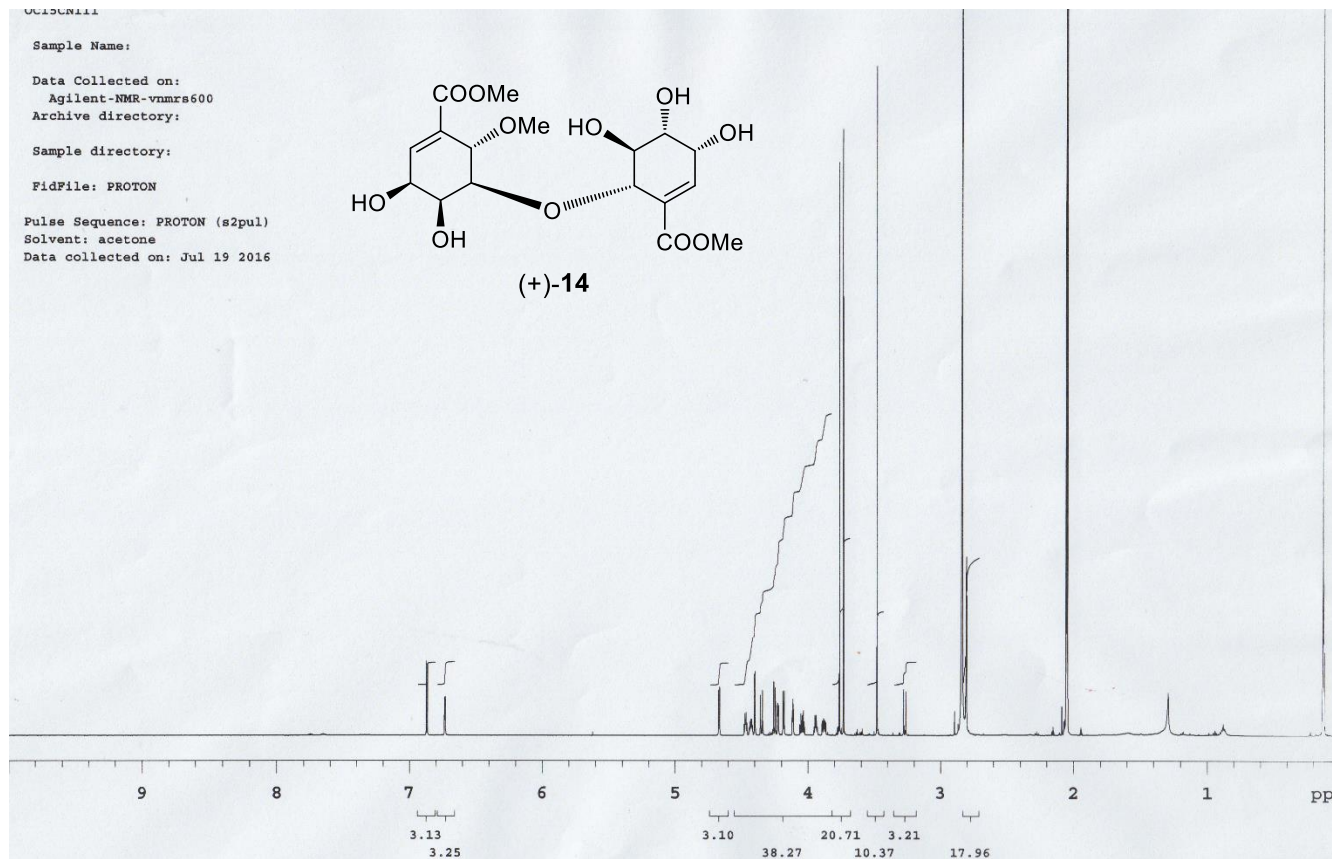
Figure S38:  $^{13}\text{C}$ -NMR Spectrum of (-)-6 in acetone- $d_6$  (100 MHz)



OC15CN89

| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 31114.1   | 206.266 | 24.2   |
| 2     | 31095.6   | 206.143 | 1652.1 |
| 3     | 31074.7   | 206.005 | 21.5   |
| 4     | 25264.8   | 167.489 | 20.2   |
| 5     | 25187.4   | 166.976 | 16.2   |
| 6     | 21517.2   | 142.645 | 28.6   |
| 7     | 21372.7   | 141.687 | 41.7   |
| 8     | 19682.7   | 130.483 | 21.9   |
| 9     | 19626.0   | 130.108 | 19.4   |
| 10    | 12477.5   | 82.718  | 33.2   |
| 11    | 11580.5   | 76.771  | 41.7   |
| 12    | 11493.8   | 76.196  | 44.0   |
| 13    | 10980.5   | 72.794  | 4.0    |
| 14    | 10925.1   | 72.426  | 11.6   |
| 15    | 10631.4   | 70.479  | 16.9   |
| 16    | 10438.4   | 69.200  | 15.0   |
| 17    | 10259.2   | 68.012  | 18.5   |
| 18    | 9952.9    | 65.981  | 14.8   |
| 19    | 8842.0    | 58.617  | 37.0   |
| 20    | 7901.0    | 52.379  | 30.2   |
| 21    | 7864.0    | 52.133  | 46.7   |
| 22    | 7439.8    | 49.321  | 13.2   |
| 23    | 4576.5    | 30.339  | 6.7    |
| 24    | 4559.1    | 30.224  | 188.9  |
| 25    | 4539.5    | 30.094  | 639.3  |
| 26    | 4519.8    | 29.964  | 1166.1 |
| 27    | 4500.2    | 29.833  | 1027.0 |
| 28    | 4481.7    | 29.711  | 1153.5 |
| 29    | 4462.0    | 29.580  | 639.9  |
| 30    | 4442.4    | 29.450  | 190.8  |
| 31    | 4110.6    | 27.251  | 29.0   |
| 32    | -1.2      | -0.008  | 6.8    |

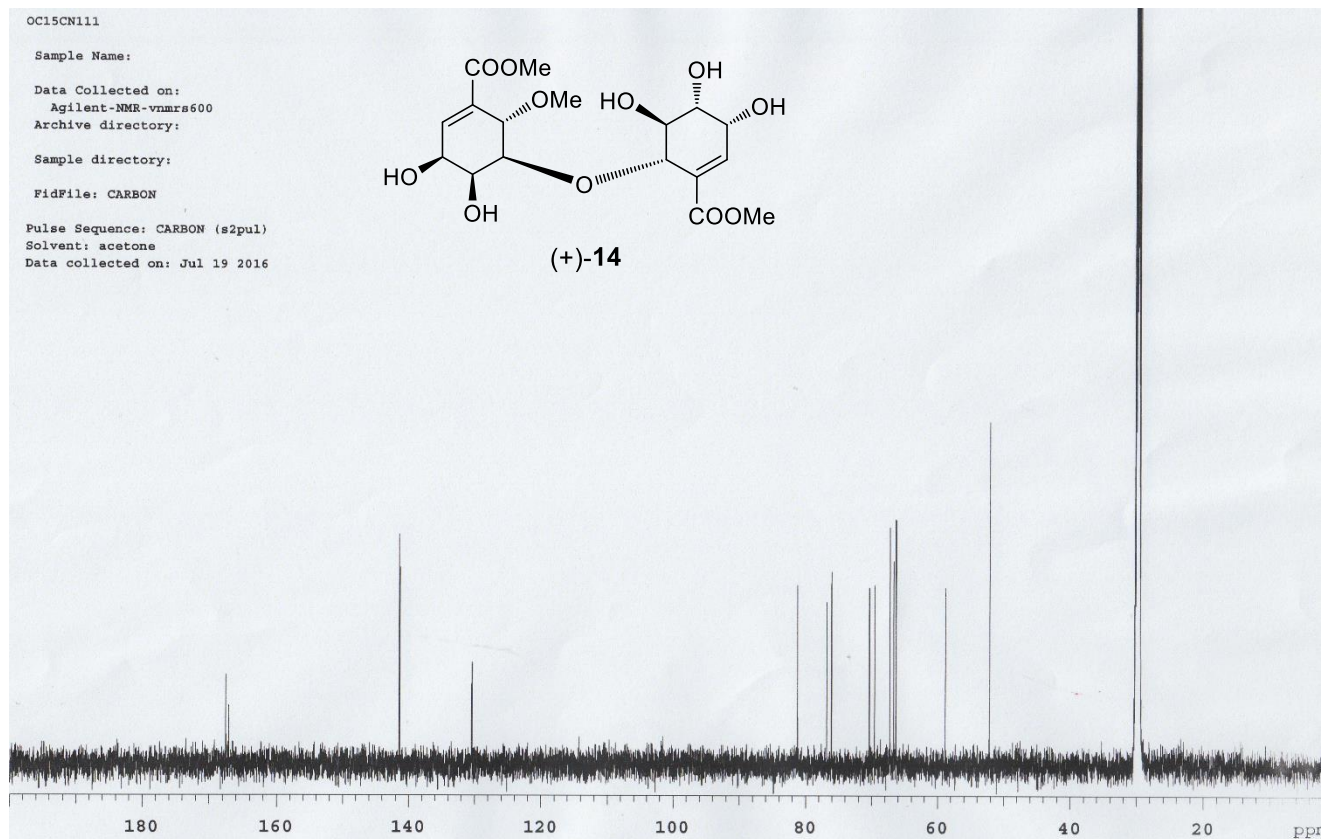
Figure S39: <sup>1</sup>H-NMR Spectrum of (+)-14 in acetone-d<sub>6</sub> (600 MHz)



OC15CN111

| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT  | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|-------|---------|-------|-----------|--------|--------|
| 1     | 4123.2    | 6.873 | 92.2   | 51    | 2321.2    | 3.869 | 17.4    | 101   | 74.3      | 0.124  | 189.5  |
| 2     | 4118.5    | 6.865 | 88.4   | 52    | 2318.8    | 3.865 | 16.2    | 102   | 73.5      | 0.122  | 165.9  |
| 3     | 4040.4    | 6.735 | 47.2   | 53    | 2265.4    | 3.776 | 9.7     | 103   | 72.3      | 0.120  | 103.9  |
| 4     | 4038.4    | 6.732 | 35.0   | 54    | 2263.4    | 3.773 | 11.2    | 104   | 70.5      | 0.118  | 12.2   |
| 5     | 4037.5    | 6.730 | 48.0   | 55    | 2262.5    | 3.771 | 7.7     | 105   | 69.6      | 0.116  | 10.3   |
| 6     | 2801.8    | 4.671 | 56.2   | 56    | 2260.5    | 3.768 | 13.2    | 106   | 68.5      | 0.114  | 12.7   |
| 7     | 2798.0    | 4.664 | 60.5   | 57    | 2256.3    | 3.761 | 709.0   | 107   | 1.9       | 0.003  | 21.8   |
| 8     | 2686.8    | 4.479 | 14.3   | 58    | 2249.3    | 3.749 | 9.3     | 108   | -1.4      | -0.002 | 810.7  |
| 9     | 2683.3    | 4.473 | 27.6   | 59    | 2238.1    | 3.731 | 751.1   | 109   | -4.9      | -0.008 | 24.3   |
| 10    | 2681.2    | 4.469 | 20.2   | 60    | 2174.8    | 3.625 | 8.1     |       |           |        |        |
| 11    | 2679.5    | 4.467 | 18.9   | 61    | 2153.6    | 3.590 | 8.4     |       |           |        |        |
| 12    | 2677.7    | 4.464 | 29.3   | 62    | 2087.3    | 3.479 | 828.8   |       |           |        |        |
| 13    | 2673.9    | 4.457 | 15.6   | 63    | 2081.2    | 3.469 | 8.0     |       |           |        |        |
| 14    | 2663.6    | 4.440 | 9.5    | 64    | 1968.2    | 3.281 | 57.3    |       |           |        |        |
| 15    | 2660.4    | 4.435 | 16.7   | 65    | 1957.3    | 3.263 | 54.3    |       |           |        |        |
| 16    | 2656.6    | 4.428 | 20.6   | 66    | 1735.2    | 2.892 | 30.2    |       |           |        |        |
| 17    | 2653.1    | 4.423 | 20.7   | 67    | 1719.1    | 2.866 | 15.0    |       |           |        |        |
| 18    | 2649.3    | 4.416 | 12.2   | 68    | 1717.0    | 2.862 | 7.7     |       |           |        |        |
| 19    | 2640.7    | 4.402 | 76.4   | 69    | 1702.9    | 2.839 | 14021.9 |       |           |        |        |
| 20    | 2637.5    | 4.397 | 79.7   | 70    | 1689.7    | 2.817 | 21.6    |       |           |        |        |
| 21    | 2614.0    | 4.357 | 50.4   | 71    | 1688.0    | 2.814 | 23.3    |       |           |        |        |
| 22    | 2612.0    | 4.354 | 12.2   | 72    | 1683.0    | 2.805 | 222.0   |       |           |        |        |
| 23    | 2604.7    | 4.342 | 55.8   | 73    | 1292.7    | 2.155 | 11.3    |       |           |        |        |
| 24    | 2602.3    | 4.338 | 12.7   | 74    | 1252.5    | 2.088 | 36.5    |       |           |        |        |
| 25    | 2559.2    | 4.266 | 7.9    | 75    | 1251.9    | 2.087 | 13.3    |       |           |        |        |
| 26    | 2553.6    | 4.257 | 67.3   | 76    | 1251.3    | 2.086 | 12.8    |       |           |        |        |
| 27    | 2551.2    | 4.253 | 7.8    | 77    | 1250.7    | 2.085 | 10.1    |       |           |        |        |
| 28    | 2546.3    | 4.244 | 59.3   | 78    | 1242.8    | 2.072 | 17.8    |       |           |        |        |
| 29    | 2535.7    | 4.227 | 40.1   | 79    | 1240.8    | 2.068 | 20.8    |       |           |        |        |
| 30    | 2532.8    | 4.222 | 38.2   | 80    | 1238.4    | 2.064 | 18.2    |       |           |        |        |
| 31    | 2511.6    | 4.187 | 54.8   | 81    | 1235.2    | 2.059 | 660.4   |       |           |        |        |
| 32    | 2506.9    | 4.179 | 55.6   | 82    | 1232.8    | 2.055 | 1139.5  |       |           |        |        |
| 33    | 2470.3    | 4.118 | 31.9   | 83    | 1230.8    | 2.052 | 1977.5  |       |           |        |        |
| 34    | 2467.6    | 4.113 | 45.0   | 84    | 1228.4    | 2.048 | 1140.6  |       |           |        |        |
| 35    | 2464.7    | 4.108 | 31.8   | 85    | 1226.4    | 2.044 | 658.3   |       |           |        |        |
| 36    | 2436.2    | 4.061 | 13.7   | 86    | 1223.1    | 2.039 | 9.9     |       |           |        |        |
| 37    | 2431.2    | 4.053 | 27.3   | 87    | 1168.9    | 1.948 | 7.9     |       |           |        |        |
| 38    | 2425.9    | 4.044 | 25.0   | 88    | 1166.8    | 1.945 | 10.4    |       |           |        |        |
| 39    | 2420.7    | 4.035 | 31.3   | 89    | 1164.5    | 1.941 | 7.8     |       |           |        |        |
| 40    | 2415.7    | 4.027 | 17.3   | 90    | 782.1     | 1.304 | 17.2    |       |           |        |        |
| 41    | 2371.7    | 3.953 | 10.9   | 91    | 773.9     | 1.290 | 53.6    |       |           |        |        |
| 42    | 2367.0    | 3.946 | 25.6   | 92    | 563.8     | 0.940 | 7.0     |       |           |        |        |
| 43    | 2361.7    | 3.937 | 25.3   | 93    | 535.6     | 0.893 | 7.8     |       |           |        |        |
| 44    | 2357.3    | 3.929 | 10.8   | 94    | 533.9     | 0.890 | 7.5     |       |           |        |        |
| 45    | 2335.9    | 3.894 | 18.2   | 95    | 530.0     | 0.884 | 9.1     |       |           |        |        |
| 46    | 2333.5    | 3.890 | 18.1   | 96    | 528.9     | 0.882 | 10.6    |       |           |        |        |
| 47    | 2330.9    | 3.885 | 16.7   | 97    | 526.8     | 0.878 | 14.7    |       |           |        |        |
| 48    | 2328.5    | 3.882 | 21.0   | 98    | 523.6     | 0.873 | 9.9     |       |           |        |        |
| 49    | 2326.2    | 3.878 | 19.2   | 99    | 520.4     | 0.867 | 8.5     |       |           |        |        |
| 50    | 2324.1    | 3.874 | 18.6   | 100   | 76.1      | 0.127 | 1132.5  |       |           |        |        |

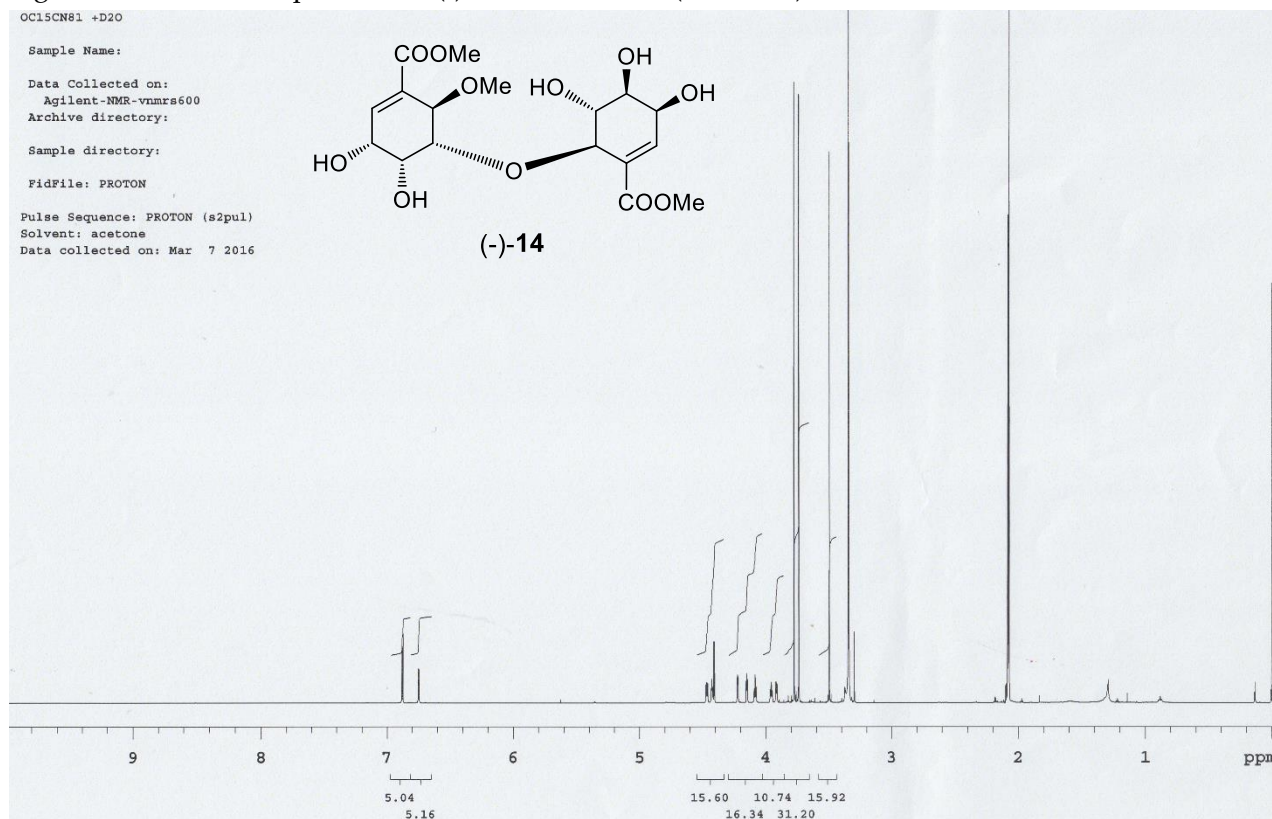
Figure S40: <sup>13</sup>C-NMR Spectrum of (+)-14 in acetone-d<sub>6</sub> (100 MHz)



