

## Supporting Information for

### **Withanolides from Aeroponically Grown *Physalis peruviana* and Their Selective Cytotoxicity to Prostate Cancer and Renal Carcinoma Cells**

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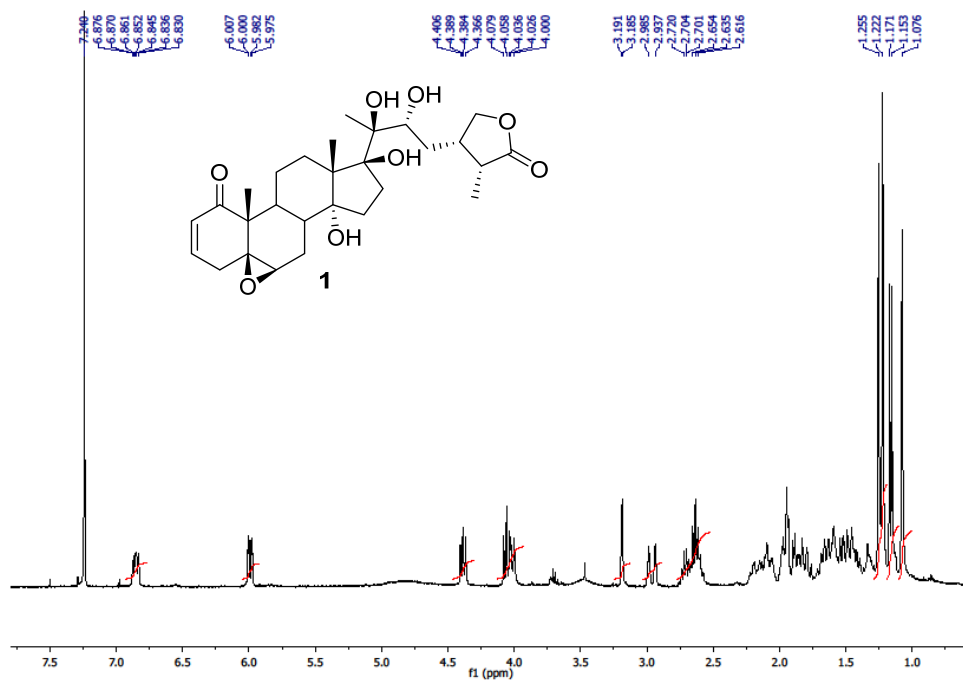
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## Table of Contents

<b>Figure S1.</b>	<sup>1</sup> H NMR Spectrum (400 MHz) of Perulactone I ( <b>1</b> ) in CDCl <sub>3</sub>	<b>S3</b>
<b>Figure S2.</b>	<sup>13</sup> C NMR Spectrum (100 MHz) of Perulactone I ( <b>1</b> ) in CDCl <sub>3</sub>	<b>S3</b>
<b>Figure S3.</b>	HSQC Spectrum (400 MHz) of Perulactone I ( <b>1</b> ) in CDCl <sub>3</sub>	<b>S4</b>
<b>Figure S4.</b>	HMBC Spectrum (400 MHz) of Perulactone I ( <b>1</b> ) in CDCl <sub>3</sub>	<b>S4</b>
<b>Figure S5.</b>	1D NOESY spectra (400 MHz) of Perulactone I ( <b>1</b> ) in CDCl <sub>3</sub>	<b>S5</b>
<b>Figure S6.</b>	<sup>1</sup> H NMR Spectrum (400 MHz) of Perulactone J ( <b>2</b> ) in CDCl <sub>3</sub>	<b>S5</b>
<b>Figure S7.</b>	<sup>13</sup> C NMR Spectrum (100 MHz) Perulactone J ( <b>2</b> ) in CDCl <sub>3</sub>	<b>S6</b>
<b>Figure S8.</b>	<sup>1</sup> H- <sup>1</sup> H COSY Spectrum (400 MHz) Perulactone J ( <b>2</b> ) in CDCl <sub>3</sub>	<b>S6</b>
<b>Figure S9.</b>	HSQC Spectrum (400 MHz) Perulactone J ( <b>2</b> ) in CDCl <sub>3</sub>	<b>S7</b>
<b>Figure S10.</b>	HMBC Spectrum (400 MHz) of Perulactone J ( <b>2</b> ) in CDCl <sub>3</sub>	<b>S7</b>
<b>Figure S11.</b>	1D NOESY Spectra (400 MHz) of Perulactone J ( <b>2</b> ) in CDCl <sub>3</sub>	<b>S8</b>
<b>Figure S12.</b>	<sup>1</sup> H NMR Spectrum (400 MHz) of Perulactone K ( <b>3</b> ) in CDCl <sub>3</sub>	<b>S8</b>
<b>Figure S13.</b>	<sup>13</sup> C NMR Spectrum (100 MHz) of Perulactone K ( <b>3</b> ) in CDCl <sub>3</sub>	<b>S9</b>
<b>Figure S14.</b>	HSQC Spectrum (400 MHz) of Perulactone K ( <b>3</b> ) in CDCl <sub>3</sub>	<b>S9</b>
<b>Figure S15.</b>	HMBC Spectrum (400 MHz) of Perulactone K ( <b>3</b> ) in CDCl <sub>3</sub>	<b>S10</b>
<b>Figure S16.</b>	1D NOESY Spectra (400 MHz) of Perulactone K ( <b>3</b> ) in CDCl <sub>3</sub>	<b>S10</b>
<b>Figure S17.</b>	<sup>1</sup> H NMR Spectrum (400 MHz) of Perulactone L ( <b>4</b> ) in CDCl <sub>3</sub>	<b>S11</b>
<b>Figure S18.</b>	<sup>13</sup> C NMR Spectrum (100 MHz) of Perulactone L ( <b>4</b> ) in CDCl <sub>3</sub>	<b>S11</b>
<b>Figure S19.</b>	HSQC Spectrum (400 MHz) of Perulactone L ( <b>4</b> ) in CDCl <sub>3</sub>	<b>S12</b>
<b>Figure S20.</b>	1D NOESY Spectra (400 MHz) of Perulactone L ( <b>4</b> ) in CDCl <sub>3</sub>	<b>S12</b>
<b>Figure S21.</b>	<sup>1</sup> H NMR Spectrum (400 MHz) of 17-Deoxy-23β-hydroxywithanolide E ( <b>5</b> ) in CDCl <sub>3</sub>	<b>S13</b>
<b>Figure S22.</b>	<sup>13</sup> C NMR Spectrum (100 MHz) of 17-Deoxy-23β-hydroxywithanolide E ( <b>5</b> ) in CDCl <sub>3</sub>	<b>S13</b>
<b>Figure S23.</b>	<sup>1</sup> H- <sup>1</sup> H COSY Spectrum (400 MHz) of 17-Deoxy-23β-hydroxywithanolide E ( <b>5</b> ) in CDCl <sub>3</sub>	<b>S14</b>
<b>Figure S24.</b>	HSQC Spectrum (400 MHz) of 17-Deoxy-23β-hydroxywithanolide E ( <b>5</b> ) in CDCl <sub>3</sub>	<b>S14</b>
<b>Figure S25.</b>	HMBC Spectrum (400 MHz) of 17-Deoxy-23β-hydroxywithanolide E ( <b>5</b> ) in CDCl <sub>3</sub>	<b>S15</b>
<b>Figure S26.</b>	1D NOESY Spectra (400 MHz) of 17-Deoxy-23β-hydroxywithanolide E ( <b>5</b> ) in CDCl <sub>3</sub>	<b>S15</b>
<b>Figure S27.</b>	<sup>1</sup> H NMR Spectrum (400 MHz) of 23β-Hydroxywithanolide E ( <b>6</b> ) in CDCl <sub>3</sub>	<b>S16</b>
<b>Figure S28.</b>	<sup>13</sup> C NMR Spectrum (100 MHz) of 23β-Hydroxywithanolide E ( <b>6</b> ) in CDCl <sub>3</sub>	<b>S16</b>
<b>Figure S29.</b>	<sup>1</sup> H- <sup>1</sup> H COSY Spectrum (400 MHz) of 23β-Hydroxywithanolide E ( <b>6</b> ) in CDCl <sub>3</sub>	<b>S17</b>
<b>Figure S30.</b>	HSQC Spectrum (400 MHz) of 23β-Hydroxywithanolide E ( <b>6</b> ) in CDCl <sub>3</sub>	<b>S17</b>
<b>Figure S31.</b>	HMBC Spectrum (400 MHz) of 23β-Hydroxywithanolide E ( <b>6</b> ) in CDCl <sub>3</sub>	<b>S18</b>
<b>Figure S32.</b>	1D NOESY Spectra (400 MHz) of 23β-Hydroxywithanolide E ( <b>6</b> ) in CDCl <sub>3</sub>	<b>S18</b>
<b>Figure S33.</b>	<sup>1</sup> H NMR Spectrum (400 MHz) of 4-Deoxyphyperunolide A ( <b>7</b> ) in CDCl <sub>3</sub>	<b>S19</b>
<b>Figure S34.</b>	<sup>13</sup> C NMR Spectrum (100 MHz) of 4-Deoxyphyperunolide A ( <b>7</b> ) in CDCl <sub>3</sub>	<b>S19</b>
<b>Figure S35.</b>	HSQC Spectrum (400 MHz) of 4-Deoxyphyperunolide A ( <b>7</b> ) in CDCl <sub>3</sub>	<b>S20</b>
<b>Figure S36.</b>	HMBC Spectrum (400 MHz) of 4-Deoxyphyperunolide A ( <b>7</b> ) in CDCl <sub>3</sub>	<b>S20</b>
<b>Figure S37.</b>	1D NOESY Spectrum (400 MHz) of 4-Deoxyphyperunolide A ( <b>7</b> ) in CDCl <sub>3</sub>	<b>S21</b>
<b>Figure S38.</b>	<sup>1</sup> H NMR Spectrum (400 MHz) of 4-Deoxyphyperunolide A ( <b>8</b> ) in CDCl <sub>3</sub>	<b>S21</b>
<b>Figure S39.</b>	<sup>13</sup> C NMR Spectrum (100 MHz) of 7β-Hydroxywithanolide F ( <b>8</b> ) in CDCl <sub>3</sub>	<b>S22</b>
<b>Figure S40.</b>	HSQC Spectrum (400 MHz) of 7β-Hydroxywithanolide F ( <b>8</b> ) in CDCl <sub>3</sub>	<b>S22</b>
<b>Figure S41.</b>	HMBC Spectrum (400 MHz) of 7β-Hydroxywithanolide F ( <b>8</b> ) in CDCl <sub>3</sub>	<b>S23</b>
<b>Figure S42.</b>	1D NOESY spectra (400 MHz) of 7β-Hydroxywithanolide F ( <b>8</b> ) in CDCl <sub>3</sub>	<b>S23</b>

<b>Figure S43.</b>	<sup>1</sup> H NMR Spectrum (400 MHz) of 7 $\beta$ -Hydroxy-17- <i>epi</i> -withanolide K ( <b>9</b> ) in CDCl <sub>3</sub>	<b>S24</b>
<b>Figure S44.</b>	<sup>13</sup> C NMR Spectrum (100 MHz) of 7 $\beta$ -Hydroxy-17- <i>epi</i> -withanolide K ( <b>9</b> ) in CDCl <sub>3</sub>	<b>S24</b>
<b>Figure S45.</b>	HSQC Spectrum (400 MHz) of 7 $\beta$ -Hydroxy-17- <i>epi</i> -withanolide K ( <b>9</b> ) in CDCl <sub>3</sub>	<b>S25</b>
<b>Figure S46.</b>	HMBC Spectrum (400 MHz) of 7 $\beta$ -Hydroxy-17- <i>epi</i> -withanolide K ( <b>9</b> ) in CDCl <sub>3</sub>	<b>S25</b>
<b>Figure S47.</b>	1D NOESY Spectra (400 MHz) of 7 $\beta$ -Hydroxy-17- <i>epi</i> -withanolide K ( <b>9</b> ) in CDCl <sub>3</sub>	<b>S26</b>
<b>Figure S48.</b>	<sup>1</sup> H NMR Spectrum (400 MHz) of 24,25-Dihydro-23 $\beta$ ,28-dihydroxywithanolide G ( <b>10</b> ) in CDCl <sub>3</sub>	<b>S26</b>
<b>Figure S49.</b>	<sup>13</sup> C NMR Spectrum (100 MHz) of 24,25-Dihydro-23 $\beta$ ,28-dihydroxywithanolide G ( <b>10</b> ) in CDCl <sub>3</sub>	<b>S27</b>
<b>Figure S50.</b>	<sup>1</sup> H- <sup>1</sup> H COSY Spectrum (400 MHz) of 24,25-Dihydro-23 $\beta$ ,28-dihydroxywithanolide G ( <b>10</b> ) in CDCl <sub>3</sub>	<b>S27</b>
<b>Figure S51.</b>	HSQC Spectrum (400 MHz) of 24,25-Dihydro-23 $\beta$ ,28-dihydroxywithanolide G ( <b>10</b> ) in CDCl <sub>3</sub>	<b>S28</b>
<b>Figure S52.</b>	HMBC Spectrum (400 MHz) of 24,25-Dihydro-23 $\beta$ ,28-dihydroxywithanolide G ( <b>10</b> ) in CDCl <sub>3</sub>	<b>S28</b>
<b>Figure S53.</b>	1D NOESY Spectra (400 MHz) of 24,25-Dihydro-23 $\beta$ ,28-dihydroxywithanolide G ( <b>10</b> ) in CDCl <sub>3</sub>	<b>S29</b>
<b>Figure S54.</b>	<sup>1</sup> H NMR Spectrum (400 MHz) of 24,25-Dihydrowithanolide E ( <b>11</b> ) in CDCl <sub>3</sub>	<b>S29</b>
<b>Figure S55.</b>	<sup>13</sup> C NMR Spectrum (100 MHz) of 24,25-Dihydrowithanolide E ( <b>11</b> ) in CDCl <sub>3</sub>	<b>S30</b>
<b>Figure S56.</b>	HSQC Spectrum (400 MHz) of 24,25-Dihydrowithanolide E ( <b>11</b> ) in CDCl <sub>3</sub>	<b>S30</b>
<b>Figure S57.</b>	HMBC Spectrum (400 MHz) of 24,25-Dihydrowithanolide E ( <b>11</b> ) in CDCl <sub>3</sub>	<b>S31</b>
<b>Figure S58.</b>	1D NOESY Spectra (400 MHz) of 24,25-Dihydrowithanolide E ( <b>11</b> ) in CDCl <sub>3</sub>	<b>S31</b>
<b>Figure S59.</b>	Key HMBC Correlations of <b>1</b> , <b>3</b> , <b>5</b> , and <b>7-11</b> , and <sup>1</sup> H- <sup>1</sup> H COSY Correlations of <b>5</b> and <b>10</b>	<b>S32</b>
<b>Figure S60.</b>	Key NOESY Correlations of <b>1</b> , <b>3-5</b> , and <b>7-11</b>	<b>S33</b>
<b>Figure S61.</b>	CD spectra of <b>1-11</b>	<b>S34</b>

**Figure S1.**  $^1\text{H}$  NMR Spectrum (400 MHz) of Perulactone I (**1**) in  $\text{CDCl}_3$



**Figure S2.**  $^{13}\text{C}$  NMR Spectrum (100 MHz) of Perulactone I (**1**) in  $\text{CDCl}_3$

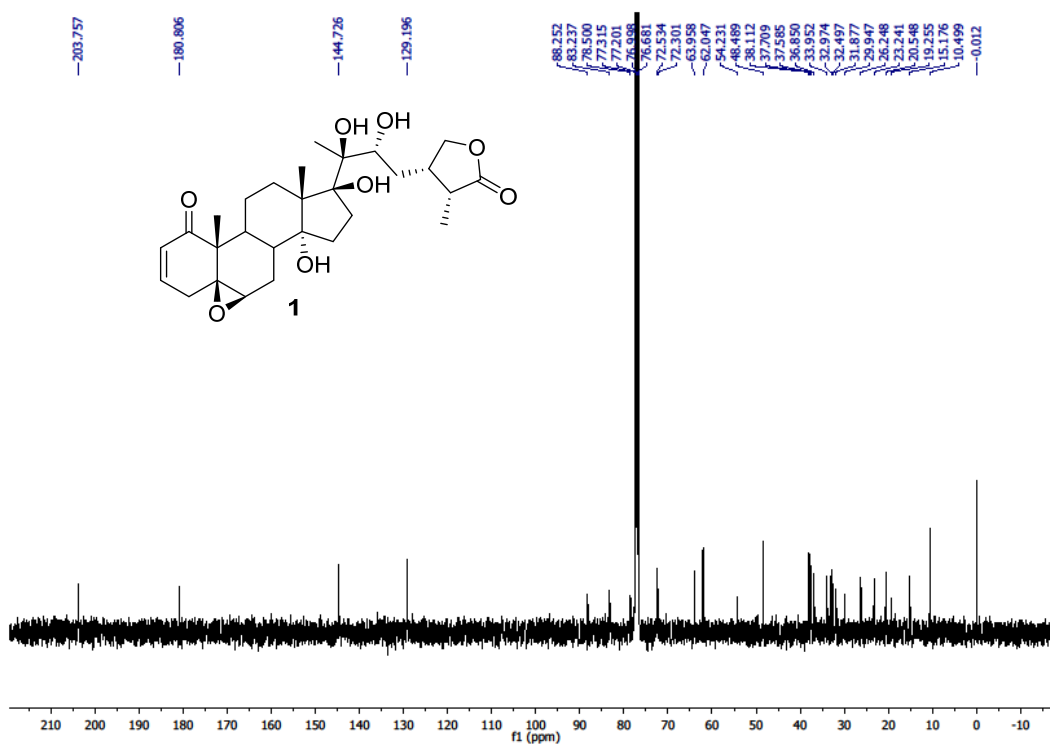


Figure S3. HSQC Spectrum (400 MHz) of Perulactone I (1) in CDCl<sub>3</sub>

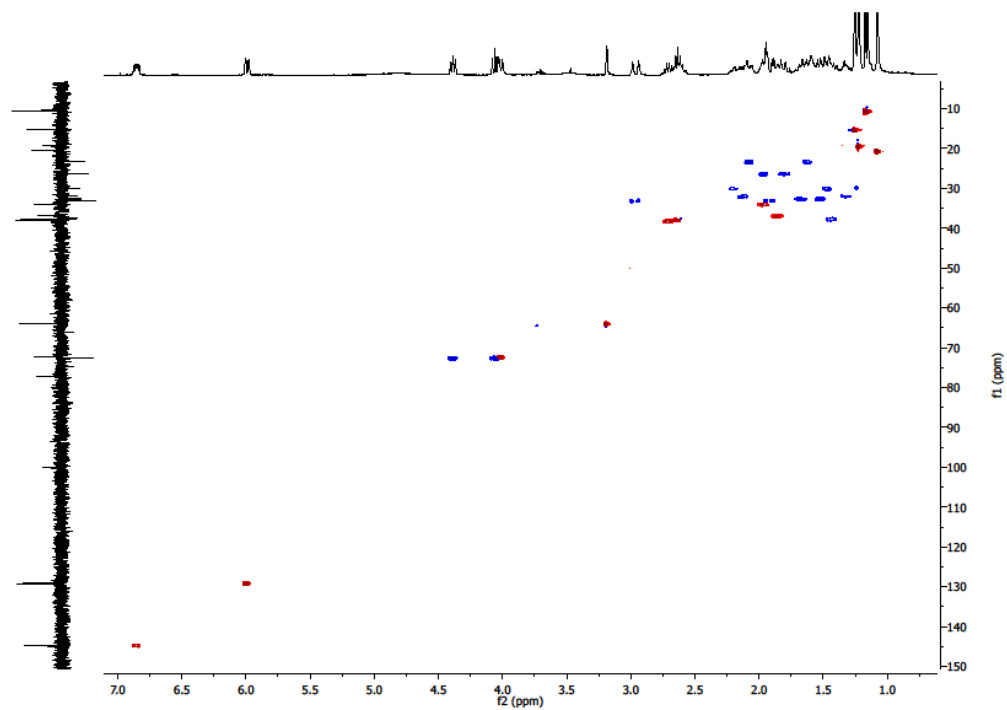


Figure S4. HMBC Spectrum (400 MHz) of Perulactone I (1) in CDCl<sub>3</sub>

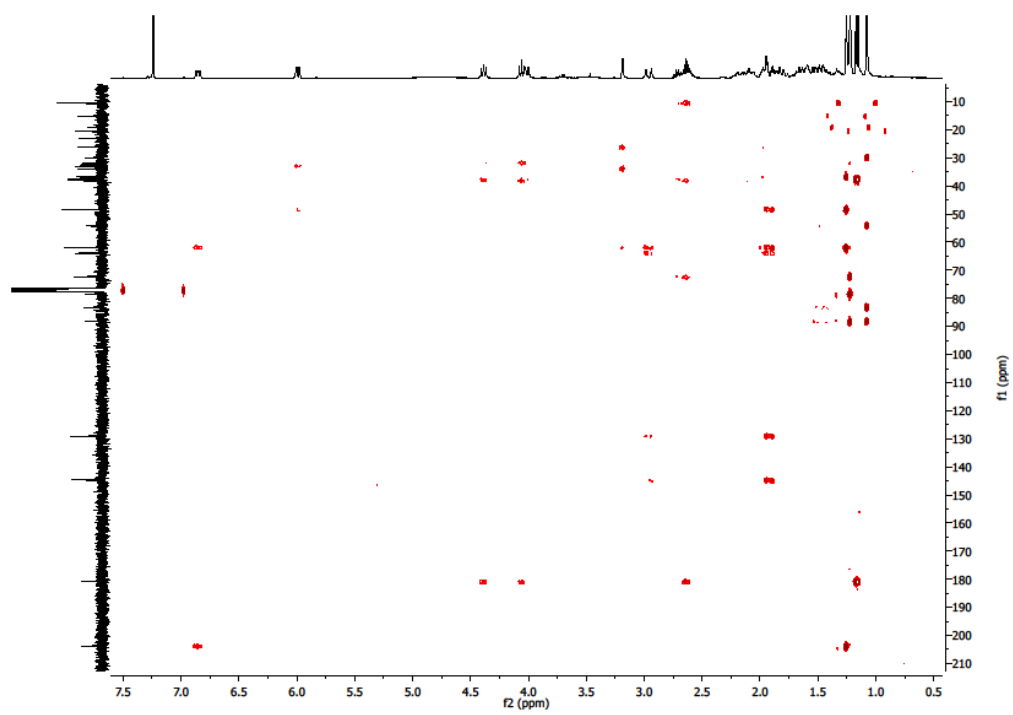


Figure S5. 1D NOESY spectra (400 MHz) of Perulactone I (1) in CDCl<sub>3</sub>

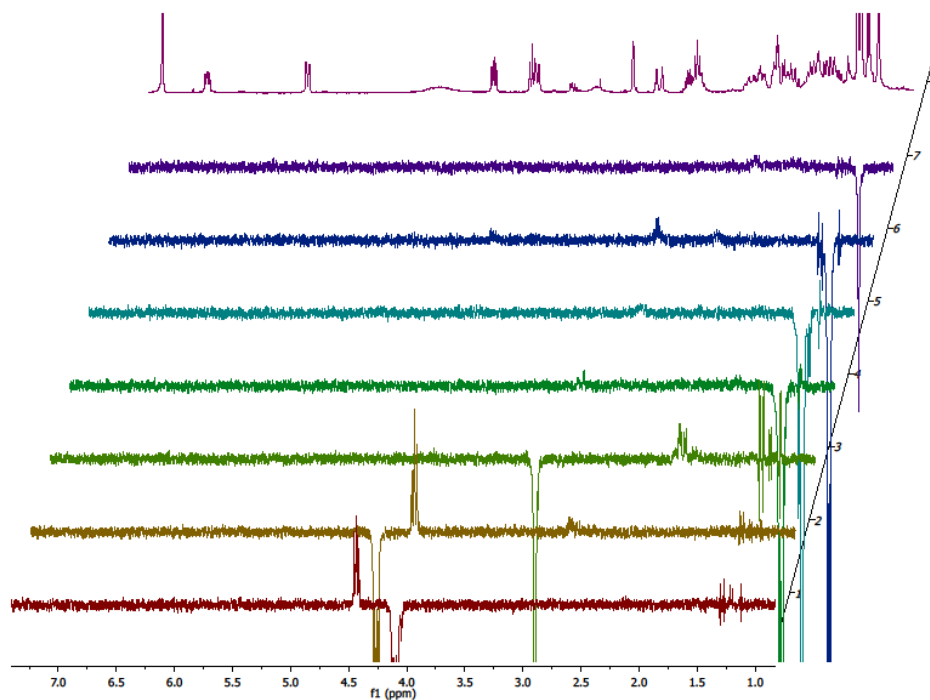


Figure S6. <sup>1</sup>H NMR Spectrum (400 MHz) of Perulactone J (2) in CDCl<sub>3</sub>

