

# Supplementary Information

## Acylated aminooligosaccharides from the Yellow Sea *Streptomyces* sp. HO1518 as both $\alpha$ -glucosidase and lipase inhibitors

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## Table of Contents

<b>Figure S1.</b> <sup>1</sup> H NMR spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O).....	4
<b>Figure S2.</b> 1D-selective TOCSY spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.24, H-A1 $\alpha$ ). .....	5
<b>Figure S3.</b> 1D-selective TOCSY spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 4.66, H-A1 $\beta$ ).....	6
<b>Figure S4.</b> 1D-selective TOCSY spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.42, H-B1, H-C1, and H-D1).....	7
<b>Figure S5.</b> 1D-selective TOCSY spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 4.44, H-D6a).....	8
<b>Figure S6.</b> 1D-selective TOCSY spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.27, H-E1).....	9
<b>Figure S7.</b> 1D-selective TOCSY spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.90, H-F7).....	10
<b>Figure S8.</b> <sup>13</sup> C NMR spectrum of compound <b>1</b> (125 MHz, D <sub>2</sub> O).....	11
<b>Figure S9.</b> DEPT-135 spectrum of compound <b>1</b> (125 MHz, D <sub>2</sub> O).....	12
<b>Figure S10.</b> HSQC spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O). .....	13
<b>Figure S11.</b> <sup>1</sup> H- <sup>1</sup> H COSY spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O).....	14
<b>Figure S12.</b> 2D-TCOSY spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O).....	15
<b>Figure S13.</b> HSQC-TCOSY spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O).....	16
<b>Figure S14.</b> HMBC spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O). .....	17
<b>Figure S15.</b> NOESY spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O).....	18
<b>Figure S16.</b> HRESIMS spectrum of compound <b>1</b> . .....	19
<b>Figure S17.</b> UV spectrum of compound <b>1</b> . .....	19
<b>Figure S18.</b> IR spectrum of compound <b>1</b> . .....	20
<b>Figure S19.</b> <sup>1</sup> H NMR spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O).....	21
<b>Figure S20.</b> 1D-selective TOCSY spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.21, H-A1 $\alpha$ ). .....	22
<b>Figure S21.</b> 1D-selective TOCSY spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 4.63, H-A1 $\beta$ ).....	23
<b>Figure S22.</b> 1D-selective TOCSY spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.38, H-B1, C1, and D1). .....	24
<b>Figure S23.</b> 1D-selective TOCSY spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 4.44, H-D6a).....	25
<b>Figure S24.</b> 1D-selective TOCSY spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.23, H-E1).....	26
<b>Figure S25.</b> 1D-selective TOCSY spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.87, H-F1).....	27
<b>Figure S26.</b> <sup>13</sup> C NMR spectrum of compound <b>2</b> (125 MHz, D <sub>2</sub> O).....	28
<b>Figure S27.</b> DEPT-135 spectrum of compound <b>2</b> (125 MHz, D <sub>2</sub> O).....	29
<b>Figure S28.</b> HSQC spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O). .....	30
<b>Figure S29.</b> <sup>1</sup> H- <sup>1</sup> H COSY spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O).....	31
<b>Figure S30.</b> 2D-TCOSY spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O).....	32

<b>Figure S31.</b> HSQC-TCOSY spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O).....	33
<b>Figure S32.</b> HMBC spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O).....	34
<b>Figure S33.</b> NOESY spectrum of compound <b>2</b> (500 MHz, D <sub>2</sub> O).....	35
<b>Figure S34.</b> HRESIMS spectrum of compound <b>2</b> . ....	36
<b>Figure S35.</b> UV spectrum of compound <b>2</b> .....	36
<b>Figure S36.</b> IR spectrum of compound <b>2</b> .....	37
<b>Figure S37.</b> <sup>1</sup> H NMR spectrum of compound <b>1</b> (500 MHz, D <sub>2</sub> O).....	38
<b>Figure S38.</b> 1D-selective TOCSY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.26, H-A1 $\alpha$ ). ....	39
<b>Figure S39.</b> 1D-selective TOCSY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 4.66, H-A1 $\beta$ ).....	40
<b>Figure S40.</b> 1D-selective TOCSY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.43, H-B1, H-C1, H-D1).....	41
<b>Figure S41.</b> 1D-selective TOCSY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 4.46, H-D6a).....	42
<b>Figure S42.</b> 1D-selective TOCSY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.29, H-E1).....	43
<b>Figure S43.</b> 1D-selective TOCSY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 6.01, H-F7).....	44
<b>Figure S44.</b> 1D-selective TOCSY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.40, H-G1). ....	45
<b>Figure S45.</b> 1D-selective TOCSY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.34, H-H1). ....	46
<b>Figure S46.</b> 1D-selective TOCSY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O, excitation at $\delta$ 5.93, H-I7).....	47
<b>Figure S47.</b> <sup>13</sup> C NMR spectrum of compound <b>3</b> (125 MHz, D <sub>2</sub> O).....	48
<b>Figure S48.</b> DEPT-135 spectrum of compound <b>3</b> (125 MHz, D <sub>2</sub> O).....	49
<b>Figure S49.</b> HSQC spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O). ....	50
<b>Figure S50.</b> <sup>1</sup> H- <sup>1</sup> H COSY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O).....	51
<b>Figure S51.</b> 2D-TOCSY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O).....	52
<b>Figure S52.</b> HSQC-TOCSY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O).....	53
<b>Figure S53.</b> HMBC spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O). ....	54
<b>Figure S54.</b> NOESY spectrum of compound <b>3</b> (500 MHz, D <sub>2</sub> O).....	55
<b>Figure S55.</b> HRESIMS spectrum of compound <b>3</b> . ....	56
<b>Figure S56.</b> UV spectrum of compound <b>3</b> .....	56
<b>Figure S57.</b> IR spectrum of compound <b>3</b> .....	57
<b>Figure S58.</b> <sup>1</sup> H NMR spectrum of the common basic hydrolysis product ( <b>9</b> ) of compounds <b>1</b> and <b>5</b> (500 MHz, D <sub>2</sub> O). ....	58
<b>Figure S59.</b> <sup>1</sup> H NMR spectrum of the common basic hydrolysis product ( <b>10</b> ) of compound <b>3</b> (500 MHz, D <sub>2</sub> O). ....	59

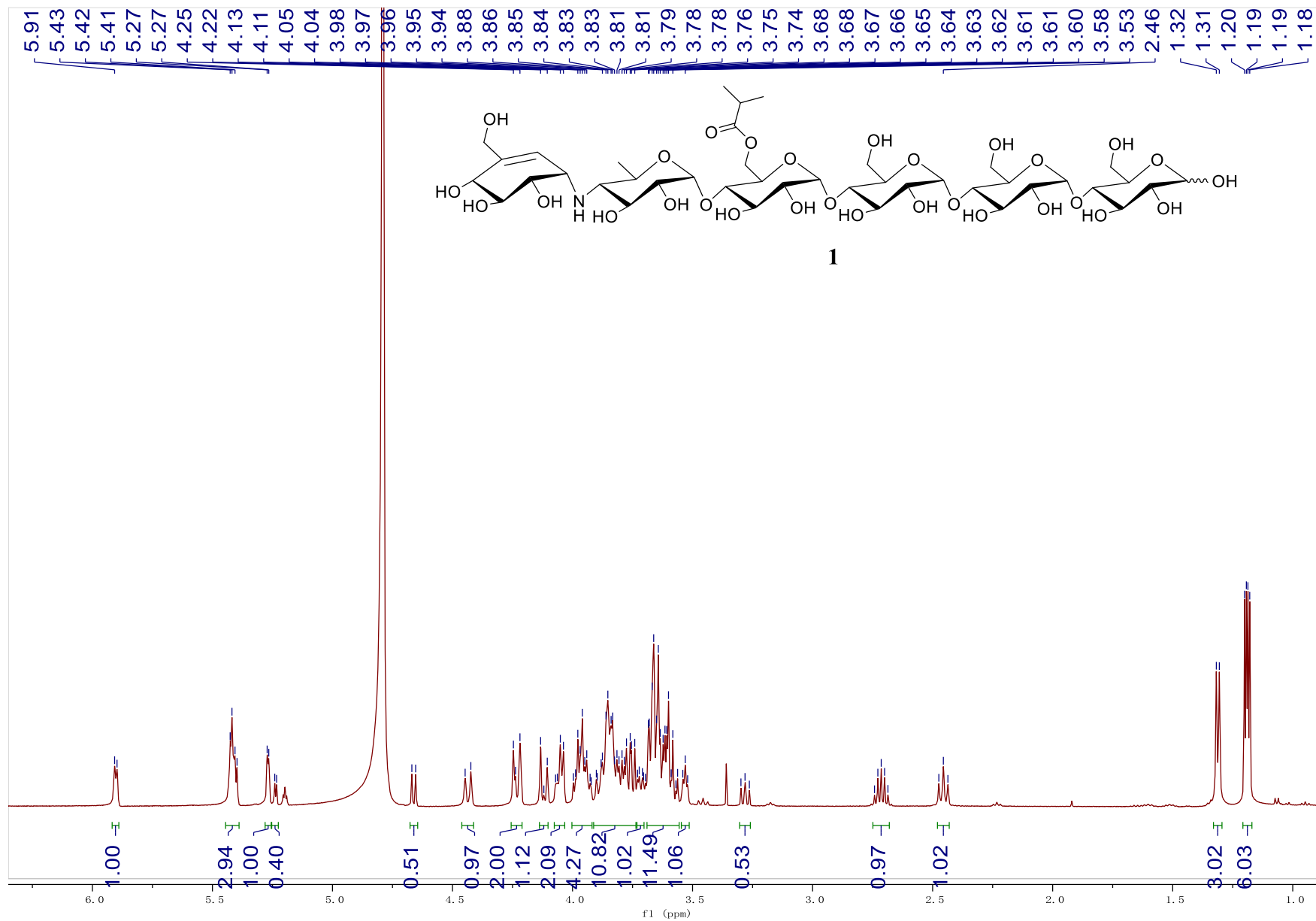
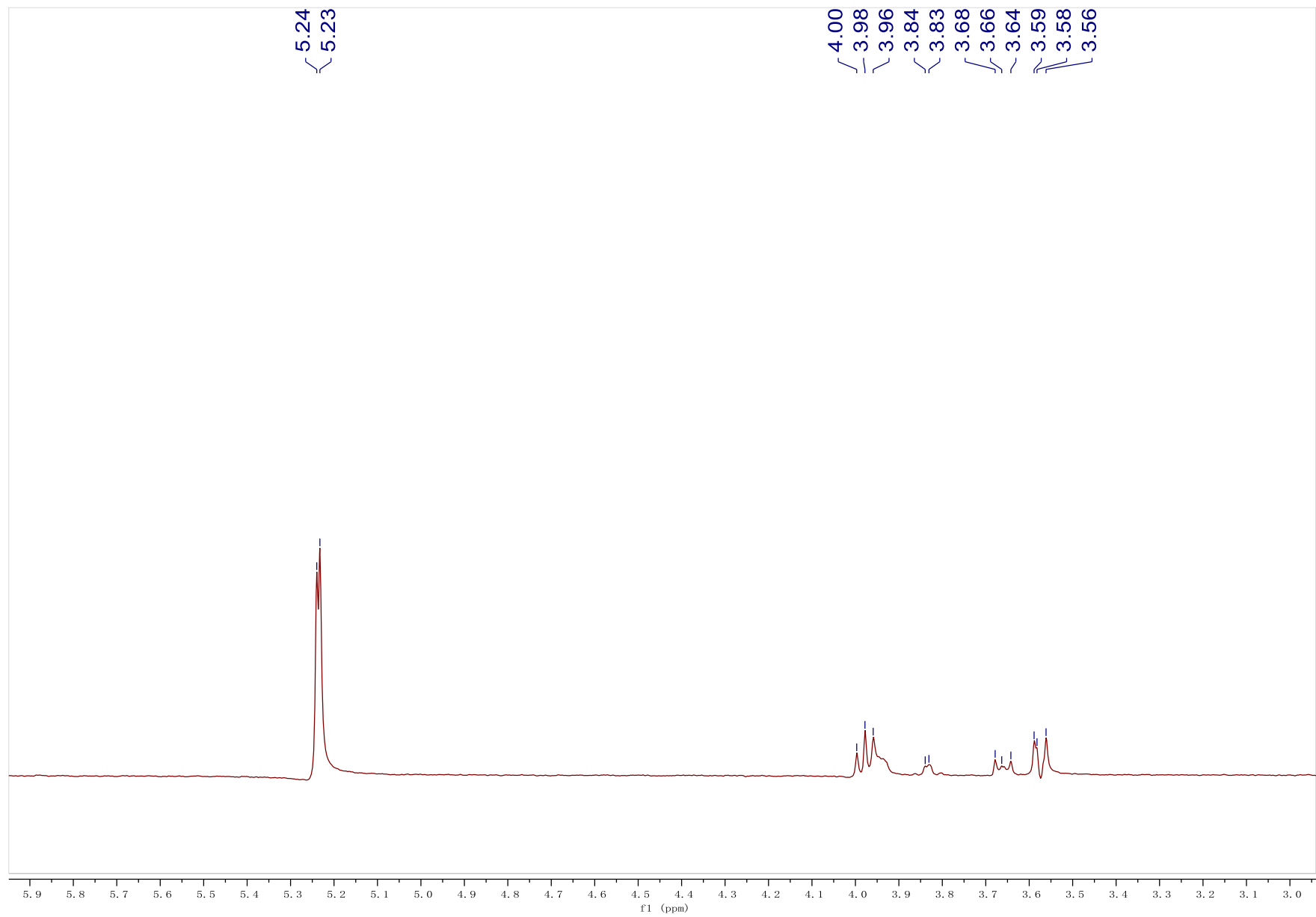
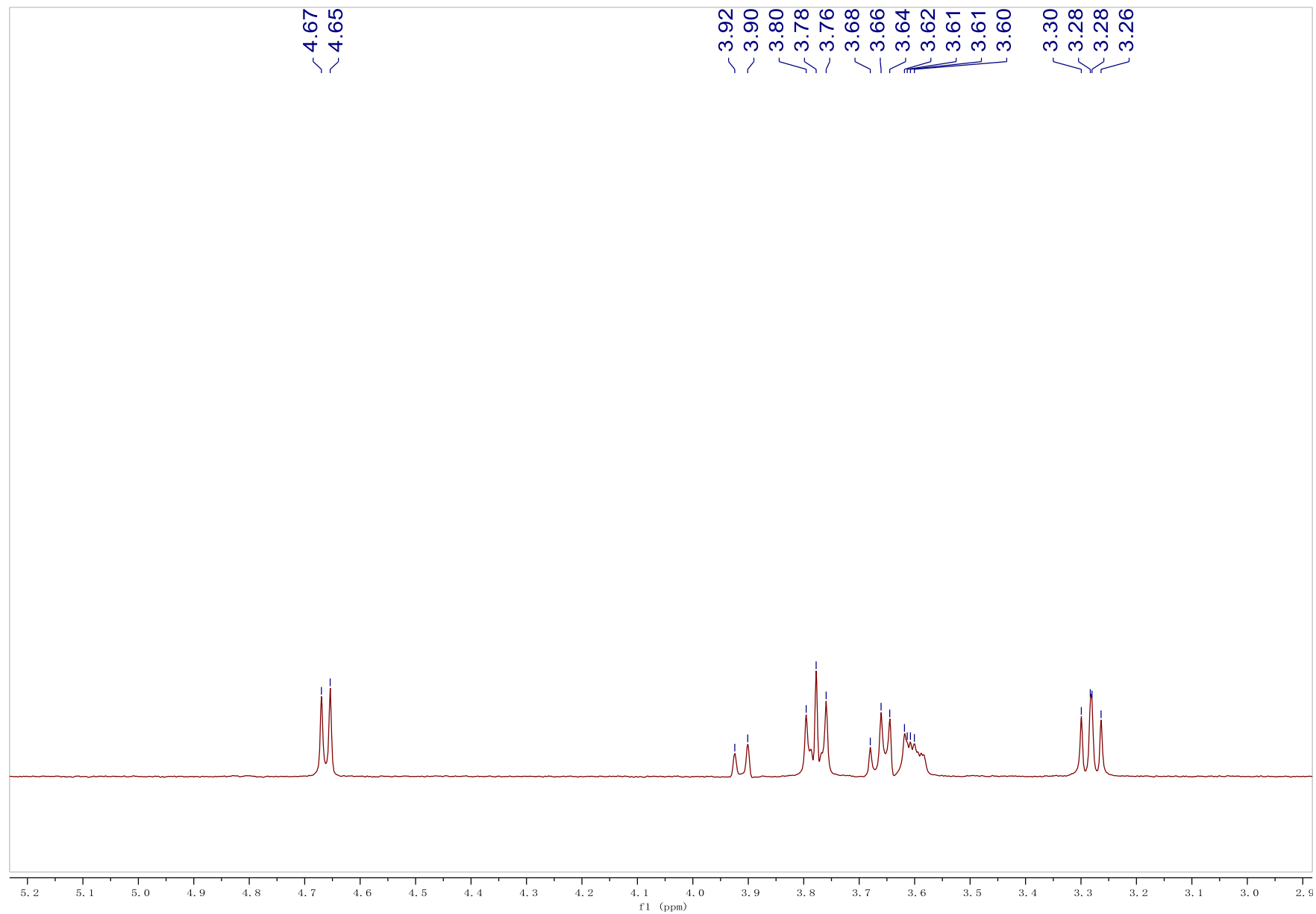


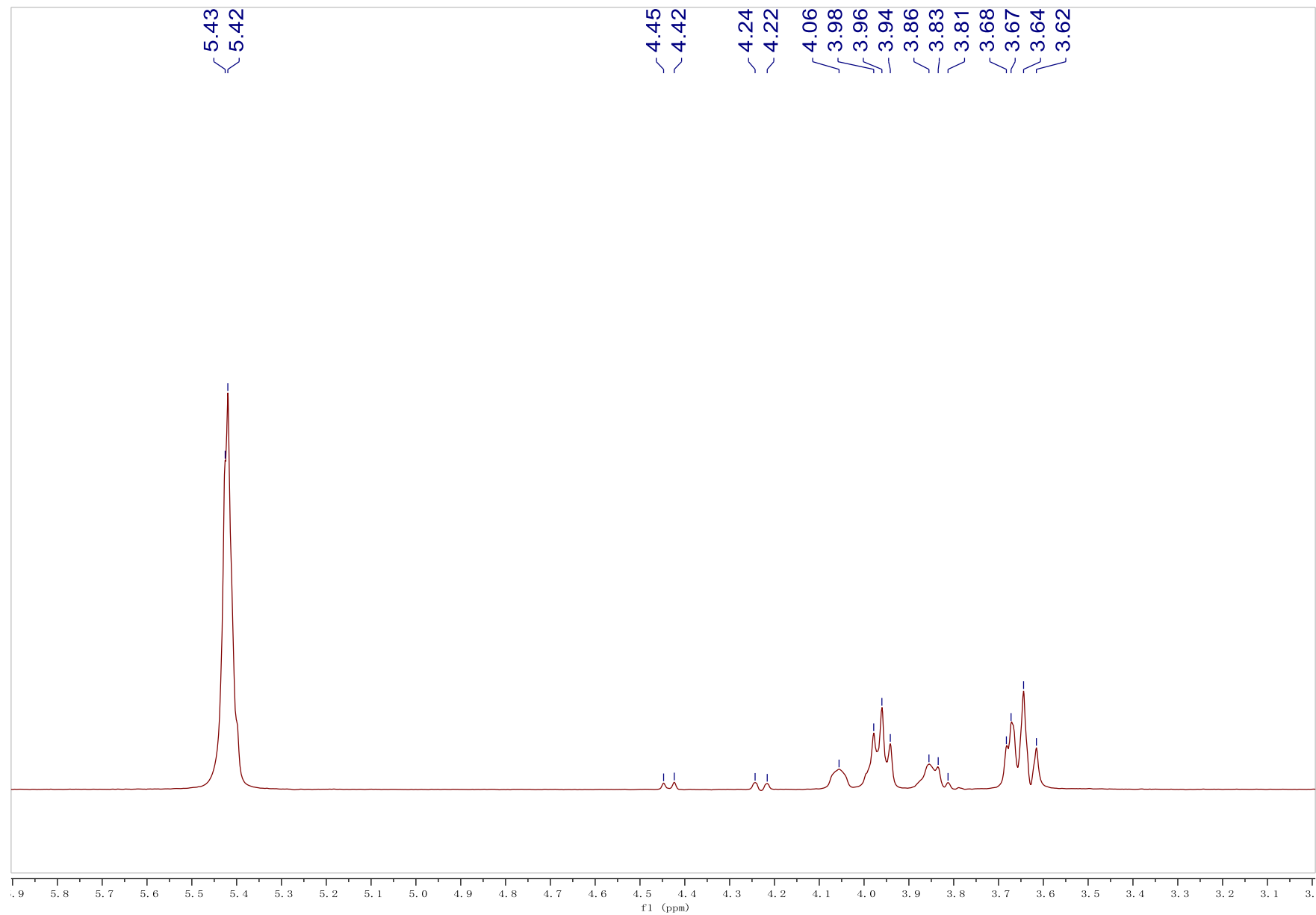
Figure S1. <sup>1</sup>H NMR spectrum of compound 1 (500 MHz, D<sub>2</sub>O).



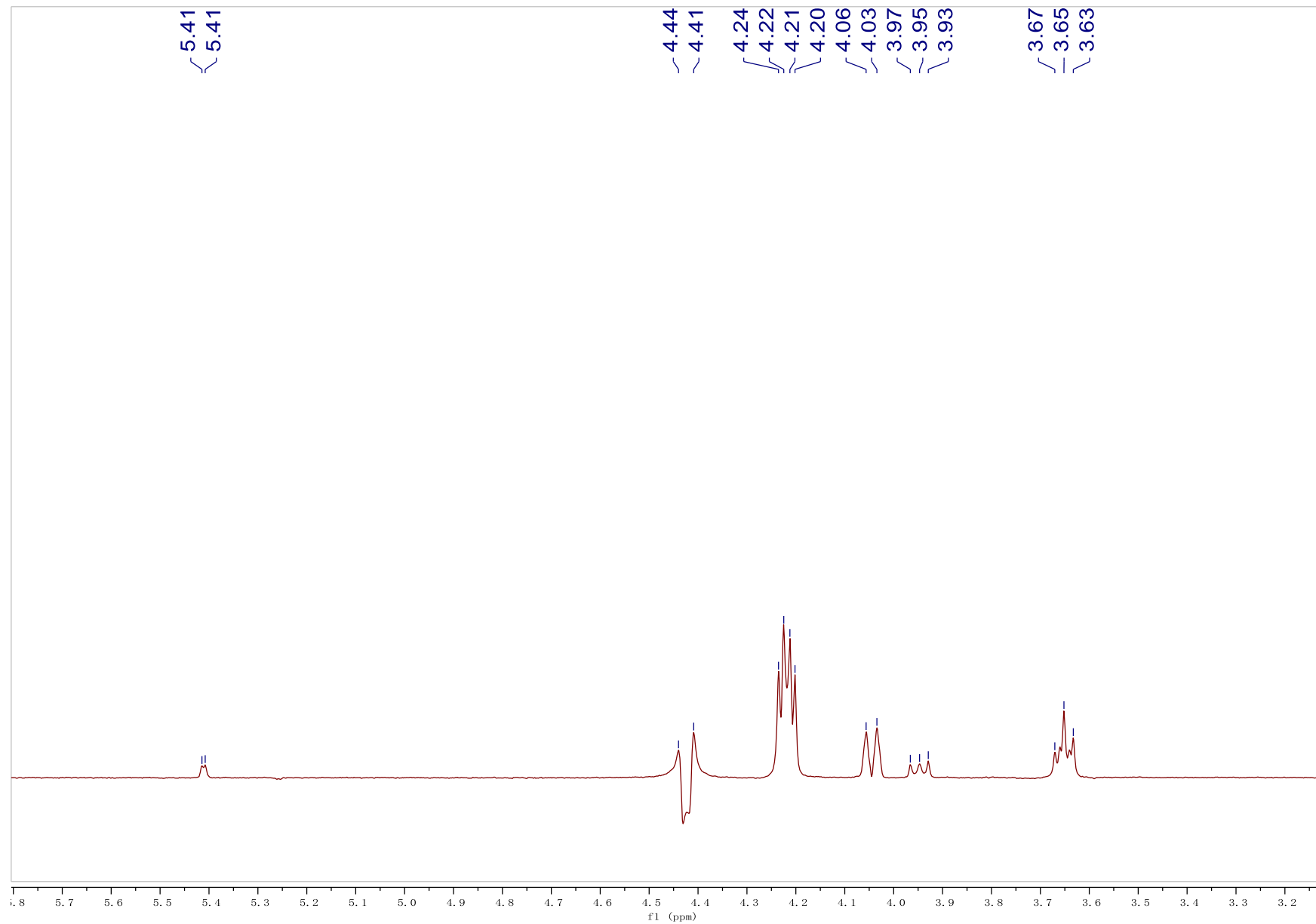
**Figure S2.** 1D-selective TOCSY spectrum of compound **1** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$  5.24, H-A1 $\alpha$ ).



**Figure S3.** 1D-selective TOCSY spectrum of compound **2** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$ 4.66, H-A1 $\beta$ ).

