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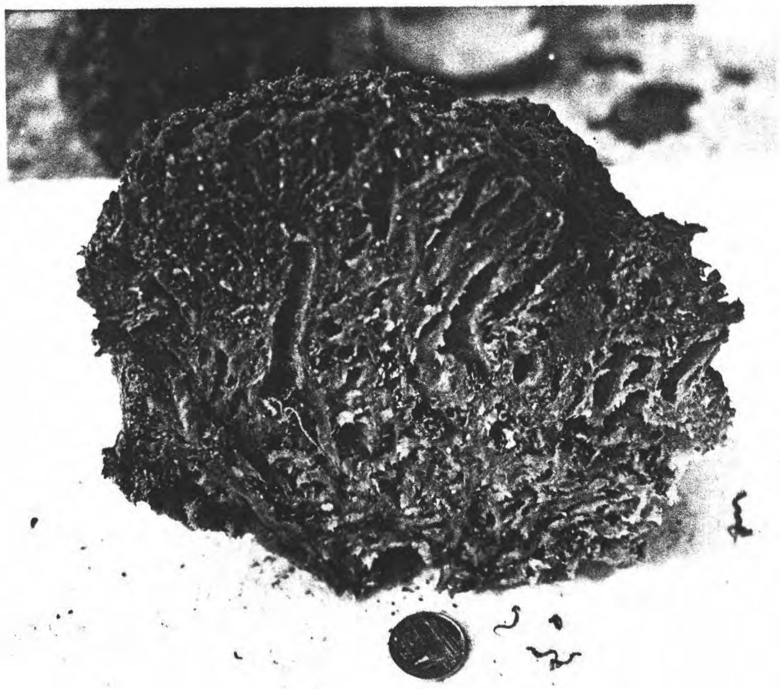
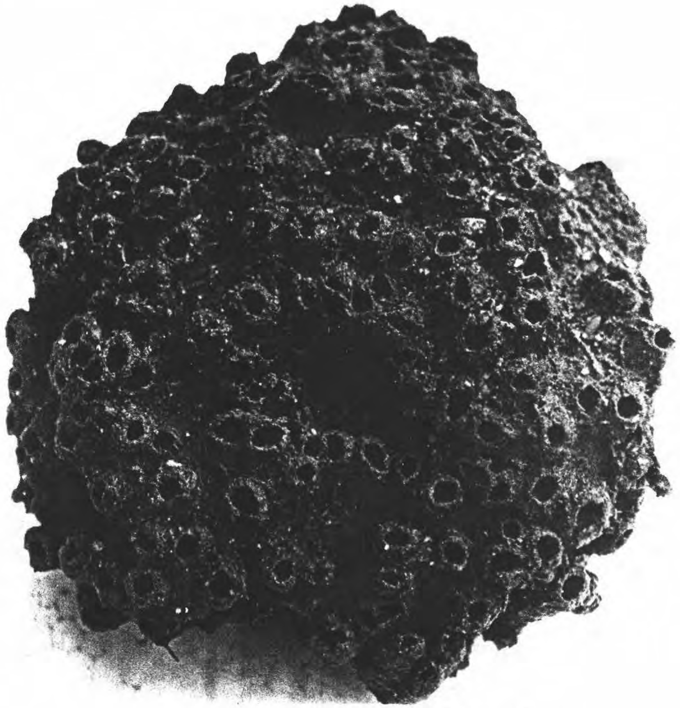
# APPENDIX

Long section





Top view

Figure 1. The photographs of Thai marine sponge, *Biemna fortis* (Topsent).

