

Supplementary Material

Clavukoellians G-K, New Nardosinane and Aristolane Sesquiterpenoids with Angiogenesis Promoting Activity from the Marine Soft coral *Lemnalia* sp.

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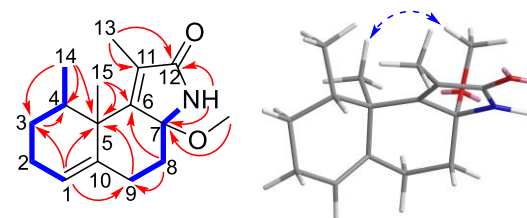
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- † The authors contributed equally to this work.

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— COSY → HMBC - - - NOESY



2

Figure S1. Key COSY (bolds, blue), HMBC (arrows, red), and NOESY (dashed arrows, blue) correlations of **2**.

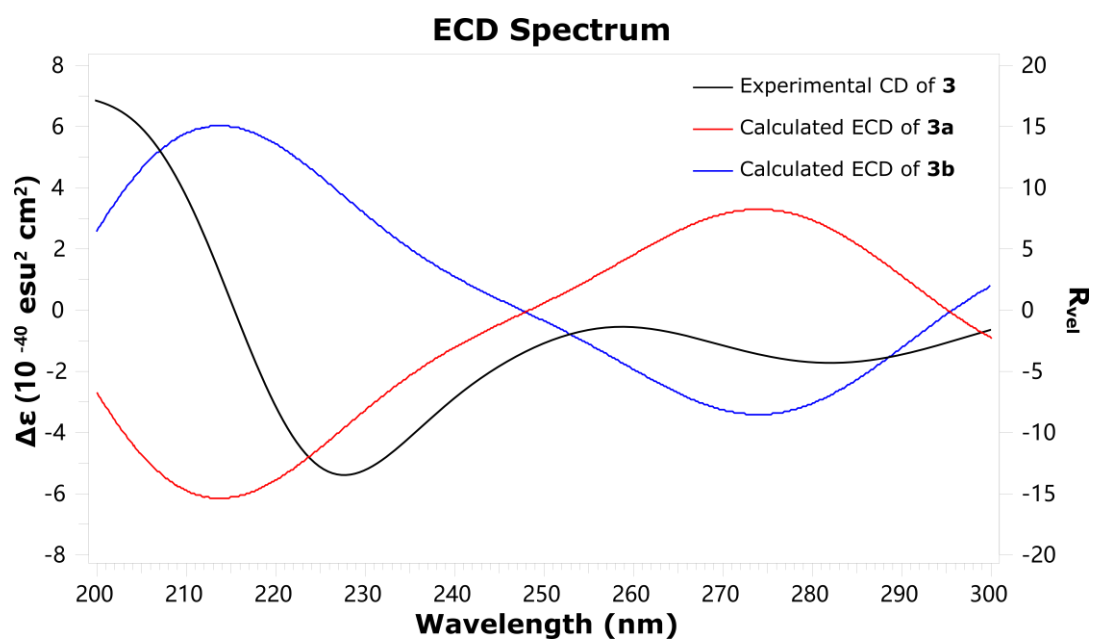


Figure S2. Experimental and calculated ECD spectra of **3**.

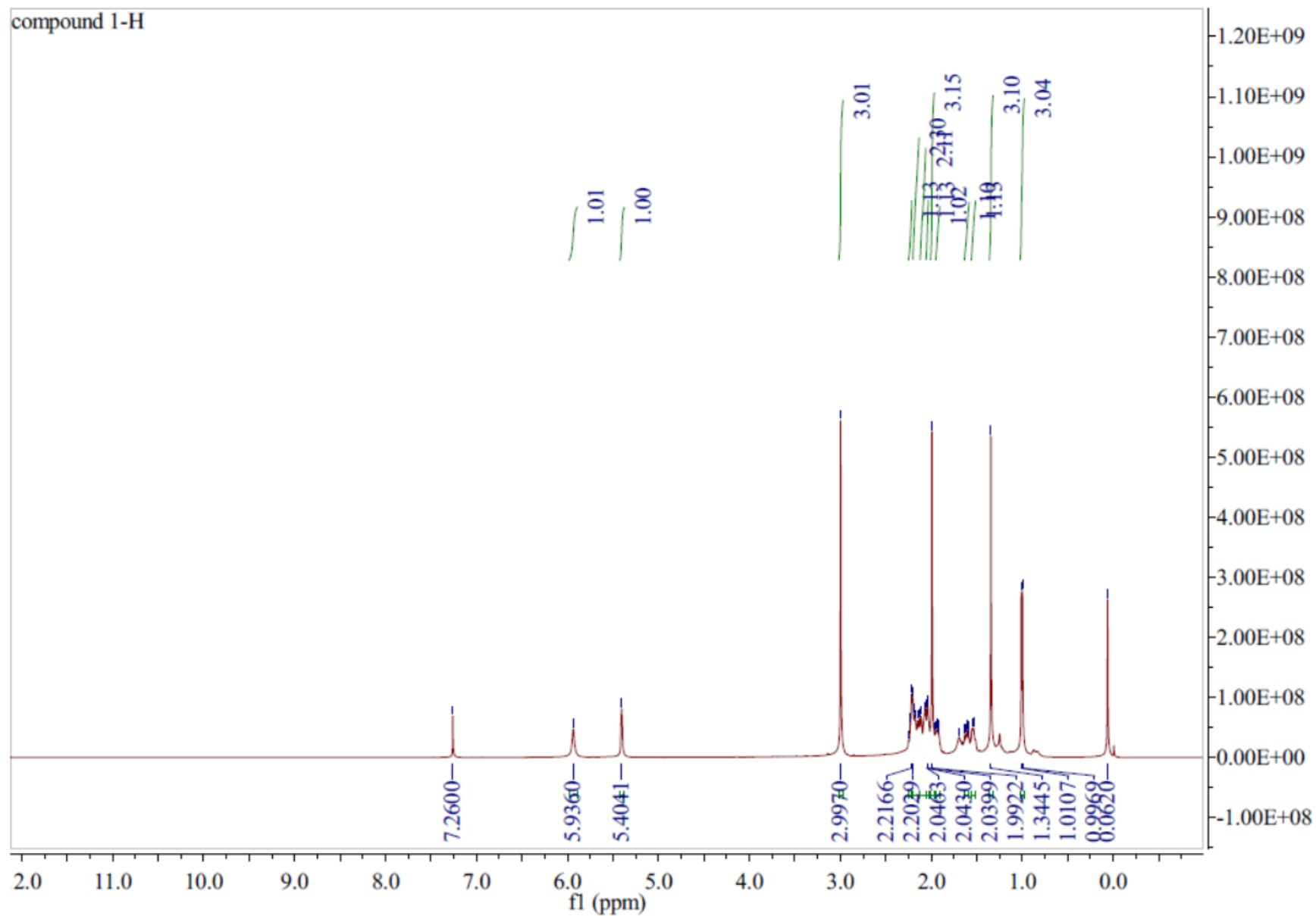


Figure S3. ^1H NMR spectrum of calvukoellian G (**1**) in CDCl_3 (500 MHz).

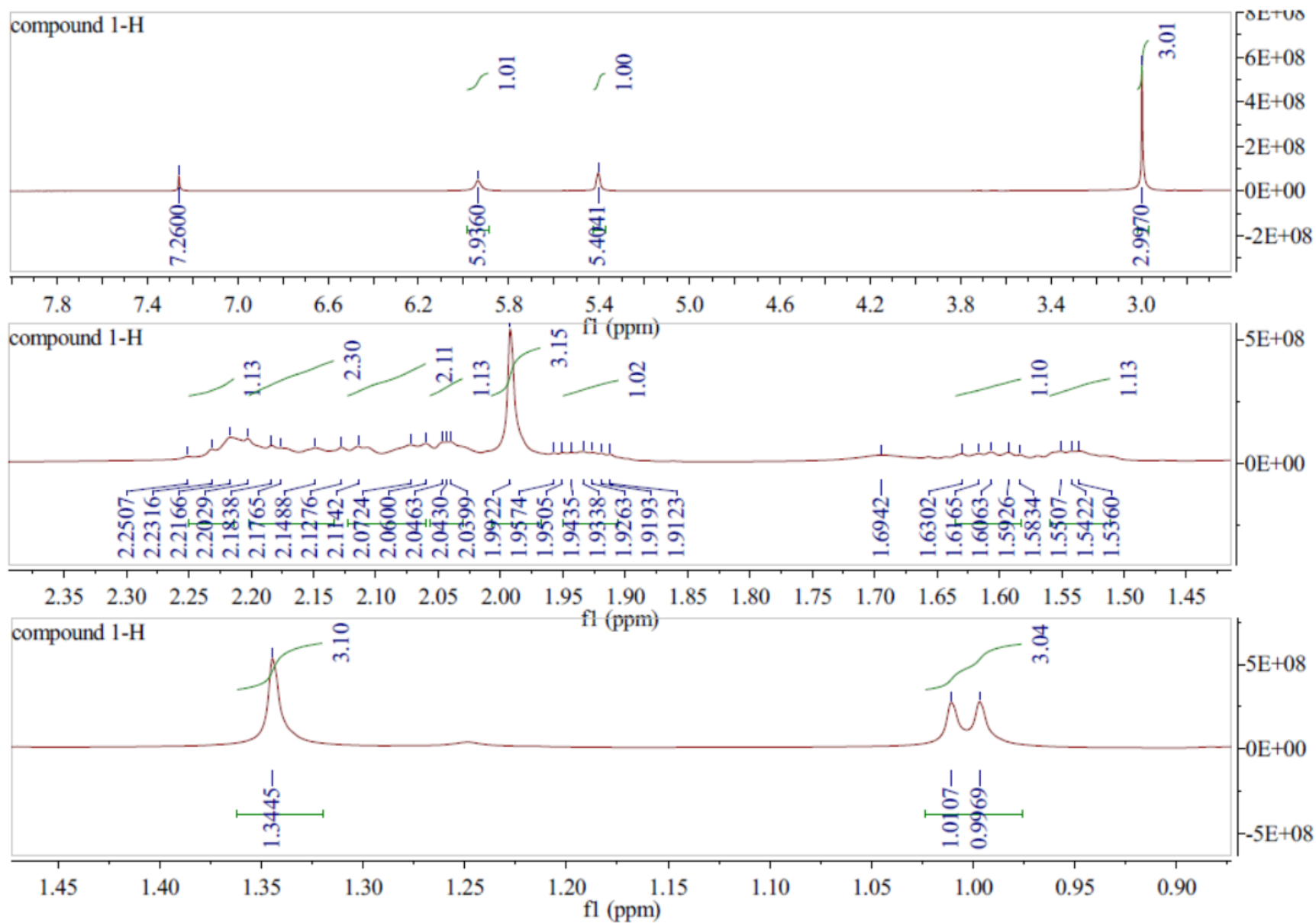


Figure S4. Enlarged ^1H NMR spectrum of calvukoellian G (1) in CDCl_3 (500 MHz).

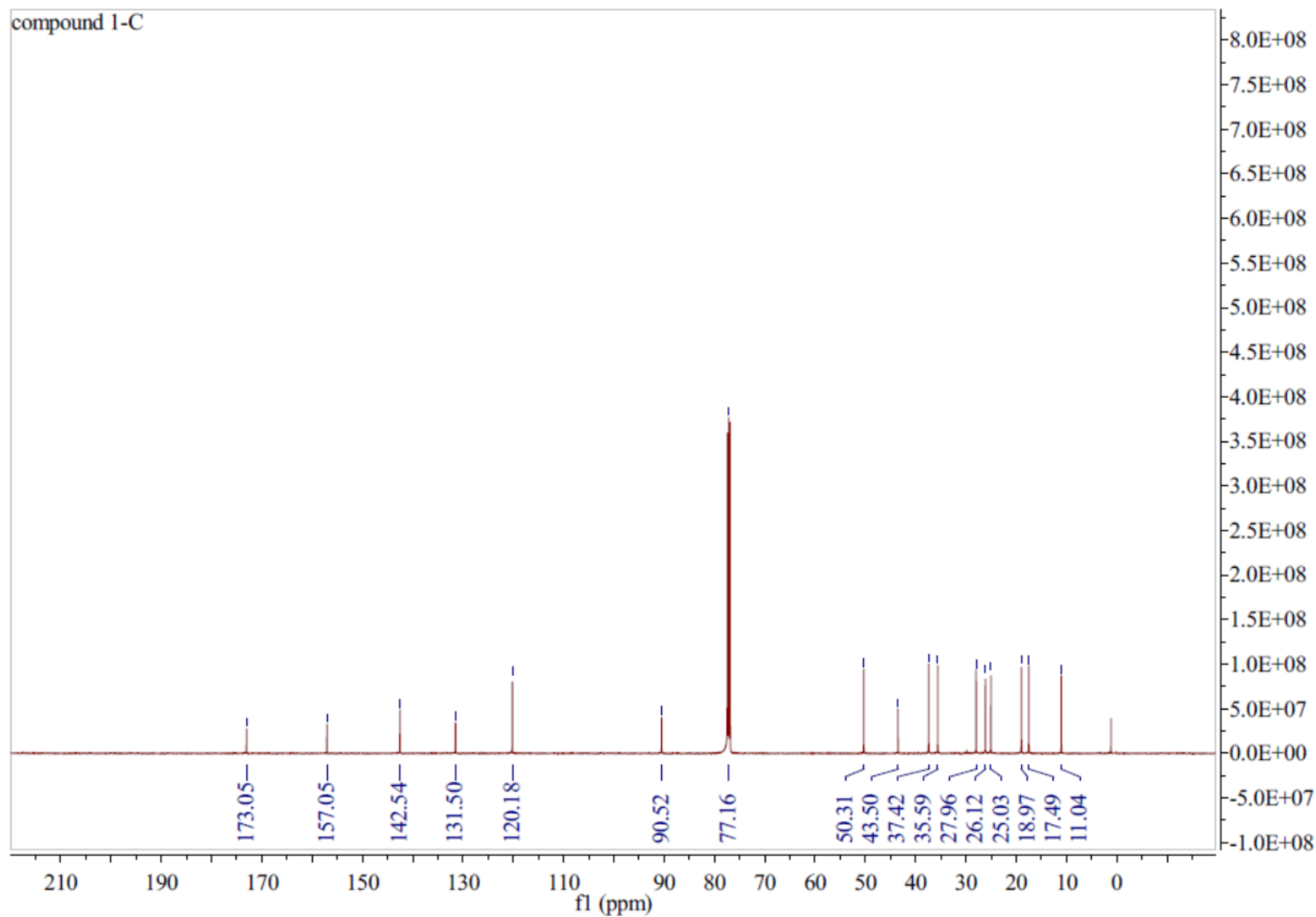


Figure S5. ^{13}C NMR spectrum of calvukoellian G (**1**) in CDCl_3 (125 MHz).

-P7/P55

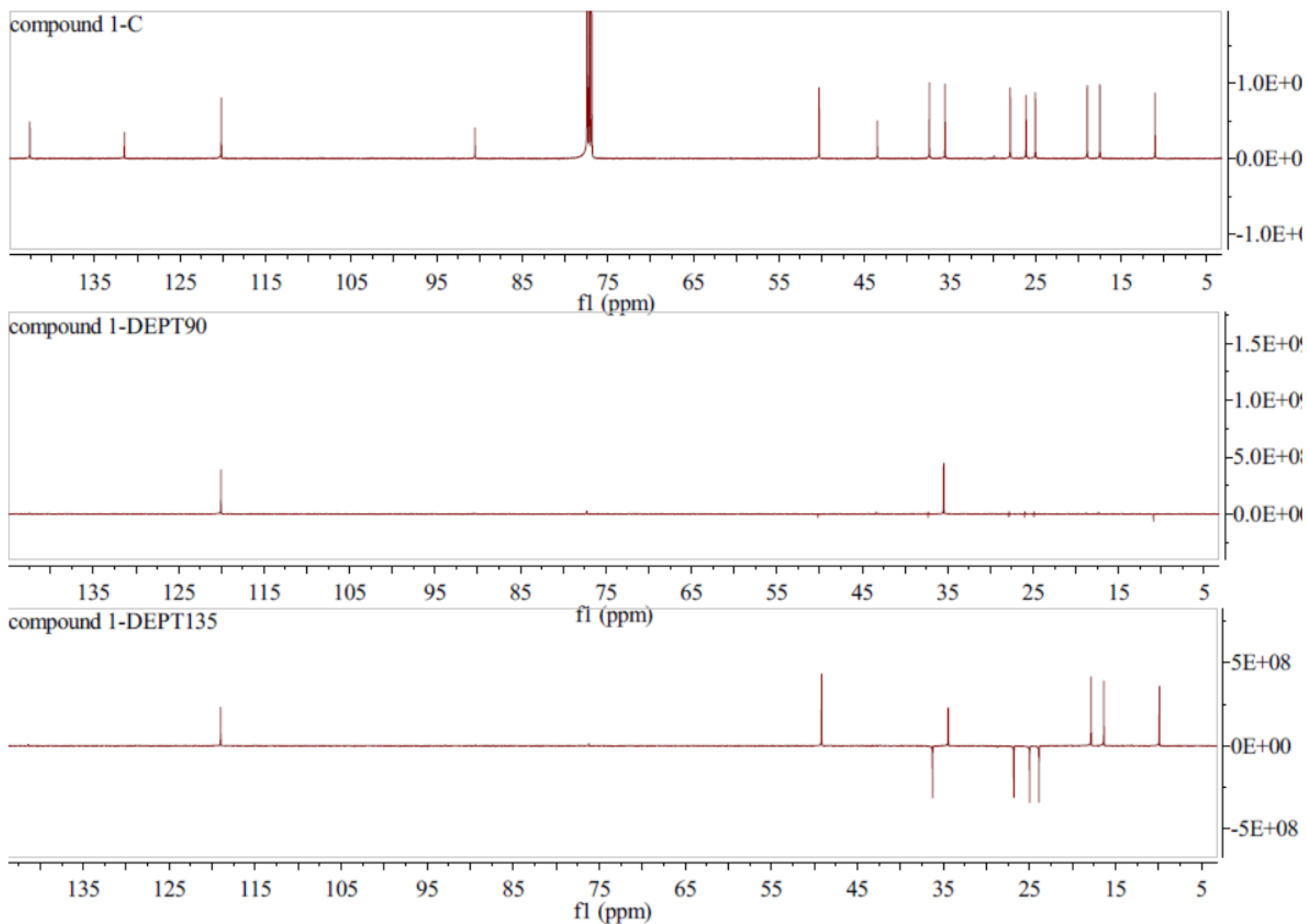


Figure S6. ¹³C NMR and DEPT spectrum of calvukoellian G (1) in CDCl₃ (125 MHz).

-P8/P55

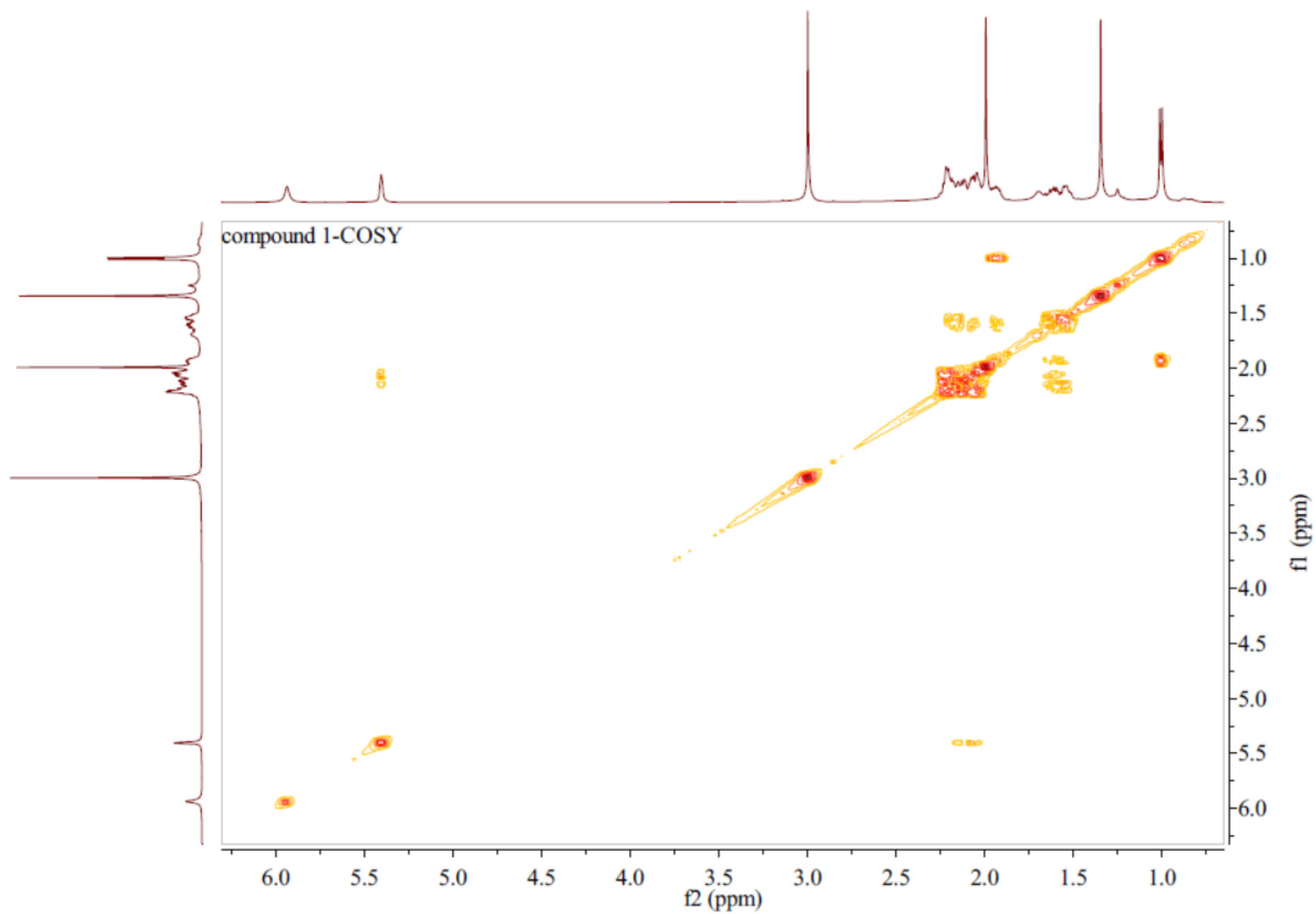


Figure S7. ^1H - ^1H COSY spectrum of calvukoellian G (**1**) in CDCl_3 (500 MHz).

-P9/P55

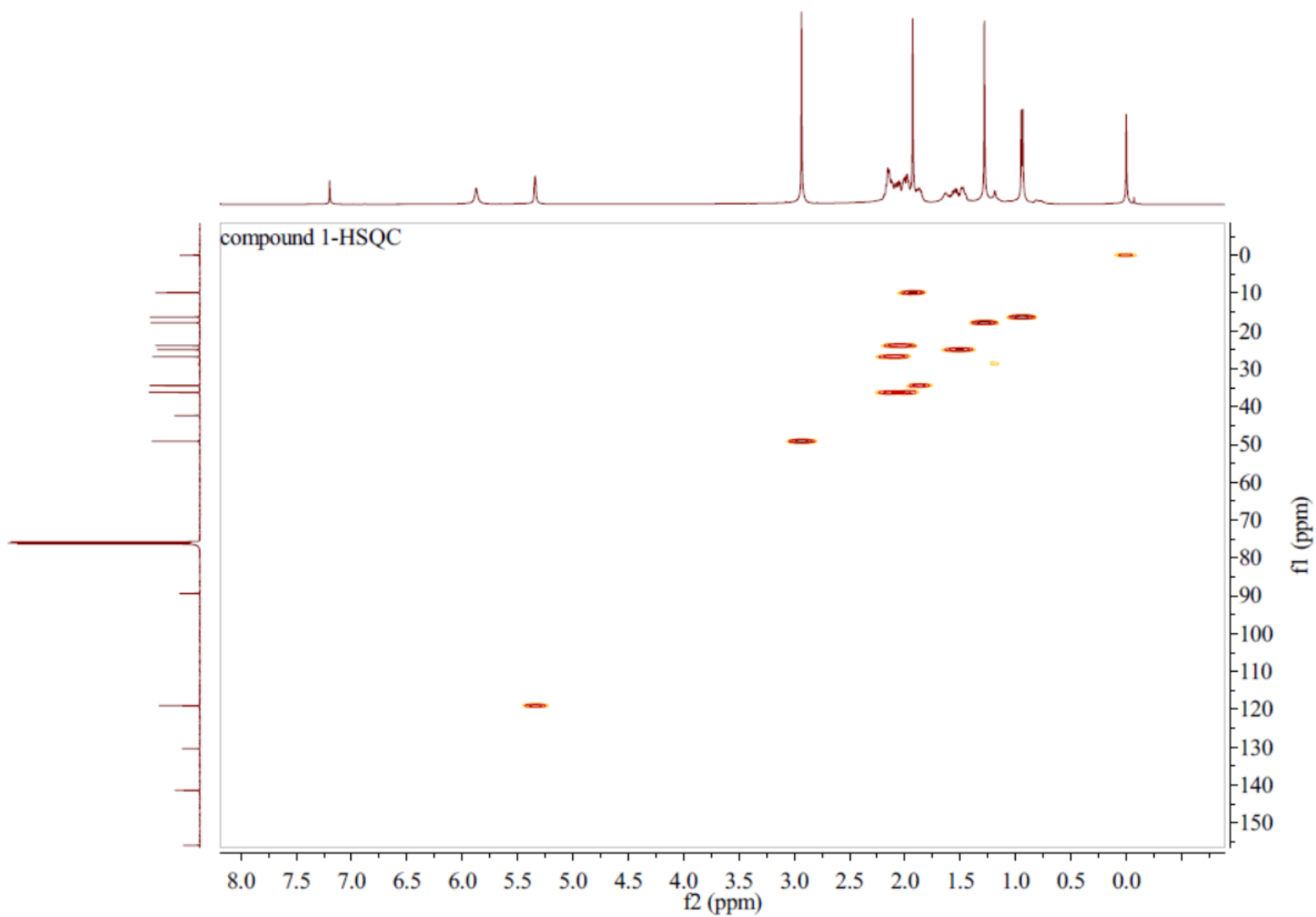


Figure S8. HSQC spectrum of calvukoellian G (**1**) in CDCl₃ (500 MHz).