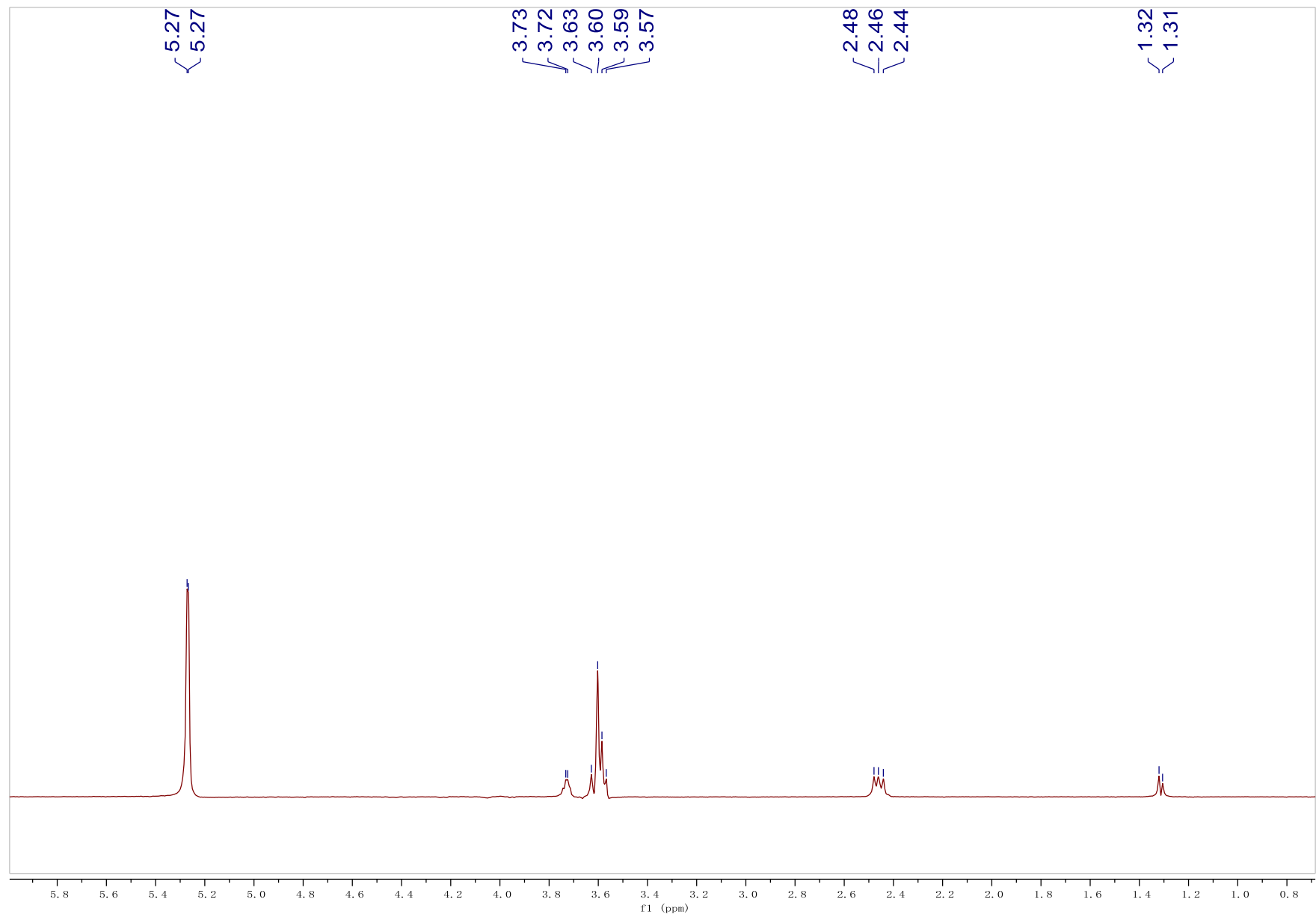


**Figure S4.** 1D-selective TOCSY spectrum of compound **1** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$ 5.42, H-B1, H-C1, and H-D1).

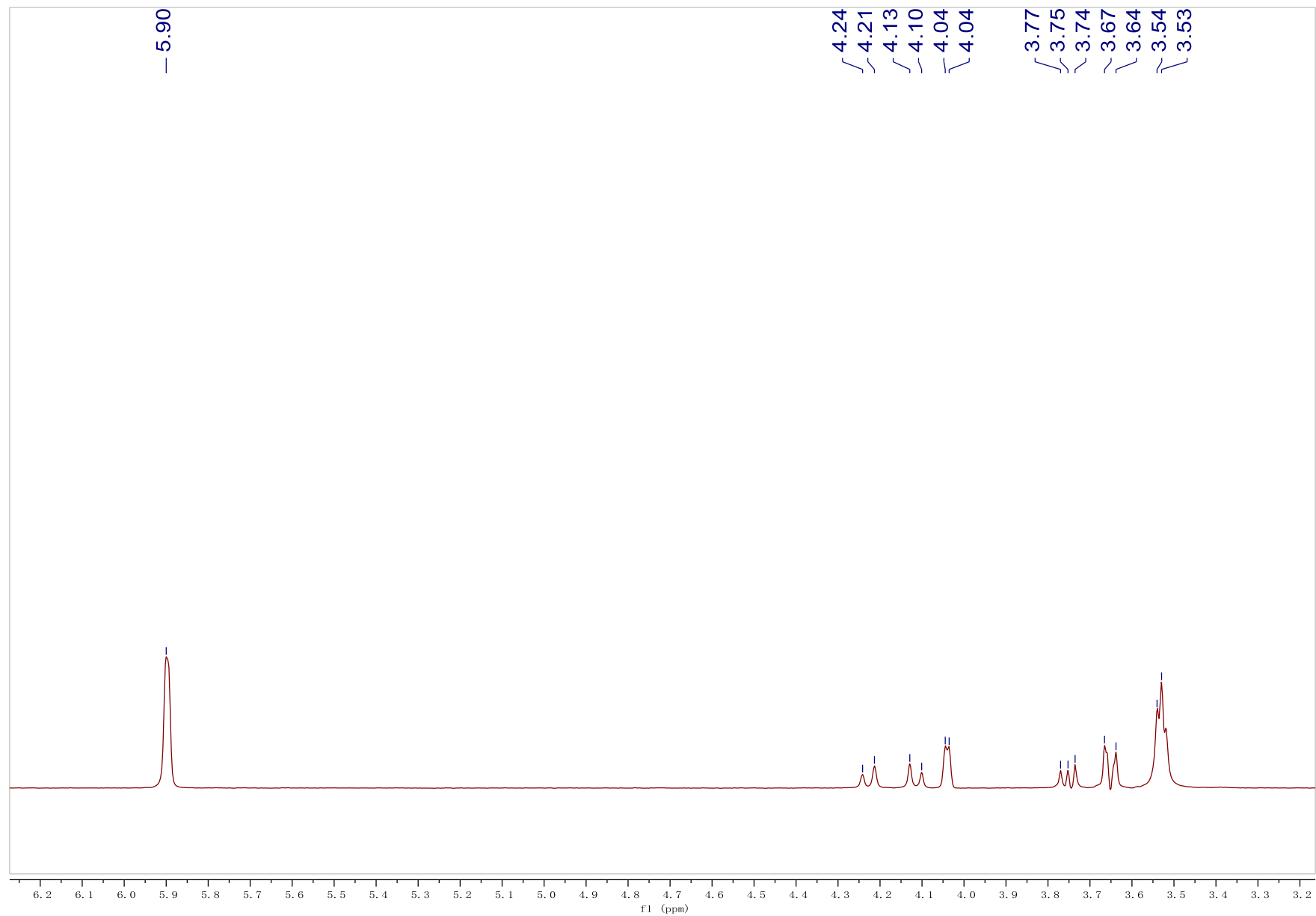


**Figure S5.** 1D-selective TOCSY spectrum of compound **1** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$ 4.44, H-D6a).

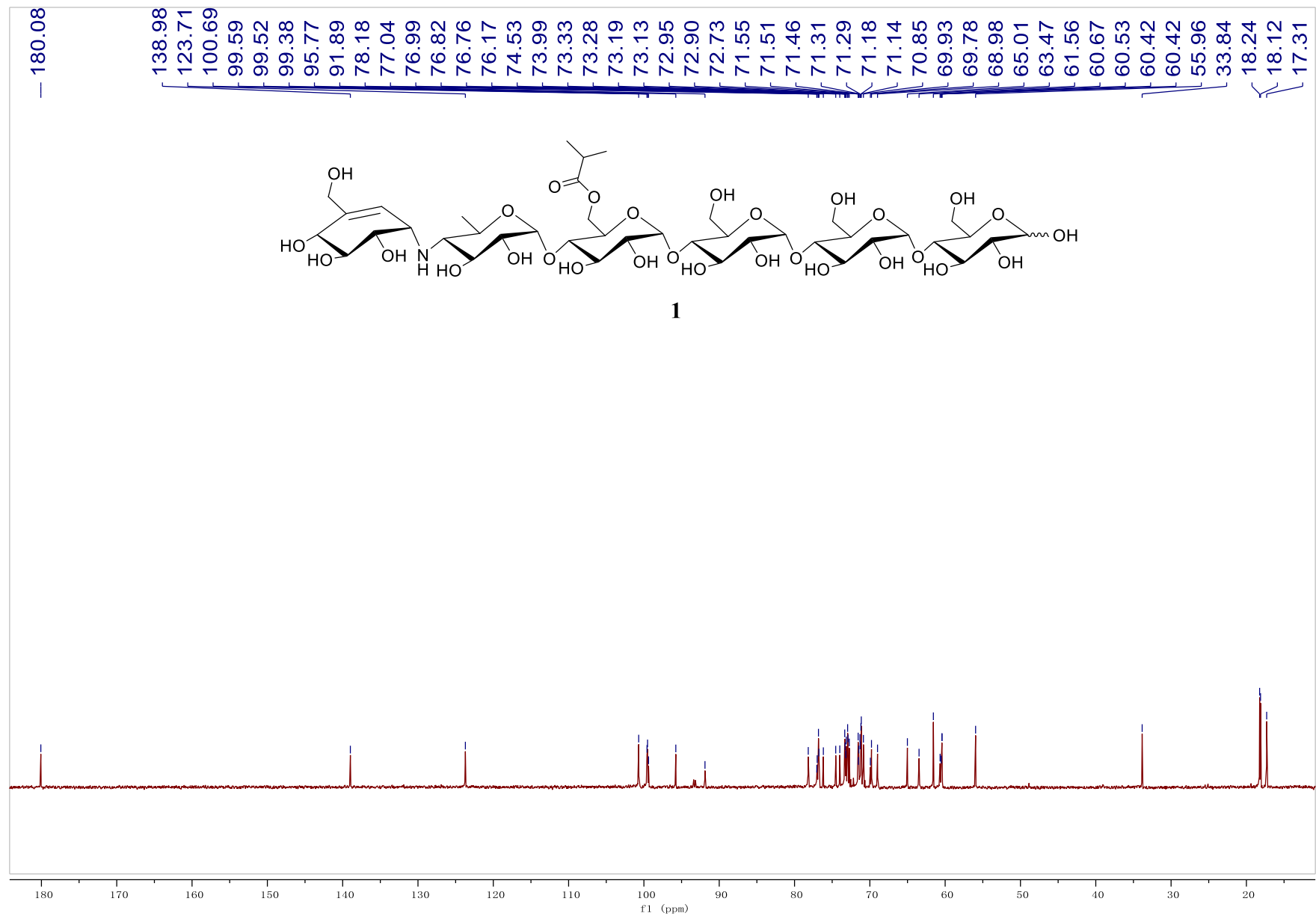




**Figure S6.** 1D-selective TOCSY spectrum of compound **1** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$ 5.27, H-E1).



**Figure S7.** 1D-selective TOCSY spectrum of compound **1** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$  5.90, H-F7).



**Figure S8.** <sup>13</sup>C NMR spectrum of compound **1** (125 MHz, D<sub>2</sub>O).

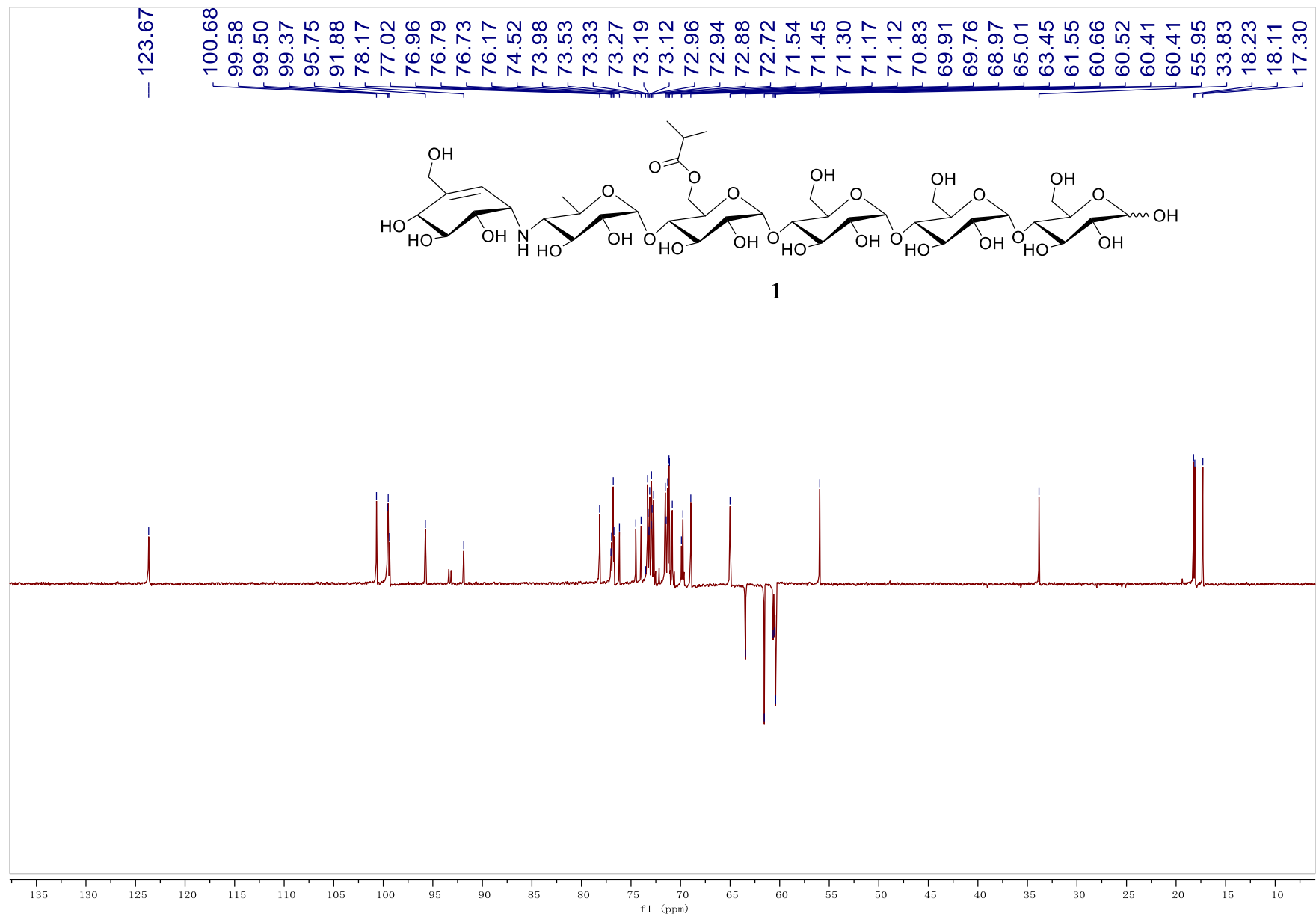
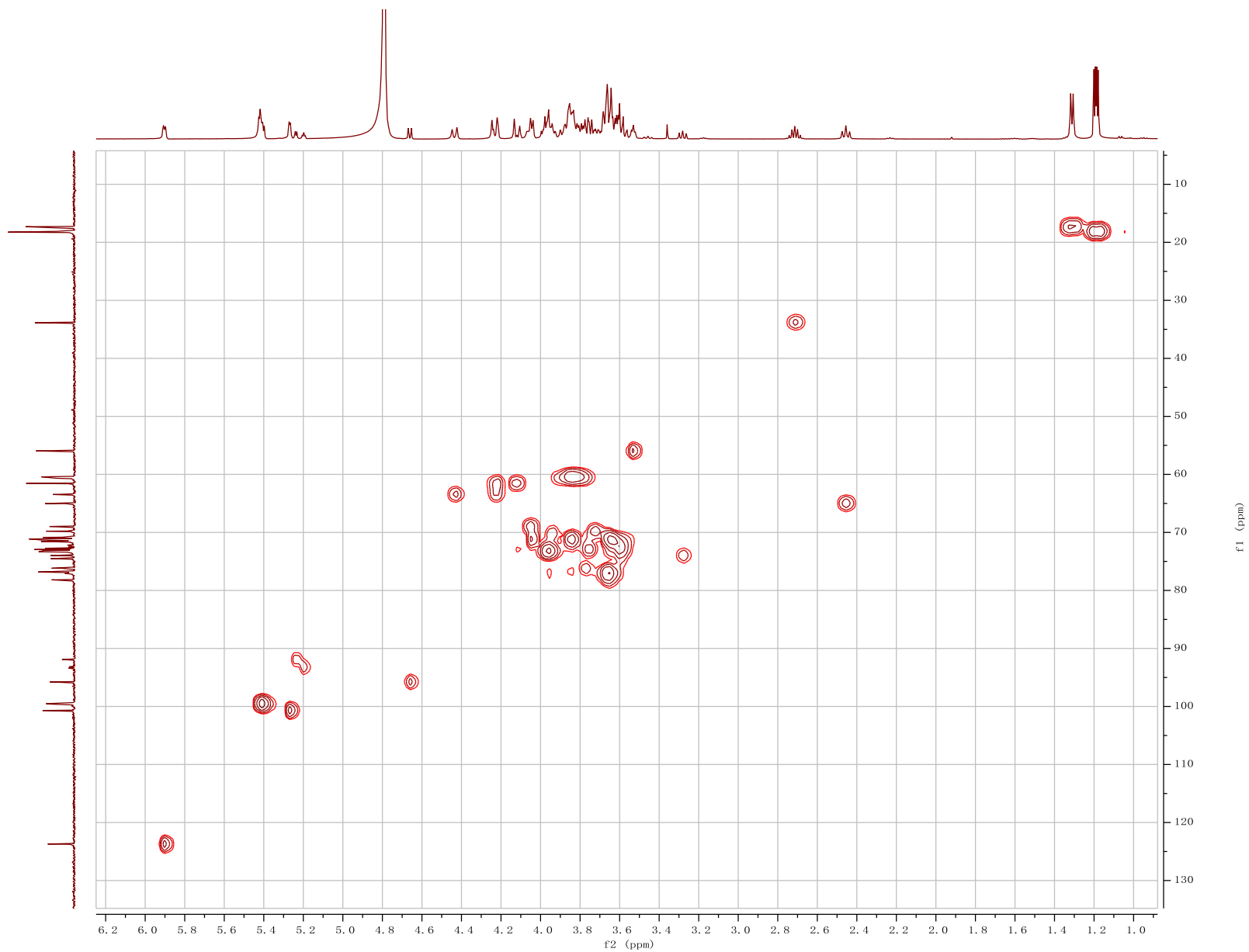
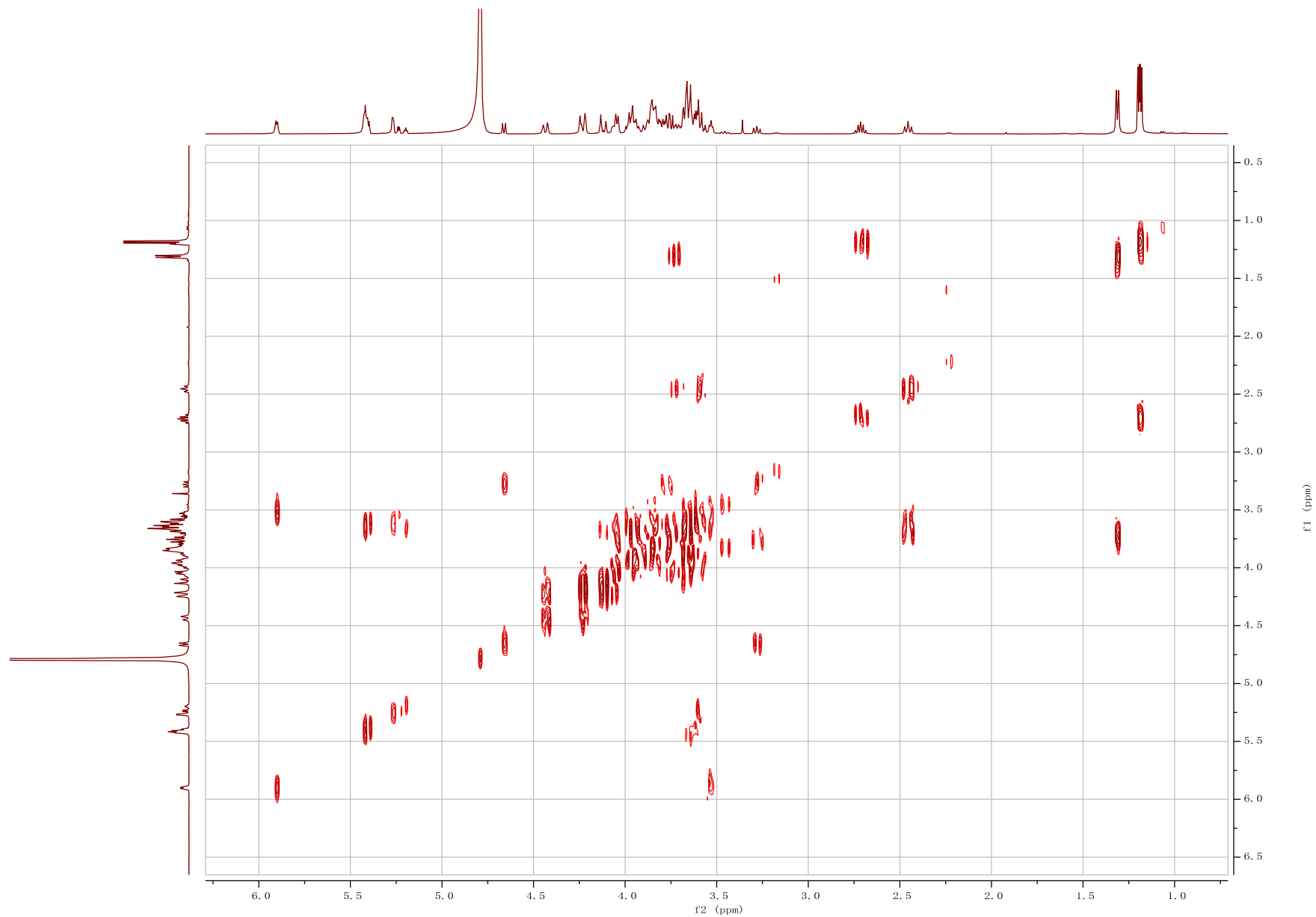


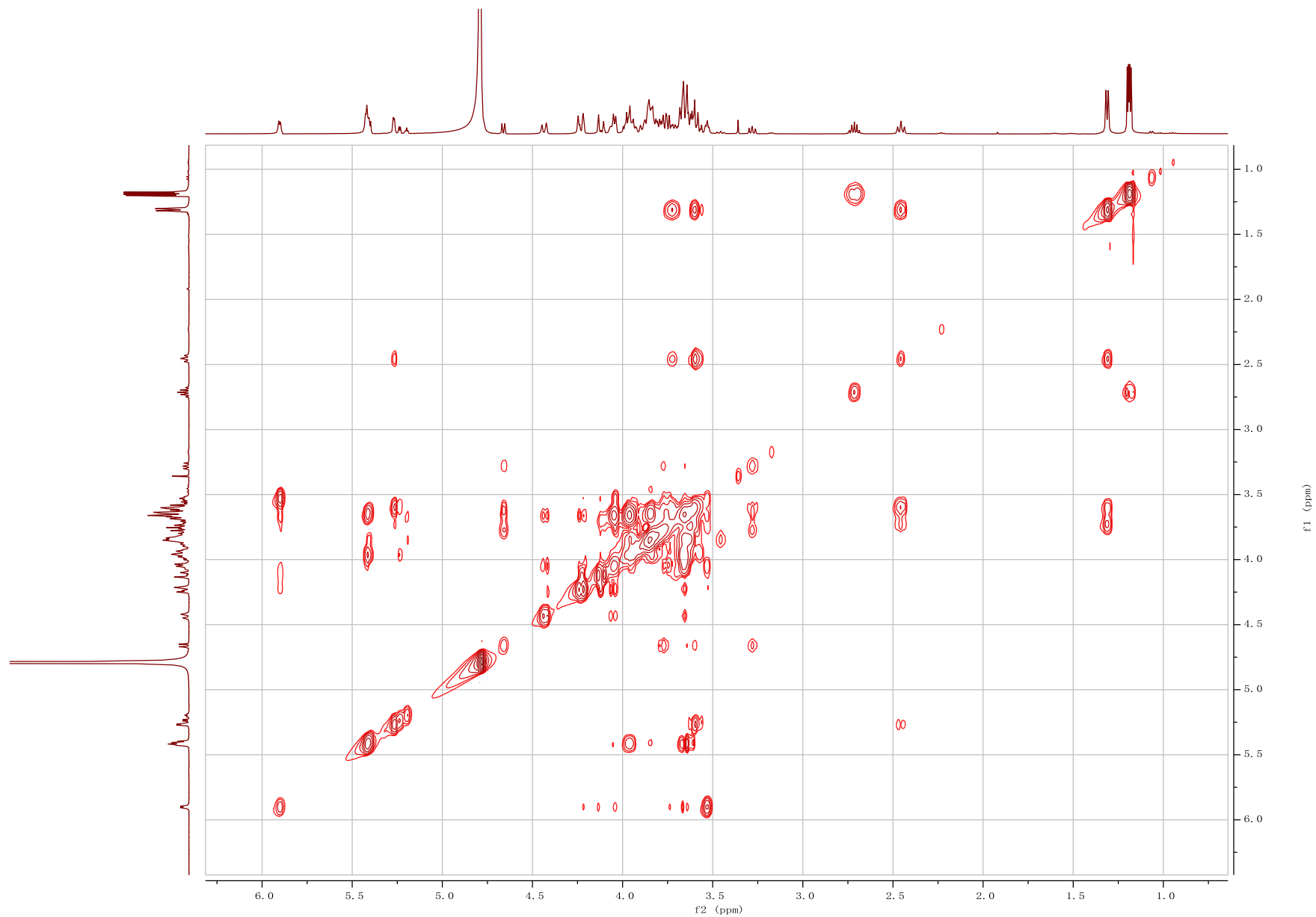
Figure S9. DEPT-135 spectrum of compound **1** (125 MHz, D<sub>2</sub>O).