OC15CN111

| INDEX | FREQUENCY | PPM     | HEIGHT  |
|-------|-----------|---------|---------|
| 1     | 31164.9   | 206.603 | 12.2    |
| 2     | 31121.0   | 206.312 | 149.3   |
| 3     | 31101.3   | 206.181 | 11222.3 |
| 4     | 31080.5   | 206.044 | 148.2   |
| 5     | 25263.7   | 167.482 | 19.2    |
| 6     | 25197.8   | 167.045 | 13.0    |
| 7     | 21339.2   | 141.465 | 47.4    |
| 8     | 21320.7   | 141.342 | 40.8    |
| 9     | 19682.7   | 130.483 | 17.3    |
| 10    | 19665.3   | 130.368 | 21.7    |
| 11    | 12251.0   | 81.216  | 37.3    |
| 12    | 11584.0   | 76.794  | 33.9    |
| 13    | 11469.5   | 76.035  | 40.0    |
| 14    | 10608.3   | 70.326  | 36.8    |
| 15    | 10491.6   | 69.552  | 37.4    |
| 16    | 10143.6   | 67.246  | 49.0    |
| 17    | 10055.8   | 66.663  | 42.1    |
| 18    | 10004.9   | 66.326  | 50.5    |
| 19    | 8867.4    | 58.785  | 36.7    |
| 20    | 7864.1    | 52.134  | 70.2    |
| 21    | 4577.6    | 30.347  | 33.5    |
| 22    | 4559.1    | 30.224  | 938.6   |
| 23    | 4540.6    | 30.101  | 3422.1  |
| 24    | 4521.0    | 29.971  | 7618.6  |
| 25    | 4501.3    | 29.841  | 8161.9  |
| 26    | 4481.7    | 29.711  | 5330.2  |
| 27    | 4463.2    | 29.588  | 3519.6  |
| 28    | 4443.5    | 29.458  | 1282.5  |
| 29    | 4421.6    | 29.312  | 14.5    |
| 30    | 212.7     | 1.410   | 141.5   |

Figure S41: <sup>1</sup>H- NMR Spectrum of (-)-14 in acetone-d<sub>6</sub> (600 MHz)

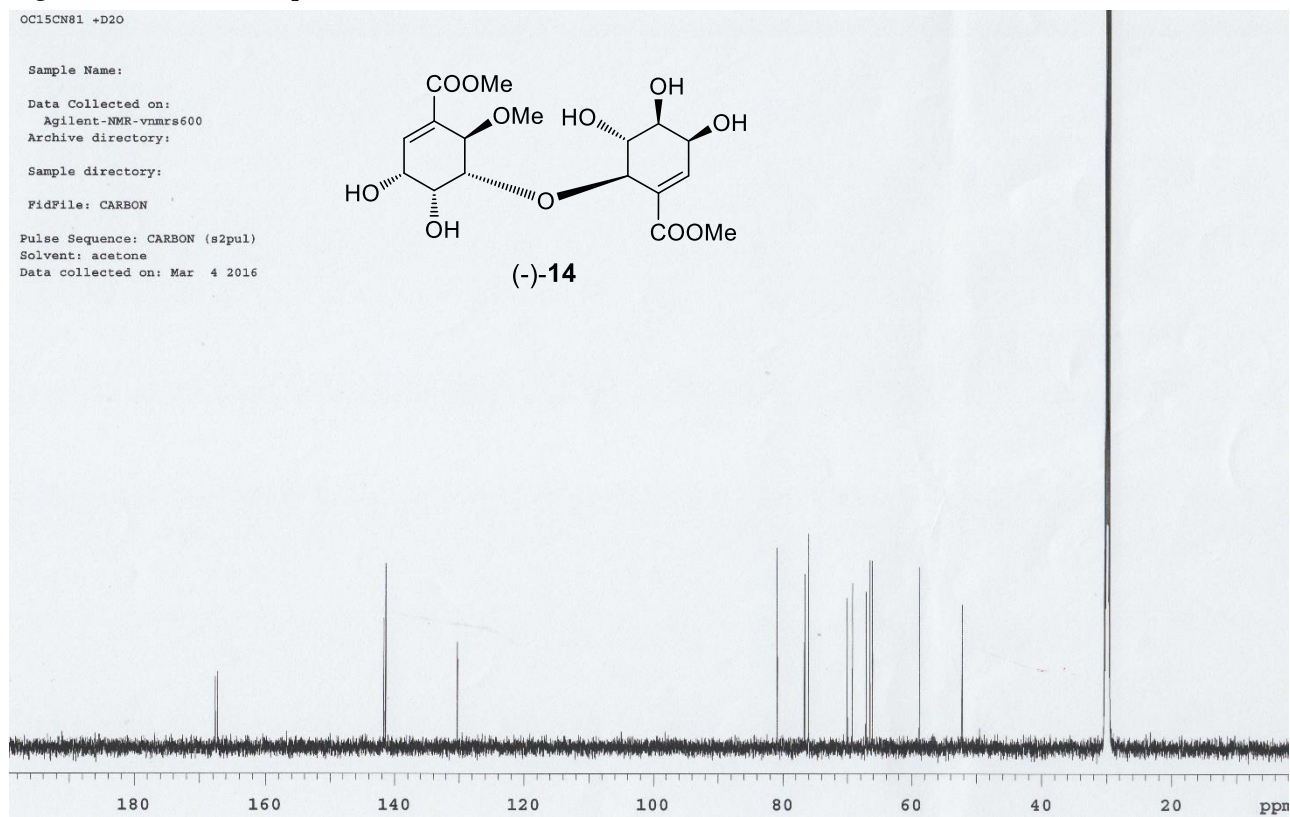


OC15CN81 +D2O

| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|--------|--------|
| 1     | 4128.7    | 6.882 | 98.7   | 51    | 1241.8    | 2.070  | 458.2  |
| 2     | 4124.0    | 6.874 | 107.0  | 52    | 1099.2    | 1.832  | 11.3   |
| 3     | 4050.6    | 6.752 | 53.7   | 53    | 773.5     | 1.289  | 36.6   |
| 4     | 4048.0    | 6.748 | 52.6   | 54    | 684.0     | 1.140  | 15.4   |
| 5     | 2683.2    | 4.473 | 28.6   | 55    | 78.6      | 0.131  | 32.7   |
| 6     | 2680.0    | 4.467 | 32.6   | 56    | 3.5       | 0.006  | 15.0   |
| 7     | 2677.6    | 4.463 | 32.1   | 57    | -0.0      | -0.000 | 649.5  |
| 8     | 2674.4    | 4.458 | 30.9   | 58    | -3.2      | -0.005 | 20.2   |
| 9     | 2658.0    | 4.431 | 23.1   |       |           |        |        |
| 10    | 2654.7    | 4.425 | 37.8   |       |           |        |        |
| 11    | 2651.8    | 4.420 | 23.0   |       |           |        |        |
| 12    | 2645.9    | 4.411 | 95.2   |       |           |        |        |
| 13    | 2642.7    | 4.405 | 95.5   |       |           |        |        |
| 14    | 2533.8    | 4.224 | 44.3   |       |           |        |        |
| 15    | 2530.9    | 4.219 | 42.5   |       |           |        |        |
| 16    | 2491.6    | 4.153 | 37.2   |       |           |        |        |
| 17    | 2488.9    | 4.149 | 46.6   |       |           |        |        |
| 18    | 2486.0    | 4.144 | 35.9   |       |           |        |        |
| 19    | 2454.9    | 4.092 | 23.3   |       |           |        |        |
| 20    | 2449.9    | 4.084 | 44.8   |       |           |        |        |
| 21    | 2445.2    | 4.076 | 25.0   |       |           |        |        |
| 22    | 2378.3    | 3.965 | 21.4   |       |           |        |        |
| 23    | 2373.6    | 3.957 | 32.5   |       |           |        |        |
| 24    | 2368.6    | 3.948 | 19.5   |       |           |        |        |
| 25    | 2352.8    | 3.922 | 33.5   |       |           |        |        |
| 26    | 2350.4    | 3.918 | 33.3   |       |           |        |        |
| 27    | 2347.8    | 3.914 | 32.0   |       |           |        |        |
| 28    | 2345.5    | 3.910 | 28.9   |       |           |        |        |
| 29    | 2292.6    | 3.822 | 11.1   |       |           |        |        |
| 30    | 2278.8    | 3.799 | 11.6   |       |           |        |        |
| 31    | 2264.5    | 3.775 | 959.5  |       |           |        |        |
| 32    | 2262.4    | 3.771 | 26.5   |       |           |        |        |
| 33    | 2254.8    | 3.759 | 18.0   |       |           |        |        |
| 34    | 2245.4    | 3.743 | 11.2   |       |           |        |        |
| 35    | 2241.9    | 3.737 | 940.7  |       |           |        |        |
| 36    | 2238.1    | 3.731 | 14.7   |       |           |        |        |
| 37    | 2104.0    | 3.507 | 12.4   |       |           |        |        |
| 38    | 2096.9    | 3.495 | 852.2  |       |           |        |        |
| 39    | 2089.0    | 3.482 | 15.2   |       |           |        |        |
| 40    | 2024.7    | 3.375 | 25.1   |       |           |        |        |
| 41    | 2022.1    | 3.371 | 23.1   |       |           |        |        |
| 42    | 2005.9    | 3.344 | 2908.0 |       |           |        |        |
| 43    | 1978.9    | 3.299 | 110.1  |       |           |        |        |
| 44    | 1258.3    | 2.097 | 27.6   |       |           |        |        |
| 45    | 1256.2    | 2.094 | 30.4   |       |           |        |        |
| 46    | 1253.9    | 2.090 | 28.9   |       |           |        |        |
| 47    | 1250.6    | 2.085 | 461.1  |       |           |        |        |
| 48    | 1248.6    | 2.081 | 754.4  |       |           |        |        |
| 49    | 1246.2    | 2.077 | 1378.9 |       |           |        |        |
| 50    | 1243.9    | 2.073 | 776.1  |       |           |        |        |



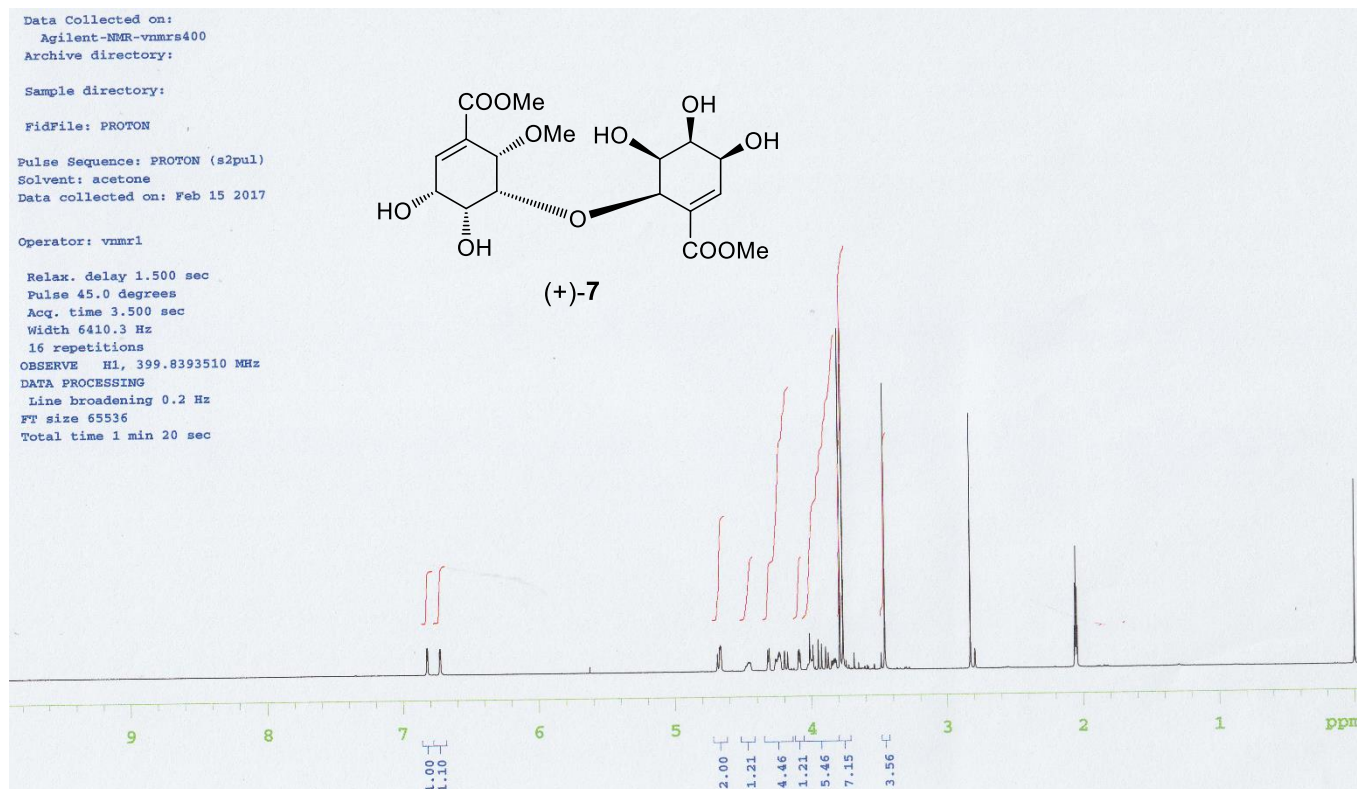
Figure S42:  $^{13}\text{C}$ -NMR Spectrum of (-)-14 in acetone- $d_6$  (150 MHz)



OC15CN81 +D2O

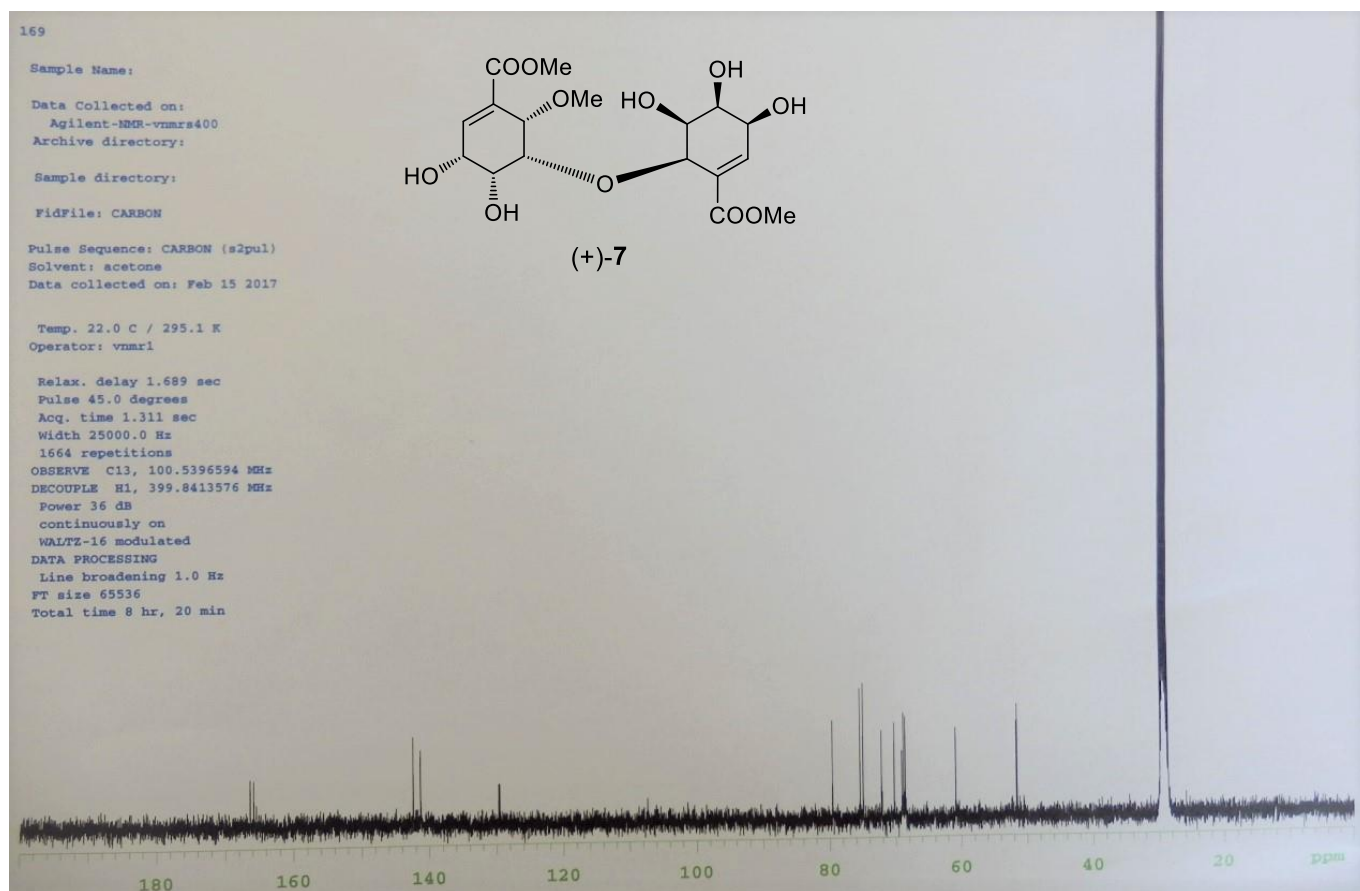
| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 31305.9   | 207.538 | 57.1   |
| 2     | 31286.3   | 207.408 | 4208.6 |
| 3     | 31265.5   | 207.270 | 58.3   |
| 4     | 25282.2   | 167.604 | 14.8   |
| 5     | 25227.9   | 167.244 | 15.9   |
| 6     | 21373.9   | 141.695 | 26.9   |
| 7     | 21333.4   | 141.426 | 38.2   |
| 8     | 19663.0   | 130.353 | 21.9   |
| 9     | 19652.6   | 130.284 | 18.5   |
| 10    | 12201.3   | 80.886  | 41.4   |
| 11    | 11556.2   | 76.610  | 36.0   |
| 12    | 11463.7   | 75.997  | 44.3   |
| 13    | 10563.2   | 70.027  | 31.1   |
| 14    | 10444.2   | 69.238  | 34.3   |
| 15    | 10127.4   | 67.138  | 32.3   |
| 16    | 10035.0   | 66.525  | 38.9   |
| 17    | 9977.2    | 66.142  | 38.8   |
| 18    | 8872.1    | 58.816  | 37.4   |
| 19    | 7882.6    | 52.256  | 28.9   |
| 20    | 7874.5    | 52.202  | 29.7   |
| 21    | 4585.7    | 30.400  | 16.3   |
| 22    | 4568.4    | 30.285  | 479.1  |
| 23    | 4548.7    | 30.155  | 1609.1 |
| 24    | 4529.1    | 30.025  | 3033.9 |
| 25    | 4509.4    | 29.895  | 2862.9 |
| 26    | 4490.9    | 29.772  | 2780.6 |
| 27    | 4471.3    | 29.642  | 1606.1 |
| 28    | 4451.6    | 29.511  | 518.8  |
| 29    | 0.0       | 0.000   | 14.3   |

Figure S43: <sup>1</sup>H- NMR Spectrum of (+)-7 in acetone-d<sub>6</sub>(400 MHz)