-P10/P55

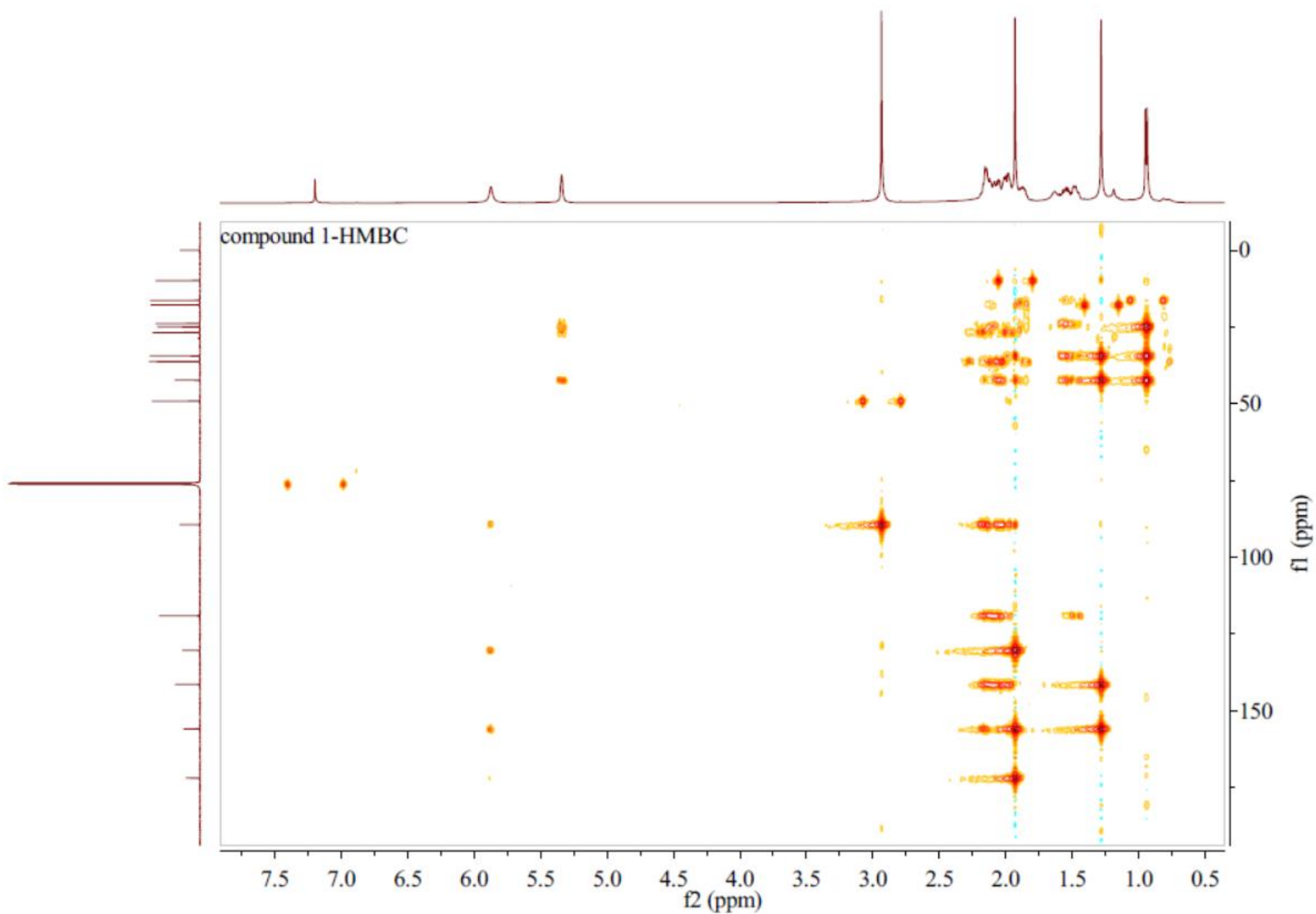


Figure S9. HMBC spectrum of calvukoellian G (1) in CDCl₃ (500 MHz).

-P11/P55

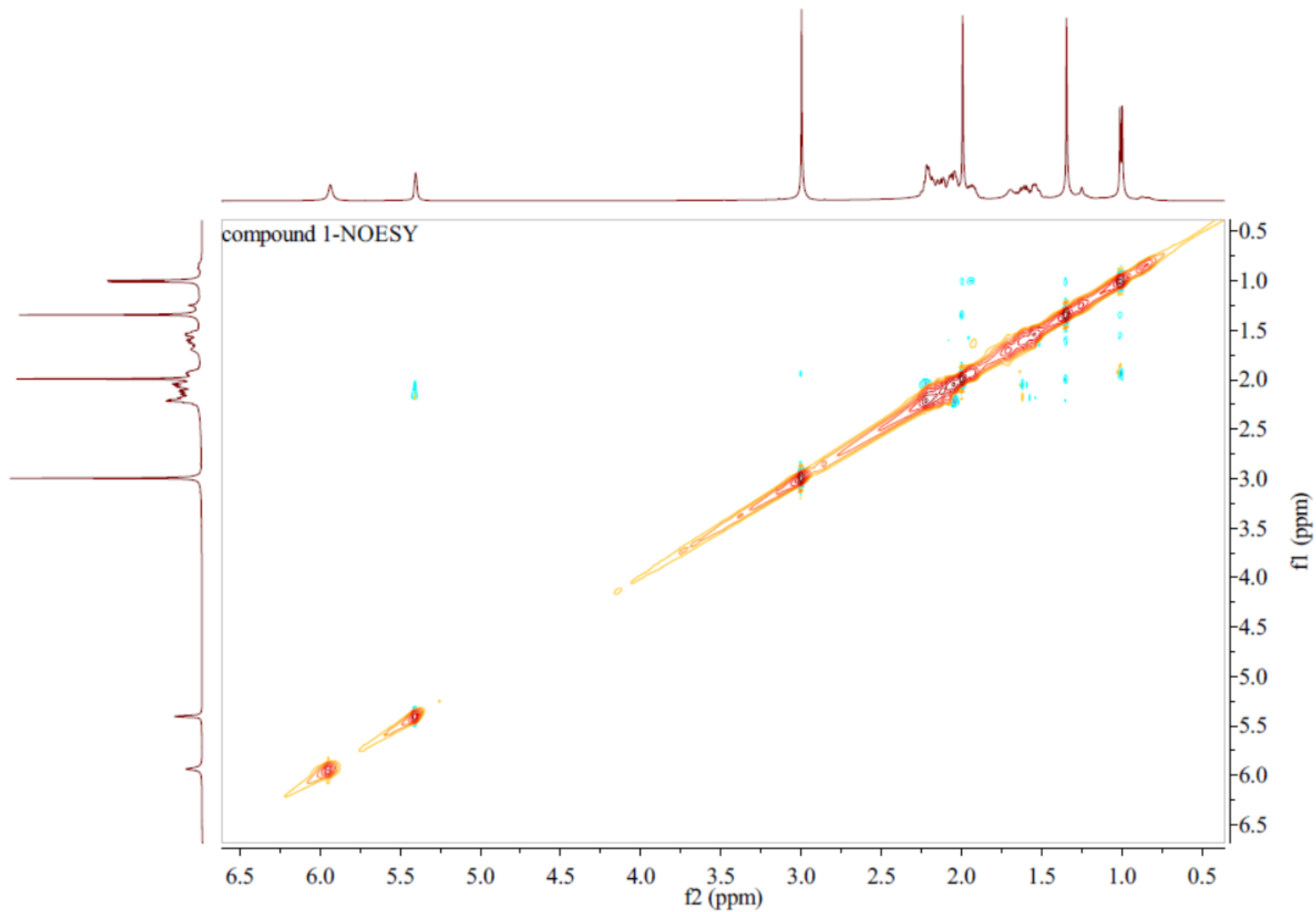


Figure S10. NOESY spectrum of calvukoellian G (**1**) in CDCl₃ (500 MHz).

-P12/P55

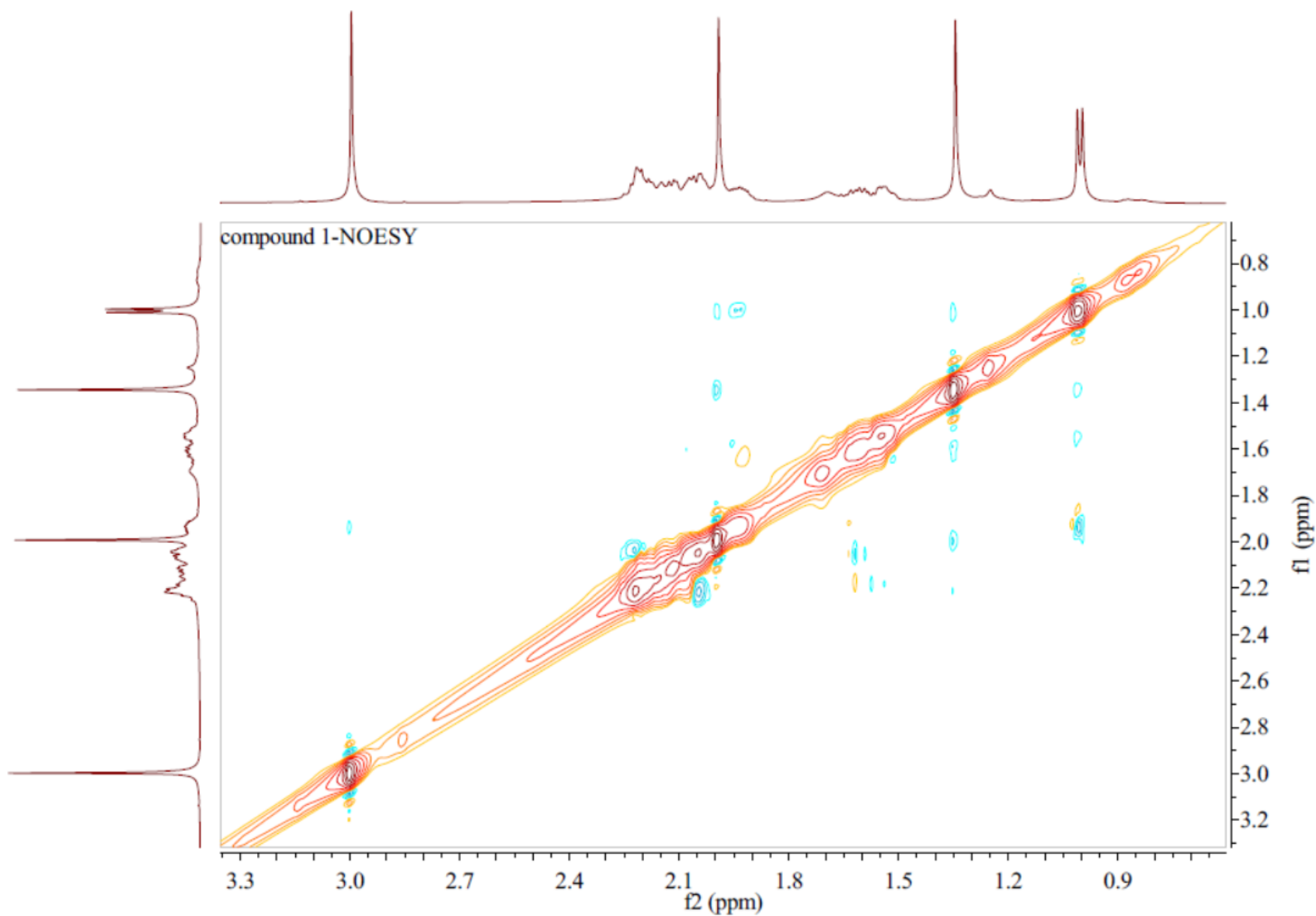


Figure S11. NOESY spectrum of calvukoellian G (**1**) in CDCl₃ (500 MHz).

-P13/P55

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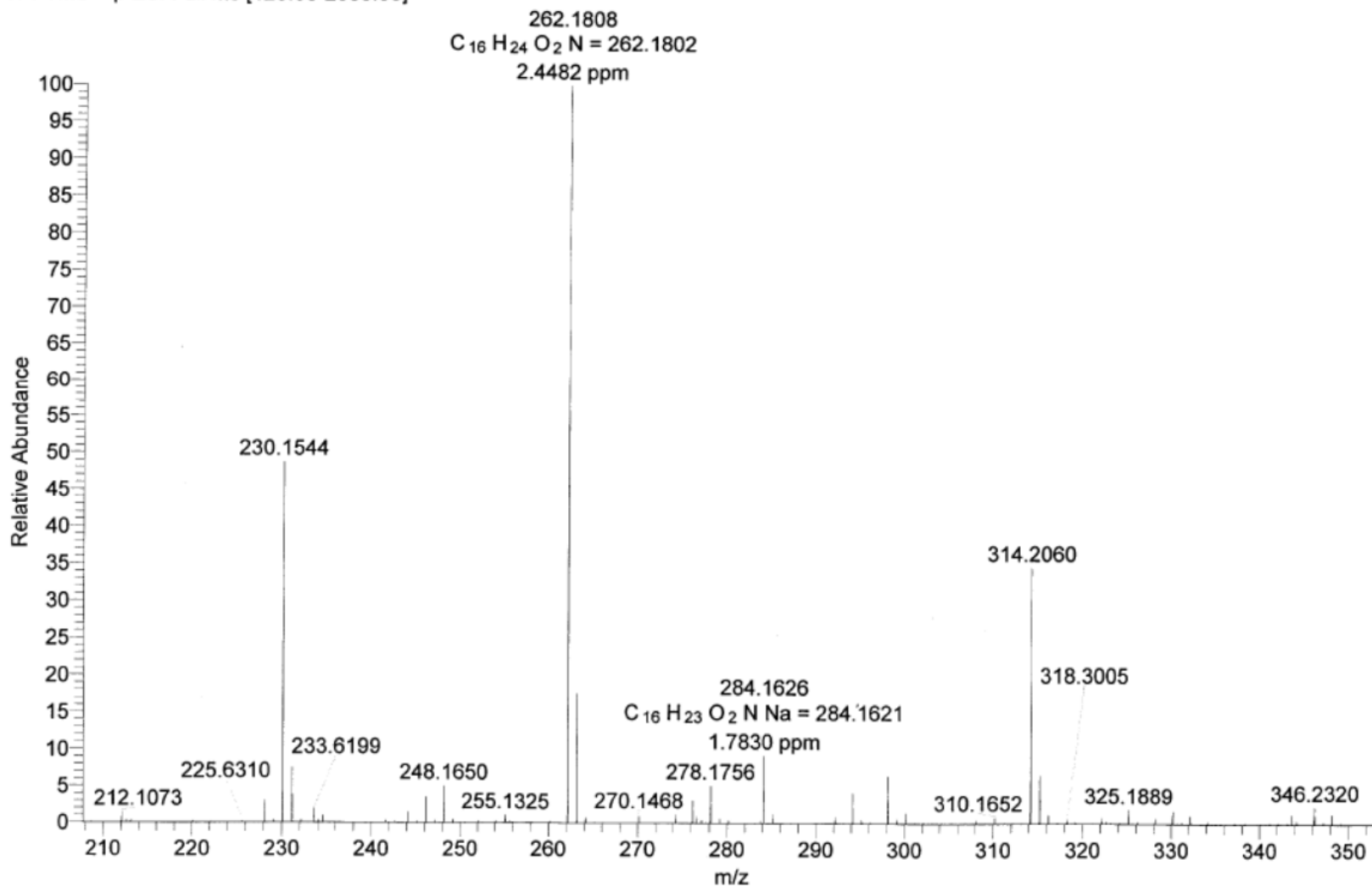


Figure S12. HRESIMS data of calvukoellian G (1).

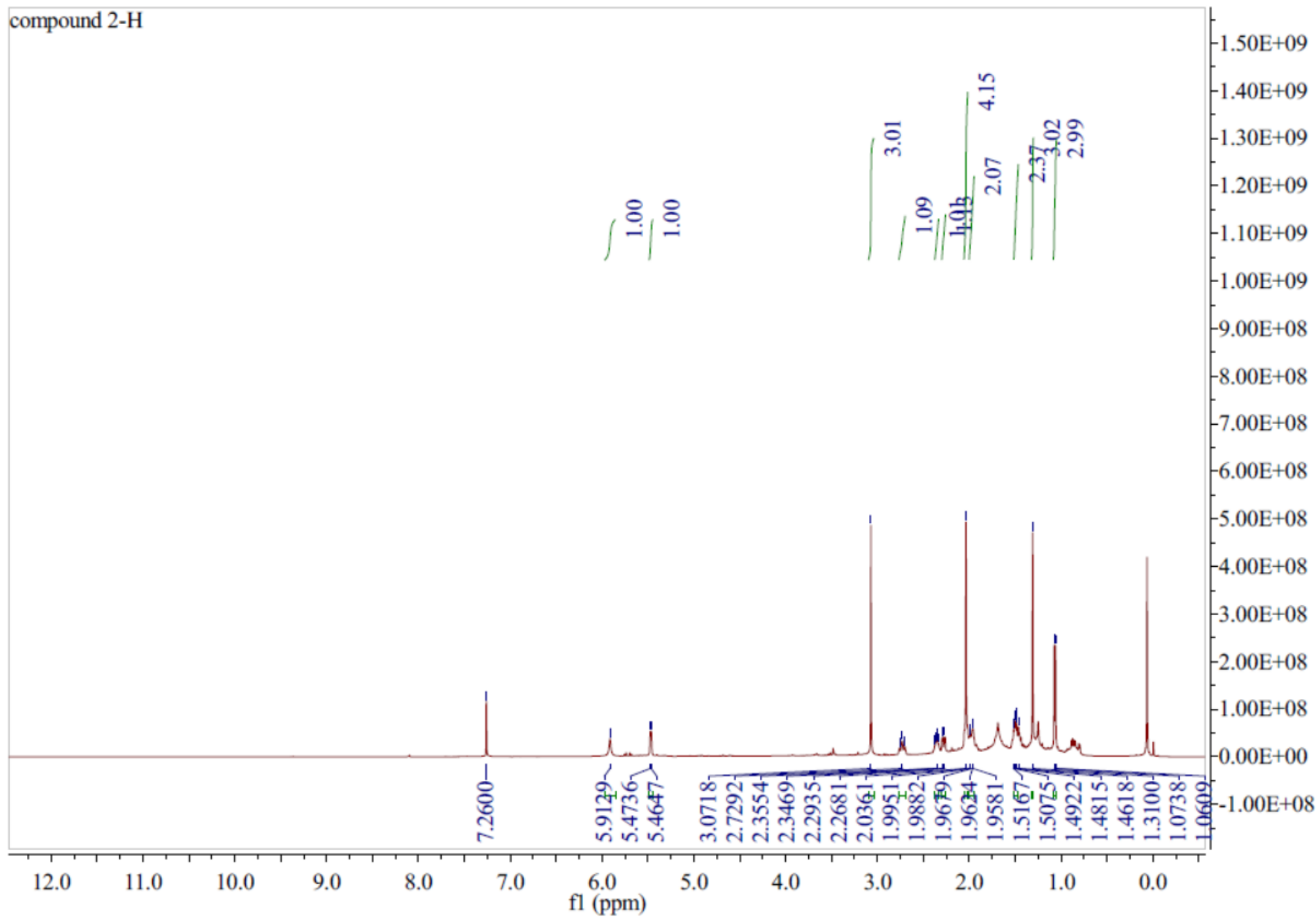


Figure S13. ¹H NMR spectrum of calvukoellian H (2) in CDCl₃ (500 MHz).

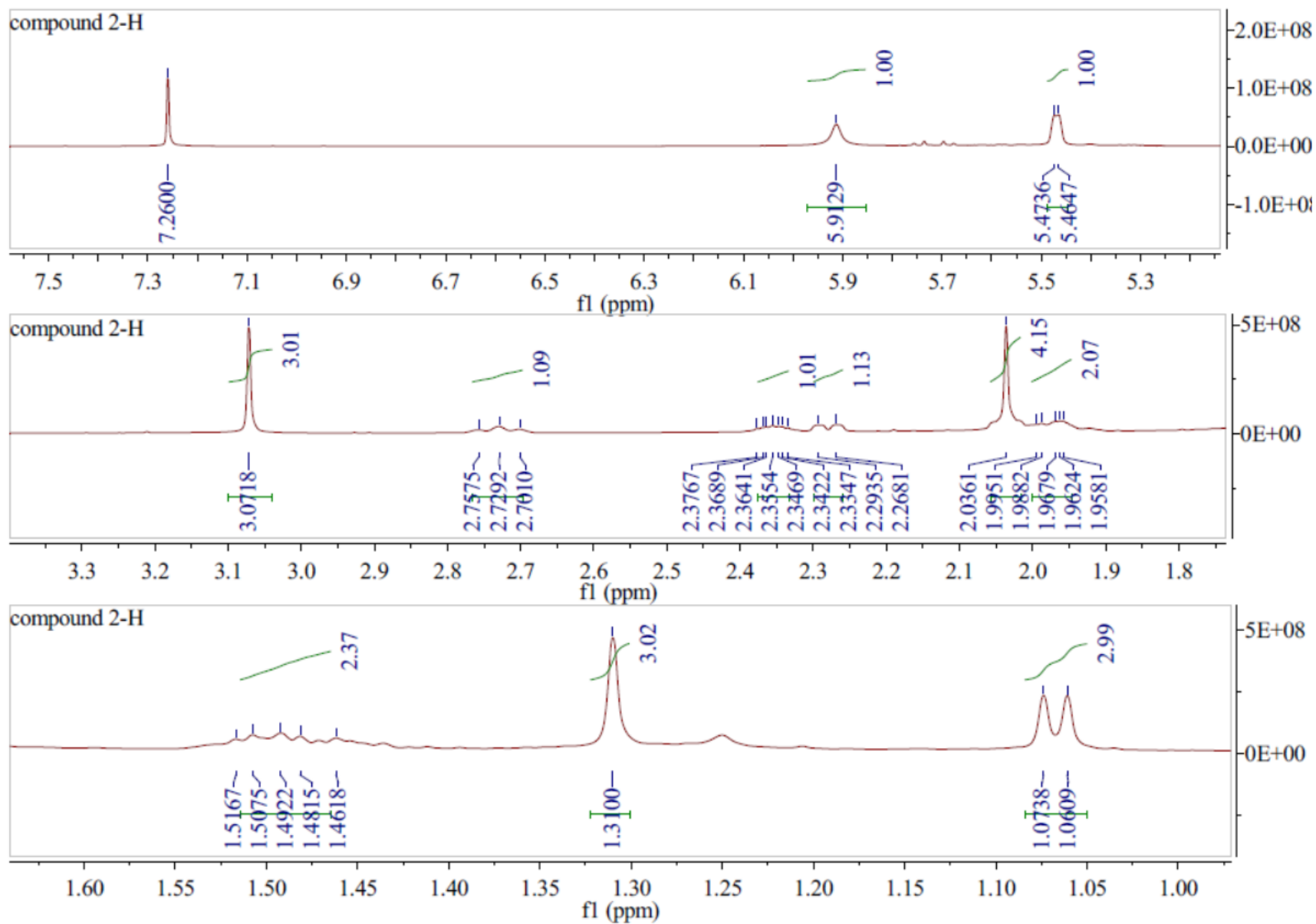


Figure S14. Enlarged ^1H NMR spectrum of calvukoellian H (2) in CDCl_3 (500 MHz).