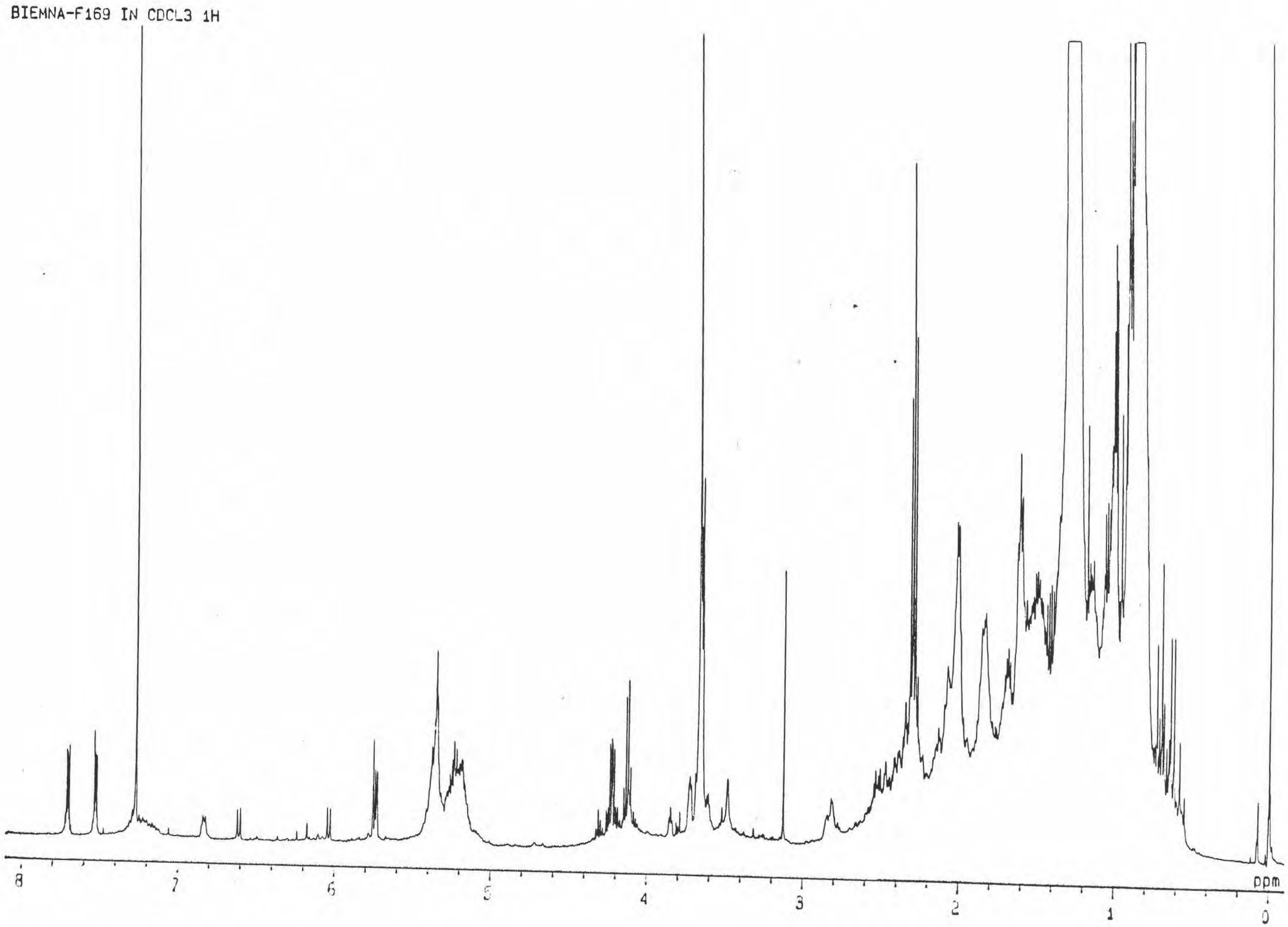



Figure 2. The 500 MHz $^{1}H$ NMR spectrum of F169 in $CDCl_3$