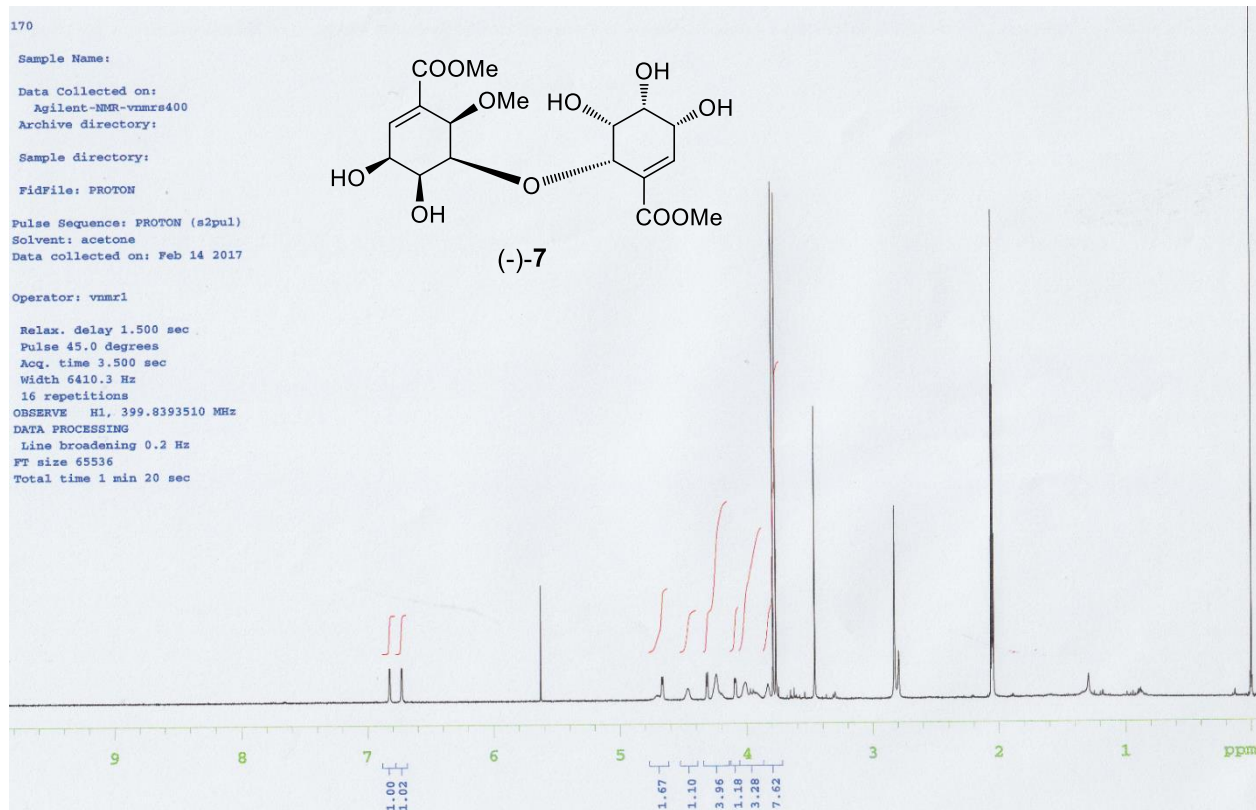
| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|-------|--------|-------|-----------|--------|--------|
| 1     | 2730.5    | 6.829 | 33.2   | 36    | 1639.9    | 4.101 | 25.3   | 71    | 1385.6    | 3.465  | 393.1  |
| 2     | 2729.2    | 6.826 | 37.1   | 37    | 1637.6    | 4.096 | 27.2   | 72    | 1132.3    | 2.832  | 349.8  |
| 3     | 2728.0    | 6.823 | 37.2   | 38    | 1636.0    | 4.092 | 26.1   | 73    | 1119.8    | 2.801  | 21.9   |
| 4     | 2726.6    | 6.819 | 33.3   | 39    | 1633.9    | 4.086 | 23.1   | 74    | 1118.8    | 2.798  | 27.5   |
| 5     | 2693.0    | 6.735 | 32.2   | 40    | 1611.4    | 4.030 | 8.1    | 75    | 1117.8    | 2.796  | 22.0   |
| 6     | 2691.6    | 6.732 | 34.9   | 41    | 1610.2    | 4.027 | 8.1    | 76    | 825.5     | 2.065  | 57.0   |
| 7     | 2690.4    | 6.729 | 36.0   | 42    | 1606.1    | 4.017 | 50.9   | 77    | 823.4     | 2.059  | 115.1  |
| 8     | 2689.3    | 6.726 | 32.4   | 43    | 1601.8    | 4.006 | 14.3   | 78    | 821.2     | 2.054  | 166.1  |
| 9     | 2250.3    | 5.628 | 8.4    | 44    | 1600.6    | 4.003 | 13.4   | 79    | 819.1     | 2.049  | 108.6  |
| 10    | 1875.5    | 4.691 | 24.4   | 45    | 1599.4    | 4.000 | 14.4   | 80    | 816.7     | 2.043  | 57.3   |
| 11    | 1869.2    | 4.675 | 33.5   | 46    | 1598.5    | 3.998 | 14.7   | 81    | 3.1       | 0.008  | 8.2    |
| 12    | 1867.2    | 4.670 | 35.4   | 47    | 1596.3    | 3.992 | 35.0   | 82    | -0.0      | -0.000 | 253.4  |
| 13    | 1865.1    | 4.665 | 34.8   | 48    | 1580.8    | 3.954 | 42.4   | 83    | -3.3      | -0.008 | 7.6    |
| 14    | 1791.5    | 4.481 | 7.2    | 49    | 1571.1    | 3.929 | 35.9   |       |           |        |        |
| 15    | 1790.2    | 4.477 | 7.5    | 50    | 1559.1    | 3.899 | 32.0   |       |           |        |        |
| 16    | 1786.5    | 4.468 | 11.5   | 51    | 1551.7    | 3.881 | 24.2   |       |           |        |        |
| 17    | 1785.1    | 4.464 | 12.2   | 52    | 1542.1    | 3.857 | 11.4   |       |           |        |        |
| 18    | 1782.7    | 4.459 | 11.8   | 53    | 1540.0    | 3.851 | 11.5   |       |           |        |        |
| 19    | 1781.6    | 4.456 | 11.9   | 54    | 1538.0    | 3.847 | 12.2   |       |           |        |        |
| 20    | 1780.2    | 4.452 | 12.1   | 55    | 1535.7    | 3.841 | 13.8   |       |           |        |        |
| 21    | 1728.4    | 4.323 | 27.5   | 56    | 1533.9    | 3.836 | 15.0   |       |           |        |        |
| 22    | 1724.4    | 4.313 | 30.0   | 57    | 1531.7    | 3.831 | 14.5   |       |           |        |        |
| 23    | 1707.0    | 4.269 | 13.0   | 58    | 1529.8    | 3.826 | 14.8   |       |           |        |        |
| 24    | 1705.9    | 4.266 | 14.3   | 59    | 1527.6    | 3.821 | 11.9   |       |           |        |        |
| 25    | 1704.3    | 4.262 | 15.7   | 60    | 1516.9    | 3.794 | 469.0  |       |           |        |        |
| 26    | 1702.7    | 4.259 | 15.4   | 61    | 1507.9    | 3.771 | 469.7  |       |           |        |        |
| 27    | 1701.4    | 4.255 | 15.7   | 62    | 1499.3    | 3.750 | 13.3   |       |           |        |        |
| 28    | 1699.8    | 4.251 | 16.4   | 63    | 1498.7    | 3.748 | 11.7   |       |           |        |        |
| 29    | 1698.6    | 4.248 | 20.1   | 64    | 1490.9    | 3.729 | 6.8    |       |           |        |        |
| 30    | 1697.2    | 4.245 | 22.4   | 65    | 1475.2    | 3.690 | 23.6   |       |           |        |        |
| 31    | 1696.1    | 4.242 | 24.0   | 66    | 1461.7    | 3.656 | 8.8    |       |           |        |        |
| 32    | 1694.5    | 4.238 | 25.4   | 67    | 1436.5    | 3.593 | 6.1    |       |           |        |        |
| 33    | 1691.6    | 4.231 | 21.4   | 68    | 1416.7    | 3.543 | 7.8    |       |           |        |        |
| 34    | 1679.2    | 4.200 | 27.4   | 69    | 1398.1    | 3.497 | 6.3    |       |           |        |        |
| 35    | 1670.4    | 4.178 | 23.7   | 70    | 1396.0    | 3.491 | 23.4   |       |           |        |        |

Figure S44: <sup>13</sup>C-NMR Spectrum of (+)-7 in acetone-d<sub>6</sub> (100 MHz)



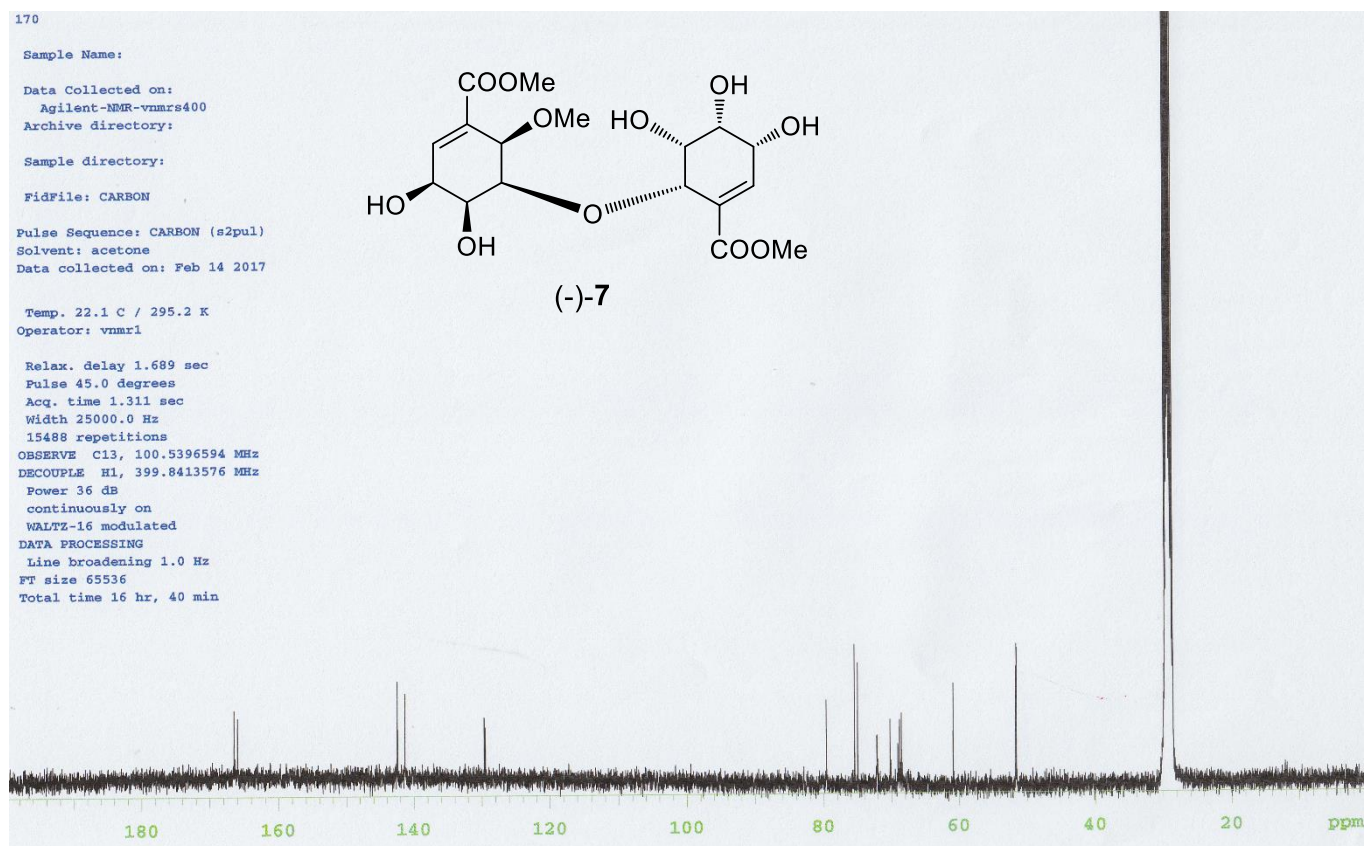
| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 16730.8   | 166.410 | 8.8    |
| 2     | 16679.7   | 165.901 | 8.2    |
| 3     | 14319.9   | 142.430 | 16.5   |
| 4     | 14210.0   | 141.338 | 13.8   |
| 5     | 13037.4   | 129.674 | 6.9    |
| 6     | 13022.1   | 129.522 | 7.1    |
| 7     | 8003.5    | 79.606  | 18.5   |
| 8     | 7584.7    | 75.440  | 25.3   |
| 9     | 7538.1    | 74.977  | 26.0   |
| 10    | 7259.7    | 72.207  | 16.4   |
| 11    | 7065.1    | 70.272  | 17.9   |
| 12    | 6948.4    | 69.111  | 12.1   |
| 13    | 6924.0    | 68.868  | 20.0   |
| 14    | 6897.3    | 68.602  | 19.1   |
| 15    | 6124.4    | 60.915  | 17.1   |
| 16    | 5198.2    | 51.703  | 17.7   |
| 17    | 5186.8    | 51.589  | 21.6   |
| 18    | 2993.3    | 29.772  | 208.6  |
| 19    | 2973.5    | 29.575  | 576.8  |
| 20    | 2954.4    | 29.385  | 1273.6 |
| 21    | 2935.3    | 29.196  | 1383.2 |
| 22    | 2915.5    | 28.998  | 1196.6 |
| 23    | 2896.4    | 28.809  | 635.1  |
| 24    | 2877.3    | 28.619  | 186.1  |

Figure S45: <sup>1</sup>H- NMR Spectrum of (-)-7 in acetone-d<sub>6</sub> (400 MHz)



| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|-------|--------|-------|-----------|-------|--------|-------|-----------|--------|--------|
| 1     | 4033.3    | 6.723 | 27.8   | 51    | 2436.7    | 4.062 | 22.7   | 101   | 1240.7    | 2.068 | 41.5   | 151   | 528.2     | 0.880  | 15.8   |
| 2     | 4032.4    | 6.722 | 26.9   | 52    | 2429.4    | 4.050 | 6.7    | 102   | 1239.8    | 2.067 | 10.7   | 152   | 525.0     | 0.875  | 12.8   |
| 3     | 4029.2    | 6.716 | 27.9   | 53    | 2369.5    | 3.950 | 31.7   | 103   | 1237.1    | 2.062 | 603.4  | 153   | 521.1     | 0.869  | 10.2   |
| 4     | 4028.3    | 6.715 | 26.4   | 54    | 2368.9    | 3.949 | 34.1   | 104   | 1235.1    | 2.059 | 1095.3 | 154   | 518.5     | 0.864  | 7.4    |
| 5     | 4021.0    | 6.703 | 28.6   | 55    | 2361.0    | 3.936 | 30.9   | 105   | 1232.7    | 2.055 | 1817.9 | 155   | 513.2     | 0.856  | 4.0    |
| 6     | 4019.8    | 6.701 | 29.7   | 56    | 2358.4    | 3.931 | 30.2   | 106   | 1230.7    | 2.051 | 1083.7 | 156   | 77.5      | 0.123  | 87.4   |
| 7     | 4018.3    | 6.698 | 29.4   | 57    | 2355.4    | 3.926 | 5.3    | 107   | 1228.3    | 2.048 | 606.1  | 157   | 75.7      | 0.126  | 11.3   |
| 8     | 4017.2    | 6.696 | 28.9   | 58    | 2351.9    | 3.921 | 33.8   | 108   | 1225.1    | 2.042 | 8.4    | 158   | 75.1      | 0.125  | 9.8    |
| 9     | 3462.3    | 5.771 | 3.5    | 59    | 2348.7    | 3.915 | 4.9    | 109   | 1220.7    | 2.035 | 3.3    | 159   | 73.7      | 0.123  | 8.9    |
| 10    | 3374.0    | 5.624 | 578.8  | 60    | 2333.1    | 3.889 | 3.2    | 110   | 1218.6    | 2.031 | 3.2    | 160   | 69.8      | 0.116  | 3.6    |
| 11    | 3282.1    | 5.471 | 3.1    | 61    | 2312.9    | 3.855 | 3.6    | 111   | 1216.3    | 2.028 | 3.4    | 161   | -0.0      | -0.000 | 58.1   |
| 12    | 2717.8    | 4.530 | 22.1   | 62    | 2268.0    | 3.781 | 10.7   | 112   | 1180.5    | 1.968 | 30.5   | 162   | -3.2      | -0.005 | 3.3    |
| 13    | 2714.0    | 4.524 | 22.9   | 63    | 2264.5    | 3.775 | 687.3  | 113   | 1173.2    | 1.956 | 3.8    |       |           |        |        |
| 14    | 2642.1    | 4.404 | 26.4   | 64    | 2260.9    | 3.769 | 616.6  | 114   | 1170.8    | 1.952 | 6.4    |       |           |        |        |
| 15    | 2637.4    | 4.396 | 29.3   | 65    | 2257.4    | 3.763 | 5.2    | 115   | 1168.8    | 1.948 | 10.4   |       |           |        |        |
| 16    | 2626.3    | 4.378 | 46.8   | 66    | 2246.6    | 3.745 | 11.1   | 116   | 1166.4    | 1.944 | 6.3    |       |           |        |        |
| 17    | 2622.5    | 4.372 | 53.6   | 67    | 2238.3    | 3.731 | 45.1   | 117   | 1164.4    | 1.941 | 3.6    |       |           |        |        |
| 18    | 2618.9    | 4.366 | 7.5    | 68    | 2228.1    | 3.714 | 42.4   | 118   | 995.6     | 1.660 | 3.5    |       |           |        |        |
| 19    | 2614.8    | 4.359 | 13.7   | 69    | 2225.1    | 3.709 | 9.8    | 119   | 994.5     | 1.658 | 3.3    |       |           |        |        |
| 20    | 2611.3    | 4.353 | 13.7   | 70    | 2222.2    | 3.704 | 14.0   | 120   | 968.6     | 1.615 | 6.3    |       |           |        |        |
| 21    | 2607.8    | 4.347 | 16.4   | 71    | 2217.8    | 3.697 | 13.7   | 121   | 963.9     | 1.607 | 5.8    |       |           |        |        |
| 22    | 2603.7    | 4.340 | 8.8    | 72    | 2215.2    | 3.693 | 9.1    | 122   | 961.0     | 1.602 | 4.5    |       |           |        |        |
| 23    | 2543.5    | 4.240 | 9.9    | 73    | 2210.8    | 3.685 | 8.5    | 123   | 955.7     | 1.593 | 5.9    |       |           |        |        |
| 24    | 2539.1    | 4.233 | 12.5   | 74    | 2189.3    | 3.650 | 3.3    | 124   | 848.0     | 1.414 | 4.4    |       |           |        |        |
| 25    | 2535.9    | 4.227 | 14.1   | 75    | 2176.7    | 3.628 | 12.2   | 125   | 822.5     | 1.371 | 5.9    |       |           |        |        |
| 26    | 2531.5    | 4.220 | 13.9   | 76    | 2137.4    | 3.563 | 480.1  | 126   | 815.5     | 1.359 | 5.8    |       |           |        |        |
| 27    | 2527.4    | 4.213 | 9.6    | 77    | 2104.5    | 3.508 | 6.3    | 127   | 808.7     | 1.348 | 7.6    |       |           |        |        |
| 28    | 2511.0    | 4.186 | 6.8    | 78    | 1989.8    | 3.317 | 9.8    | 128   | 800.2     | 1.334 | 8.3    |       |           |        |        |
| 29    | 2506.3    | 4.178 | 9.4    | 79    | 1984.5    | 3.308 | 10.9   | 129   | 783.8     | 1.307 | 24.8   |       |           |        |        |
| 30    | 2505.1    | 4.176 | 9.6    | 80    | 1745.4    | 2.909 | 9.7    | 130   | 775.6     | 1.293 | 64.1   |       |           |        |        |
| 31    | 2499.5    | 4.167 | 10.0   | 81    | 1730.1    | 2.884 | 4.6    | 131   | 760.9     | 1.213 | 12.6   |       |           |        |        |
| 32    | 2491.9    | 4.154 | 35.4   | 82    | 1712.5    | 2.855 | 4409.9 | 132   | 727.4     | 1.268 | 64.1   |       |           |        |        |
| 33    | 2484.8    | 4.142 | 32.1   | 83    | 1692.8    | 2.822 | 106.7  | 133   | 720.4     | 1.201 | 19.8   |       |           |        |        |
| 34    | 2483.4    | 4.140 | 15.7   | 84    | 1677.0    | 2.795 | 3.5    | 134   | 713.1     | 1.189 | 9.2    |       |           |        |        |
| 35    | 2481.9    | 4.137 | 10.6   | 85    | 1395.6    | 2.325 | 3.7    | 135   | 711.9     | 1.187 | 3.6    |       |           |        |        |
| 36    | 2480.4    | 4.135 | 9.6    | 86    | 1373.0    | 2.289 | 3.5    | 136   | 706.9     | 1.178 | 5.5    |       |           |        |        |
| 37    | 2479.3    | 4.133 | 10.5   | 87    | 1365.7    | 2.276 | 5.5    | 137   | 707.5     | 1.179 | 5.6    |       |           |        |        |
| 38    | 2477.5    | 4.130 | 7.2    | 88    | 1358.0    | 2.264 | 3.1    | 138   | 677.0     | 1.128 | 6.1    |       |           |        |        |
| 39    | 2475.7    | 4.127 | 6.9    | 89    | 1299.1    | 2.165 | 3.6    | 139   | 592.7     | 0.988 | 5.0    |       |           |        |        |
| 40    | 2474.9    | 4.125 | 6.8    | 90    | 1297.0    | 2.162 | 6.6    | 140   | 572.8     | 0.955 | 3.6    |       |           |        |        |
| 41    | 2472.8    | 4.122 | 11.0   | 91    | 1294.6    | 2.158 | 10.0   | 141   | 565.5     | 0.943 | 6.2    |       |           |        |        |
| 42    | 2471.6    | 4.120 | 11.4   | 92    | 1292.6    | 2.155 | 6.6    | 142   | 557.8     | 0.930 | 3.6    |       |           |        |        |
| 43    | 2469.9    | 4.117 | 10.9   | 93    | 1290.2    | 2.151 | 3.7    | 143   | 548.4     | 0.914 | 5.2    |       |           |        |        |
| 44    | 2468.7    | 4.115 | 13.2   | 94    | 1265.6    | 2.110 | 3.5    | 144   | 543.4     | 0.906 | 4.3    |       |           |        |        |
| 45    | 2467.2    | 4.113 | 9.3    | 95    | 1254.4    | 2.091 | 39.6   | 145   | 537.3     | 0.896 | 9.7    |       |           |        |        |
| 46    | 2465.5    | 4.110 | 8.9    | 96    | 1253.9    | 2.090 | 26.0   | 146   | 535.2     | 0.892 | 8.8    |       |           |        |        |
| 47    | 2464.3    | 4.108 | 8.3    | 97    | 1245.9    | 2.077 | 12.5   | 147   | 531.7     | 0.886 | 12.3   |       |           |        |        |
| 48    | 2442.0    | 4.071 | 17.4   | 98    | 1245.1    | 2.075 | 40.4   | 148   | 530.5     | 0.884 | 14.7   |       |           |        |        |
| 49    | 2439.9    | 4.067 | 18.9   | 99    | 1242.7    | 2.072 | 49.0   | 149   | 529.4     | 0.882 | 15.4   |       |           |        |        |
| 50    | 2438.2    | 4.064 | 19.4   | 100   | 1241.8    | 2.070 | 13.5   | 150   |           |       |        |       |           |        |        |