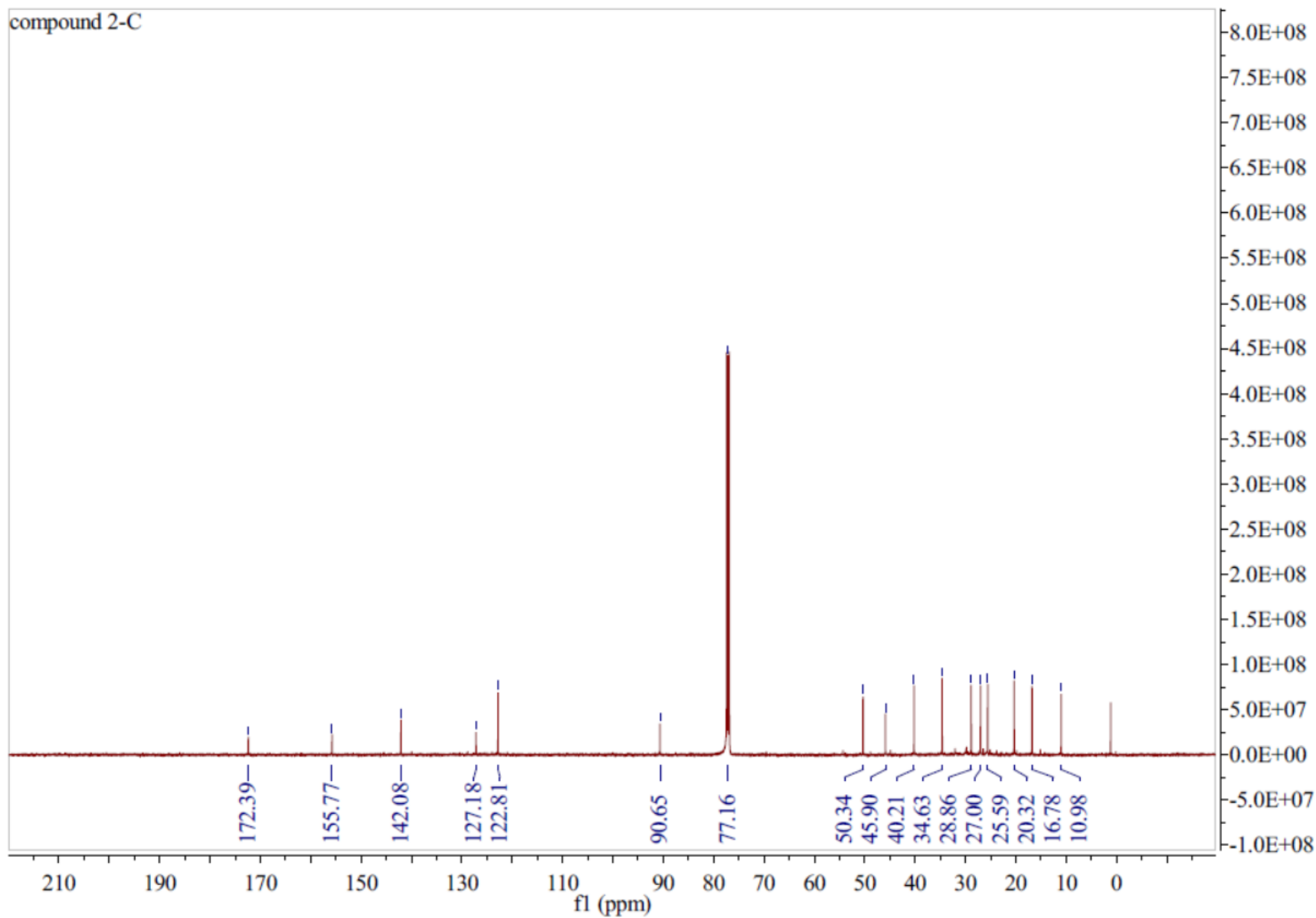


Figure S15. ^{13}C NMR spectrum of calvukoellian H (**2**) in CDCl_3 (125 MHz).

-P17/P55

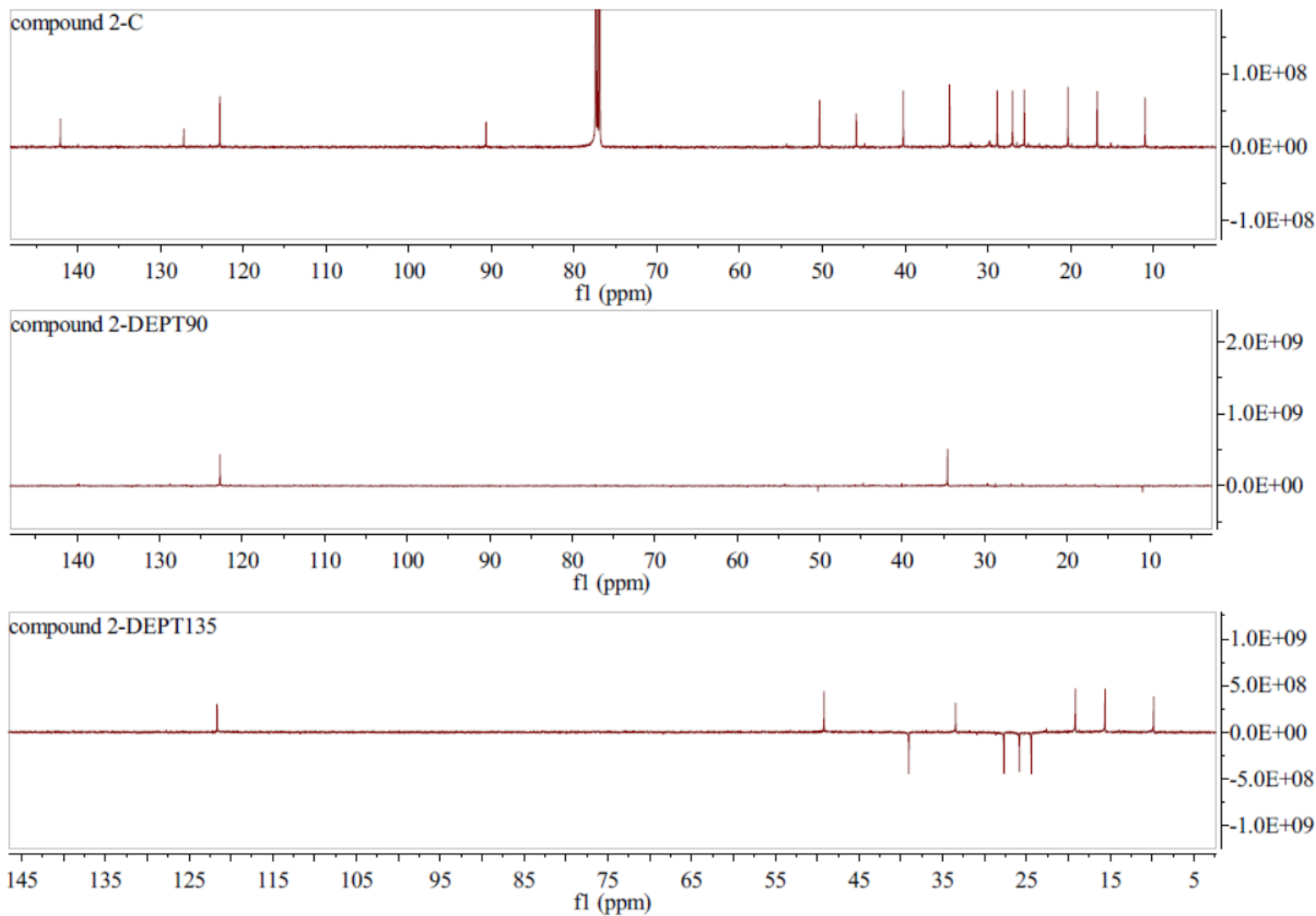


Figure S16. ^{13}C NMR and DEPT spectrum of calvukoellian H (2) in CDCl_3 (125 MHz).

-P18/P55

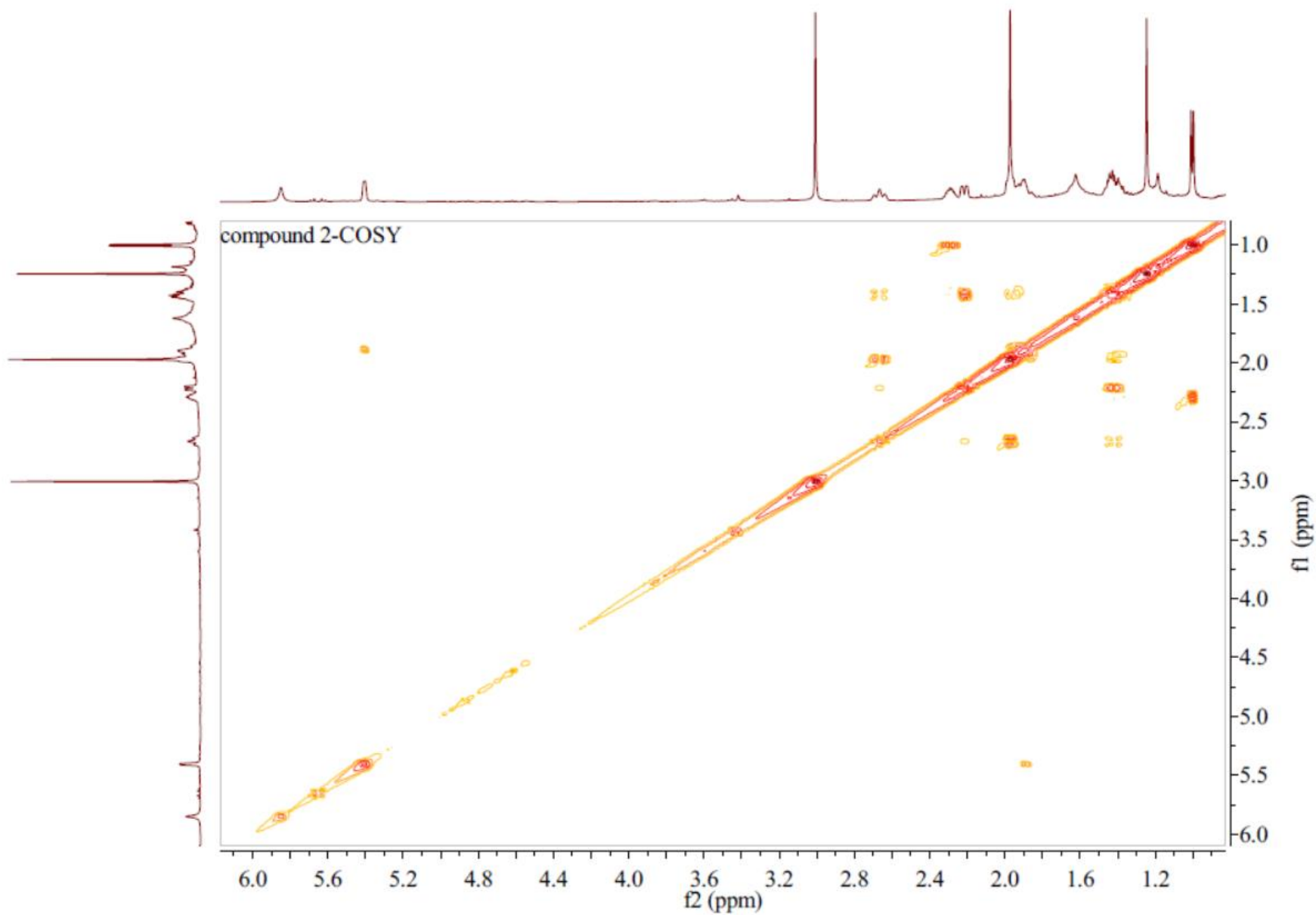


Figure S17. ^1H - ^1H COSY spectrum of calvukoellian H (2) in CDCl_3 (500 MHz).

-P19/P55

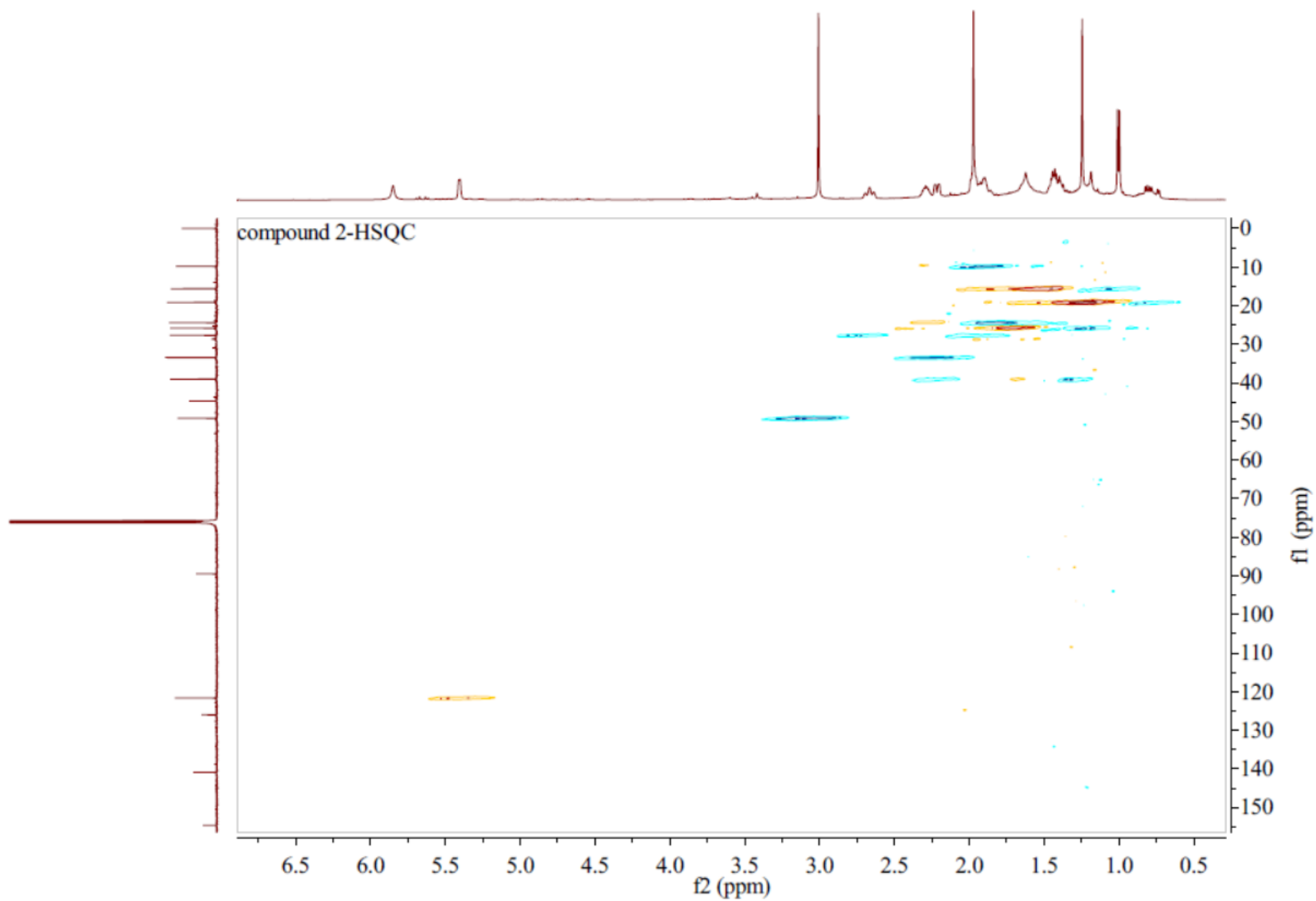


Figure S18. HSQC spectrum of calvukoellian H (**2**) in CDCl₃ (500 MHz).

-P20/P55

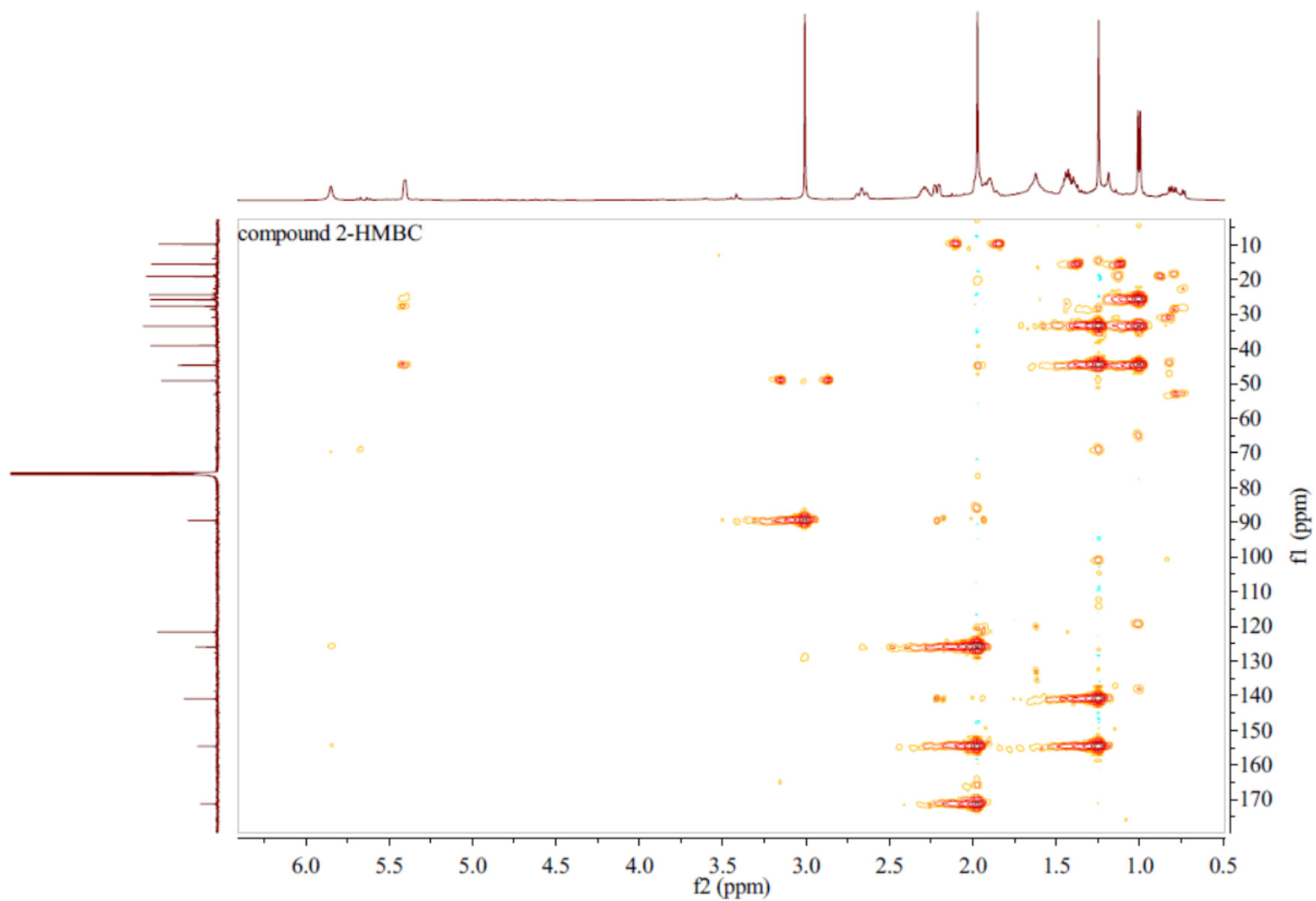


Figure S19. HMBC spectrum of calvukoellian H (2) in CDCl₃ (500 MHz).

-P21/P55

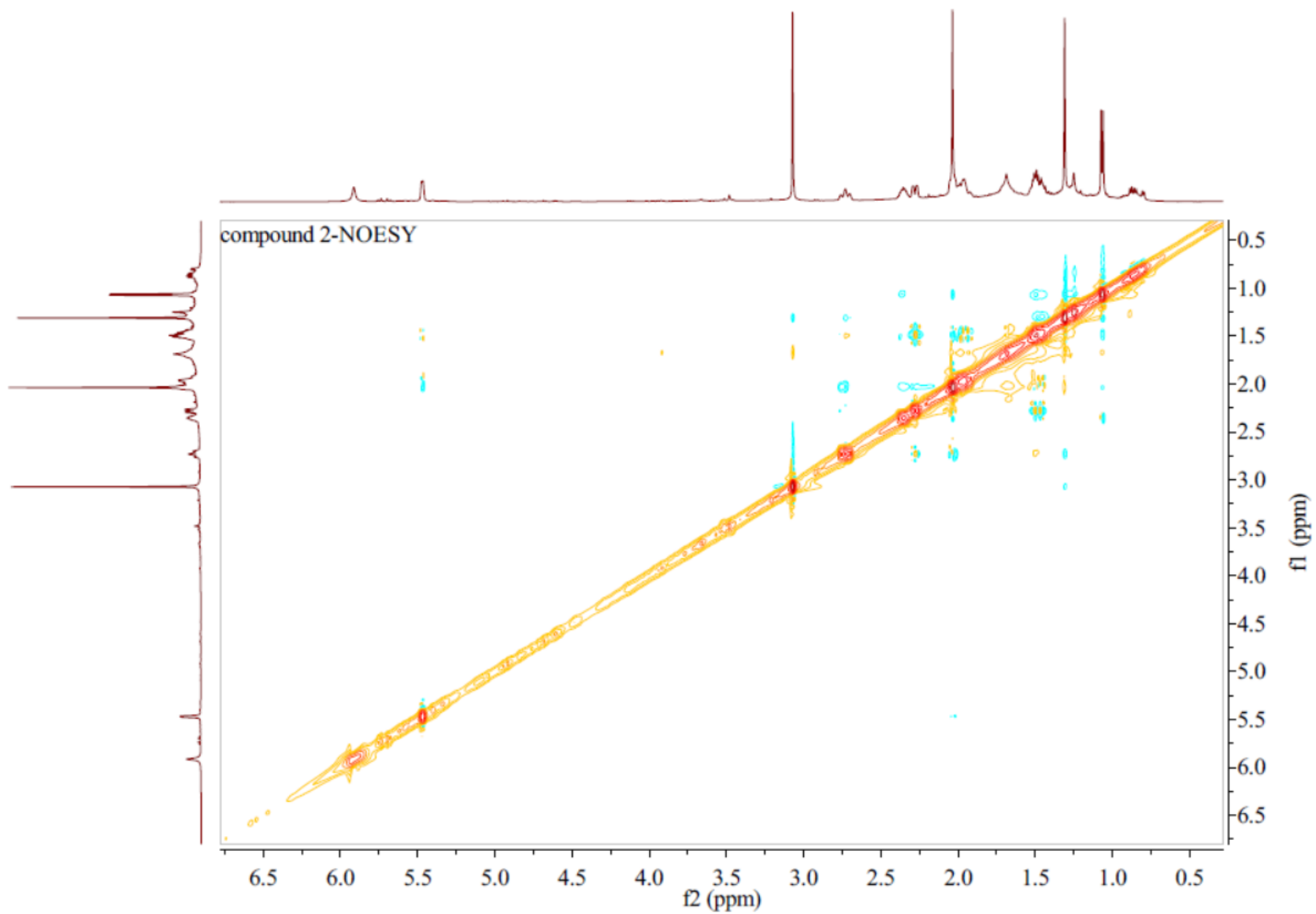


Figure S20. NOESY spectrum of calvukoellian H (**2**) in CDCl_3 (500 MHz).

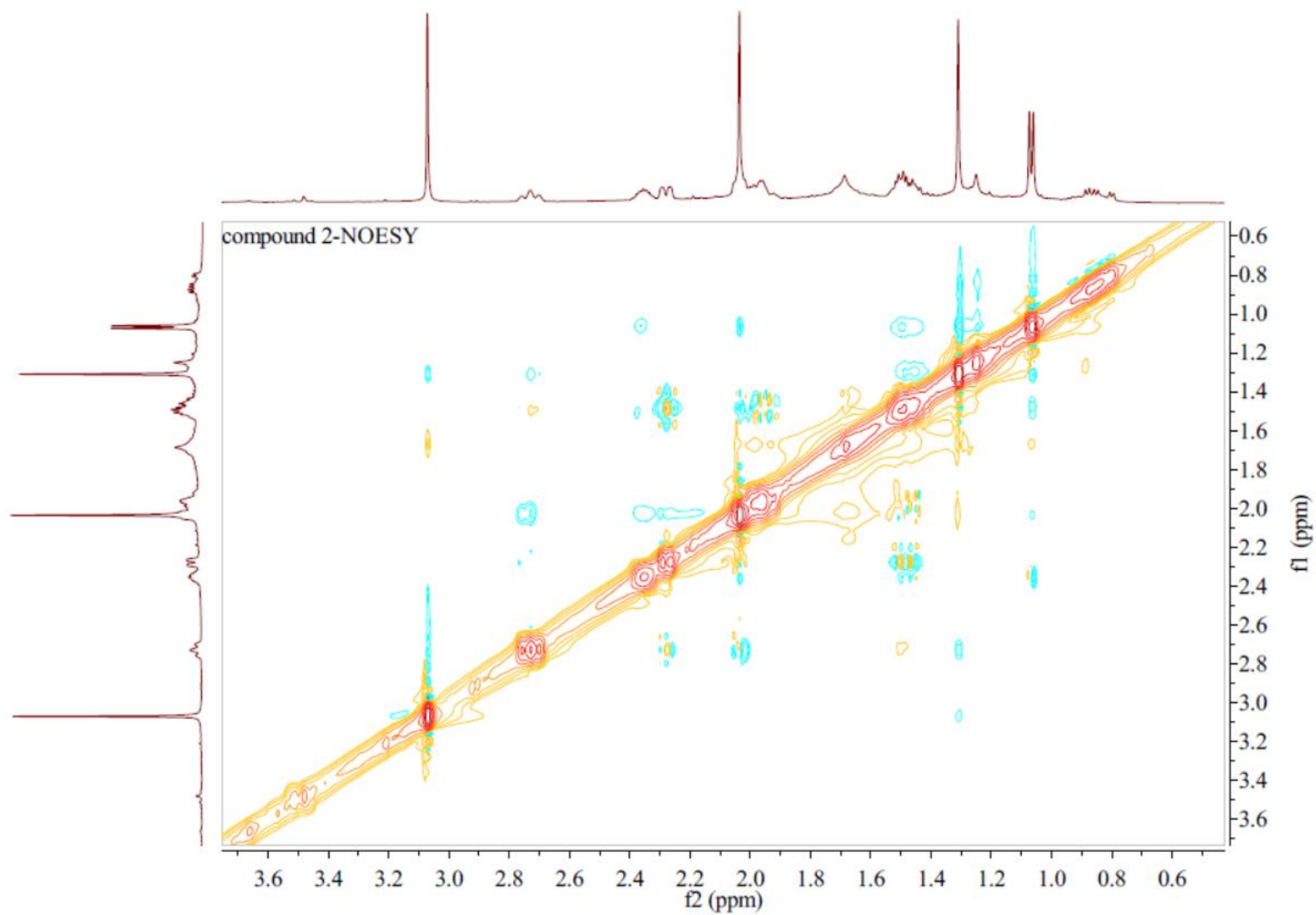


Figure S21. NOESY spectrum of calvukoellian H (**2**) in CDCl₃ (500 MHz).