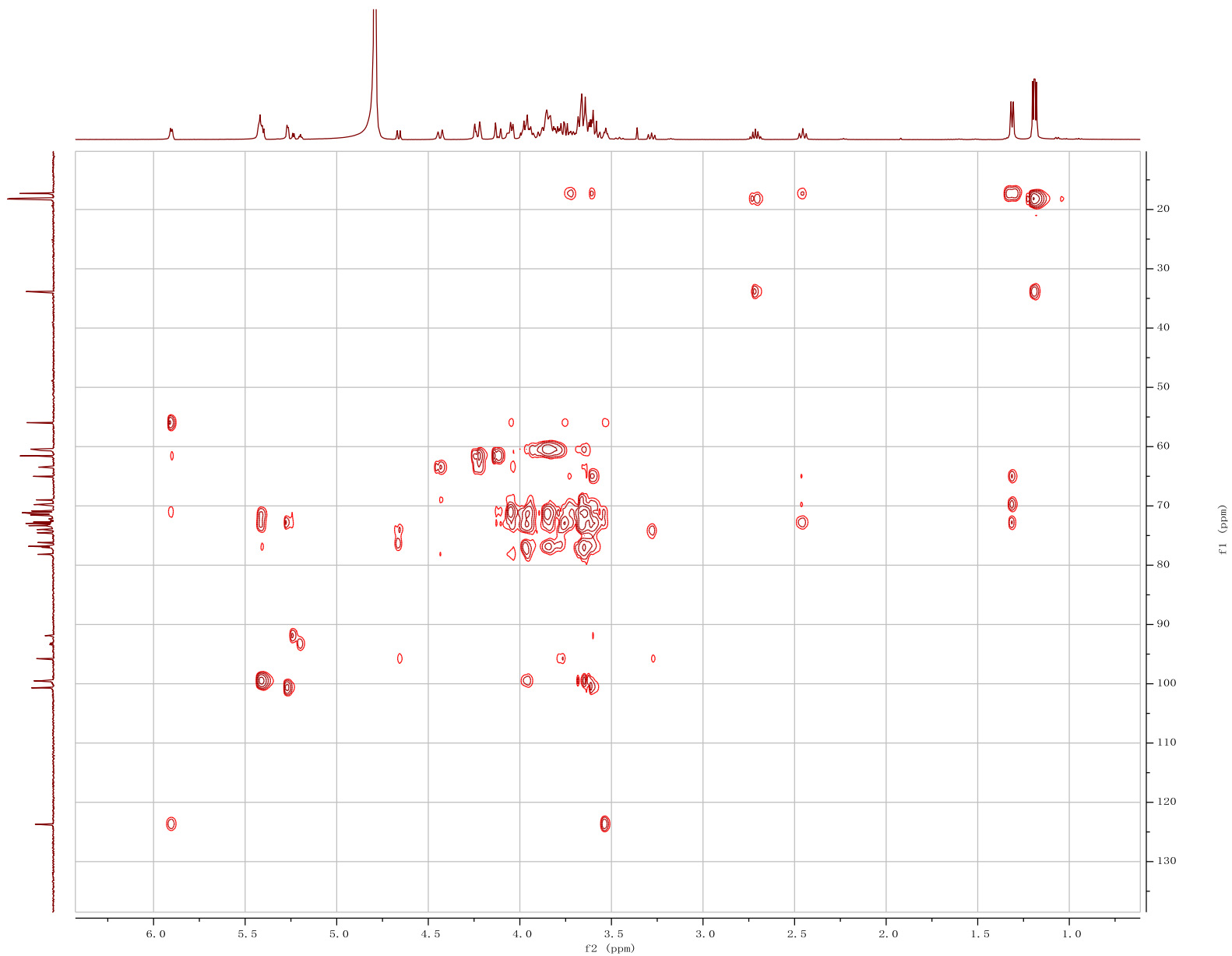
**Figure S10.** HSQC spectrum of compound **1** (500 MHz,  $\text{D}_2\text{O}$ ).



**Figure S11.**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of compound **1** (500 MHz,  $\text{D}_2\text{O}$ ).



**Figure S12.** 2D-TCOSY spectrum of compound **1** (500 MHz, D<sub>2</sub>O).

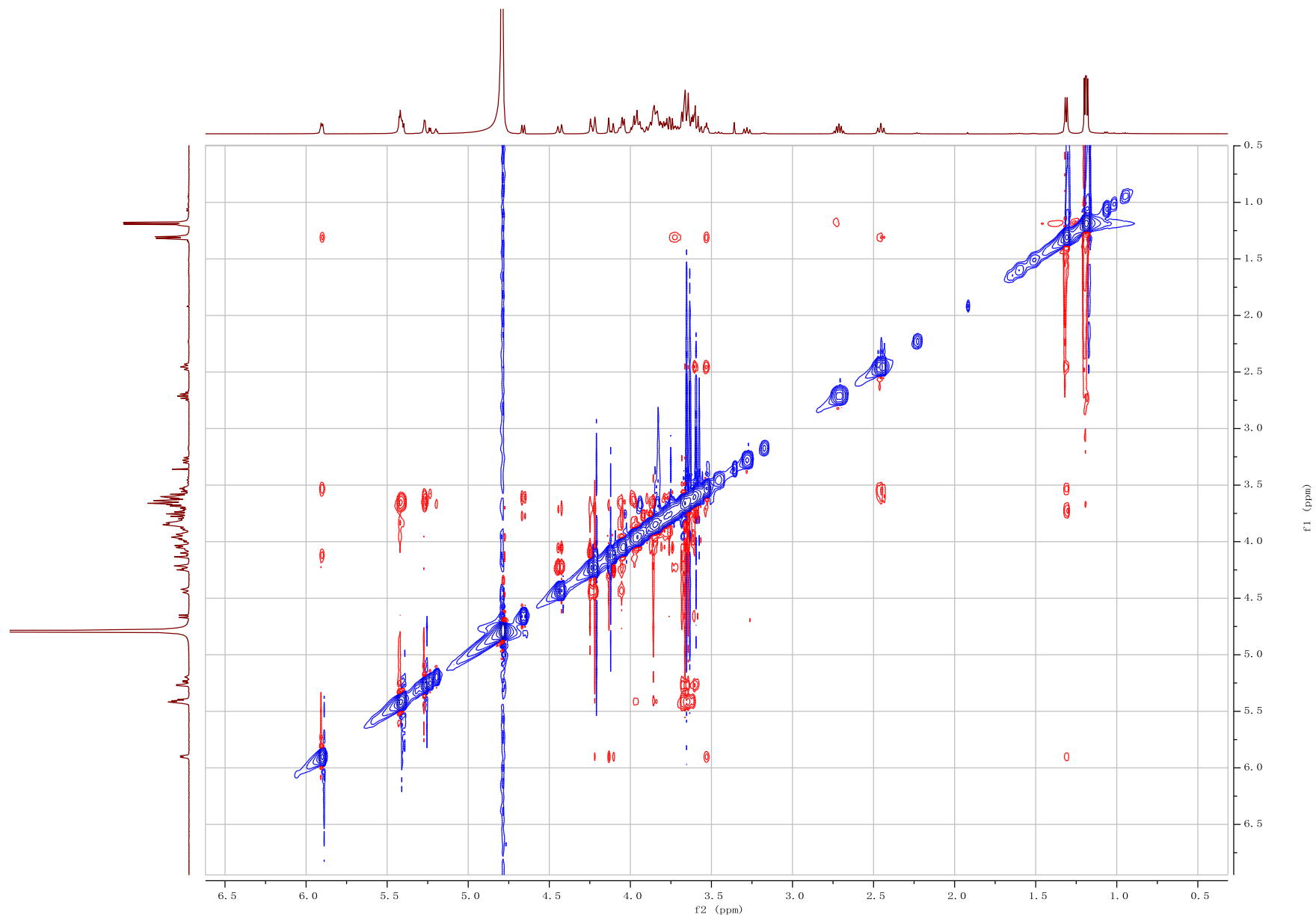


**Figure S13.** HSQC-TCOSY spectrum of compound **1** (500 MHz, D<sub>2</sub>O).



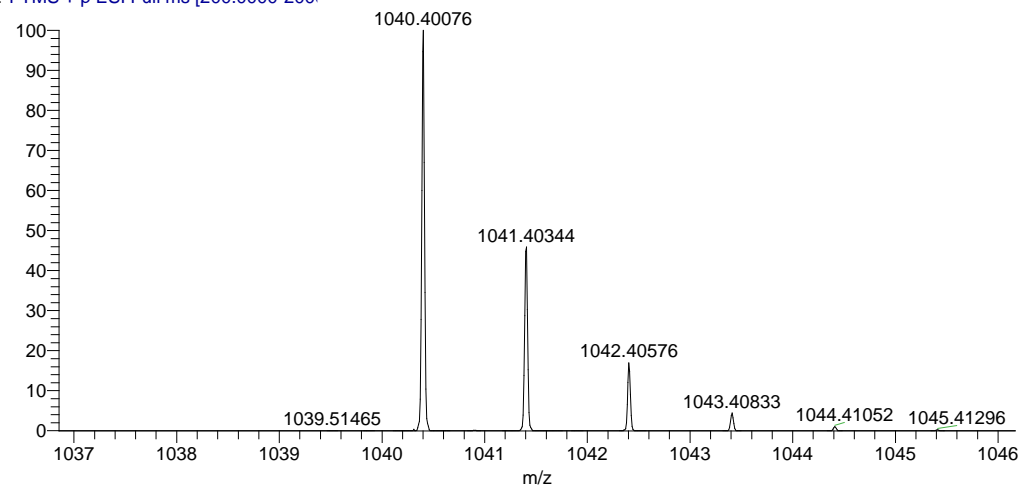


**Figure S14.** HMBC spectrum of compound **1** (500 MHz, D<sub>2</sub>O).

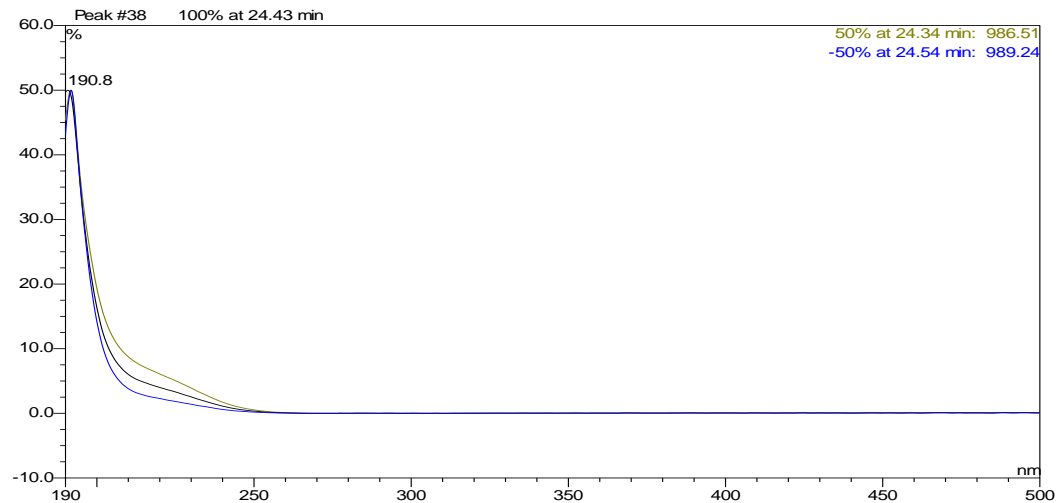


**Figure S15.** NOESY spectrum of compound **1** (500 MHz, D<sub>2</sub>O).

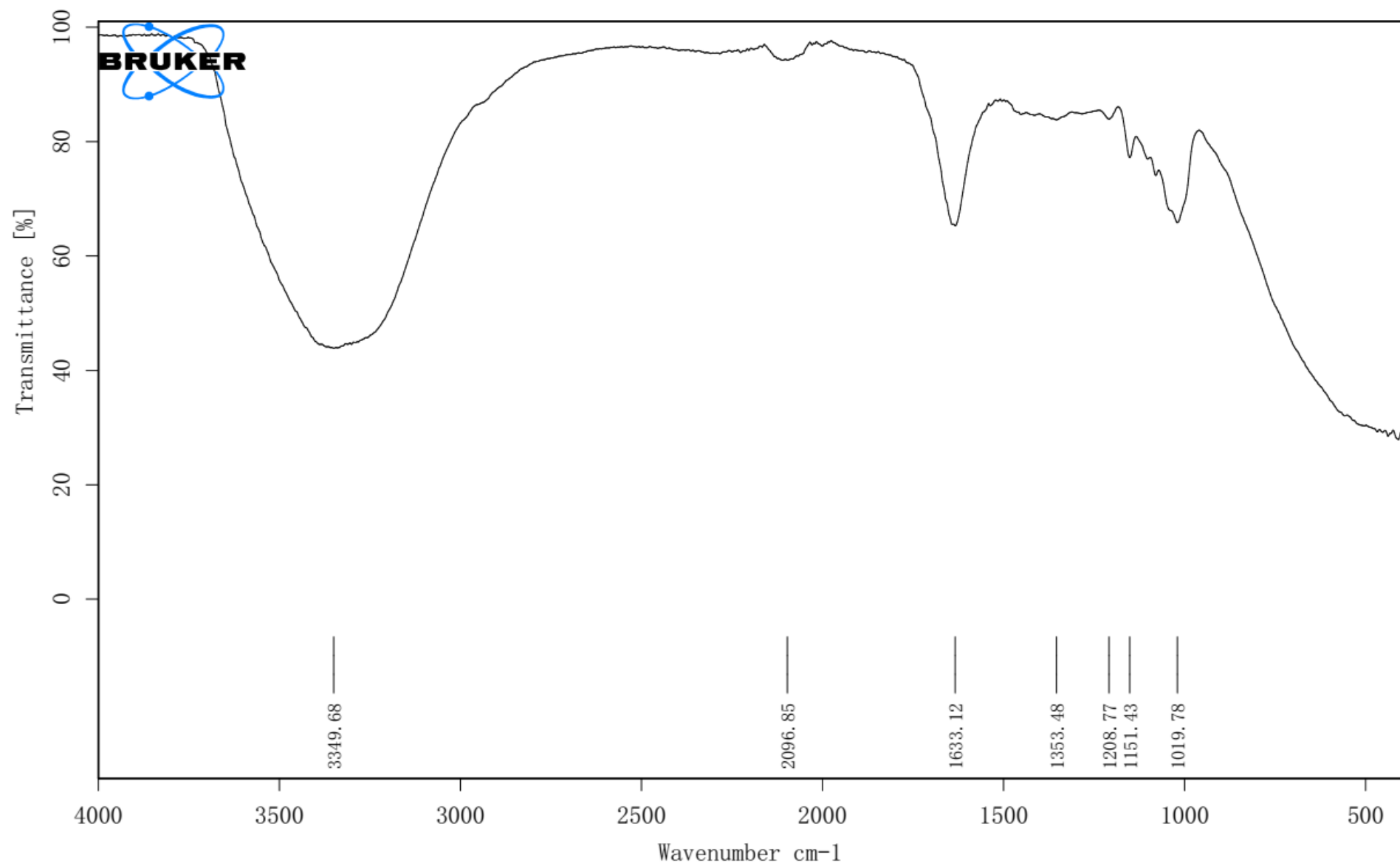
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T: FTMS + p ESI Full ms [200.0000-200]



**Figure S16.** HRESIMS spectrum of compound 1.



**Figure S17.** UV spectrum of compound 1.



**Figure S18.** IR spectrum of compound **1**.

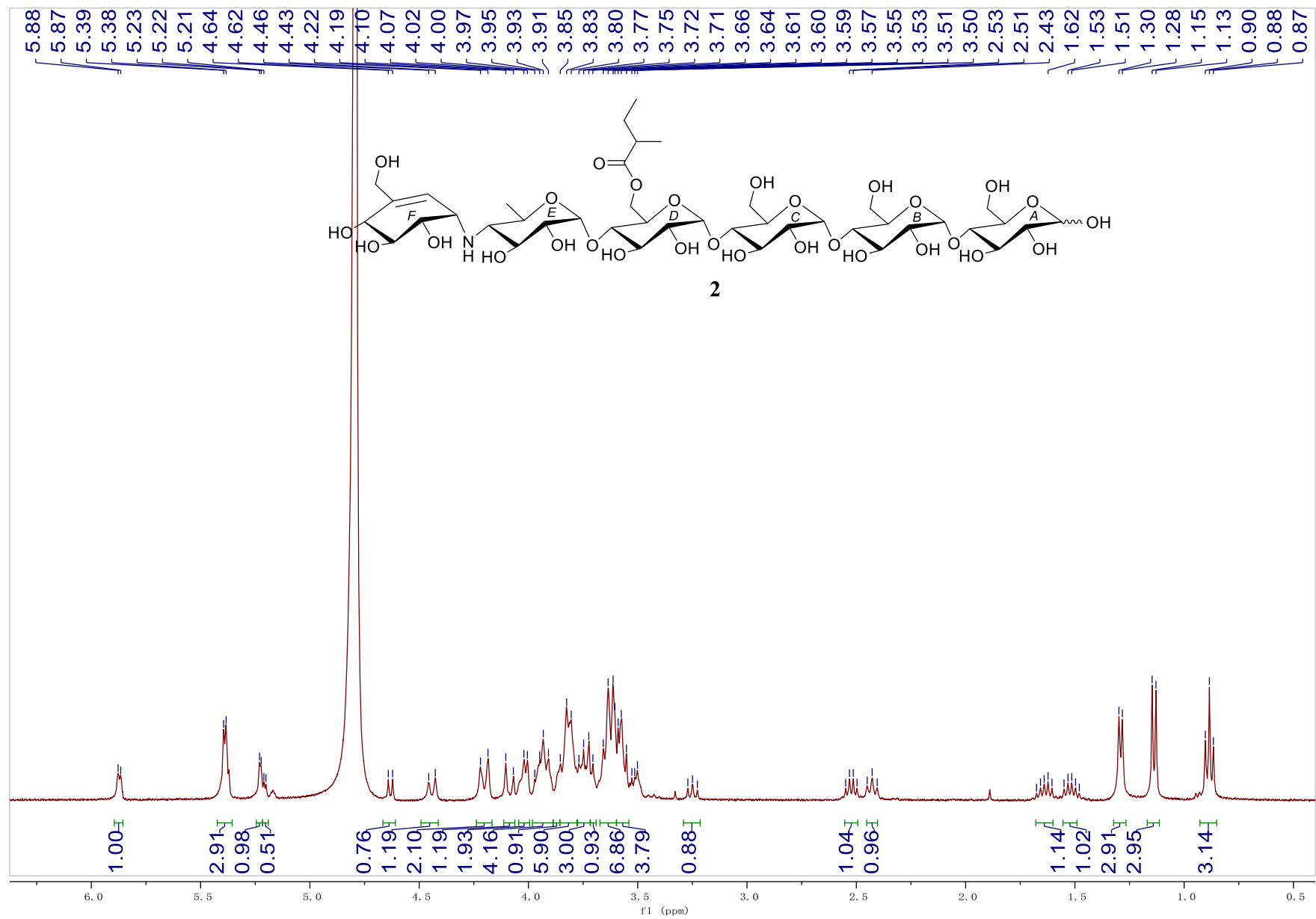
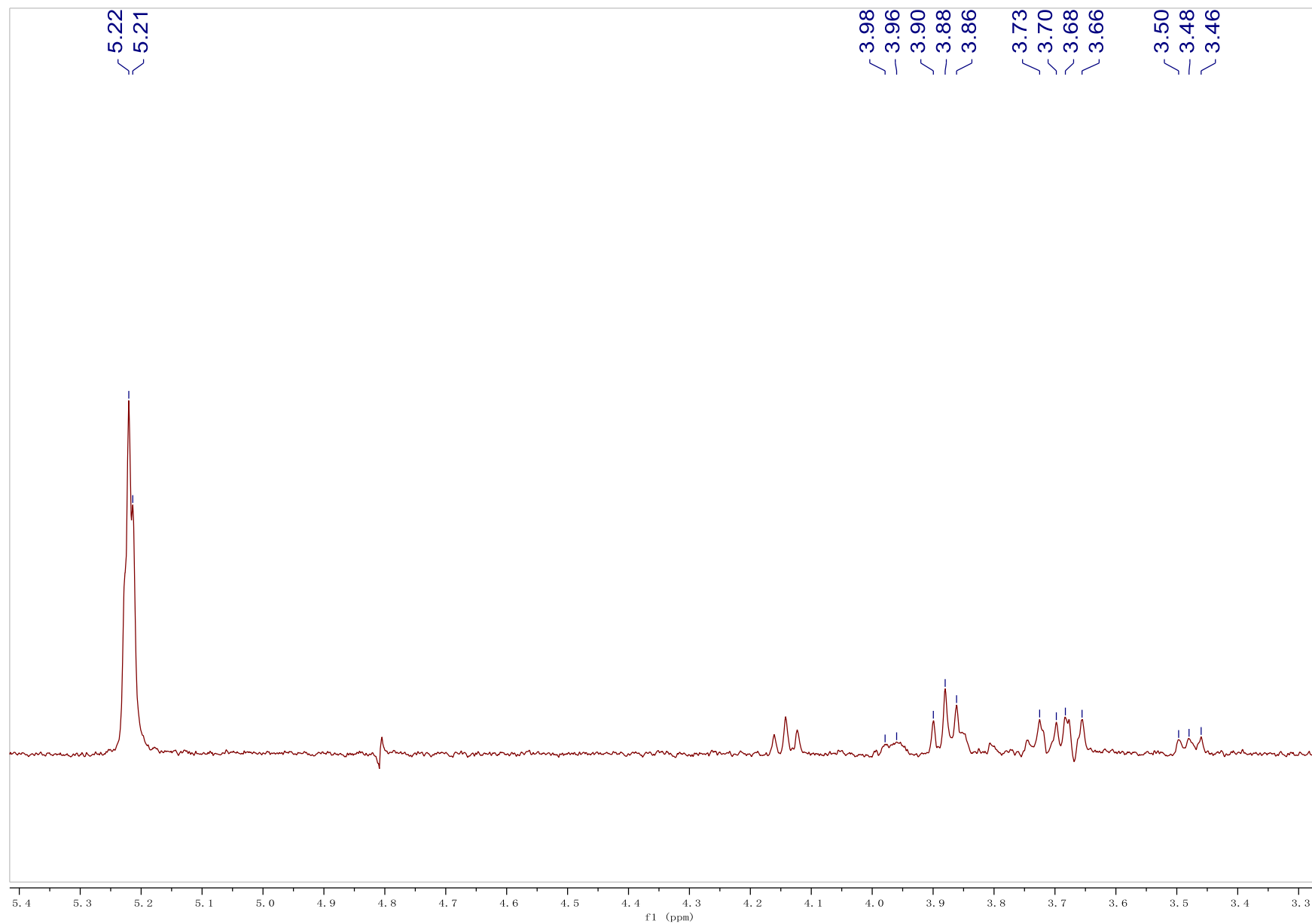
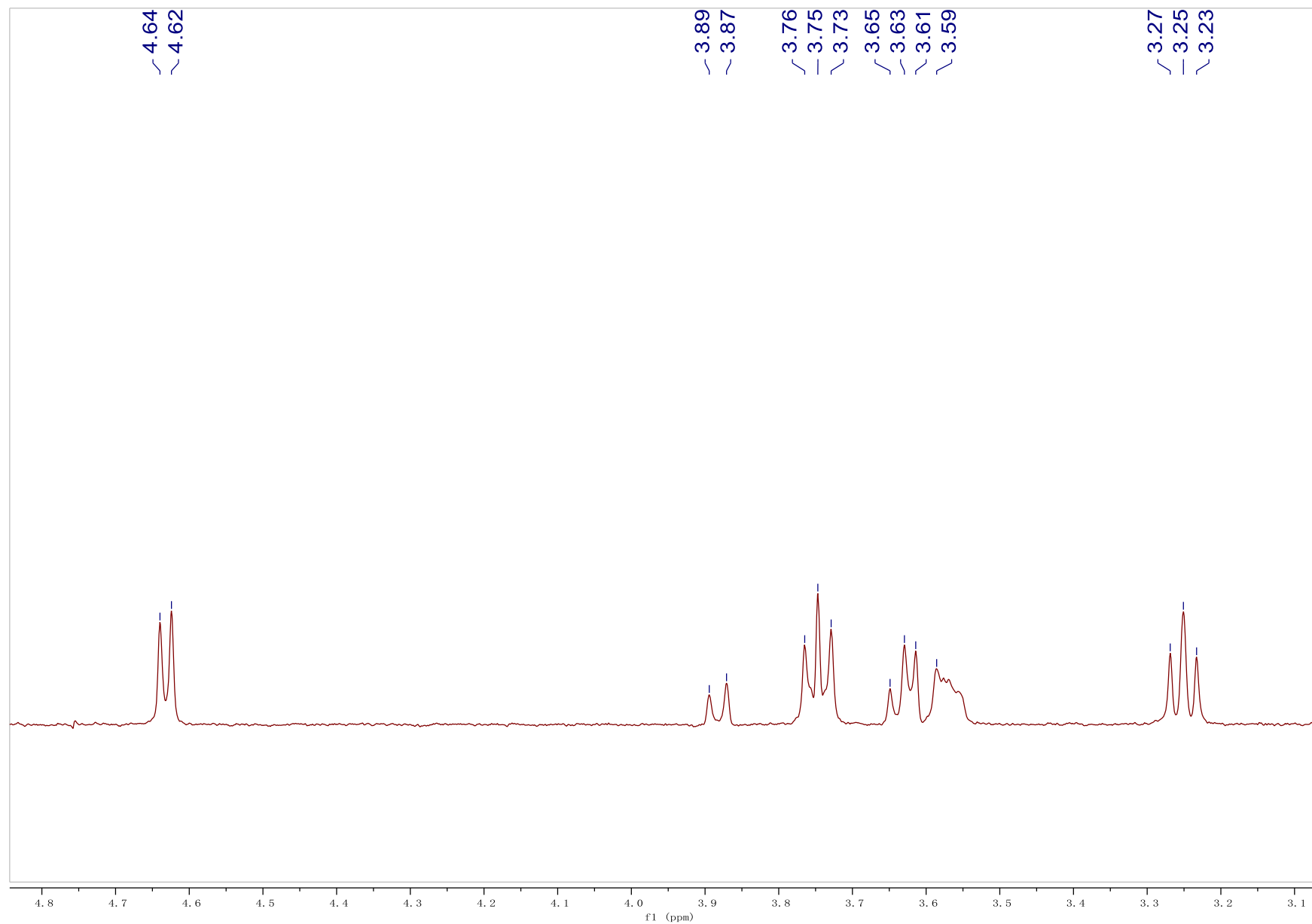


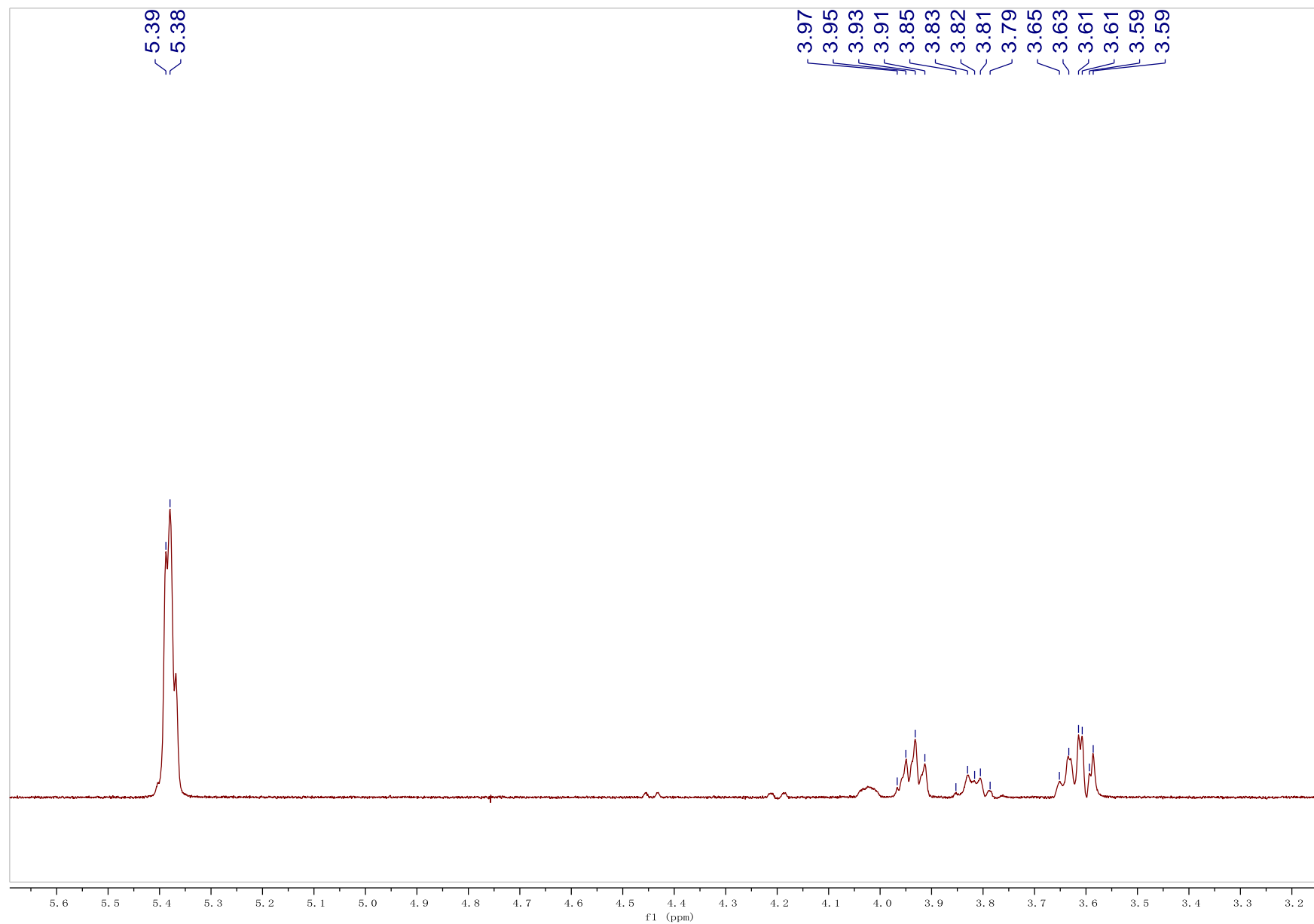
Figure S19. <sup>1</sup>H NMR spectrum of compound 2 (500 MHz, D<sub>2</sub>O).