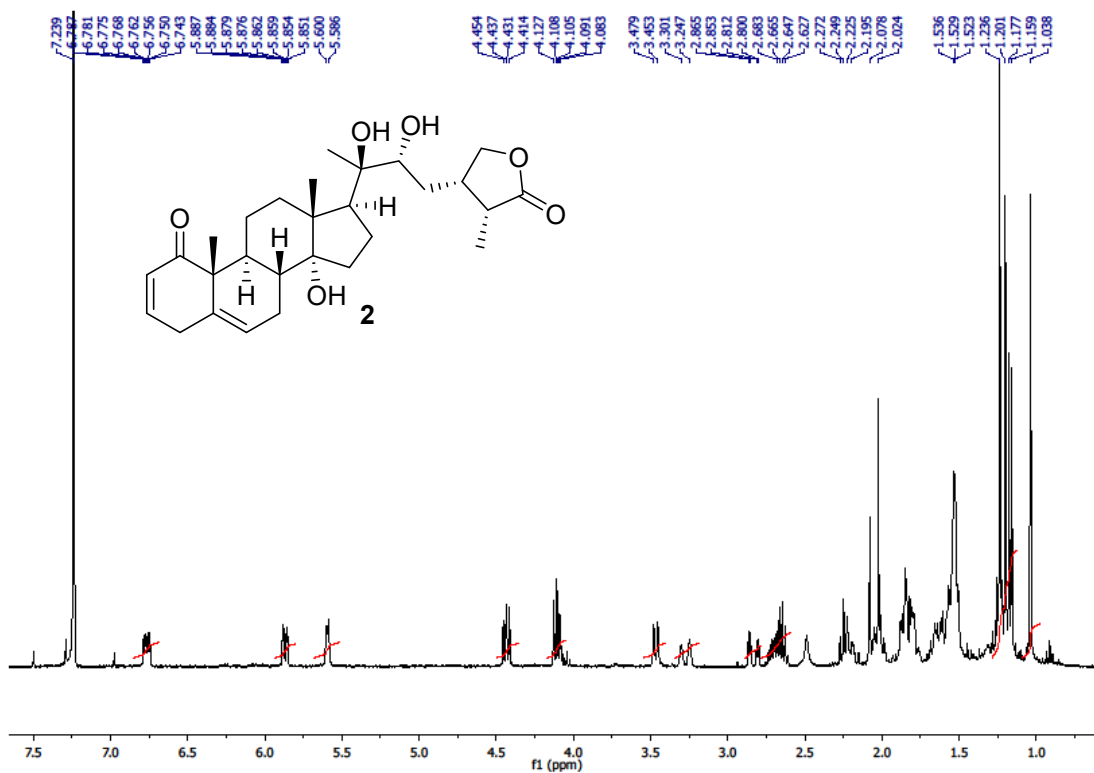


Figure S7.  $^{13}\text{C}$  NMR Spectrum (100 MHz) Perulactone J (2) in  $\text{CDCl}_3$

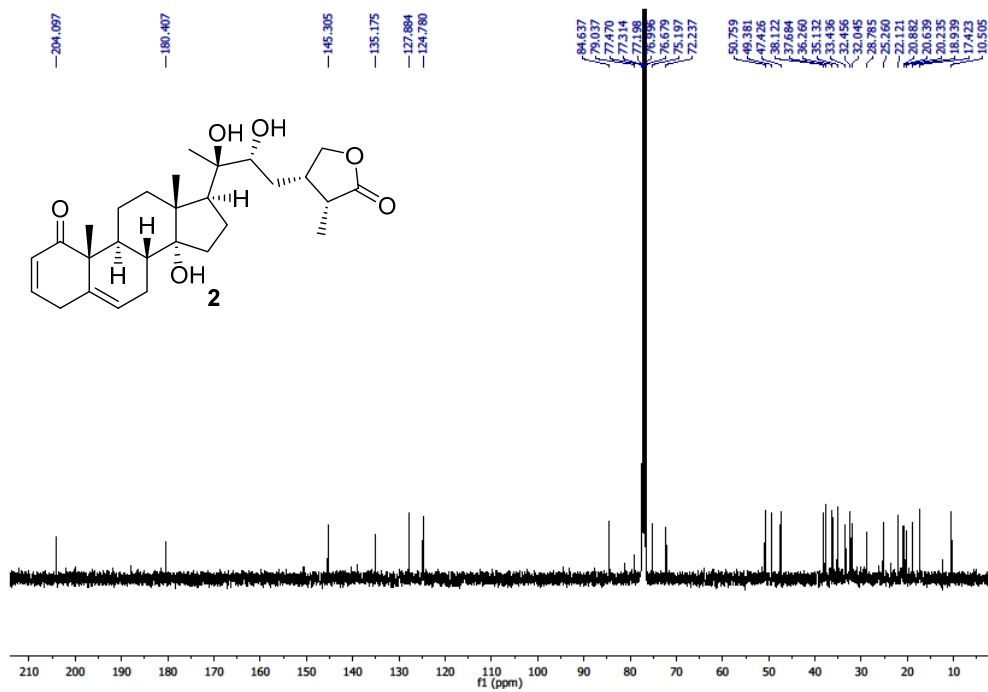


Figure S8.  $^1\text{H}$ - $^1\text{H}$  COSY Spectrum (400 MHz) Perulactone J (2) in  $\text{CDCl}_3$

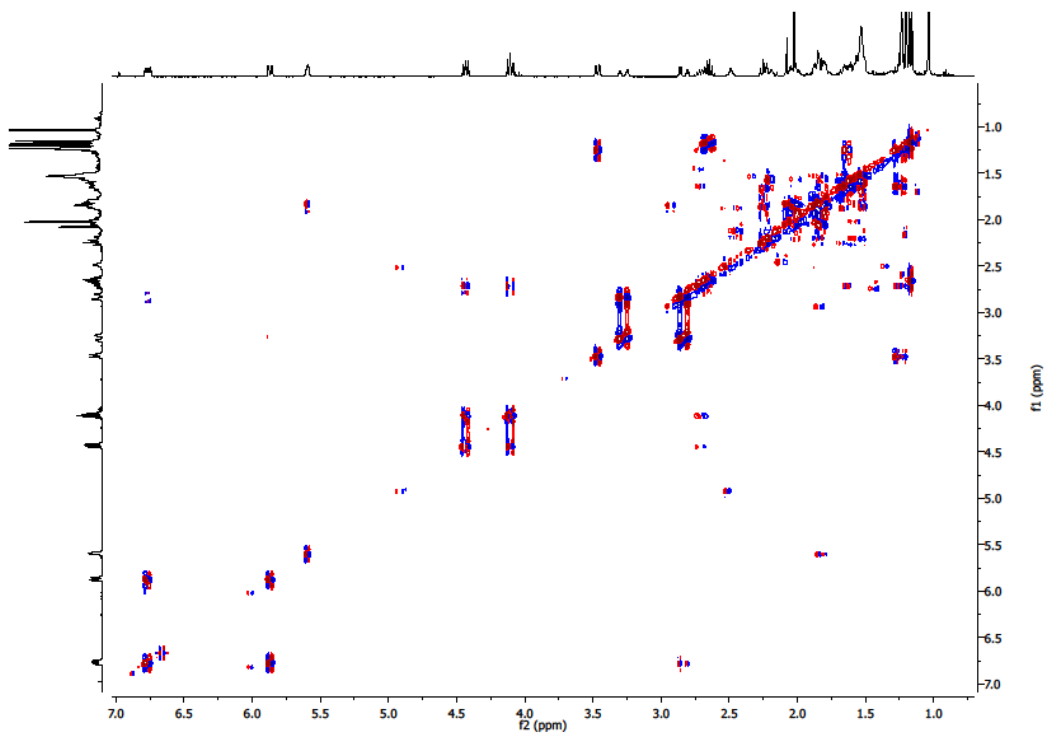


Figure S9. HSQC Spectrum (400 MHz) Perulactone J (2) in CDCl<sub>3</sub>

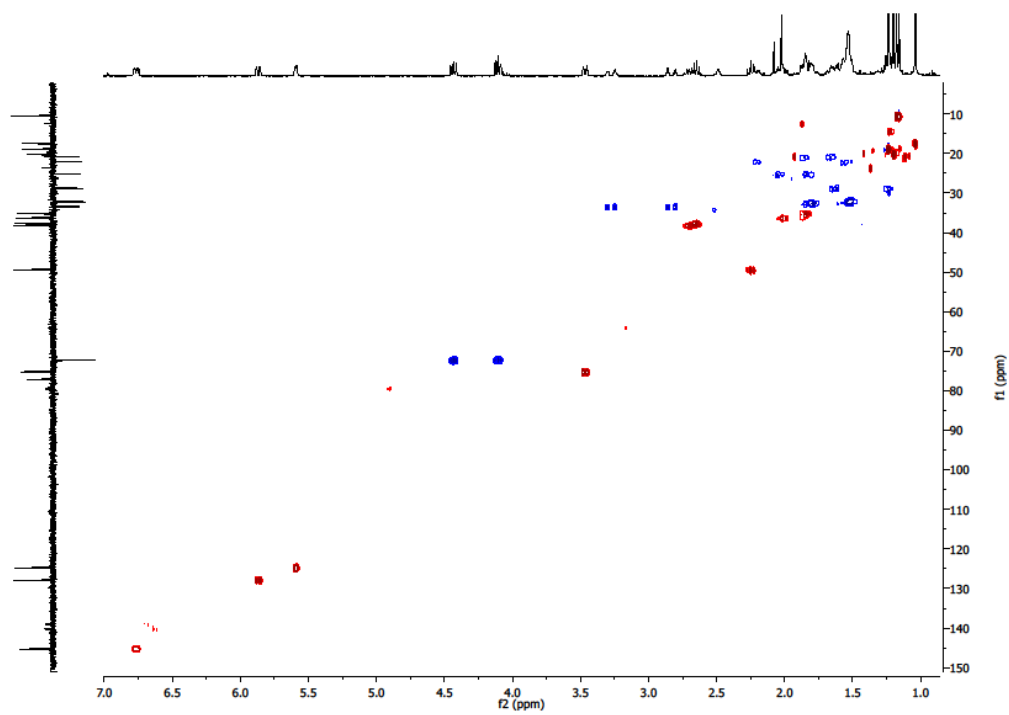


Figure S10. HMBC Spectrum (400 MHz) Perulactone J (2) in CDCl<sub>3</sub>

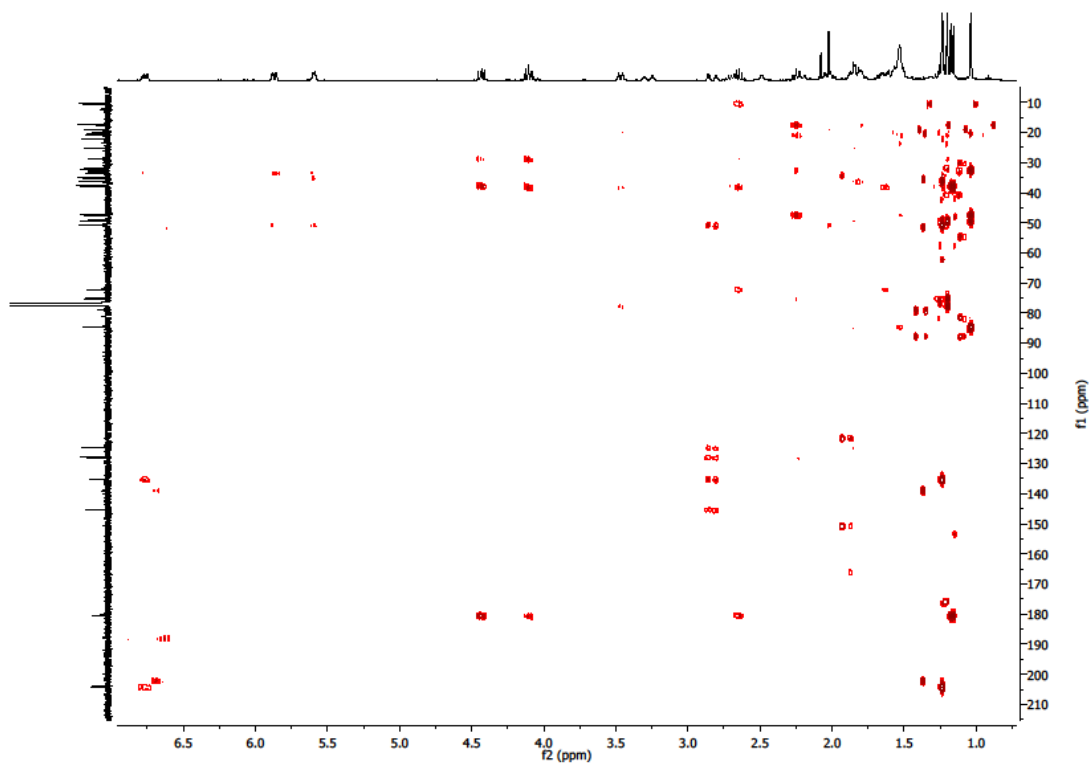




Figure S11. 1D NOESY spectra (400 MHz) of Perulactone J (2) in CDCl<sub>3</sub>

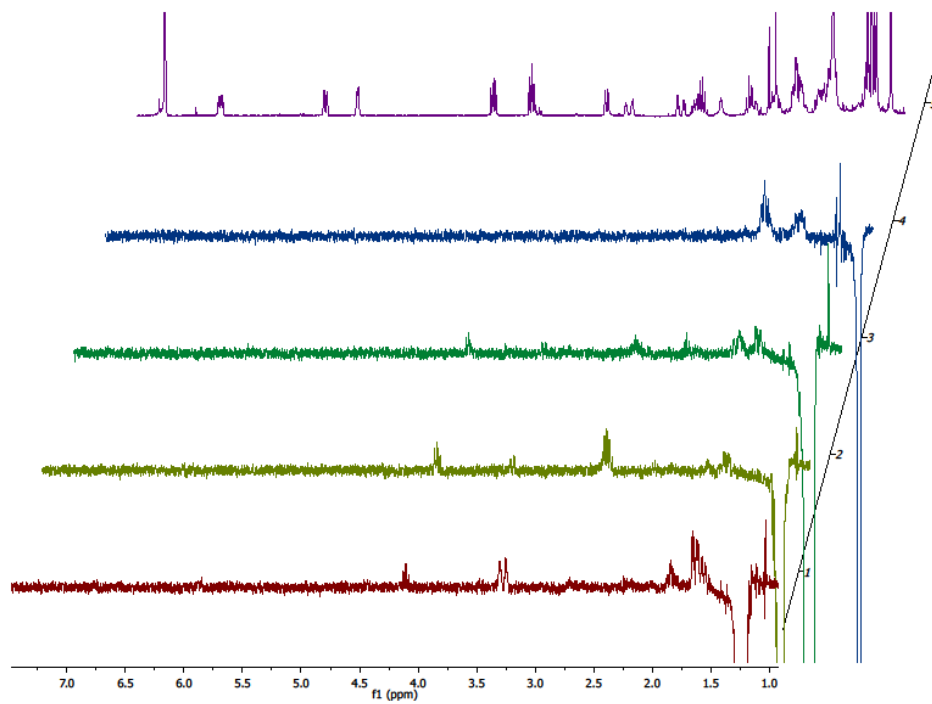


Figure S12. <sup>1</sup>H NMR Spectrum (400 MHz) of Perulactone K (3) in CDCl<sub>3</sub>

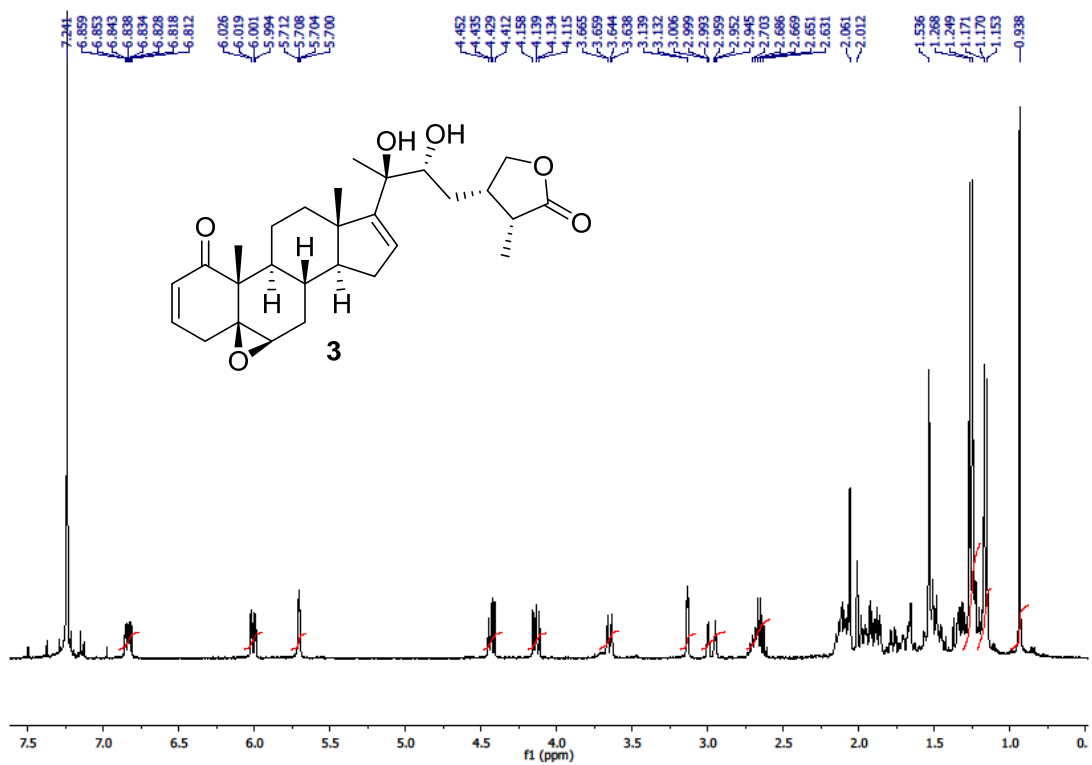


Figure S13.  $^{13}\text{C}$  NMR Spectrum (100 MHz) Perulactone K (**3**) in  $\text{CDCl}_3$