-P23/P55

20190528-L-13-4-2_190528091814 #92-94 RT: 0.73-0.75 AV: 3 NL: 6.63E7
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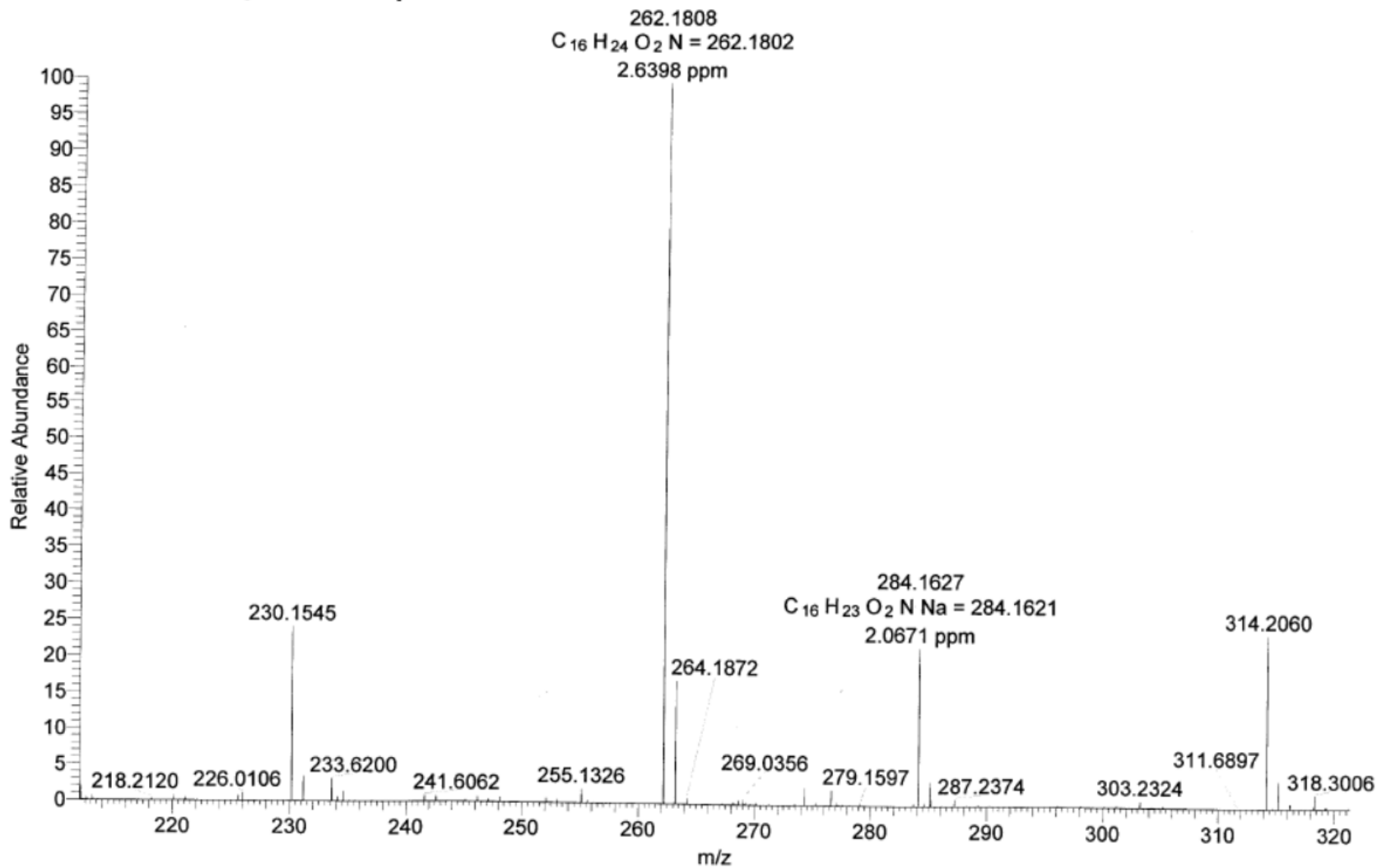


Figure S22. HRESIMS data of calvukoellian H (2).

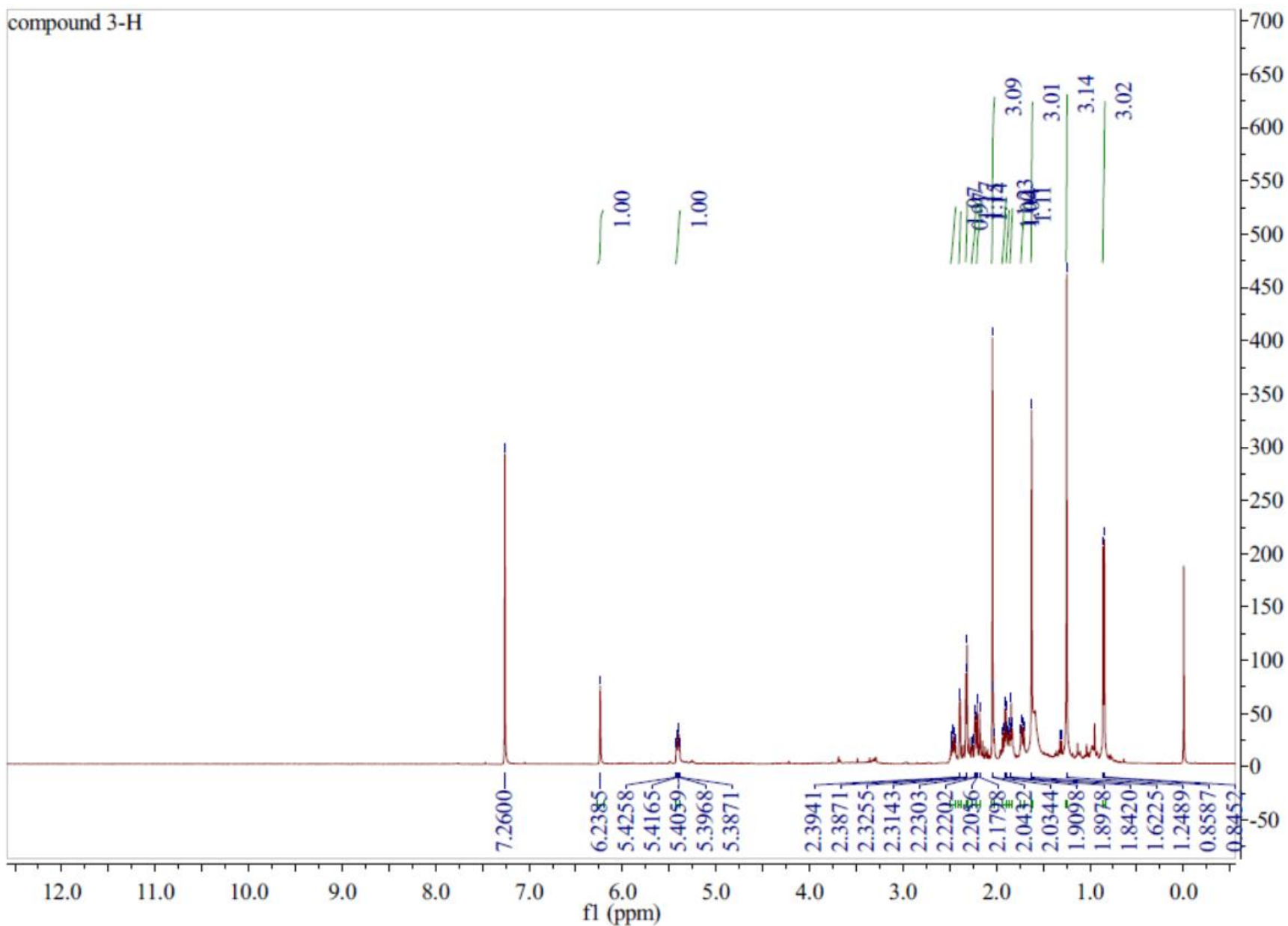


Figure S23. ^1H NMR spectrum of calvukoellian I (**3**) in CDCl_3 (500 MHz).

-P25/P55

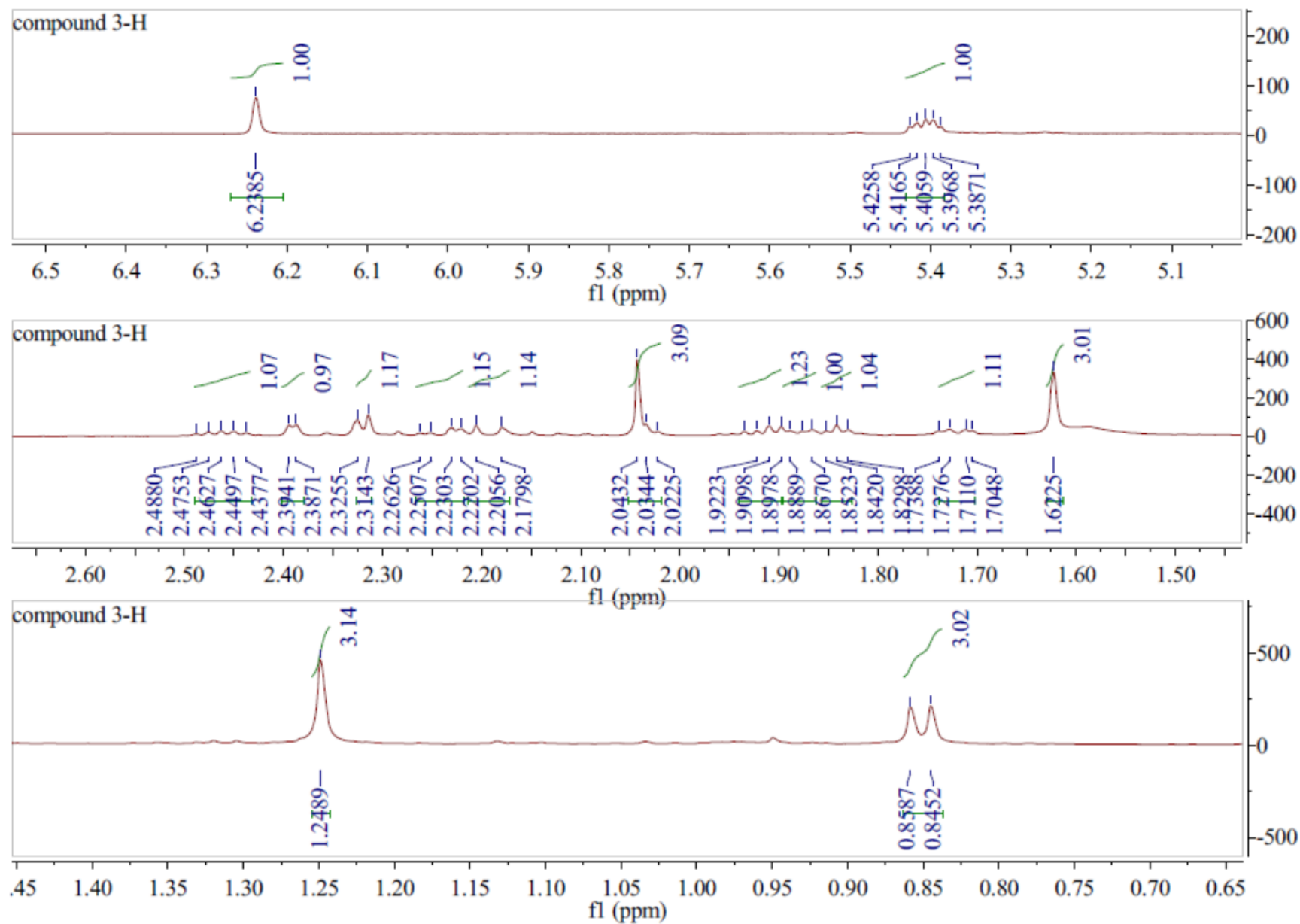


Figure S24. Enlarged ^1H NMR spectrum of calvukoellian I (3) in CDCl_3 (500 MHz).

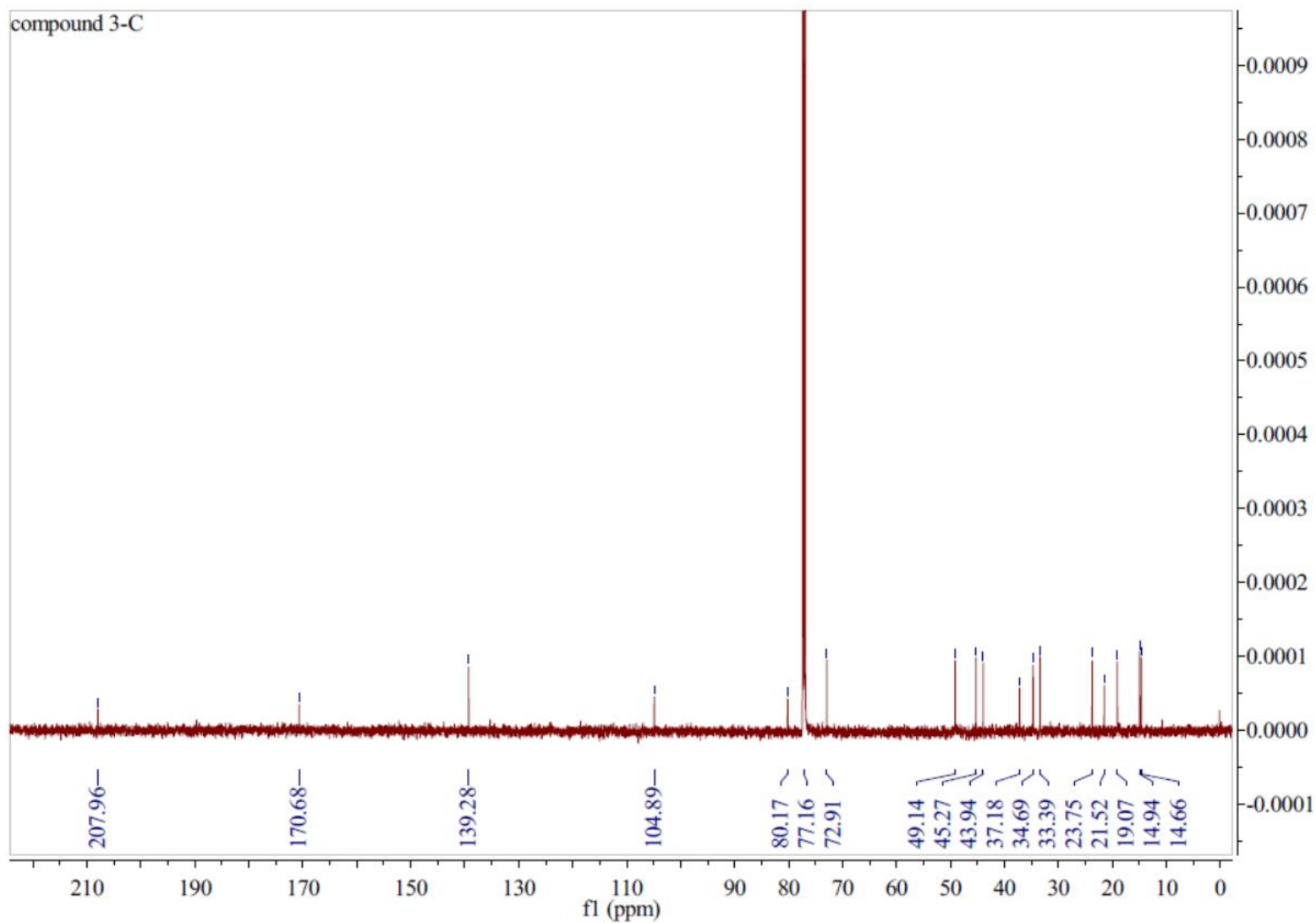


Figure S25. ¹³C NMR spectrum of calvukoellian I (**3**) in CDCl₃ (125 MHz).

-P27/P55

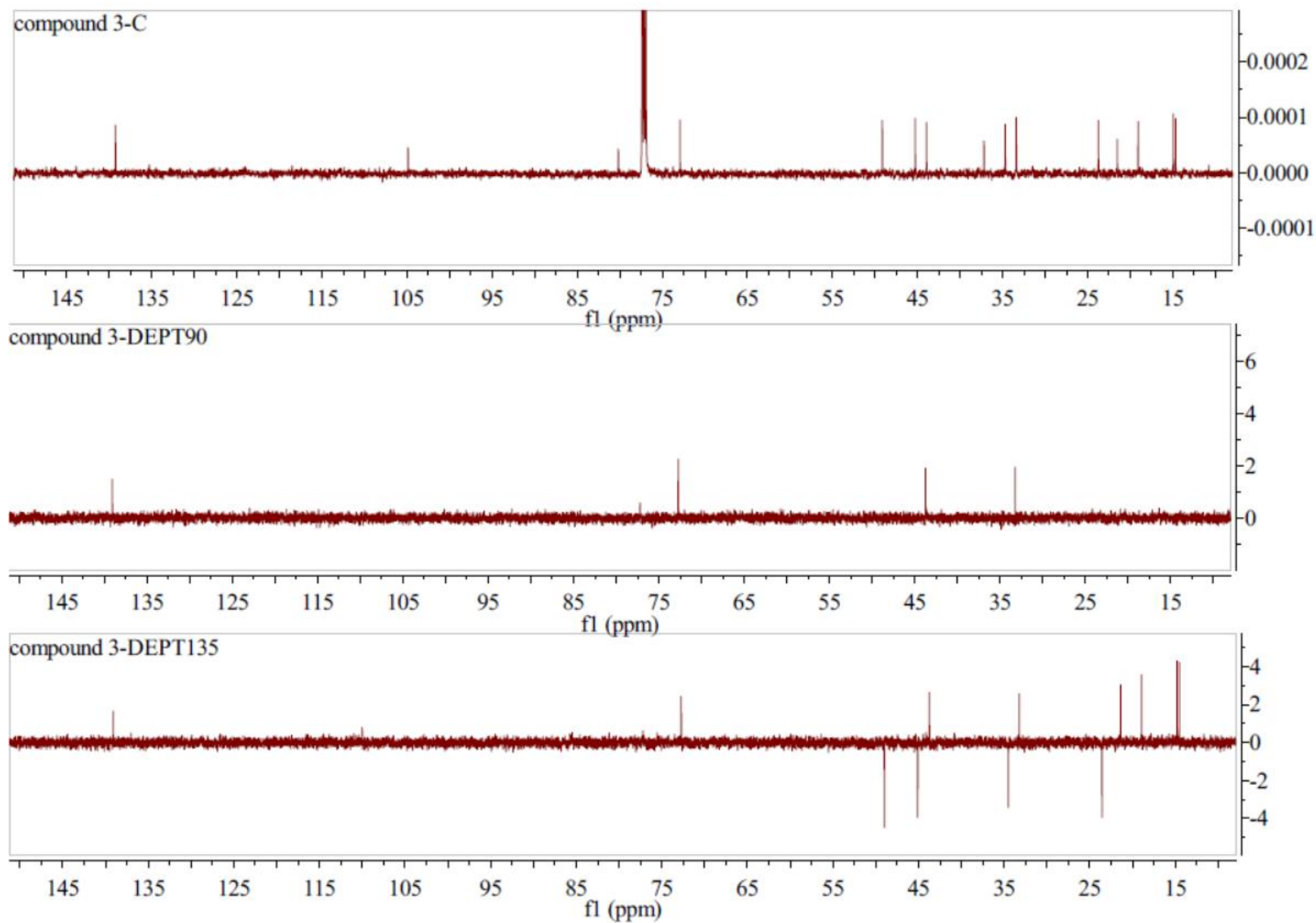


Figure S26. ^{13}C NMR and DEPT spectrum of calvukoellian I (3) in CDCl_3 (125 MHz).

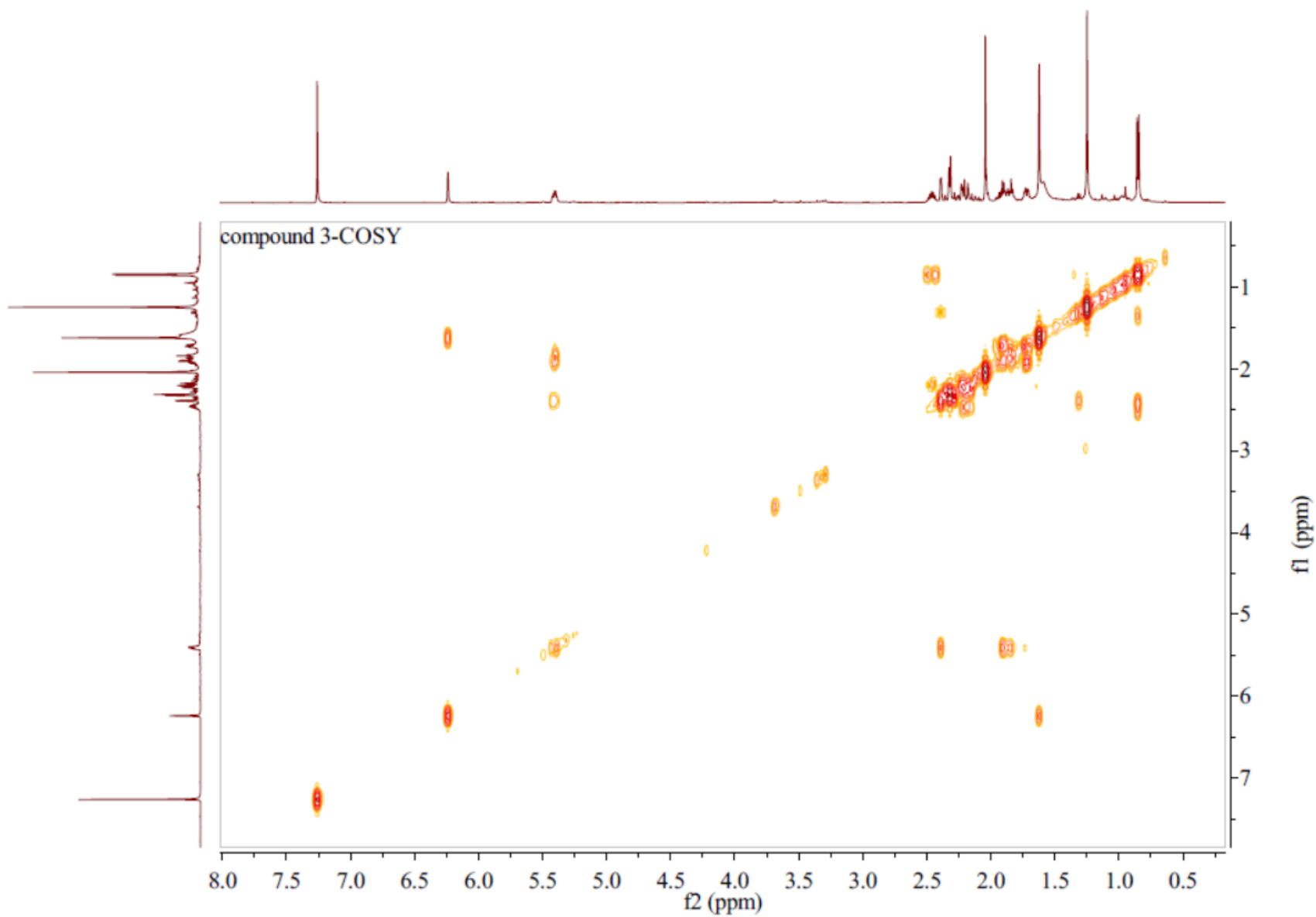


Figure S27. ^1H - ^1H COSY spectrum of calvukoellian I (**3**) in CDCl_3 (500 MHz).