**Figure S20.** 1D-selective TOCSY spectrum of compound **2** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$ 5.21, H-A1 $\alpha$ ).

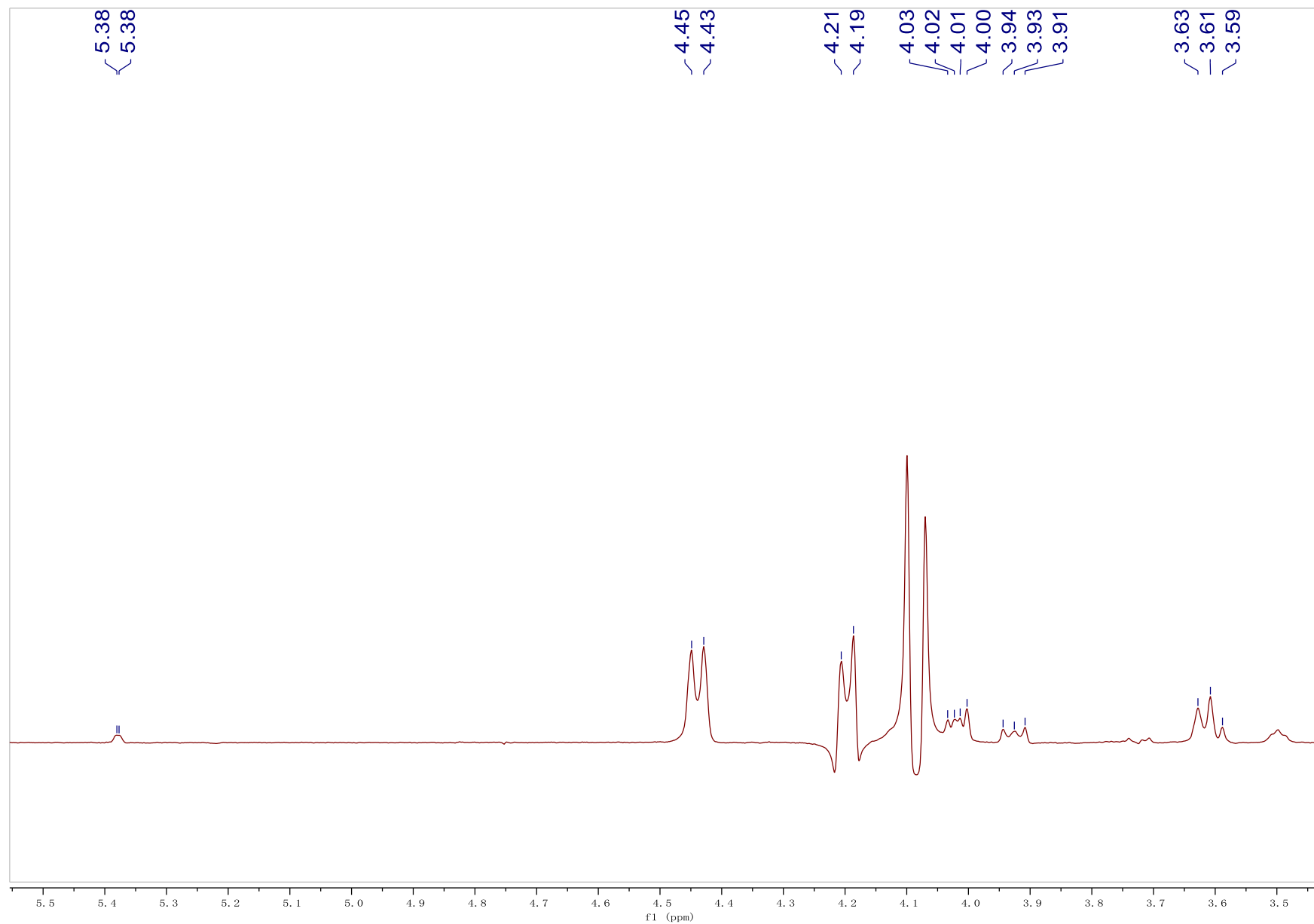


**Figure S21.** 1D-selective TOCSY spectrum of compound **2** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$ 4.63, H-A1 $\beta$ ).

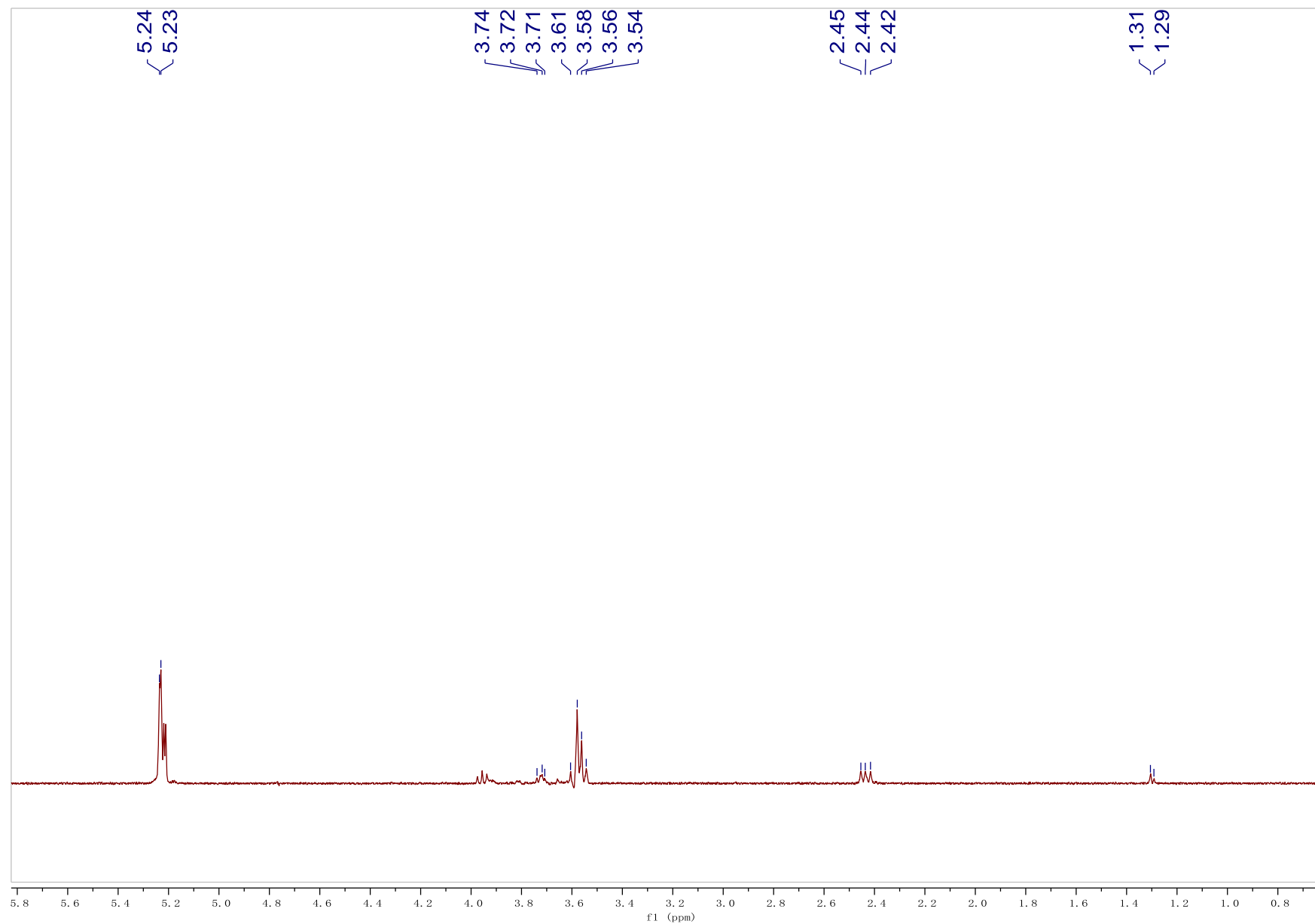


**Figure S22.** 1D-selective TOCSY spectrum of compound **2** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$  5.38, H-**B1**, C1, and D1).

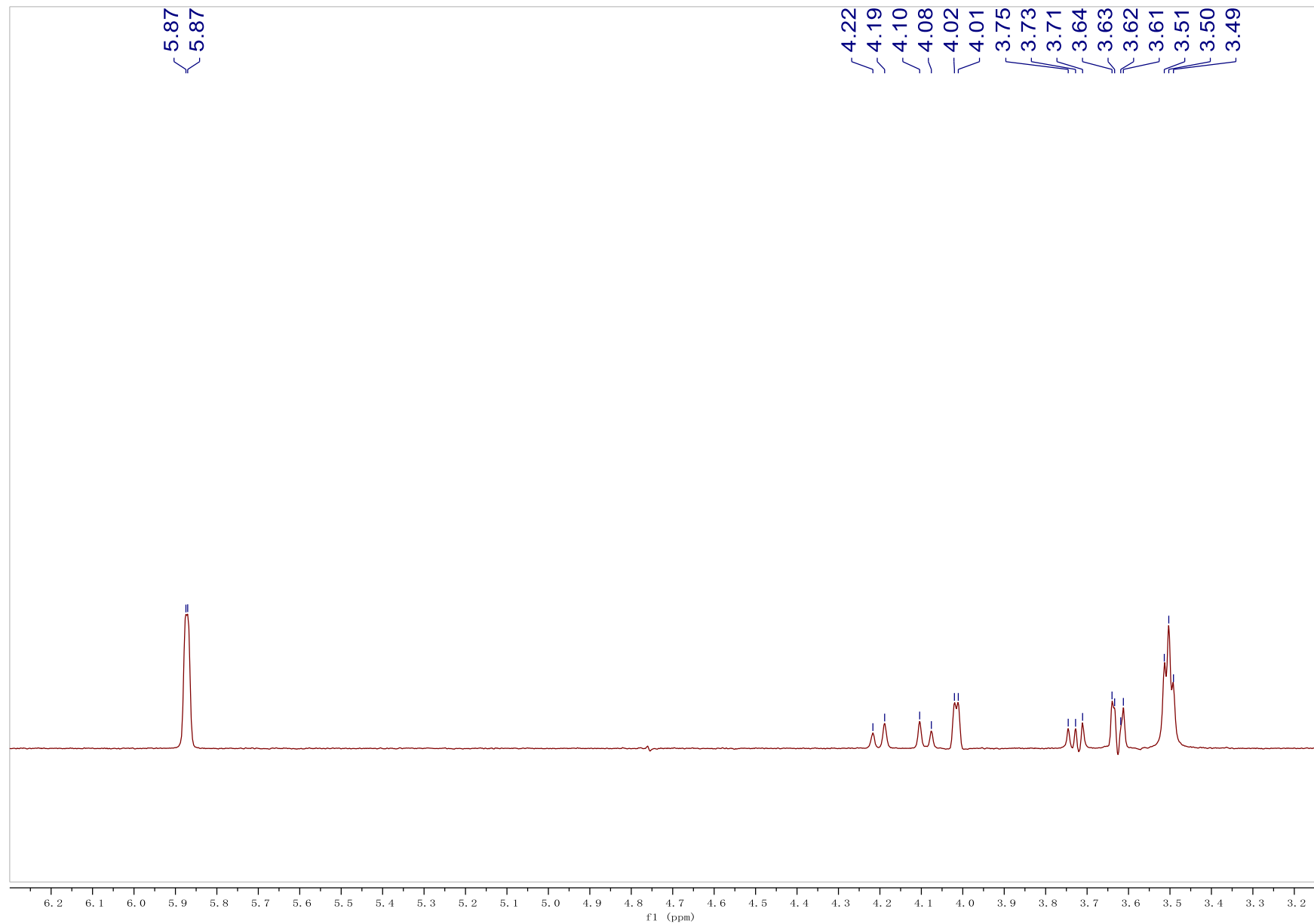




**Figure S23.** 1D-selective TOCSY spectrum of compound **2** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$ 4.44, H-D6a).



**Figure S24.** 1D-selective TOCSY spectrum of compound **2** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$  5.23, H-E1).



**Figure S25.** 1D-selective TOCSY spectrum of compound **2** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$  5.87, H-F1).

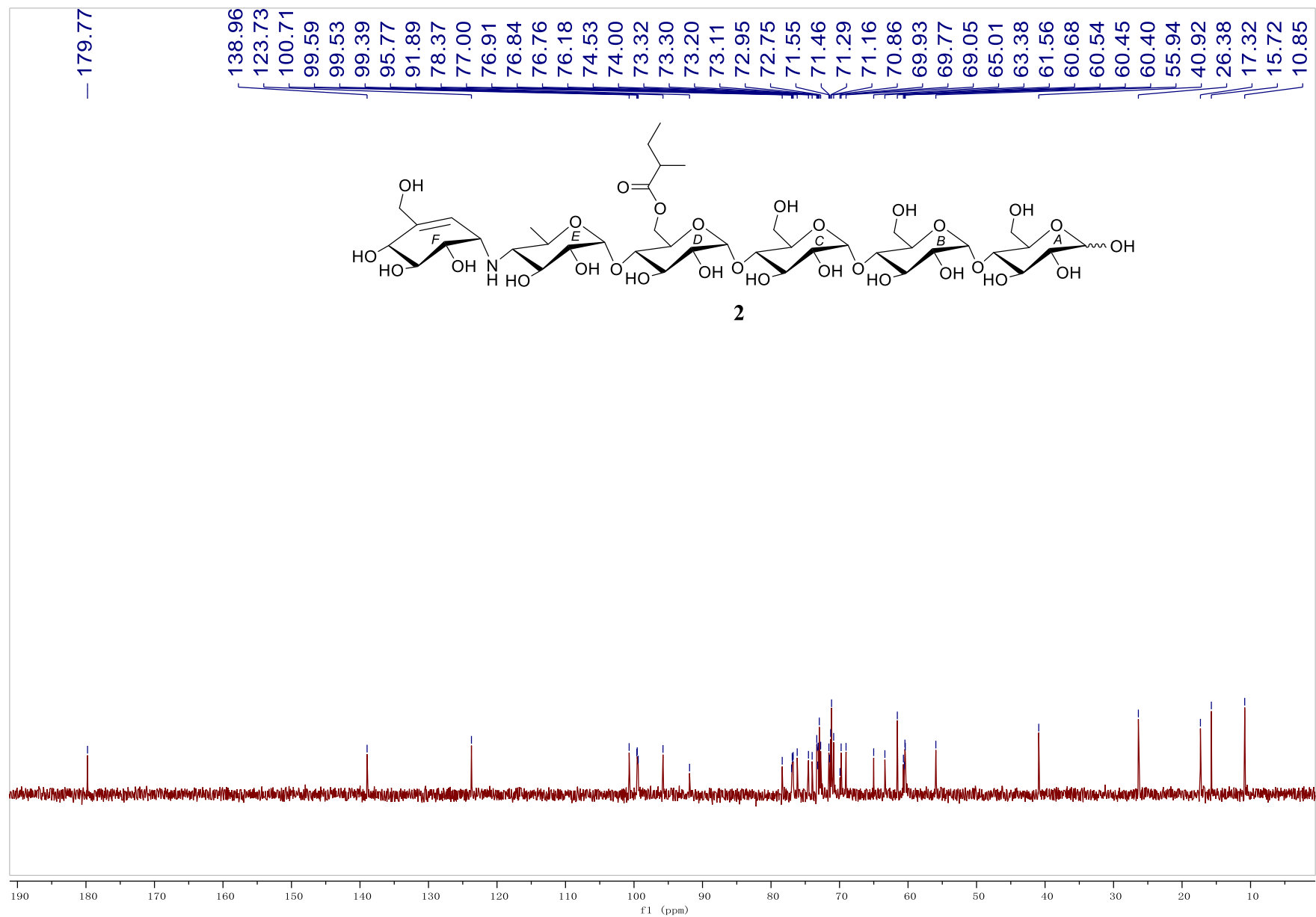


Figure S26. <sup>13</sup>C NMR spectrum of compound **2** (125 MHz, D<sub>2</sub>O).

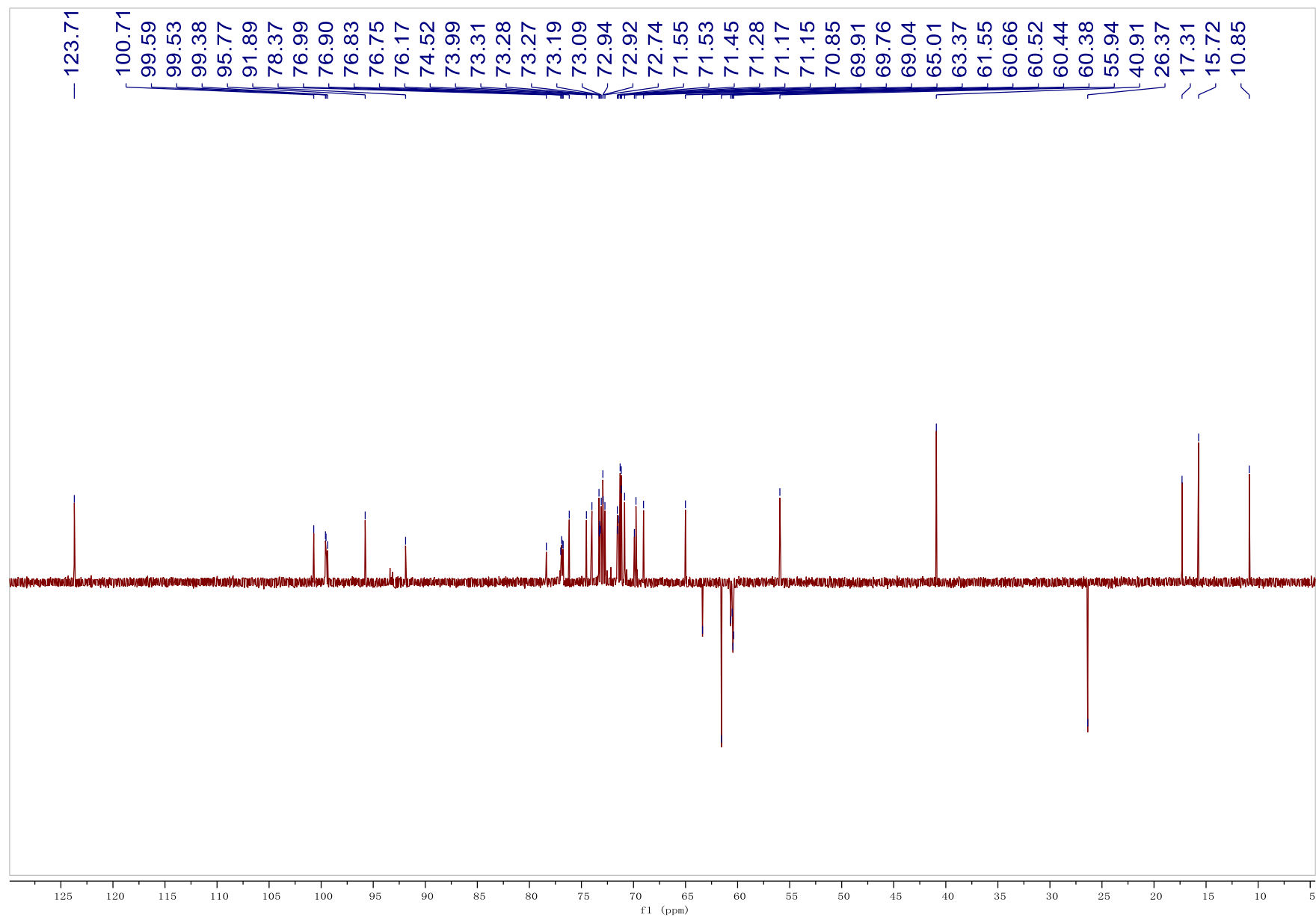
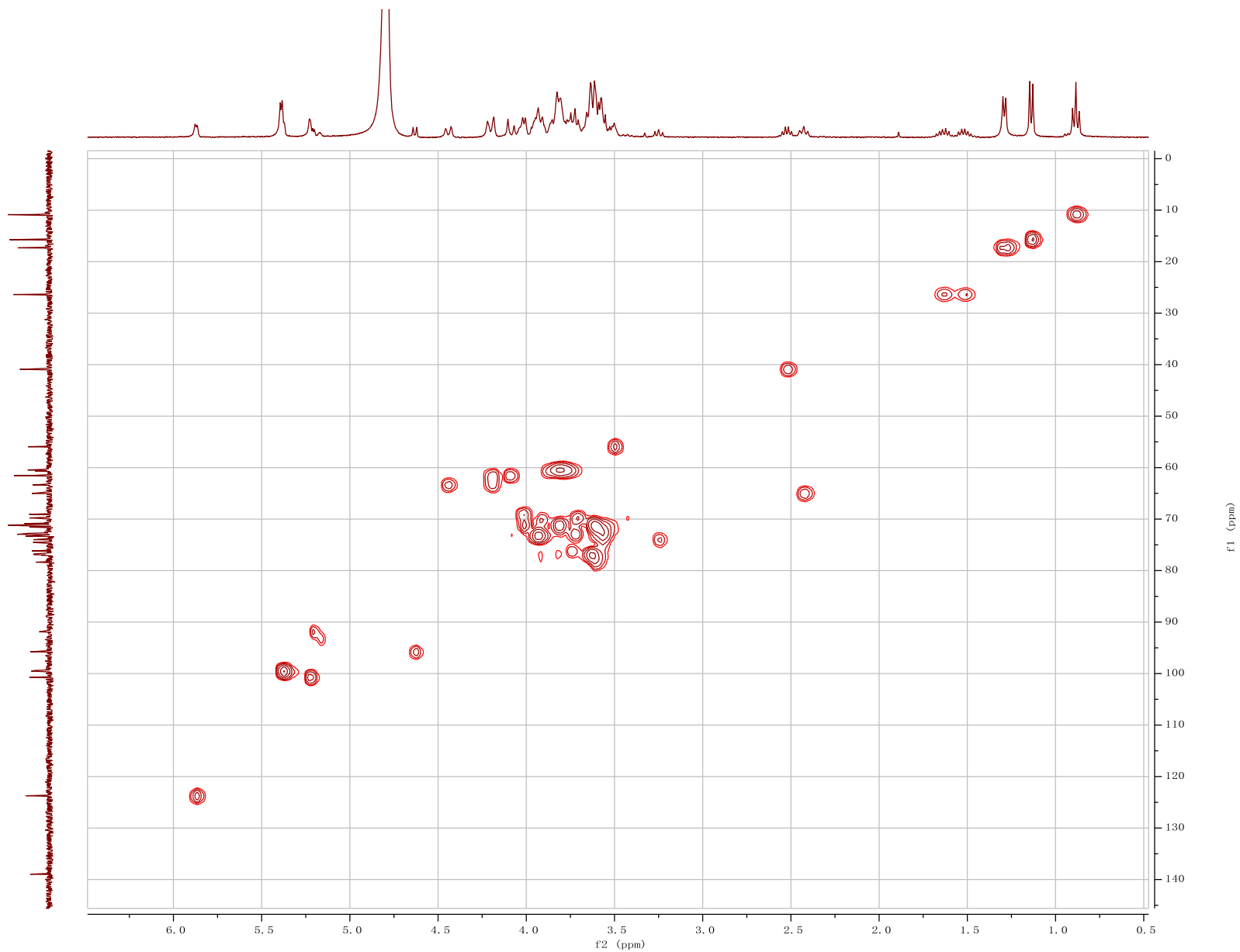


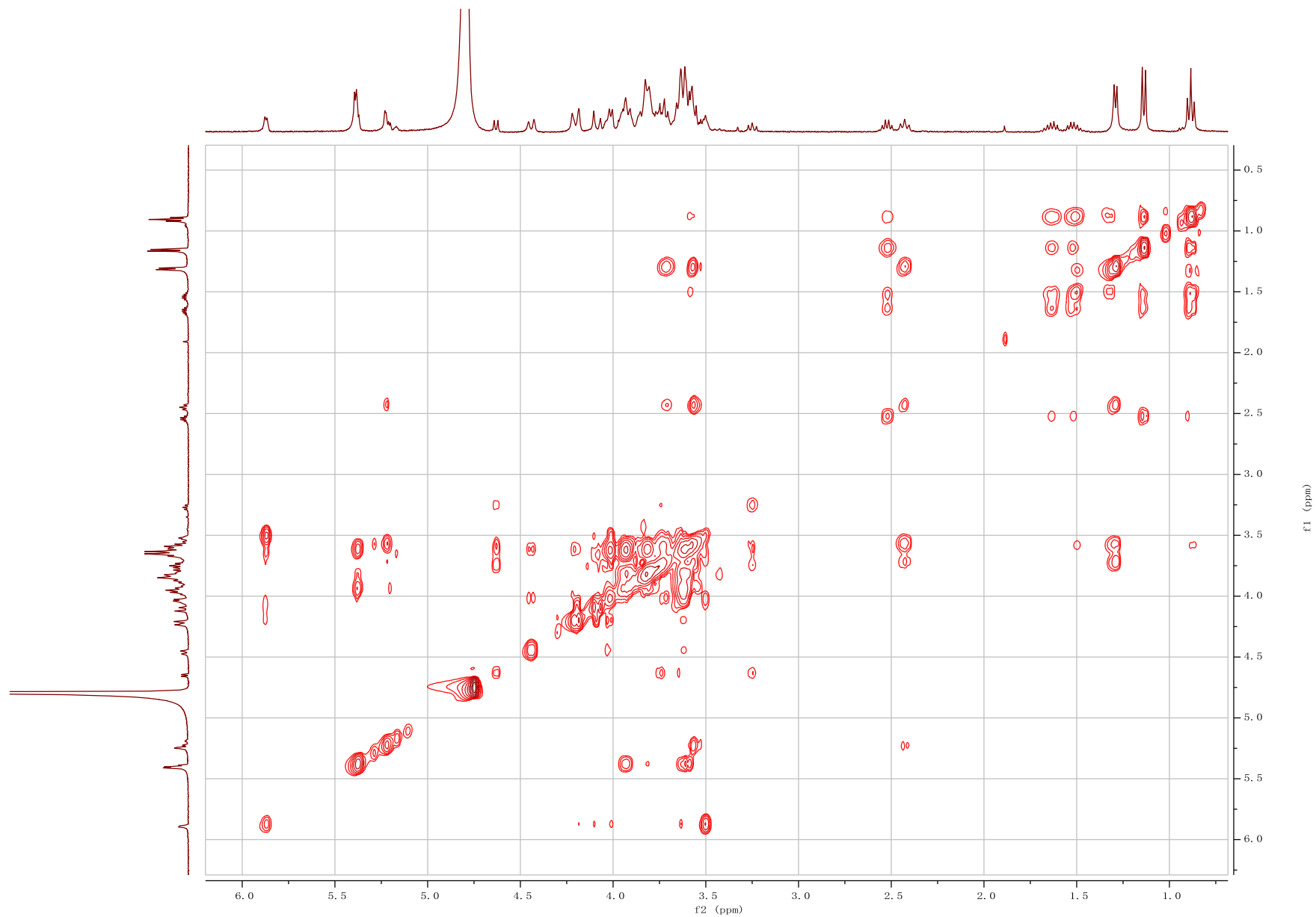
Figure S27. DEPT-135 spectrum of compound **2** (125 MHz, D<sub>2</sub>O).