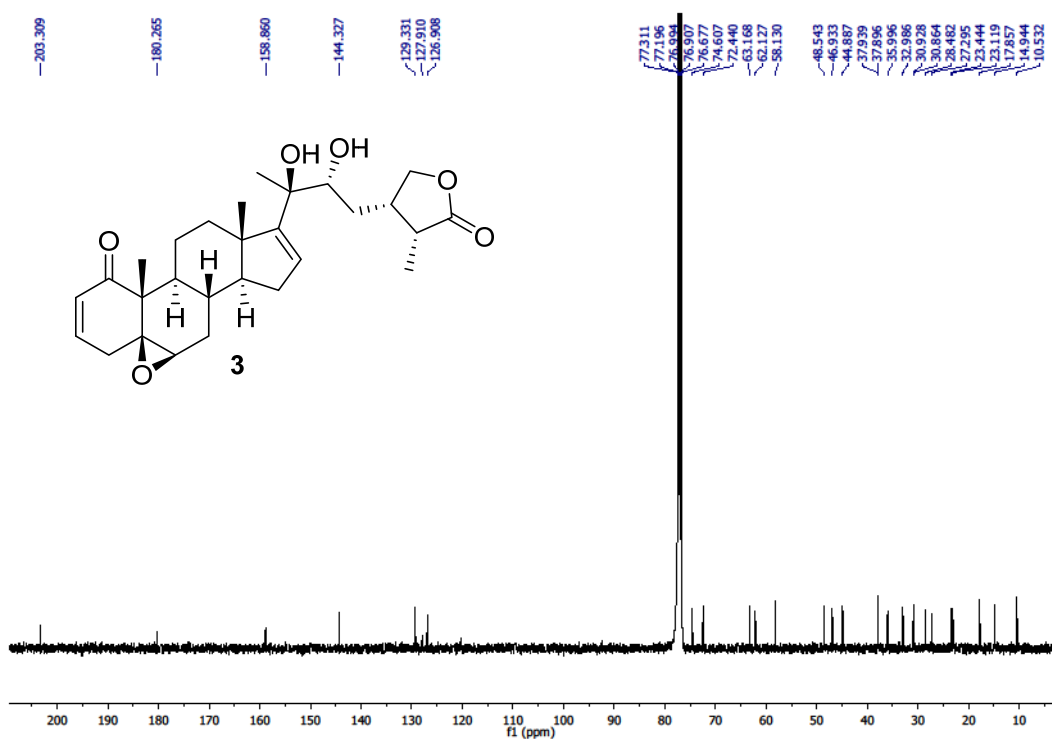
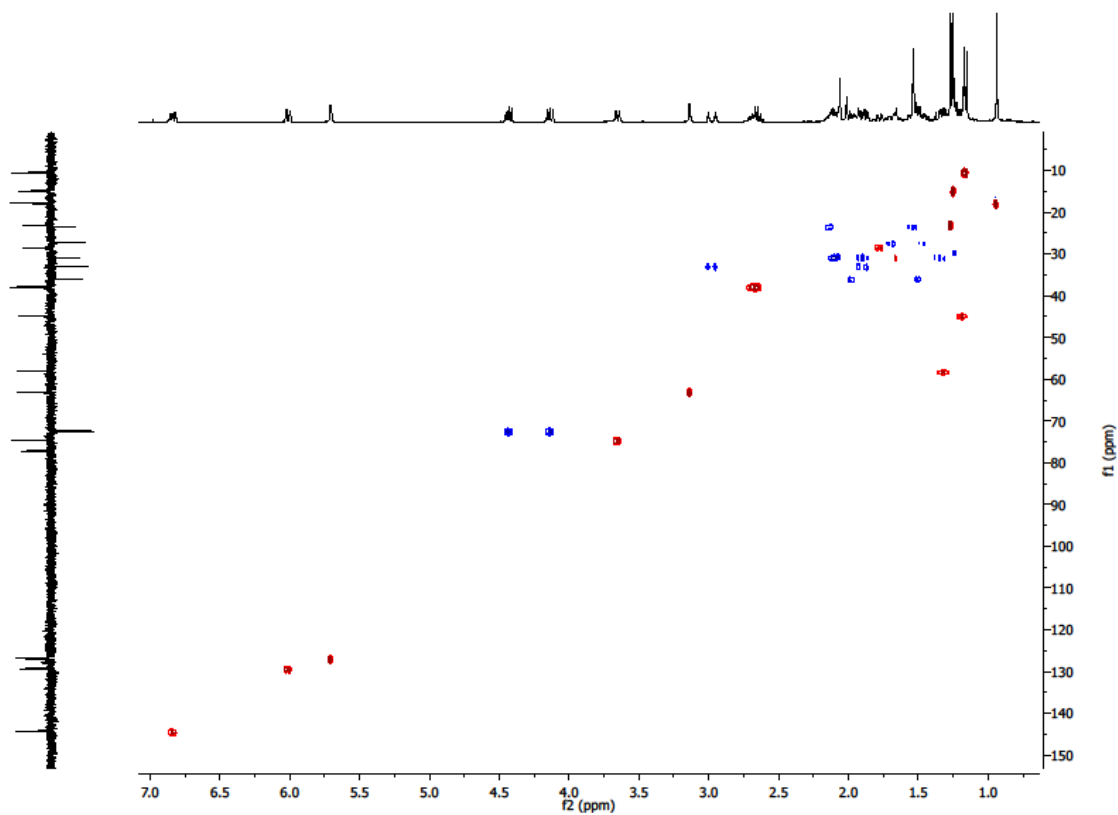
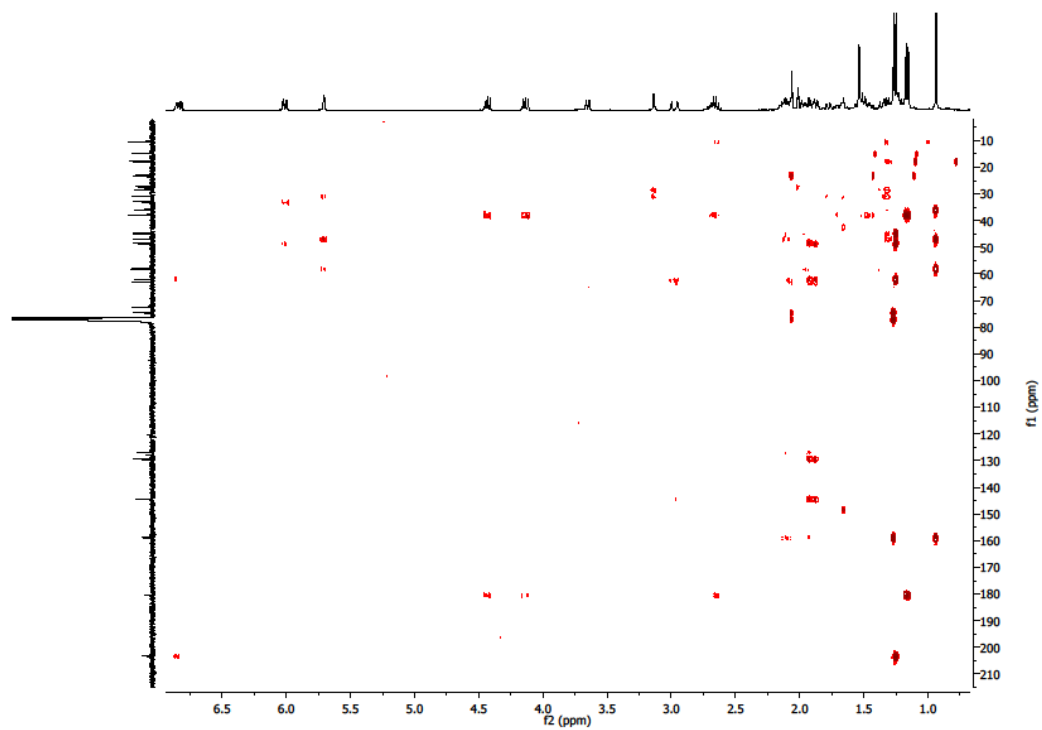


Figure S14. HSQC Spectrum (400 MHz) Perulactone K (**3**) in  $\text{CDCl}_3$



**Figure S15.** HMBC Spectrum (400 MHz) of Perulactone K (**3**) in CDCl<sub>3</sub>



**Figure S16.** 1D NOESY Spectra (400 MHz) of Perulactone K (**3**) in CDCl<sub>3</sub>

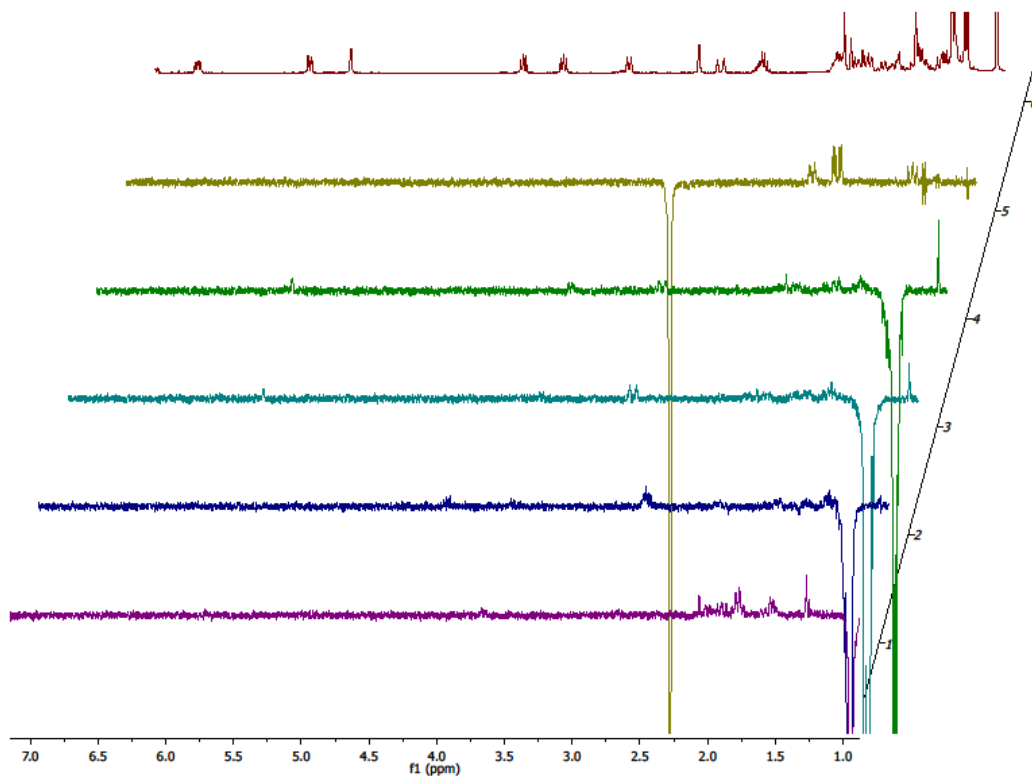


Figure S17. <sup>1</sup>H NMR Spectrum (400 MHz) of Perulactone L (**4**) in CDCl<sub>3</sub>

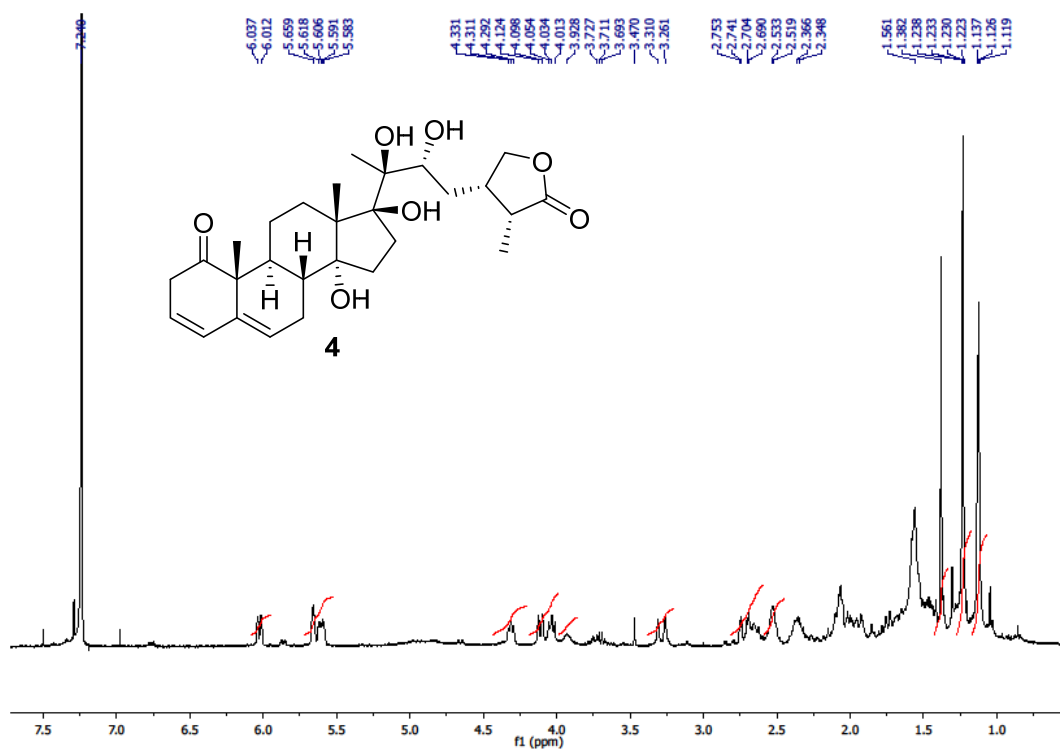


Figure S18. <sup>13</sup>C NMR Spectrum (100 MHz) of Perulactone L (**4**) in CDCl<sub>3</sub>

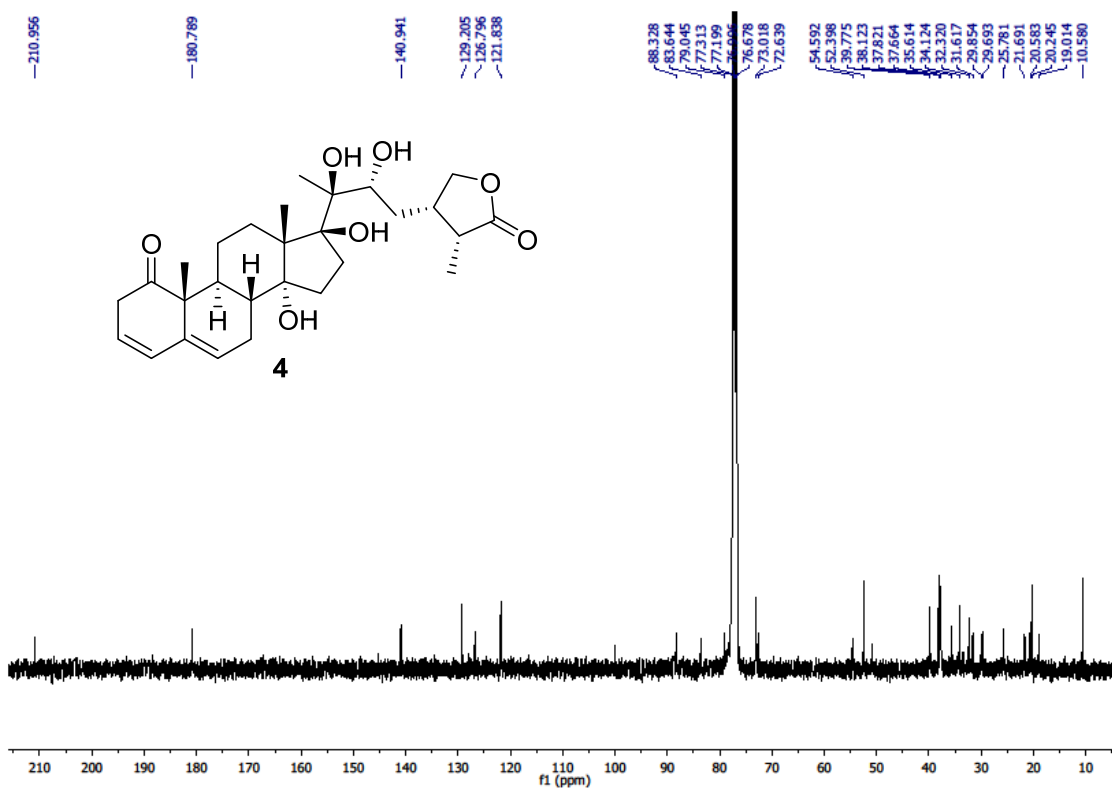


Figure S19. HSQC Spectrum (400 MHz) of Perulactone L (4) in CDCl<sub>3</sub>

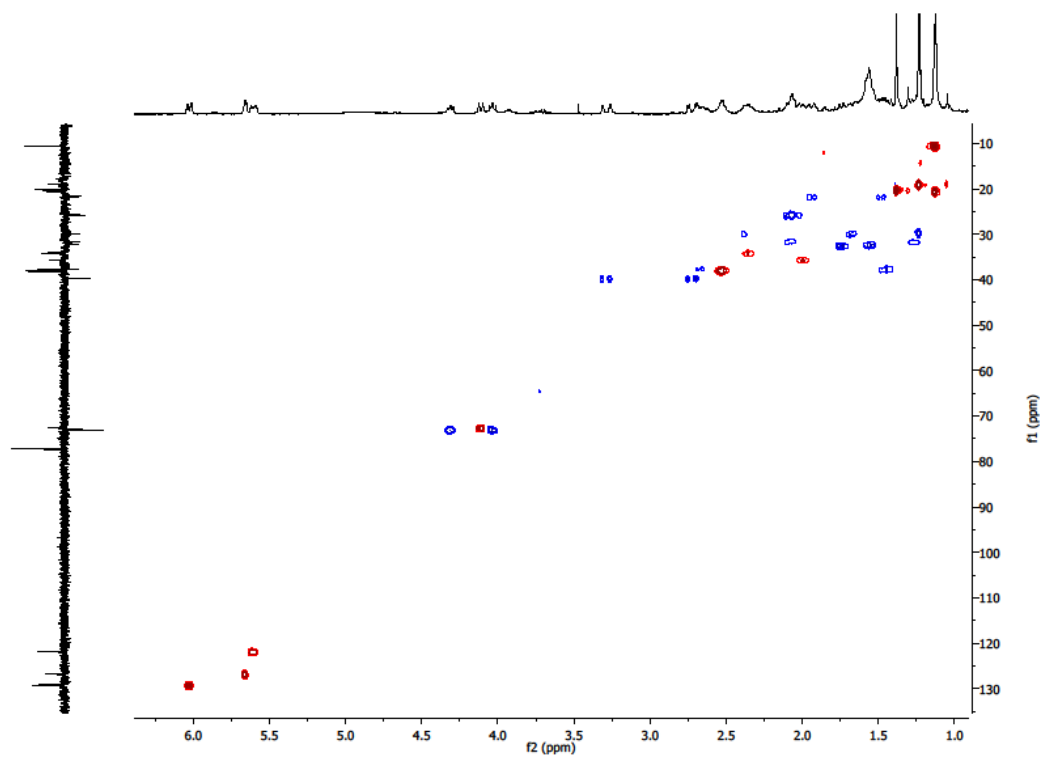


Figure S20. 1D NOESY Spectra (400 MHz) of Perulactone L (4) in CDCl<sub>3</sub>

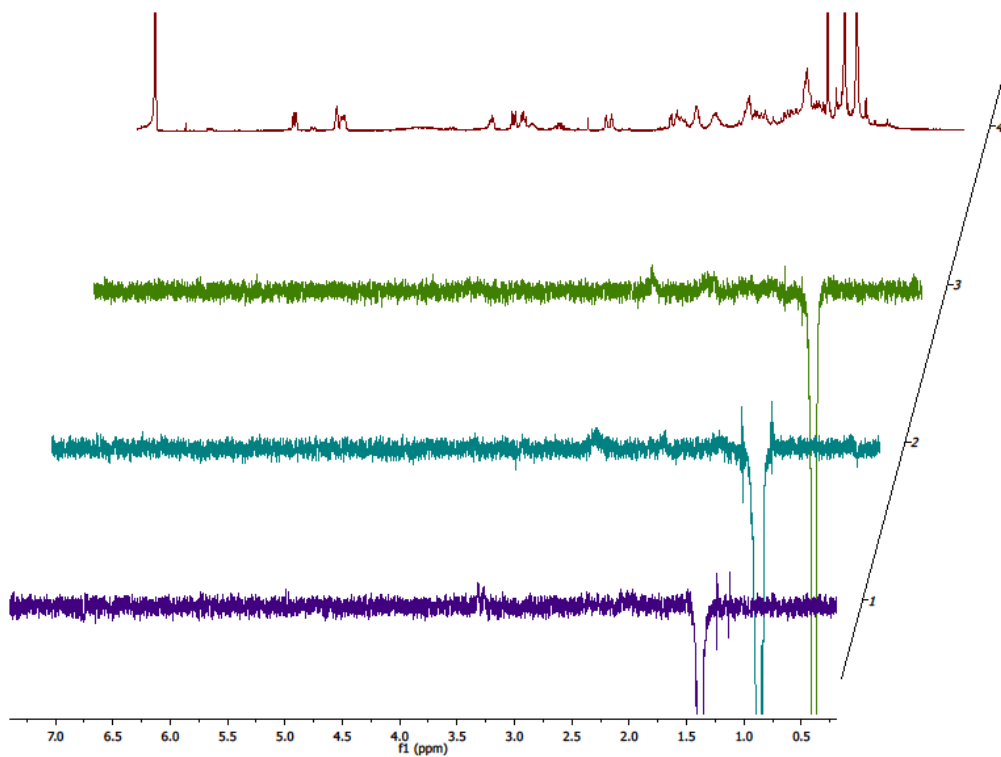


Figure S21. <sup>1</sup>H NMR Spectrum (400 MHz) of 17-Deoxy-23β-hydroxywithanolide E (5) in CDCl<sub>3</sub>

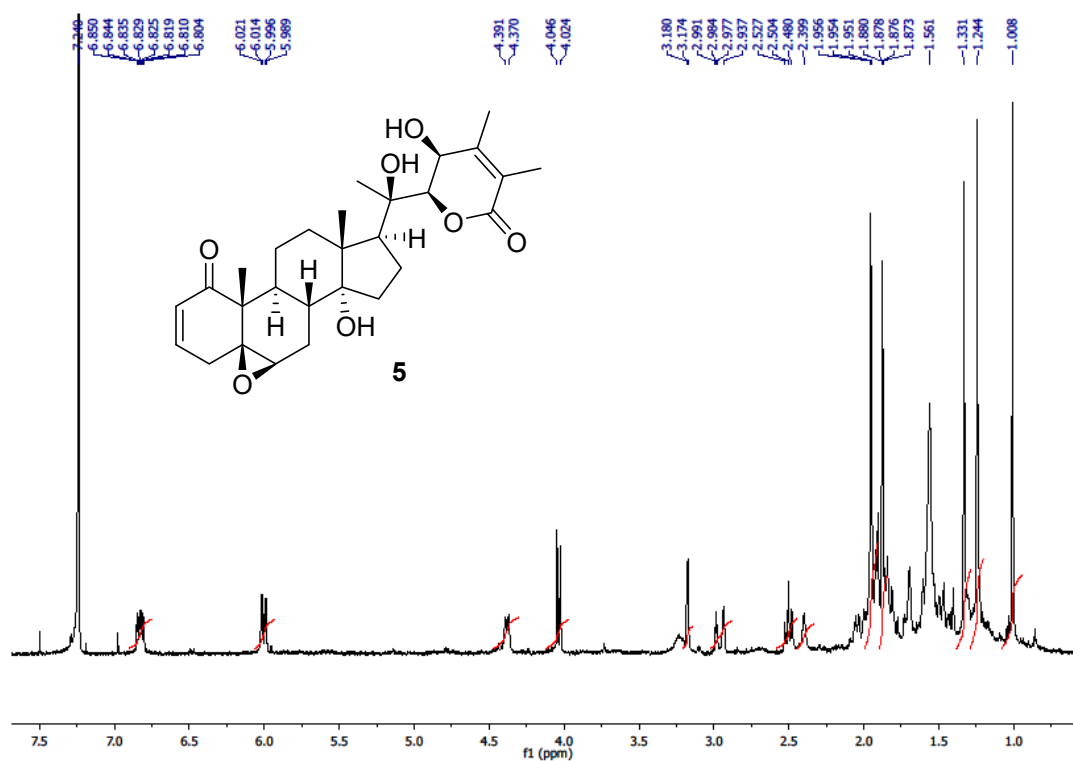


Figure S22. <sup>13</sup>C NMR Spectrum (100 MHz) of 17-Deoxy-23β-hydroxywithanolide E (5) in CDCl<sub>3</sub>

