

**UNIVERSIDADE FEDERAL RURAL DO RIO DE JANEIRO**

**INSTITUTO DE QUÍMICA**

**CURSO DE PÓS-GRADUAÇÃO EM QUÍMICA**

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**Metabólitos secundários e avaliação de atividades biológicas de *Siolmatra brasiliensis* (Cogn.) Baill. (Cucurbitaceae) e espécies do gênero *Ziziphus* Mill. (Rhamnaceae).**

**Carlos Henrique Corrêa dos Santos**

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**Metabólitos secundários e avaliação de atividades biológicas de *Siolmatra brasiliensis* (Cogn.) Baill. (Cucurbitaceae) e espécies do gênero *Ziziphus* Mill. (Rhamnaceae). (Espectros)**

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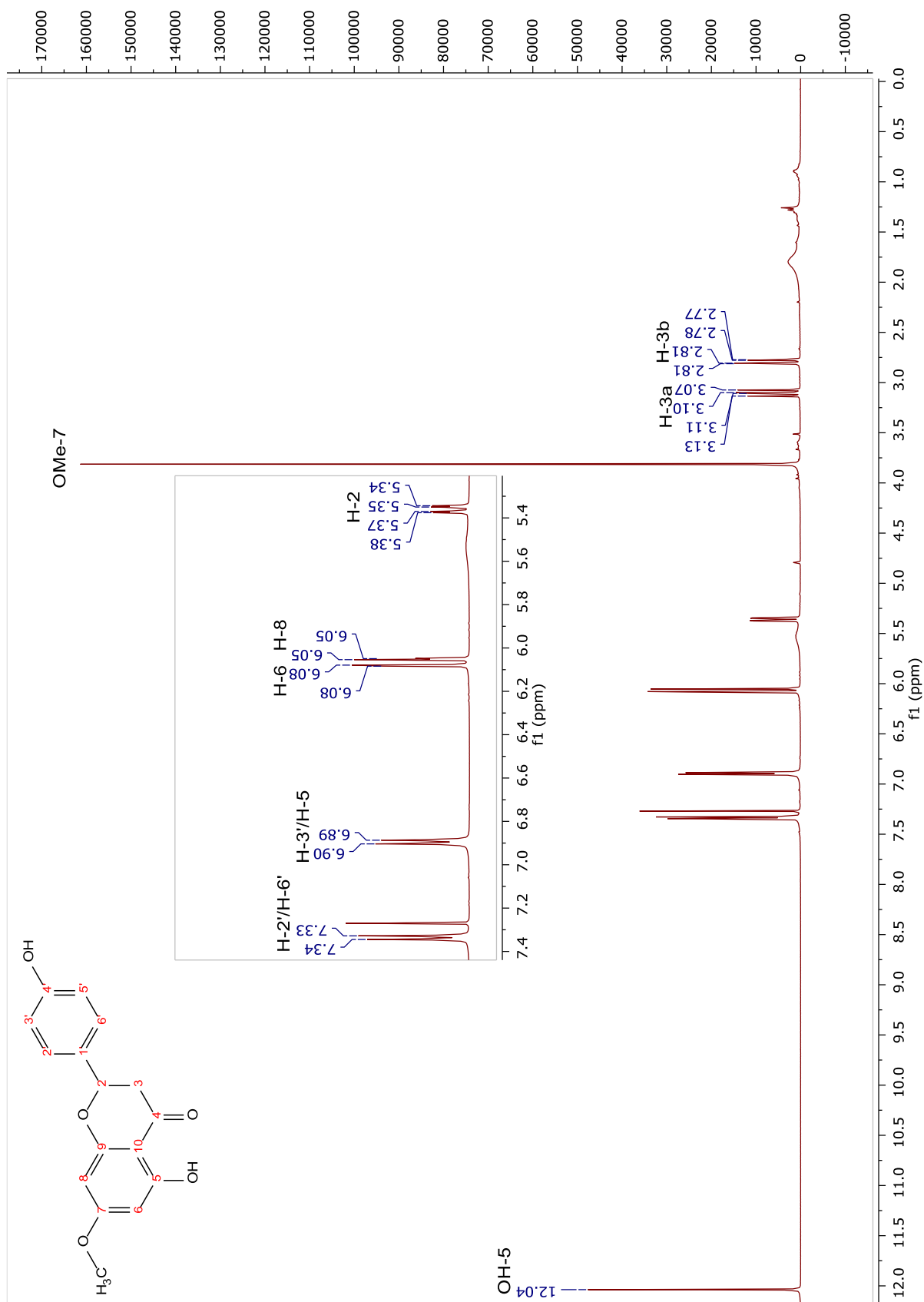
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**Figura 1.** Espectro de RMN  $^1\text{H}$  de **Sb1** (500 MHz,  $\text{CDCl}_3$ ).

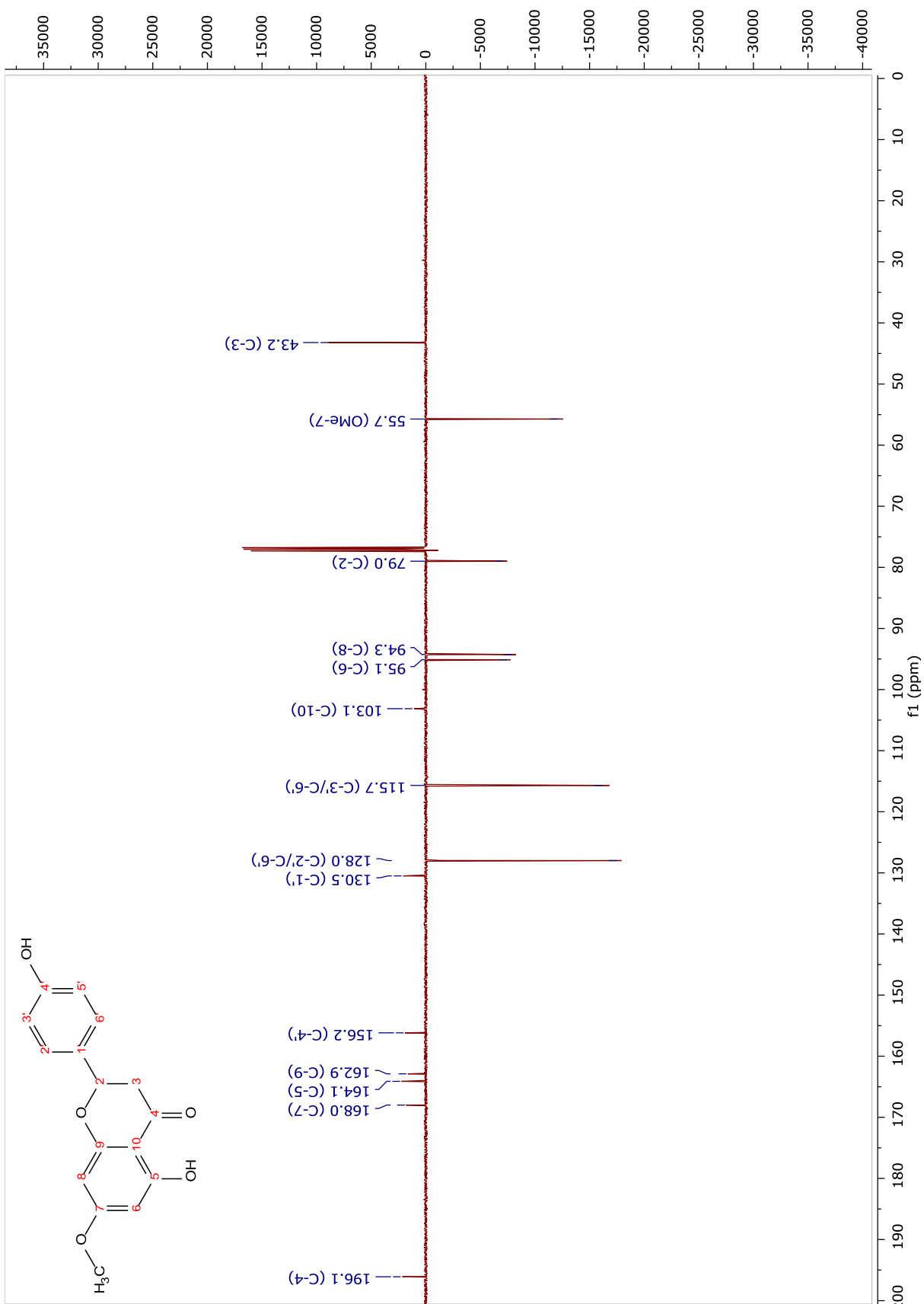


Figura 2. Espectro de DEPTQ de Sb1 (125 MHz, CDCl<sub>3</sub>).

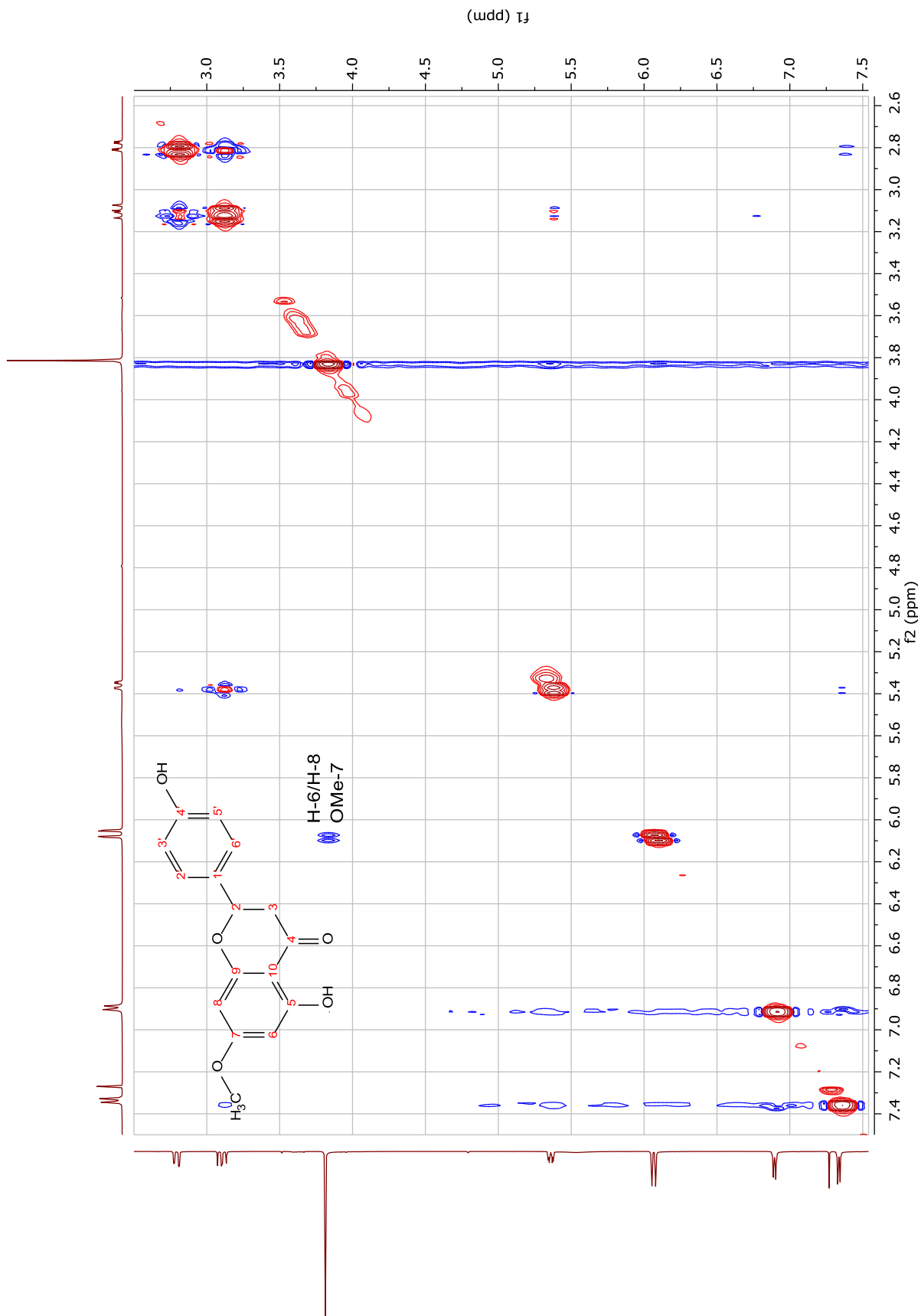


Figura 3. Espectro de NOESY de **Sb1** (500 MHz,  $\text{CDCl}_3$ ).



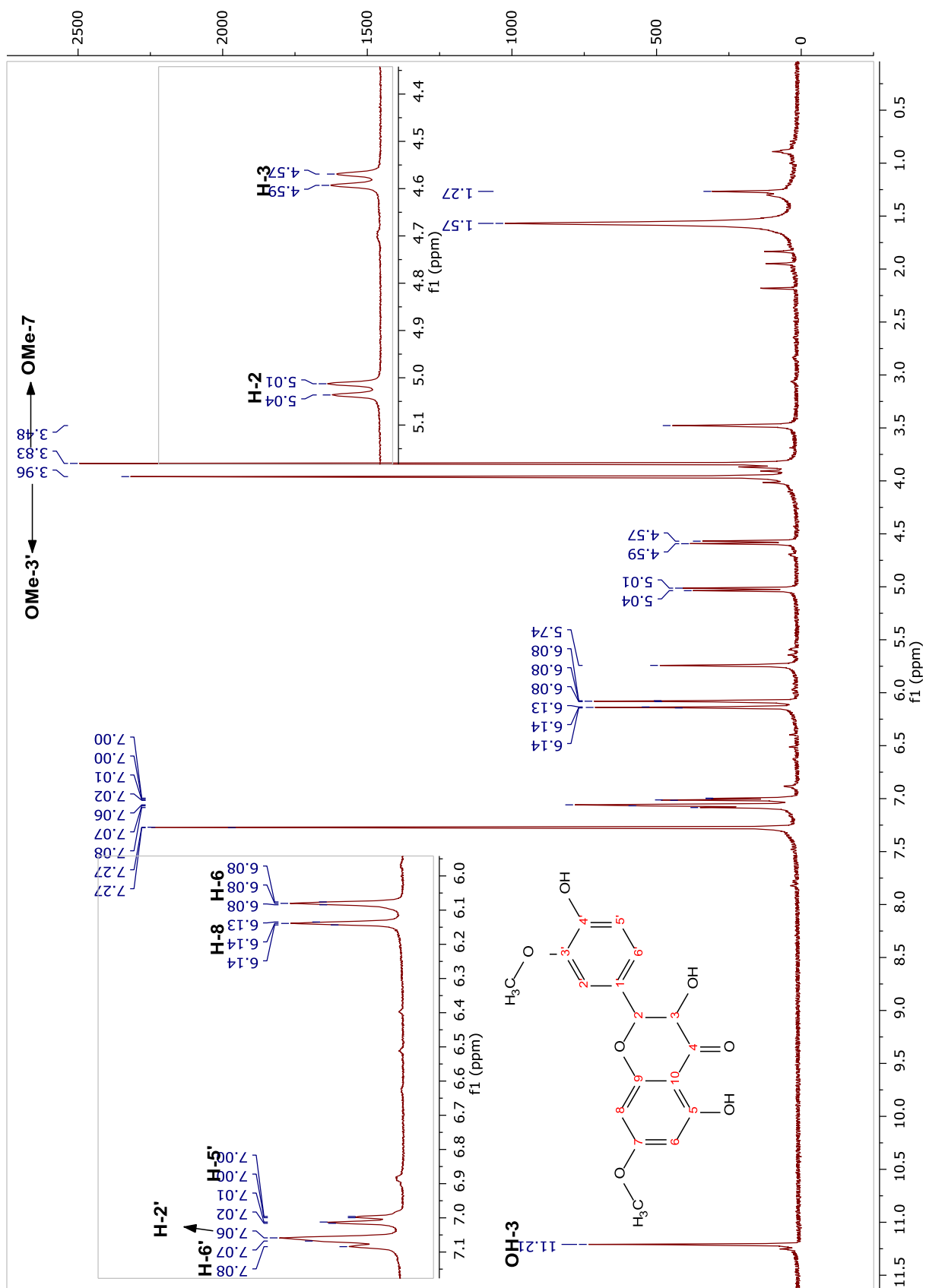


Figura 4. Espectro de RMN  $^1\text{H}$  de **Sb2** (500 MHz,  $\text{CDCl}_3$ ).

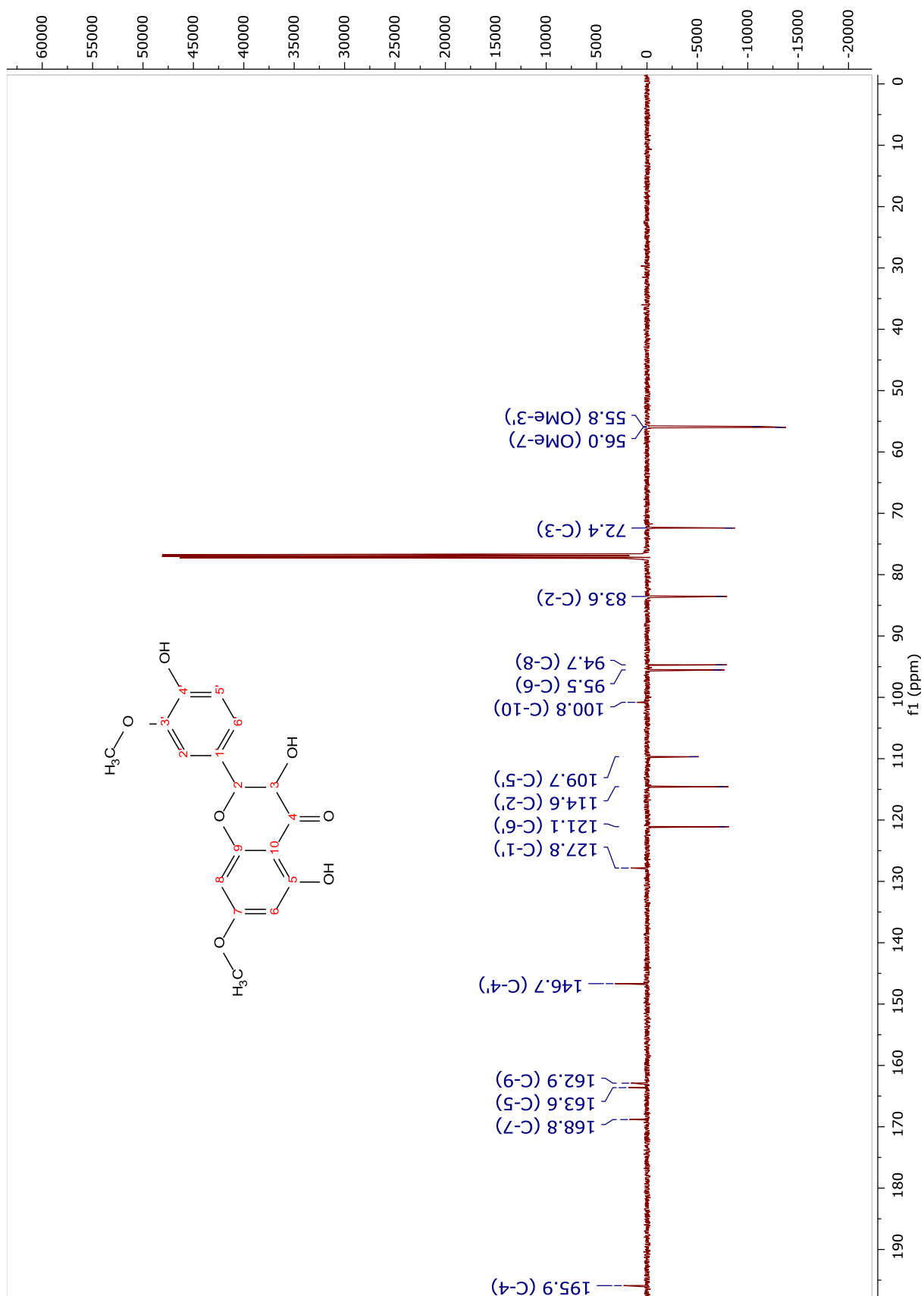


Figura 5. Espectro de DEPTQ de **Sb2** (125 MHz, CDCl<sub>3</sub>).

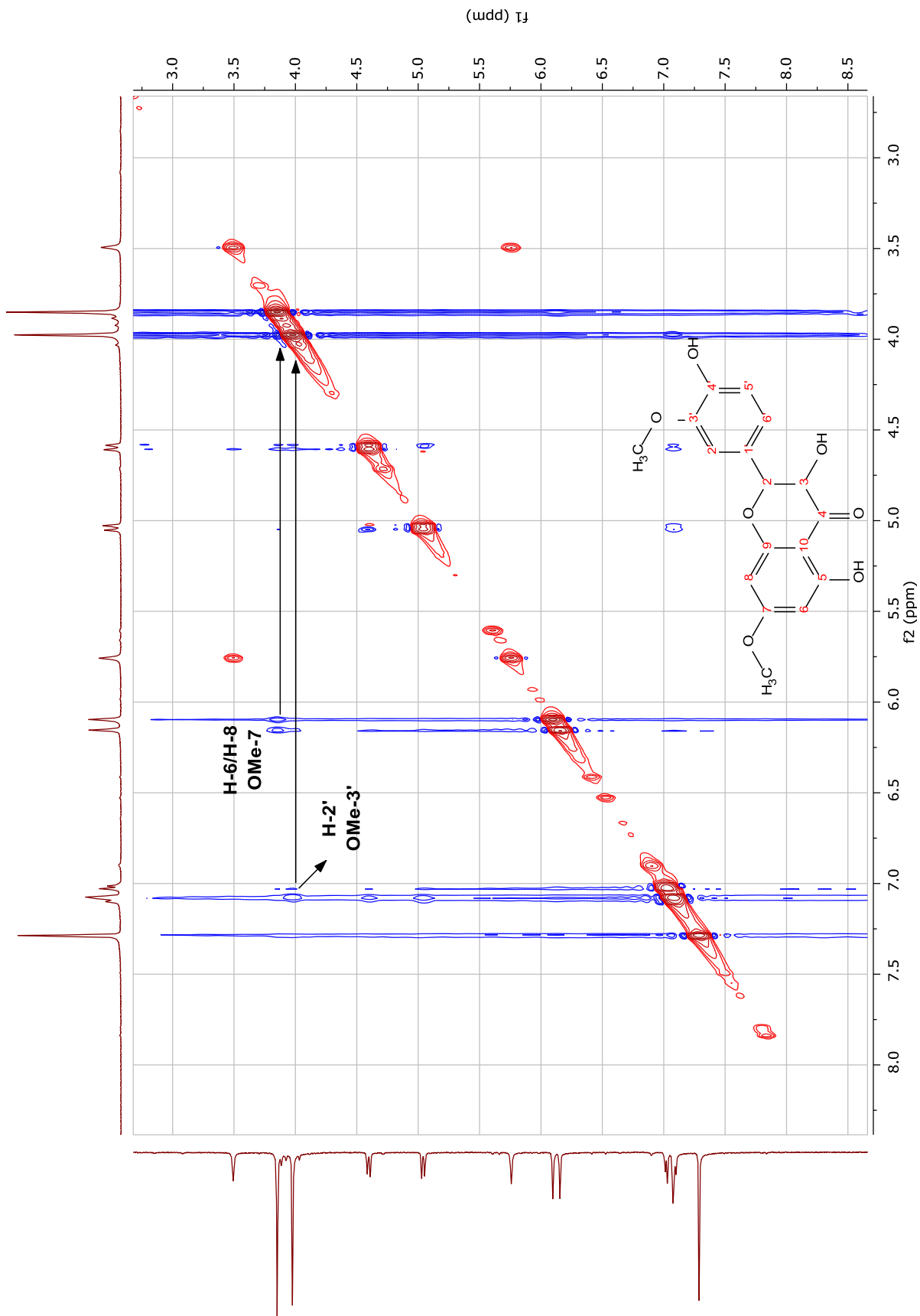
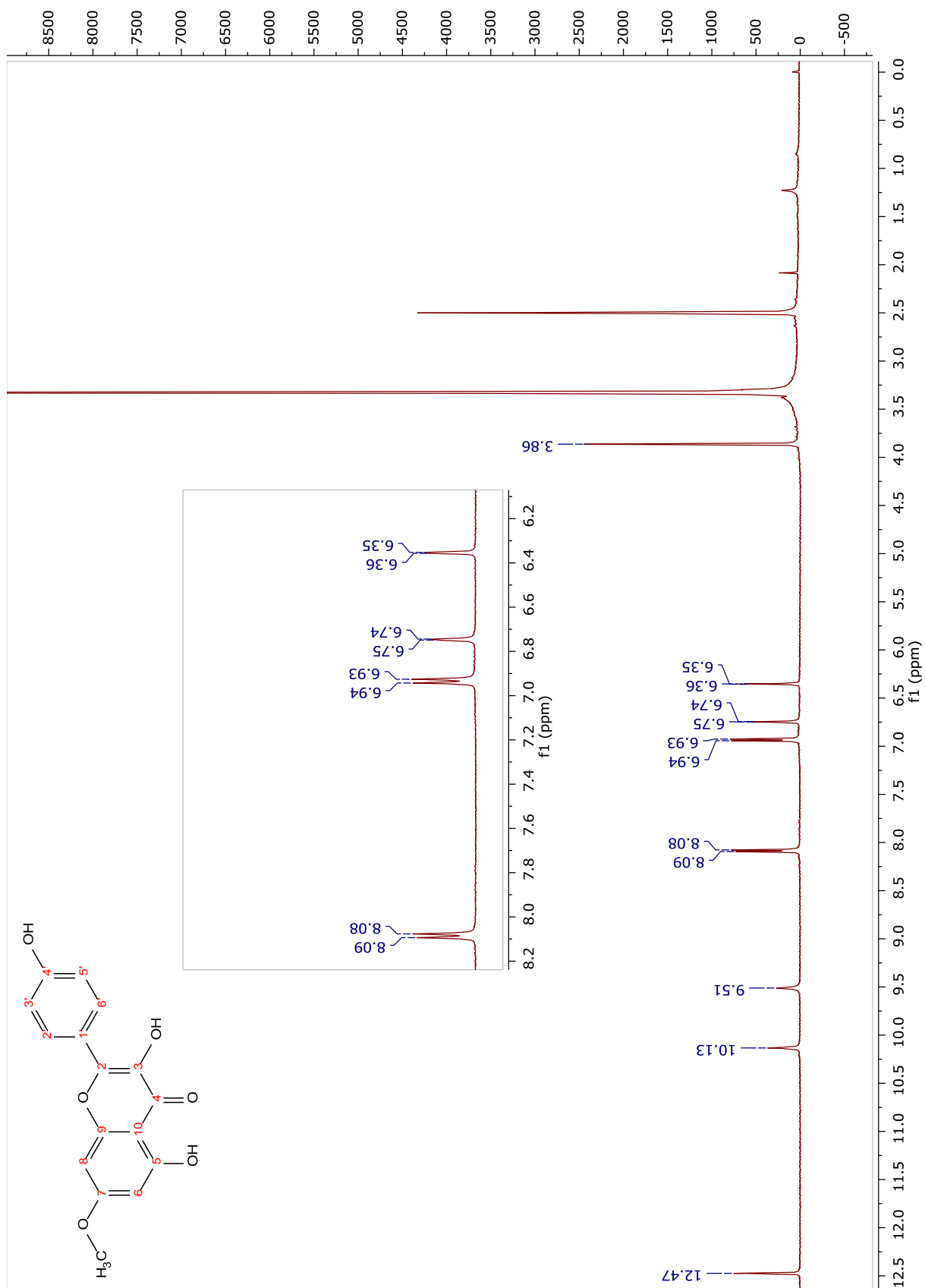


Figura 6. Espectro de NOESY de **Sb2** (500 MHz, CDCl<sub>3</sub>).



**Figura 7.** Espectro de RMN  $^1\text{H}$  de **Sb3** (500 MHz,  $\text{DMSO-}d_6$ ).

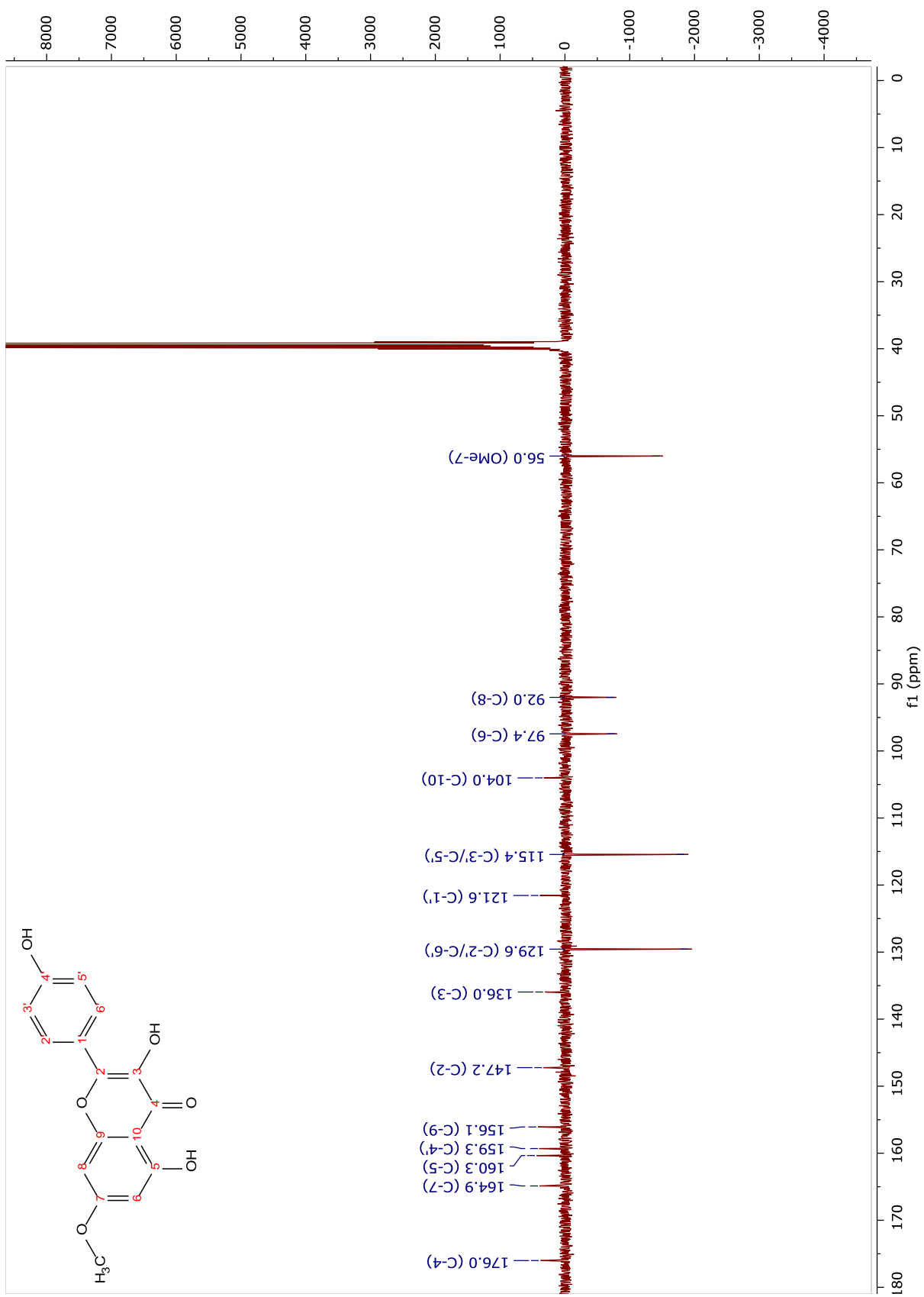
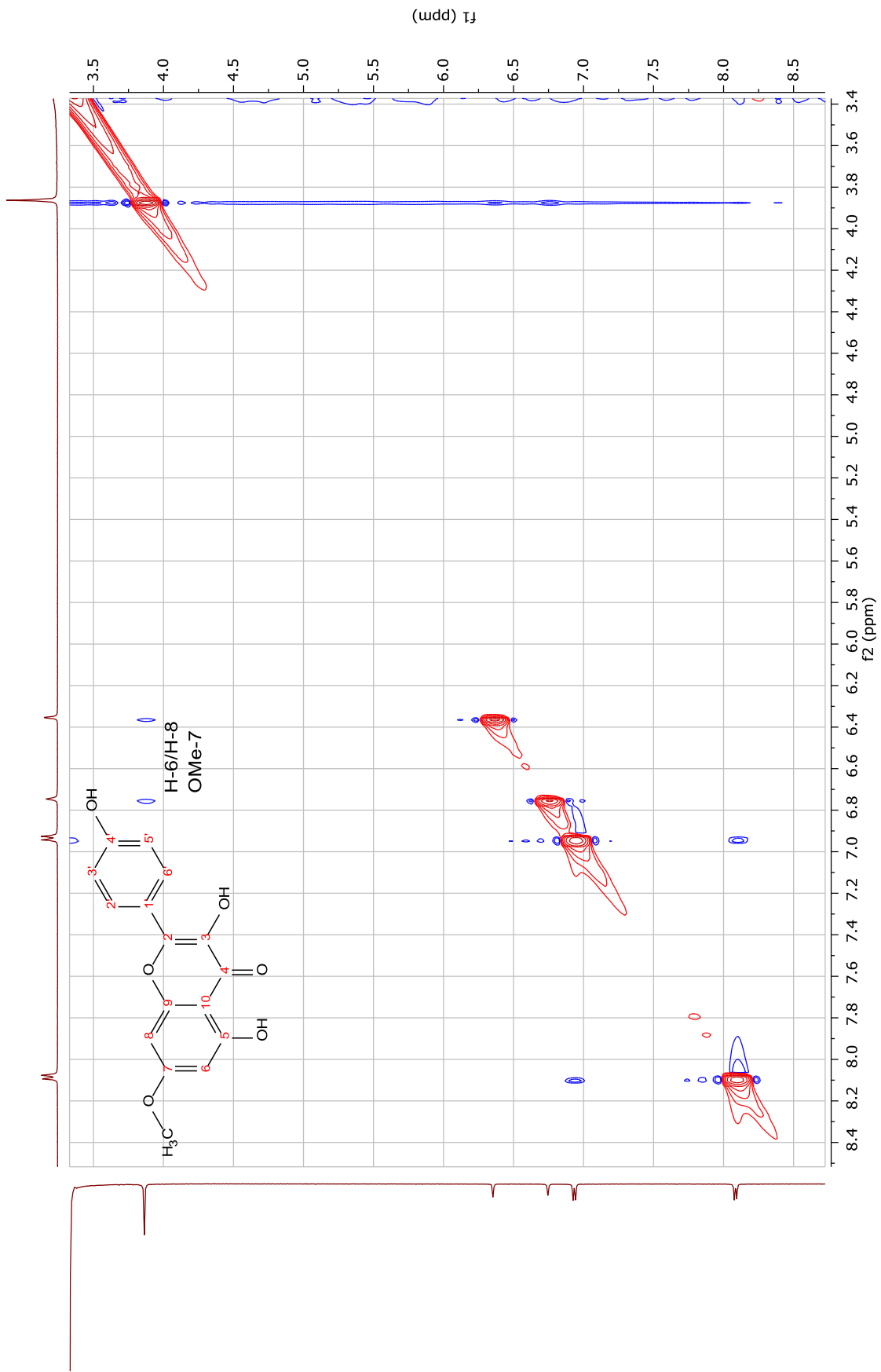
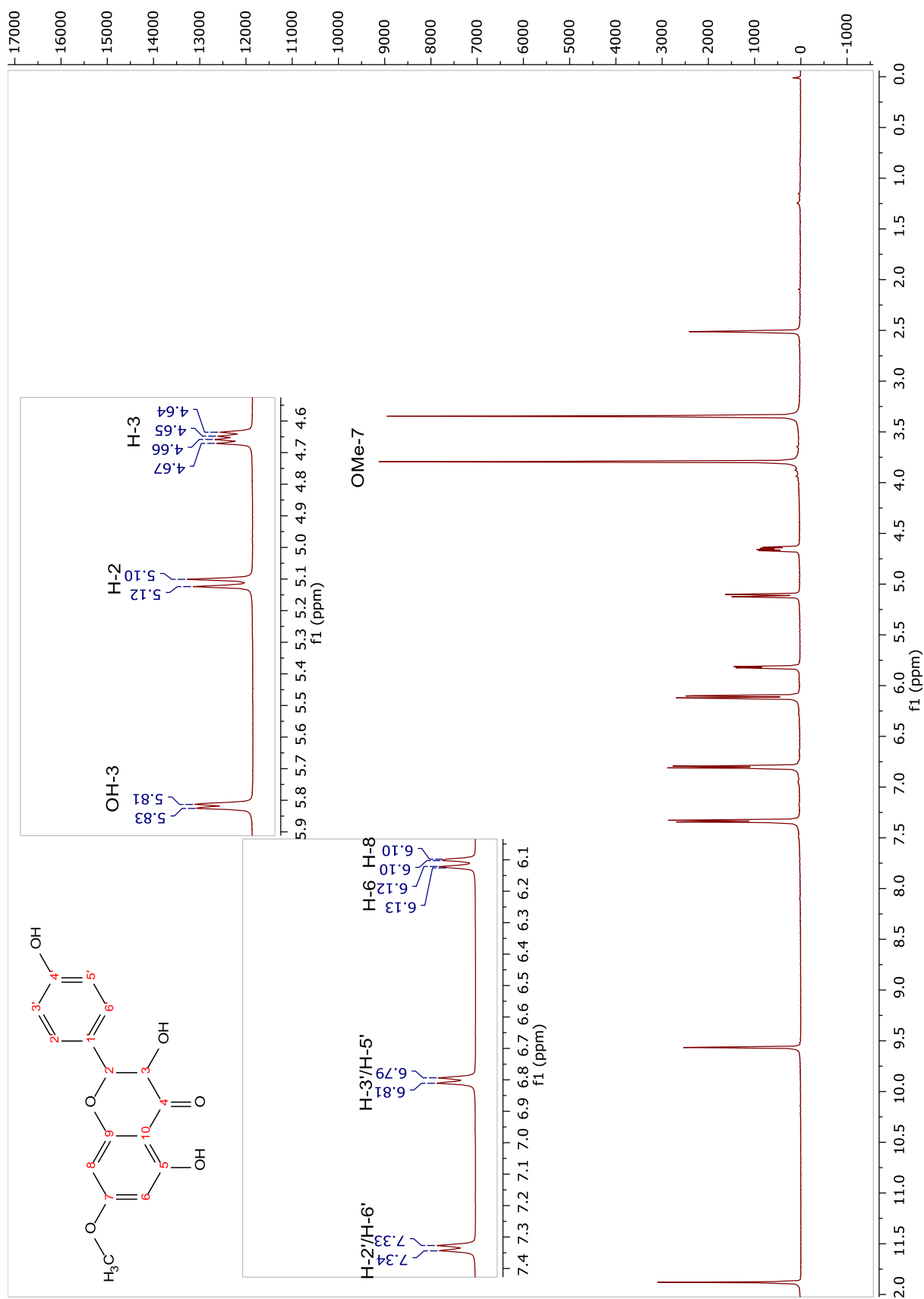


Figura 8. Espectro de DEPTQ de Sb3 (125 MHz, DMSO- $d_6$ ).



**Figura 9.** Espectro de NOESY de **Sb3** (500 MHz, DMSO- $d_6$ ).



**Figura 10.** Espectro de RMN  $^1\text{H}$  de **Sb4** (500 MHz,  $\text{DMSO-}d_6$ ).

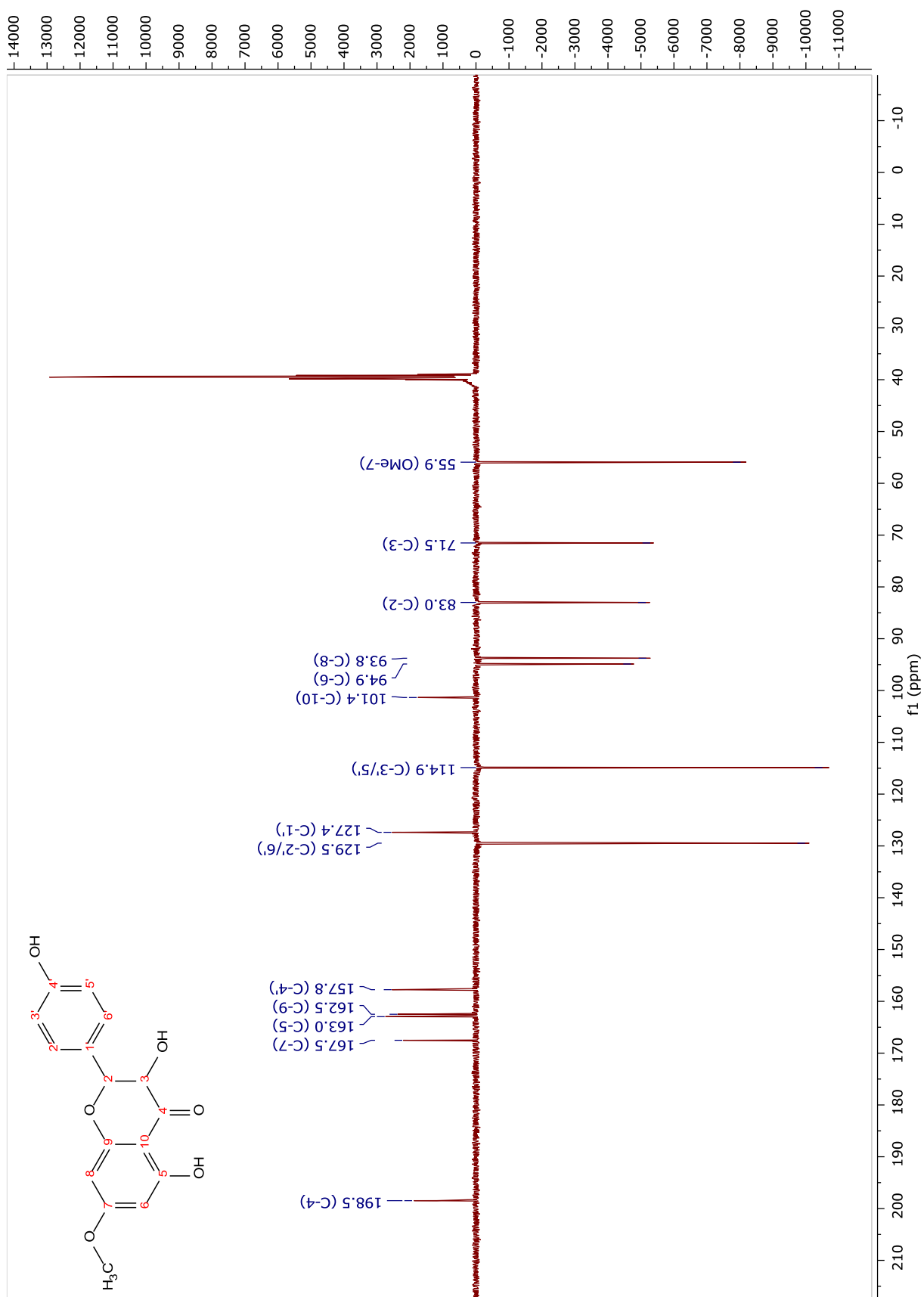
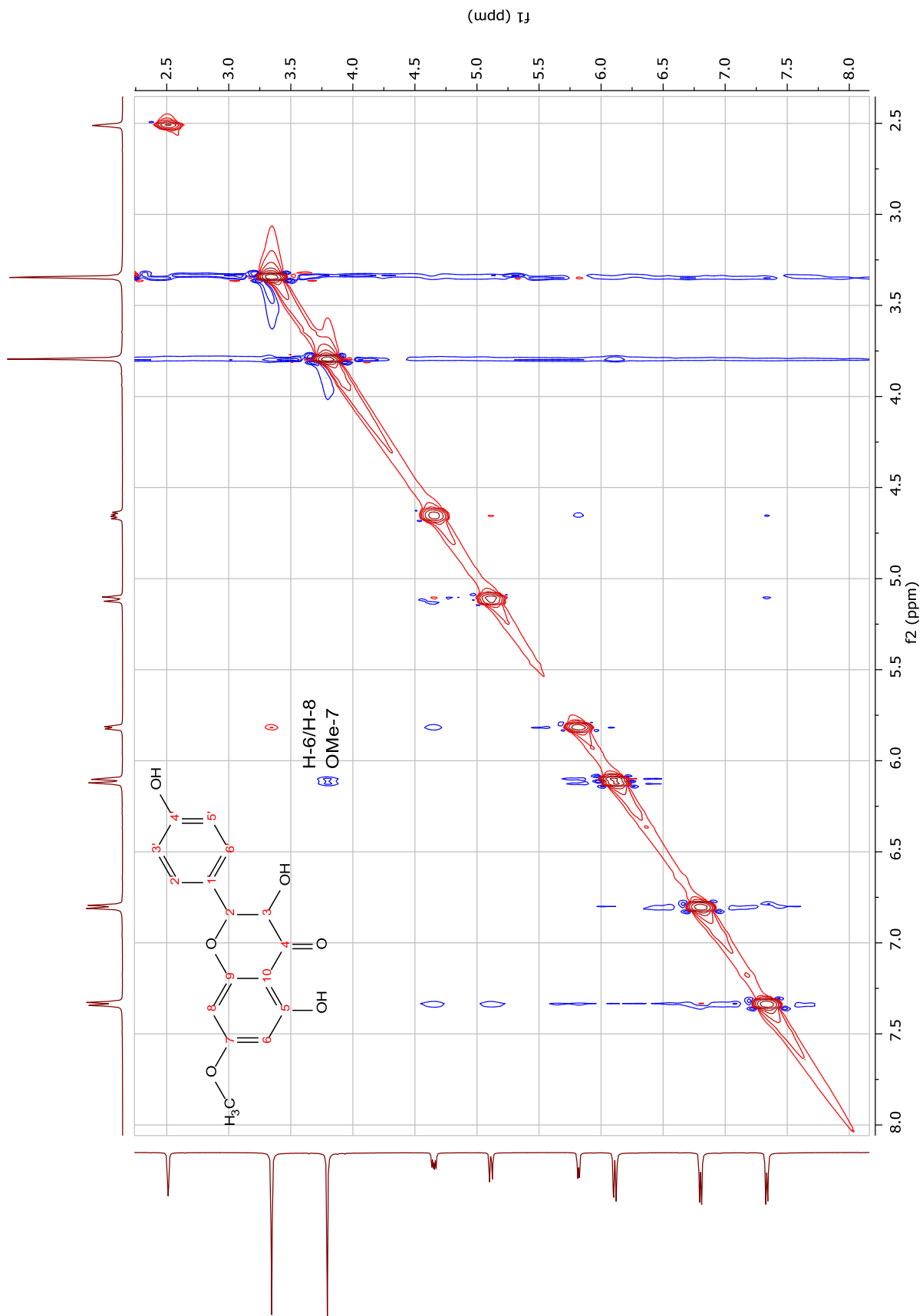
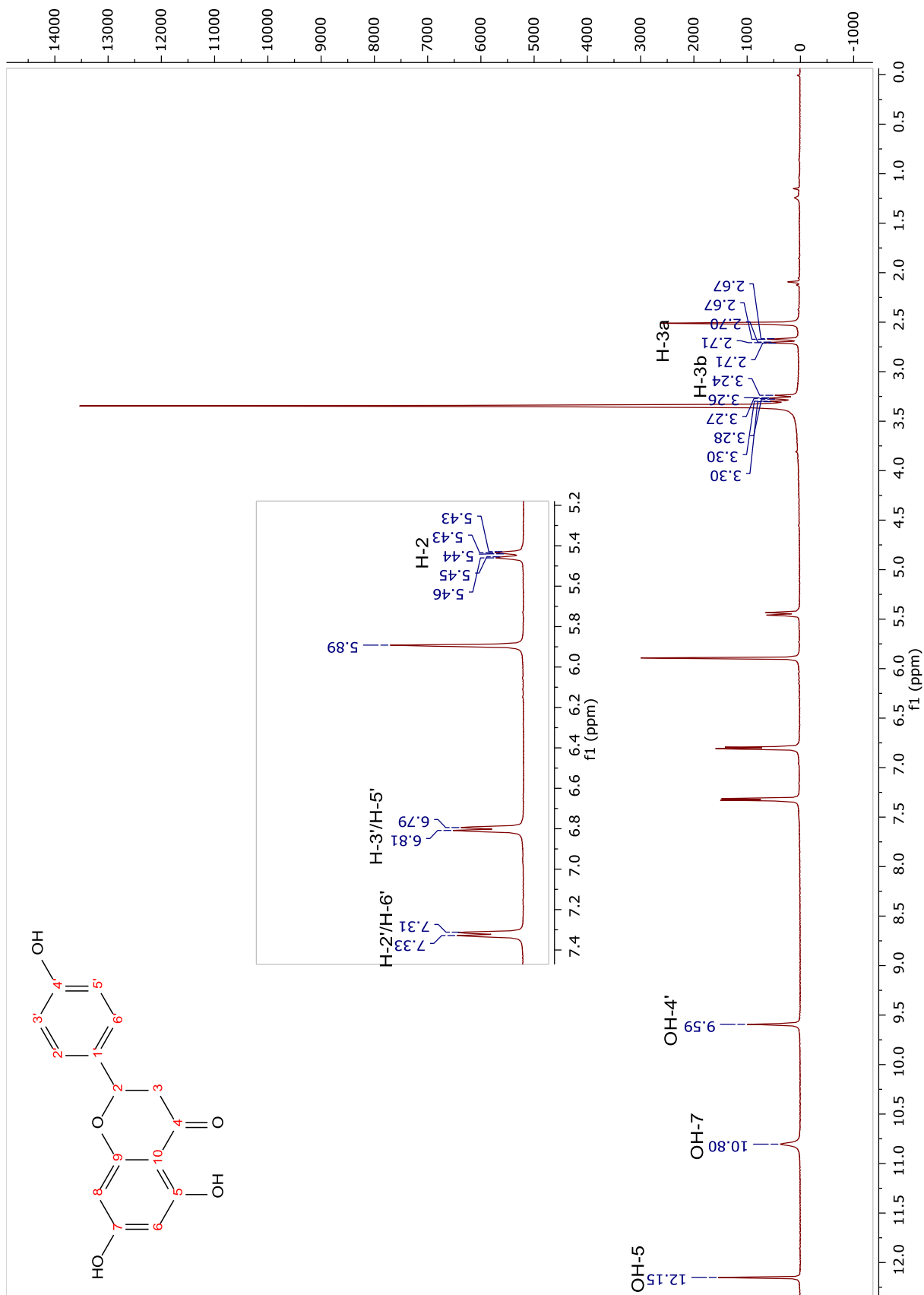


Figura 11. Espectro de DEPTQ de **Sb4** (125 MHz, DMSO- $d_6$ ).

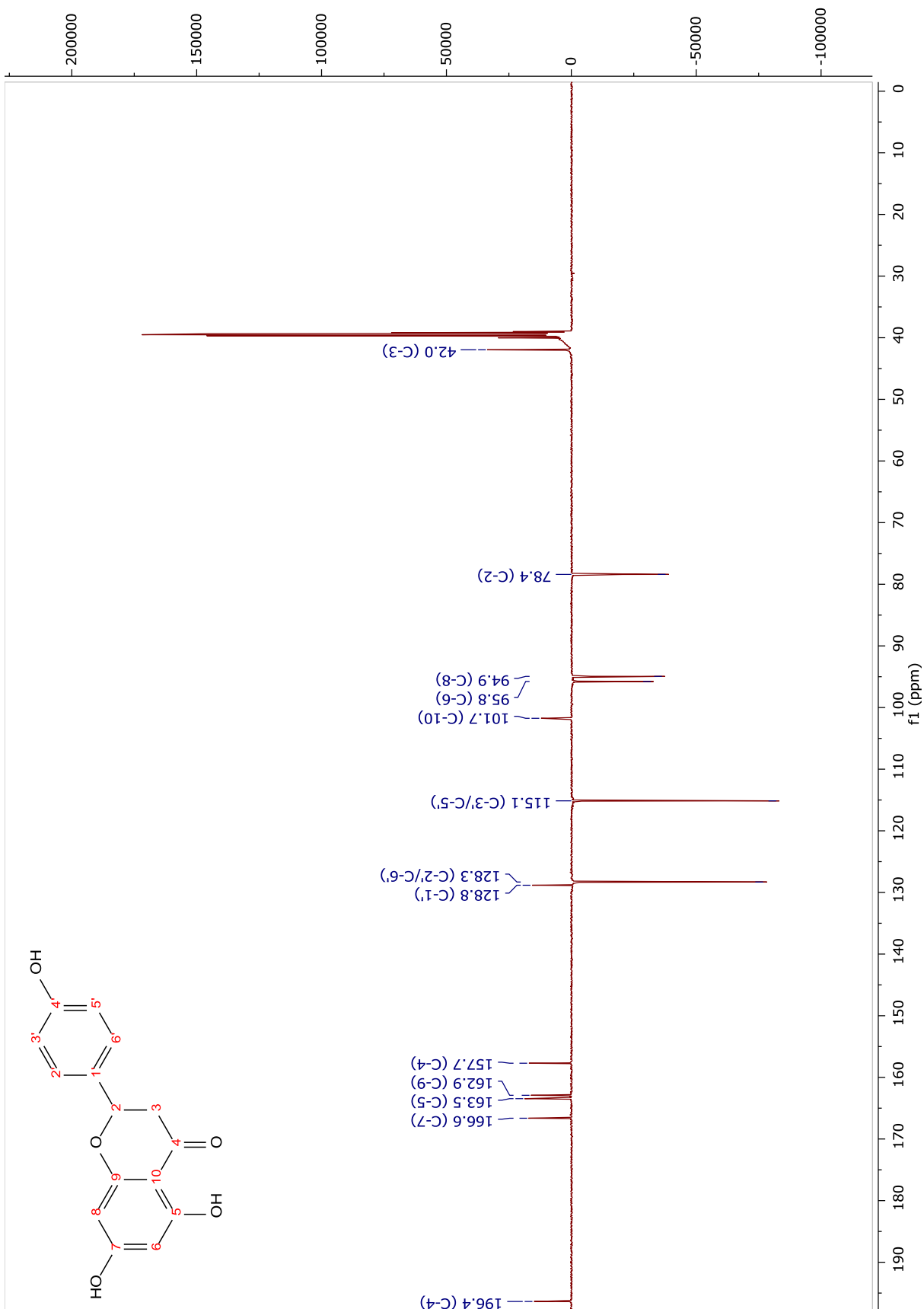




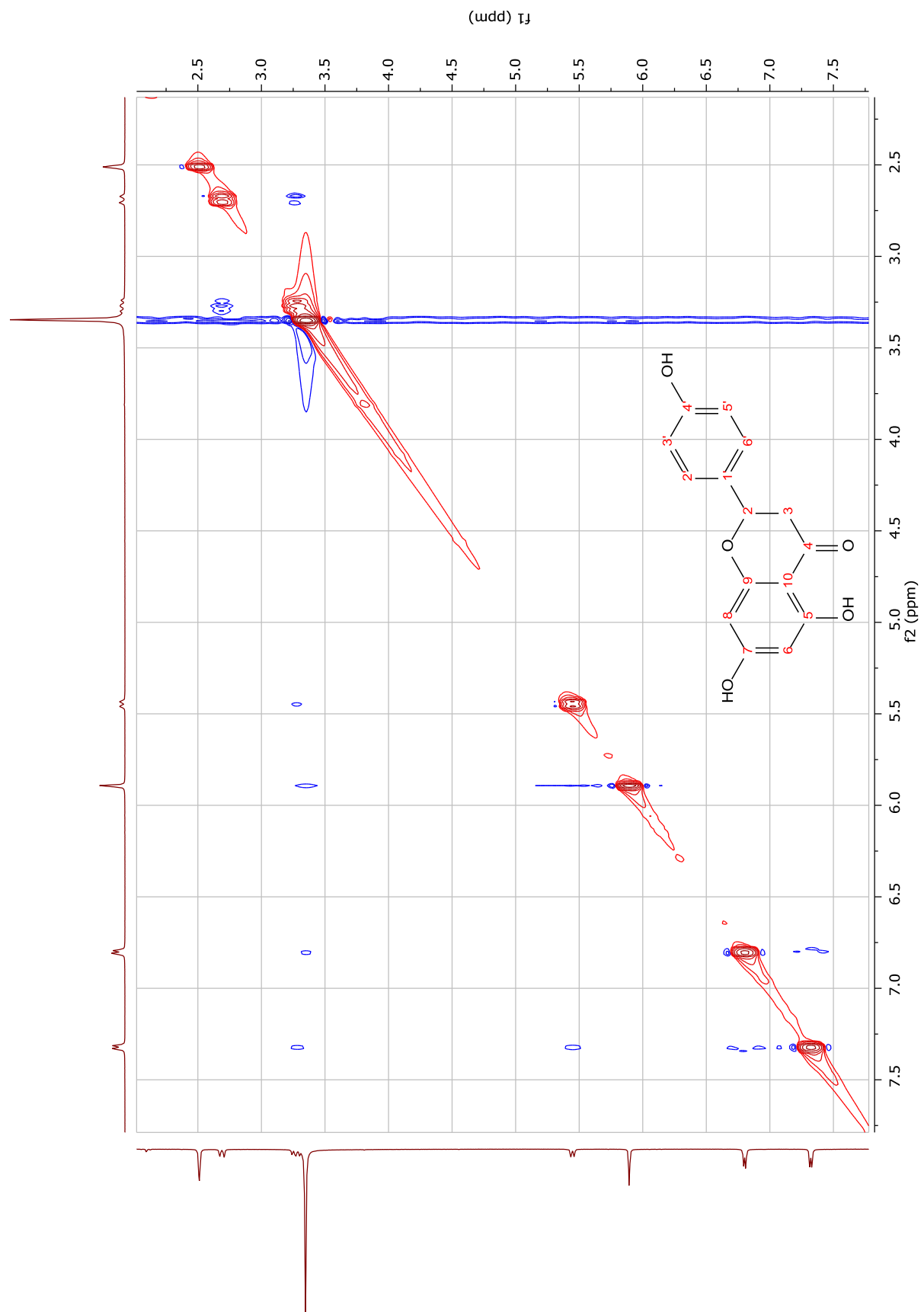
**Figura 12.** Espectro de NOESY **Sb4** (500 MHz,  $\text{DMSO-}d_6$ ).



**Figura 13.** Espectro de RMN  $^1\text{H}$  de **Sb5** (500 MHz,  $\text{DMSO-}d_6$ ).



**Figura 14.** Espectro de DEPTQ de **Sb5** (125 MHz, DMSO-*d*<sub>6</sub>).



**Figura 15.** Espectro de NOESY de **Sb5** (500 MHz,  $\text{DMSO-}d_6$ ).

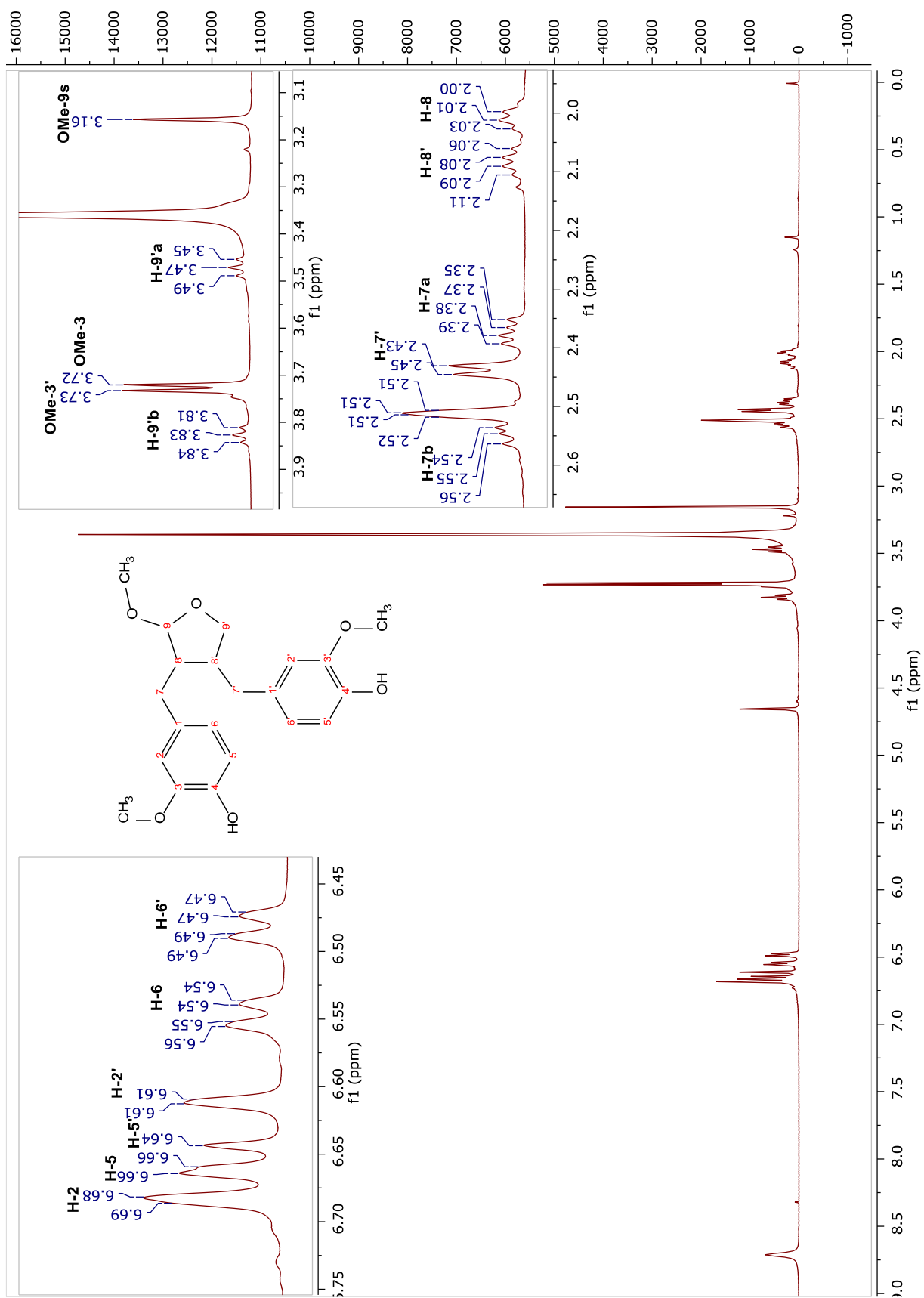


Figura 16. Espectro de RMN  $^1\text{H}$  de **Sb6** (500 MHz,  $\text{DMSO-}d_6$ ).

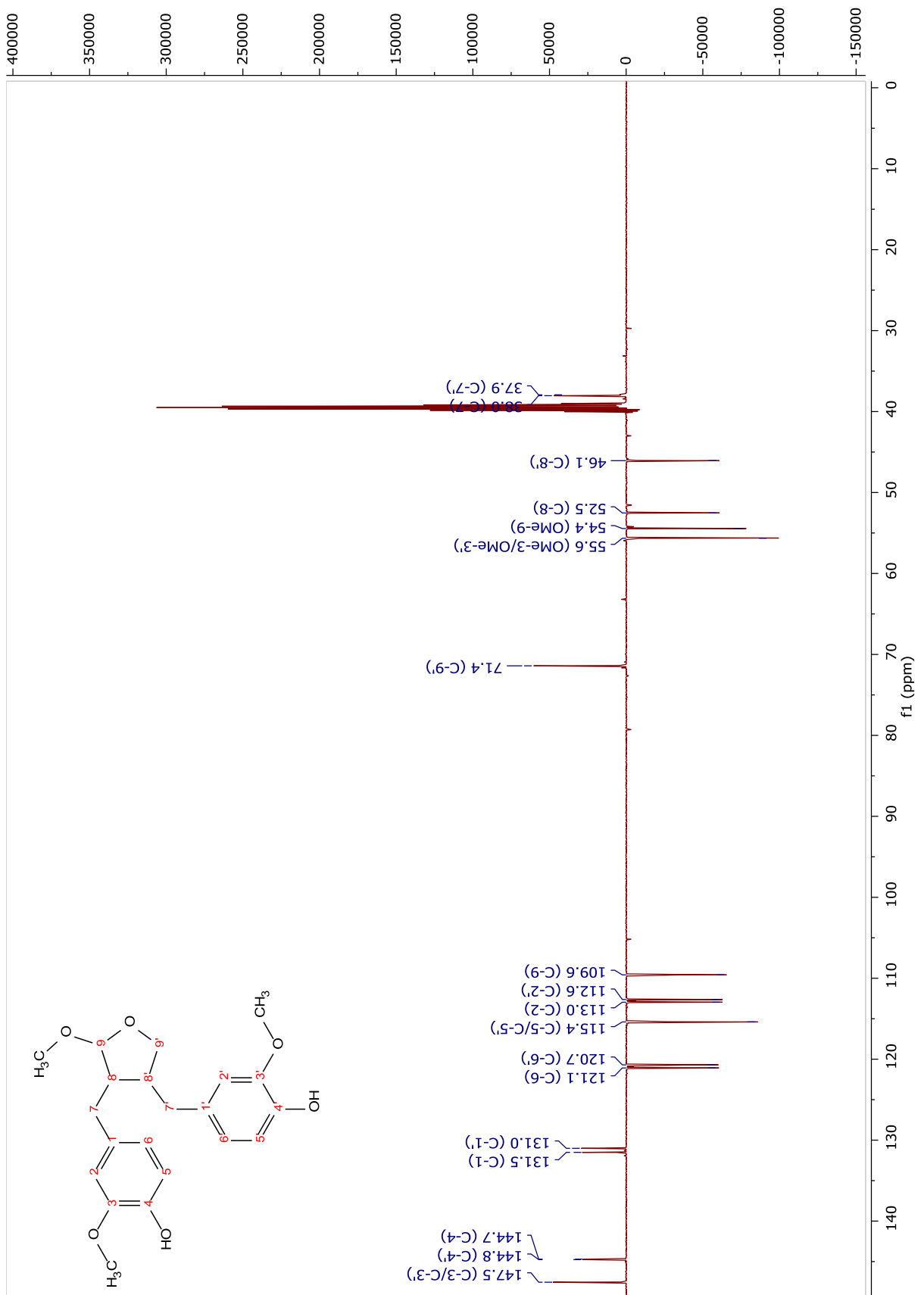


Figura 17. Espectro de DEPTQ de **Sb6** (125 MHz, DMSO-*d*<sub>6</sub>).

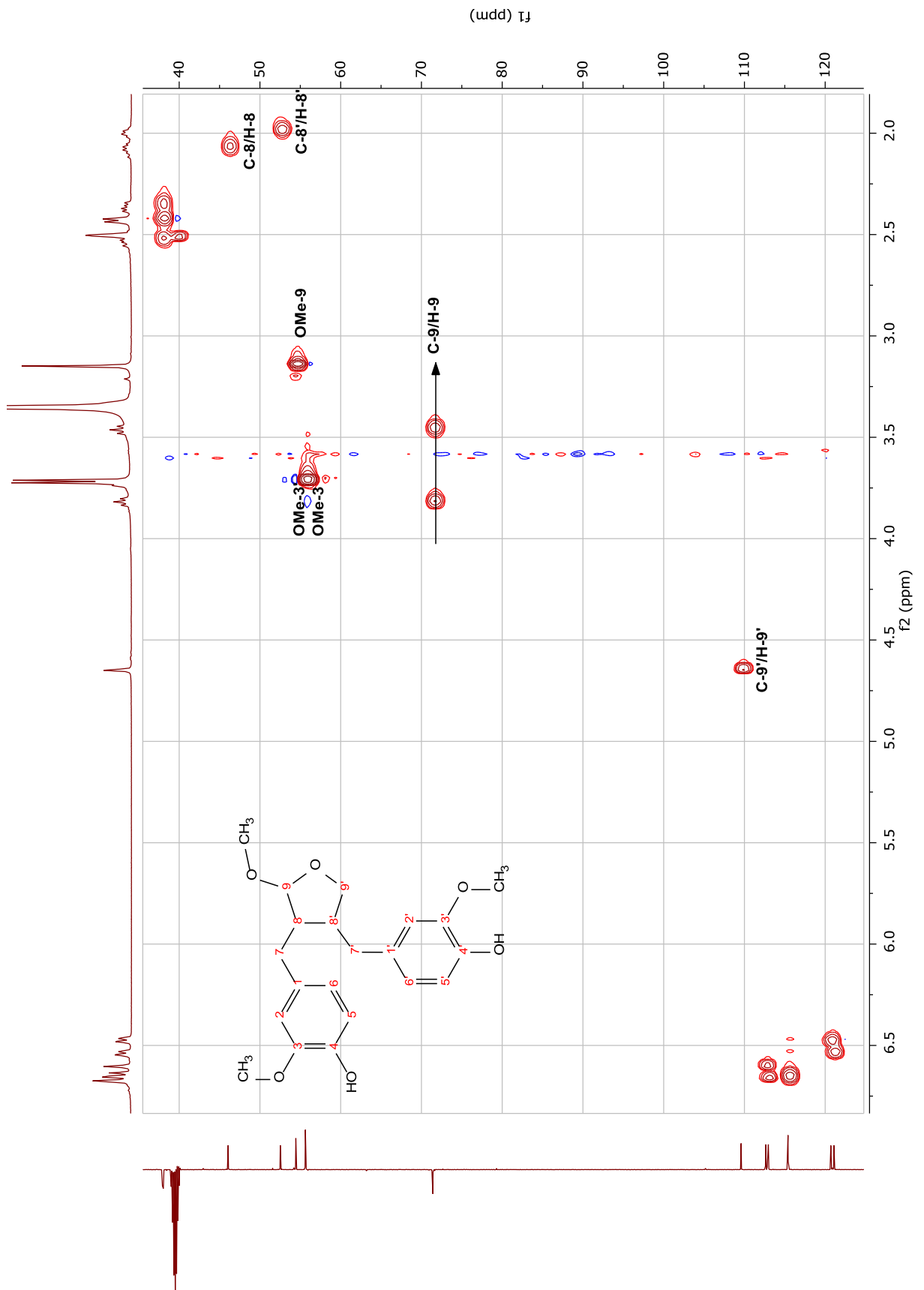
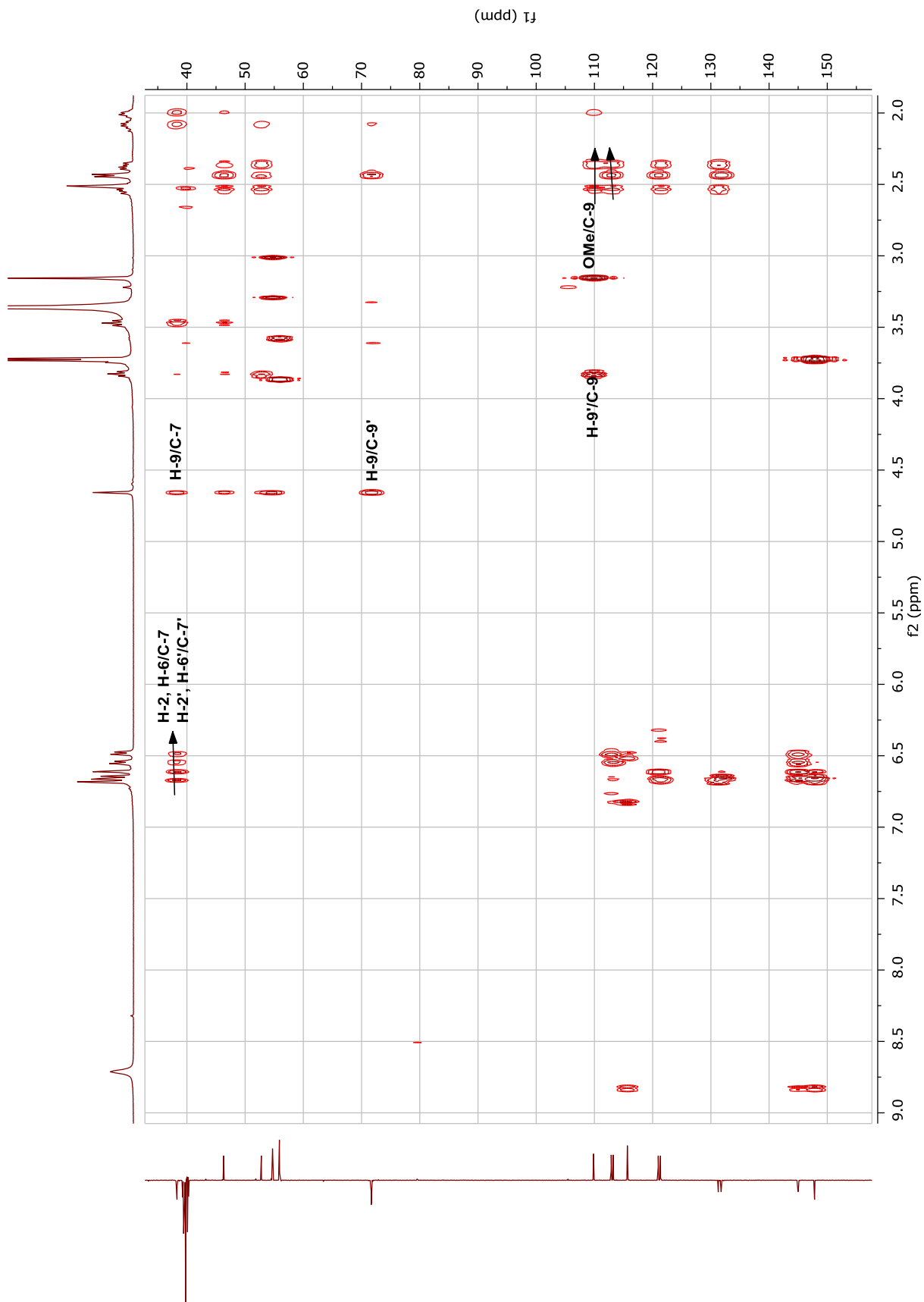
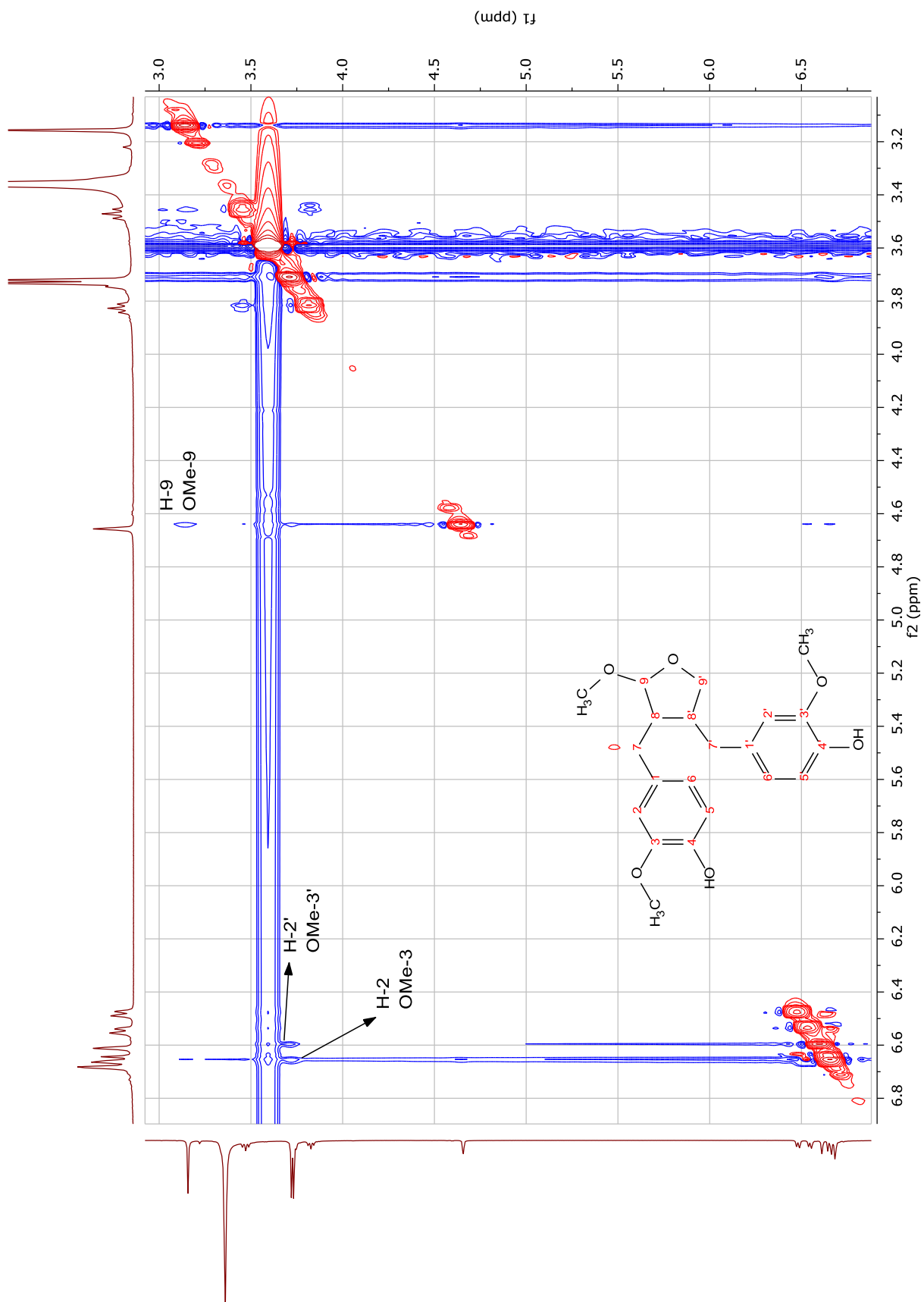


Figura 18. Espectro de HSQC de **Sb6** (500 MHz, DMSO-*d*<sub>6</sub>).

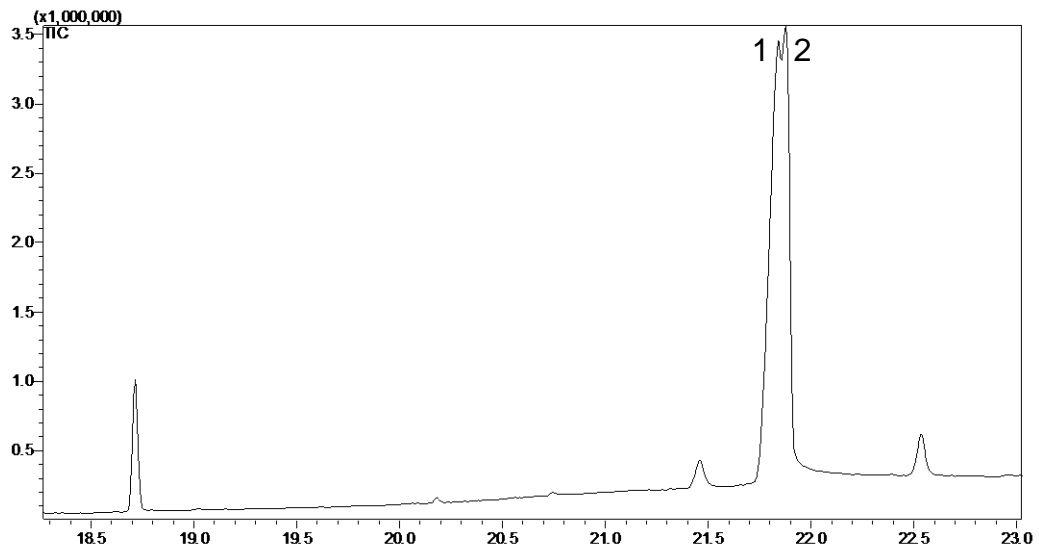


**Figura 19.** Espectro de HMBC de **Sb6** (500 MHz,  $\text{DMSO-}d_6$ ).

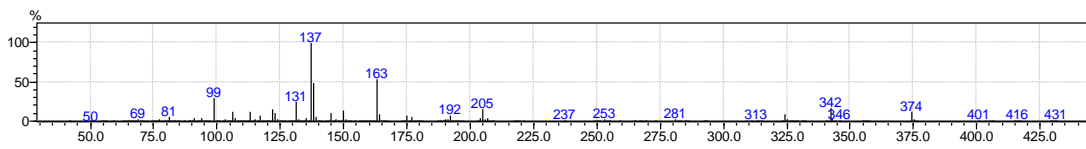




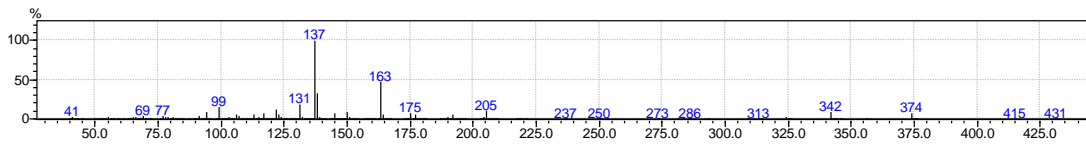
**Figura 20.** Espectro de NOESY de **Sb6** (500 MHz,  $\text{DMSO-}d_6$ ).



**Figura 21.** Cromatograma de CG-EM de Sb6.



**Figura 22.** Espectro de massas do pico 1 de Sb6 (i.e. 70 eV).



**Figura 23.** Espectro de massas do pico 2 de Sb6 (i.e. 70 eV).

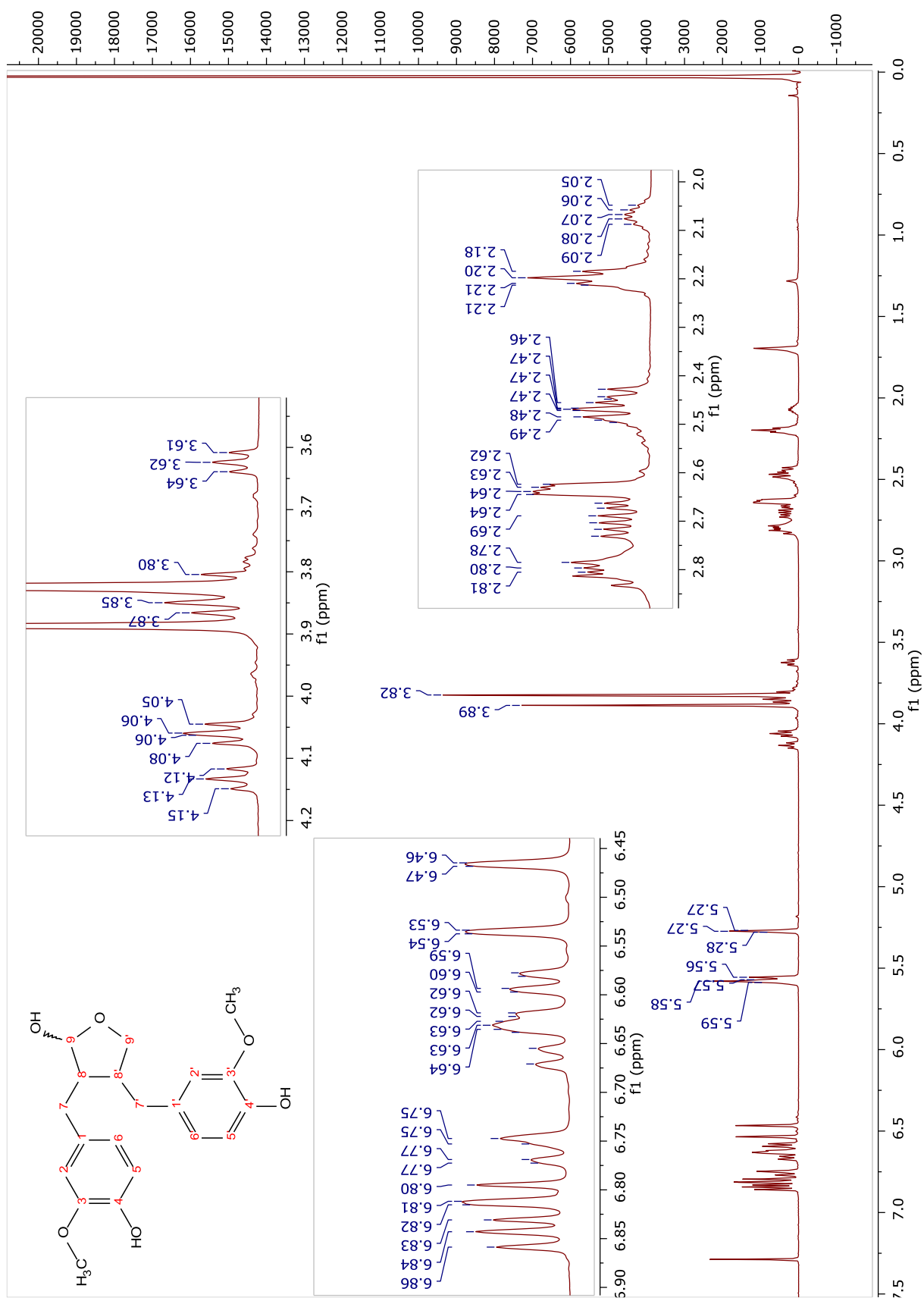


Figura 24. Espectro de RMN  $^1\text{H}$  de **Sb7** (500 MHz,  $\text{CDCl}_3$ ).

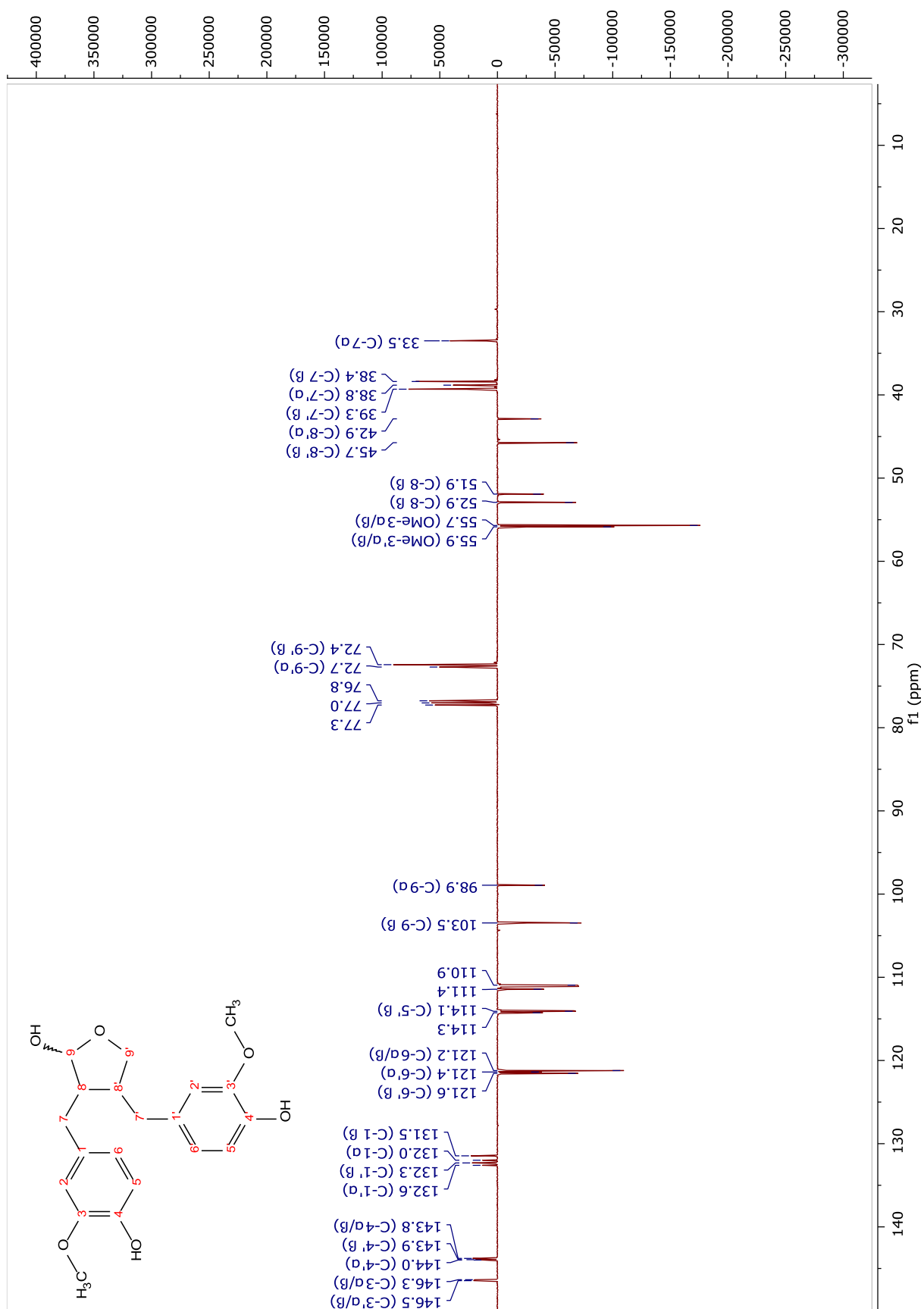
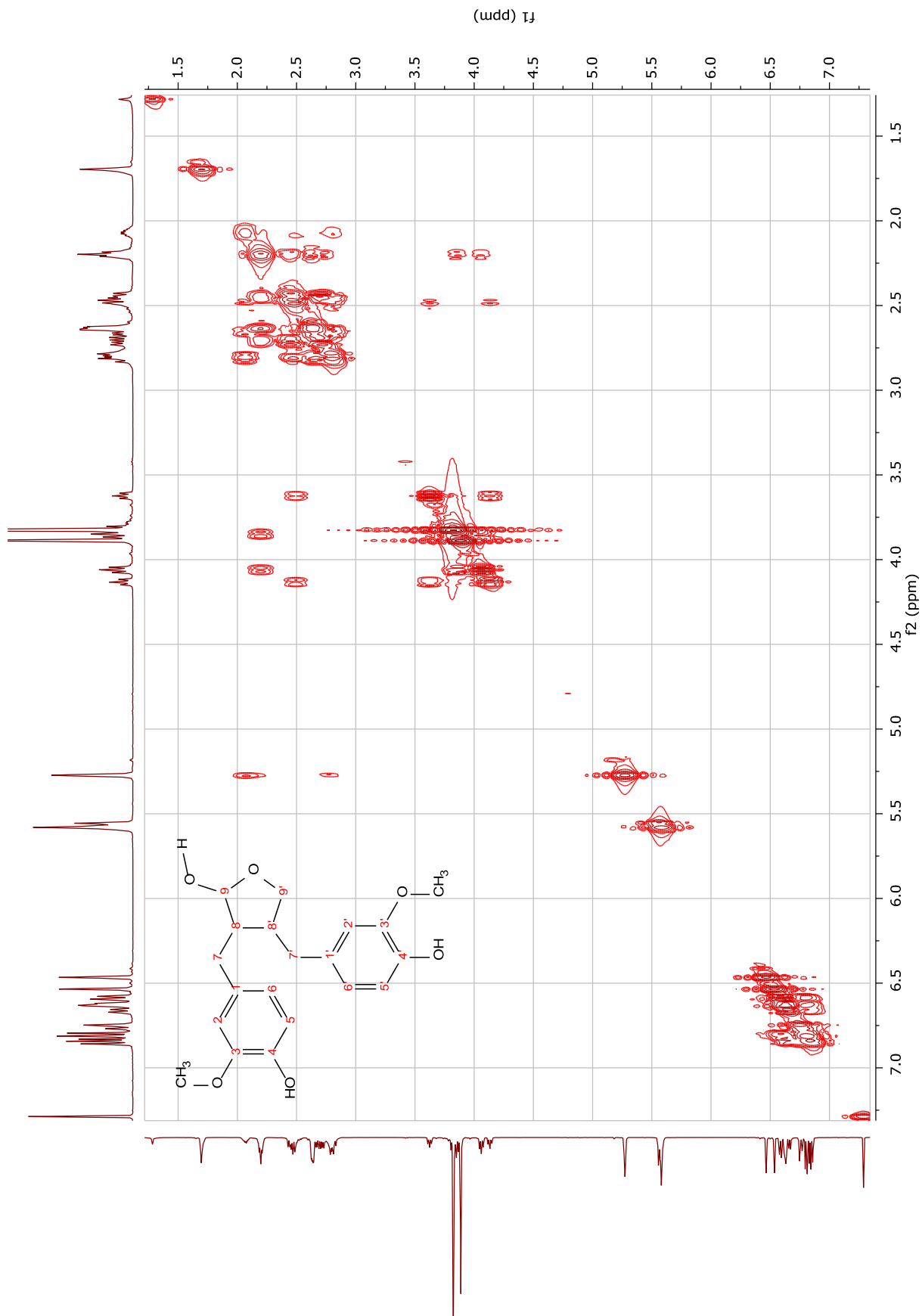


Figura 25. Espectro de DEPTQ de Sb7 (125 MHz, CDCl<sub>3</sub>).



**Figura 26.** Espectro de COSY de Sb7 (500 MHz, CDCl<sub>3</sub>).

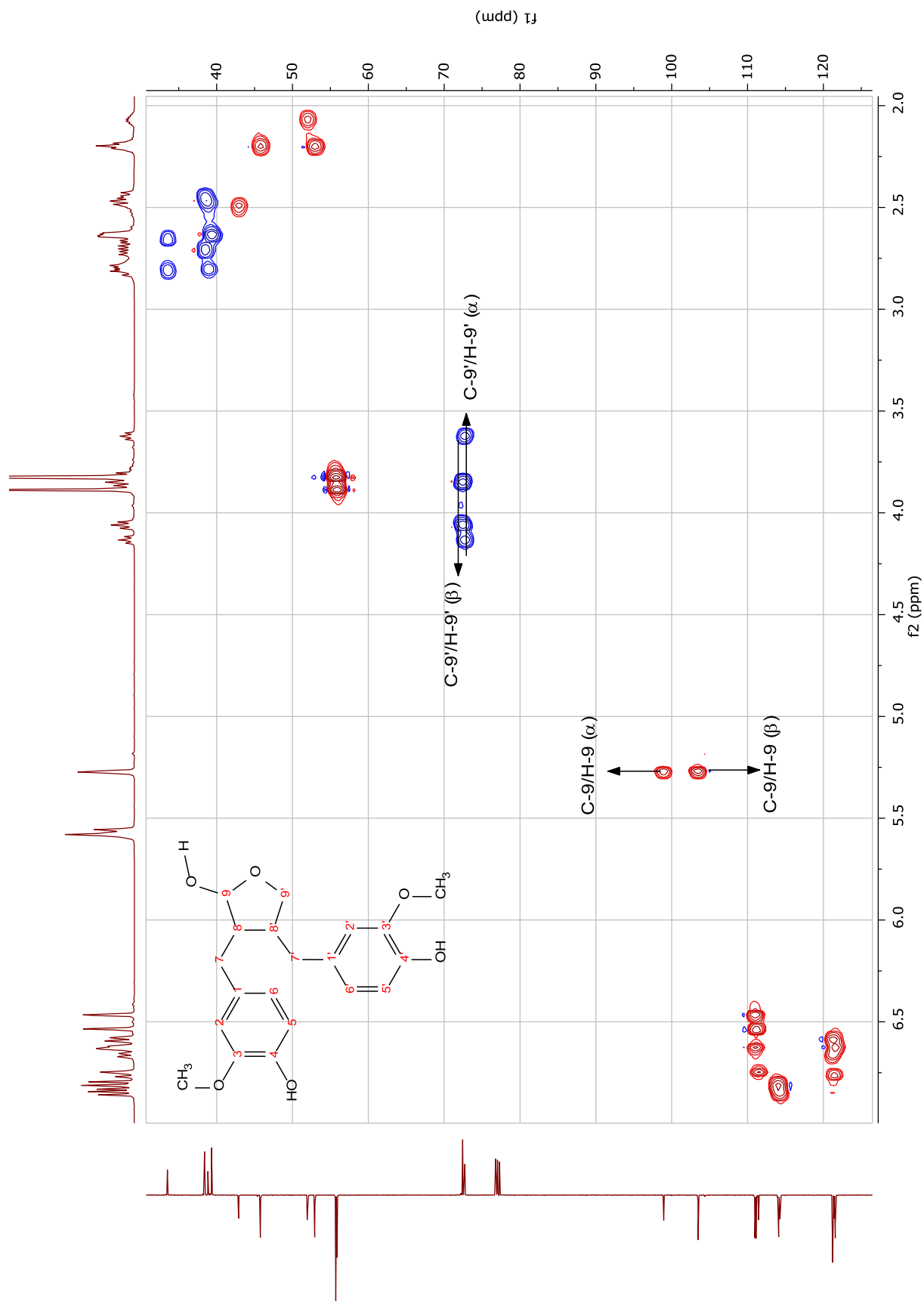


Figura 27. Espectro de HSQC de Sb7 (500 MHz, CDCl<sub>3</sub>).

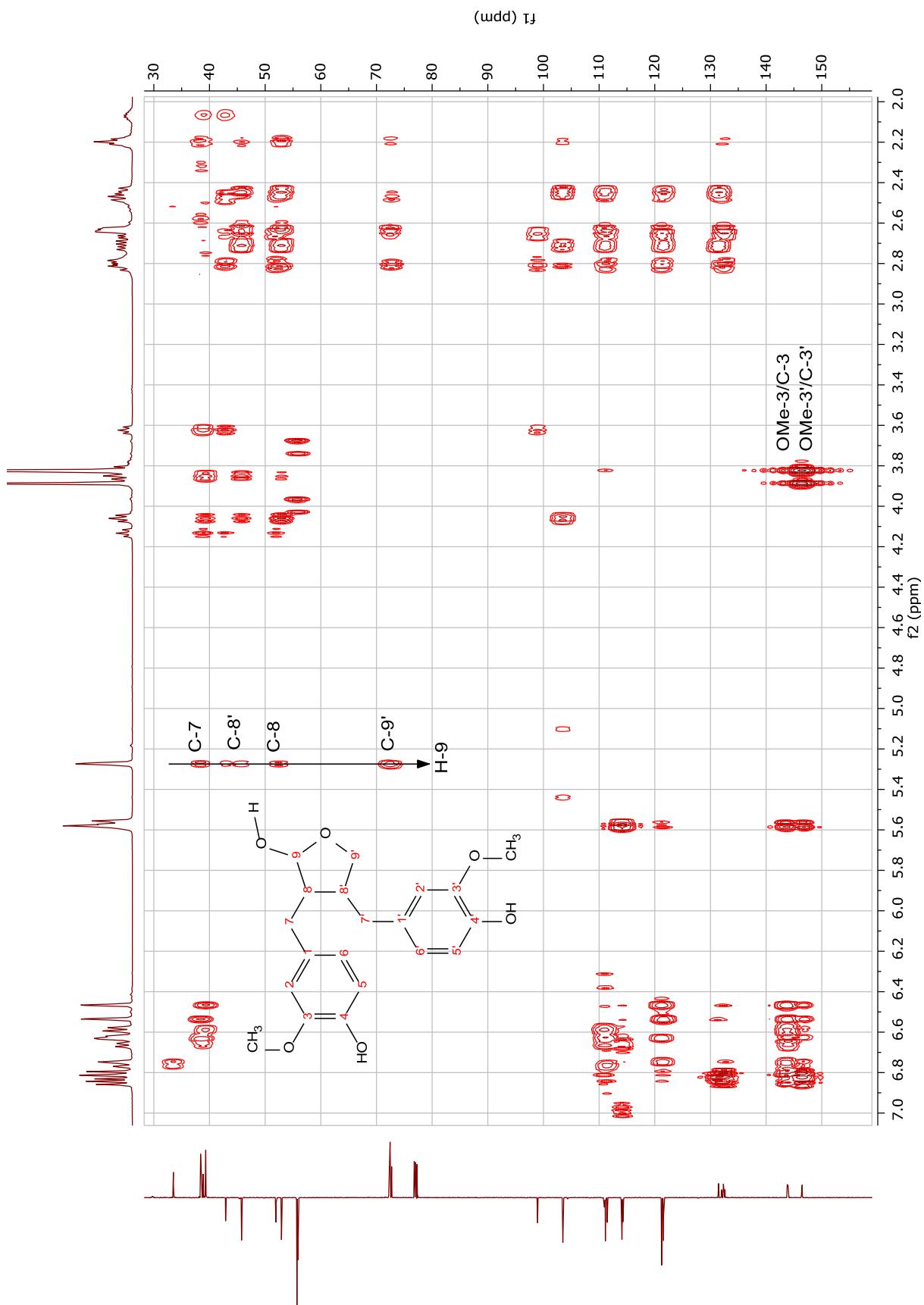
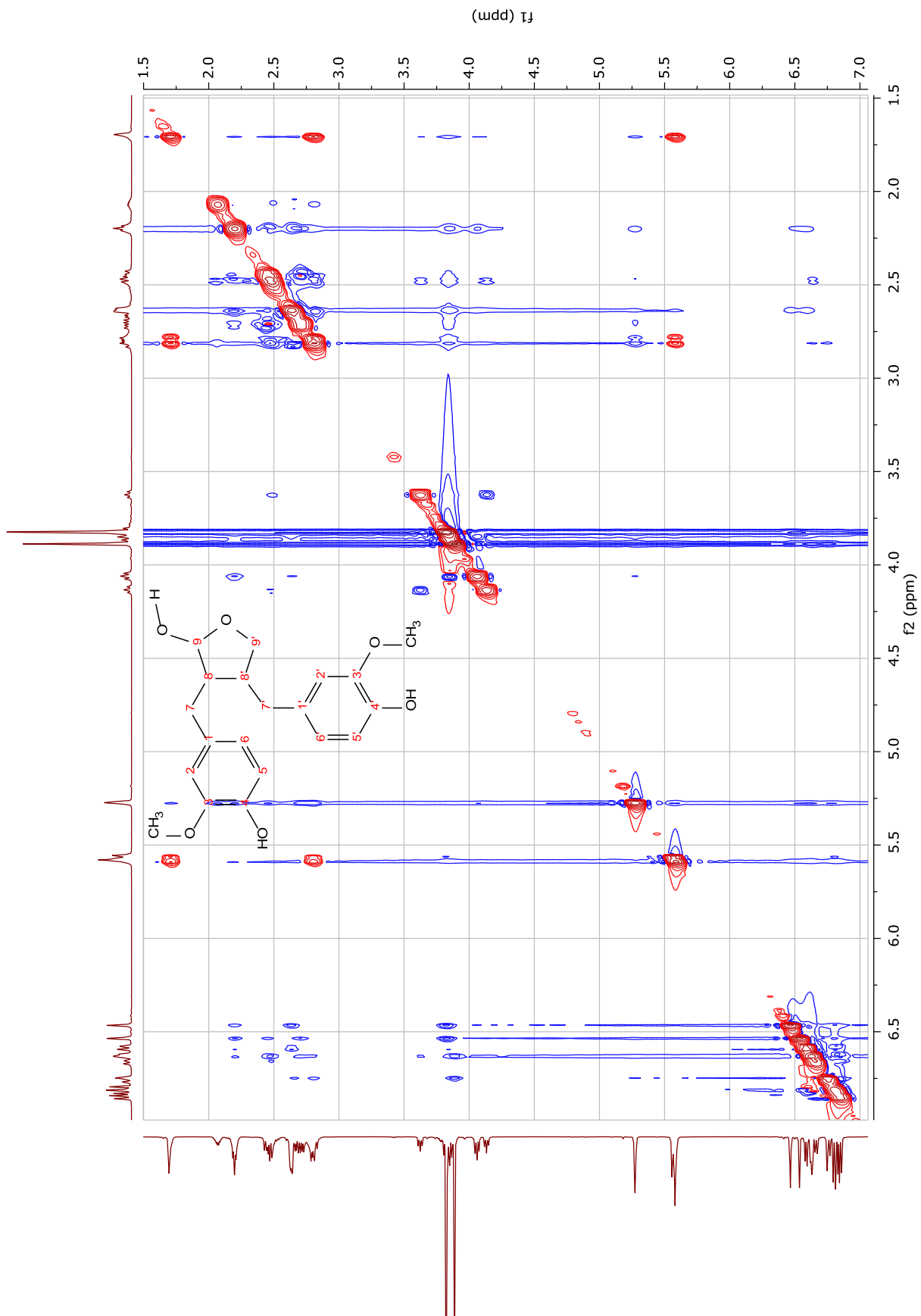
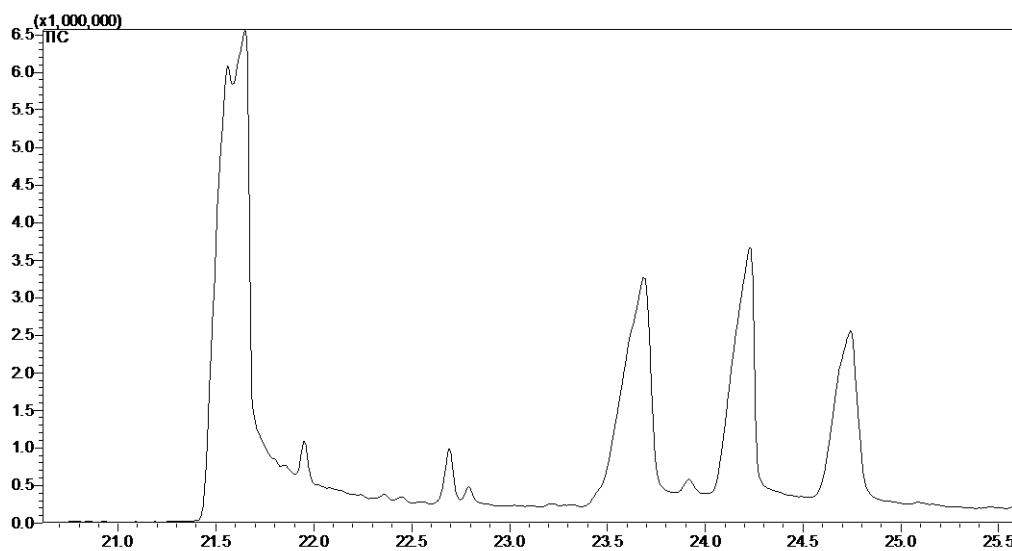


Figura 28. Espectro de HMBC de Sb7 (500 MHz, CDCl<sub>3</sub>).

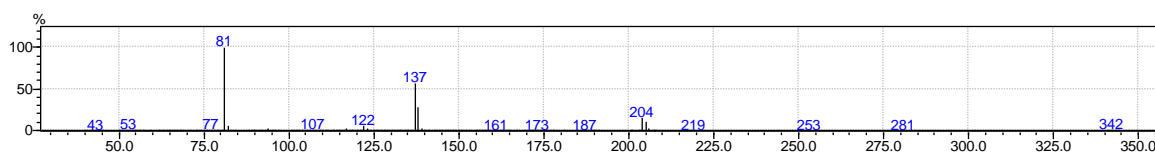


**Figura 29.** Espectro de NOESY de **Sb7** (500 MHz,  $\text{CDCl}_3$ ).

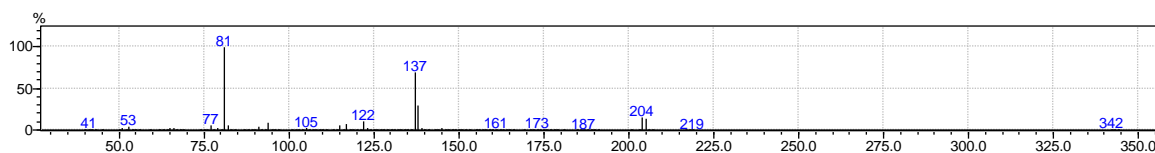




**Figura 30.** Cromatograma de CG-EM de Sb7.



**Figura 31.** Espectro de massas do pico 1 de Sb7 (i.e. 70 eV).



**Figura 32.** Espectro de massas do pico 2 de Sb7 (i.e. 70 eV).

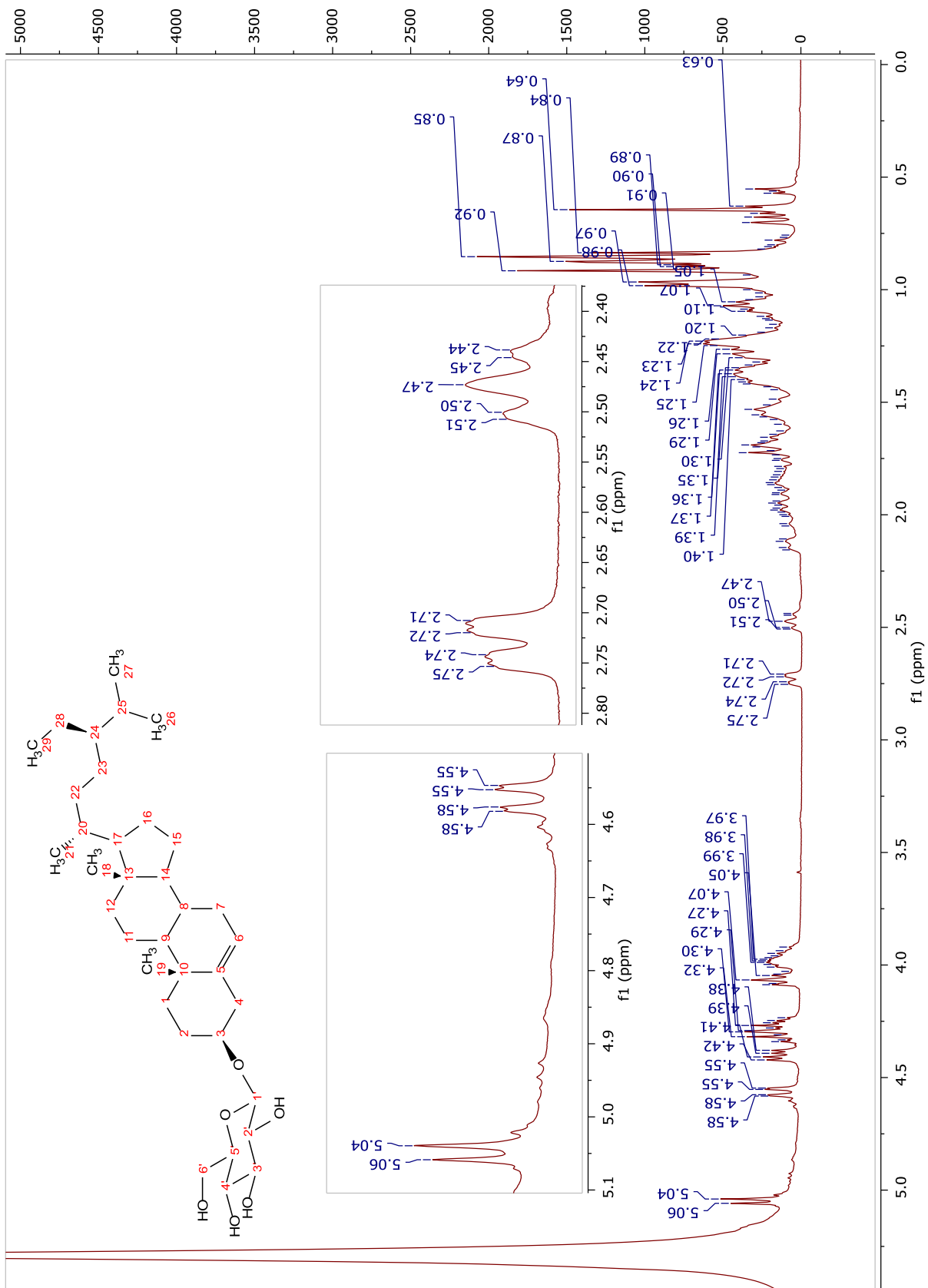


Figura 33. Espectro de RMN  $^1\text{H}$  de Sb8 (500 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

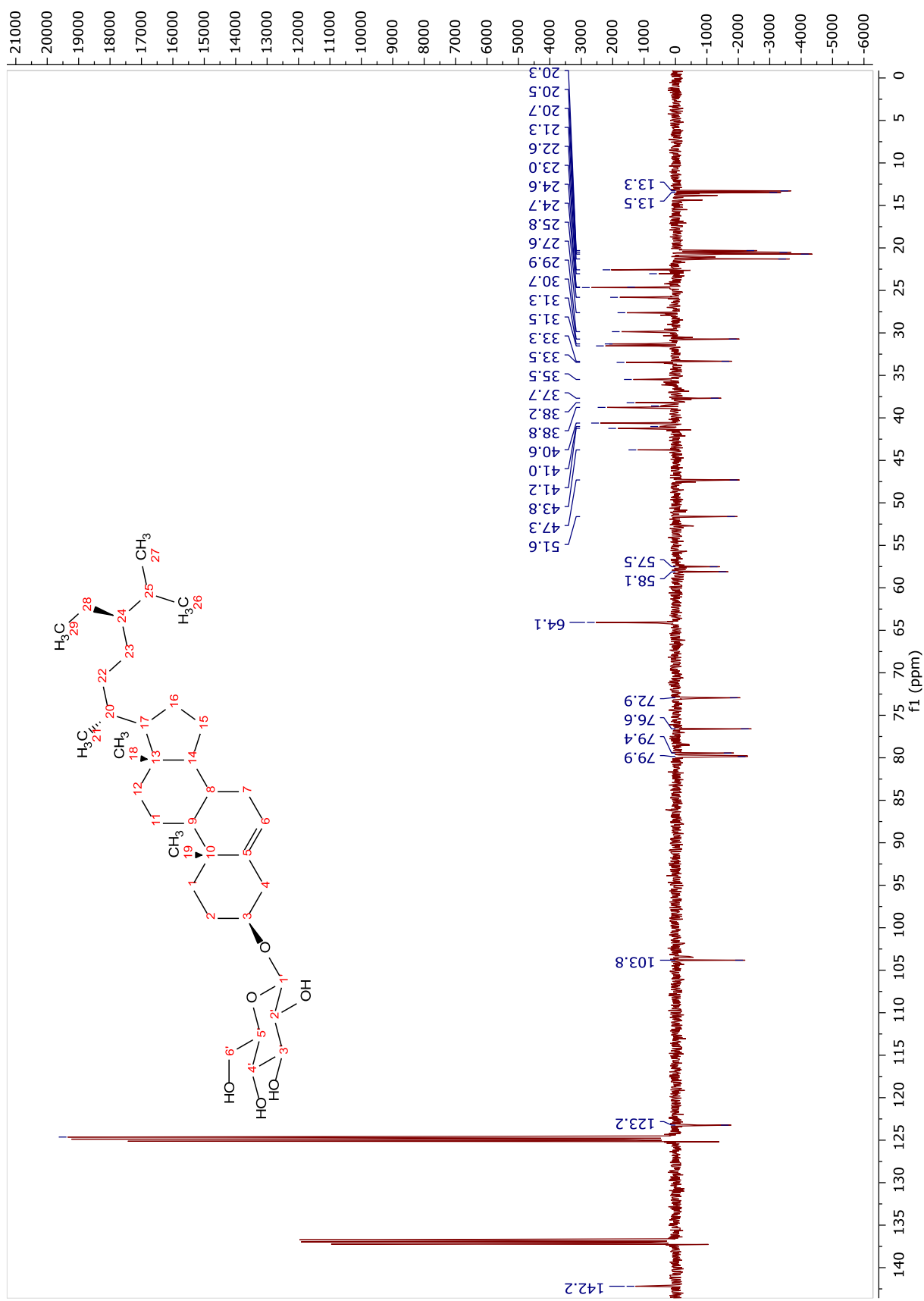


Figura 34. Espectro de DEPTQ de Sb8 (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

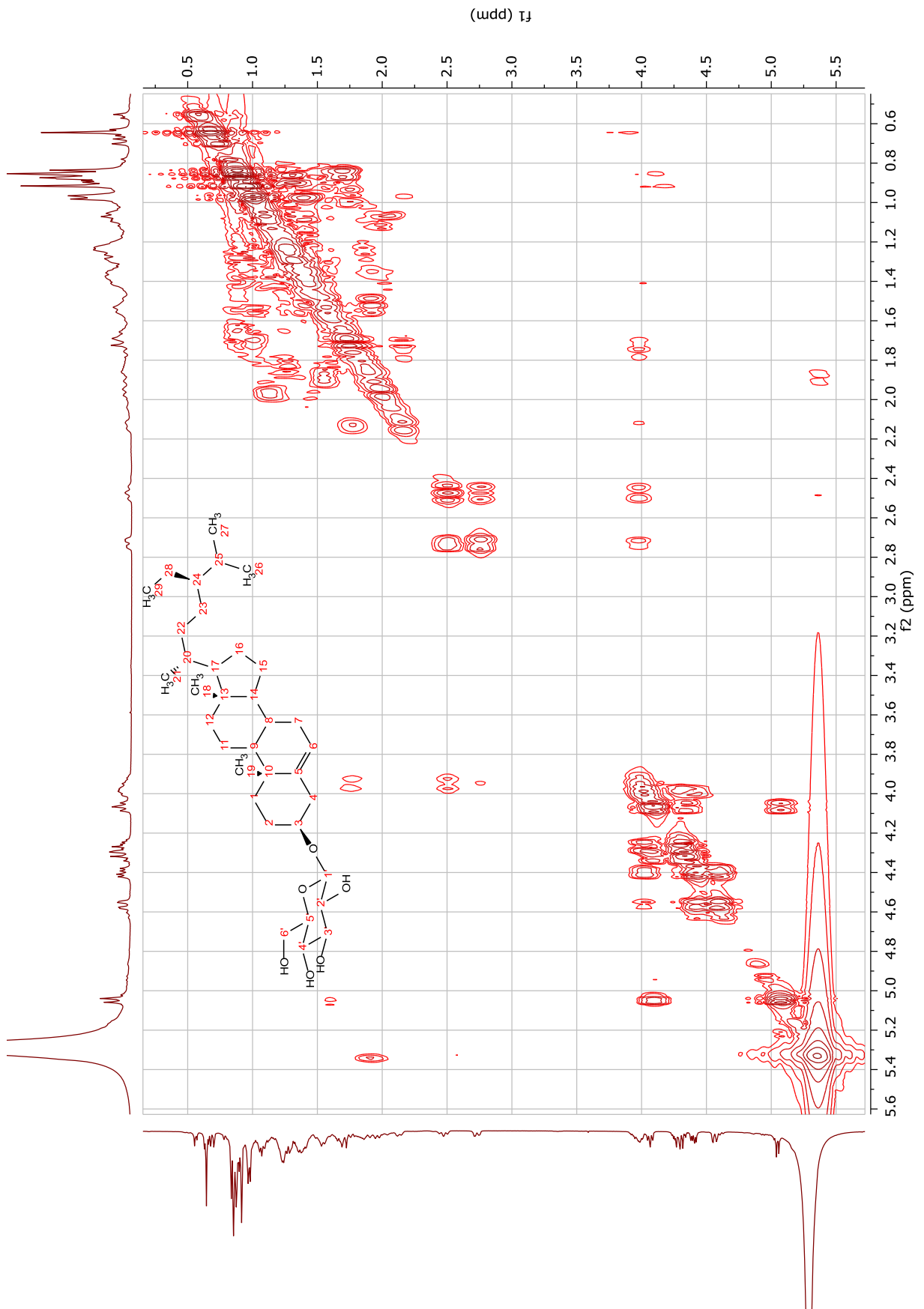


Figura 35. Espectro de COSY de Sb8 (400 MHz,  $C_5D_5N$ ).

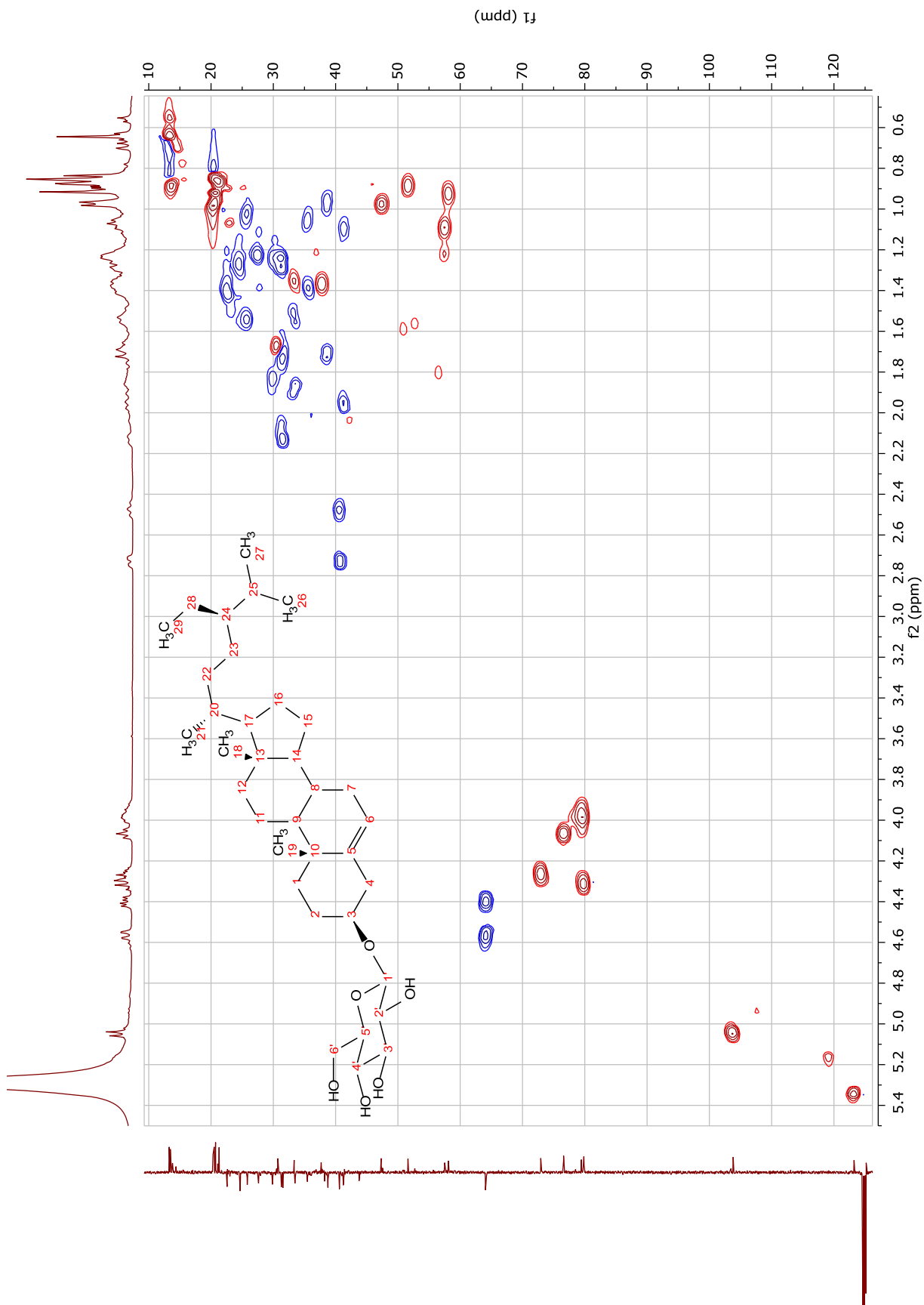


Figura 36. Espectro de HSQC de Sb8 (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

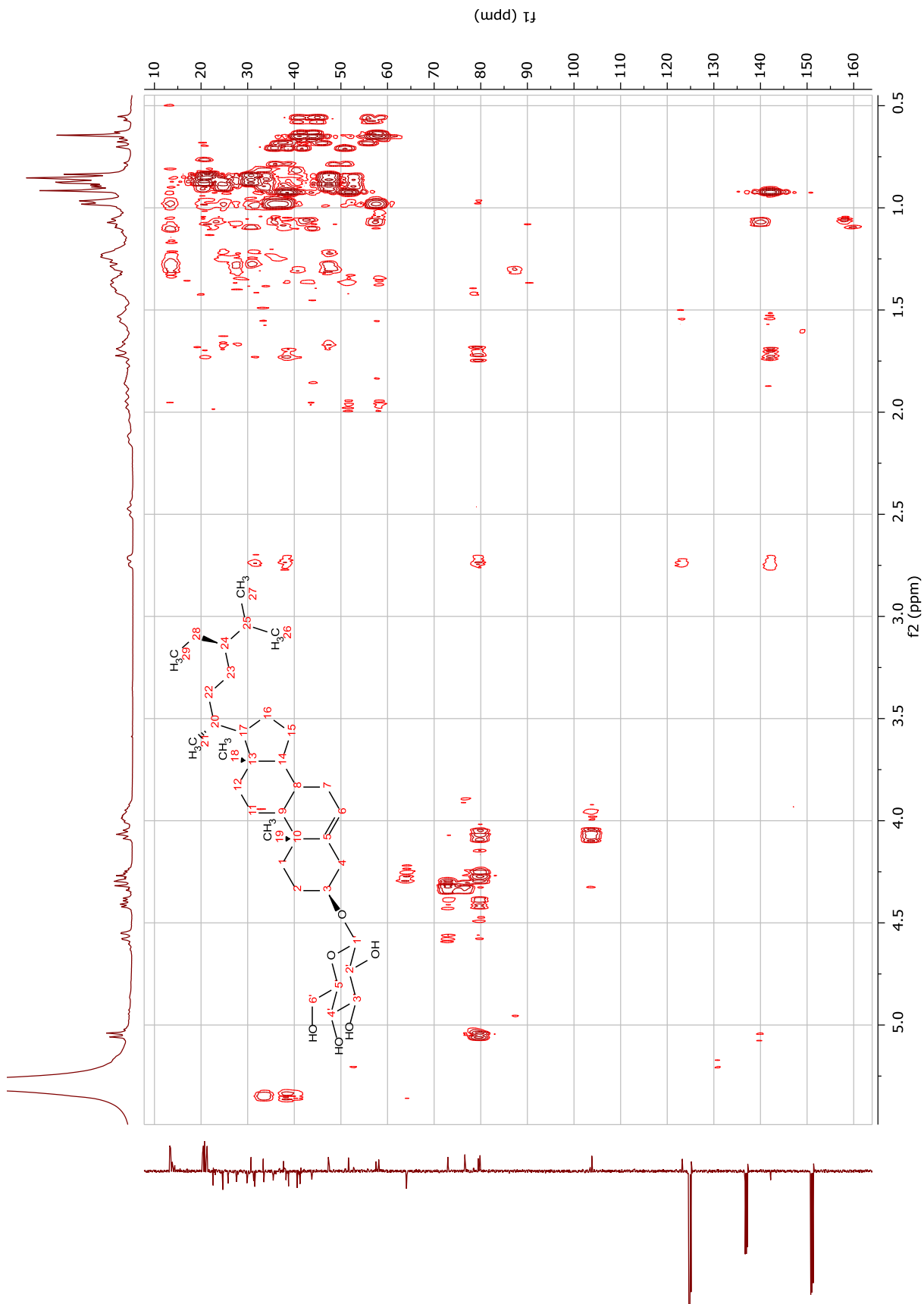


Figura 37. Espectro de HMBC de Sb8 (400 MHz.  $C_3D_5N$ ).