**Figure S28.** HSQC spectrum of compound **2** (500 MHz,  $\text{D}_2\text{O}$ ).

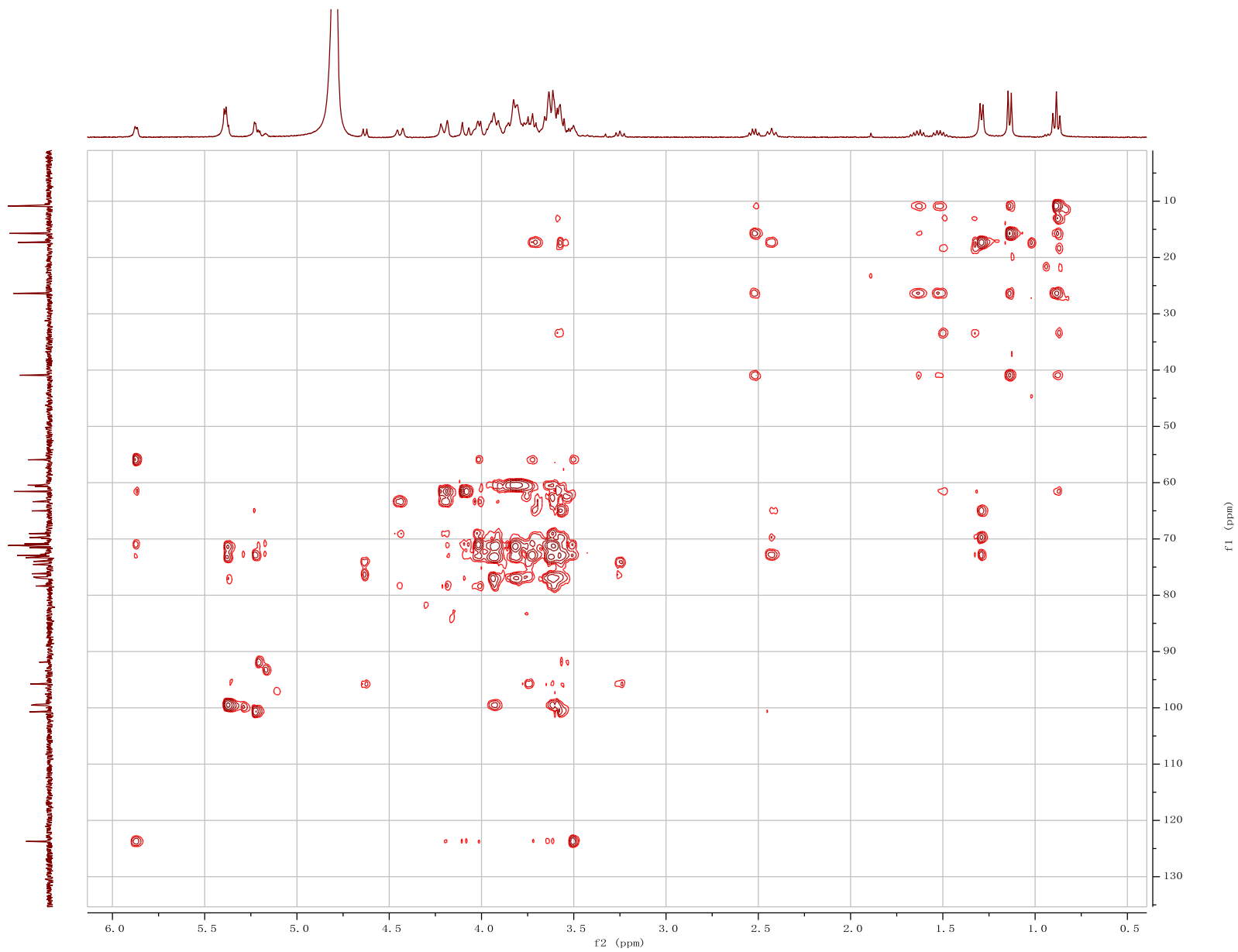


**Figure S29.**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of compound **2** (500 MHz,  $\text{D}_2\text{O}$ ).



**Figure S30.** 2D-TCOSY spectrum of compound **2** (500 MHz, D<sub>2</sub>O).





**Figure S31.** HSQC-TCOSY spectrum of compound **2** (500 MHz, D<sub>2</sub>O).

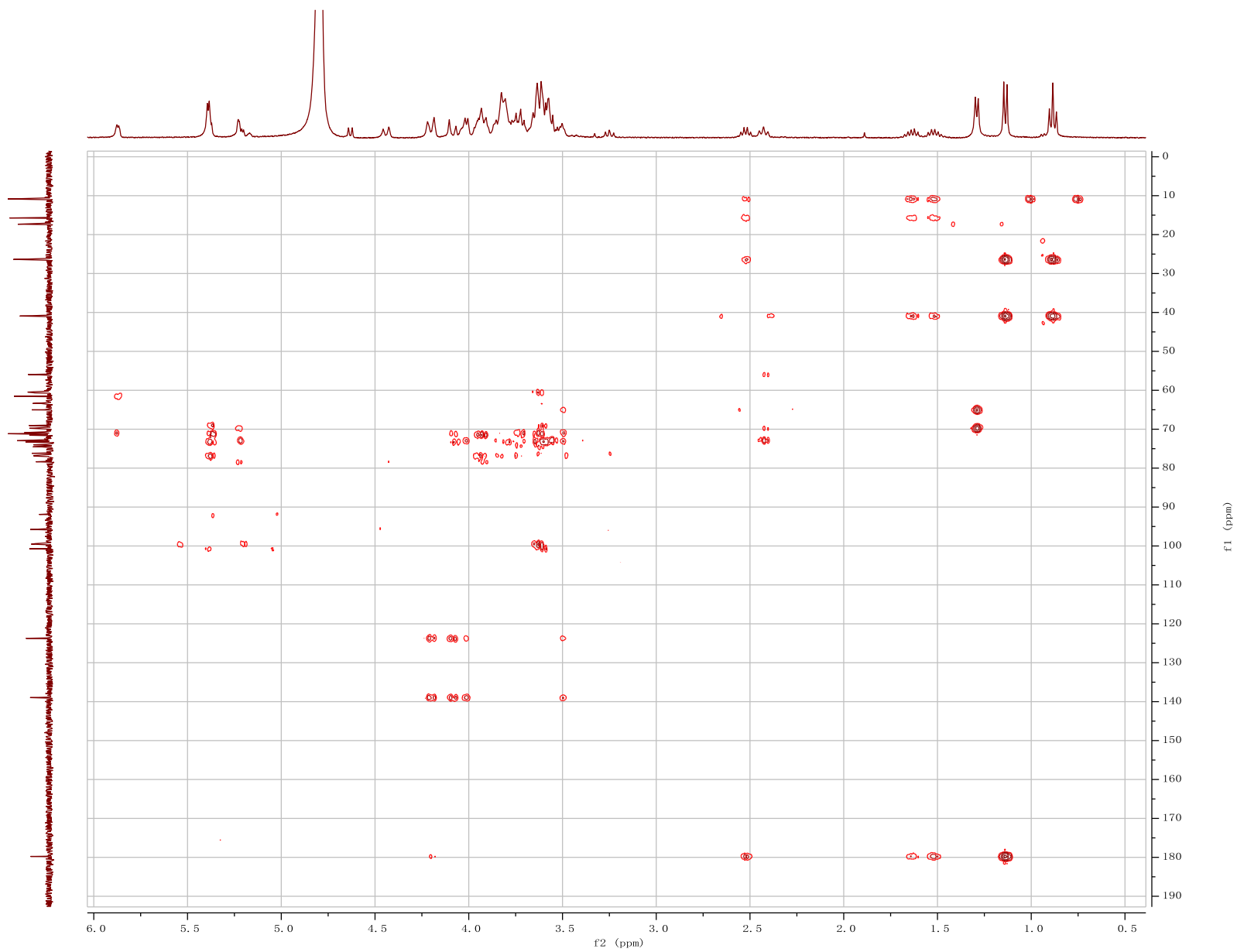
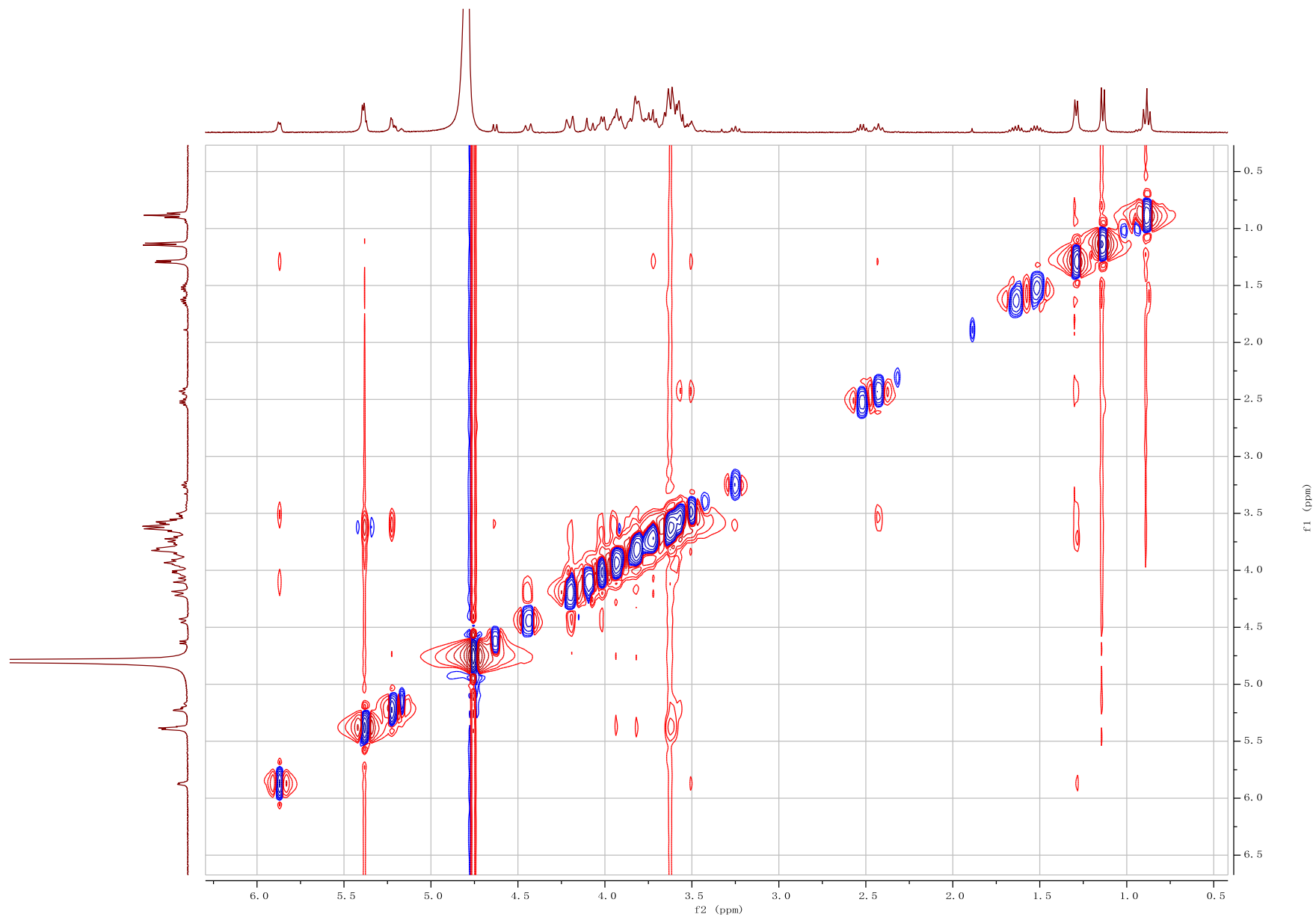
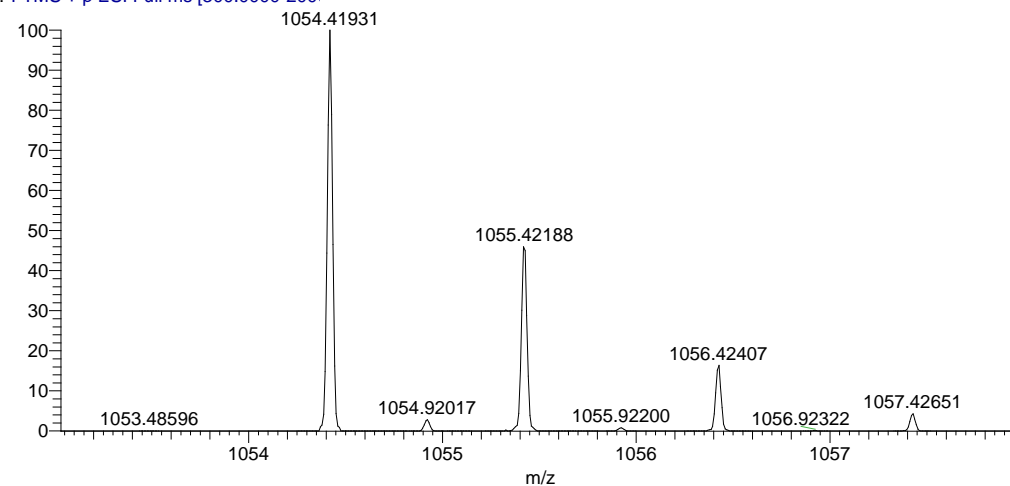


Figure S32. HMBC spectrum of compound **2** (500 MHz, D<sub>2</sub>O).

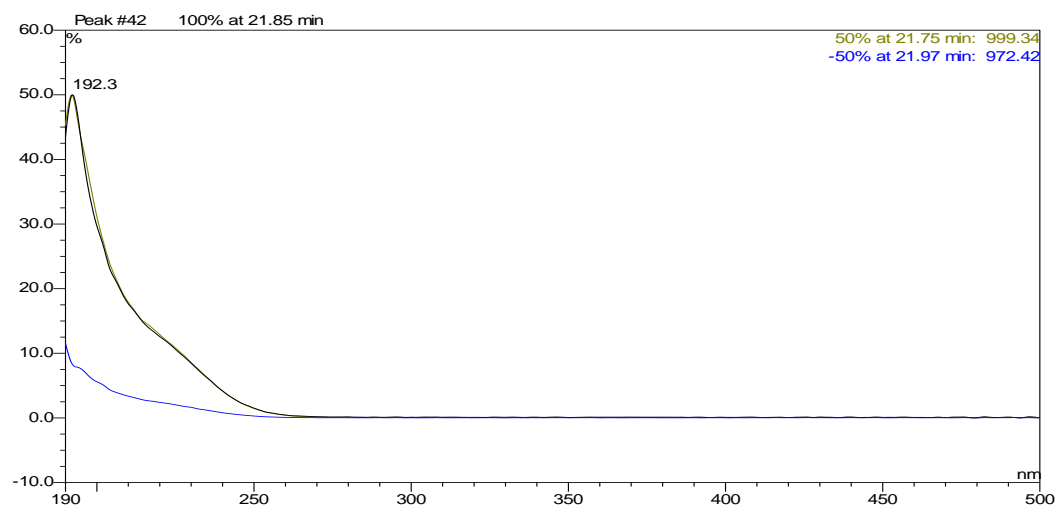


**Figure S33.** NOESY spectrum of compound **2** (500 MHz, D<sub>2</sub>O).

H45a\_POS #1175 RT: 4.65 AV: 1 NL: 1.40E9  
T: FTMS + p ESI Full ms [300.0000-200]



**Figure S34.** HRESIMS spectrum of compound 2.



**Figure S35.** UV spectrum of compound 2.

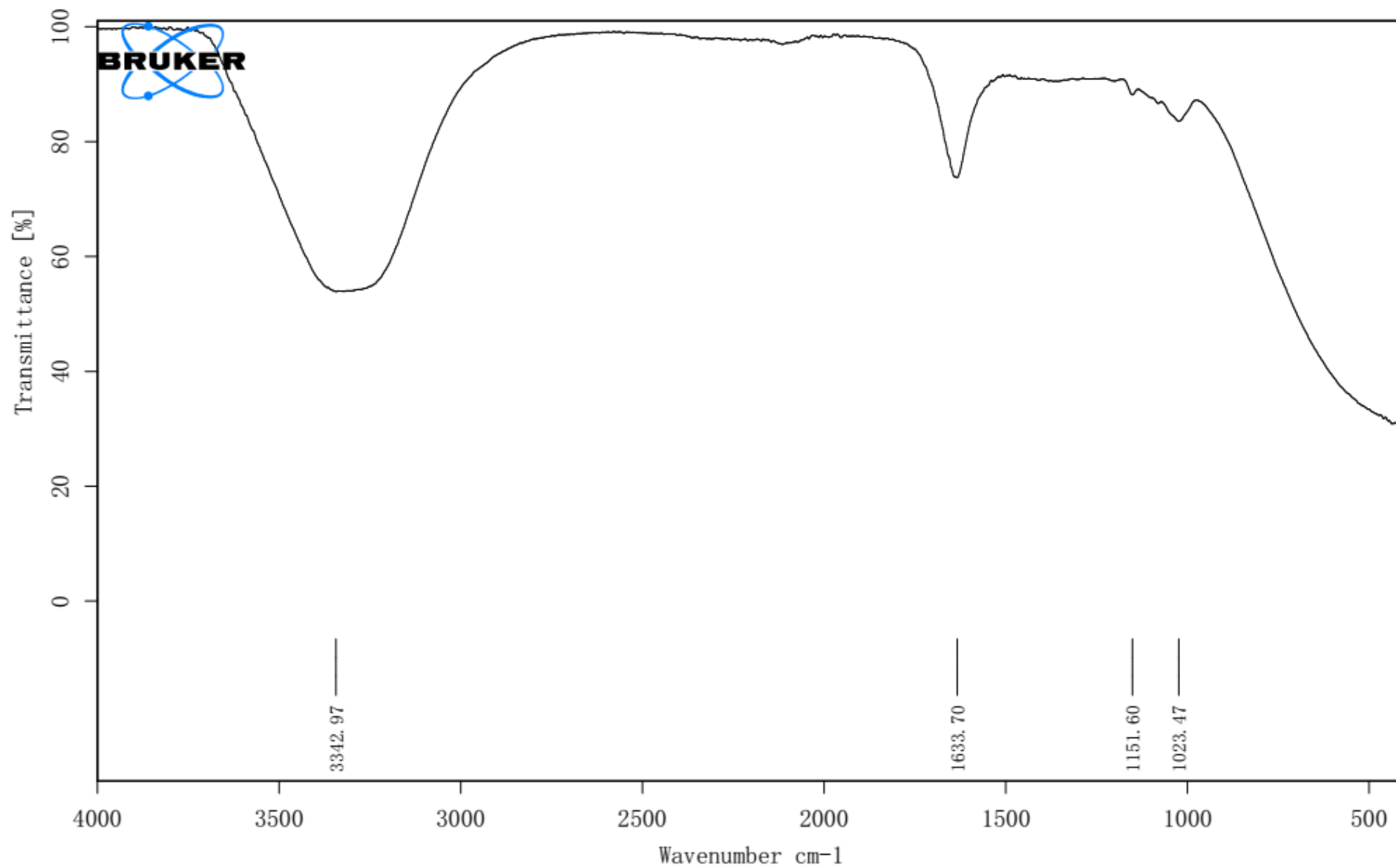


Figure S36. IR spectrum of compound 2.