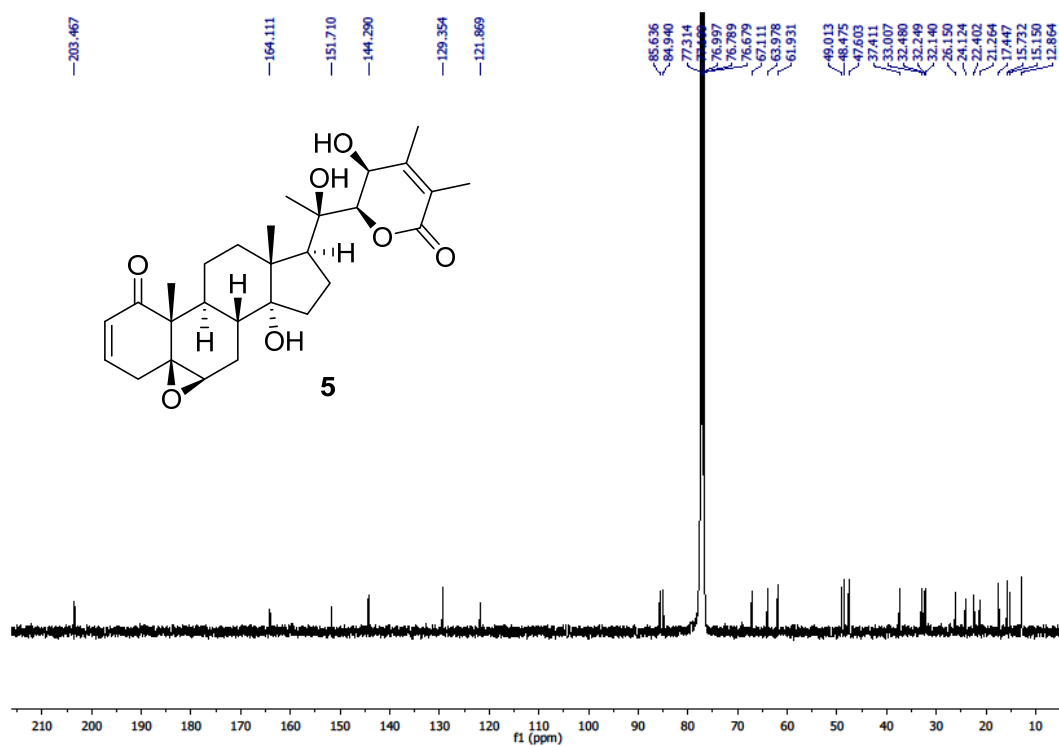


Figure S23.  $^1\text{H}$ - $^1\text{H}$  COSY Spectrum (400 MHz) of 17-Deoxy-23 $\beta$ -hydroxywithanolide E (**5**) in  $\text{CDCl}_3$

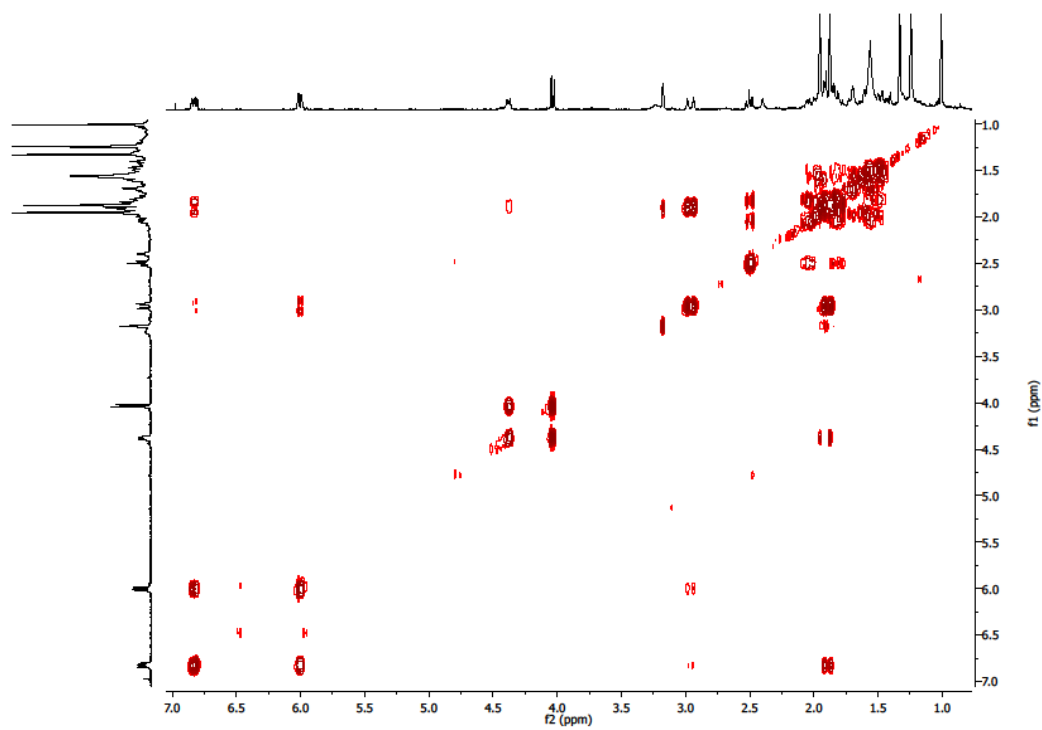


Figure S24. HSQC Spectrum (400 MHz) of 17-Deoxy-23 $\beta$ -hydroxywithanolide E (**5**) in  $\text{CDCl}_3$

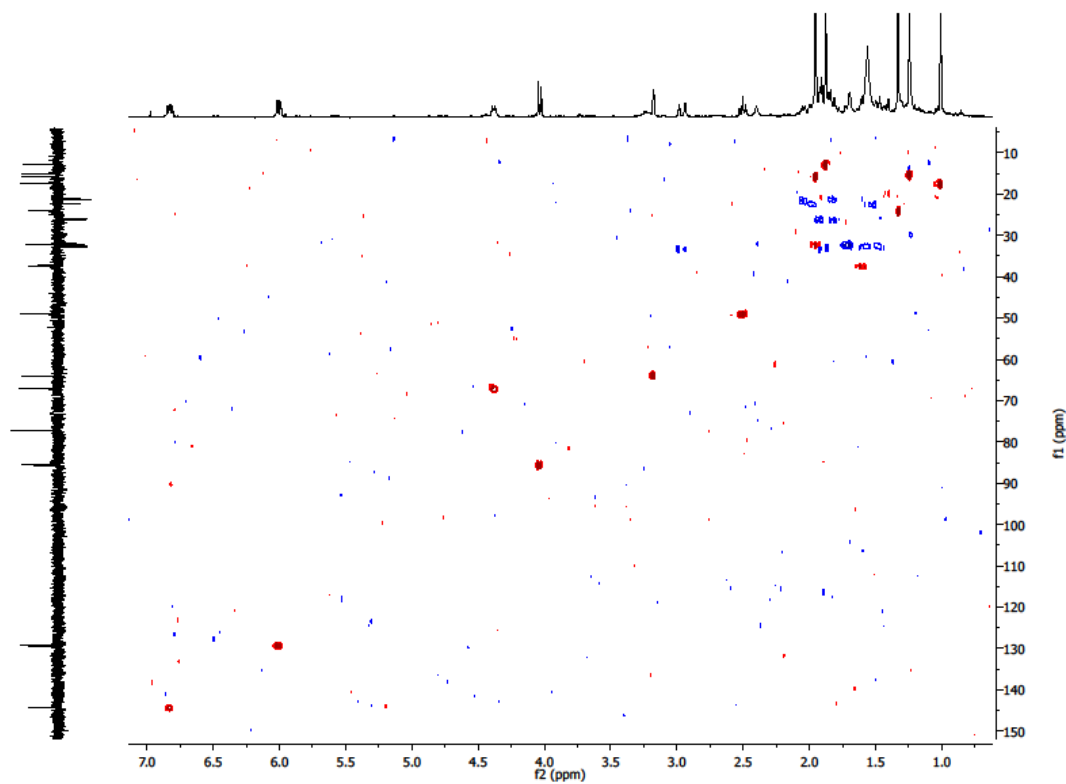


Figure S25. HMBC Spectrum (400 MHz) of 17-Deoxy-23 $\beta$ -hydroxywithanolide E (**5**) in CDCl<sub>3</sub>

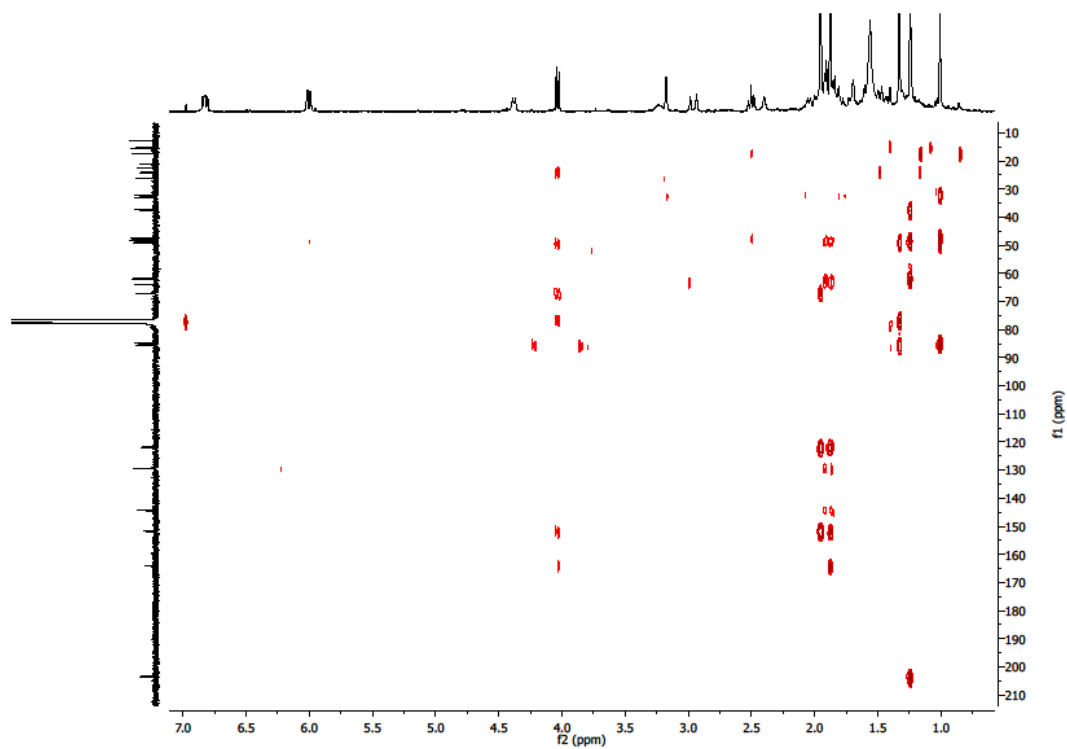


Figure S26. 1D NOESY Spectra (400 MHz) of 17-Deoxy-23 $\beta$ -hydroxywithanolide E (**5**) in CDCl<sub>3</sub>

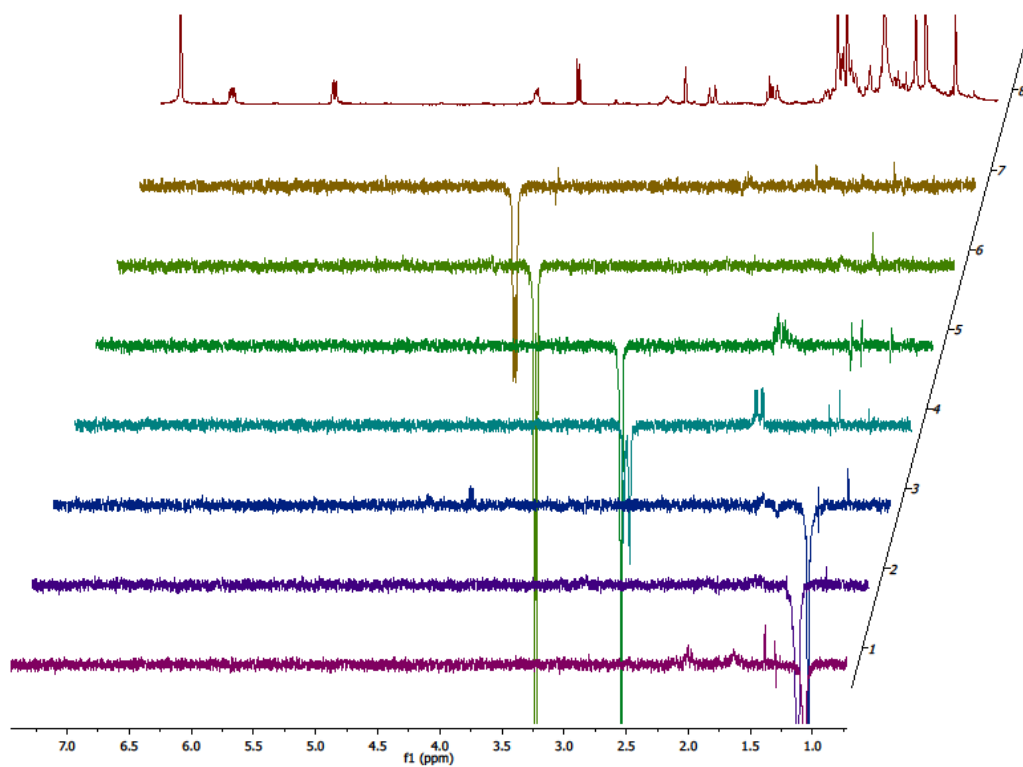




Figure S27. <sup>1</sup>H NMR Spectrum (400 MHz) of 23β-Hydroxywithanolide E (6) in CDCl<sub>3</sub>

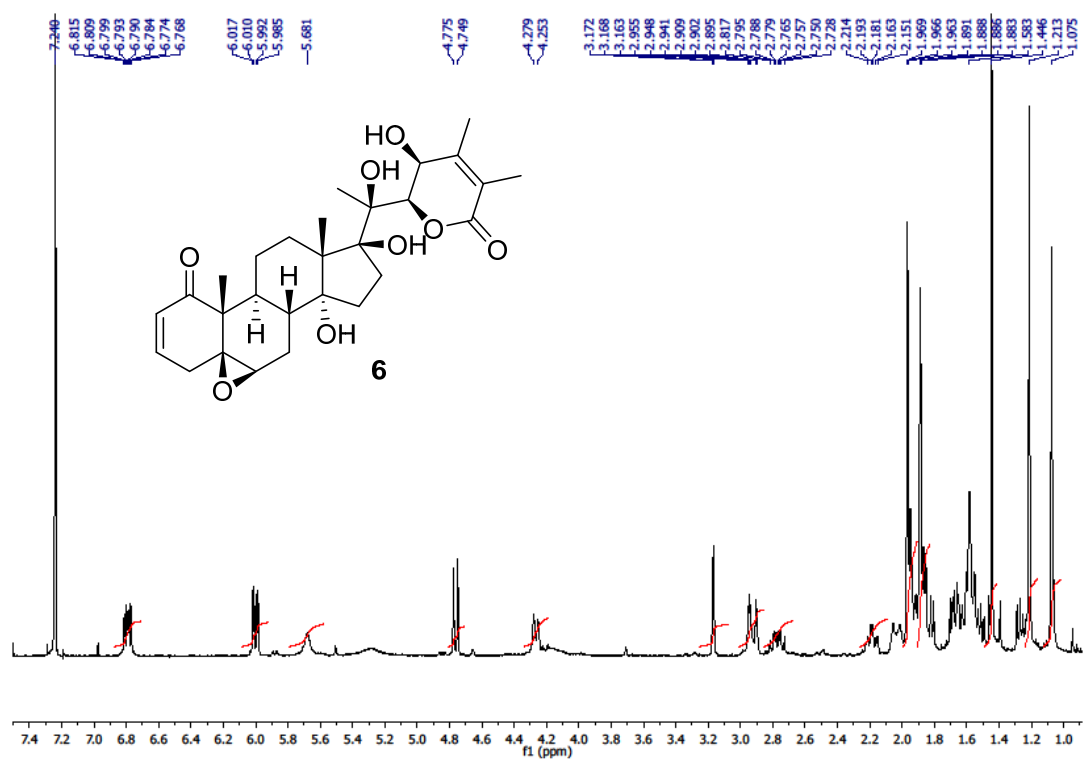


Figure S28. <sup>13</sup>C NMR Spectrum (100 MHz) of 23β-hydroxywithanolide E (6) in CDCl<sub>3</sub>

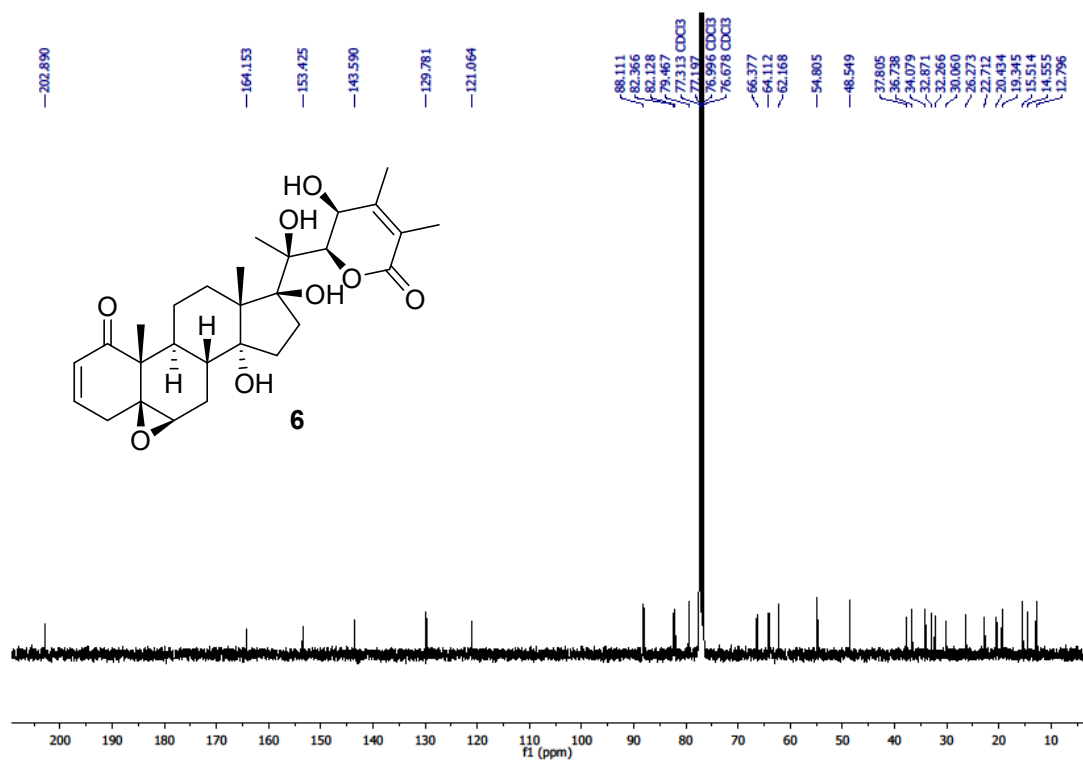


Figure S29.  $^1\text{H}$ - $^1\text{H}$  COSY Spectrum (400 MHz) of  $23\beta$ -Hydroxywithanolide E (**6**) in  $\text{CDCl}_3$

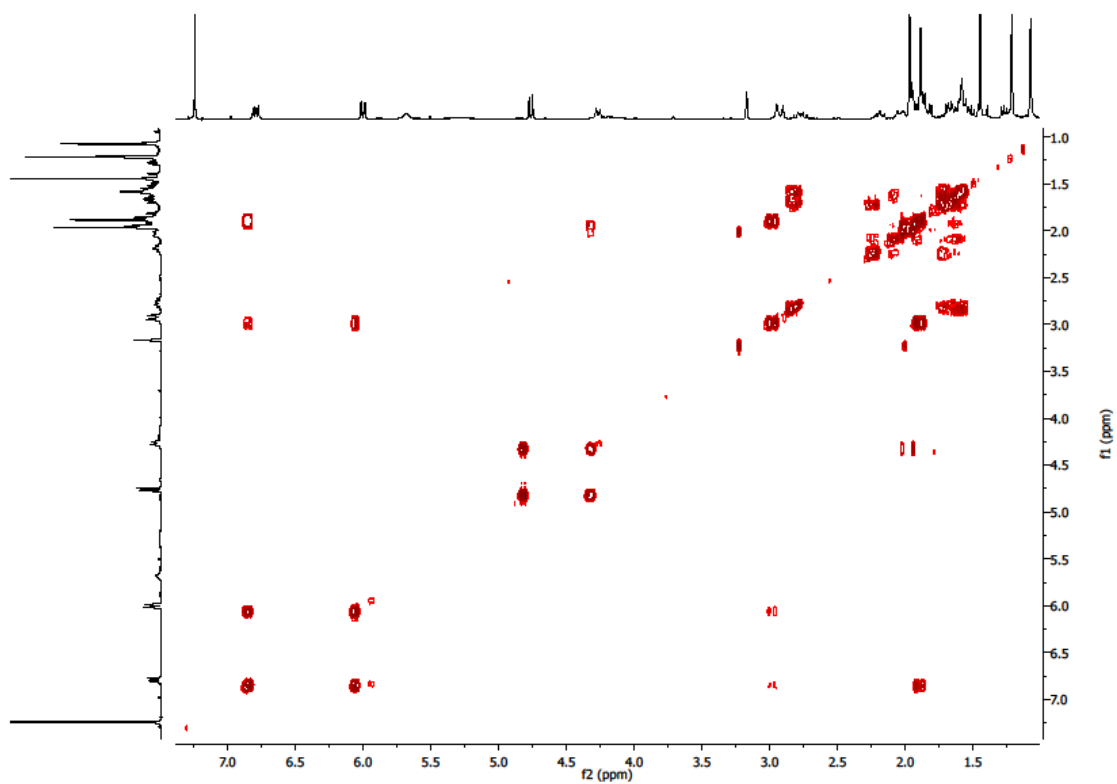


Figure S30. HSQC Spectrum (400 MHz) of  $23\beta$ -Hydroxywithanolide E (**6**) in  $\text{CDCl}_3$