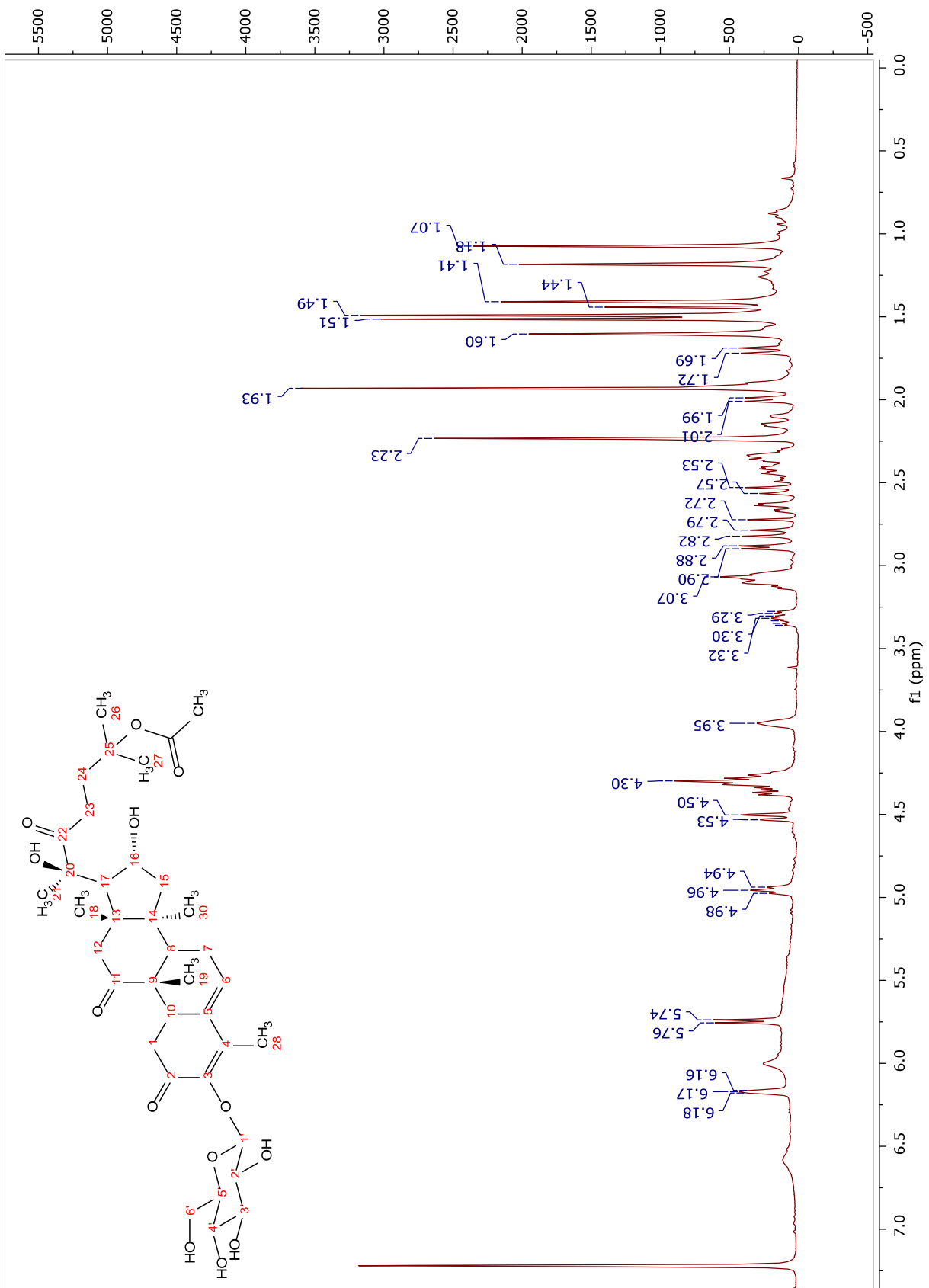


Figura 38. Espectro de RMN  $^1\text{H}$  de Sb9 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

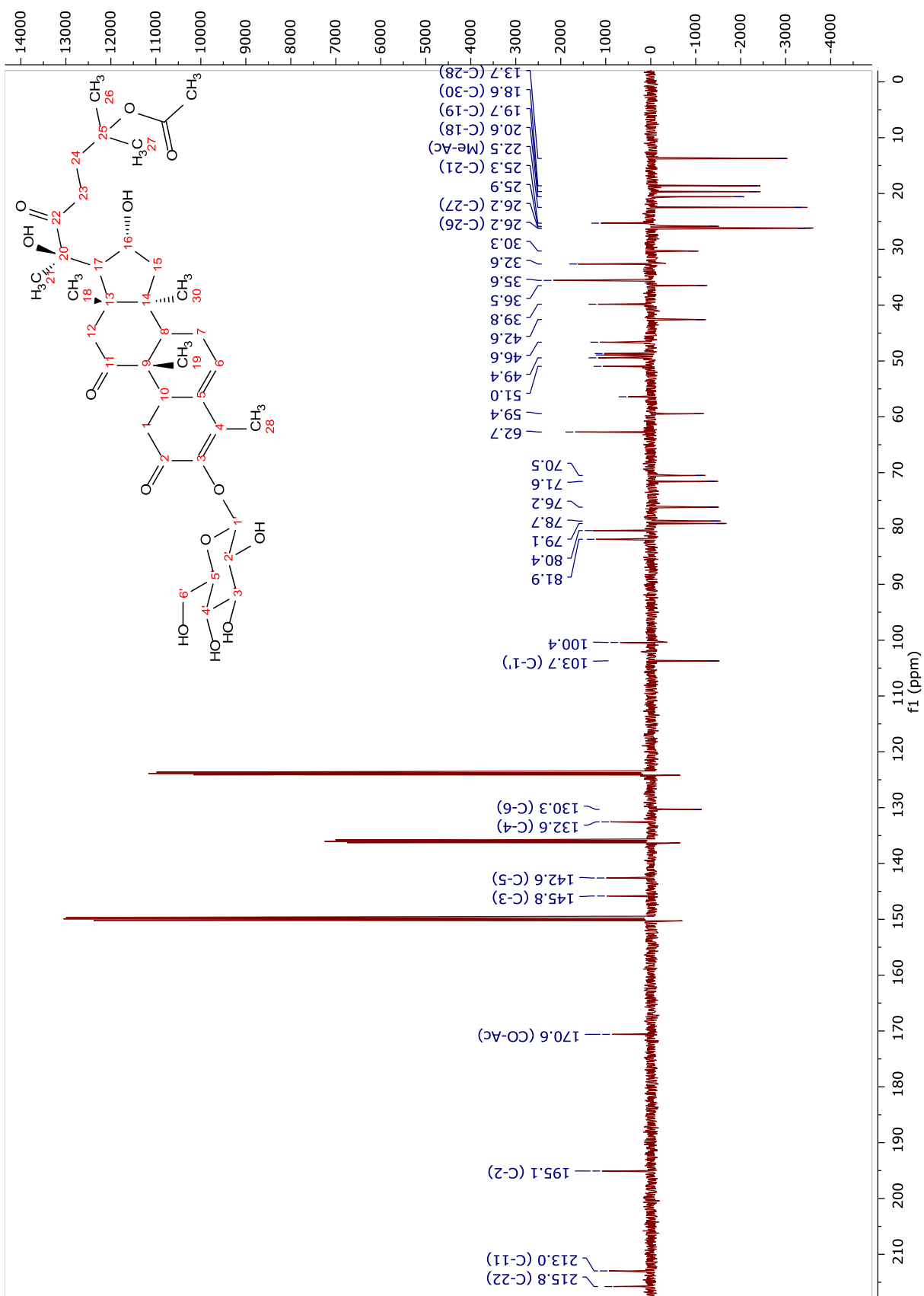


Figura 39. Espectro de DEPTQ de **Sb9** (100 MHz, C<sub>5</sub>D<sub>5</sub>N).



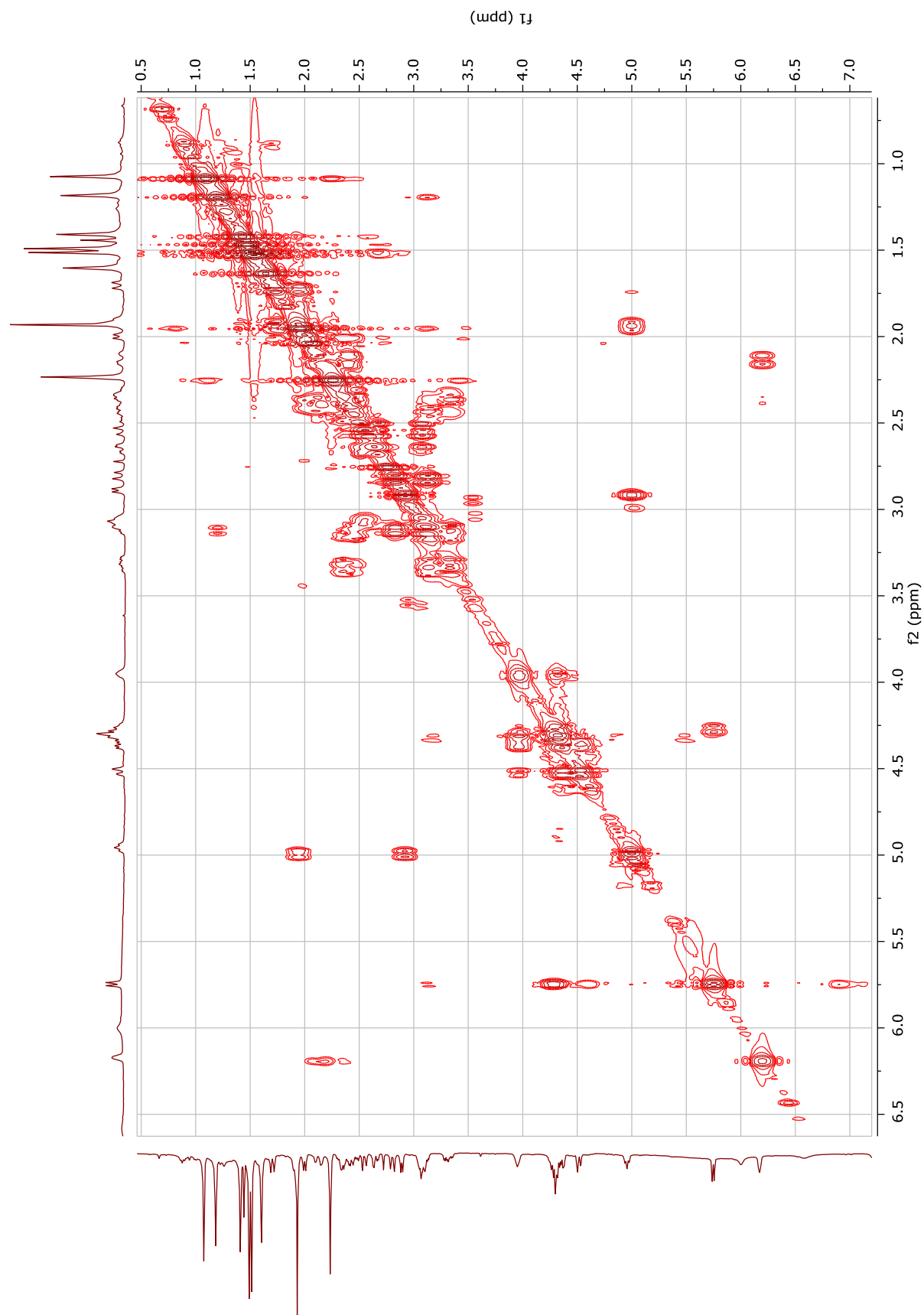
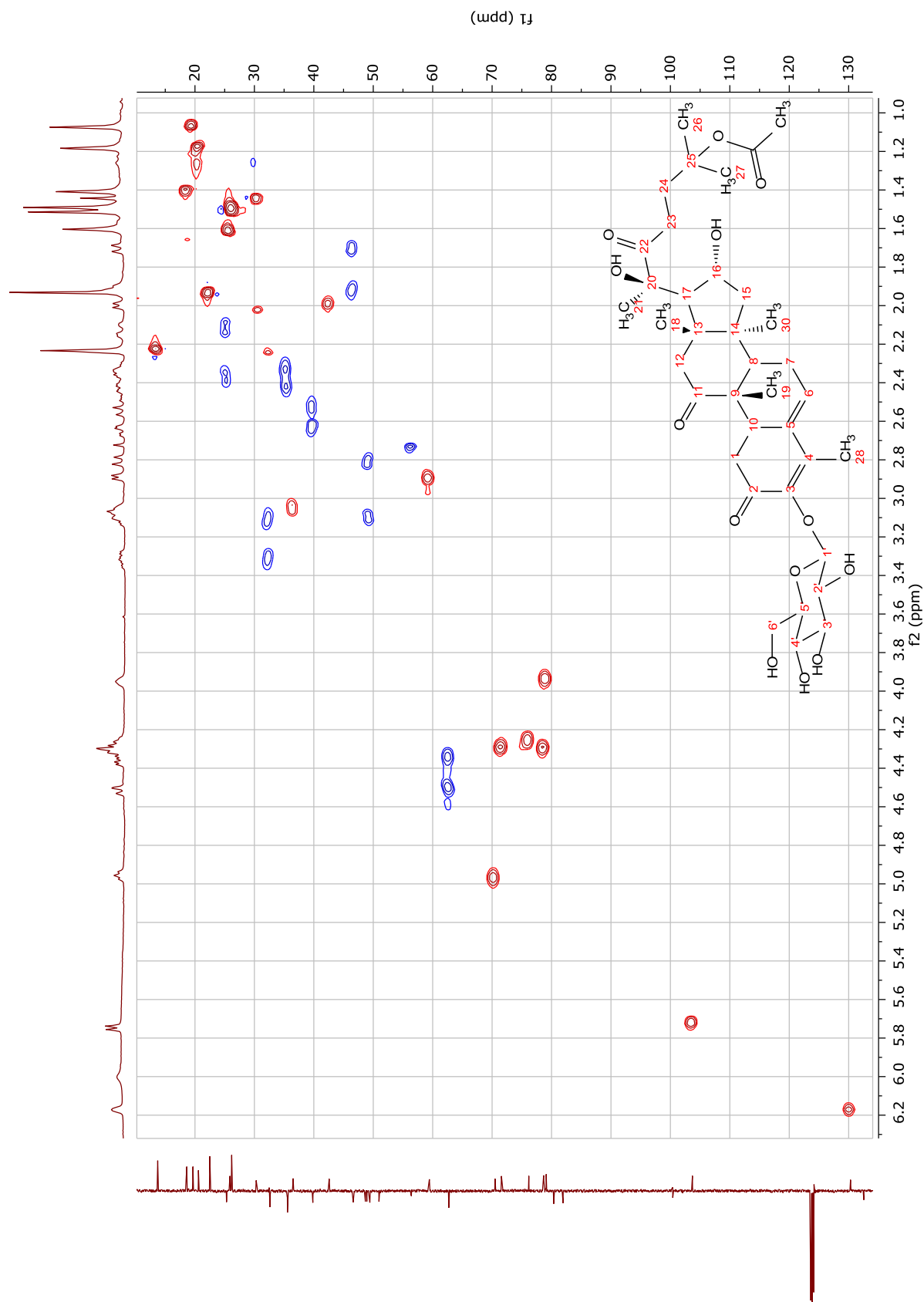


Figura 40. Espectro de COSY de Sb9 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



**Figura 41.** Espectro de HSQC de **Sb9** (400 MHz,  $C_5D_5N$ ).

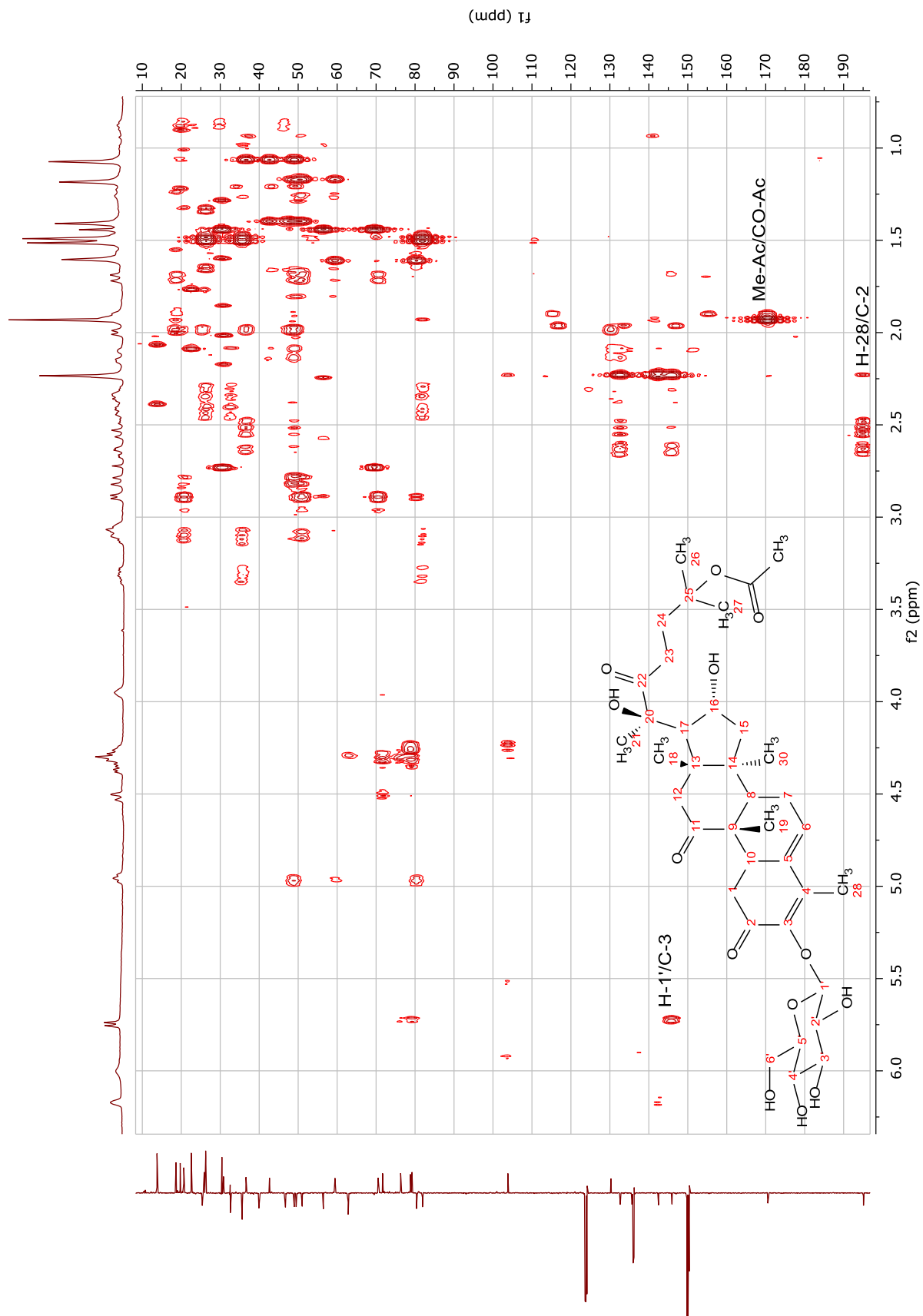
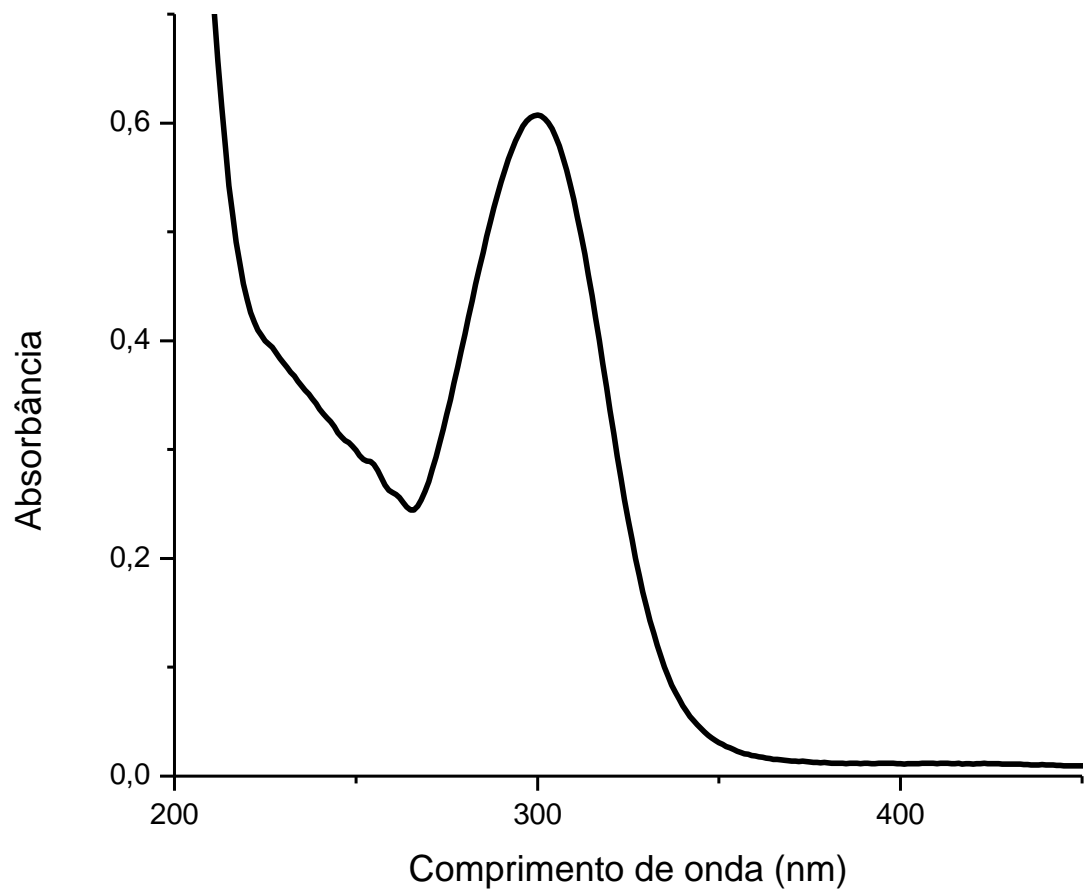


Figura 42. Espectro de HMBC de Sb9 (400 MHz,  $C_5D_5N$ ).



**Figura 43.** Espectro de UV de Sb9 (propanol).

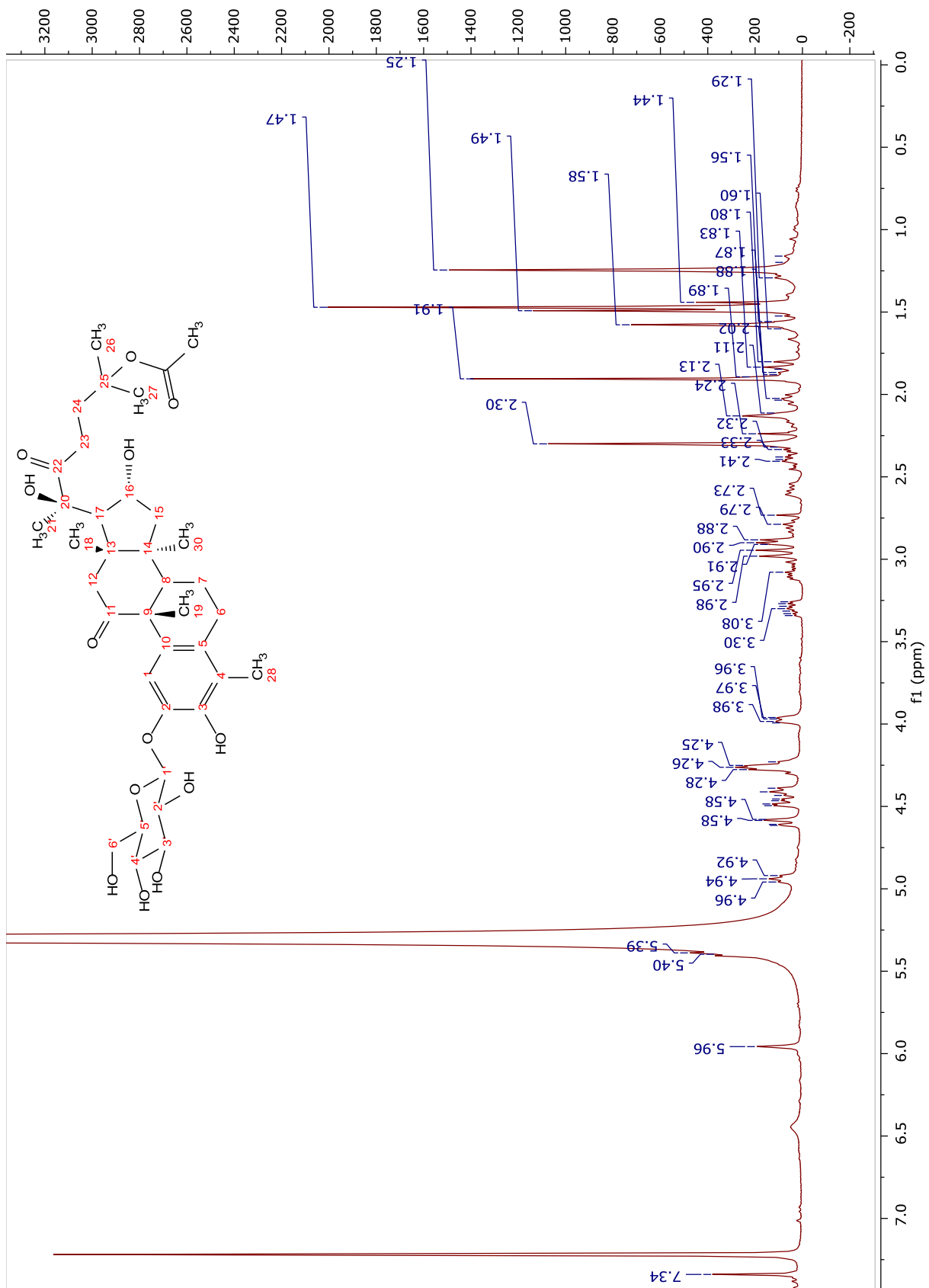


Figura 44. Espectro de RMN  $^1\text{H}$  de Sb10 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

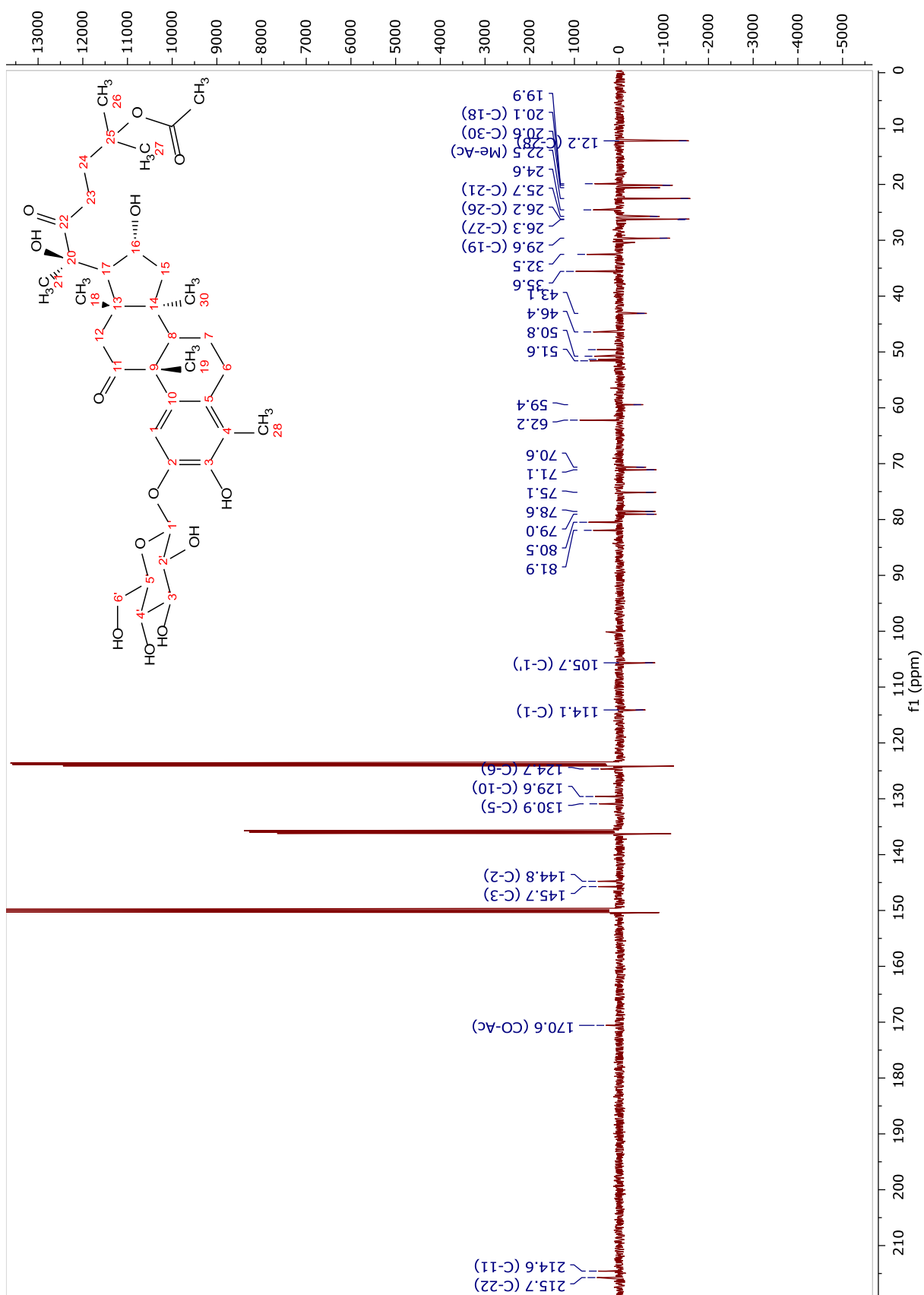


Figura 45. Espectro de DEPTQ de Sb10 (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

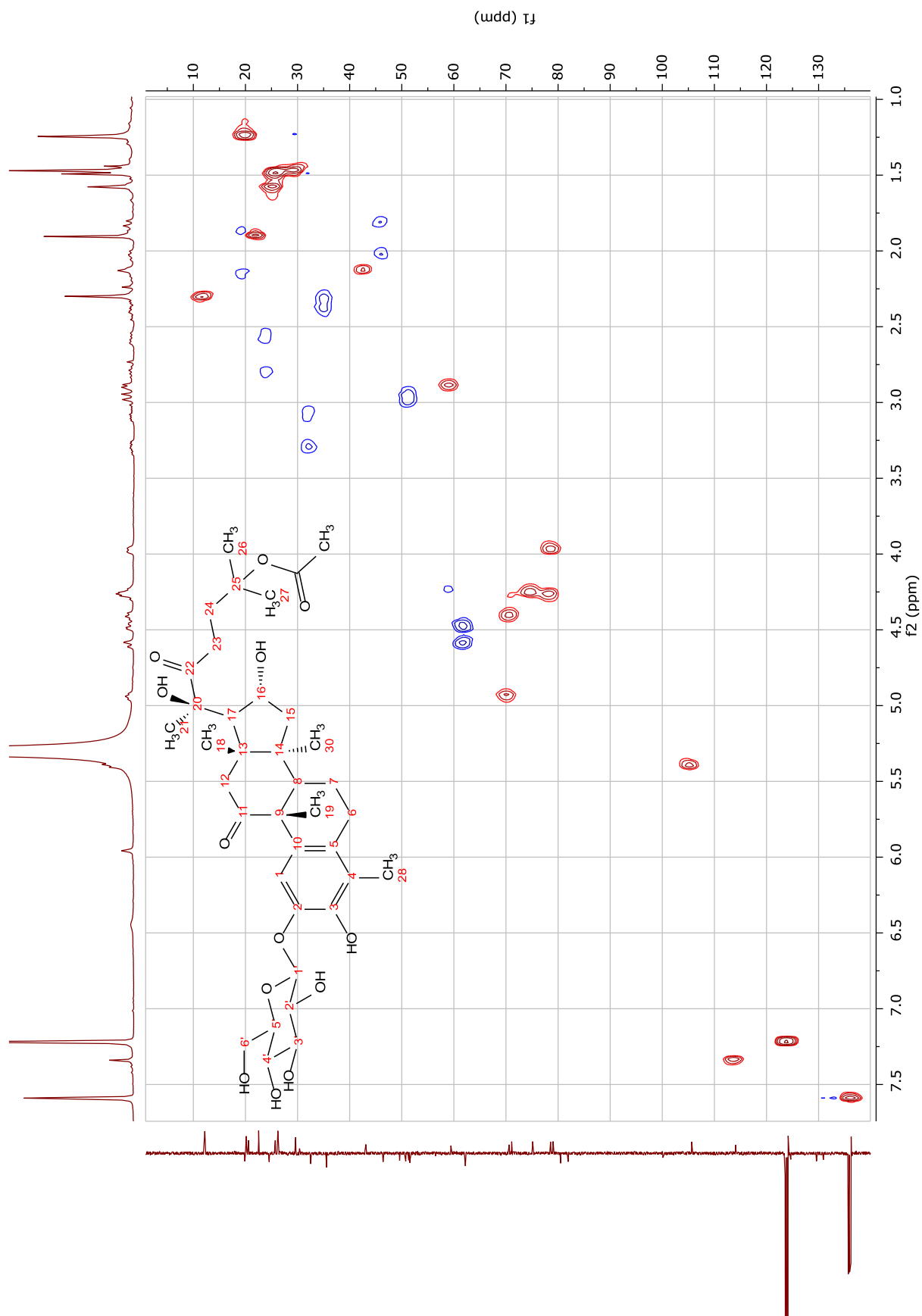


Figura 46. Espectro de HSQC de Sb10 (400 MHz,  $C_5D_5N$ ).

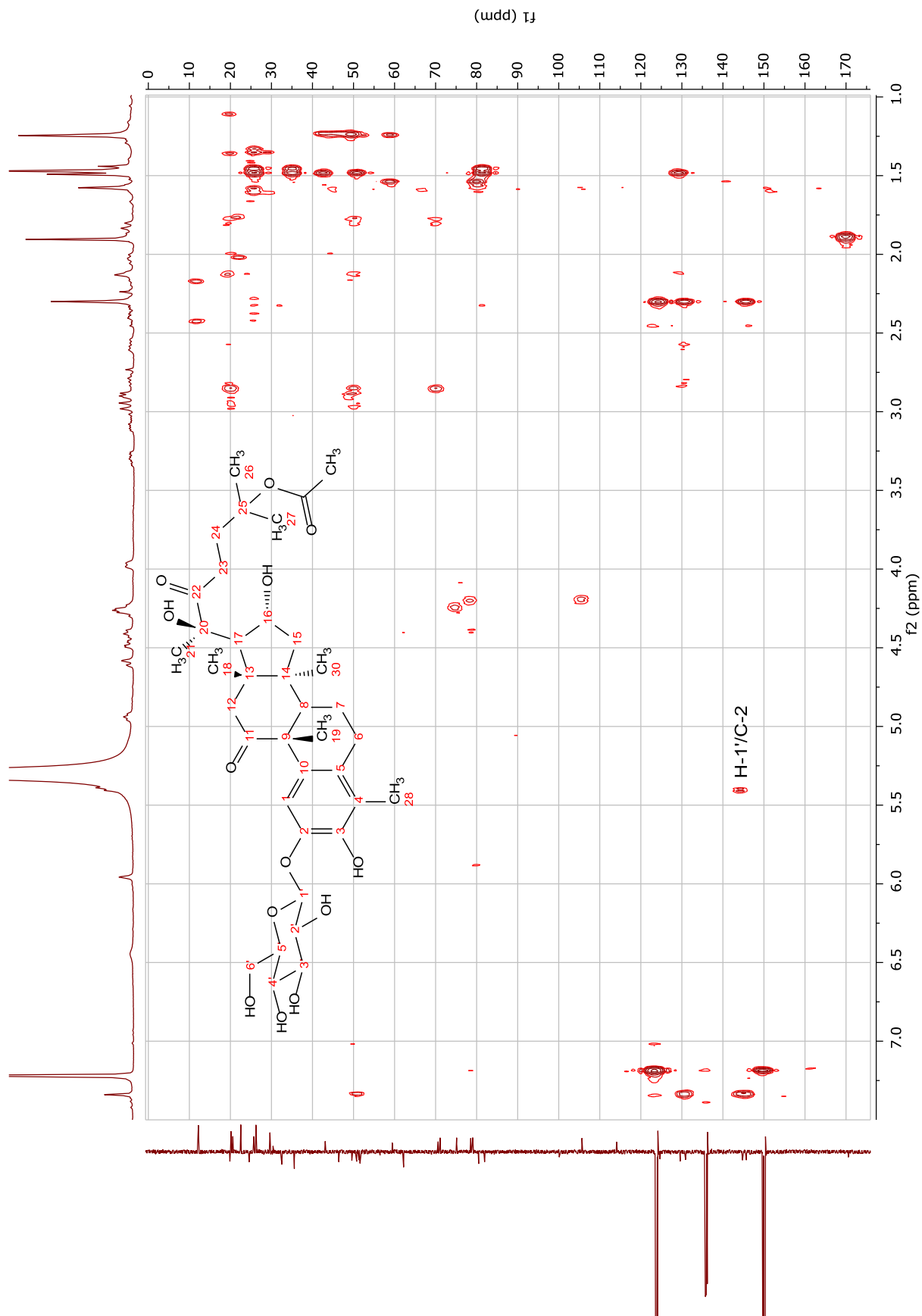


Figura 47. Espectro de HMBC de Sb10 (400 MHz,  $C_5D_5N$ ).



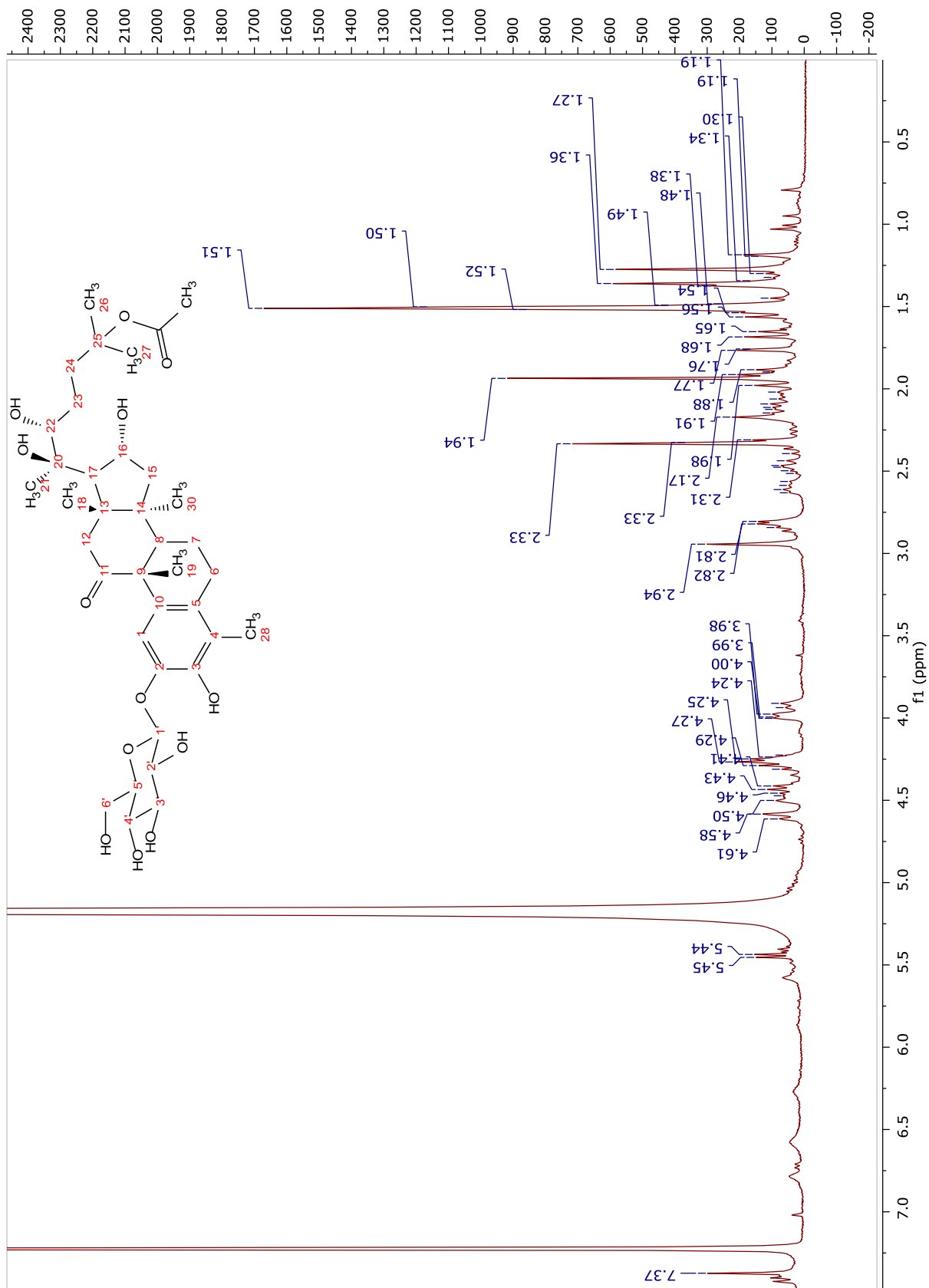


Figura 48. Espectro de RMN  $^1\text{H}$  de Sb11 (400 MHz,  $\text{C}_3\text{D}_5\text{N}$ ).

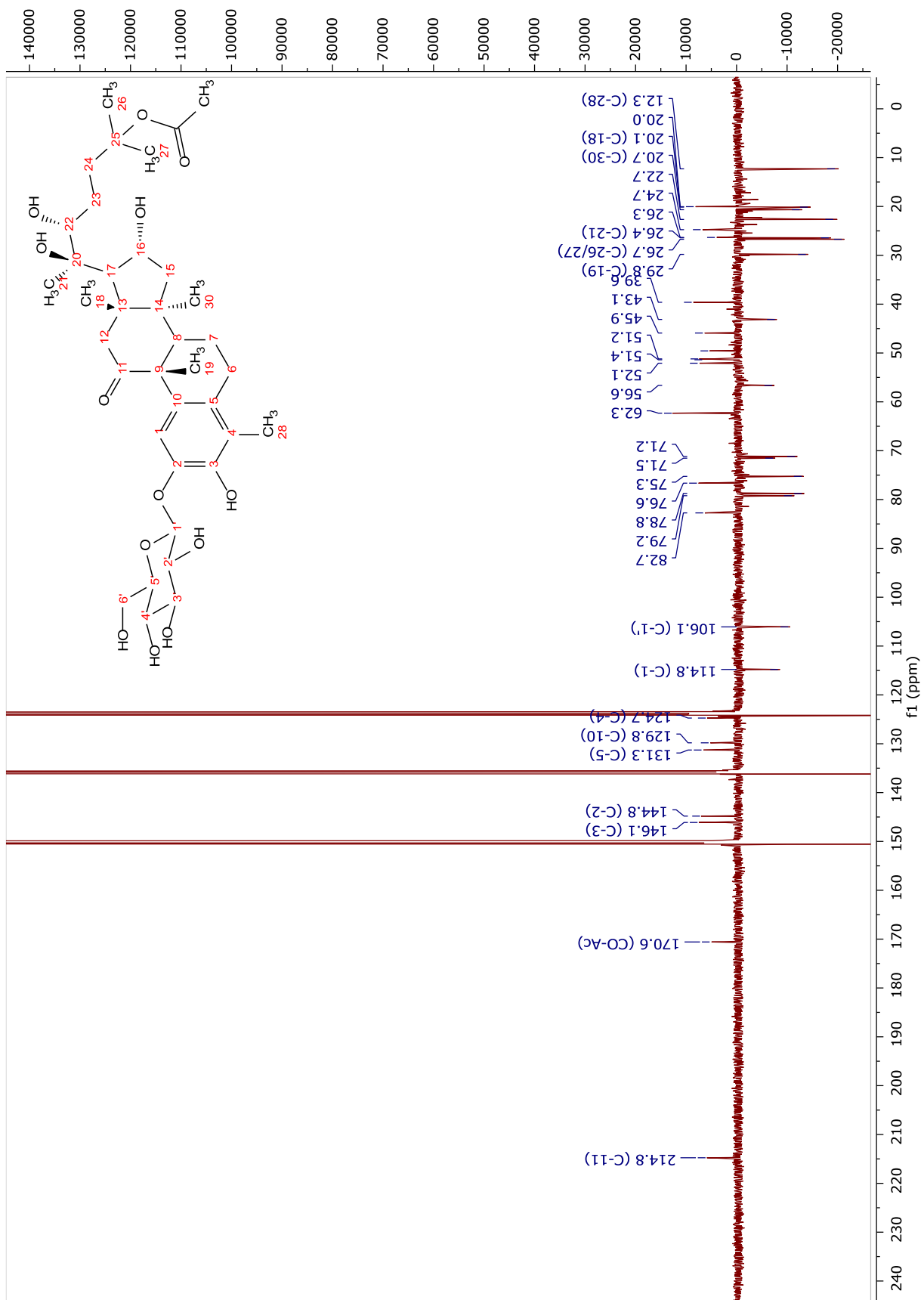


Figura 49. Espectro de DEPTQ de Sb11 (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

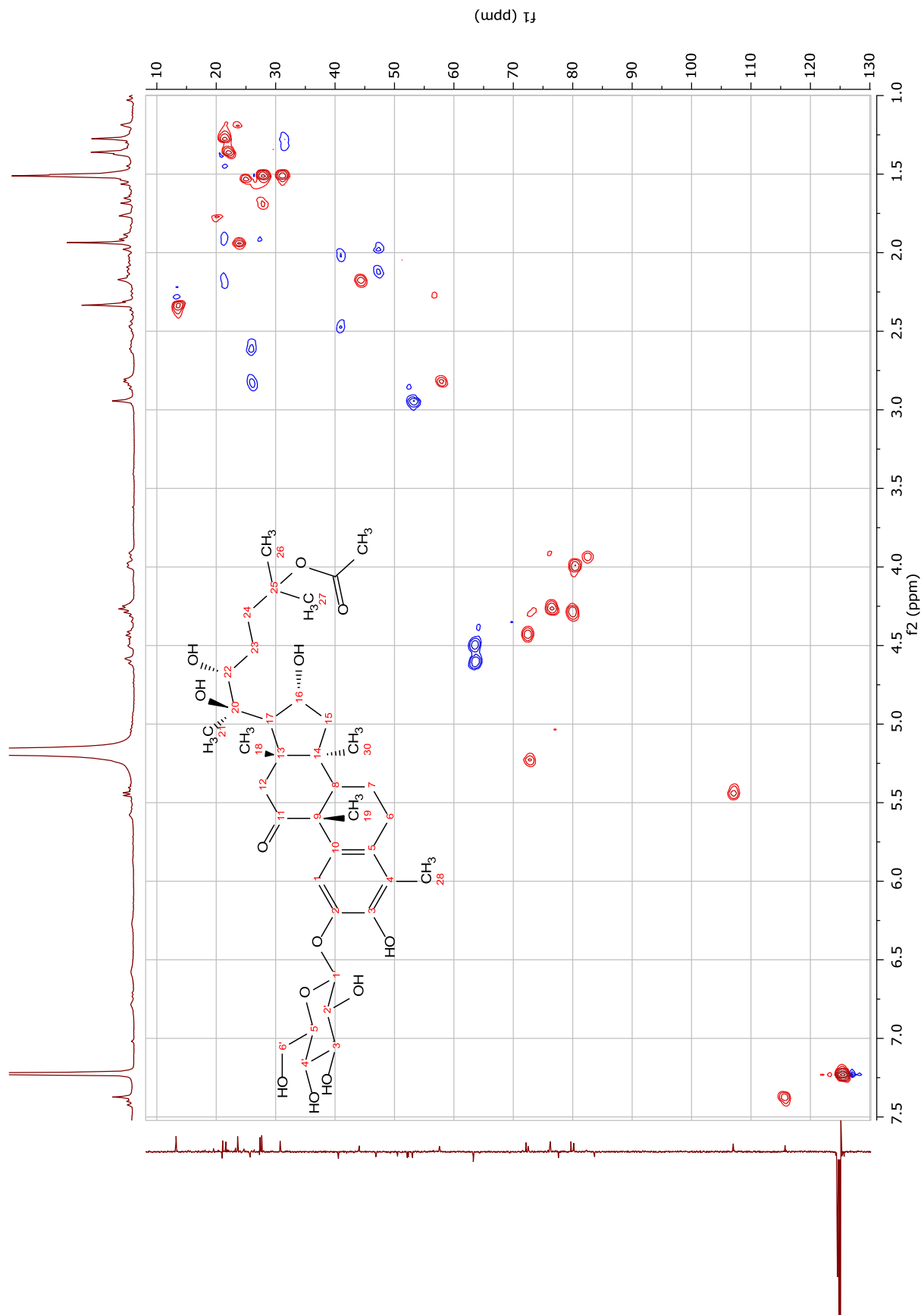


Figura 50. Espectro de HSQC de Sb11 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

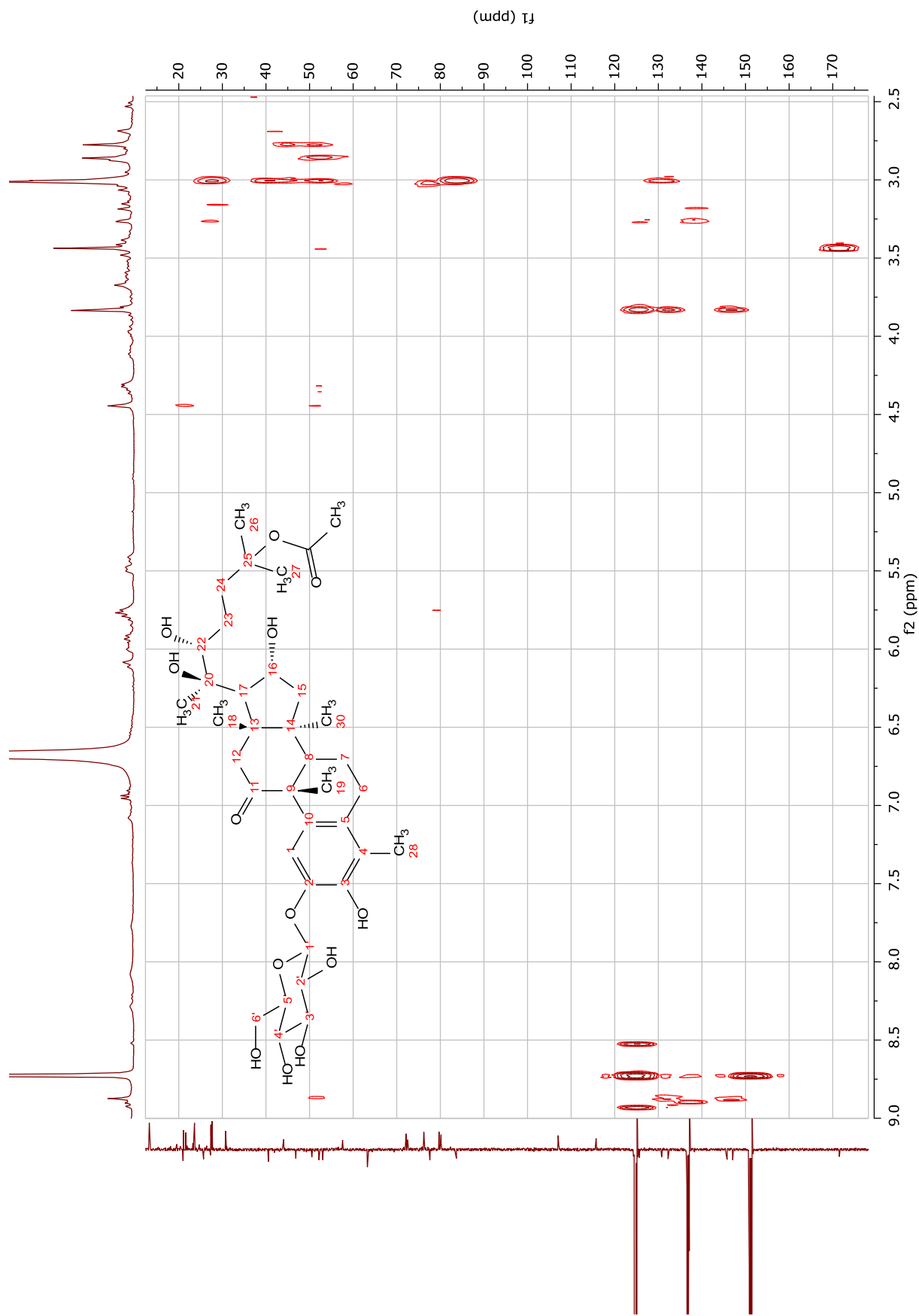


Figura 51. Espectro de HMBC de Sb11 (400 MHz,  $C_5D_5N$ ).

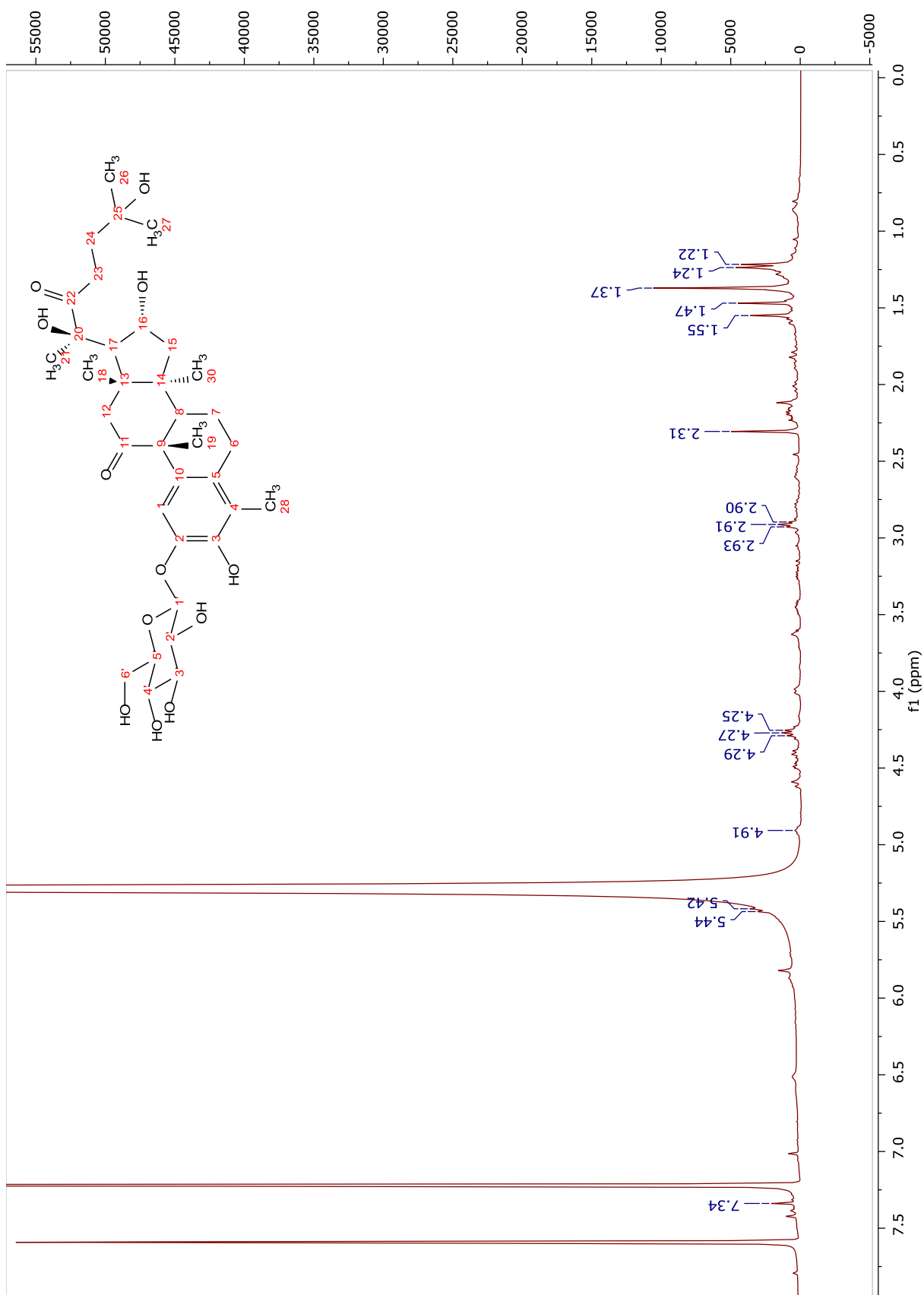


Figura 52. Espectro de RMN  $^1\text{H}$  de Sb12 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

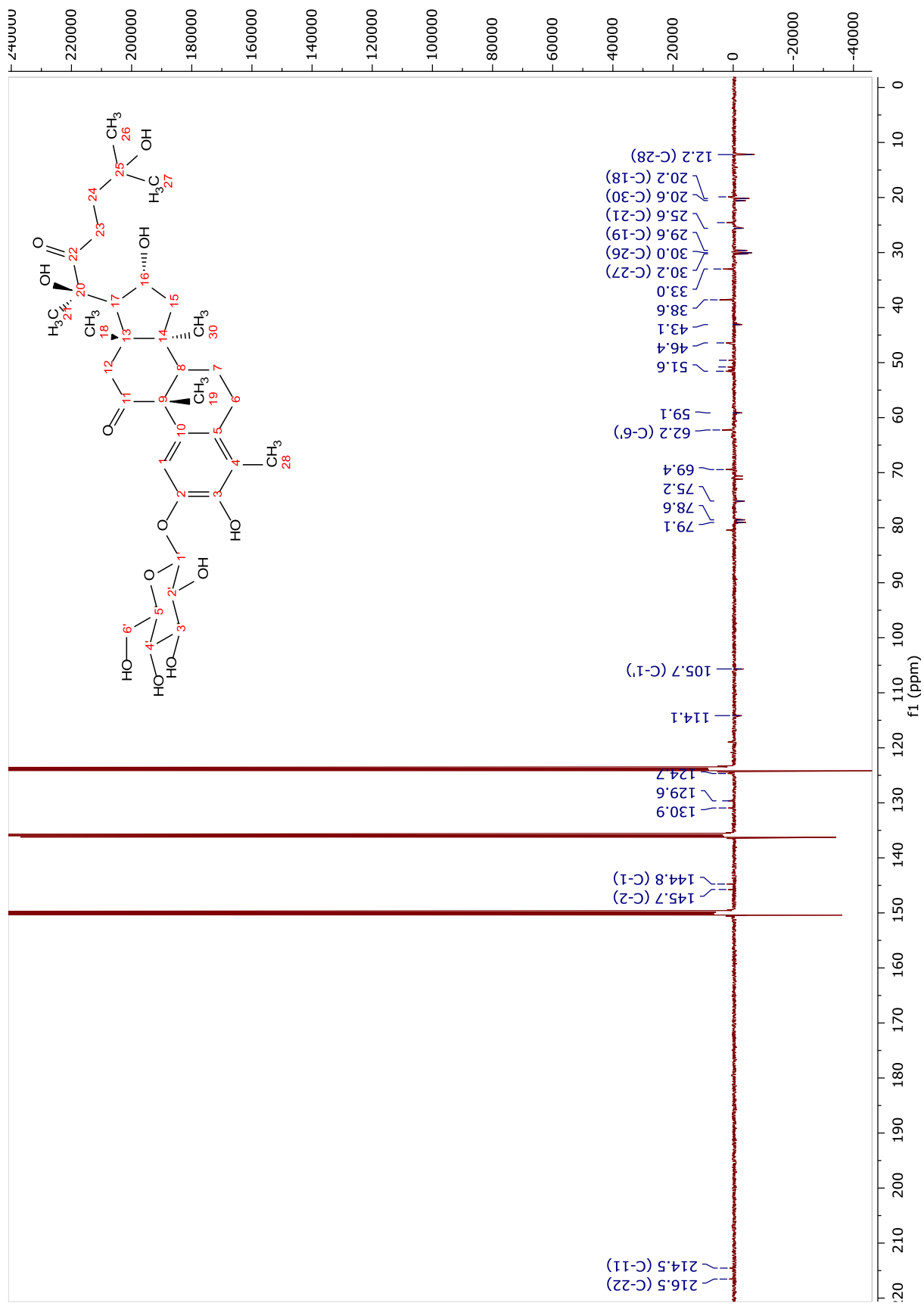


Figura 53. Espectro de DEPTQ de Sb12 (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

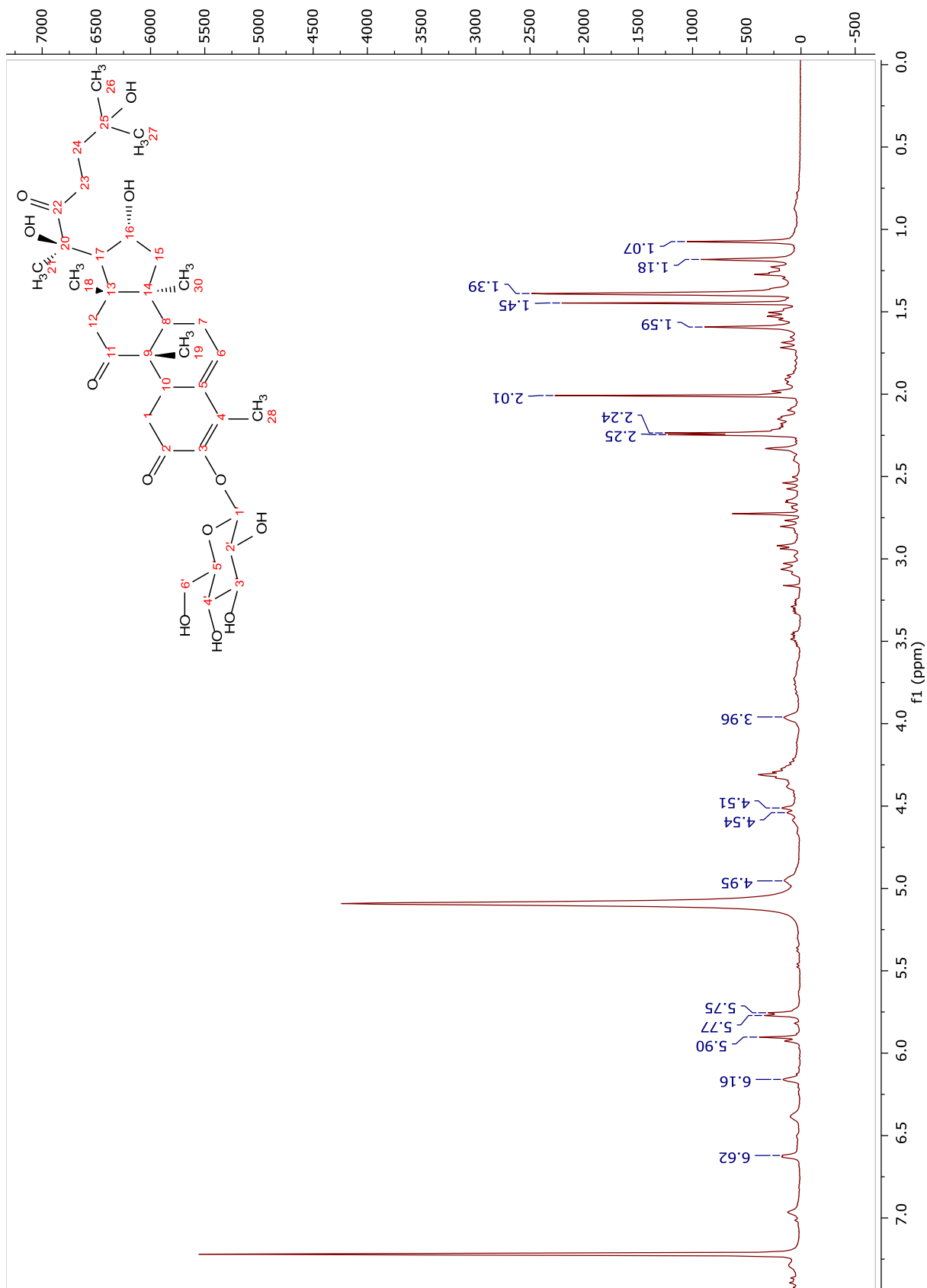


Figura 54. Espectro de RMN  $^1\text{H}$  de Sb13 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

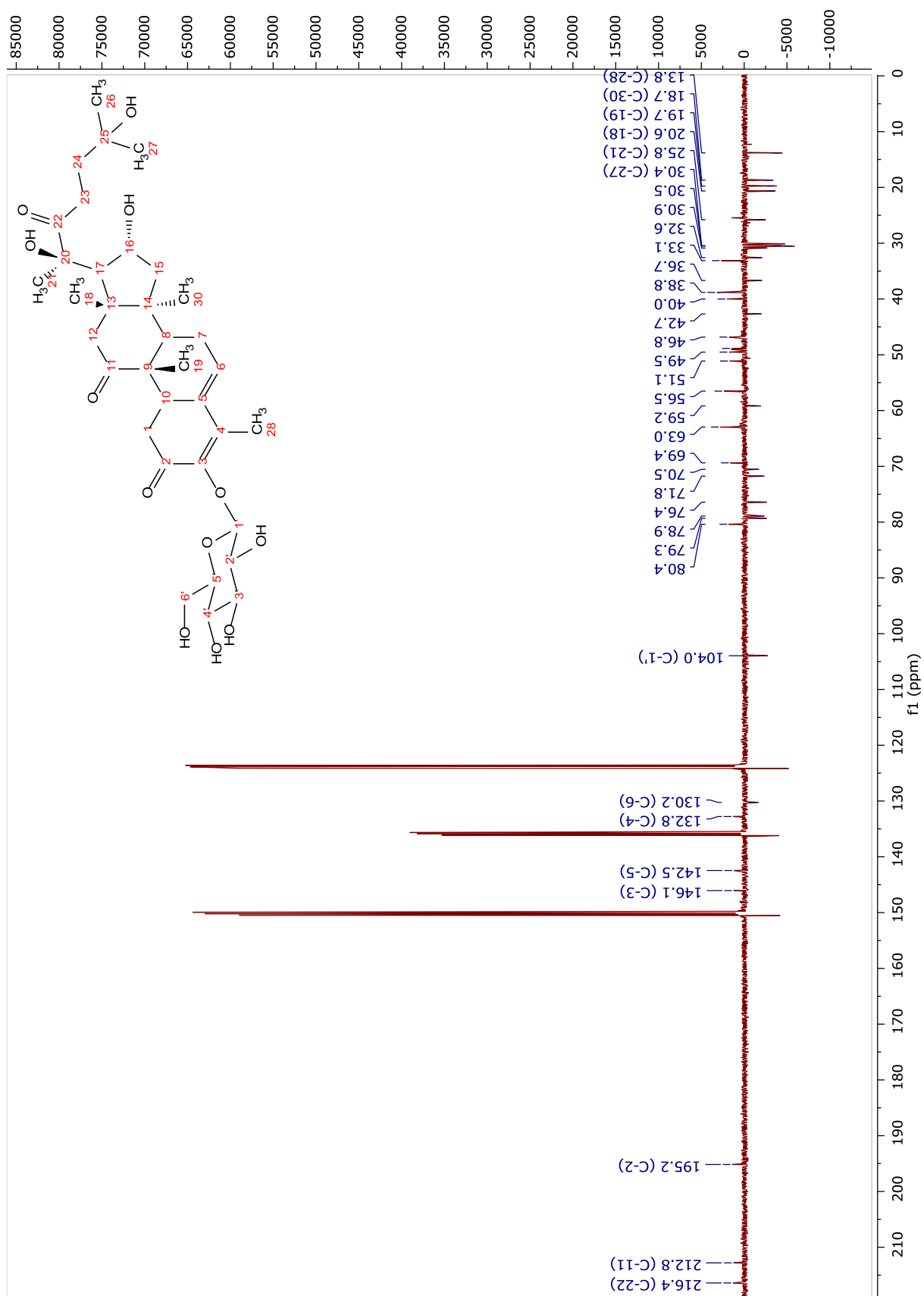


Figura 55. Espectro de DEPTQ de Sb13 (100 MHz, C<sub>5</sub>D<sub>5</sub>N).



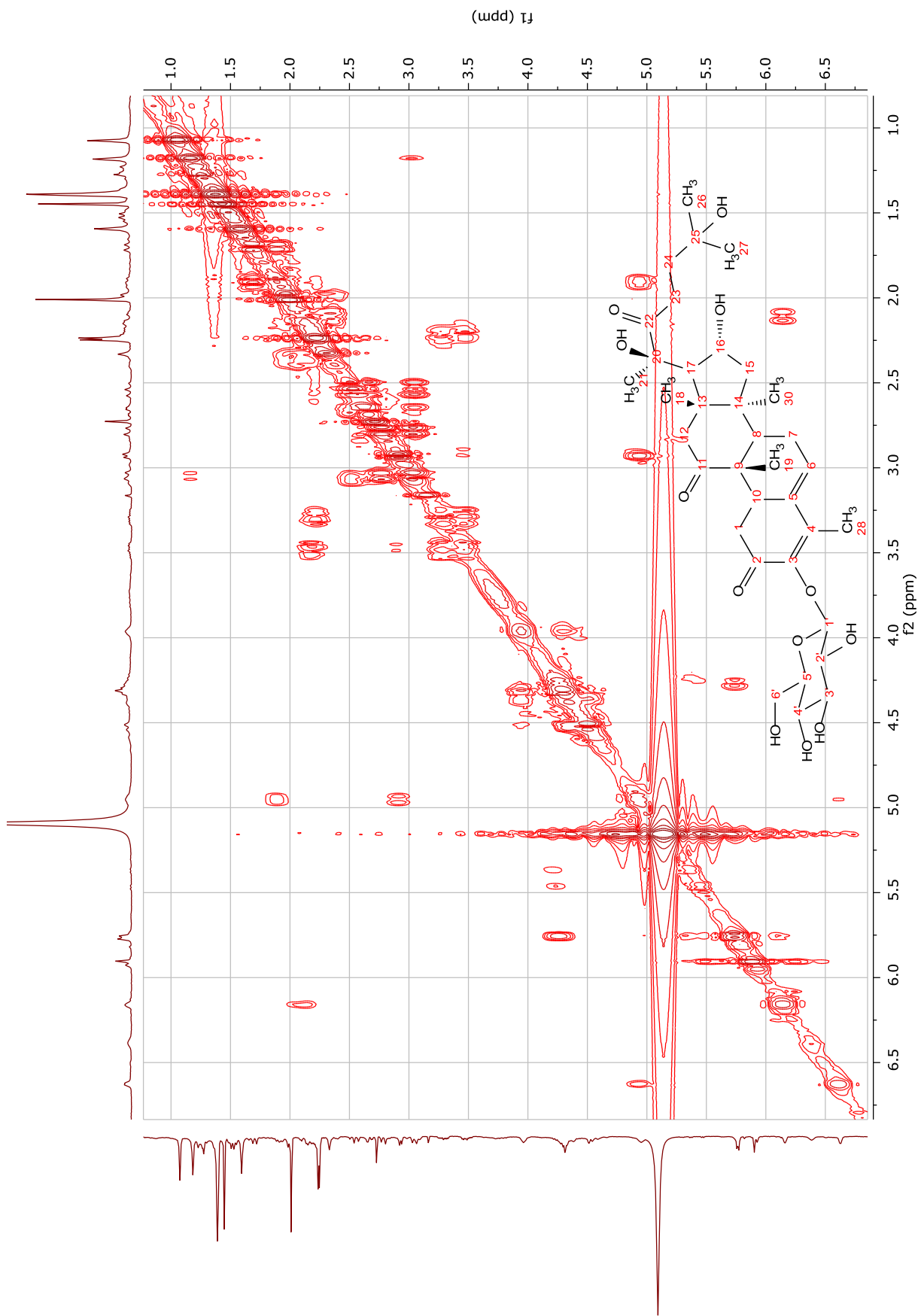


Figura 56. Espectro de COSY de Sb13 (400 MHz,  $C_5D_5N$ ).

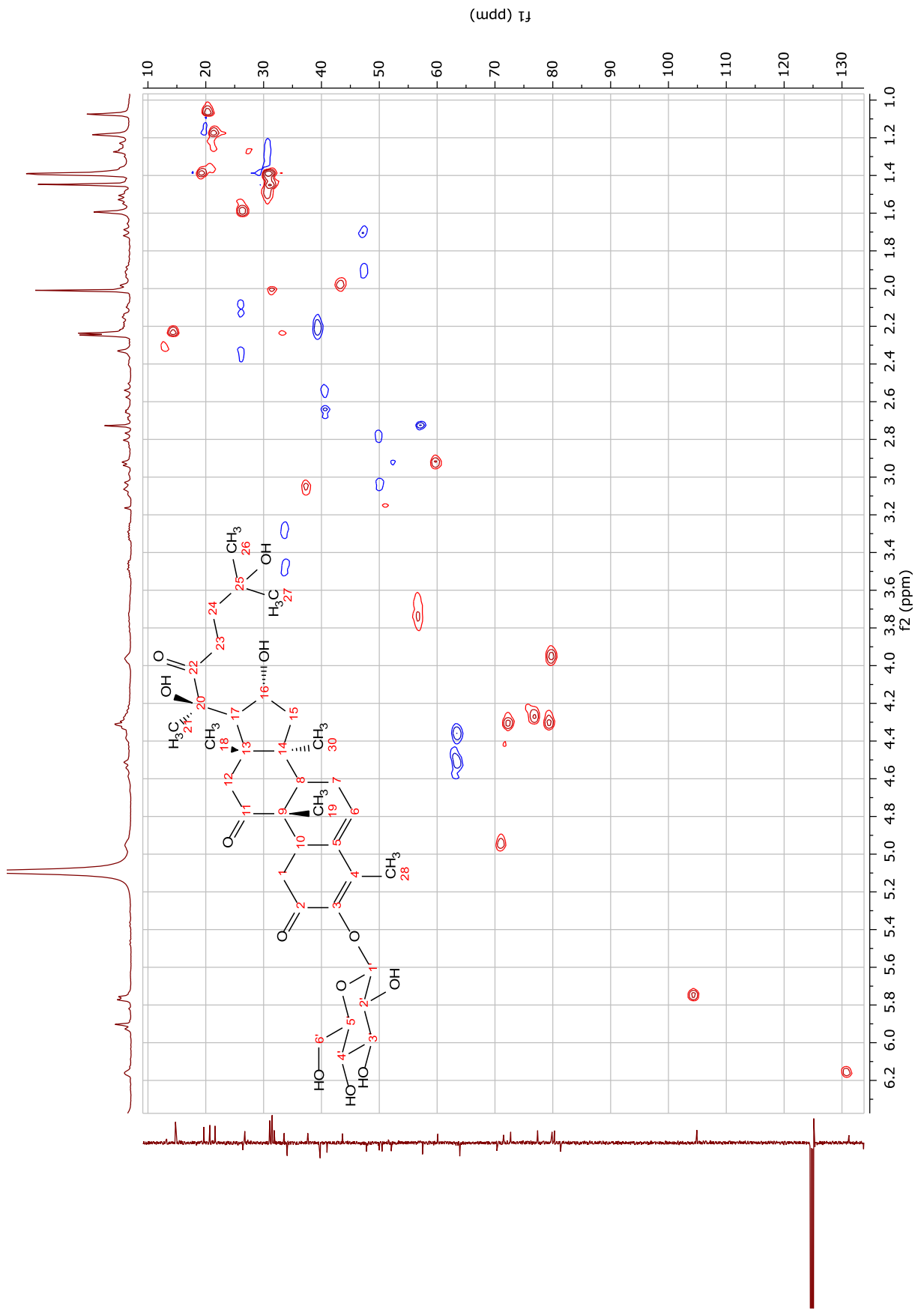


Figura 57. Espectro de HSQC de Sb13 (400 MHz,  $C_5D_5N$ ).

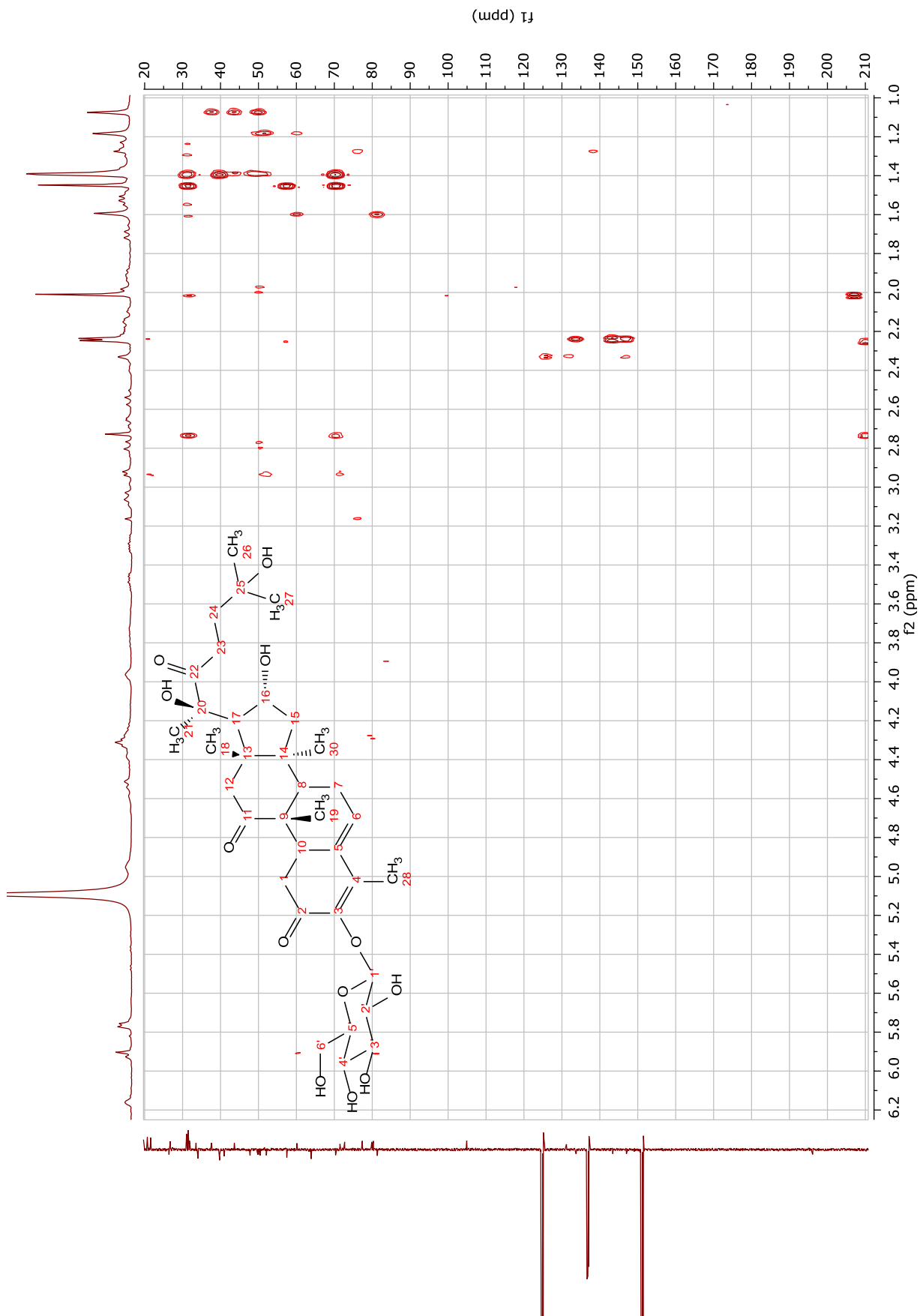
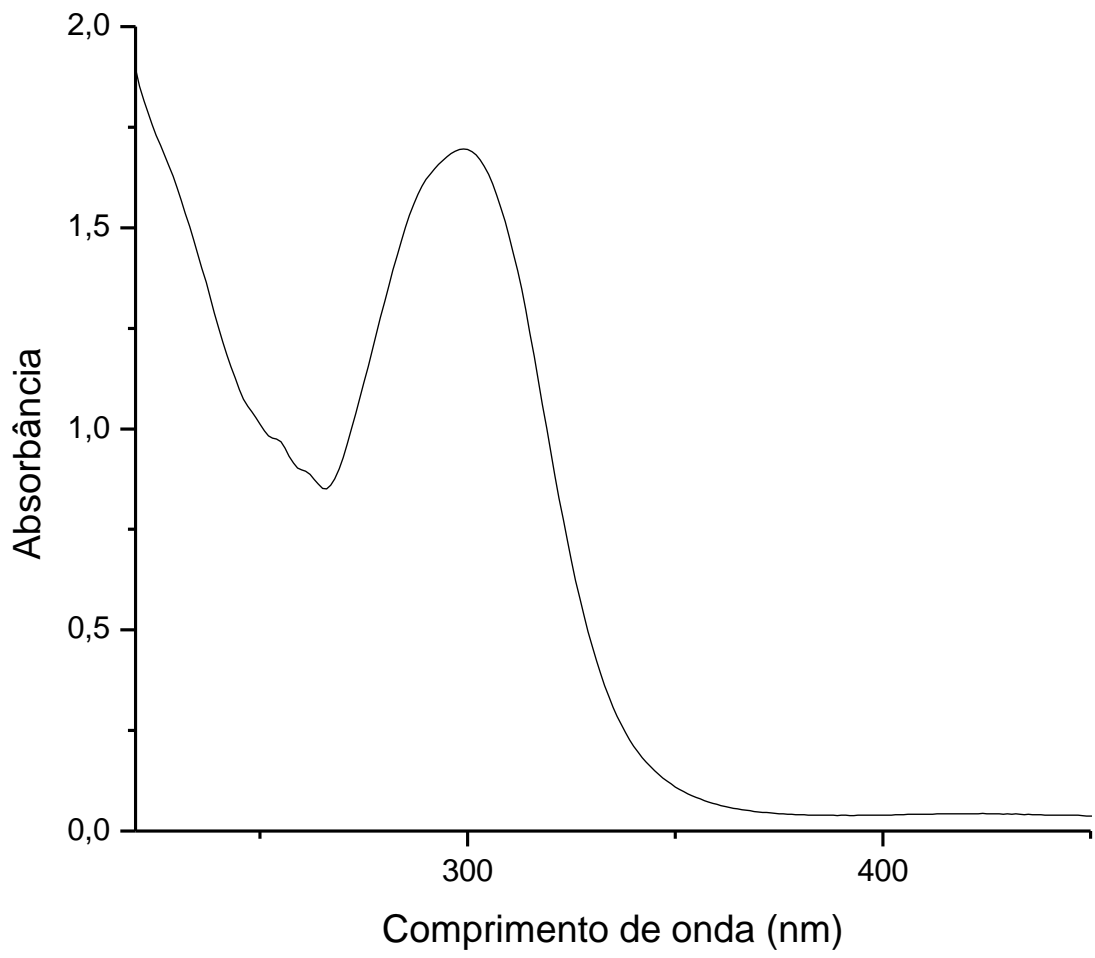


Figura 58. Espectro de HMBC de Sb13 (400 MHz,  $C_5D_5N$ ).



**Figura 59.** Espectro de UV de **Sb13** (propanol).

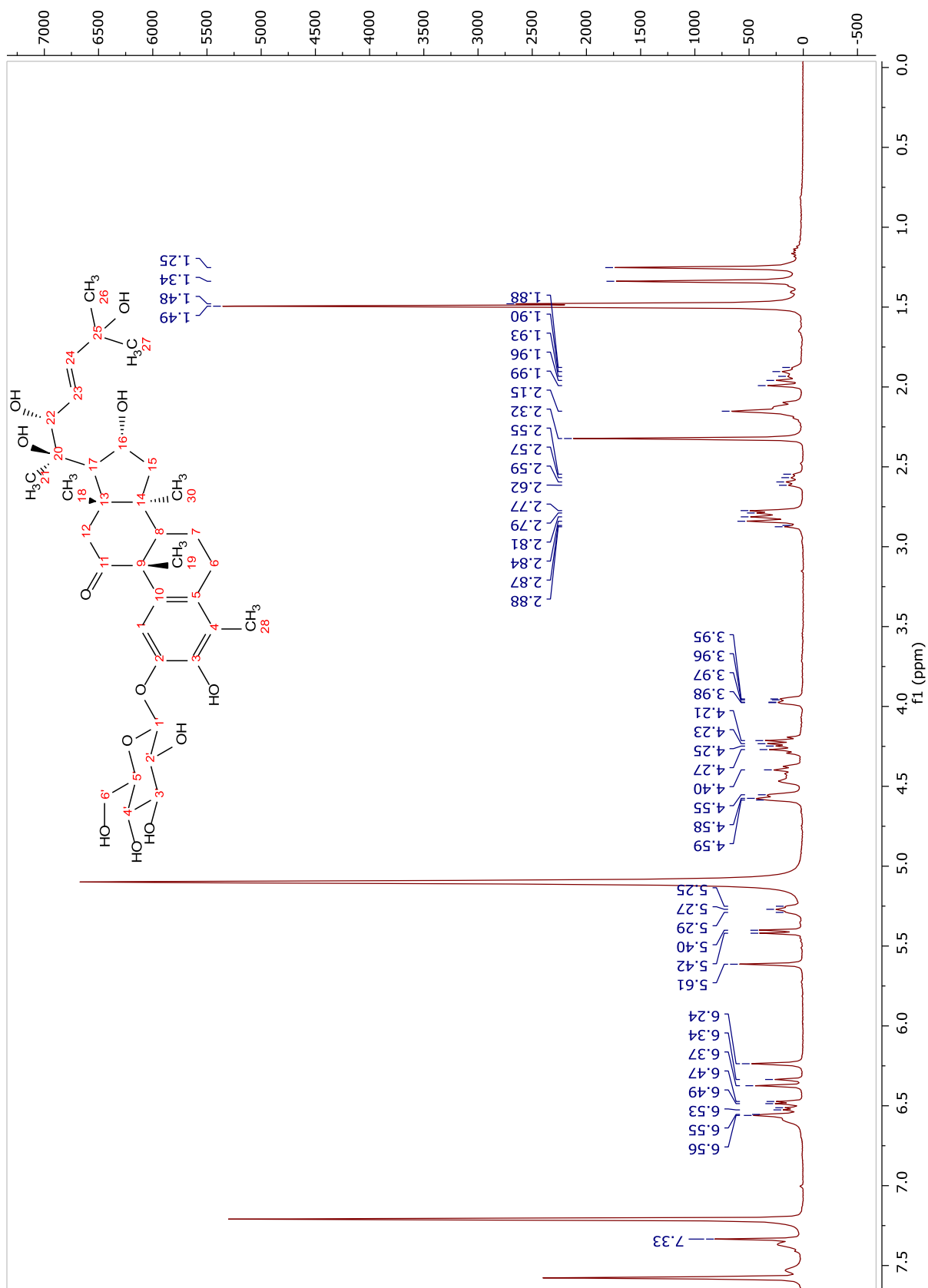


Figura 60. Espectro de RMN  $^1\text{H}$  de Sb14 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



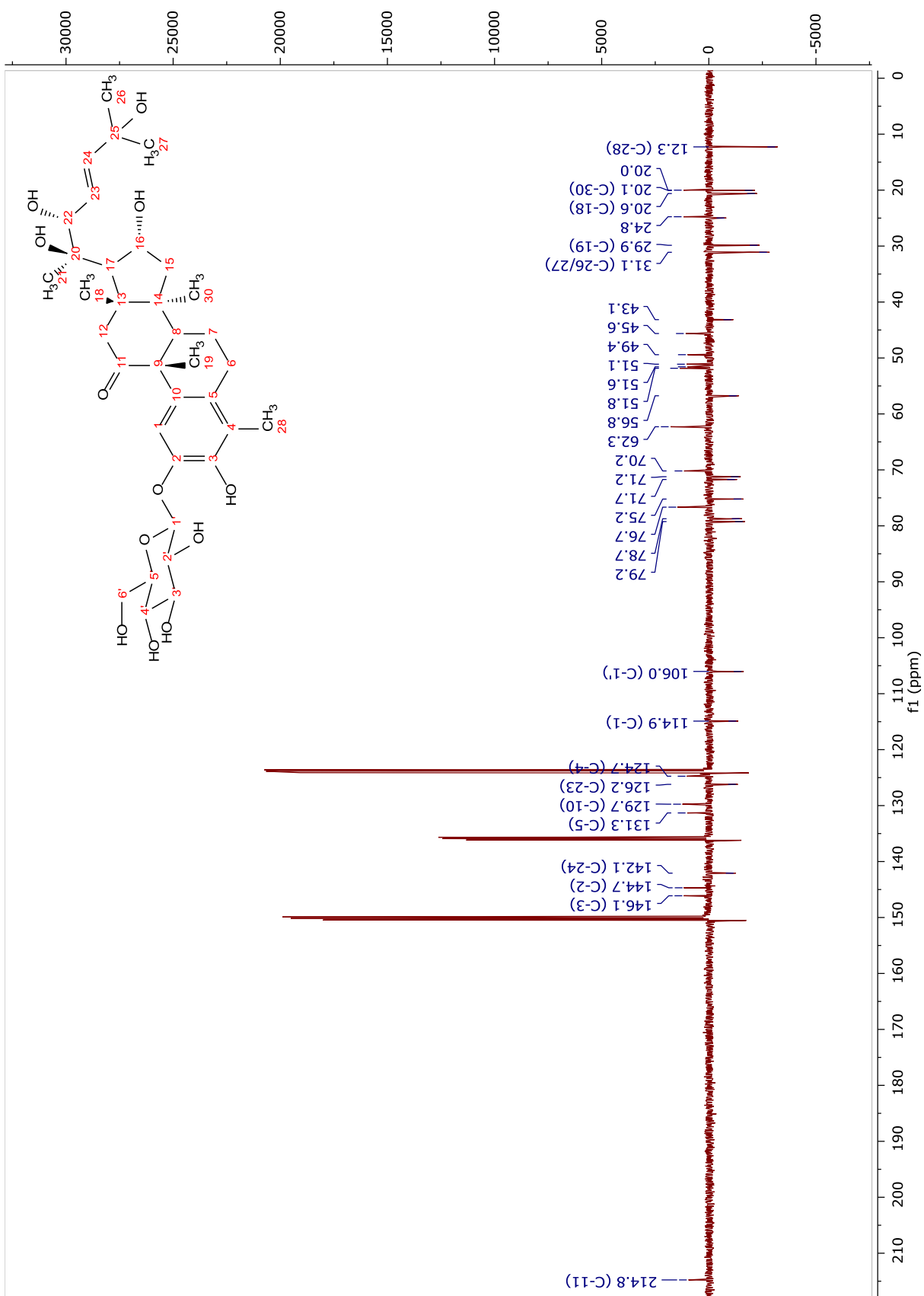


Figura 61. Espectro de DEPTQ de Sb14 (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

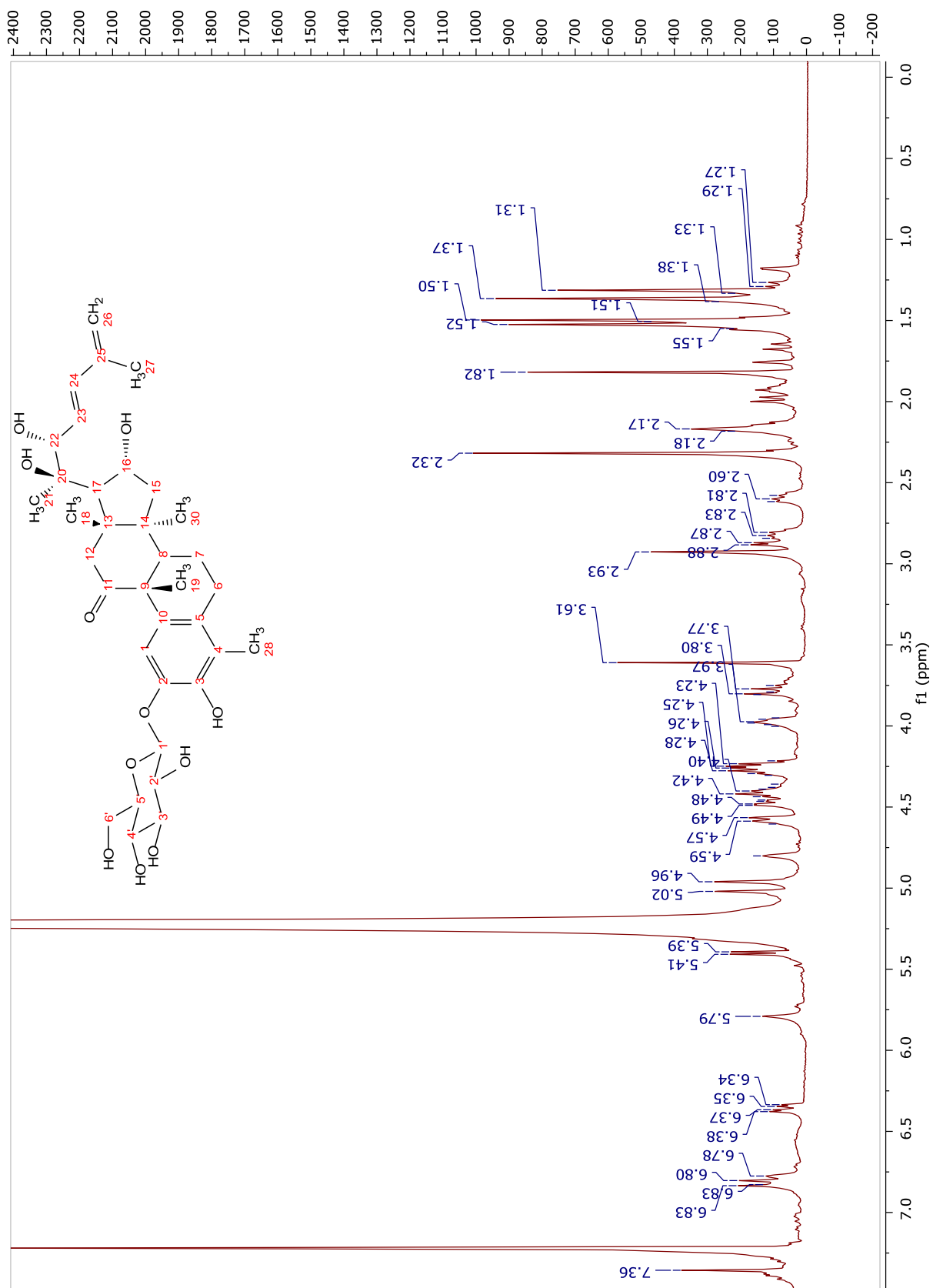


Figura 62. Espectro de RMN  $^1\text{H}$  de Sb15 (500 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



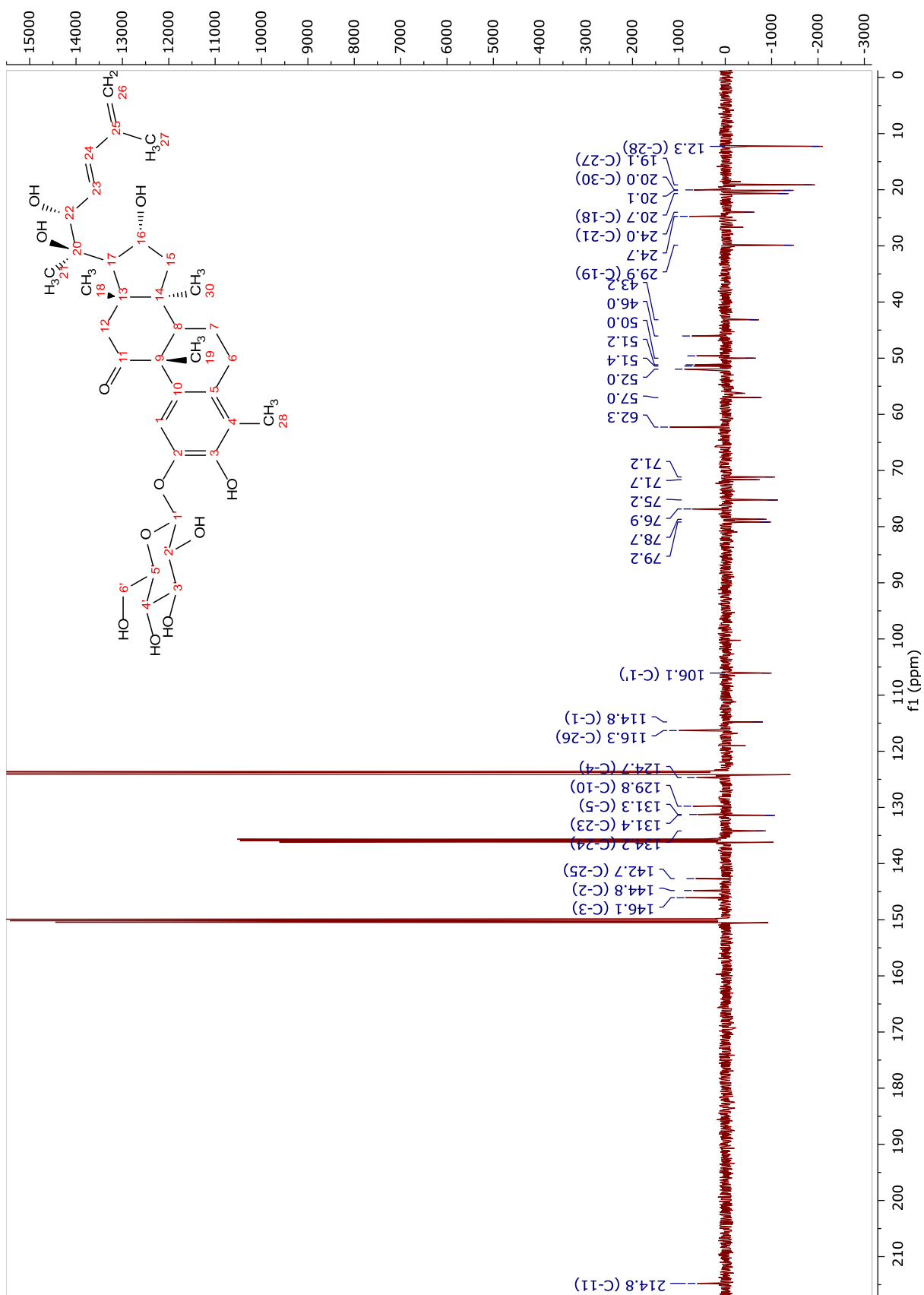
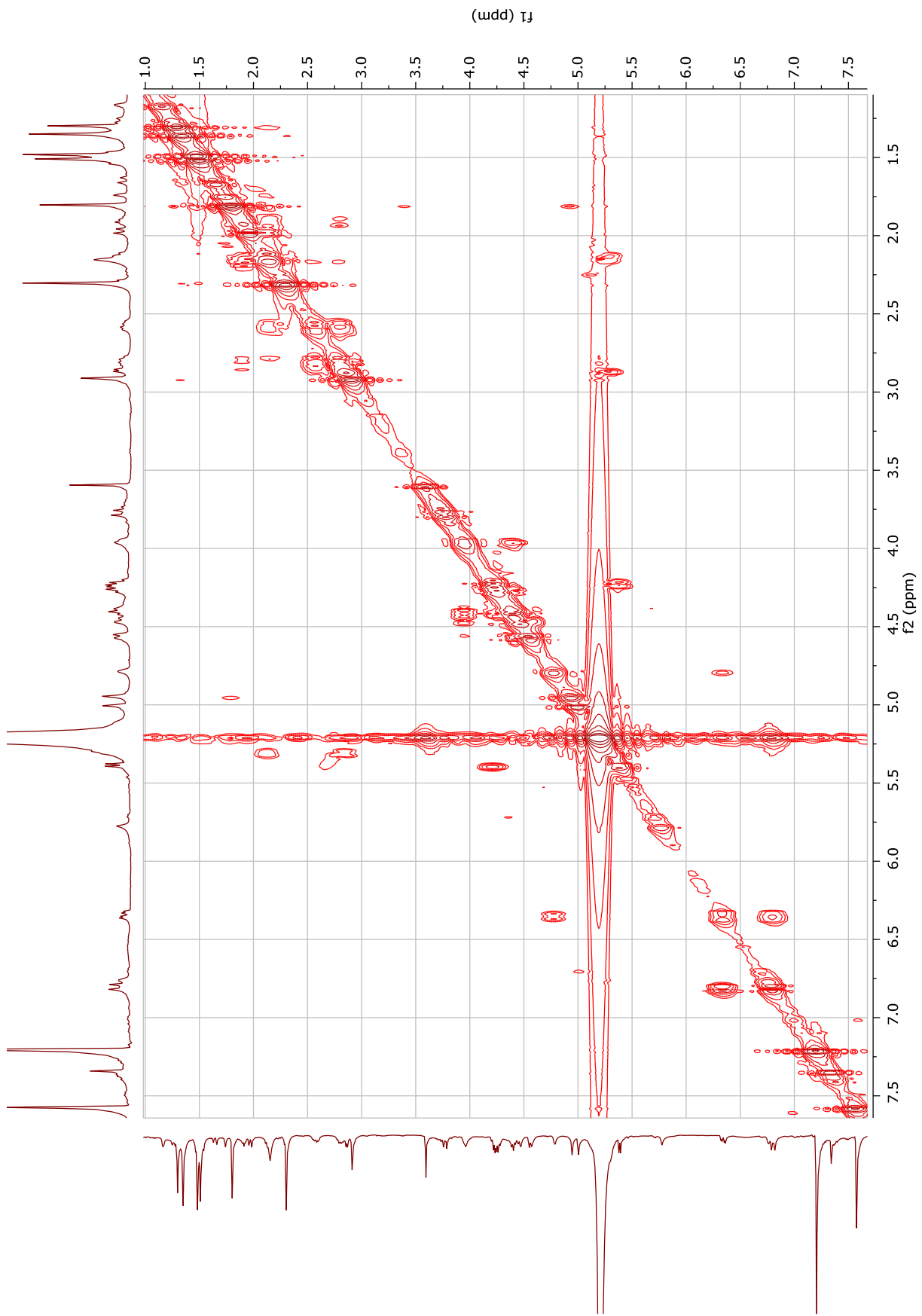


Figura 63. Espectro de DEPTQ de Sb15 (125 MHz, C<sub>5</sub>D<sub>5</sub>N).



**Figura 64.** Espectro de COSY de Sb15 (500 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

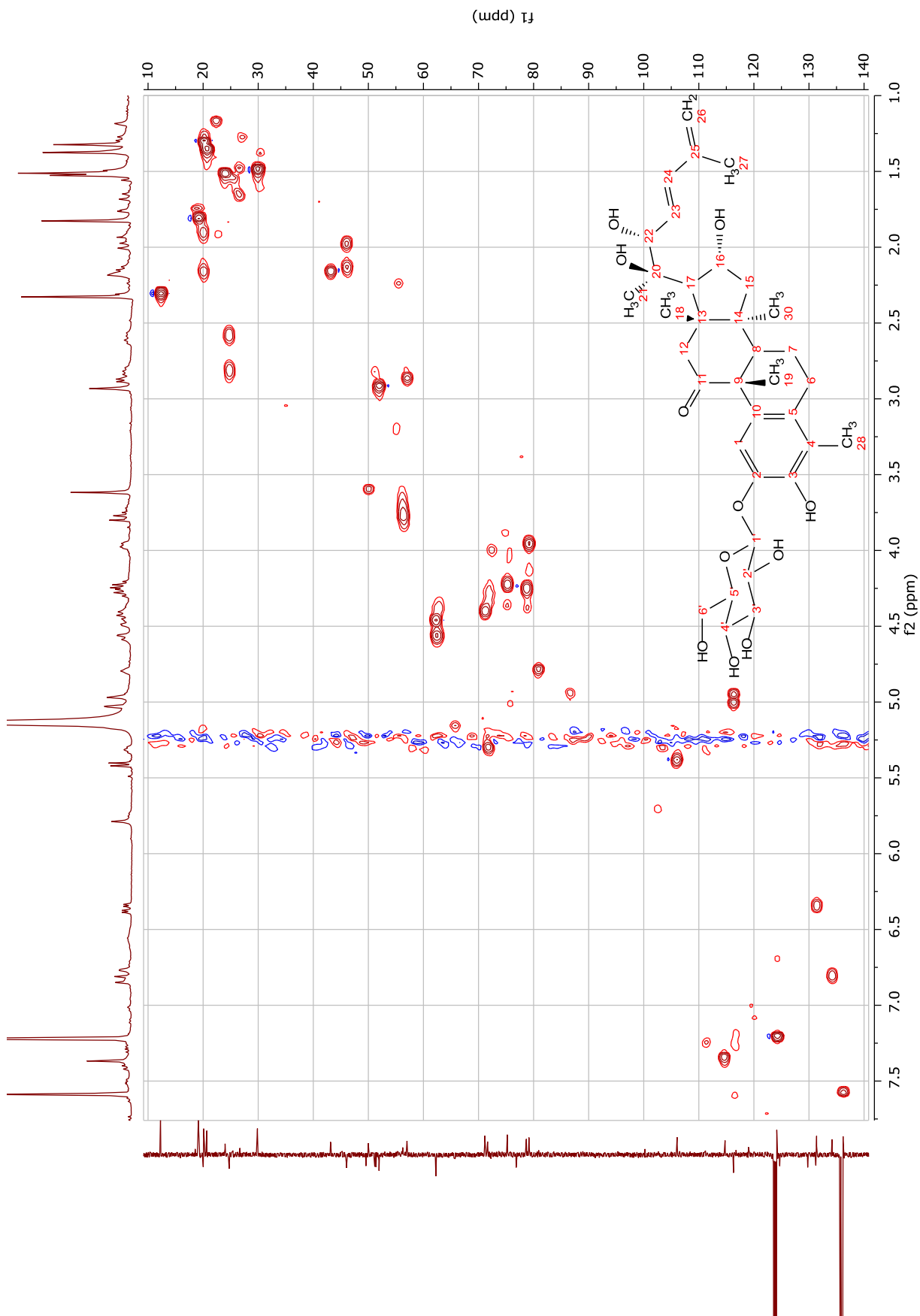


Figura 65. Espectro de HSQC de Sb15 (500 MHz,  $C_5D_5N$ ).

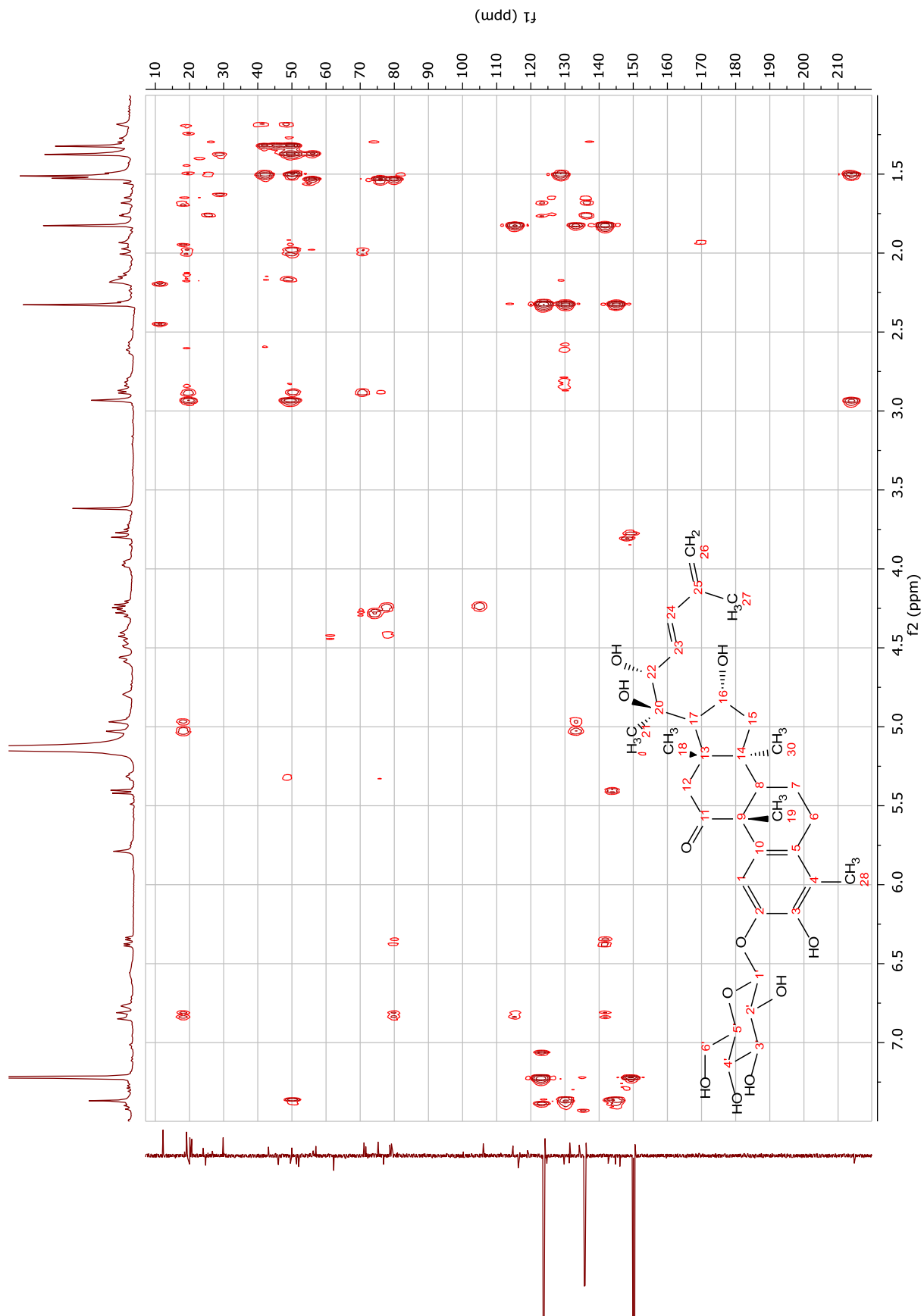
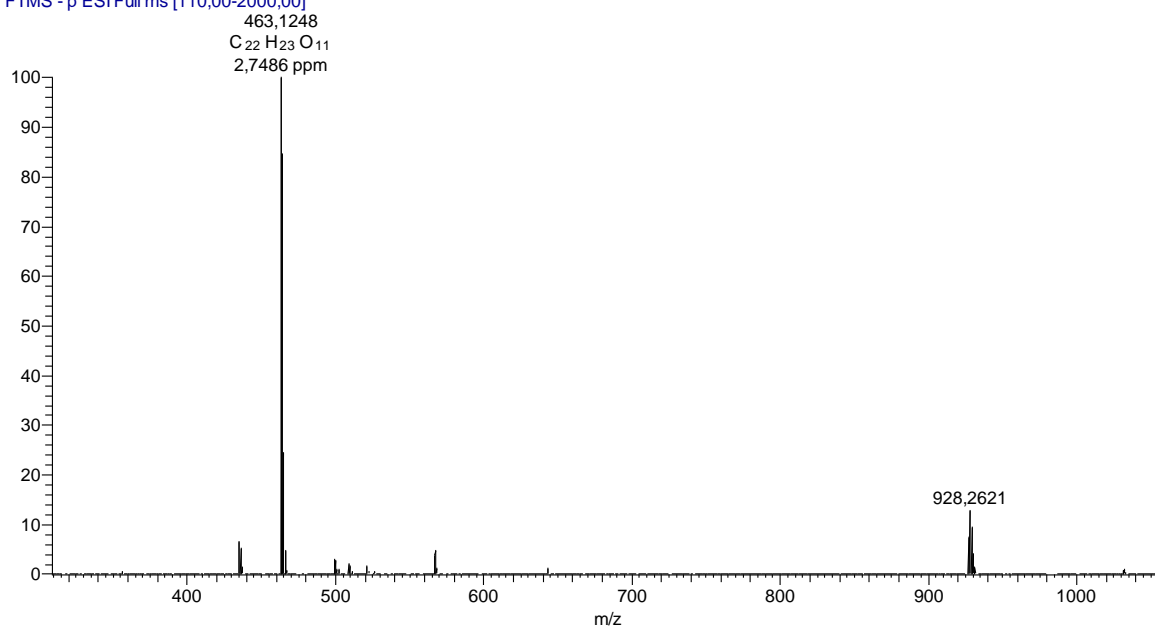
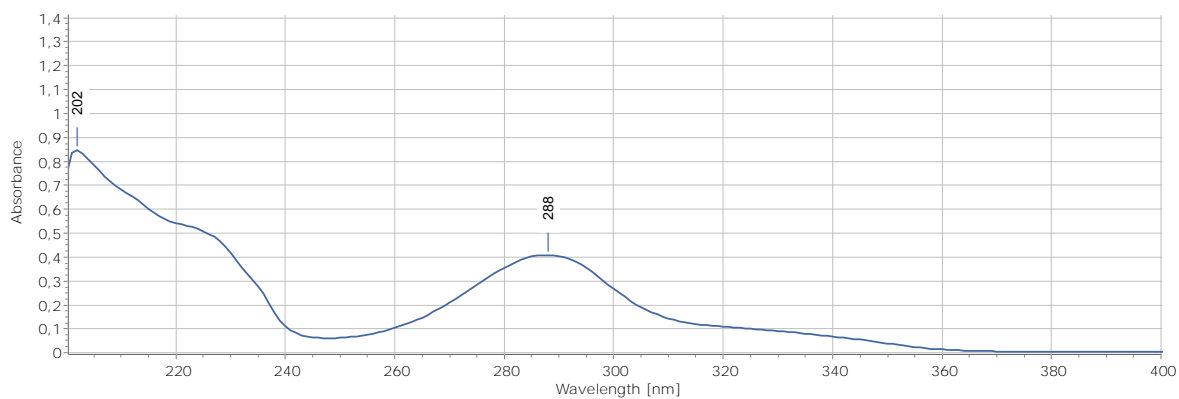


Figura 66. Espectro de HMBC de **Sb15** (500 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

180319\_CAC\_173neg5 #3048-3063 RT: 7,59-7,62 AV: 16 NL: 1,86E6  
T: FTMS -p ESI Full ms [110,00-2000,00]



**Figura 67.** Espectro de massas de alta resolução de **Sb16** (ESI, modo negativo).



**Figura 68.** Espectro de ultravioleta de **Sb16** (metanol).

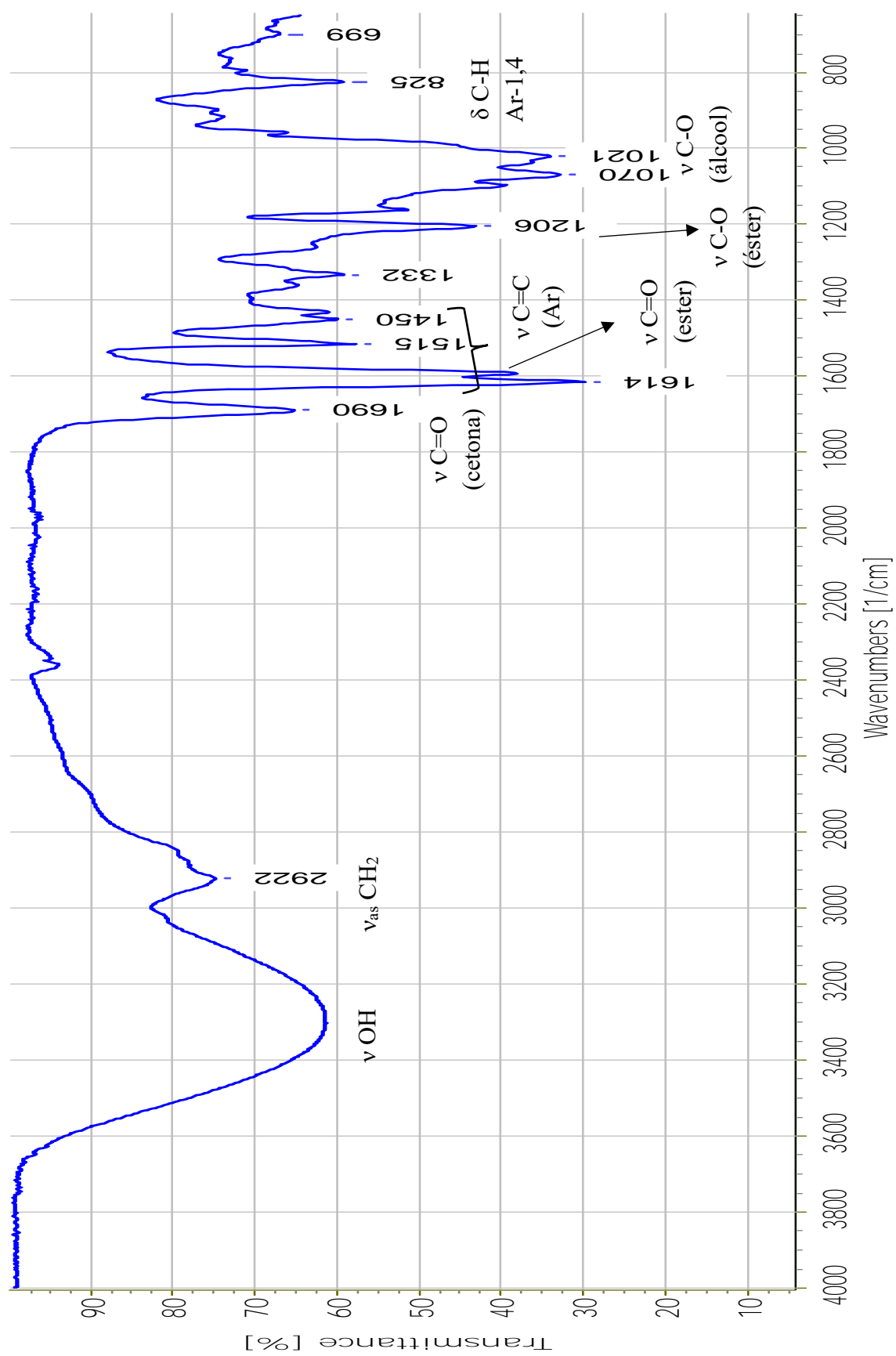


Figura 69. Espectro de Infravermelho de Sb16 (FTIR-ATR).

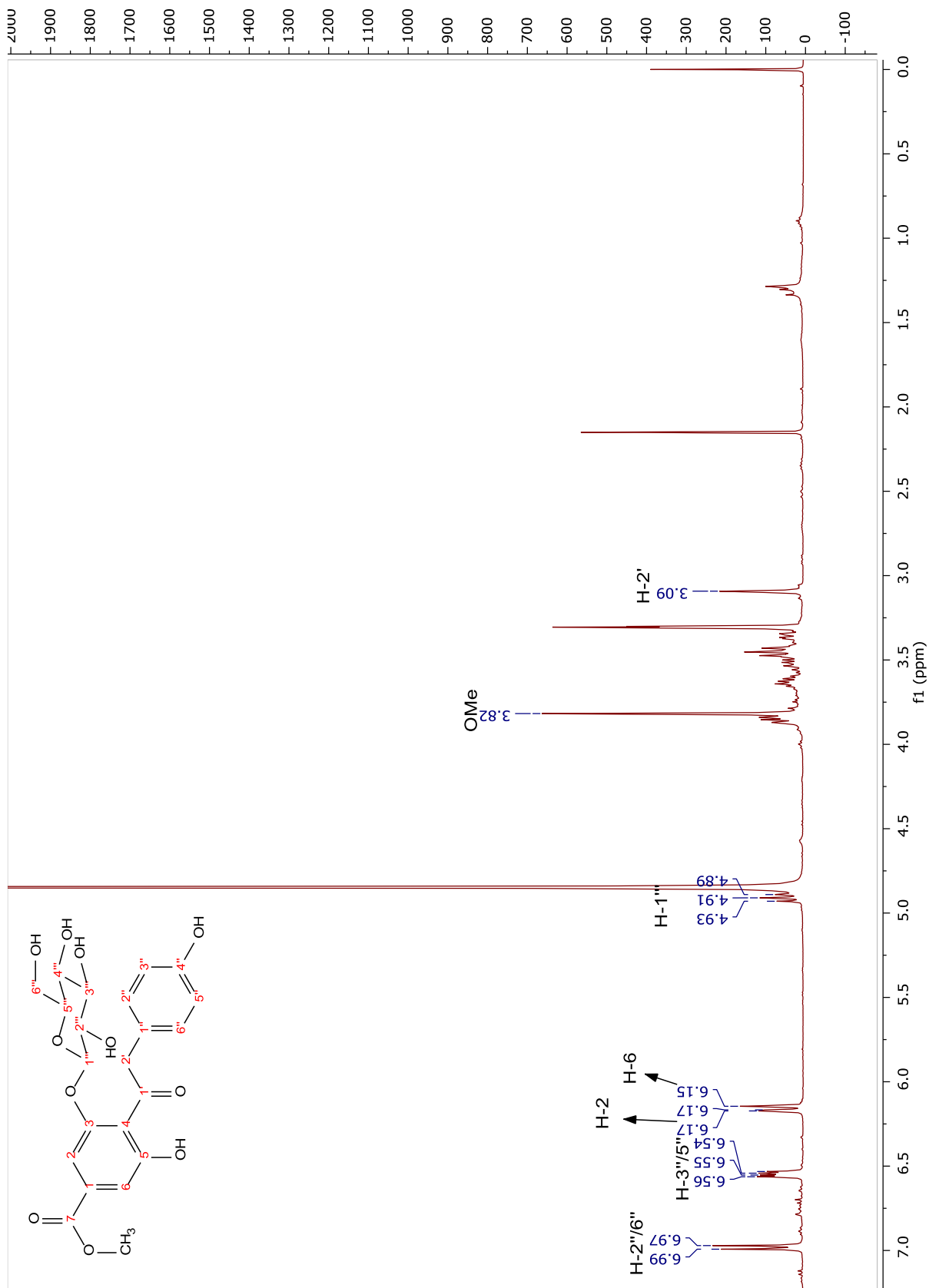


Figura 70. Espectro de RMN  $^1\text{H}$  de Sb16 (400 MHz,  $\text{CD}_3\text{OD}$ ).

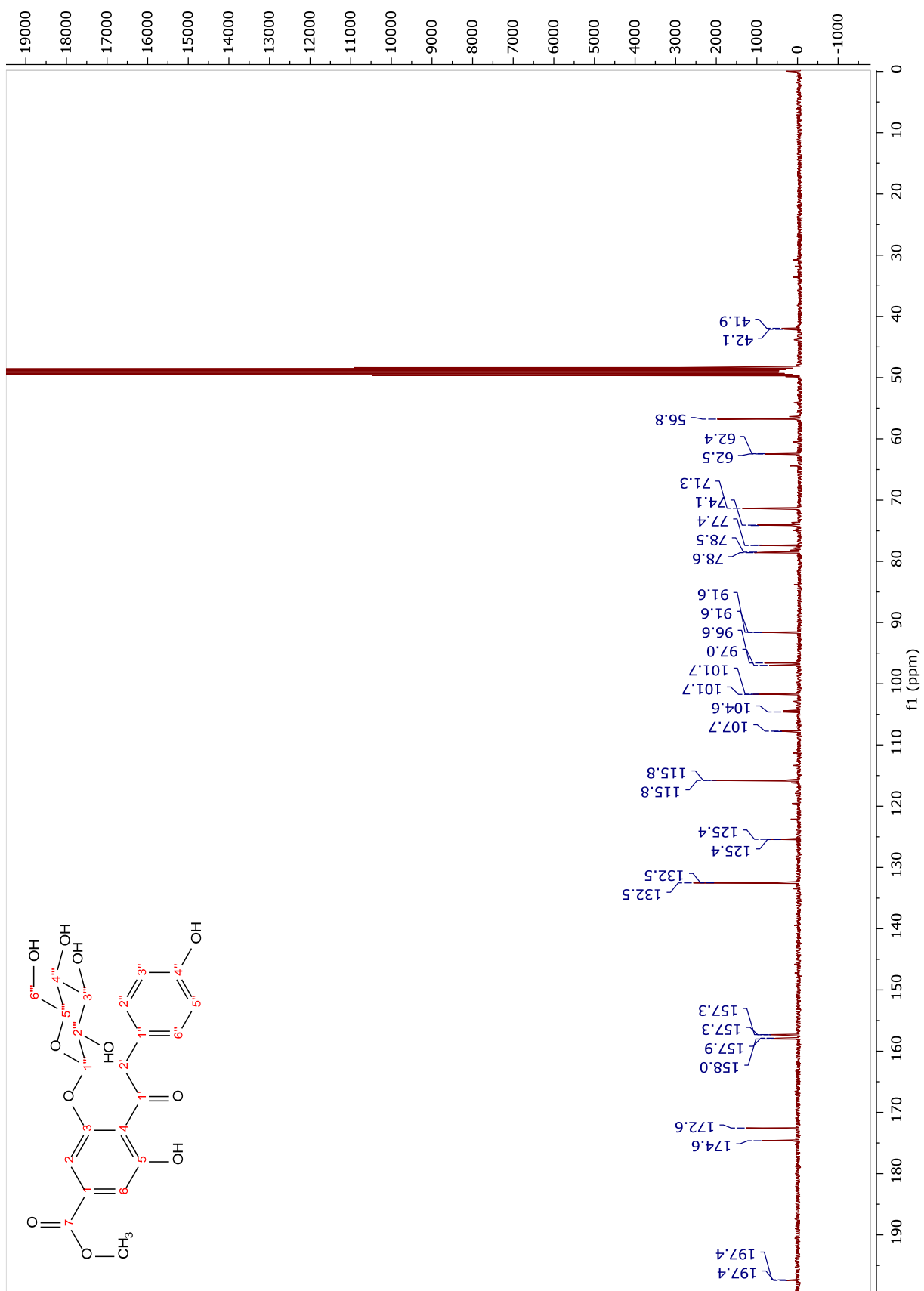


Figura 71. Espectro de RMN  $^{13}\text{C}$  de Sb16 (100 MHz,  $\text{CD}_3\text{OD}$ ).



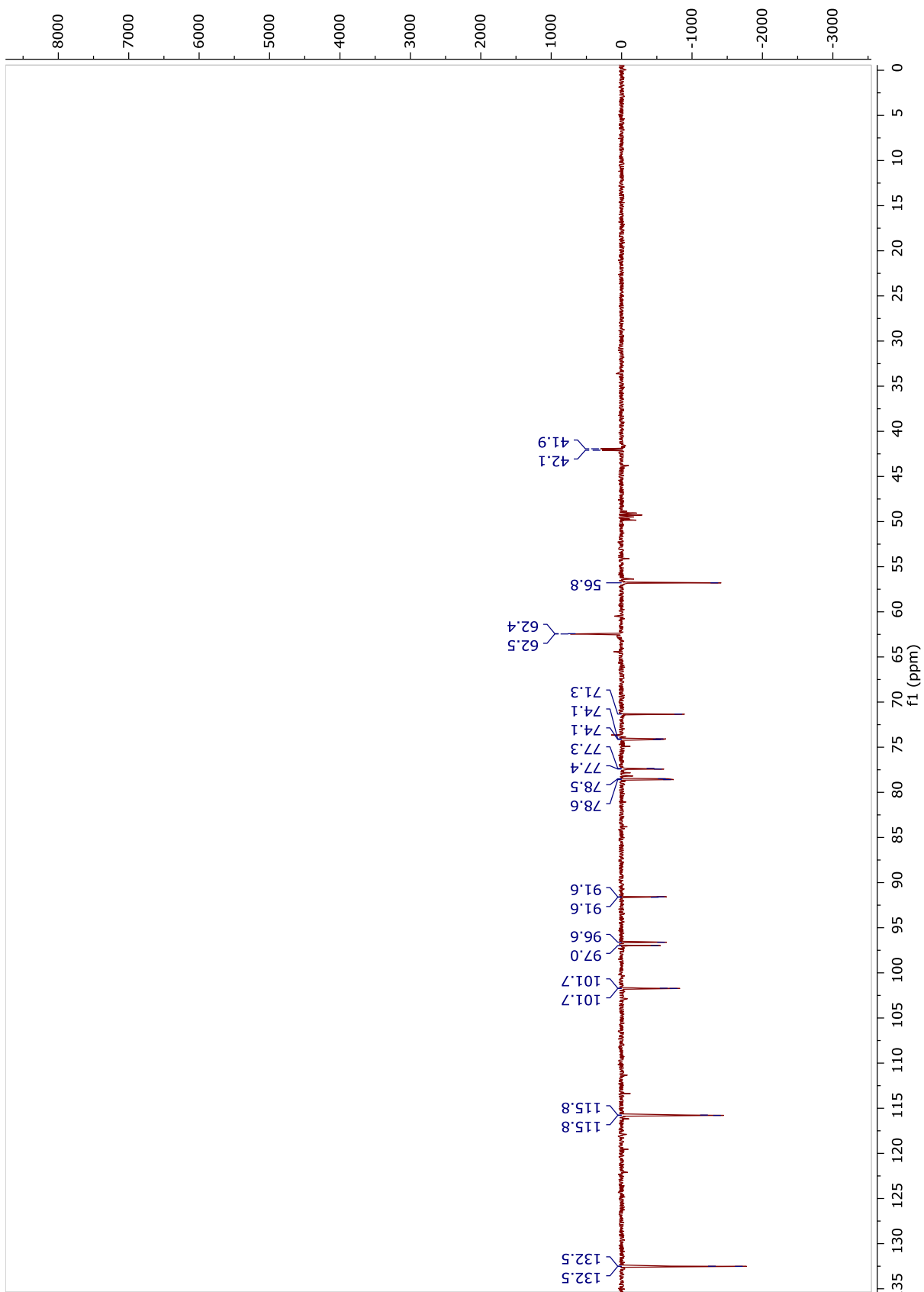


Figura 72. Espectro de DEPT-135 de Sb16 (100 MHz, CD<sub>3</sub>OD).