Figure S46: <sup>13</sup>C-NMR Spectrum of (-)-7 in acetone-d<sub>6</sub> (100 MHz)



| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 16731.2   | 166.414 | 18.4   |
| 2     | 16680.9   | 165.913 | 16.8   |
| 3     | 14321.1   | 142.442 | 25.4   |
| 4     | 14212.0   | 141.357 | 22.6   |
| 5     | 13037.8   | 129.679 | 16.6   |
| 6     | 13022.6   | 129.527 | 14.0   |
| 7     | 8004.7    | 79.618  | 20.5   |
| 8     | 7582.8    | 75.421  | 34.0   |
| 9     | 7538.6    | 74.981  | 29.5   |
| 10    | 7257.0    | 72.181  | 11.8   |
| 11    | 7062.5    | 70.246  | 15.7   |
| 12    | 6947.3    | 69.100  | 9.8    |
| 13    | 6923.6    | 68.865  | 15.7   |
| 14    | 6896.9    | 68.599  | 17.4   |
| 15    | 6124.8    | 60.920  | 24.6   |
| 16    | 5198.6    | 51.707  | 28.7   |
| 17    | 5187.2    | 51.593  | 34.2   |
| 18    | 3009.0    | 29.928  | 28.8   |
| 19    | 2993.7    | 29.777  | 744.9  |
| 20    | 2973.9    | 29.579  | 1932.1 |
| 21    | 2954.8    | 29.390  | 4394.5 |
| 22    | 2935.8    | 29.200  | 4971.1 |
| 23    | 2915.9    | 29.003  | 4026.8 |
| 24    | 2896.8    | 28.813  | 2216.8 |
| 25    | 2877.8    | 28.623  | 680.2  |

Figure S47: <sup>1</sup>H-NMR Spectrum of (-)-18 in acetone-d<sub>6</sub> (400 MHz)

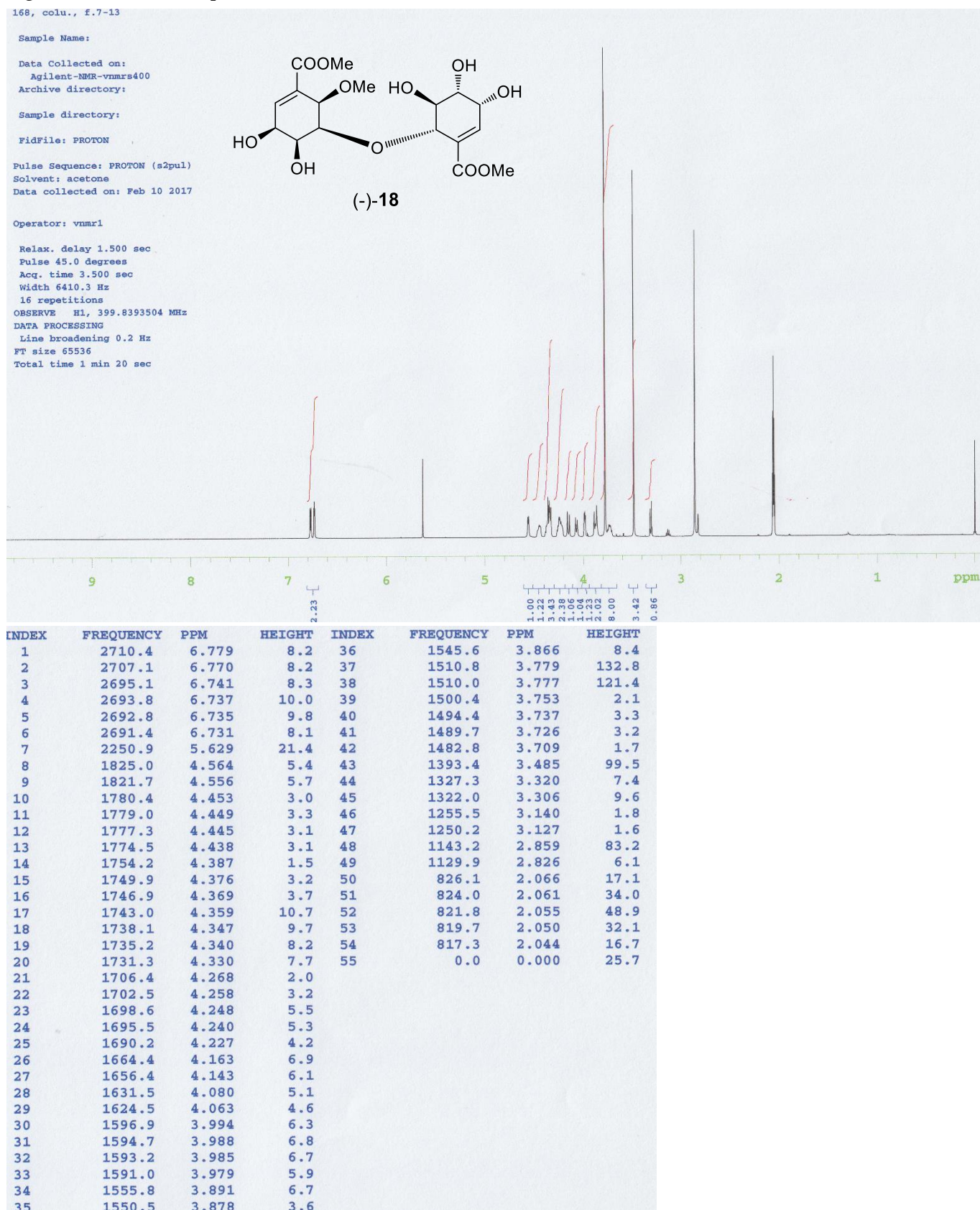
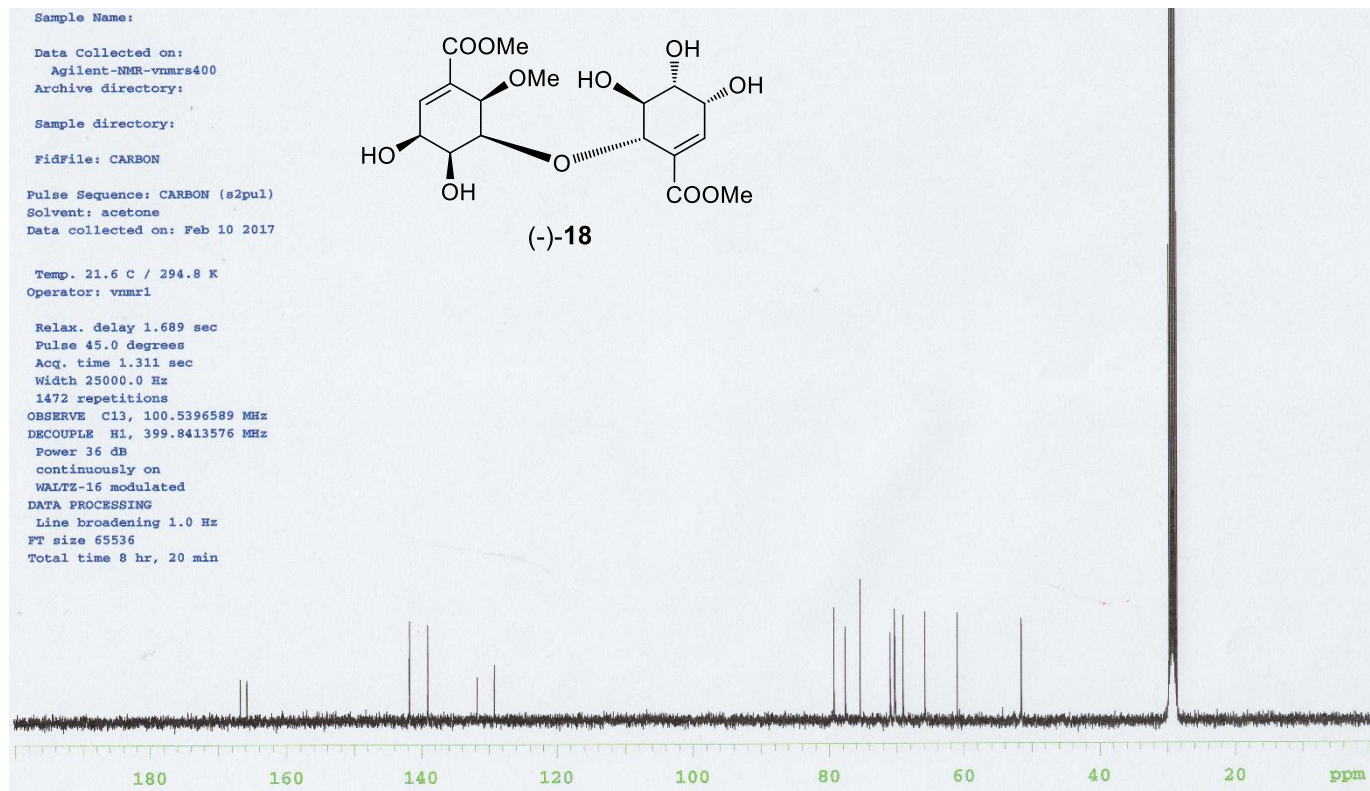


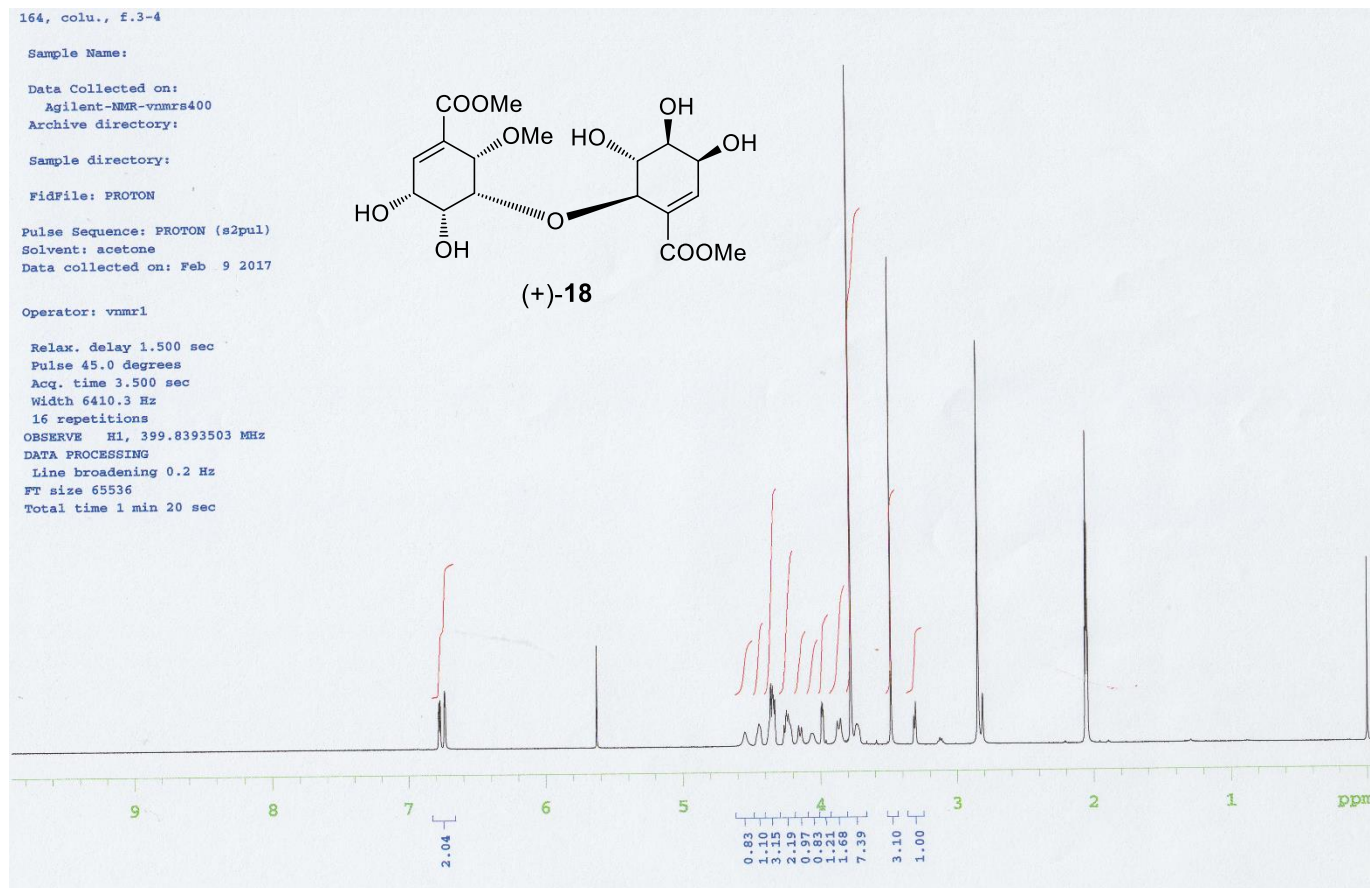
Figure S48:  $^{13}\text{C}$ -NMR Spectrum of (-)-18 in acetone- $d_6$  (400 MHz)



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| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 20684.1   | 205.731 | 21.0   |
| 2     | 20665.8   | 205.548 | 869.3  |
| 3     | 20645.2   | 205.343 | 11.0   |
| 4     | 16768.7   | 166.787 | 7.9    |
| 5     | 16672.5   | 165.830 | 7.6    |
| 6     | 14259.4   | 141.828 | 19.2   |
| 7     | 13988.5   | 139.134 | 18.4   |
| 8     | 13249.2   | 131.781 | 8.2    |
| 9     | 12993.6   | 129.239 | 10.5   |
| 10    | 7978.8    | 79.360  | 21.6   |
| 11    | 7809.5    | 77.676  | 17.8   |
| 12    | 7587.5    | 75.467  | 27.2   |
| 13    | 7141.1    | 71.028  | 16.7   |
| 14    | 7076.3    | 70.383  | 21.3   |
| 15    | 7071.7    | 70.338  | 15.9   |
| 16    | 6951.2    | 69.139  | 20.1   |
| 17    | 6628.4    | 65.929  | 20.8   |
| 18    | 6139.4    | 61.064  | 20.5   |
| 19    | 5188.8    | 51.609  | 19.5   |
| 20    | 5183.4    | 51.556  | 18.2   |
| 21    | 2993.8    | 29.777  | 92.5   |
| 22    | 2974.7    | 29.588  | 312.5  |
| 23    | 2955.7    | 29.398  | 592.4  |
| 24    | 2935.8    | 29.201  | 666.0  |
| 25    | 2916.7    | 29.011  | 621.5  |
| 26    | 2897.7    | 28.821  | 283.4  |
| 27    | 2877.8    | 28.624  | 99.0   |