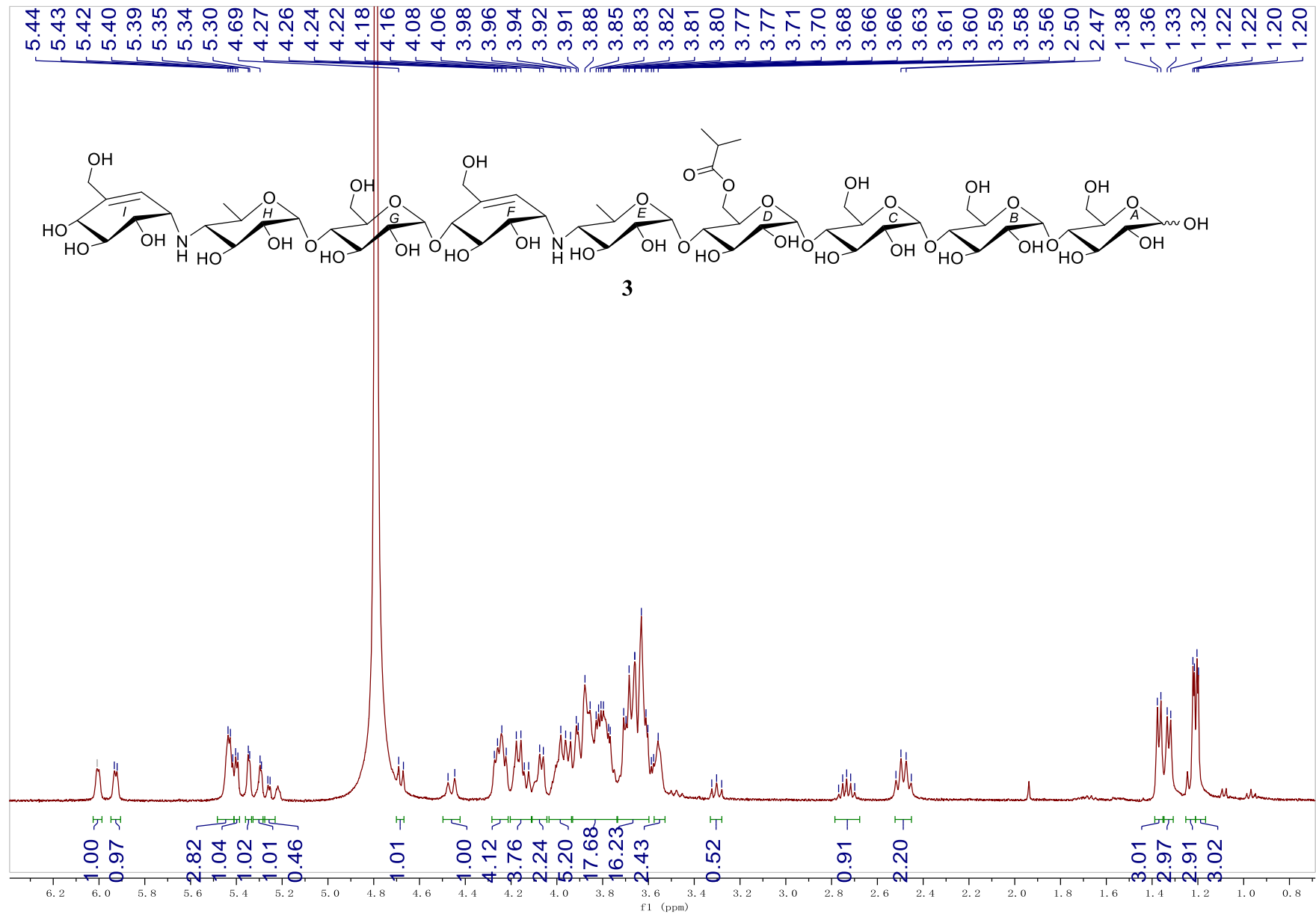
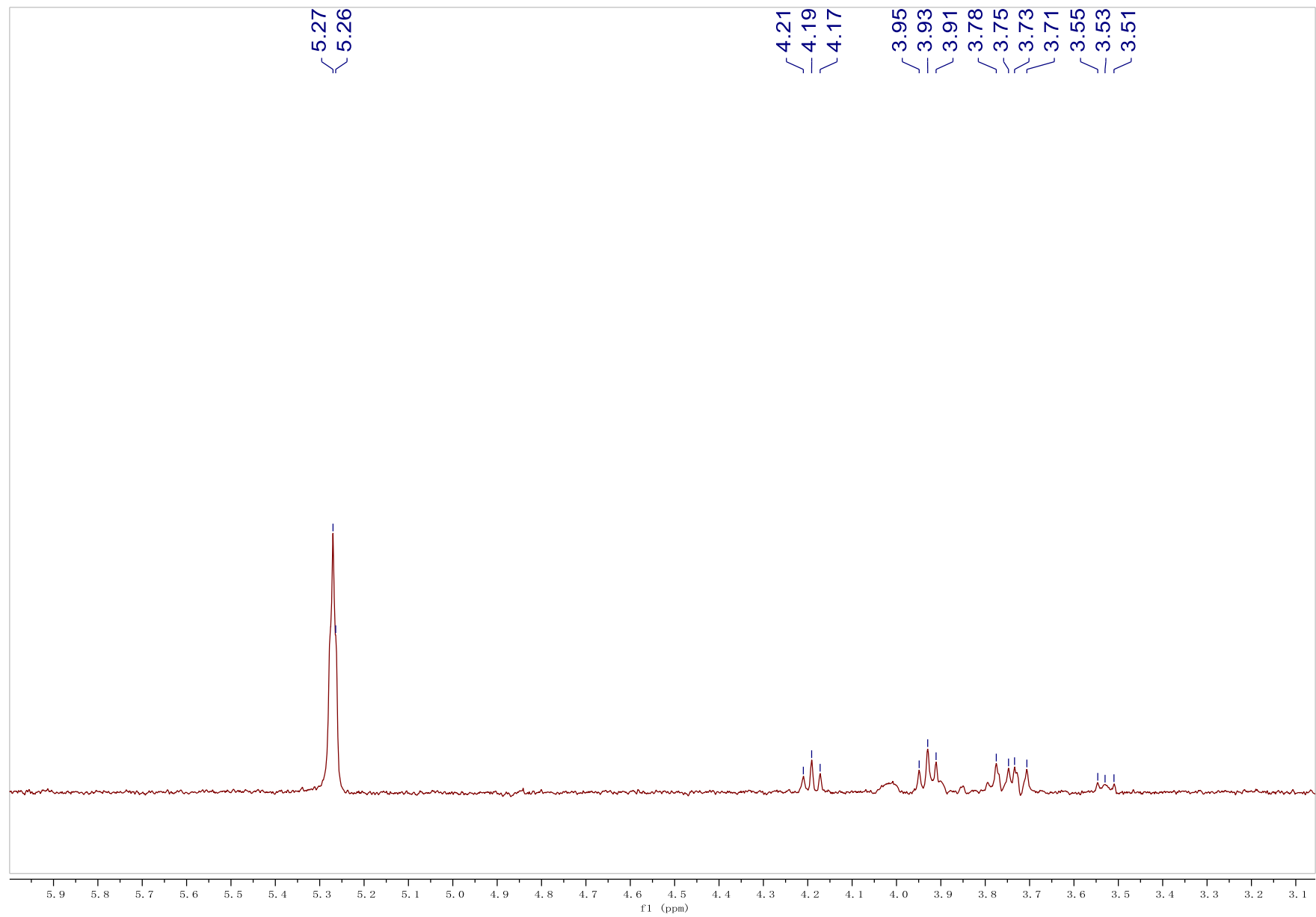
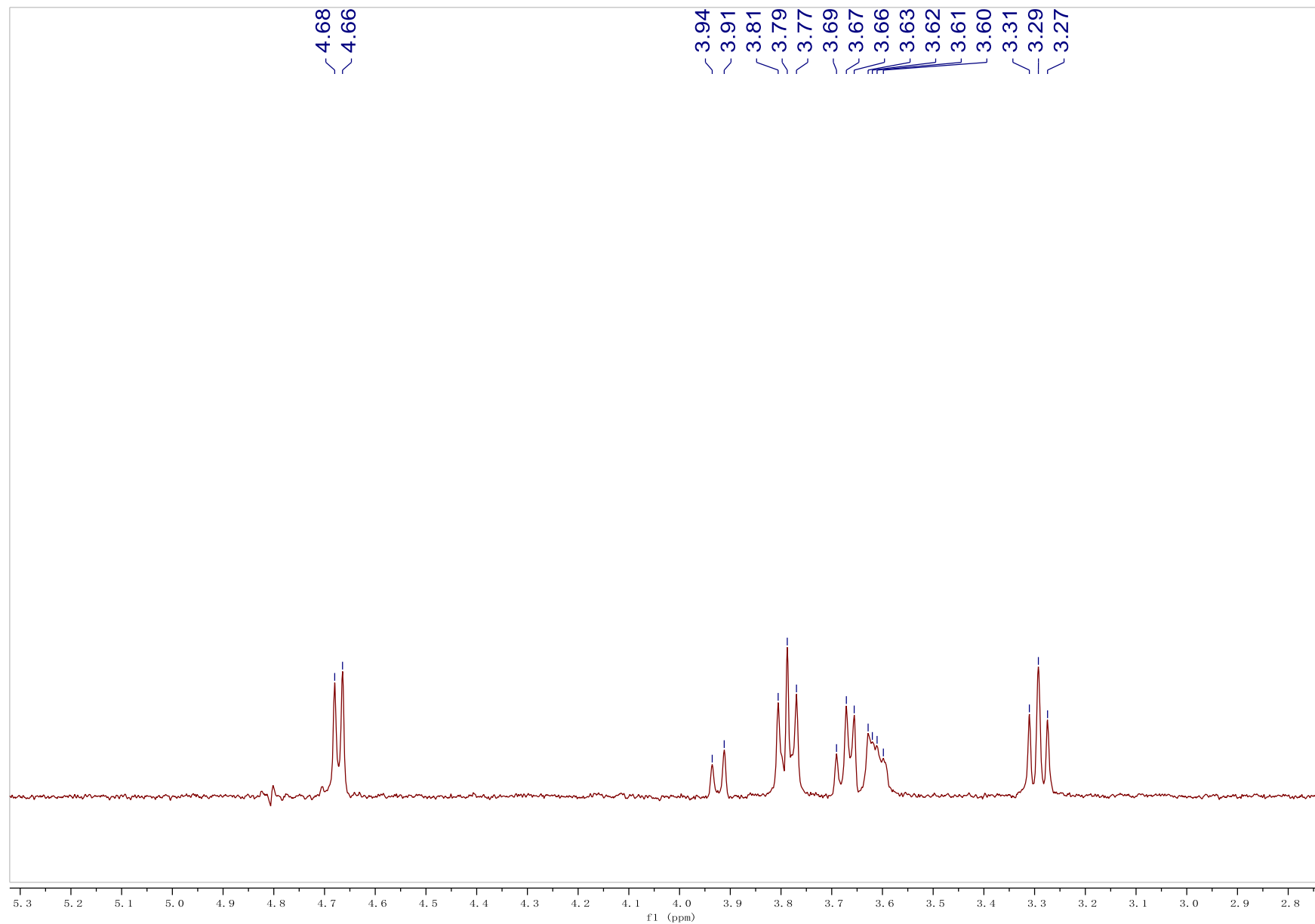


Figure S37. <sup>1</sup>H NMR spectrum of compound 1 (500 MHz, D<sub>2</sub>O).

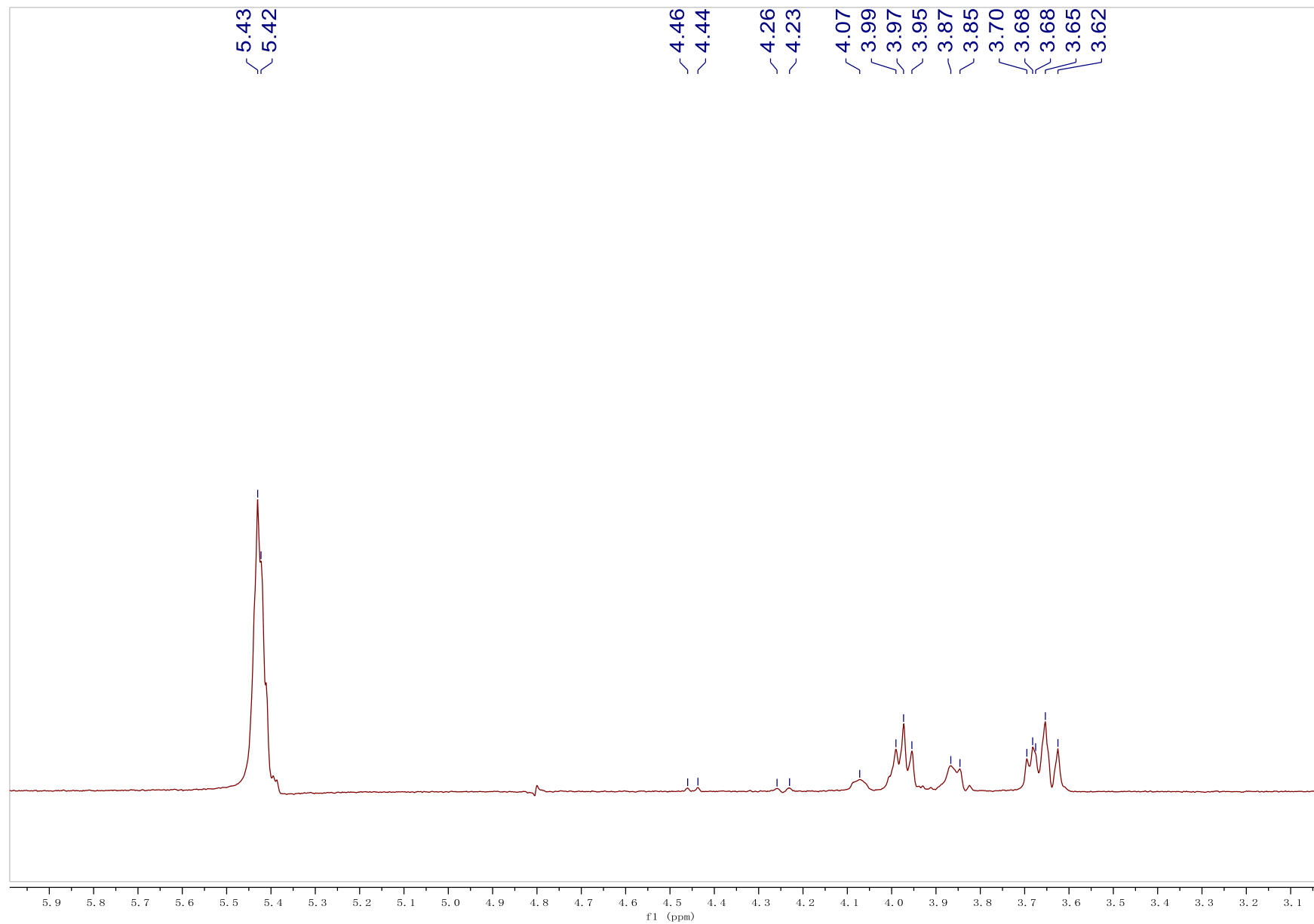


**Figure S38.** 1D-selective TOCSY spectrum of compound **3** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$  5.26, H-A1 $\alpha$ ).

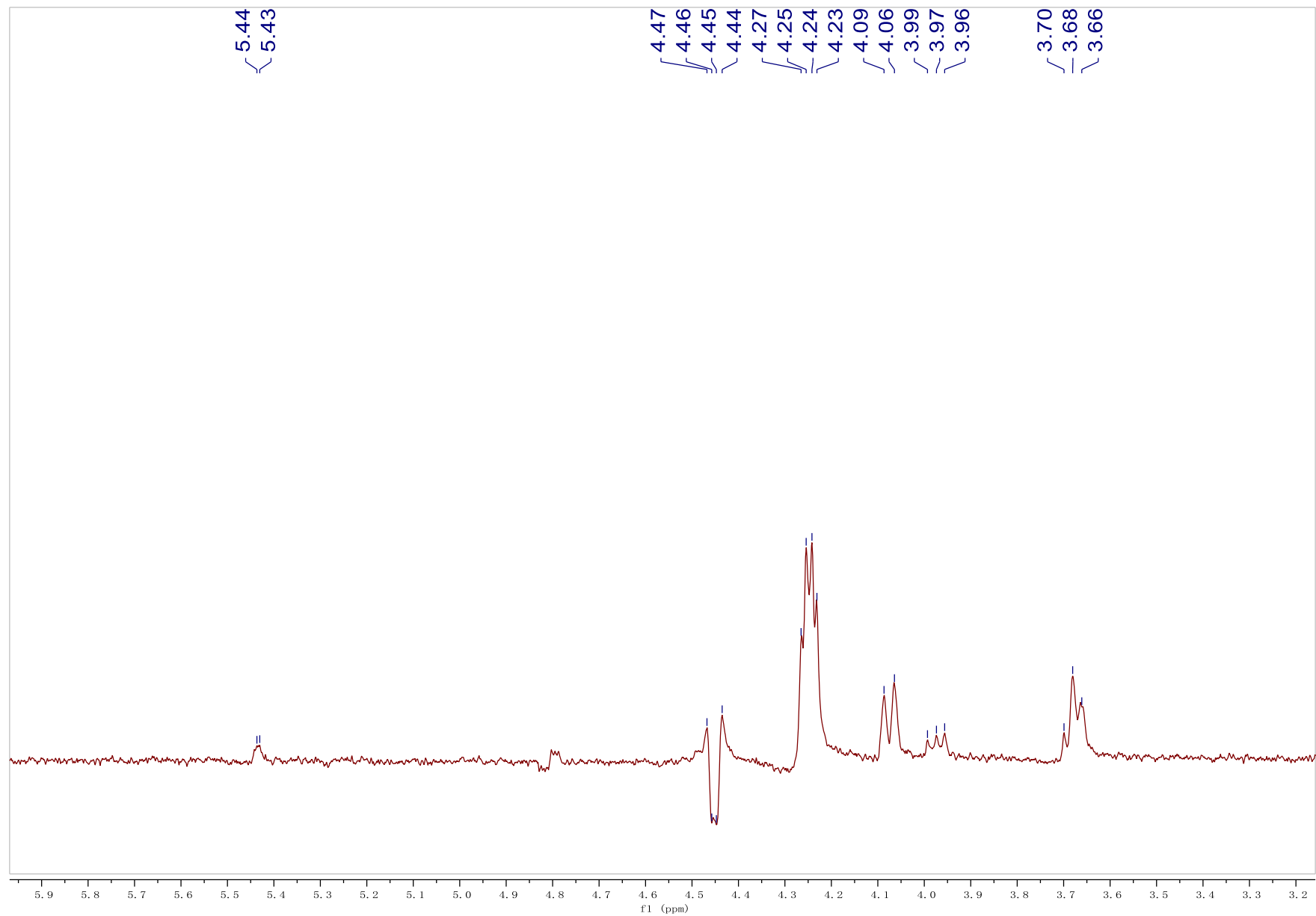


**Figure S39.** 1D-selective TOCSY spectrum of compound **3** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$ 4.66, H-A1 $\beta$ ).

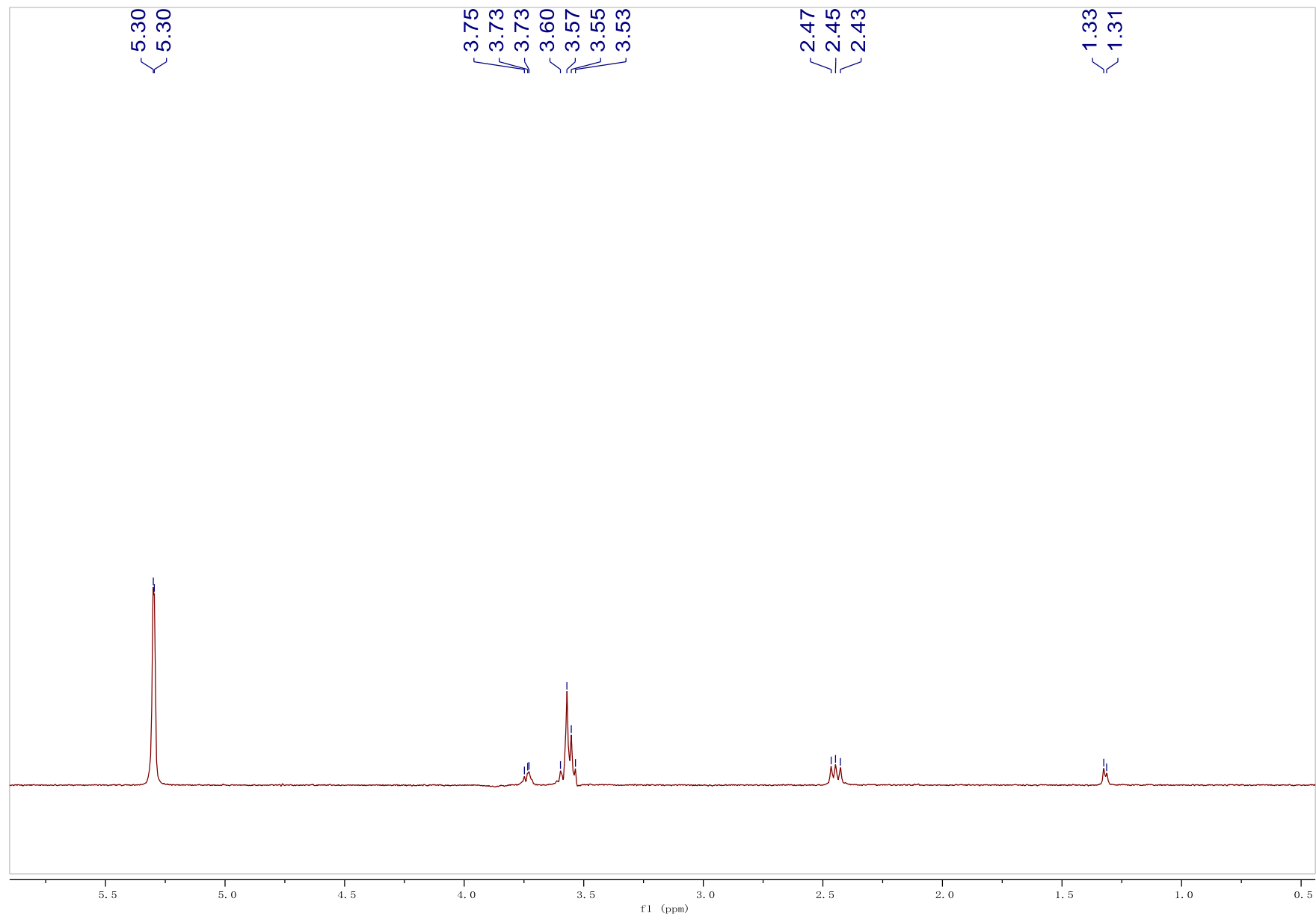




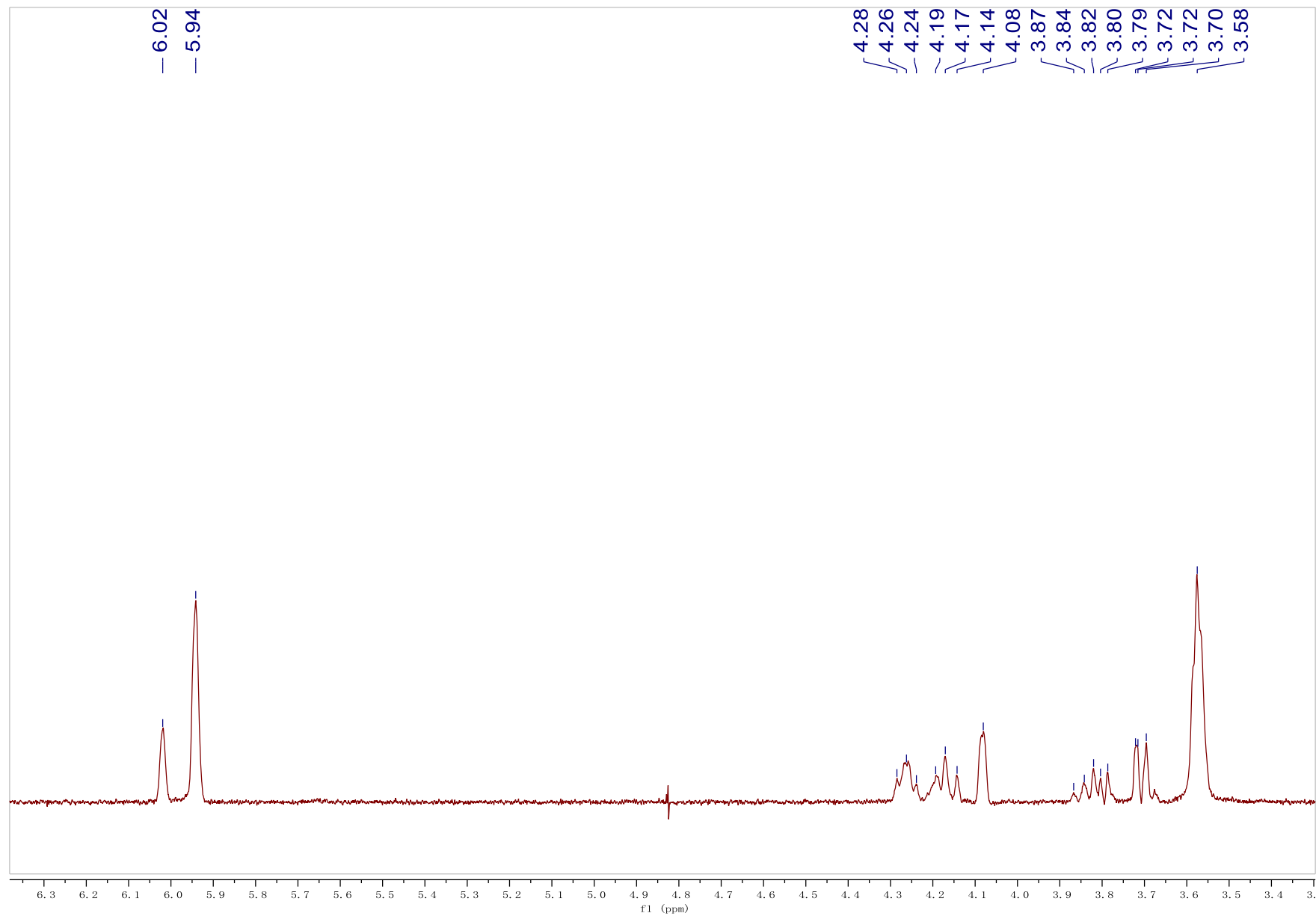
**Figure S40.** 1D-selective TOCSY spectrum of compound **3** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$ 5.43, H-B1, H-C1, H-D1).



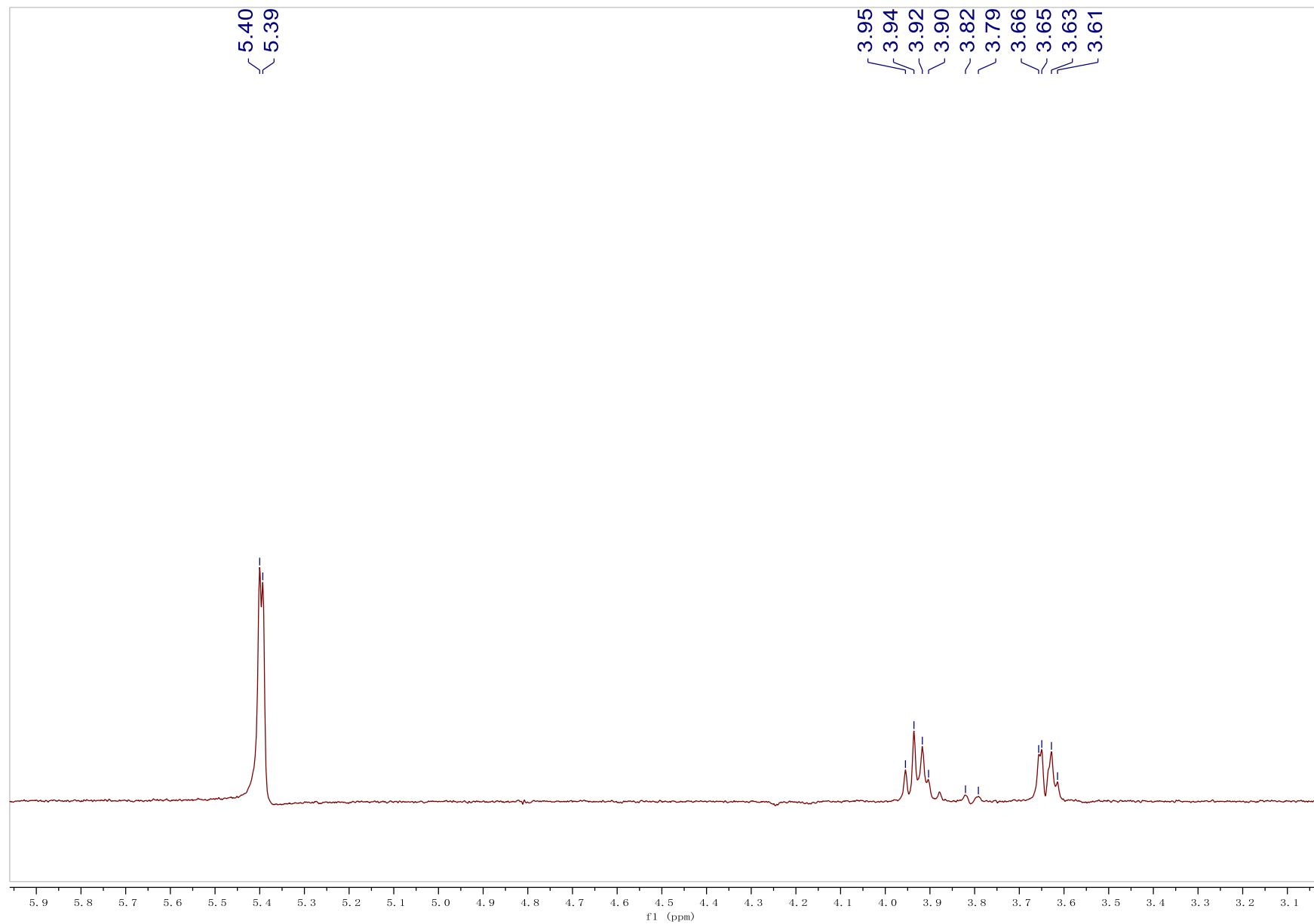
**Figure S41.** 1D-selective TOCSY spectrum of compound **3** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$ 4.46, H-D6a).