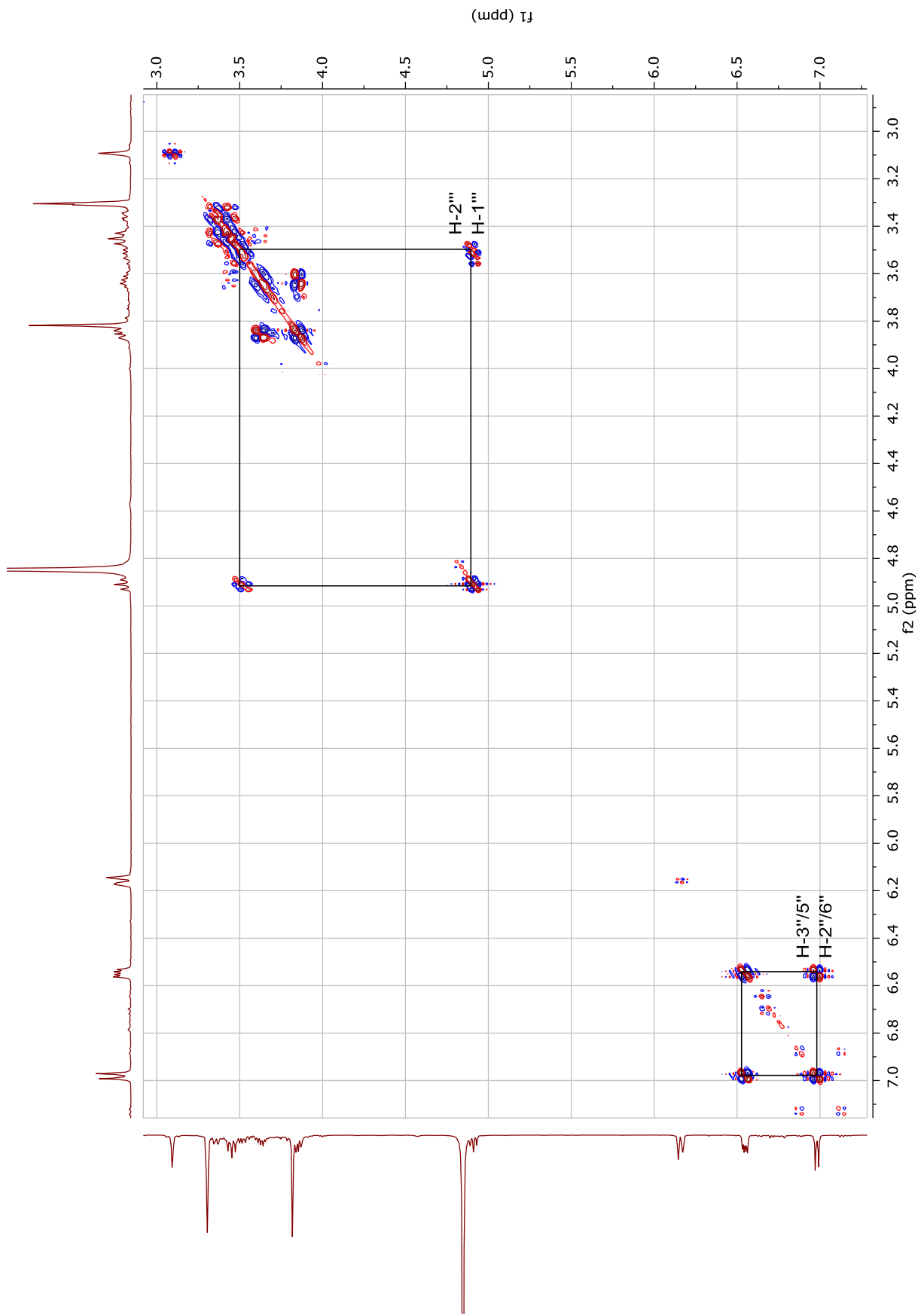


Figura 73. Espectro de COSY de Sb16 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

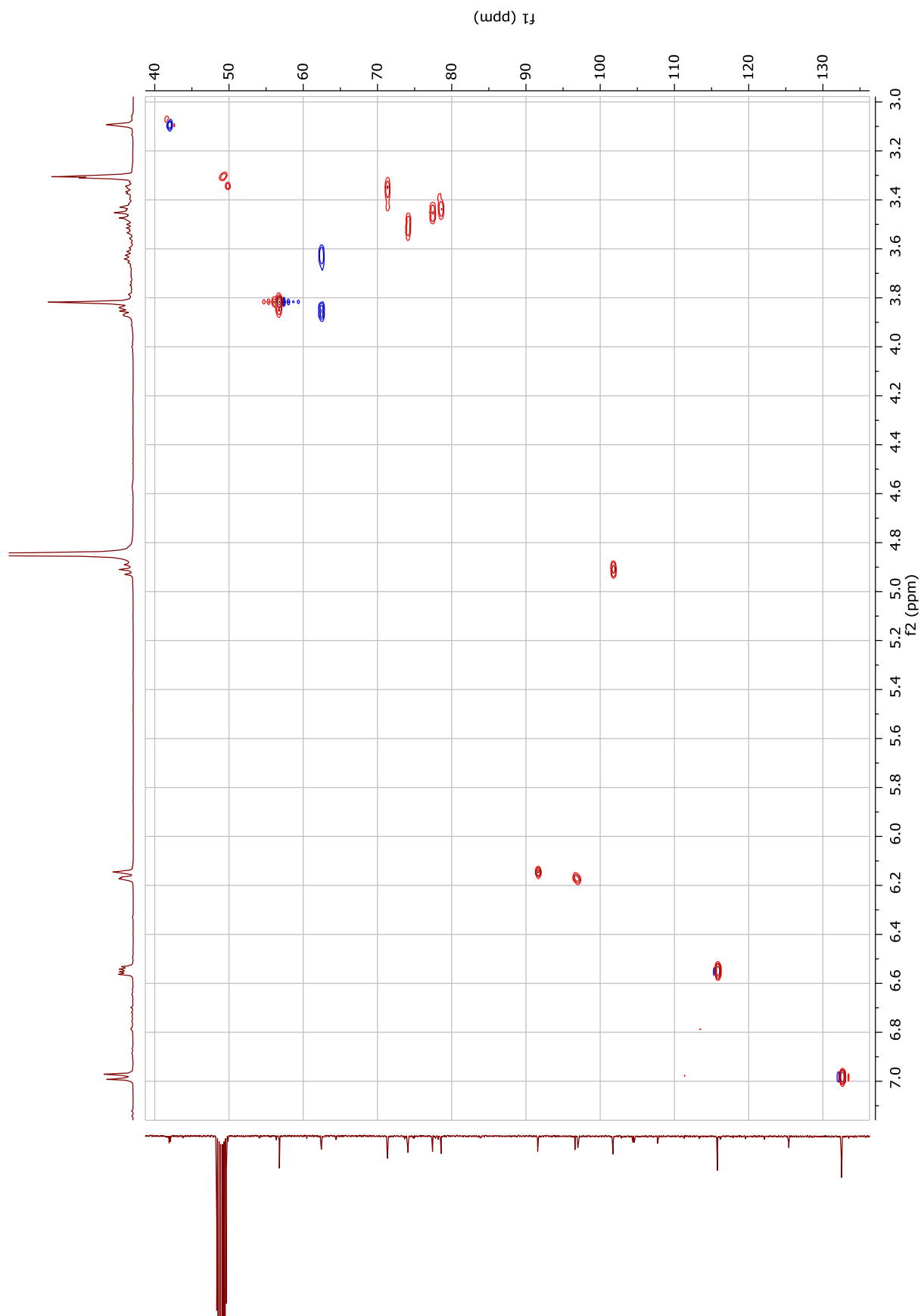


Figura 74. Espectro de HSQC de Sb16 (400 MHz, CD<sub>3</sub>OD).

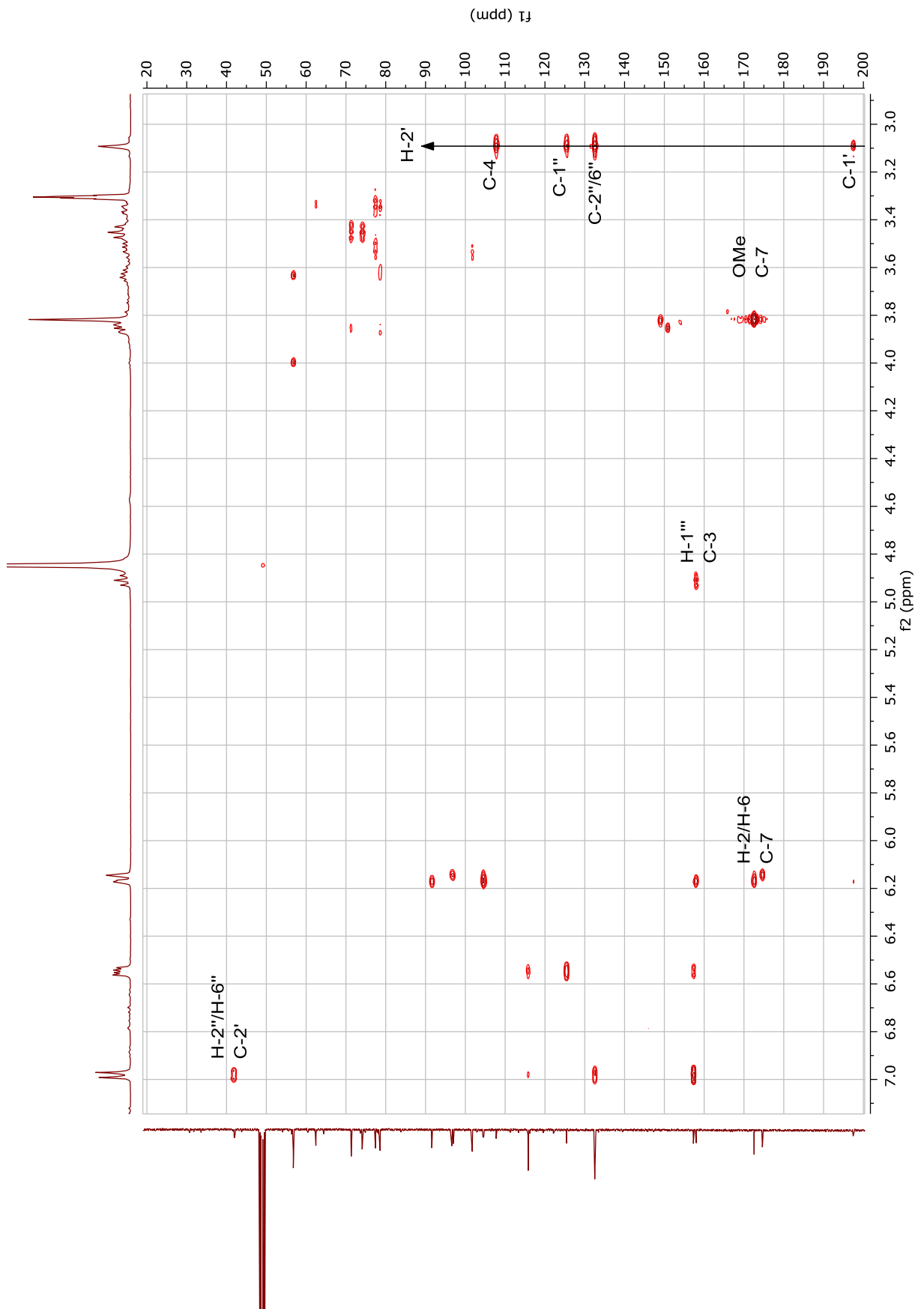


Figura 75. Espectro de HMBC de Sb16 (400 MHz, CD<sub>3</sub>OD).

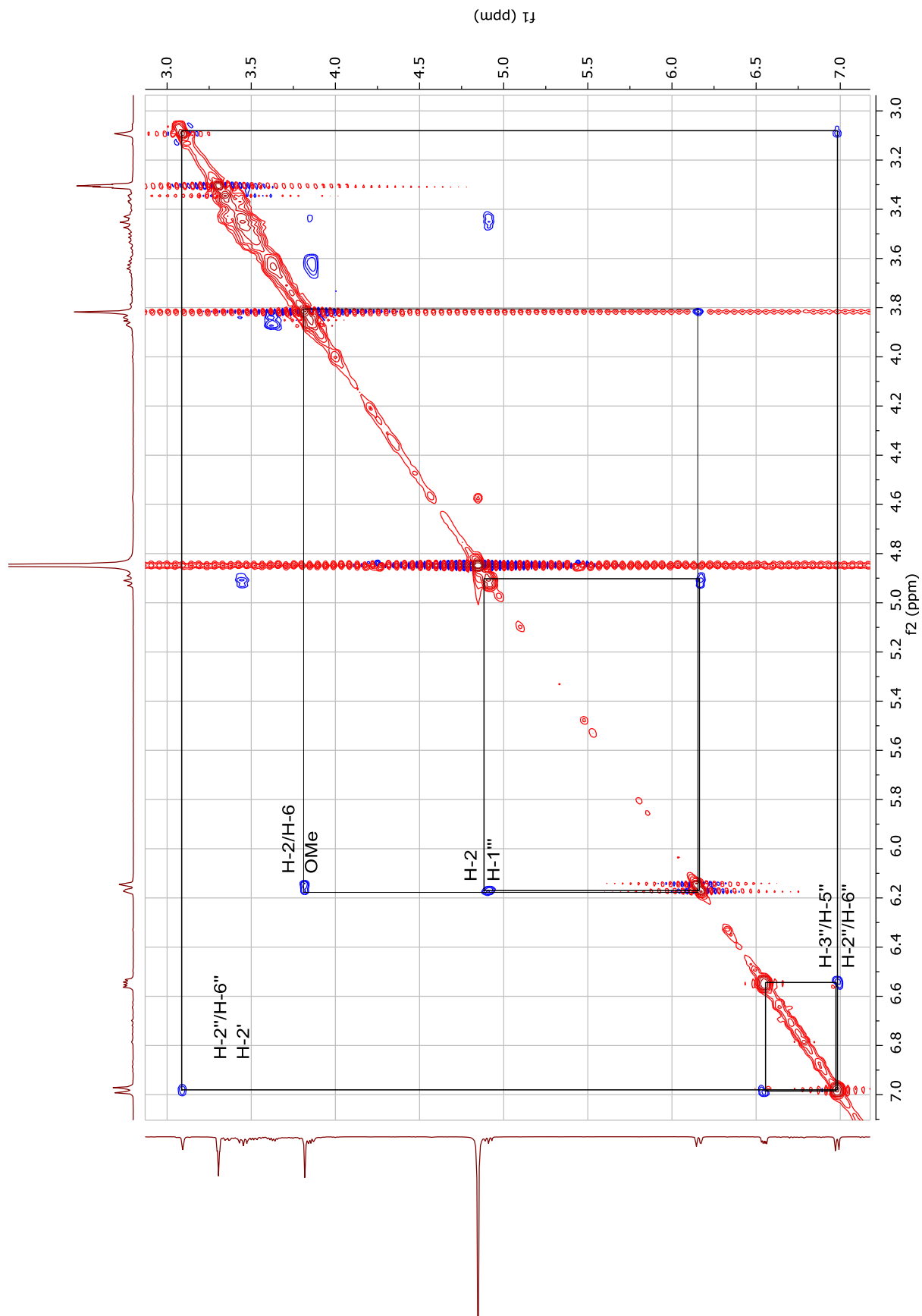


Figura 76. Espectro de NOESY de Sb16 (400 MHz,  $\text{CD}_3\text{OD}$ ).

+MS, 0.1-0.7min #8-41

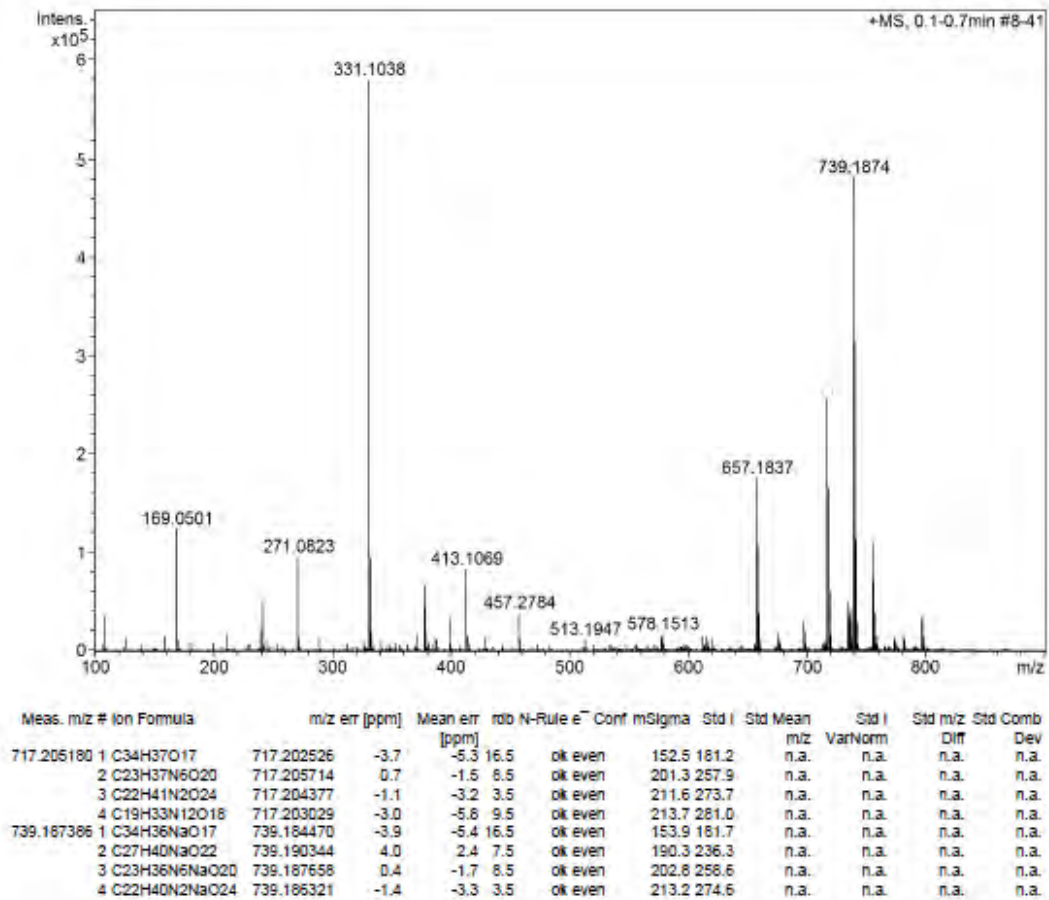


Figura 77. Espectro de massas de alta resolução do derivado acetilado de **Sb16** (ESI, modo positivo).

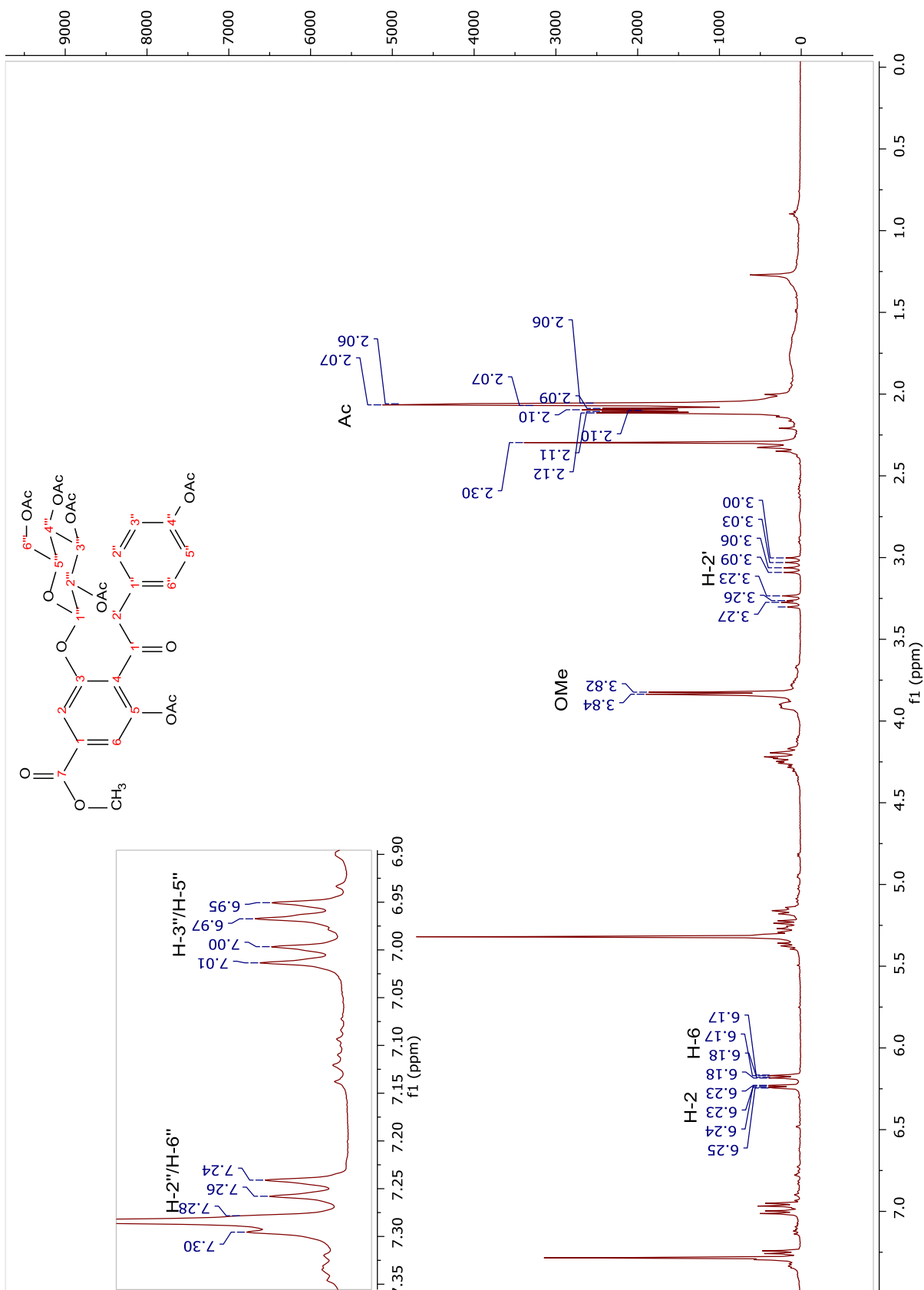


Figura 78. Espectro de RMN  $^1\text{H}$  do derivado acetilado de Sb16 (500 MHz,  $\text{CDCl}_3$ ).

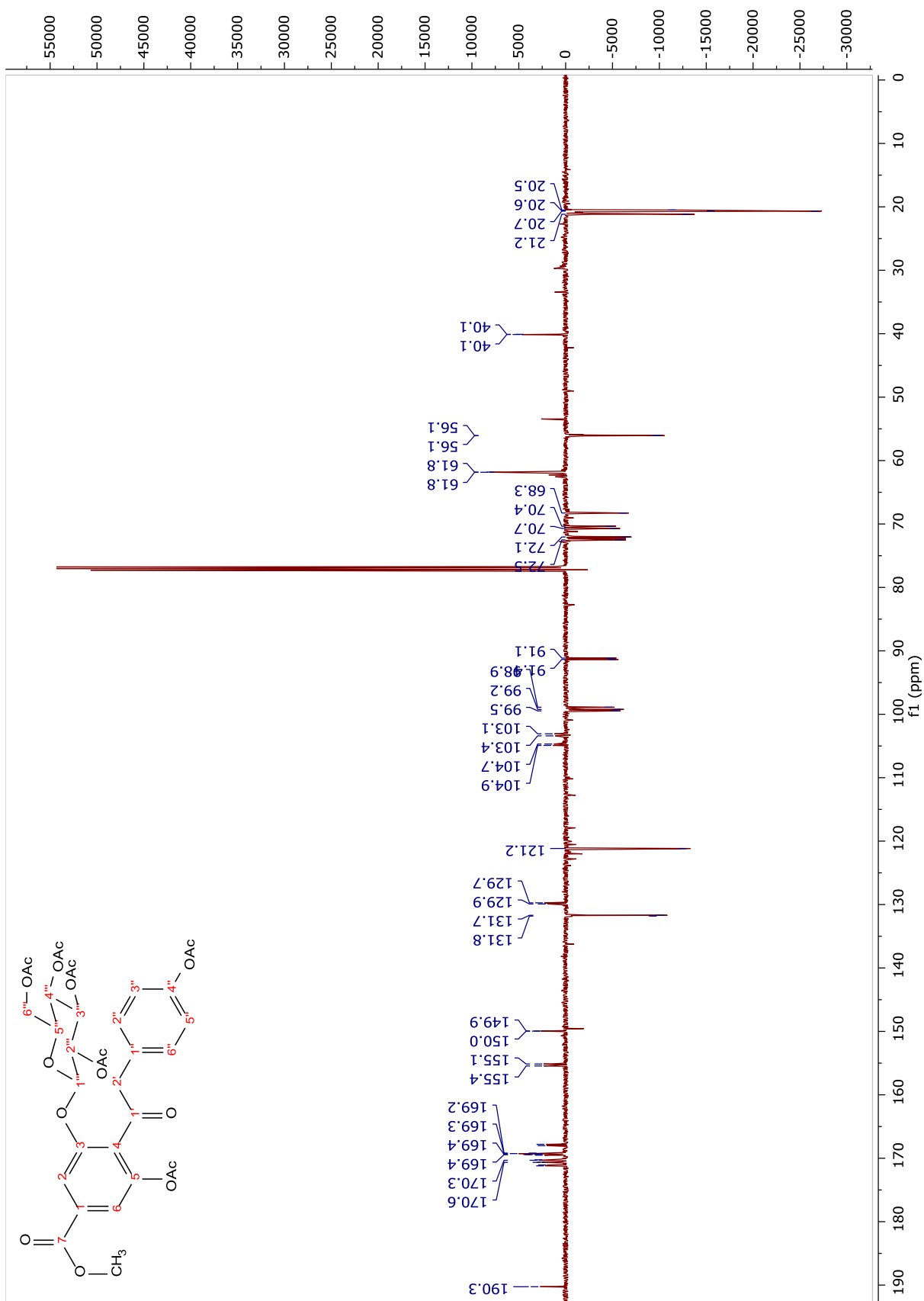
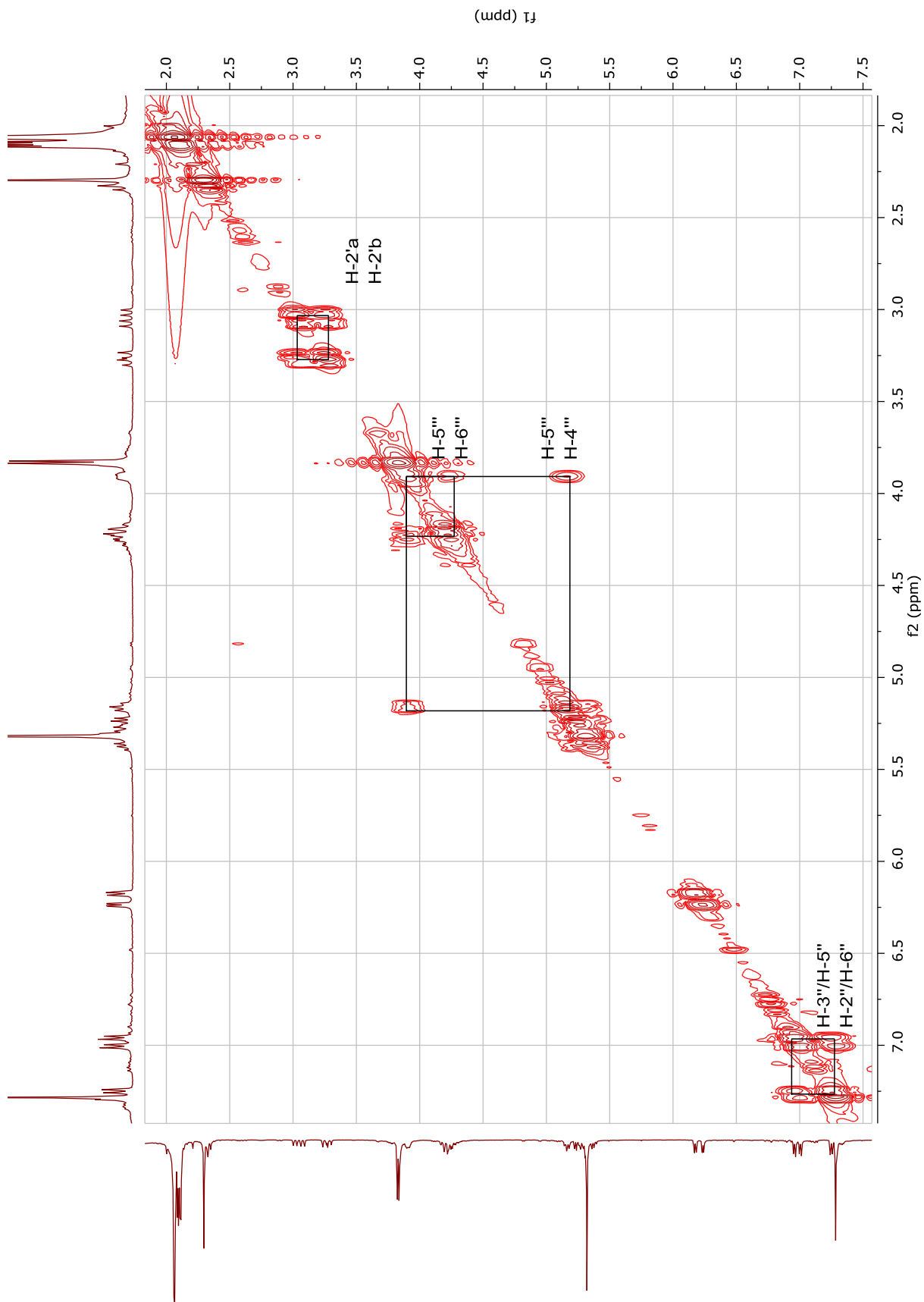


Figura 79. Espectro de DEPTQ do derivado acetilado de Sb16 (125 MHz, CDCl<sub>3</sub>).





**Figura 80.** Espectro de COSY do derivado acetilado de **Sb16** (500 MHz,  $\text{CDCl}_3$ ).

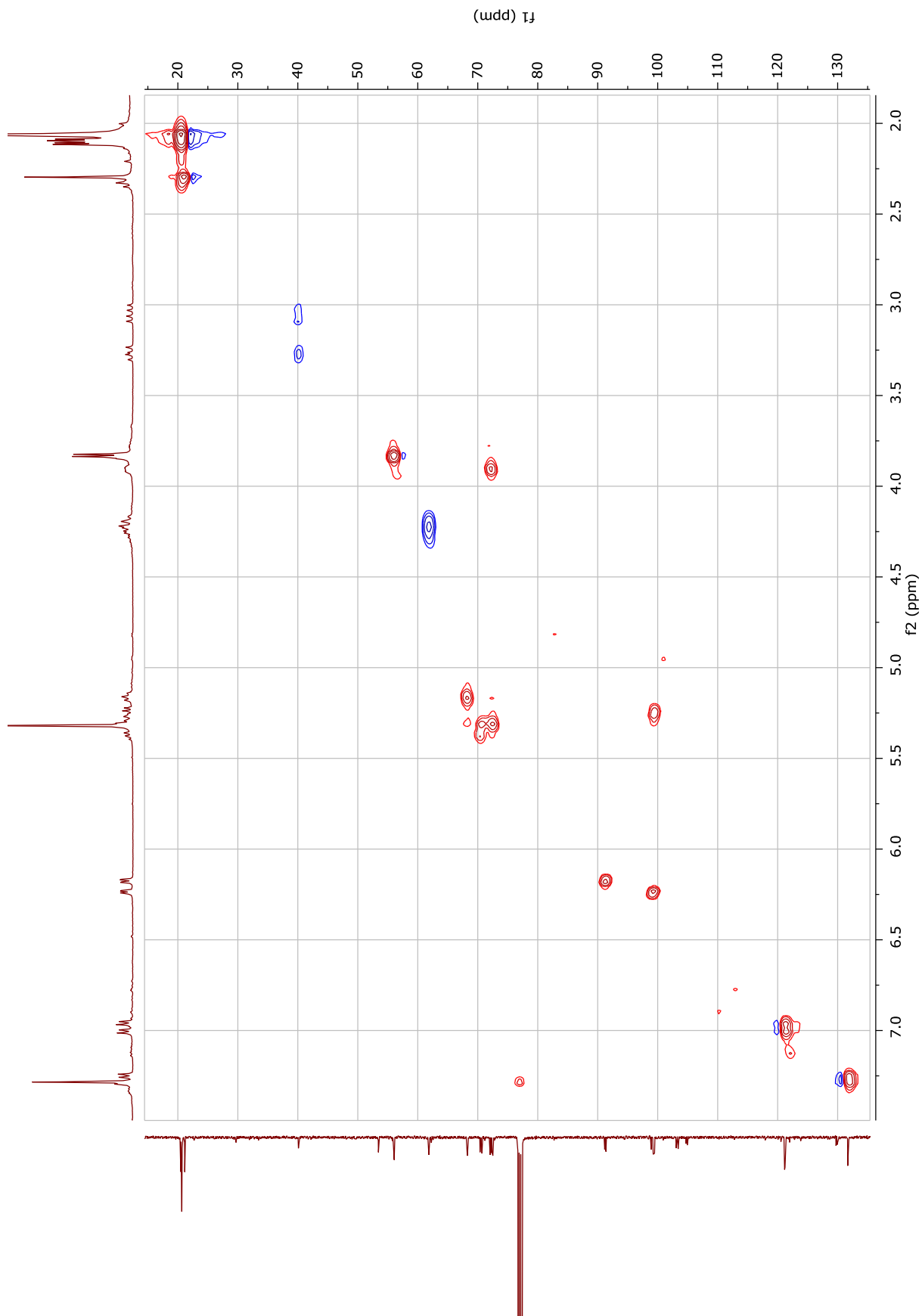


Figura 81. Espectro de HSQC do derivado acetilado de Sb16 (500 MHz, CDCl<sub>3</sub>).

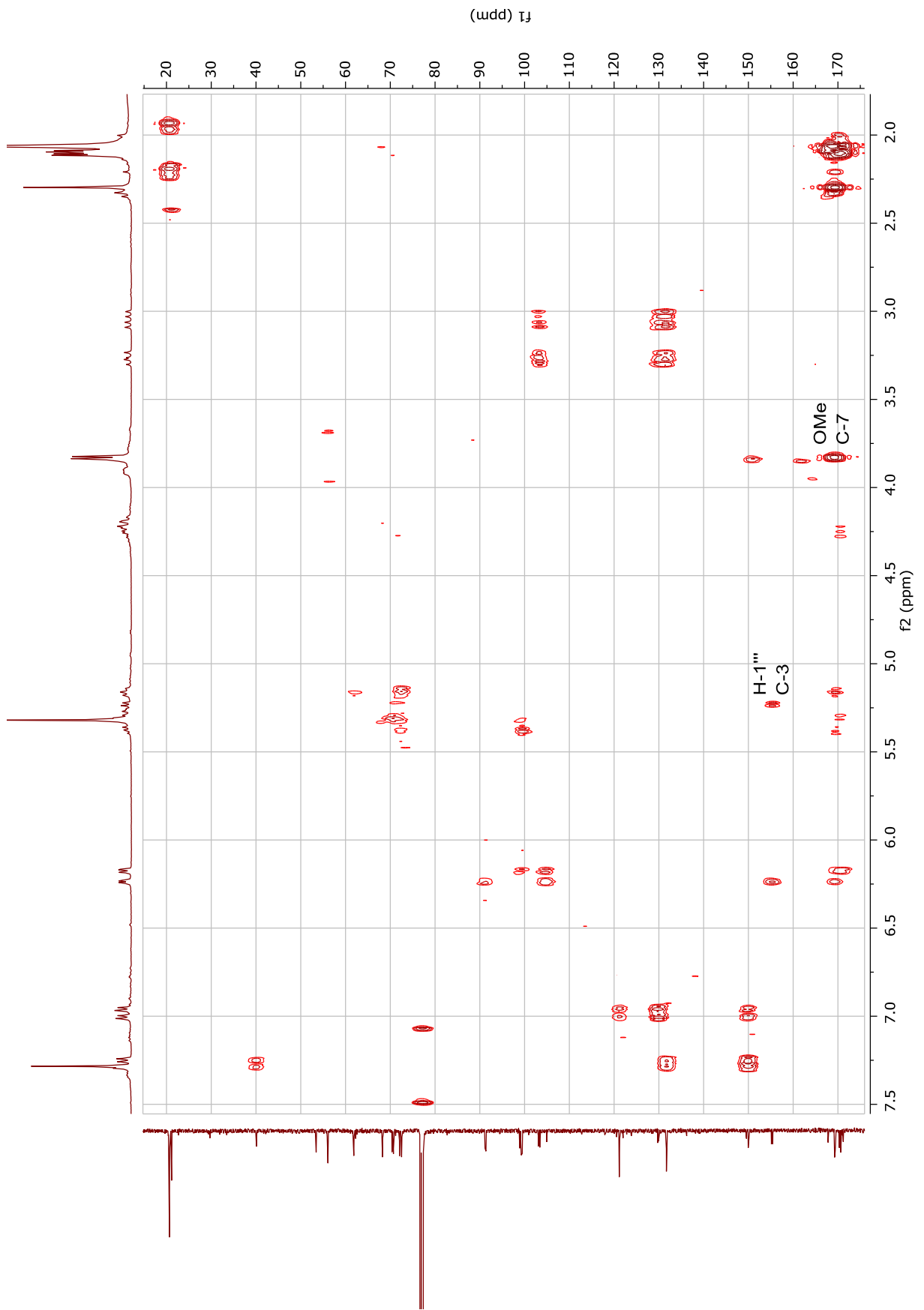


Figura 82. Espectro de HMBC do derivado acetilado de **Sb16** (500 MHz,  $\text{CDCl}_3$ ).

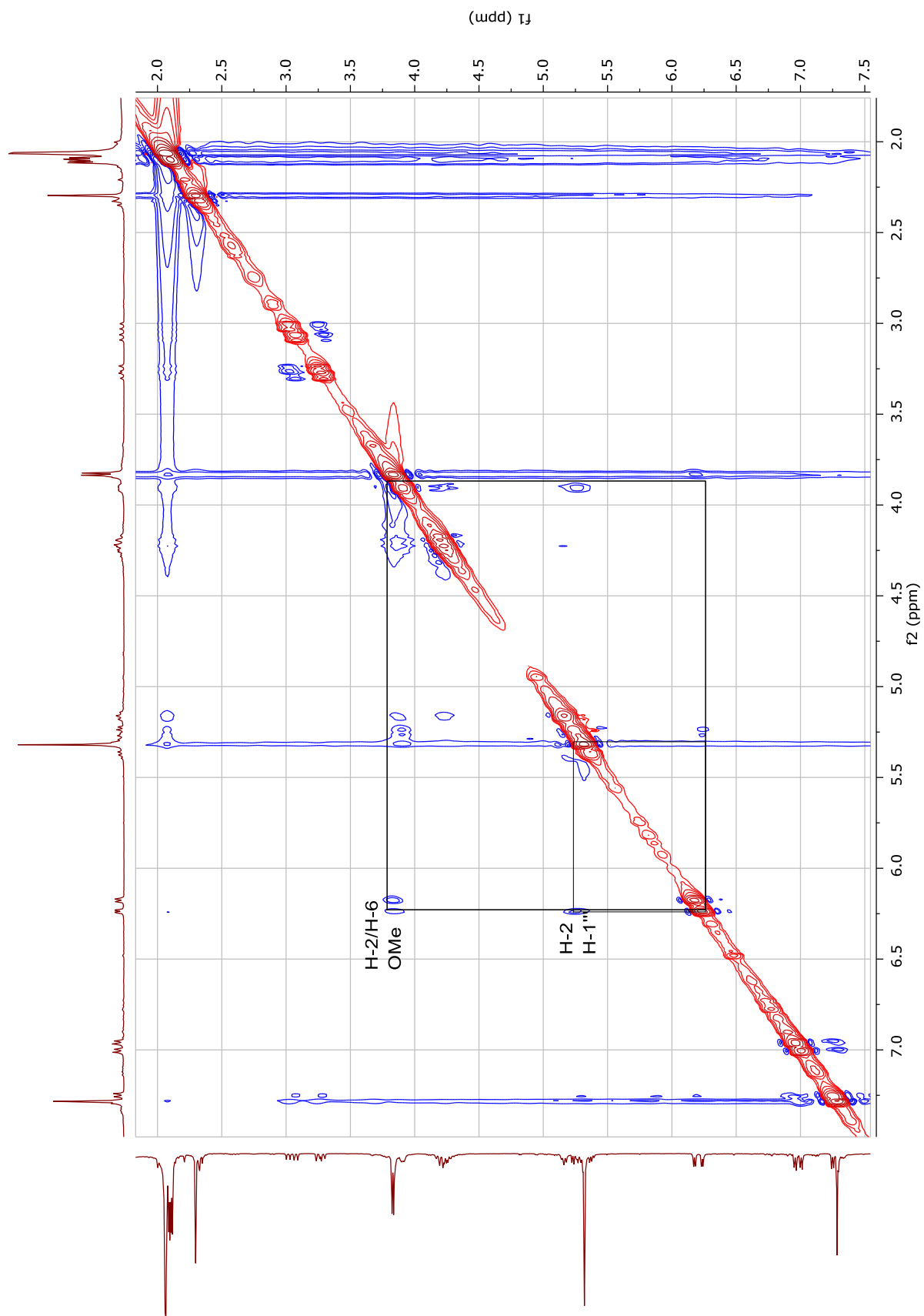


Figura 83. Espectro de ROESY do derivado acetilado de Sb16 (500 MHz,  $\text{CDCl}_3$ ).

180319\_CAC\_172neg4 #4356-4386 RT: 10,84-10,92 AV: 31 NL: 2,49E6  
T: FTMS - p ESI Full ms [110,00-2000,00]

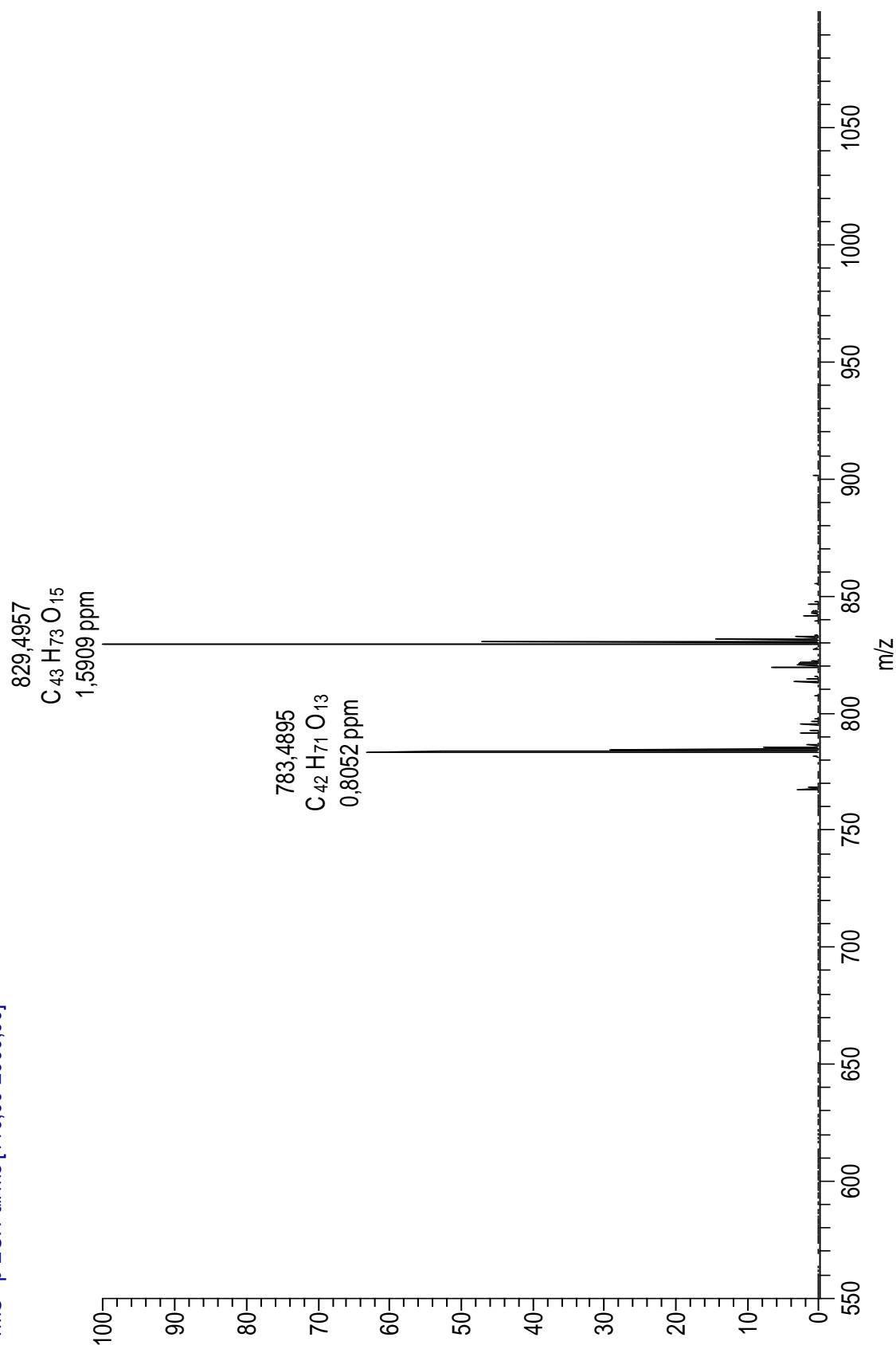
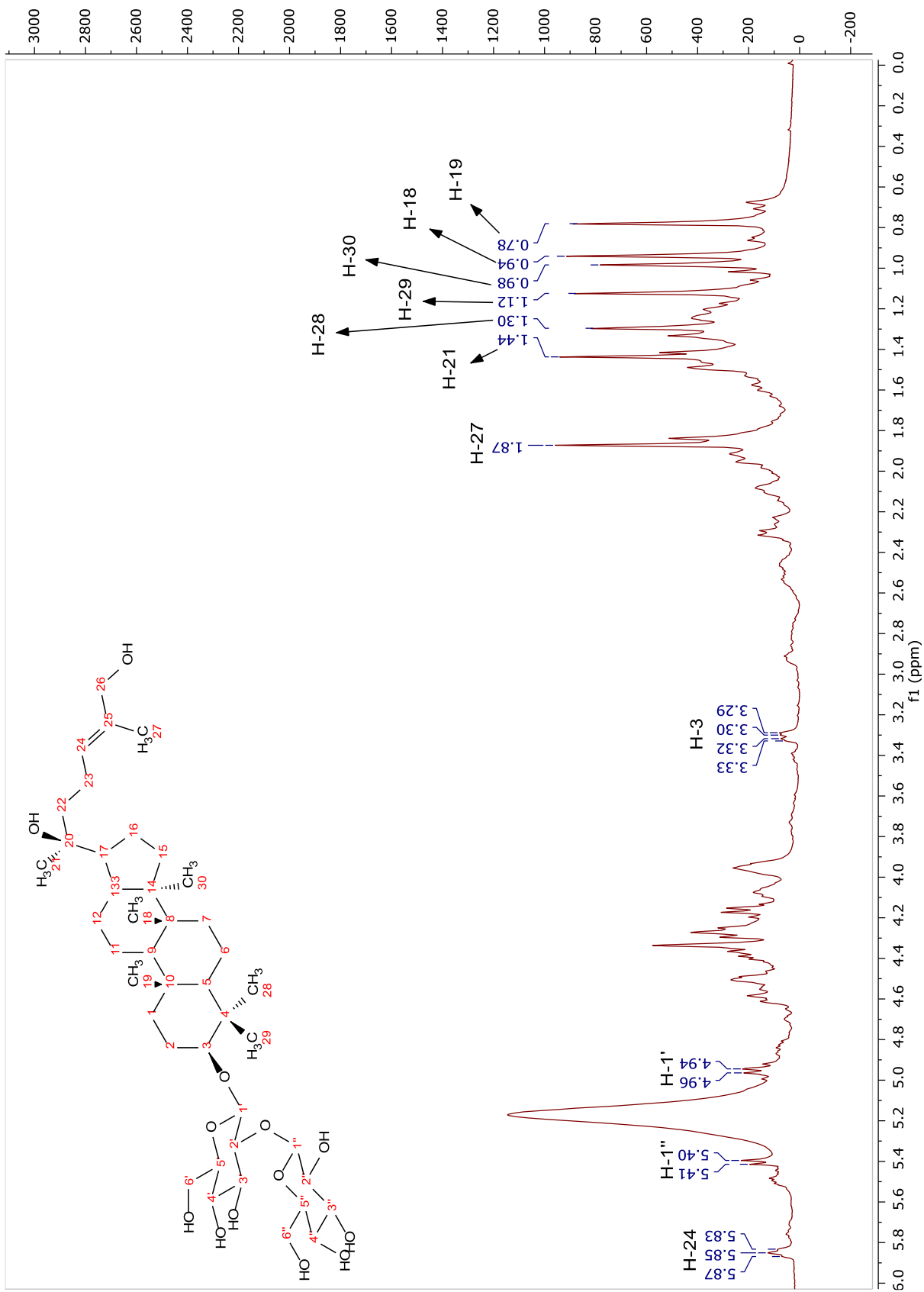


Figura 84. Espectro de massas de alta resolução de Sb17 (ESI, modo negativo).



**Figura 85.** Espectro de RMN  $^1\text{H}$  de **Sb17** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

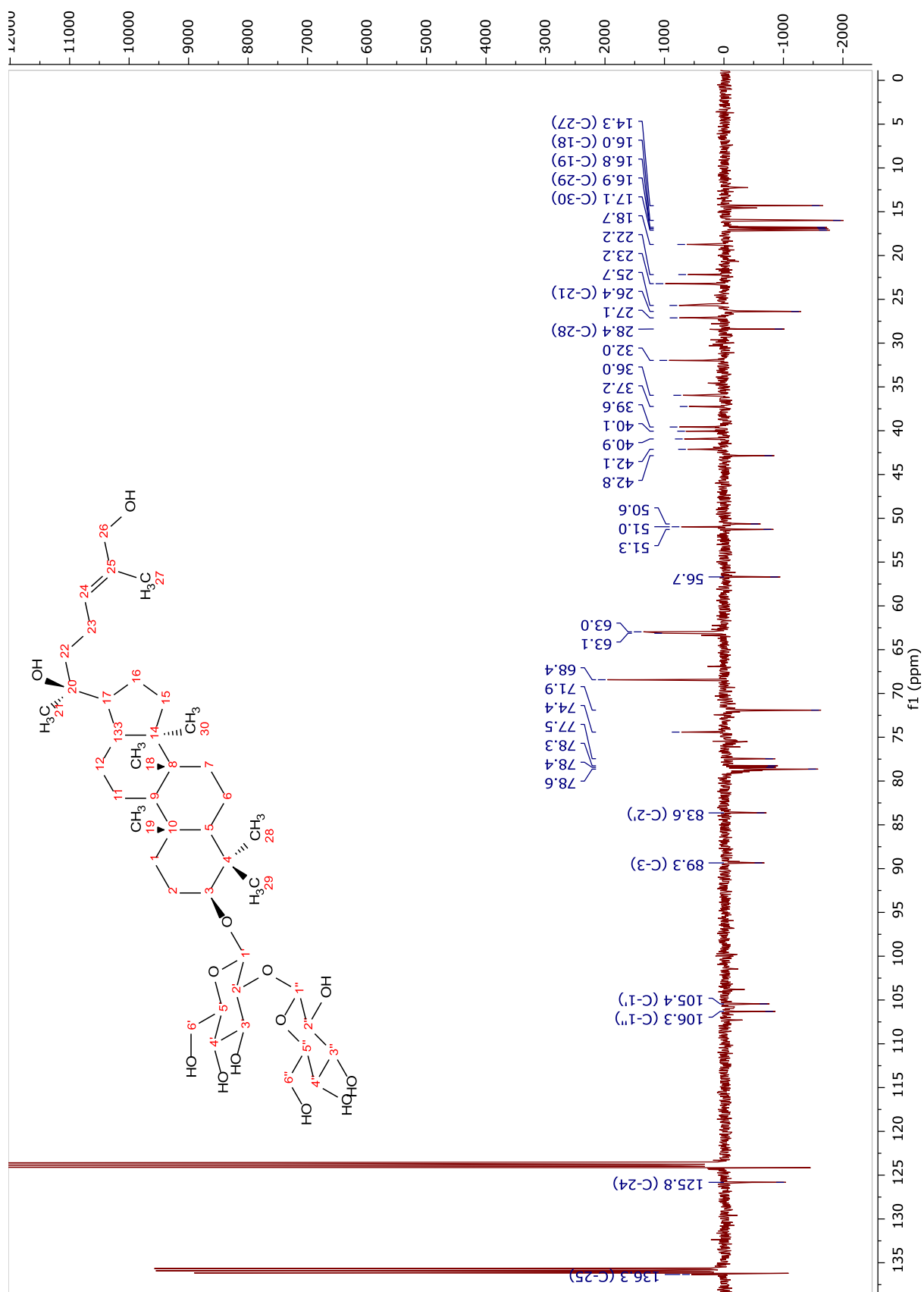


Figura 86. Espectro de DEPTQ de Sb17 (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

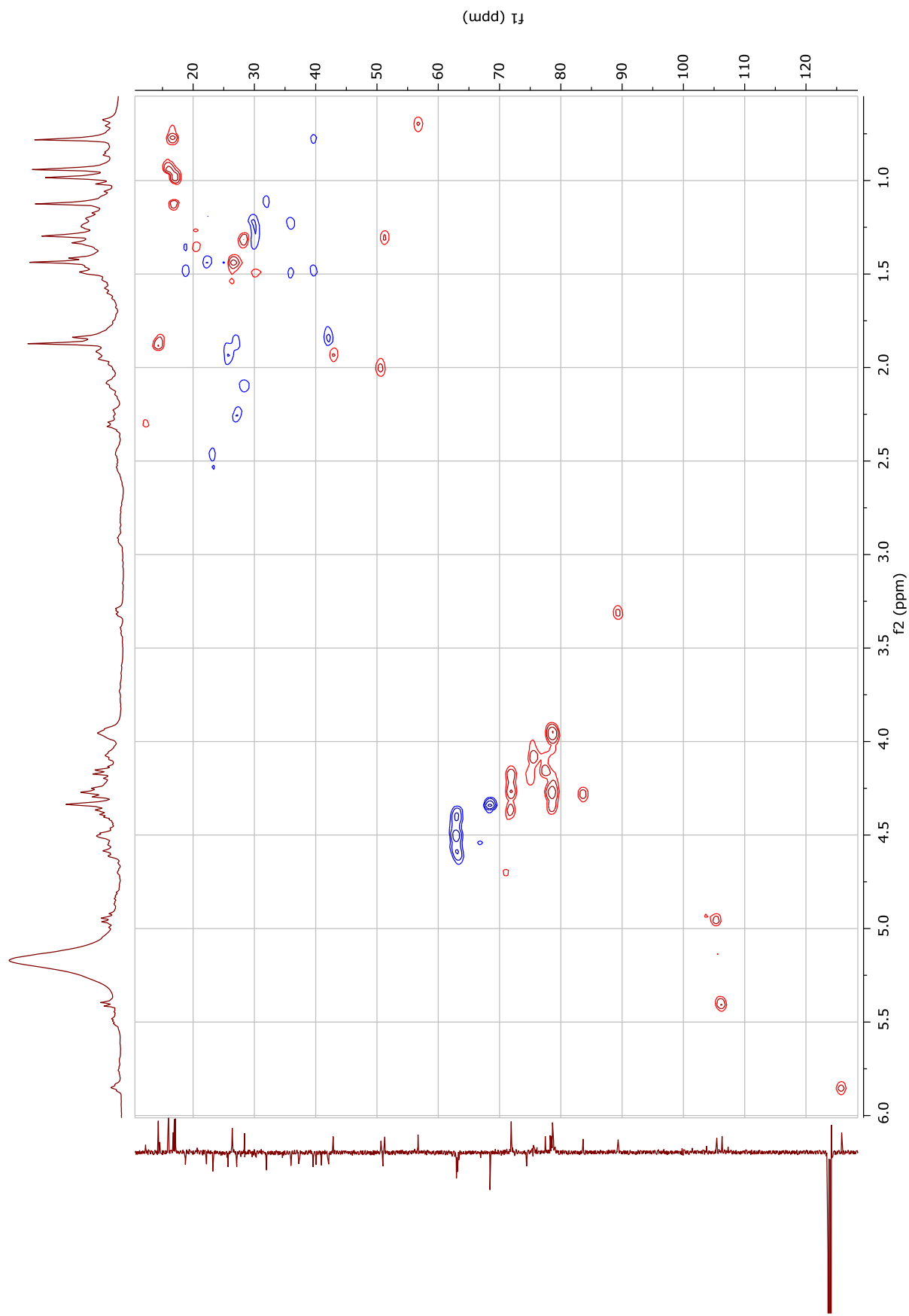


Figura 87. Espectro de HSQC de Sb17 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



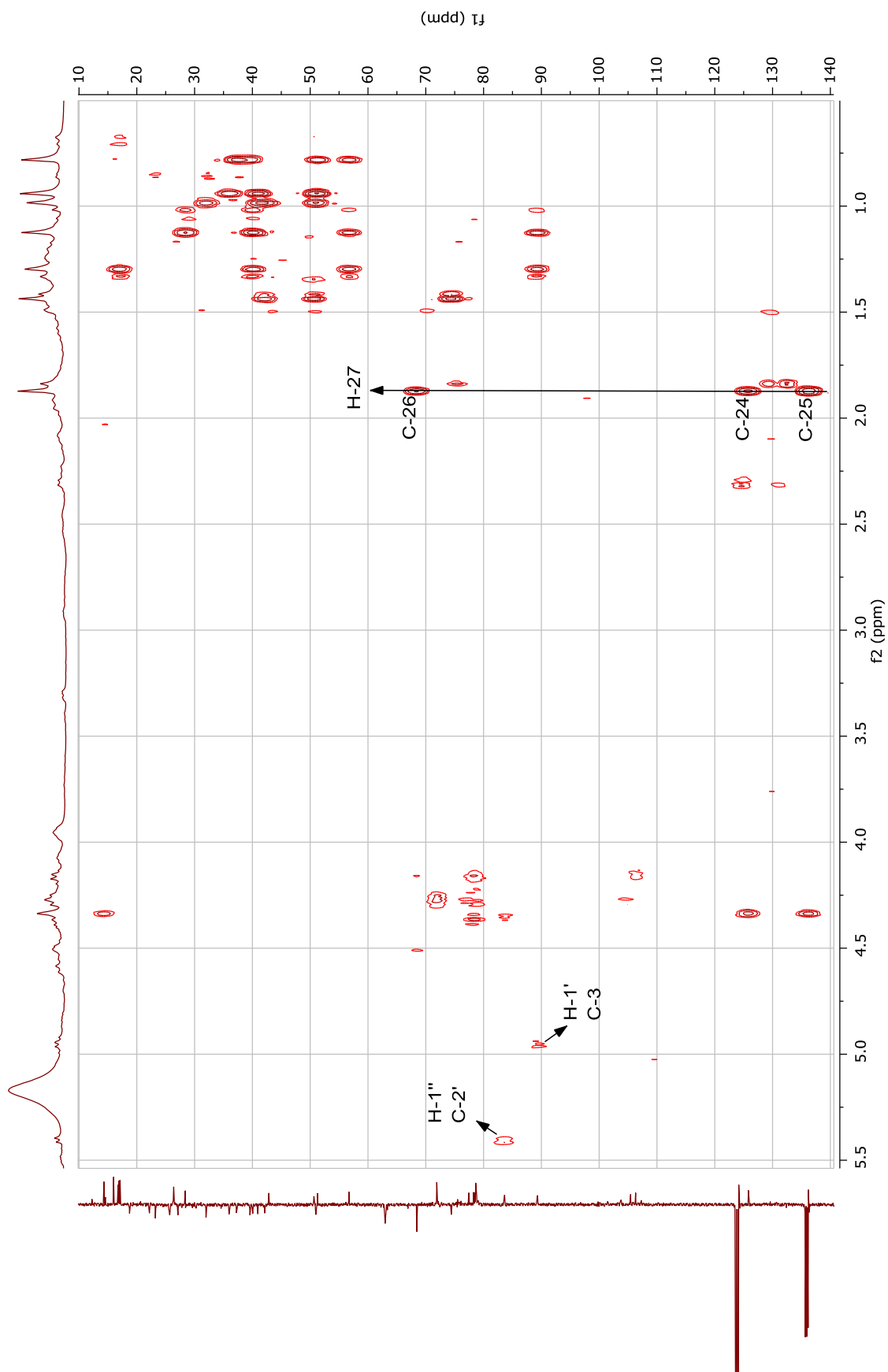


Figura 88. Espectro de HMBC de Sb17 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

CAC140\_pos#1 RT: 0,00 AV: 1 NL: 3,25E7  
T: FTMS + p ESI Full ms [500,00-1500,00]

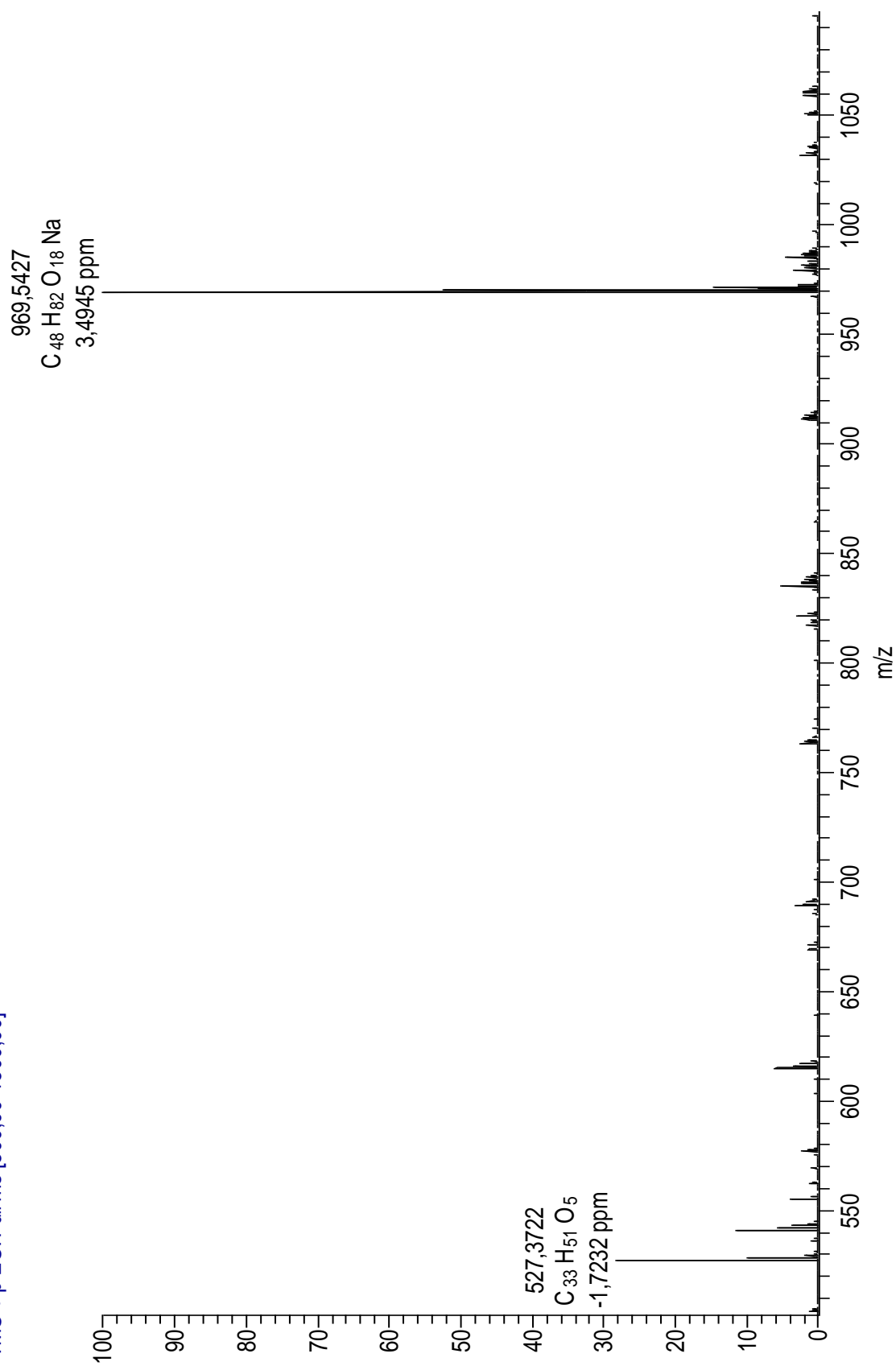


Figura 89. Espectro de massas de alta resolução de Sb18 (ESI, modo positivo).

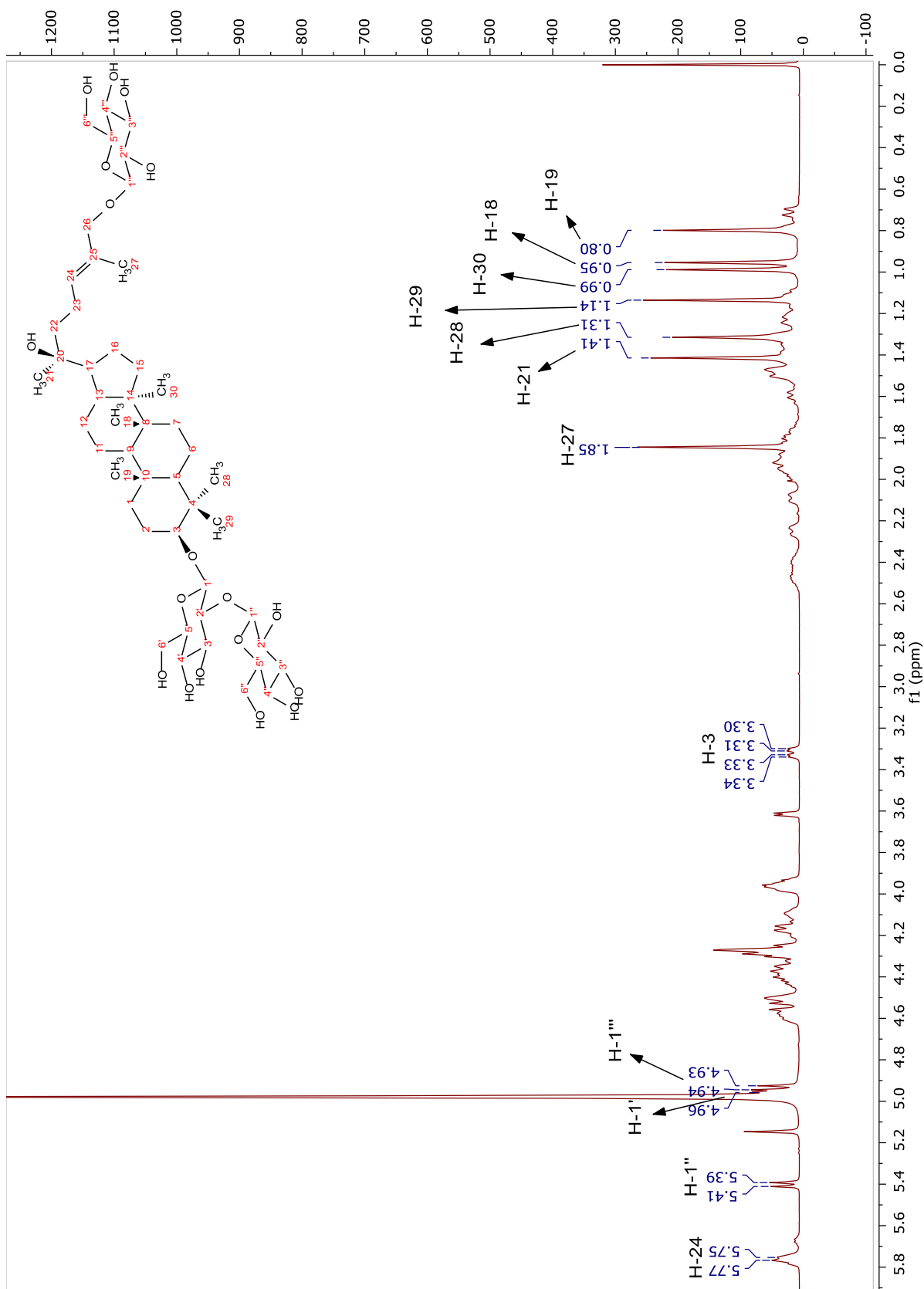


Figura 90. Espectro de RMN  $^1\text{H}$  de Sb18 (400 MHz,  $\text{C}_3\text{D}_5\text{N}$ ).

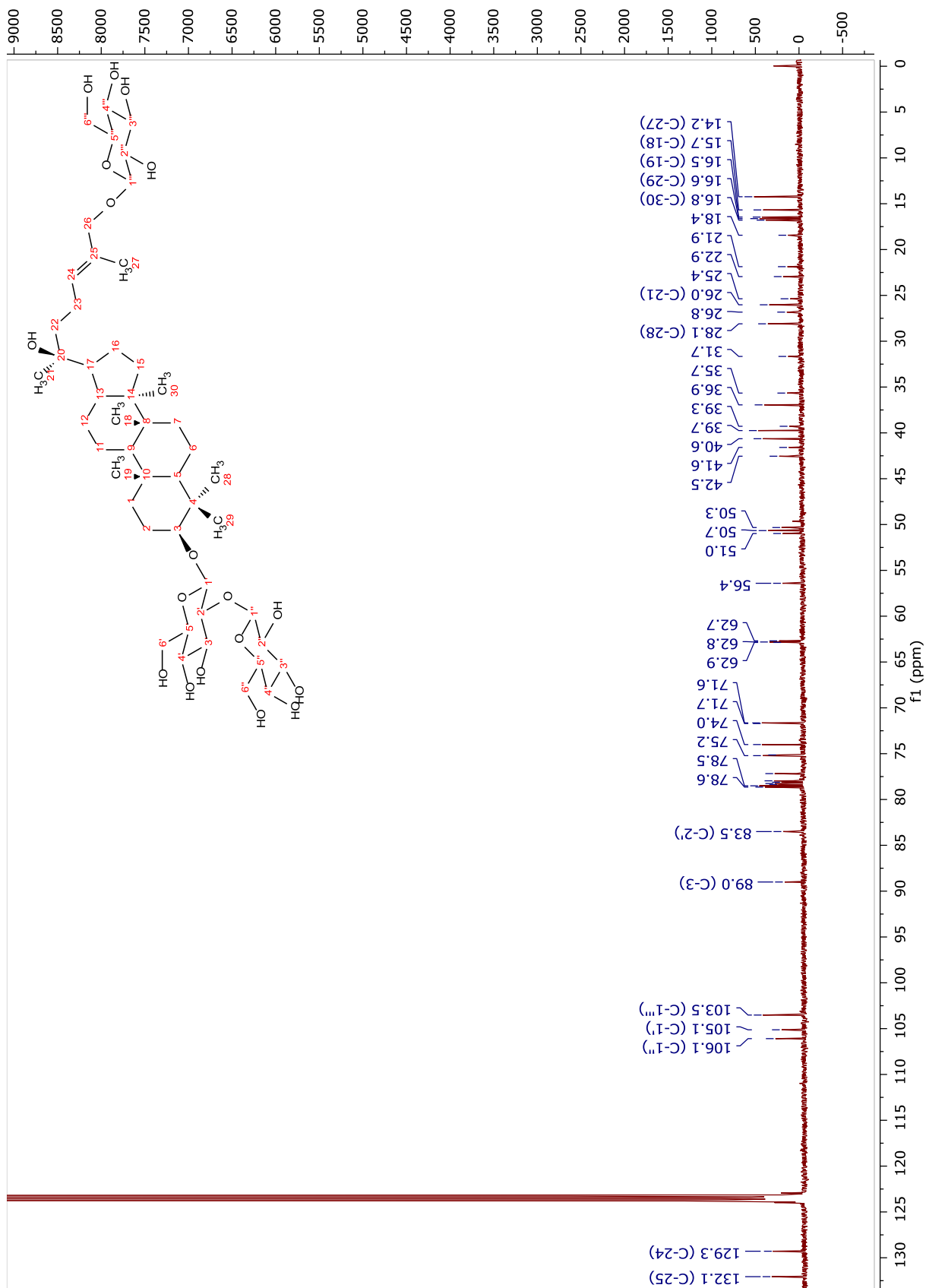
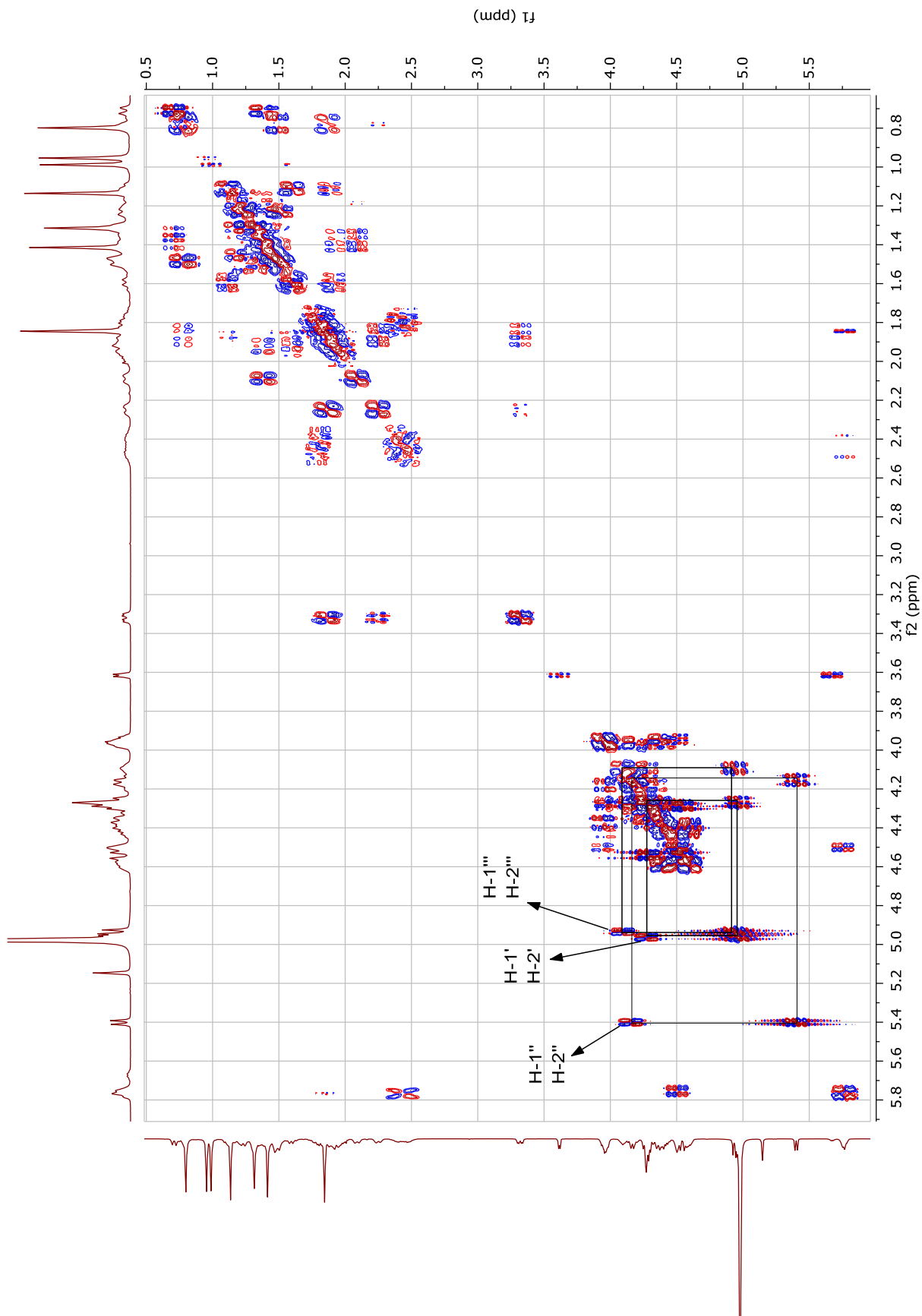


Figura 91. Espectro de RMN  $^{13}\text{C}$  de Sb18 (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



**Figura 92.** Espectro de COSY de Sb18 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

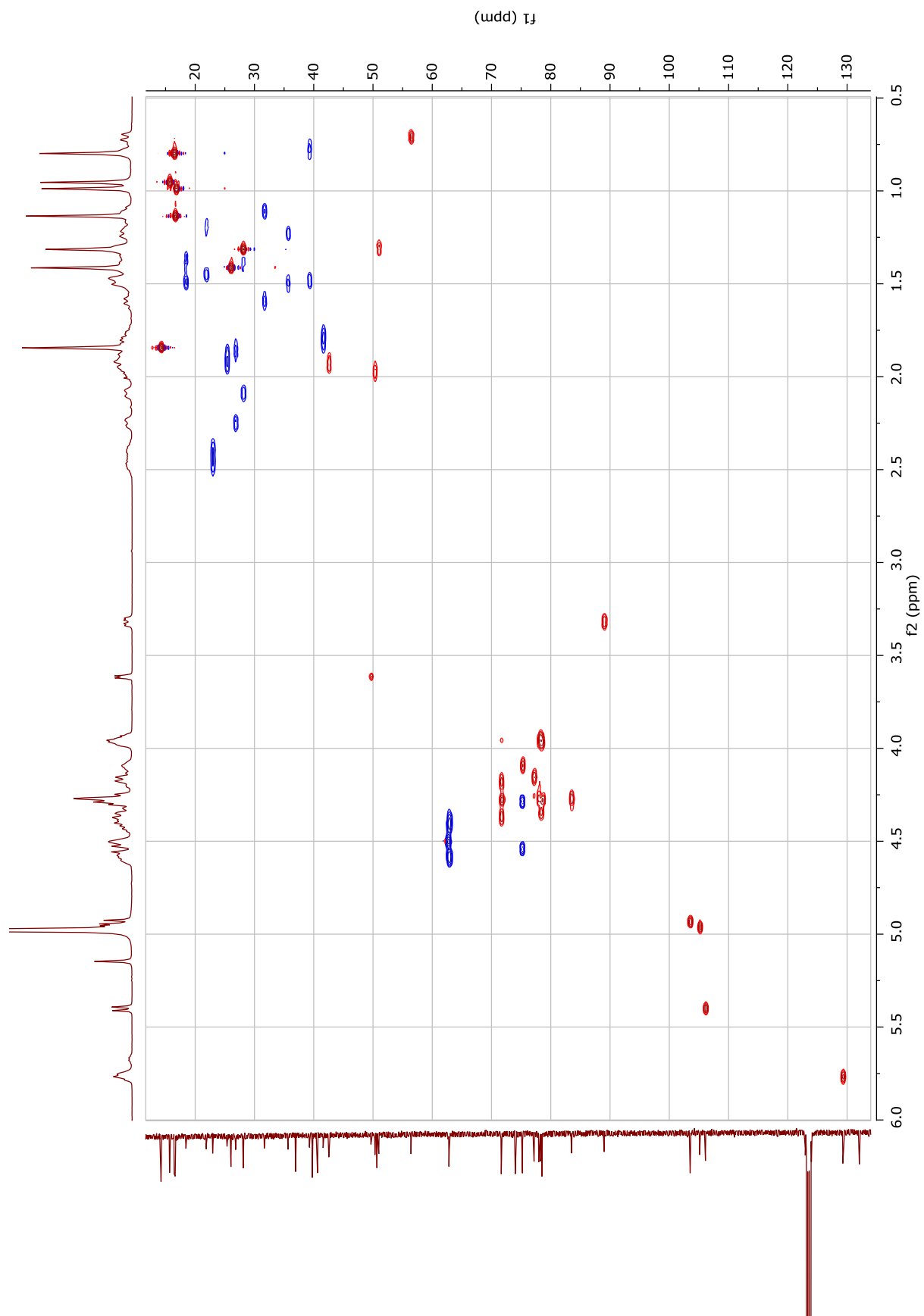


Figura 93. Espectro de HSQC de Sb18 (400 MHz,  $C_5D_5N$ ).

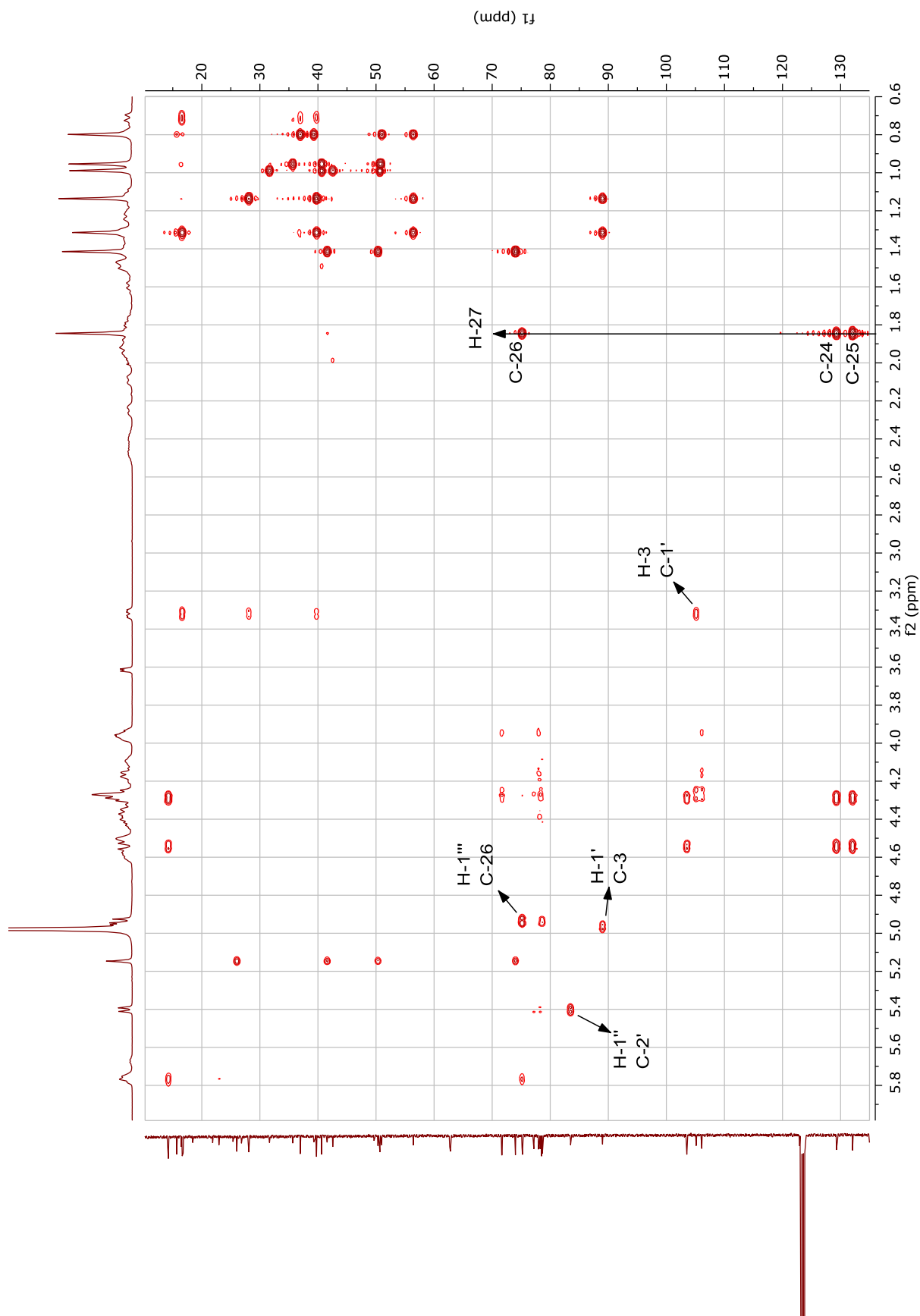


Figura 94. Espectro de HMBC de Sb18 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

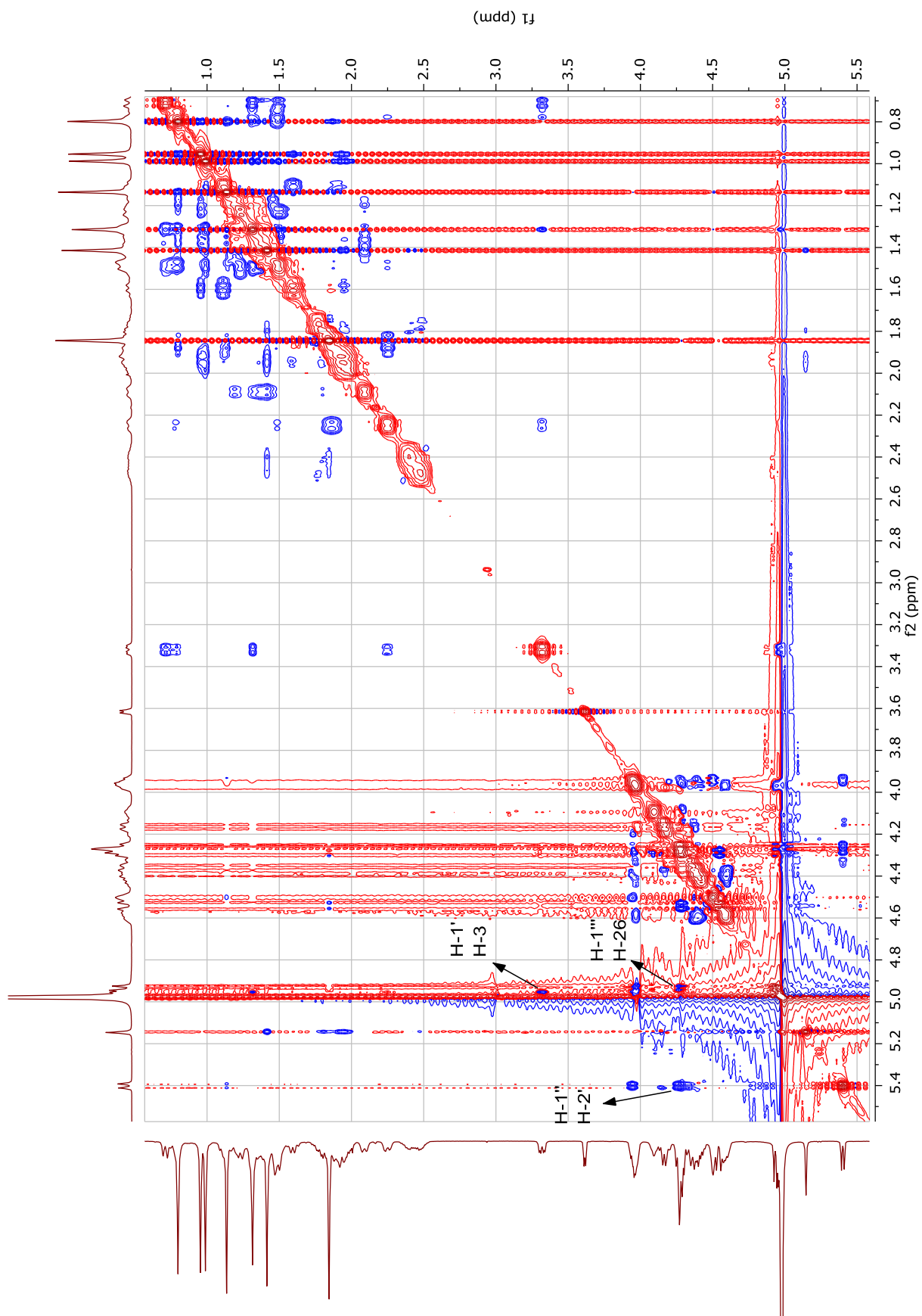


Figura 95. Espectro de ROESY de Sb18 (400 MHz, C<sub>5</sub>D<sub>5</sub>N).



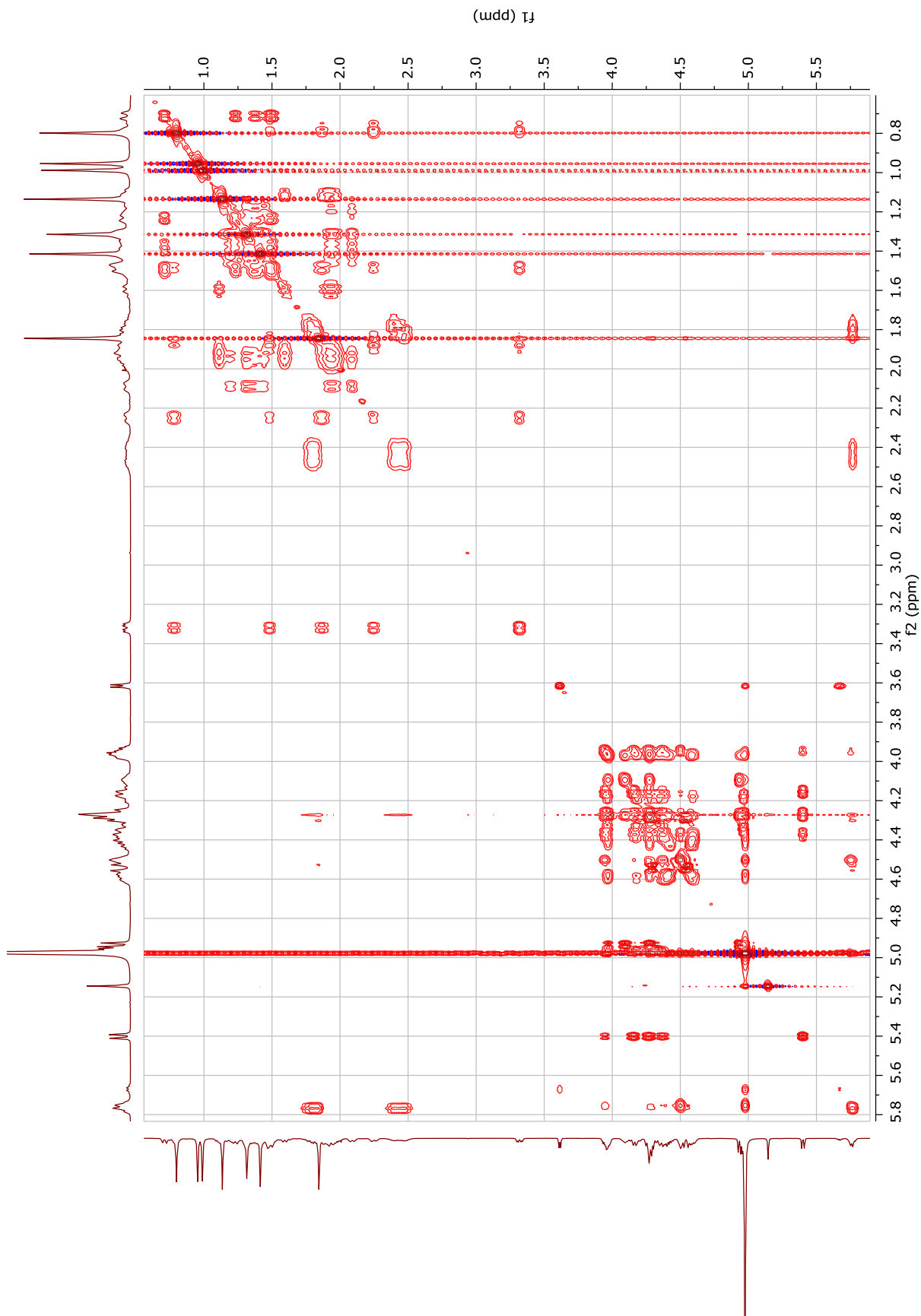


Figura 96. Espectro de TOCSY de Sb18 (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

CAC138\_pos #1 RT: 0,00 AV: 1 NL: 3,22E7  
T: FTMS + p ESIFull ms [150,00-2000,00]

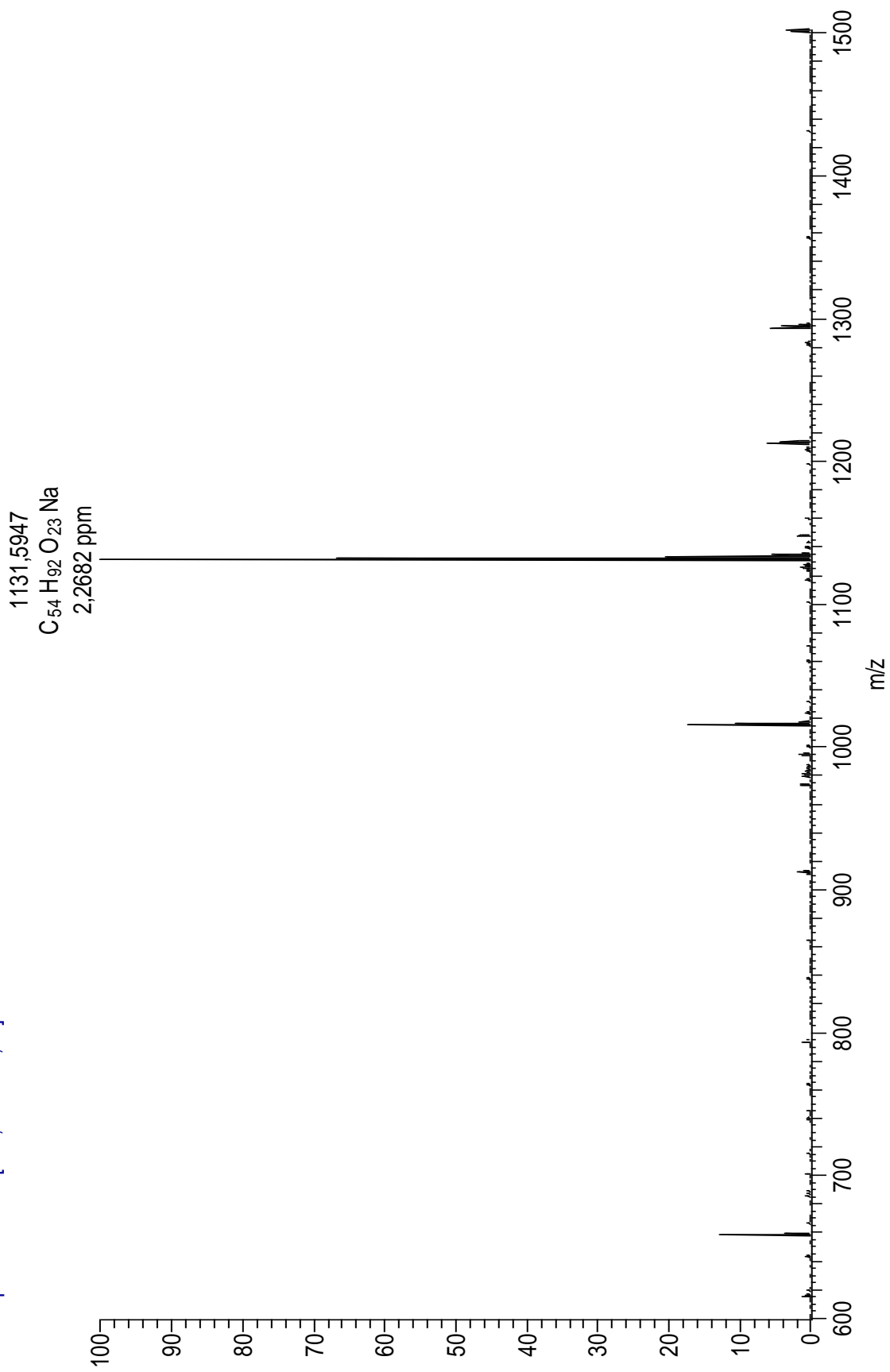


Figura 97. Espectro de massas de alta resolução de **Sb19** (ESI, modo positivo).

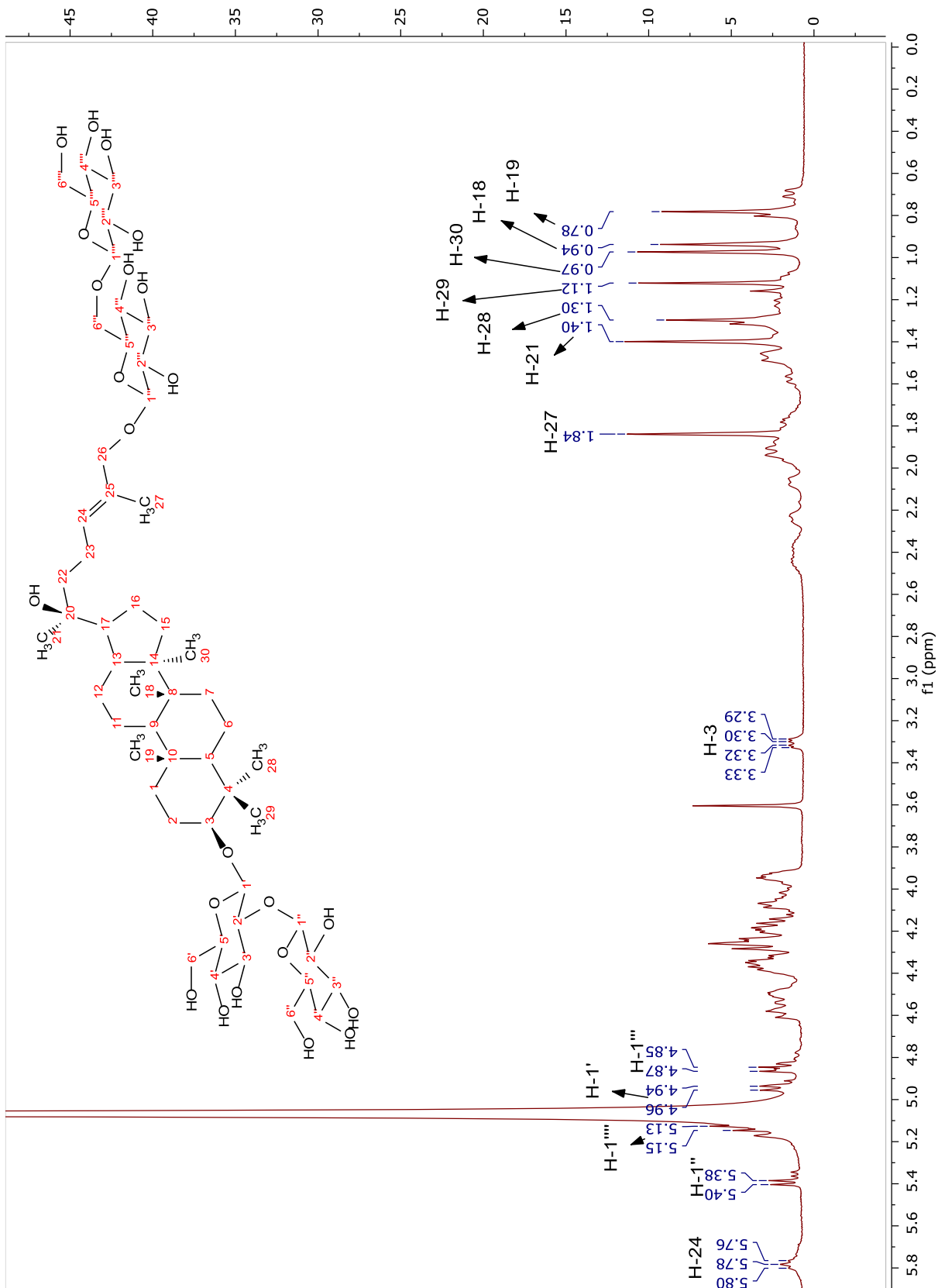


Figura 98. Espectro de RMN  $^1\text{H}$  de Sb19 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

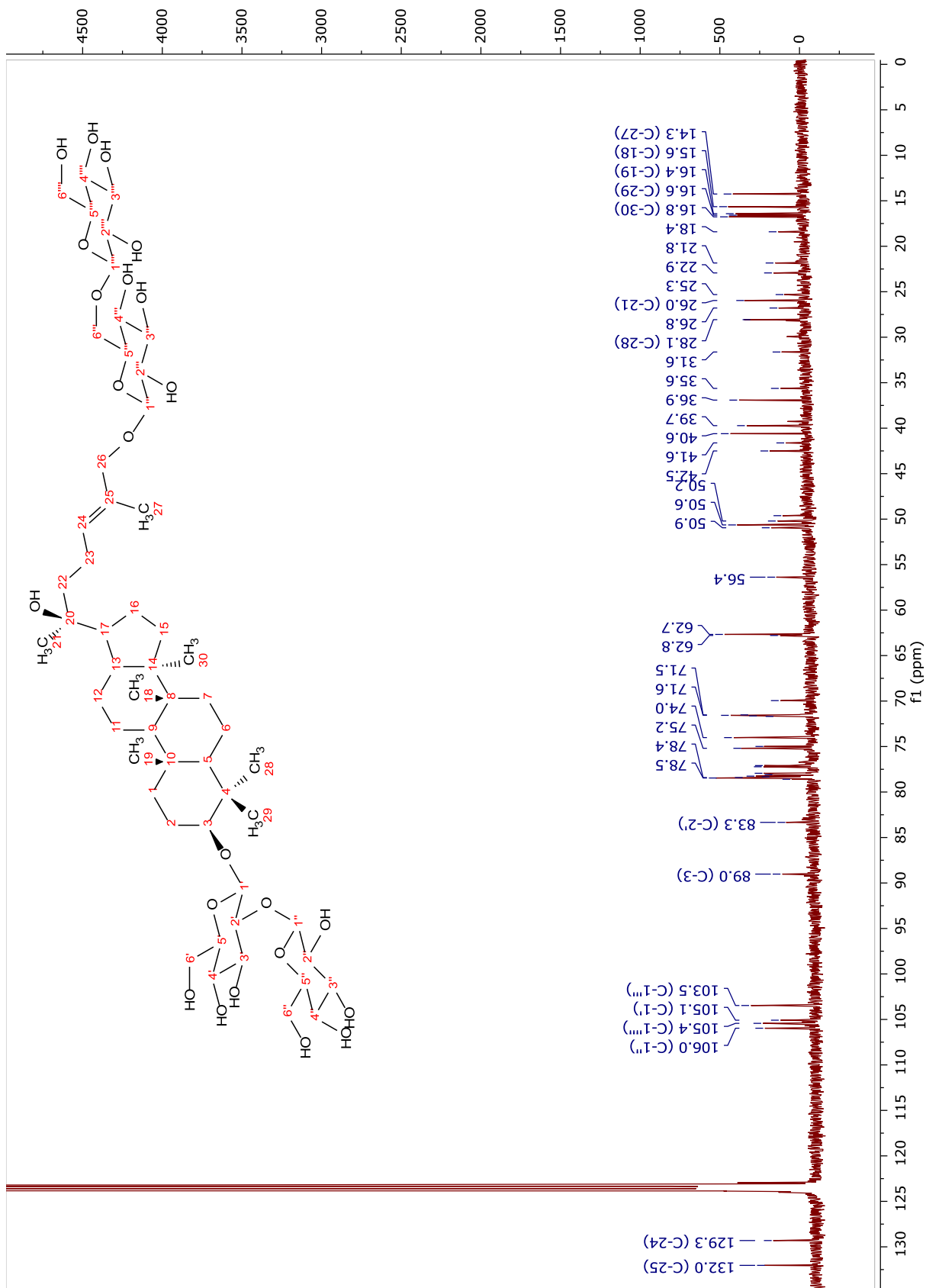


Figura 99. Espectro de RMN  $^{13}\text{C}$  de Sb19 (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

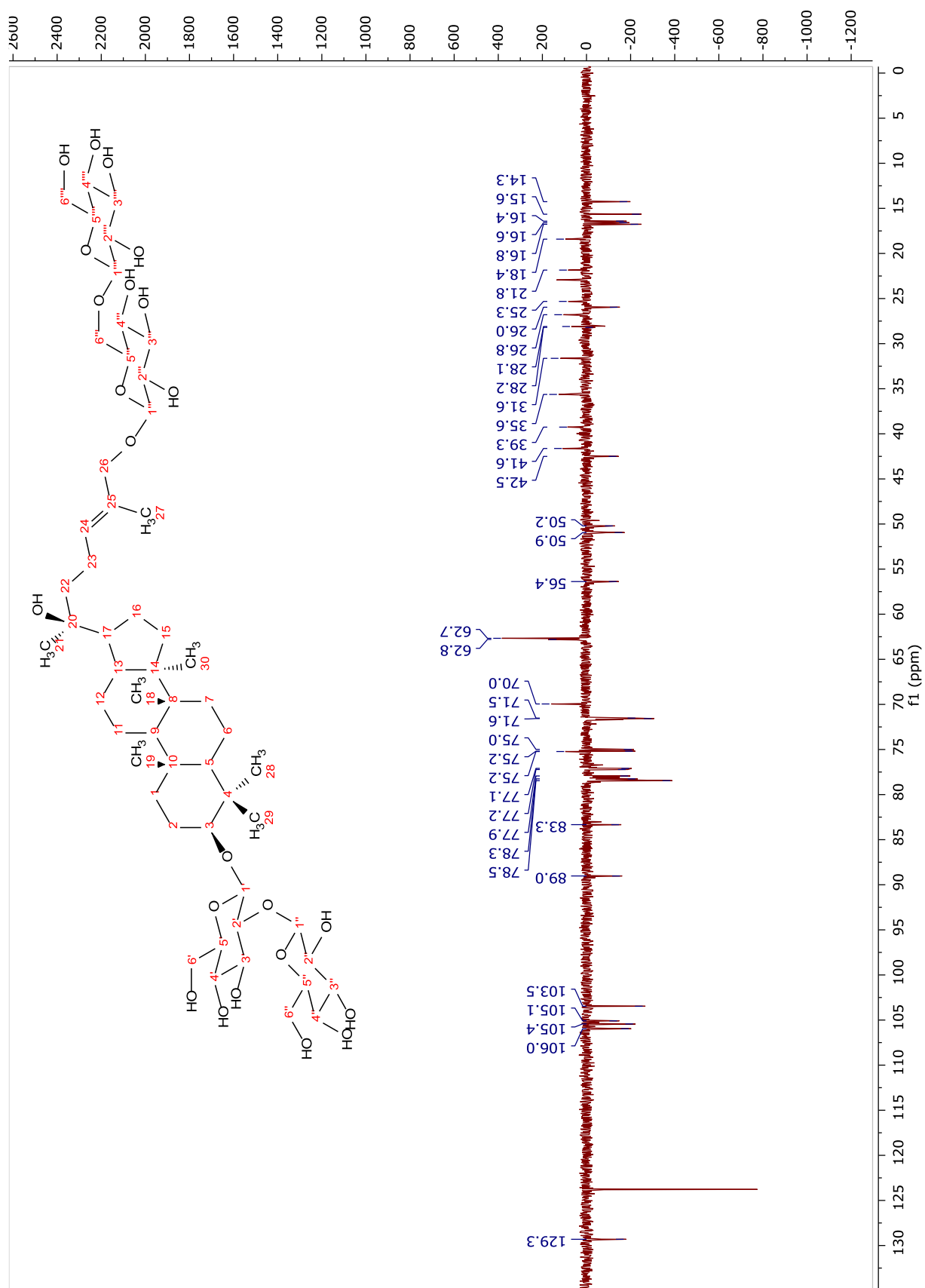
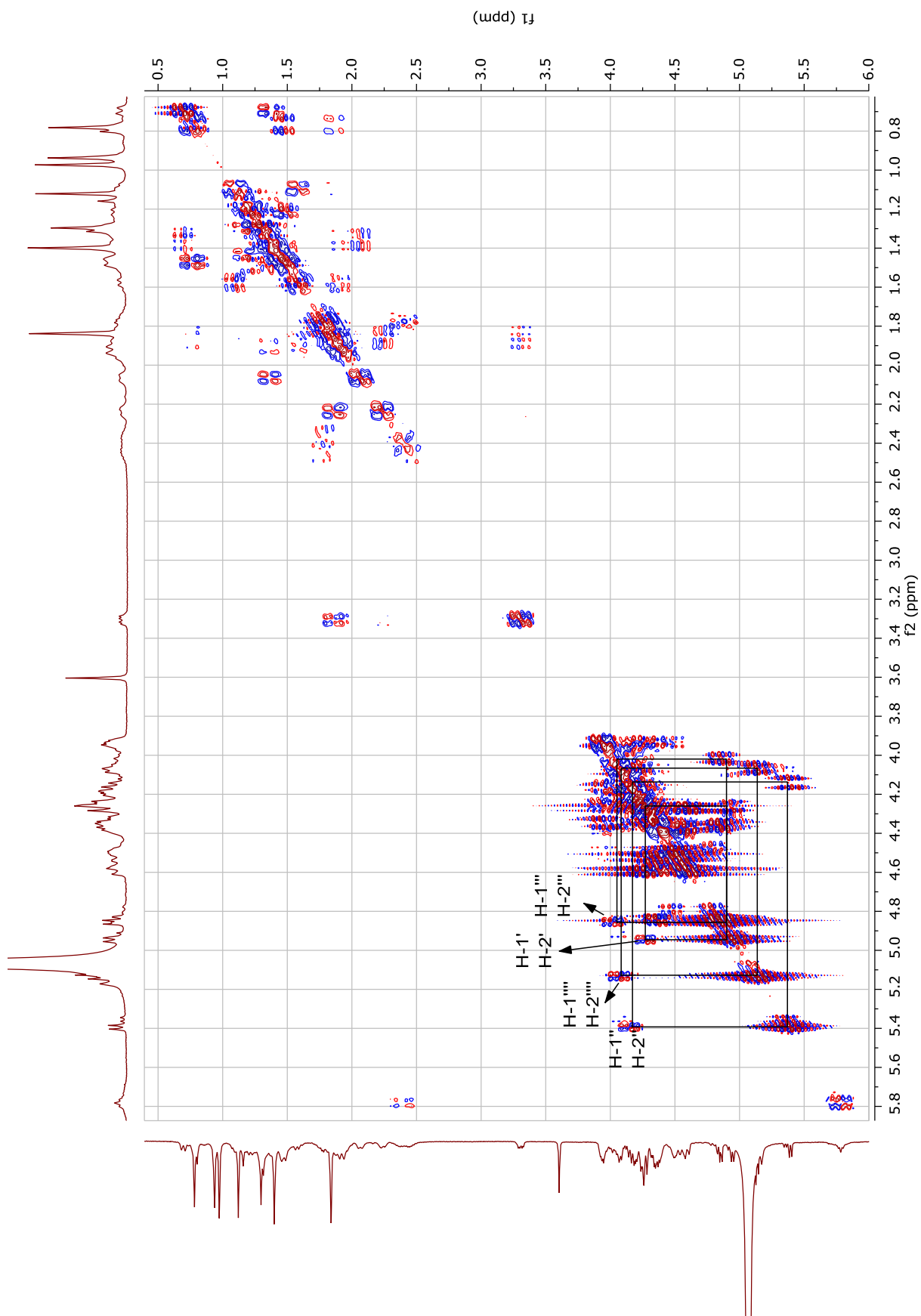


Figura 100. Espectro de DEPT-135 de Sb19 (100 MHz, C<sub>3</sub>D<sub>3</sub>N).



**Figura 101.** Espectro de COSY de **Sb19** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

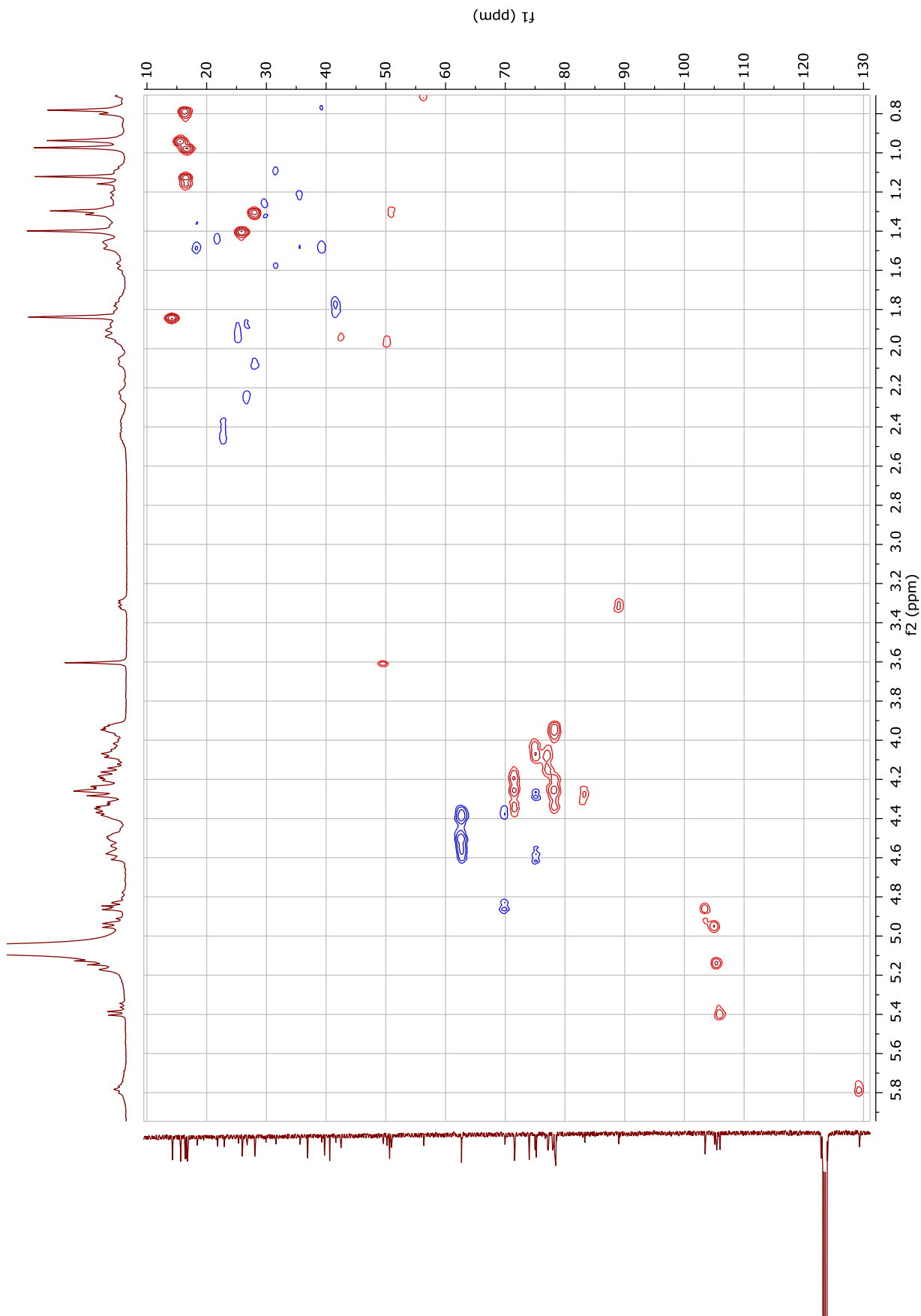


Figura 102. Espectro de HSQC de Sb19 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

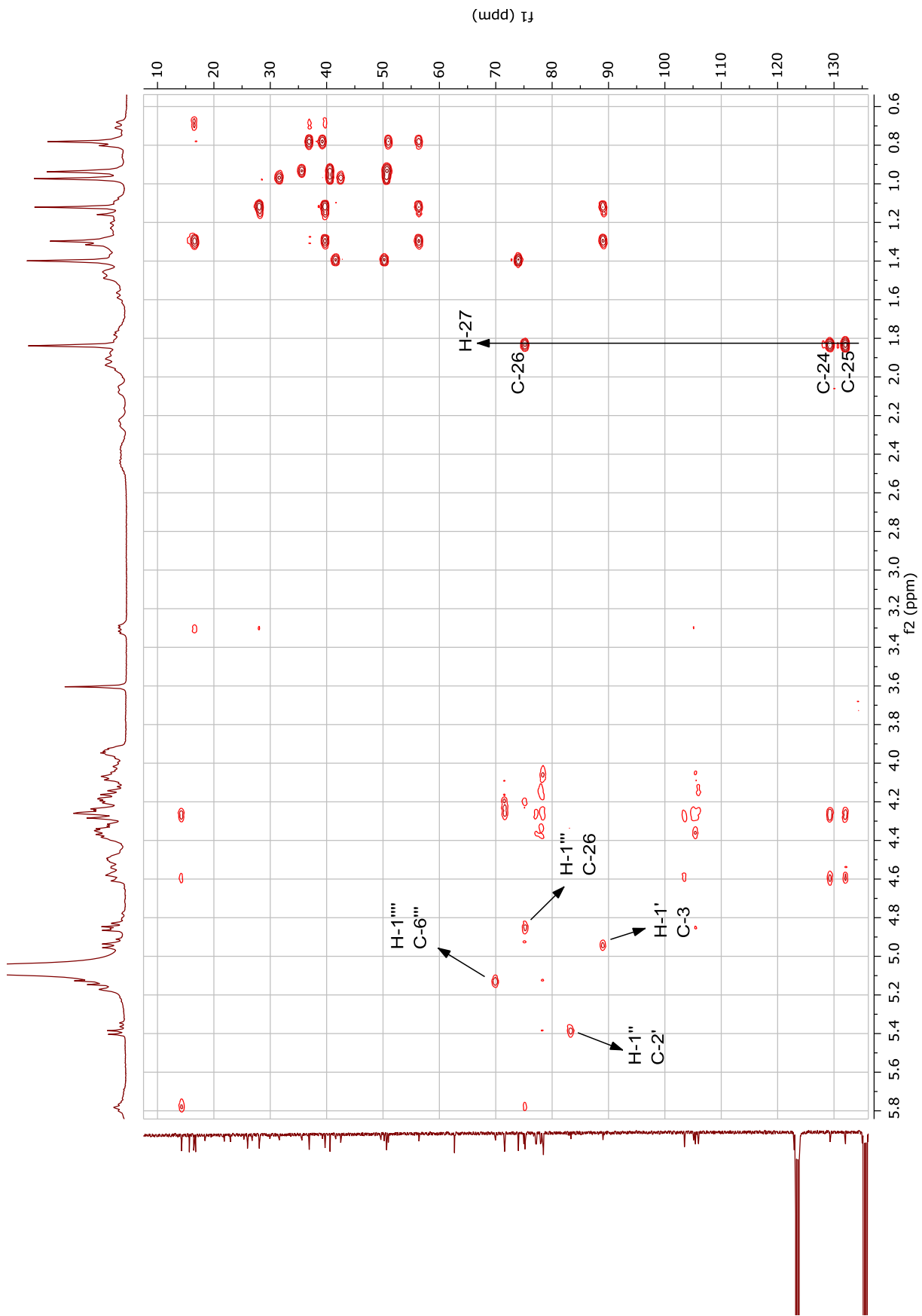


Figura 103. Espectro de HMBC de Sb19 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



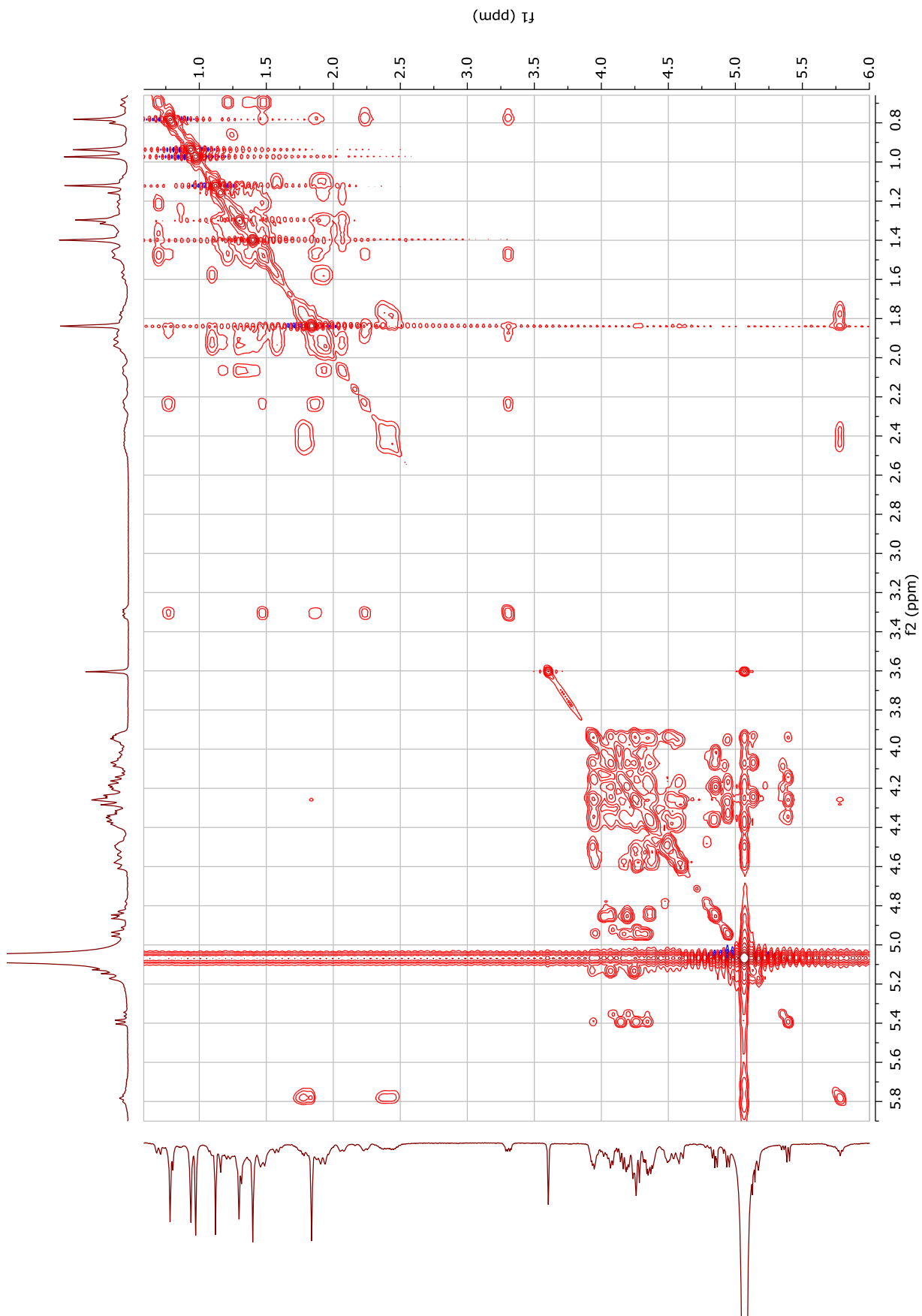


Figura 104. Espectro de TOCSY (2D) de Sb19 (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

CAC103\_pos #2 RT: 0,00 AV: 1 NL: 3,66E7  
T: FTMS + p ESI Full ms [150,00-2000,00]

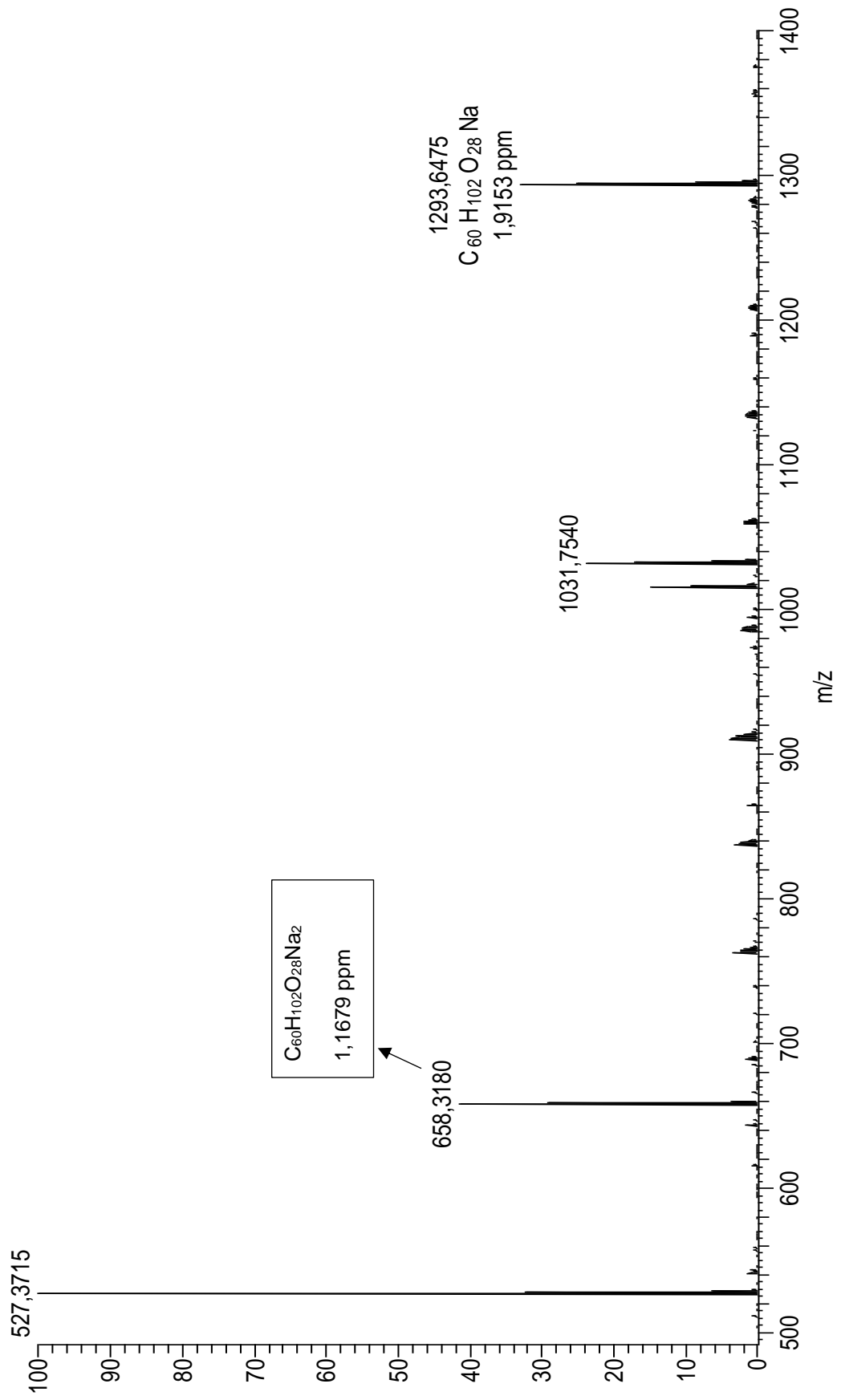


Figura 105. Espectro de massas de alta resolução de Sb20 (ESI, modo positivo).