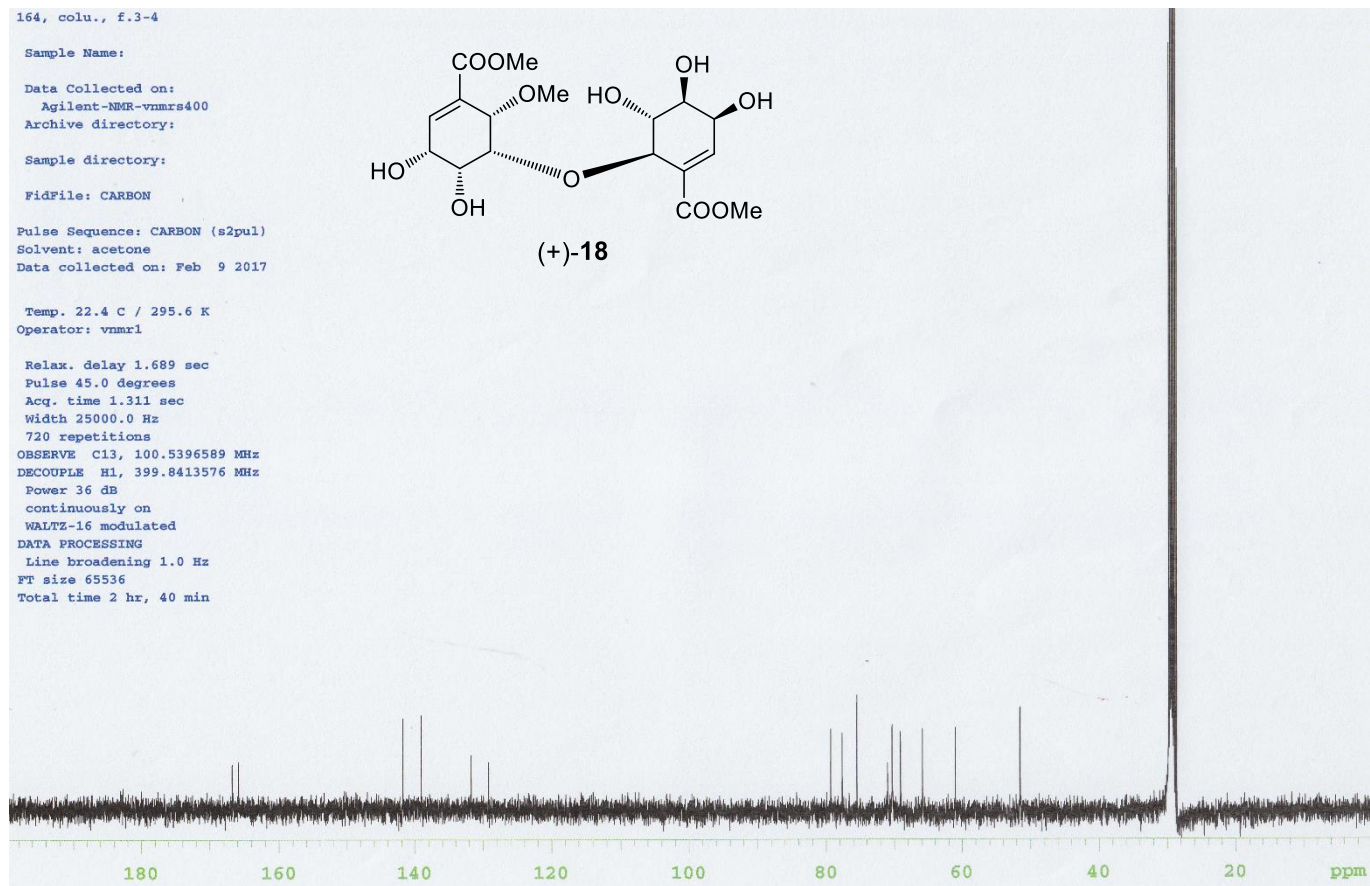
Figure S49: <sup>1</sup>H- NMR Spectrum of (+)-18 in acetone-d<sub>6</sub> (400 MHz)



| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|--------|--------|
| 1     | 2710.4    | 6.779 | 32.4   | 36    | 823.8     | 2.060  | 153.2  |
| 2     | 2707.1    | 6.770 | 33.8   | 37    | 821.6     | 2.055  | 214.8  |
| 3     | 2694.7    | 6.740 | 31.8   | 38    | 819.3     | 2.049  | 151.6  |
| 4     | 2693.4    | 6.736 | 40.4   | 39    | 817.1     | 2.044  | 78.1   |
| 5     | 2692.6    | 6.734 | 39.4   | 40    | -0.0      | -0.000 | 126.2  |
| 6     | 2691.2    | 6.731 | 30.9   |       |           |        |        |
| 7     | 2250.3    | 5.628 | 70.4   |       |           |        |        |
| 8     | 1819.3    | 4.550 | 10.1   |       |           |        |        |
| 9     | 1778.2    | 4.447 | 15.6   |       |           |        |        |
| 10    | 1743.0    | 4.359 | 42.9   |       |           |        |        |
| 11    | 1738.1    | 4.347 | 41.7   |       |           |        |        |
| 12    | 1735.4    | 4.340 | 35.3   |       |           |        |        |
| 13    | 1731.5    | 4.330 | 32.1   |       |           |        |        |
| 14    | 1704.5    | 4.263 | 14.4   |       |           |        |        |
| 15    | 1697.1    | 4.244 | 24.4   |       |           |        |        |
| 16    | 1692.2    | 4.232 | 22.2   |       |           |        |        |
| 17    | 1662.6    | 4.158 | 14.0   |       |           |        |        |
| 18    | 1654.4    | 4.138 | 12.8   |       |           |        |        |
| 19    | 1625.5    | 4.065 | 8.9    |       |           |        |        |
| 20    | 1596.7    | 3.993 | 27.1   |       |           |        |        |
| 21    | 1594.7    | 3.988 | 29.7   |       |           |        |        |
| 22    | 1593.0    | 3.984 | 29.1   |       |           |        |        |
| 23    | 1591.0    | 3.979 | 25.0   |       |           |        |        |
| 24    | 1550.1    | 3.877 | 16.8   |       |           |        |        |
| 25    | 1540.6    | 3.853 | 18.8   |       |           |        |        |
| 26    | 1510.6    | 3.778 | 467.7  |       |           |        |        |
| 27    | 1509.8    | 3.776 | 434.9  |       |           |        |        |
| 28    | 1494.6    | 3.738 | 14.9   |       |           |        |        |
| 29    | 1492.6    | 3.733 | 15.1   |       |           |        |        |
| 30    | 1393.6    | 3.485 | 335.5  |       |           |        |        |
| 31    | 1327.1    | 3.319 | 19.4   |       |           |        |        |
| 32    | 1322.0    | 3.306 | 28.9   |       |           |        |        |
| 33    | 1137.8    | 2.846 | 277.5  |       |           |        |        |
| 34    | 1124.5    | 2.812 | 34.7   |       |           |        |        |
| 35    | 825.9     | 2.066 | 80.1   |       |           |        |        |

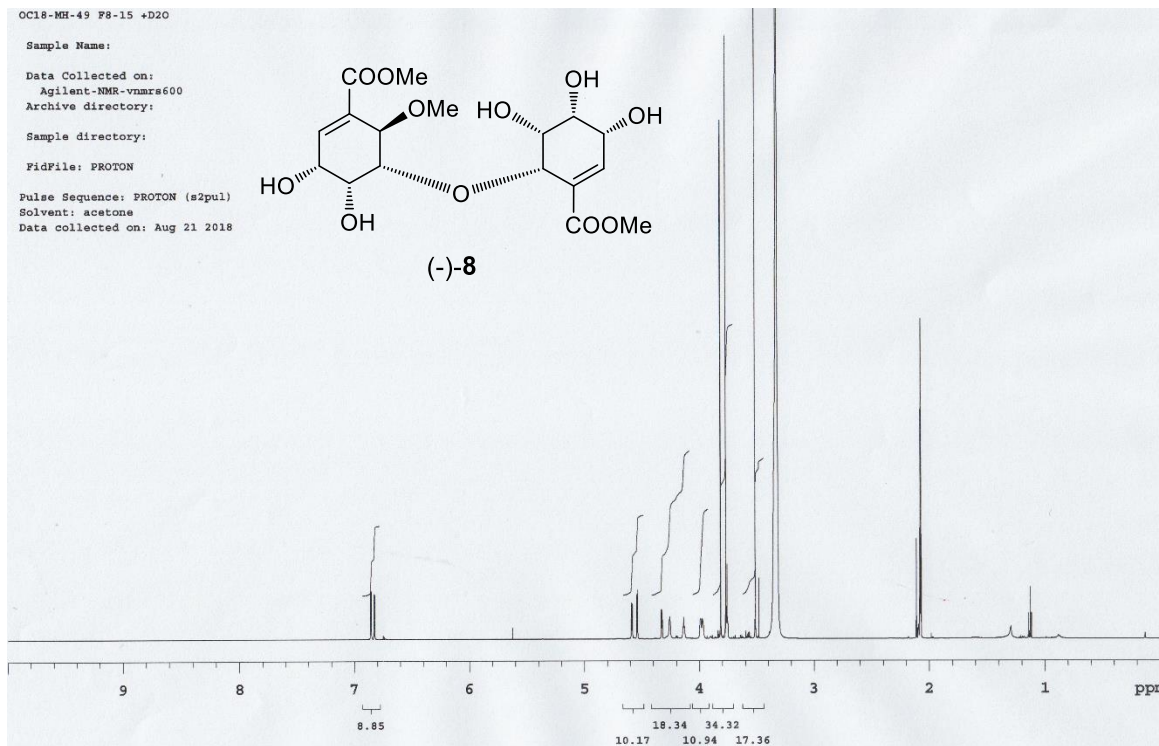


Figure S50:  $^{13}\text{C}$ -NMR Spectrum of (+)-18 in acetone- $d_6$  (100 MHz)



| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 16768.7   | 166.787 | 11.5   |
| 2     | 16672.6   | 165.831 | 12.0   |
| 3     | 14258.6   | 141.821 | 22.1   |
| 4     | 13989.3   | 139.142 | 22.8   |
| 5     | 13247.7   | 131.766 | 13.5   |
| 6     | 12994.4   | 129.247 | 11.9   |
| 7     | 7978.1    | 79.353  | 19.5   |
| 8     | 7808.0    | 77.661  | 18.6   |
| 9     | 7588.3    | 75.475  | 27.4   |
| 10    | 7140.4    | 71.021  | 11.7   |
| 11    | 7075.6    | 70.376  | 20.5   |
| 12    | 6951.2    | 69.139  | 18.9   |
| 13    | 6628.5    | 65.929  | 19.6   |
| 14    | 6138.7    | 61.057  | 19.8   |
| 15    | 5188.8    | 51.610  | 24.3   |
| 16    | 5183.5    | 51.556  | 24.5   |
| 17    | 2993.8    | 29.778  | 177.8  |
| 18    | 2974.0    | 29.580  | 447.3  |
| 19    | 2954.9    | 29.391  | 1019.5 |
| 20    | 2935.8    | 29.201  | 1144.7 |
| 21    | 2916.0    | 29.004  | 927.7  |
| 22    | 2896.9    | 28.814  | 506.1  |
| 23    | 2877.9    | 28.624  | 148.9  |

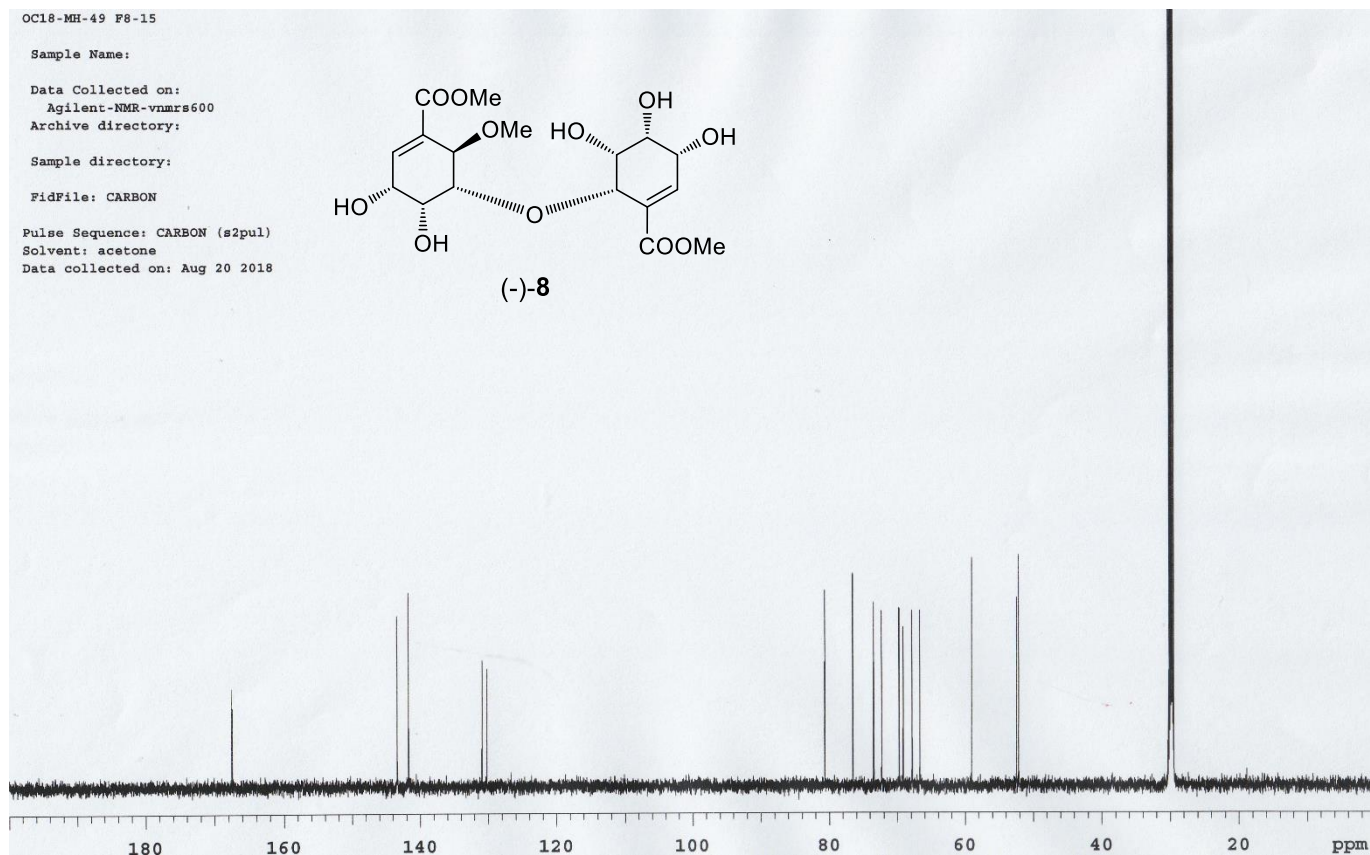
Figure S51: <sup>1</sup>H- NMR Spectrum of (-)-8 in acetone-d<sub>6</sub> (600 MHz)



OC18-MH-49 F8-15 +D2O

| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|-------|--------|
| 1     | 4114.9    | 6.859 | 93.7   | 51    | 1250.0    | 2.084 | 209.8  |
| 2     | 4110.8    | 6.852 | 91.8   | 52    | 1247.7    | 2.080 | 434.3  |
| 3     | 4096.4    | 6.828 | 81.0   | 53    | 1245.6    | 2.076 | 606.8  |
| 4     | 4095.2    | 6.827 | 86.3   | 54    | 1243.3    | 2.073 | 437.2  |
| 5     | 4094.1    | 6.825 | 82.9   | 55    | 1241.2    | 2.069 | 197.5  |
| 6     | 4092.6    | 6.822 | 83.6   | 56    | 775.3     | 1.292 | 24.4   |
| 7     | 3374.0    | 5.624 | 21.4   | 57    | 683.4     | 1.139 | 48.1   |
| 8     | 2752.5    | 4.588 | 68.8   | 58    | 680.8     | 1.135 | 14.9   |
| 9     | 2748.3    | 4.581 | 67.1   | 59    | 676.4     | 1.127 | 98.9   |
| 10    | 2724.6    | 4.542 | 85.5   | 60    | 669.3     | 1.116 | 50.0   |
| 11    | 2720.5    | 4.535 | 93.5   |       |           |       |        |
| 12    | 2598.4    | 4.331 | 55.8   |       |           |       |        |
| 13    | 2596.6    | 4.328 | 57.0   |       |           |       |        |
| 14    | 2594.3    | 4.325 | 55.4   |       |           |       |        |
| 15    | 2592.2    | 4.321 | 50.8   |       |           |       |        |
| 16    | 2556.7    | 4.262 | 34.2   |       |           |       |        |
| 17    | 2553.8    | 4.257 | 42.7   |       |           |       |        |
| 18    | 2485.1    | 4.143 | 22.8   |       |           |       |        |
| 19    | 2481.0    | 4.136 | 41.1   |       |           |       |        |
| 20    | 2476.9    | 4.129 | 24.5   |       |           |       |        |
| 21    | 2395.6    | 3.993 | 37.3   |       |           |       |        |
| 22    | 2393.6    | 3.990 | 39.2   |       |           |       |        |
| 23    | 2391.5    | 3.987 | 38.1   |       |           |       |        |
| 24    | 2384.5    | 3.975 | 39.2   |       |           |       |        |
| 25    | 2382.7    | 3.972 | 37.8   |       |           |       |        |
| 26    | 2380.1    | 3.967 | 33.2   |       |           |       |        |
| 27    | 2303.5    | 3.840 | 16.2   |       |           |       |        |
| 28    | 2297.3    | 3.830 | 15.9   |       |           |       |        |
| 29    | 2287.6    | 3.813 | 983.7  |       |           |       |        |
| 30    | 2266.5    | 3.778 | 17.9   |       |           |       |        |
| 31    | 2263.9    | 3.774 | 46.6   |       |           |       |        |
| 32    | 2260.4    | 3.768 | 1145.0 |       |           |       |        |
| 33    | 2256.5    | 3.762 | 55.8   |       |           |       |        |
| 34    | 2254.8    | 3.759 | 142.4  |       |           |       |        |
| 35    | 2252.1    | 3.754 | 42.0   |       |           |       |        |
| 36    | 2250.1    | 3.751 | 34.0   |       |           |       |        |
| 37    | 2155.9    | 3.594 | 15.3   |       |           |       |        |
| 38    | 2107.5    | 3.513 | 1271.3 |       |           |       |        |
| 39    | 2104.8    | 3.509 | 17.8   |       |           |       |        |
| 40    | 2104.0    | 3.507 | 20.6   |       |           |       |        |
| 41    | 2088.7    | 3.482 | 115.6  |       |           |       |        |
| 42    | 1993.9    | 3.324 | 1488.6 |       |           |       |        |
| 43    | 1267.1    | 2.112 | 189.7  |       |           |       |        |
| 44    | 1266.5    | 2.111 | 62.8   |       |           |       |        |
| 45    | 1258.9    | 2.098 | 20.6   |       |           |       |        |
| 46    | 1257.7    | 2.096 | 28.3   |       |           |       |        |
| 47    | 1256.8    | 2.095 | 20.9   |       |           |       |        |
| 48    | 1255.6    | 2.093 | 26.7   |       |           |       |        |
| 49    | 1254.4    | 2.091 | 20.0   |       |           |       |        |
| 50    | 1253.3    | 2.089 | 18.6   |       |           |       |        |

Figure S52: <sup>13</sup>C-NMR Spectrum of (-)-8 in acetone-d<sub>6</sub> (150 MHz)



OC18-MH-49 F8-15

| NDEX | FREQUENCY | PPM     | HEIGHT |
|------|-----------|---------|--------|
| 1    | 25268.3   | 167.512 | 19.2   |
| 2    | 25248.7   | 167.382 | 15.5   |
| 3    | 21622.4   | 143.342 | 33.4   |
| 4    | 21372.7   | 141.687 | 38.1   |
| 5    | 19740.5   | 130.866 | 24.8   |
| 6    | 19630.7   | 130.138 | 23.1   |
| 7    | 12159.6   | 80.610  | 38.4   |
| 8    | 11537.7   | 76.487  | 41.7   |
| 9    | 11077.6   | 73.437  | 36.0   |
| 10   | 10901.9   | 72.273  | 34.3   |
| 11   | 10512.4   | 69.690  | 34.9   |
| 12   | 10425.7   | 69.115  | 31.1   |
| 13   | 10228.0   | 67.805  | 34.4   |
| 14   | 10059.2   | 66.686  | 34.4   |
| 15   | 8899.8    | 59.000  | 44.6   |
| 16   | 7912.6    | 52.455  | 36.9   |
| 17   | 7864.0    | 52.133  | 45.2   |
| 18   | 4577.6    | 30.347  | 8.8    |
| 19   | 4559.1    | 30.224  | 181.8  |
| 20   | 4539.5    | 30.094  | 421.6  |
| 21   | 4521.0    | 29.971  | 1085.9 |
| 22   | 4501.3    | 29.841  | 1387.4 |
| 23   | 4481.7    | 29.711  | 1077.3 |
| 24   | 4463.2    | 29.588  | 428.3  |
| 25   | 4443.5    | 29.458  | 184.5  |

Figure S53: <sup>1</sup>H-NMR Spectrum of (+)-8 in acetone-d<sub>6</sub> (400 MHz)