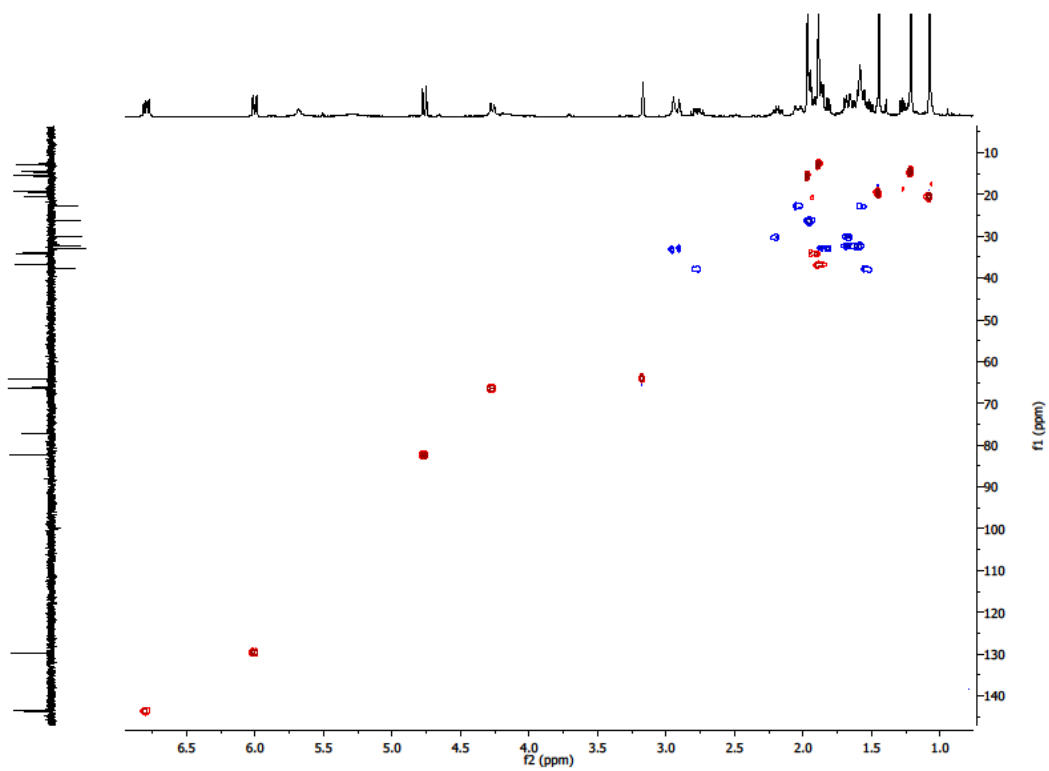


Figure S31. HMBC Spectrum (400 MHz) of 23 $\beta$ -Hydroxywithanolide E (**6**) in CDCl<sub>3</sub>

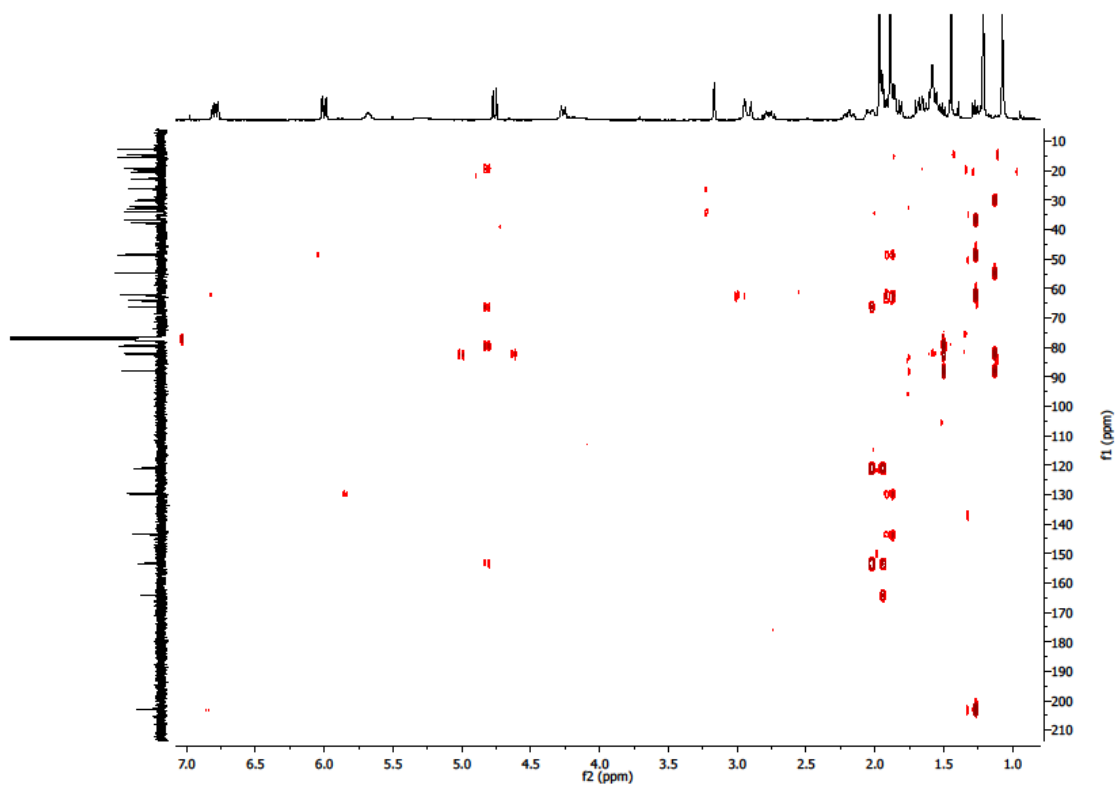


Figure S32. 1D NOESY Spectra (400 MHz) of 23 $\beta$ -Hydroxywithanolide E (**6**) in CDCl<sub>3</sub>

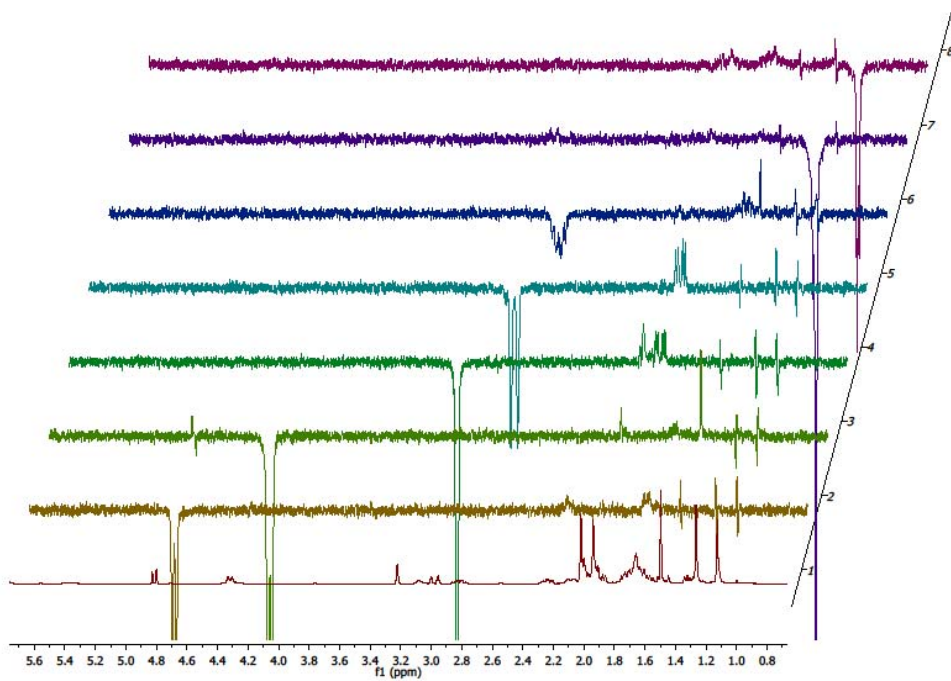


Figure S33.  $^1\text{H}$  NMR Spectrum (400 MHz) of 4-Deoxyhyperunolide A (**7**) in  $\text{CDCl}_3$

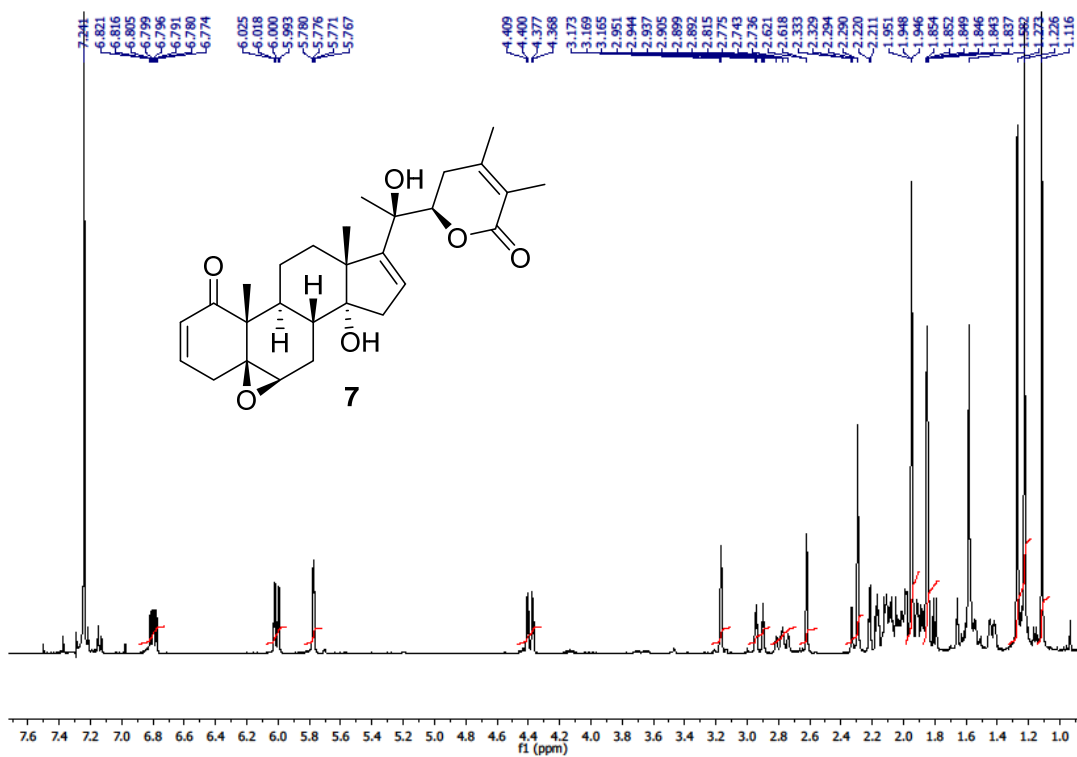


Figure S34.  $^{13}\text{C}$  NMR Spectrum (100 MHz) of 4-Deoxyhyperunolide A (**7**) in  $\text{CDCl}_3$

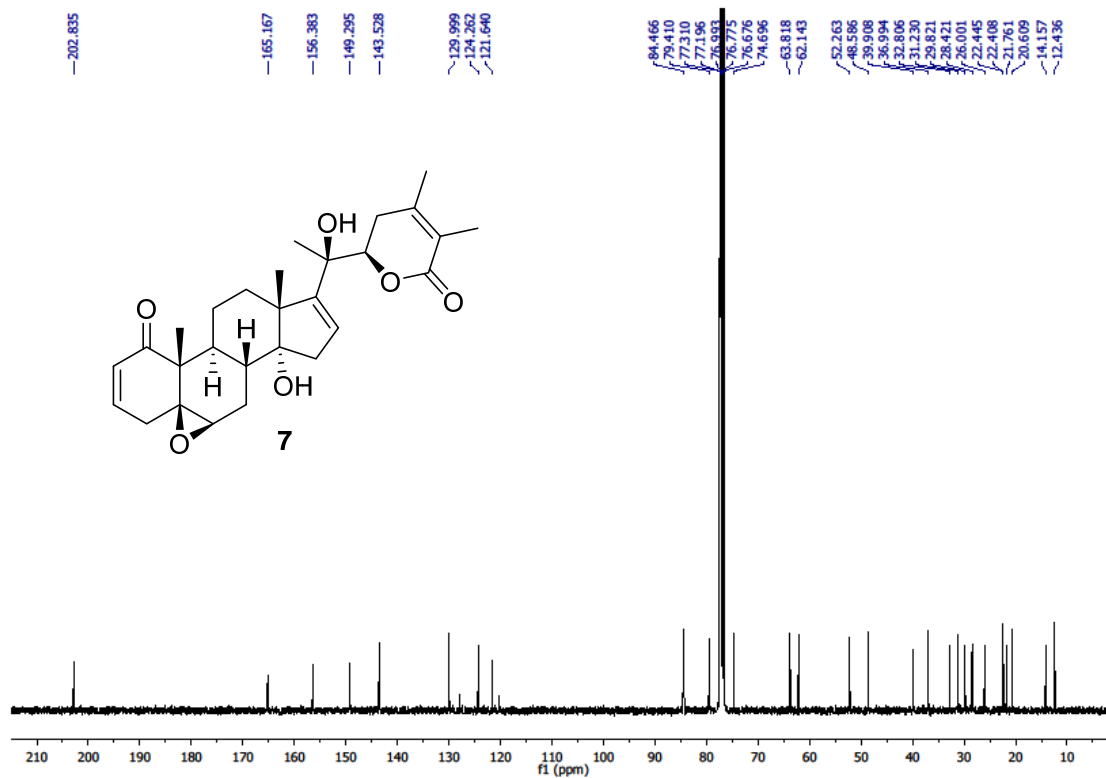


Figure S35. HSQC Spectrum (400 MHz) of 4-Deoxyhyperunolide A (7) in CDCl<sub>3</sub>

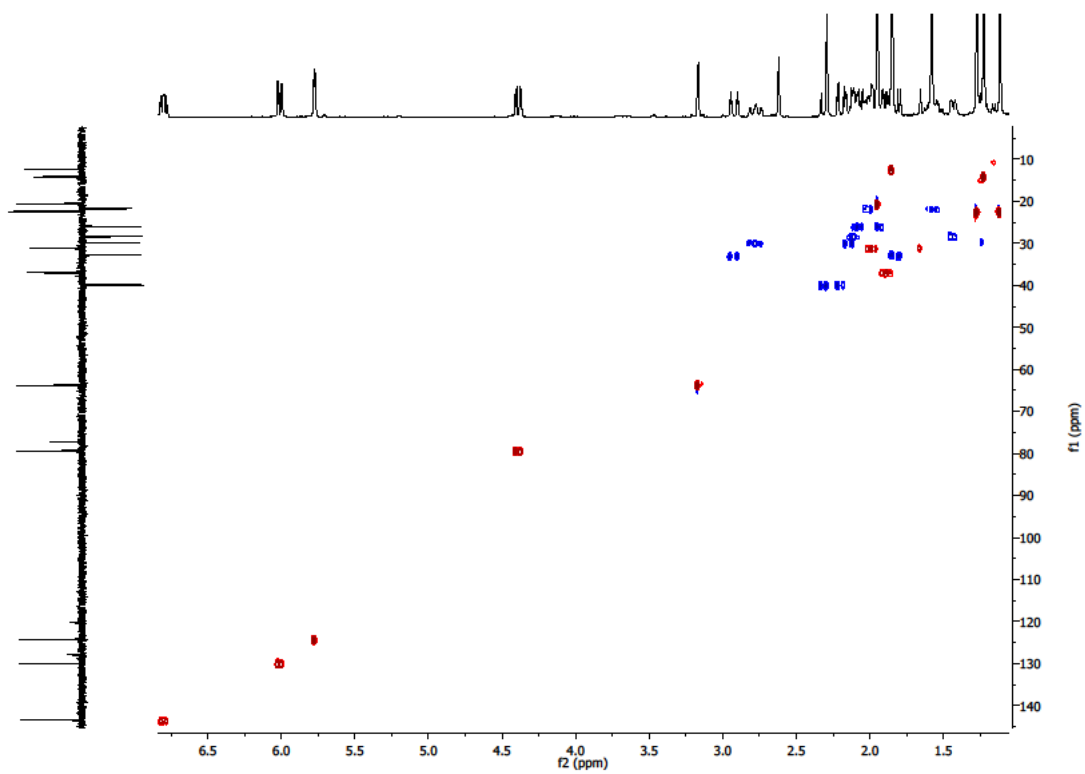


Figure S36. HMBC Spectrum (400 MHz) of 4-Deoxyhyperunolide A (7) in CDCl<sub>3</sub>

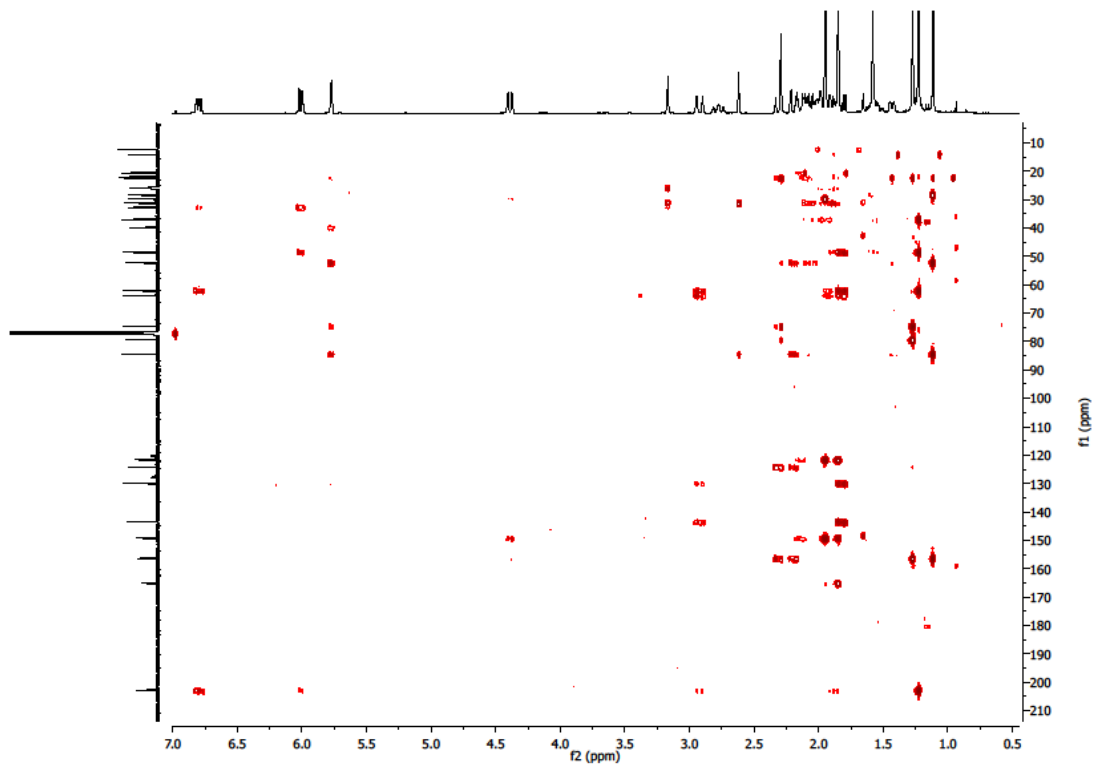


Figure S37. NOESY Spectrum (400 MHz) of 4-Deoxyhyperunolide A (7) in CDCl<sub>3</sub>

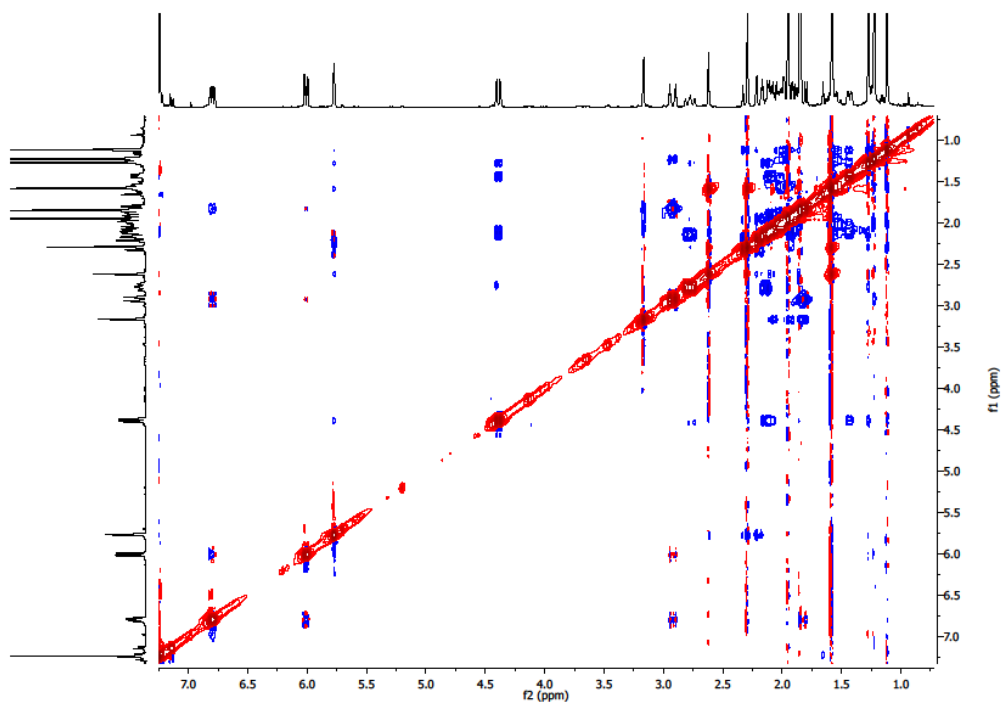


Figure S38. <sup>1</sup>H NMR Spectrum (400 MHz) of 7β-Hydroxywithanolide F (8) in CDCl<sub>3</sub>