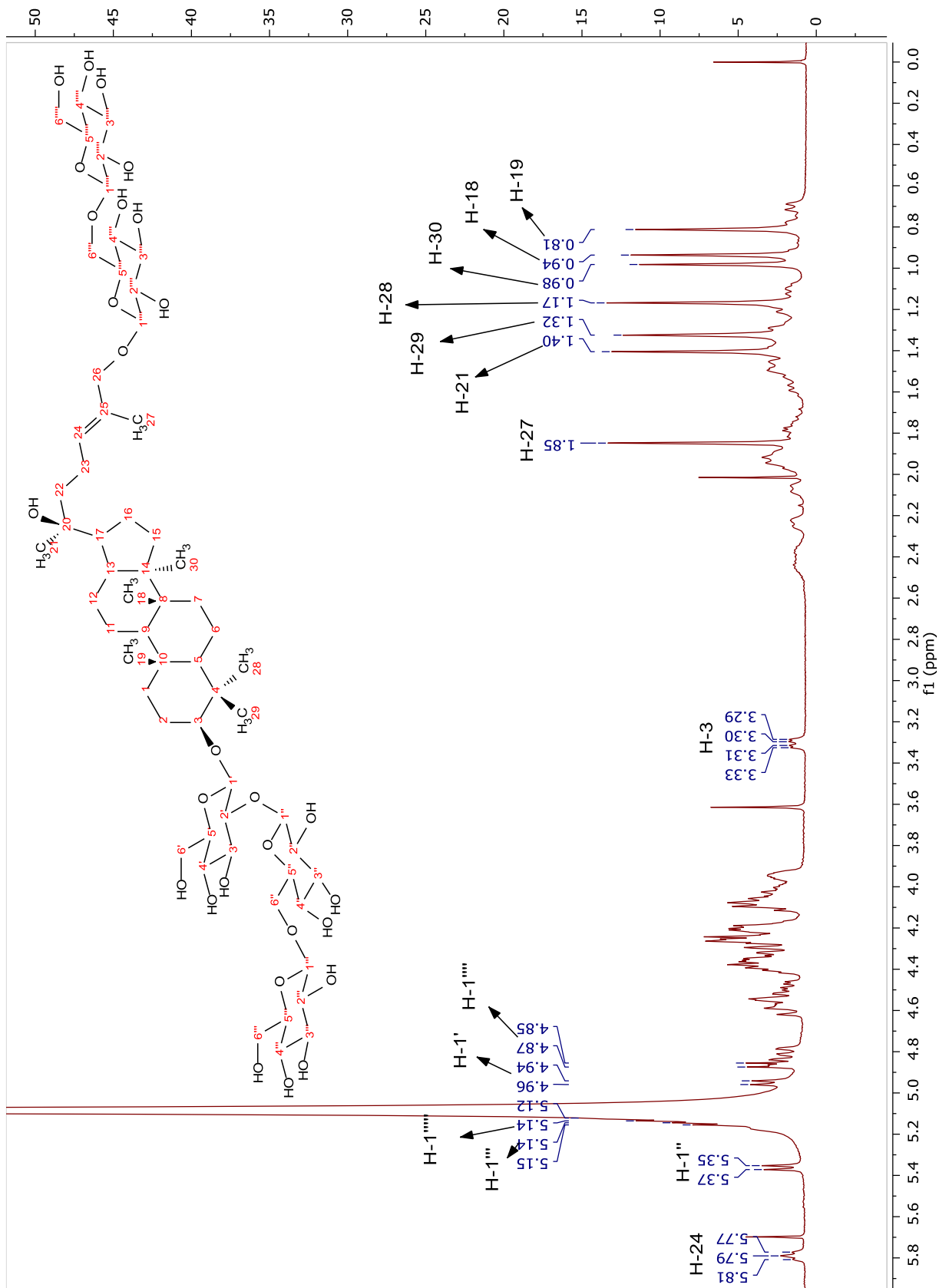


Figura 106. Espectro de RMN <sup>1</sup>H de Sb20 (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

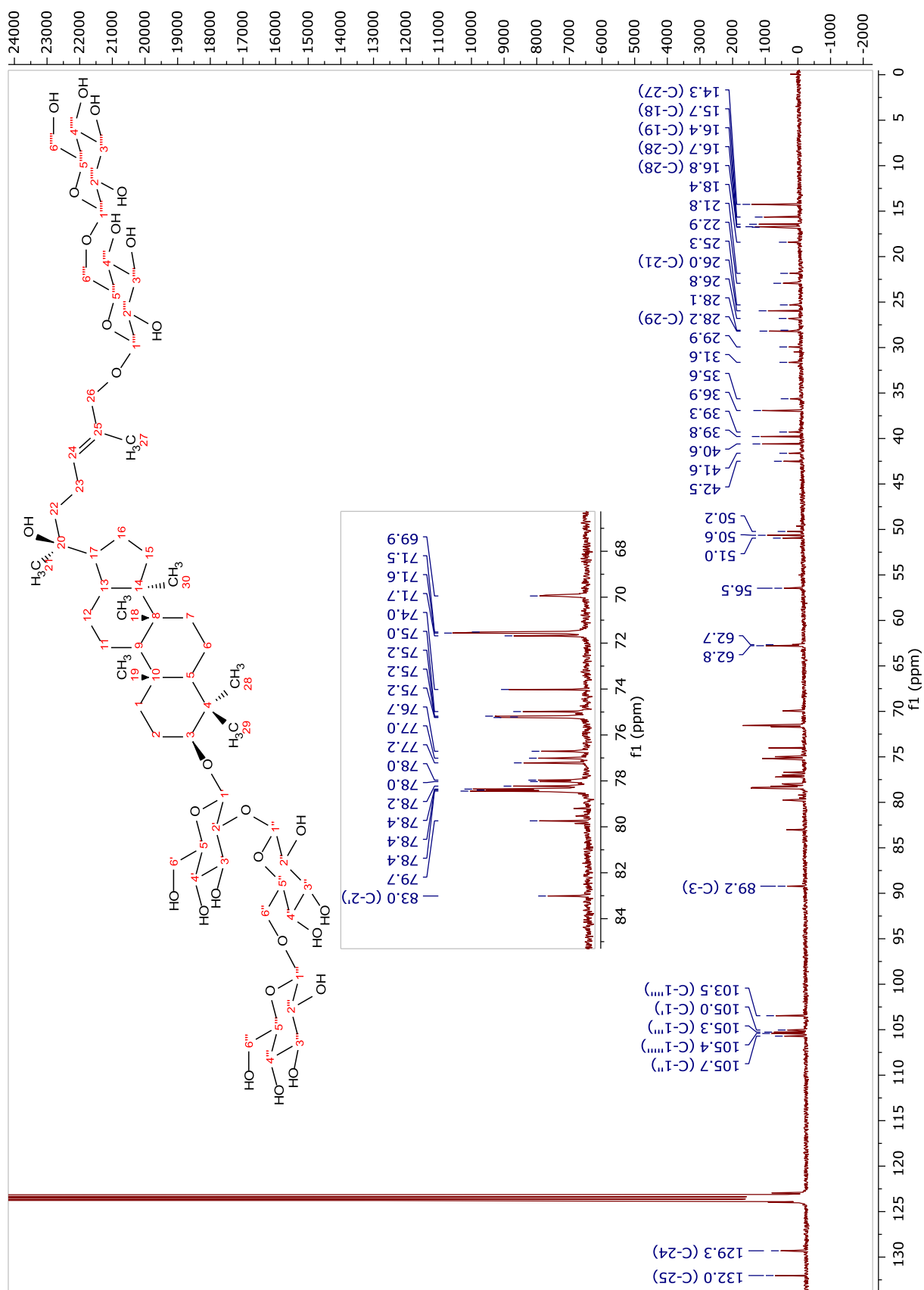


Figura 107. Espectro de RMN <sup>13</sup>C de Sb20 (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

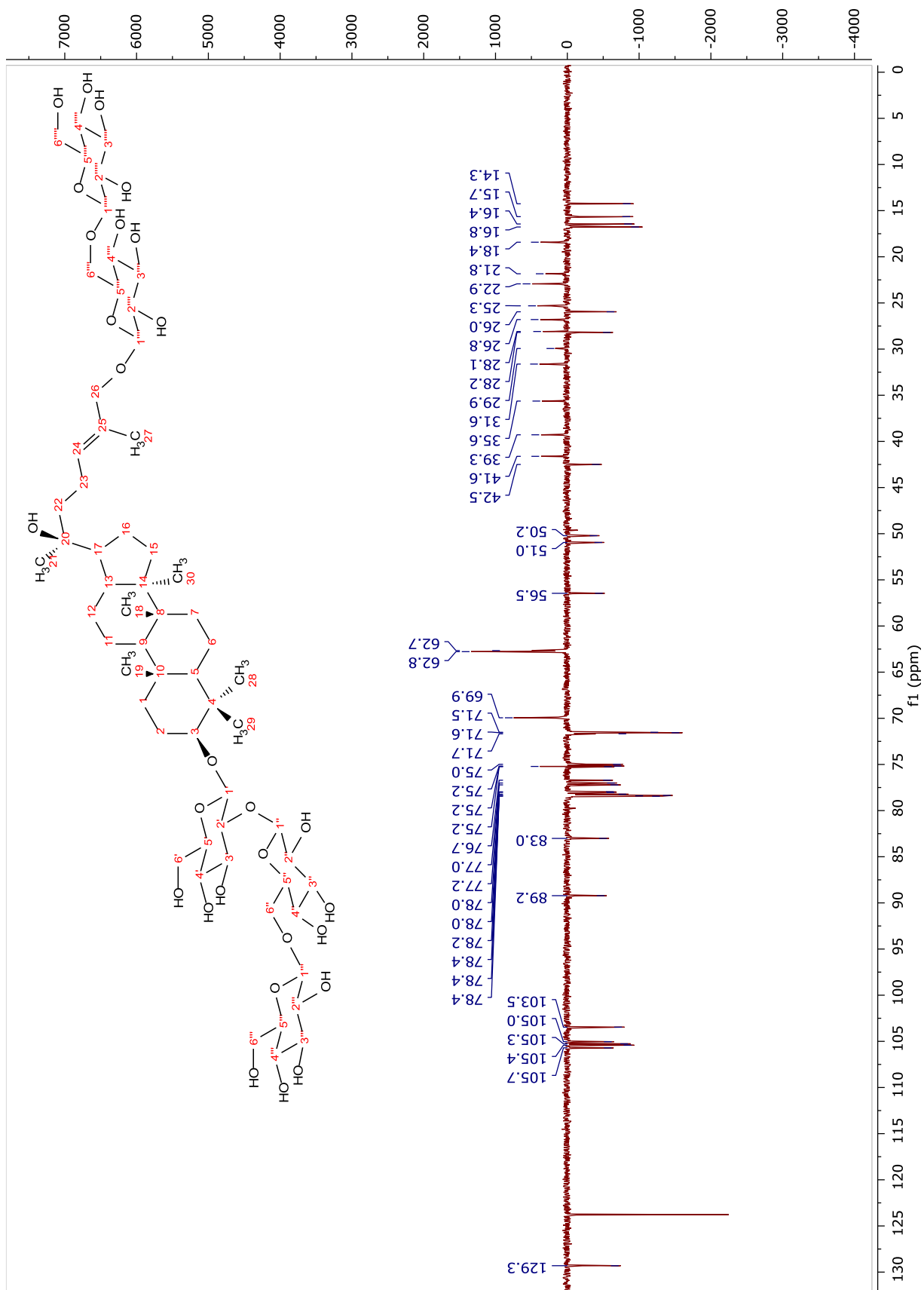
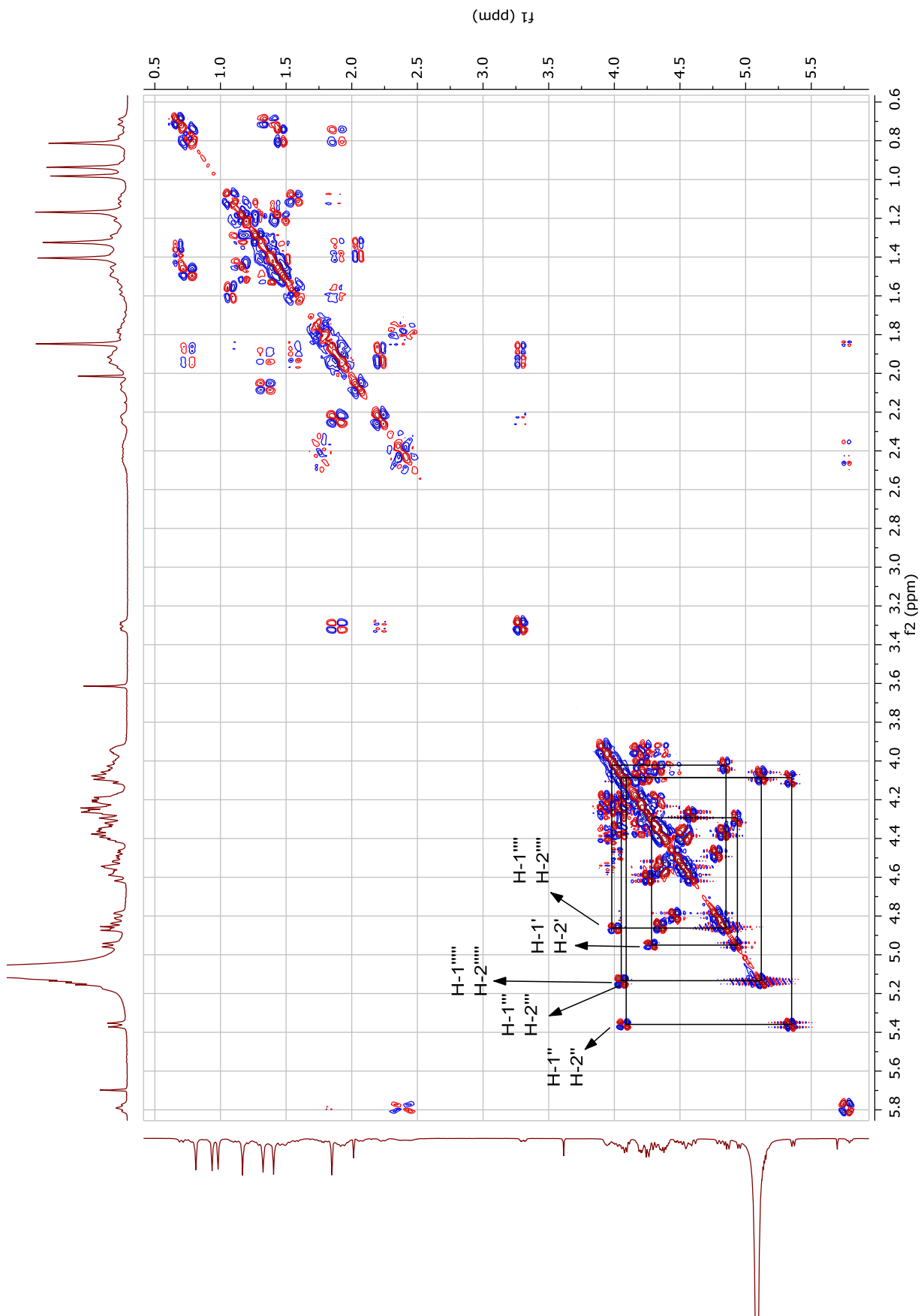
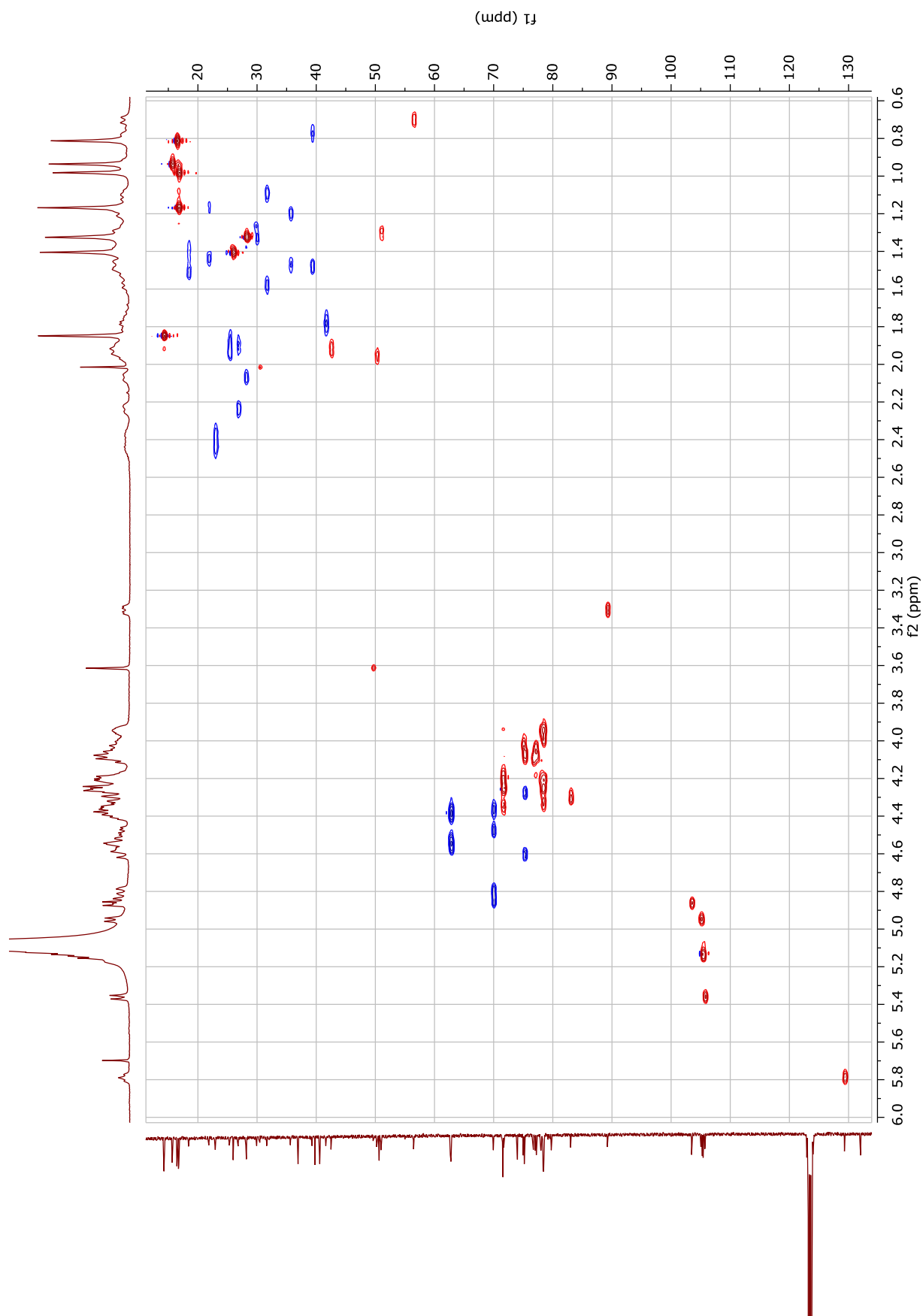


Figura 108. Espectro de DEPT-135 de **Sb20** (100 MHz, C<sub>5</sub>D<sub>5</sub>N).



**Figura 109.** Espectro de COSY de Sb20 (400 MHz, C<sub>5</sub>D<sub>5</sub>N).



**Figura 110.** Espectro de HSQC de **Sb20** (400 MHz,  $C_5D_5N$ ).

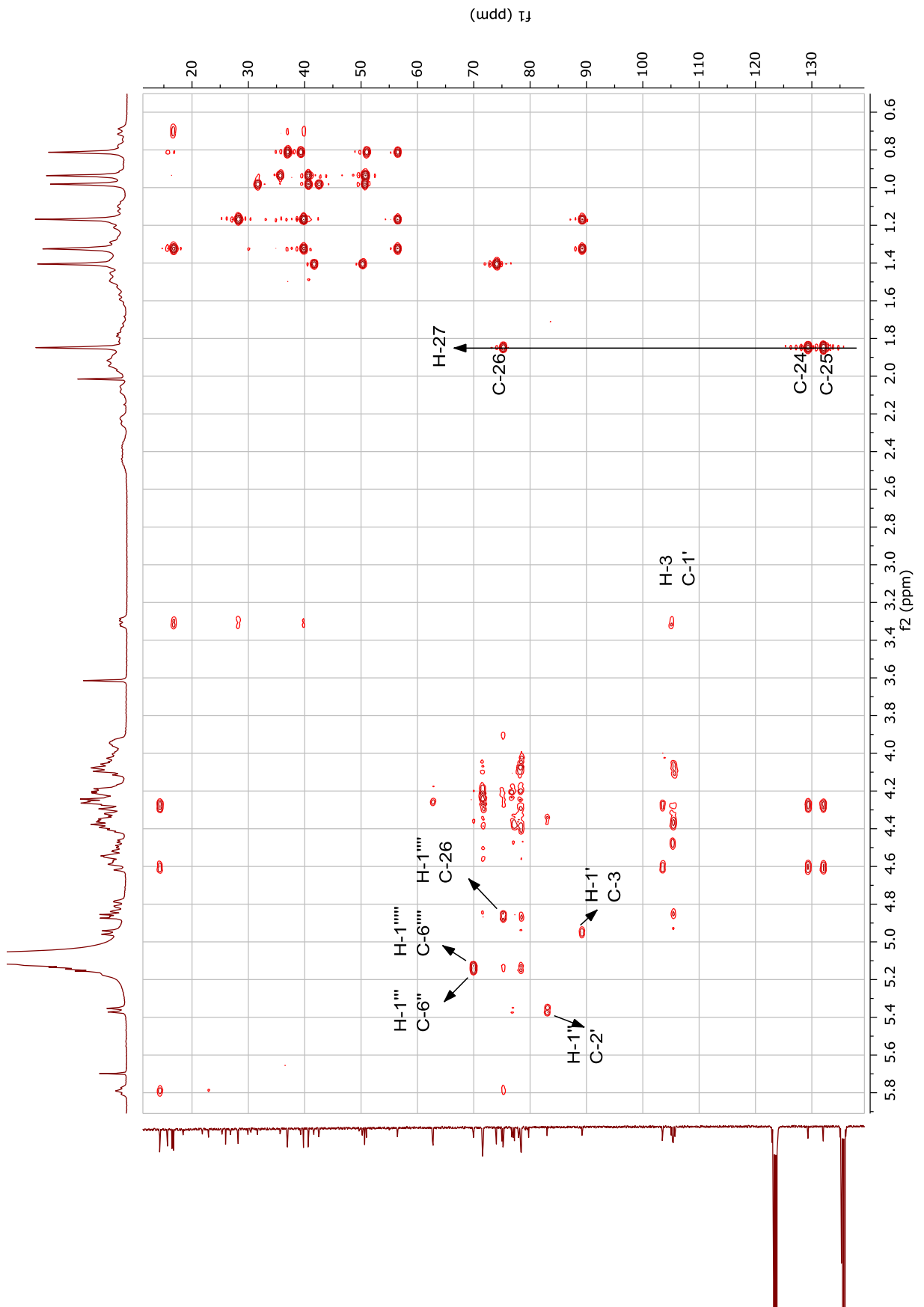
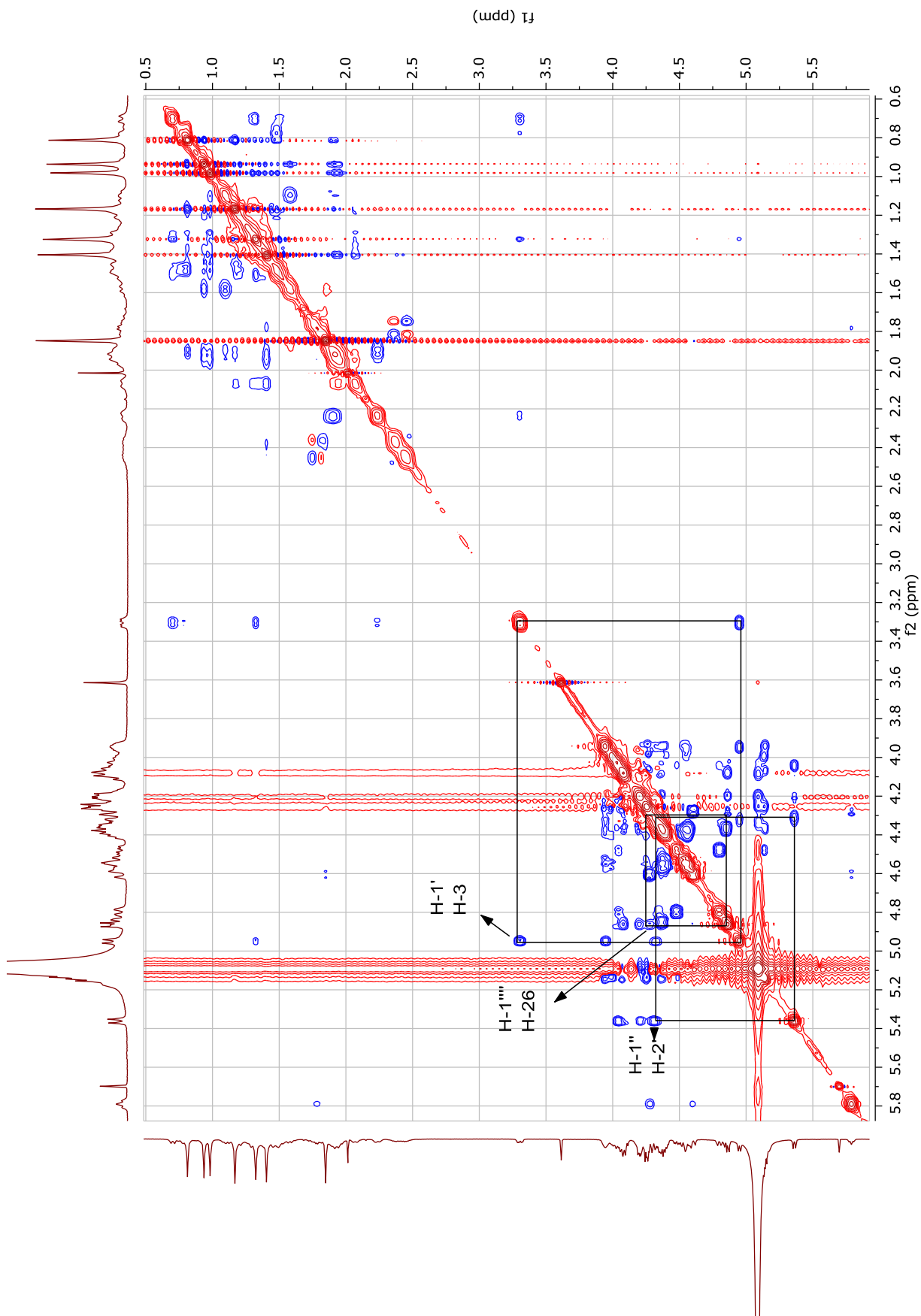
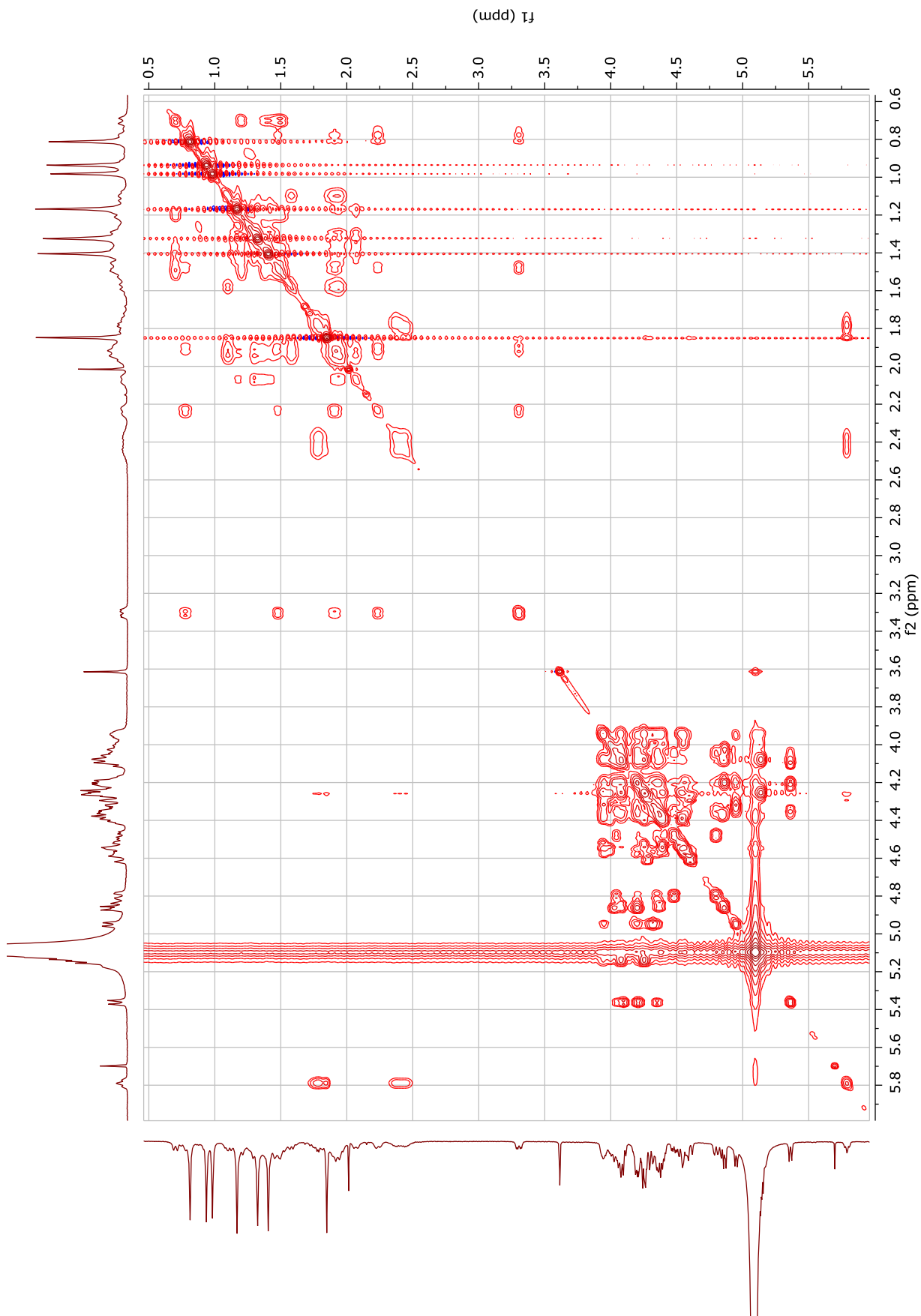


Figura 111. Espectro de HMBC de Sb20 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).





**Figura 112.** Espectro de ROESY de Sb20 (400 MHz, C<sub>5</sub>D<sub>5</sub>N).



**Figura 113.** Espectro de TOCSY (2D) de **Sb20** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

CAC126\_pos#1 RT: 0,00 AV: 1 NL: 7,13E6  
T: FTMS + p ESI Full ms [150,00-2000,00]

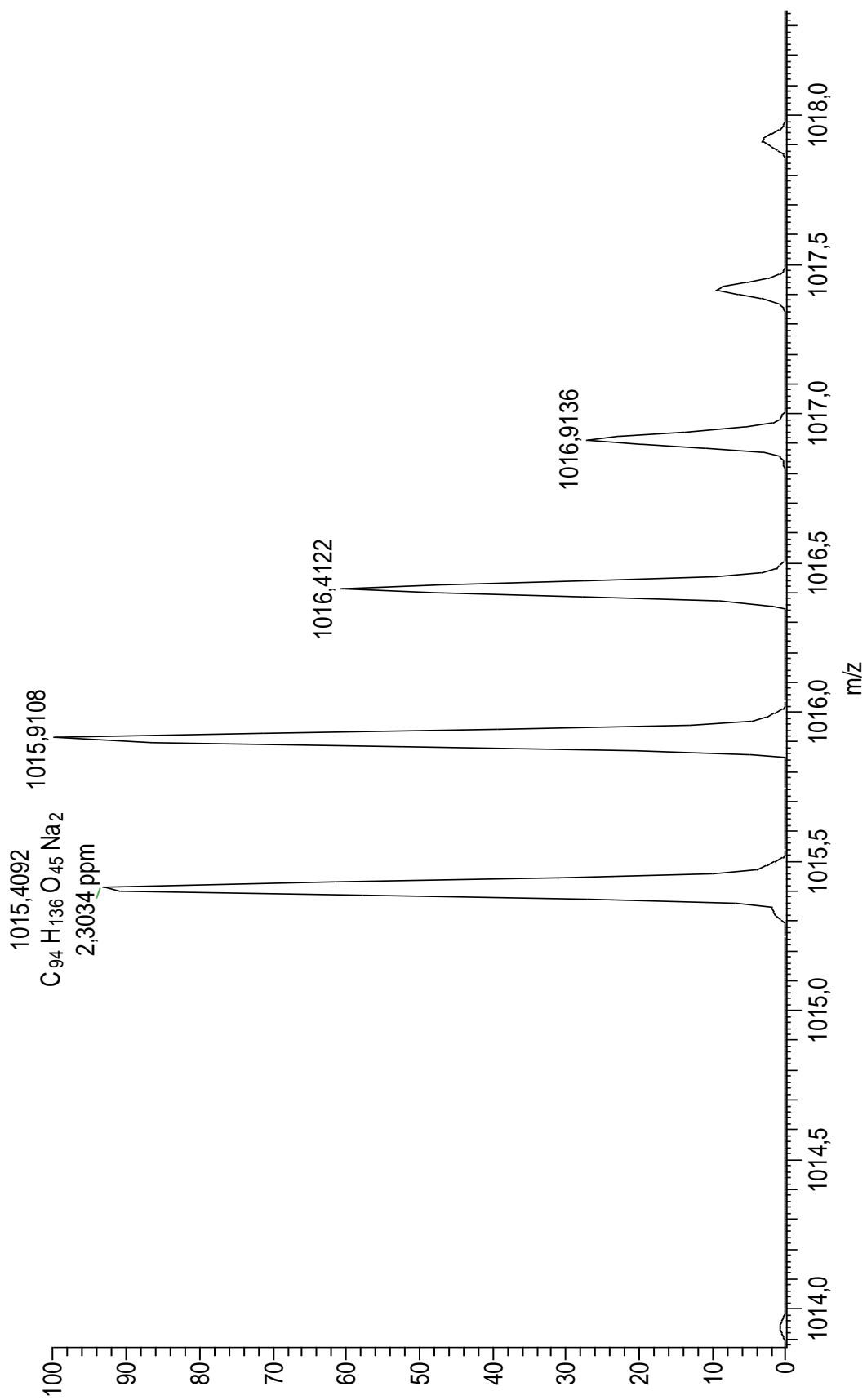


Figura 114. Espectro de massas de alta resolução do derivado acetilado de **Sb20** (modo positivo).

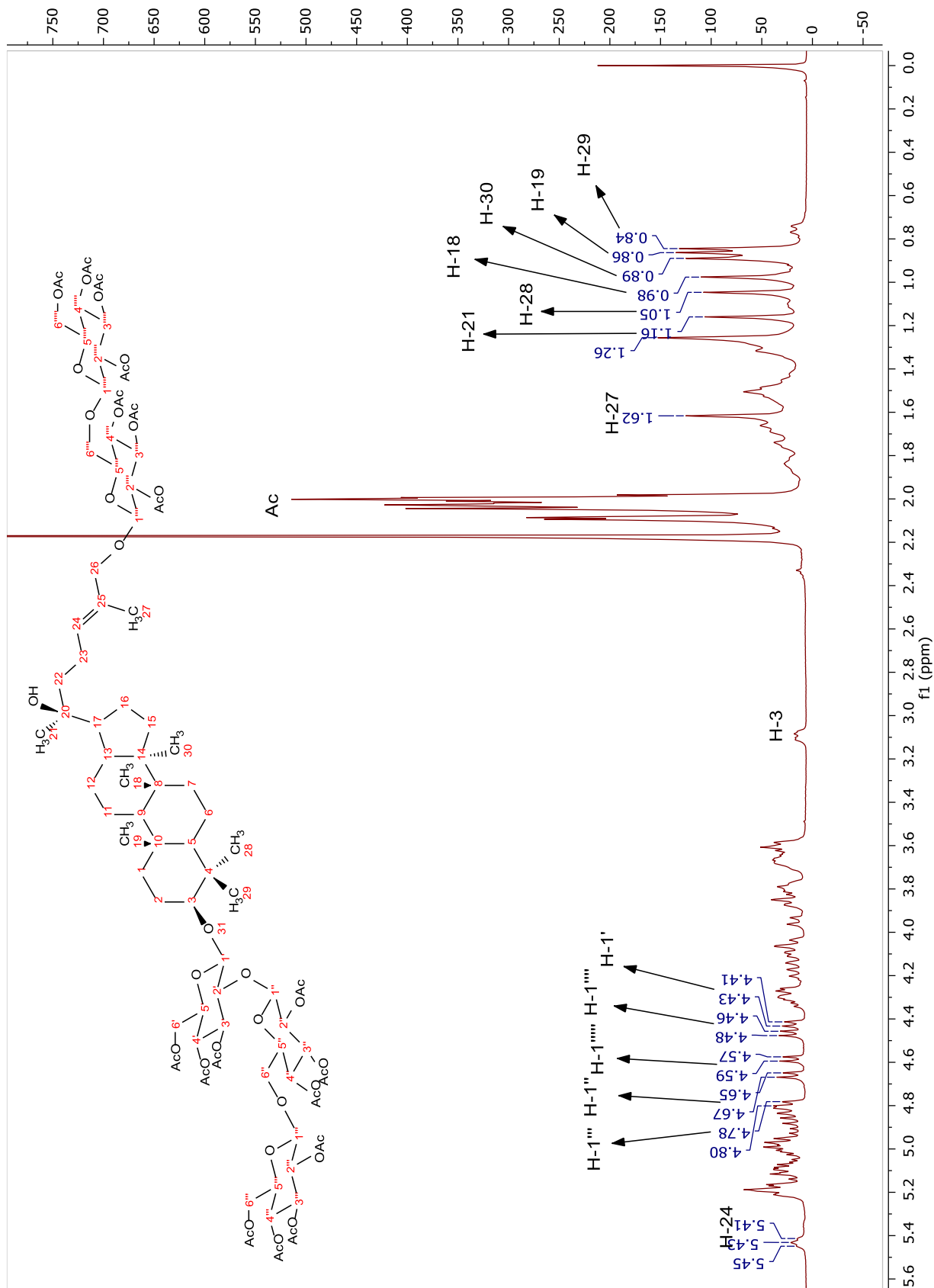


Figura 115. Espectro de RMN  $^1\text{H}$  do derivado acetilado de **Sb20** (400 MHz,  $\text{CDCl}_3$ ).

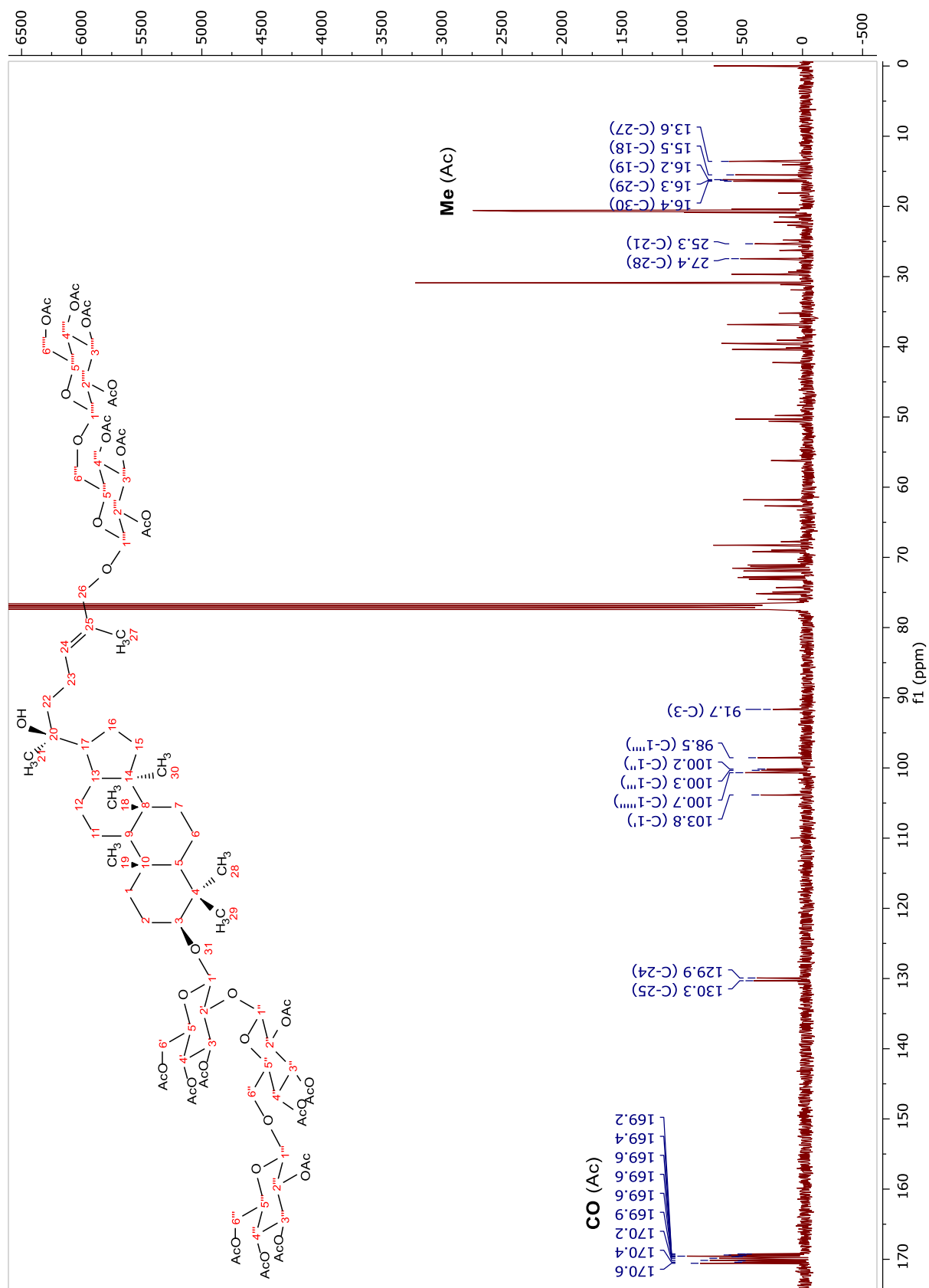


Figura 116. Espectro de RMN  $^{13}\text{C}$  do derivado acetilado de **Sb20** (100 MHz,  $\text{CDCl}_3$ ).

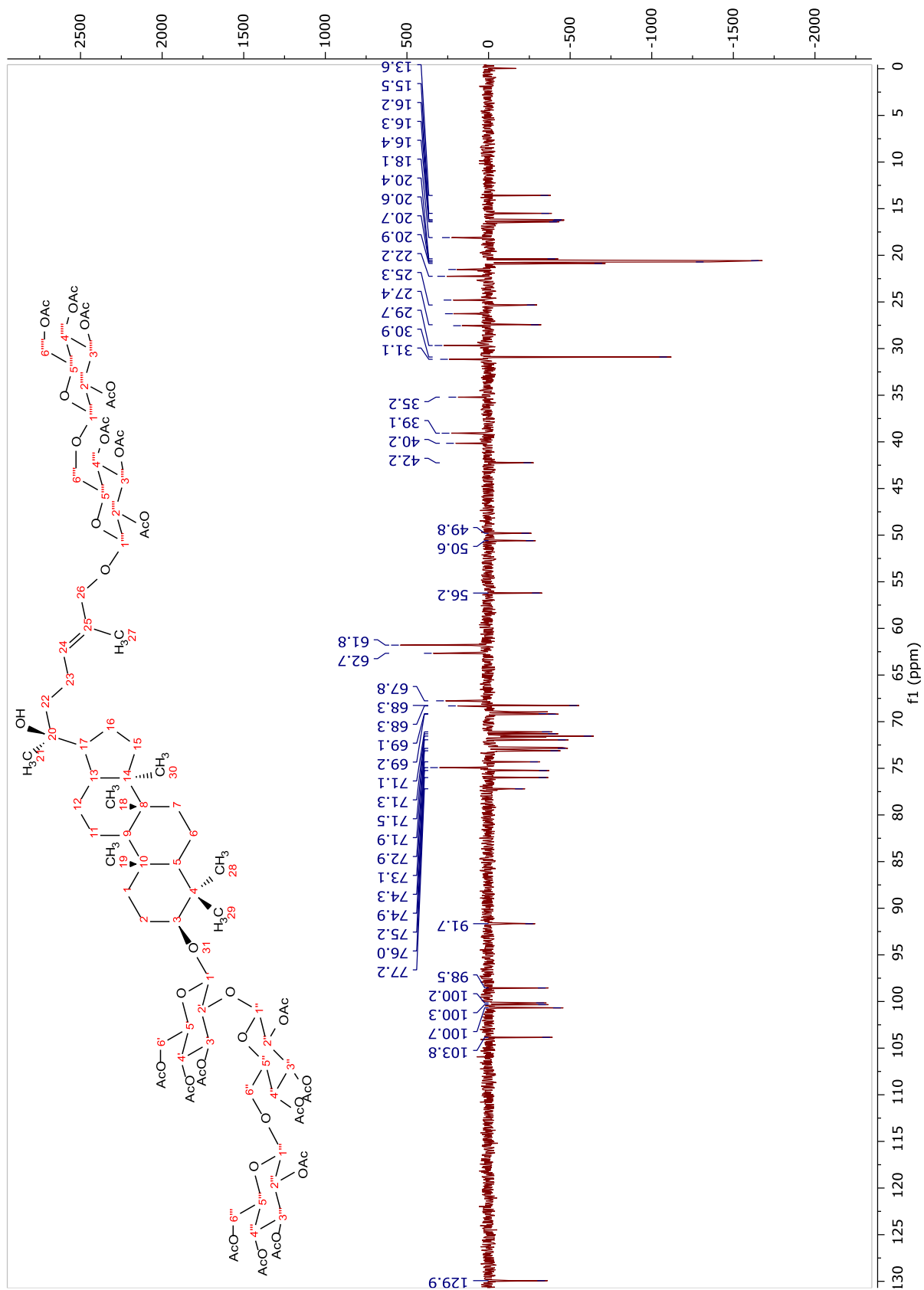
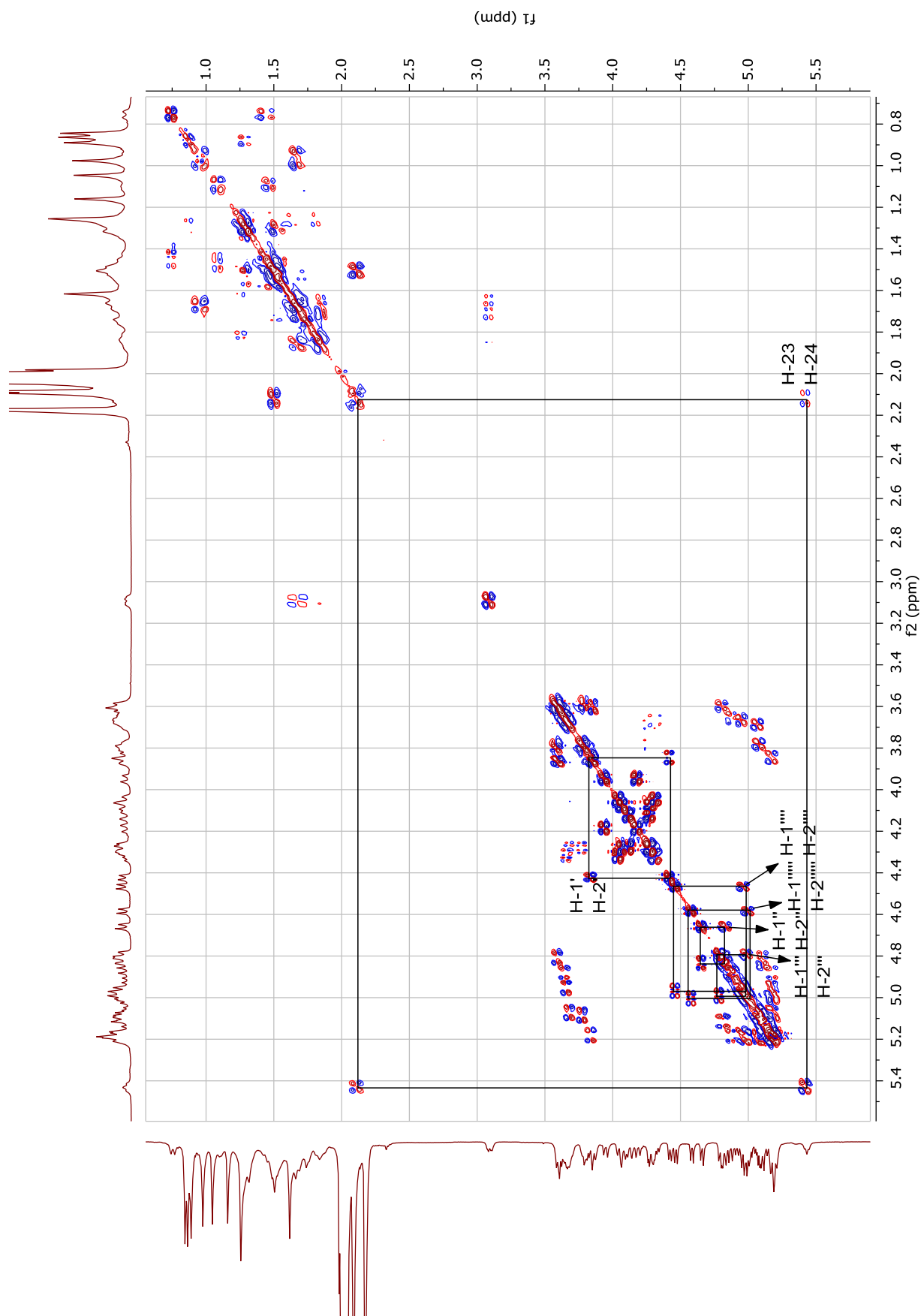


Figura 117. Espectro de DEPT-135 do derivado acetilado de Sb20 (100 MHz, CDCl<sub>3</sub>).



**Figura 118.** Espectro de COSY do derivado acetilado de **Sb20** (400 MHz,  $CDCl_3$ ).

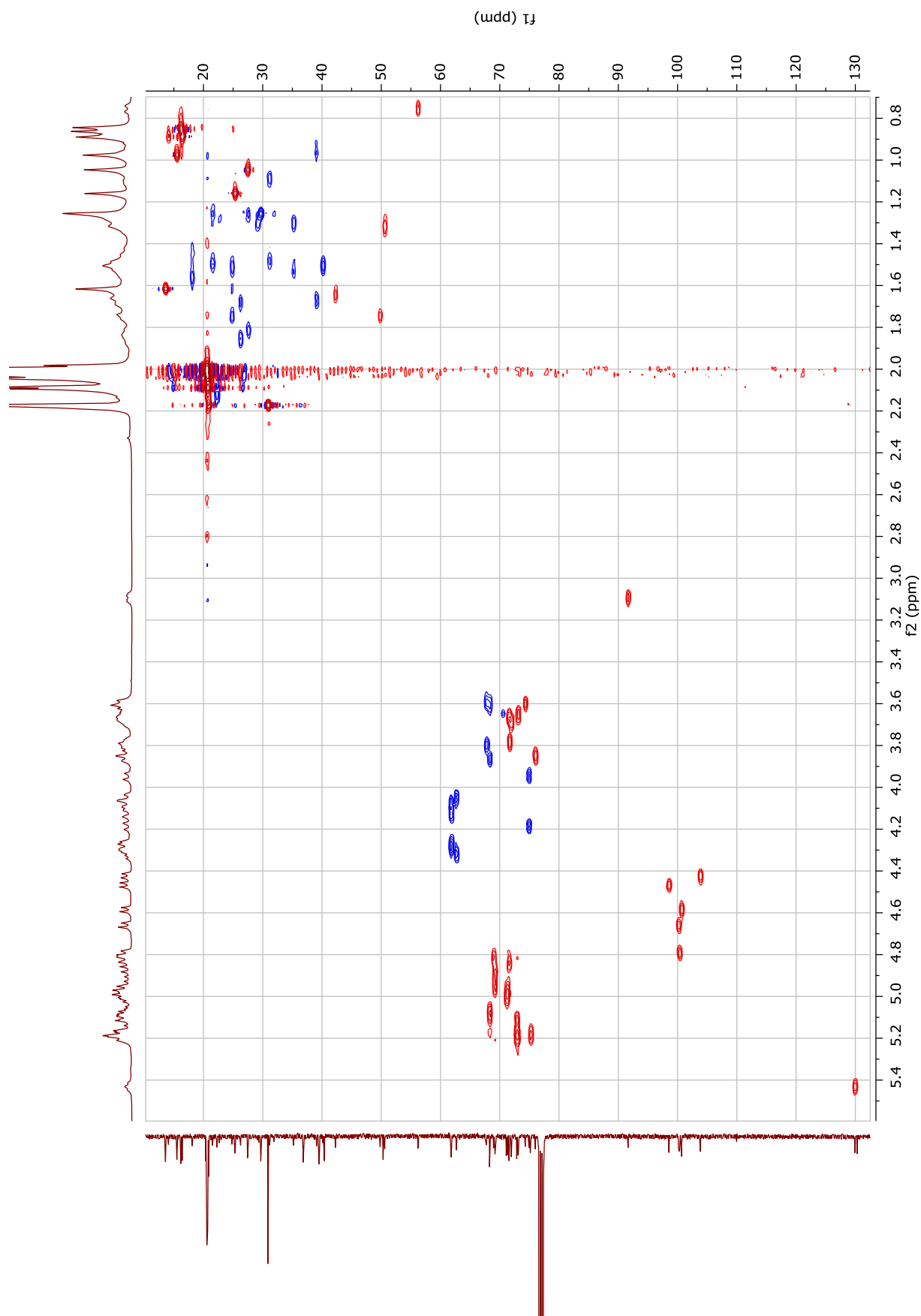


Figura 119. Espectro de HSQC do derivado acetilado de **Sb20** (400 MHz, CDCl<sub>3</sub>).



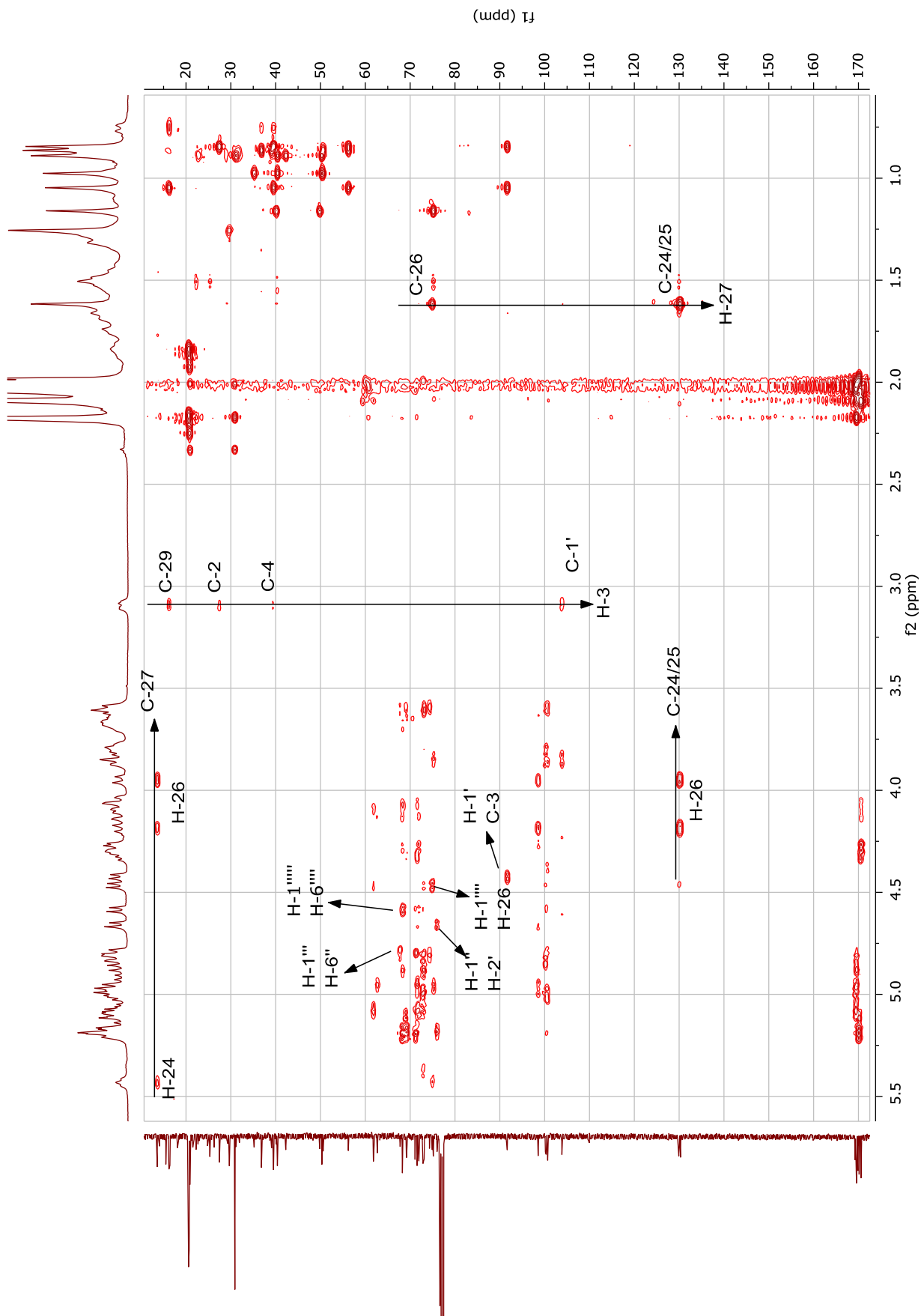
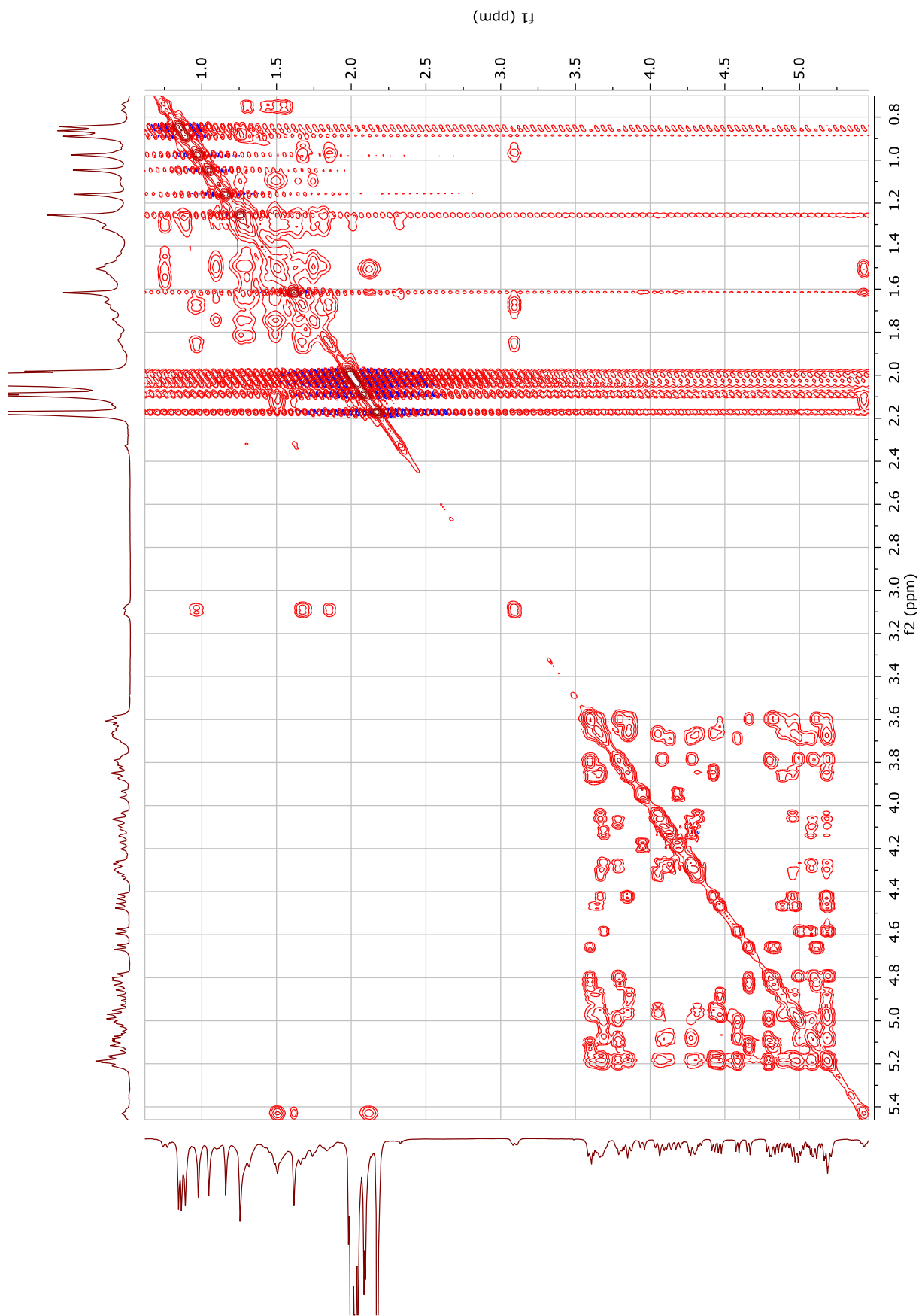
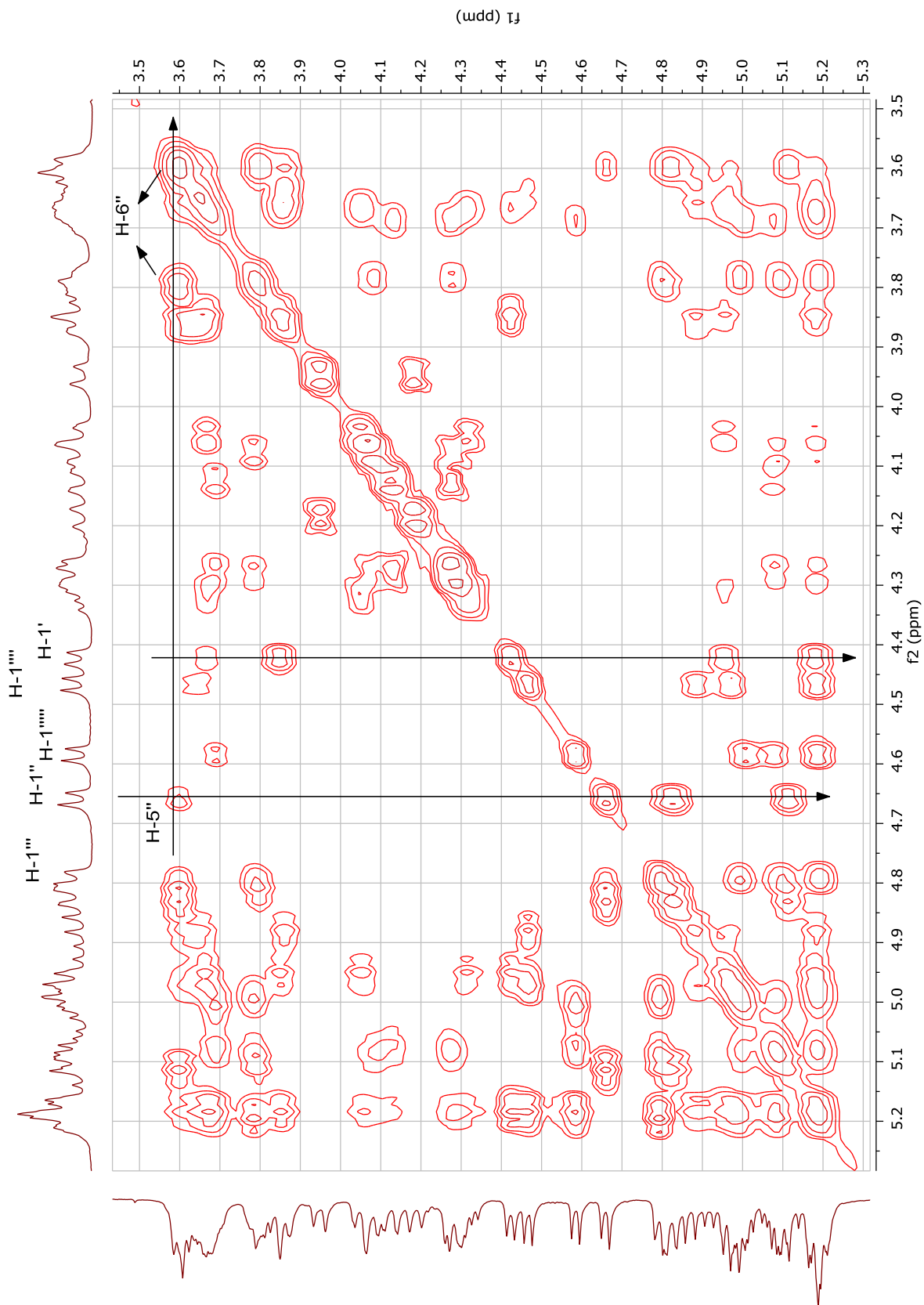


Figura 120. Espectro de HMBC do derivado acetilado de **Sb20** (400 MHz,  $\text{CDCl}_3$ ).



**Figura 121.** Espectro de TOCSY 2D do derivado acetilado de Sb20 (400 MHz,  $\text{CDCl}_3$ ).



**Figura 122.** Expansão do espectro de TOCSY 2D do derivado acetilado de **Sb20** (400 MHz,  $\text{CDCl}_3$ ).

CAC043 #1 RT: 0,00 AV: 1 NL: 1,10E8  
T: FTMS + p ESI Full ms [100,00-2000,00]  
287,0914  
C<sub>16</sub>H<sub>15</sub>O<sub>5</sub>  
0,0003 ppm

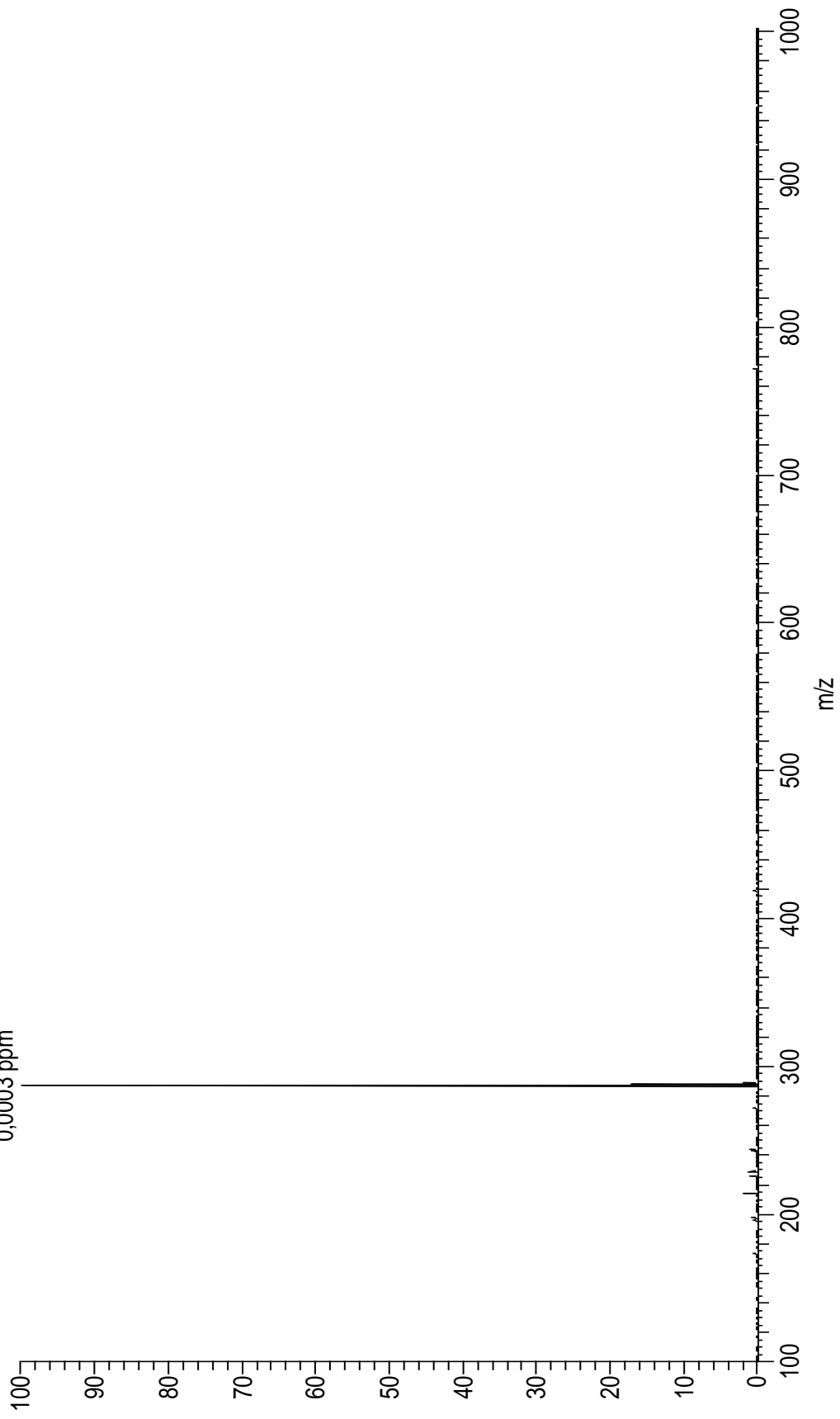


Figura 123. Espectro de massas de alta resolução de **Zg1** (ESI, modo positivo).

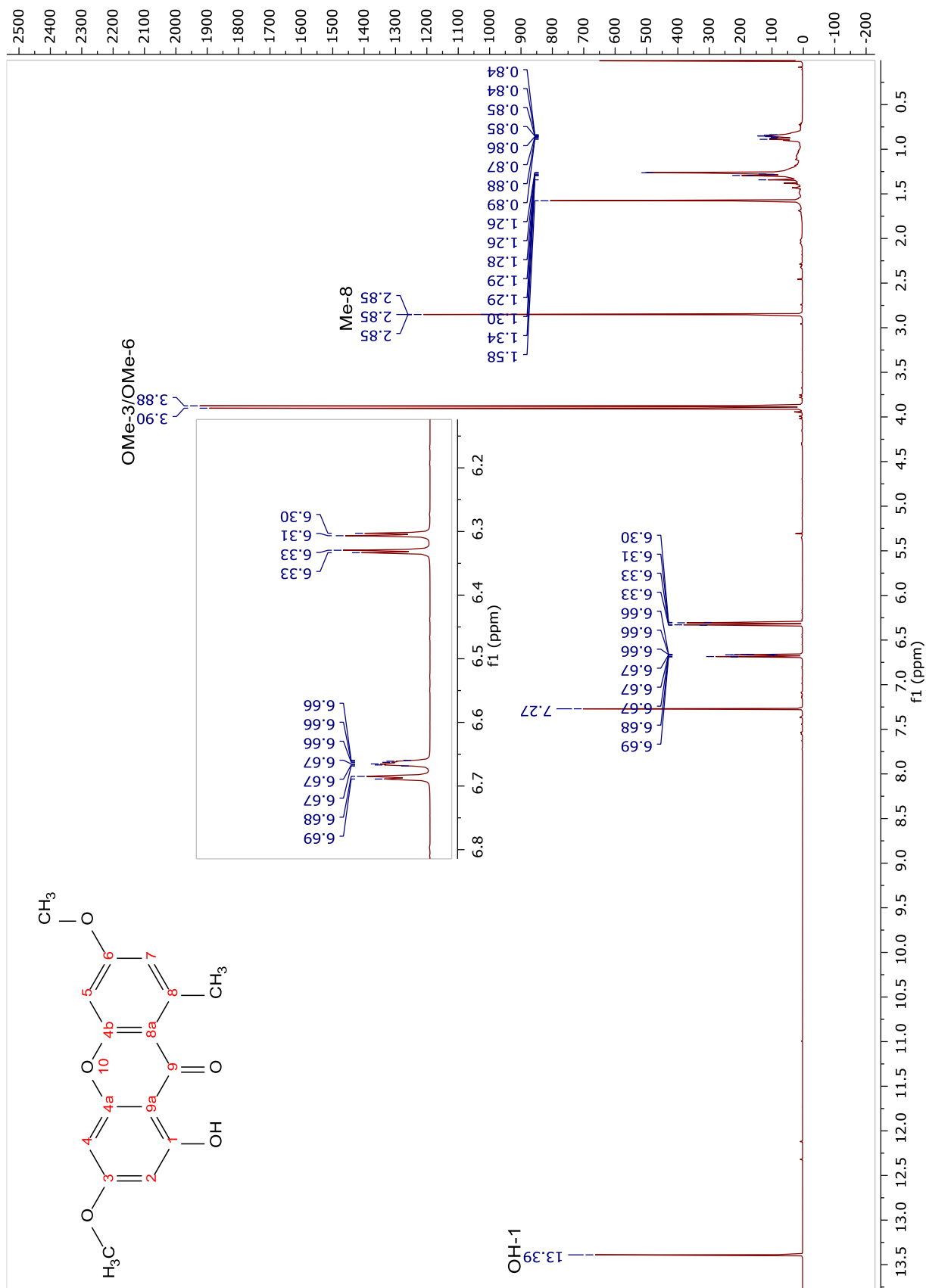


Figura 124. Espectro de RMN <sup>1</sup>H de **Zg1** (400 MHz, CDCl<sub>3</sub>).

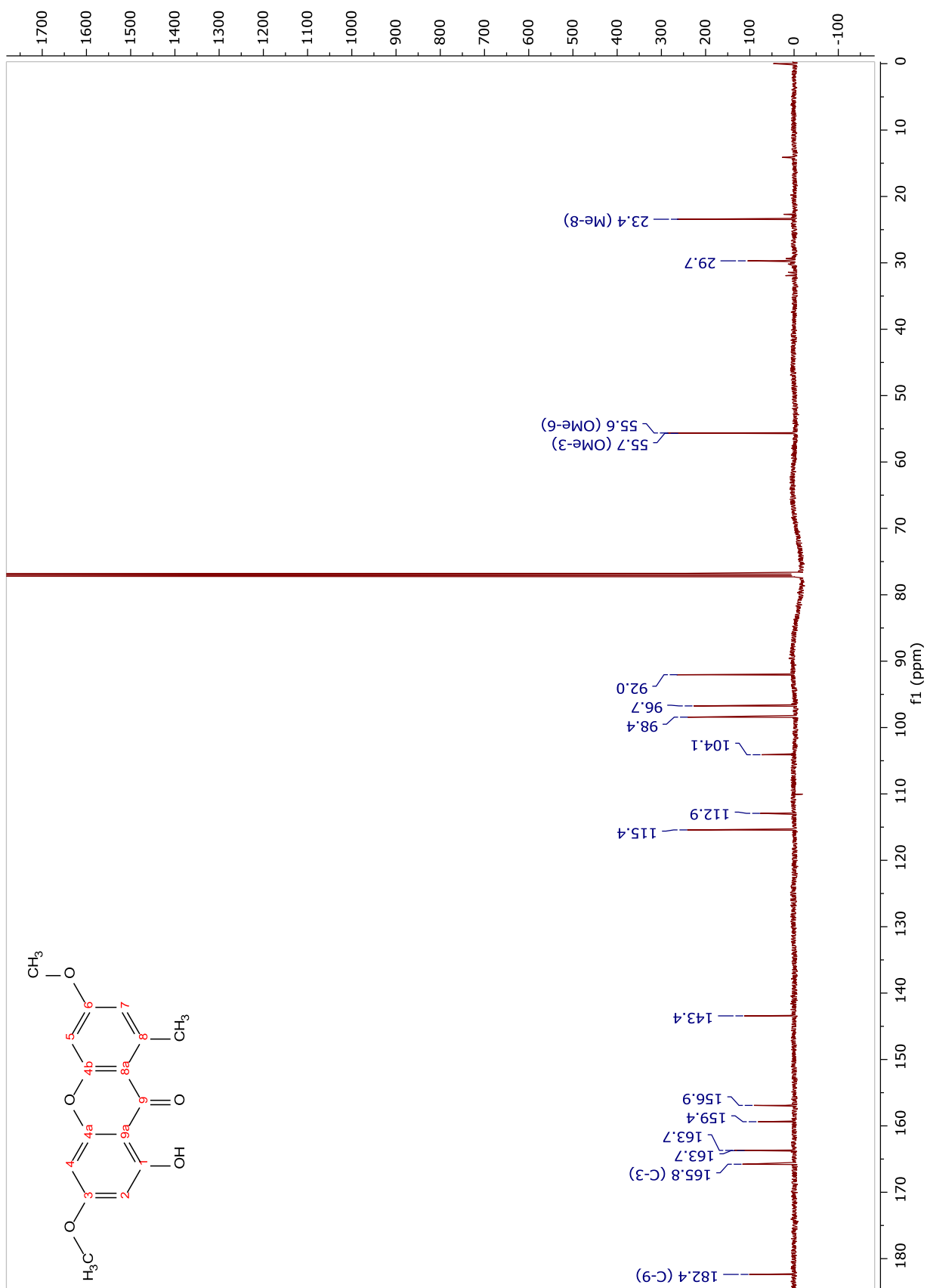


Figura 125. Espectro de RMN <sup>13</sup>C de Zg1 (100 MHz, CDCl<sub>3</sub>).

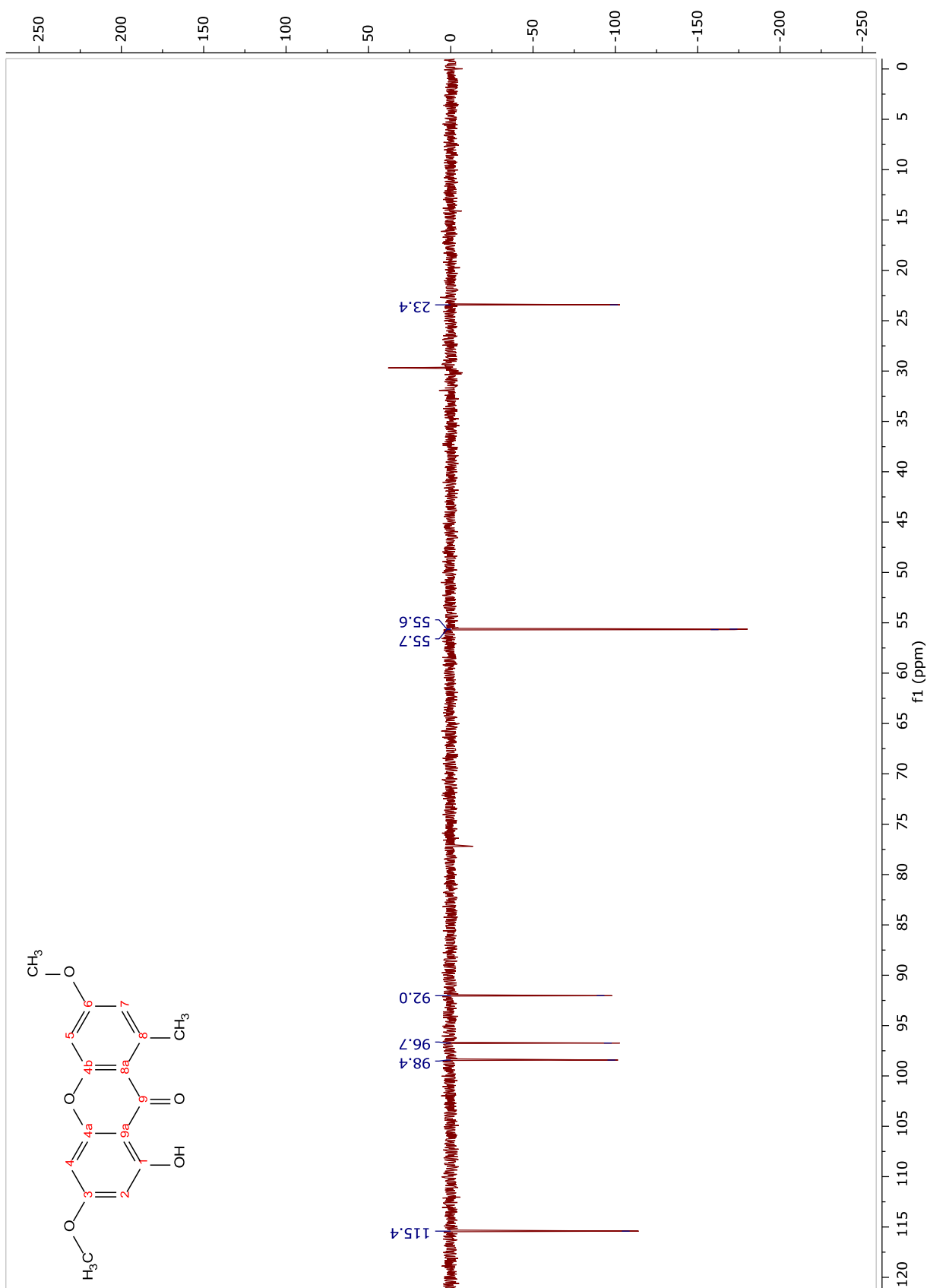


Figura 126. Espectro de DEPT-135 de **Zg1** (100 MHz,  $\text{CDCl}_3$ ).

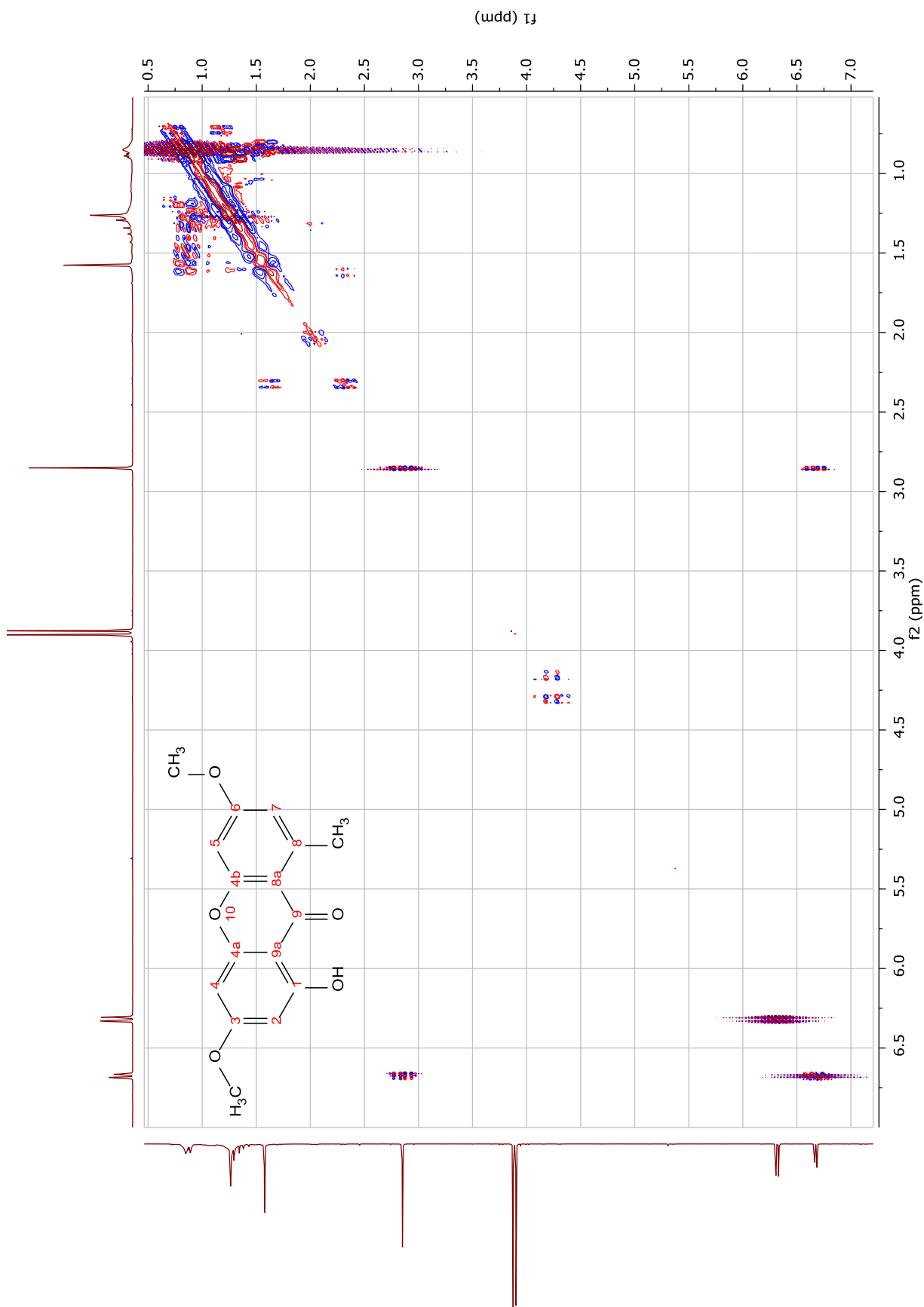


Figura 127. Espectro de COSY de **Zg1** (400 MHz, CDCl<sub>3</sub>).



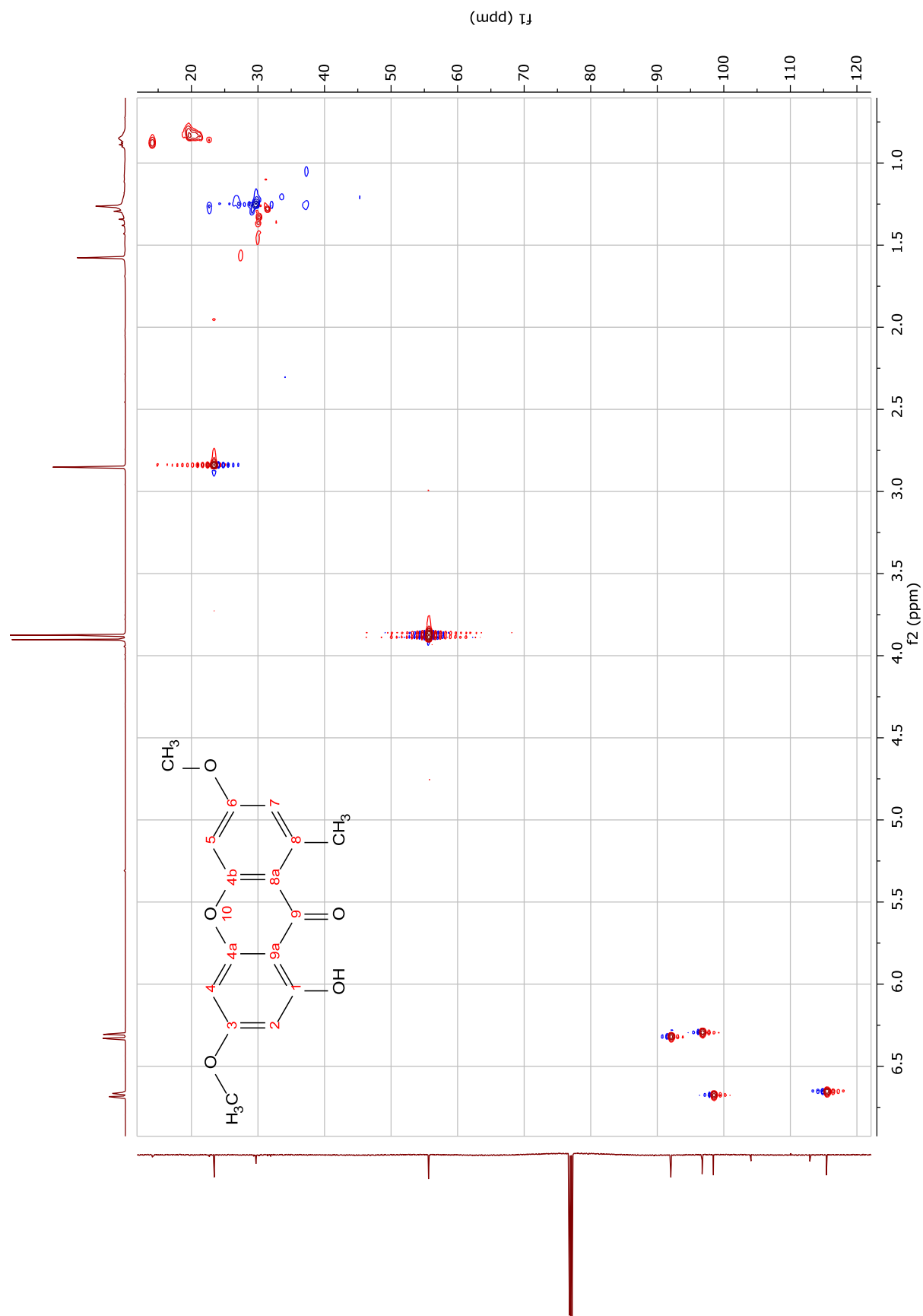


Figura 128. Espectro de HSQC de **Zg1** (400 MHz,  $\text{CDCl}_3$ ).

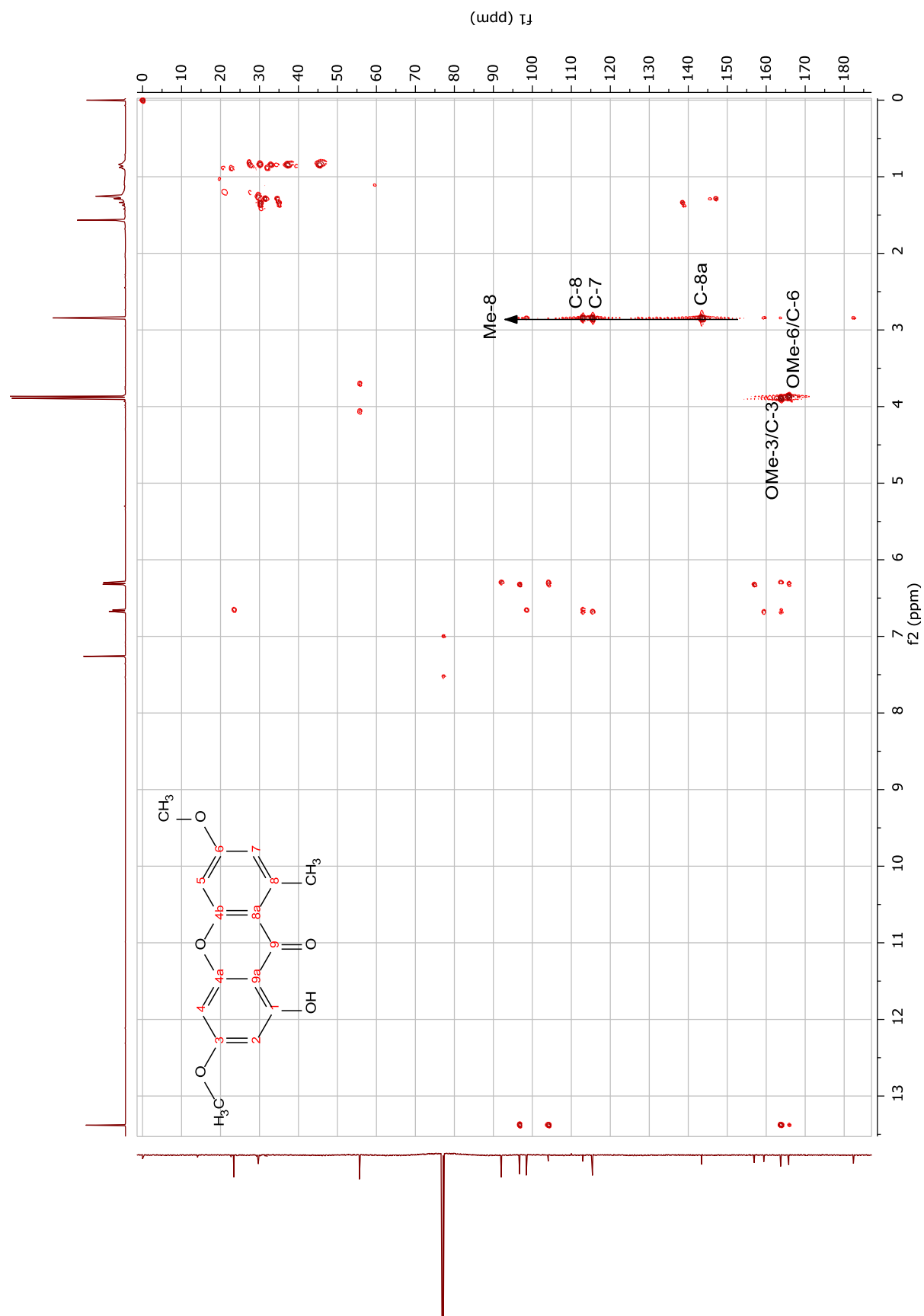


Figura 129. Espectro de HMBC de **Zg1** (400 MHz, CDCl<sub>3</sub>).

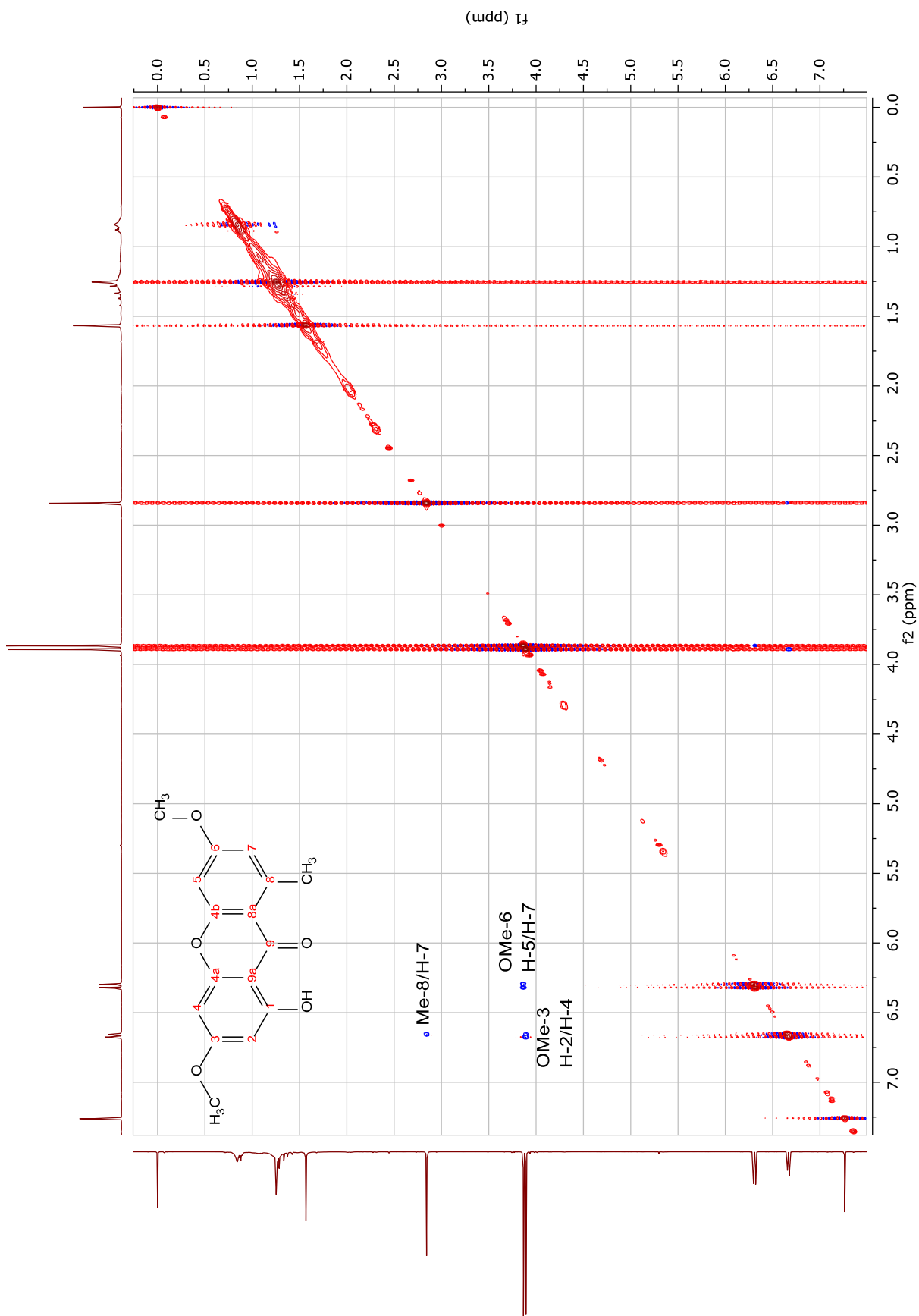


Figura 130. Espectro de NOESY de Zg1 (400 MHz, CDCl<sub>3</sub>).

CAC078\_neg #1-62 RT: 0,00-0,25 AV: 62 NL: 2,47E6  
T: FTMS - p ESIFull ms [50,00-2000,00]

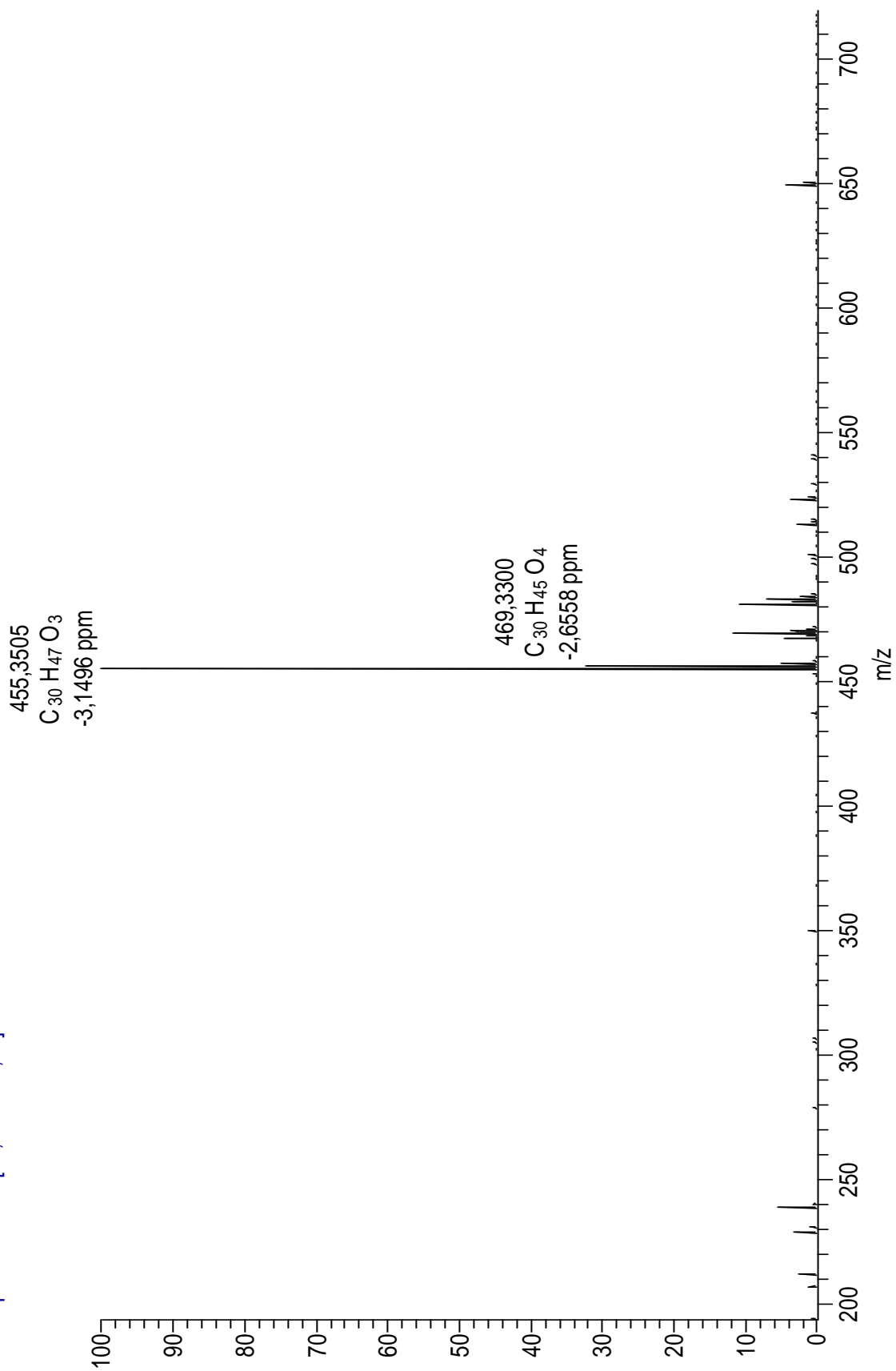


Figura 131. Espectro de massas de alta resolução de **Zg2** (ESI, modo negativo).

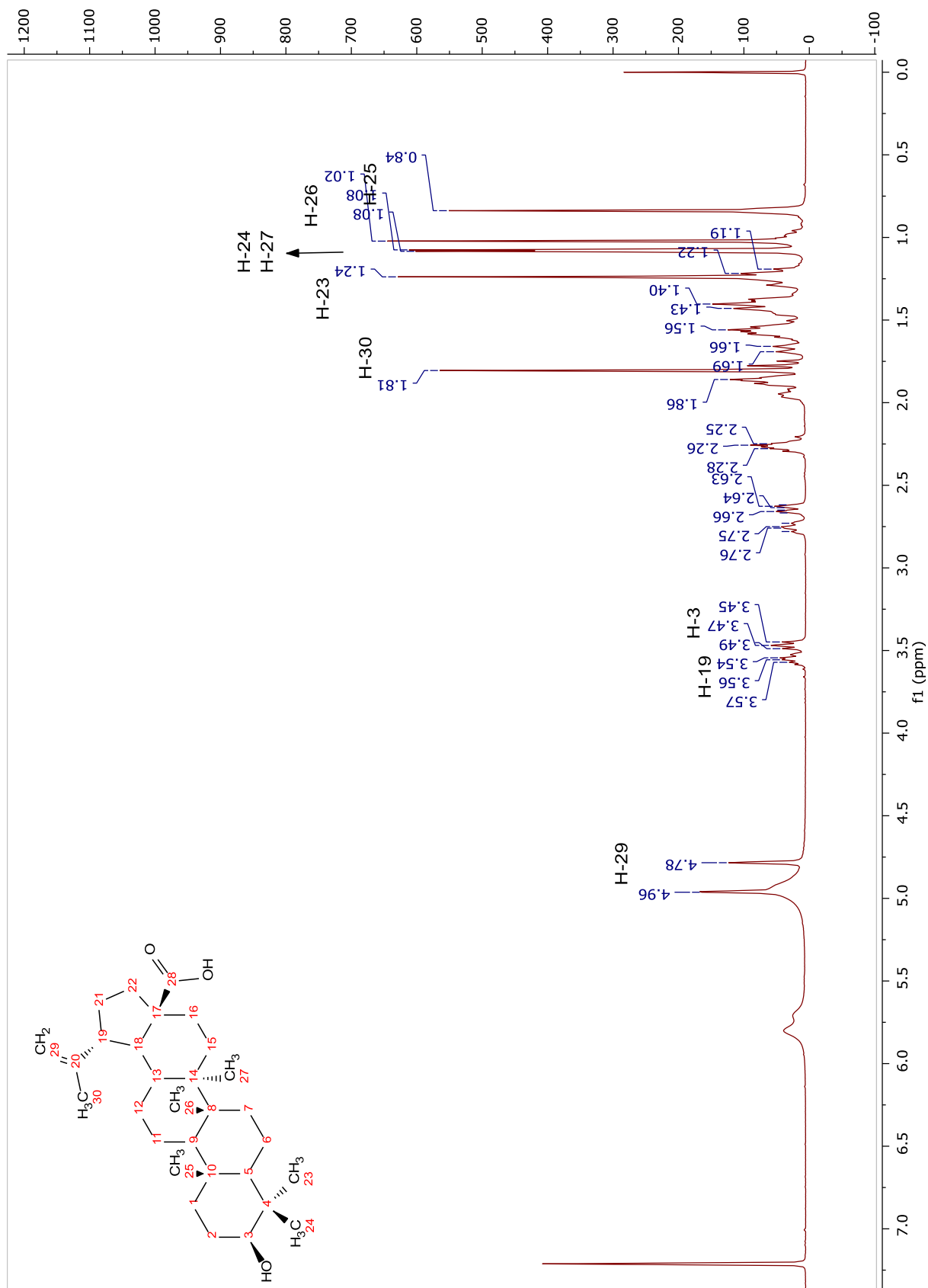


Figura 132. Espectro de RMN  $^1\text{H}$  de **Zg2** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

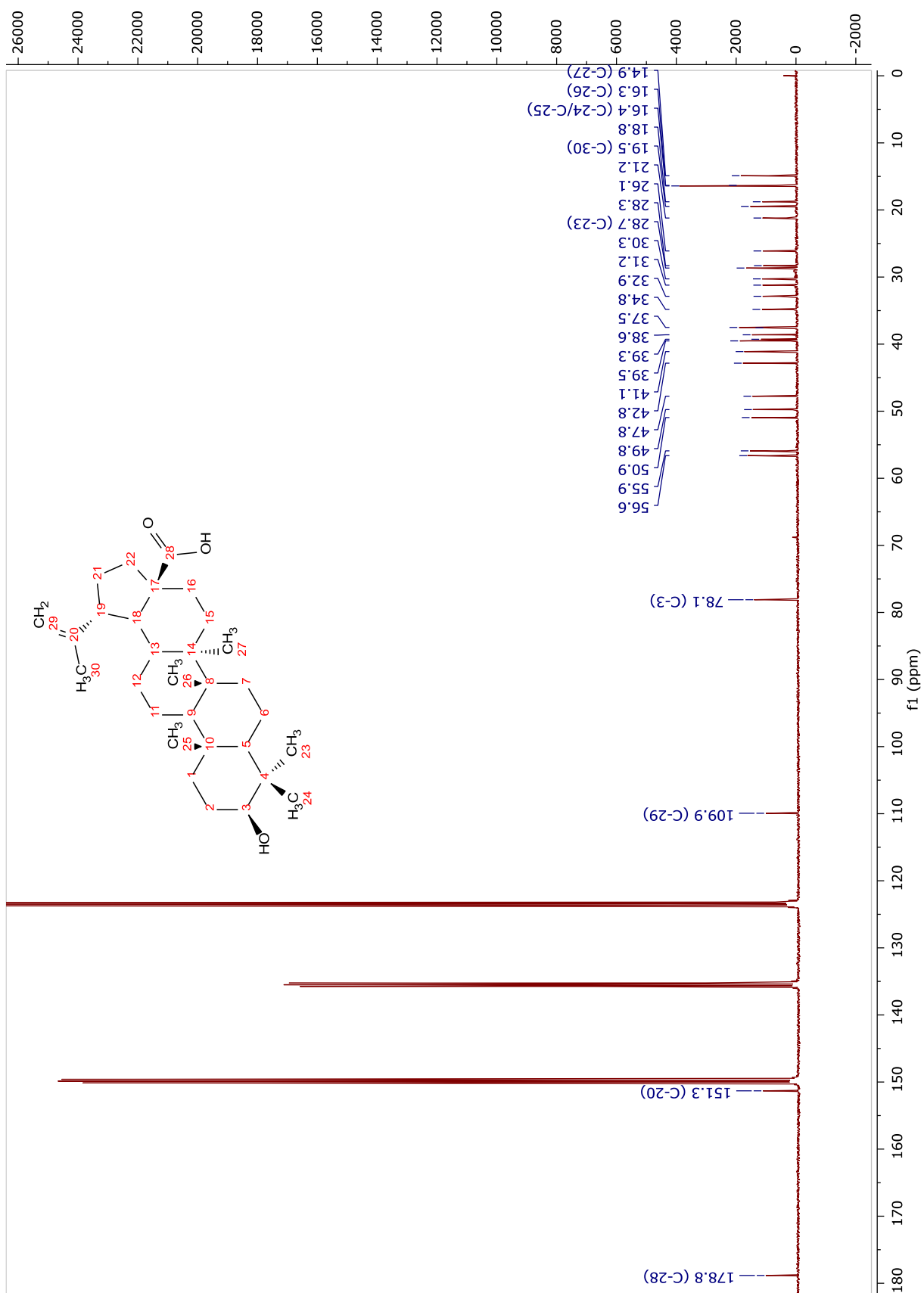


Figura 133. Espectro de RMN  $^{13}\text{C}$  de **Zg2** (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

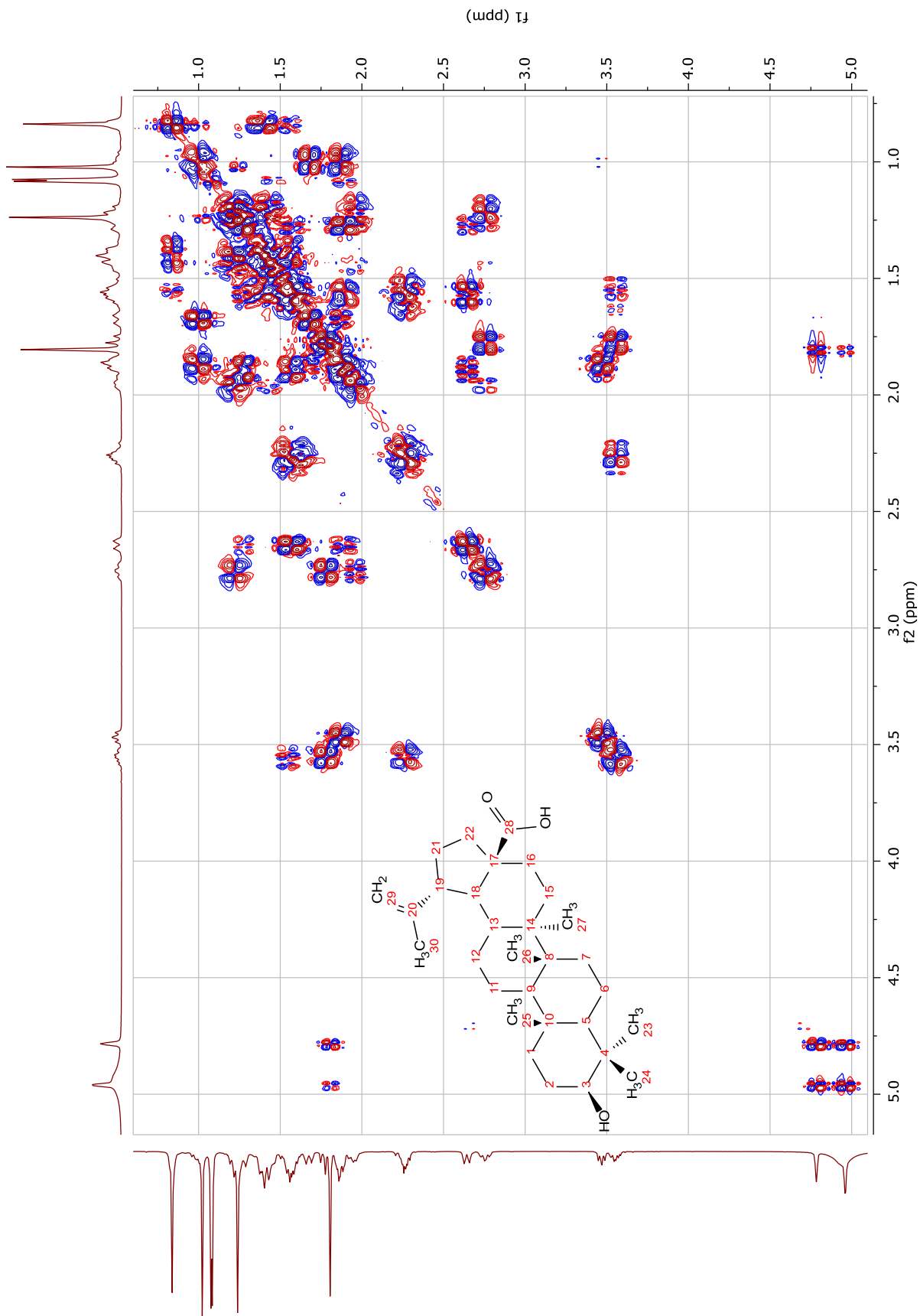


Figura 134. Espectro de COSY de **Zg2** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

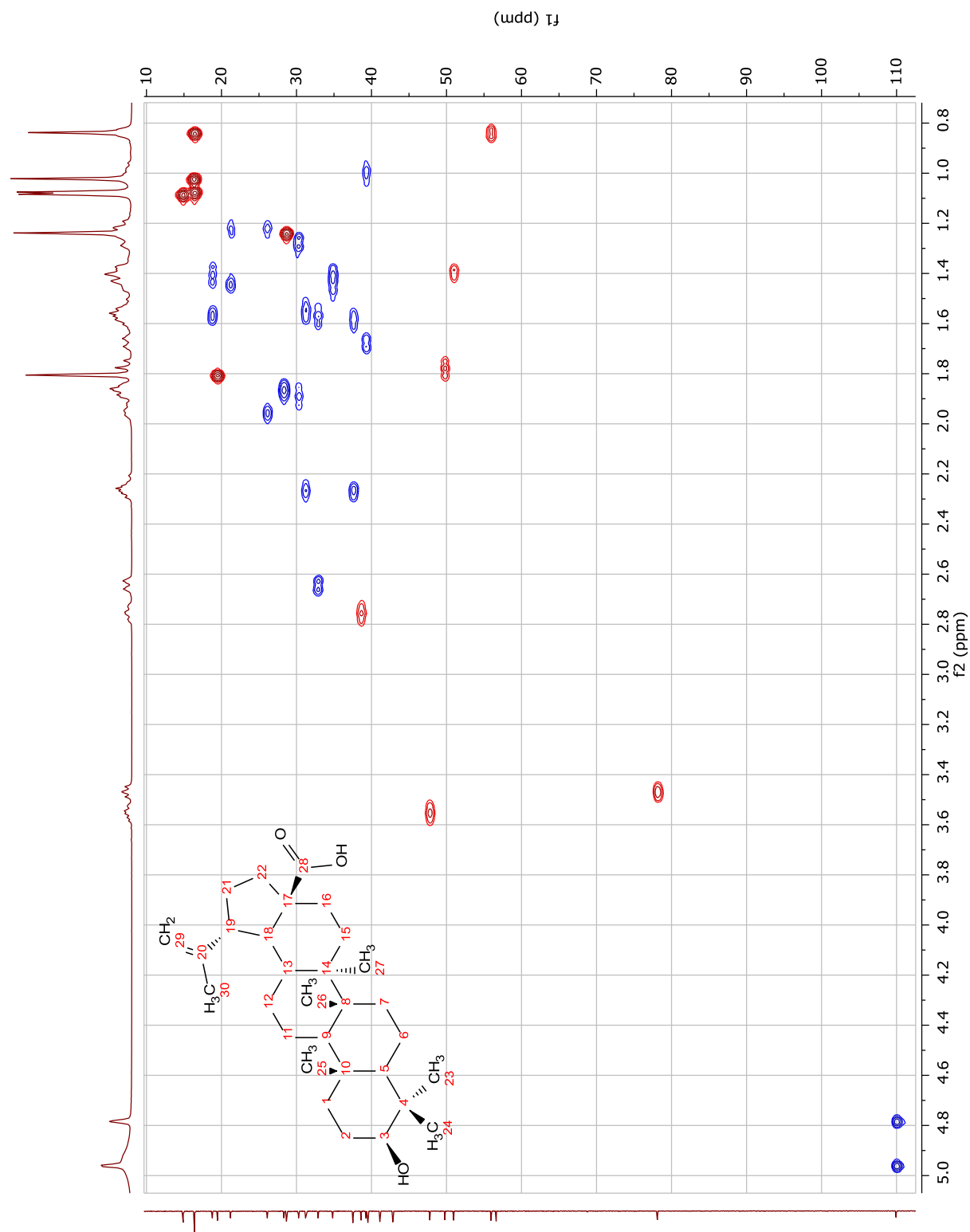


Figura 135. Espectro de HSQC de **Zg2** (400 MHz,  $C_5D_5N$ ).



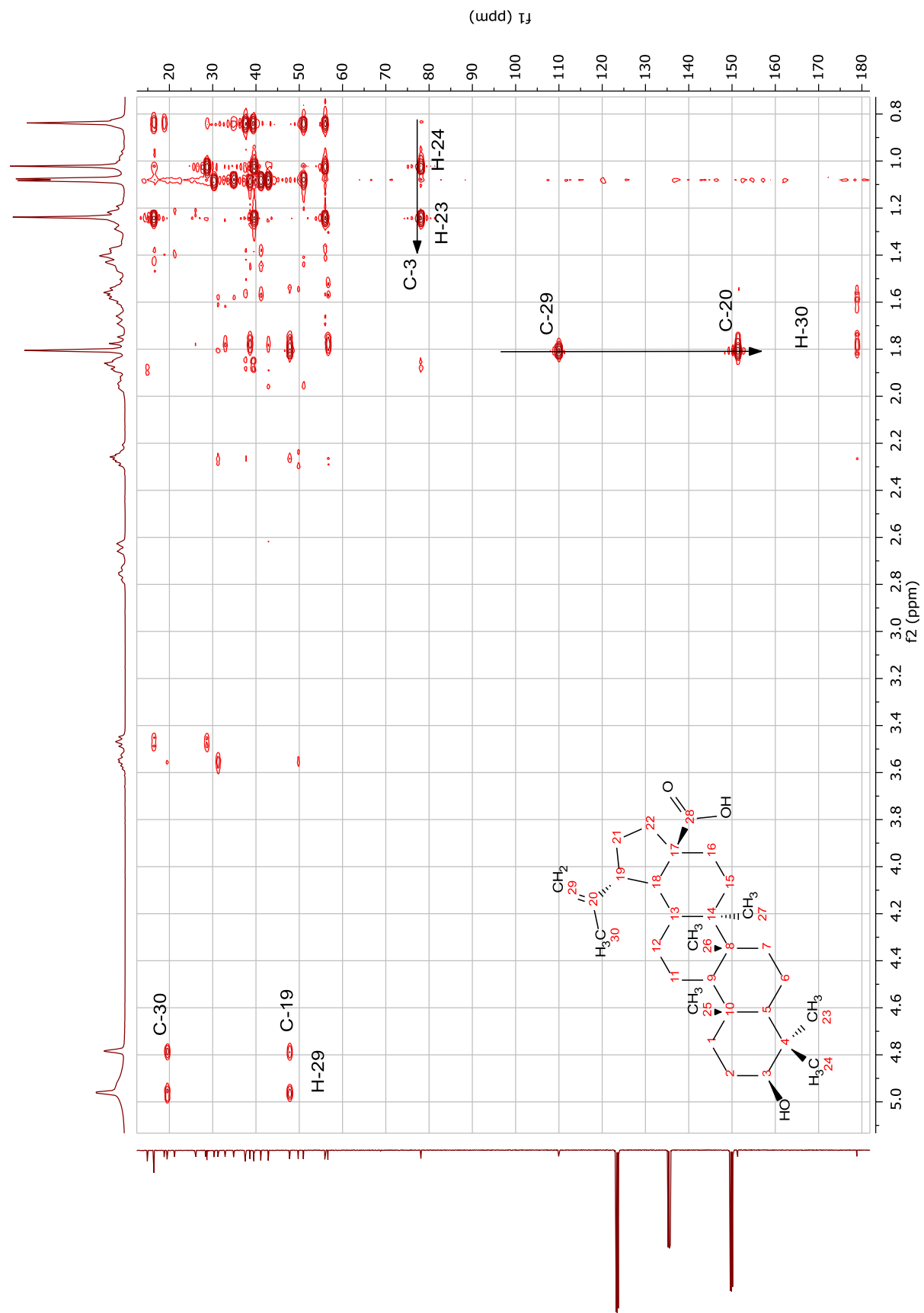


Figura 136. Espectro de HMBC de **Zg2** (400 MHz,  $C_5D_5N$ ).

CAC061 #41 RT: 0,17 AV: 1 NL: 2,82E6  
T: FTMS - p ESIFullms [50,00-2000,00]

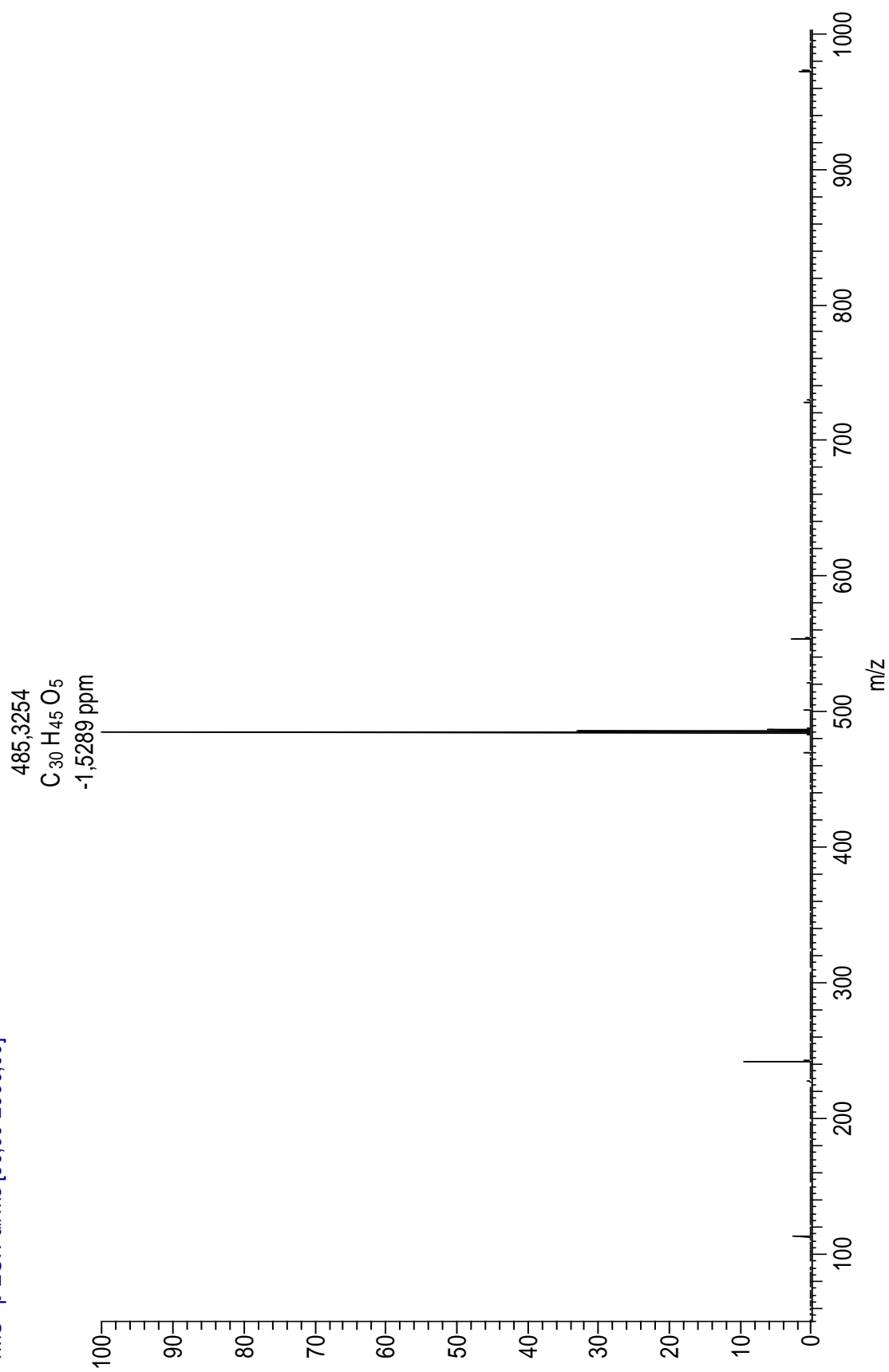


Figura 137. Espectro de massas de alta resolução de **Zg3** (ESI, modo negativo).