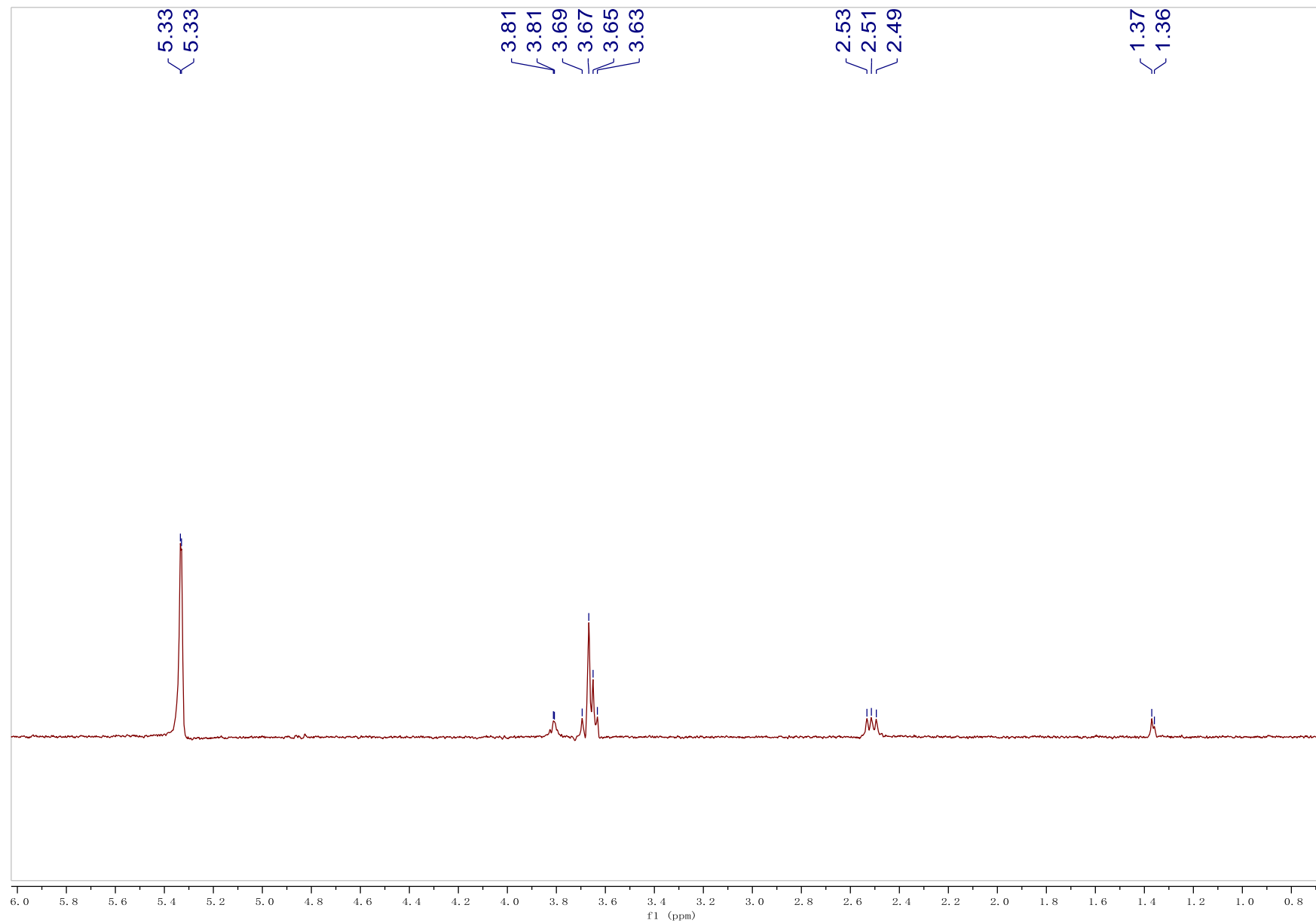
**Figure S42.** 1D-selective TOCSY spectrum of compound **3** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$  5.29, H-E1).



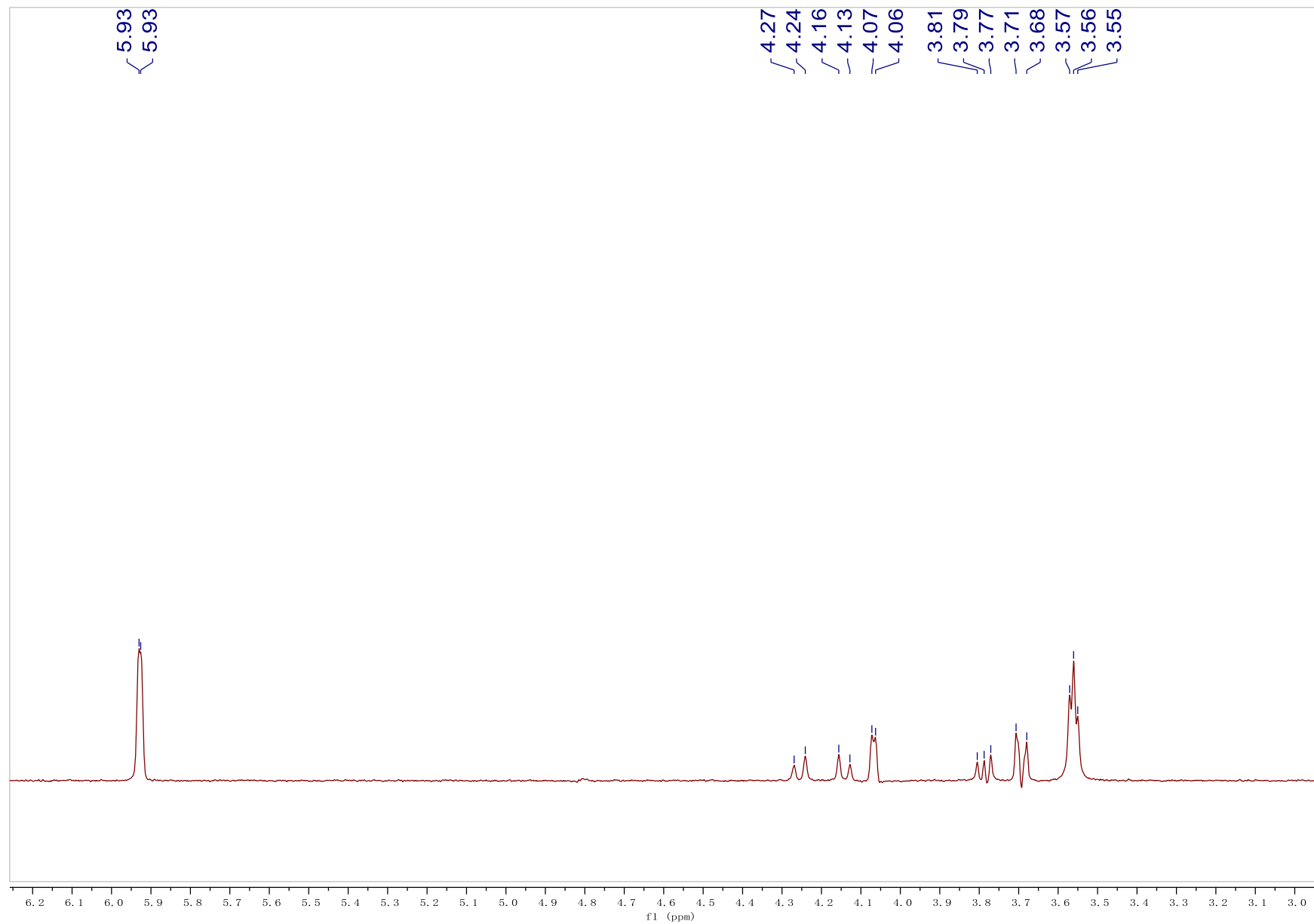
**Figure S43.** 1D-selective TOCSY spectrum of compound **3** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$  6.01, H-F7).



**Figure S44.** 1D-selective TOCSY spectrum of compound **3** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$  5.40, H-G1).



**Figure S45.** 1D-selective TOCSY spectrum of compound **3** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$  5.34, H-H1).



**Figure S46.** 1D-selective TOCSY spectrum of compound **3** (500 MHz, D<sub>2</sub>O, excitation at  $\delta$  5.93, H-17).

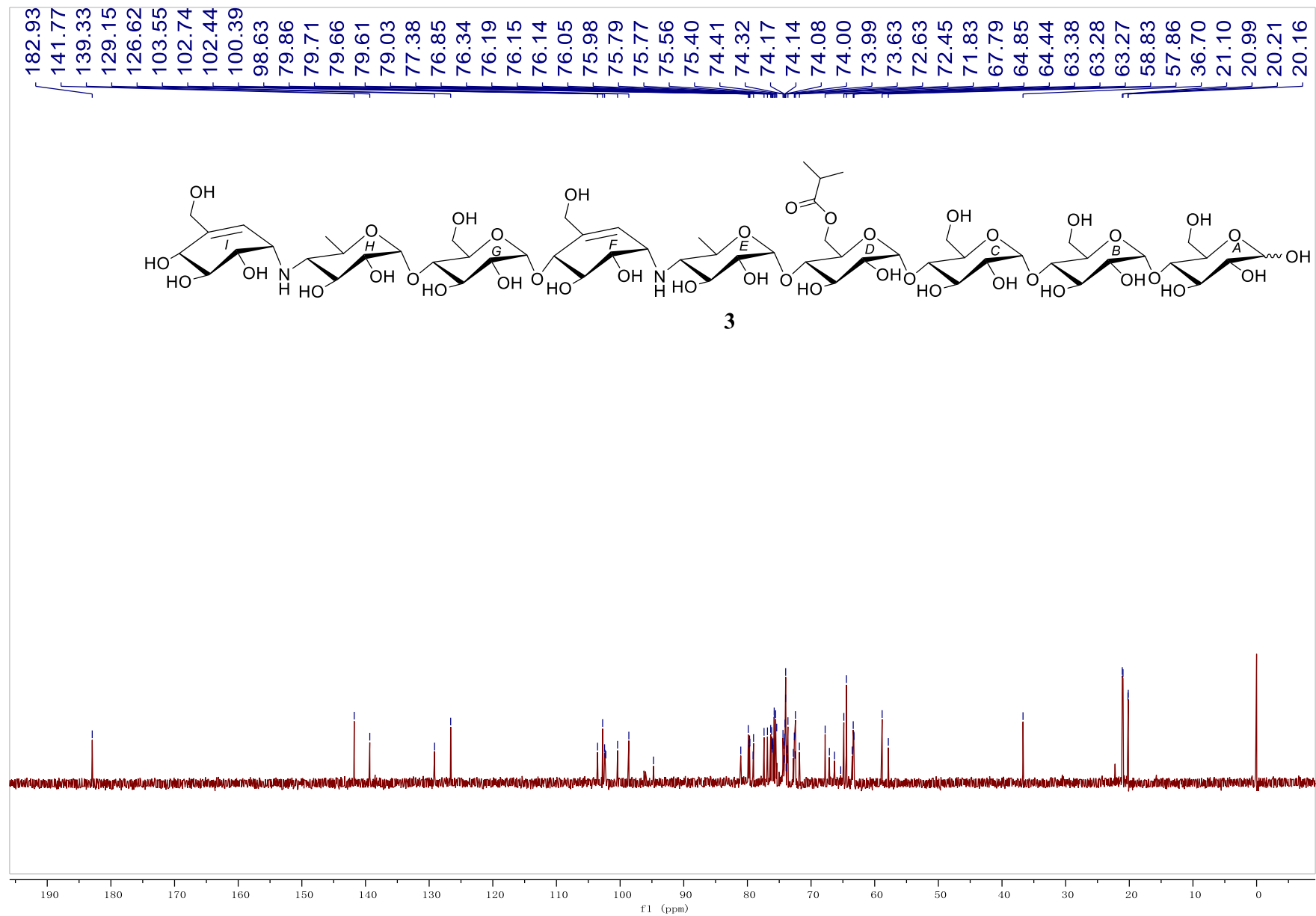


Figure S47. <sup>13</sup>C NMR spectrum of compound 3 (125 MHz, D<sub>2</sub>O).



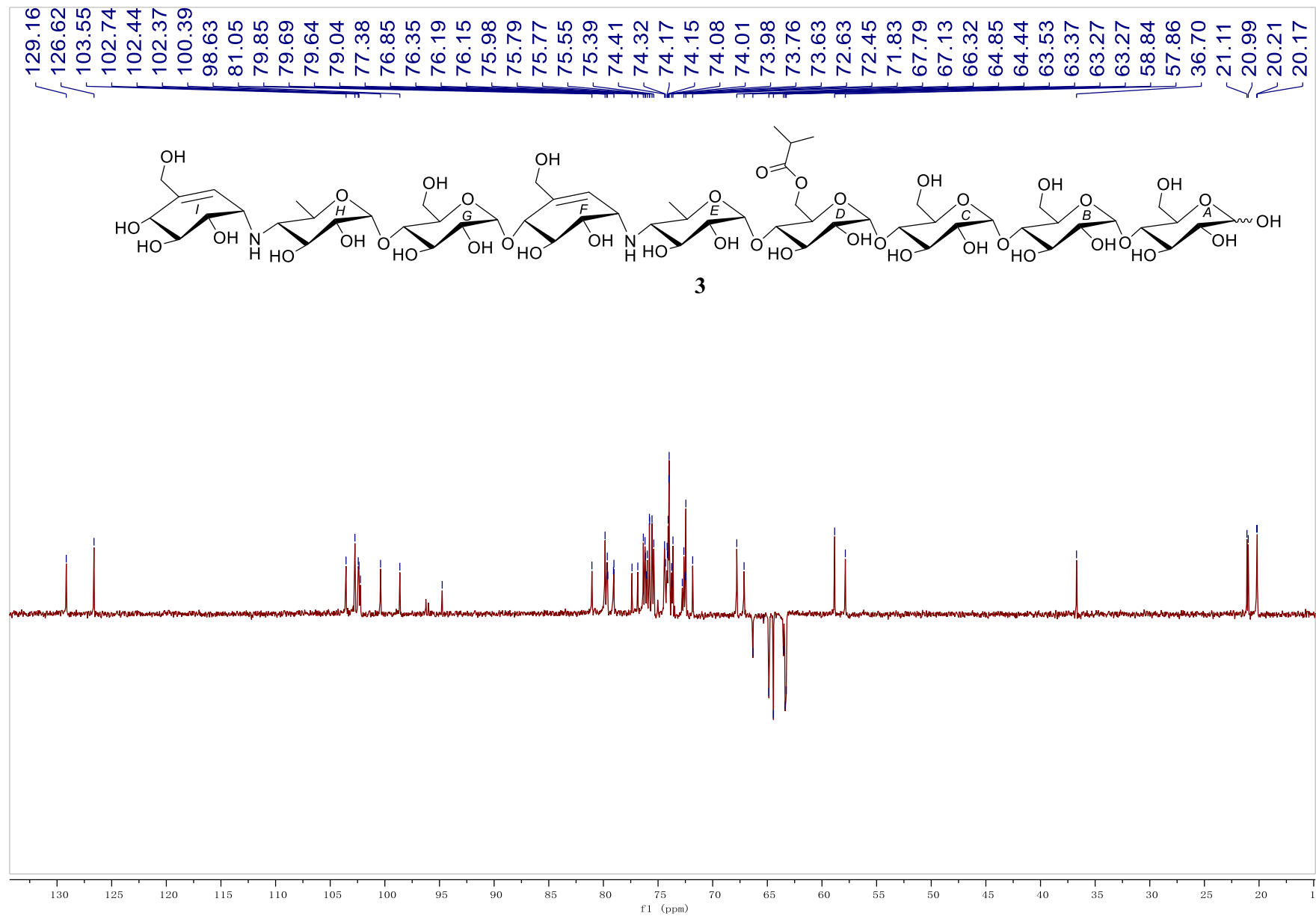
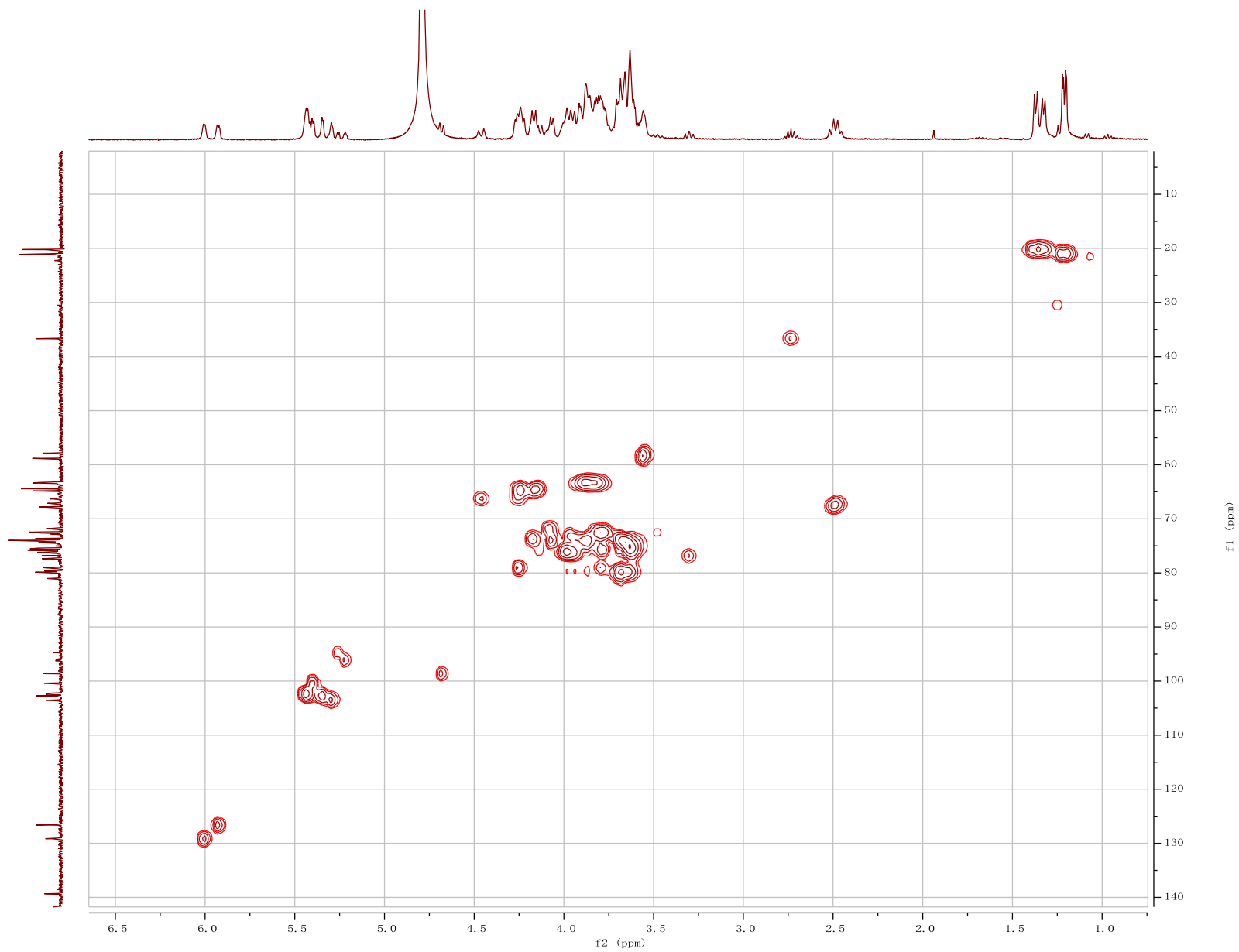
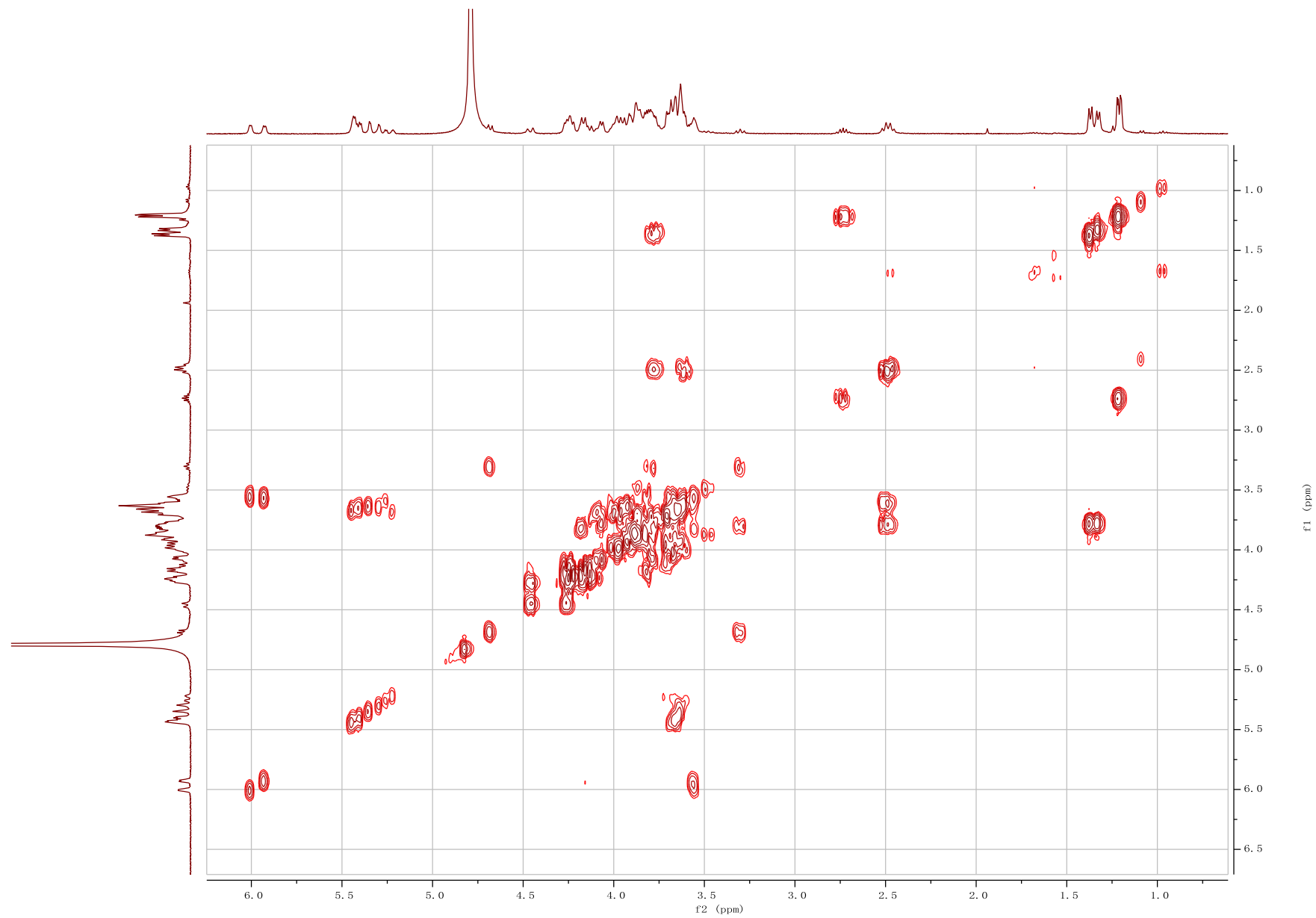


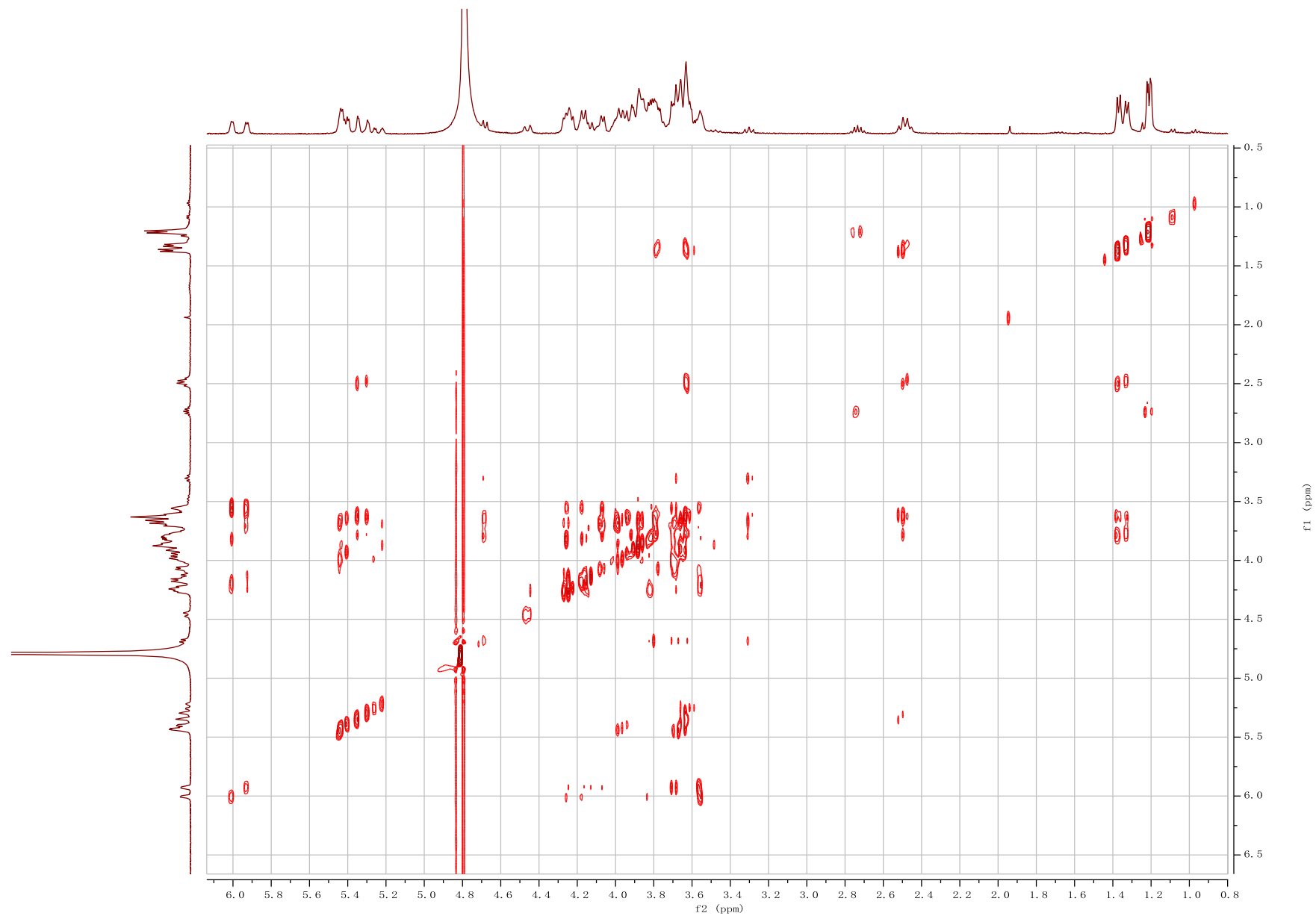
Figure S48. DEPT-135 spectrum of compound 3 (125 MHz, D<sub>2</sub>O).