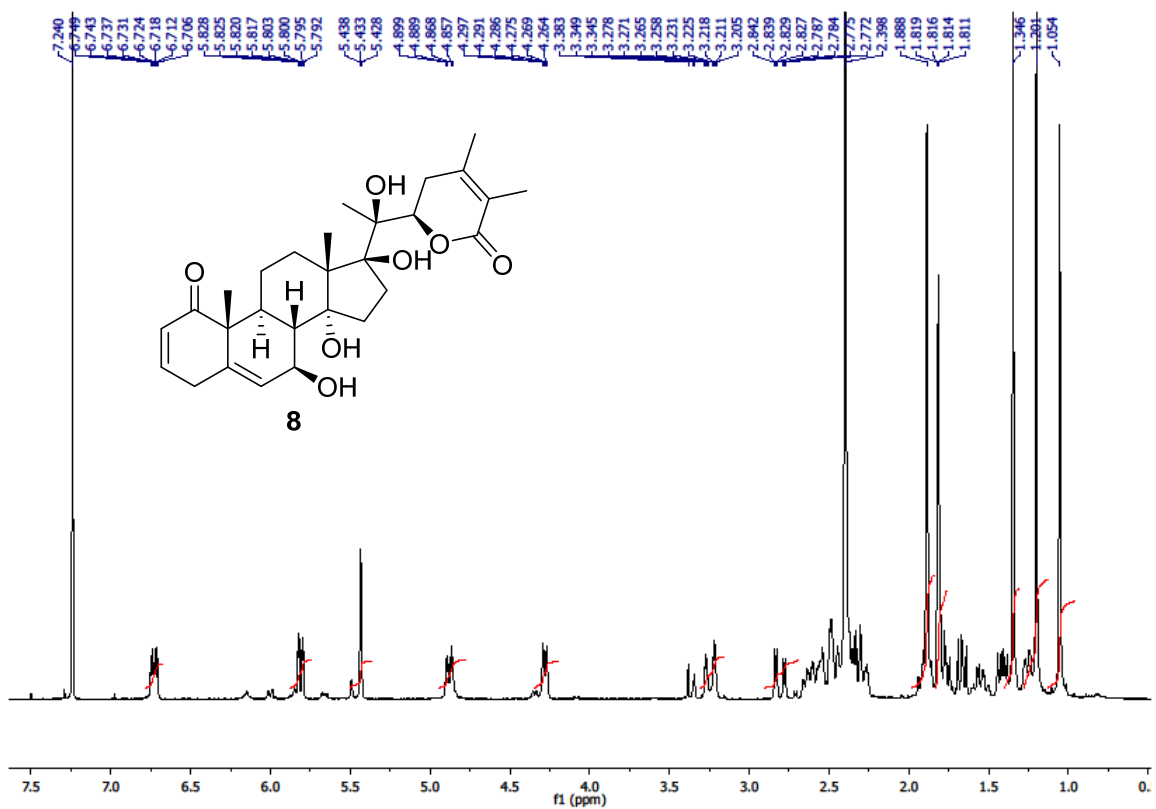


Figure S39. <sup>13</sup>C NMR Spectrum (100 MHz) of 7β-Hydroxywithanolide F (8) in CDCl<sub>3</sub>

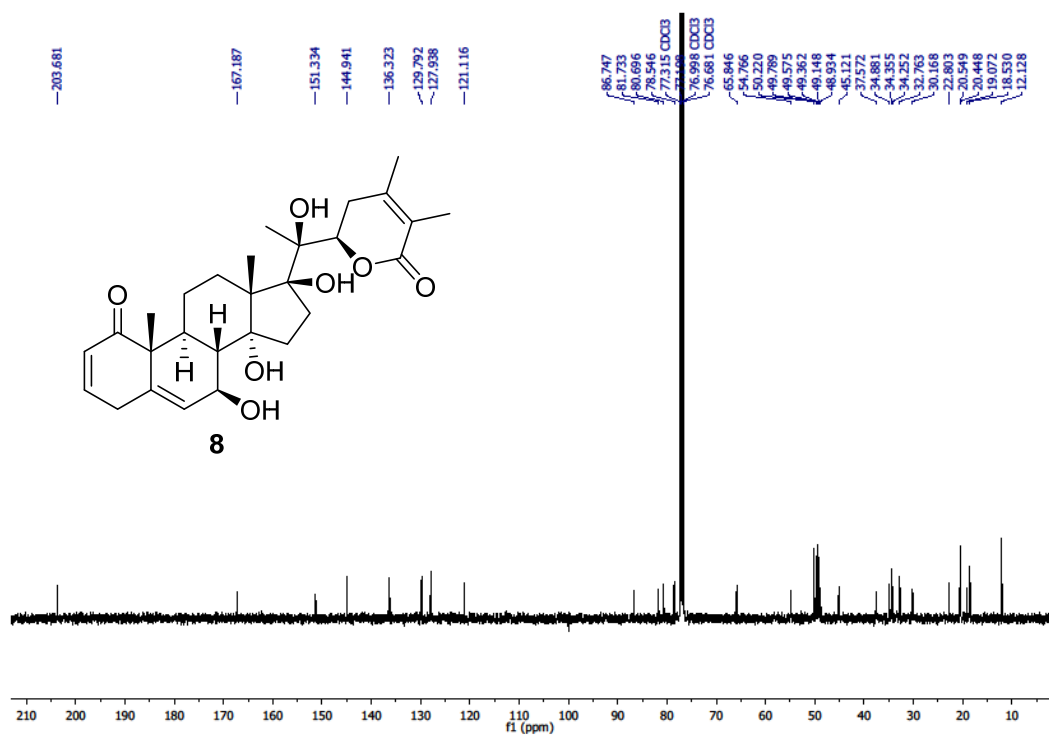


Figure S40. HSQC Spectrum (400 MHz) of 7β-Hydroxywithanolide F (8) in CDCl<sub>3</sub>

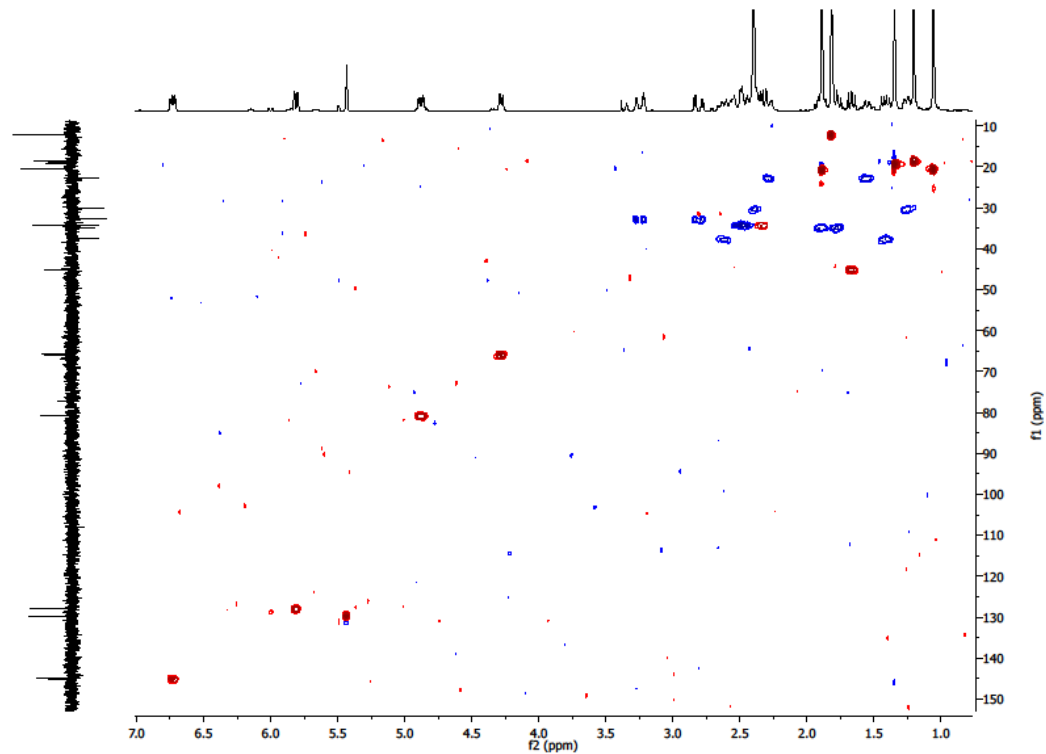


Figure S41. HMBC Spectrum (400 MHz) of 7 $\beta$ -Hydroxywithanolide F (**8**) in CDCl<sub>3</sub>

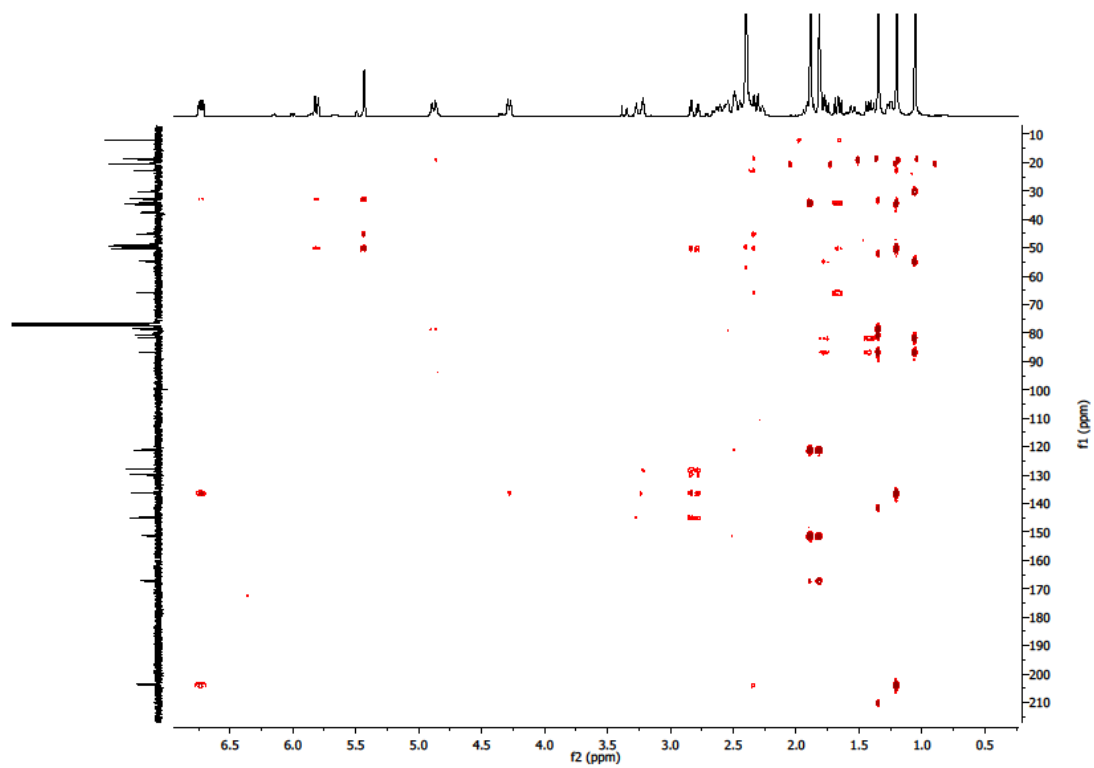


Figure S42. 1D NOESY spectra (400 MHz) of 7 $\beta$ -Hydroxywithanolide F (**8**) in CDCl<sub>3</sub>

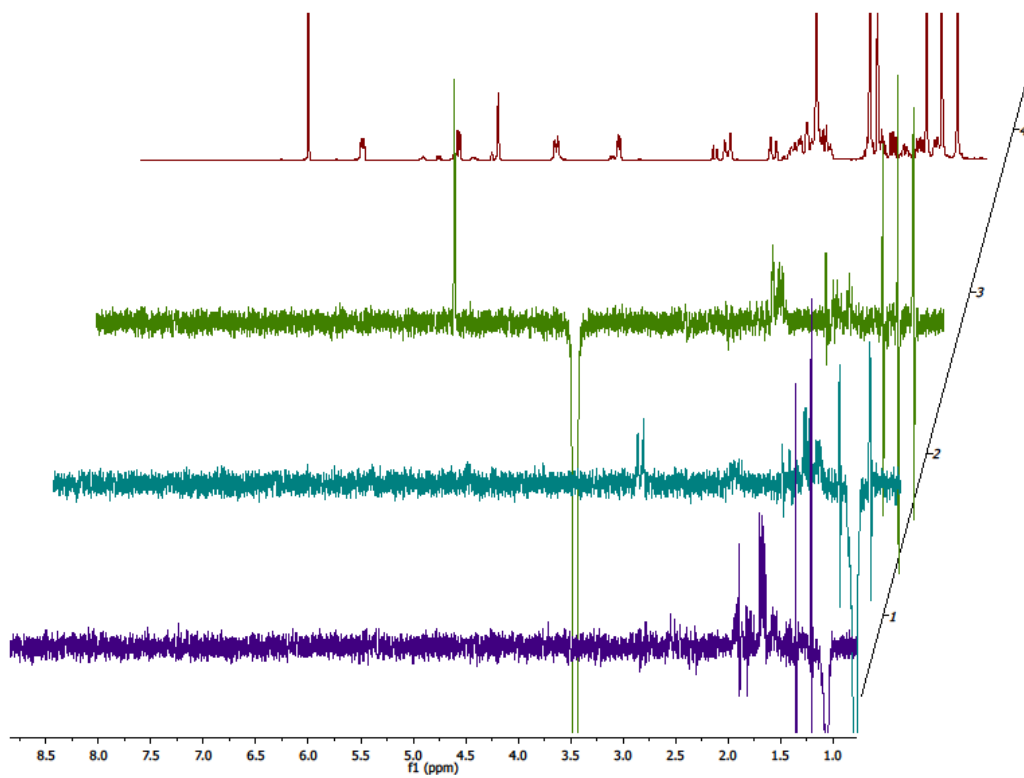




Figure S43. <sup>1</sup>H NMR Spectrum (400 MHz) of 7β-Hydroxy-17-*epi*-withanolide K (9) in CDCl<sub>3</sub>

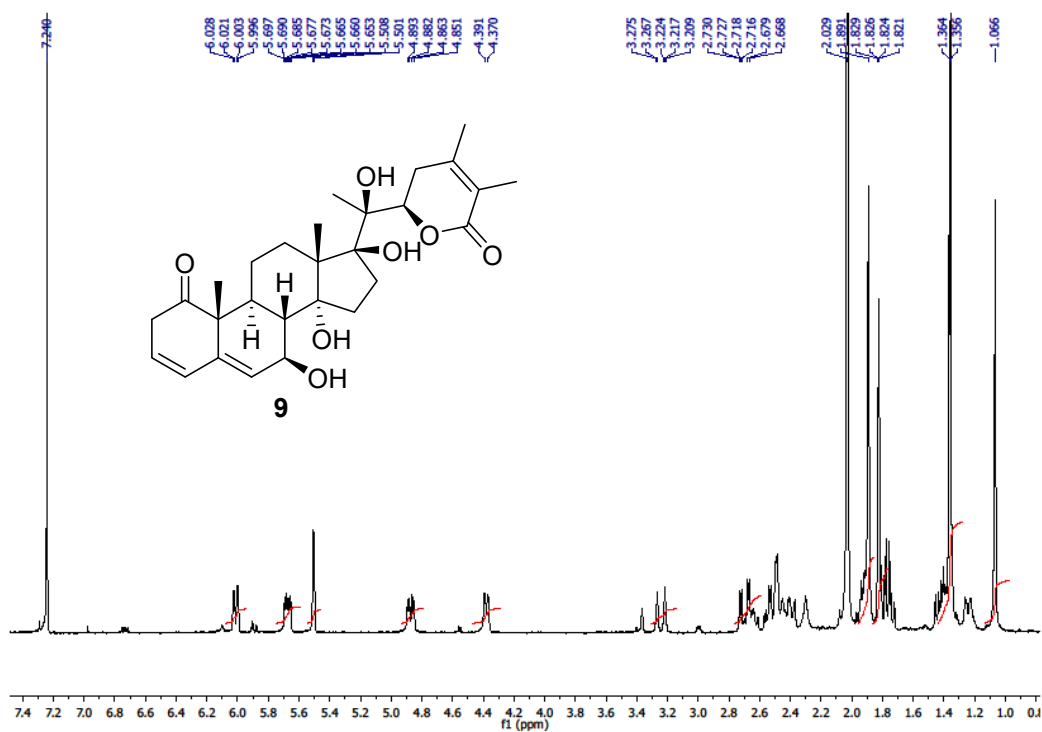


Figure S44. <sup>13</sup>C NMR Spectrum (100 MHz) of 7β-Hydroxy-17-*epi*-withanolide K (9) in CDCl<sub>3</sub>

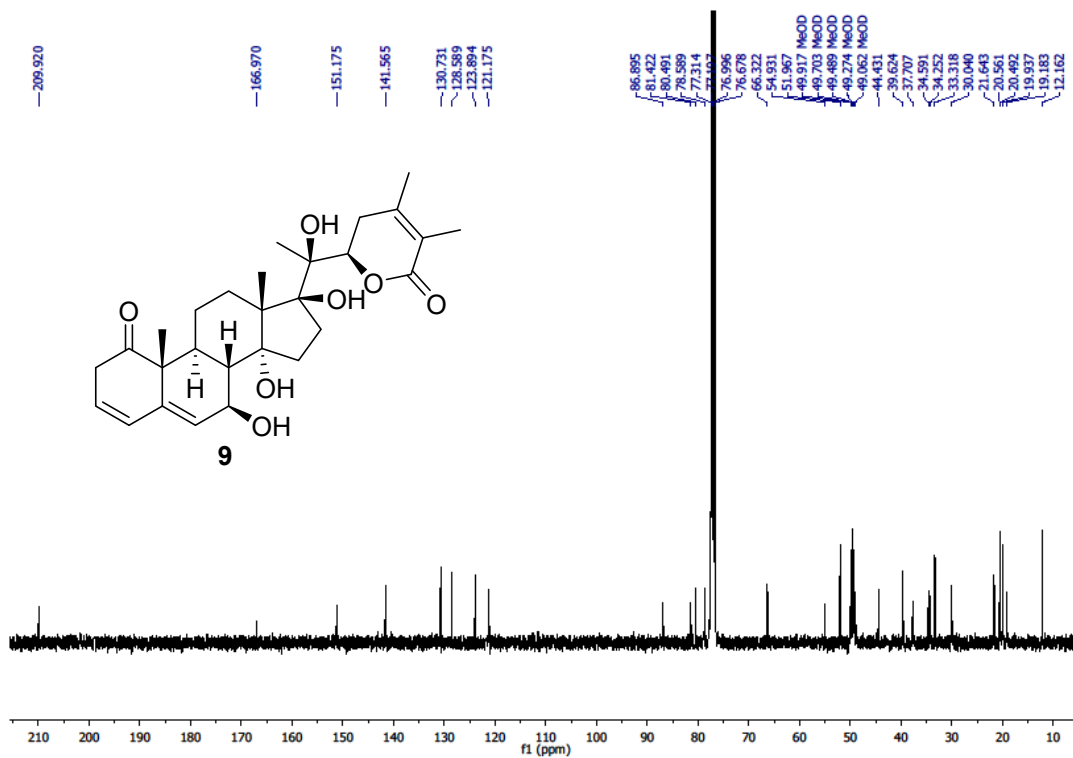


Figure S45. HSQC Spectrum (400 MHz) of 7 $\beta$ -Hydroxy-17-*epi*-withanolide K (9) in CDCl<sub>3</sub>

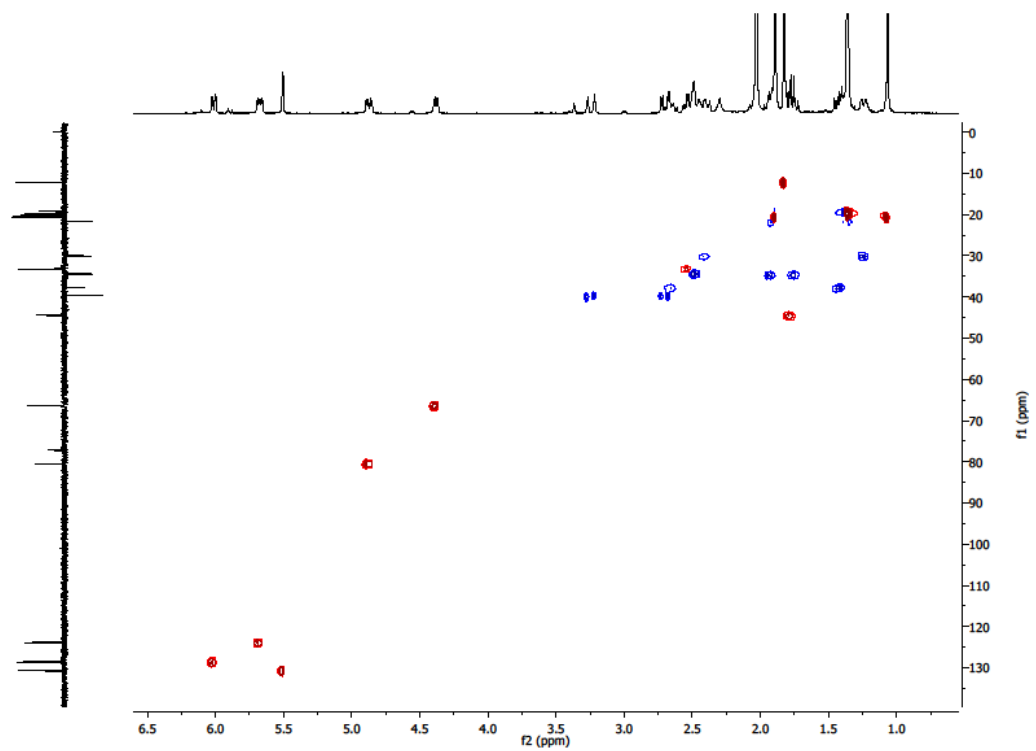


Figure S46. HMBC Spectrum (400 MHz) of 7 $\beta$ -Hydroxy-17-*epi*-withanolide K (9) in CDCl<sub>3</sub>