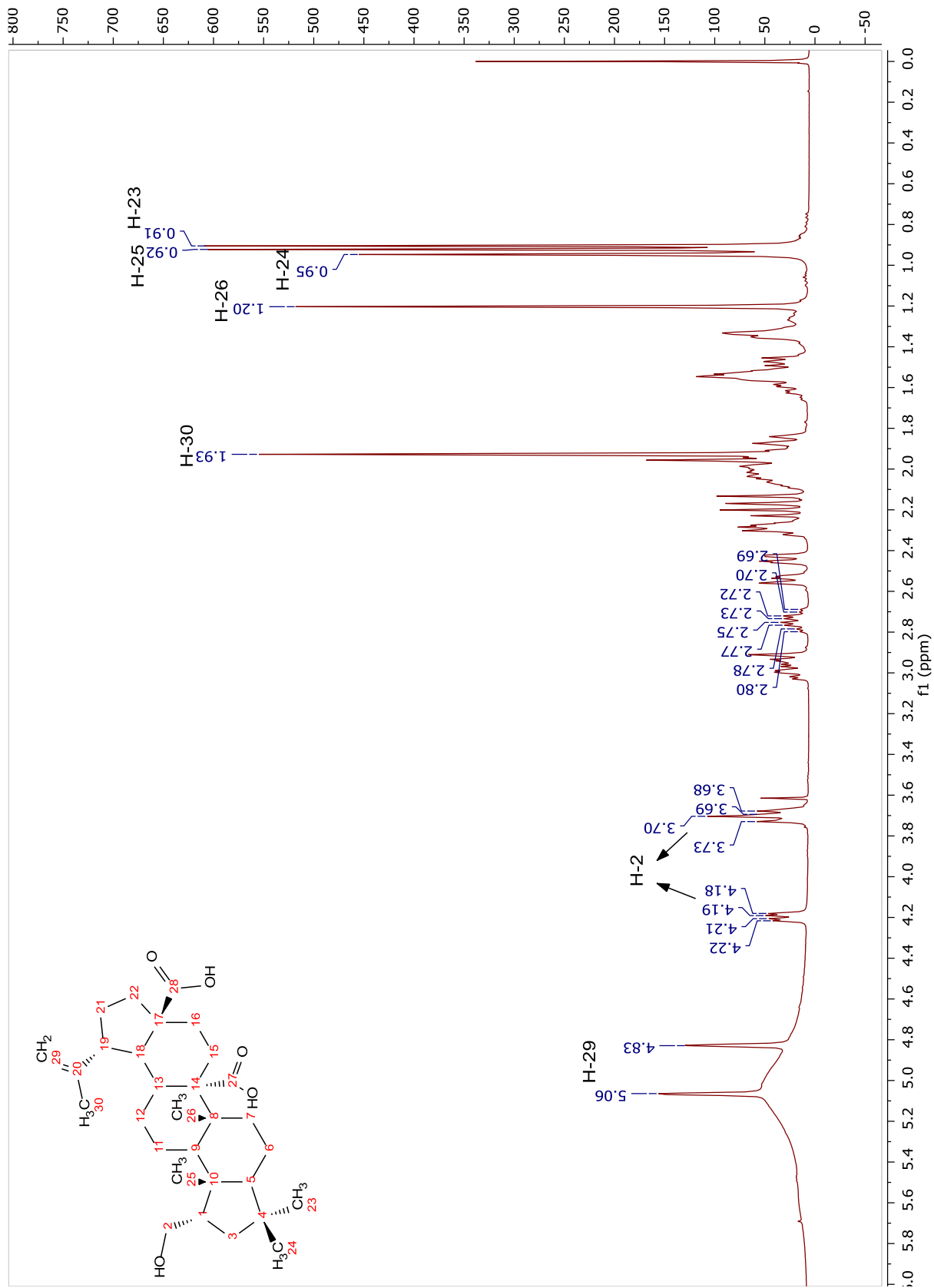


Figura 138. Espectro de RMN  $^1\text{H}$  de **Zg3** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

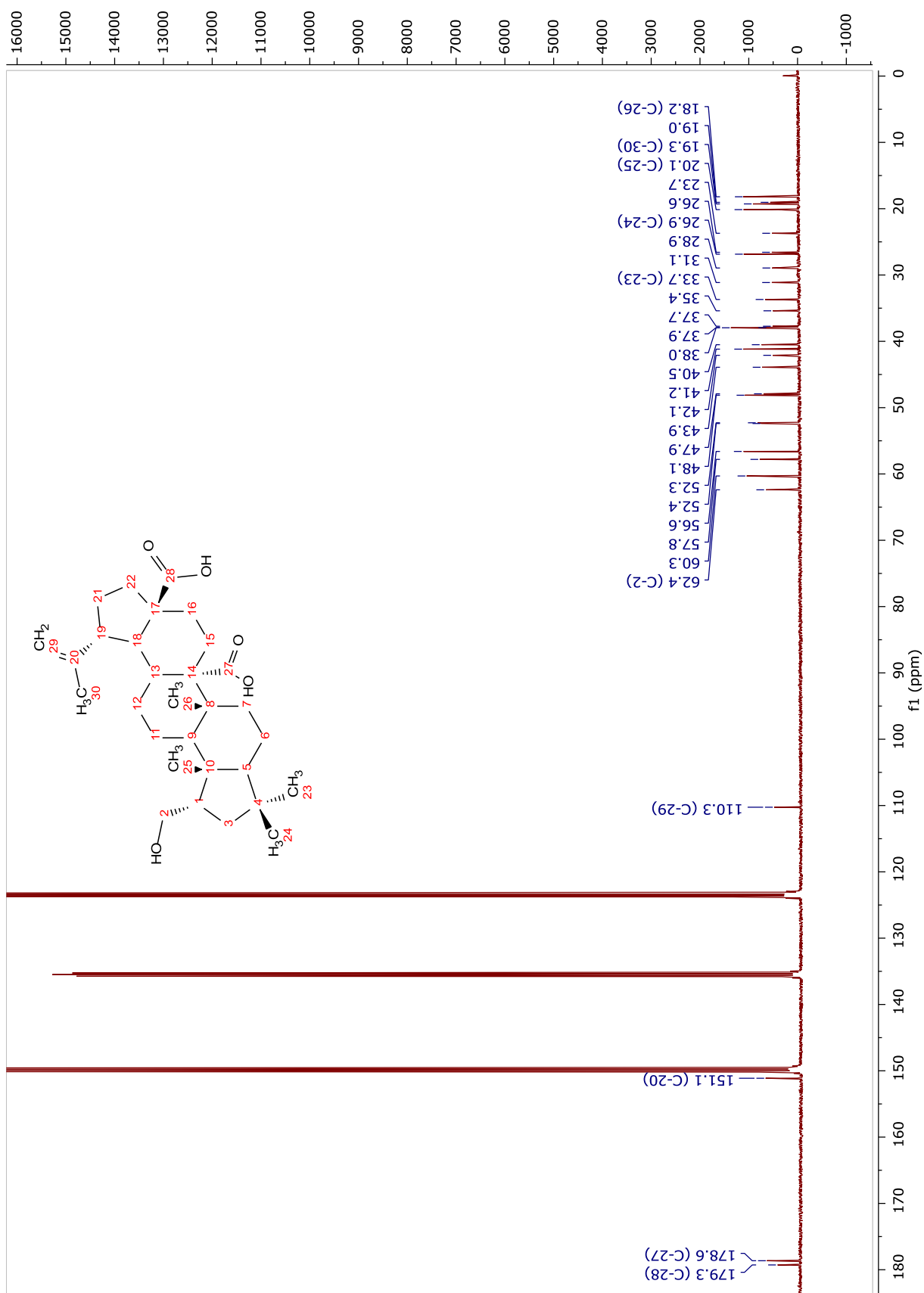


Figura 139. Espectro de RMN  $^{13}\text{C}$  de **Zg3** (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

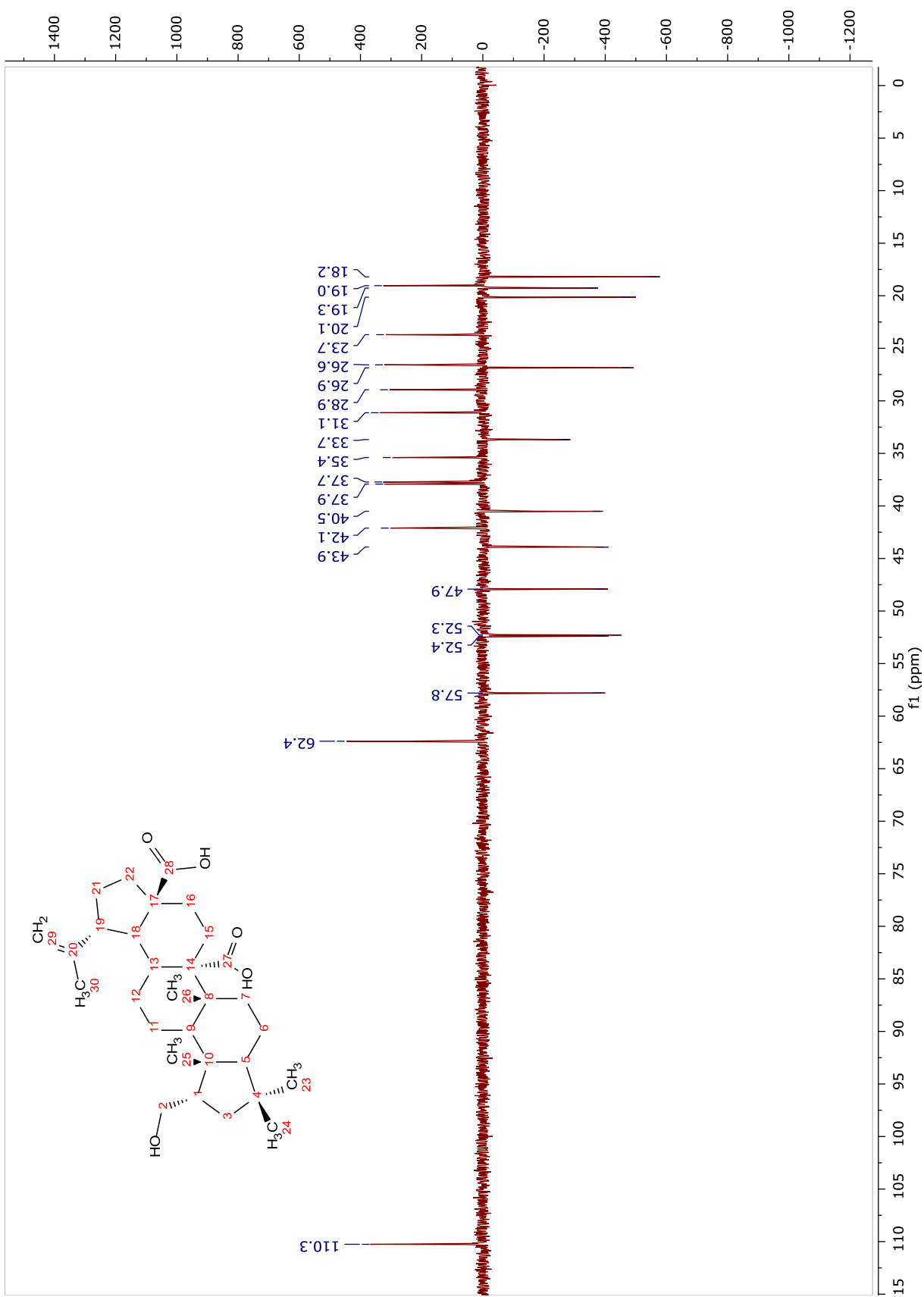


Figura 140. Espectro de DEPT-135 de **Zg3** (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

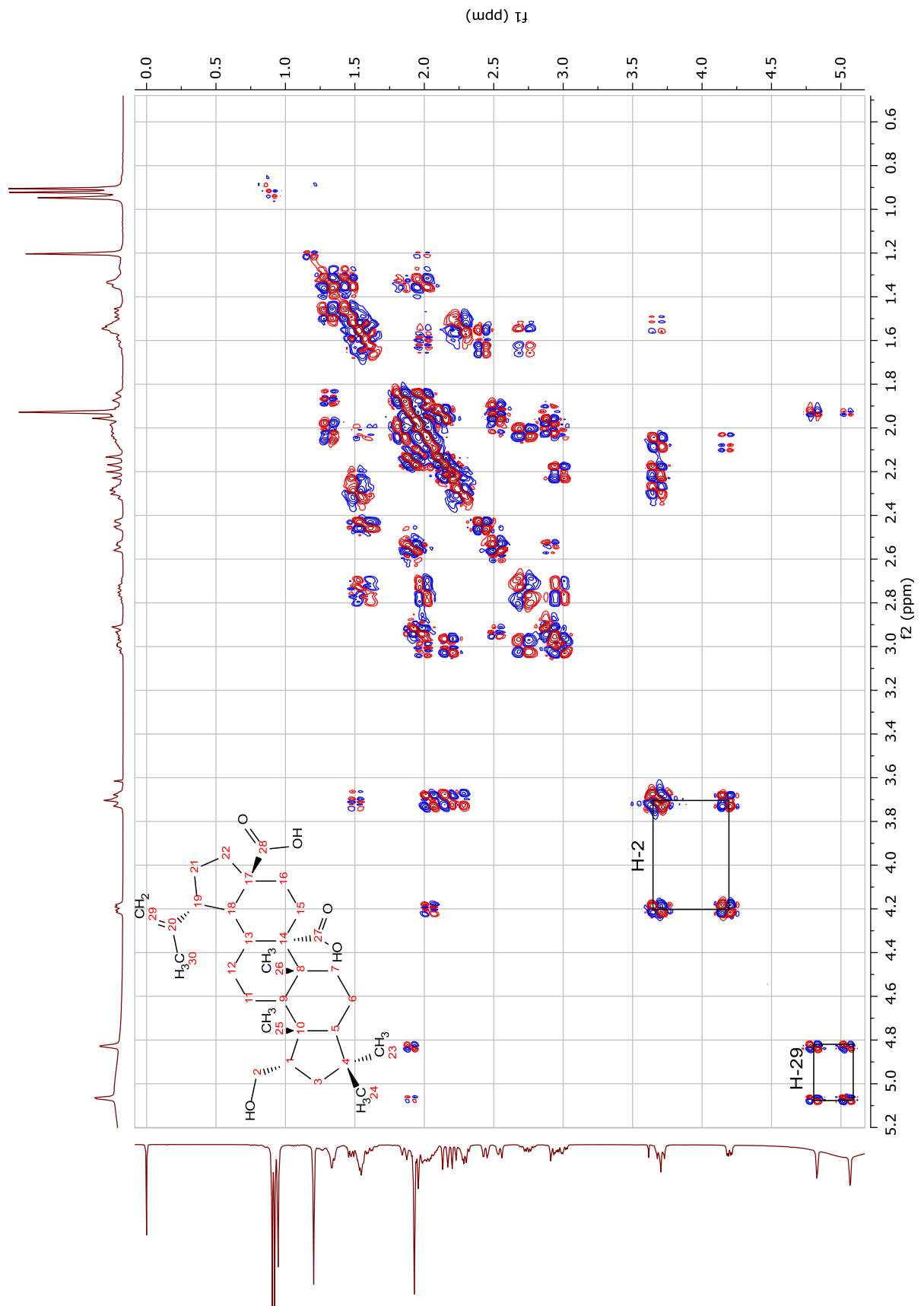


Figura 141. Espectro de COSY de **Zg3** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

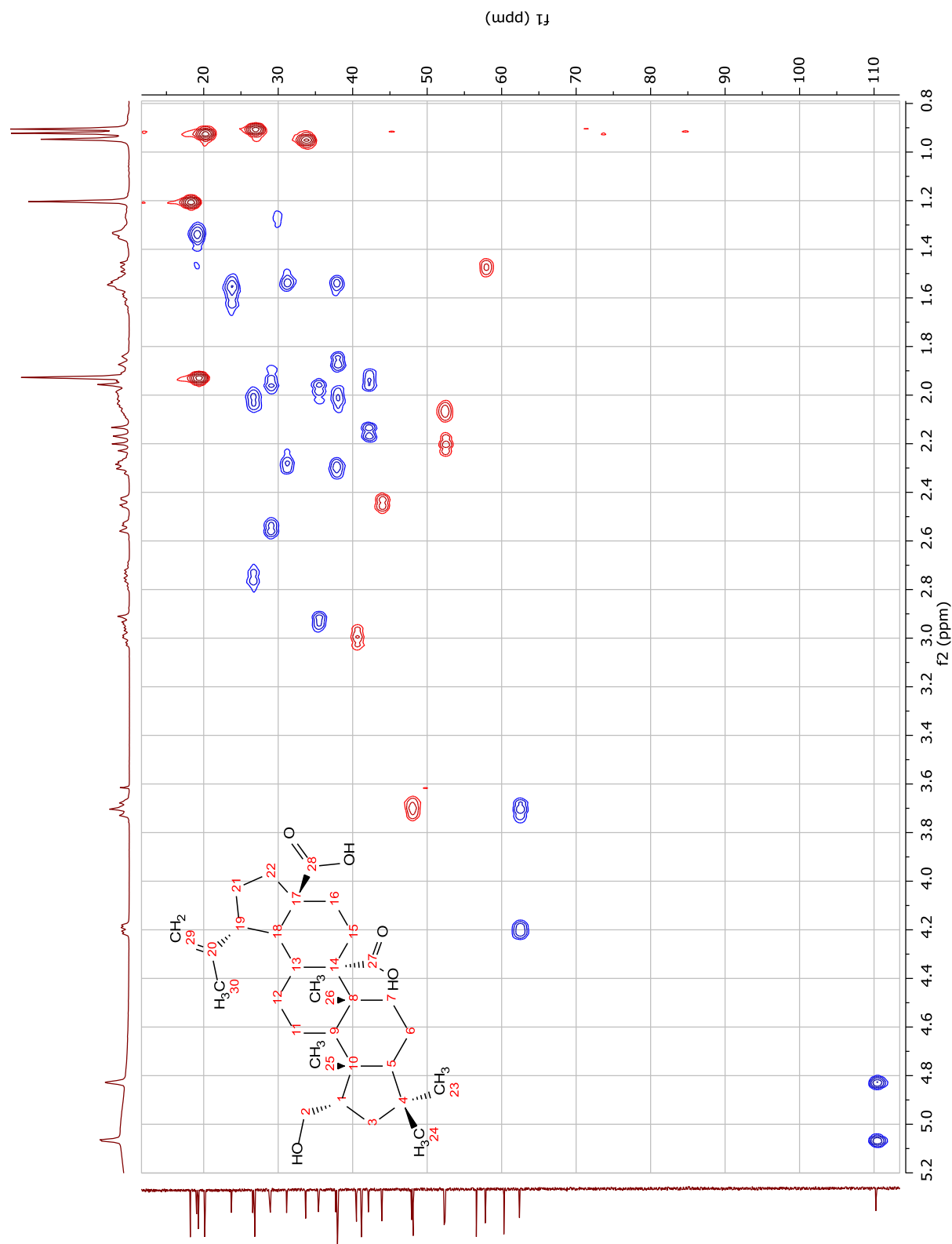


Figura 142. Espectro de HSQC de **Zg3** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

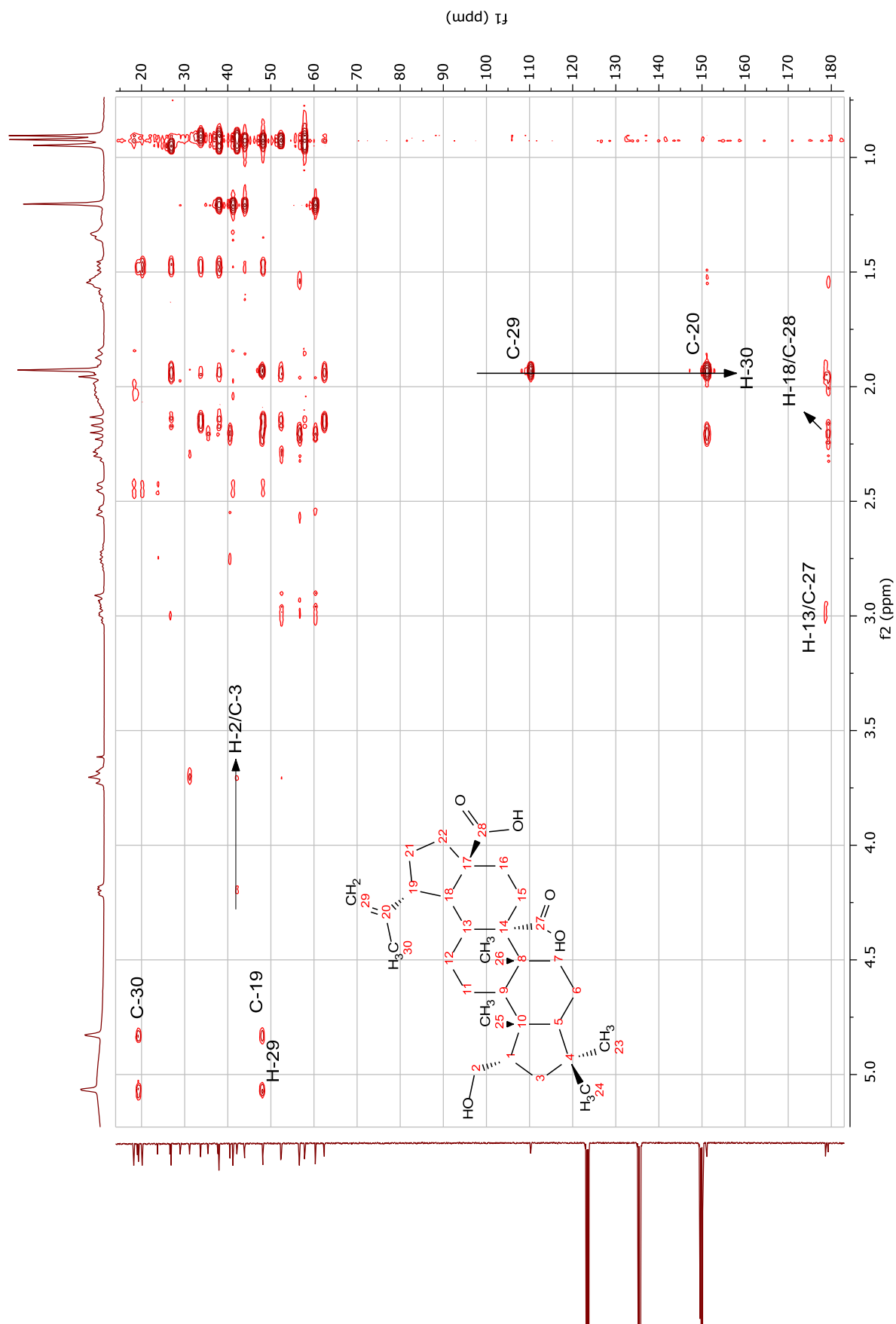


Figura 143. Espectro de HMBC de **Zg3** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



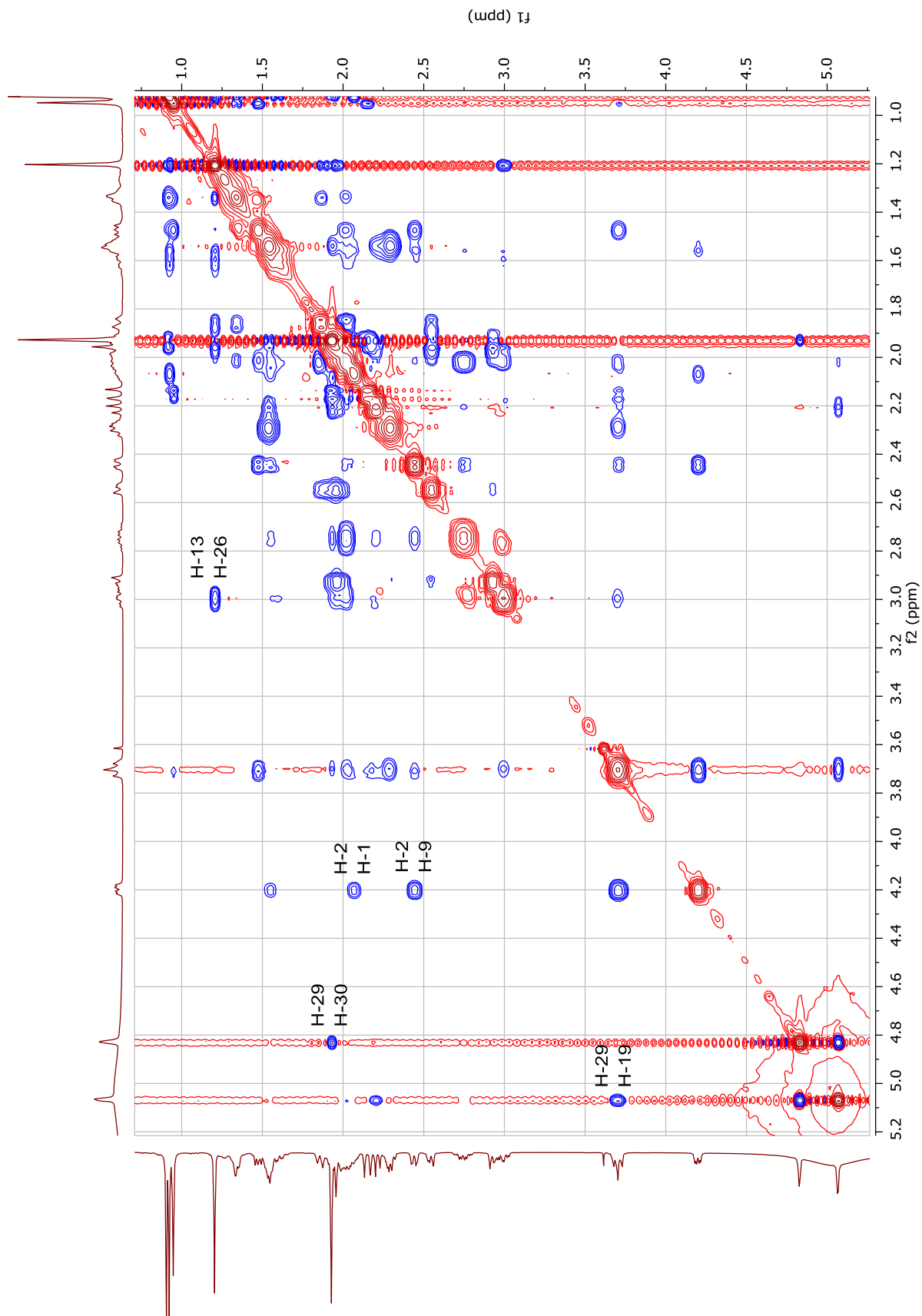


Figura 144. Espectro de NOESY de **Zg3** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

CAC077\_170901183551 #1 RT: 0,00 AV: 1 NL: 4,16E7  
T: FTMS + p ESI Full ms [100,00-2000,00]

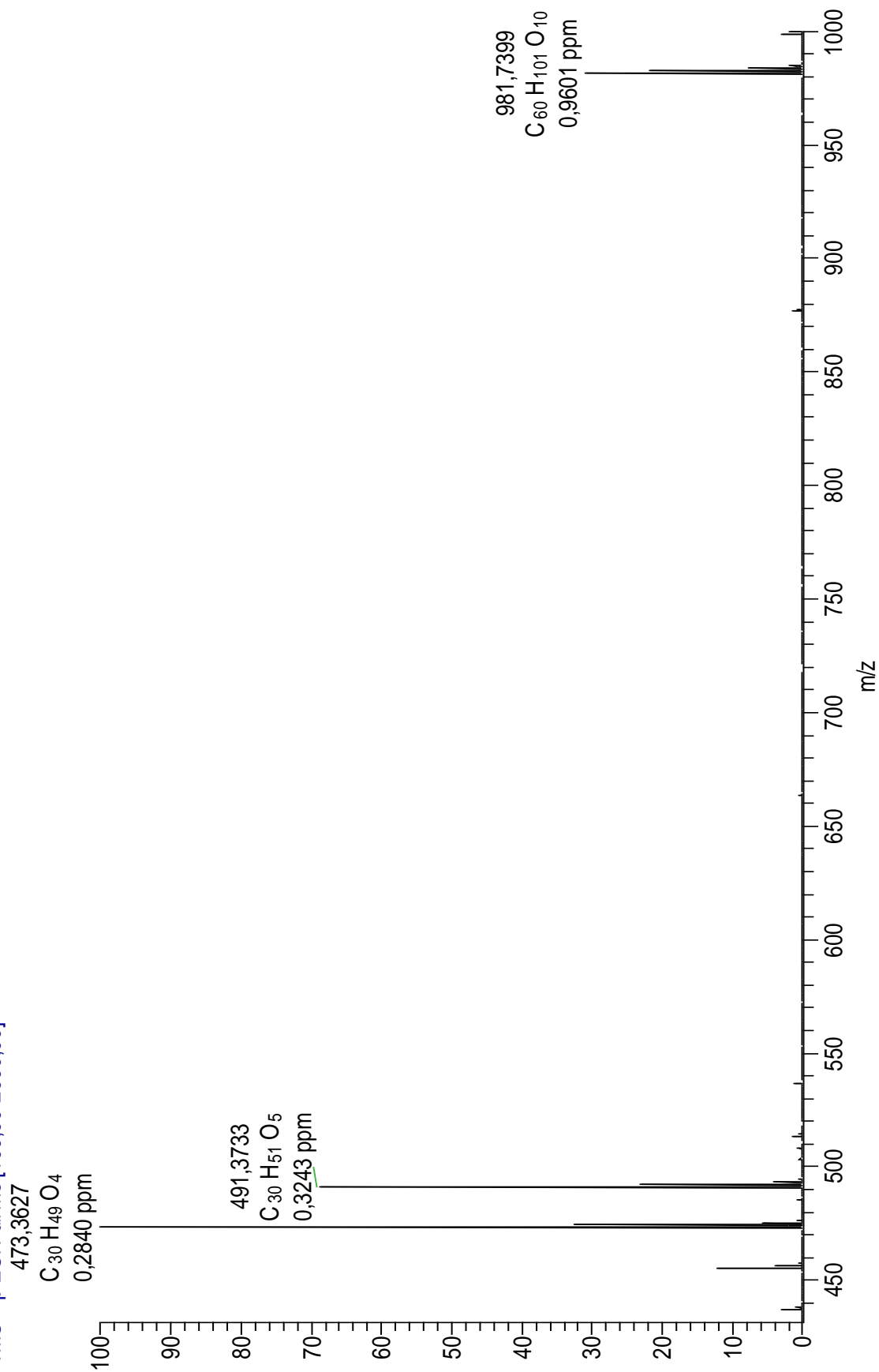


Figura 145. Espectro de massas de alta resolução de **Zg4** (ESI, modo positivo).

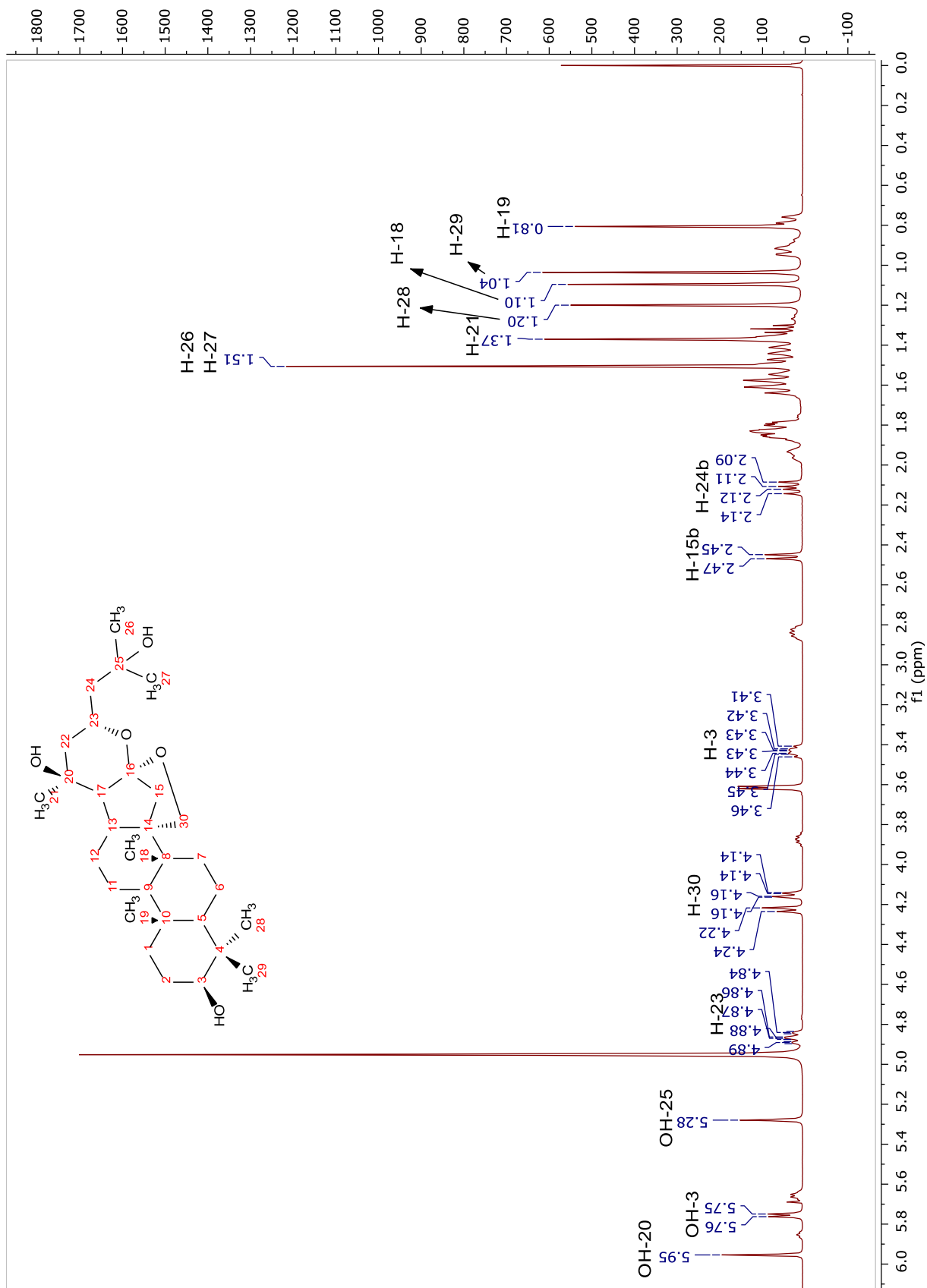


Figura 146. Espectro de RMN <sup>1</sup>H de **Zg4** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

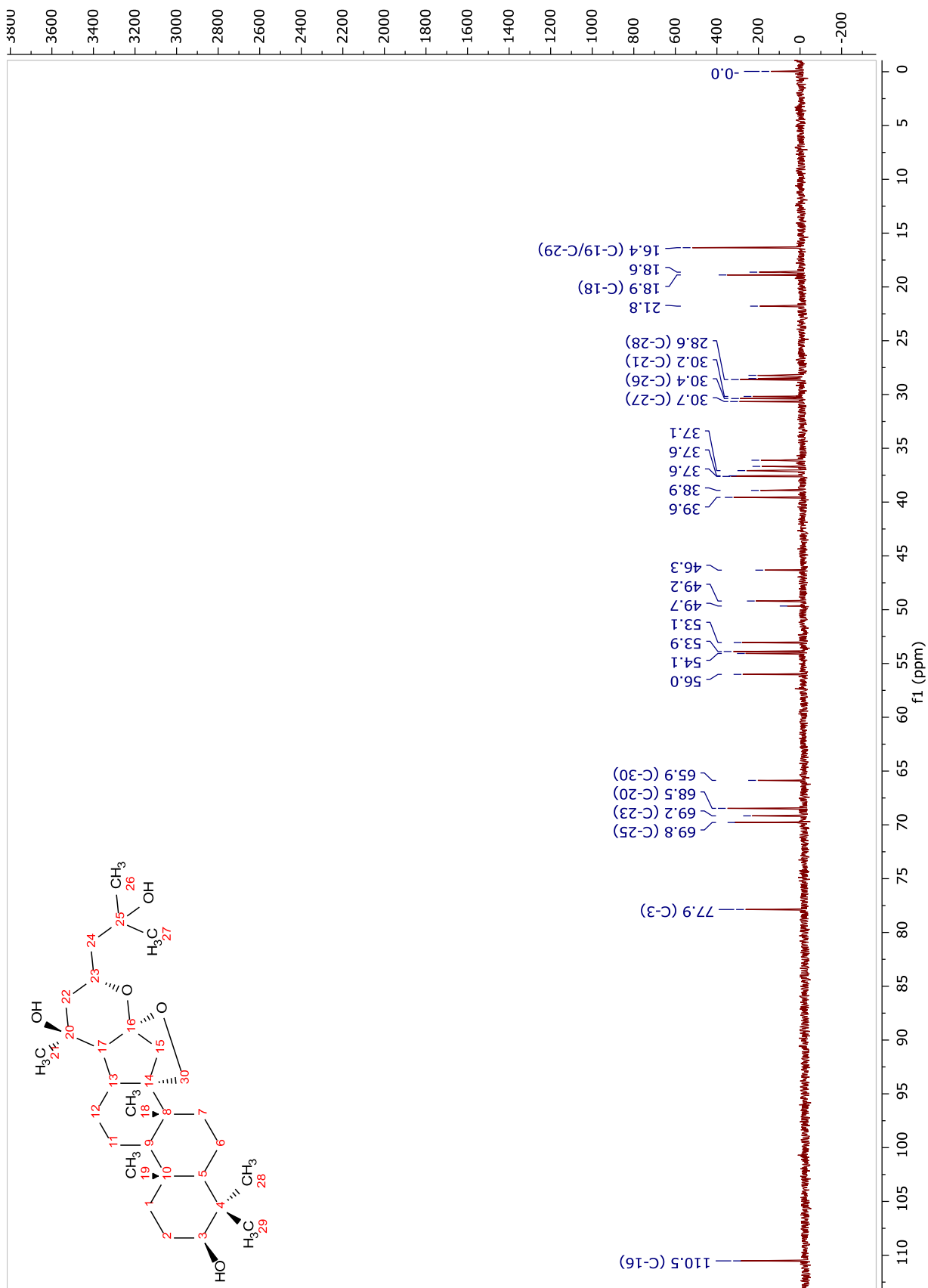


Figura 147. Espectro de RMN <sup>13</sup>C de **Zg4** (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

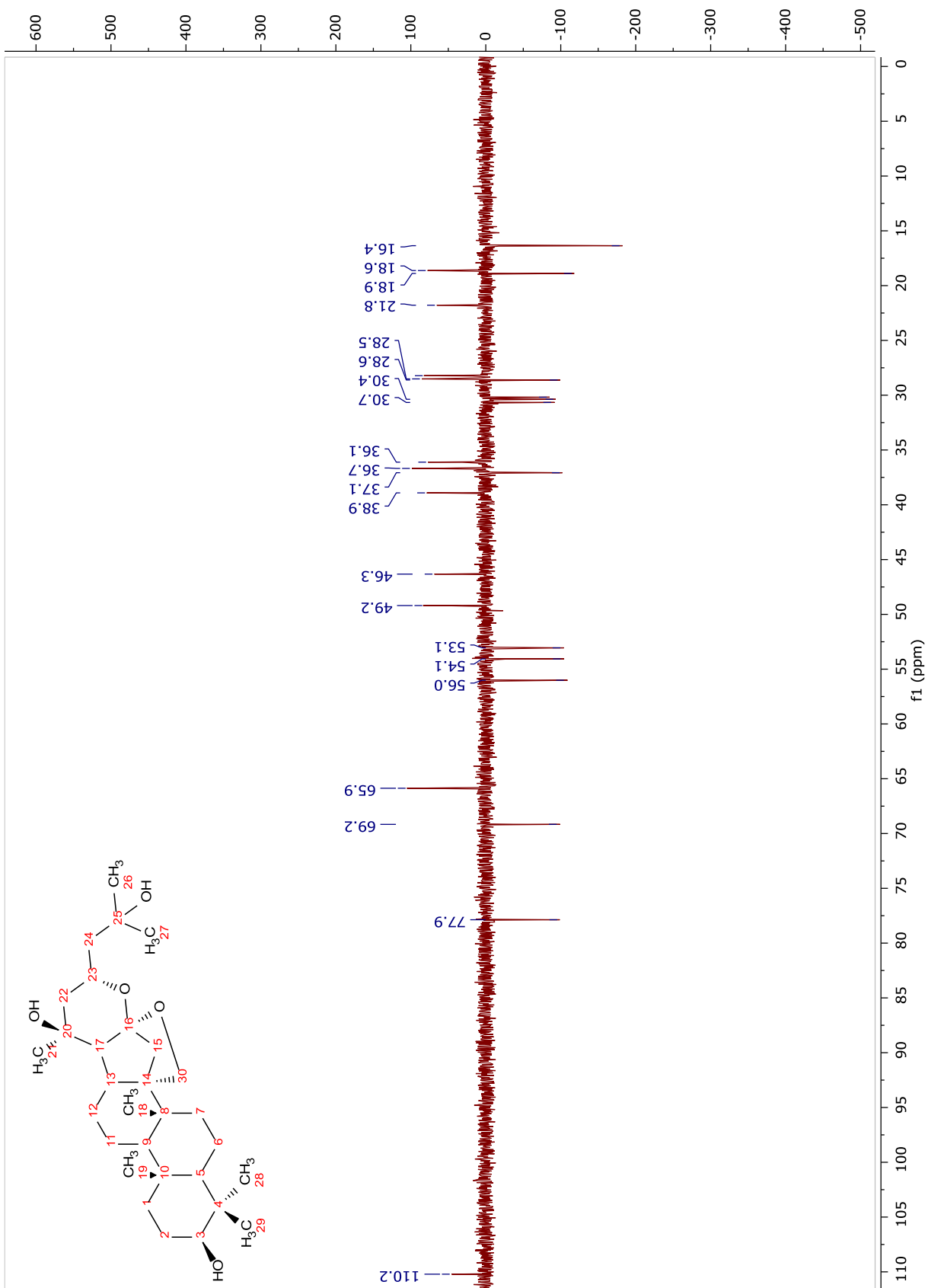


Figura 148. Espectro de DEPT-135 de **Zg4** (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

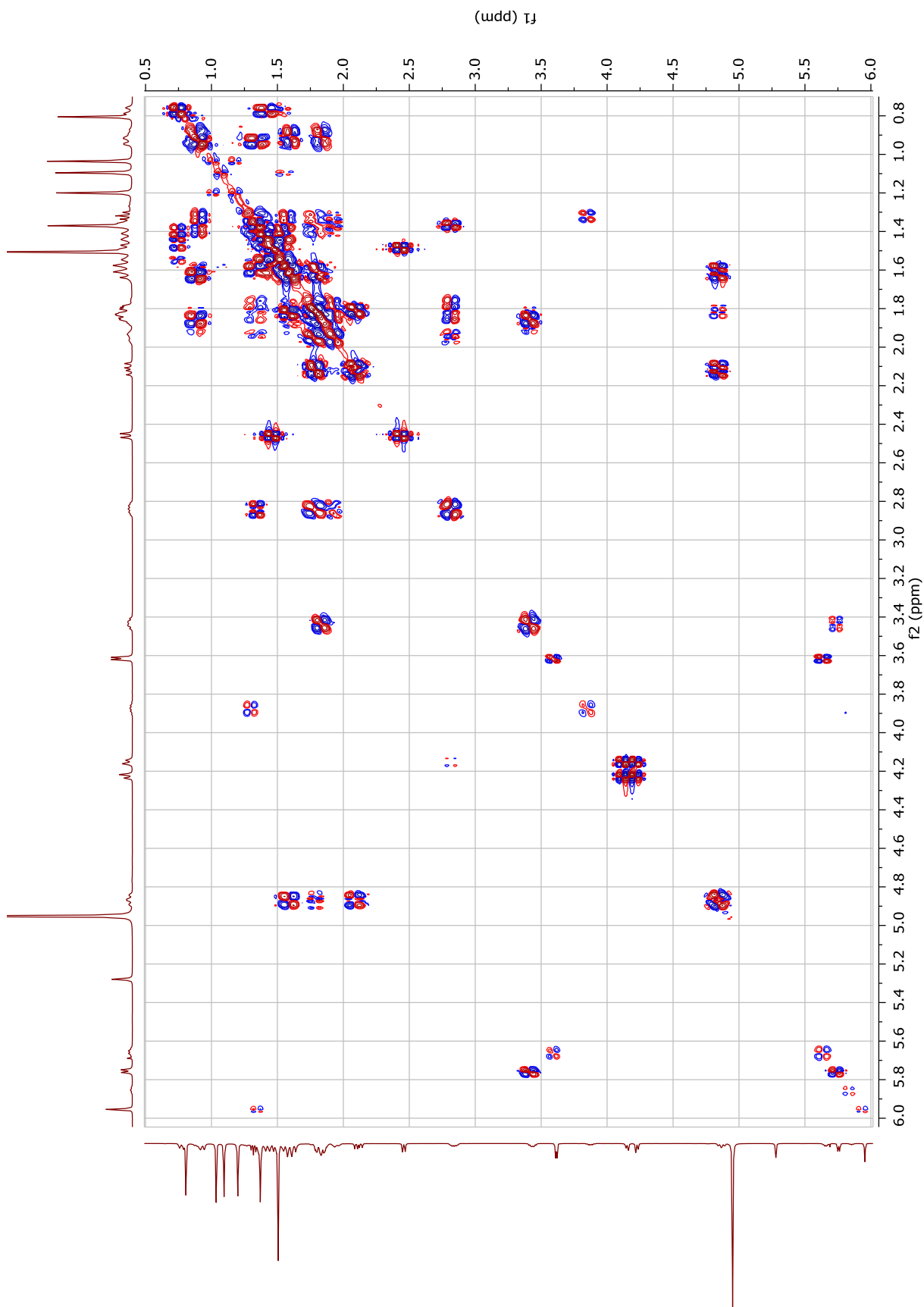
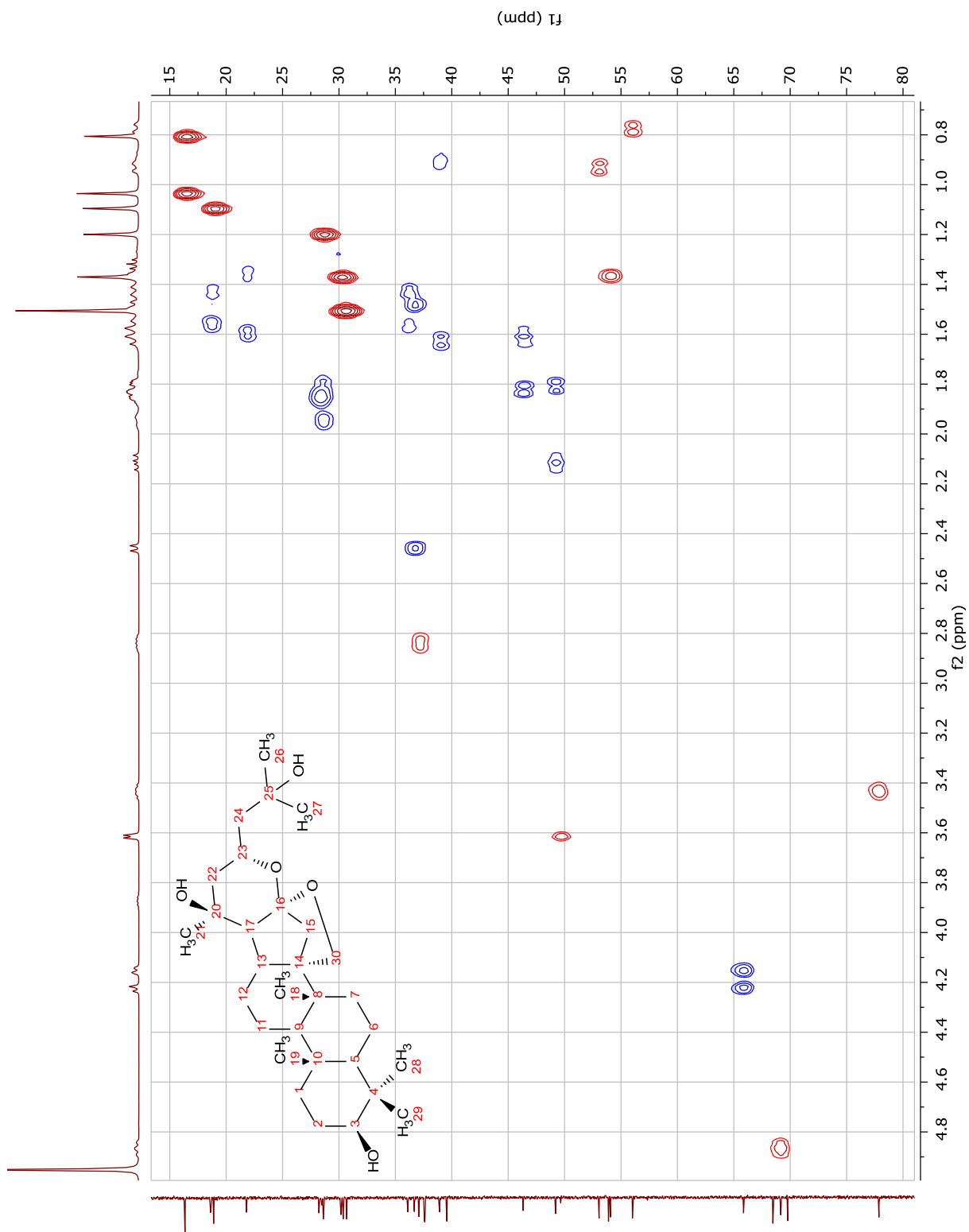


Figura 149. Espectro de COSY de **Zg4** (400 MHz,  $C_5D_5N$ ).



**Figura 150.** Espectro de HSQC de **Zg4** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

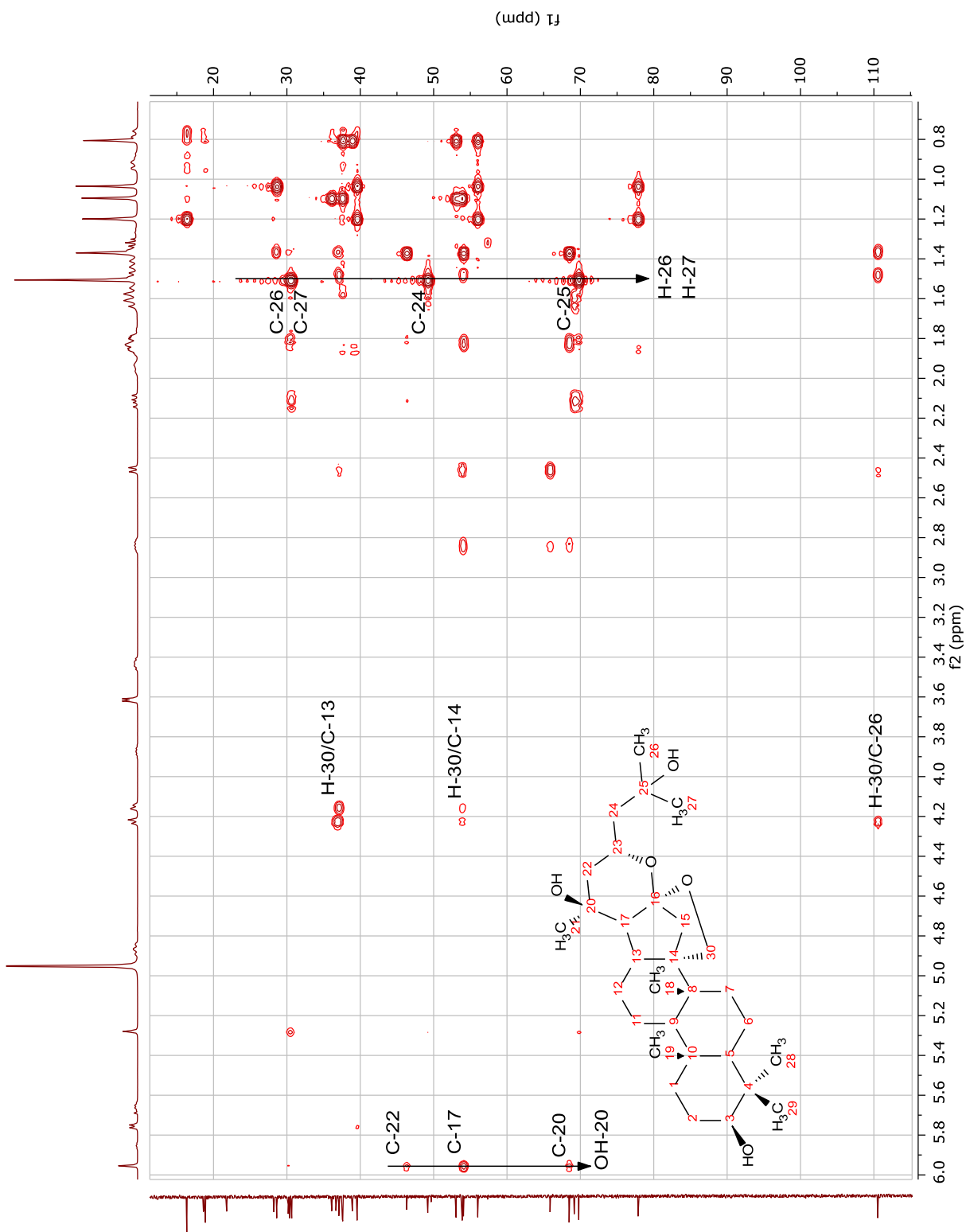


Figura 151. Espectro de HMBC de **Zg4** (400 MHz,  $C_5D_5N$ ).



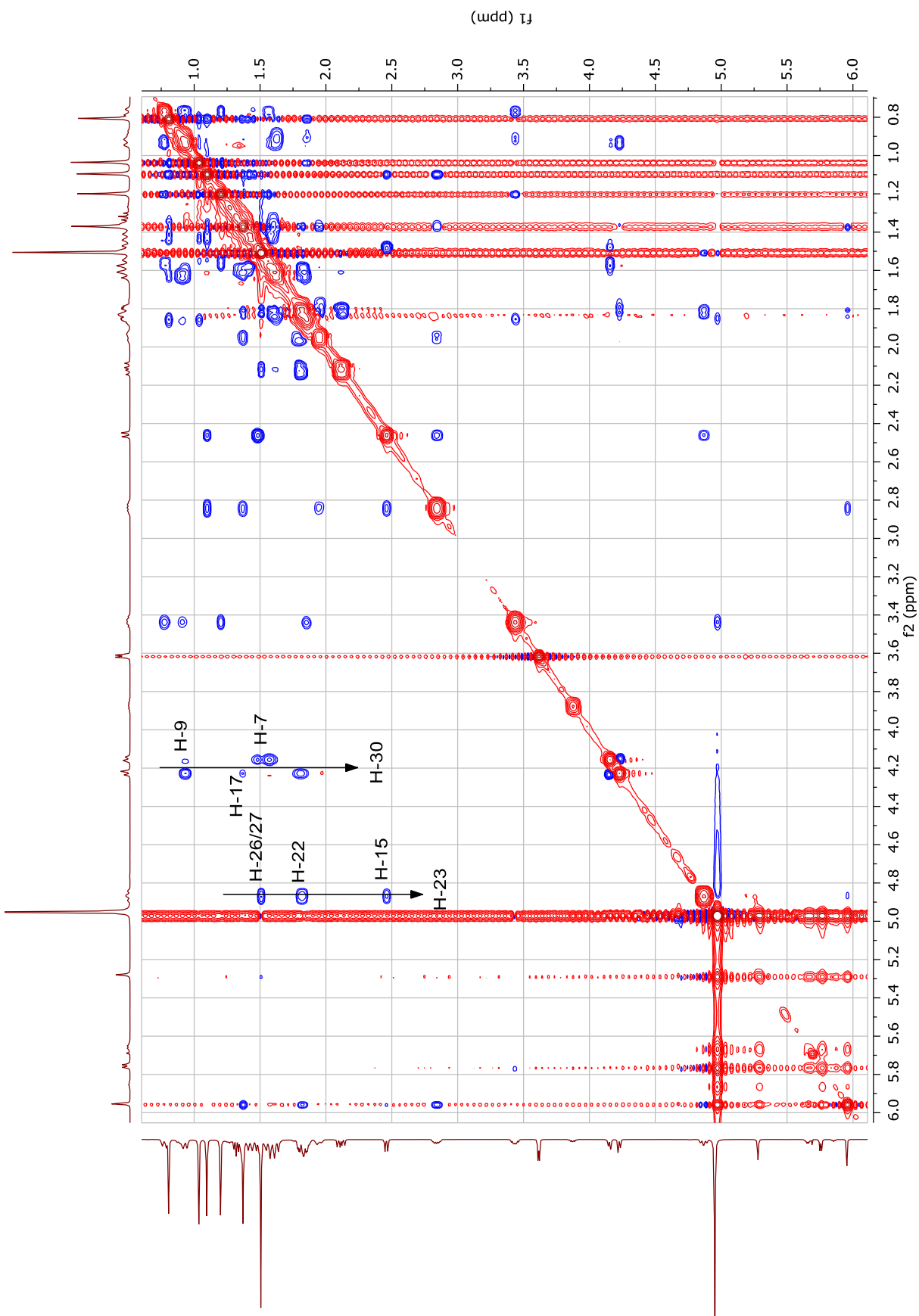


Figura 152. Espectro de NOESY de Zg4 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

CAC090pos\_171006212838 #20-25 RT: 0,08-0,10 AV: 6 NL: 8,14E6  
T: FTMS + p ESI Full ms [100,00-2000,00]

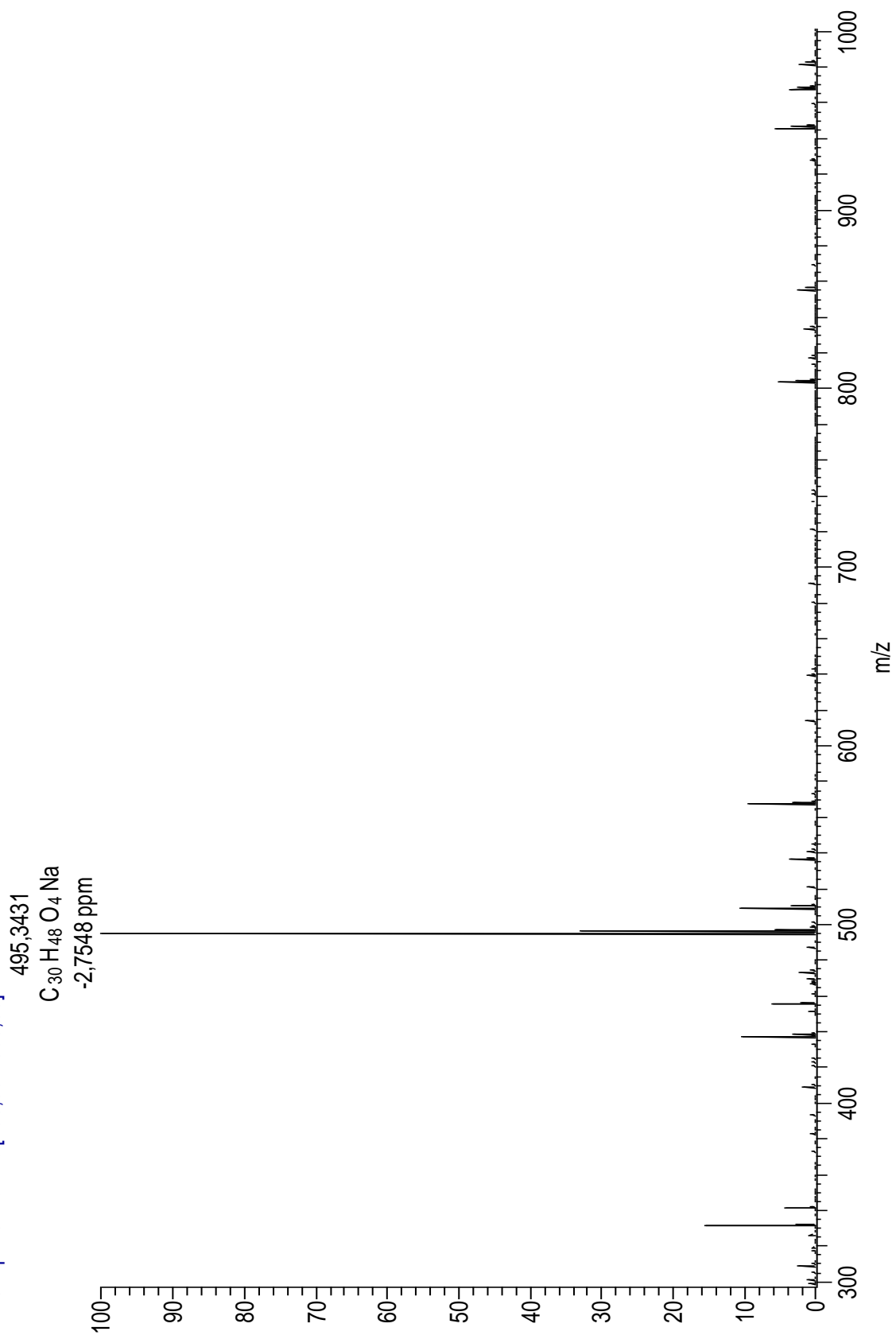


Figura 153. Espectro de massas de alta resolução de **Zg5** (ESI, modo positivo).

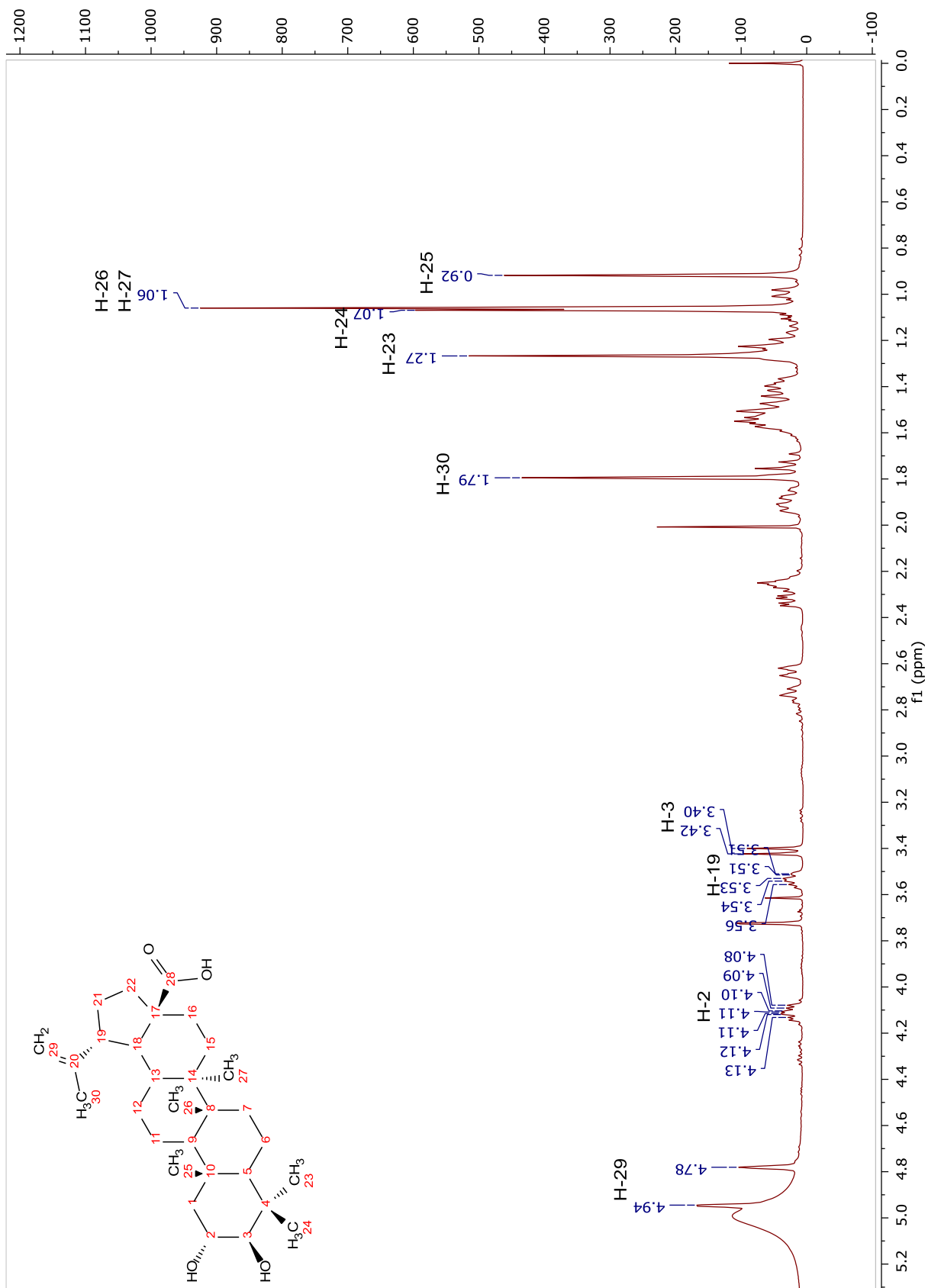


Figura 154. Espectro de RMN  $^1\text{H}$  de **Zg5** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

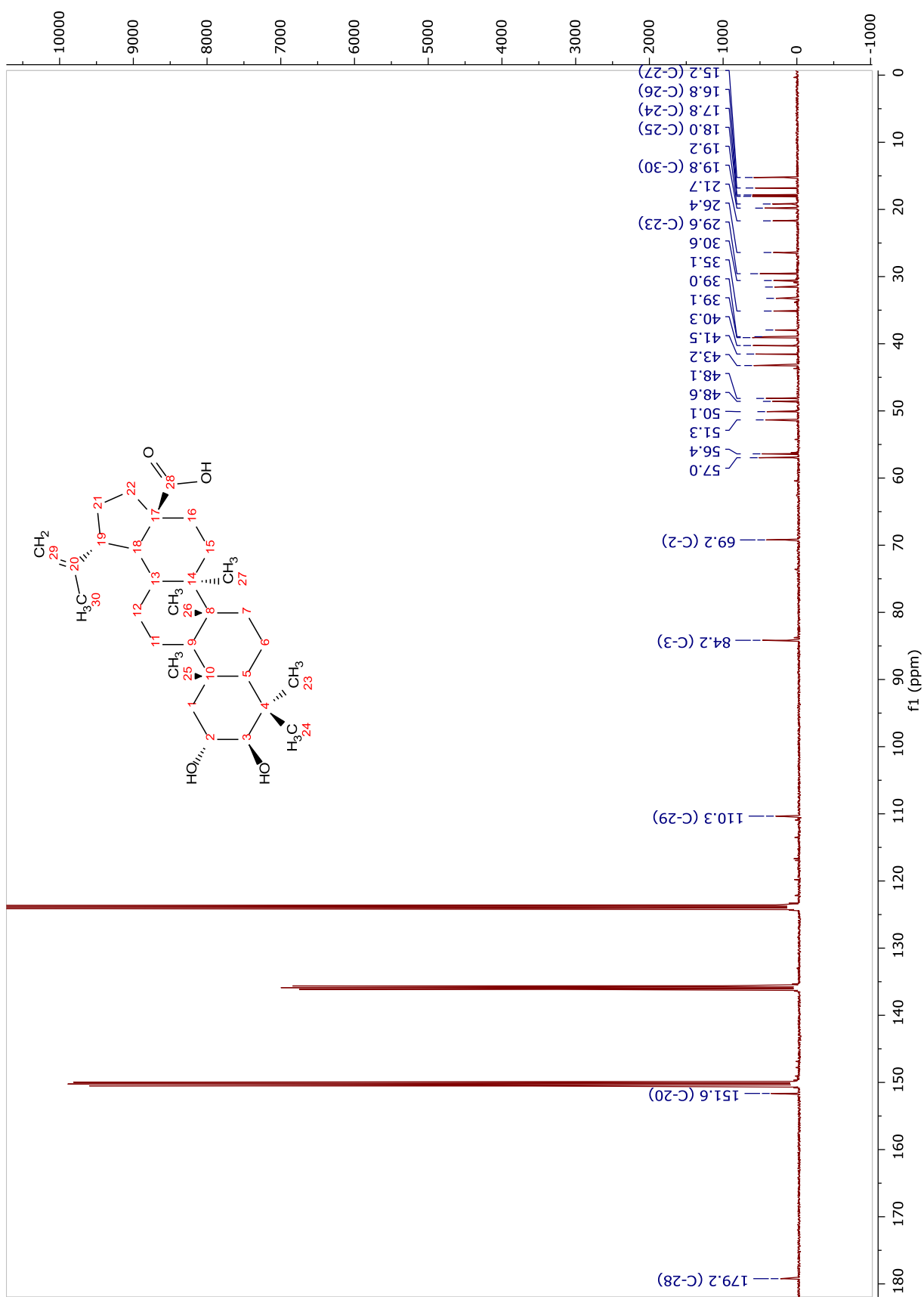


Figura 155. Espectro de RMN <sup>13</sup>C de Zg5 (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

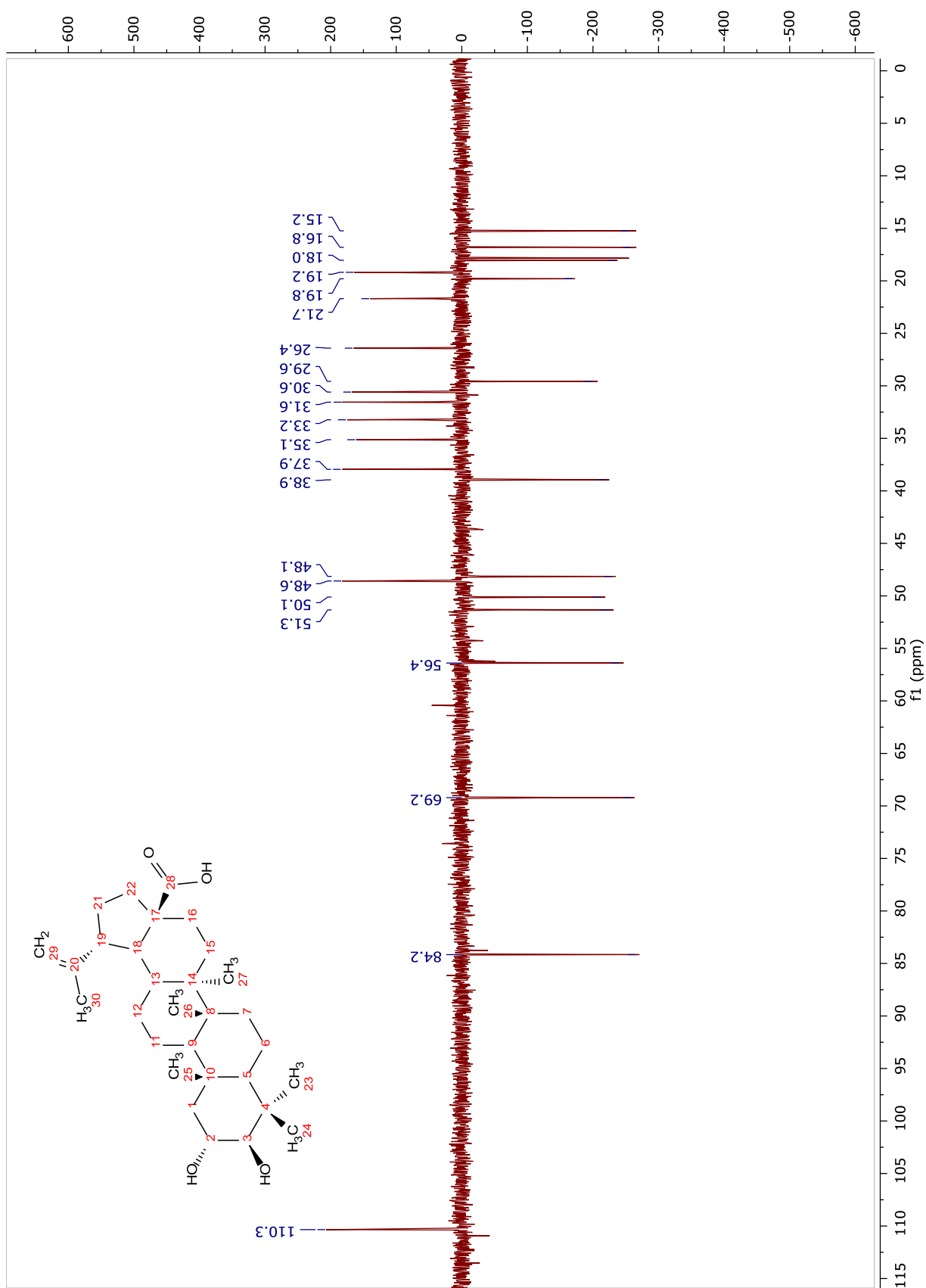


Figura 156. Espectro de DEPT-135 de **Zg5** (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

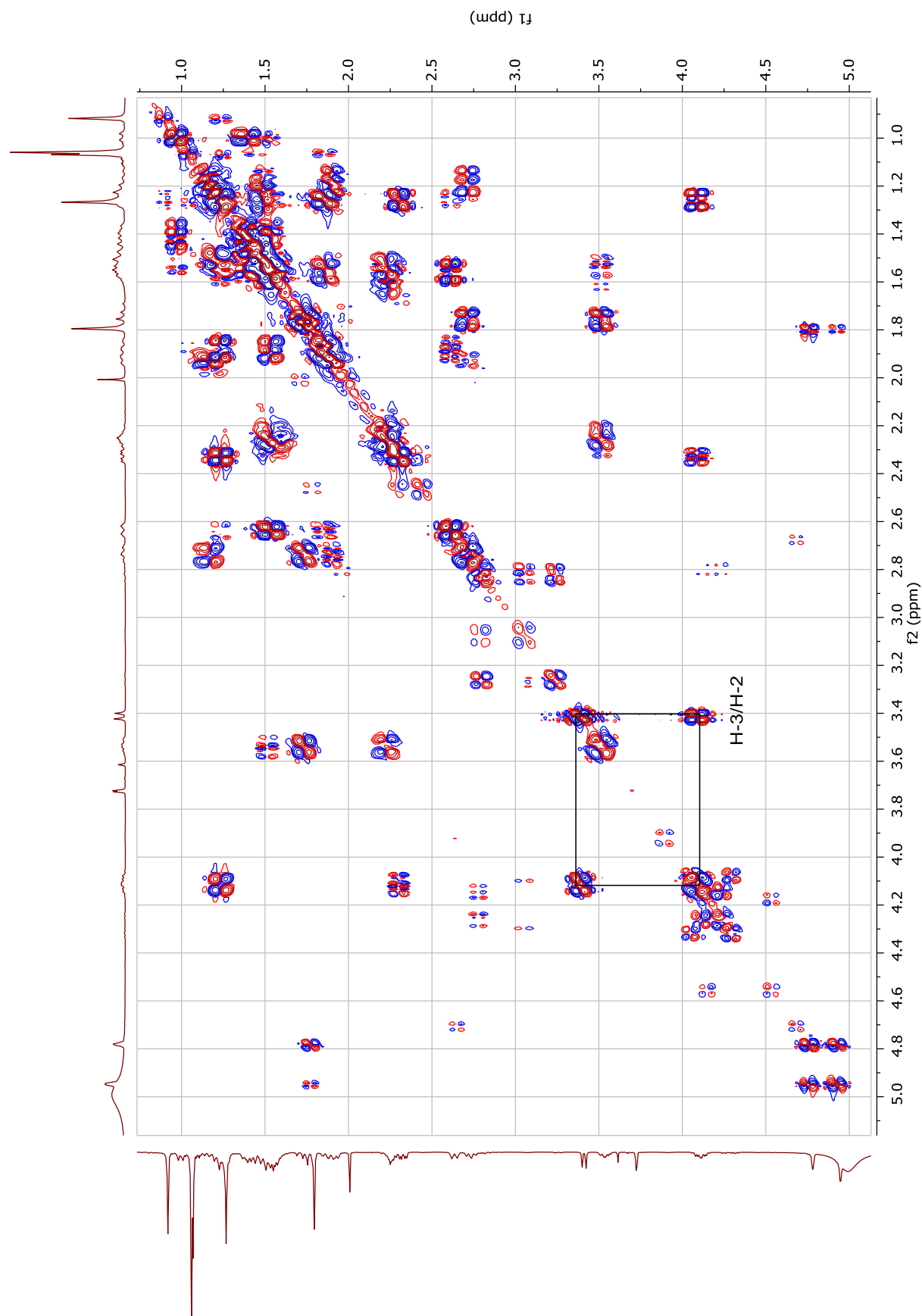


Figura 157. Espectro de COSY de **Zg5** (400 MHz,  $C_5D_5N$ ).

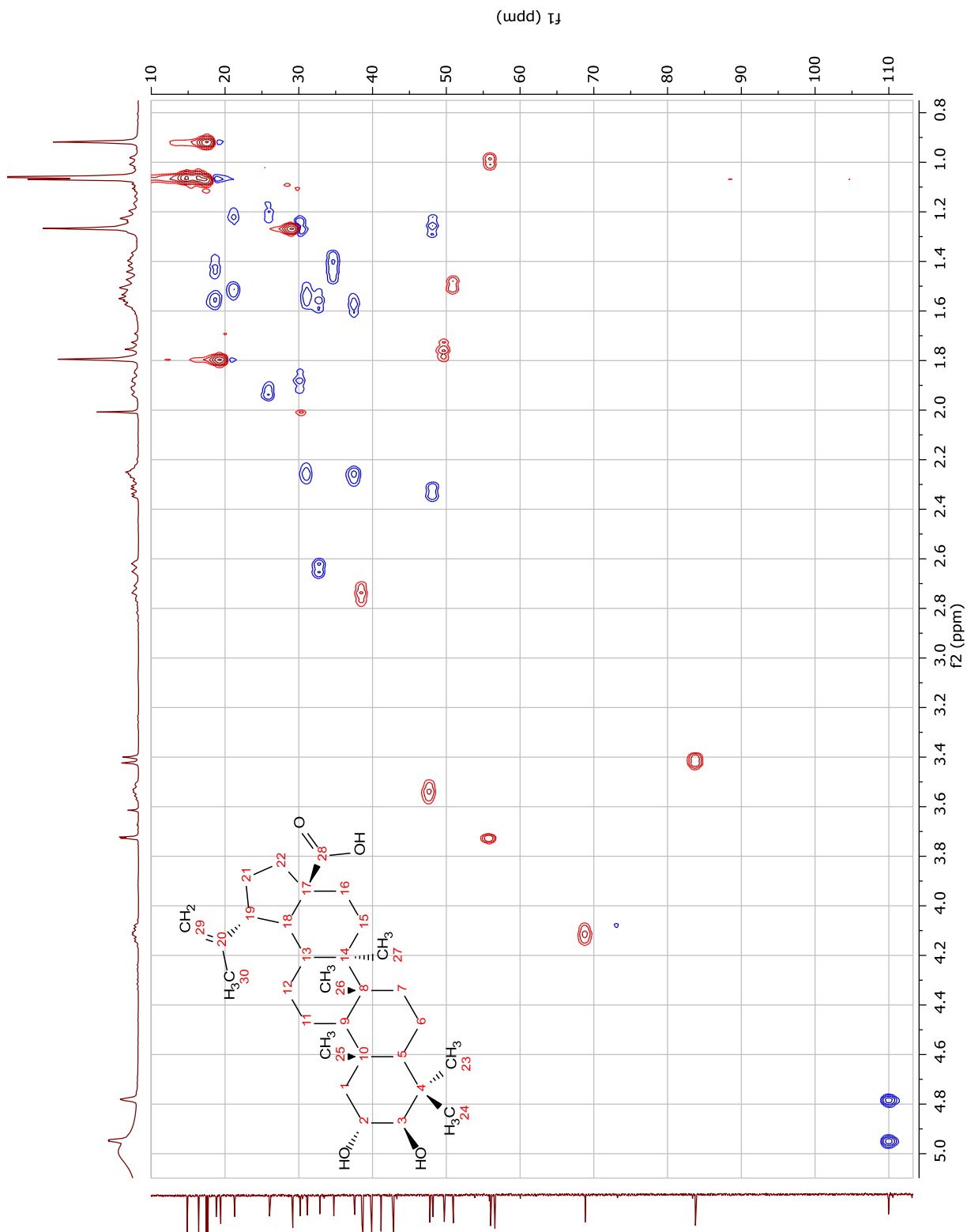


Figura 158. Espectro de HSQC de **Zg5** (400 MHz,  $C_5D_5N$ ).

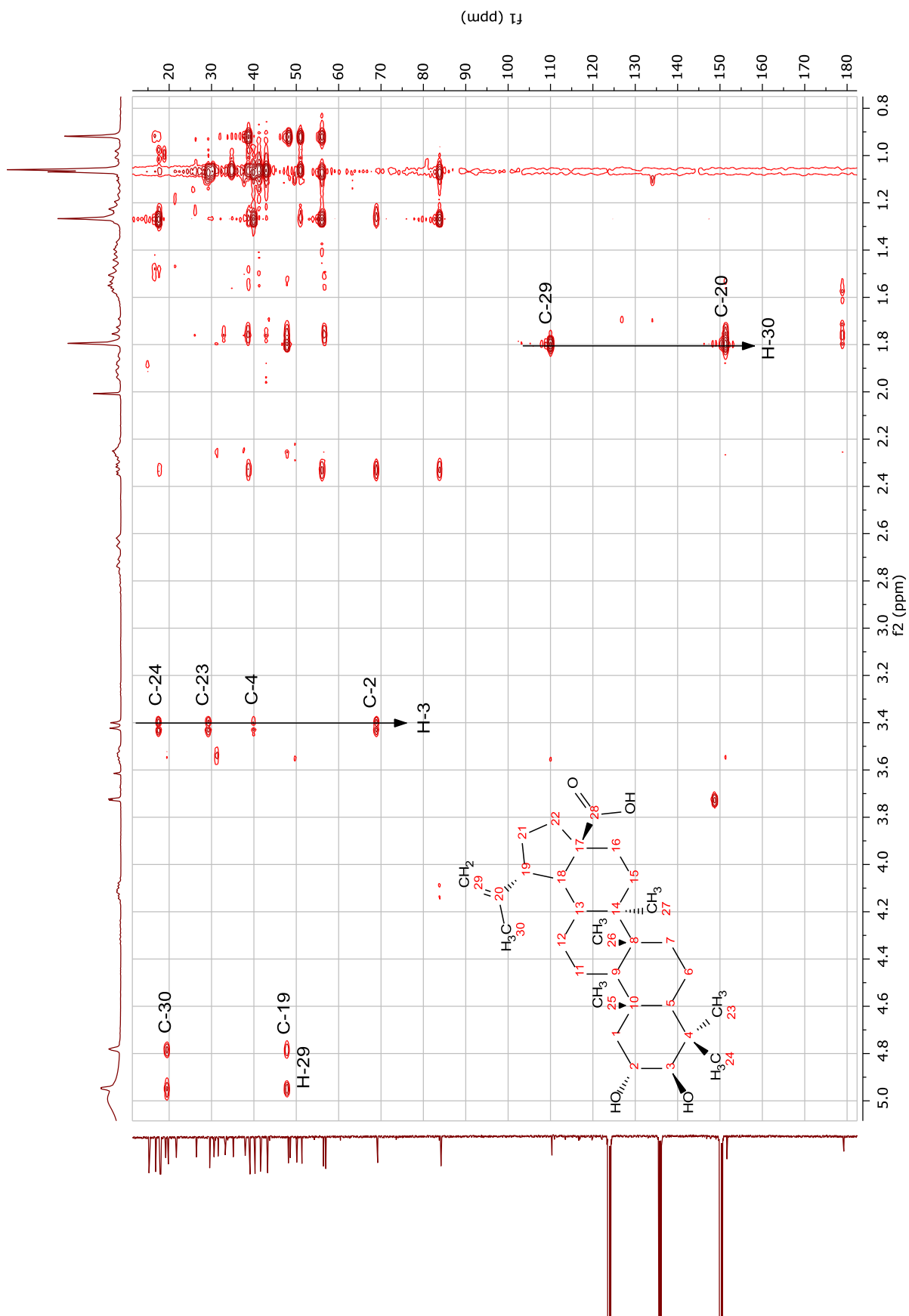


Figura 159. Espectro de HMBC de **Zg5** (400 MHz,  $C_5D_5N$ ).



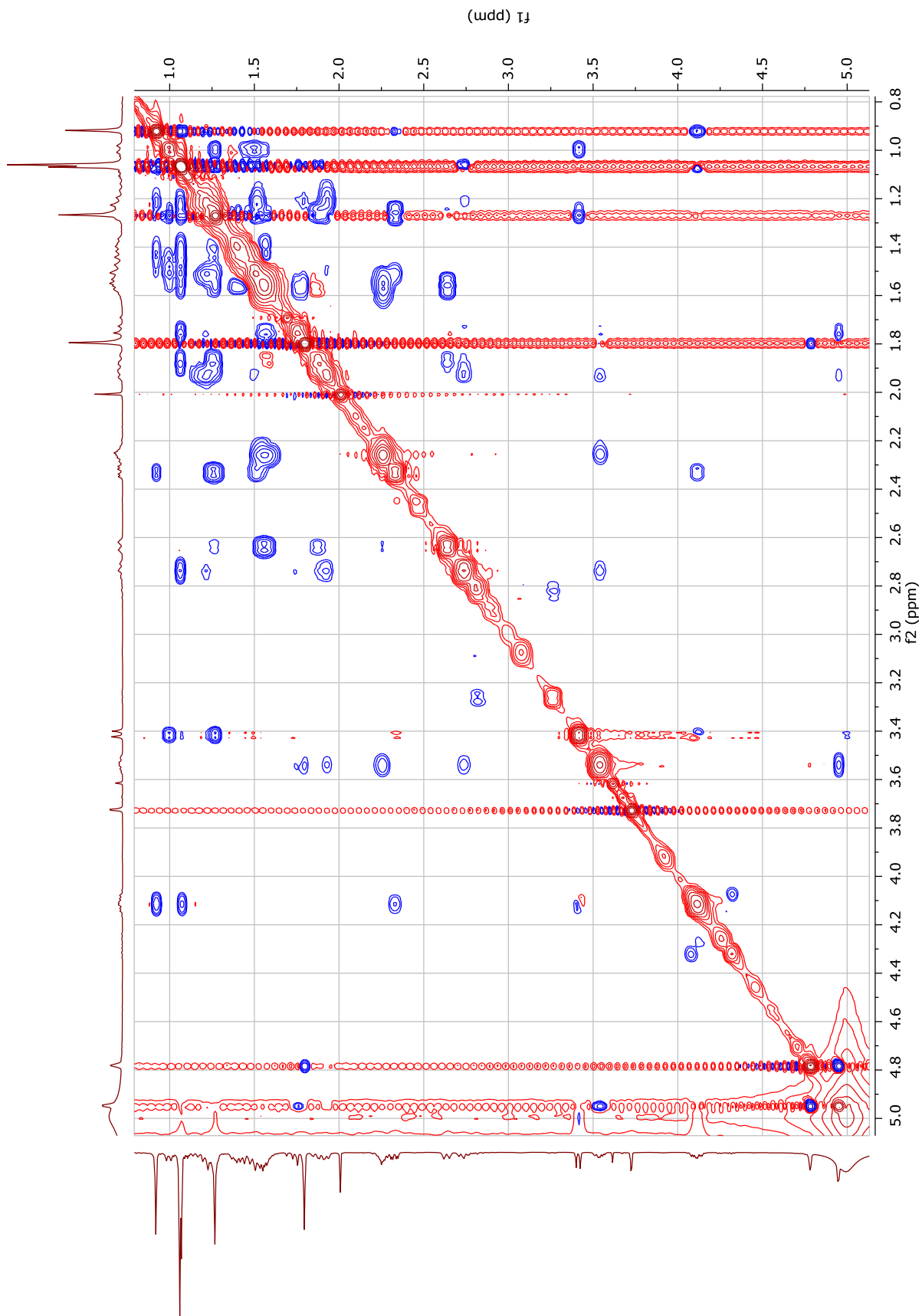


Figura 160. Espectro de NOESY de **Zg5** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

CAC073 #4-9 RT: 0,01-0,03 AV: 6 NL: 4,50E6  
T: FTMS - p ESI Full ms [50,00-2000,00]

485,3251  
C<sub>30</sub>H<sub>45</sub>O<sub>5</sub>  
-2,1157 ppm

531,3304  
C<sub>31</sub>H<sub>47</sub>O<sub>7</sub>  
-2,3182 ppm

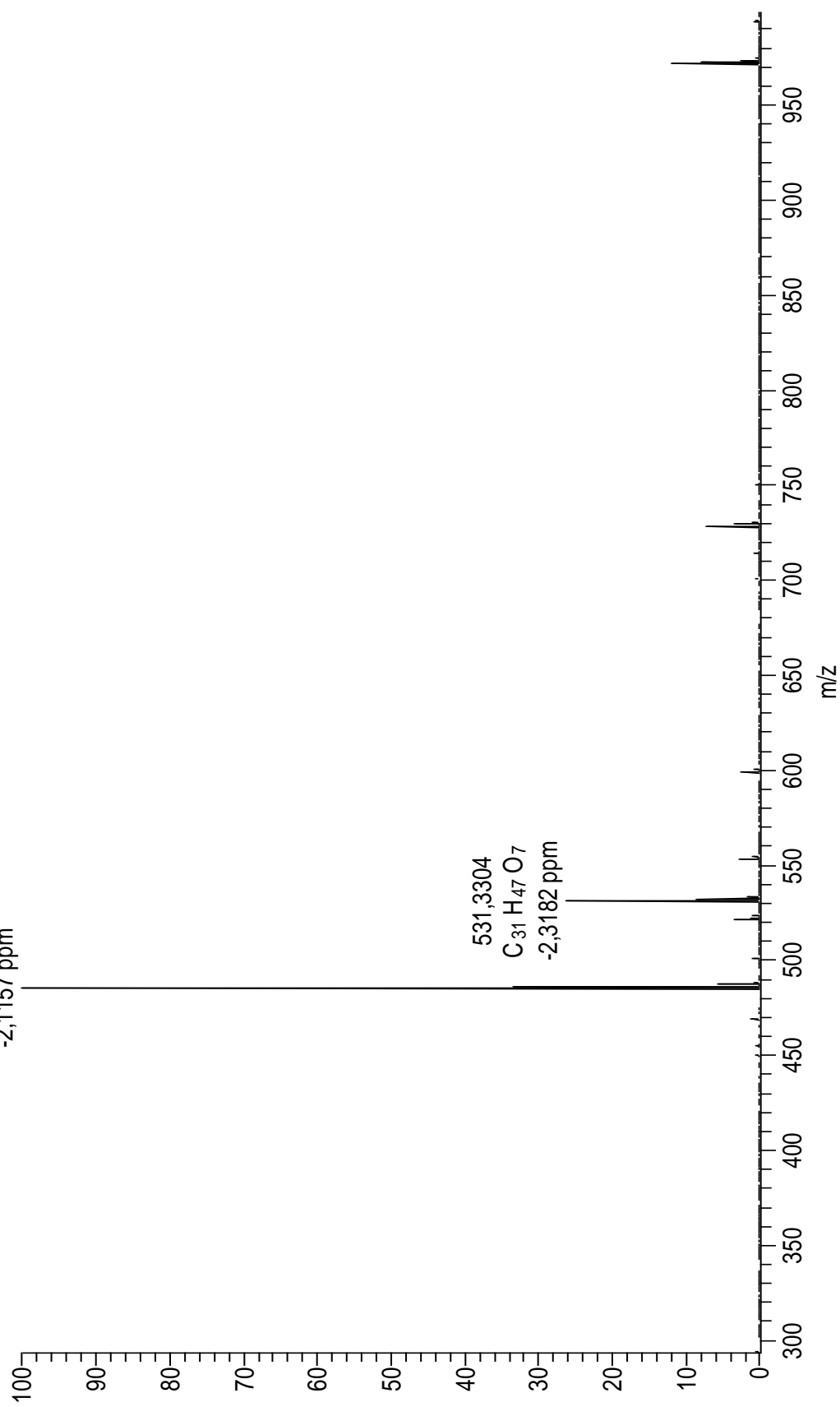


Figura 161. Espectro de massas de alta resolução de **Zg6** (ESI, modo negativo).

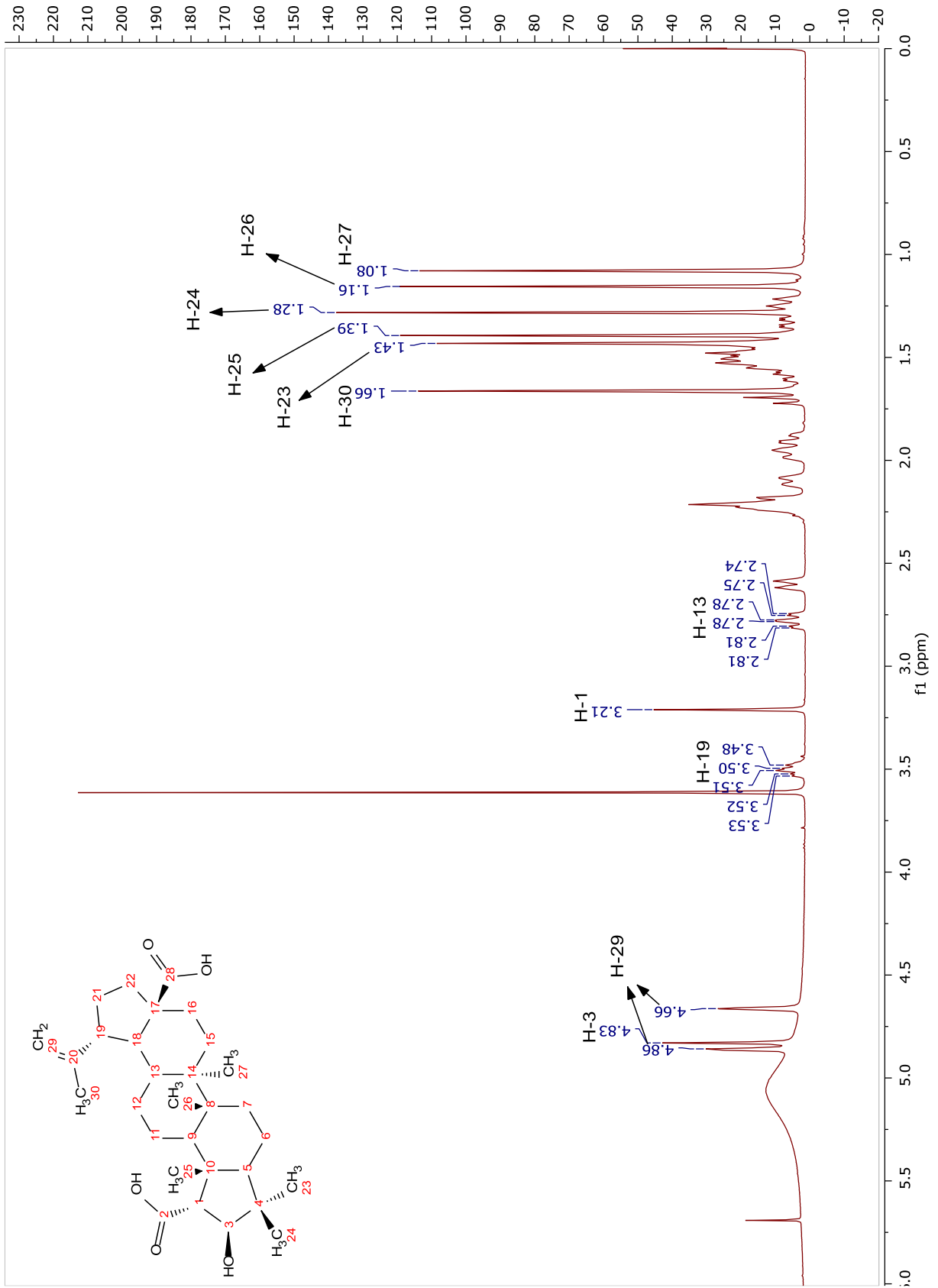


Figura 162. Espectro de RMN  $^1\text{H}$  de **Zg6** (400 MHz,  $\text{C}_3\text{D}_5\text{N}$ ).

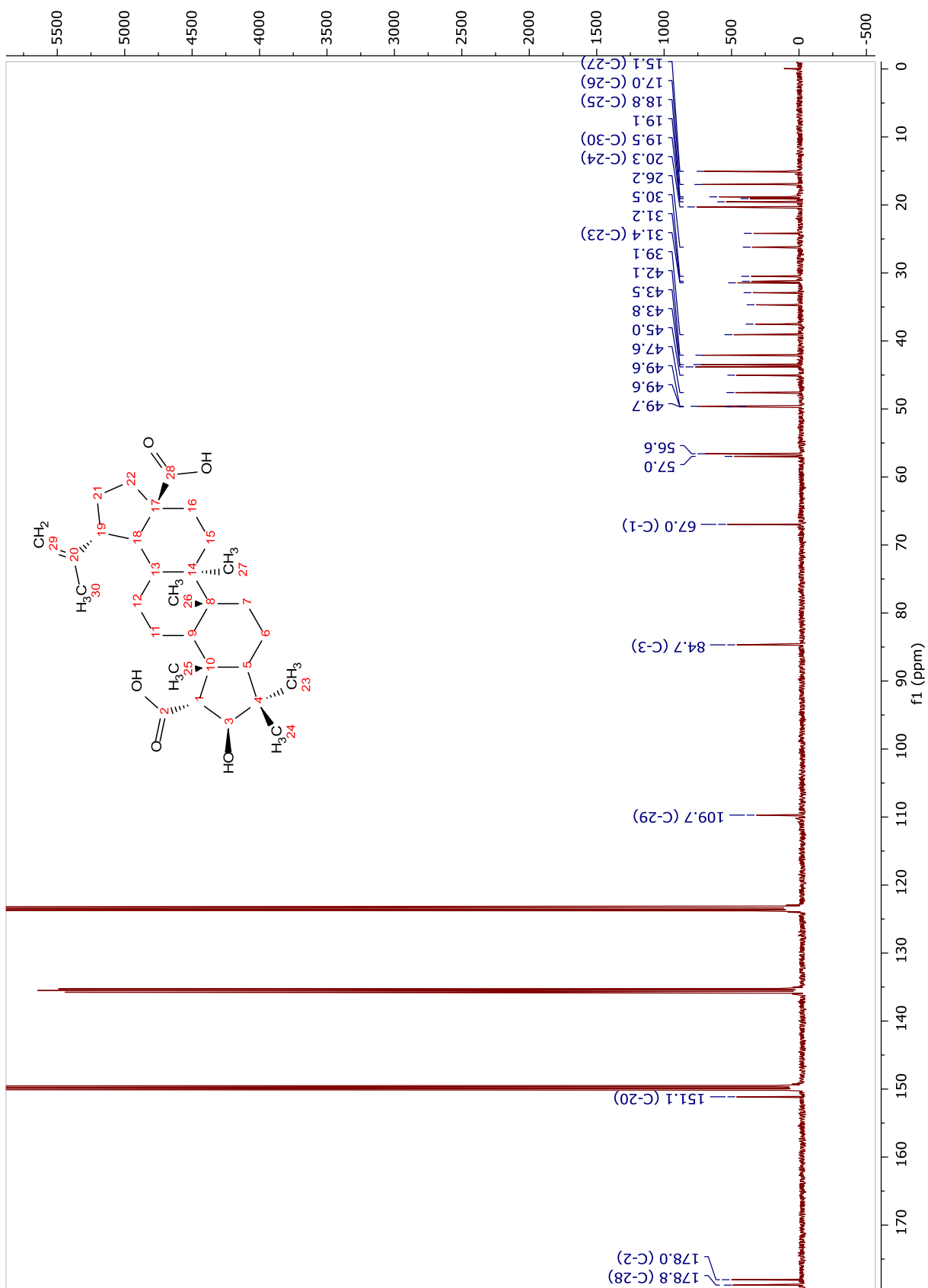


Figura 163. Espectro de RMN  $^{13}\text{C}$  de **Zg6** (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

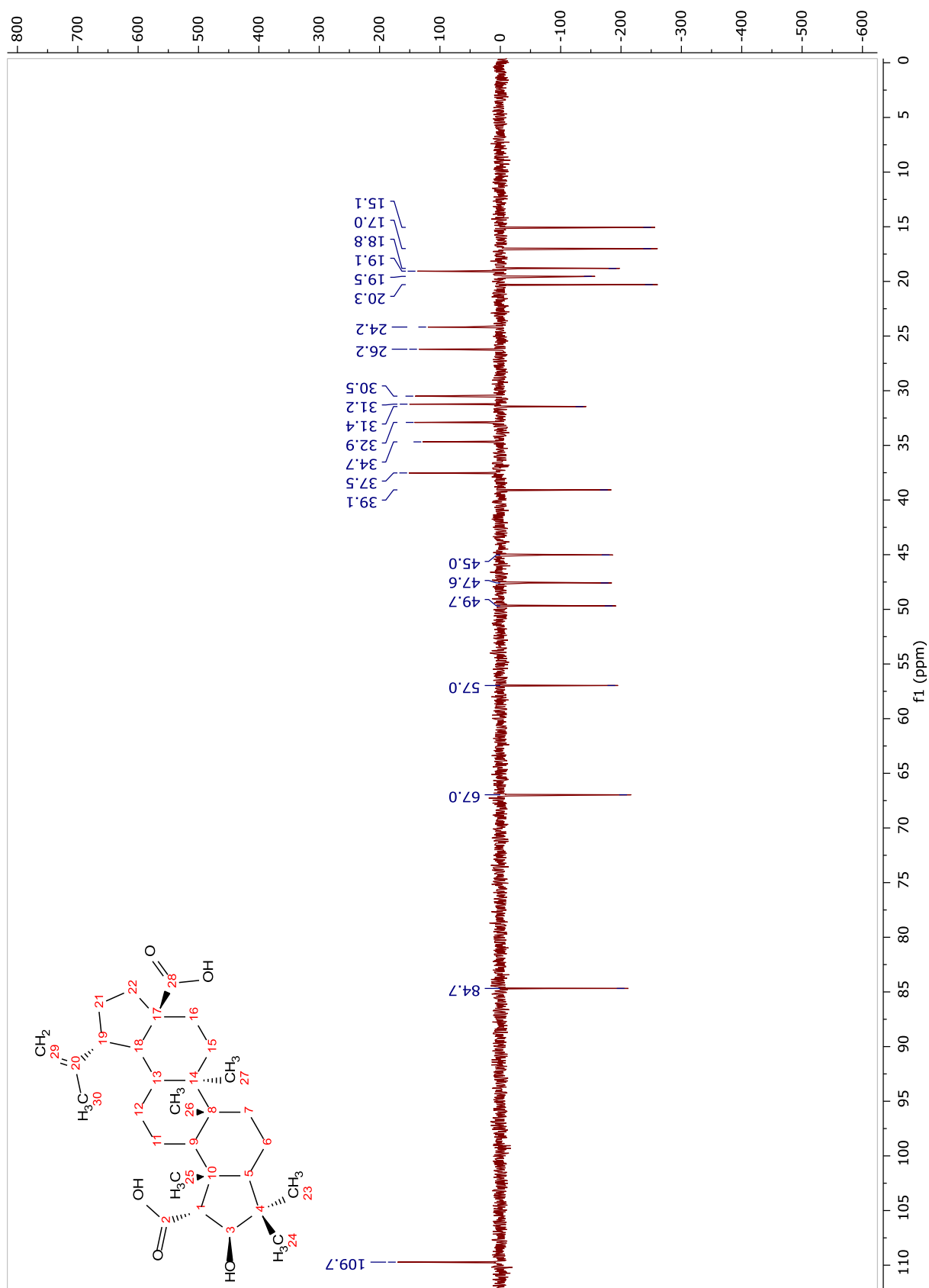


Figura 164. Espectro de DEPT-135 de **Zg6** (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

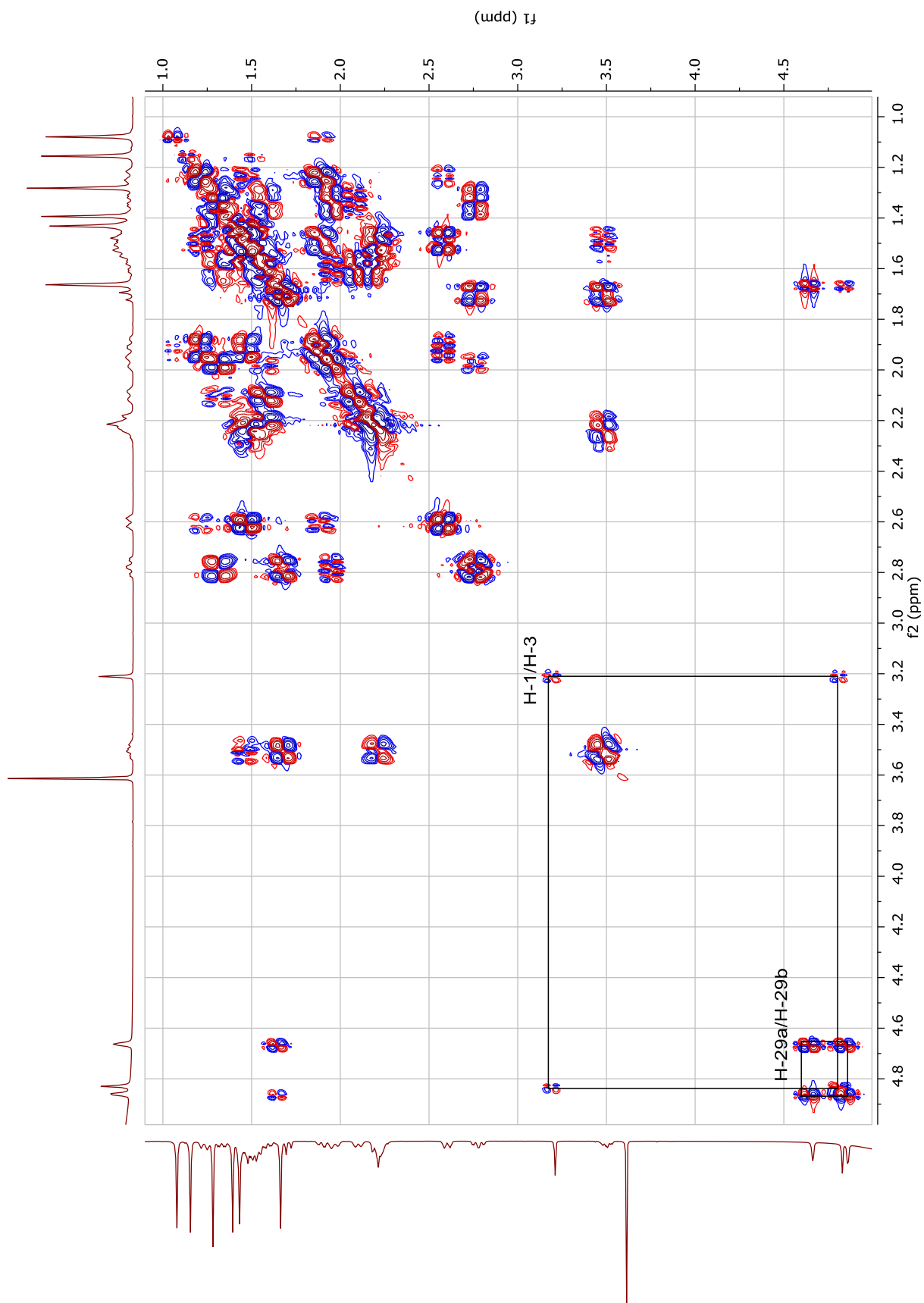


Figura 165. Espectro de COSY de **Zg6** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

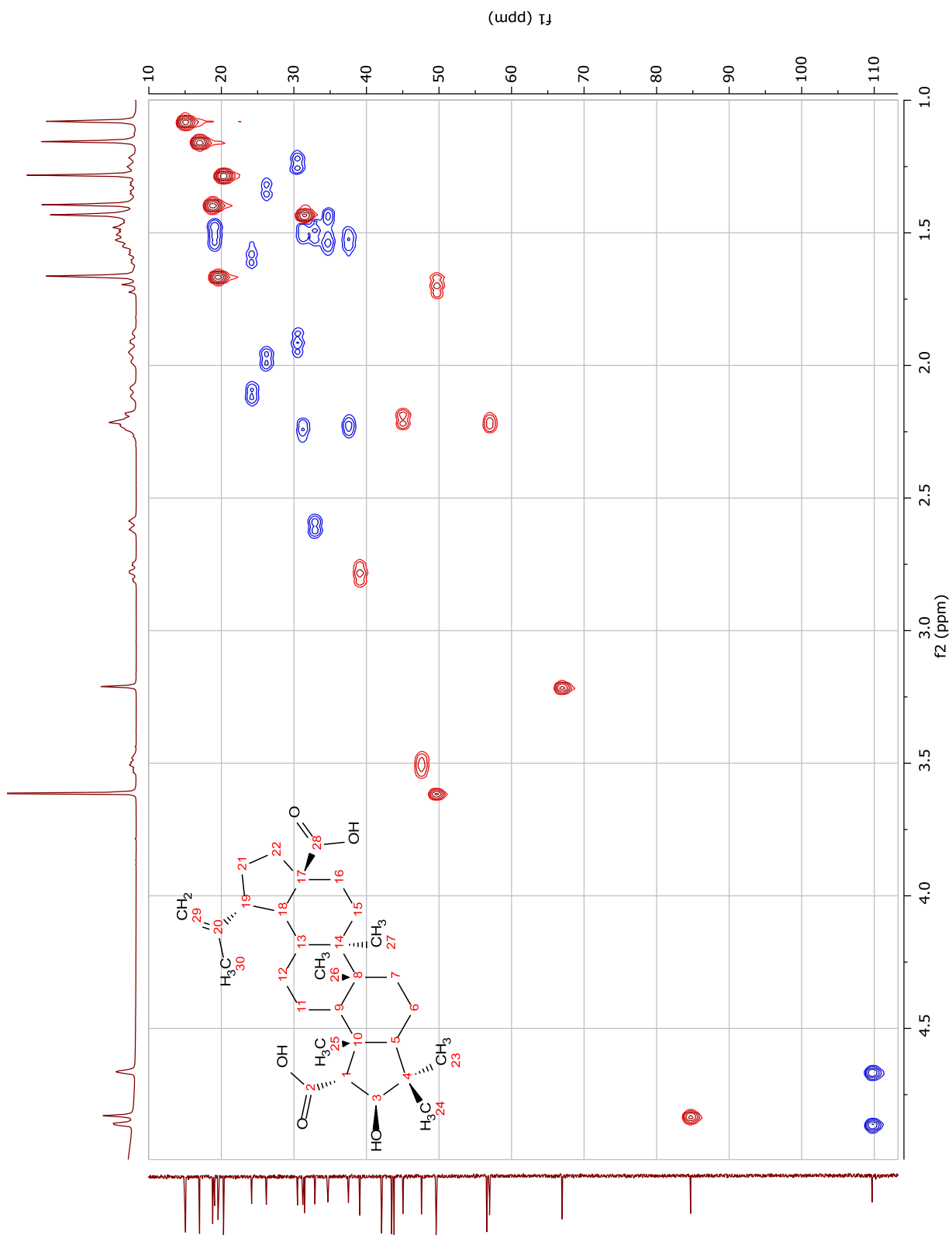


Figura 166. Espectro de HSQC de Zg6 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

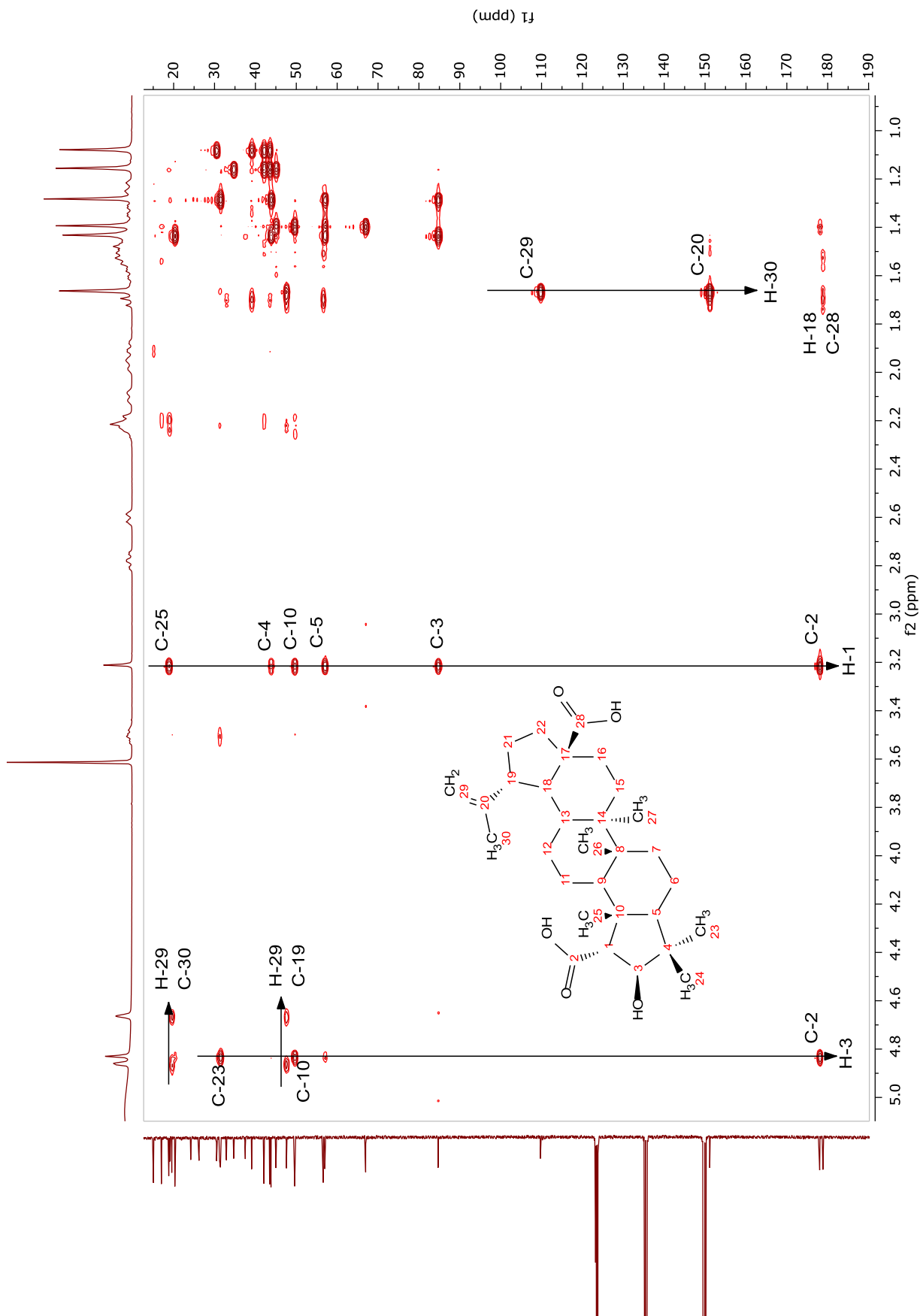


Figura 167. Espectro de HMBC de **Zg6** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



CAC100pos #18 RT: 0,07 AV: 1 NL: 8,21E6  
T: FTMS + p ESIFull.ms [100,00-2000,00]

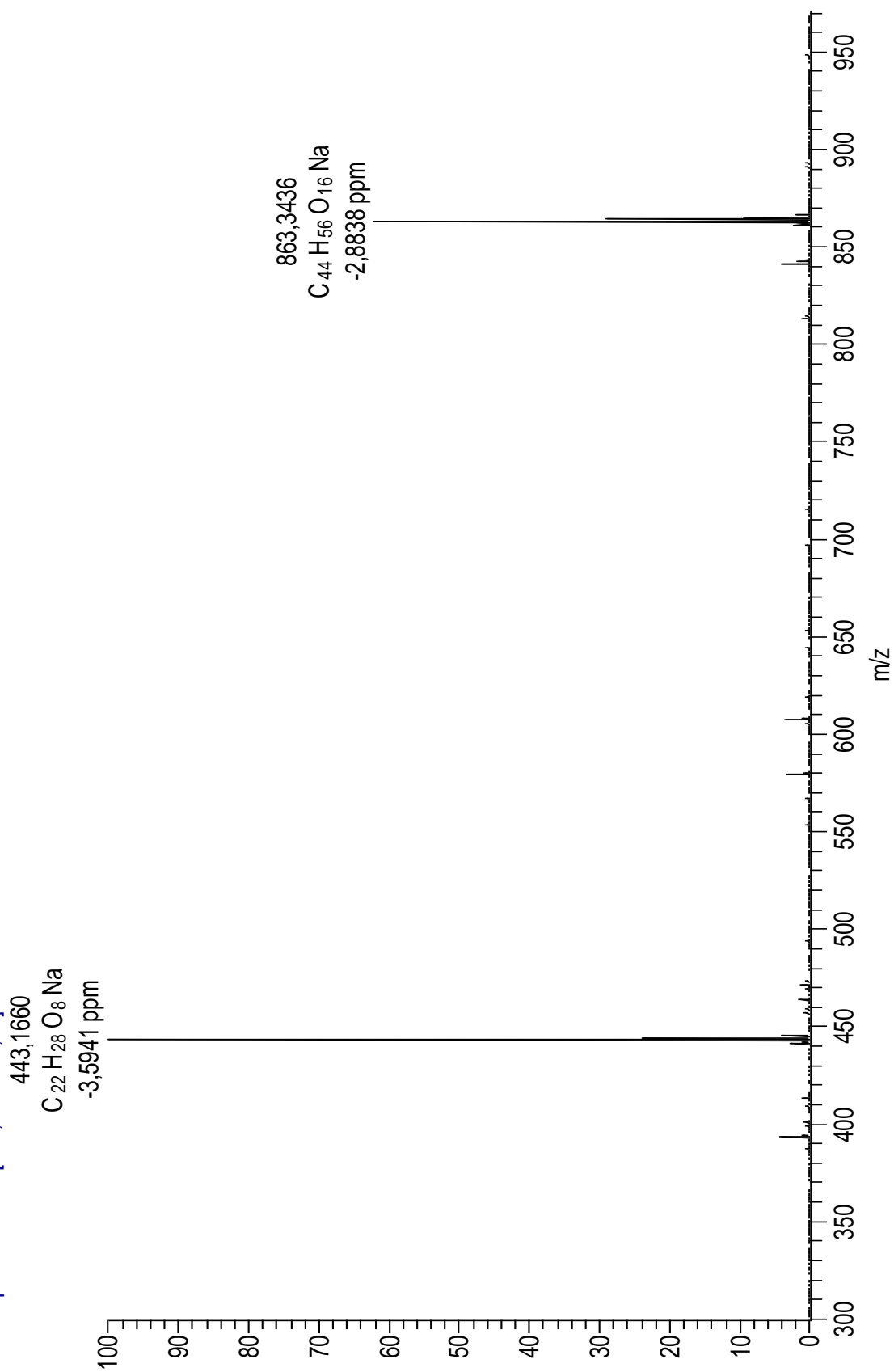


Figura 168. Espectro de massas de alta resolução de **Zg7** (ESI, modo positivo).

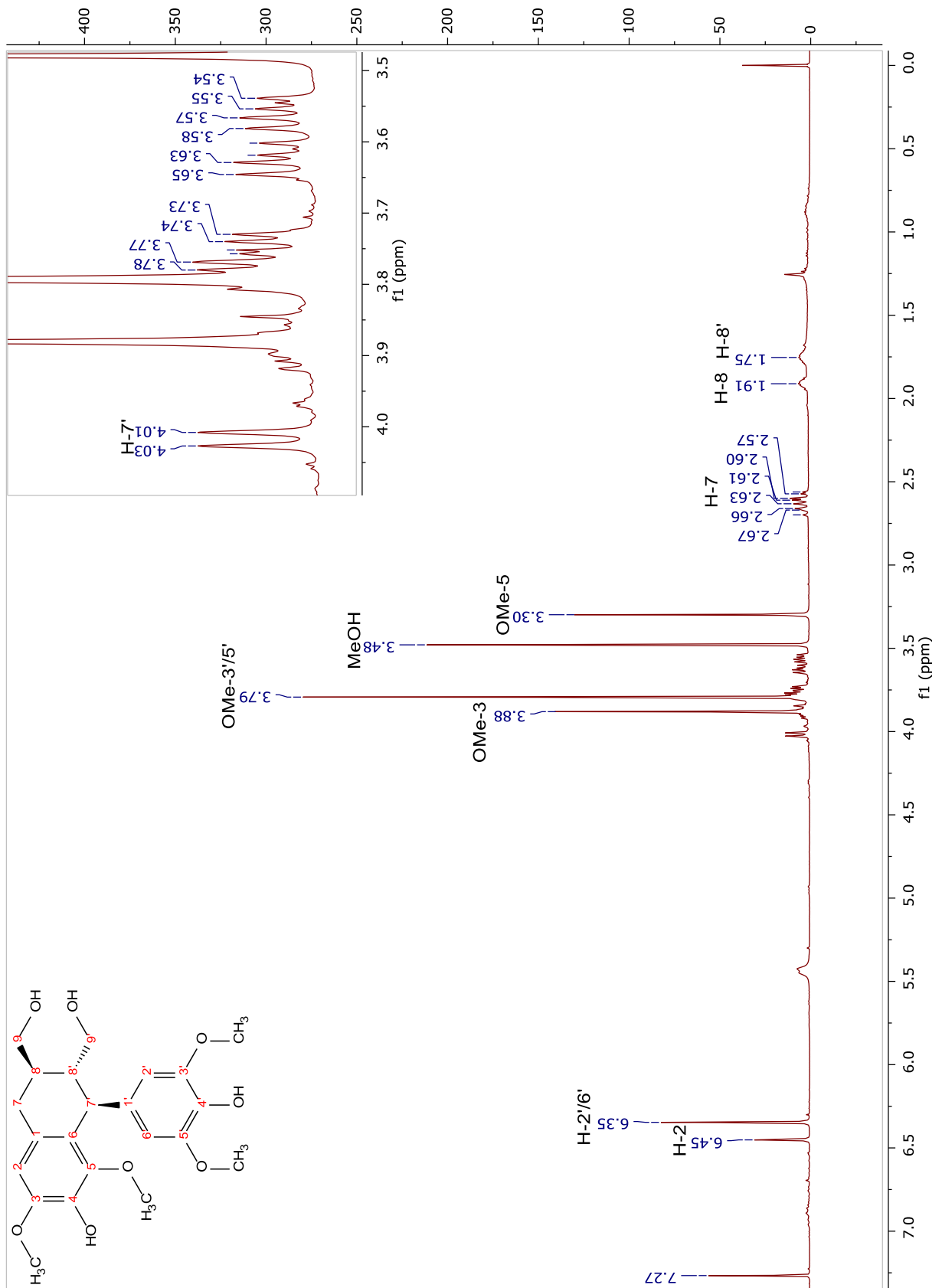


Figura 169. Espectro de RMN  $^1\text{H}$  de **Zg7** (400 MHz,  $\text{CDCl}_3$ ).

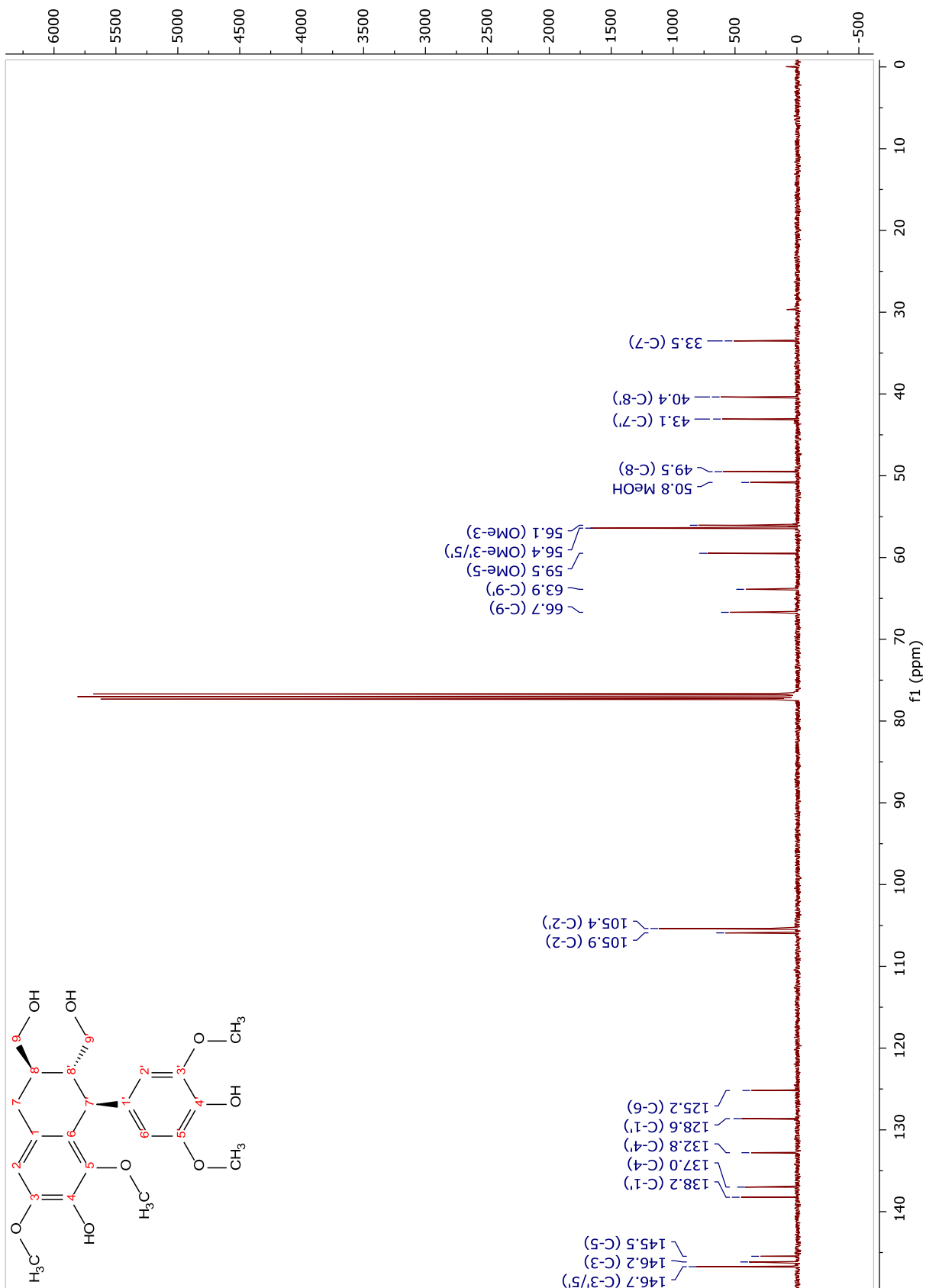


Figura 170. Espectro de RMN  $^{13}\text{C}$  de **Zg7** (100 MHz,  $\text{CDCl}_3$ ).

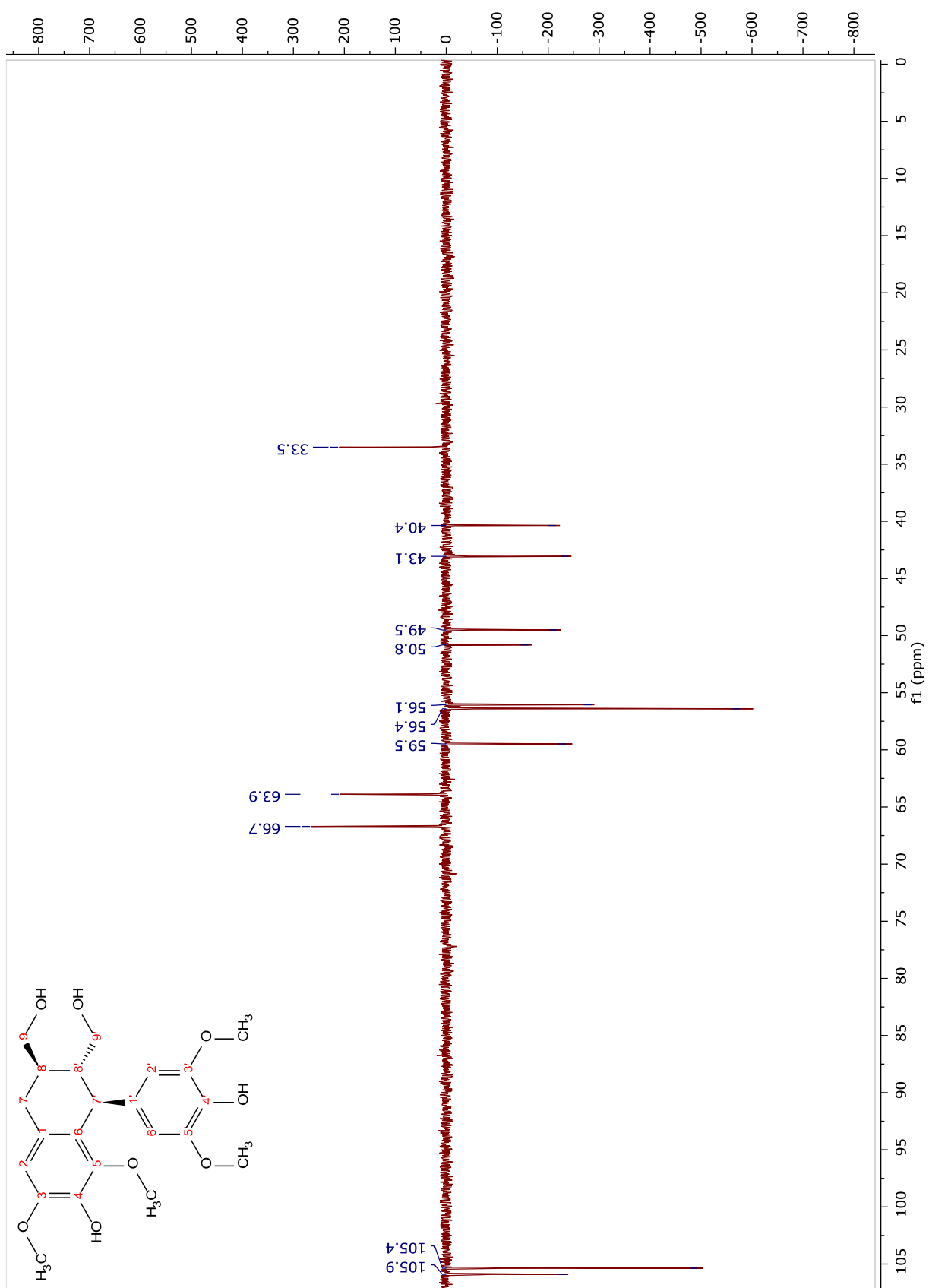


Figura 171. Espectro de DEPT-135 de **Zg7** (100 MHz,  $\text{CDCl}_3$ ).