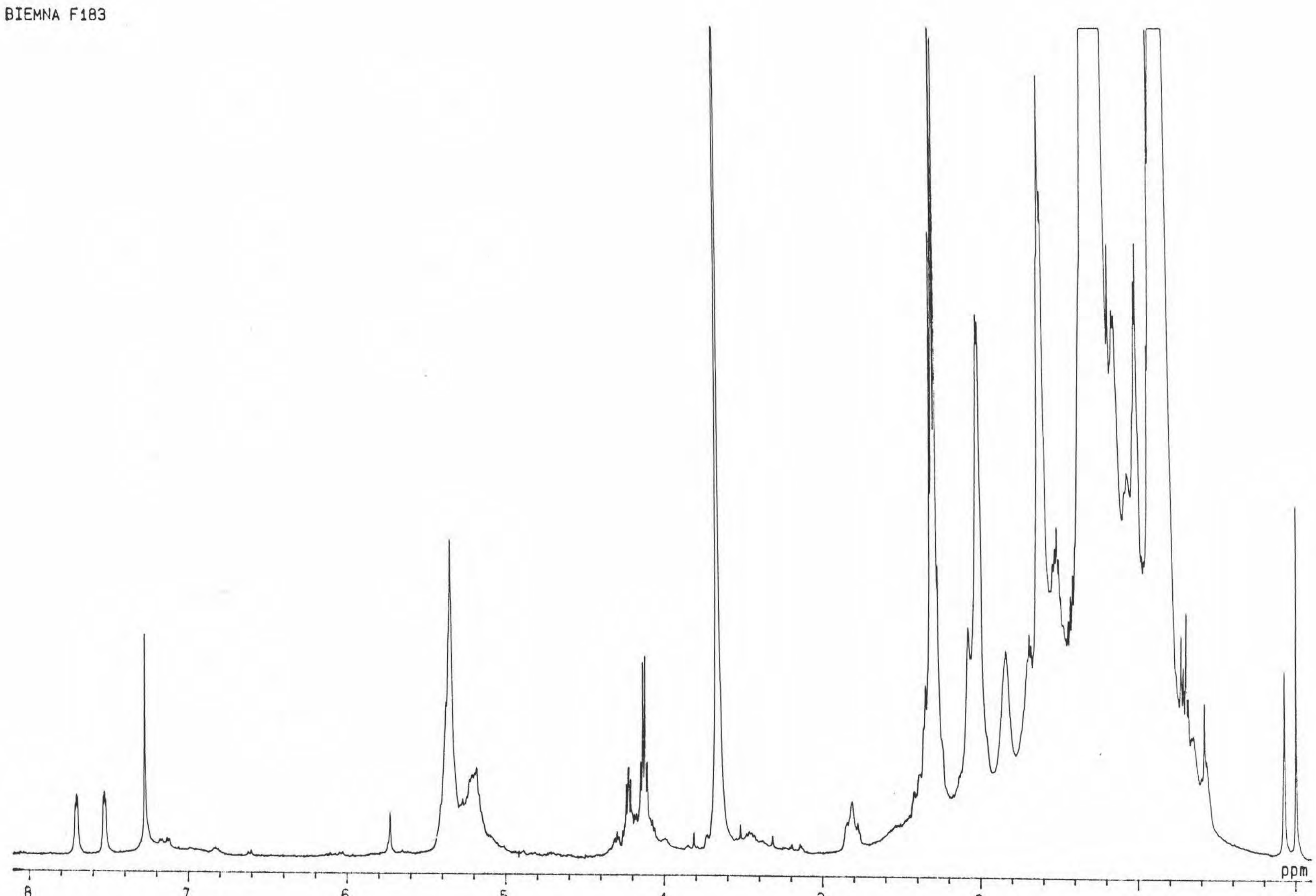



Figure 3. The 500 MHz $^{1}H$ NMR spectrum of F183 in $CDCl_3$