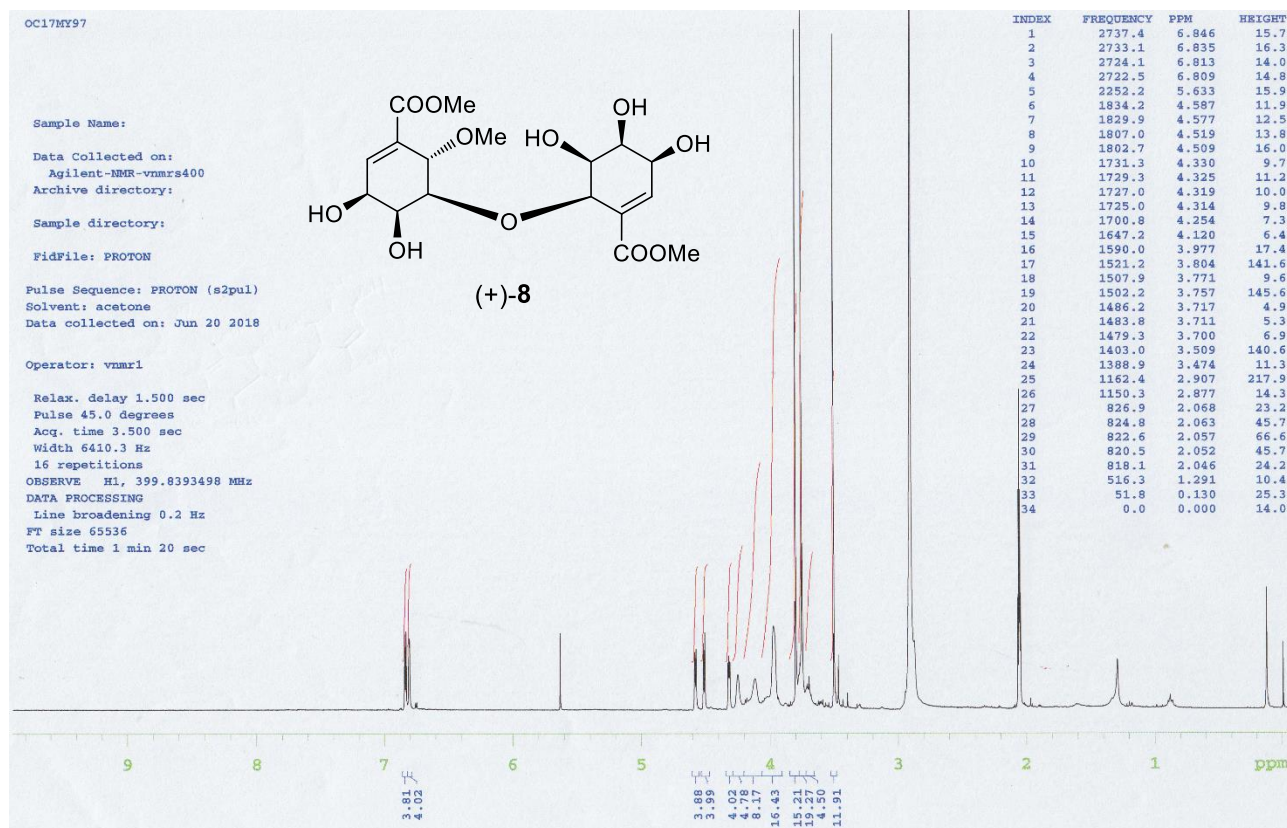


Figure S54: <sup>13</sup>C-NMR Spectrum of (+)-8 in acetone-d<sub>6</sub> (100 MHz)

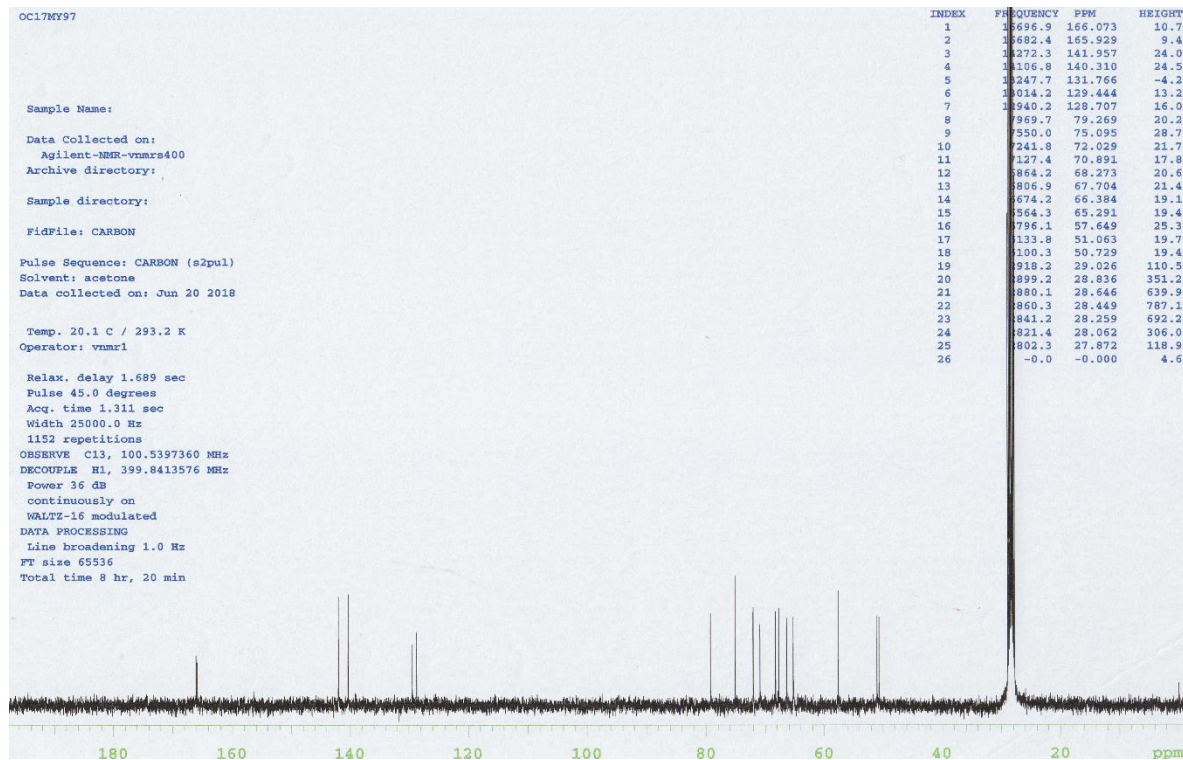
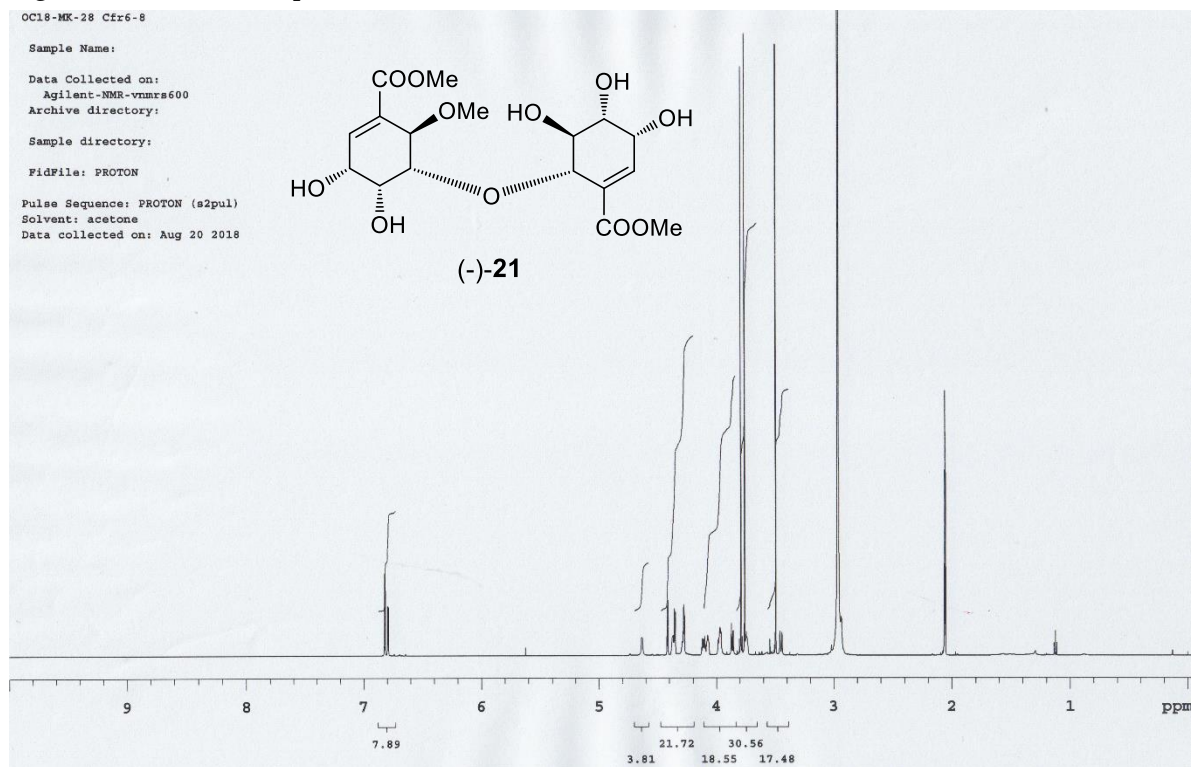
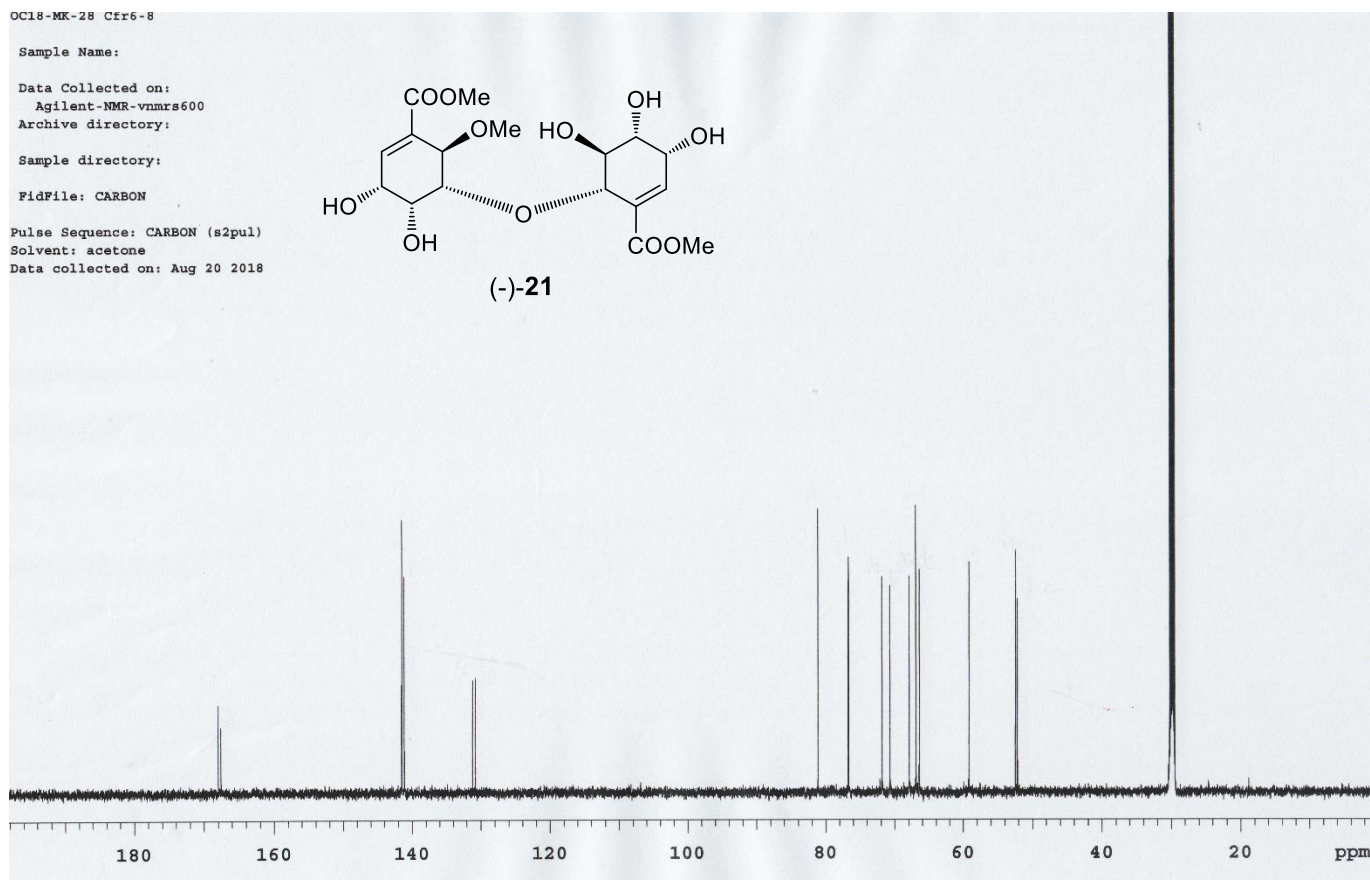


Figure S55: <sup>1</sup>H- NMR Spectrum of (-)-21 in acetone-d<sub>6</sub> (600 MHz)



| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM   | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|-------|--------|
| 1     | 4094.1    | 6.825 | 103.9  | 51    | 1779.7    | 2.967 | 4328.6 |
| 2     | 4089.9    | 6.818 | 106.7  | 52    | 1761.8    | 2.937 | 49.4   |
| 3     | 4077.9    | 6.798 | 63.0   | 53    | 1239.8    | 2.067 | 115.4  |
| 4     | 4074.4    | 6.792 | 61.8   | 54    | 1237.4    | 2.063 | 233.9  |
| 5     | 3374.0    | 5.624 | 10.5   | 55    | 1235.4    | 2.059 | 333.8  |
| 6     | 2780.0    | 4.634 | 23.3   | 56    | 1233.0    | 2.055 | 231.1  |
| 7     | 2777.7    | 4.630 | 23.4   | 57    | 1231.0    | 2.052 | 111.5  |
| 8     | 2650.6    | 4.418 | 63.4   | 58    | 680.8     | 1.135 | 16.0   |
| 9     | 2646.8    | 4.412 | 70.1   | 59    | 674.0     | 1.124 | 31.8   |
| 10    | 2620.4    | 4.368 | 25.7   | 60    | 667.0     | 1.112 | 16.7   |
| 11    | 2613.7    | 4.357 | 59.6   | 61    | 78.1      | 0.130 | 7.4    |
| 12    | 2609.3    | 4.349 | 55.9   |       |           |       |        |
| 13    | 2572.9    | 4.289 | 18.1   |       |           |       |        |
| 14    | 2568.2    | 4.281 | 61.7   |       |           |       |        |
| 15    | 2566.1    | 4.278 | 64.8   |       |           |       |        |
| 16    | 2564.1    | 4.274 | 55.5   |       |           |       |        |
| 17    | 2562.0    | 4.271 | 50.0   |       |           |       |        |
| 18    | 2475.2    | 4.126 | 11.1   |       |           |       |        |
| 19    | 2470.8    | 4.119 | 21.7   |       |           |       |        |
| 20    | 2465.5    | 4.110 | 20.2   |       |           |       |        |
| 21    | 2460.5    | 4.101 | 24.7   |       |           |       |        |
| 22    | 2456.1    | 4.094 | 14.2   |       |           |       |        |
| 23    | 2444.3    | 4.075 | 26.2   |       |           |       |        |
| 24    | 2392.4    | 3.988 | 17.8   |       |           |       |        |
| 25    | 2390.3    | 3.985 | 20.0   |       |           |       |        |
| 26    | 2387.7    | 3.980 | 22.0   |       |           |       |        |
| 27    | 2385.4    | 3.976 | 26.9   |       |           |       |        |
| 28    | 2383.6    | 3.973 | 35.4   |       |           |       |        |
| 29    | 2381.5    | 3.970 | 36.3   |       |           |       |        |
| 30    | 2378.9    | 3.966 | 34.0   |       |           |       |        |
| 31    | 2376.8    | 3.962 | 31.4   |       |           |       |        |
| 32    | 2327.3    | 3.879 | 8.9    |       |           |       |        |
| 33    | 2323.7    | 3.874 | 40.8   |       |           |       |        |
| 34    | 2314.6    | 3.858 | 32.1   |       |           |       |        |
| 35    | 2283.2    | 3.806 | 21.3   |       |           |       |        |
| 36    | 2275.0    | 3.792 | 743.3  |       |           |       |        |
| 37    | 2271.5    | 3.786 | 11.1   |       |           |       |        |
| 38    | 2268.0    | 3.781 | 24.2   |       |           |       |        |
| 39    | 2257.7    | 3.763 | 40.2   |       |           |       |        |
| 40    | 2255.4    | 3.760 | 785.1  |       |           |       |        |
| 41    | 2251.3    | 3.753 | 18.3   |       |           |       |        |
| 42    | 2247.2    | 3.746 | 30.3   |       |           |       |        |
| 43    | 2244.8    | 3.742 | 23.4   |       |           |       |        |
| 44    | 2242.2    | 3.738 | 23.7   |       |           |       |        |
| 45    | 2126.5    | 3.545 | 21.0   |       |           |       |        |
| 46    | 2104.5    | 3.508 | 13.9   |       |           |       |        |
| 47    | 2097.5    | 3.496 | 771.7  |       |           |       |        |
| 48    | 2075.5    | 3.460 | 30.8   |       |           |       |        |
| 49    | 2065.2    | 3.443 | 29.4   |       |           |       |        |
| 50    | 1812.0    | 3.020 | 13.1   |       |           |       |        |

Figure S56:  $^{13}\text{C}$ -NMR Spectrum of (-)-**21** in acetone- $d_6$  (150 MHz)



OC18-MK-28 Cfr6-8

| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 25333.1   | 167.942 | 17.2   |
| 2     | 25274.1   | 167.551 | 12.9   |
| 3     | 21340.4   | 141.473 | 52.8   |
| 4     | 21286.0   | 141.112 | 41.9   |
| 5     | 19784.4   | 131.158 | 21.8   |
| 6     | 19723.2   | 130.752 | 22.5   |
| 7     | 12232.5   | 81.093  | 54.9   |
| 8     | 11569.0   | 76.695  | 41.0   |
| 9     | 11563.2   | 76.656  | 45.5   |
| 10    | 10832.6   | 71.813  | 41.8   |
| 11    | 10660.4   | 70.671  | 40.0   |
| 12    | 10240.7   | 67.889  | 41.8   |
| 13    | 10093.9   | 66.916  | 55.5   |
| 14    | 10021.1   | 66.433  | 43.2   |
| 15    | 8926.4    | 59.176  | 44.5   |
| 16    | 7913.8    | 52.463  | 46.8   |
| 17    | 7868.7    | 52.164  | 37.4   |
| 18    | 4577.7    | 30.347  | 8.1    |
| 19    | 4559.2    | 30.224  | 159.0  |
| 20    | 4540.7    | 30.102  | 429.3  |
| 21    | 4521.0    | 29.971  | 1051.0 |
| 22    | 4501.4    | 29.841  | 1267.3 |
| 23    | 4481.7    | 29.711  | 929.8  |
| 24    | 4463.2    | 29.588  | 433.4  |
| 25    | 4443.6    | 29.458  | 176.6  |

Figure S57: <sup>1</sup>H-NMR Spectrum of (+)-21 in acetone-d<sub>6</sub> (400 MHz)