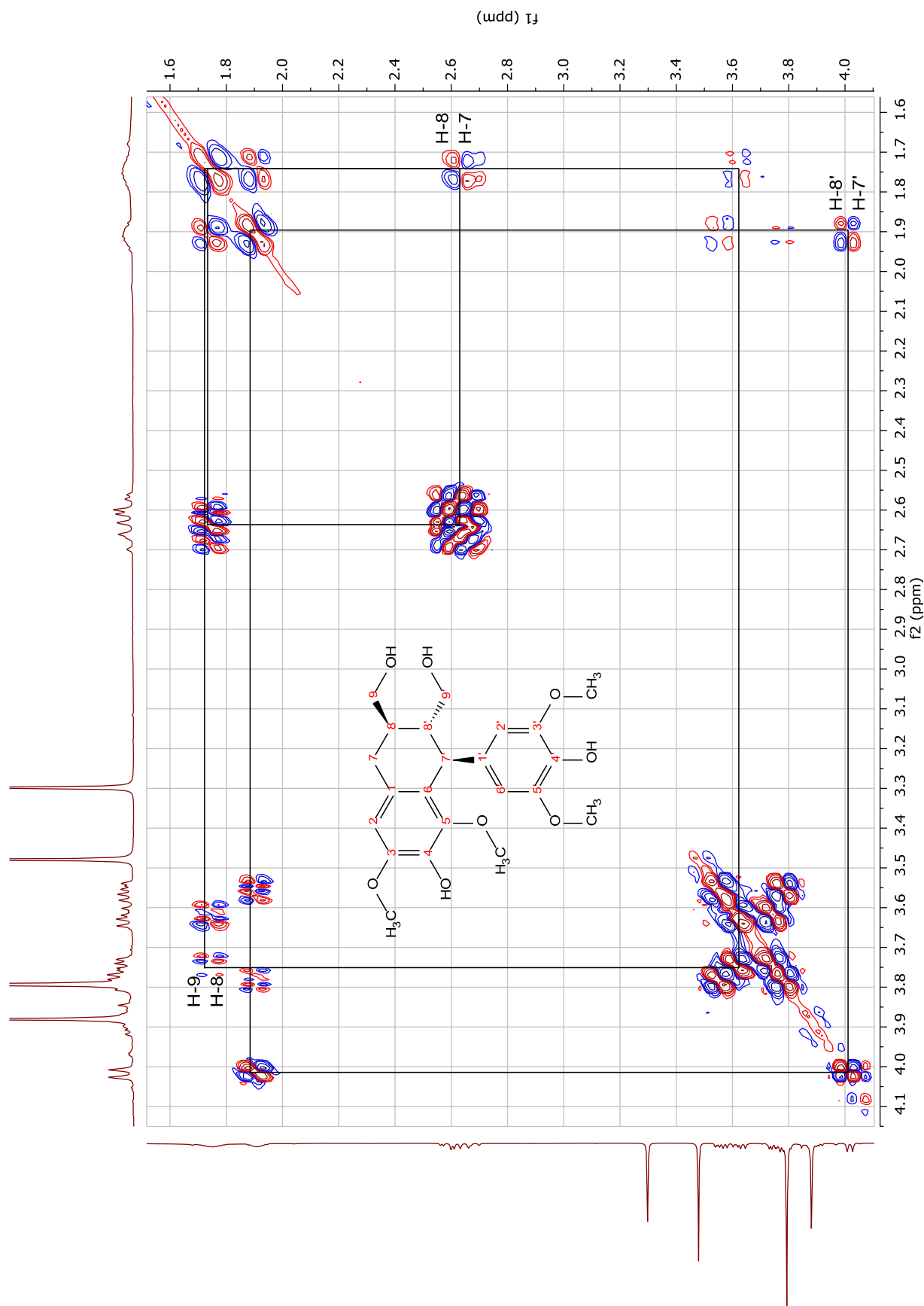


Figura 172. Espectro de COSY de **Zg7** (400 MHz, CDCl<sub>3</sub>).

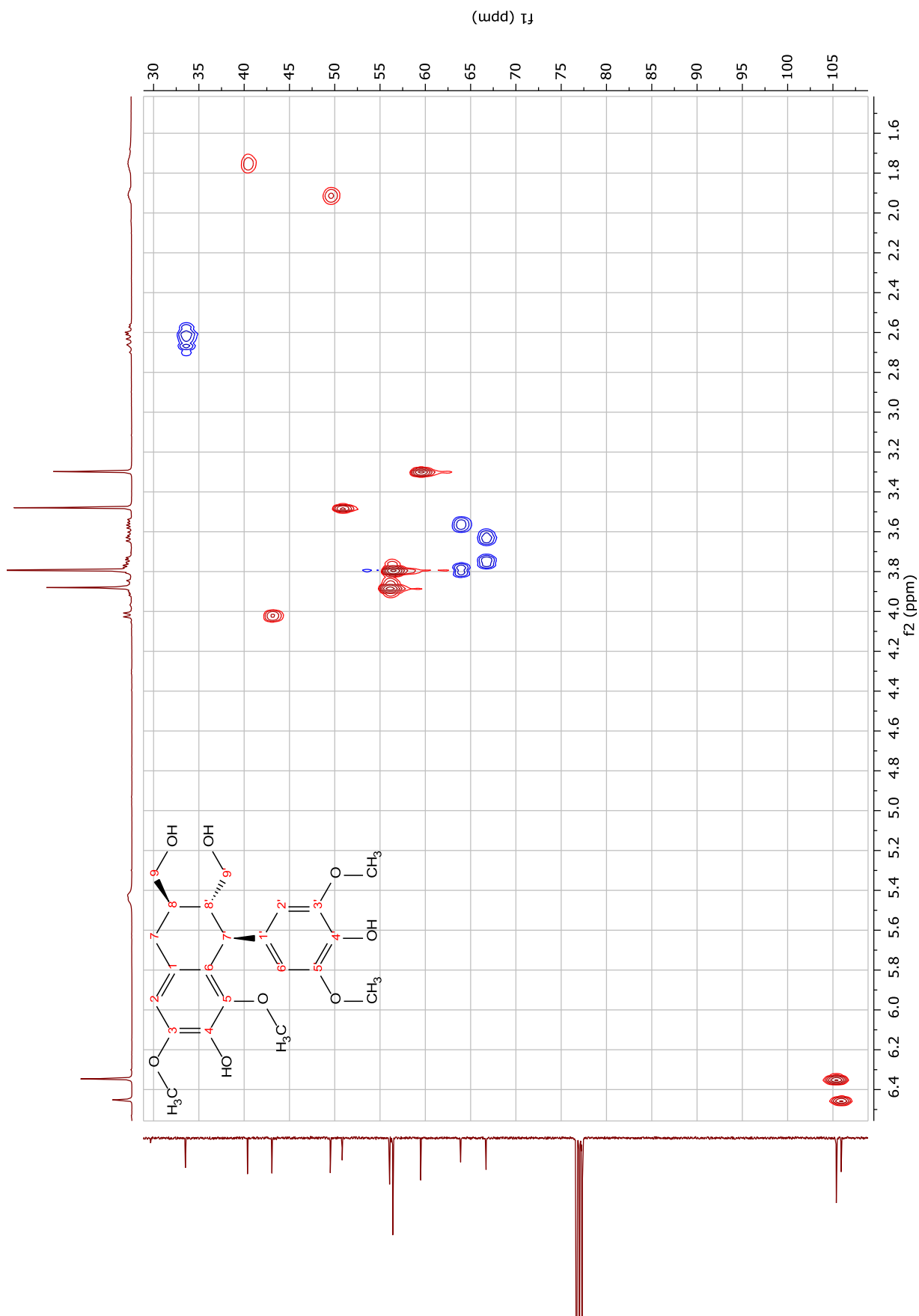


Figura 173. Espectro de HSQC de **Zg7** (400 MHz, CDCl<sub>3</sub>).

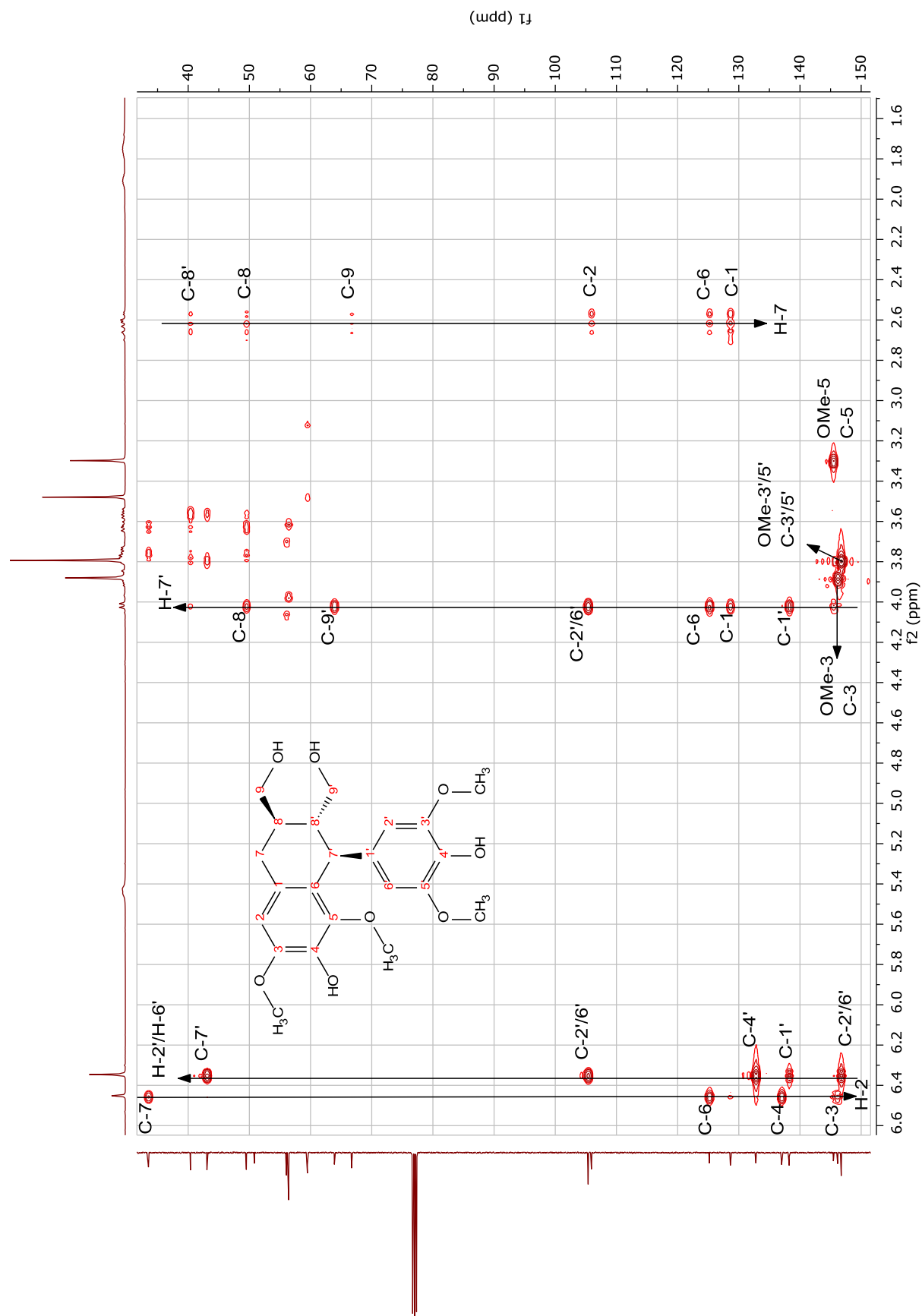
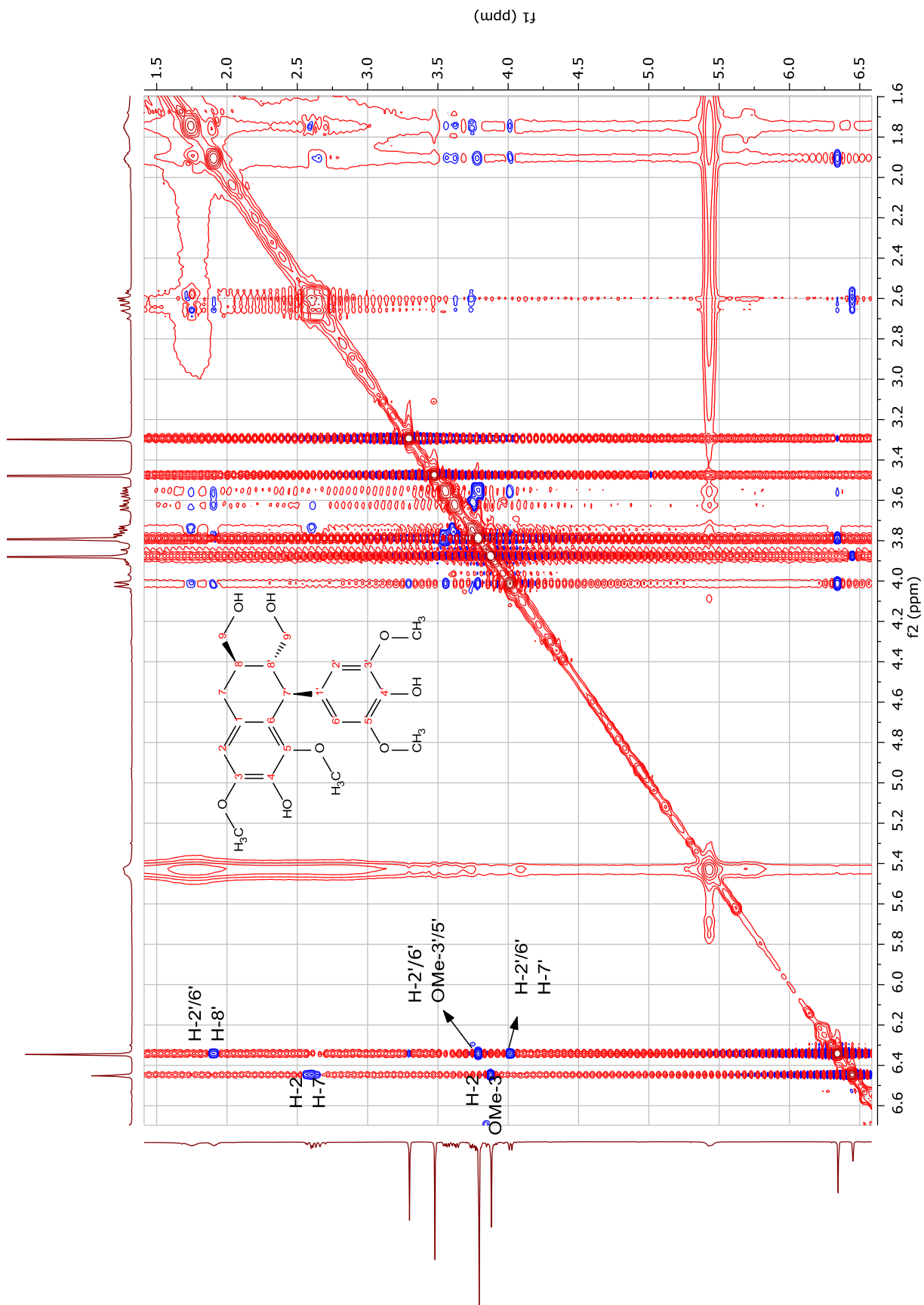


Figura 174. Espectro de HMBC de **Zg7** (400 MHz, CDCl<sub>3</sub>).



**Figura 175.** Espectro de NOESY de **Zg7** (400 MHz, CDCl<sub>3</sub>).



CAC060 #1 RT: 0,00 AV: 1 NL: 7,88E6  
T: FTMS - p ESIFull ms [50,00-2000,00]

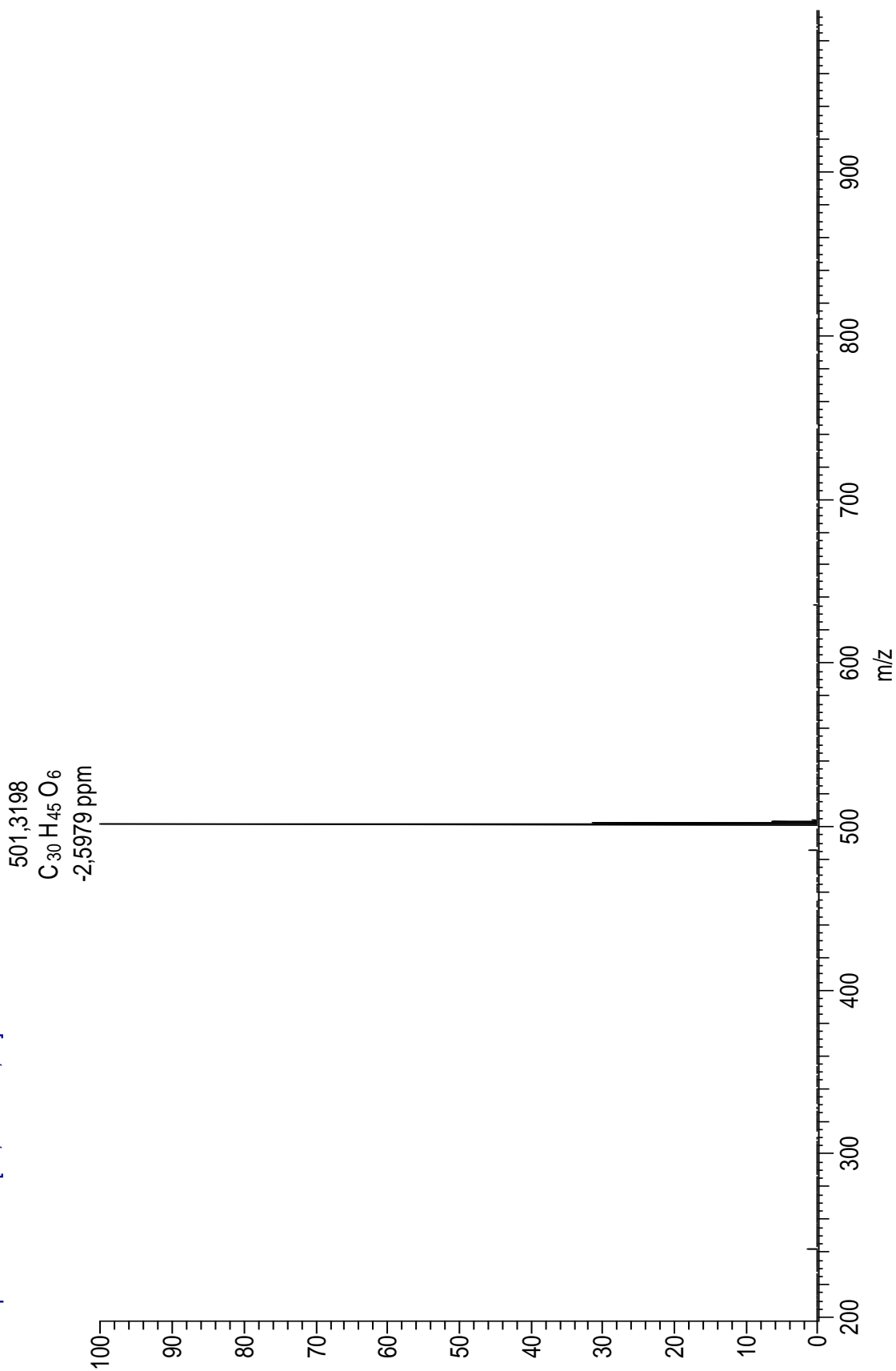


Figura 176. Espectro de massas de alta resolução de **Zg8** (ESI, modo negativo).

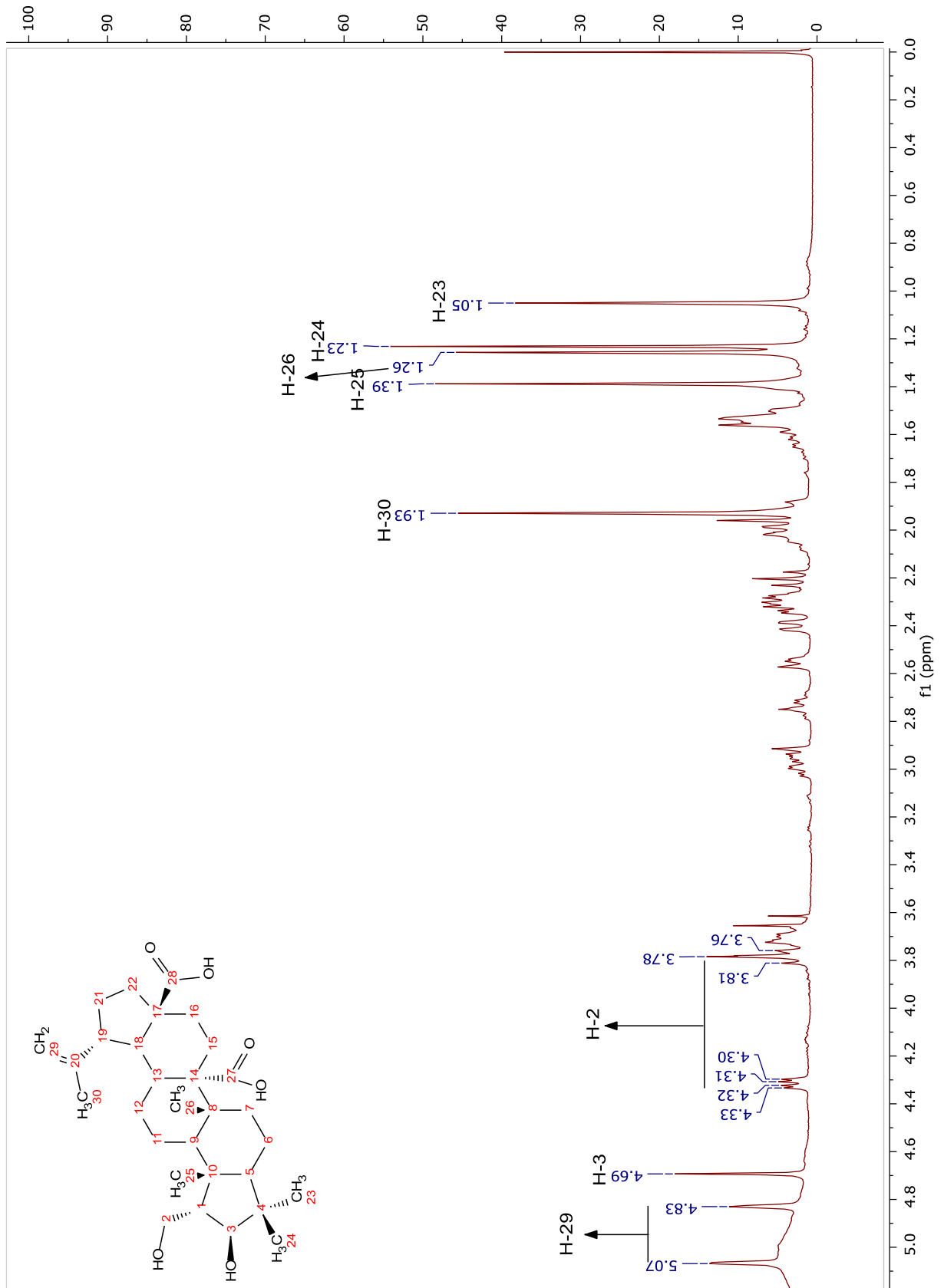


Figura 177. Espectro de RMN  $^1\text{H}$  de **Zg8** (400 MHz,  $\text{C}_3\text{D}_5\text{N}$ ).

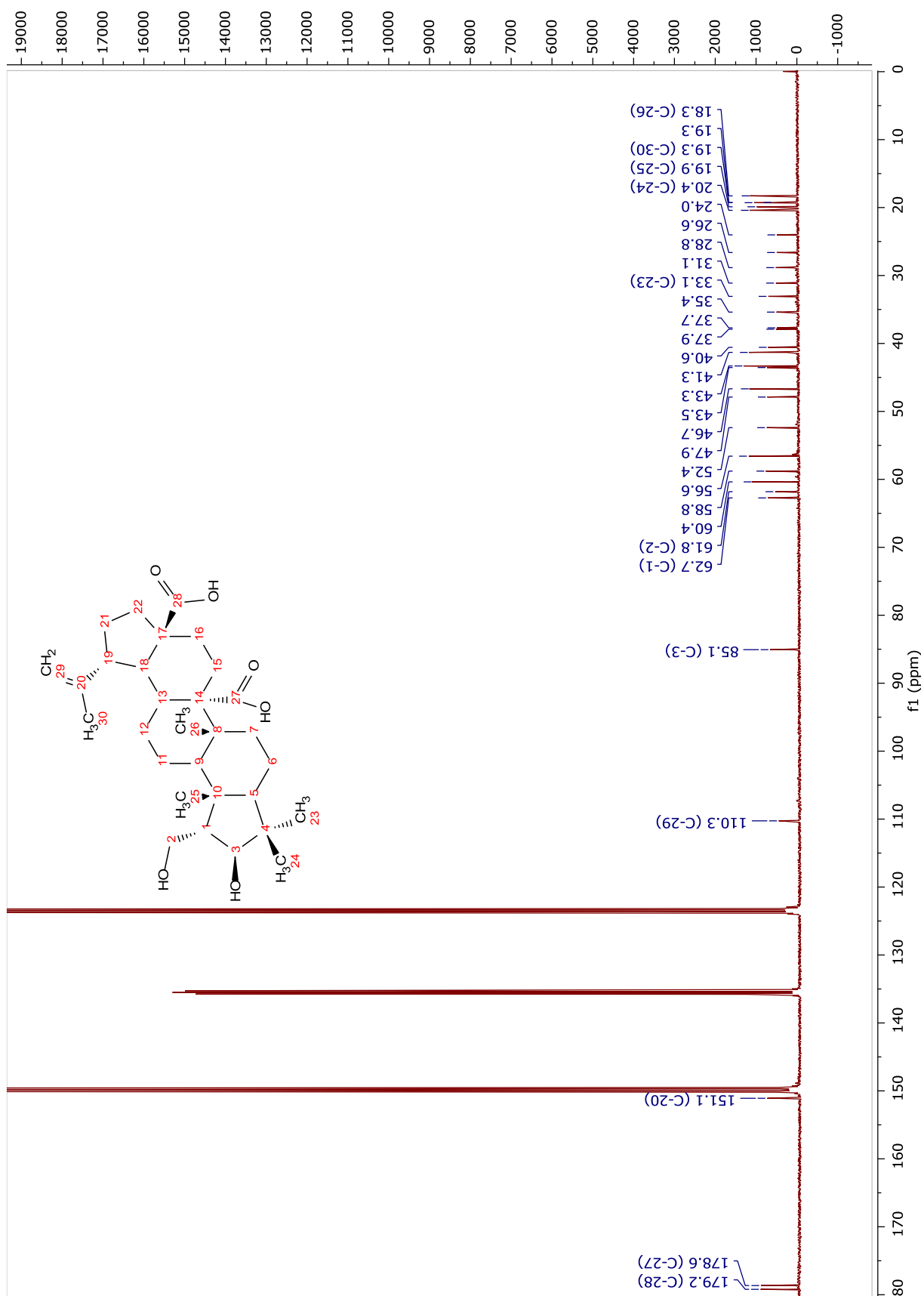


Figura 178. Espectro de RMN  $^{13}\text{C}$  de **Zg8** (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

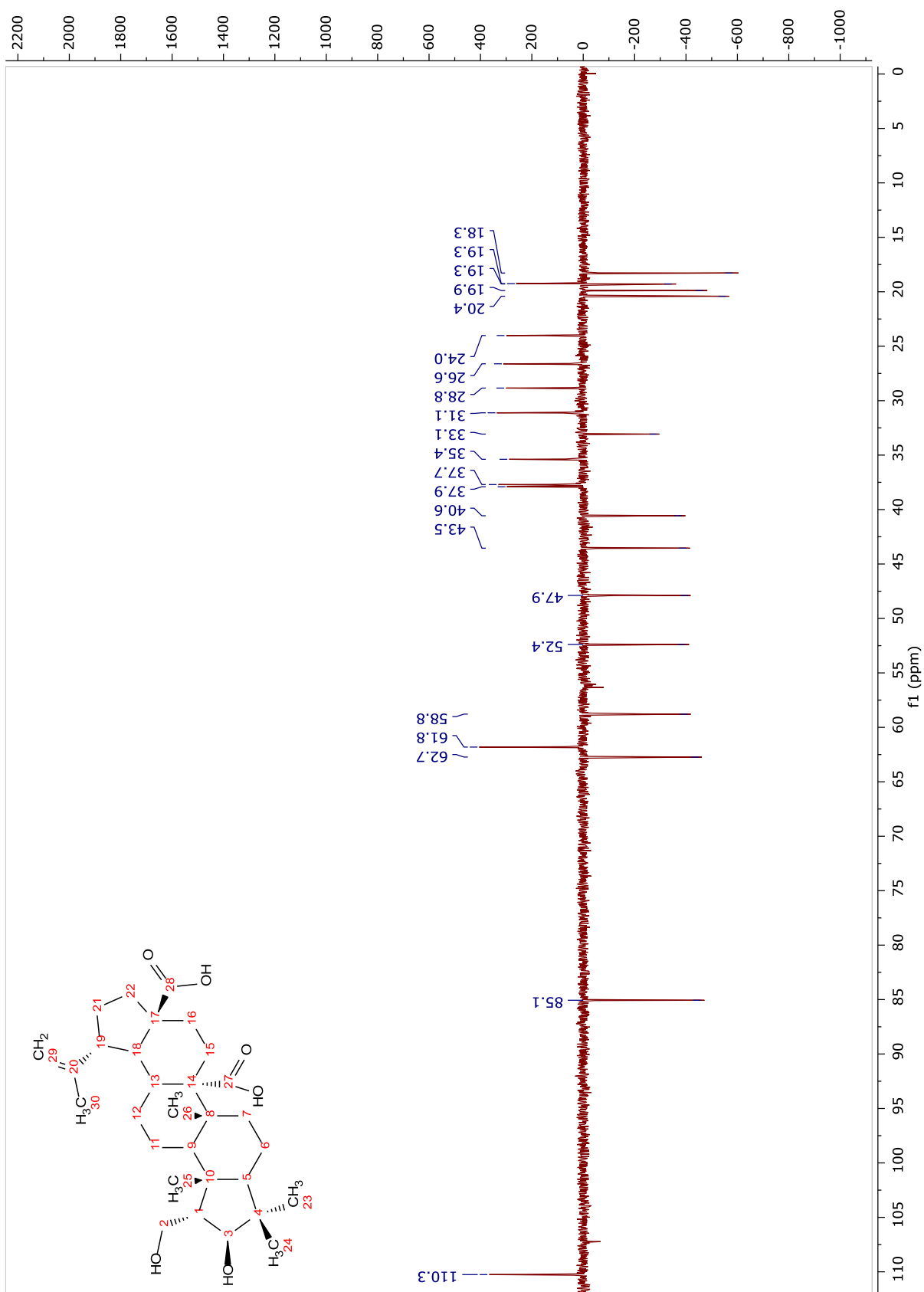


Figura 179. Espectro de DEPT-135 de **Zg8** (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

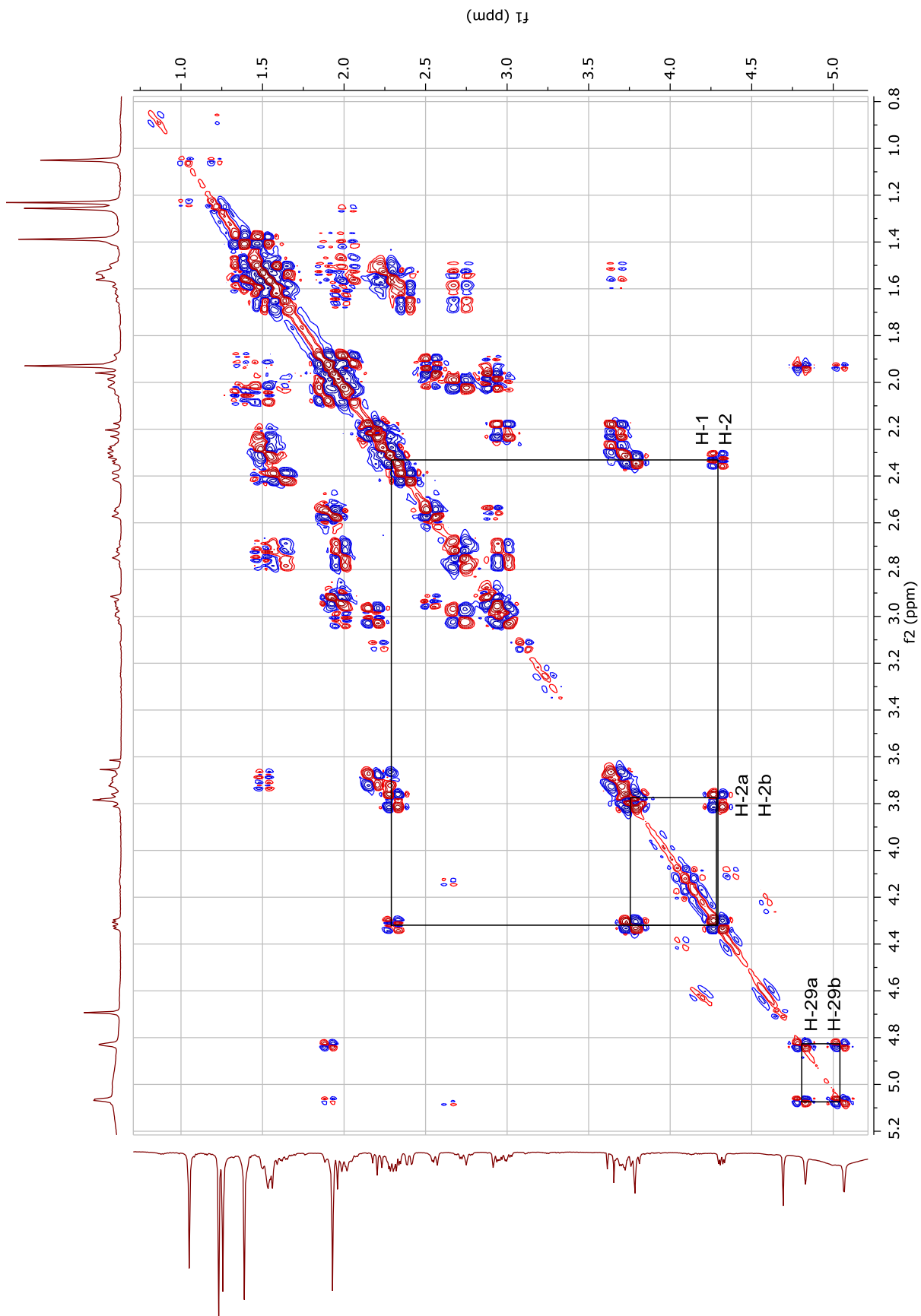


Figura 180. Espectro de COSY de **Zg8** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

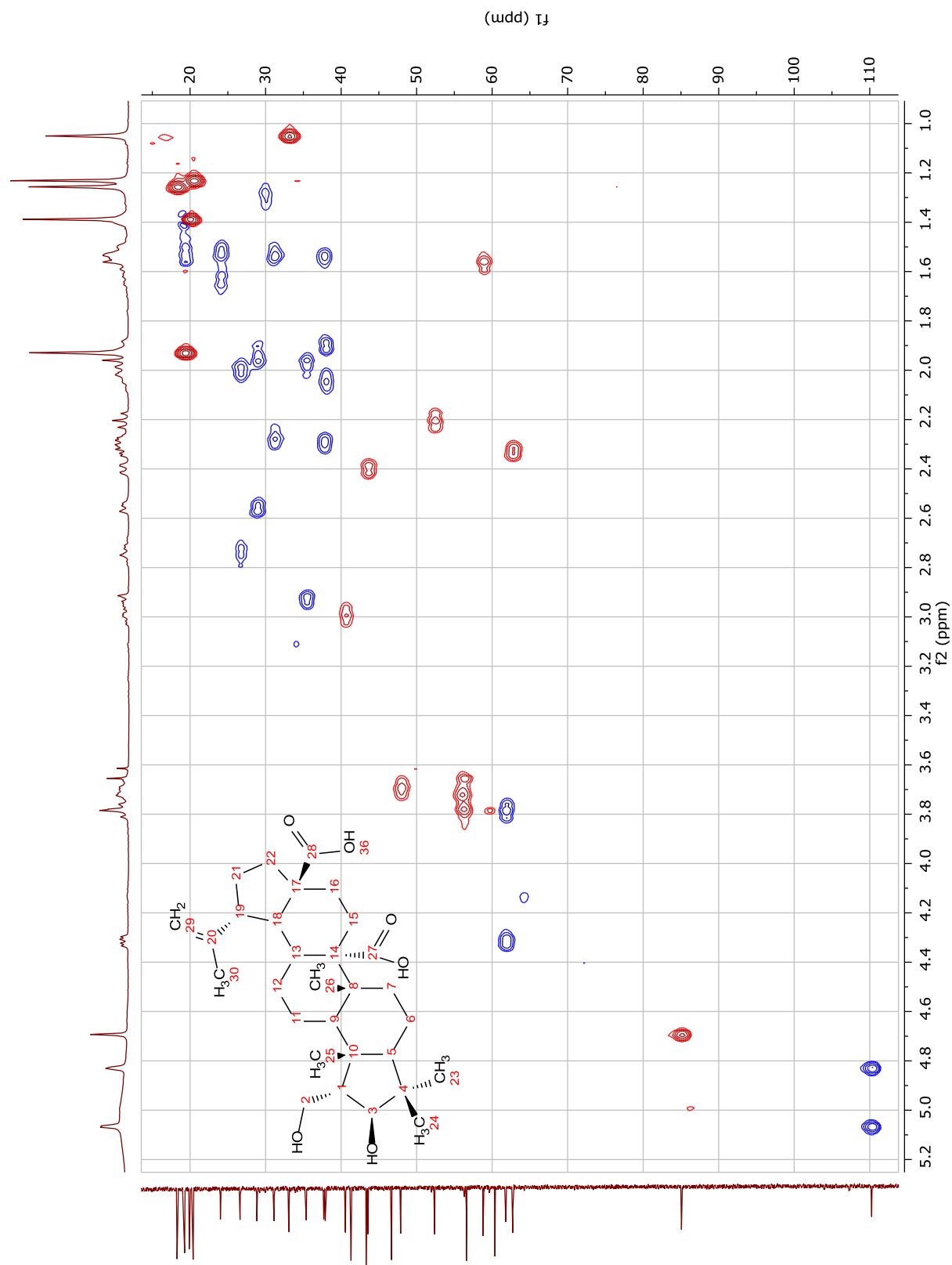


Figura 181. Espectro de HSQC de **Zg8** (400 MHz,  $C_5D_5N$ ).

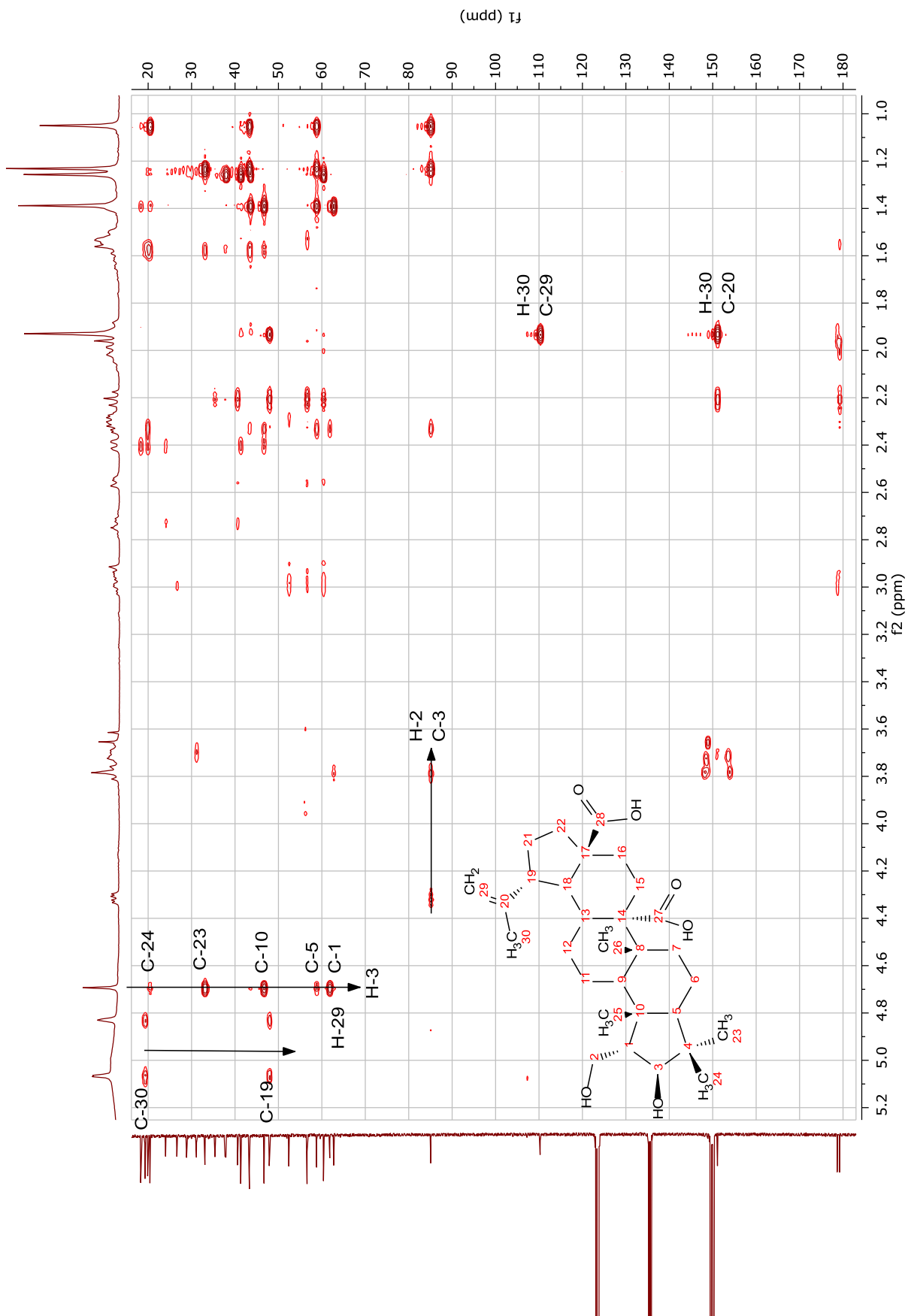


Figura 182. Espectro de HMBC de **Zg8** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

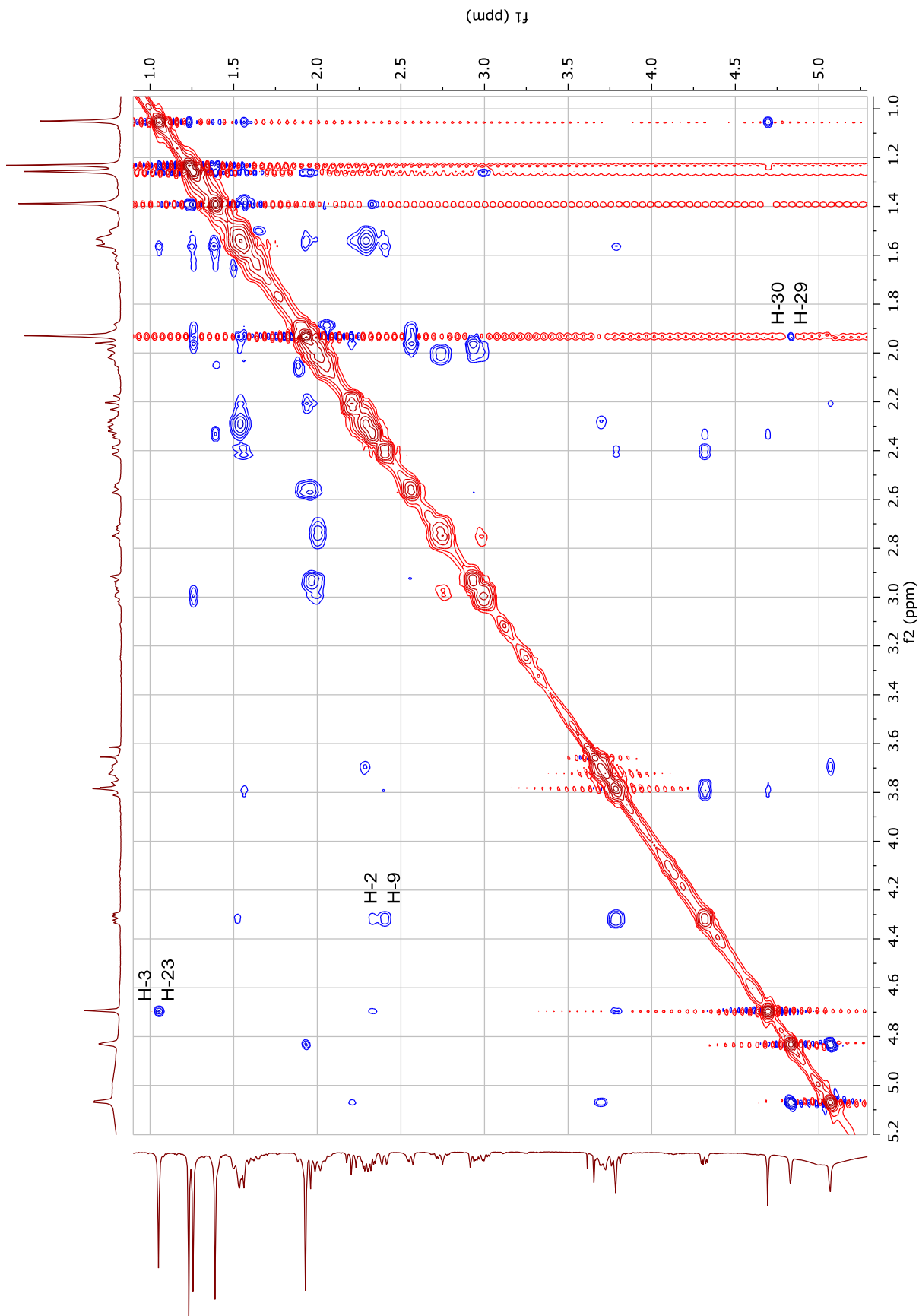


Figura 183. Espectro de ROESY de Zg8 (400 MHz, C<sub>5</sub>D<sub>5</sub>N).



180319\_CAC\_105neg1 #4597 RT: 11,44 AV: 1 NL: 3,80E6  
T: FTMS - p ESI Full ms [110,00-2000,00]

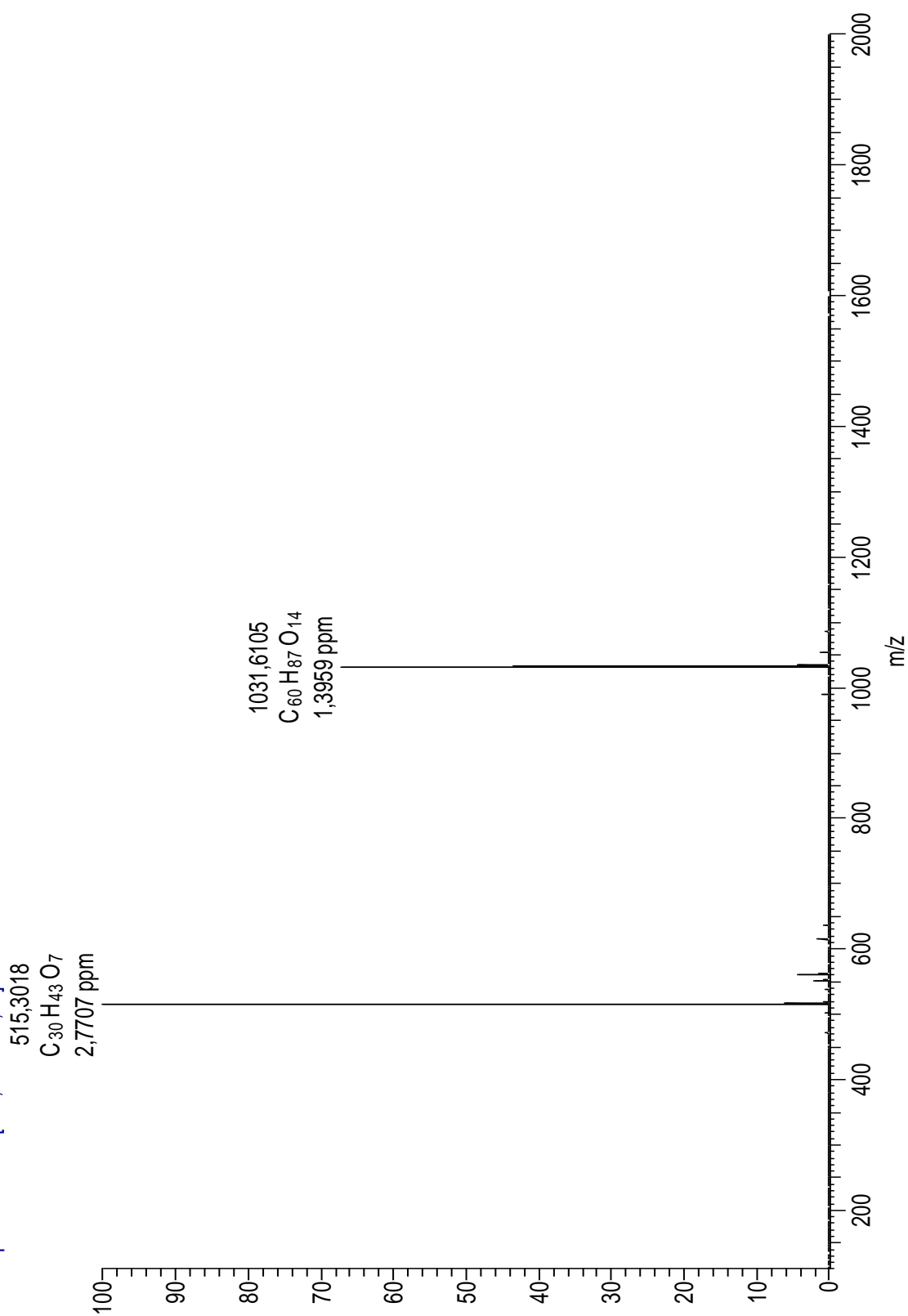


Figura 184. Espectro de massas de alta resolução de **Zg9** (ESI, modo negativo).

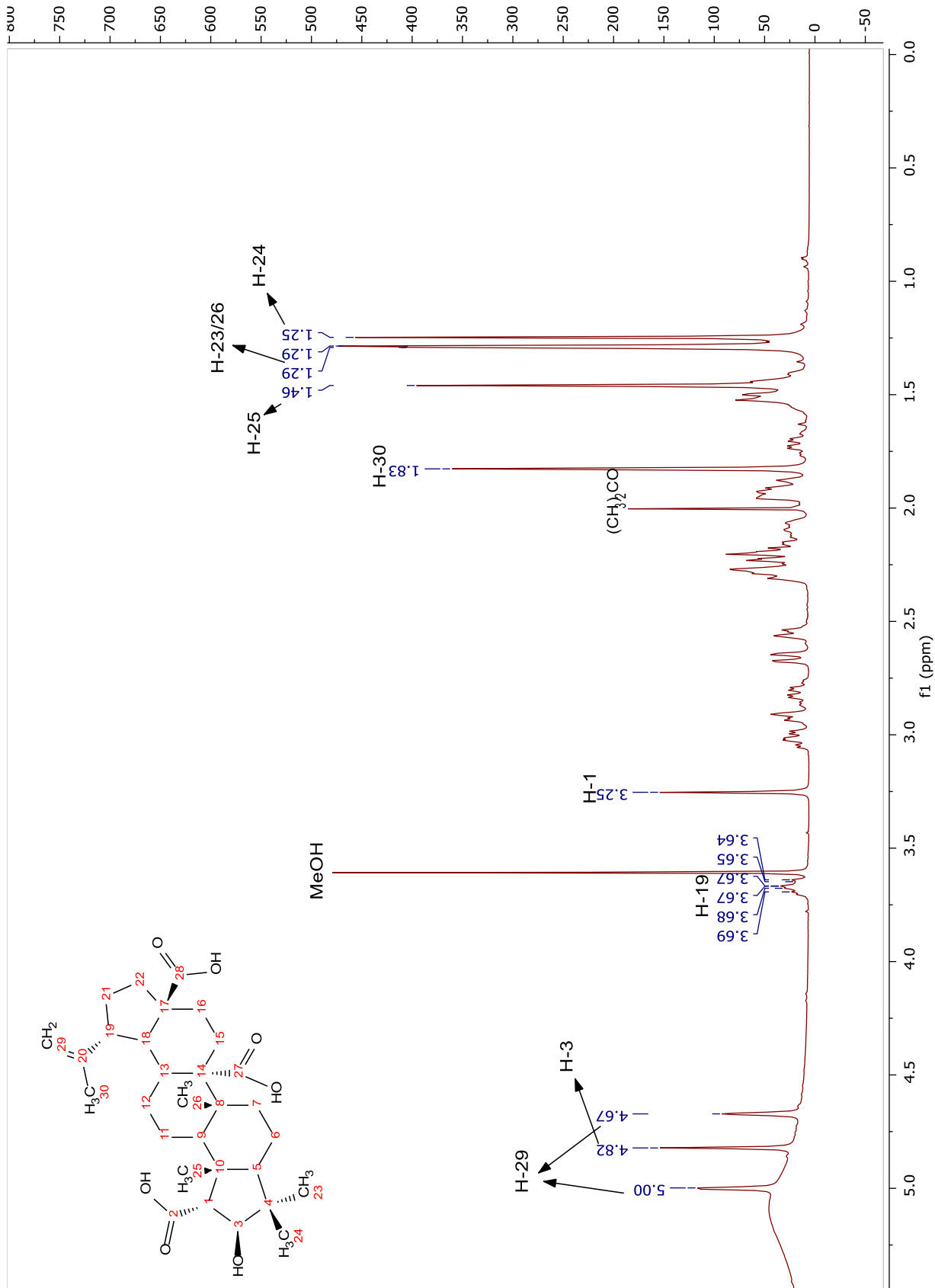
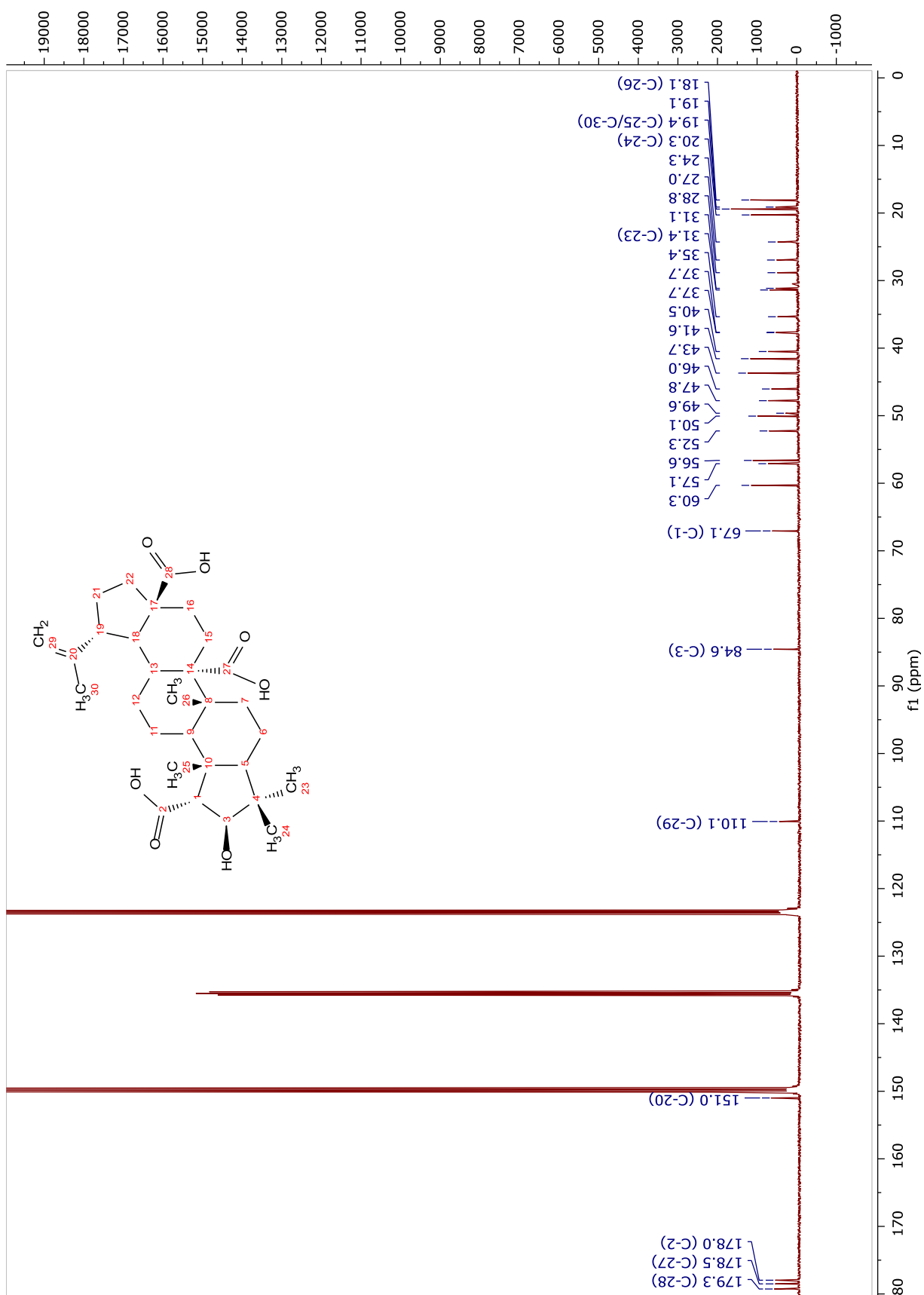


Figura 185. Espectro de RMN  $^1\text{H}$  de **Zg9** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



**Figura 186.** Espectro de RMN  $^{13}\text{C}$  de **Zg9** (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

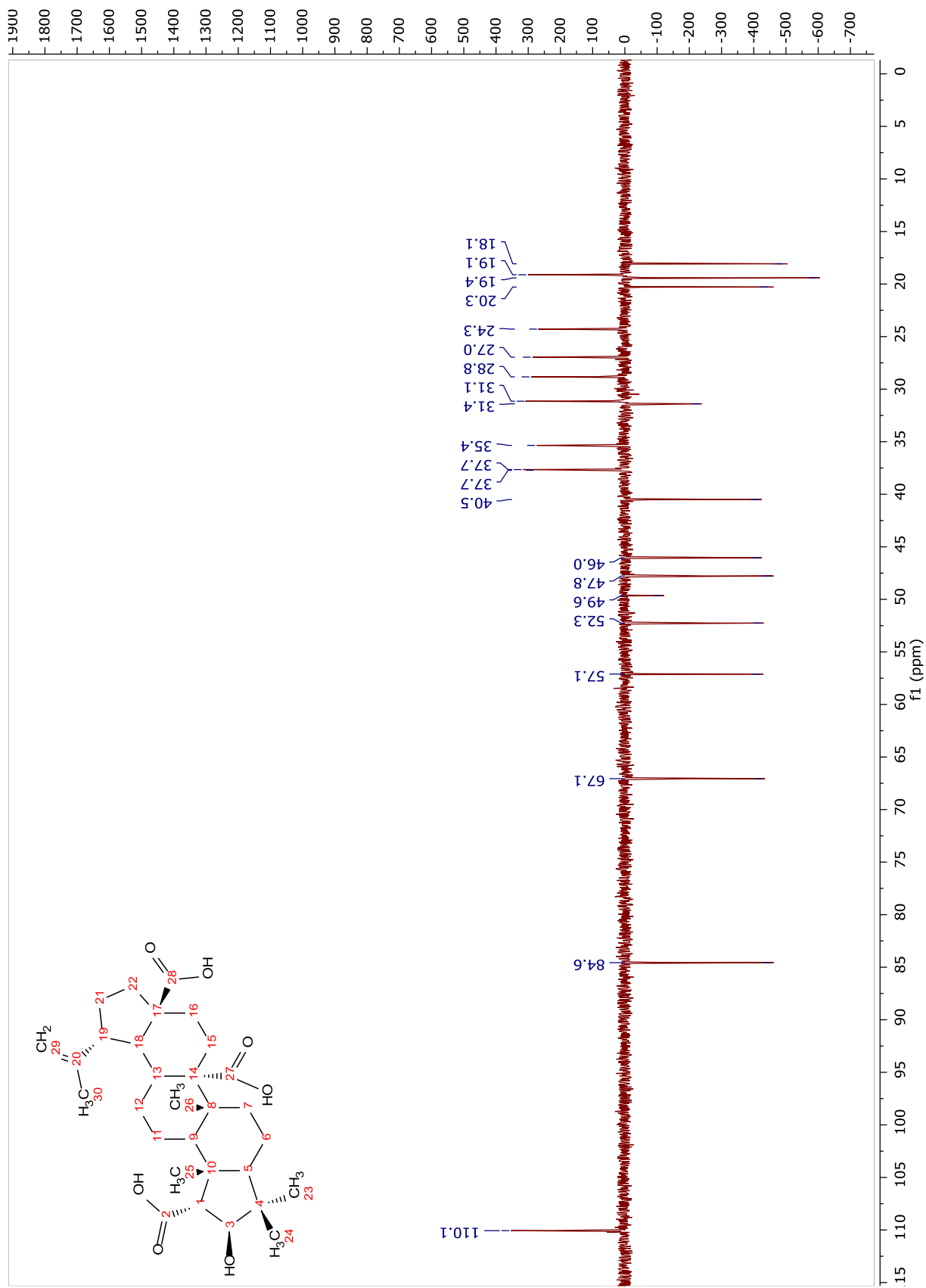


Figura 187. Espectro de DEPT-135 de **Zg9** (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

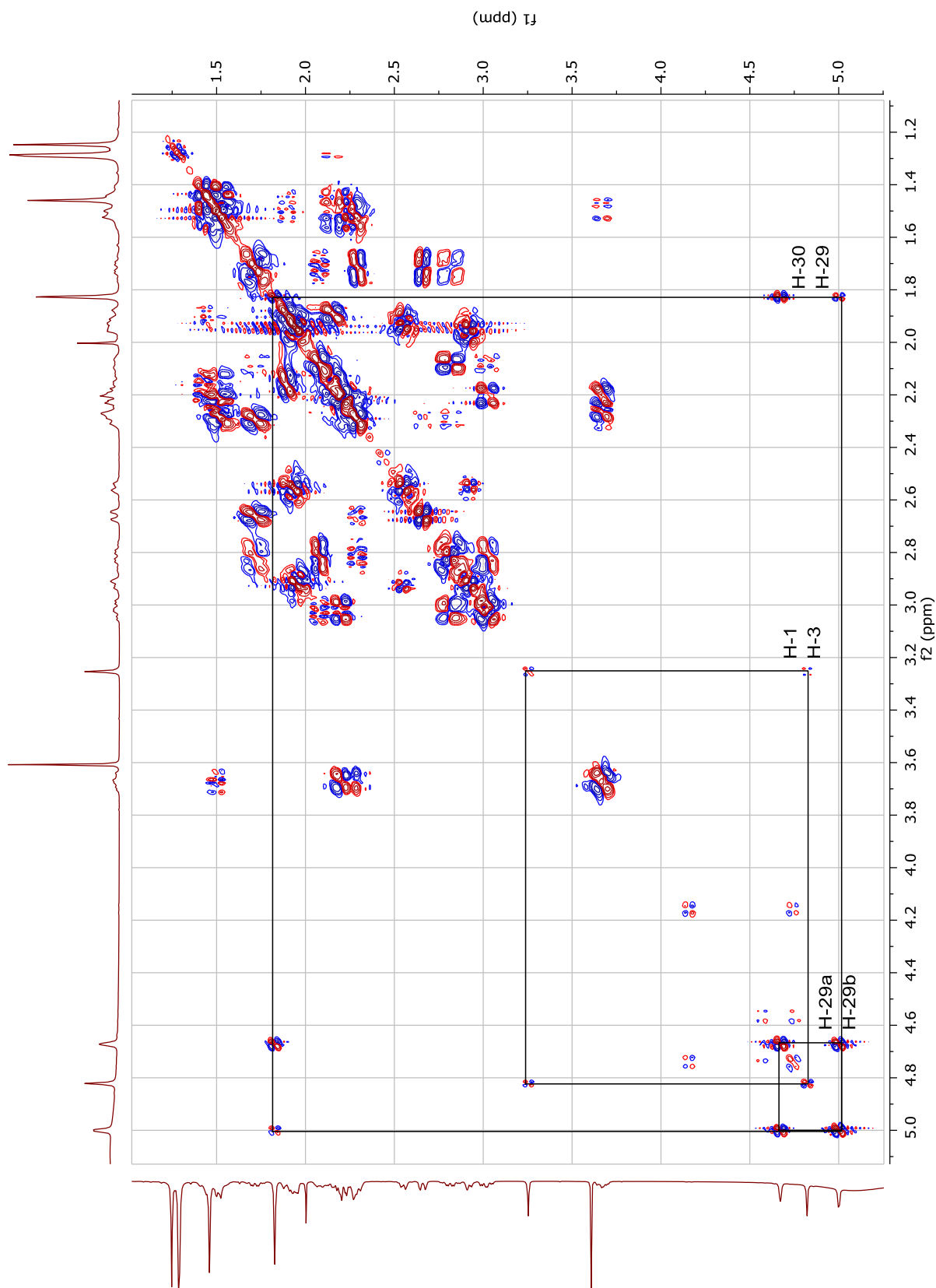


Figura 188. Espectro de COSY de **Zg9** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

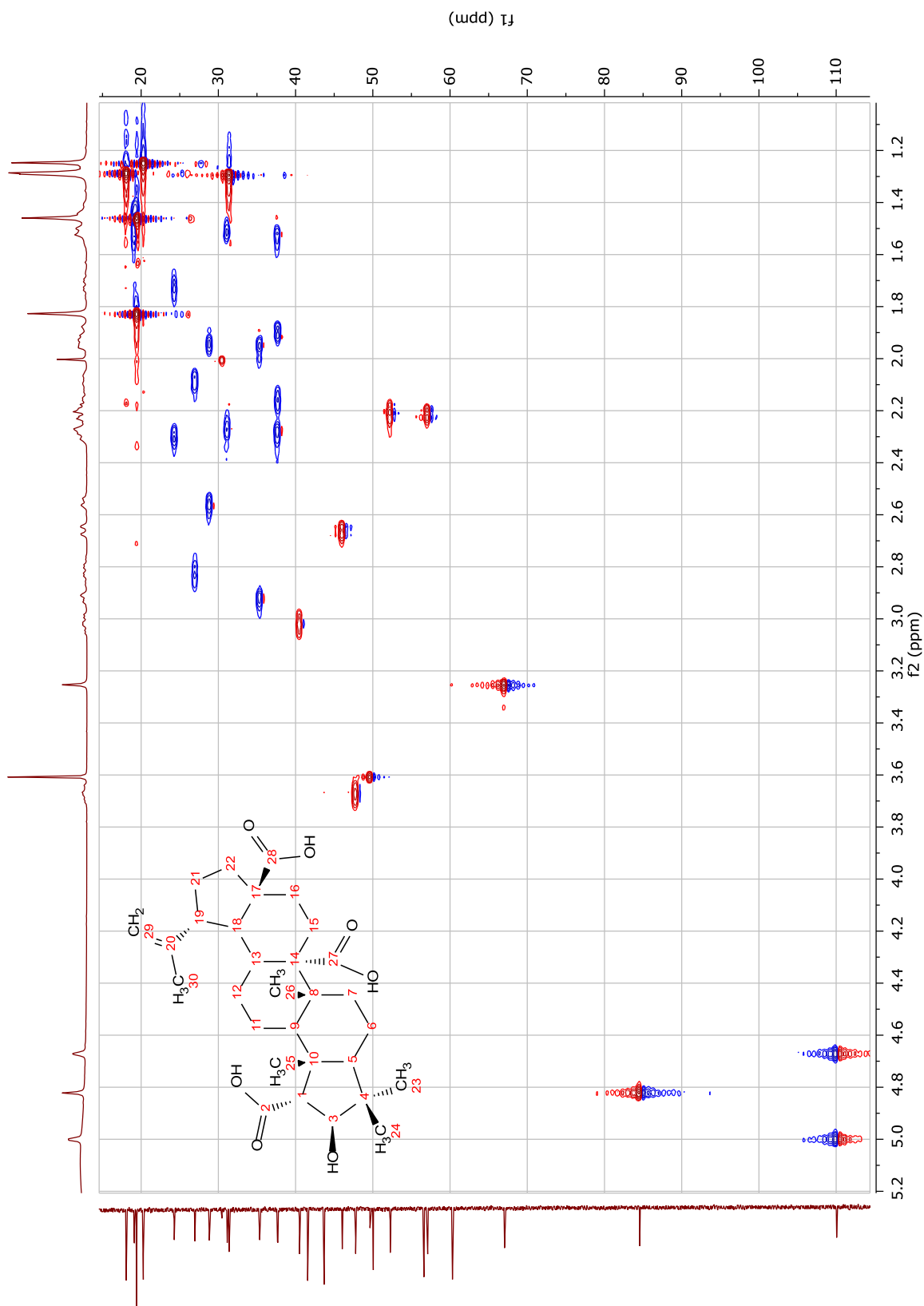


Figura 189. Espectro de HSQC de **Zg9** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

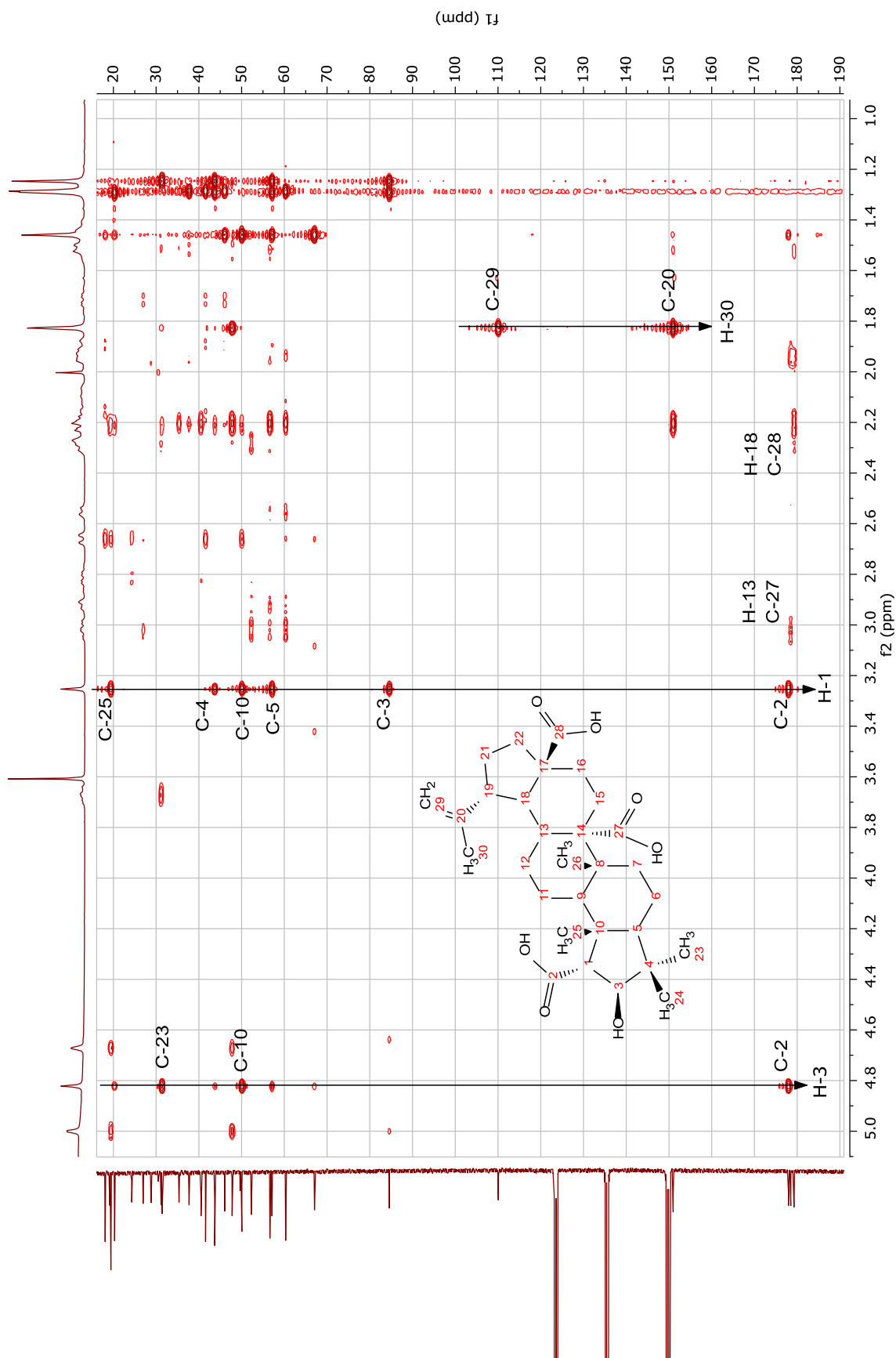


Figura 190. Espectro de HMBC de **Zg9** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

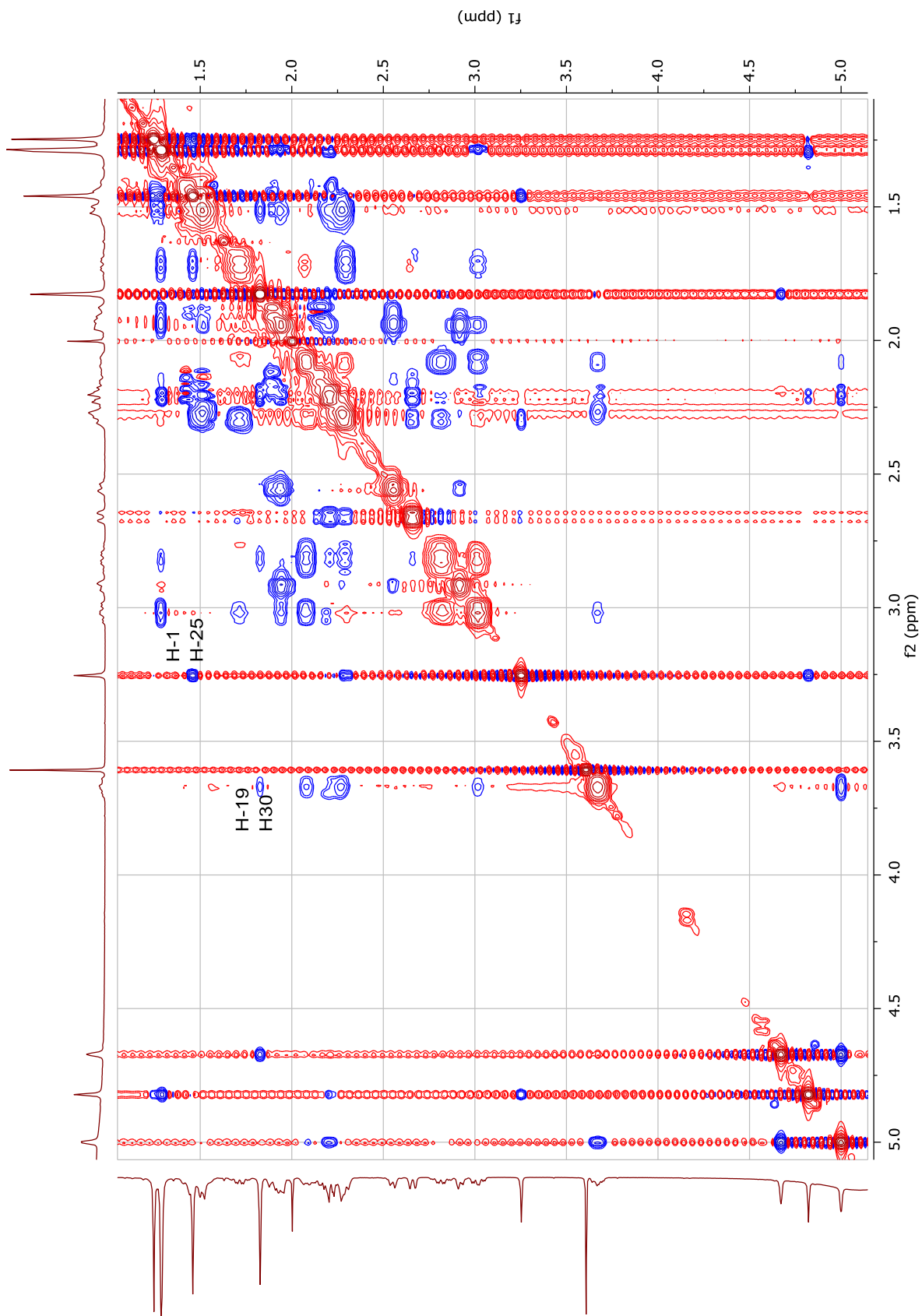


Figura 191. Espectro de ROESY de **Zg9** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).



CAC104pos\_171006214553 #14 RT: 0,05 AV: 1 NL: 6,74E7  
T: FTMS + p ESI Full ms [100,00-2000,00]

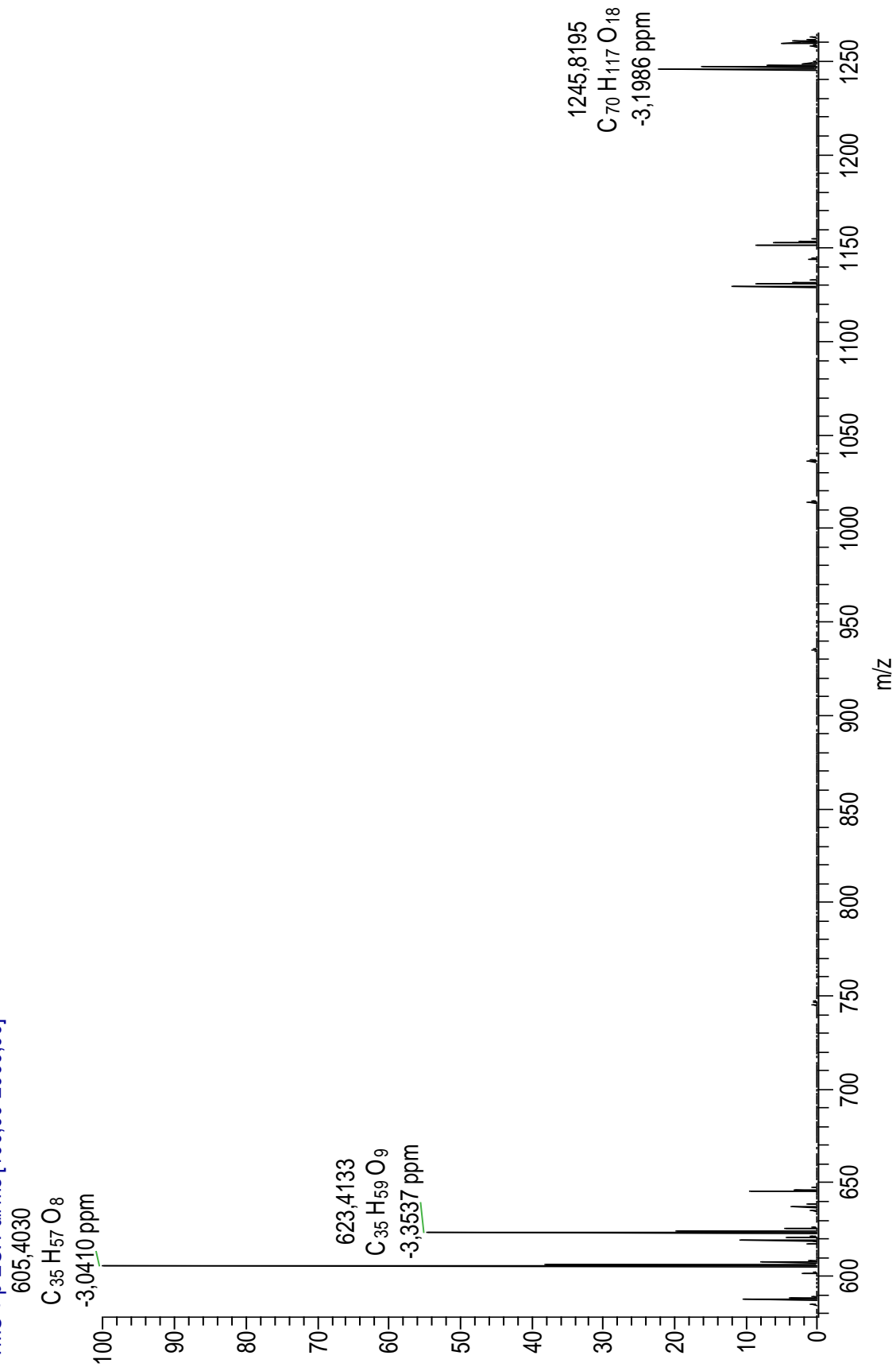
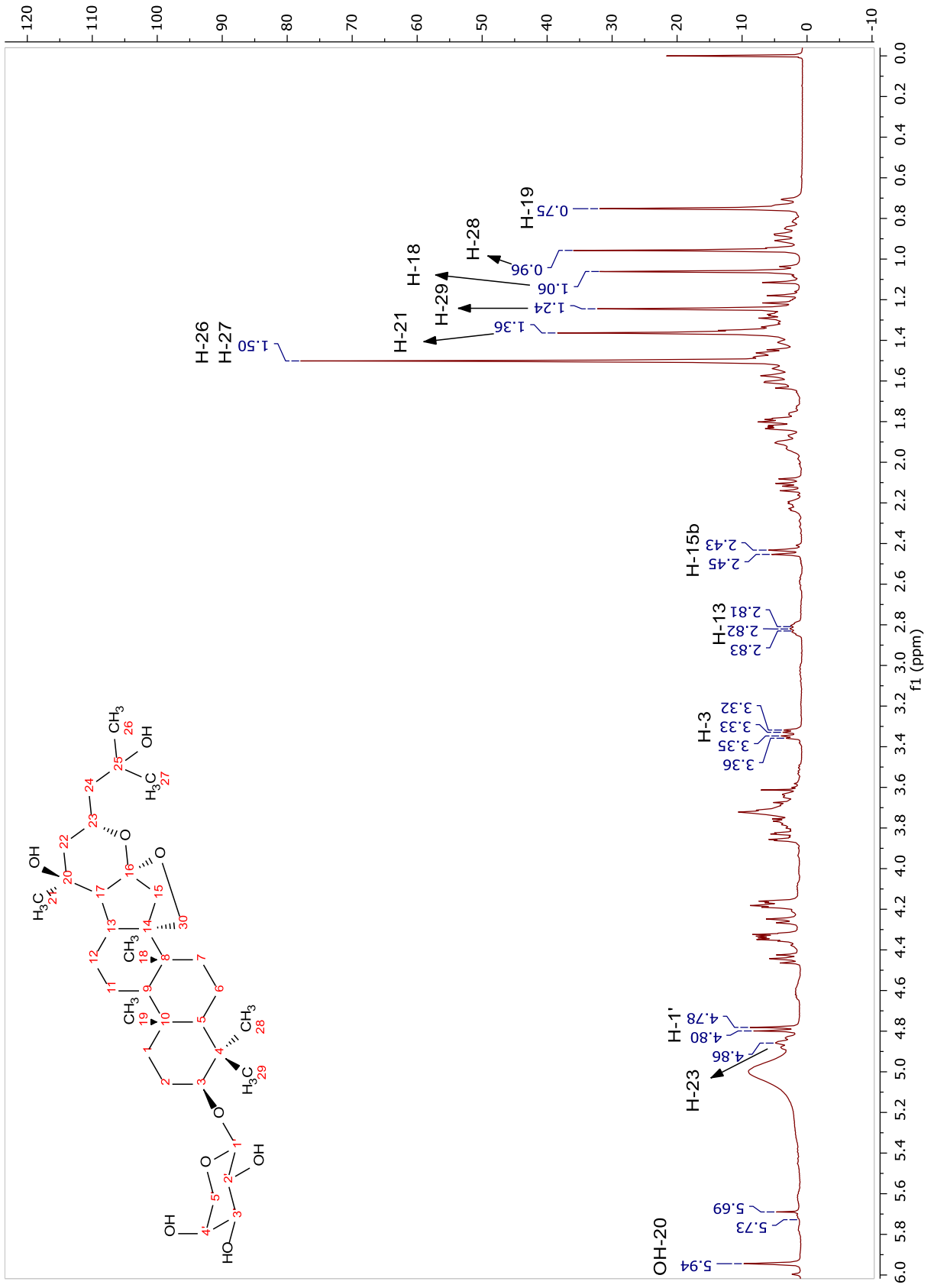


Figura 192. Espectro de massas de alta resolução de **Zg10** (ESI, modo positivo).



**Figura 193.** Espectro de RMN  $^1\text{H}$  de **Zg10** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

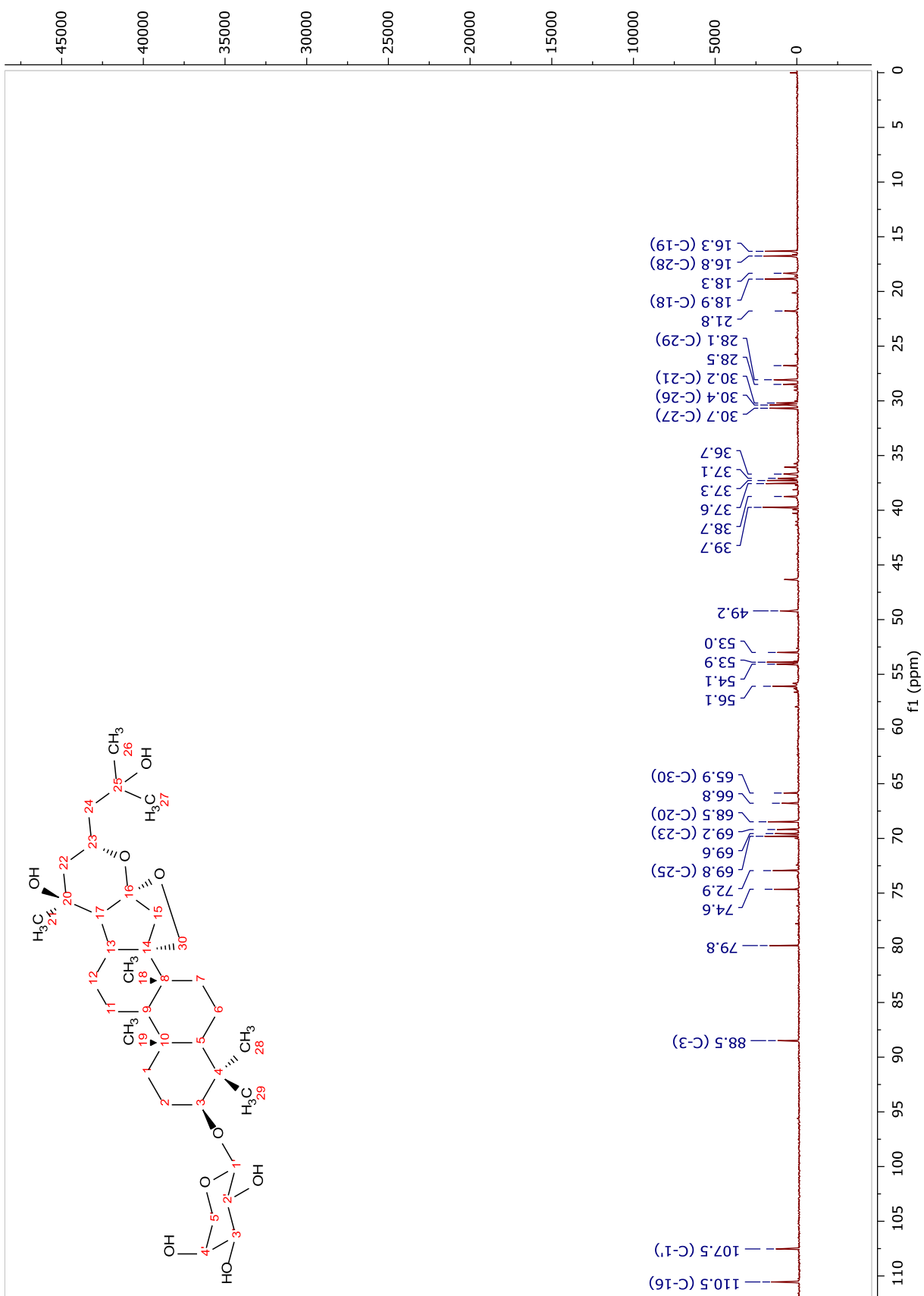


Figura 194. Espectro de RMN  $^{13}\text{C}$  de **Zg10** (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

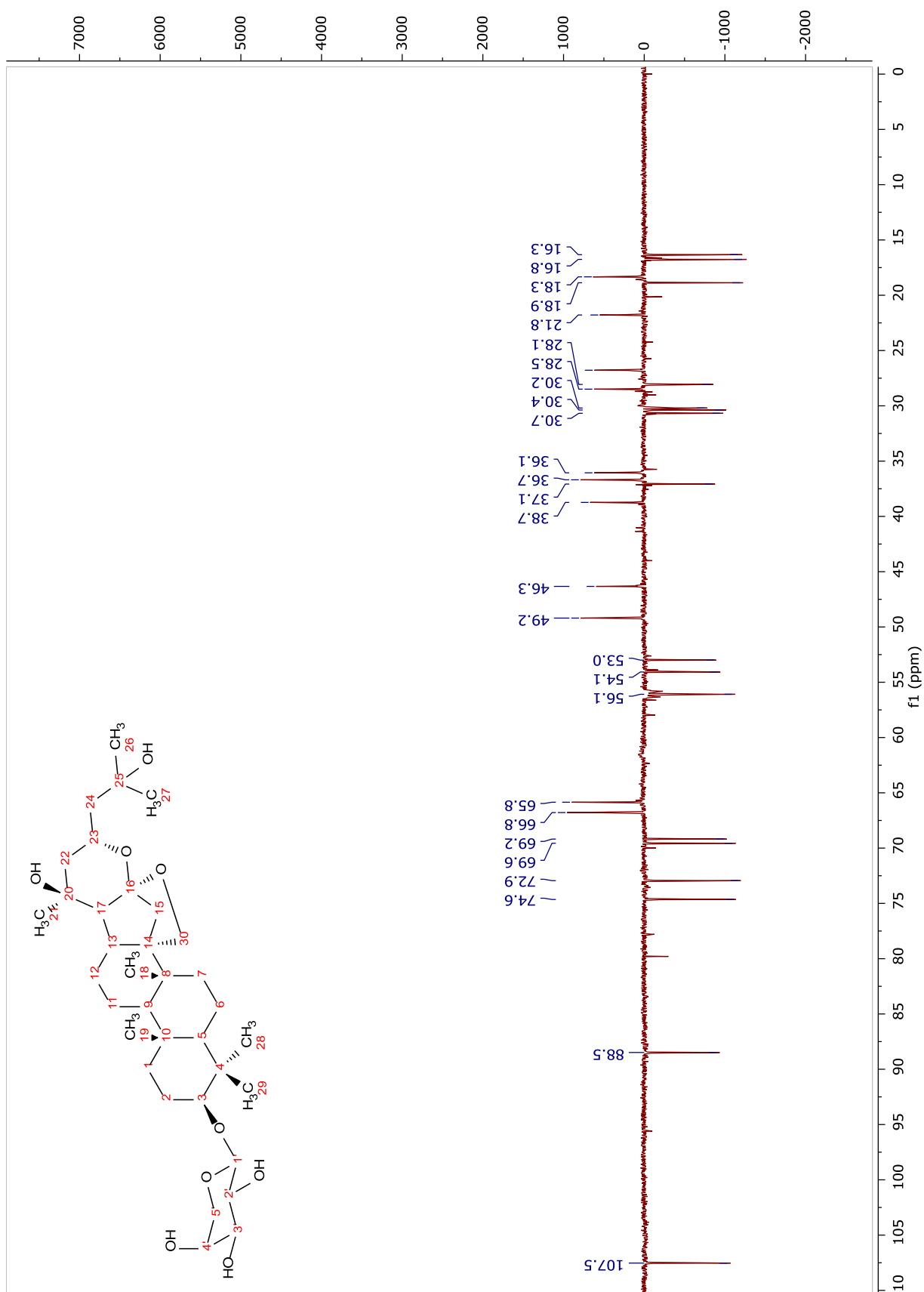
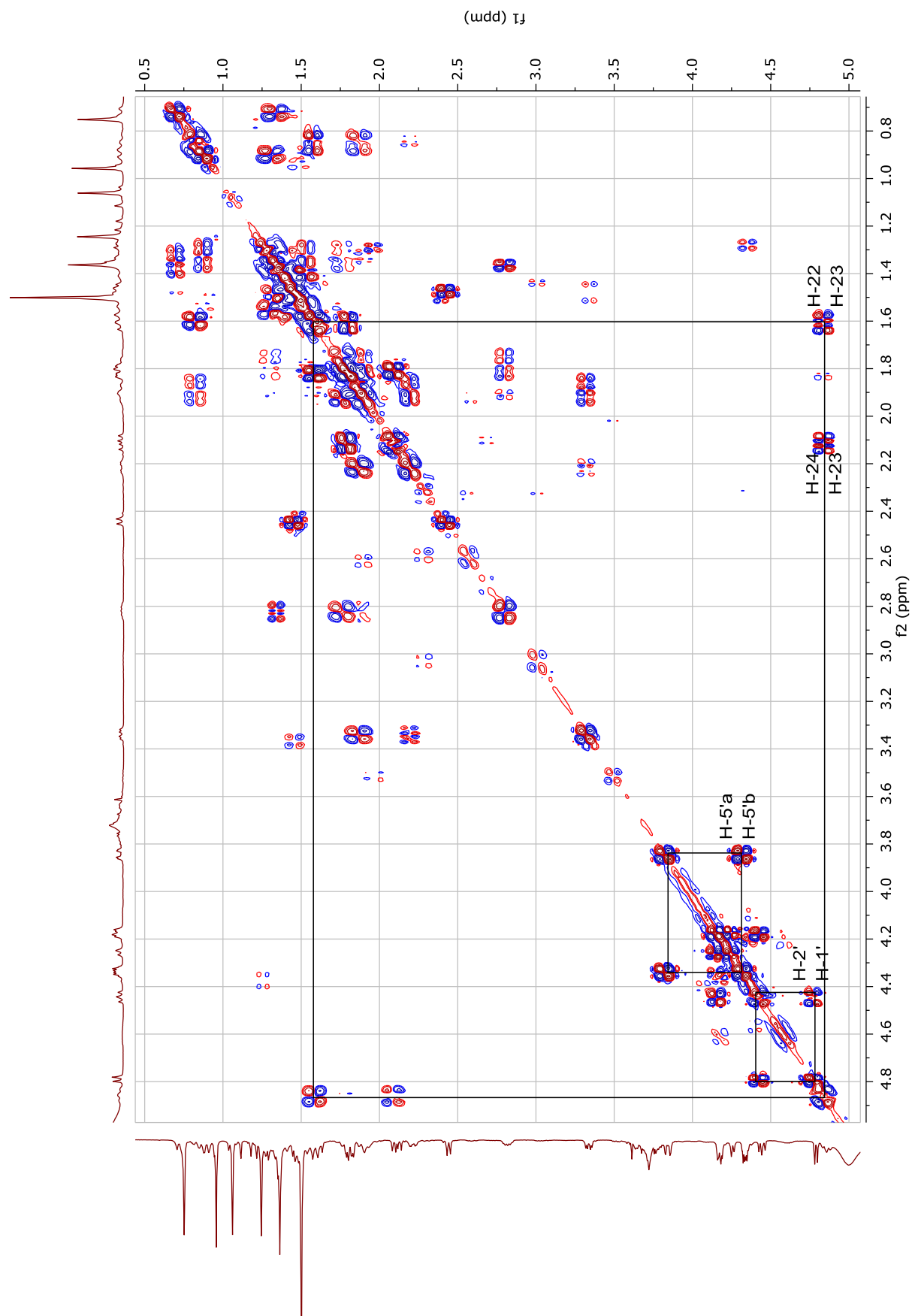
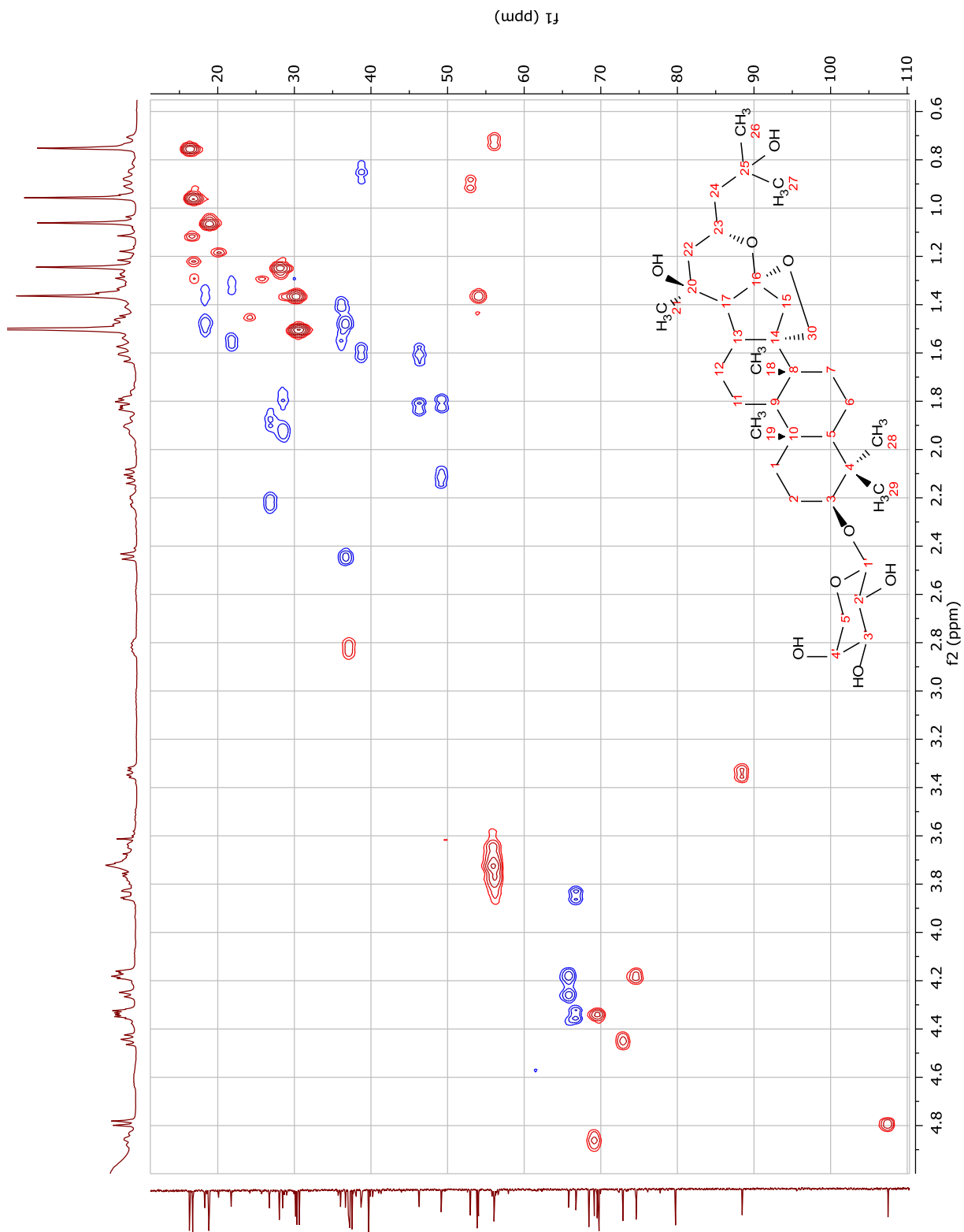


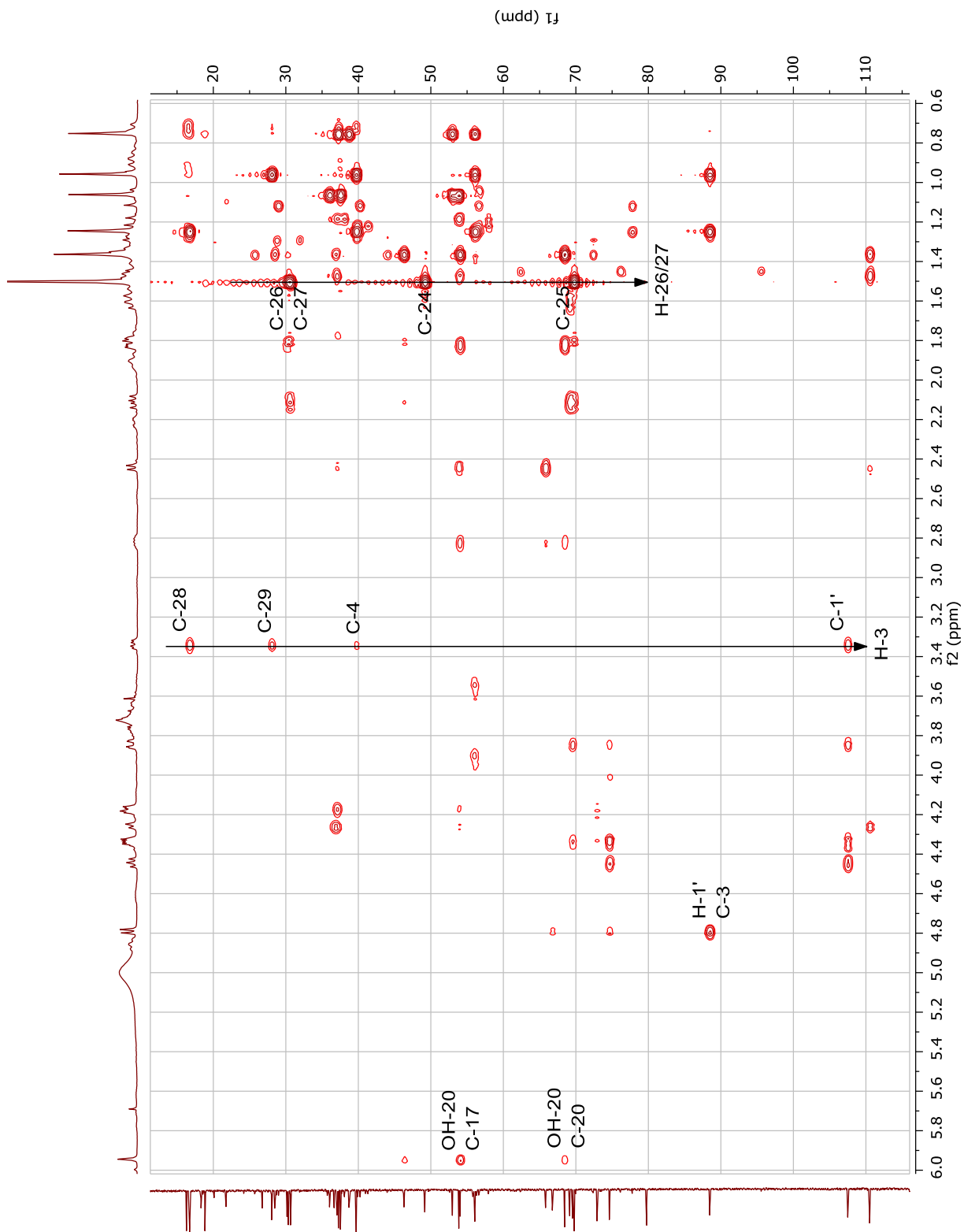
Figura 195. Espectro de DEPT-135 de **Zg10** (100 MHz, C<sub>5</sub>D<sub>5</sub>N).



**Figura 196.** Espectro de COSY de **Zg10** (400 MHz,  $C_5D_5N$ ).



**Figura 197.** Espectro de HSQC de **Zg10** (400 MHz,  $C_5D_5N$ ).



**Figura 198.** Espectro de HMBC de **Zg10** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

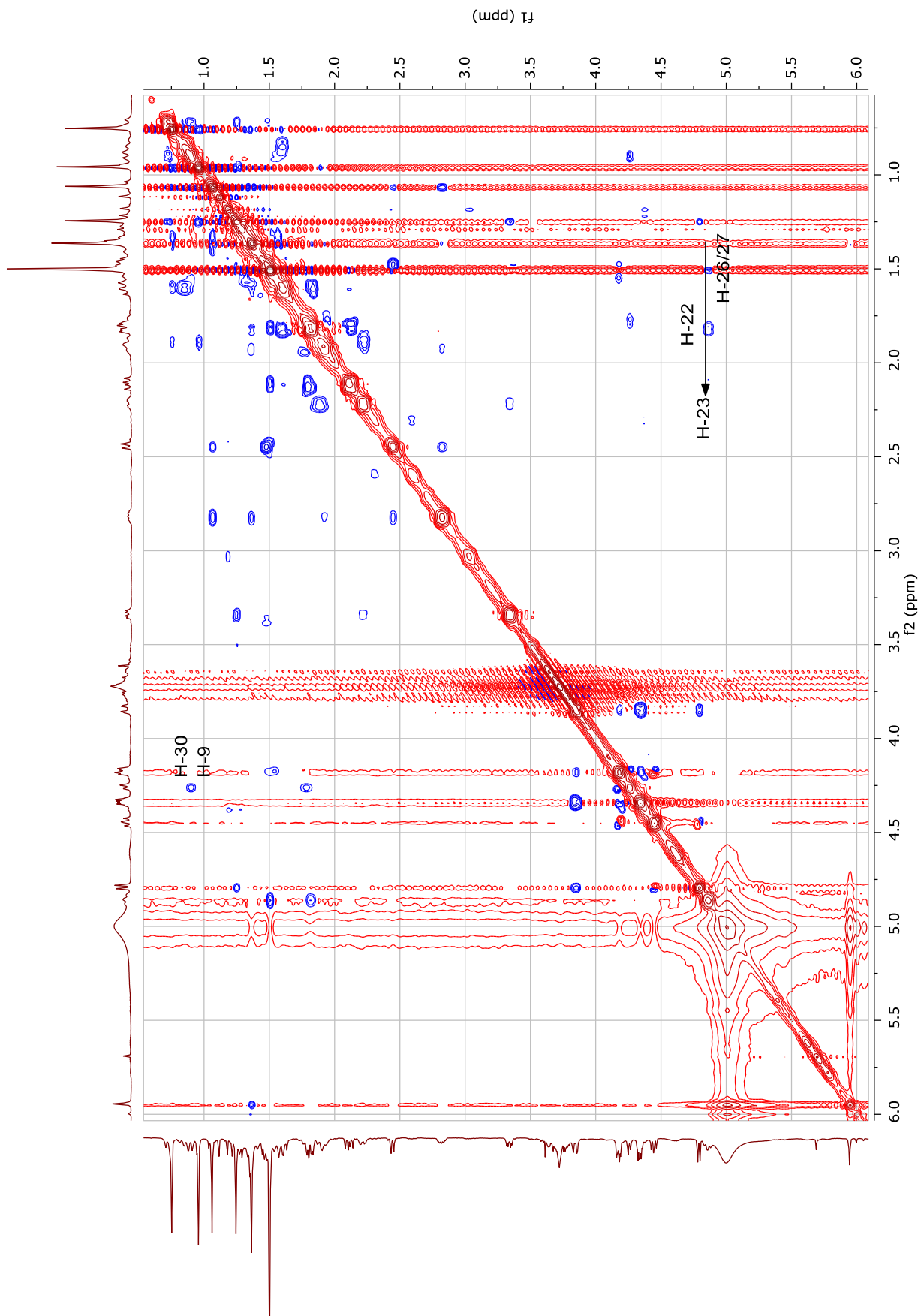


Figura 199. Espectro de NOESY de Zg10 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



CAC119 #35 RT: 0,08 AV: 1 NL: 2,13E7  
T: FTMS + p ESI Full ms [100,00-2000,00]

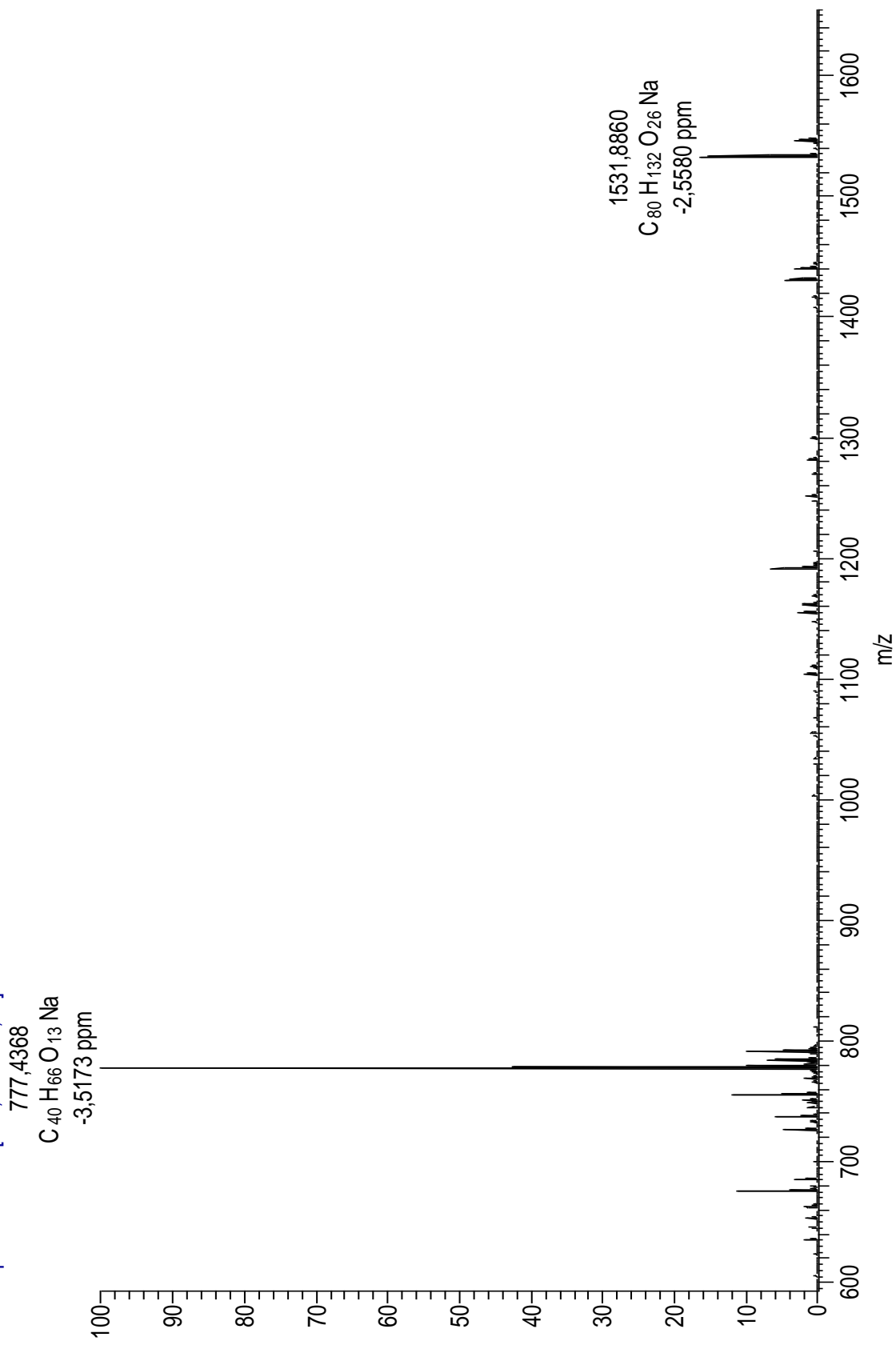


Figura 200. Espectro de massas de alta resolução de **Zg11** (ESI, modo positivo).

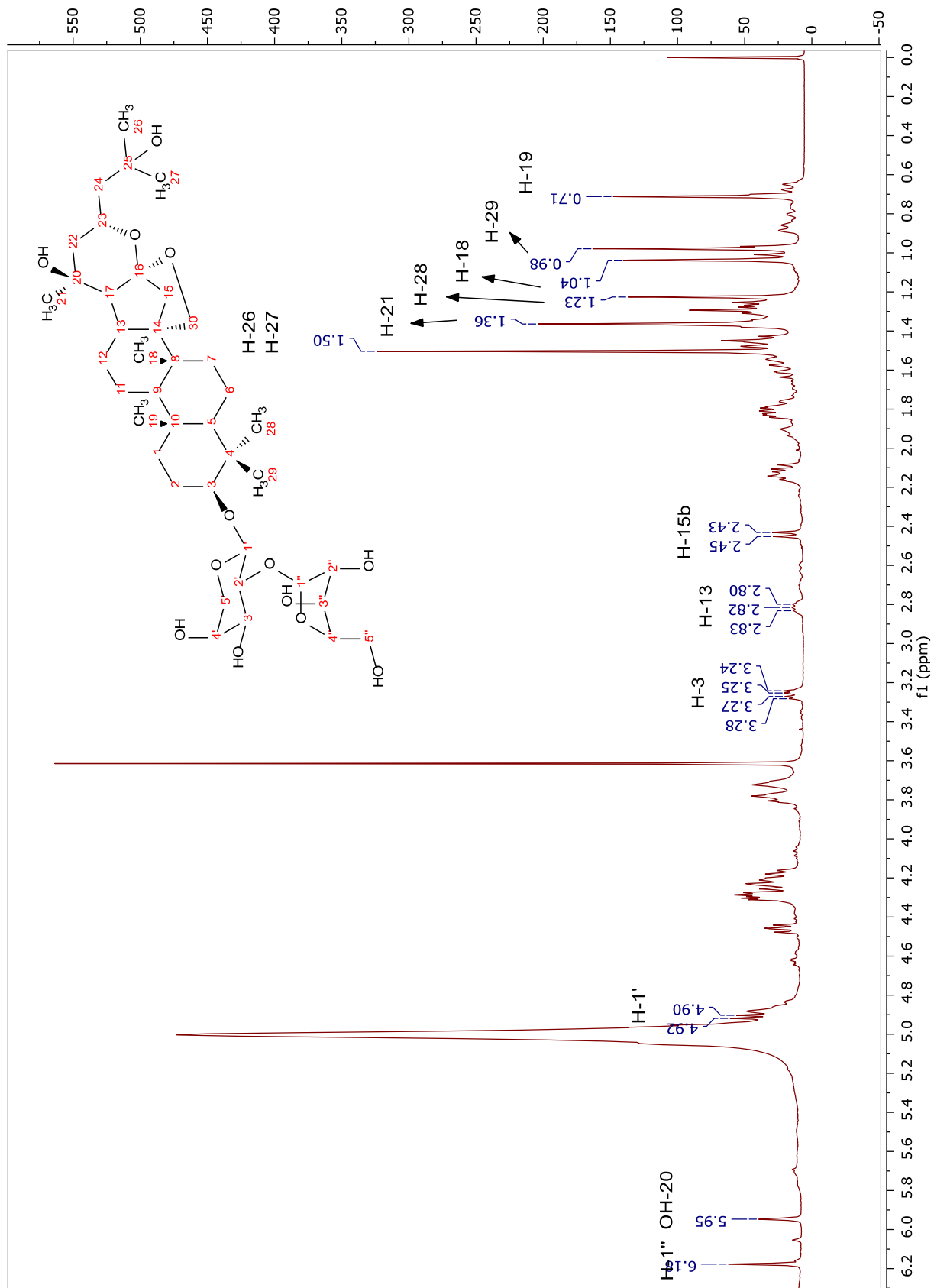


Figura 201. Espectro de RMN  $^1\text{H}$  de **Zg11** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

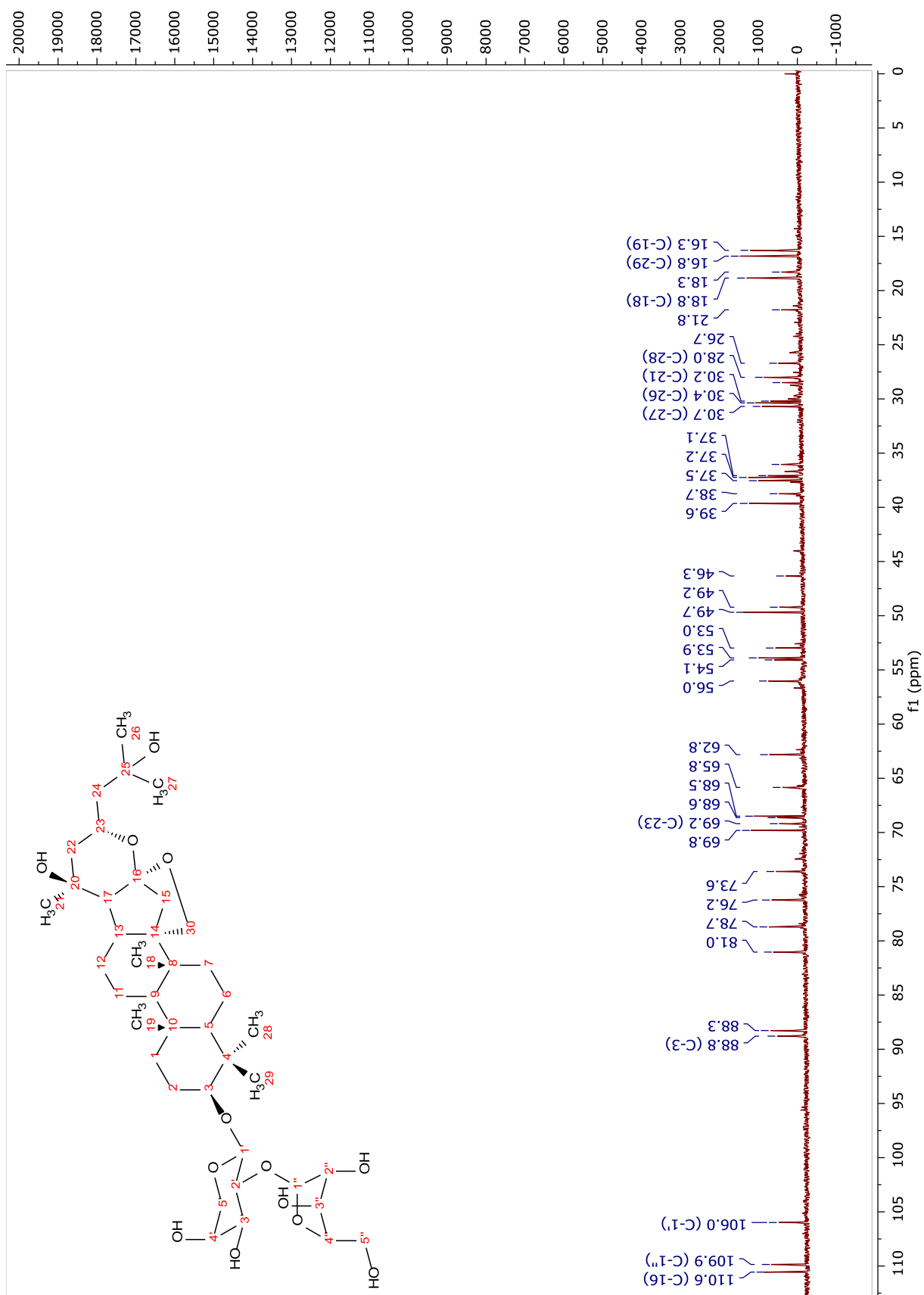


Figura 202. Espectro de RMN  $^{13}\text{C}$  de **Zg11** (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

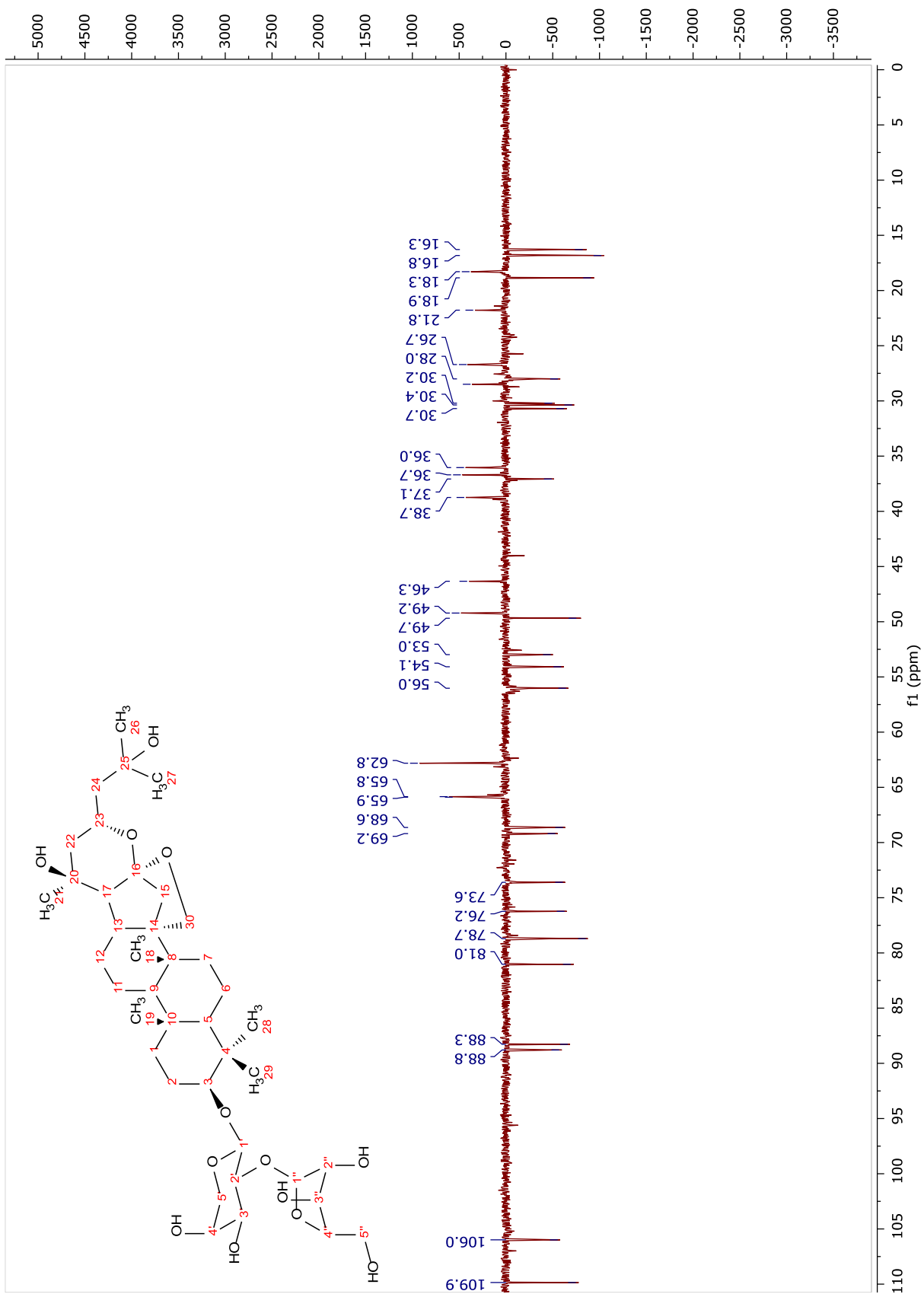
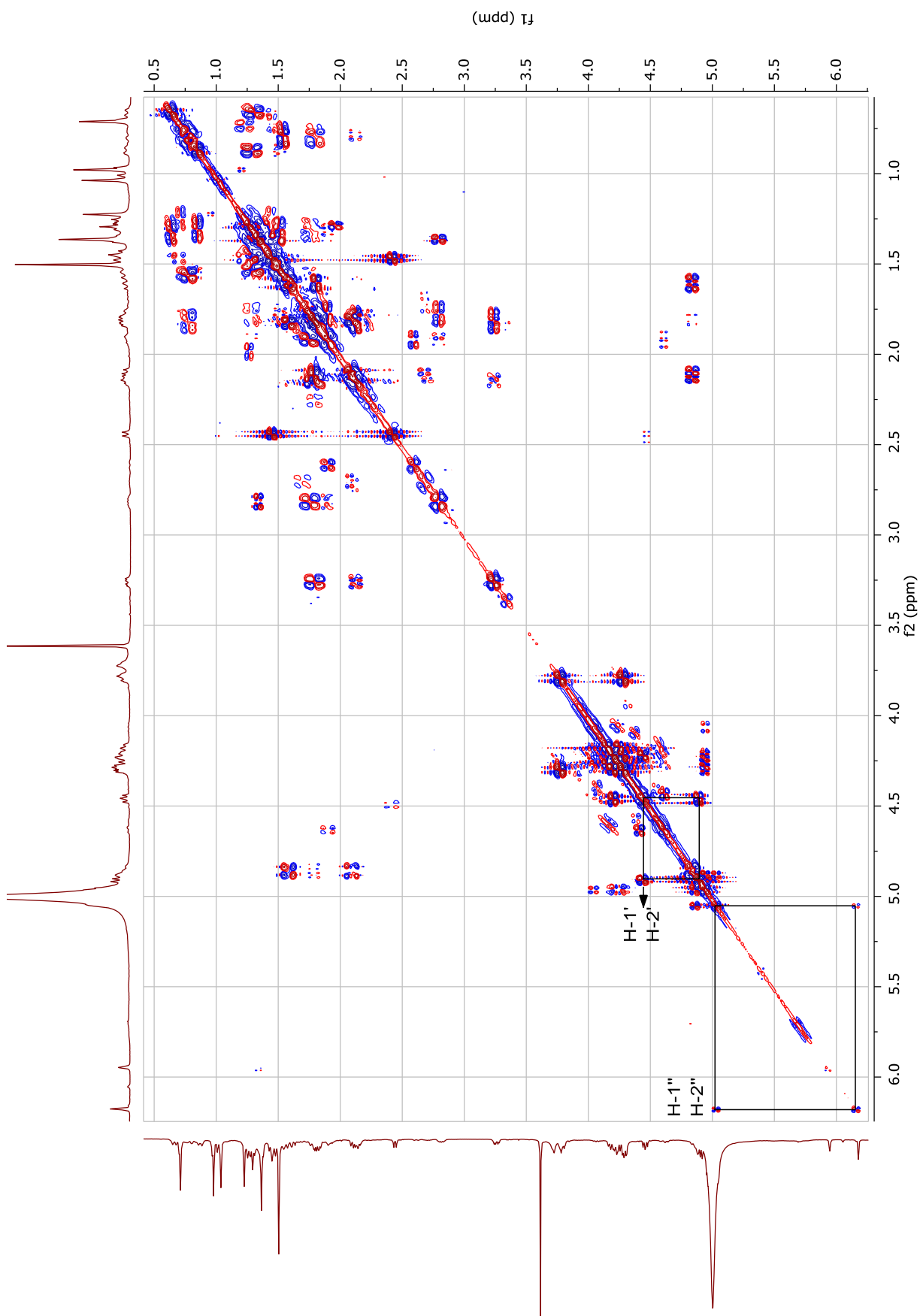


Figura 203. Espectro de DEPT-135 de **Zg11** (100 MHz,  $C_5D_5N$ ).