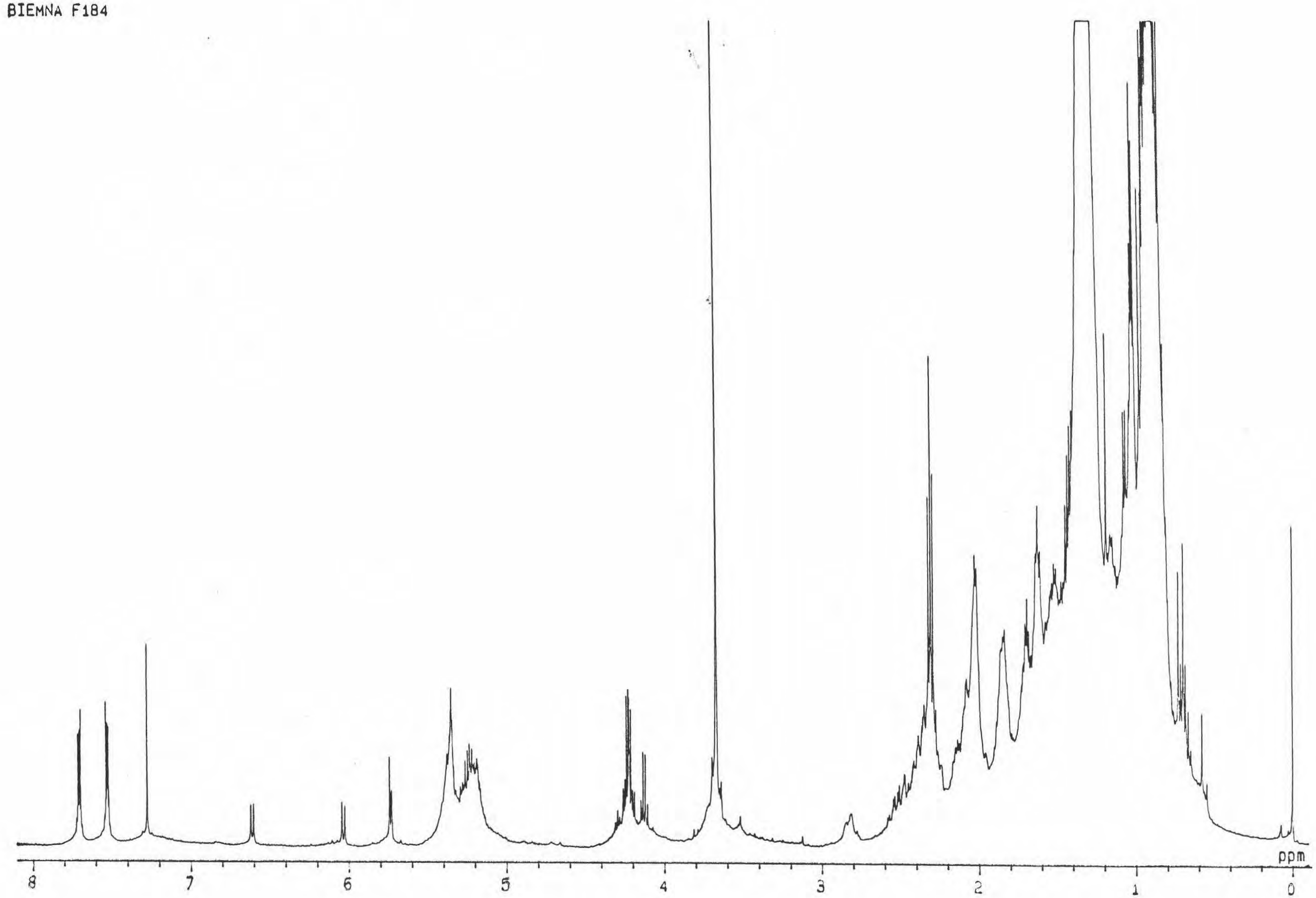



Figure 4. The 500 MHz $^1H$ NMR spectrum of F184 in $CDCl_3$