-P29/P55

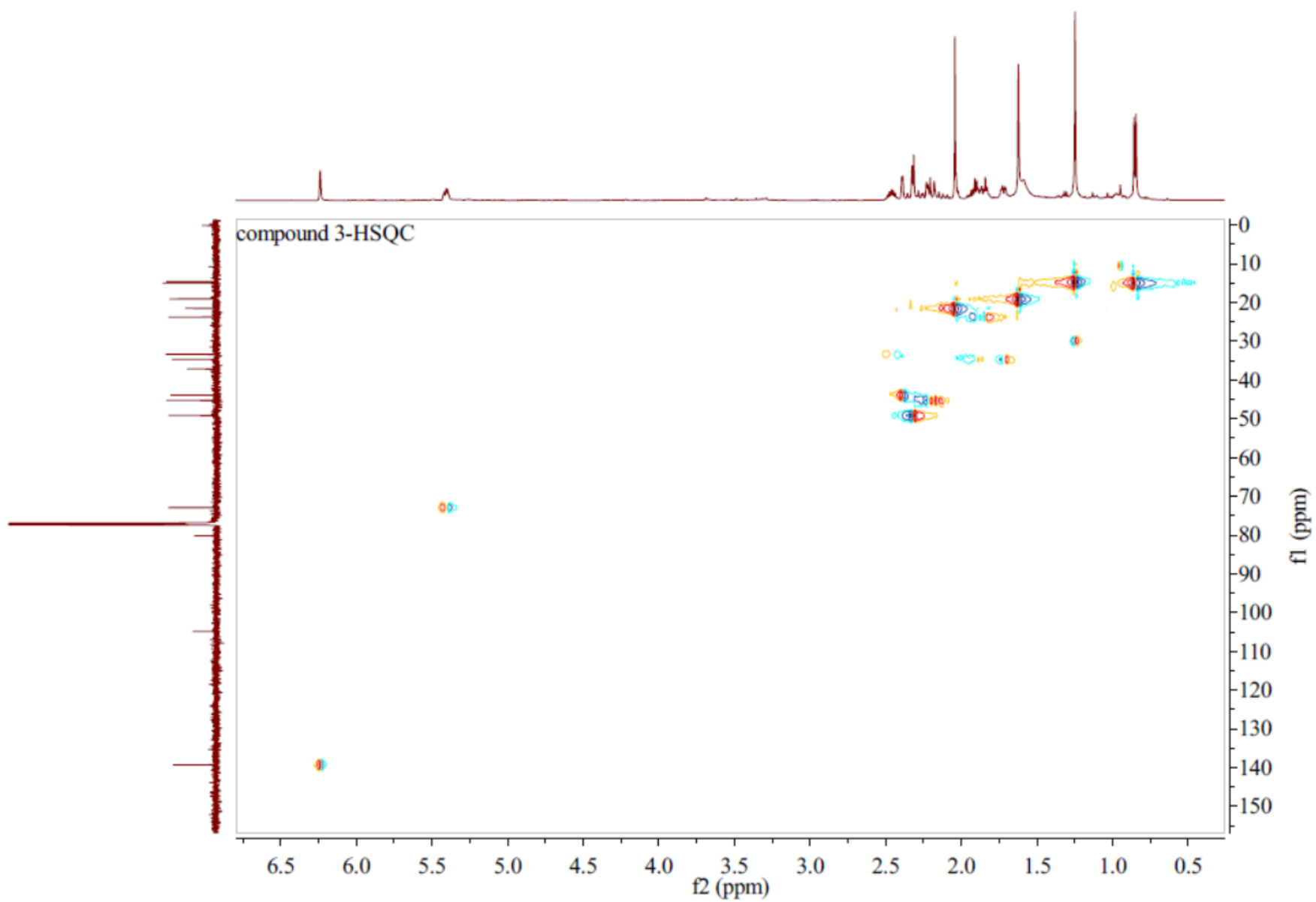


Figure S28. HSQC spectrum of calvukoellian I (**3**) in CDCl₃ (500 MHz).

-P30/P55

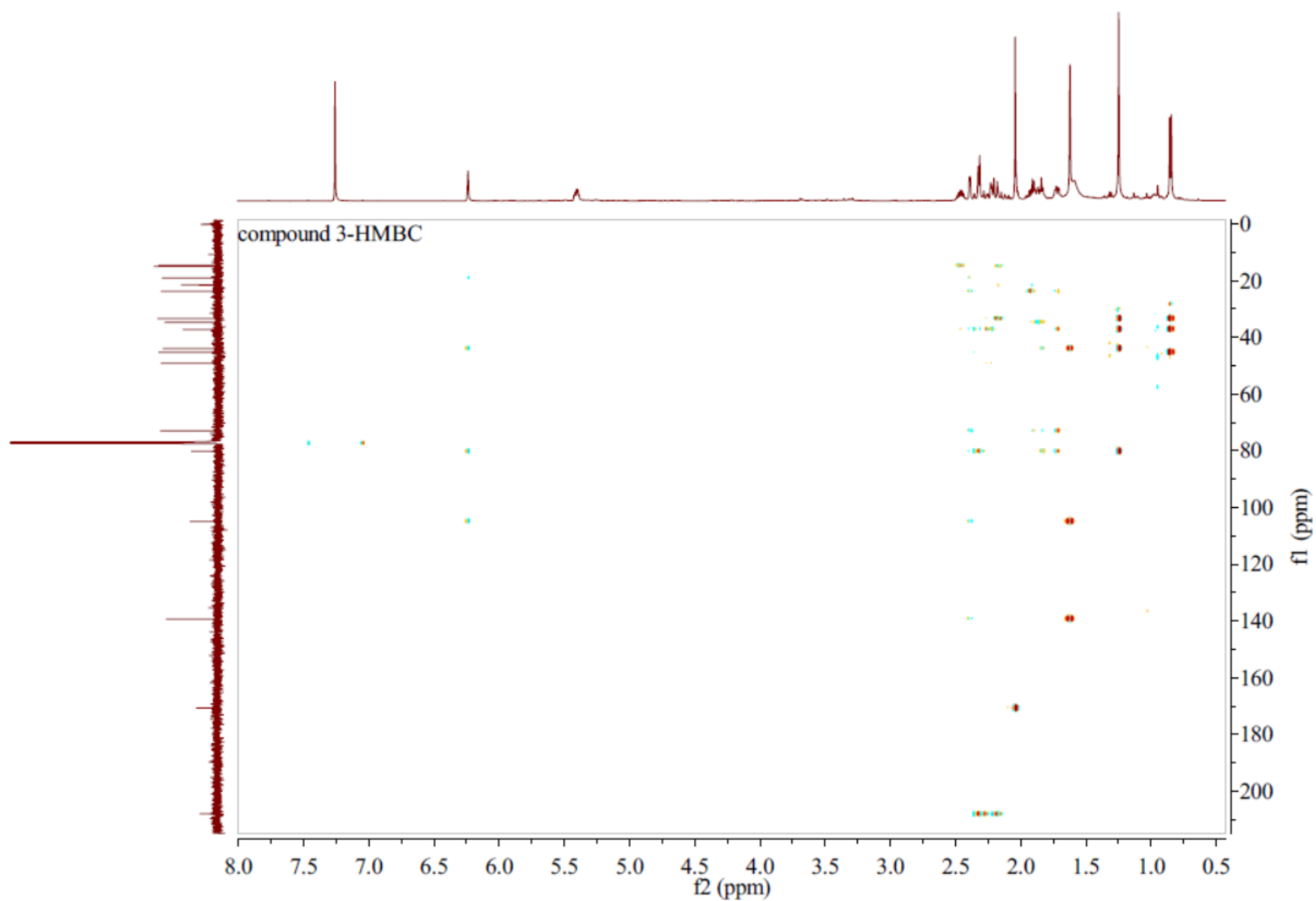


Figure S29. HMBC spectrum of calvukoellian I (3) in CDCl₃ (500 MHz).

-P31/P55

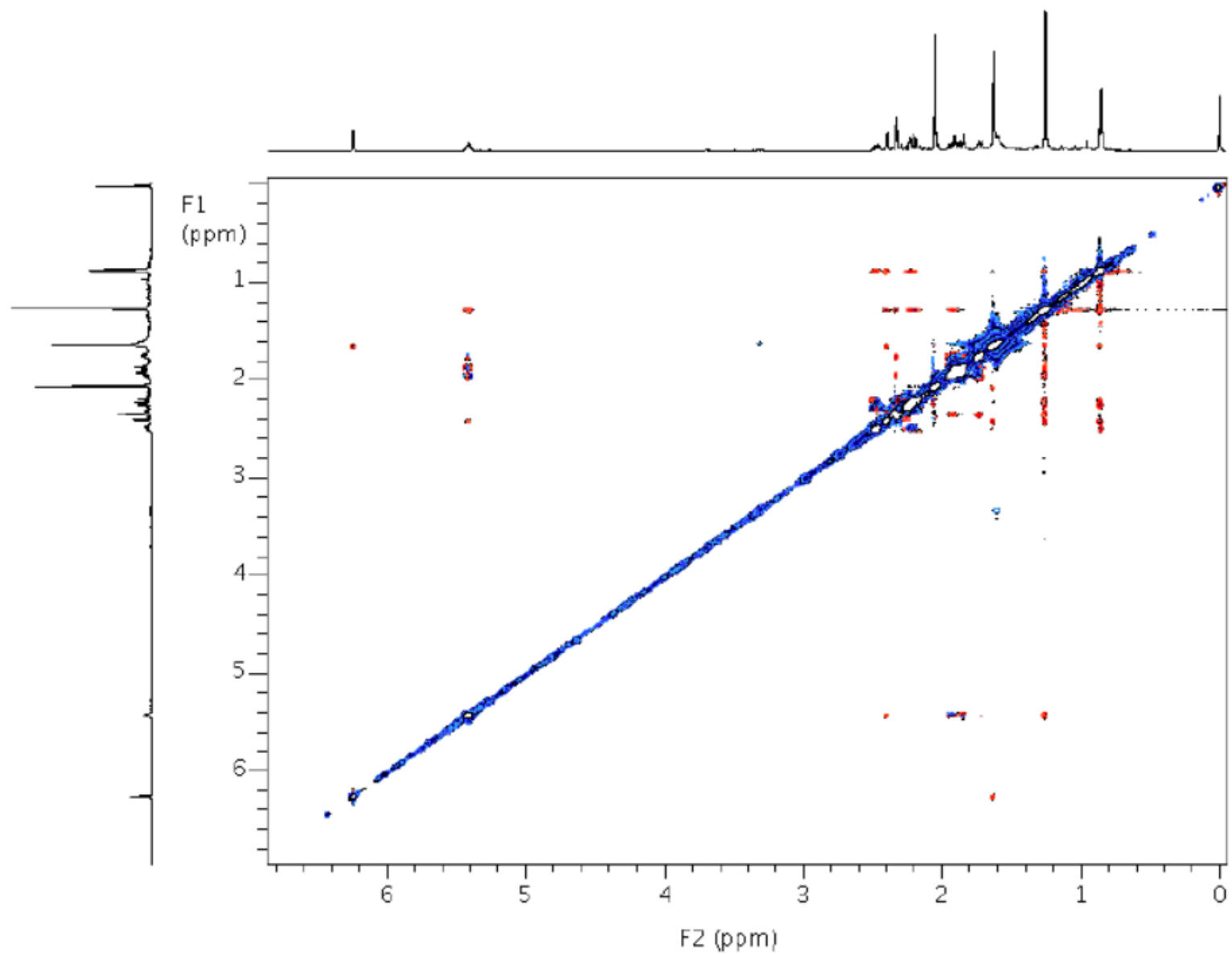


Figure S30. NOESY spectrum of calvukoellian I (**3**) in CDCl₃ (500 MHz).

-P32/P55

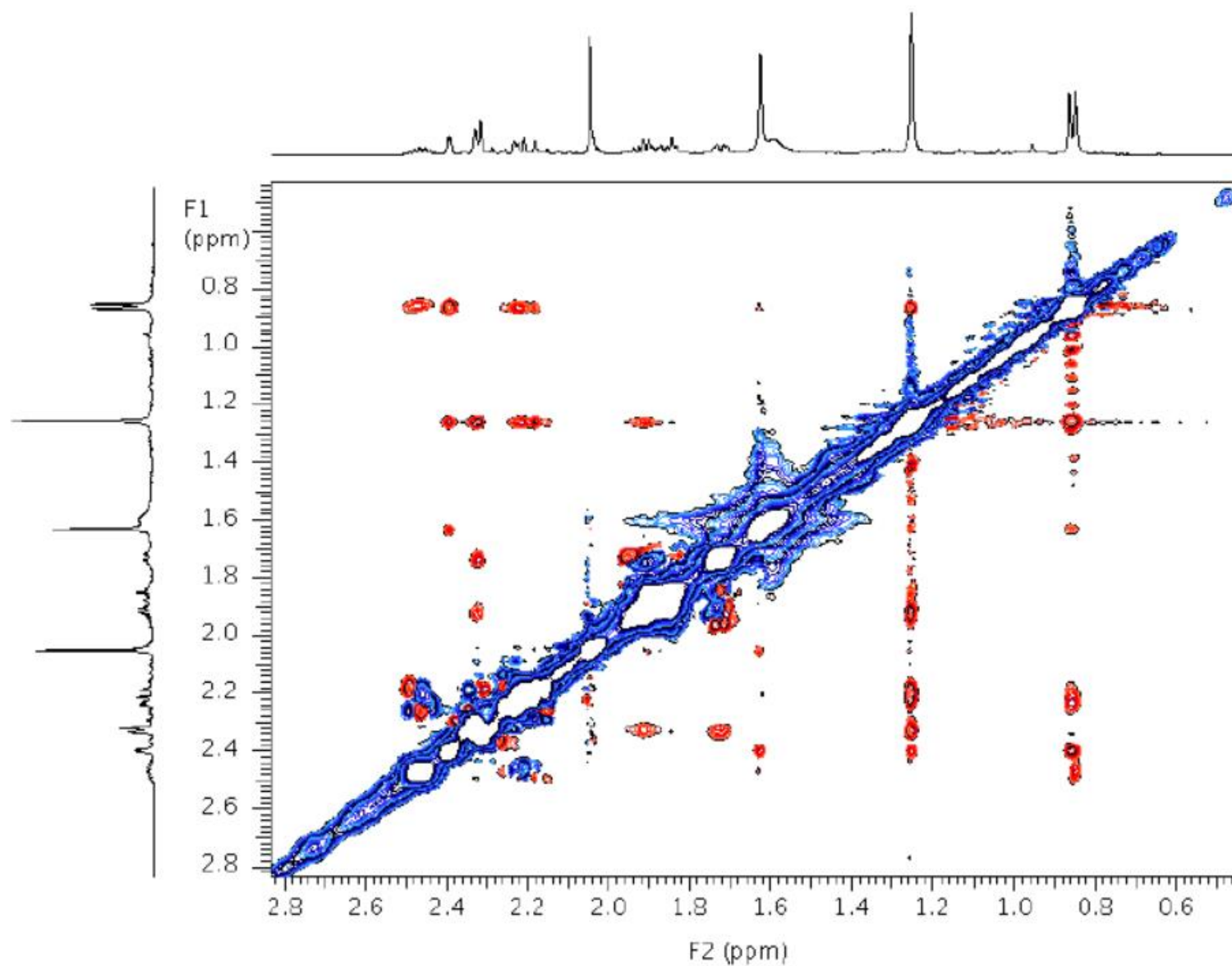


Figure S31. NOESY spectrum of calvukoellian I (**3**) in CDCl₃ (500 MHz).

-P33/P55

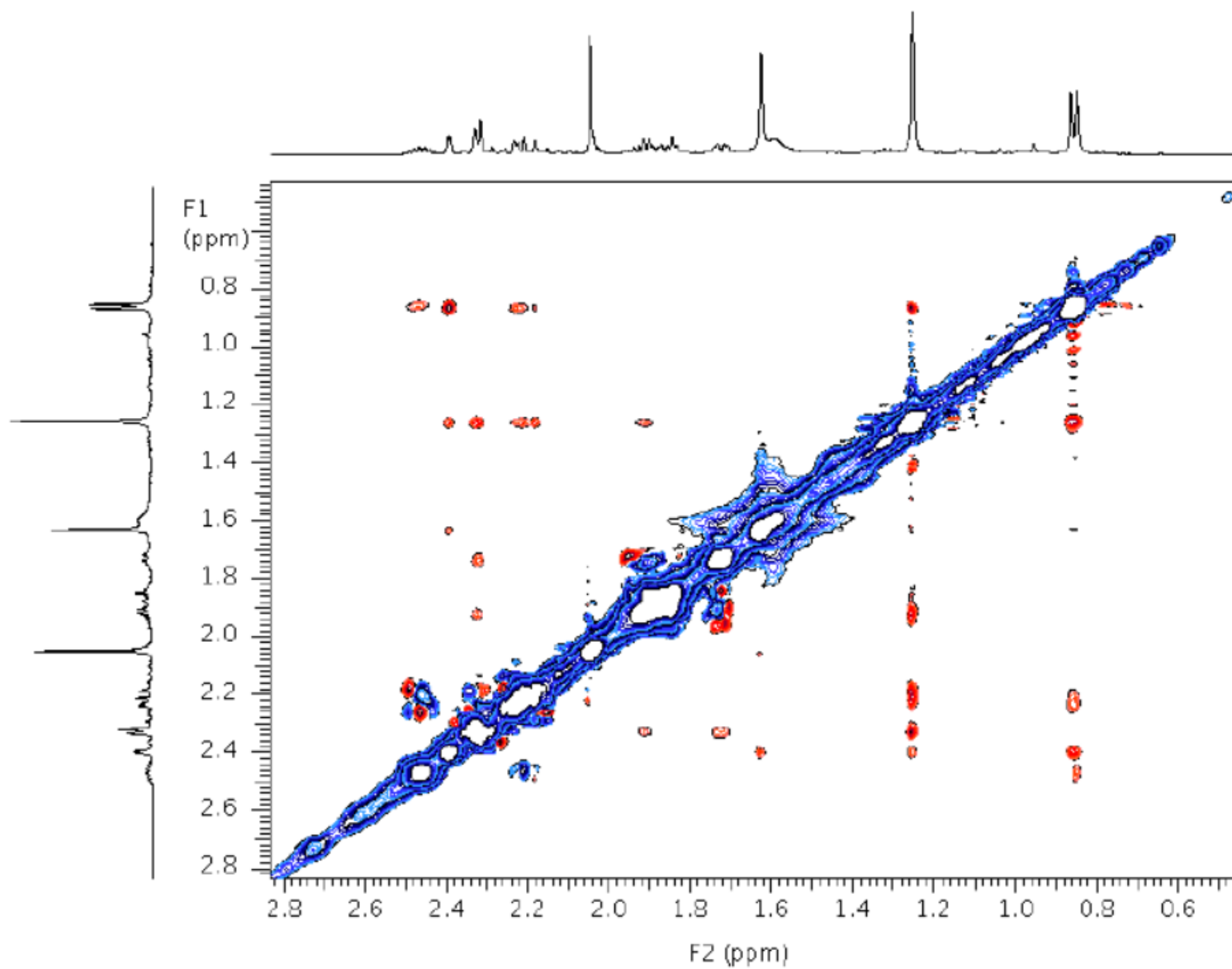


Figure S32. NOESY spectrum of calvukoellian I (3) in CDCl₃ (500 MHz).

-P34/P55

20190710-L-10-2-4-6_190710103908 #36-37 RT: 0.29-0.29 AV: 2 NL: 2.90E6
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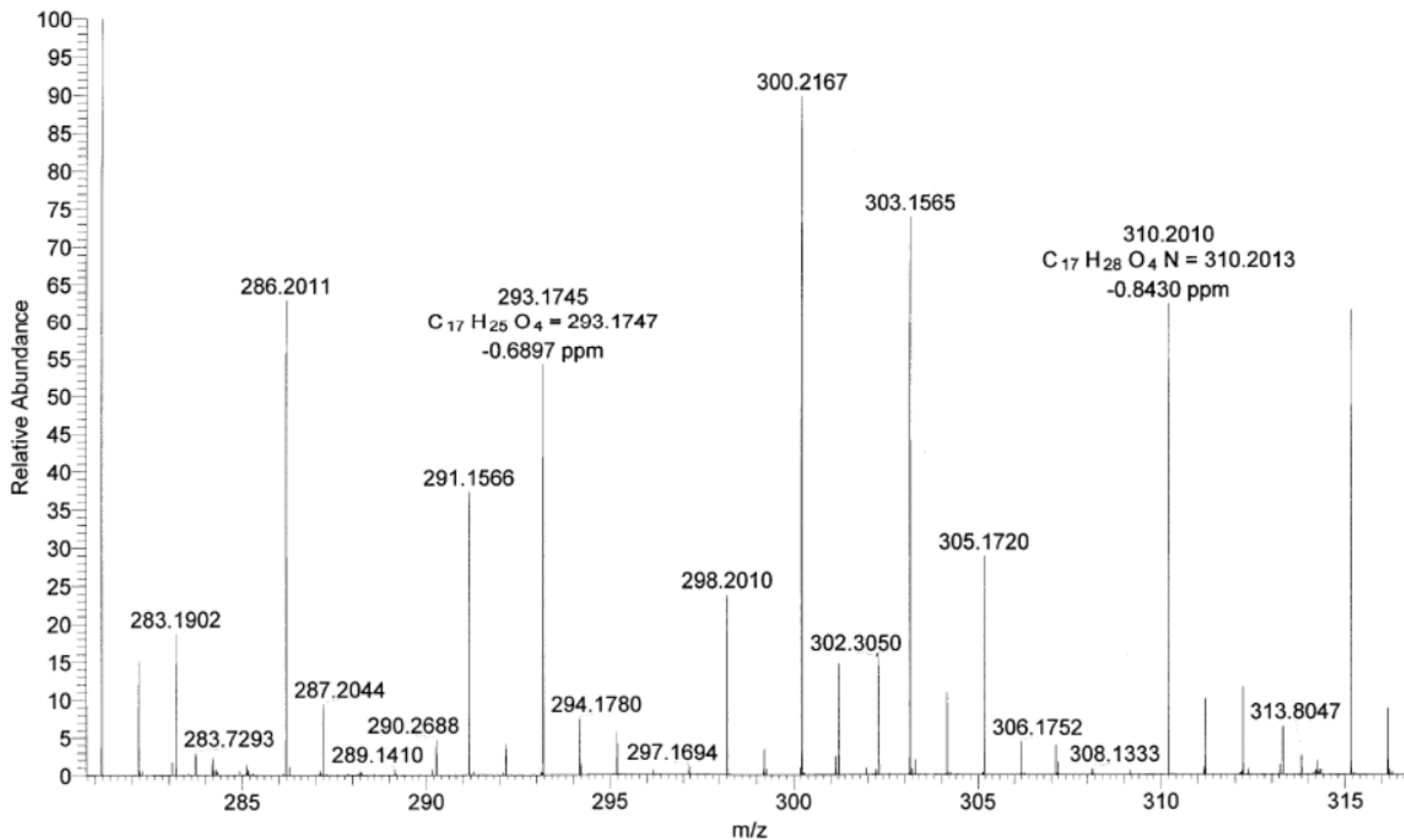


Figure S33. HRESIMS data of calvukoellian I (3).

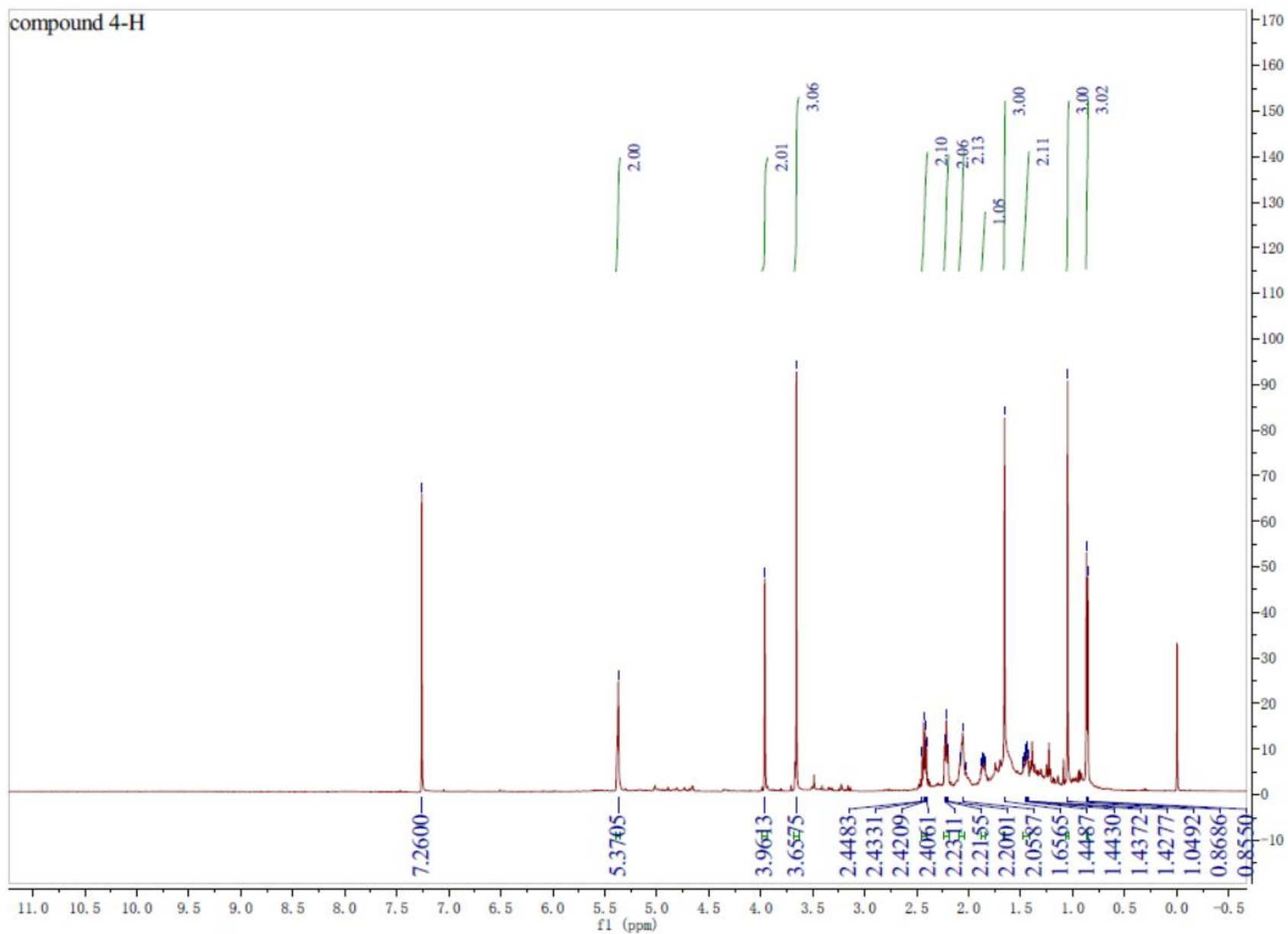


Figure S34. ¹H NMR spectrum of calvukoellian J (4) in CDCl₃ (500 MHz).