**Figura 204.** Espectro de COSY de **Zg11** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

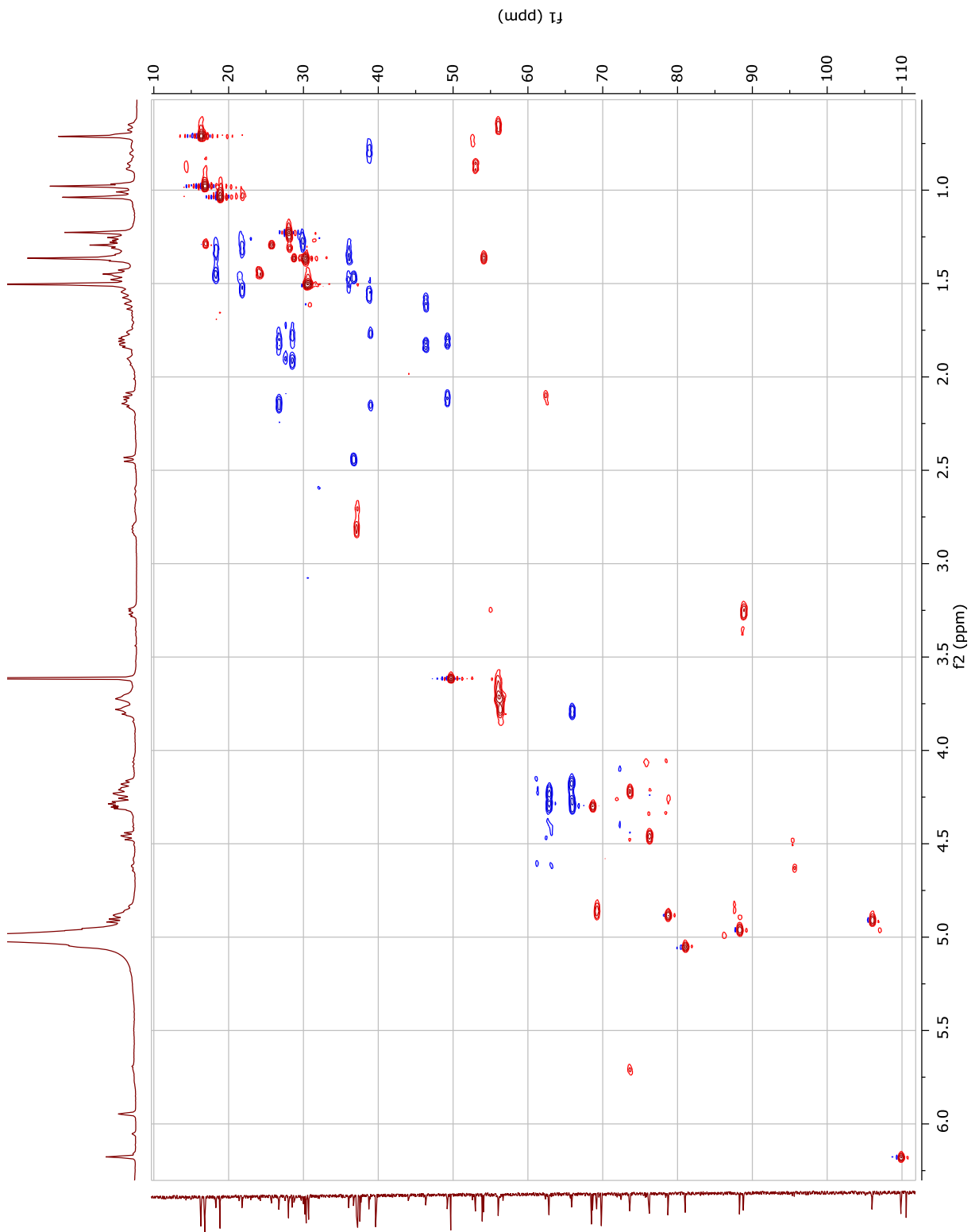


Figura 205. Espectro de HSQC de Zg11 (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

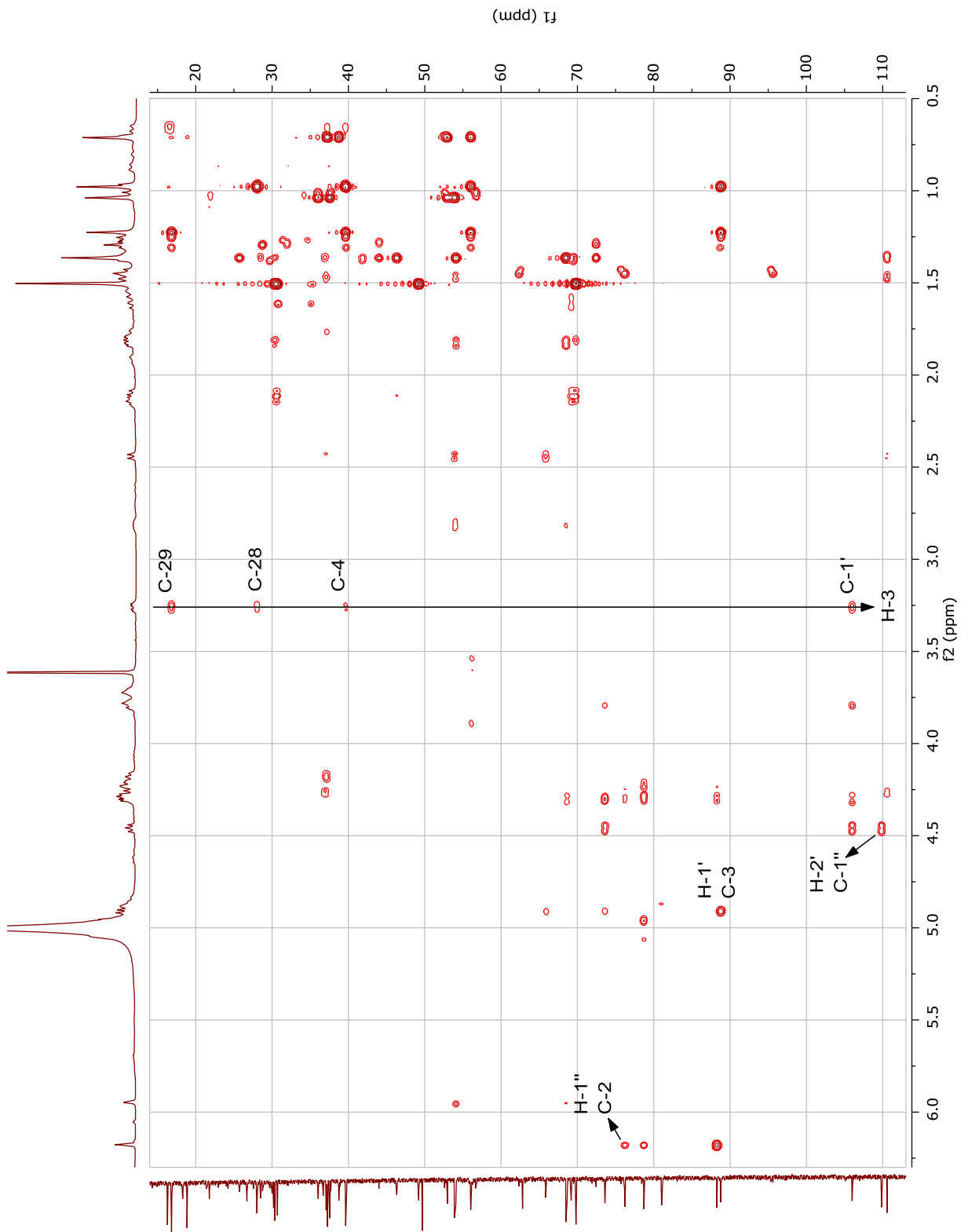


Figura 206. Espectro de HMBC de Zg11 (400 MHz,  $\text{C}_3\text{D}_5\text{N}$ ).

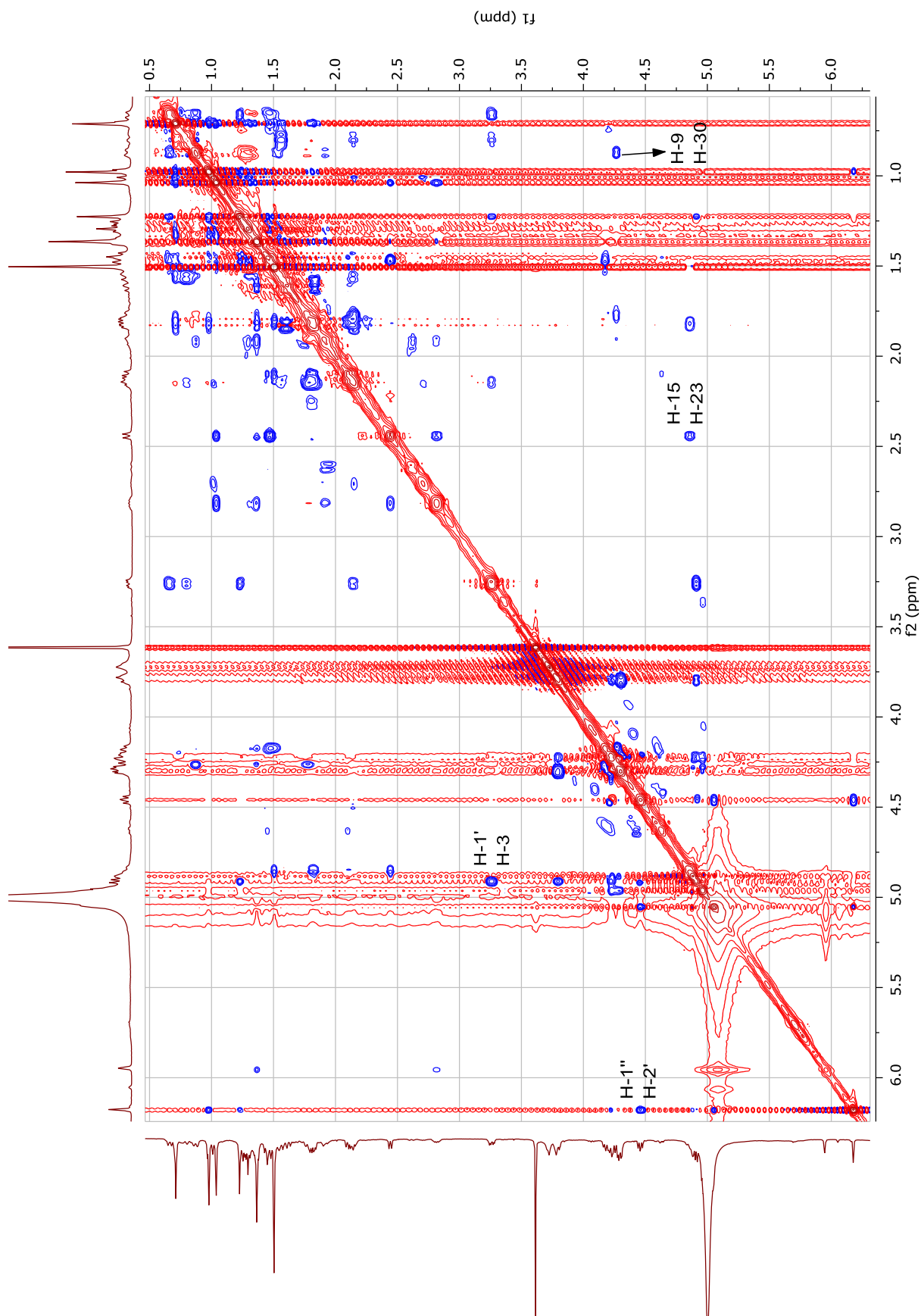


Figura 207. Espectro de ROESY de Zg11 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



CAC129\_Zgb\_c28 #91 RT: 0,36 AV: 1 NL: 7,59E6  
T: FTMS + p ESI Full ms [100,00-2000,00]

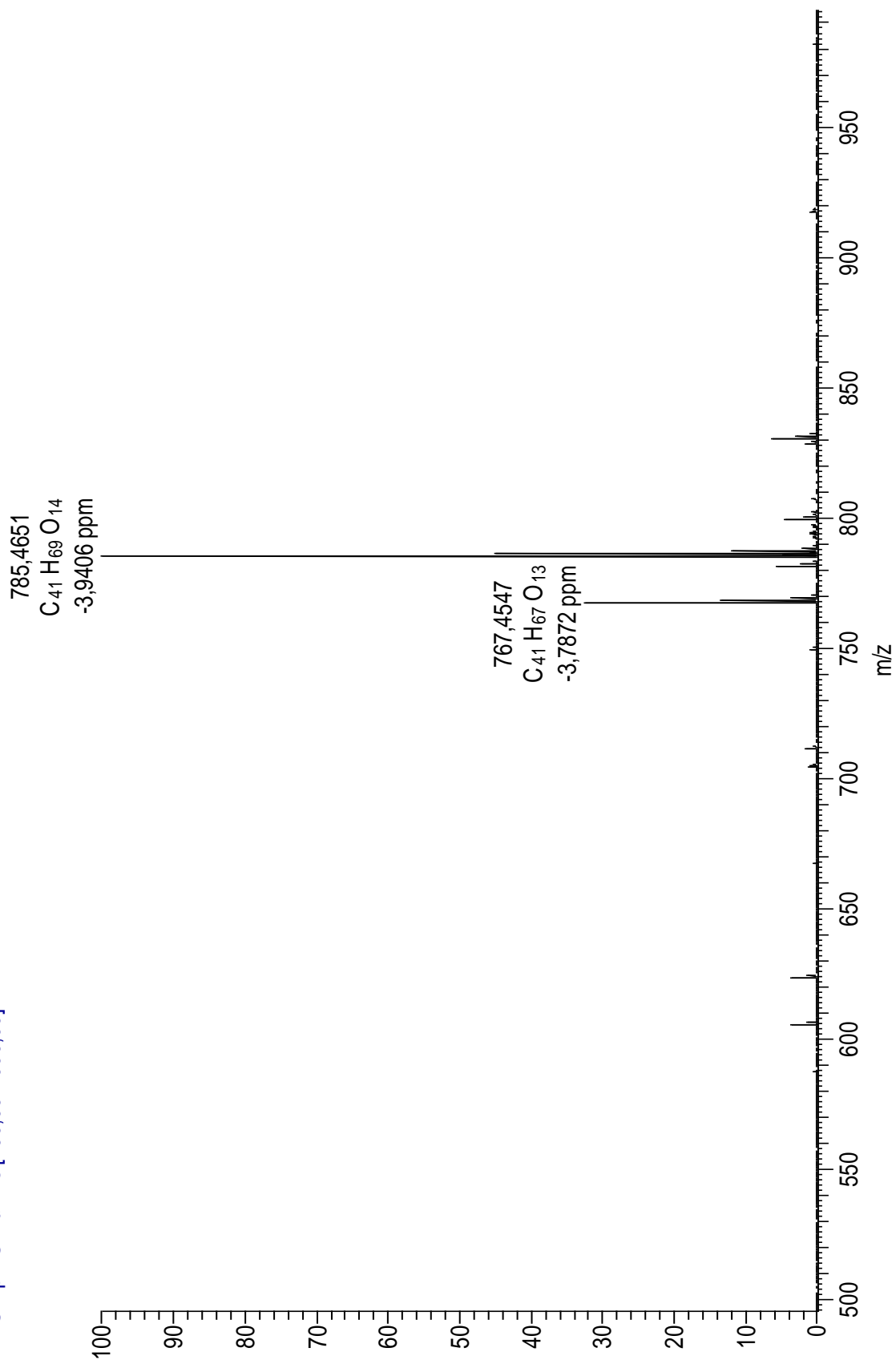


Figura 208. Espectro de massas de alta resolução de **Zg12** (ESI, modo positivo).

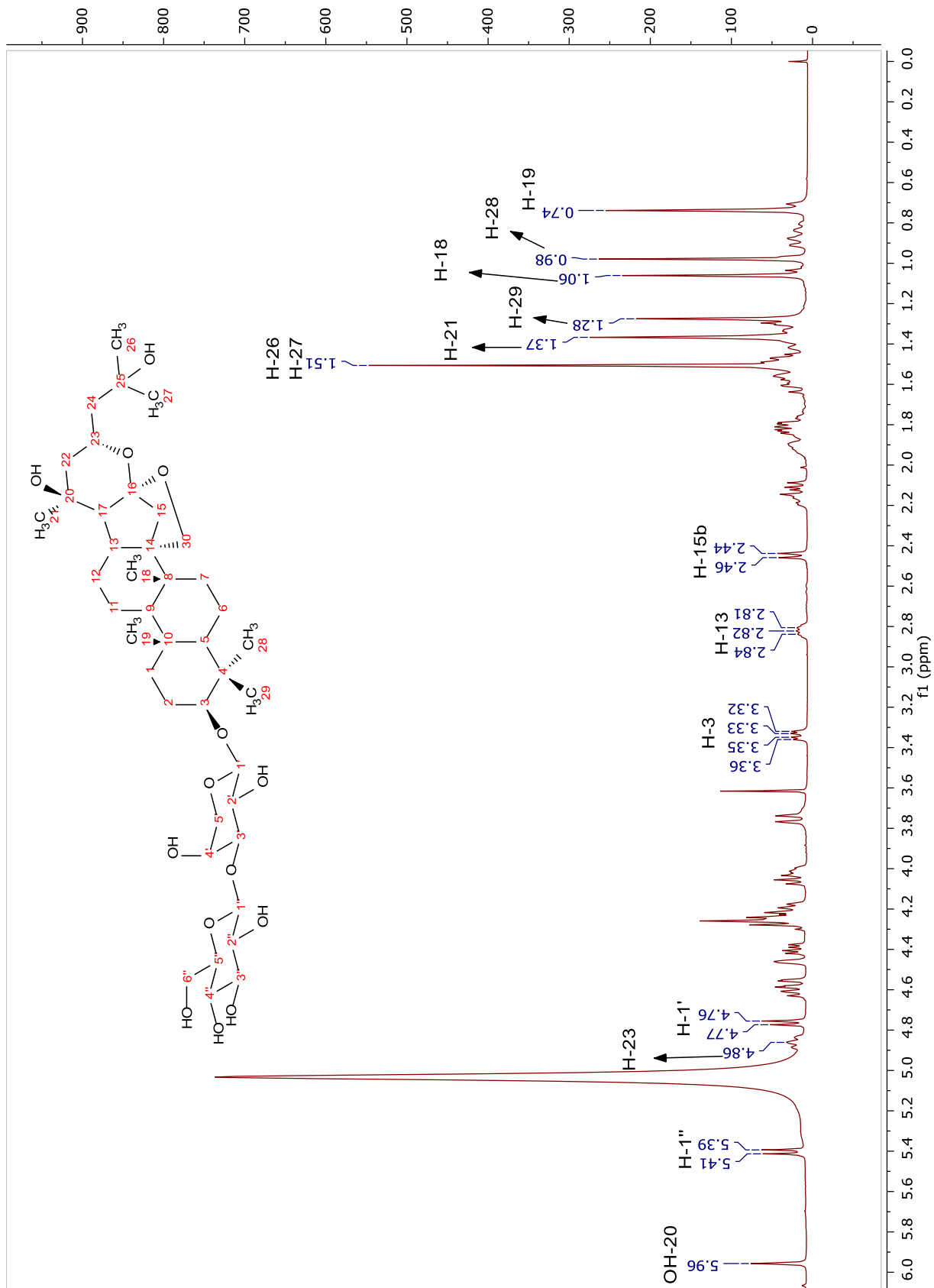


Figura 209. Espectro de RMN  $^1\text{H}$  de **Zg12** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

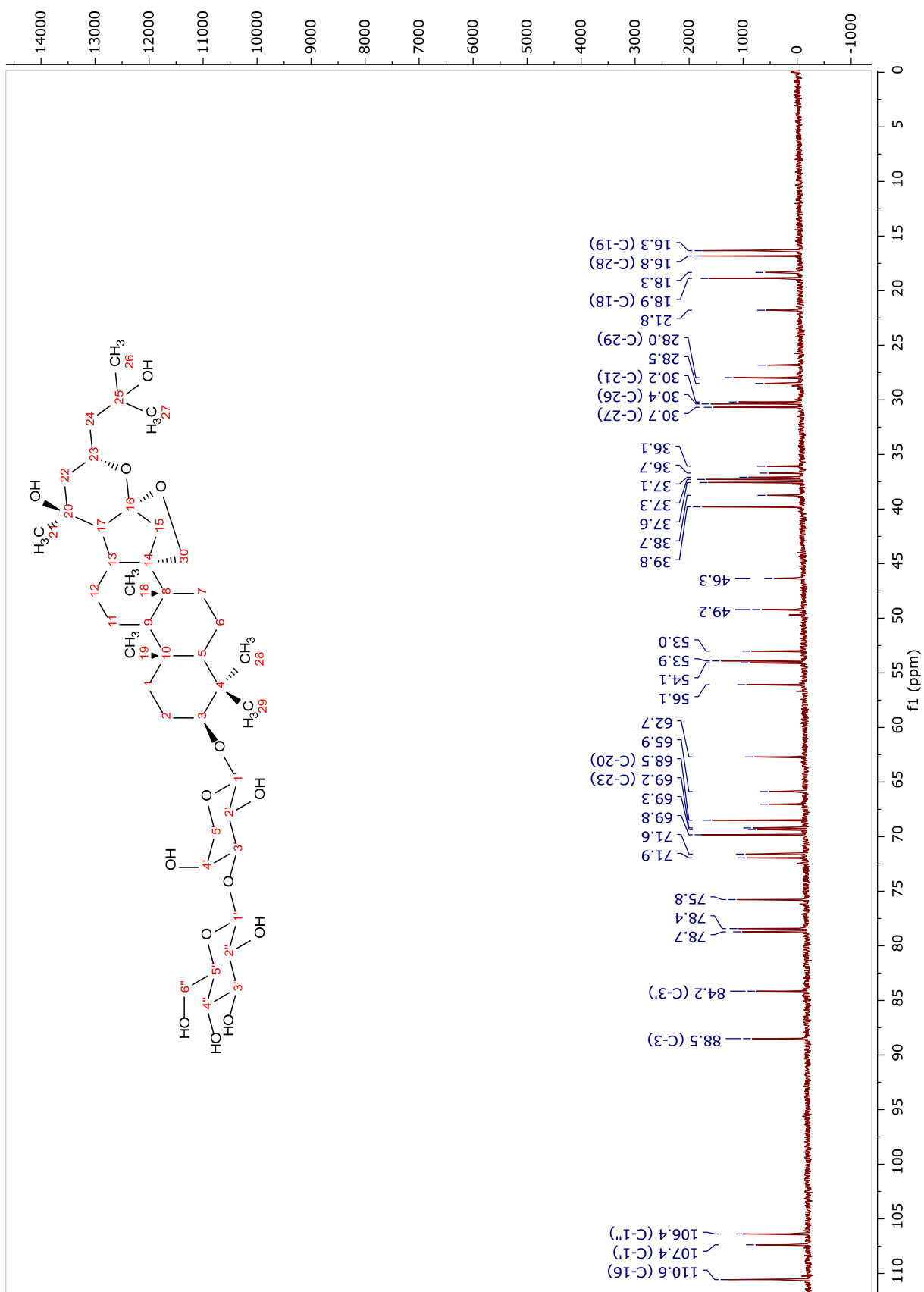


Figura 210. Espectro de RMN  $^{13}\text{C}$  de **Zg12** (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

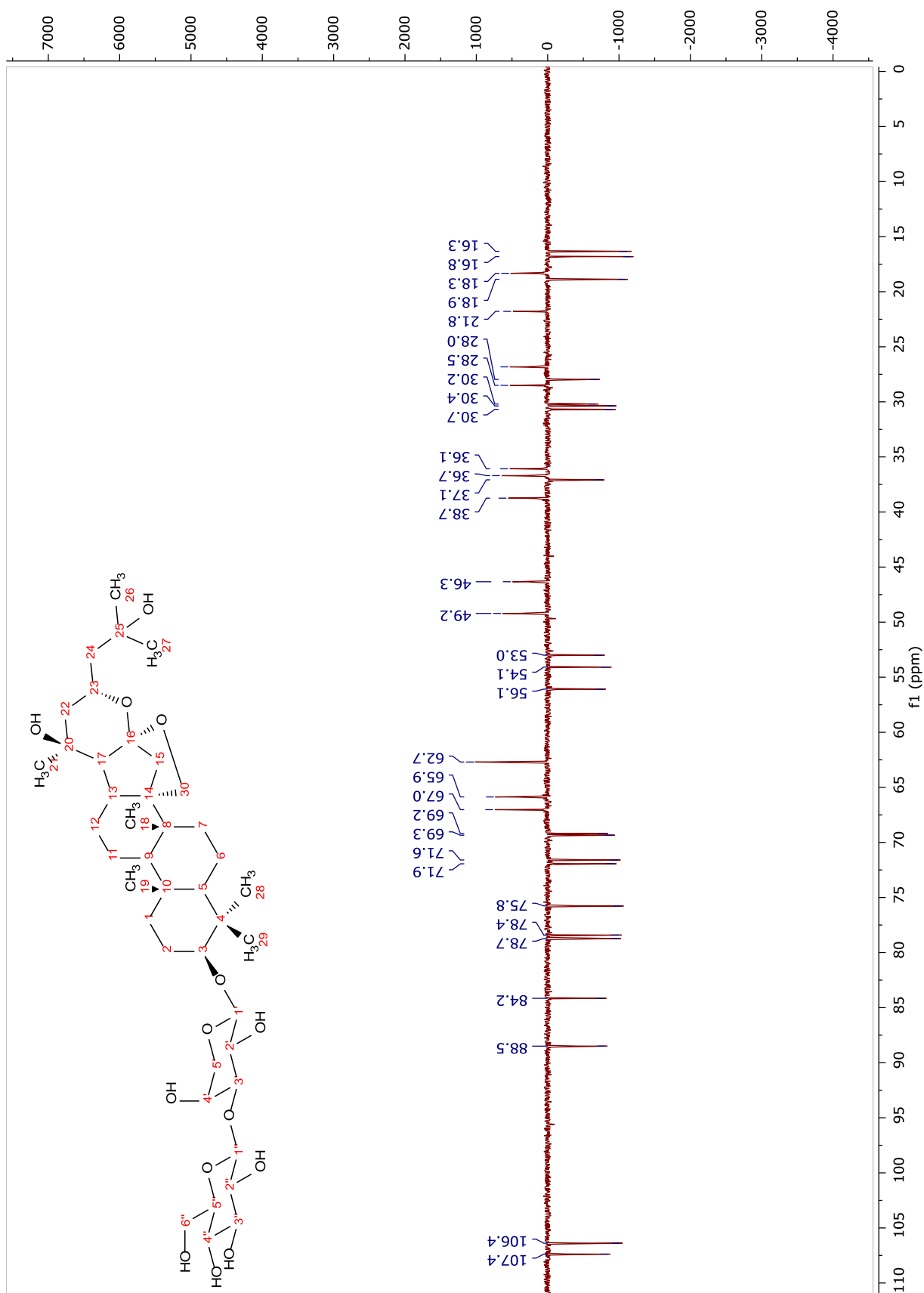


Figura 211. Espectro de DEPT-135 de **Zg12** (100 MHz, C<sub>5</sub>D<sub>5</sub>N).

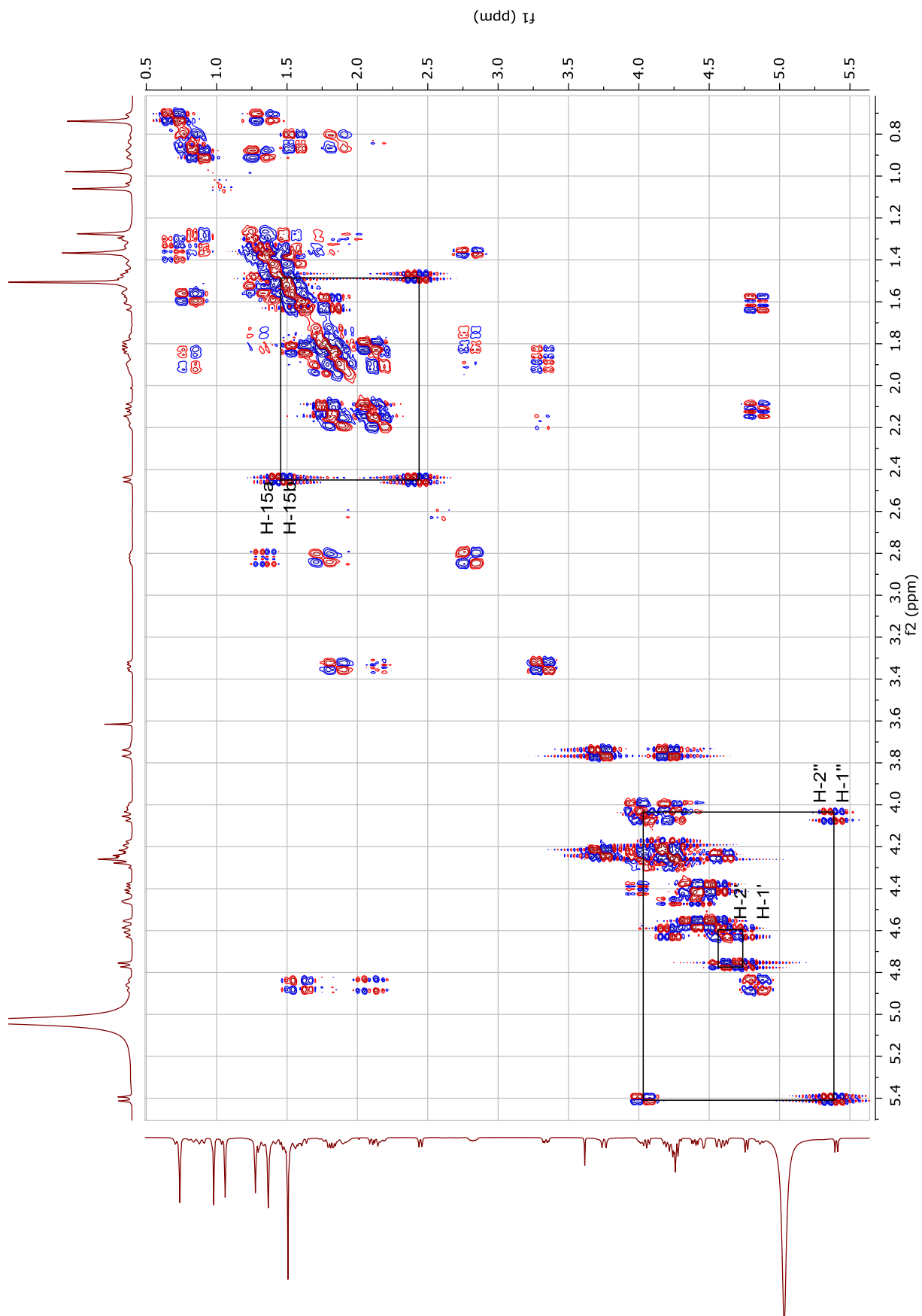
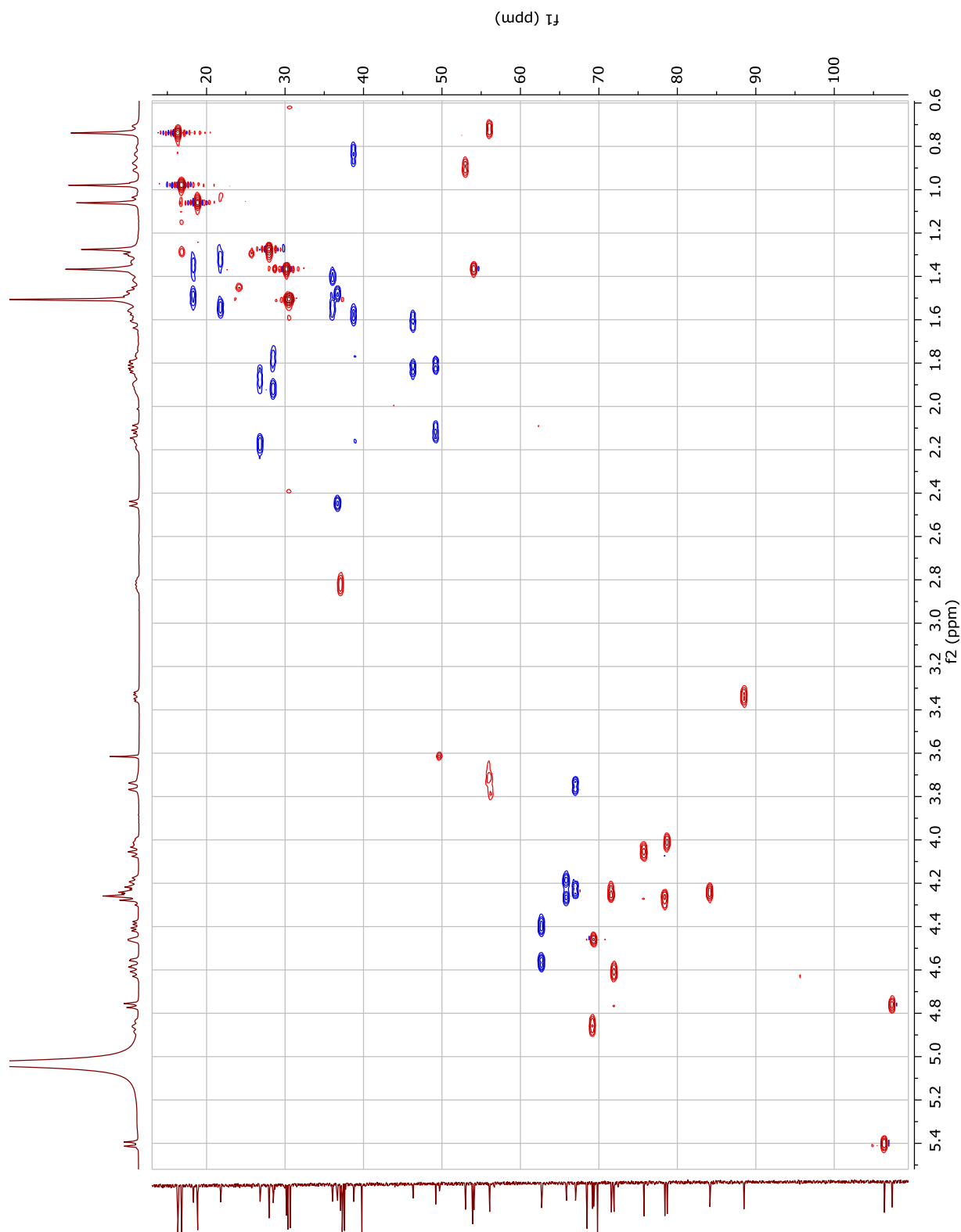


Figura 212. Espectro de COSY de **Zg12** (400 MHz,  $C_5D_5N$ ).



**Figura 213.** Espectro de HSQC de **Zg12** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

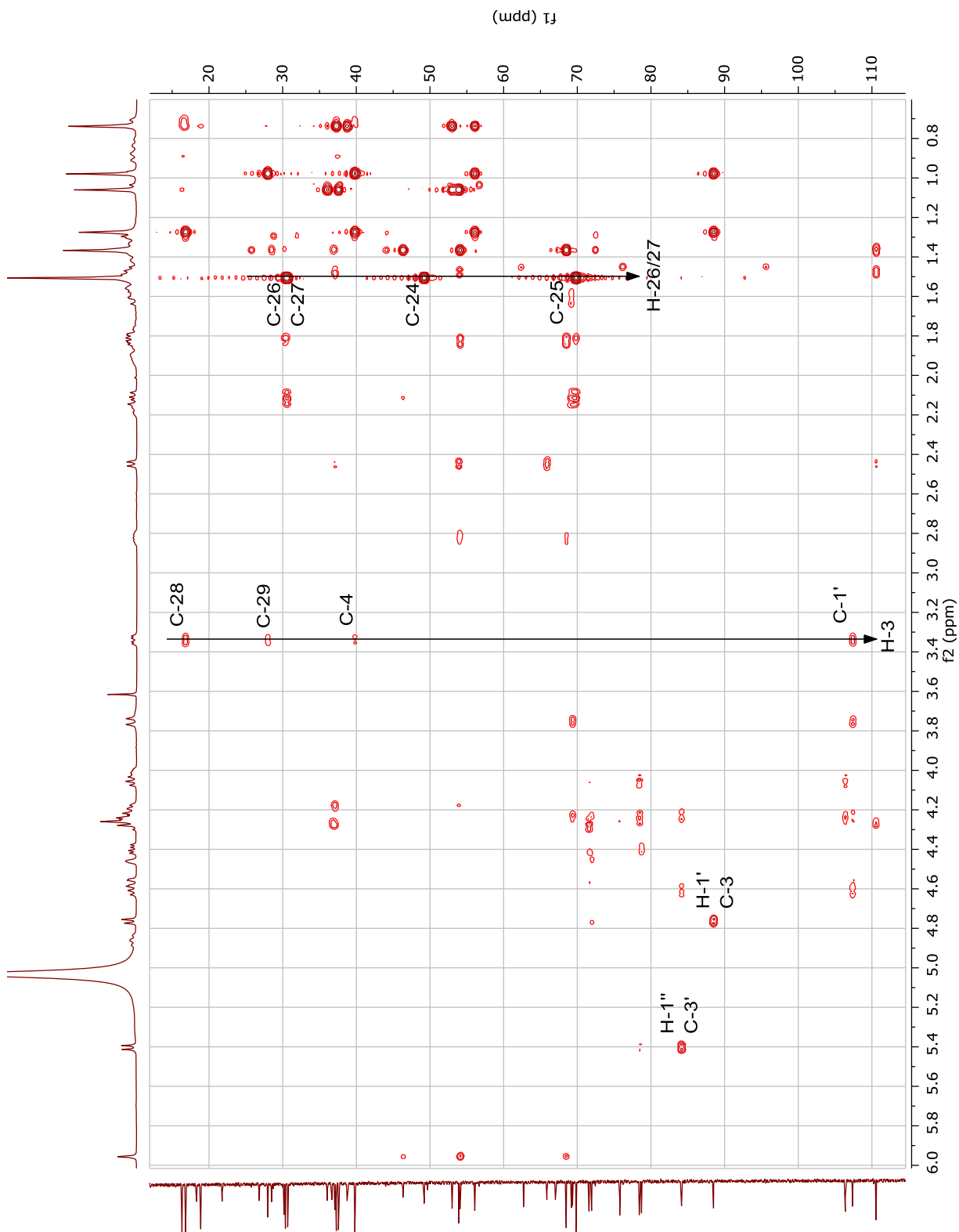


Figura 214. Espectro de HMBC de **Zg12** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

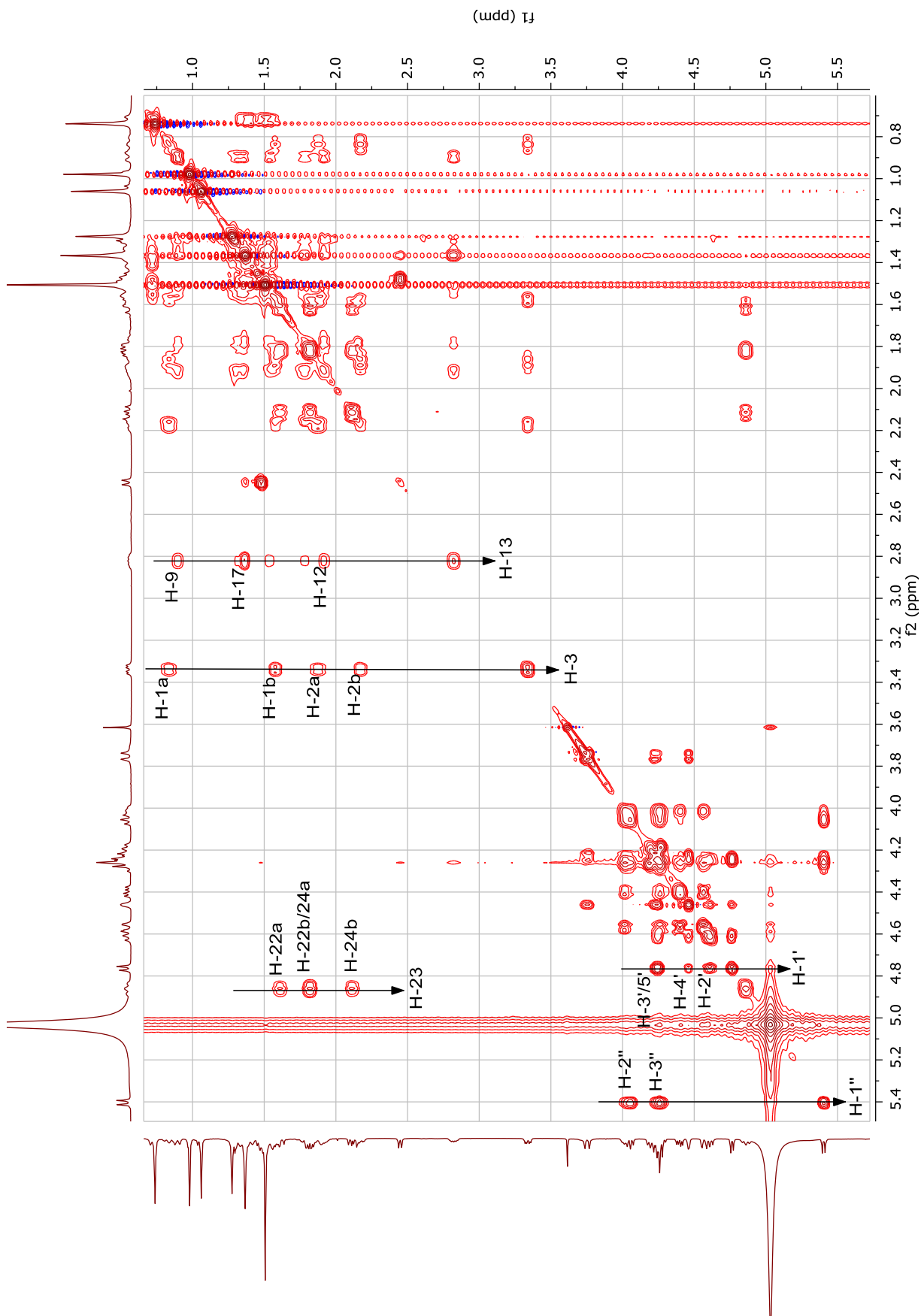


Figura 215. Espectro de TOCSY (2D) de **Zg12** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).



CAC145\_neg #1 RT: 0,00 AV: 1 NL: 2,25E5  
T: FTMS - p ESI Full ms [100,00-2000,00]

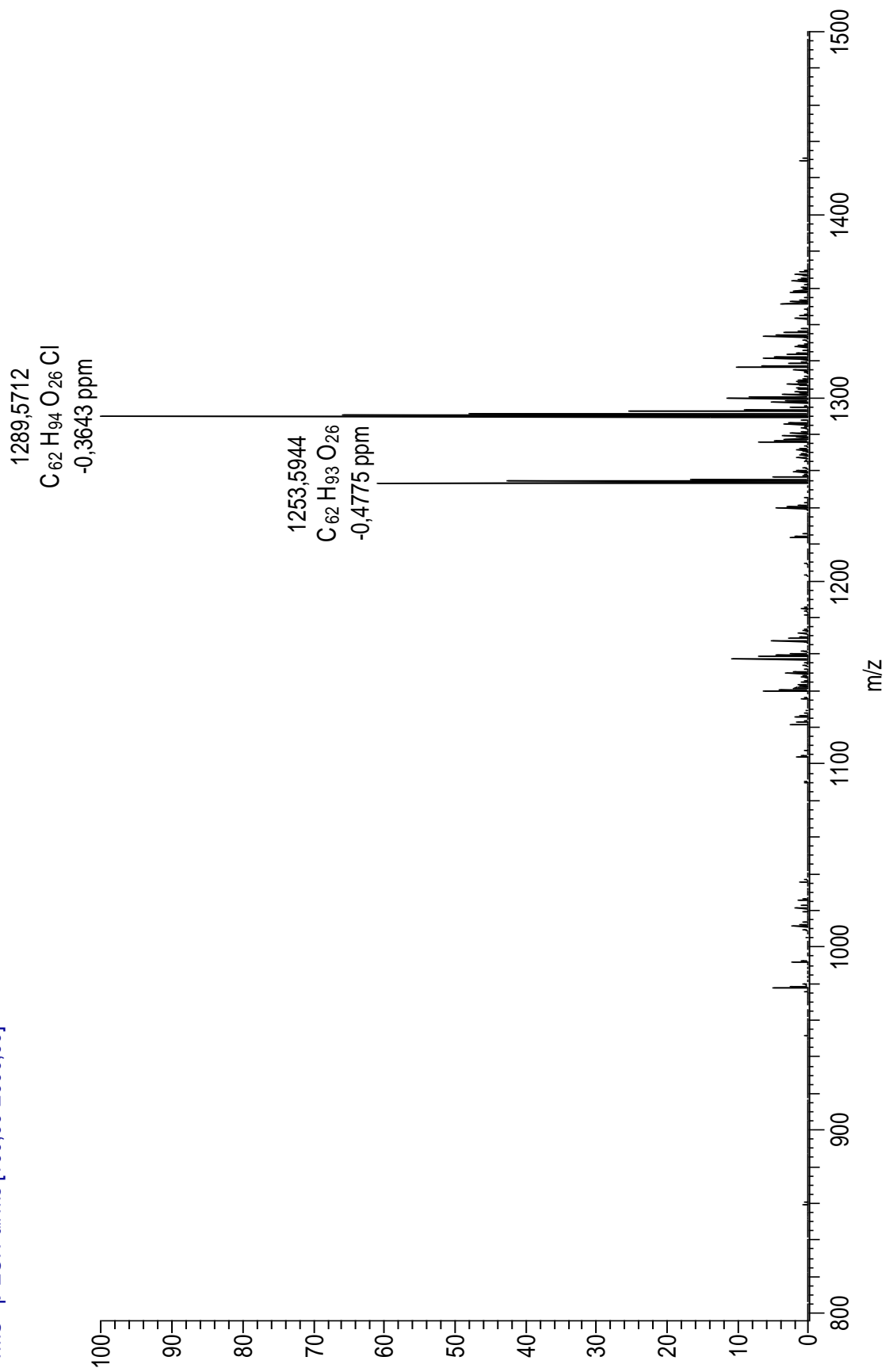


Figura 216. Espectro de massas de alta resolução de **Zg13** (ESI, modo positivo).

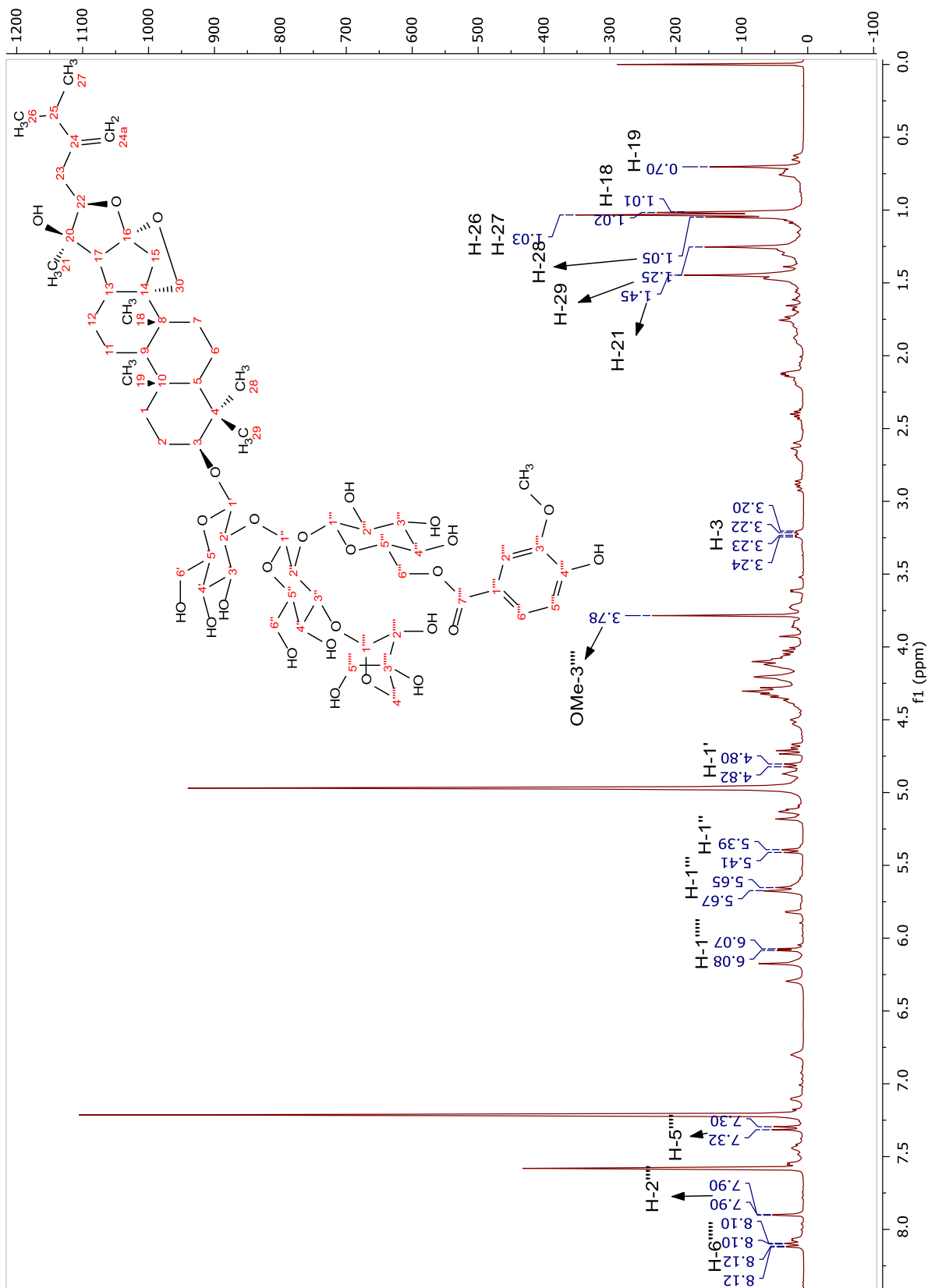


Figura 217. Espectro de RMN  $^1\text{H}$  de **Zg13** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

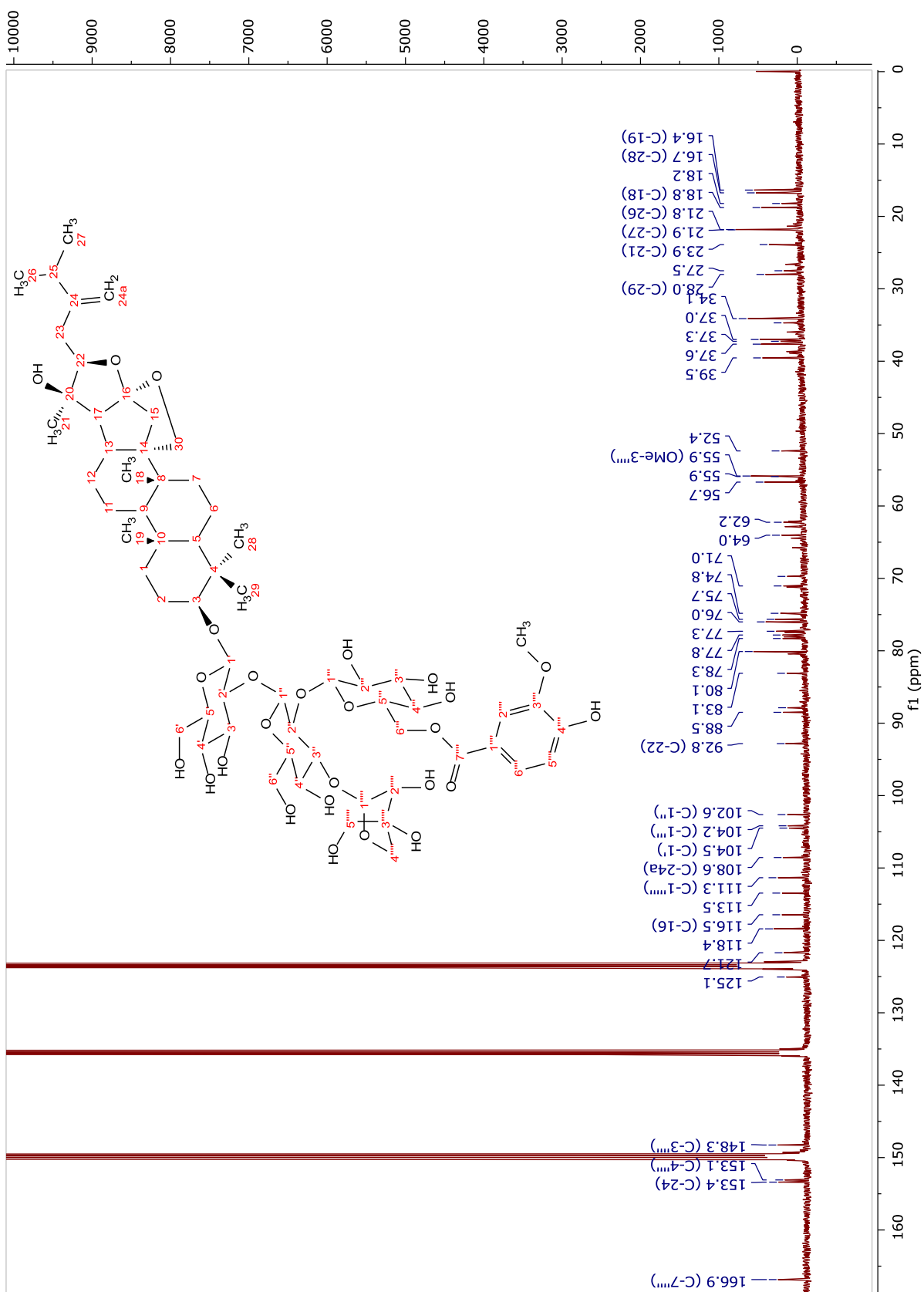


Figura 218. Espectro de RMN  $^{13}\text{C}$  de **Zg13** (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

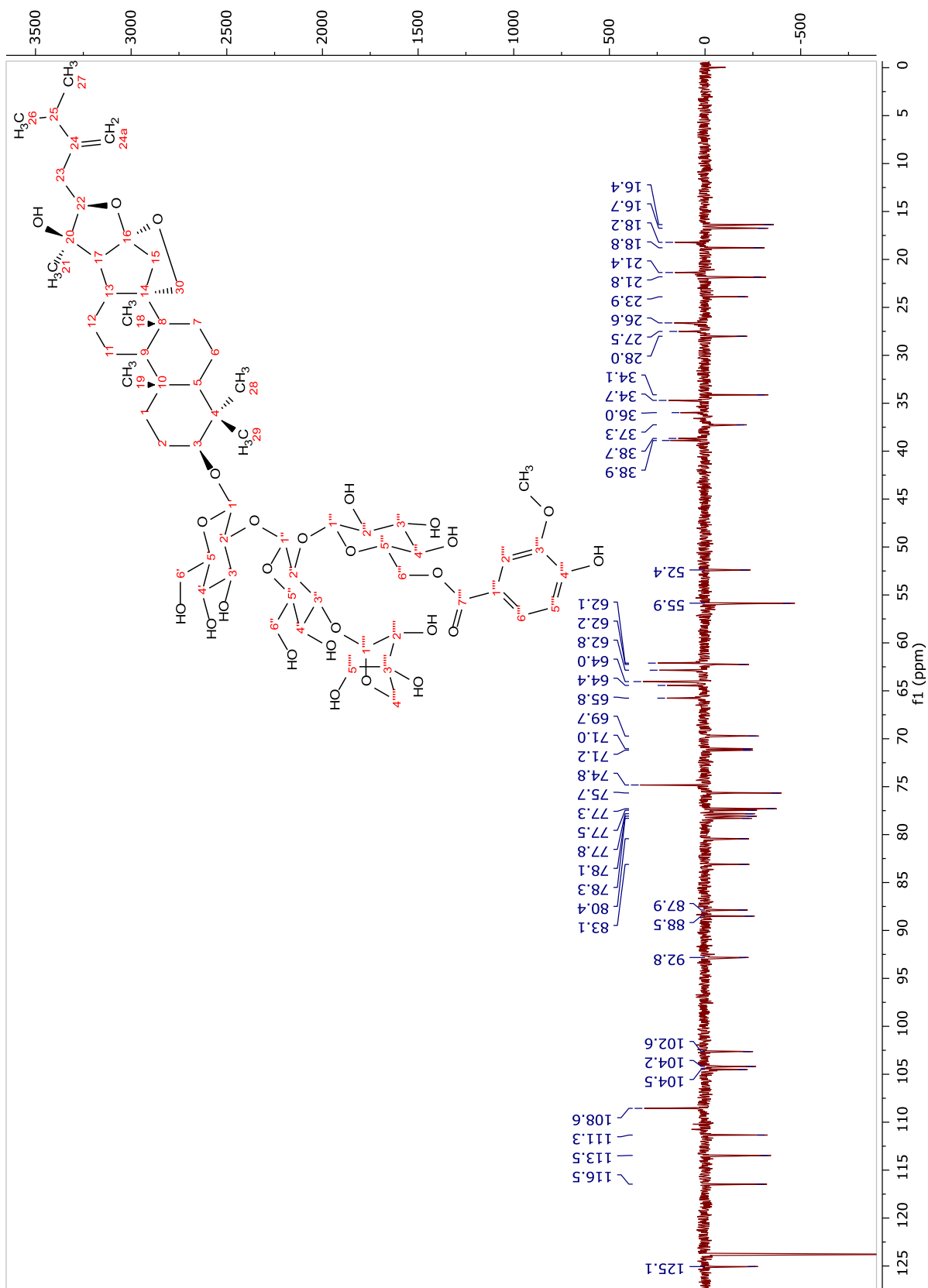
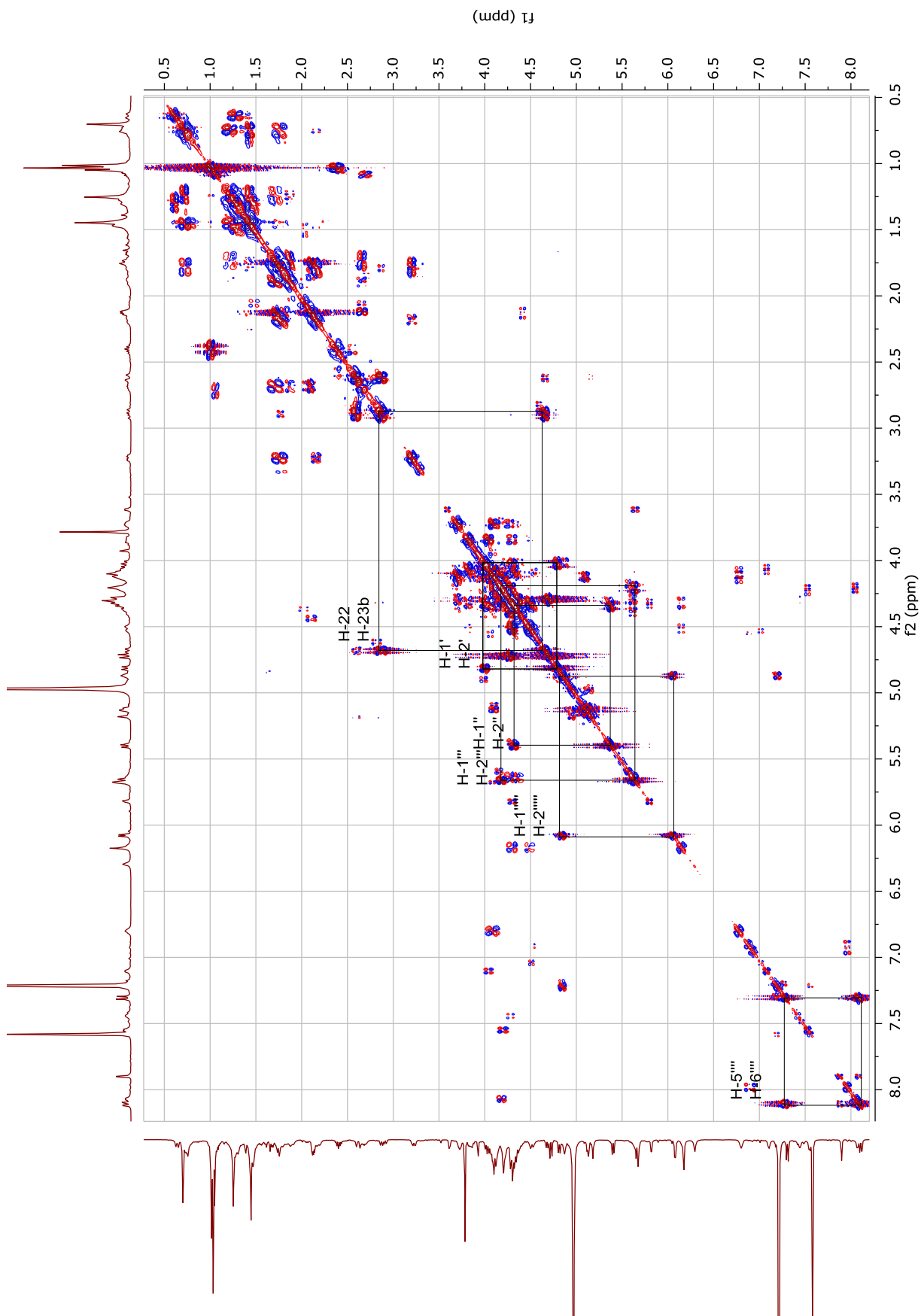


Figura 219. Espectro de DEPT-135 de **Zg13** (100 MHz,  $C_5D_5N$ ).



**Figura 220.** Espectro de COSY de **Zg13** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

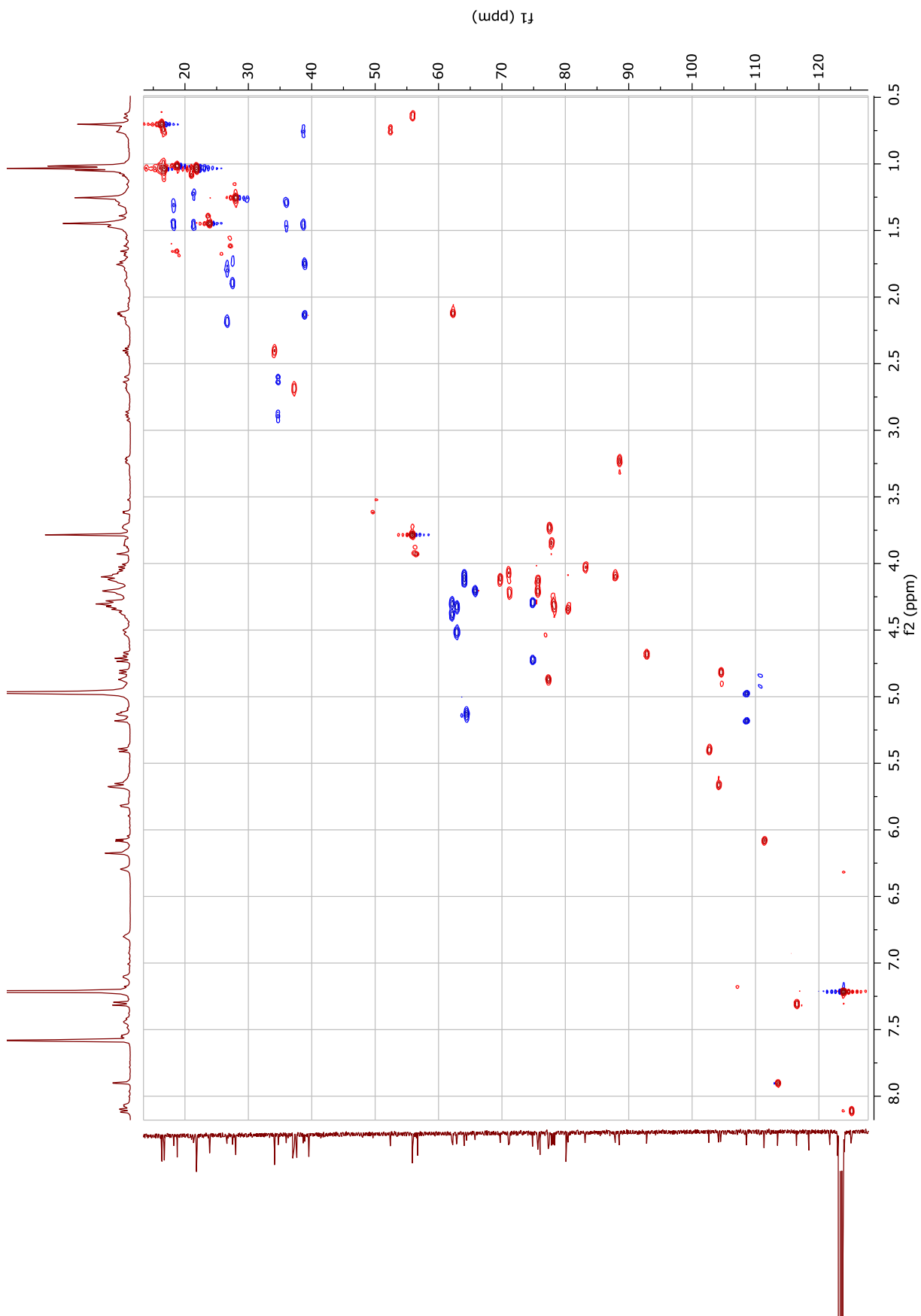


Figura 221. Espectro de HSQC de **Zg13** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

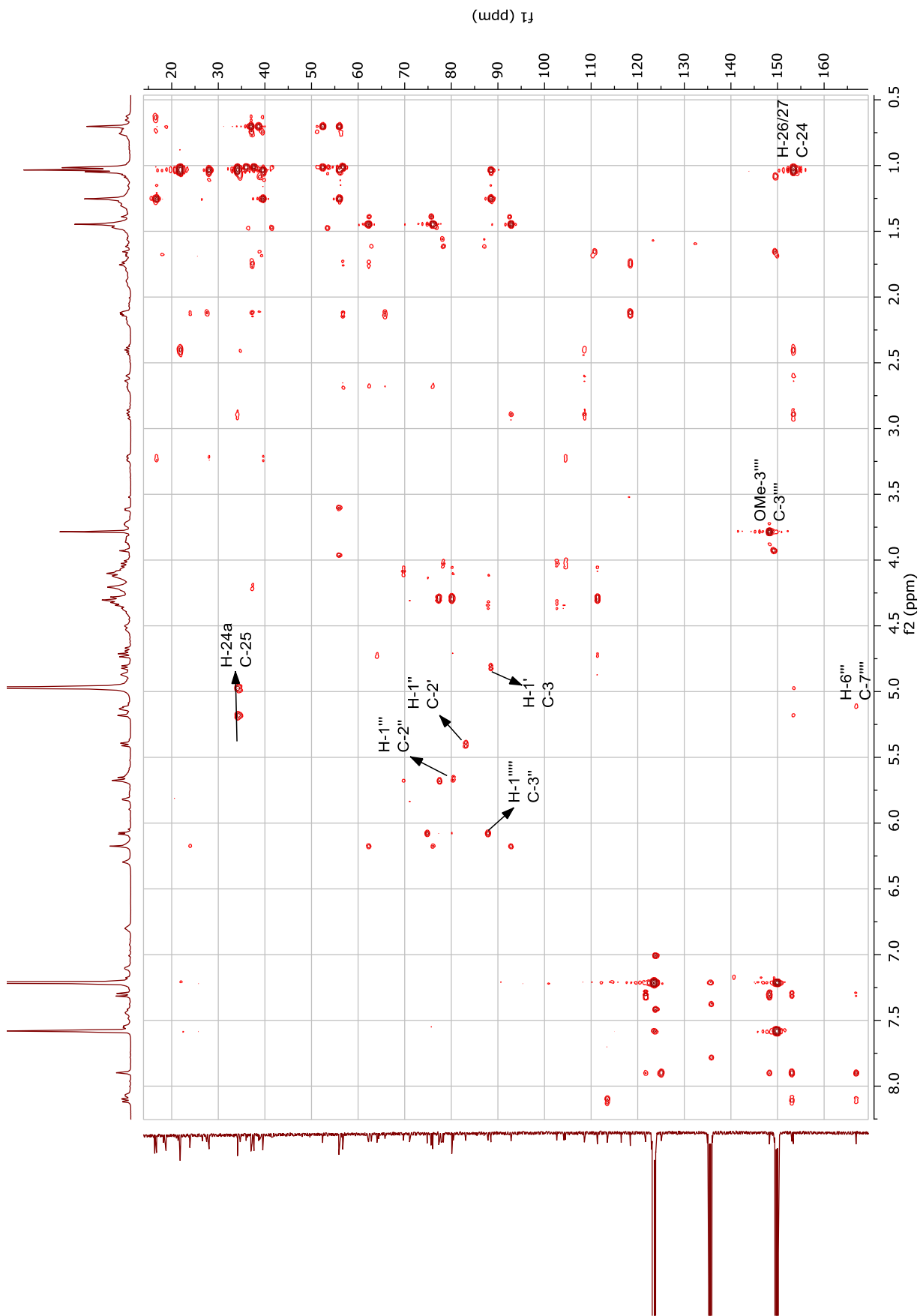


Figura 222. Espectro de HMBC de **Zg13** (400 MHz,  $C_5D_5N$ ).

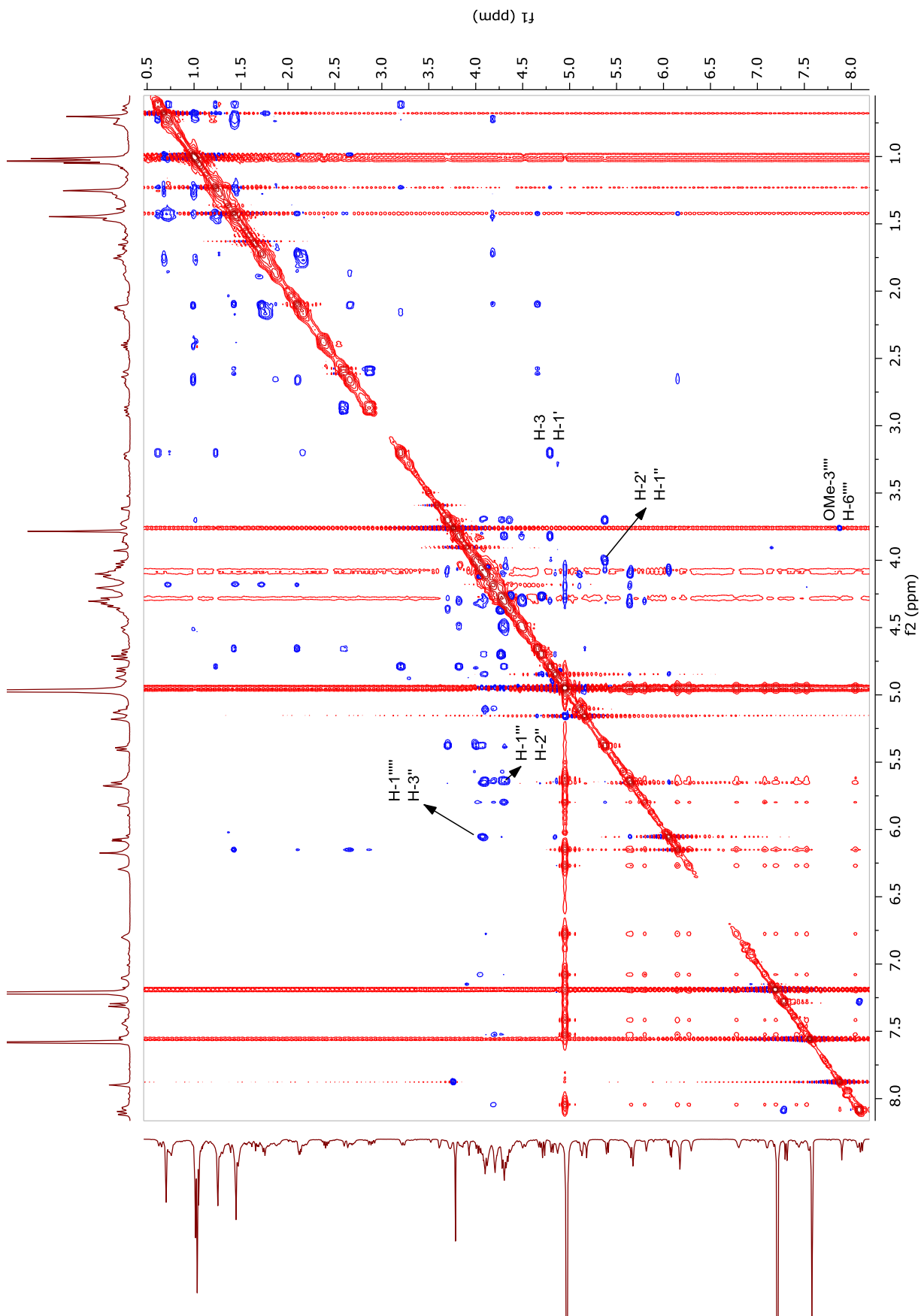


Figura 223. Espectro de ROESY de **Zg13** (400 MHz,  $C_5D_5N$ ).



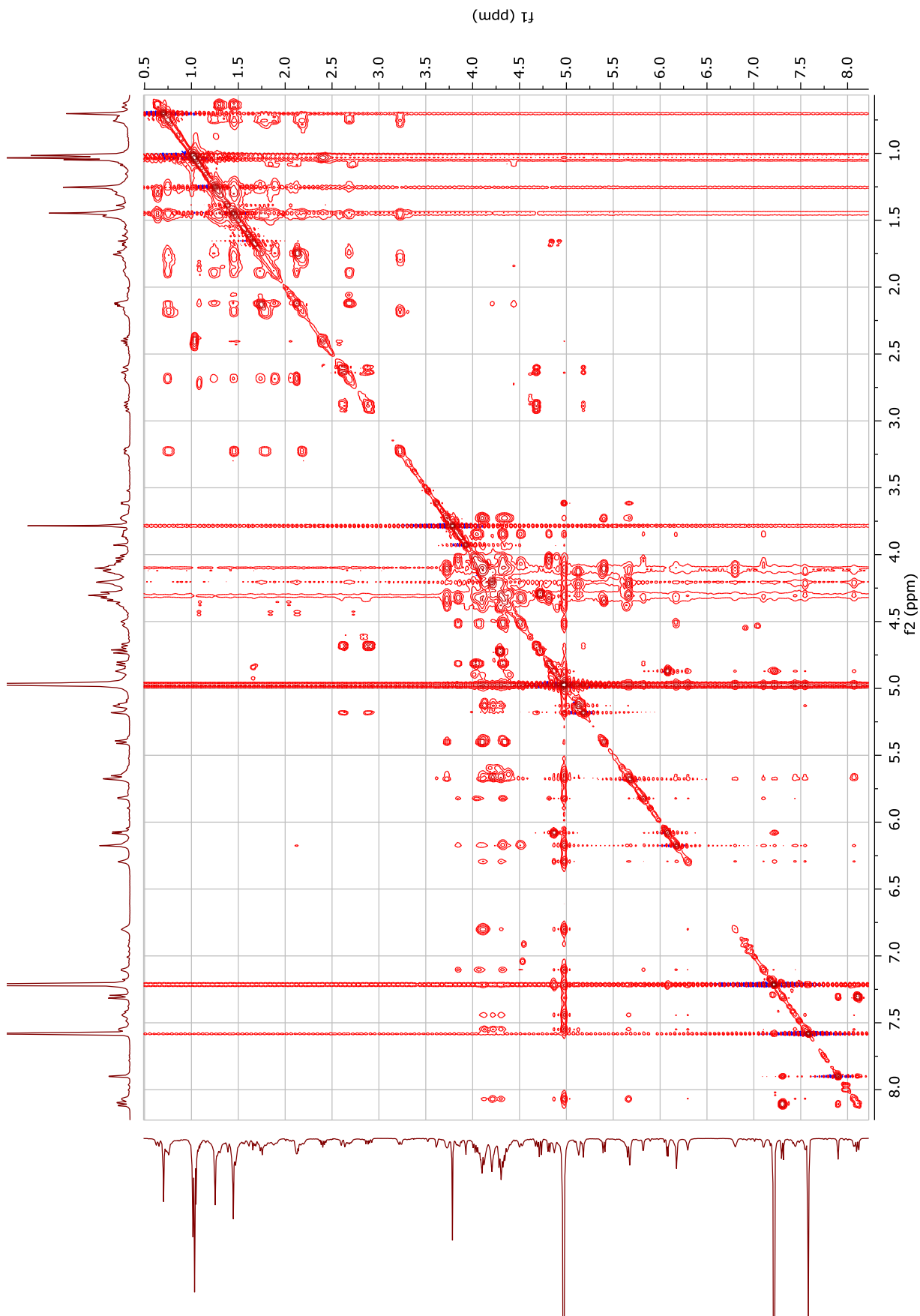
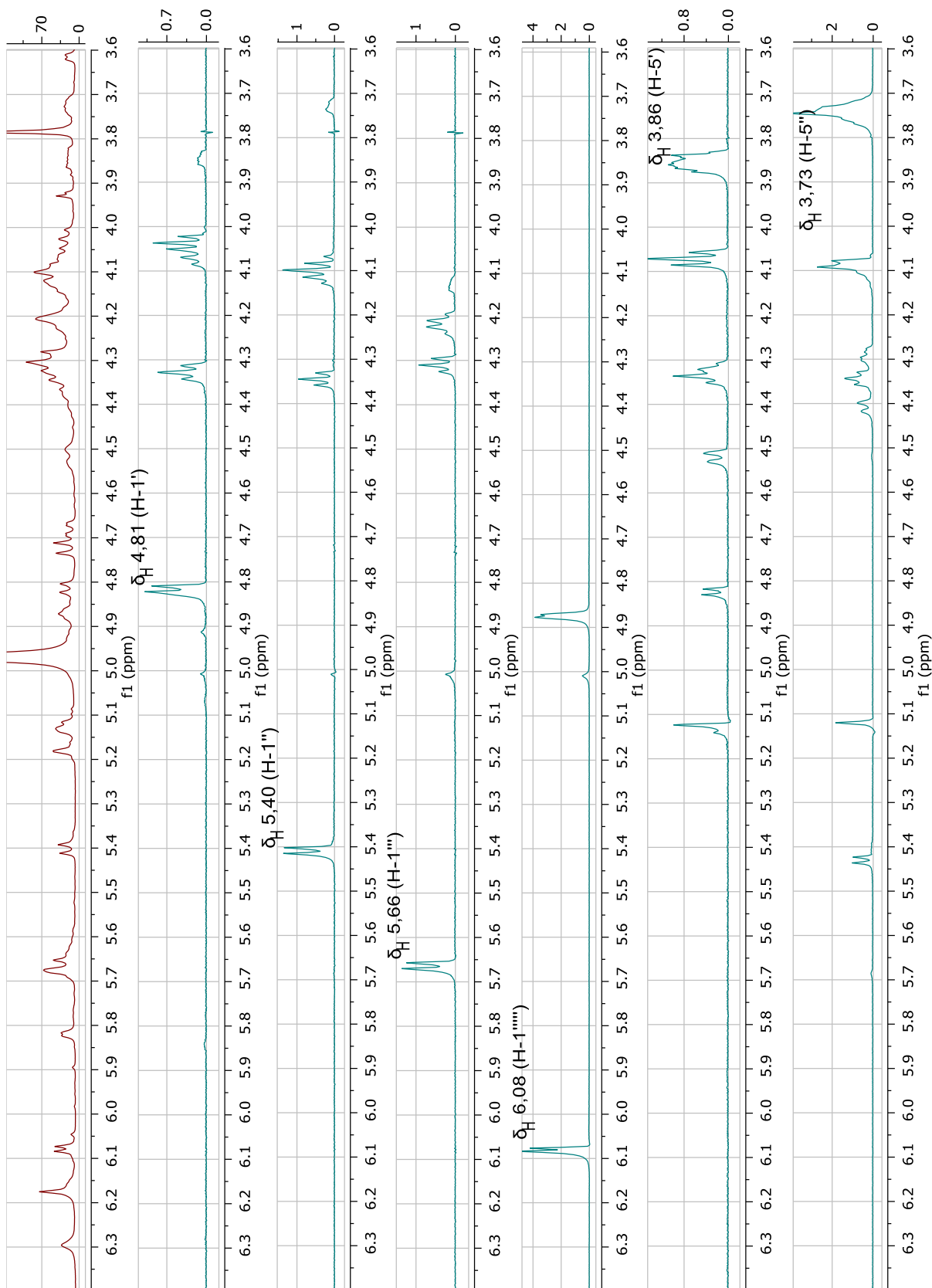


Figura 224. Espectro de TOCSY (2D) de **Zg13** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



**Figura 225.** Espectro de TOCSY seletivo de **Zg13** ( $\delta_{\text{H}}$  3,6-6,4 ppm) (600 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

180319\_CAC\_158neg #4491-4523 RT: 11,18-11,26 AV: 33 NL: 3,70E6  
T: FTMS - p ESI Full ms [110,00-2000,00]

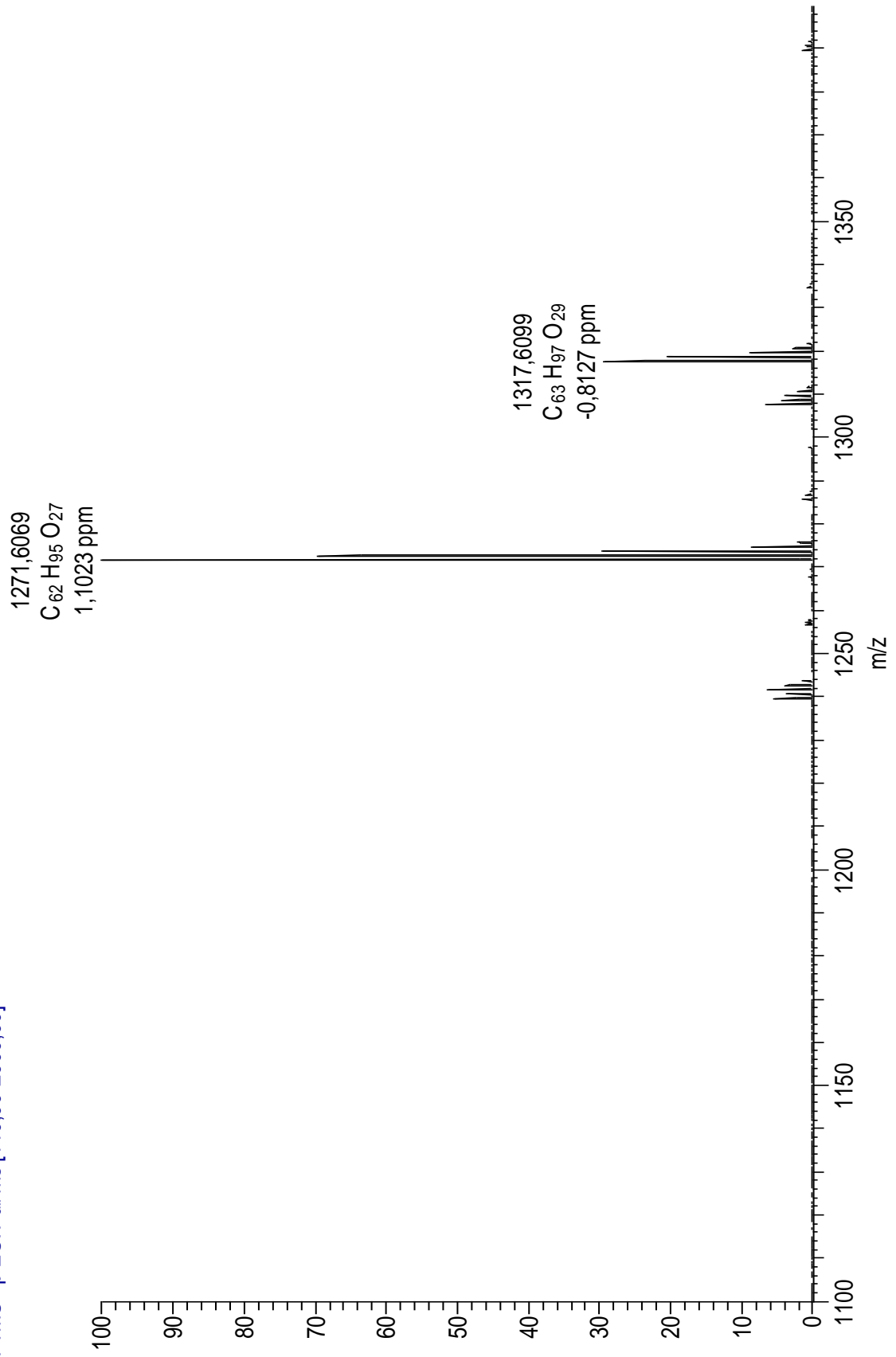


Figura 226. Espectro de massas de alta resolução de **Zg14** (ESI, modo negativo).

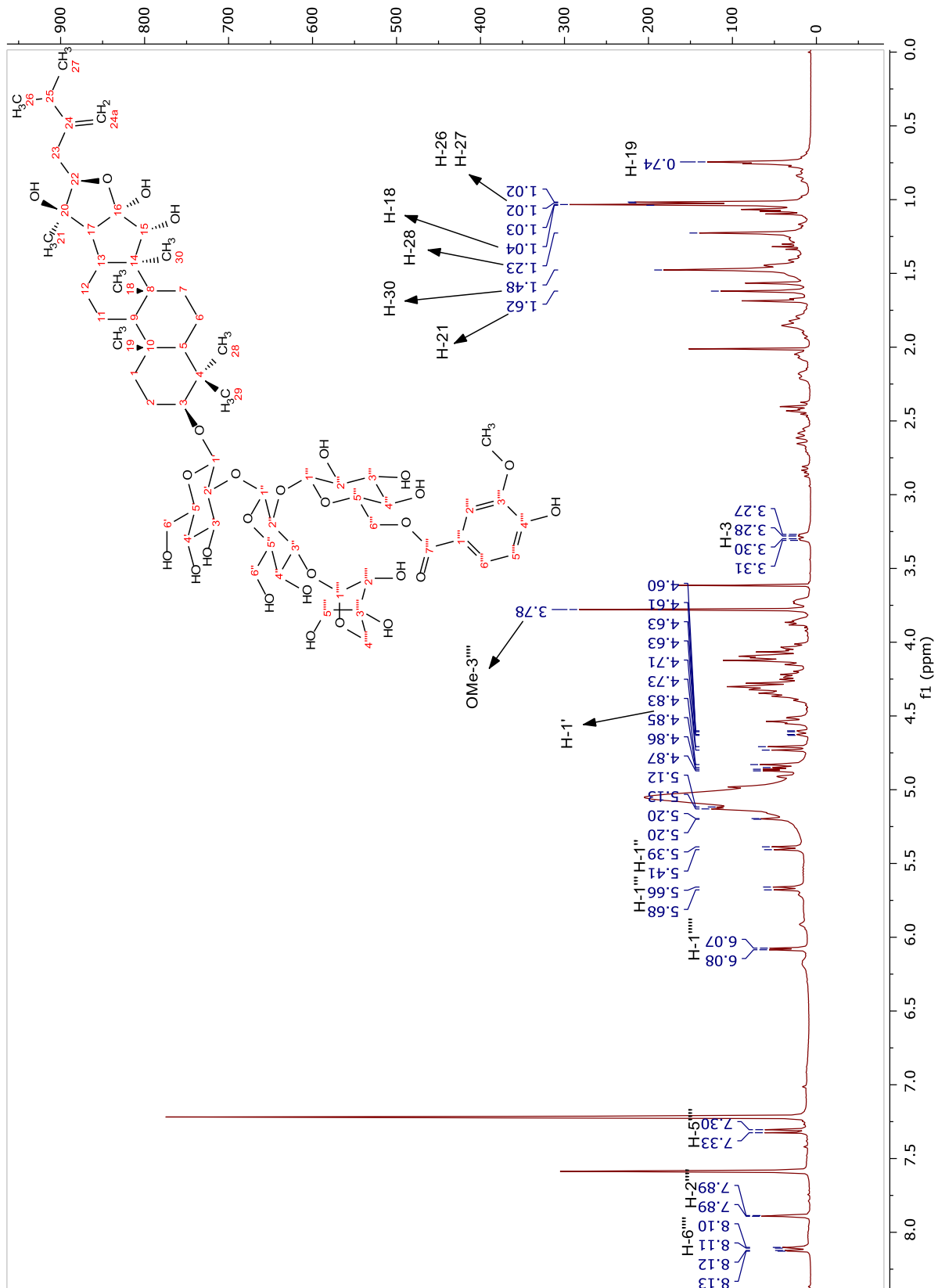


Figura 227. Espectro de RMN  $^1\text{H}$  de **Zg14** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

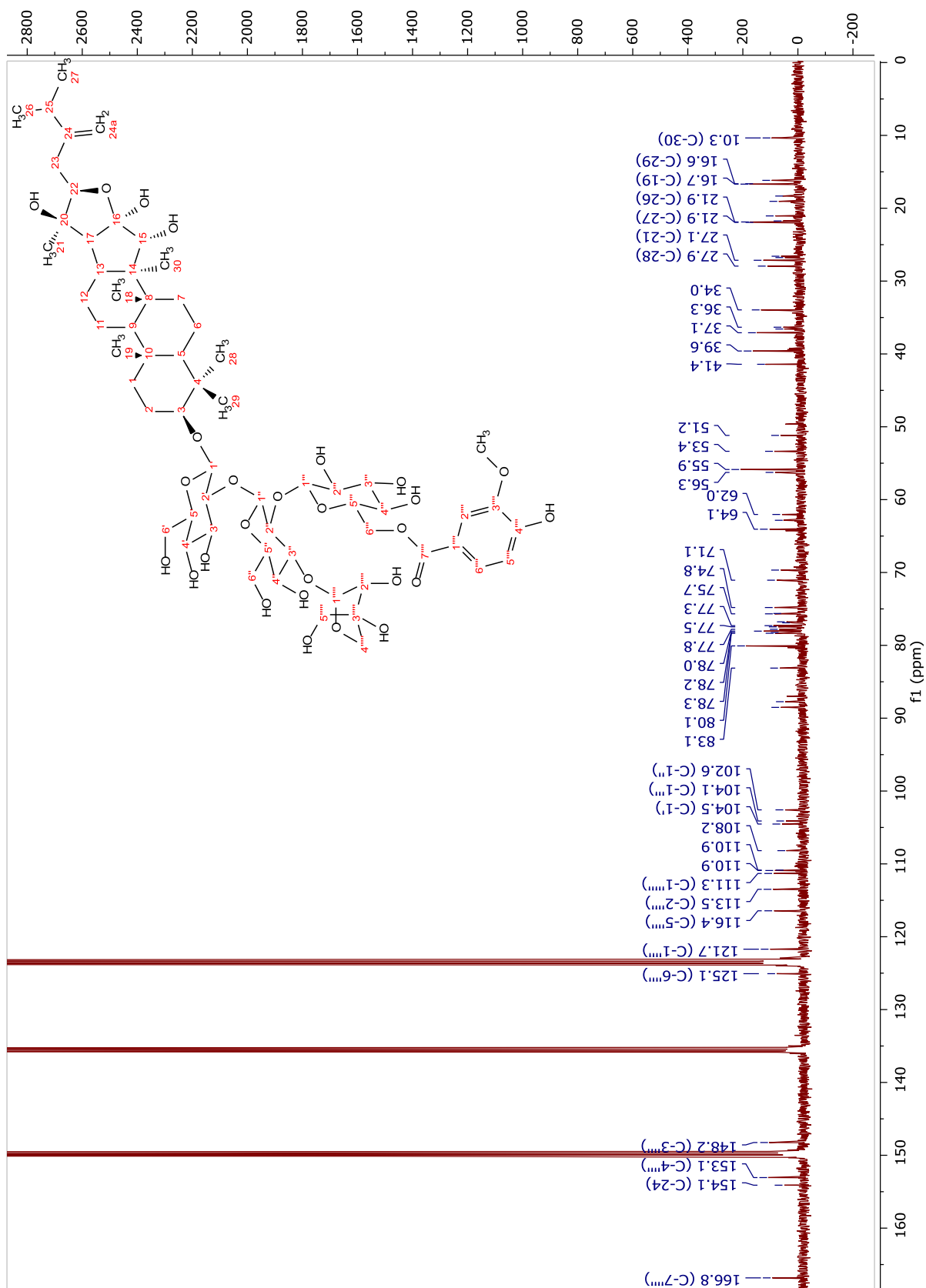


Figura 228. Espectro de RMN  $^{13}\text{C}$  de **Zg14** (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

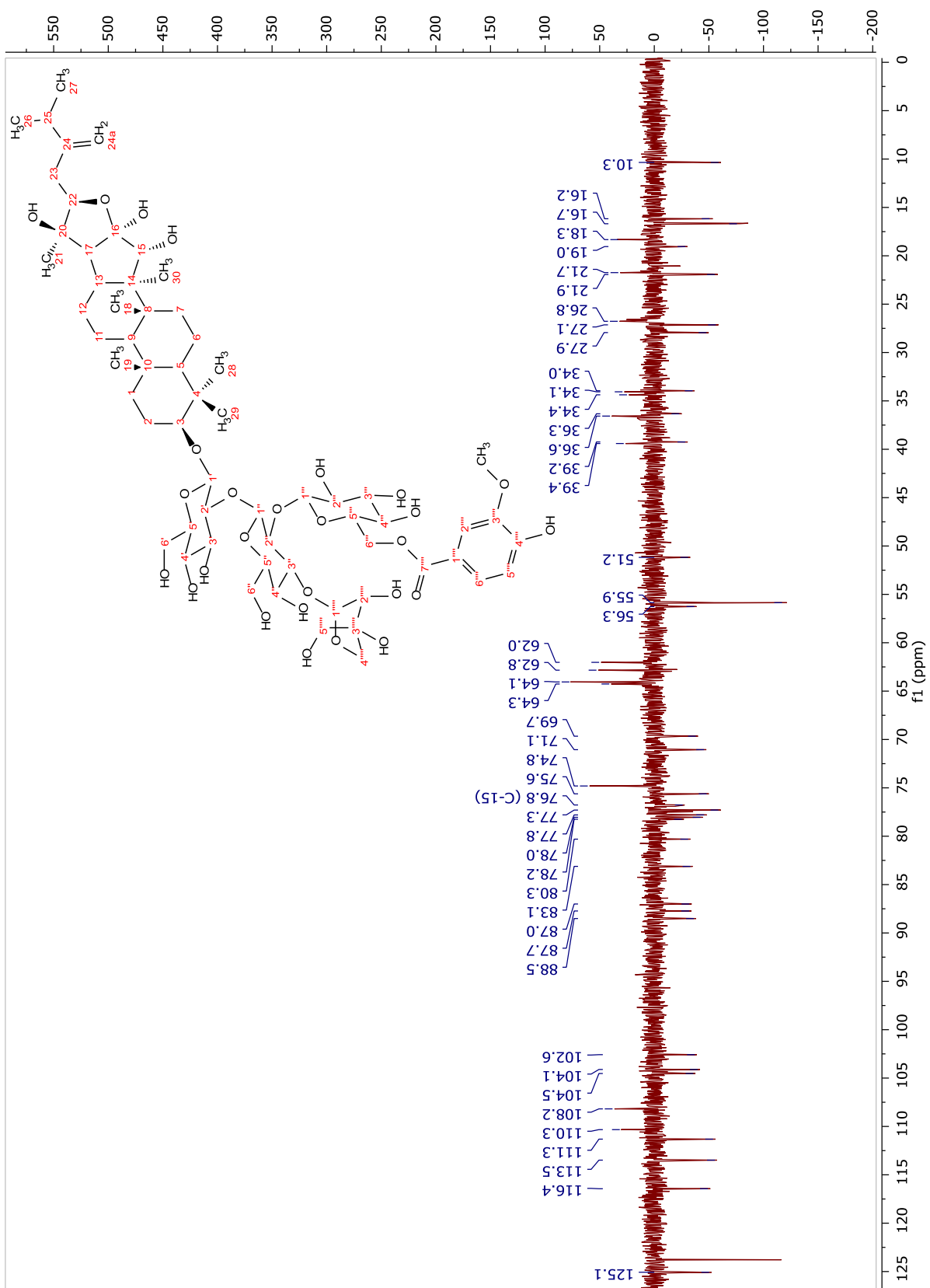


Figura 229. Espectro de DEPT-135 de **Zg14** (400 MHz,  $C_3D_5N$ ).

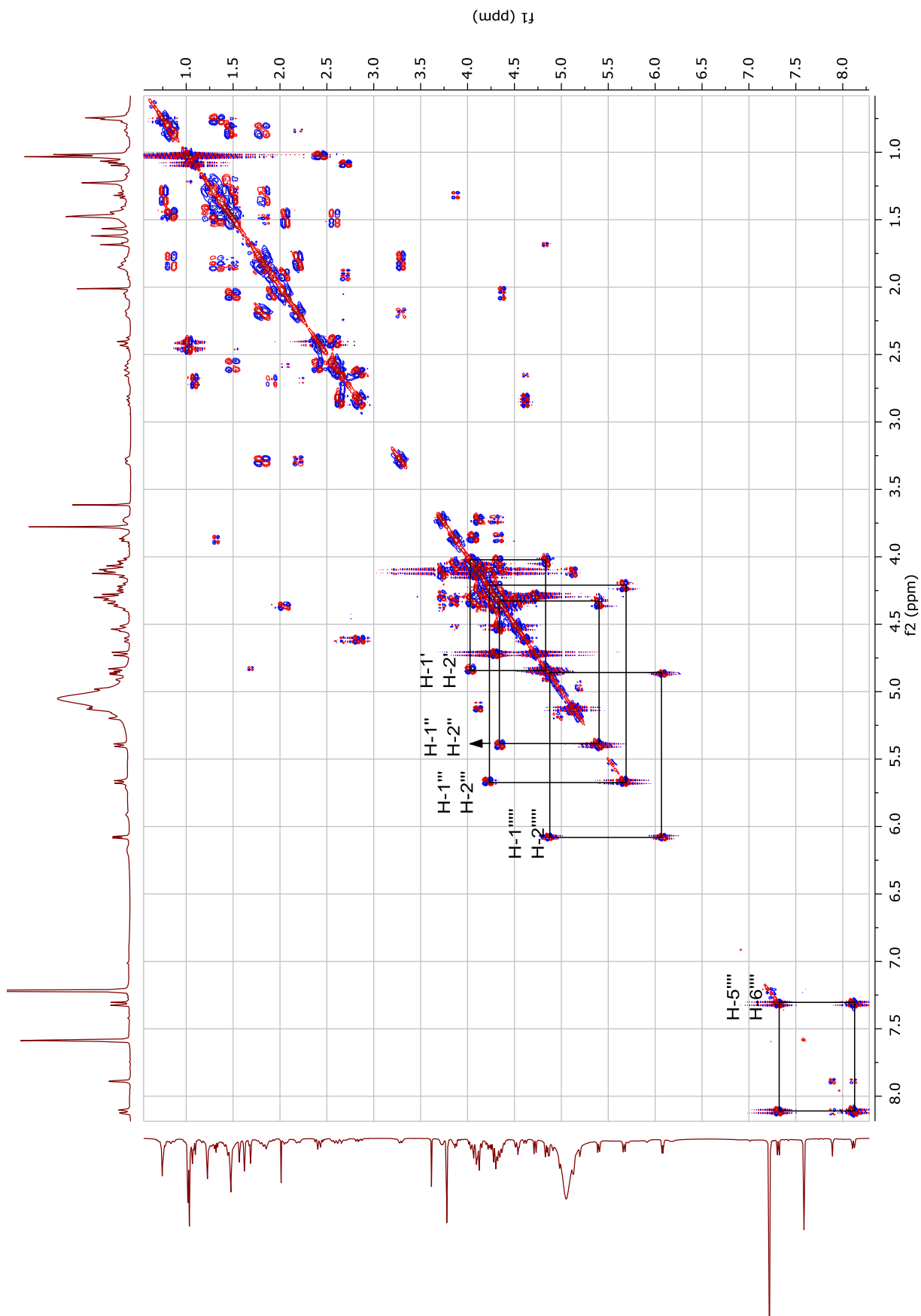


Figura 230. Espectro de COSY de Zg14 (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

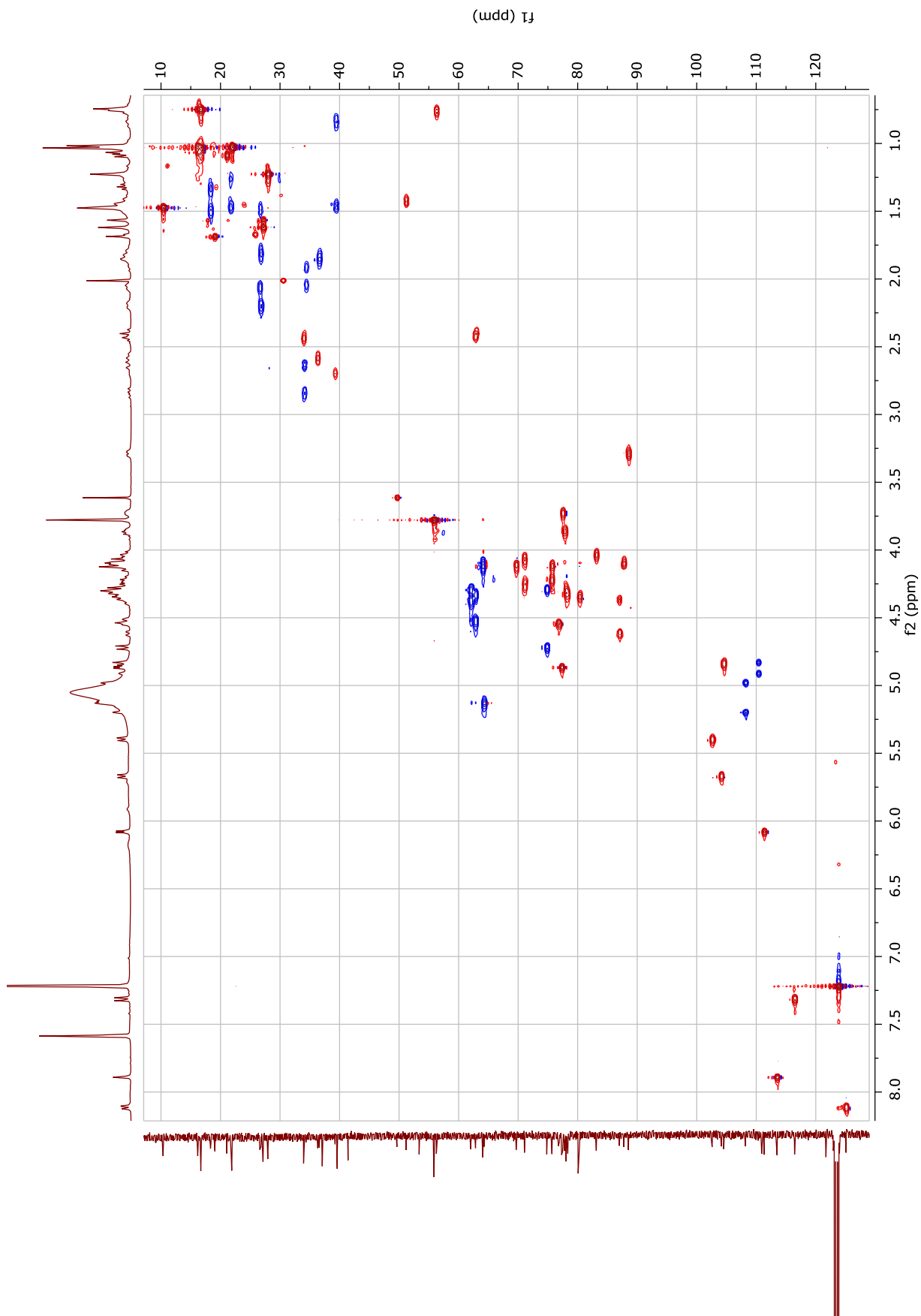


Figura 231. Espectro de HSQC de Zg14 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).



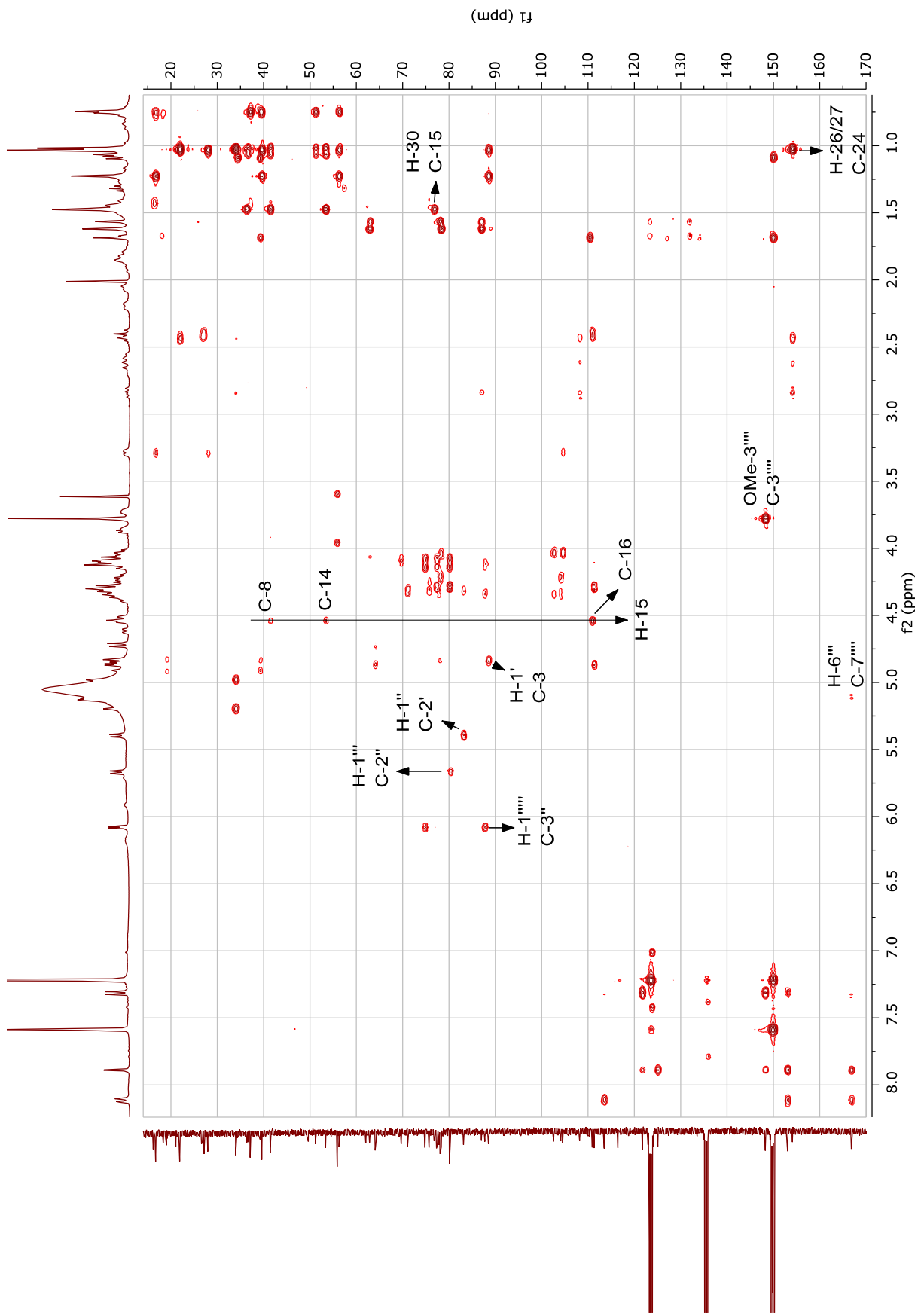


Figura 232. Espectro de HMBC de **Zg14** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

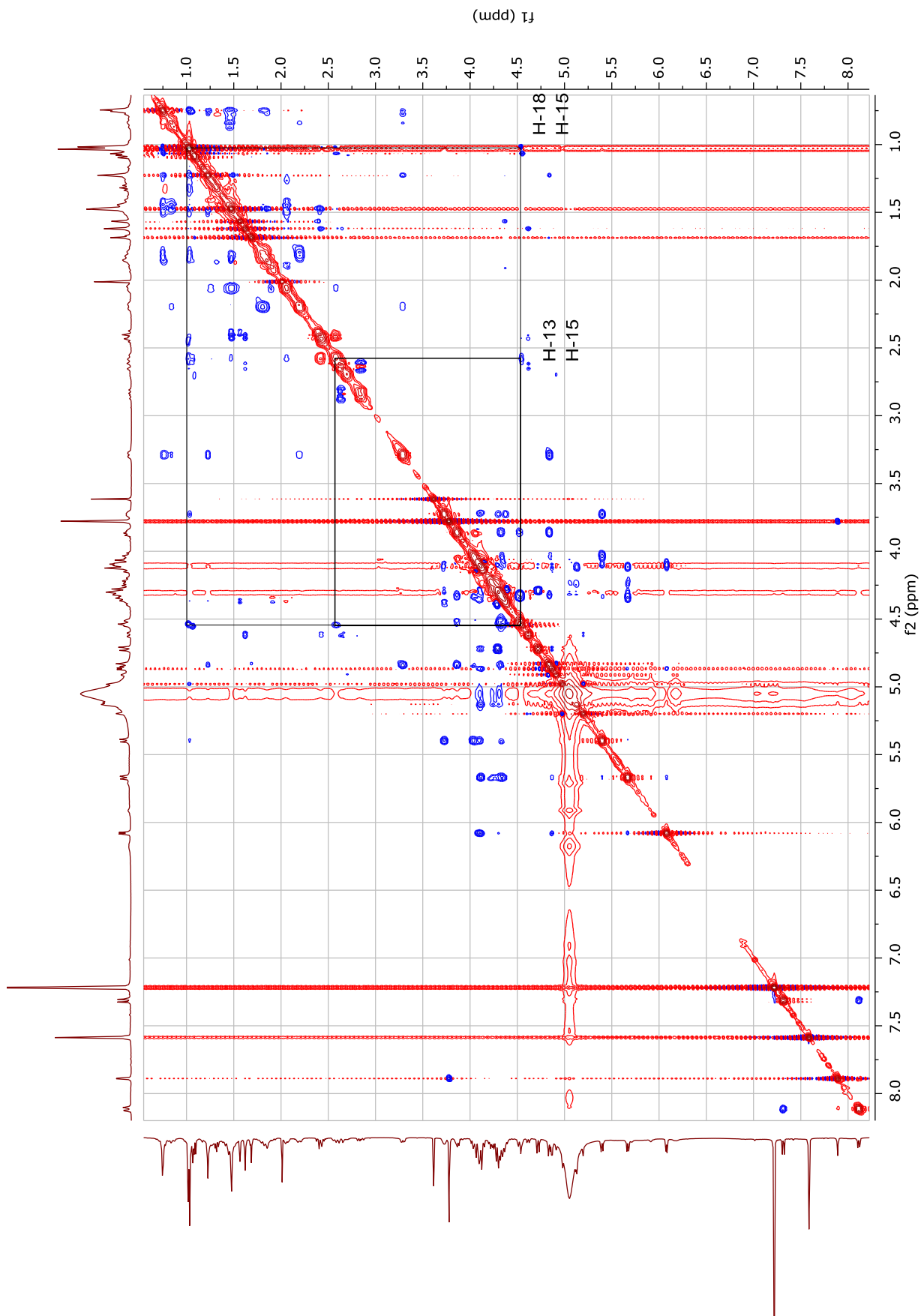


Figura 233. Espectro de ROESY de Zg14 (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

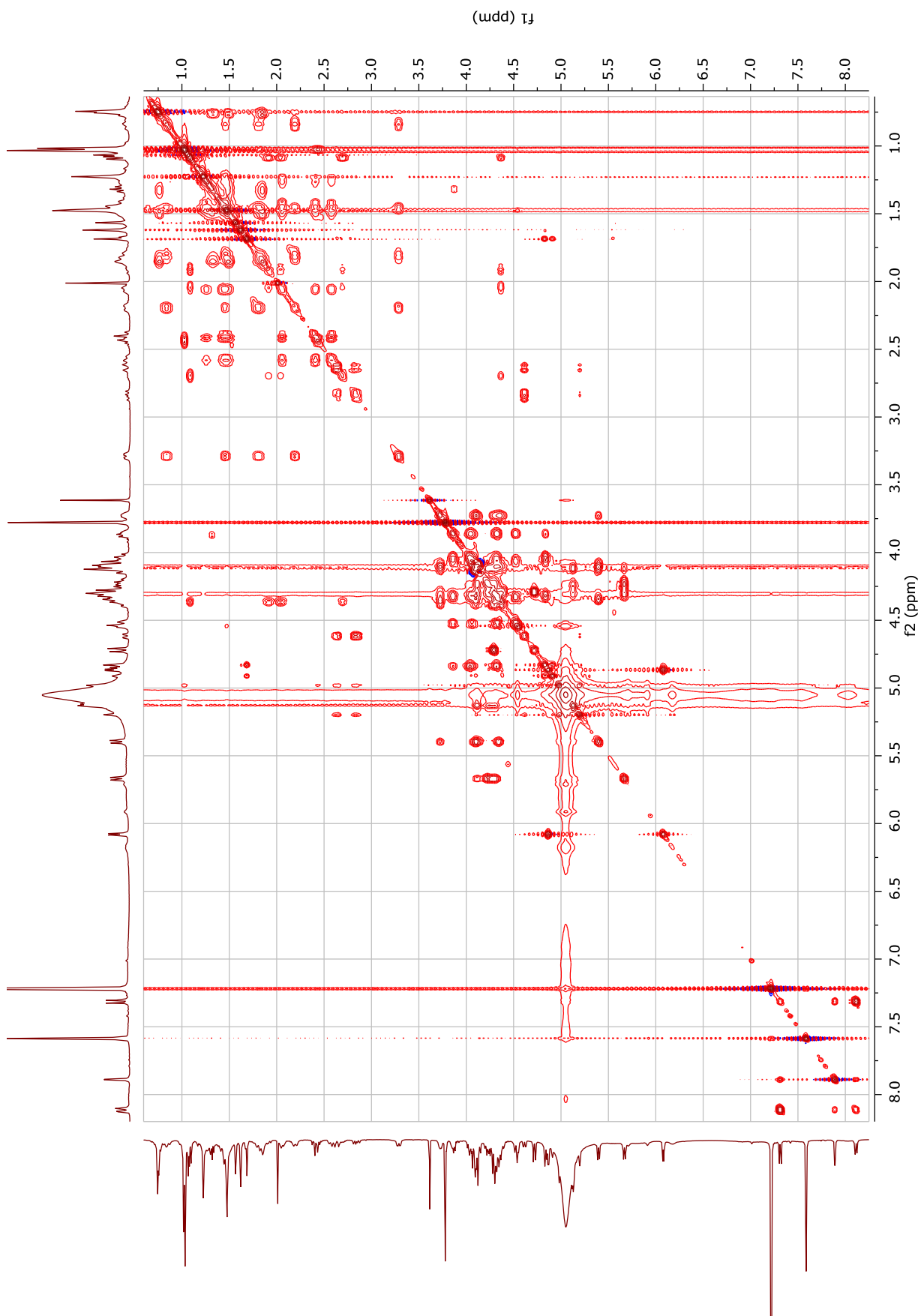


Figura 234. Espectro de TOCSY (2D) de **Zg14** (400 MHz, C5D5N).

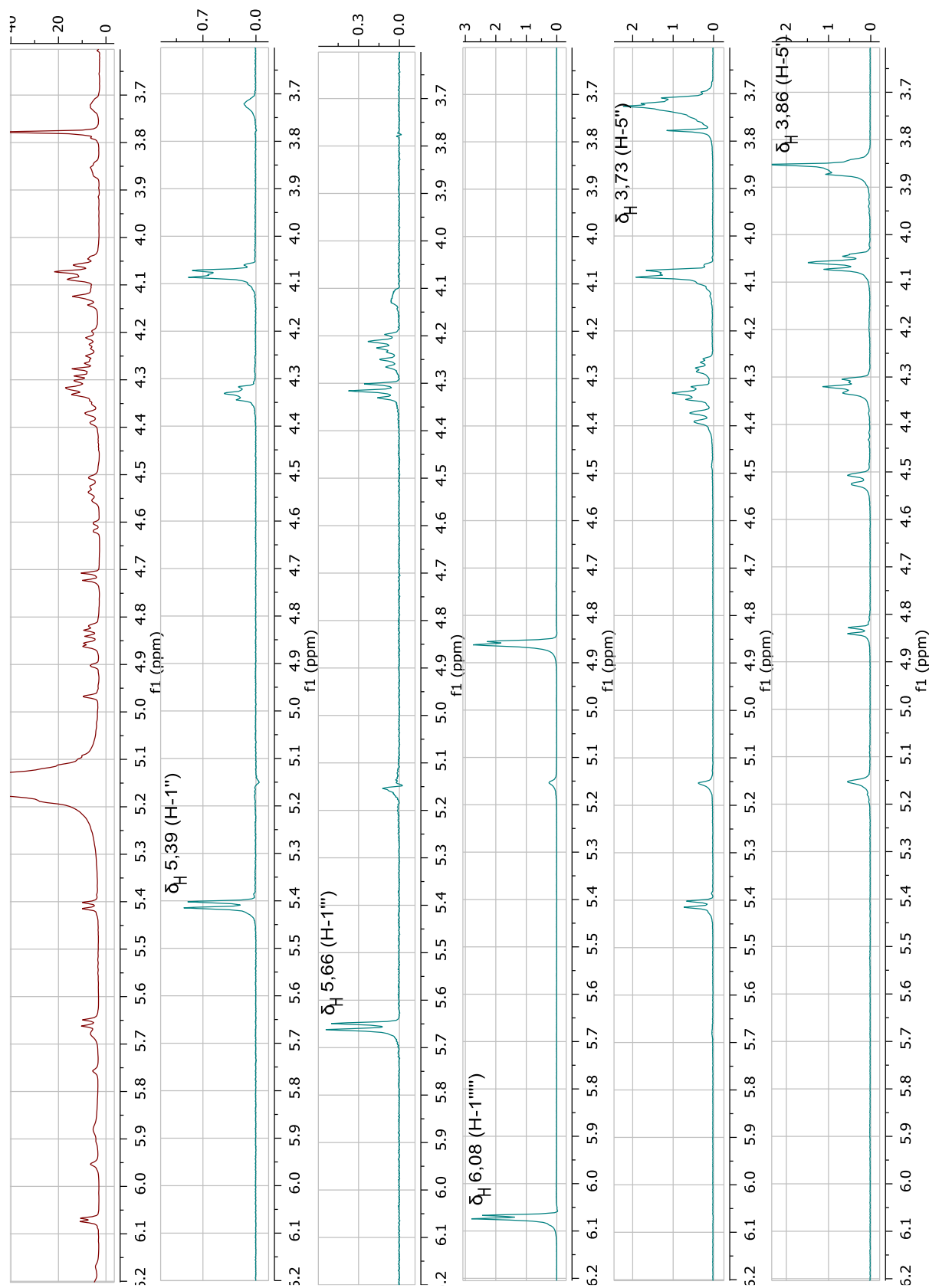


Figura 235. Espectro de TOCSY selectivo de **Zg14** ( $\delta_{\text{H}}$  3,6-6,2 ppm) (600 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

CAC146\_pos #26 RT: 0,06 AV: 1 NL: 8,17E6  
T: FTMS + p ESI Full ms [100,00-2000,00]

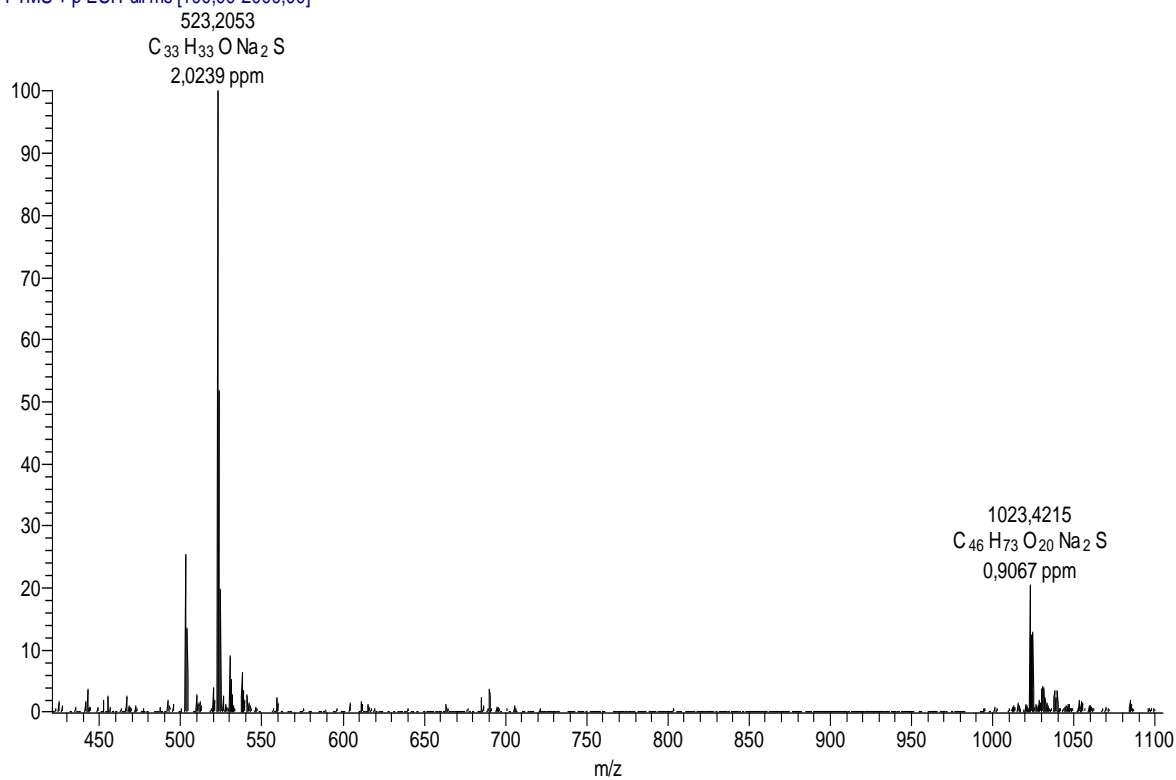


Figura 236. Espectro de massas de alta resolução de **Zg15** (ESI, modo positivo).

CAC146\_neg #1 RT: 0,00 AV: 1 NL: 4,09E6  
T: FTMS - p ESI Full ms [100,00-2000,00]

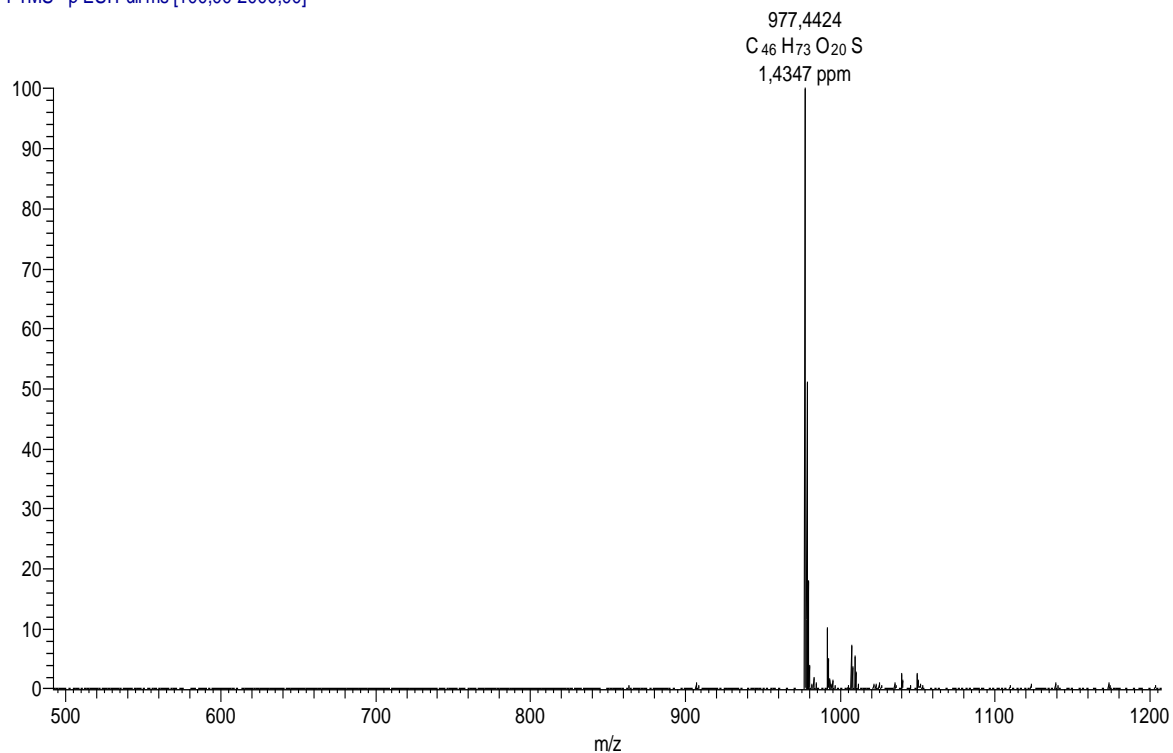


Figura 237. Espectro de massas de alta resolução de **Zg15** (ESI, modo negativo).