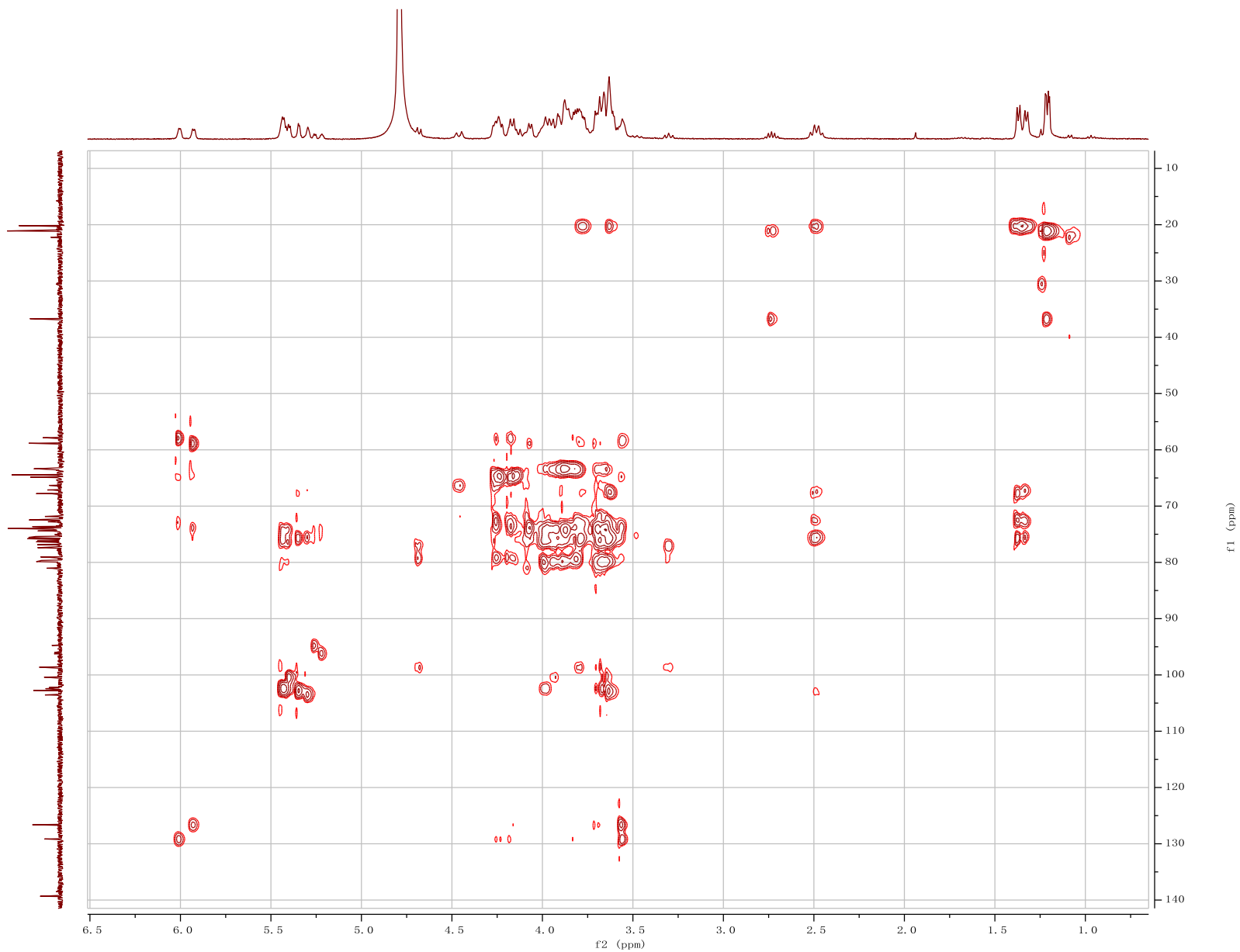
**Figure S49.** HSQC spectrum of compound **3** (500 MHz, D<sub>2</sub>O).



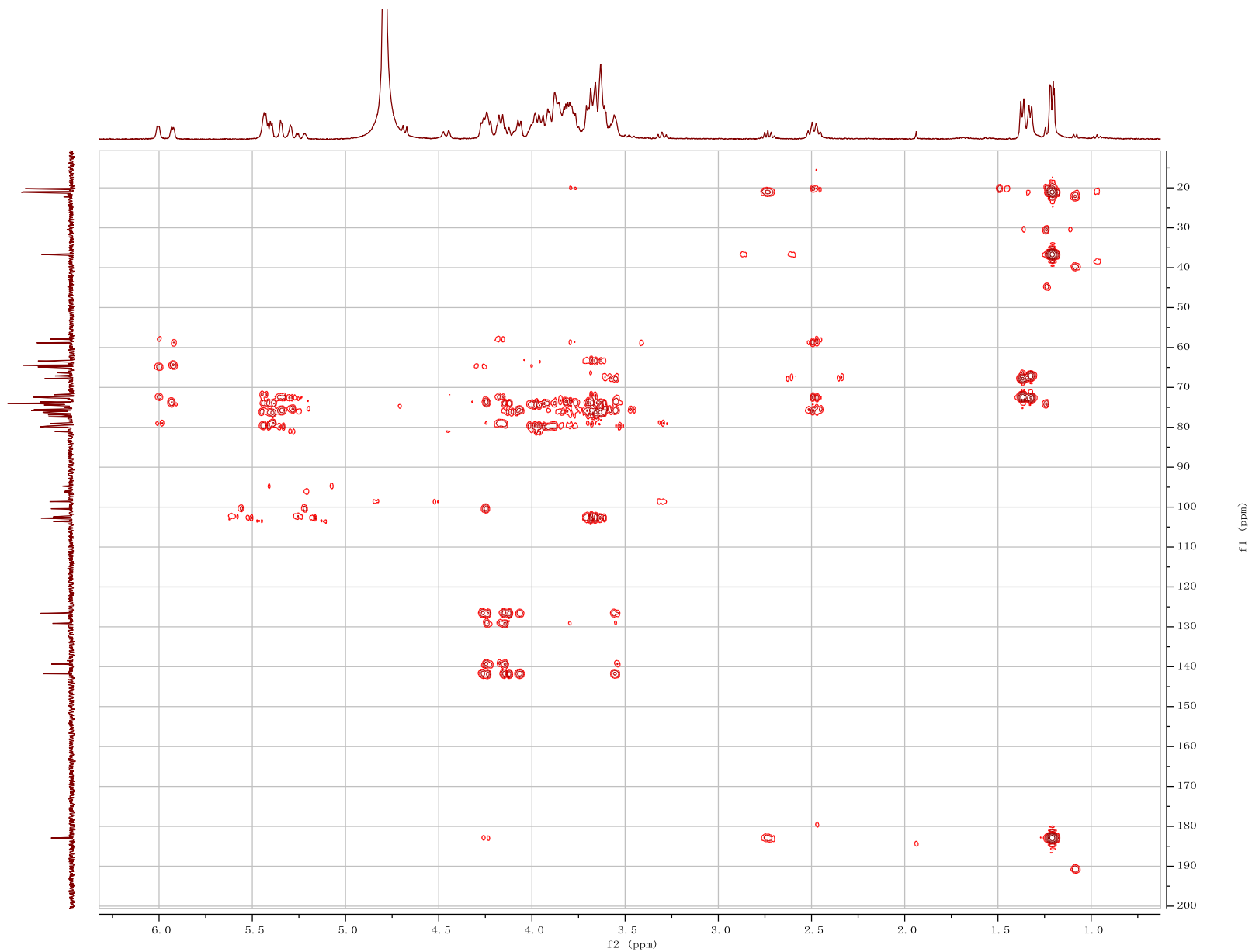
**Figure S50.**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of compound **3** (500 MHz,  $\text{D}_2\text{O}$ ).



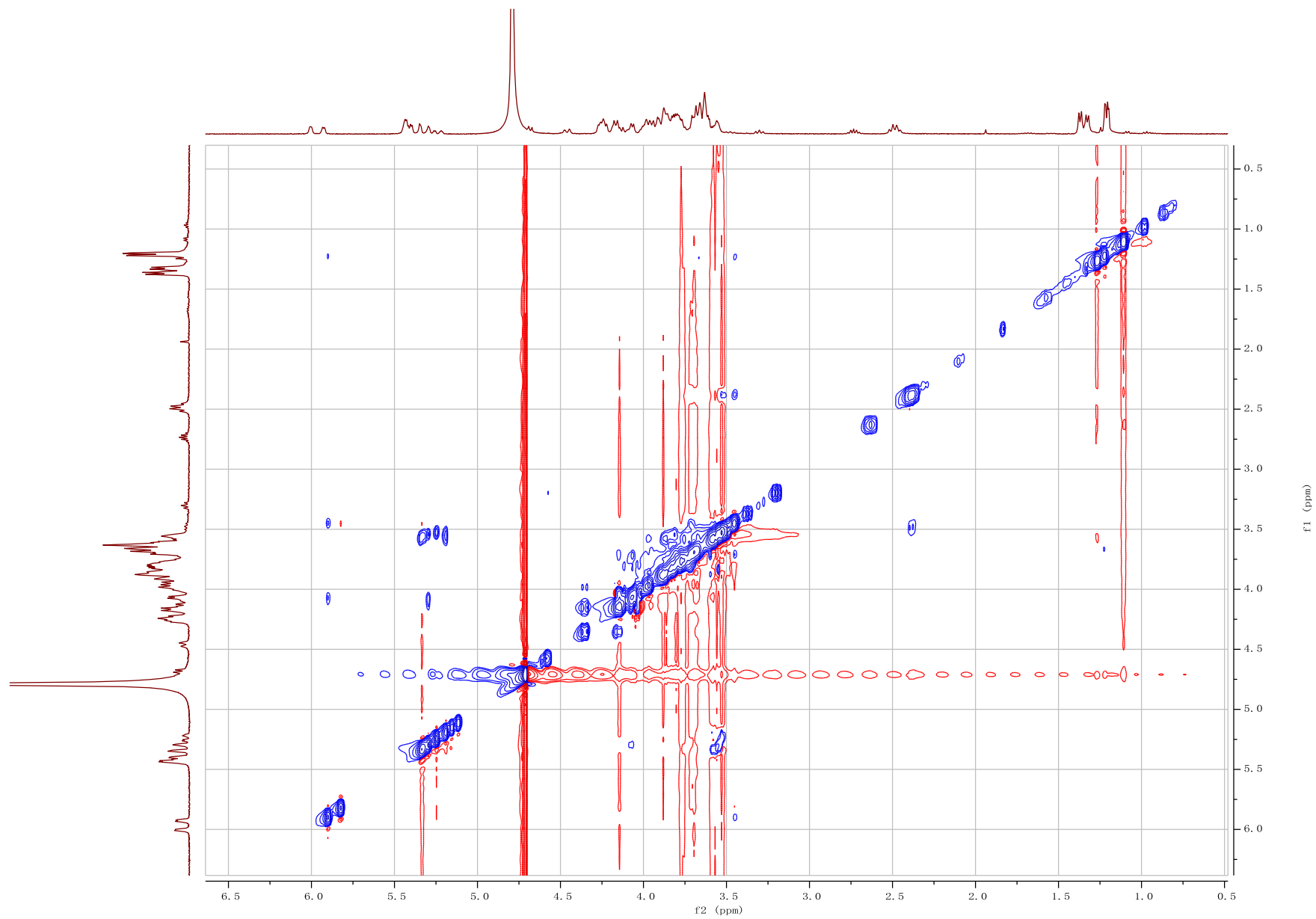
**Figure S51.** 2D-TOCSY spectrum of compound **3** (500 MHz, D<sub>2</sub>O).



**Figure S52.** HSQC-TOCSY spectrum of compound **3** (500 MHz, D<sub>2</sub>O).



**Figure S53.** HMBC spectrum of compound **3** (500 MHz, D<sub>2</sub>O).



**Figure S54.** NOESY spectrum of compound **3** (500 MHz, D<sub>2</sub>O).

H41\_POS #783 RT: 3.03 AV: 1 NL: 7.93E7  
T: FTMS + p ESI Full ms [300.0000-200]

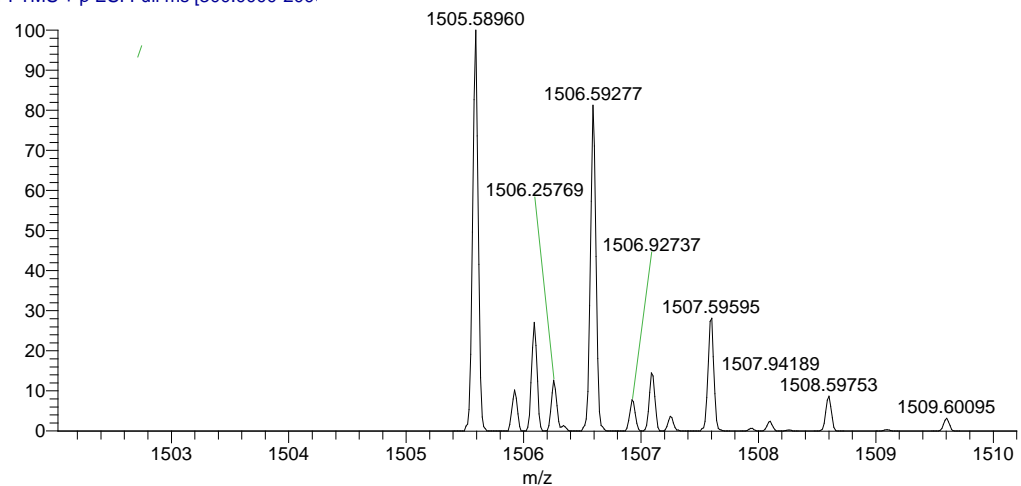


Figure S55. HRESIMS spectrum of compound 3.

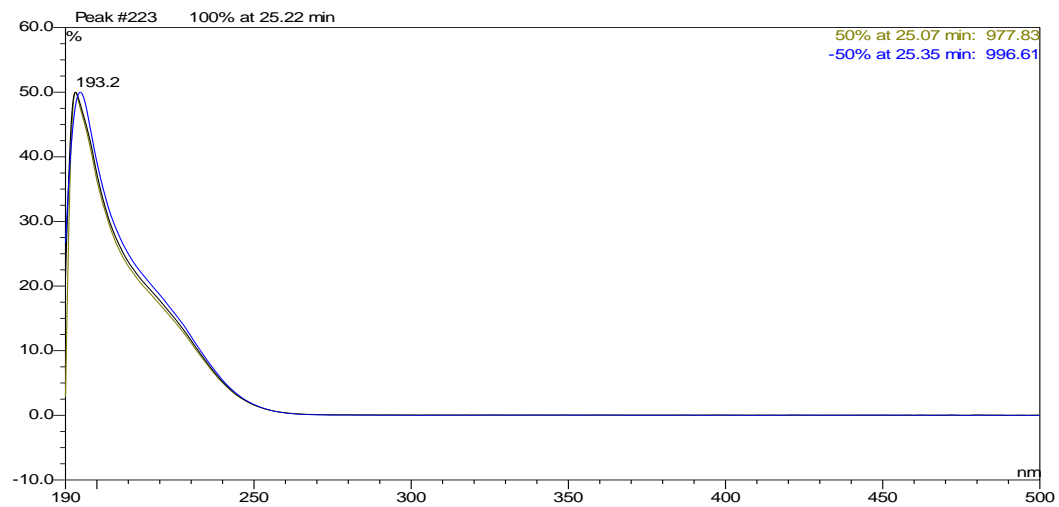
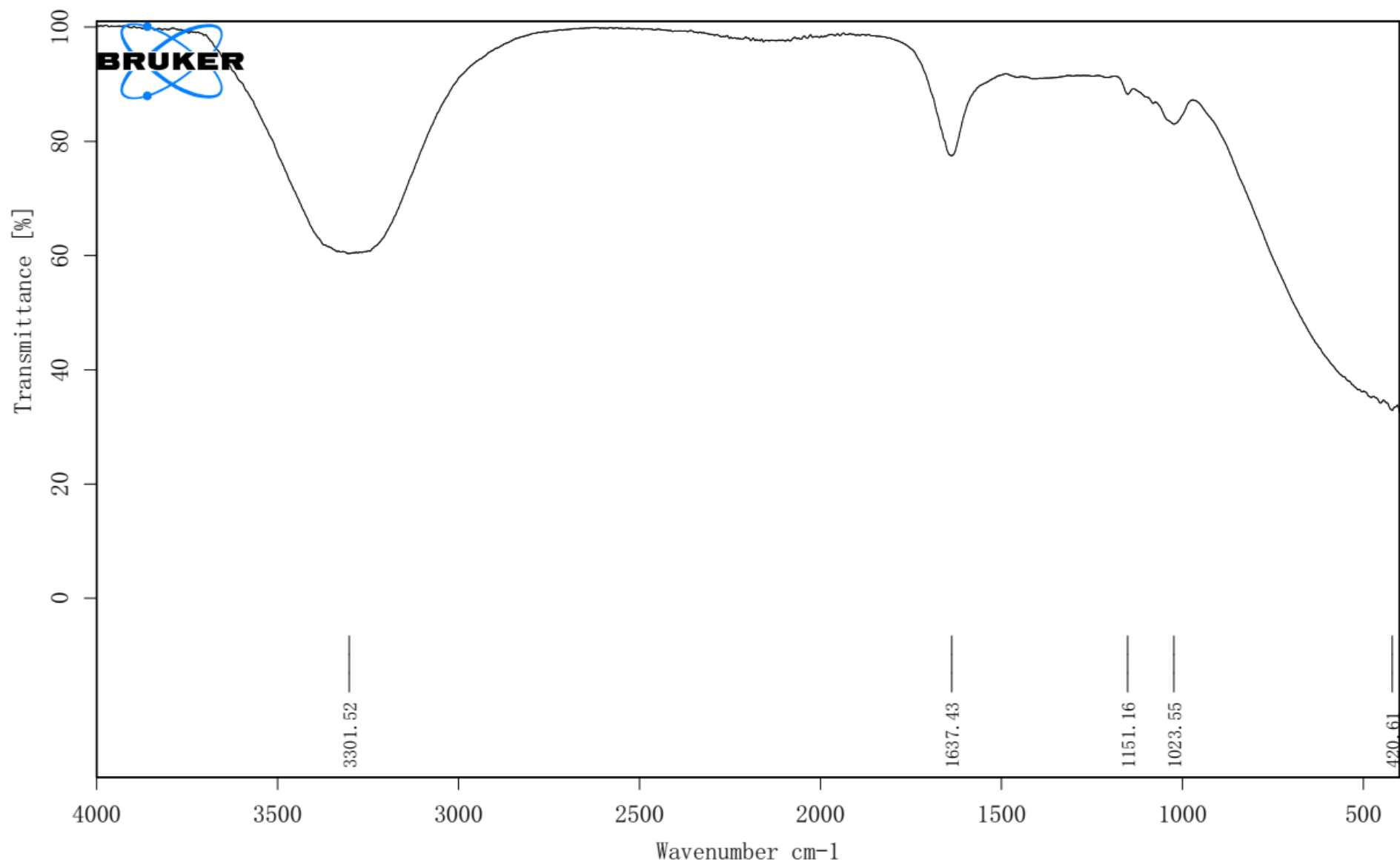


Figure S56. UV spectrum of compound 3.





**Figure S57.** IR spectrum of compound 3.

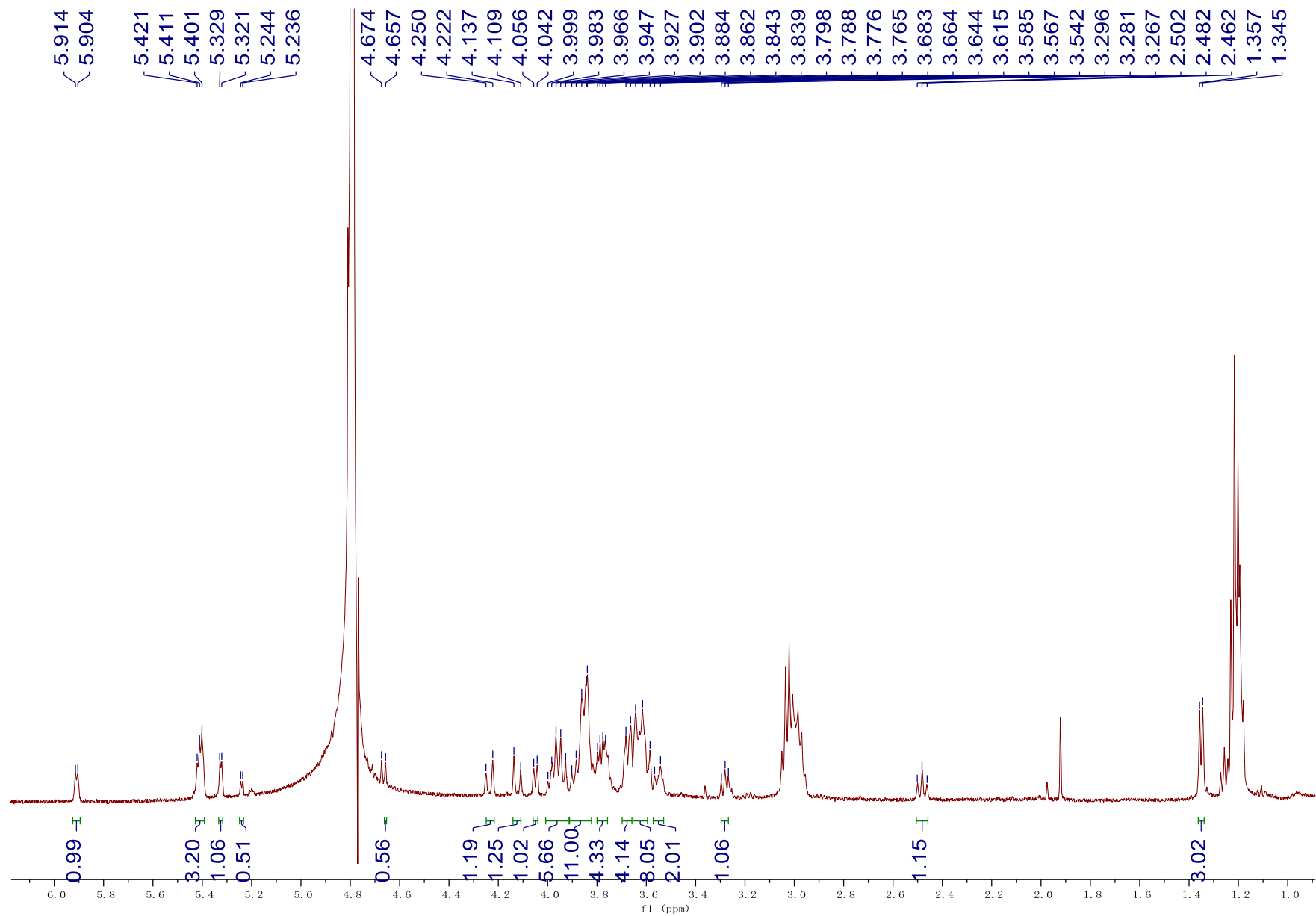
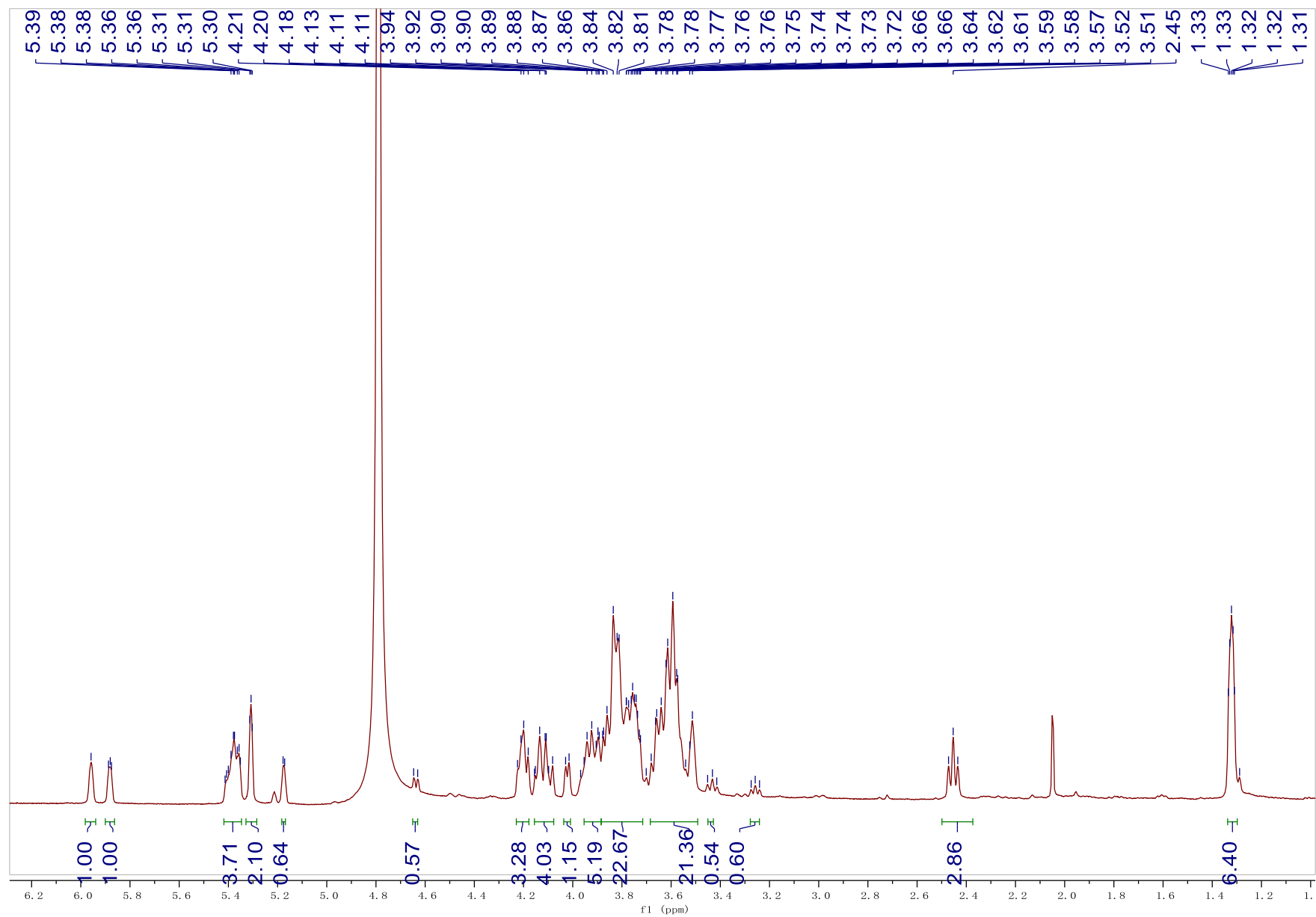


Figure S58. <sup>1</sup>H NMR spectrum of the common basic hydrolysis product (**9**) of compounds **1** and **5** (500 MHz, D<sub>2</sub>O).



**Figure S59.**  $^1\text{H}$  NMR spectrum of the common basic hydrolysis product (**10**) of compound **3** (500 MHz,  $\text{D}_2\text{O}$ ).