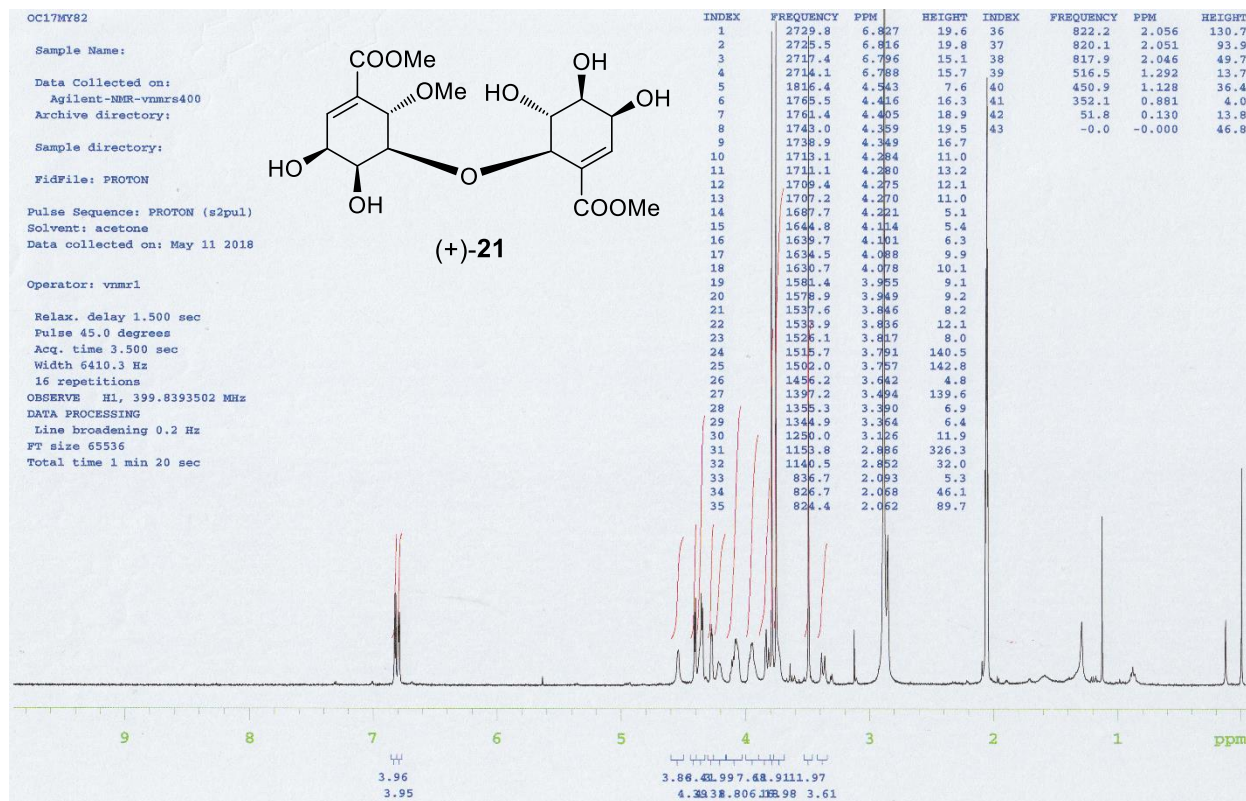


Figure S58: <sup>13</sup>C-NMR Spectrum of (+)-21 in acetone-d<sub>6</sub> (100 MHz)

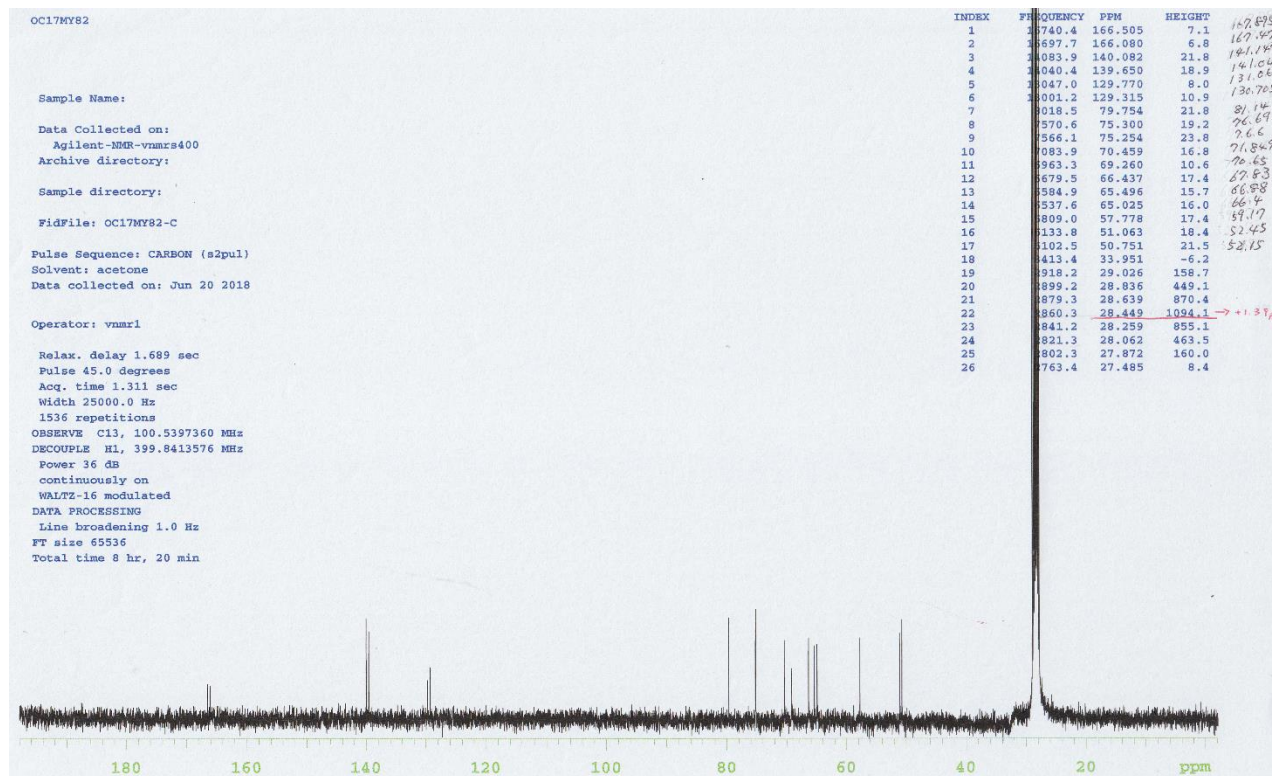
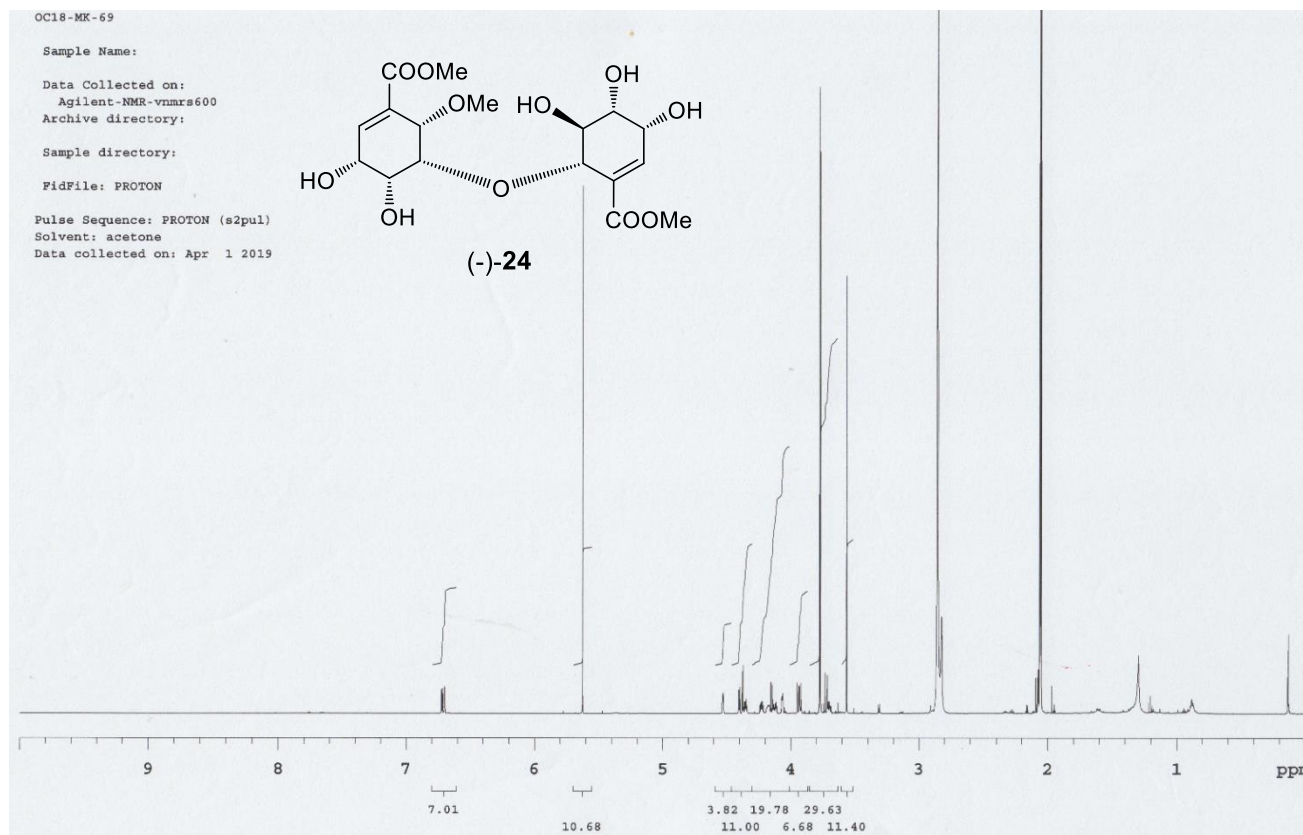


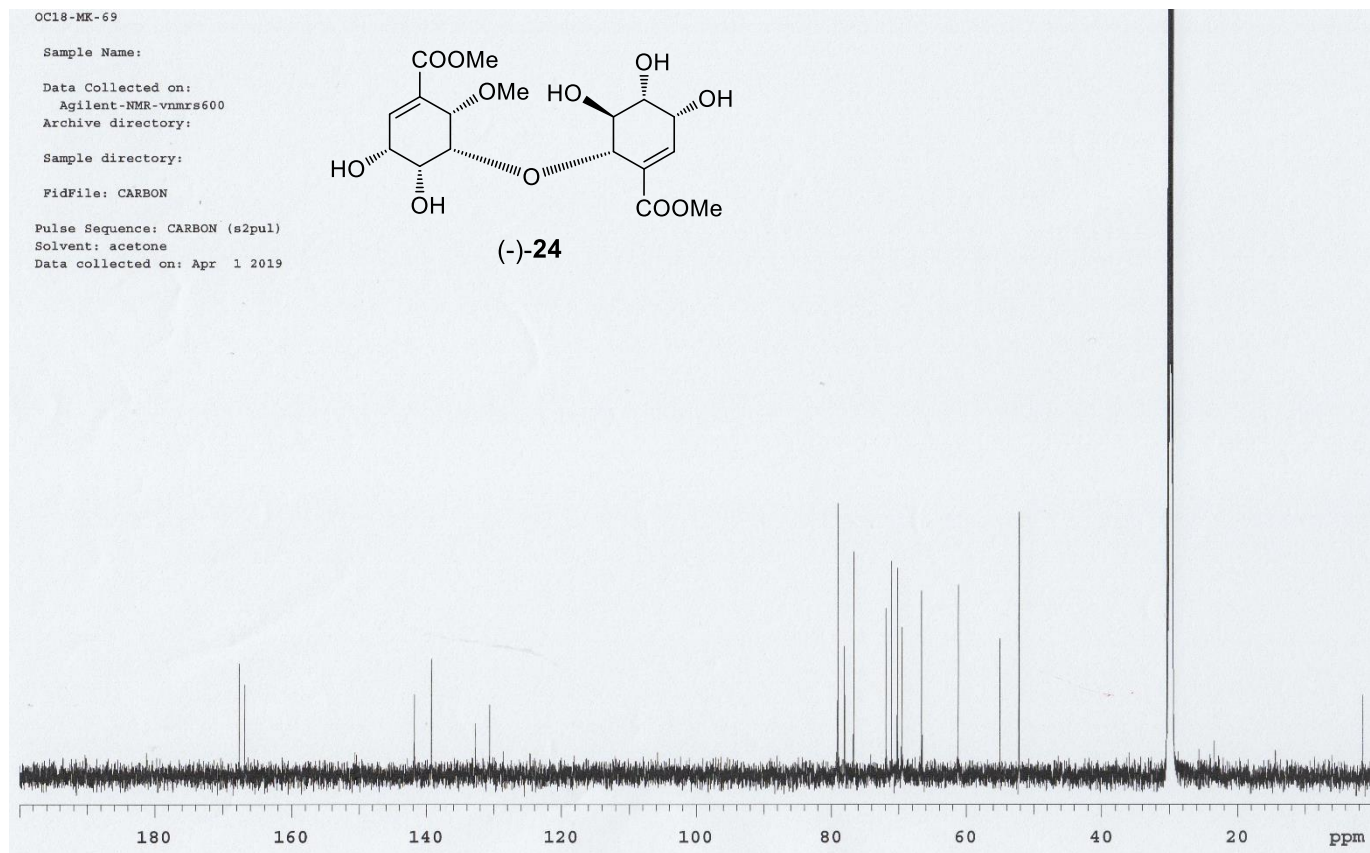
Figure S59: <sup>1</sup>H- NMR Spectrum of (-)-24 in acetone-d<sub>6</sub> (600 MHz)



| INDEX | FREQUENCY | PPM   | HEIGHT | INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|-------|--------|-------|-----------|--------|--------|
| 1     | 2729.8    | 6.827 | 25.1   | 36    | 835.7     | 2.090  | 2.6    |
| 2     | 2727.8    | 6.822 | 25.5   | 37    | 830.0     | 2.076  | 2.4    |
| 3     | 2692.2    | 6.733 | 25.0   | 38    | 825.5     | 2.065  | 122.0  |
| 4     | 2690.0    | 6.728 | 24.7   | 39    | 823.4     | 2.059  | 253.4  |
| 5     | 2250.5    | 5.628 | 87.4   | 40    | 821.2     | 2.054  | 369.1  |
| 6     | 1880.0    | 4.702 | 3.4    | 41    | 819.1     | 2.049  | 236.8  |
| 7     | 1868.6    | 4.673 | 17.6   | 42    | 816.7     | 2.043  | 124.1  |
| 8     | 1864.9    | 4.664 | 17.7   | 43    | 757.5     | 1.894  | 2.9    |
| 9     | 1787.2    | 4.470 | 8.6    | 44    | 534.3     | 1.336  | 4.0    |
| 10    | 1727.6    | 4.321 | 19.4   | 45    | 516.6     | 1.292  | 17.6   |
| 11    | 1723.9    | 4.311 | 20.9   | 46    | 506.3     | 1.266  | 3.0    |
| 12    | 1696.3    | 4.242 | 19.4   | 47    | 498.3     | 1.246  | 3.9    |
| 13    | 1680.2    | 4.202 | 4.9    | 48    | 479.9     | 1.200  | 3.2    |
| 14    | 1638.2    | 4.097 | 16.4   | 49    | 473.0     | 1.183  | 3.4    |
| 15    | 1636.0    | 4.092 | 15.8   | 50    | 471.1     | 1.178  | 4.8    |
| 16    | 1604.7    | 4.013 | 13.0   | 51    | 394.8     | 0.987  | 3.7    |
| 17    | 1589.5    | 3.975 | 7.3    | 52    | 384.0     | 0.960  | 2.7    |
| 18    | 1580.5    | 3.953 | 7.0    | 53    | 376.4     | 0.941  | 4.2    |
| 19    | 1533.9    | 3.836 | 11.6   | 54    | 369.1     | 0.923  | 2.6    |
| 20    | 1516.9    | 3.794 | 391.5  | 55    | 361.9     | 0.905  | 2.9    |
| 21    | 1507.9    | 3.771 | 383.1  | 56    | 359.0     | 0.898  | 4.9    |
| 22    | 1504.8    | 3.763 | 11.2   | 57    | 355.3     | 0.888  | 5.6    |
| 23    | 1499.3    | 3.750 | 9.3    | 58    | 352.1     | 0.881  | 6.6    |
| 24    | 1461.5    | 3.655 | 7.1    | 59    | 348.4     | 0.871  | 4.6    |
| 25    | 1450.4    | 3.627 | 8.5    | 60    | 345.7     | 0.865  | 3.5    |
| 26    | 1449.2    | 3.624 | 2.7    | 61    | 51.4      | 0.129  | 5.4    |
| 27    | 1443.1    | 3.609 | 2.9    | 62    | 4.3       | 0.011  | 3.2    |
| 28    | 1433.2    | 3.584 | 2.6    | 63    | 3.1       | 0.008  | 18.9   |
| 29    | 1416.7    | 3.543 | 4.9    | 64    | 2.3       | 0.006  | 7.5    |
| 30    | 1385.6    | 3.465 | 221.4  | 65    | -0.0      | -0.000 | 594.1  |
| 31    | 1348.6    | 3.373 | 3.3    | 66    | -2.2      | -0.005 | 6.5    |
| 32    | 1326.9    | 3.319 | 3.3    | 67    | -3.5      | -0.009 | 15.3   |
| 33    | 1321.6    | 3.305 | 5.1    |       |           |        |        |
| 34    | 1131.9    | 2.831 | 145.7  |       |           |        |        |
| 35    | 1118.4    | 2.797 | 35.7   |       |           |        |        |



Figure S60:  $^{13}\text{C}$ -NMR Spectrum of (-)-**24** in acetone- $d_6$  (150 MHz)



OC18-MK-69

| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 25288.0   | 167.643 | 22.6   |
| 2     | 25160.8   | 166.800 | 18.6   |
| 3     | 21386.6   | 141.779 | 16.6   |
| 4     | 21008.6   | 139.273 | 23.6   |
| 5     | 20022.5   | 132.736 | 10.8   |
| 6     | 19698.9   | 130.590 | 14.6   |
| 7     | 19391.4   | 128.552 | 5.3    |
| 8     | 15953.5   | 105.761 | 5.2    |
| 9     | 11952.7   | 79.239  | 5.2    |
| 10    | 11920.3   | 79.024  | 54.2   |
| 11    | 11770.1   | 78.028  | 26.1   |
| 12    | 11564.3   | 76.664  | 44.8   |
| 13    | 10843.0   | 71.882  | 33.5   |
| 14    | 10720.4   | 71.070  | 42.8   |
| 15    | 10588.7   | 70.196  | 41.5   |
| 16    | 10574.8   | 70.104  | 7.3    |
| 17    | 10490.4   | 69.545  | 29.8   |
| 18    | 10048.8   | 66.617  | 37.0   |
| 19    | 10032.6   | 66.510  | 8.6    |
| 20    | 9222.3    | 61.138  | 38.2   |
| 21    | 8290.6    | 54.961  | 27.5   |
| 22    | 7869.8    | 52.172  | 51.3   |
| 23    | 7862.9    | 52.126  | 52.5   |
| 24    | 4583.4    | 30.385  | 24.0   |
| 25    | 4577.6    | 30.347  | 53.3   |
| 26    | 4559.1    | 30.224  | 1098.4 |
| 27    | 4539.5    | 30.094  | 2601.0 |
| 28    | 4521.0    | 29.971  | 5916.5 |
| 29    | 4501.3    | 29.841  | 7991.3 |
| 30    | 4481.7    | 29.711  | 6443.9 |
| 31    | 4462.0    | 29.580  | 2507.9 |
| 32    | 4443.5    | 29.458  | 1013.5 |
| 33    | 3865.6    | 25.626  | 5.8    |
| 34    | 3518.8    | 23.327  | 7.5    |
| 35    | 2165.1    | 14.353  | 5.5    |
| 36    | 211.5     | 1.402   | 16.4   |

Figure 61: <sup>1</sup>H-NMR Spectrum of (+)-24 in acetone-d<sub>6</sub> (400 MHz)