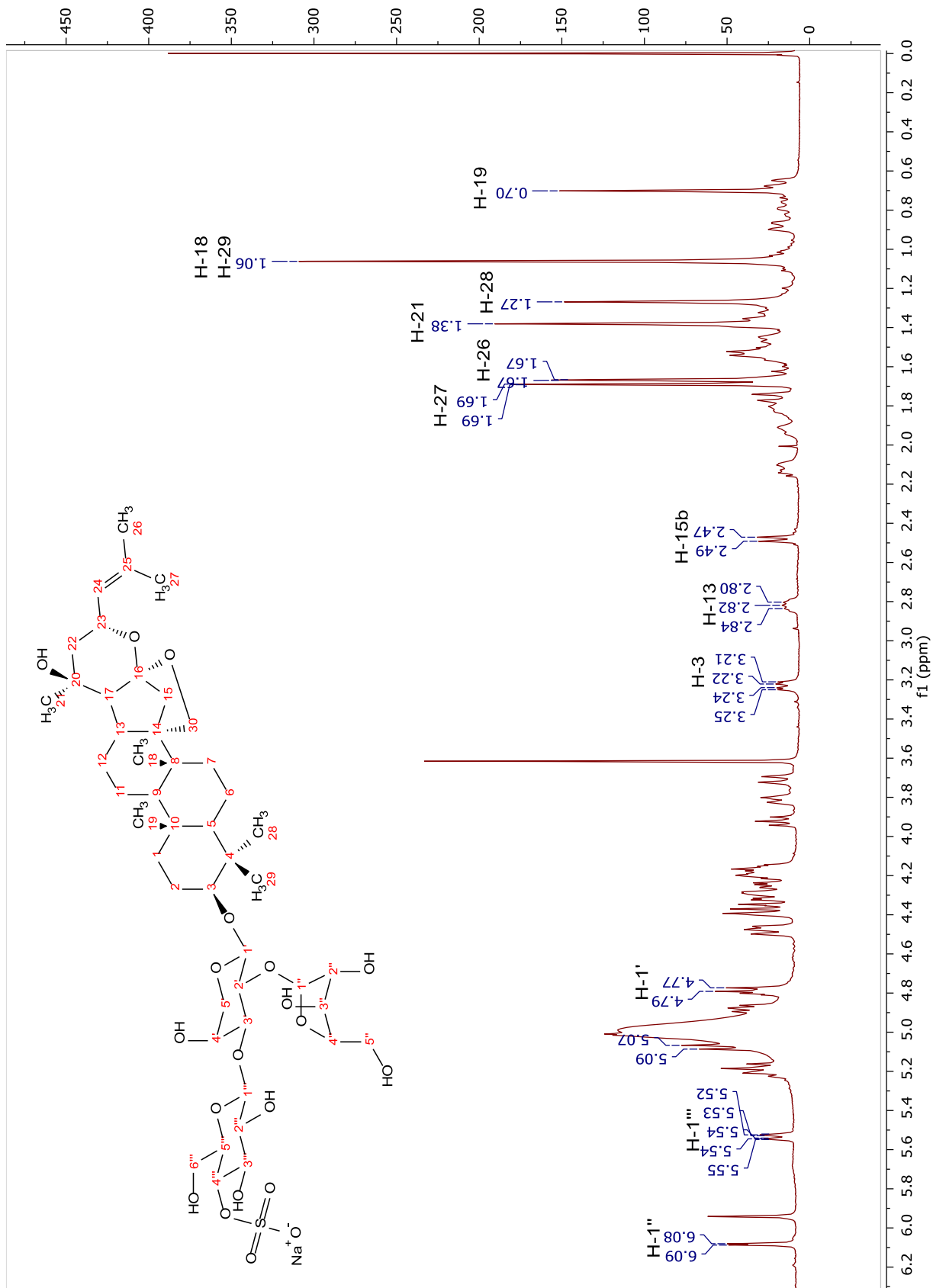


Figura 238. Espectro de RMN  $^1\text{H}$  da substância **Zg15** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

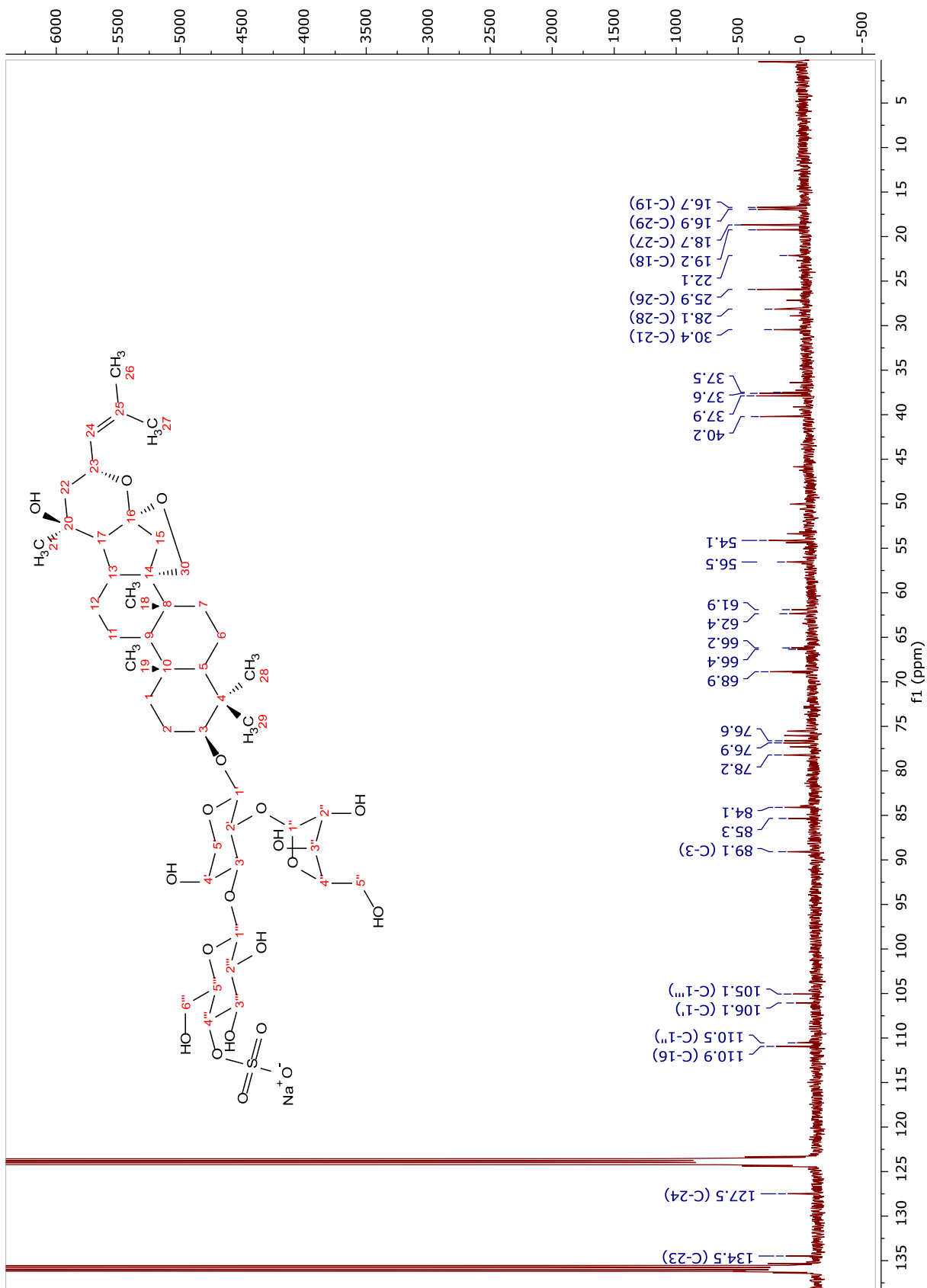


Figura 239. Espectro de RMN  $^{13}\text{C}$  de **Zg15** (100 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

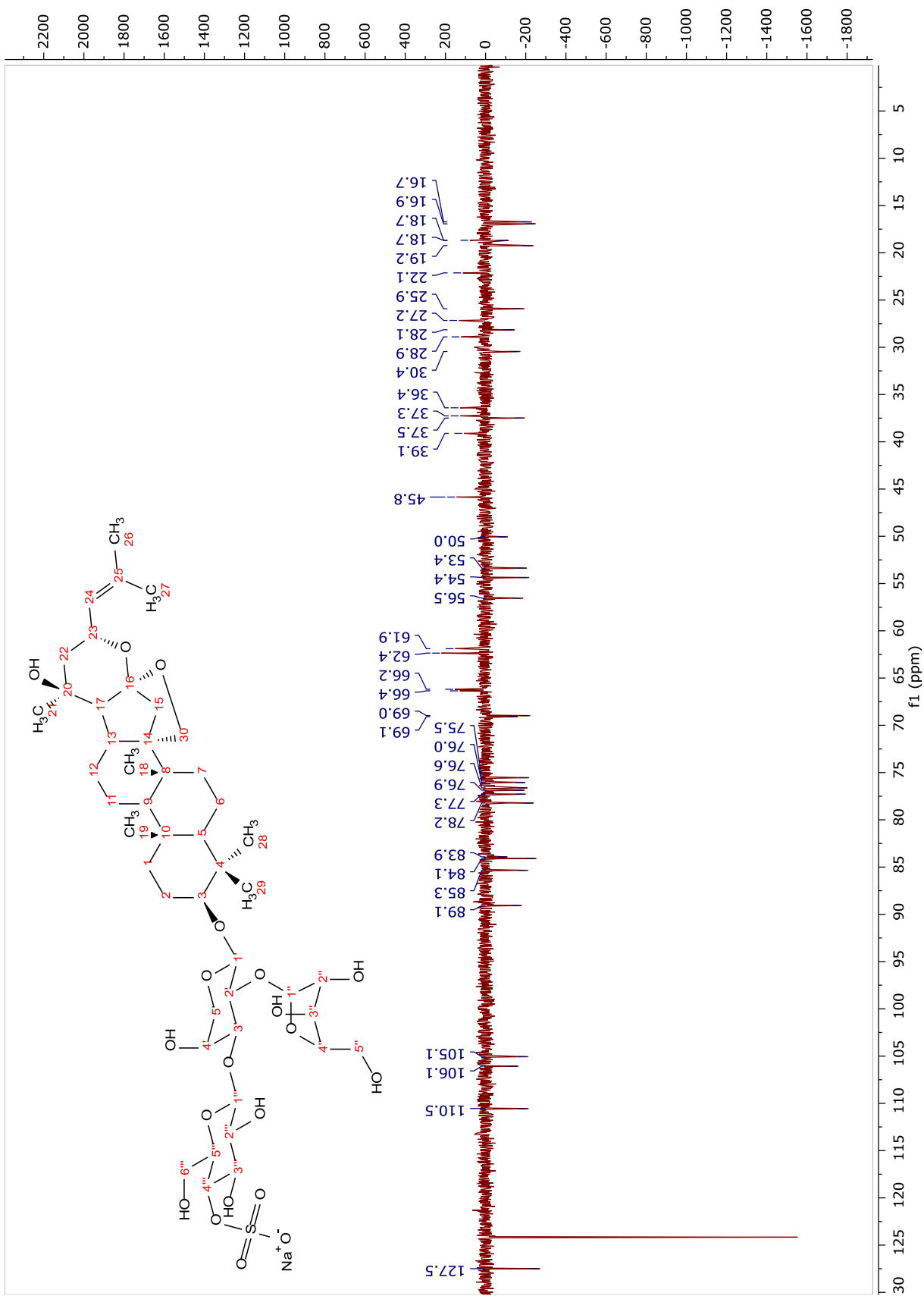
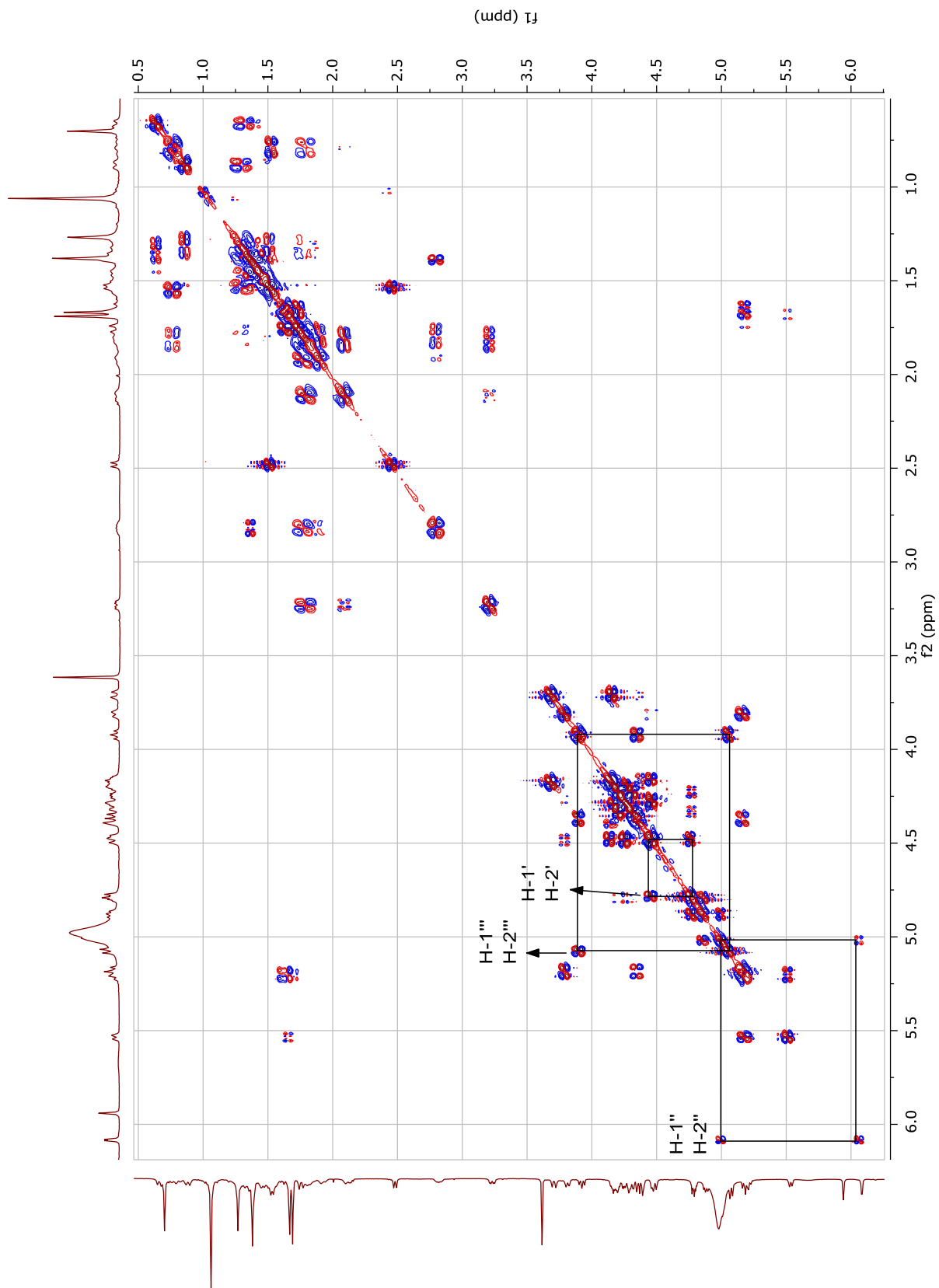


Figura 240. Espectro de DEPT-135 de **Zg15** (100 MHz, C<sub>5</sub>D<sub>5</sub>N).





**Figura 241.** Espectro de COSY de **Zg15** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

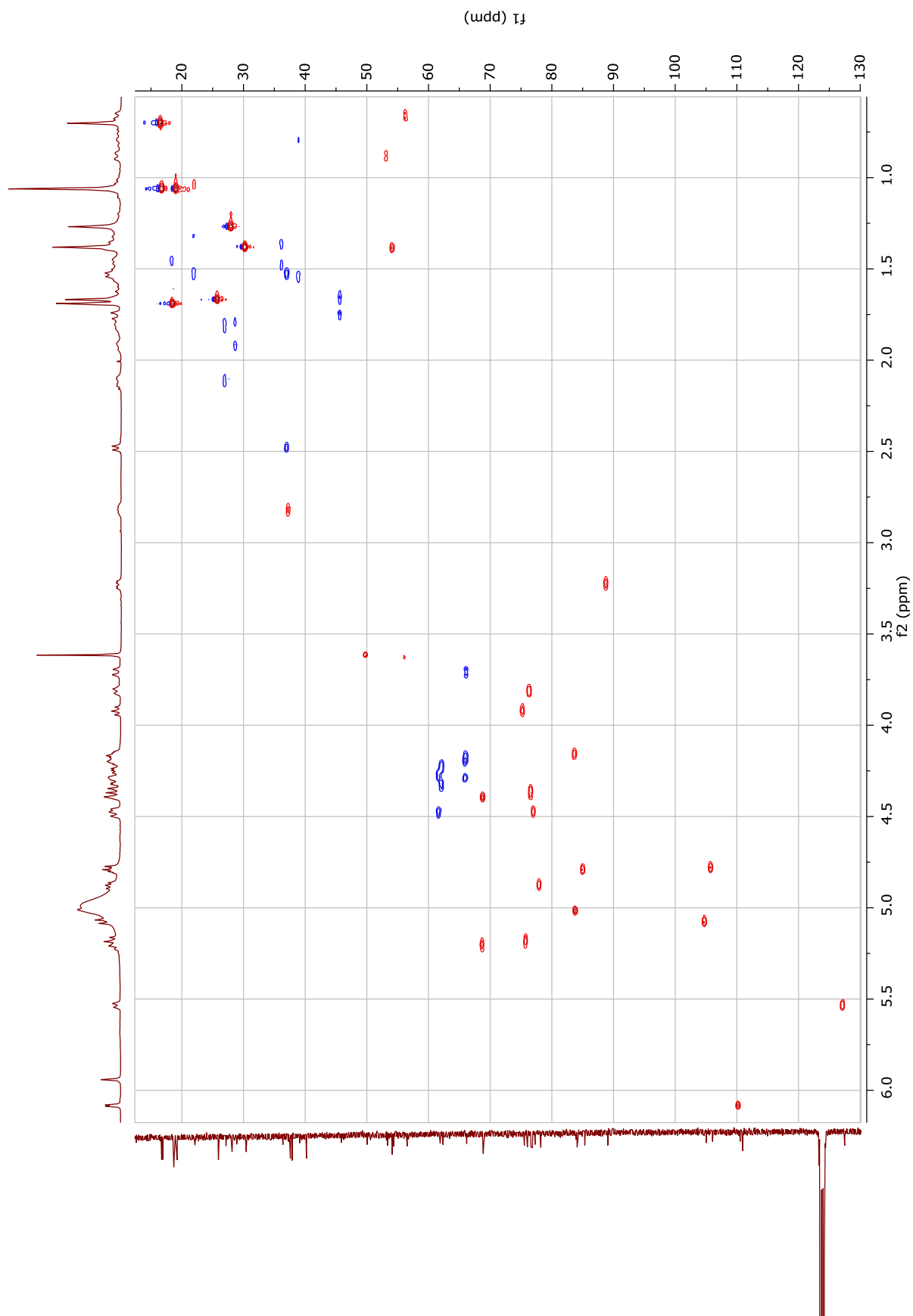


Figura 242. Espectro de HSQC de **Zg15** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

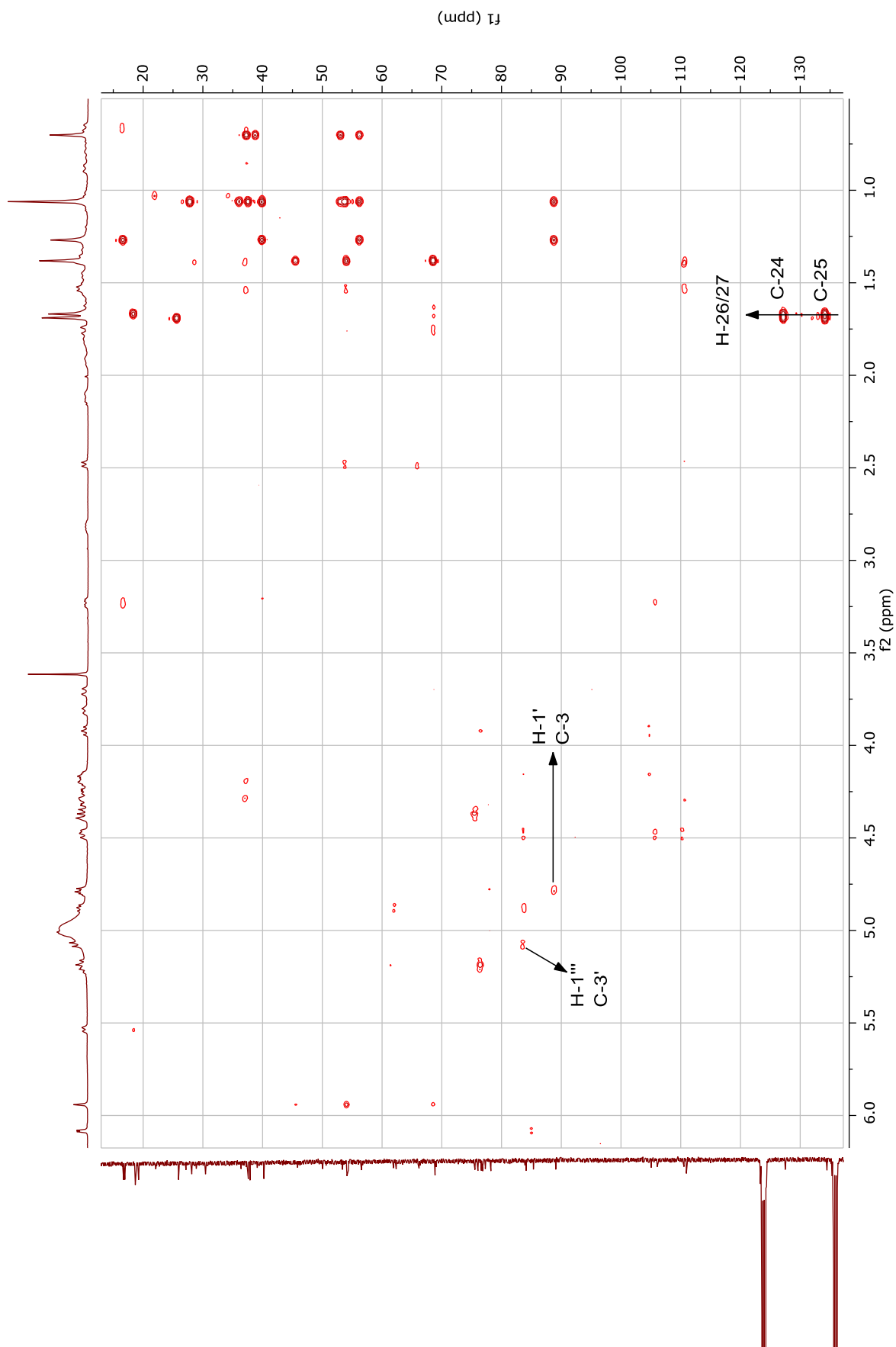


Figura 243. Espectro de HMBC de Zg15 (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

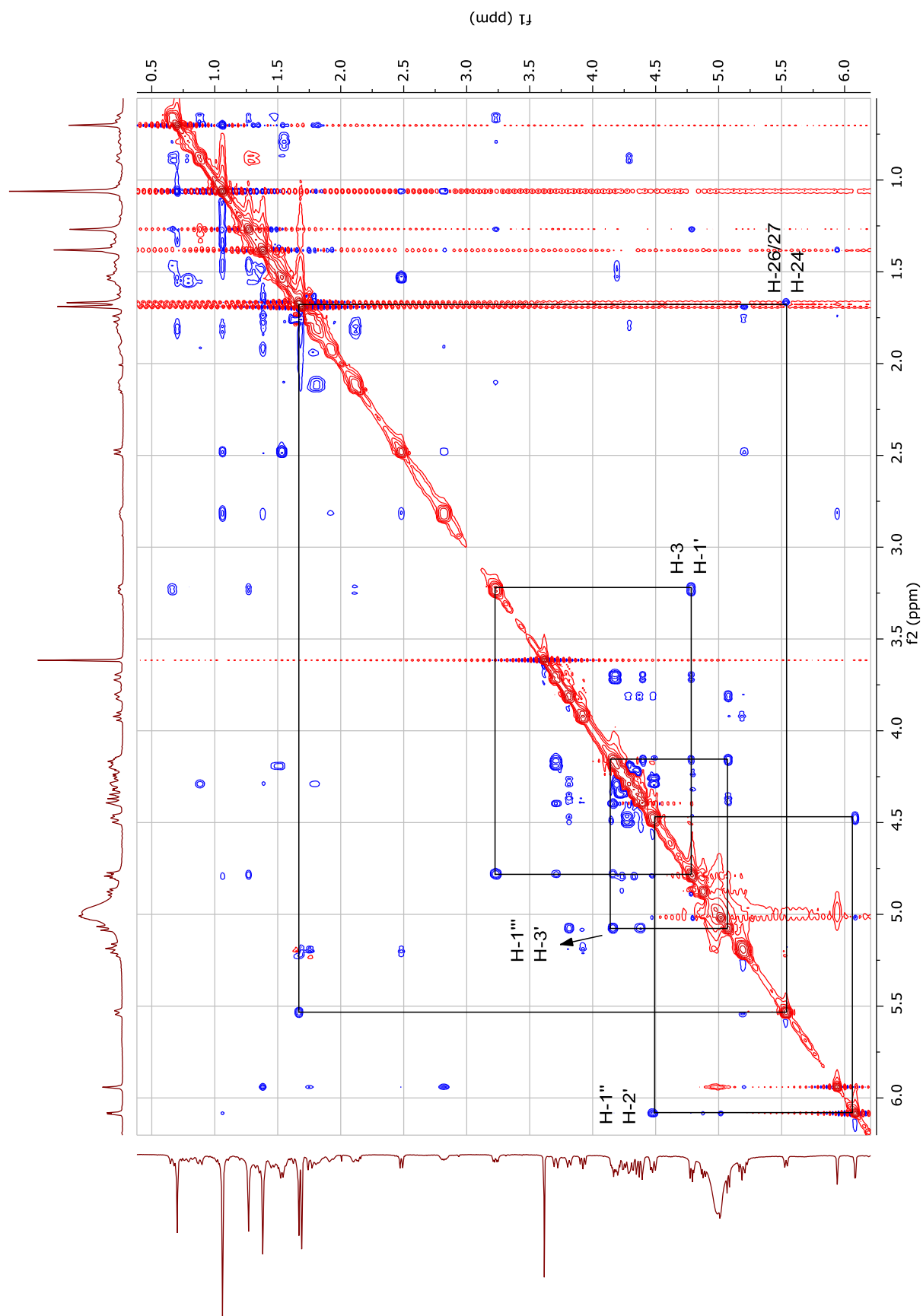


Figura 244. Espectro de ROESY de **Zg15** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

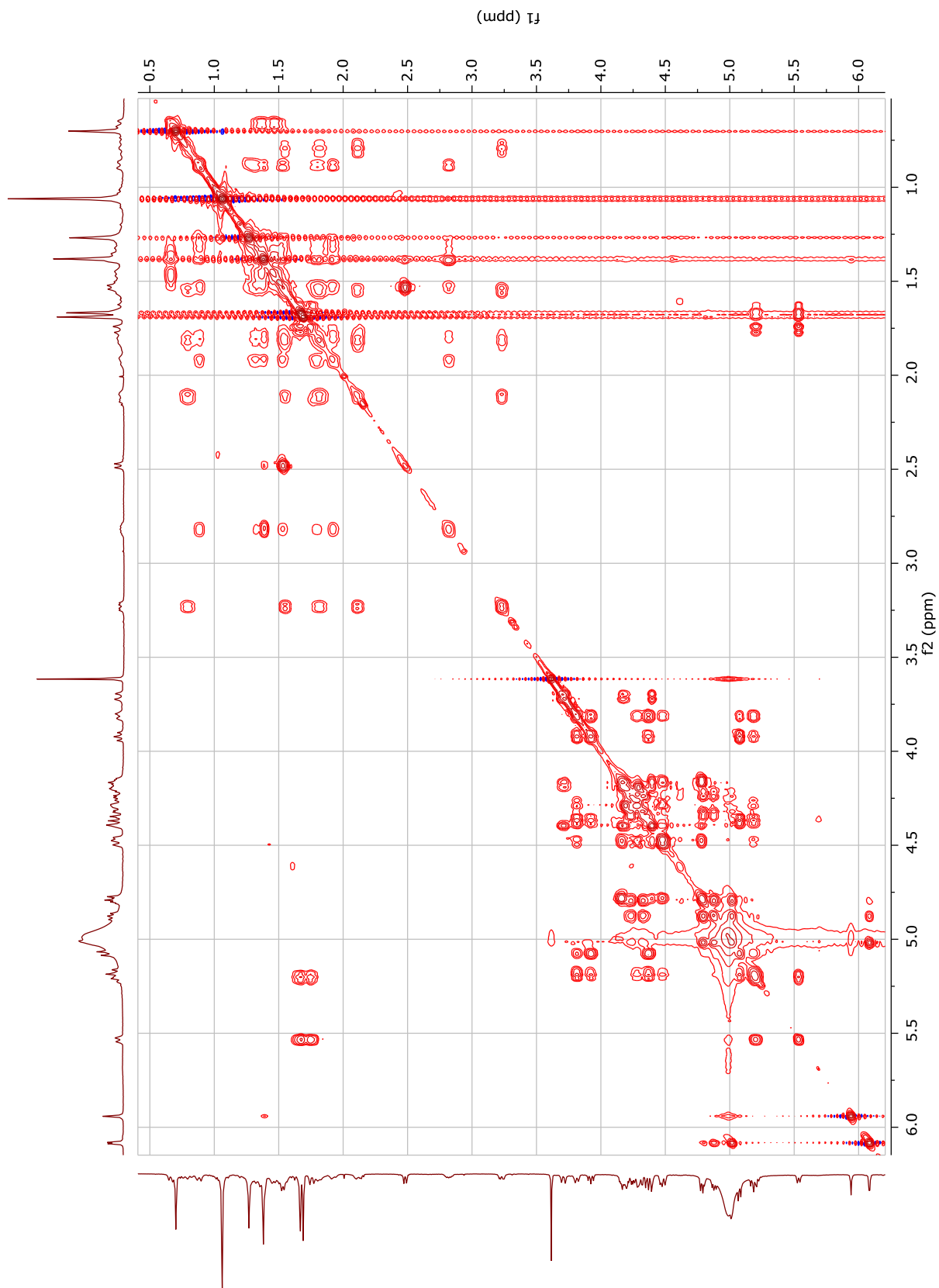


Figura 245. Espectro de TOCSY de **Zg15** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

CAC147\_pos #1 RT: 0,00 AV: 1 NL: 1,37E7  
T: FTMS + p ESI Full ms [100,00-2000,00]

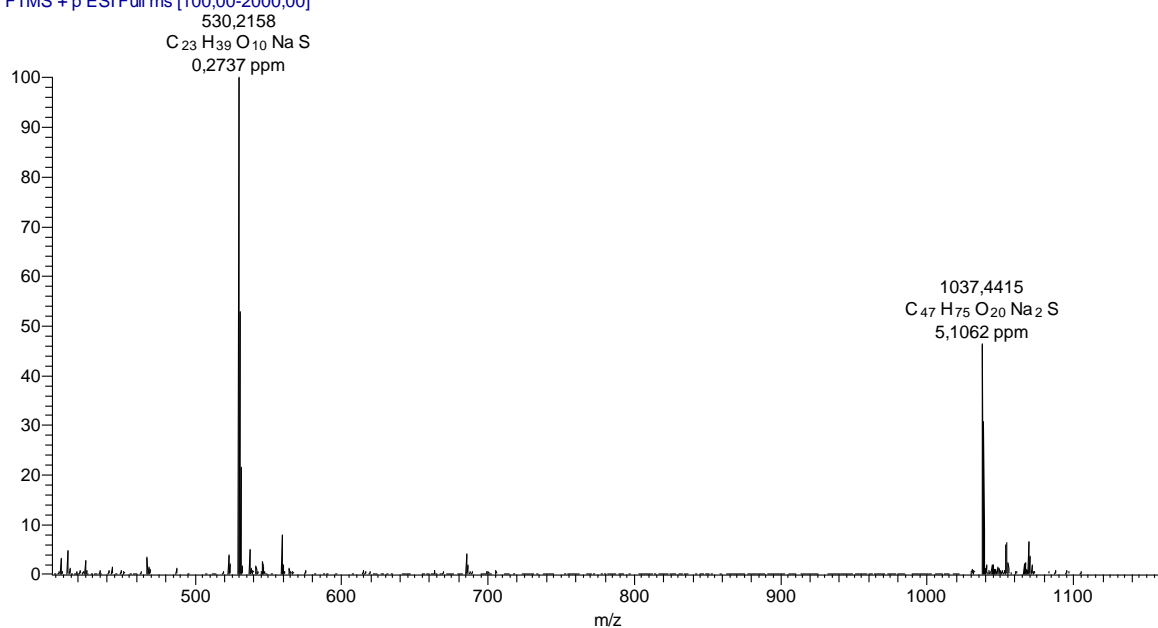


Figura 246. Espectro de massas de alta resolução **Zg16** (ESI, modo positivo).

CAC147\_neg #1 RT: 0,00 AV: 1 NL: 4,17E6  
T: FTMS - p ESI Full ms [100,00-2000,00]

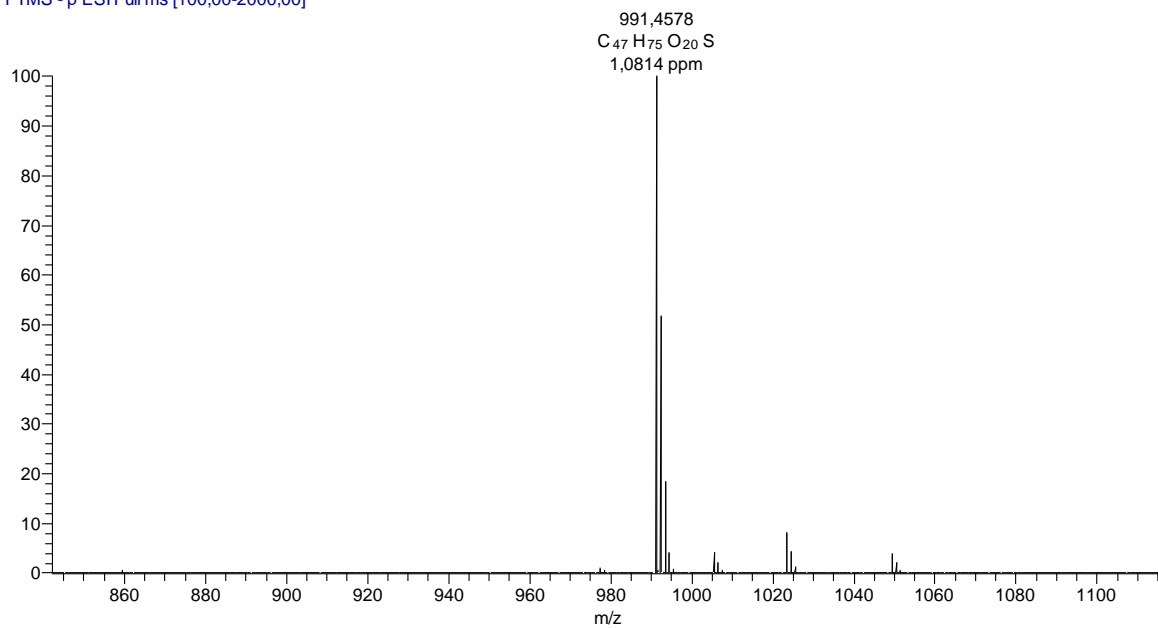


Figura 247. Espectro de massas de alta resolução de **Zg16** (ESI, modo negativo).

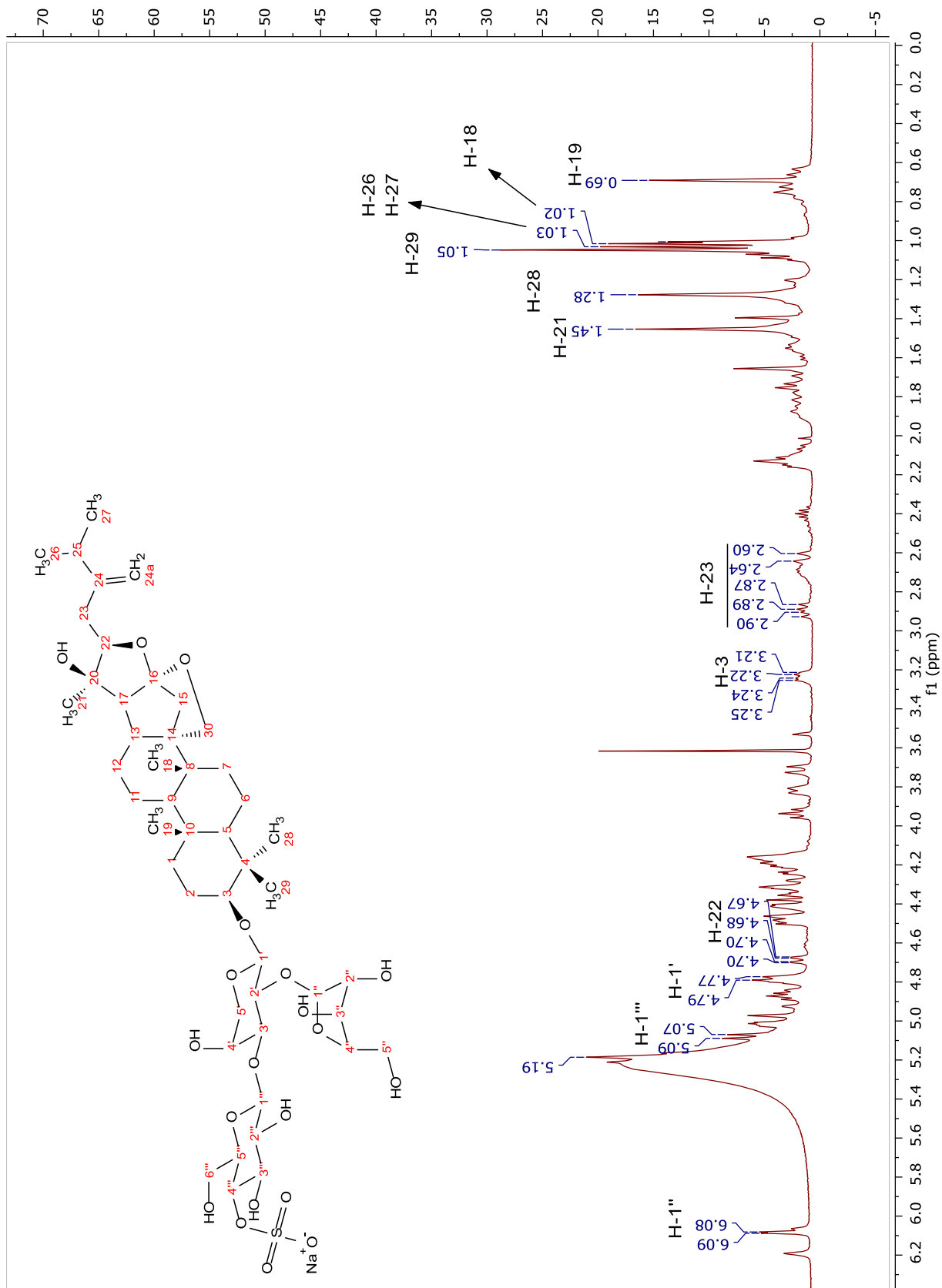


Figura 248. Espectro de RMN  $^1\text{H}$  de **Zg16** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

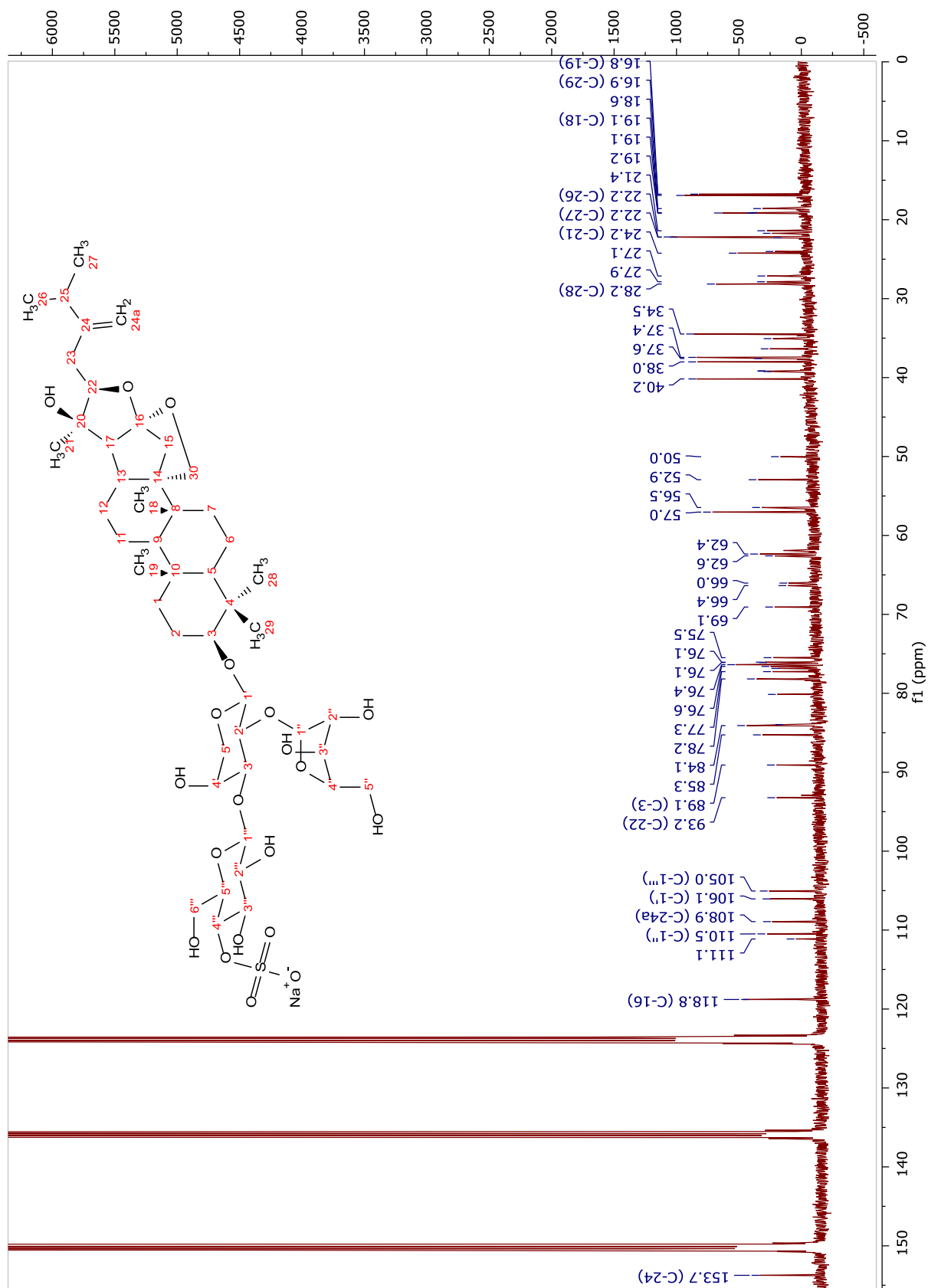


Figura 249. Espectro de RMN <sup>13</sup>C de Zg16 (100 MHz, C<sub>5</sub>D<sub>5</sub>N).



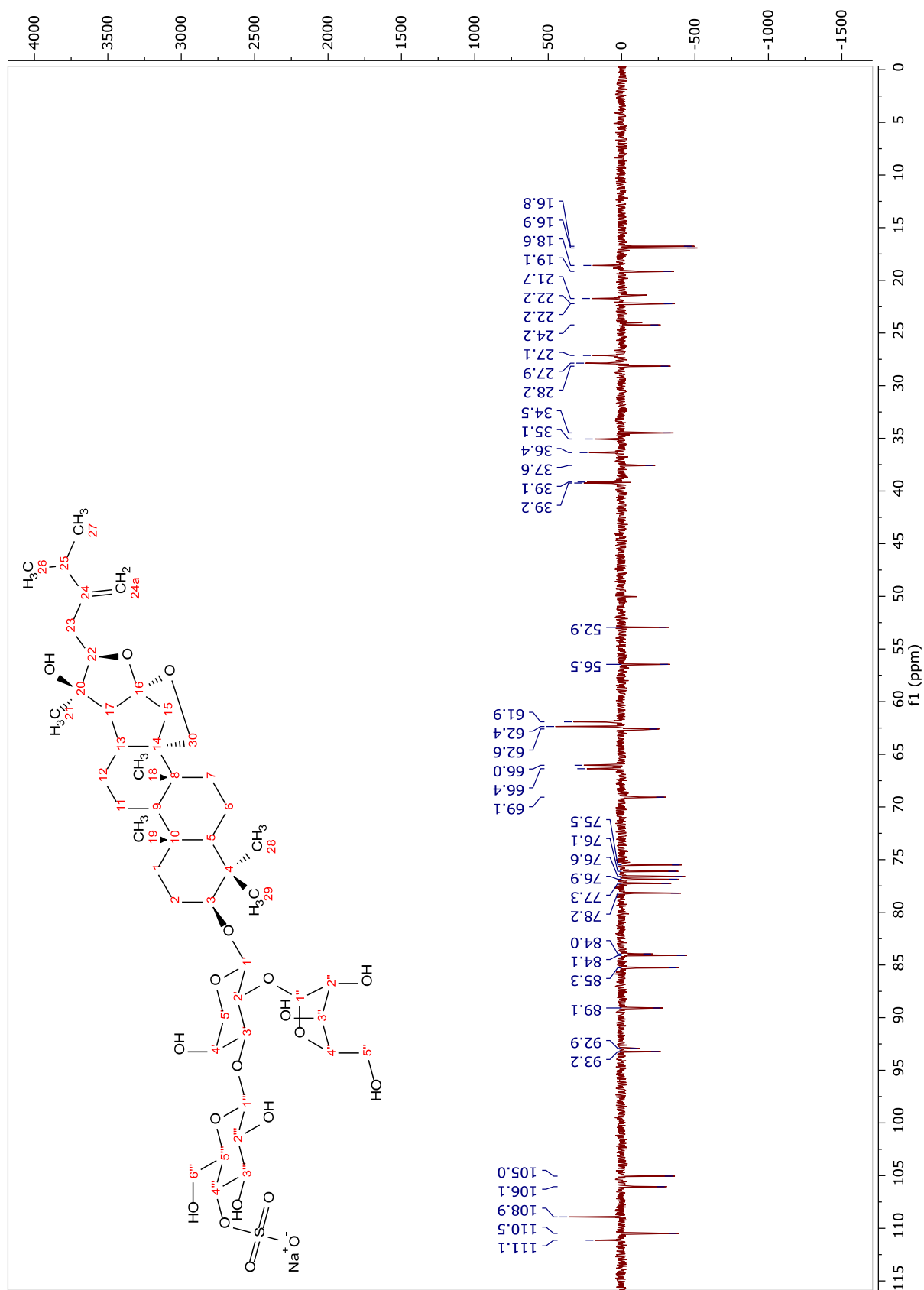


Figura 250. Espectro de DEPT-135 de Zg16 (100 MHz, C<sub>3</sub>D<sub>5</sub>N).

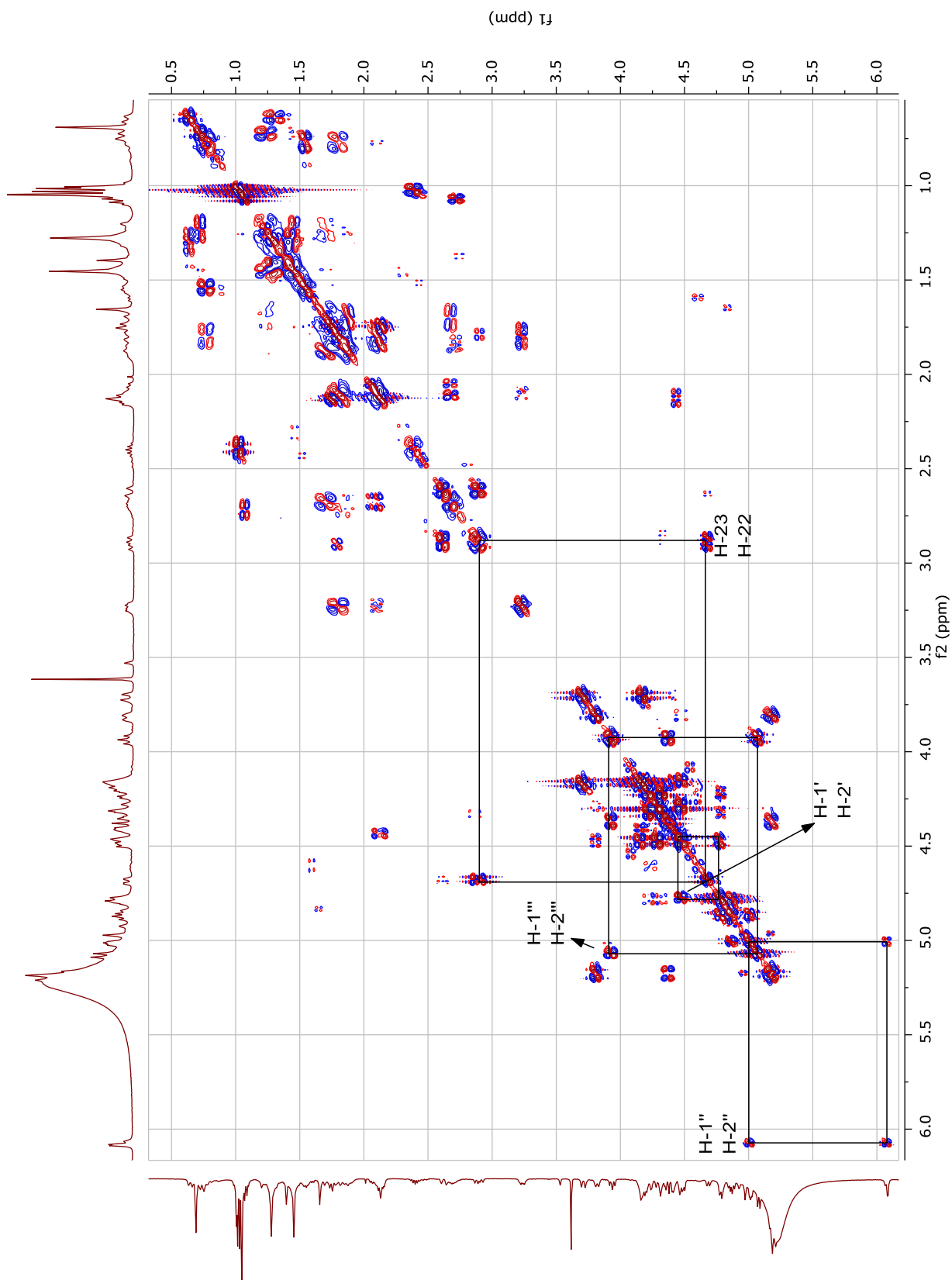
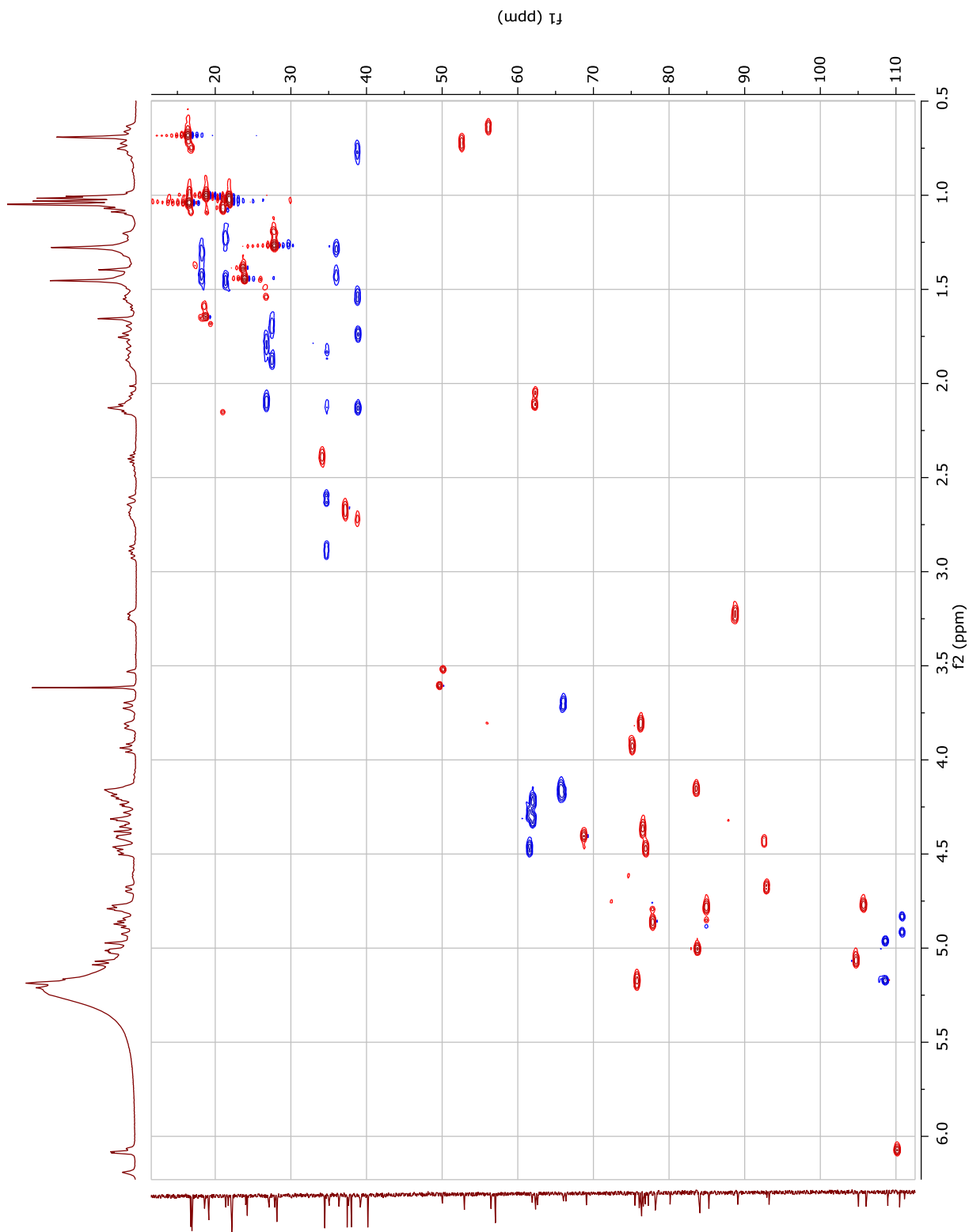


Figura 251. Espectro de COSY de **Zg16** (400 MHz,  $C_5D_5N$ ).



**Figura 252.** Espectro de HSQC de **Zg16** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

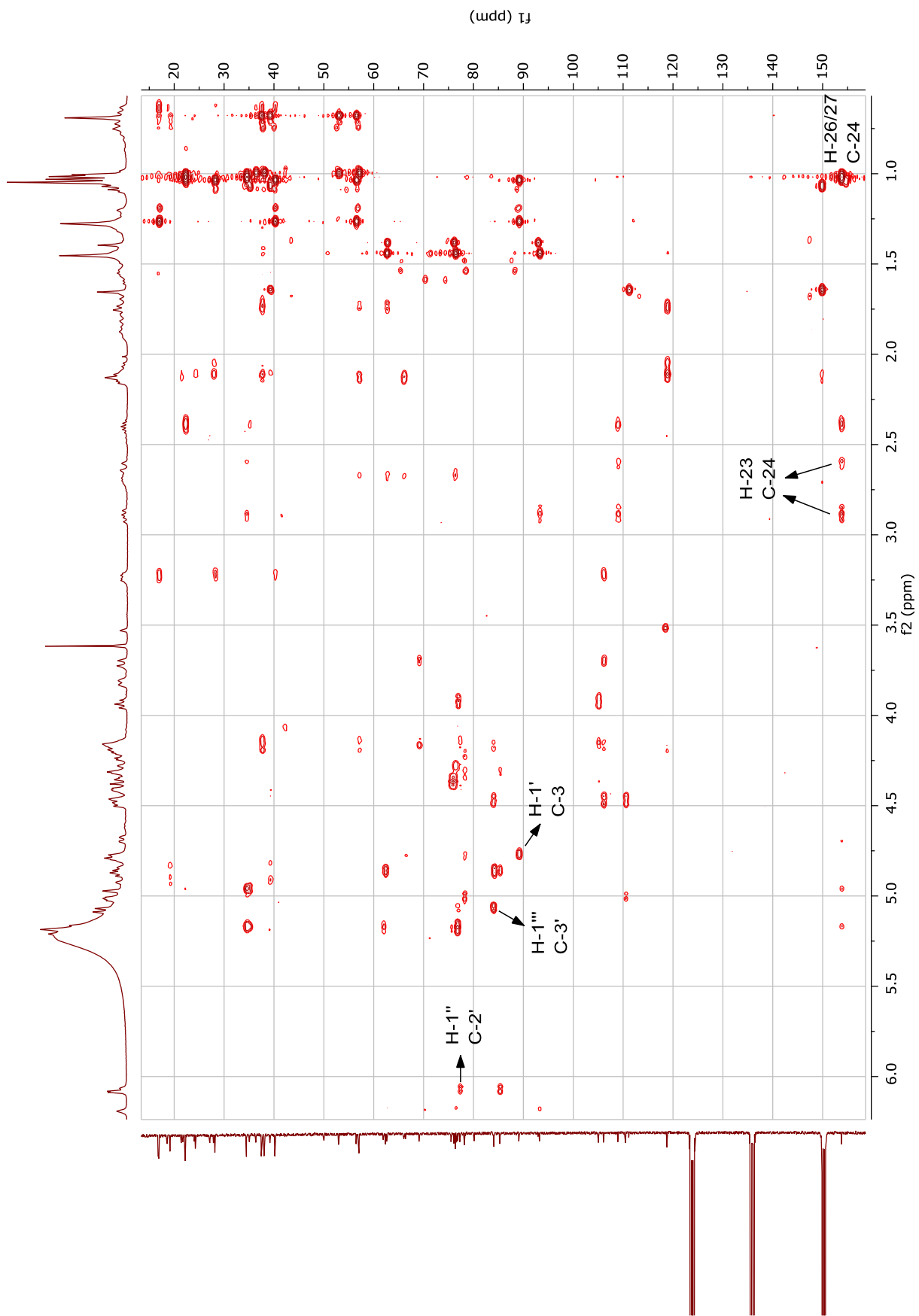
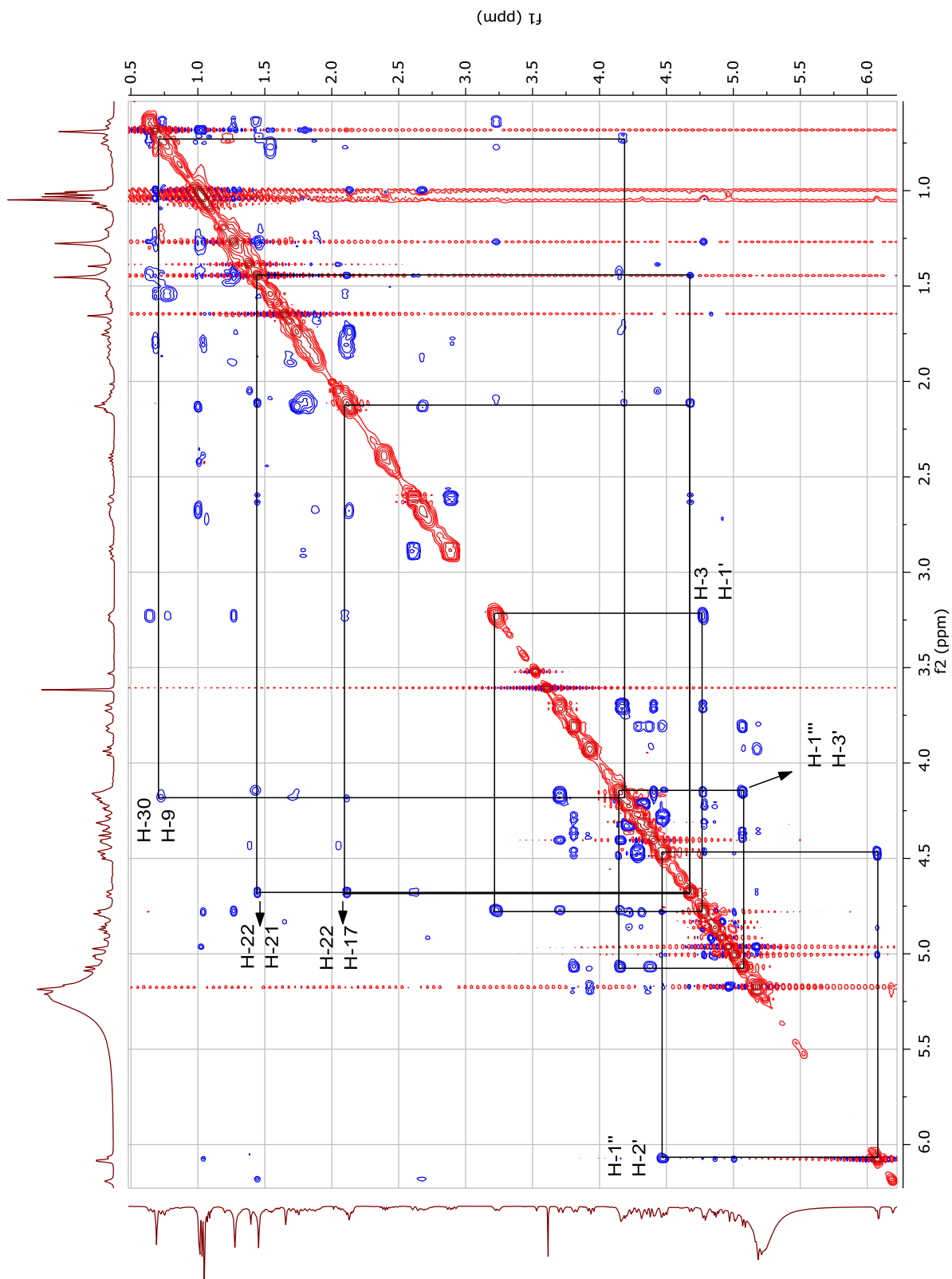


Figura 253. Espectro de HMBC de Zg16 (400 MHz, C<sub>5</sub>D<sub>5</sub>N).



**Figura 254.** Espectro de ROESY de **Zg16** (400 MHz,  $\text{C}_5\text{D}_5\text{N}$ ).

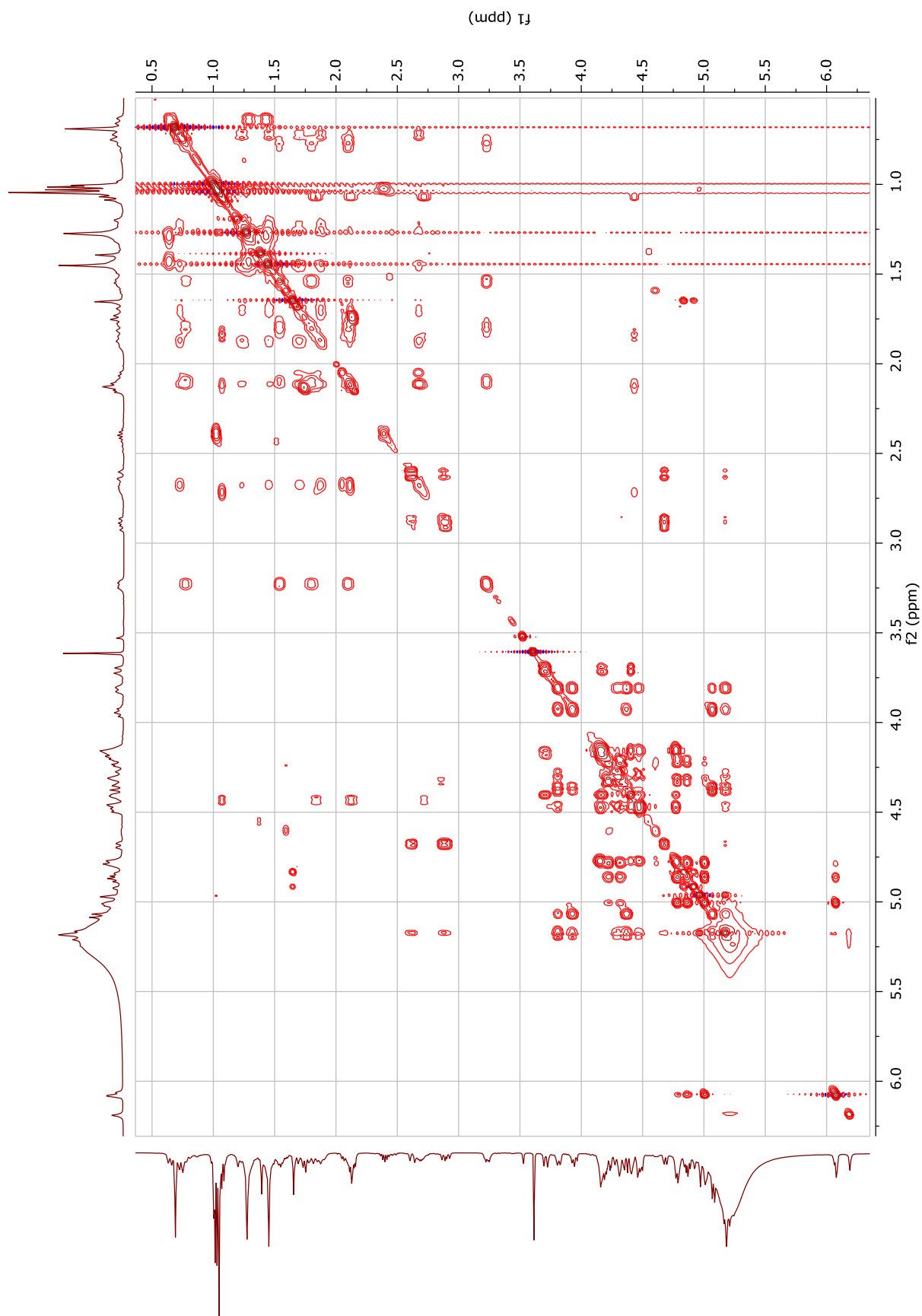


Figura 255. Espectro de TOCSY (2D) de **Zg16** (400 MHz, C<sub>5</sub>D<sub>5</sub>N).

CAC133\_pdd #1775-1783 RT: 8,85-8,87 AV: 5 NL: 3,25E7  
F: FTMS + p ESI Full ms [100,00-2000,00]

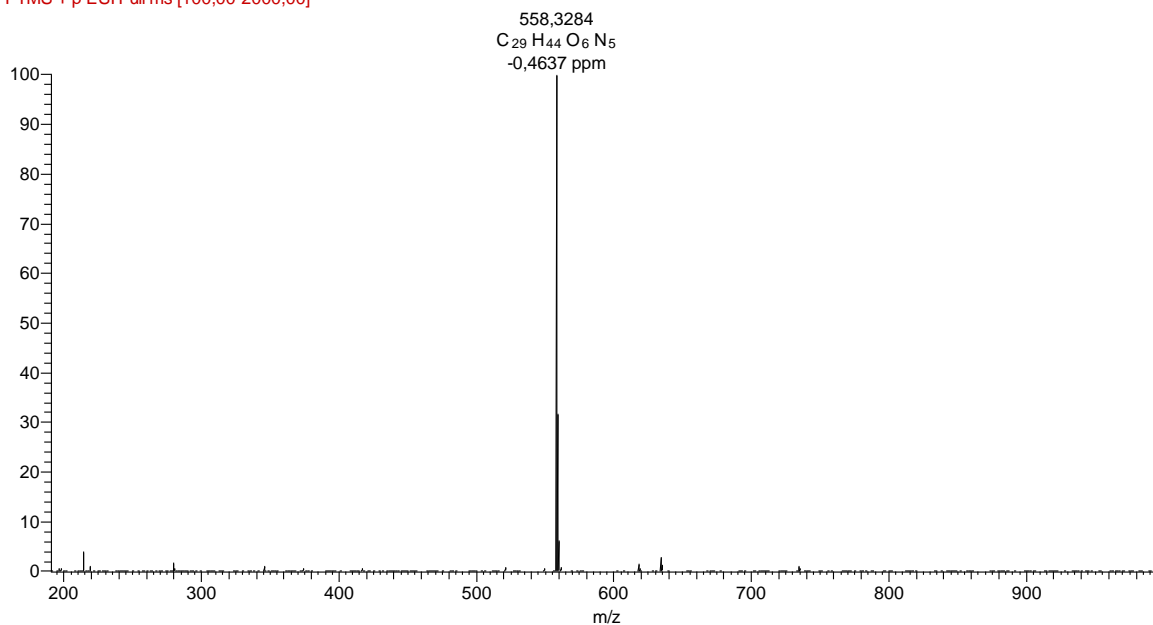


Figura 256. Espectro de massas de alta resolução (ESI) do pico em 8,86 min de **ZjC-AlcF** (modo positivo).

CAC133\_pdd #1847-1860 RT: 9,10-9,14 AV: 7 NL: 9,81E7  
F: FTMS + p ESI Full ms [100,00-2000,00]

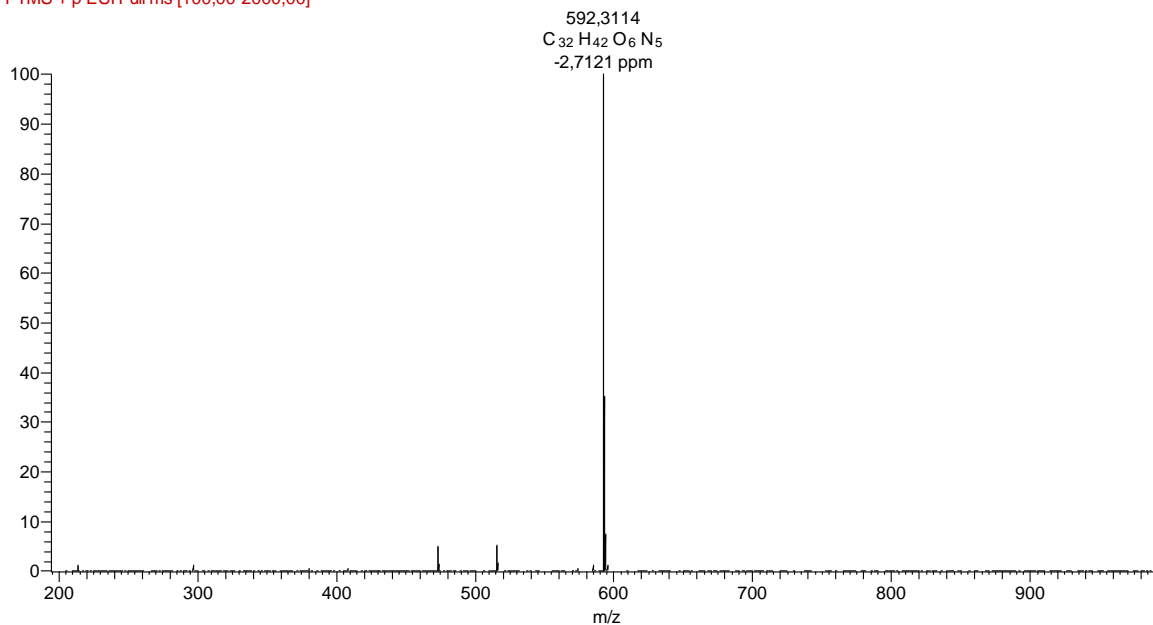
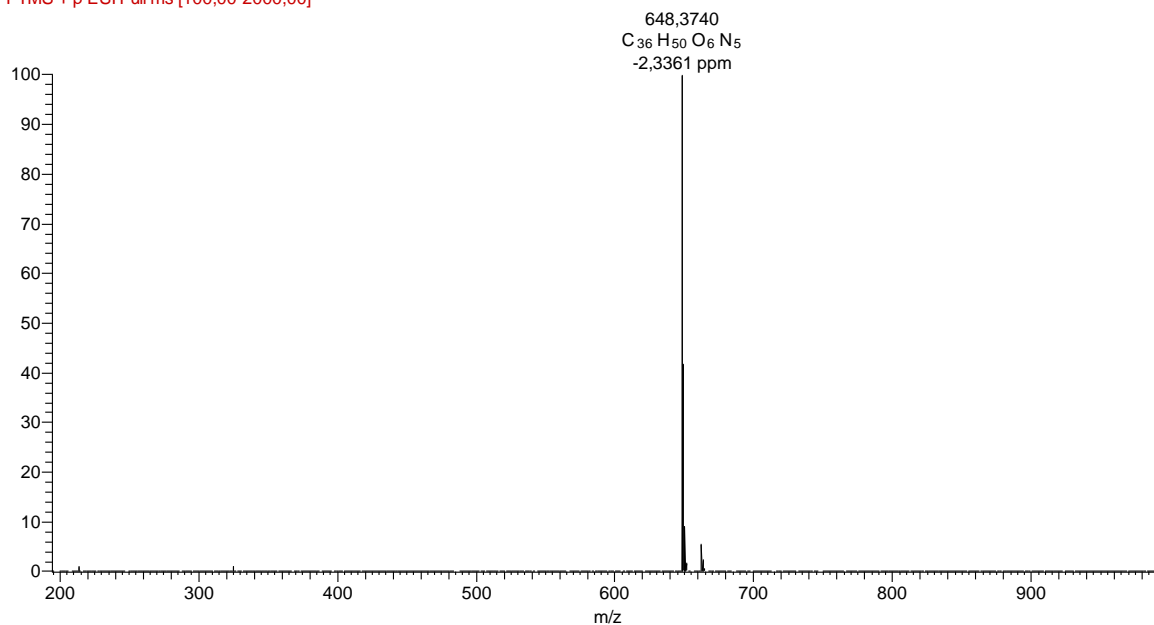


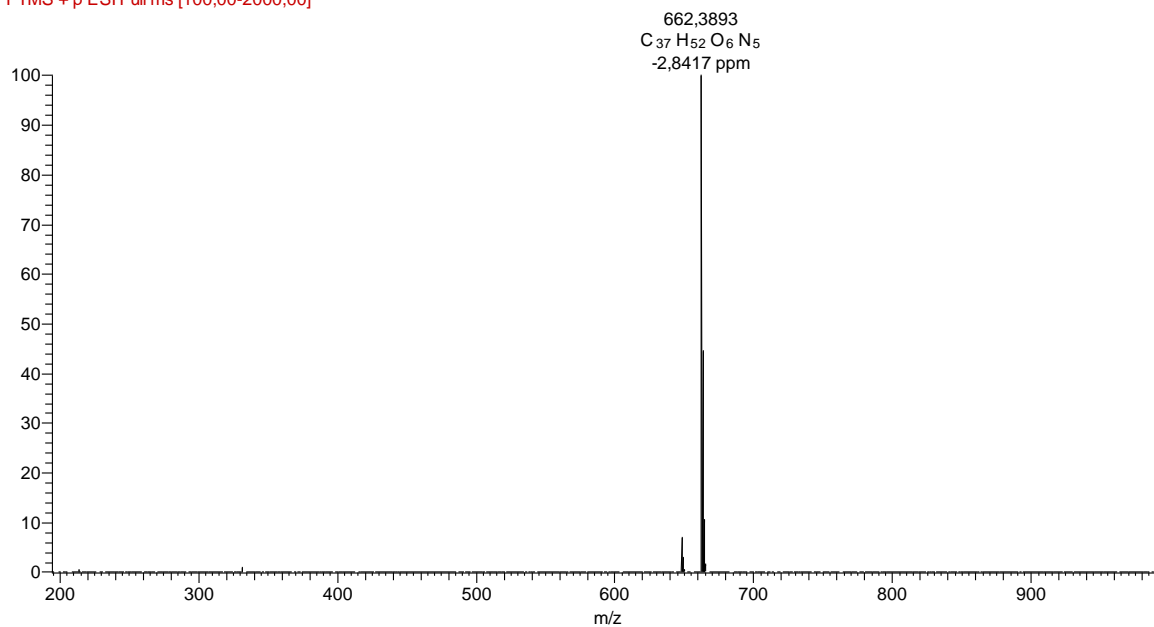
Figura 257. Espectro de massas de alta resolução (ESI) do pico em 9,13 min de **ZjC-AlcF** (modo positivo).

CAC133\_pdd #2079-2084 RT: 9,98-10,00 AV: 3 NL: 1,14E8  
F: FTMS + p ESI Full ms [100,00-2000,00]



**Figura 258.** Espectro de massas de alta resolução (ESI) do pico em 10,00 min de **ZjC-AlcF** (modo positivo).

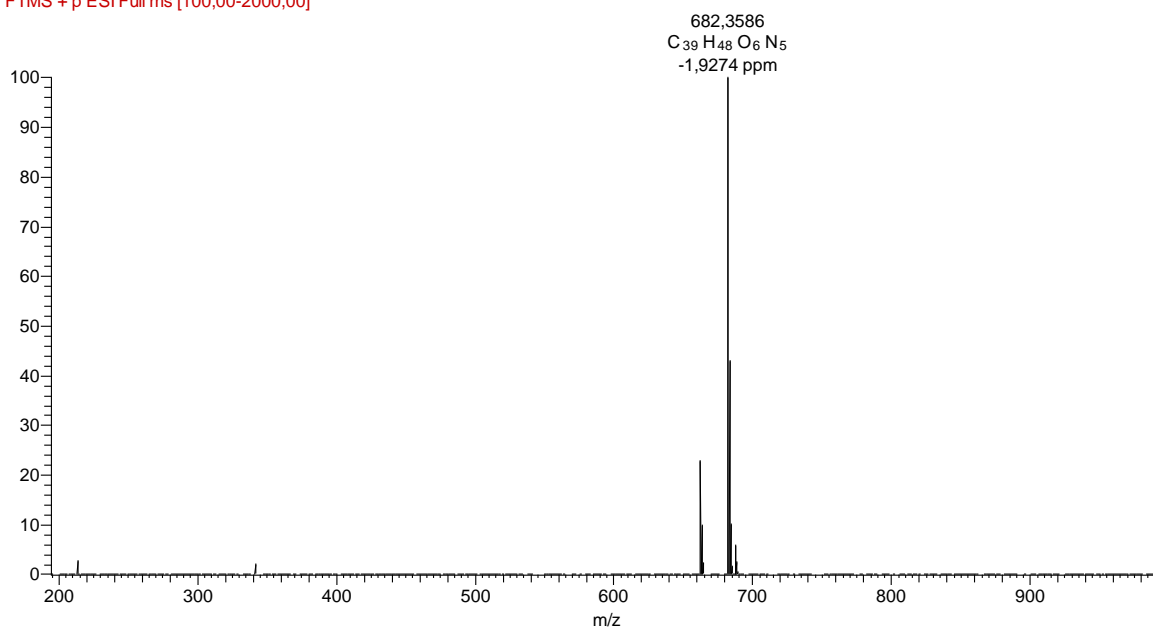
CAC133\_pdd #2095-2103 RT: 10,04-10,06 AV: 5 NL: 1,97E8  
F: FTMS + p ESI Full ms [100,00-2000,00]



**Figura 259.** Espectro de massas de alta resolução (ESI) do pico em 10,06 min de **ZjC-AlcF** (modo positivo).

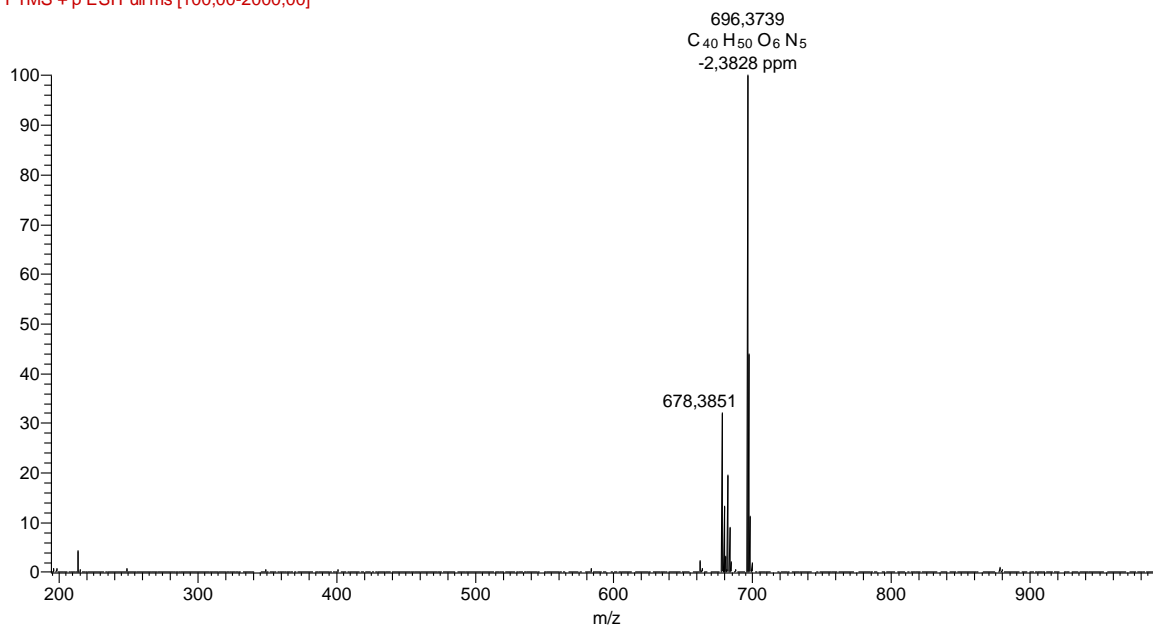


CAC133\_pdd #2165-2170 RT: 10,29-10,30 AV: 3 NL: 4,56E7  
F: FTMS + p ESI Full ms [100,00-2000,00]



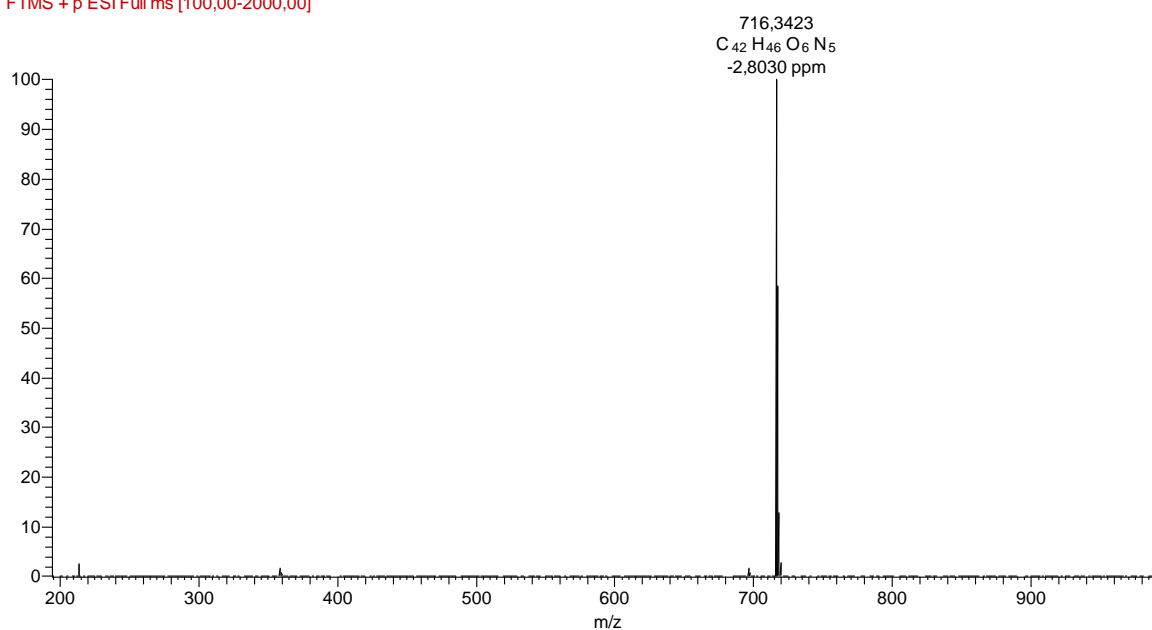
**Figura 260.** Espectro de massas de alta resolução (ESI) do pico em 10,30 min de **ZjC-AlcF** (modo positivo).

CAC133\_pdd #2185 RT: 10,35 AV: 1 NL: 3,14E7  
F: FTMS + p ESI Full ms [100,00-2000,00]



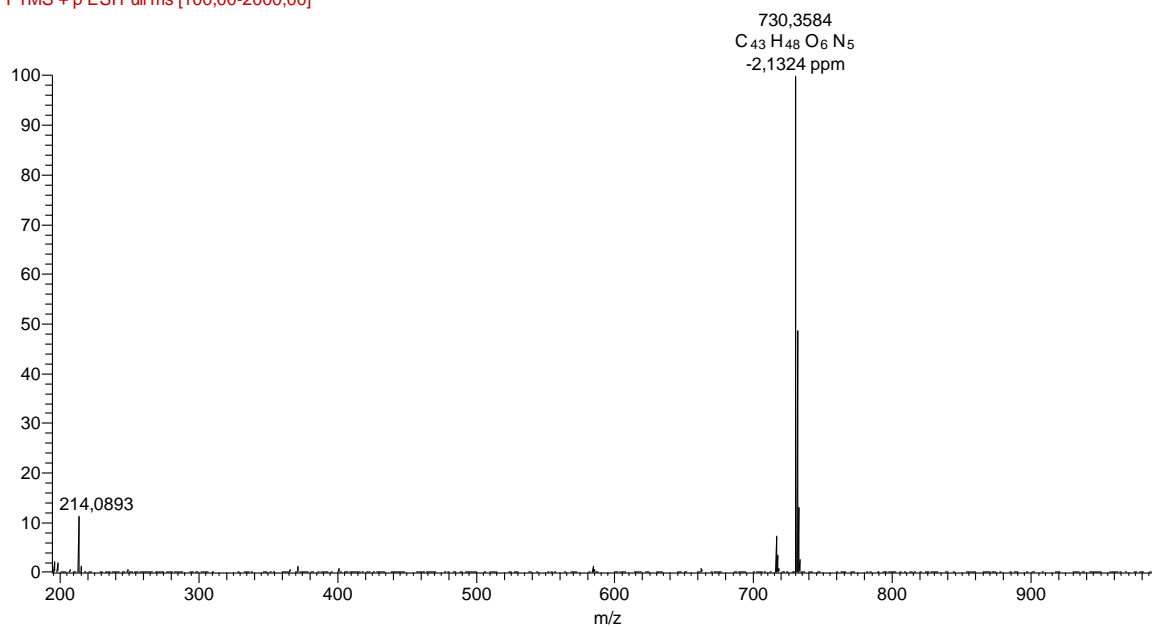
**Figura 261.** Espectro de massas de alta resolução (ESI) do pico em 10,37 min de **ZjC-AlcF** (modo positivo).

CAC133\_pdd #2216-2228 RT: 10,46-10,50 AV: 6 NL: 5,06E7  
F: FTMS + p ESI Full ms [100,00-2000,00]



**Figura 262.** Espectro de massas de alta resolução (ESI) do pico em 10,48 min de **ZjC-AlcF** (modo positivo).

CAC133\_pdd #2245-2254 RT: 10,56-10,59 AV: 5 NL: 1,26E7  
F: FTMS + p ESI Full ms [100,00-2000,00]



**Figura 263.** Espectro de massas de alta resolução (ESI) do pico em 10,57 min de **ZjC-AlcF** (modo positivo).

CAC133\_pdd #1775-1785 RT: 8,85-8,88 AV: 5 NL: 1,75E7  
F: FTMS + c ESI d Full ms2 558,33@cid45,00 [140,0C

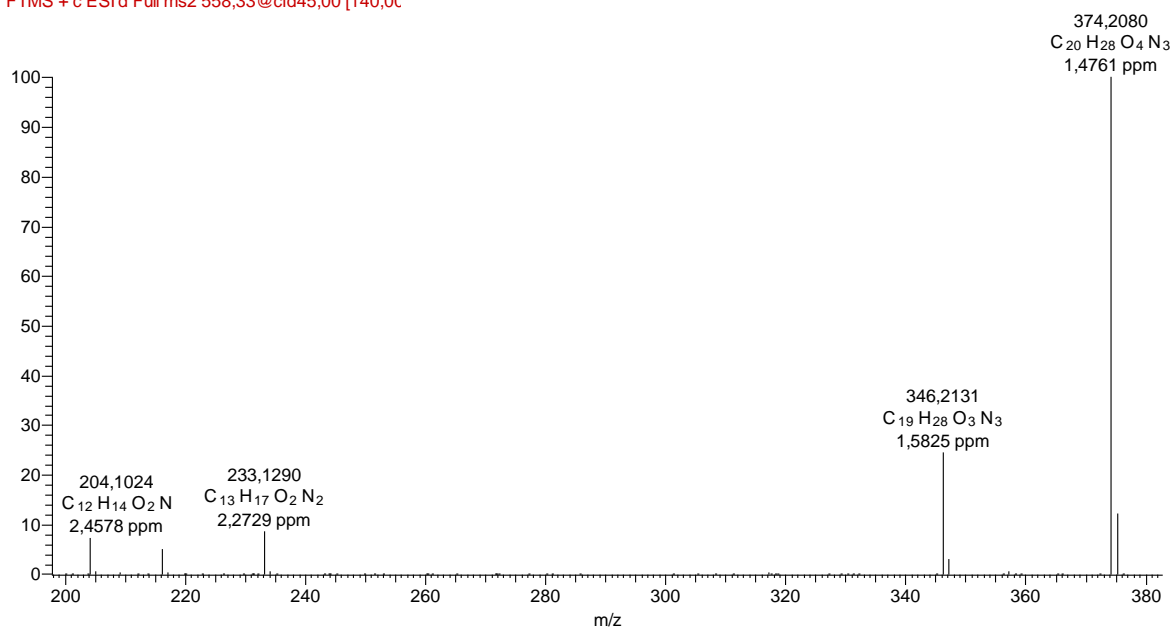


Figura 264. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP1.

CAC133\_pdd #1775-1785 RT: 8,85-8,88 AV: 5 NL: 1,51E6  
F: FTMS + c ESI d Full ms2 558,33@cid45,00 [140,0C

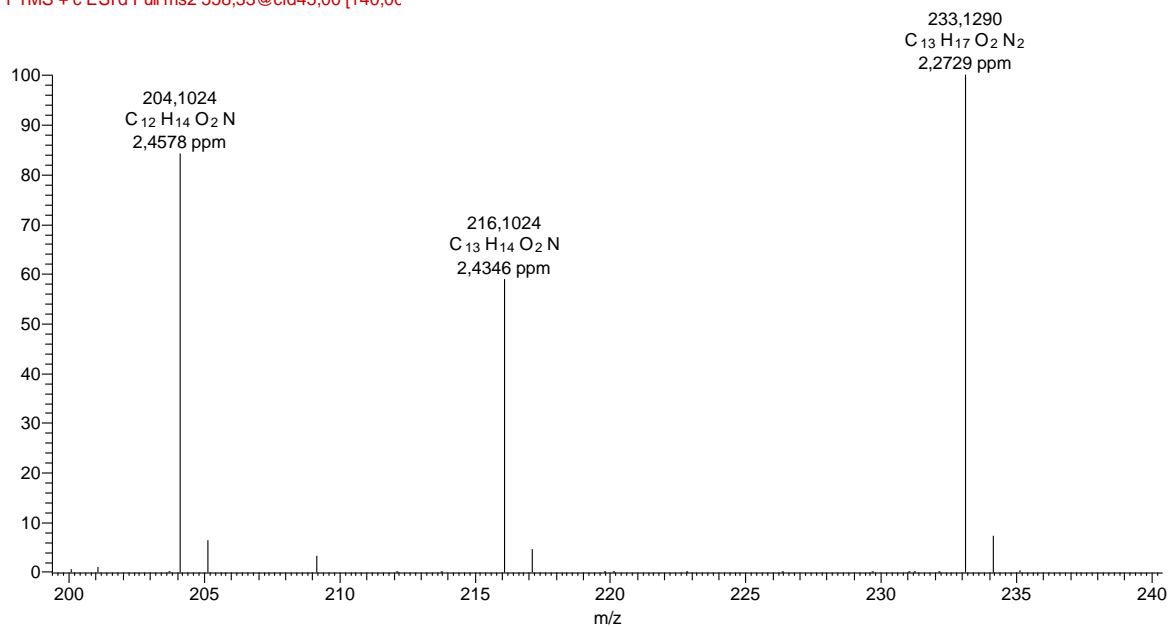


Figura 265. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP1 (ampliação em m/z 200-240).

CAC133\_pdd #1843-1859 RT: 9,09-9,14 AV: 8 NL: 5,54E7  
F: FTMS + c ESI d Full ms2 592,31@cid45,00 [150,0C

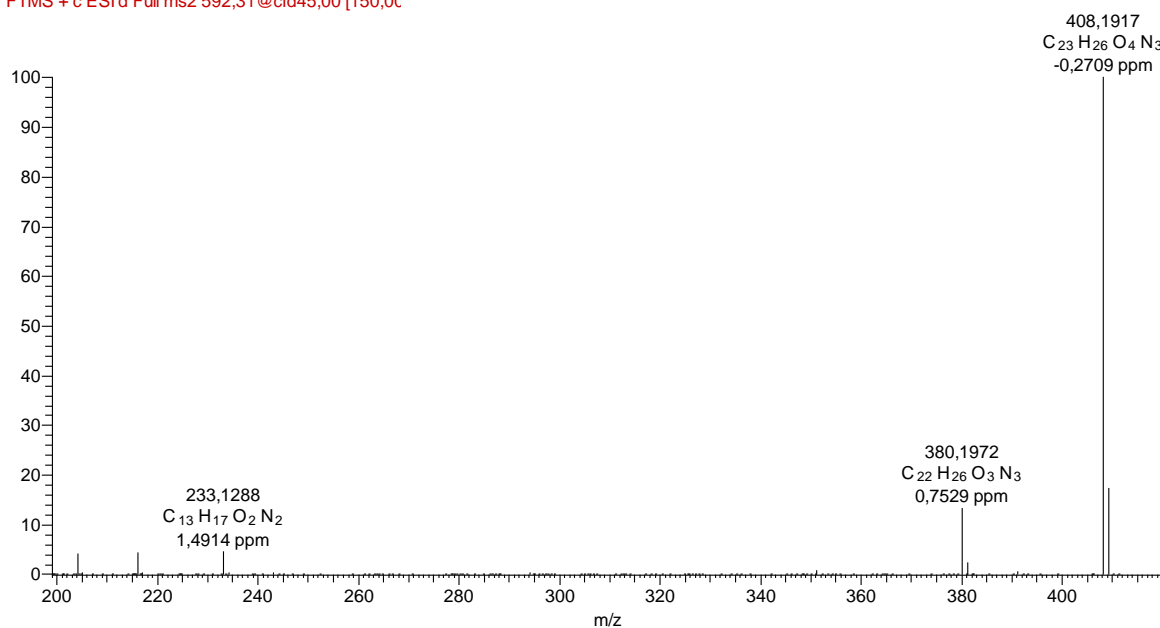


Figura 266. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP2.

CAC133\_pdd #1843-1859 RT: 9,09-9,14 AV: 8 NL: 2,55E6  
F: FTMS + c ESI d Full ms2 592,31@cid45,00 [150,0C

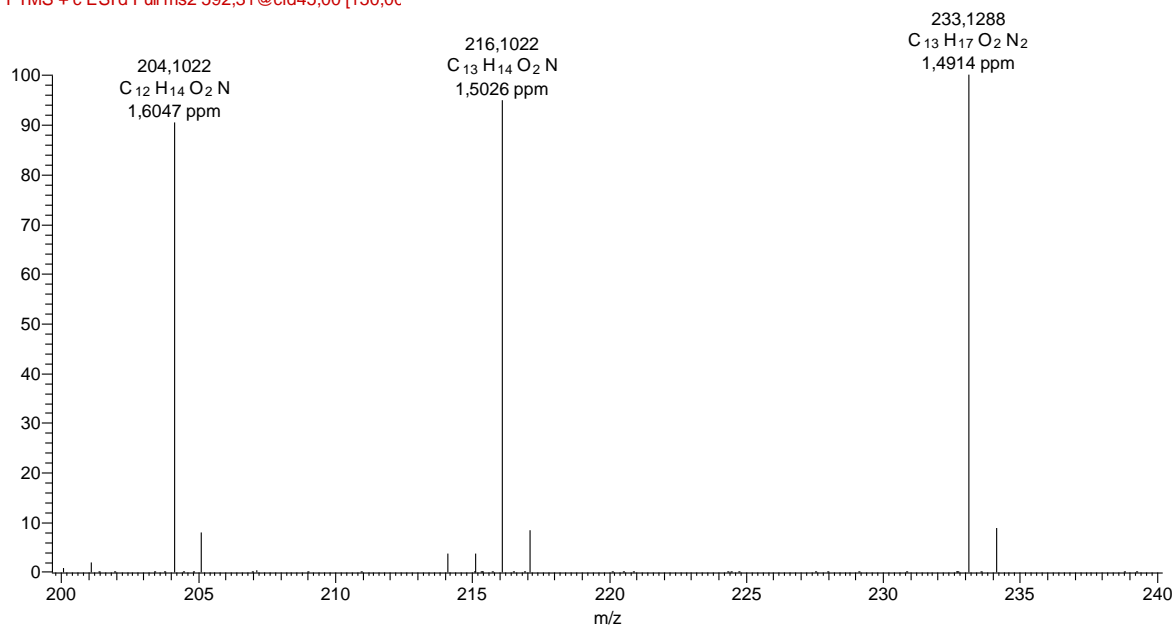


Figura 267. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP2 (ampliação em m/z 200-240).

CAC133\_pdd #2079-2086 RT: 9,99-10,01 AV: 4 NL: 2,25E7  
F: FTMS + c ESI d Full ms2 648,37@cid45,00 [165,0C

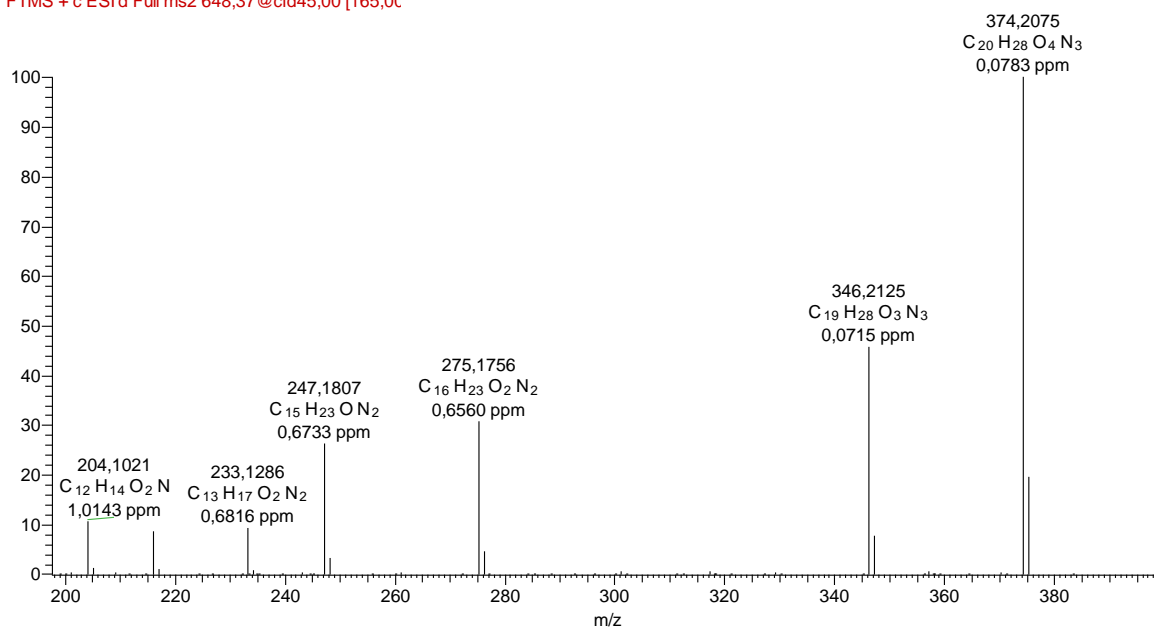


Figura 268. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP3.

CAC133\_pdd #2079-2086 RT: 9,99-10,01 AV: 4 NL: 2,37E6  
F: FTMS + c ESI d Full ms2 648,37@cid45,00 [165,0C

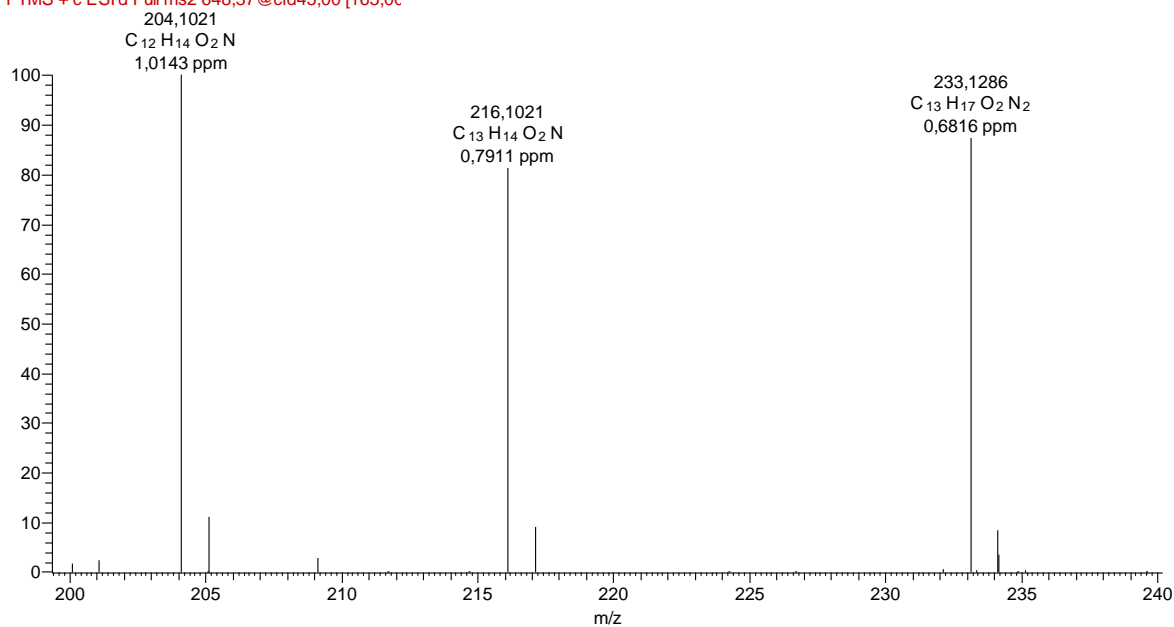


Figura 269. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP3 (ampliação em m/z 200-240).

CAC133\_pdd #2095-2105 RT: 10,04-10,07 AV: 5 NL: 1,89E7  
F: FTMS + c ESI d Full ms2 662,39@cid45,00 [170,0C

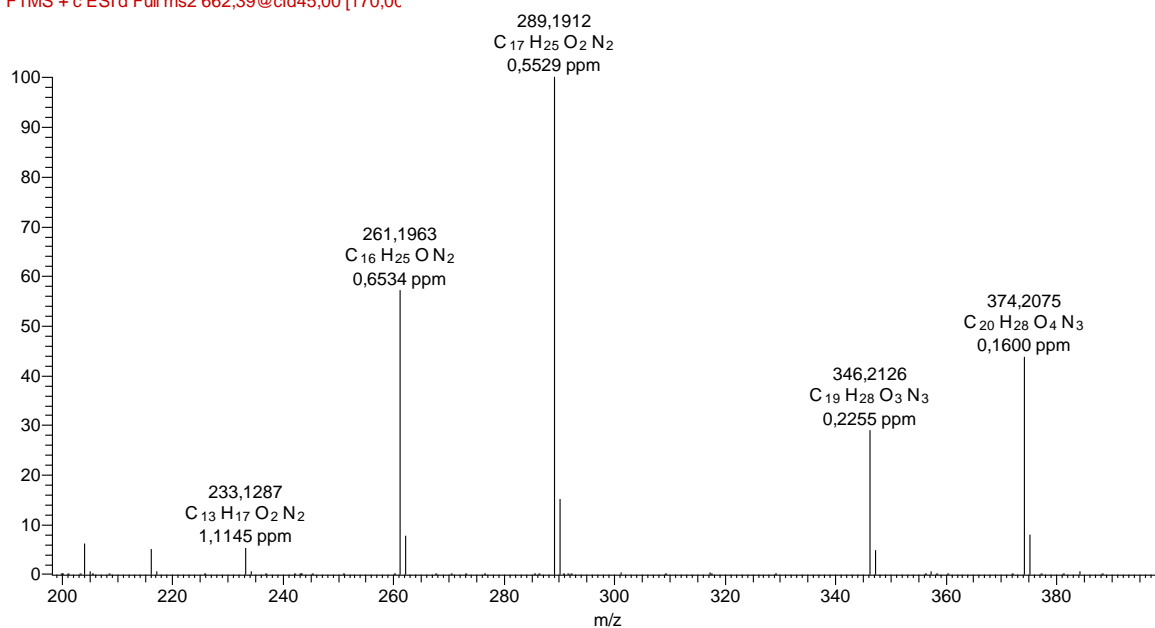


Figura 270. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP4.

CAC133\_pdd #2095-2105 RT: 10,04-10,07 AV: 5 NL: 1,18E6  
F: FTMS + c ESI d Full ms2 662,39@cid45,00 [170,0C

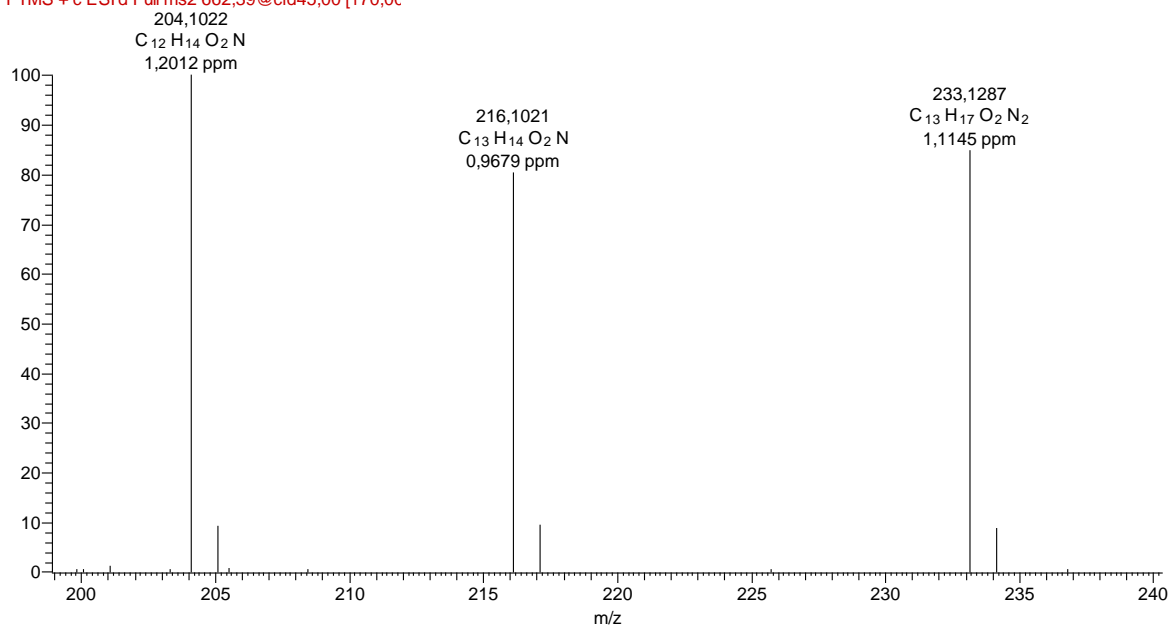


Figura 271. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP4 (ampliação em m/z 200-240).

CAC133\_pdd #2162-2175 RT: 10,28-10,32 AV: 7 NL: 5,18E6  
F: FTMS + c ESI d Full ms2 682,36@cid45,00 [175,0C

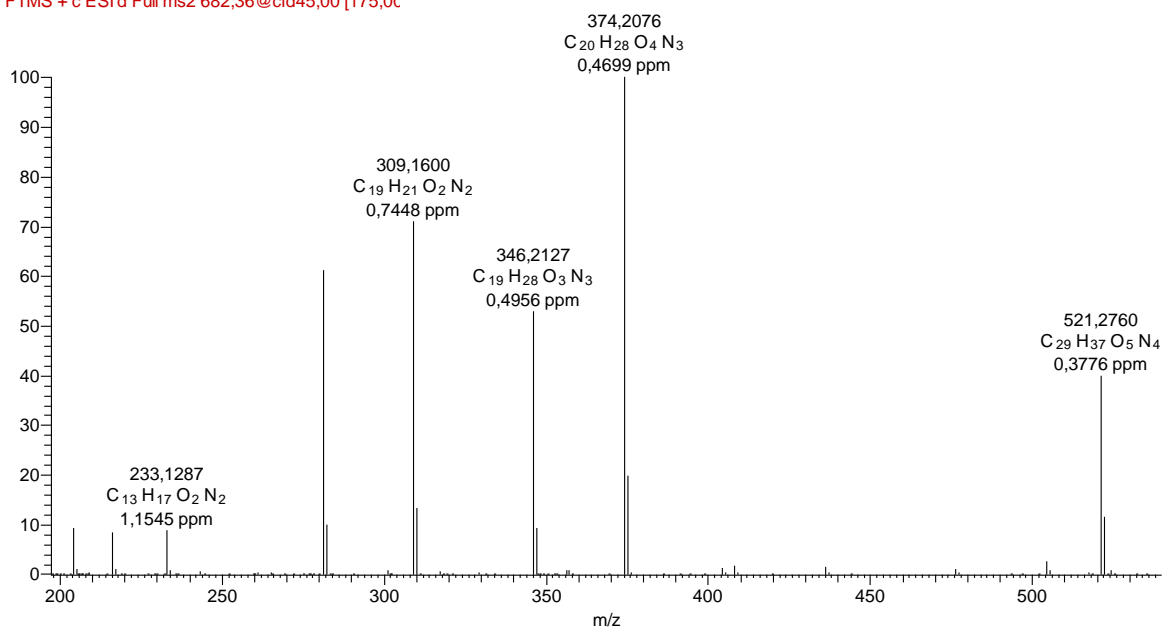


Figura 272. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP5.

CAC133\_pdd #2162-2175 RT: 10,28-10,32 AV: 7 NL: 3,17E6  
F: FTMS + c ESI d Full ms2 682,36@cid45,00 [175,0C

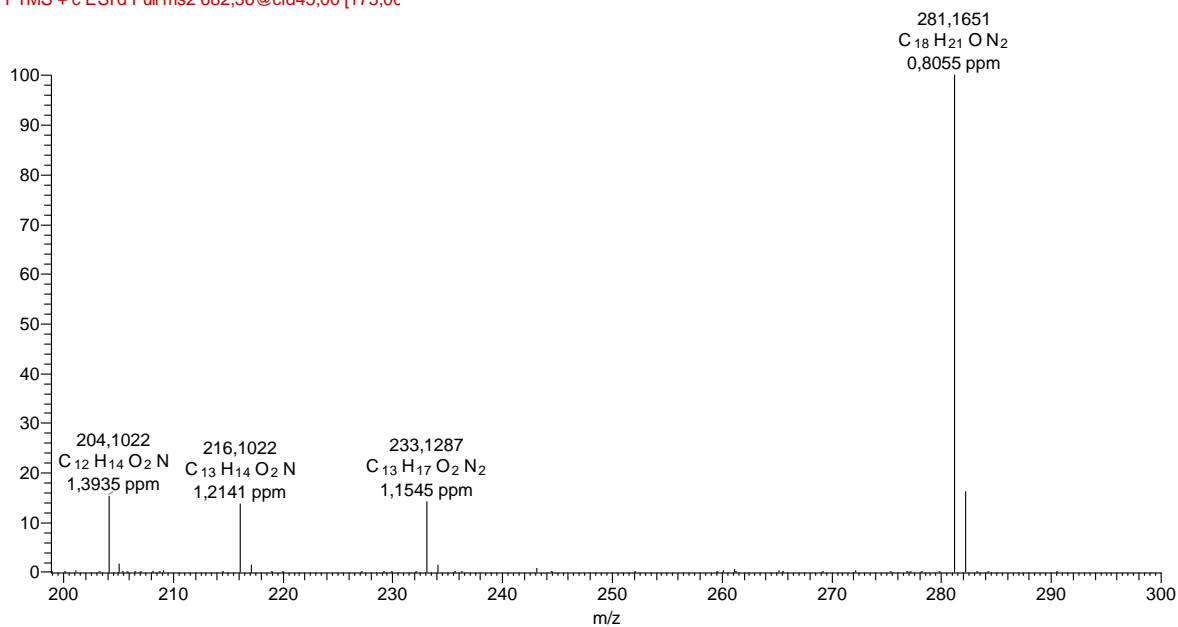


Figura 273. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP5 (ampliação em m/z 200-300).

CAC133\_pdd #2186-2191 RT: 10,36-10,37 AV: 3 NL: 3,46E6  
F: FTMS + c ESI d Full ms2 696,37@cid45,00 [180,0C

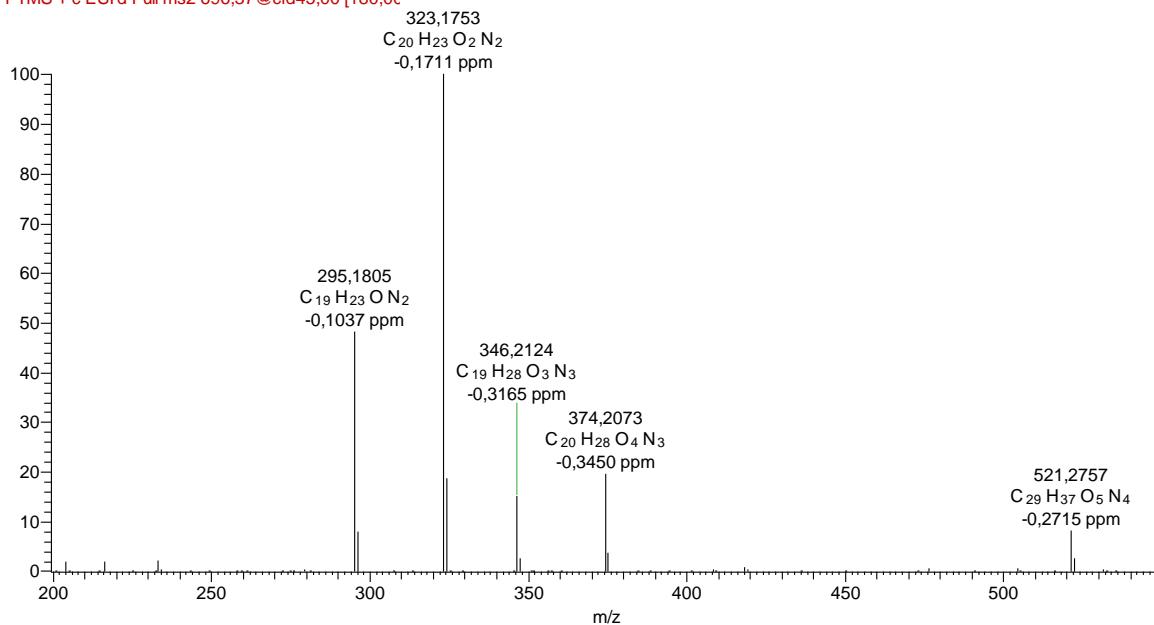


Figura 274. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP6.

CAC133\_pdd #2186-2191 RT: 10,36-10,37 AV: 3 NL: 7,12E4  
F: FTMS + c ESI d Full ms2 696,37@cid45,00 [180,0C

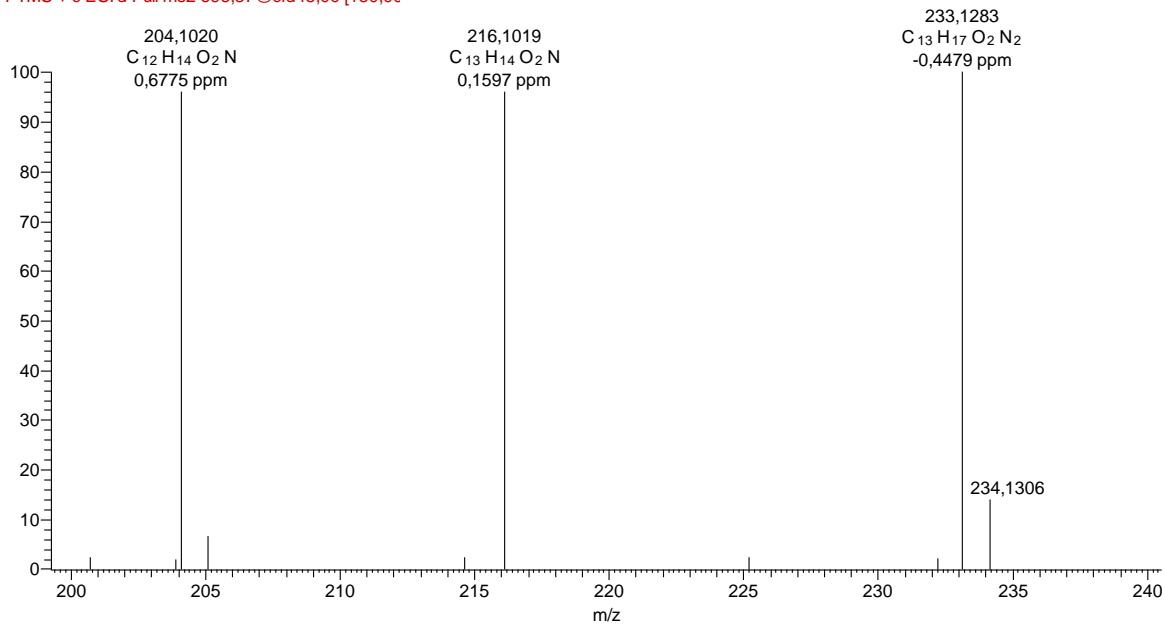


Figura 275. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP6 (ampliação em m/z 200-240).



CAC133\_pdd #2216-2228 RT: 10,46-10,50 AV: 7 NL: 1,03E7  
F: FTMS + c ESI d Full ms2 716,34@cid45,00 [185,0C

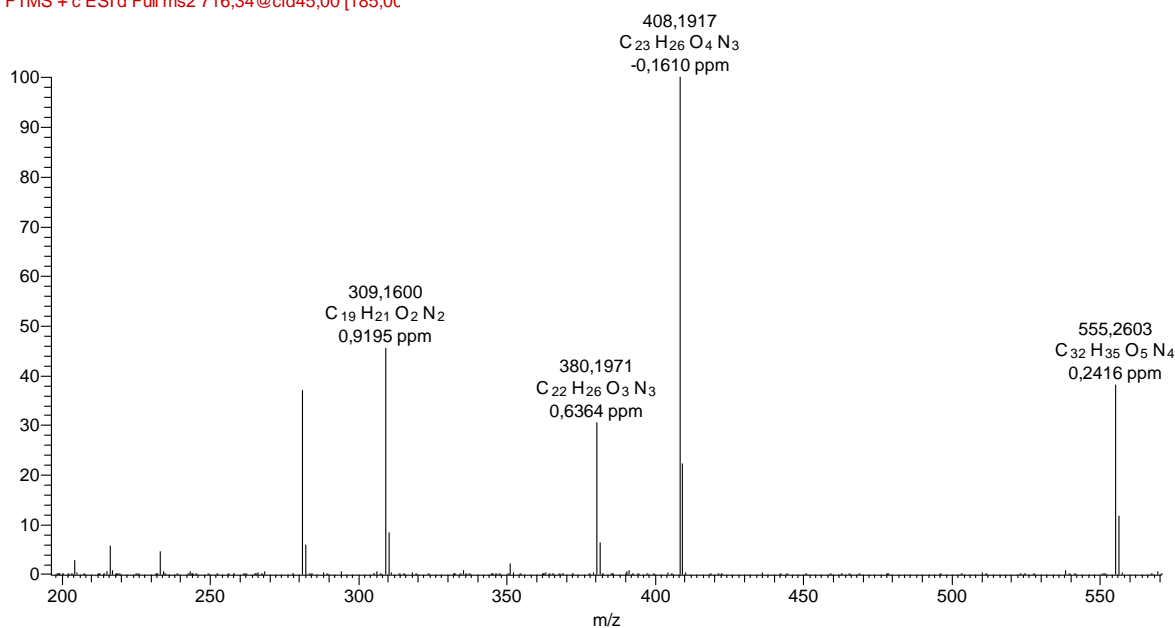


Figura 276. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP7.

CAC133\_pdd #2216-2228 RT: 10,46-10,50 AV: 7 NL: 3,81E6  
F: FTMS + c ESI d Full ms2 716,34@cid45,00 [185,0C

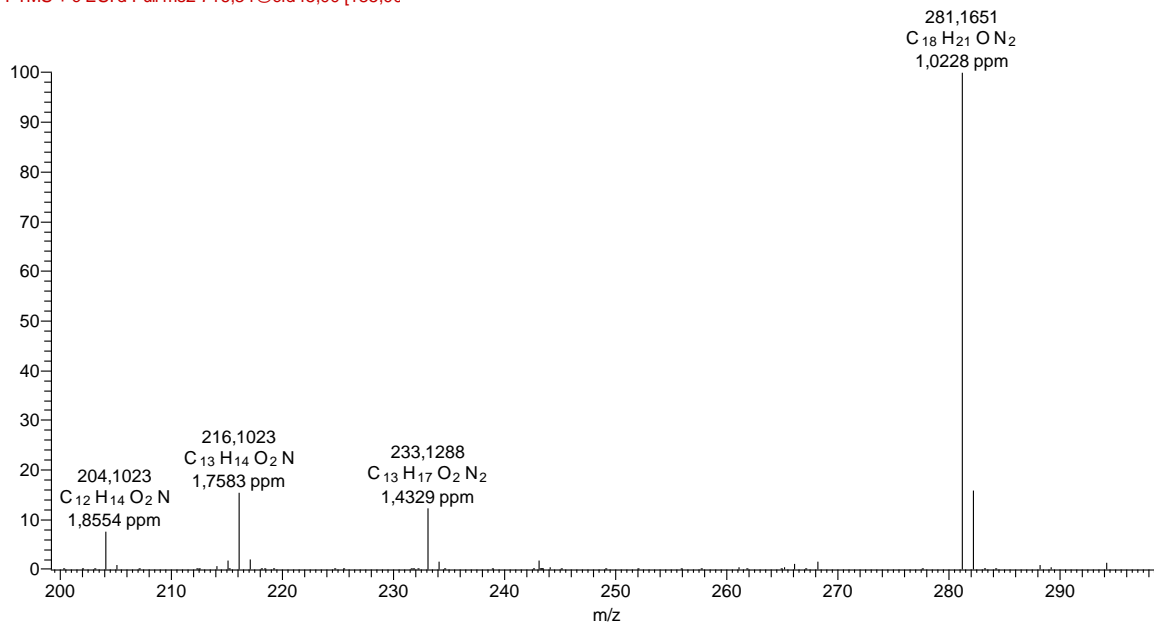


Figura 277. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP7 (ampliação em m/z 200-300).

CAC133\_pdd #2243-2252 RT: 10,56-10,58 AV: 5 NL: 1,37E6  
F: FTMS + c ESI d Full ms2 730,36@cid45,00 [190,0C

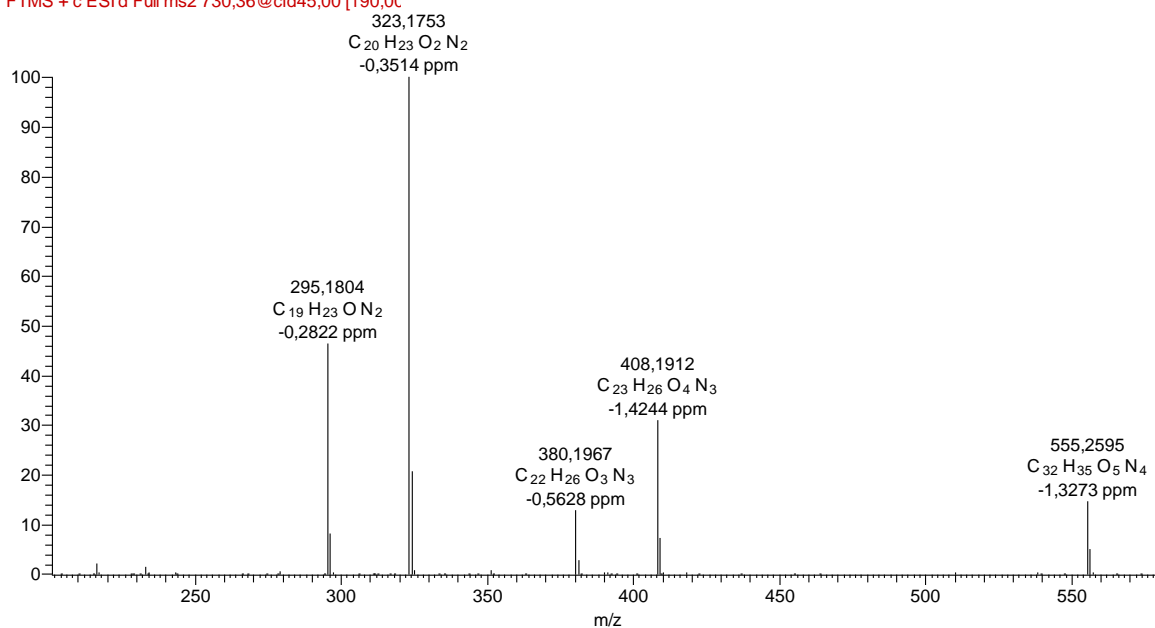


Figura 278. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP8.

CAC133\_pdd #2243-2252 RT: 10,56-10,58 AV: 5 NL: 2,82E4  
F: FTMS + c ESI d Full ms2 730,36@cid45,00 [190,0C

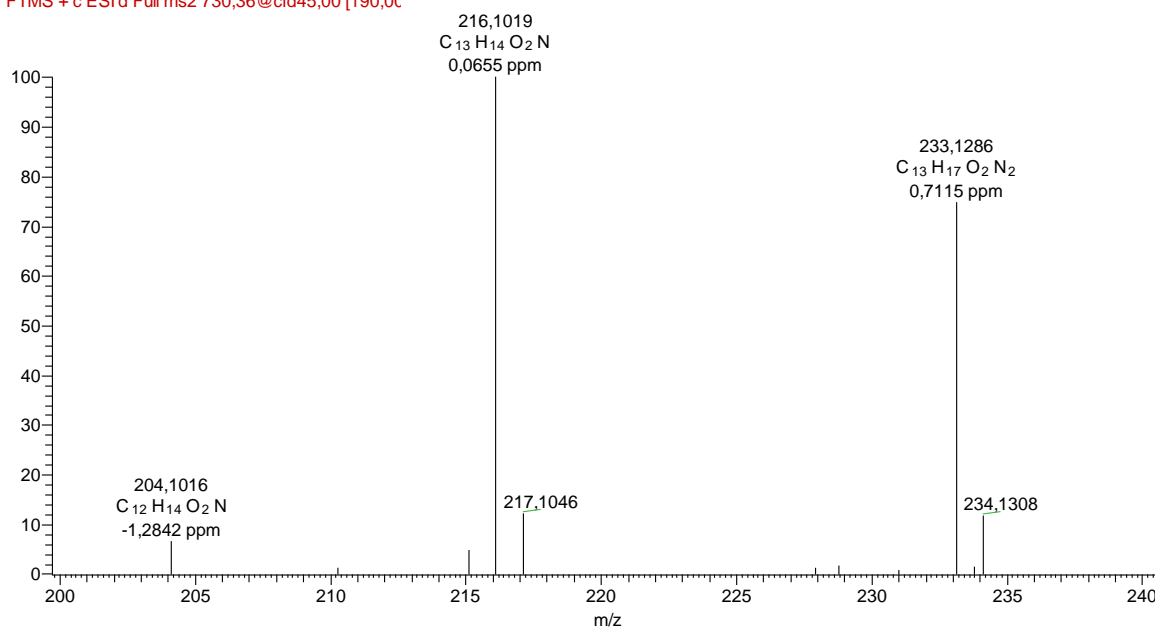


Figura 279. Espectro de massas sequencial (EM<sup>2</sup>) de ZjC-ACP8 (ampliação em m/z 200-240).