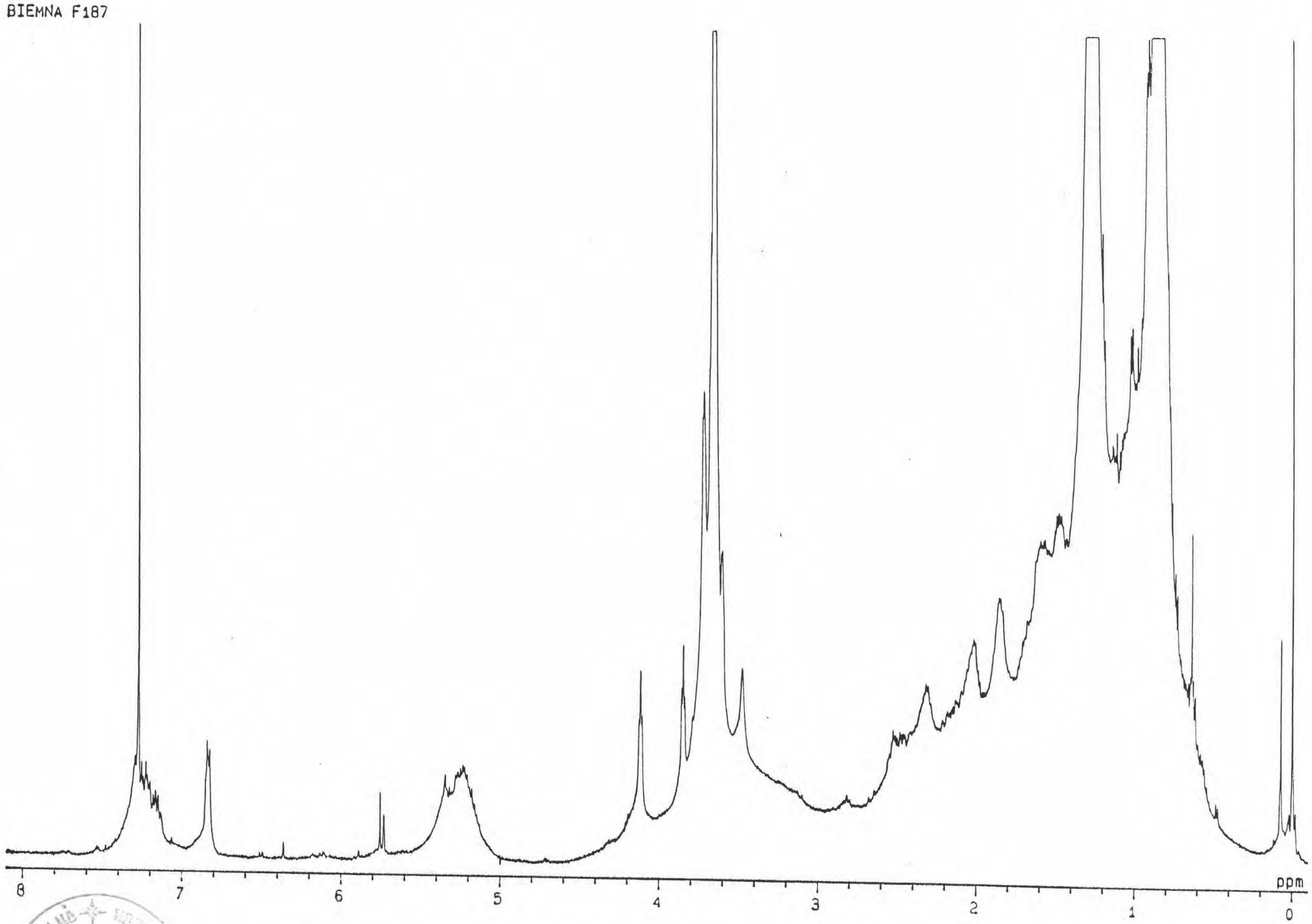



Figure 5. The 500 MHz $^{1}H$ NMR spectrum of F187 in $CDCl_3$