-P36/P55

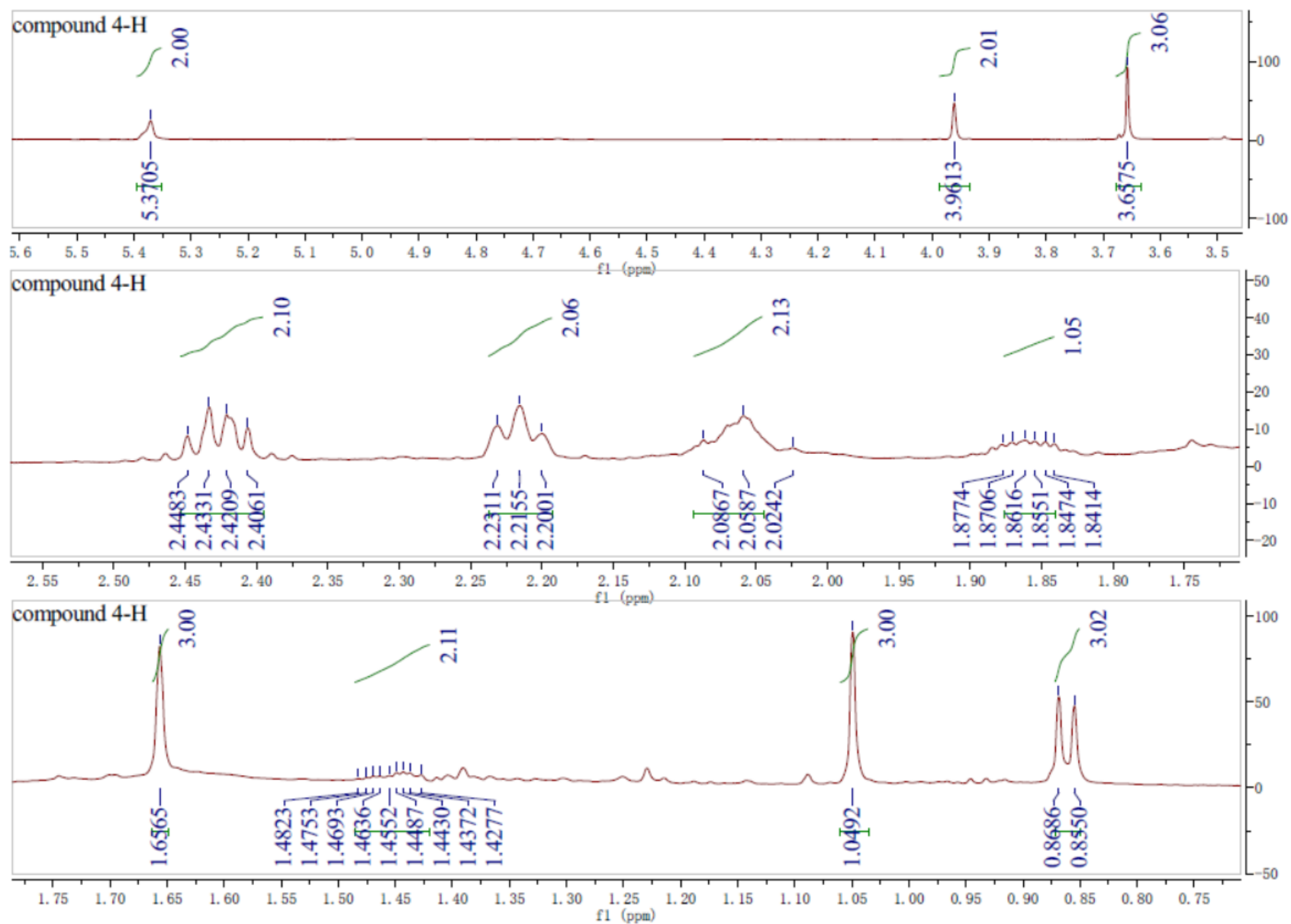


Figure S35. Enlarged ¹H NMR spectrum of calvukoellian J (4) in CDCl₃ (500 MHz).

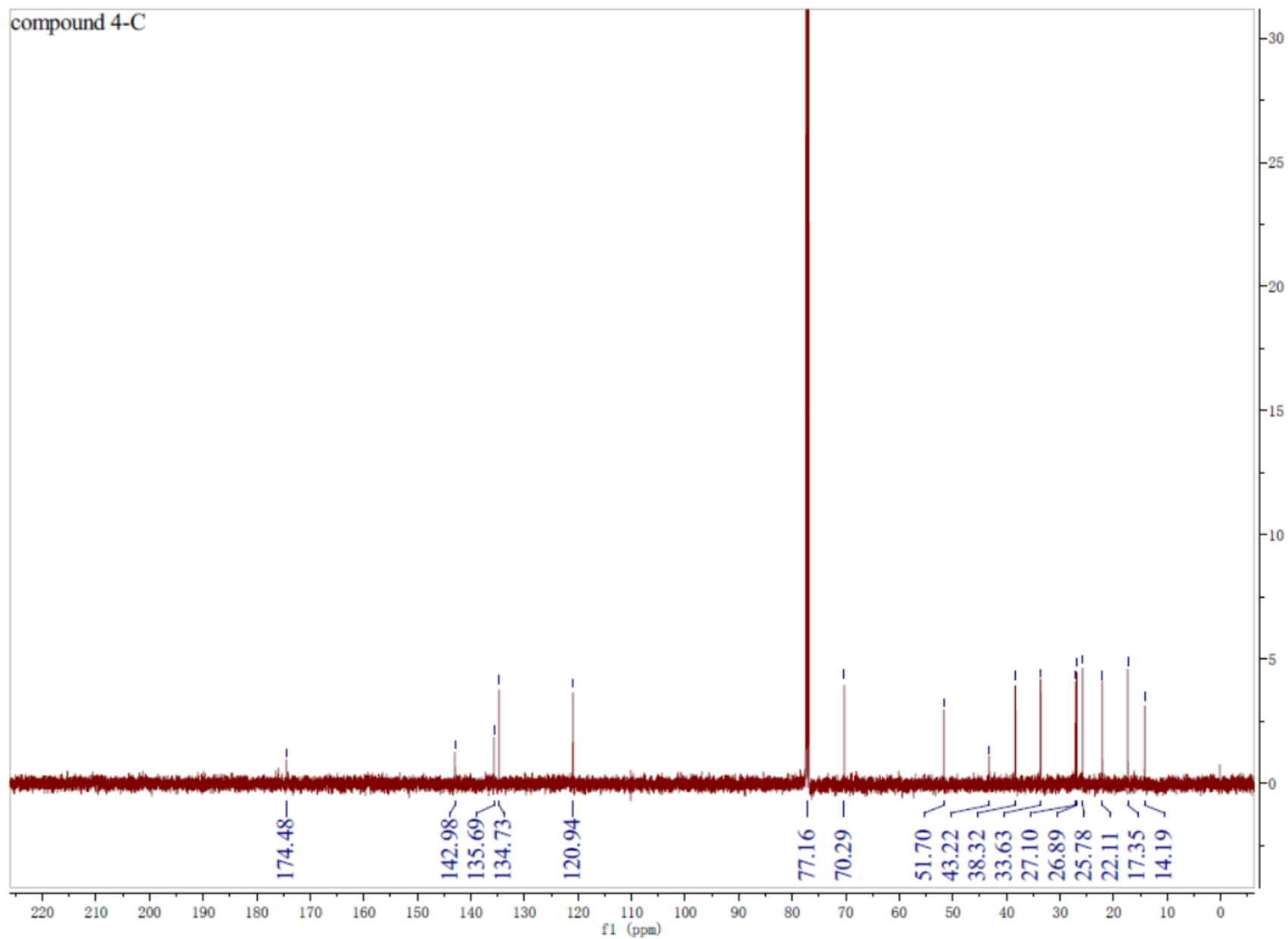


Figure S36. ^{13}C NMR spectrum of calvukoellian J (**4**) in CDCl_3 (500 MHz).

-P38/P55

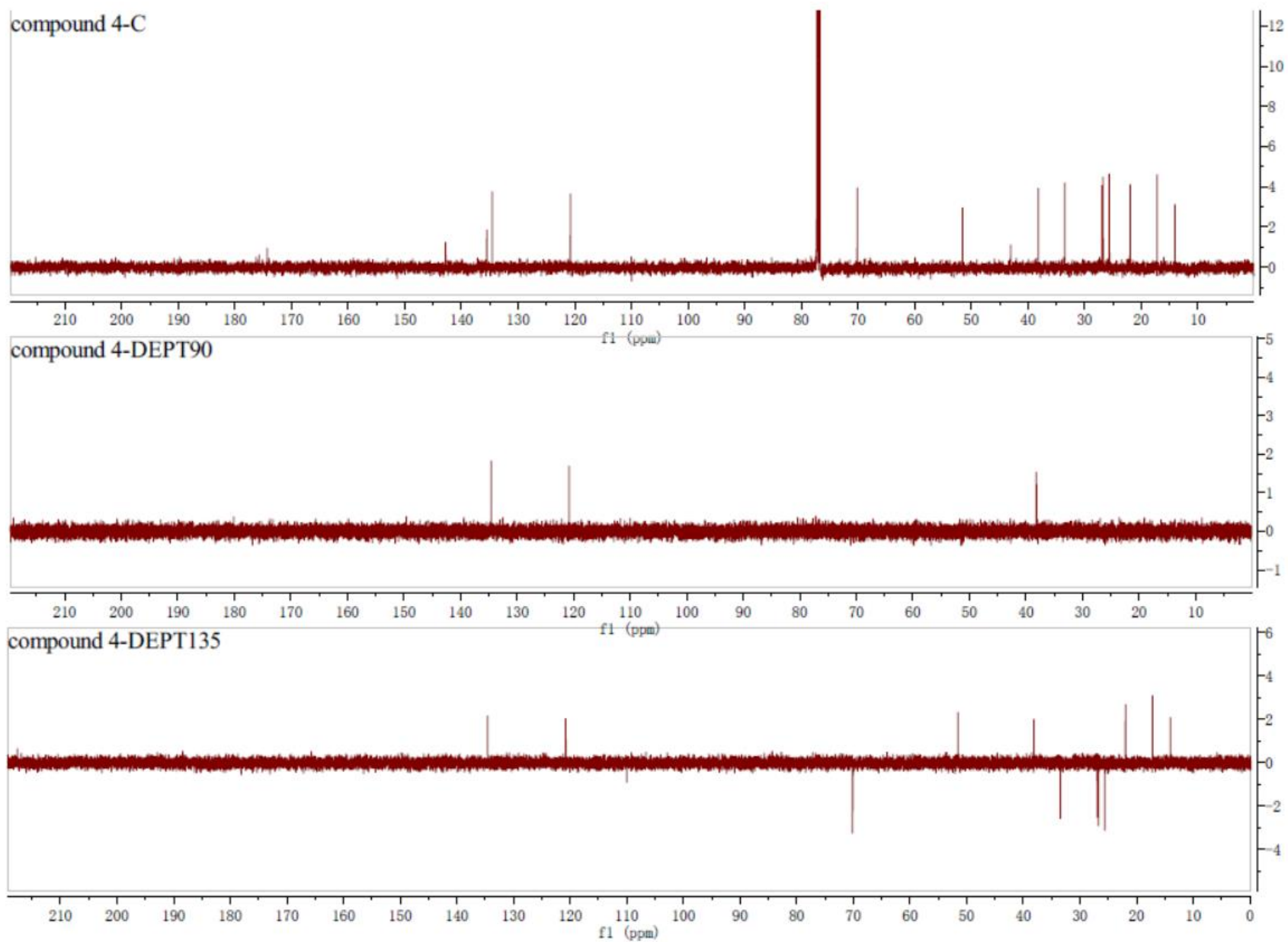


Figure S37. ¹³C NMR and DEPT spectrum of calvukoellian J (4) in CDCl₃ (500 MHz).

-P39/P55

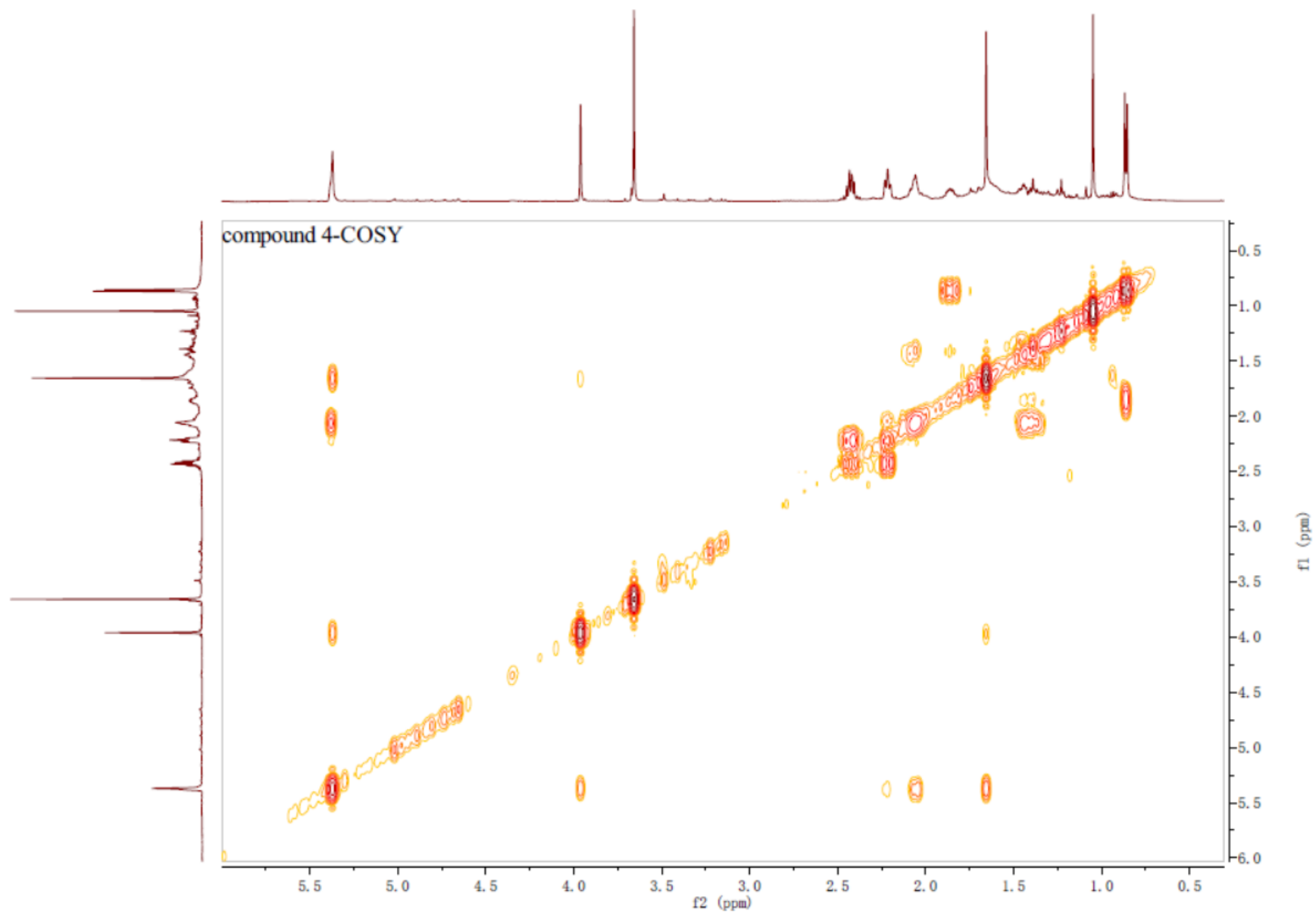
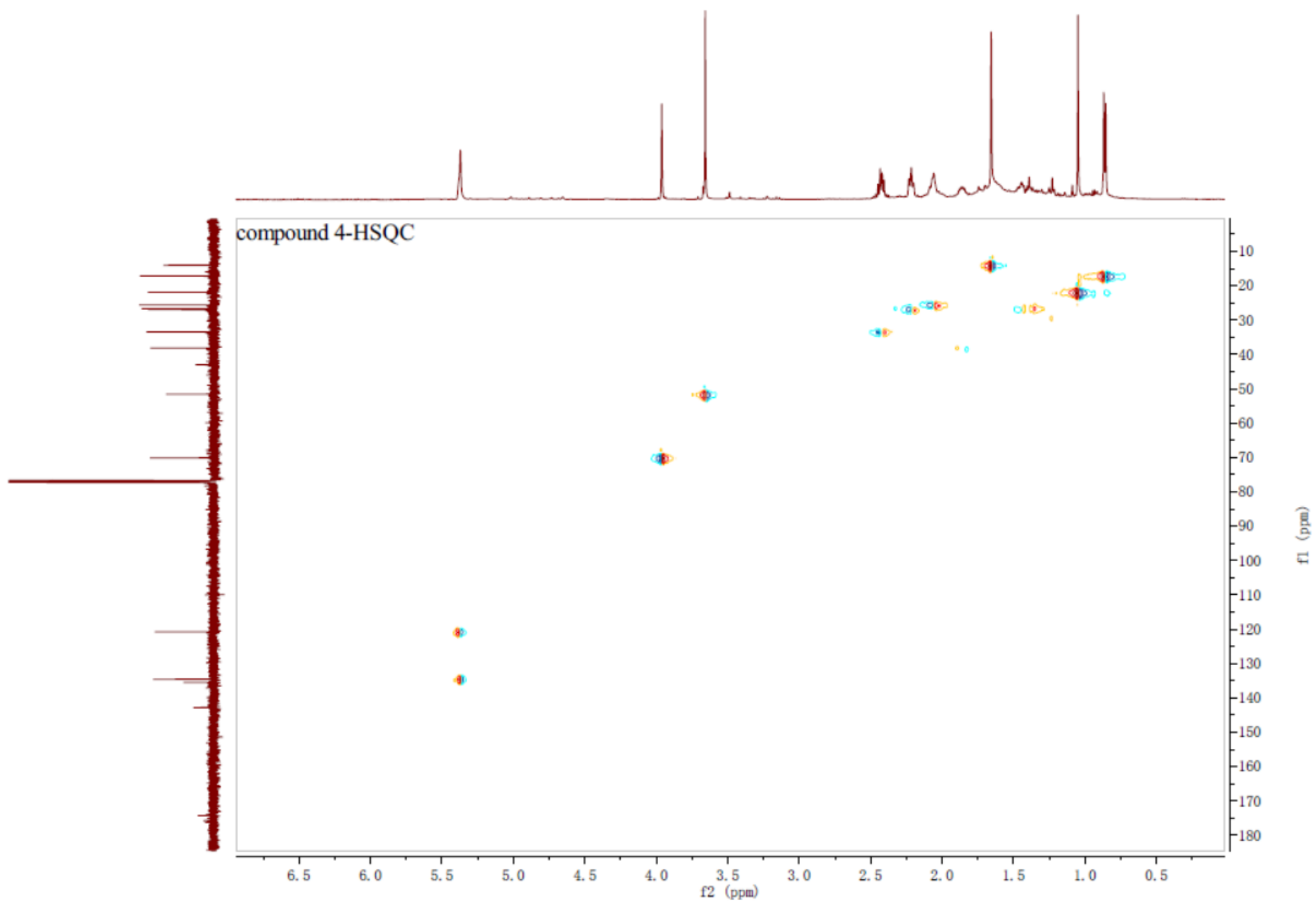


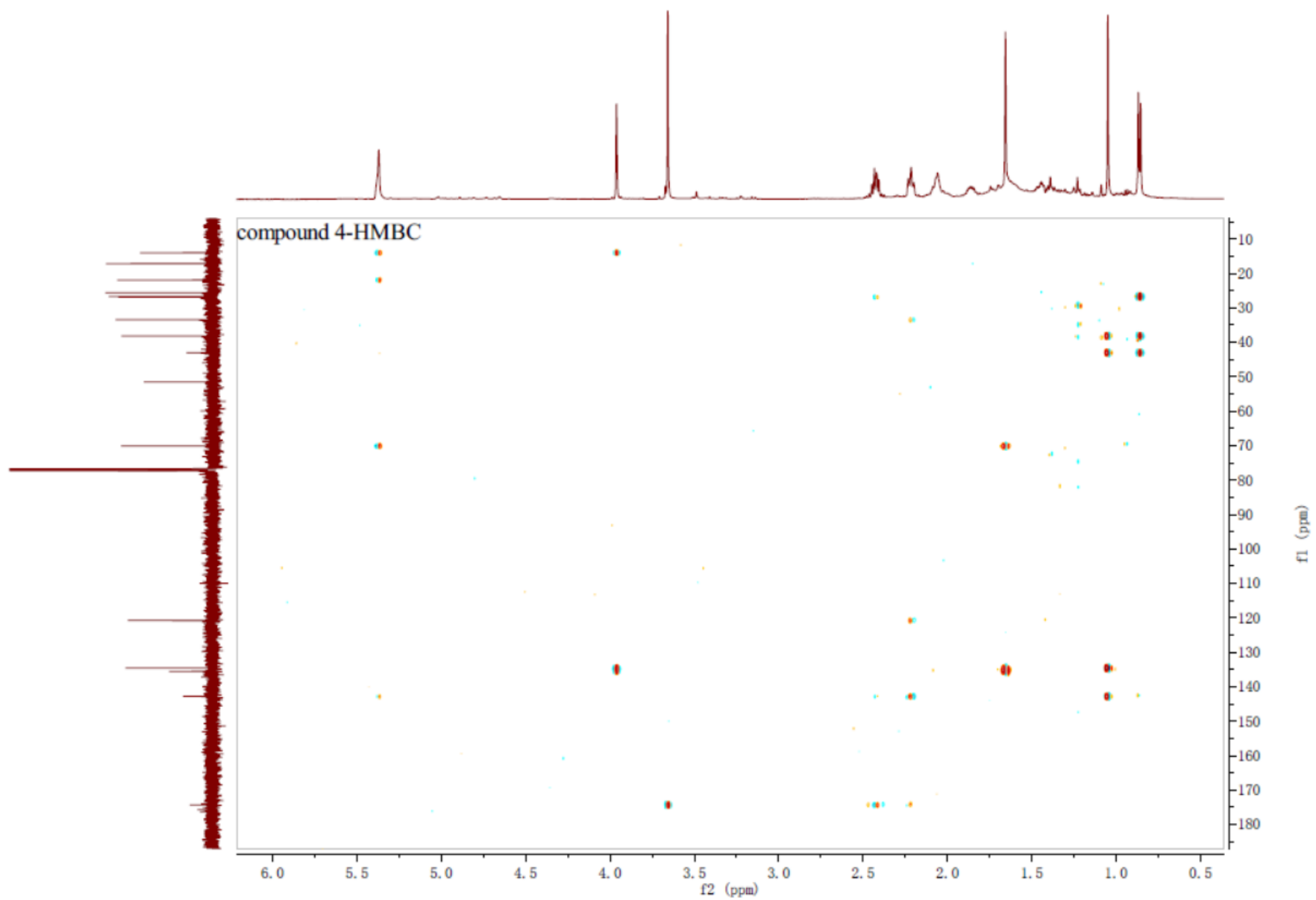
Figure S38. ^1H - ^1H COSY spectrum of calvukoellian J (**4**) in CDCl_3 (500 MHz).