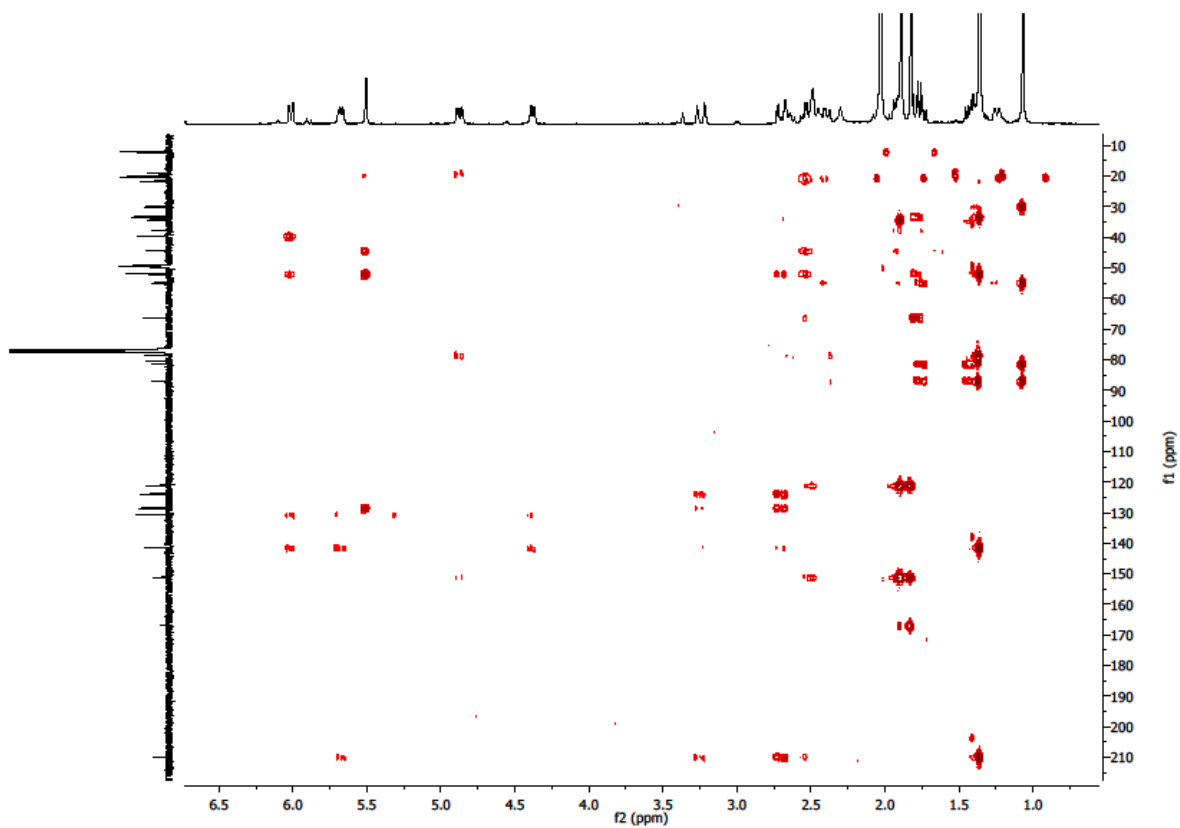


Figure S47. 1D NOESY Spectra (400 MHz) of 7 $\beta$ -Hydroxy-17-*epi*-withanolide K (**9**) in CDCl<sub>3</sub>

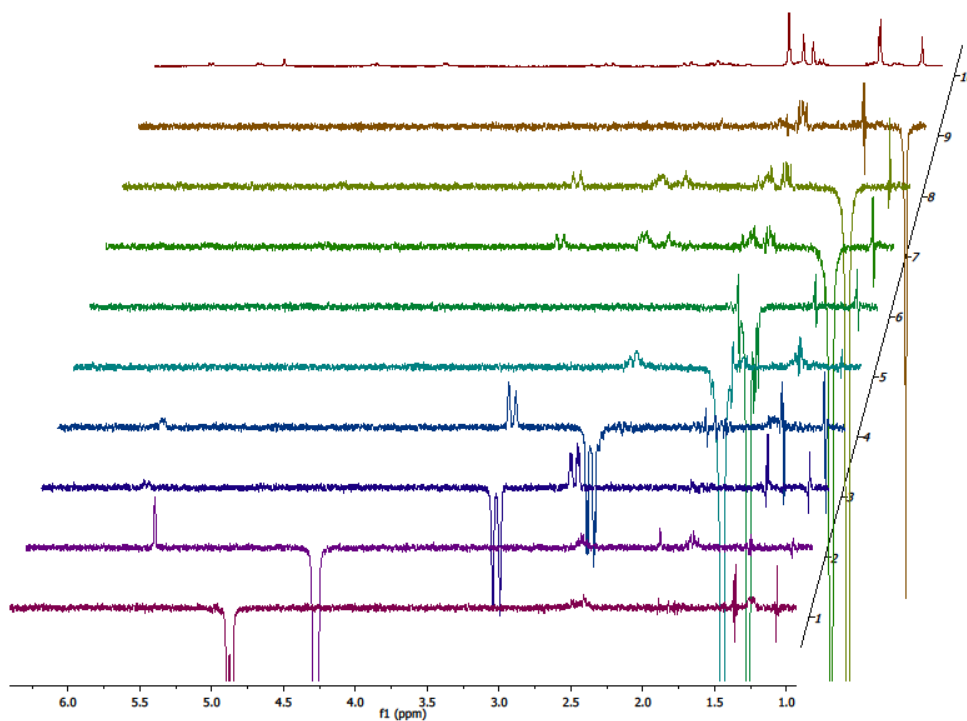


Figure S48. <sup>1</sup>H NMR Spectrum (400 MHz) of 24,25-Dihydro-23 $\beta$ ,28-dihydroxywithanolide G (**10**) in CDCl<sub>3</sub>

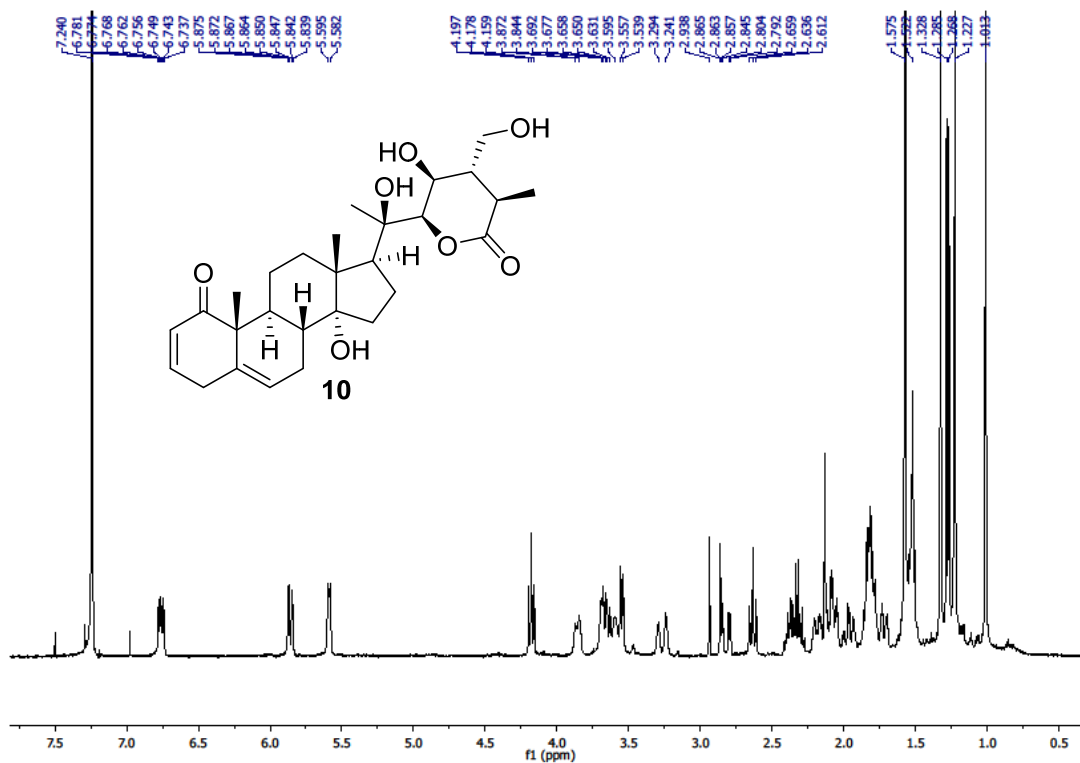


Figure S49.  $^{13}\text{C}$  NMR Spectrum (100 MHz) of 24,25-Dihydro-23 $\beta$ ,28-dihydroxywithanolide G (**10**) in  $\text{CDCl}_3$

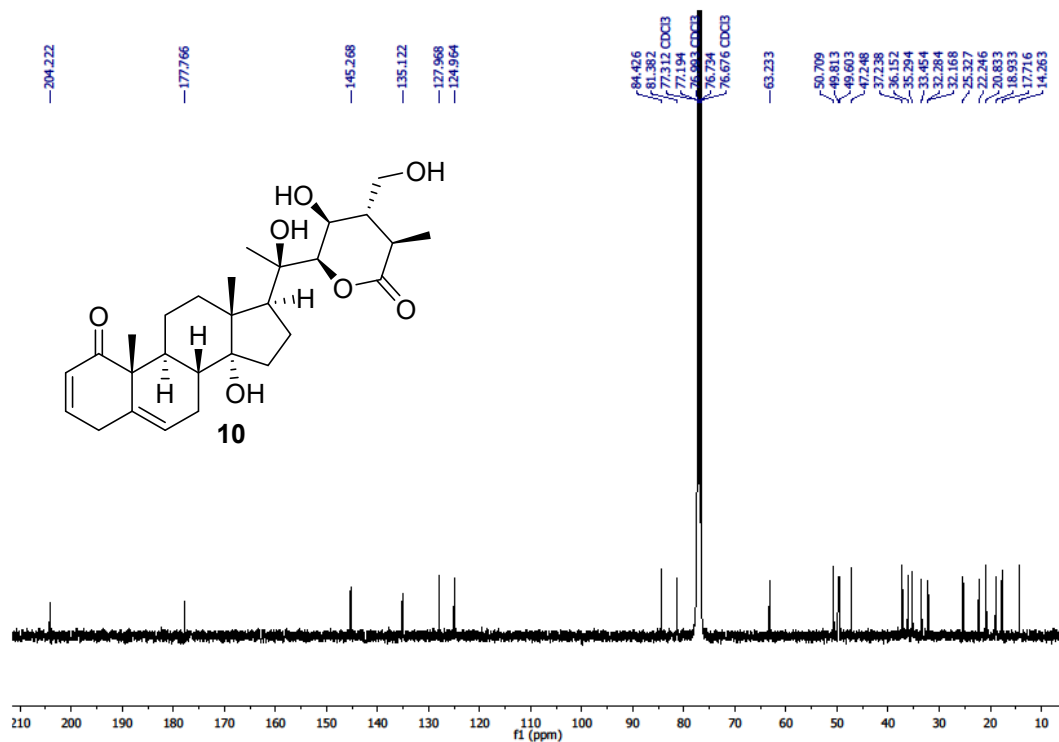


Figure S50.  $^1\text{H}$ - $^1\text{H}$  COSY Spectrum (400 MHz) of 24,25-Dihydro-23 $\beta$ ,28-dihydroxywithanolide G (**10**) in  $\text{CDCl}_3$

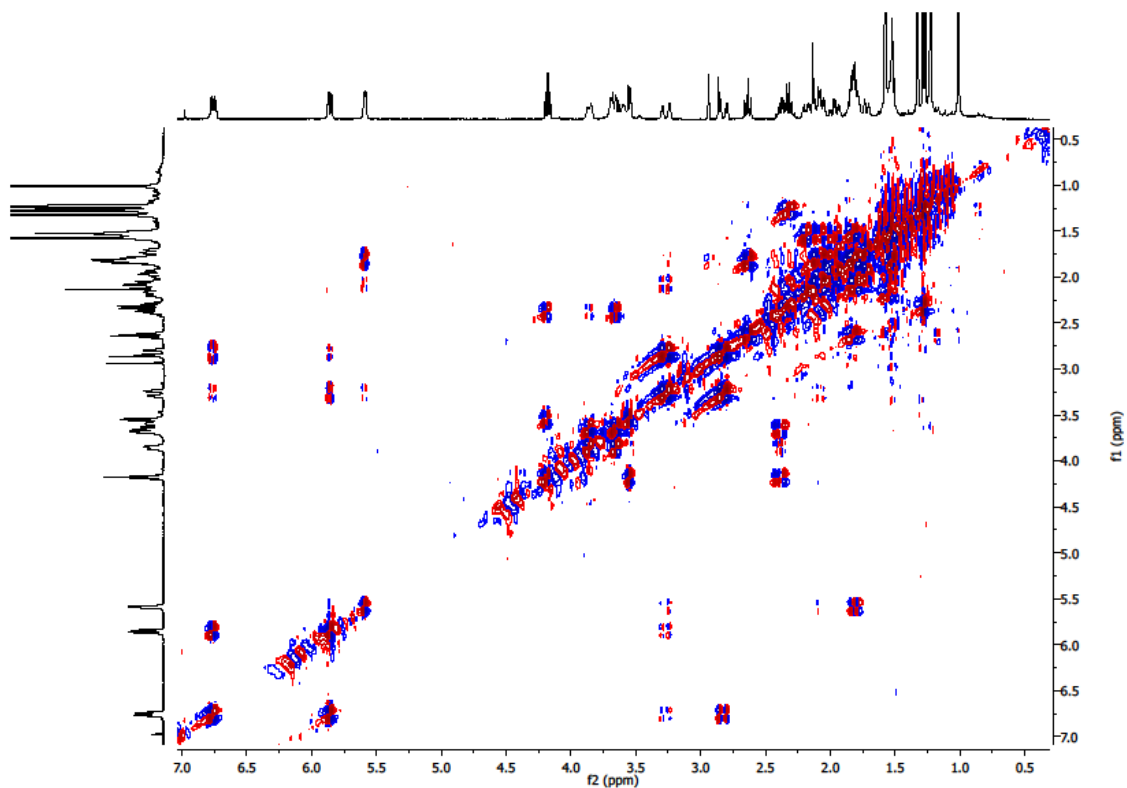


Figure S51. HSQC Spectrum (400 MHz) of 24,25-Dihydro-23 $\beta$ ,28-dihydroxywithanolide G (**10**) in CDCl<sub>3</sub>

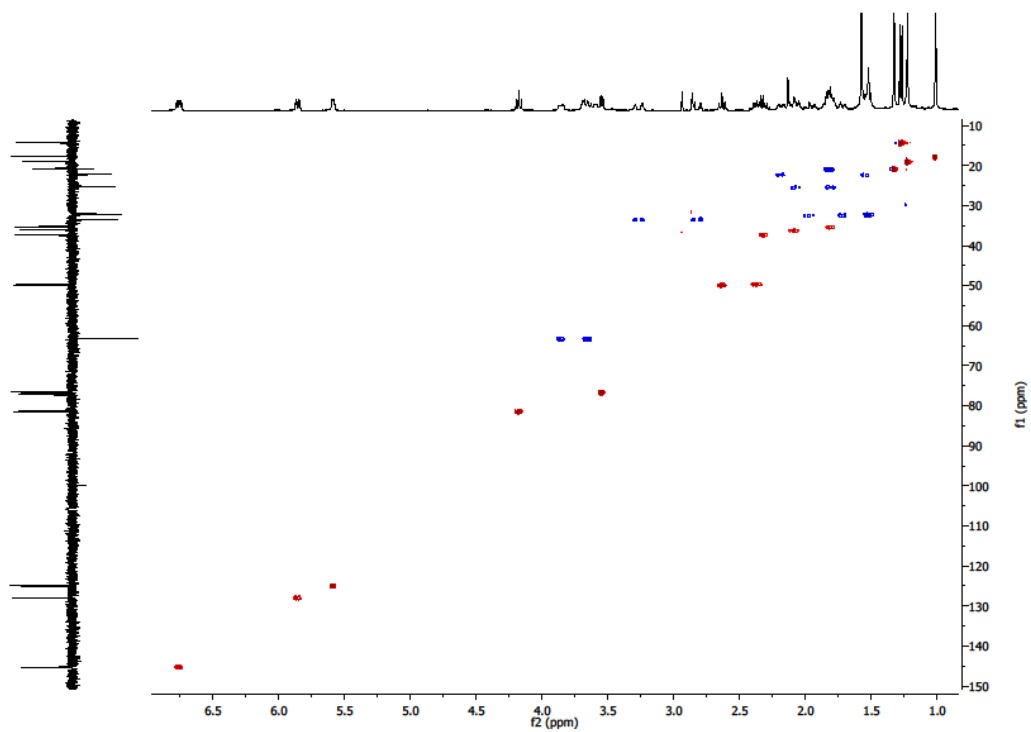


Figure S52. HMBC Spectrum (400 MHz) of 24,25-Dihydro-23 $\beta$ ,28-dihydroxywithanolide G (**10**) in CDCl<sub>3</sub>

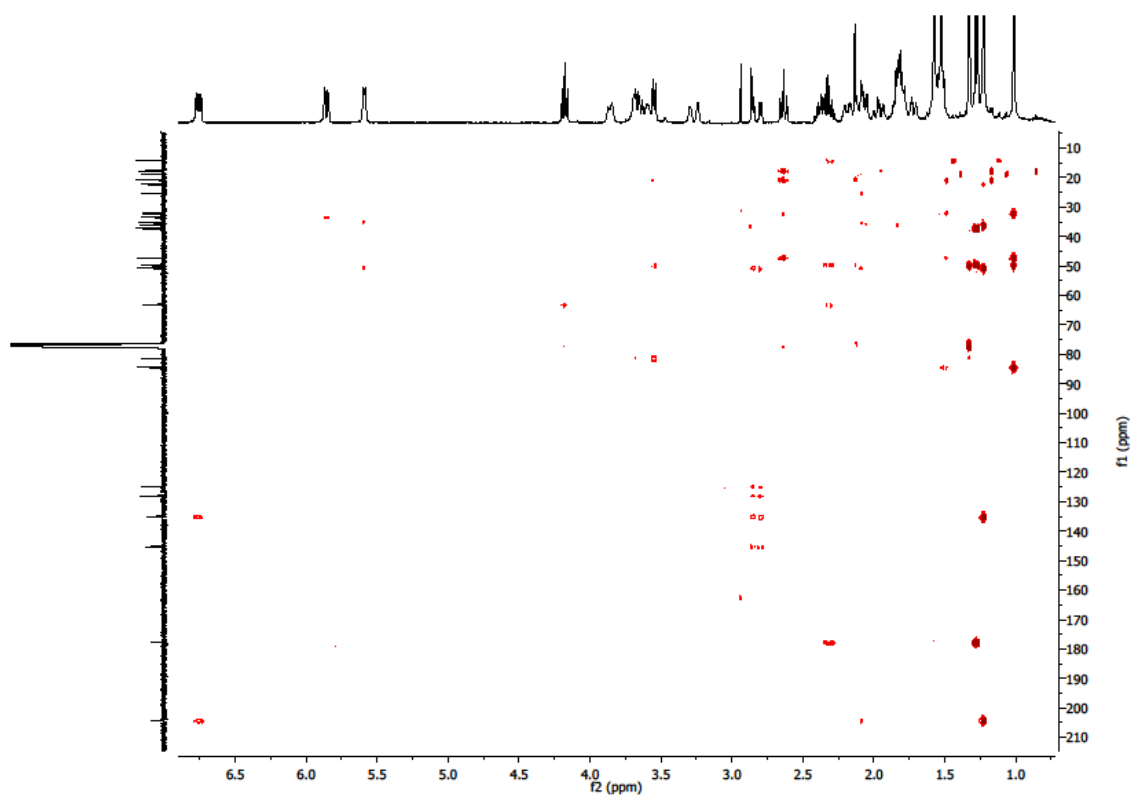


Figure S53. 1D NOESY Spectra (400 MHz) of 24,25-Dihydro-23 $\beta$ ,28-dihydroxywithanolide G (**10**) in CDCl<sub>3</sub>

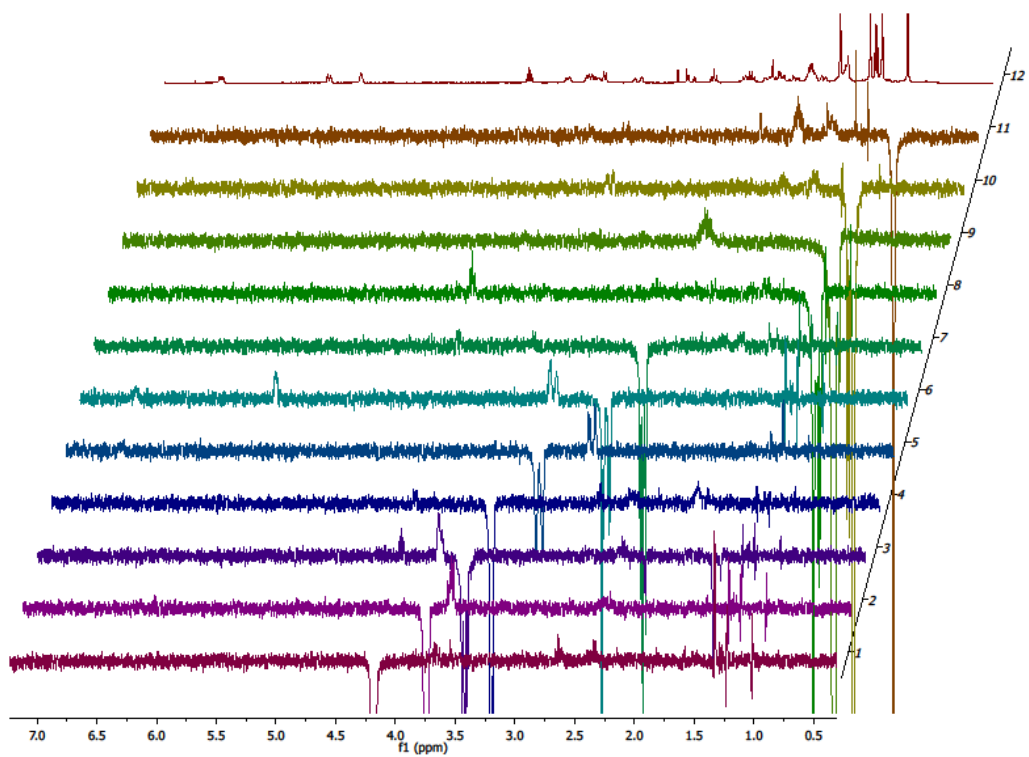


Figure S54. <sup>1</sup>H NMR Spectrum (400 MHz) of 24,25-Dihydrowithanolide E (**11**) in CDCl<sub>3</sub>