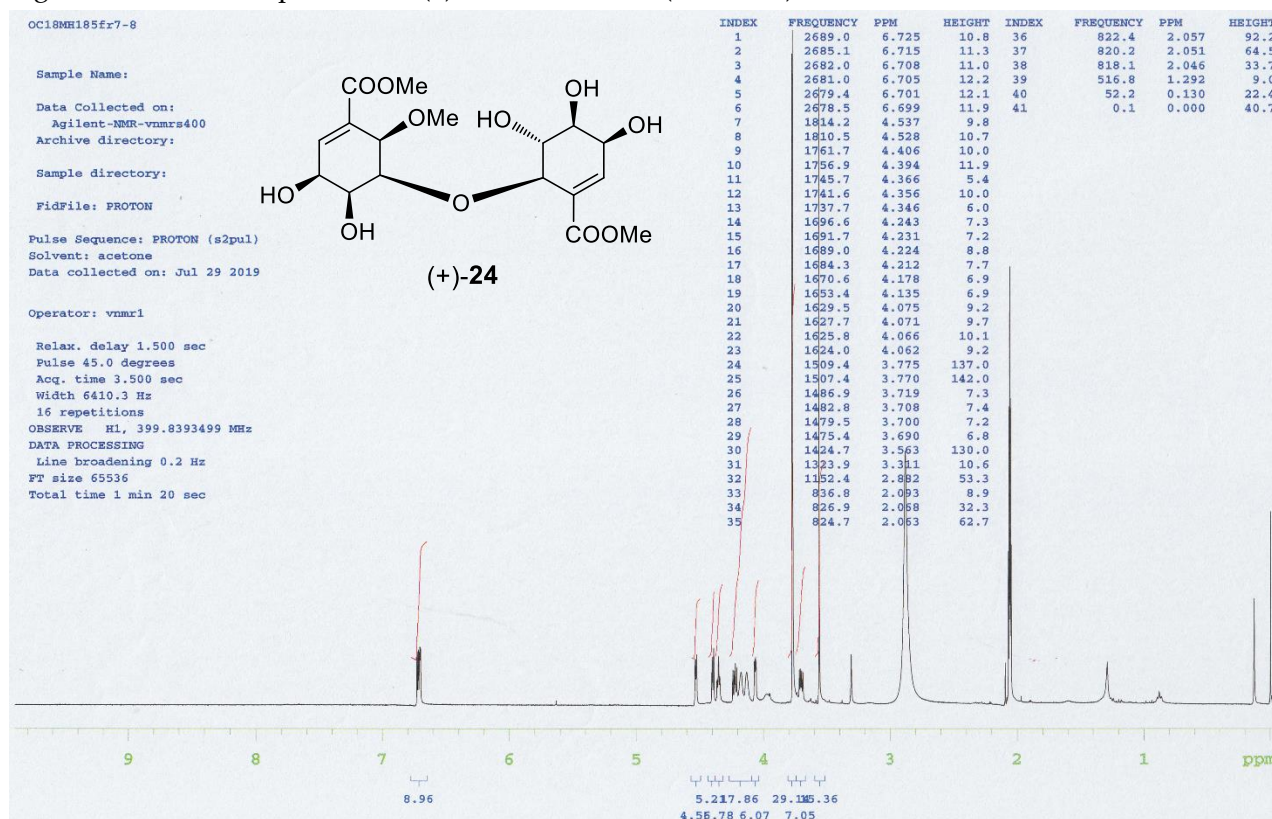


Figure S62: <sup>13</sup>C-NMR Spectrum of (+)-24 in acetone-d<sub>6</sub> (100 MHz)

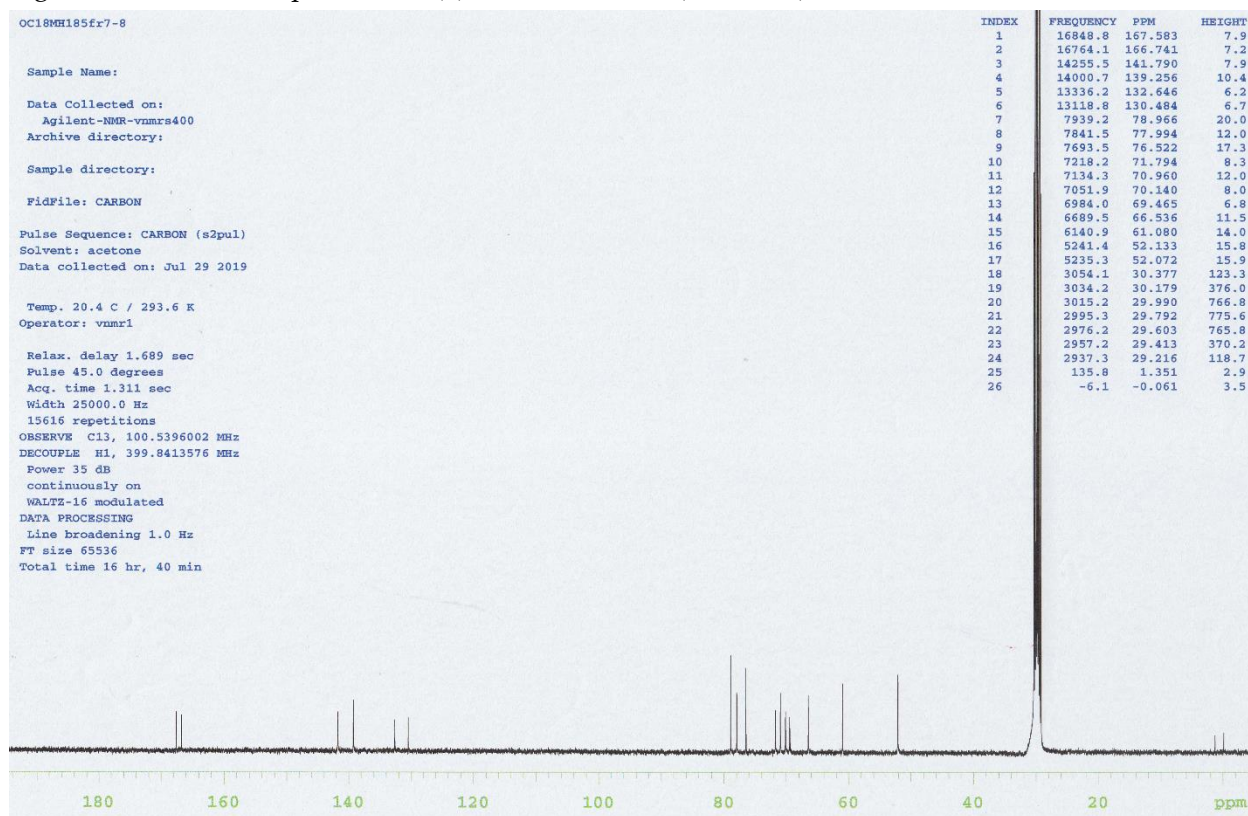
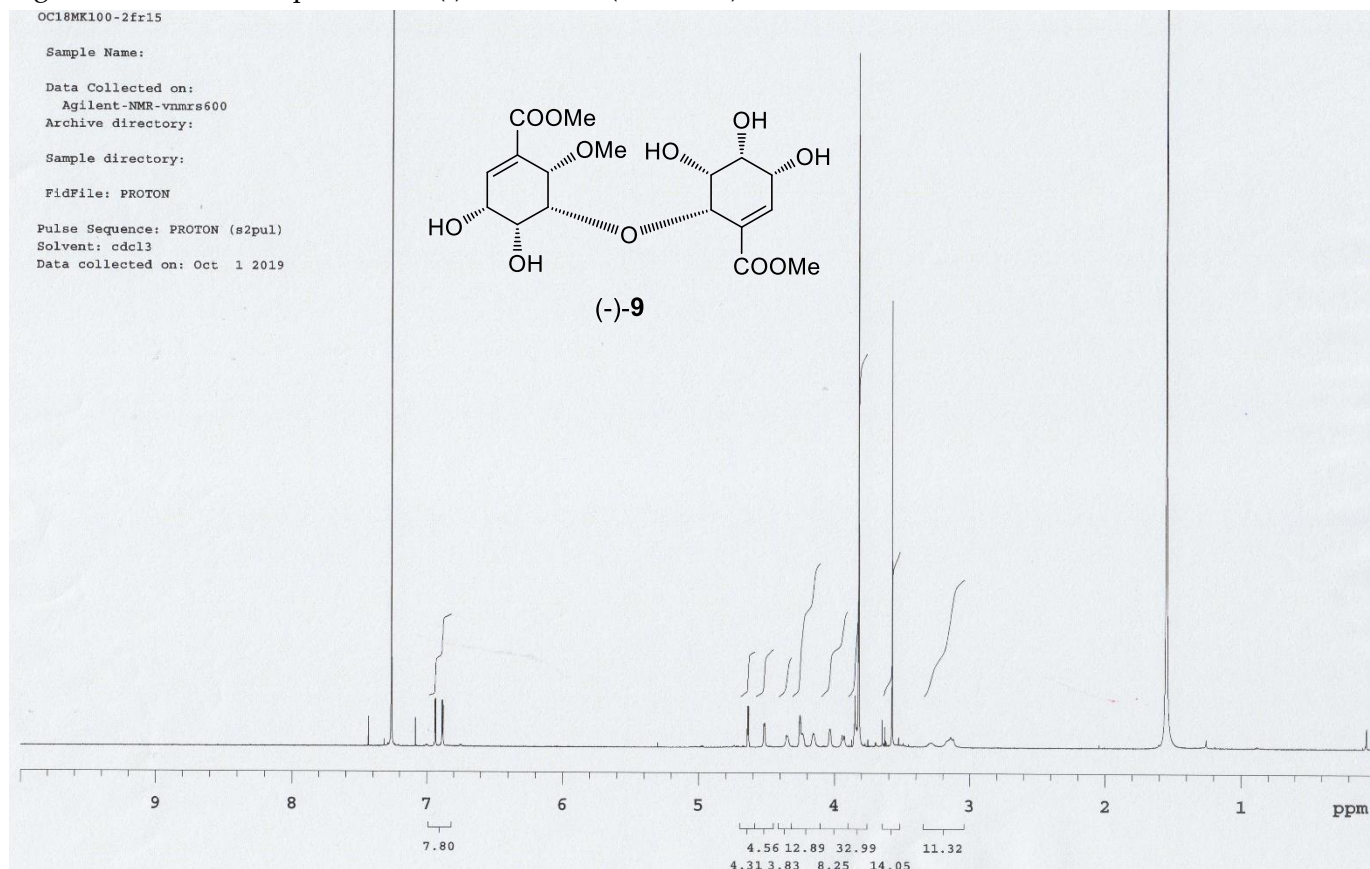


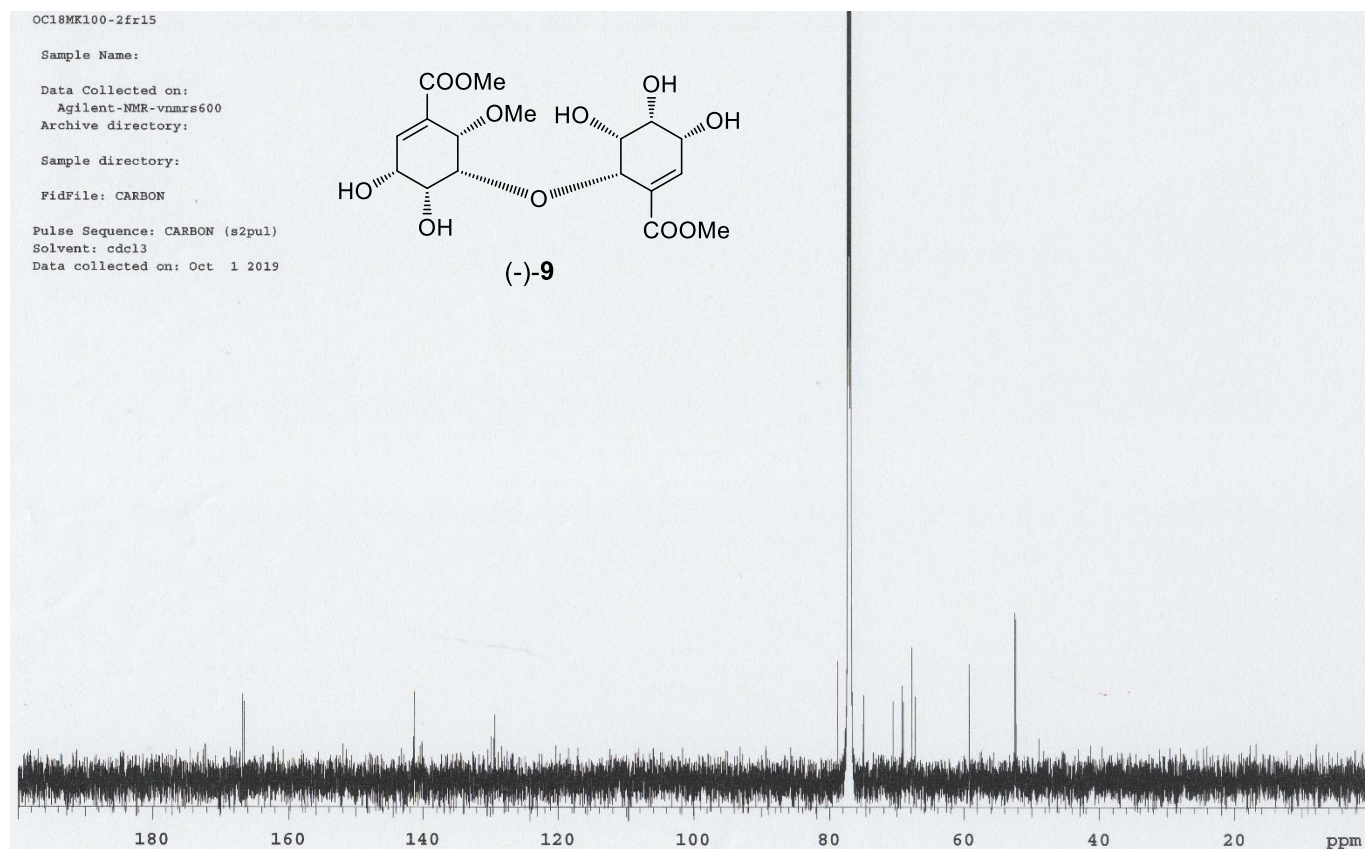
Figure S63: <sup>1</sup>H-NMR Spectrum of (-)-9 in CDCl<sub>3</sub> (600 MHz)



OC18MK100-2fr15 +D2O

| INDEX | FREQUENCY | PPM    | HEIGHT |
|-------|-----------|--------|--------|
| 1     | 4460.3    | 7.435  | 31.7   |
| 2     | 4357.3    | 7.263  | 5175.1 |
| 3     | 4251.0    | 7.086  | 34.5   |
| 4     | 4159.5    | 6.934  | 46.9   |
| 5     | 4156.6    | 6.929  | 47.0   |
| 6     | 4157.1    | 6.930  | 47.4   |
| 7     | 4119.6    | 6.867  | 41.1   |
| 8     | 4115.8    | 6.861  | 42.6   |
| 9     | 2851.3    | 4.753  | 906.1  |
| 10    | 2778.0    | 4.631  | 41.3   |
| 11    | 2773.6    | 4.623  | 40.3   |
| 12    | 2692.3    | 4.488  | 29.0   |
| 13    | 2689.4    | 4.483  | 28.7   |
| 14    | 2563.5    | 4.273  | 28.8   |
| 15    | 2538.2    | 4.231  | 20.5   |
| 16    | 2534.4    | 4.225  | 30.0   |
| 17    | 2530.9    | 4.219  | 20.0   |
| 18    | 2486.3    | 4.145  | 22.4   |
| 19    | 2481.6    | 4.137  | 30.7   |
| 20    | 2477.5    | 4.130  | 21.3   |
| 21    | 2423.5    | 4.040  | 24.1   |
| 22    | 2294.7    | 3.825  | 545.7  |
| 23    | 2291.8    | 3.820  | 545.0  |
| 24    | 2275.9    | 3.794  | 31.5   |
| 25    | 2175.8    | 3.627  | 10.6   |
| 26    | 2146.8    | 3.579  | 290.7  |
| 27    | 2107.8    | 3.514  | 10.0   |
| 28    | 939.9     | 1.567  | 46.9   |
| 29    | 752.4     | 1.254  | 11.8   |
| 30    | 41.7      | 0.069  | 24.7   |
| 31    | 3.2       | 0.005  | 29.1   |
| 32    | -0.0      | -0.000 | 968.9  |
| 33    | -3.2      | -0.005 | 26.1   |

Figure S64:  $^{13}\text{C}$ -NMR Spectrum of (-)-**9** in acetone- $d_6$  (150 MHz)



OC18MK100-2fr15

| INDEX | FREQUENCY | PPM     | HEIGHT |
|-------|-----------|---------|--------|
| 1     | 25150.2   | 166.730 | 17.2   |
| 2     | 25106.3   | 166.439 | 15.8   |
| 3     | 21320.5   | 141.341 | 17.7   |
| 4     | 19592.3   | 129.885 | 8.8    |
| 5     | 19520.7   | 129.410 | 13.1   |
| 6     | 11878.5   | 78.747  | 23.8   |
| 7     | 11646.2   | 77.207  | 5404.4 |
| 8     | 11615.0   | 77.000  | 6019.3 |
| 9     | 11582.6   | 76.785  | 5865.7 |
| 10    | 11293.6   | 74.870  | 17.0   |
| 11    | 10641.7   | 70.547  | 15.9   |
| 12    | 10440.5   | 69.214  | 18.9   |
| 13    | 10413.9   | 69.038  | 15.7   |
| 14    | 10229.0   | 67.812  | 26.5   |
| 15    | 10156.1   | 67.329  | 16.8   |
| 16    | 8929.7    | 59.198  | 23.1   |
| 17    | 7920.5    | 52.508  | 33.3   |
| 18    | 7888.1    | 52.293  | 32.0   |
| 19    | 7376.0    | 48.899  | 8.5    |

Figure S65: <sup>1</sup>H-NMR Spectrum of (+)-9 in acetone-d<sub>6</sub> (400 MHz)

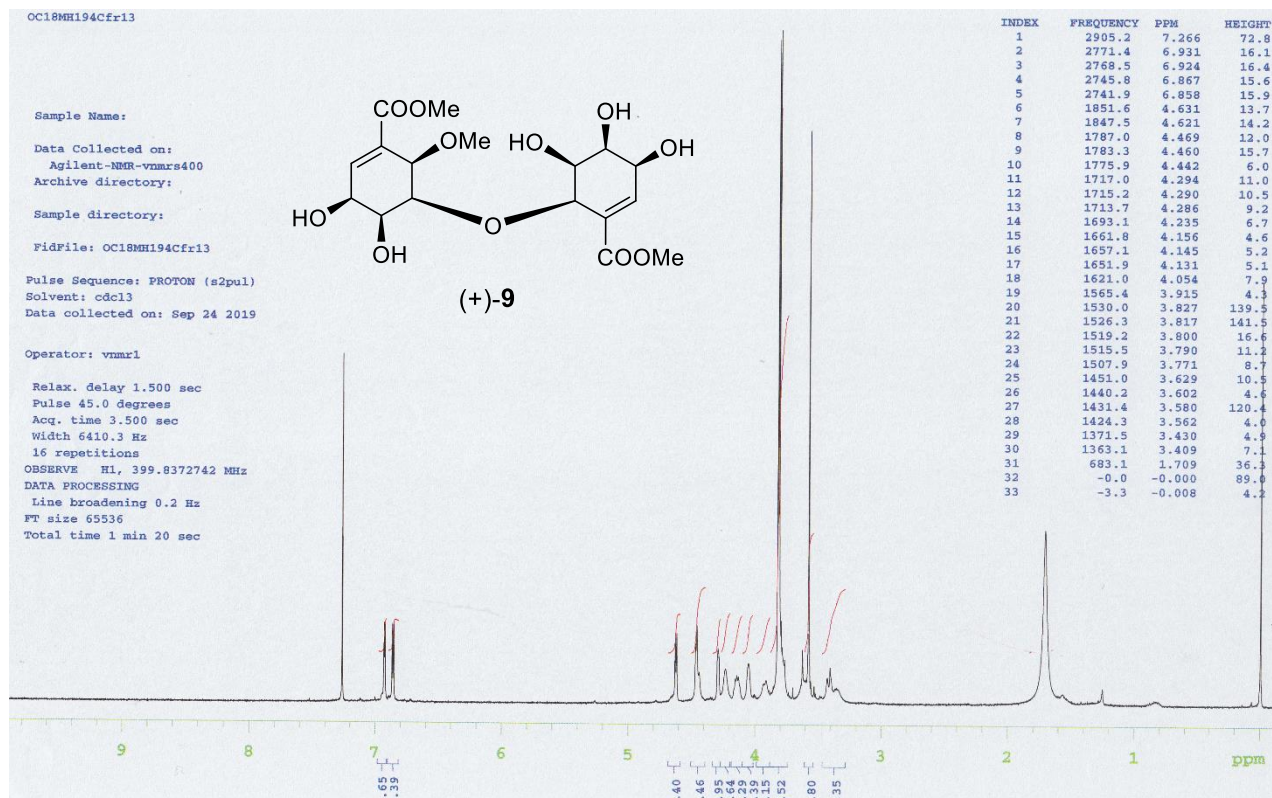


Figure S66: <sup>13</sup>C-NMR Spectrum of (+)-9 in acetone-d<sub>6</sub> (100 MHz)