-P40/P55



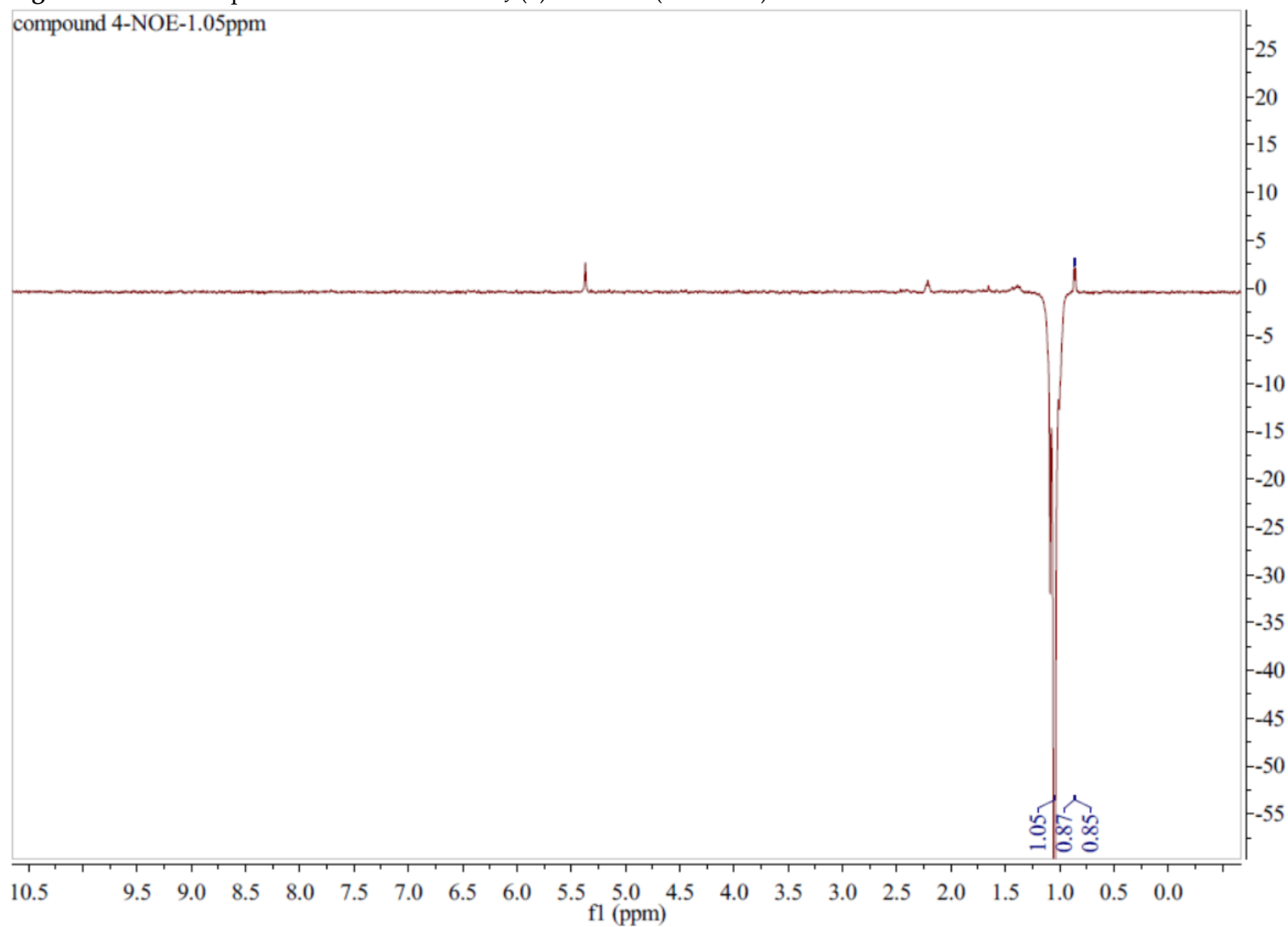
-P41/P55

Figure S39. HSQC spectrum of calvukoellian J (4) in CDCl₃ (500 MHz).



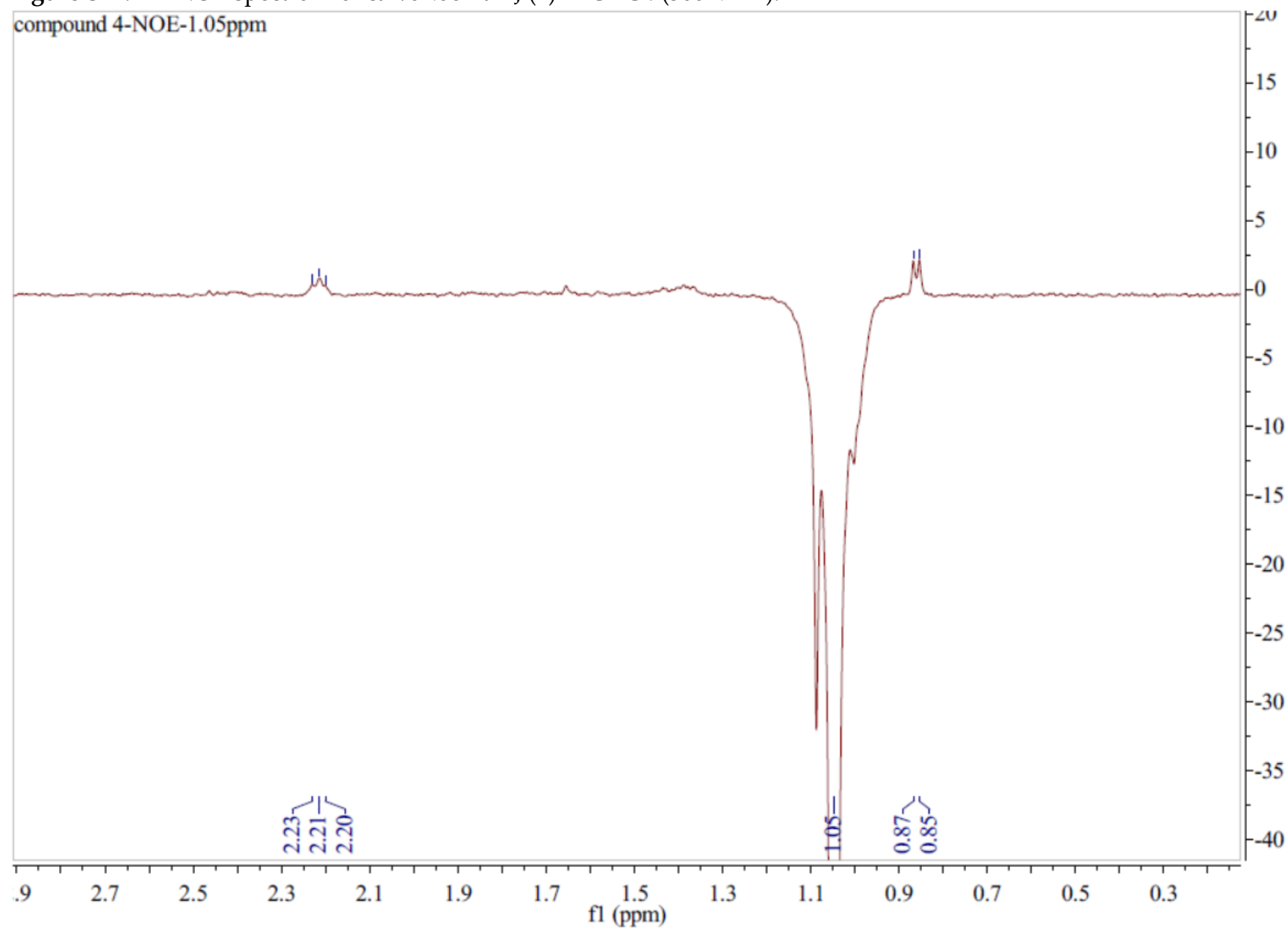
-P42/P55

Figure S40. HMBC spectrum of calvukoellian J (4) in CDCl₃ (500 MHz).



-P43/P55

Figure S41. 1D-NOE spectrum of calvukoellian J (4) in CDCl₃ (500 MHz).



-P44/P55

Figure S42. 1D-NOE spectrum of calvukoellian J (4) in CDCl₃ (500 MHz).

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L-10-2-6-3

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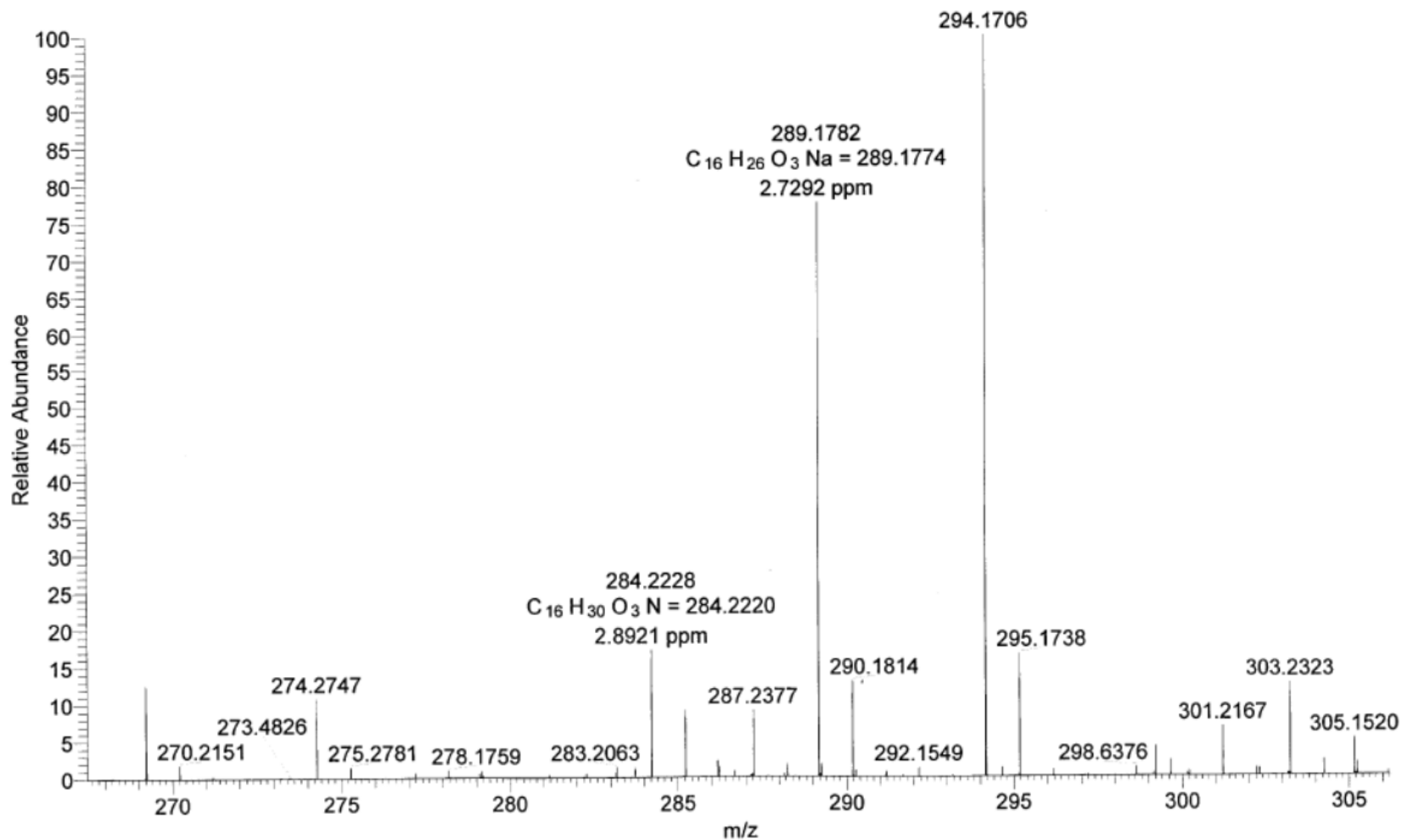


Figure S43. HRESIMS data of calvukoellian J (4).

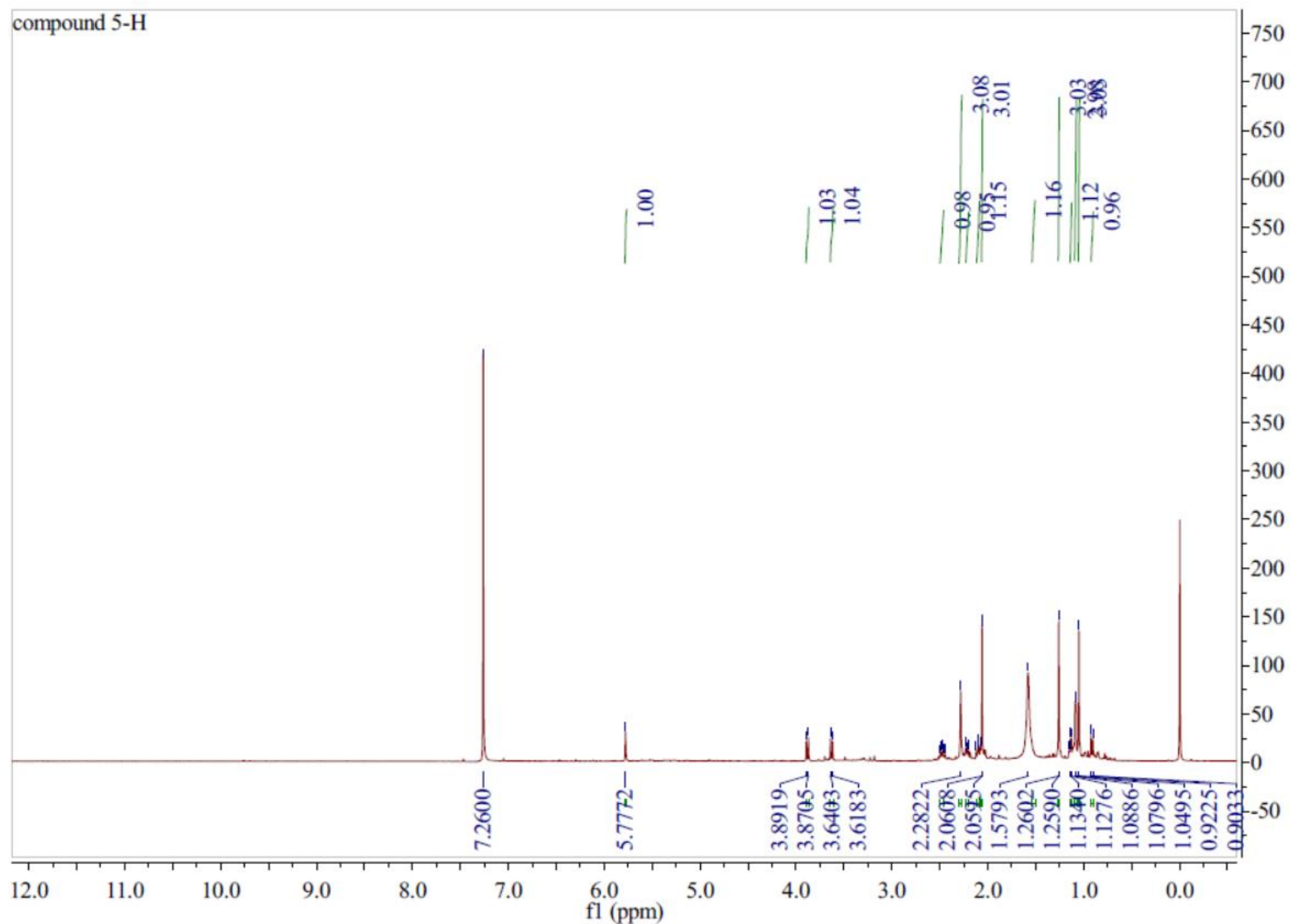


Figure S44. ¹H NMR spectrum of calvukoellian K (5) in CDCl₃ (500 MHz).

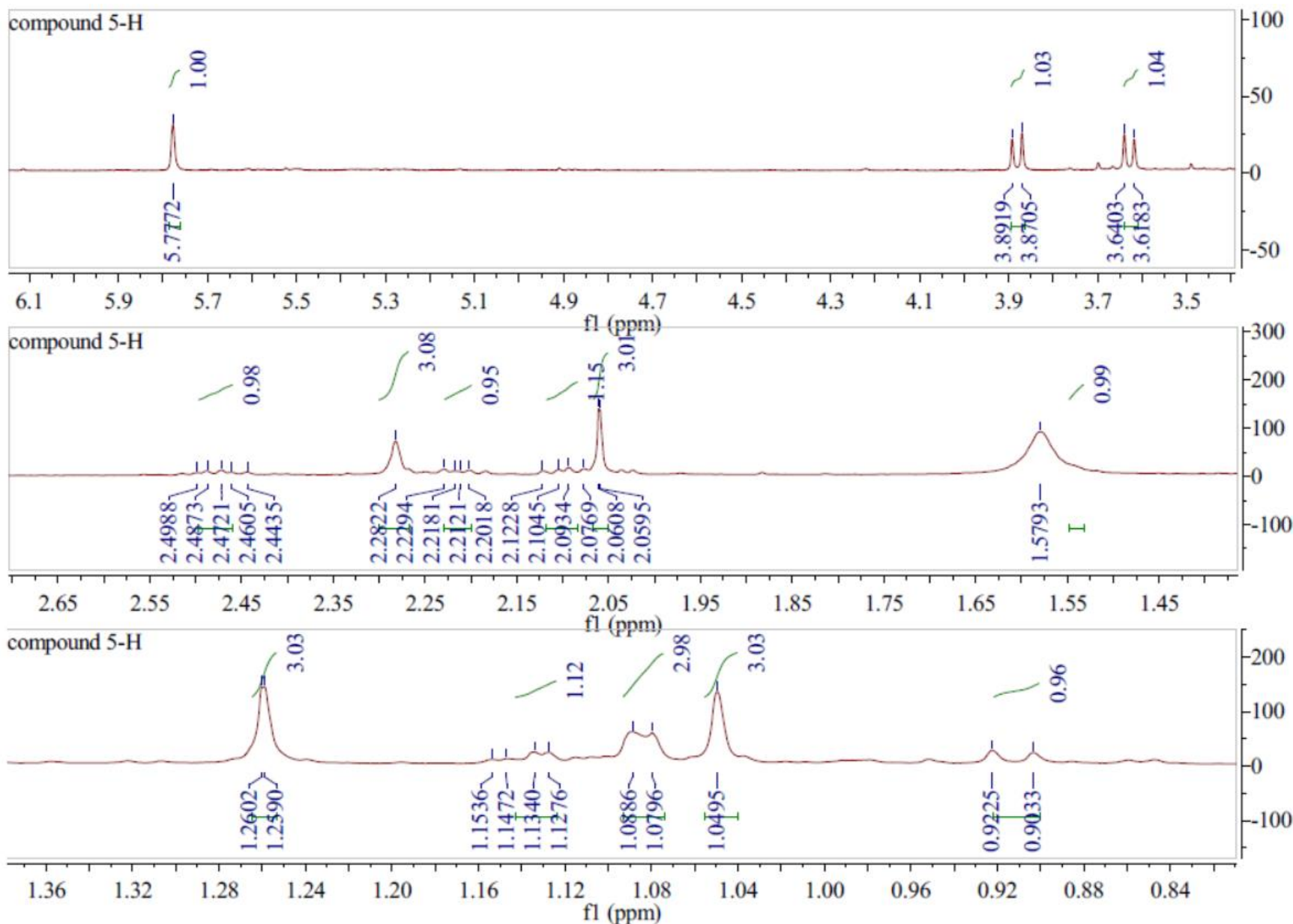


Figure S45. Enlarged ^1H NMR spectrum of calvukoellian K (5) in CDCl_3 (500 MHz).

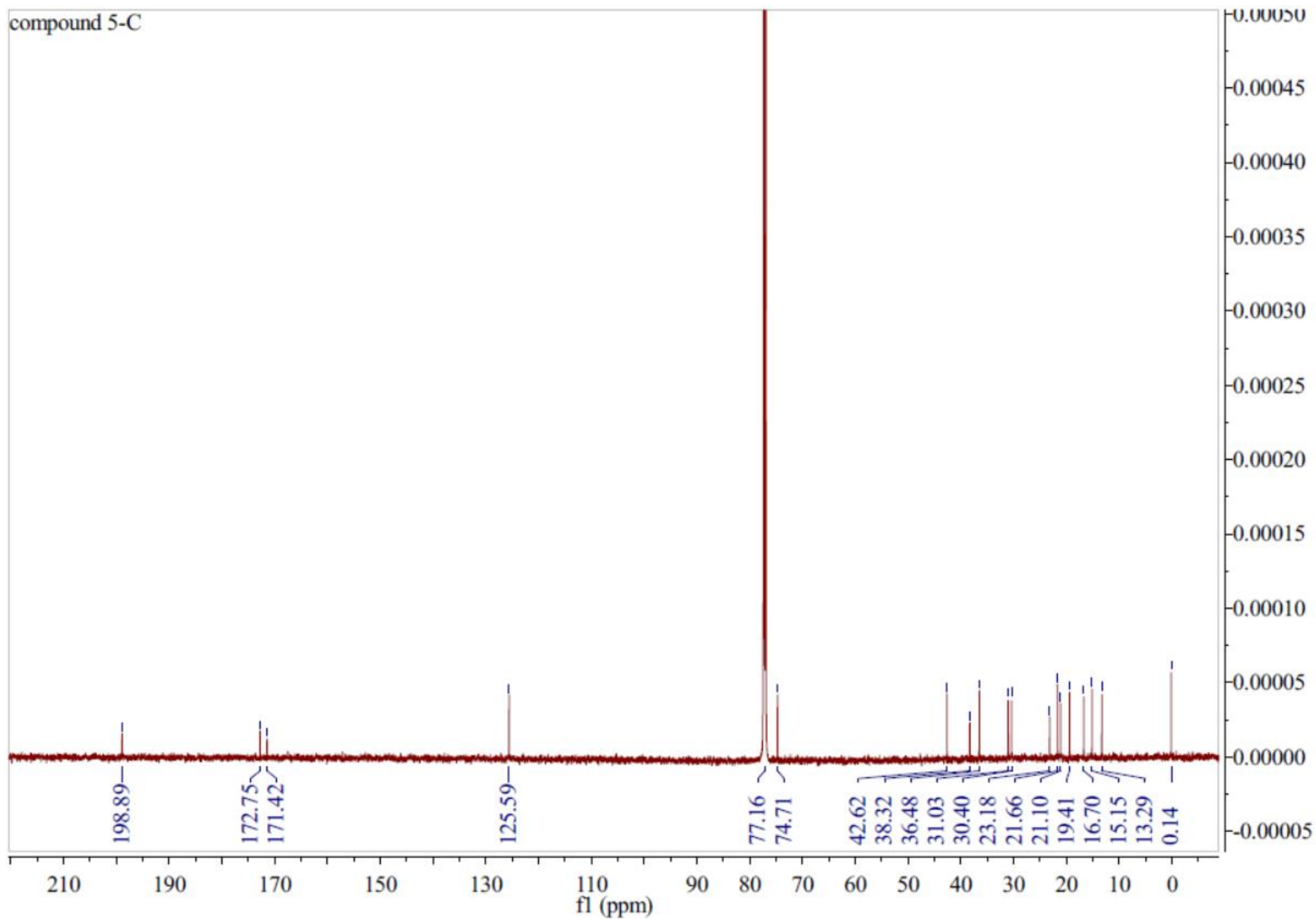


Figure S46. ¹³C NMR spectrum of calvukoellian K (5) in CDCl₃ (125 MHz)

-P48/P55

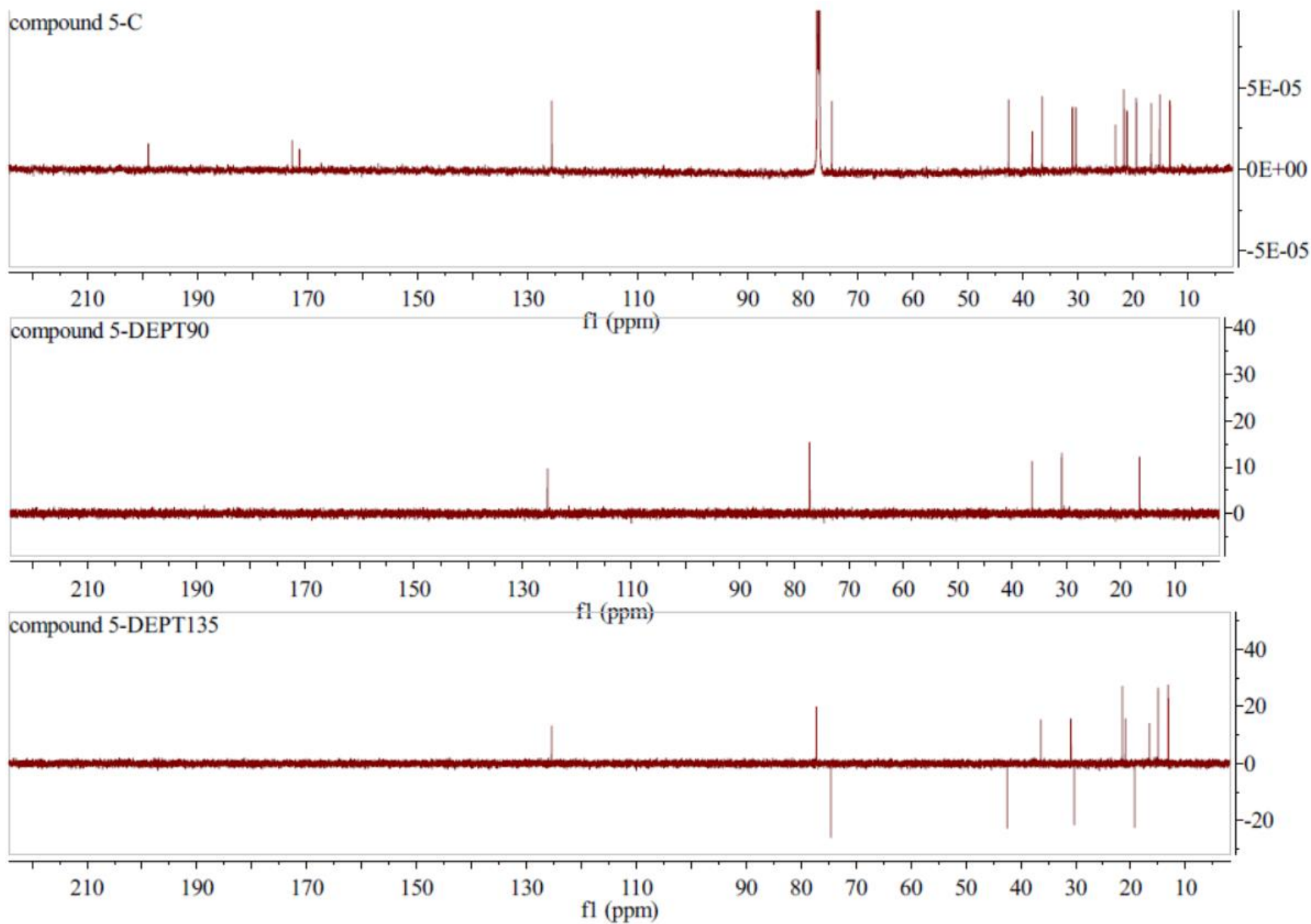


Figure S47. ¹³C NMR and DEPT spectrum of calvukoellian K (5) in CDCl₃ (125 MHz).