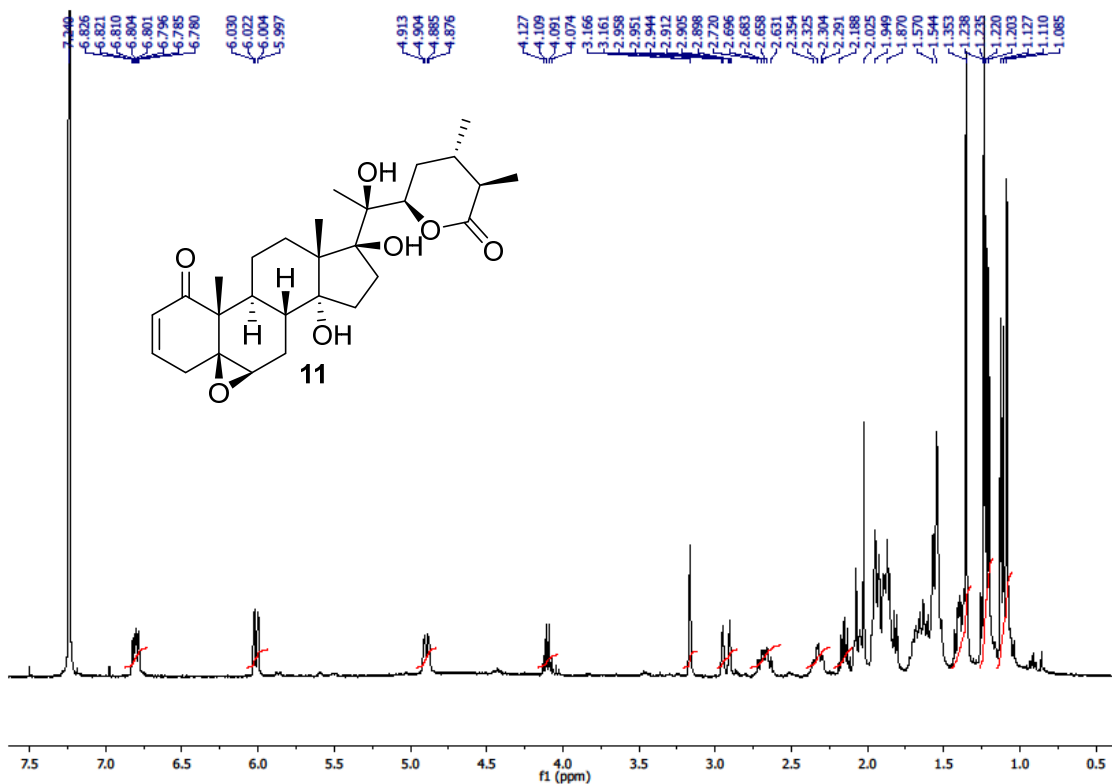


Figure S55.  $^{13}\text{C}$  NMR Spectrum (100 MHz) of 24,25-Dihydrowithanolide E (**11**) in  $\text{CDCl}_3$

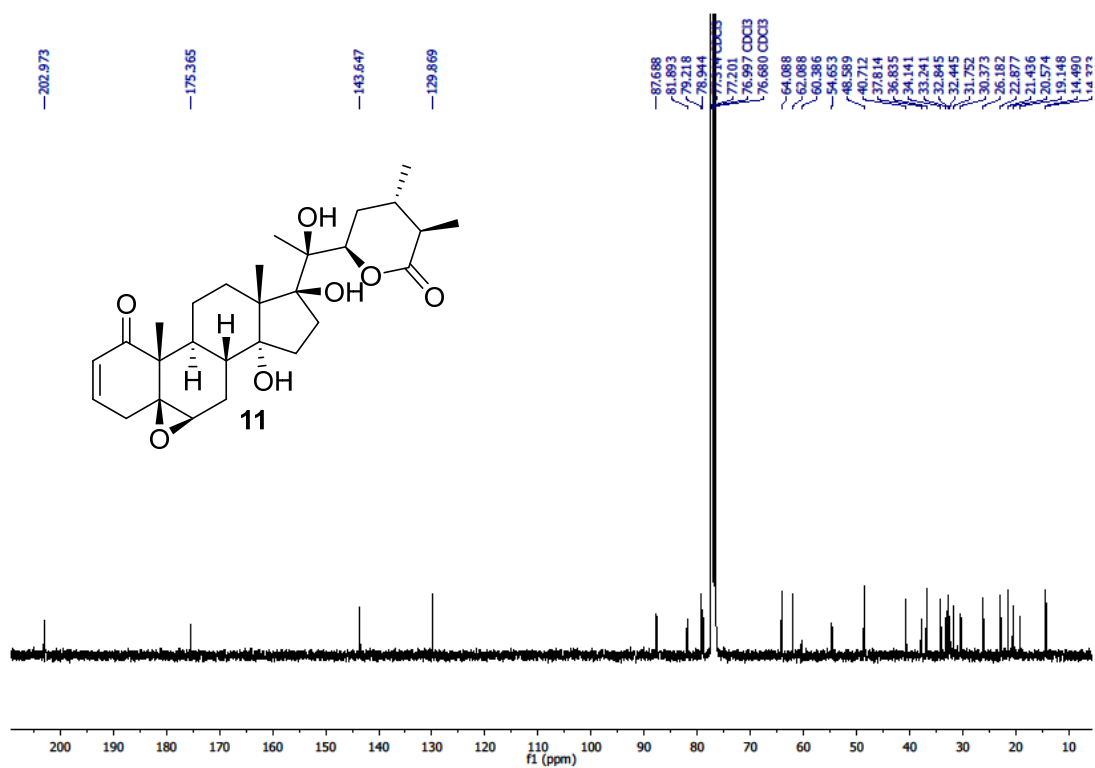


Figure S56. HSQC Spectrum (400 MHz) of 24,25-Dihydrowithanolide E (**11**) in  $\text{CDCl}_3$

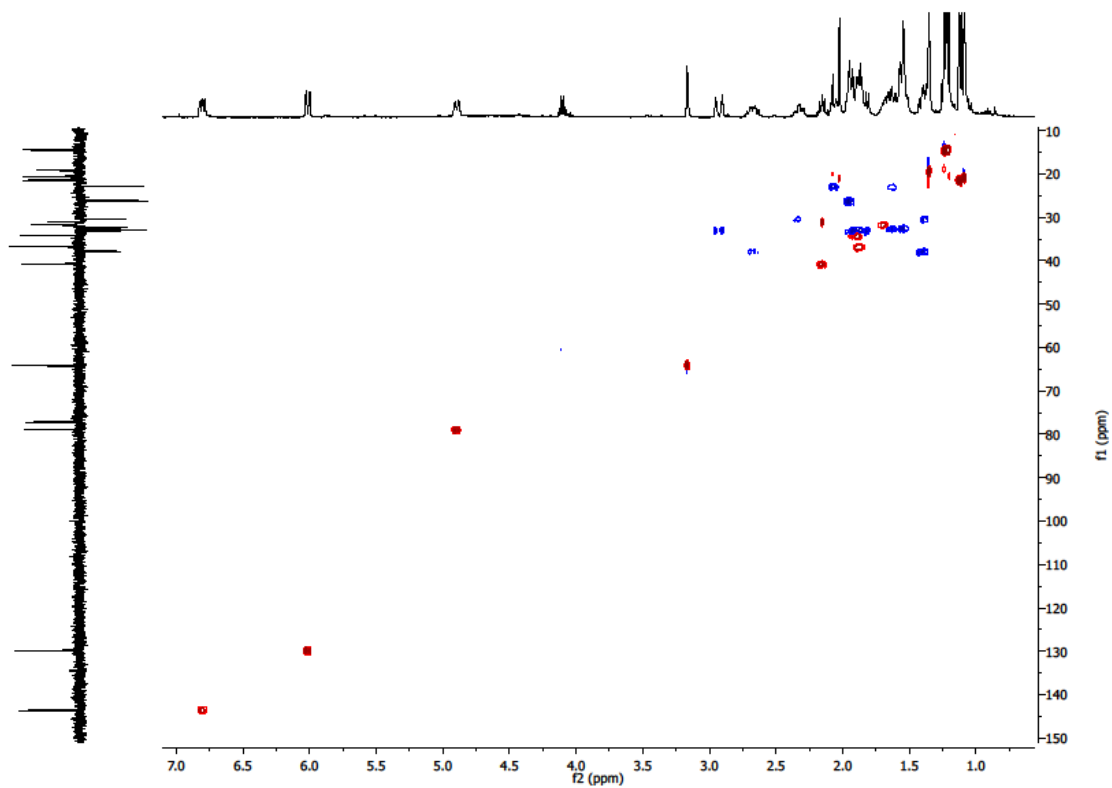


Figure S57. HMBC Spectrum (400 MHz) of 24,25-Dihydrowithanolide E (**11**) in CDCl<sub>3</sub>

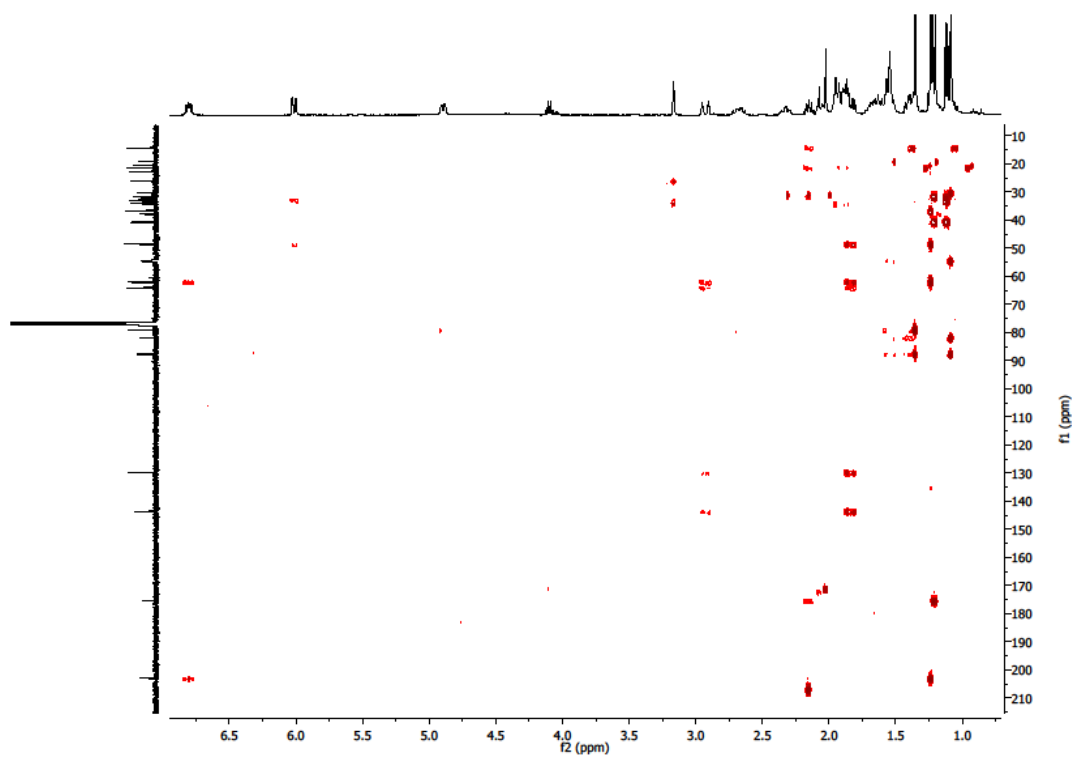
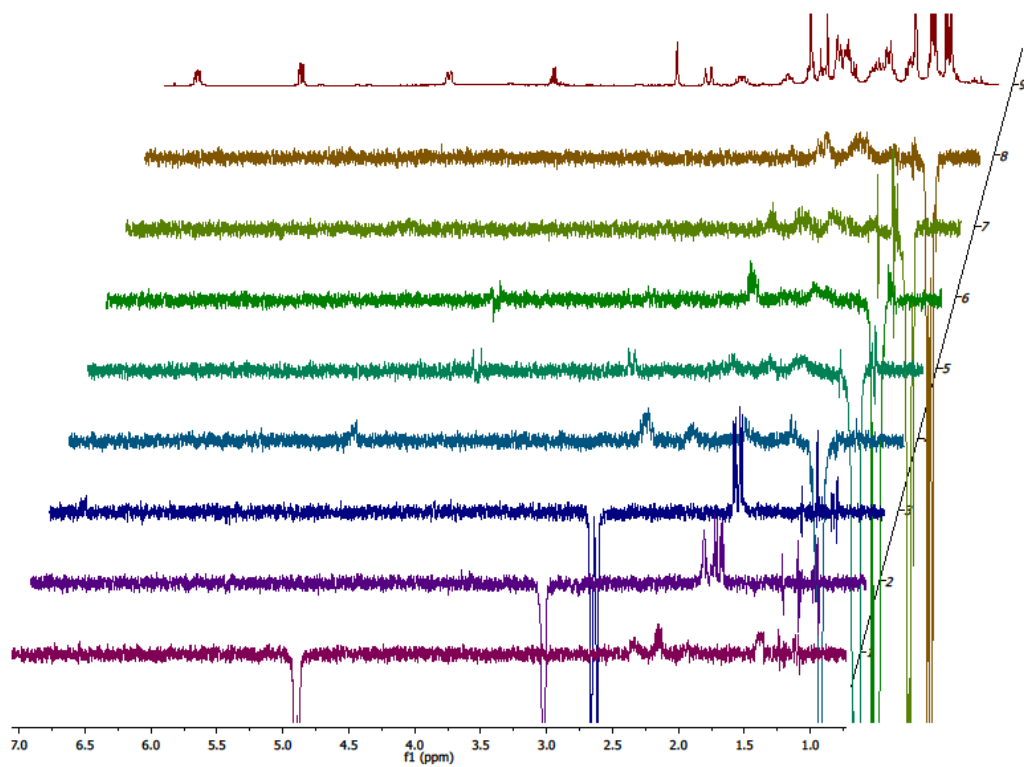


Figure S58. 1D NOESY Spectra (400 MHz) of 24,25-Dihydrowithanolide E (**11**) in CDCl<sub>3</sub>





**Figure S59.** Key HMBC Correlations of **1**, **3**, **5**, and **7-11**, and  $^1\text{H}$ - $^1\text{H}$  COSY Correlations of **5** and **10**

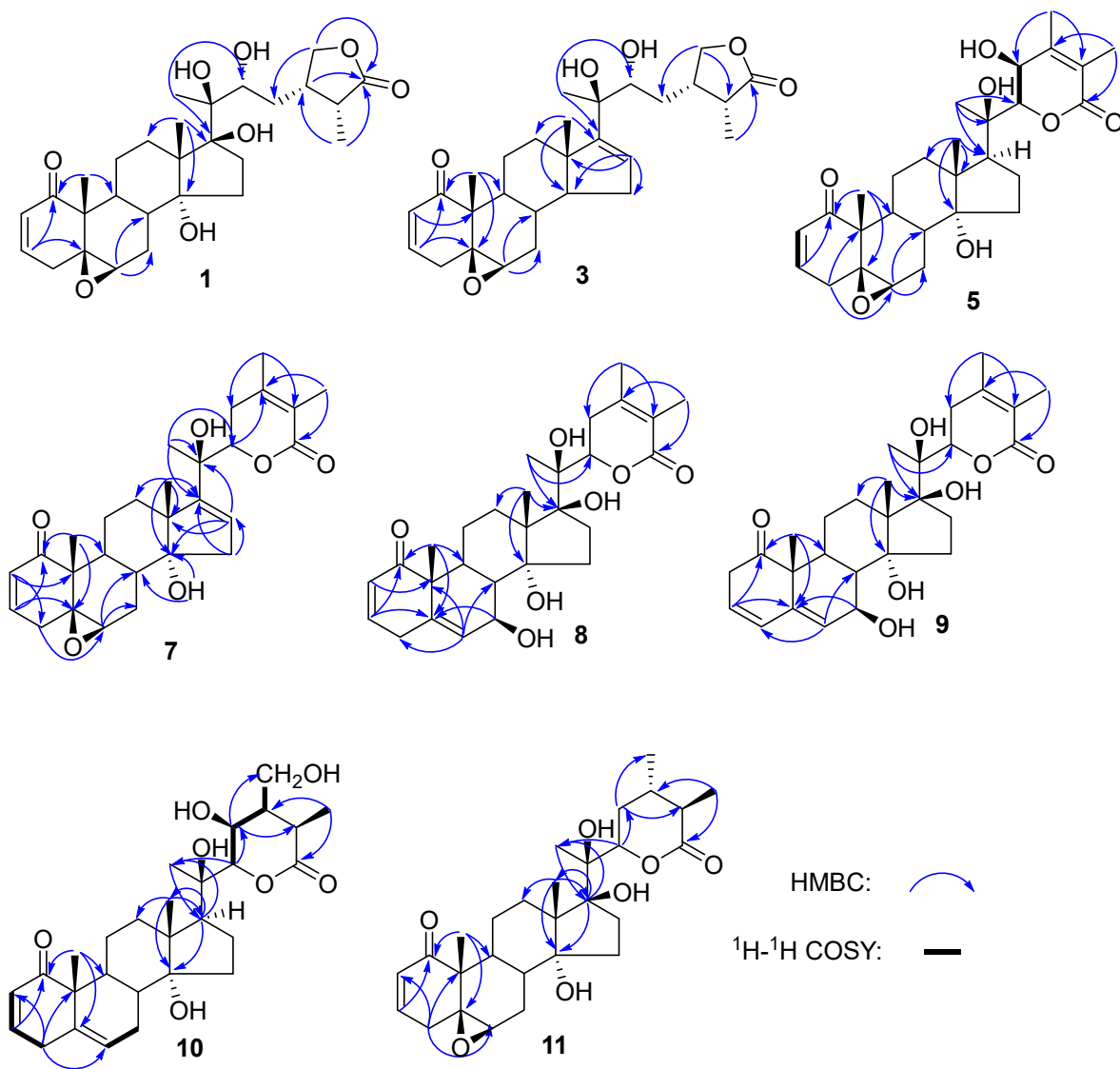
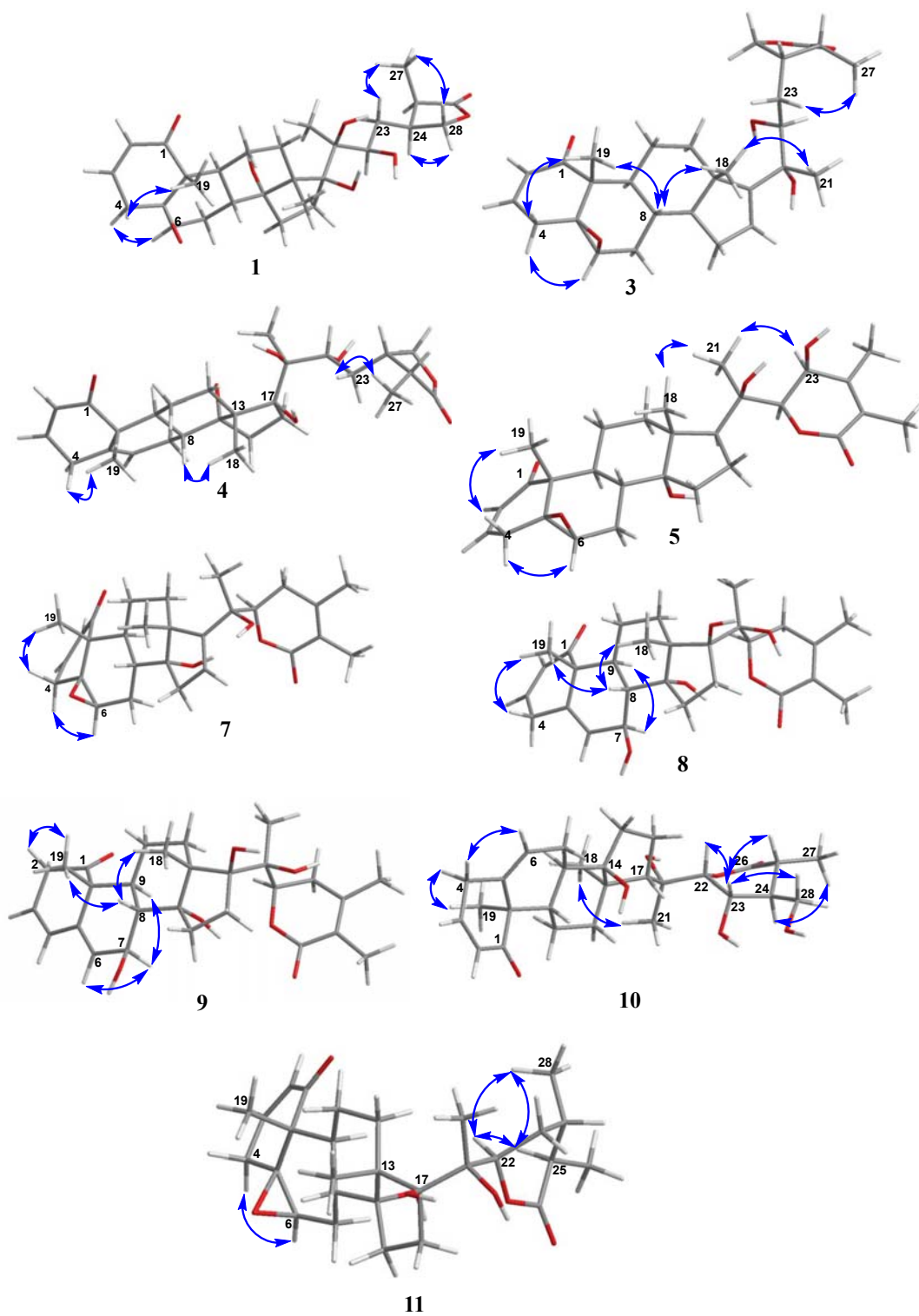


Figure S60. Key NOESY Correlations of 1, 3-5, and 7-11



**Figure S61.** ECD spectra of **1–11**