-P49/P55

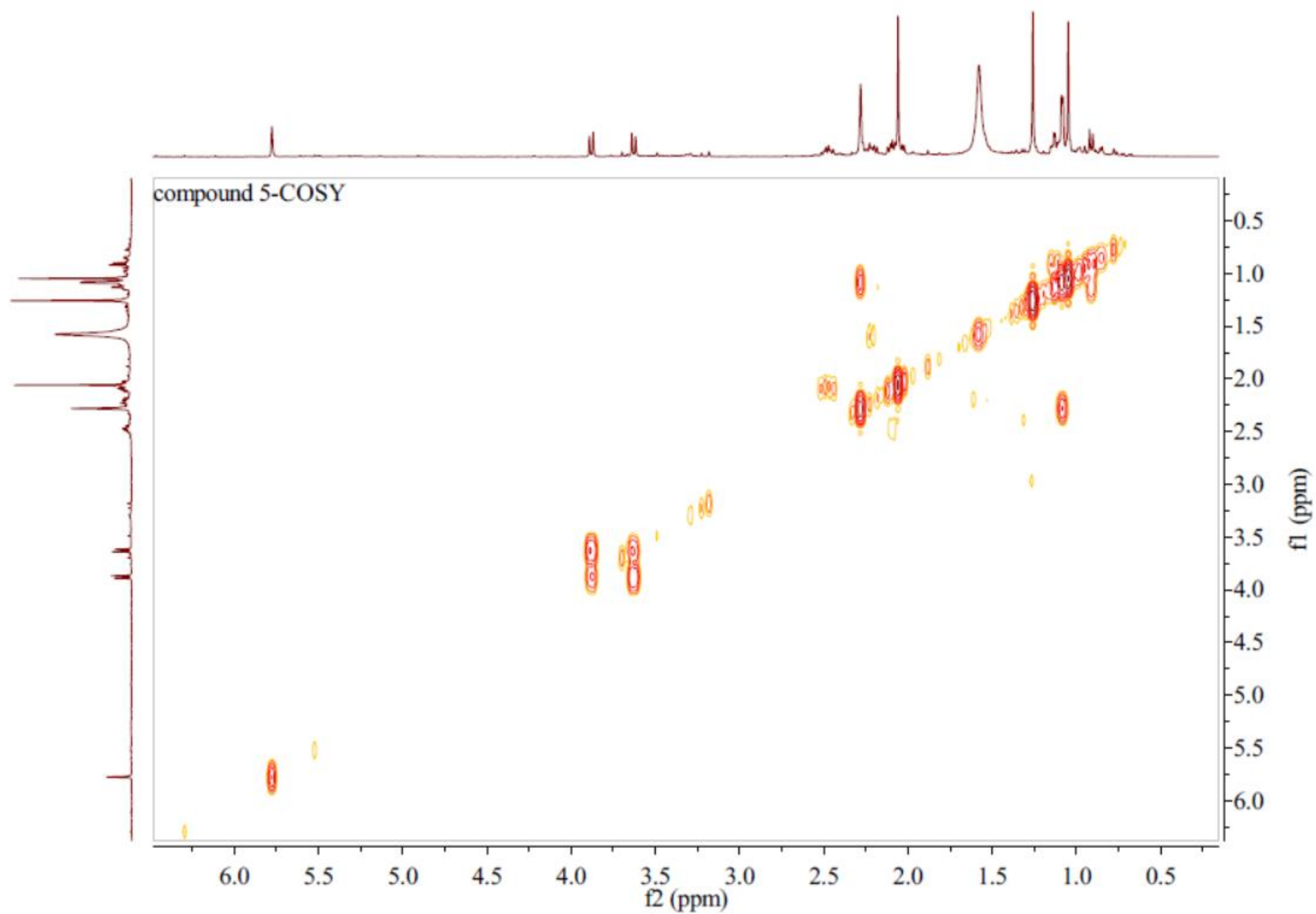


Figure S48. ^1H - ^1H COSY spectrum of calvukoellian K (5) in CDCl_3 (500 MHz).

-P50/P55

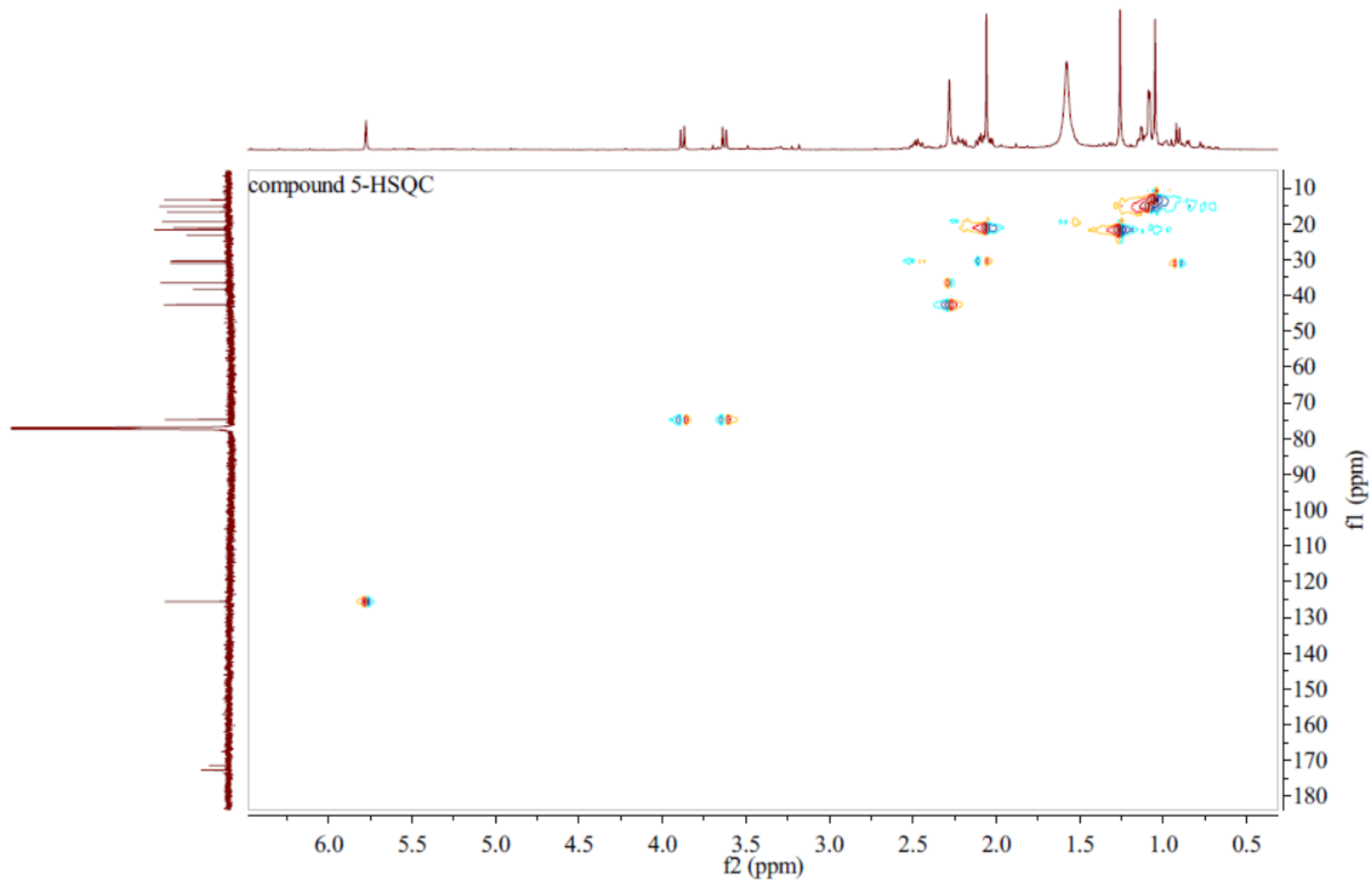


Figure S49. HSQC spectrum of calvukoellian K (**5**) in CDCl₃ (500 MHz).

-P51/P55

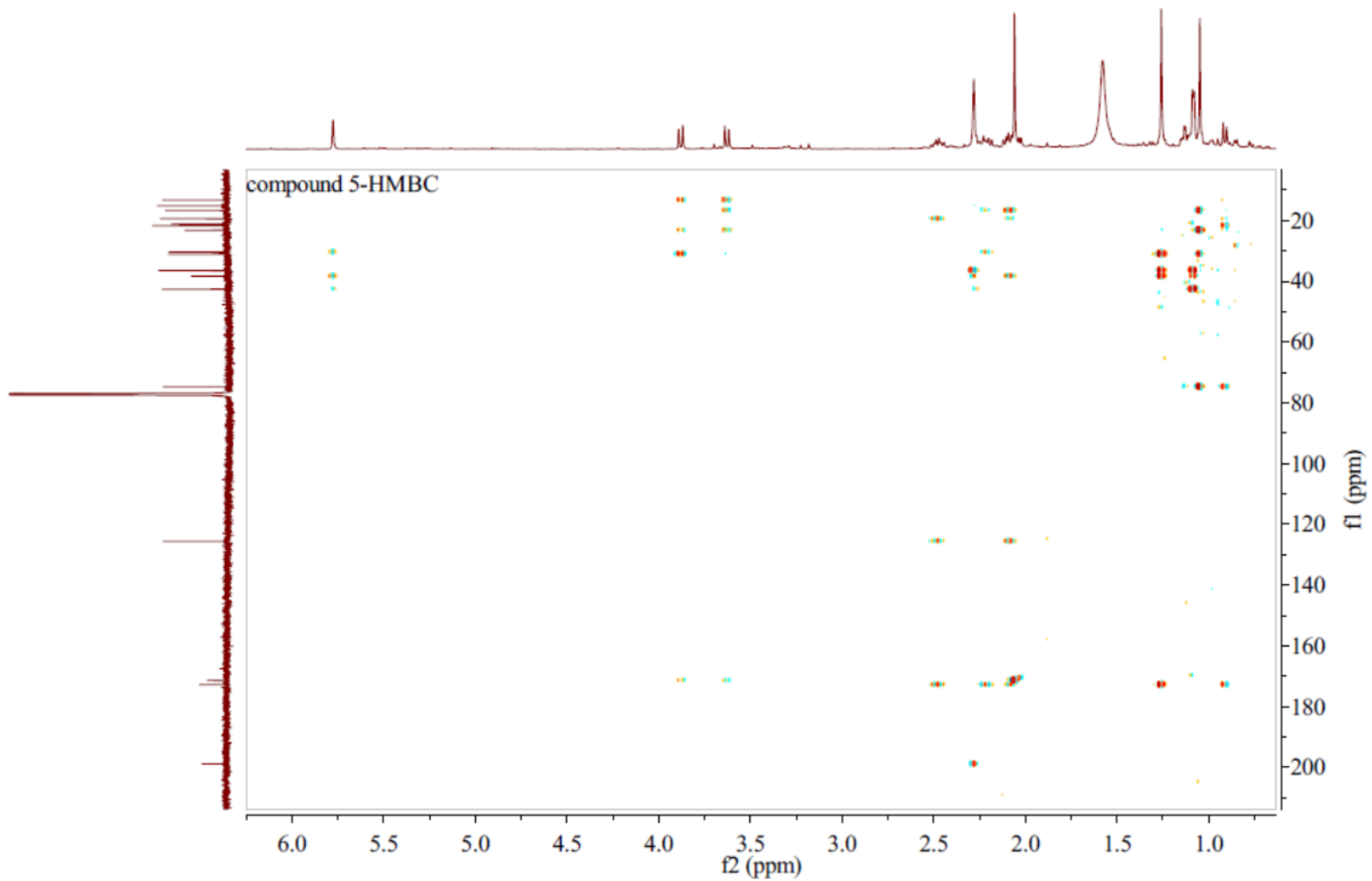


Figure S50. HMBC spectrum of calvukoellian K (5) in CDCl₃ (500 MHz).

-P52/P55

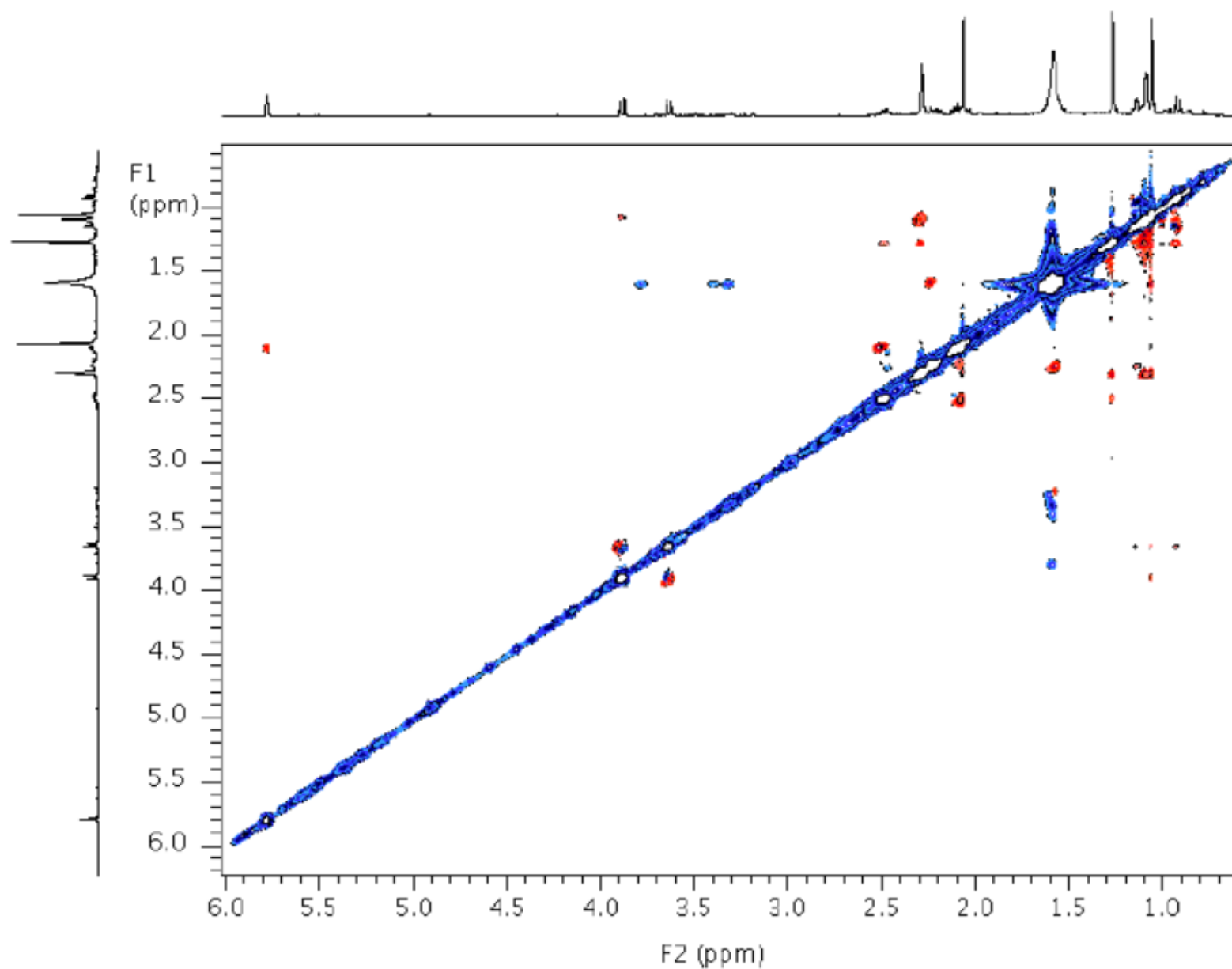


Figure S51. NOESY spectrum of calvukoellian K (5) in CDCl₃ (500 MHz).

-P53/P55

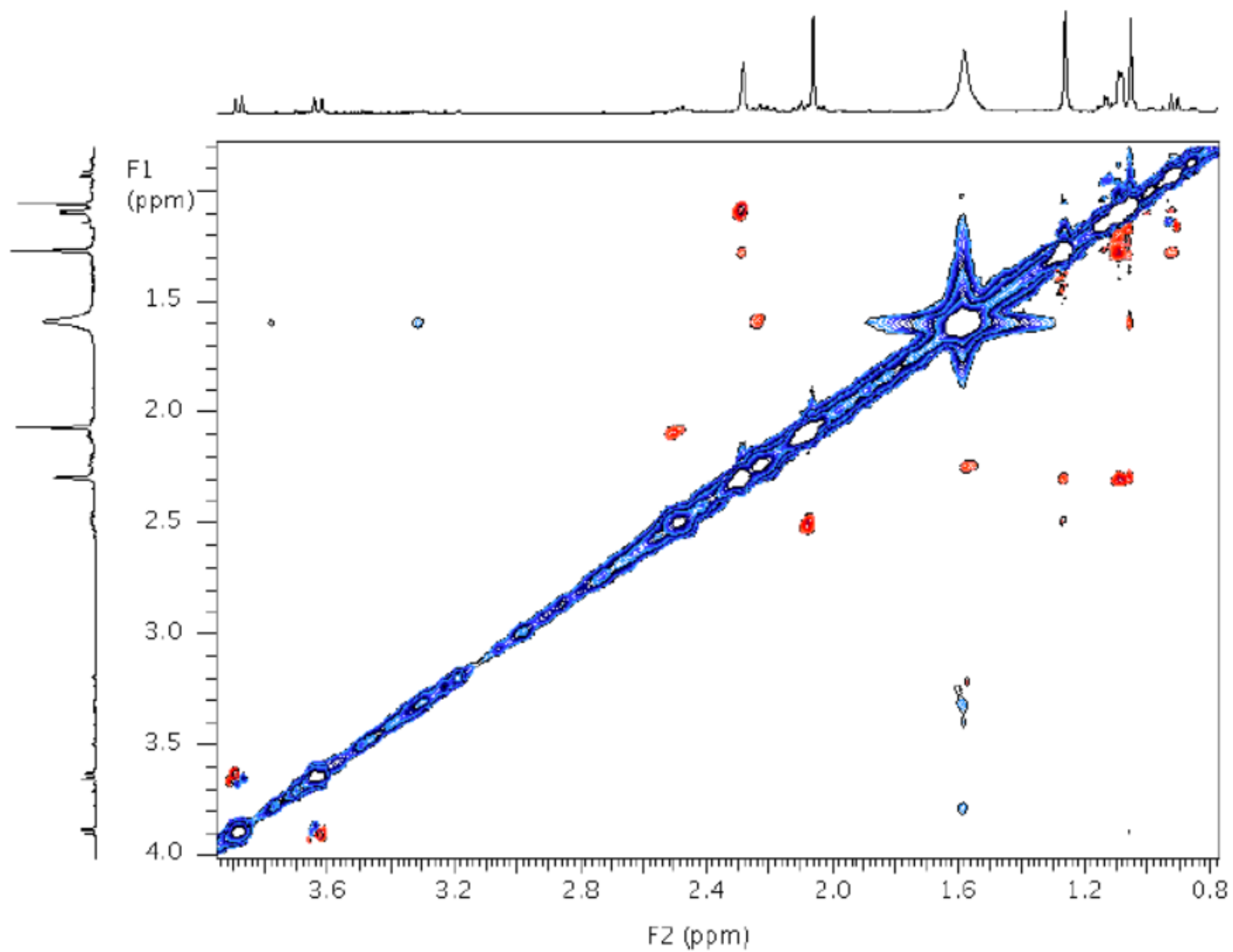


Figure S52. NOESY spectrum of calvukoellian K (5) in CDCl₃ (500 MHz).

-P54/P55

20190627-C-10-2-3-3-1_190626103937 #53-54 RT: 0.43-0.44 AV: 2 NL: 7.71E7
T: FTMS + p ESI Full ms [100.00-1000.00]

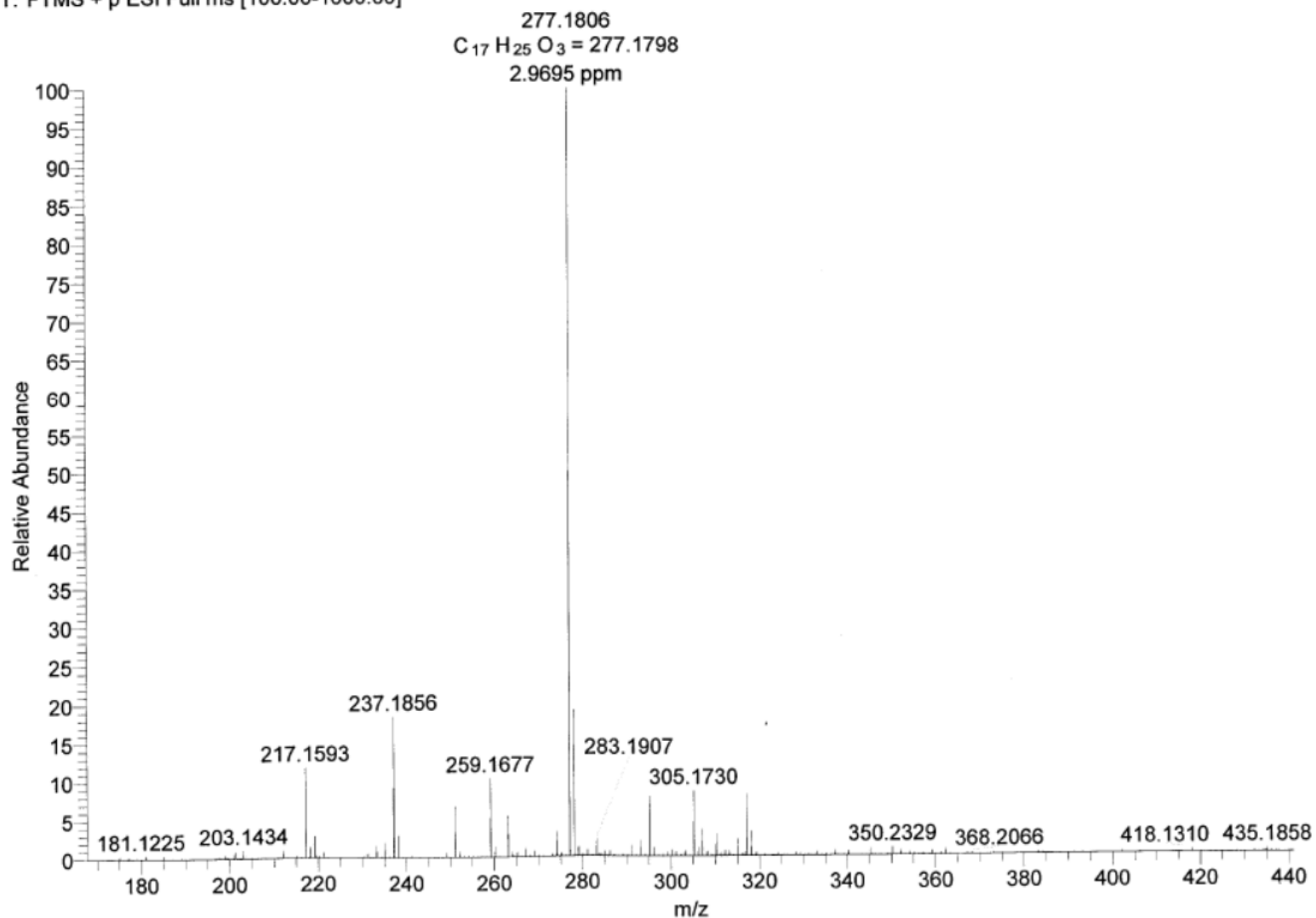


Figure S53. HRESIMS data of calvukoellian K (5).