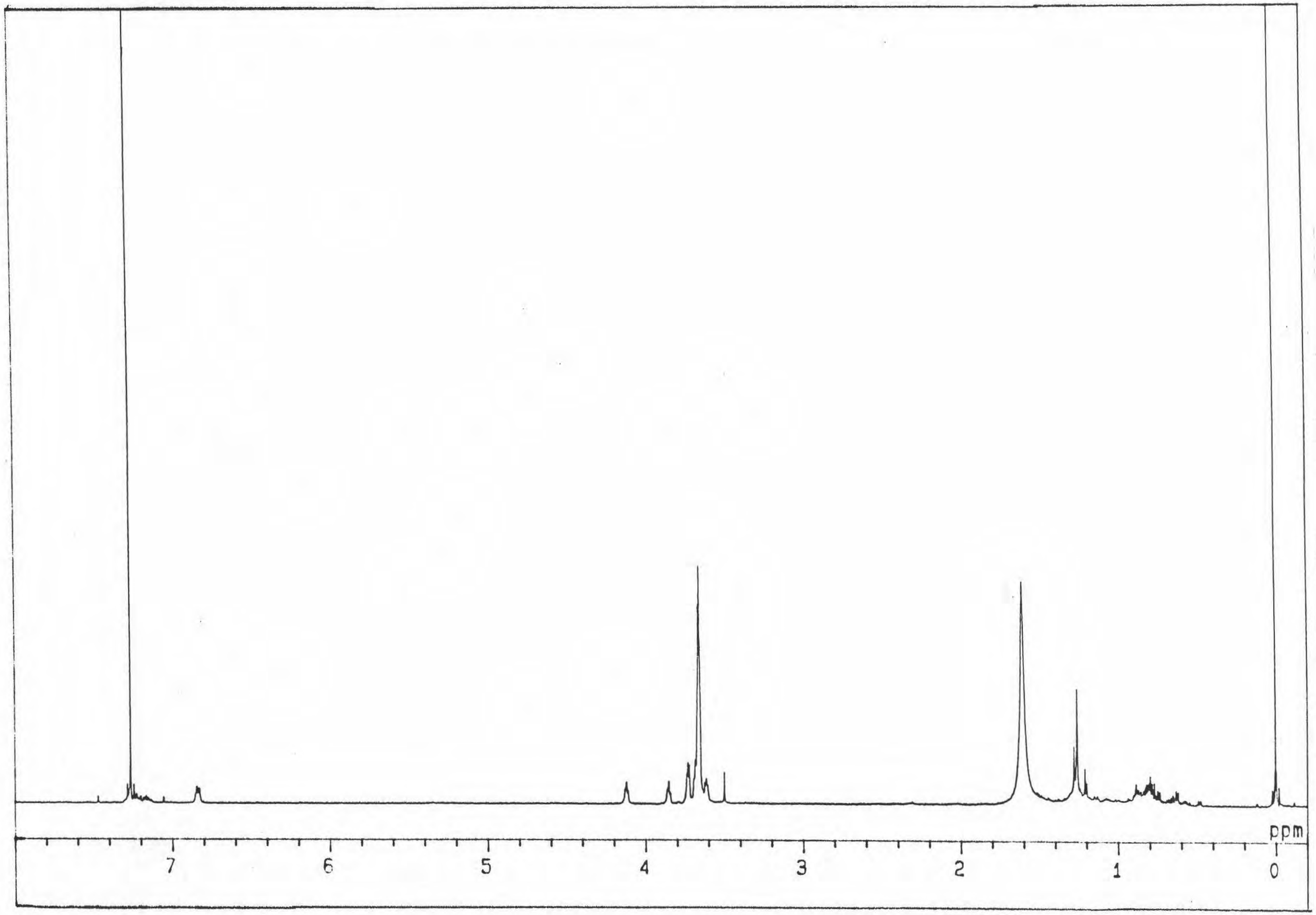



Figure 6. The 500 MHz $^{1}H$ NMR spectrum of F209 in $CDCl_3$...

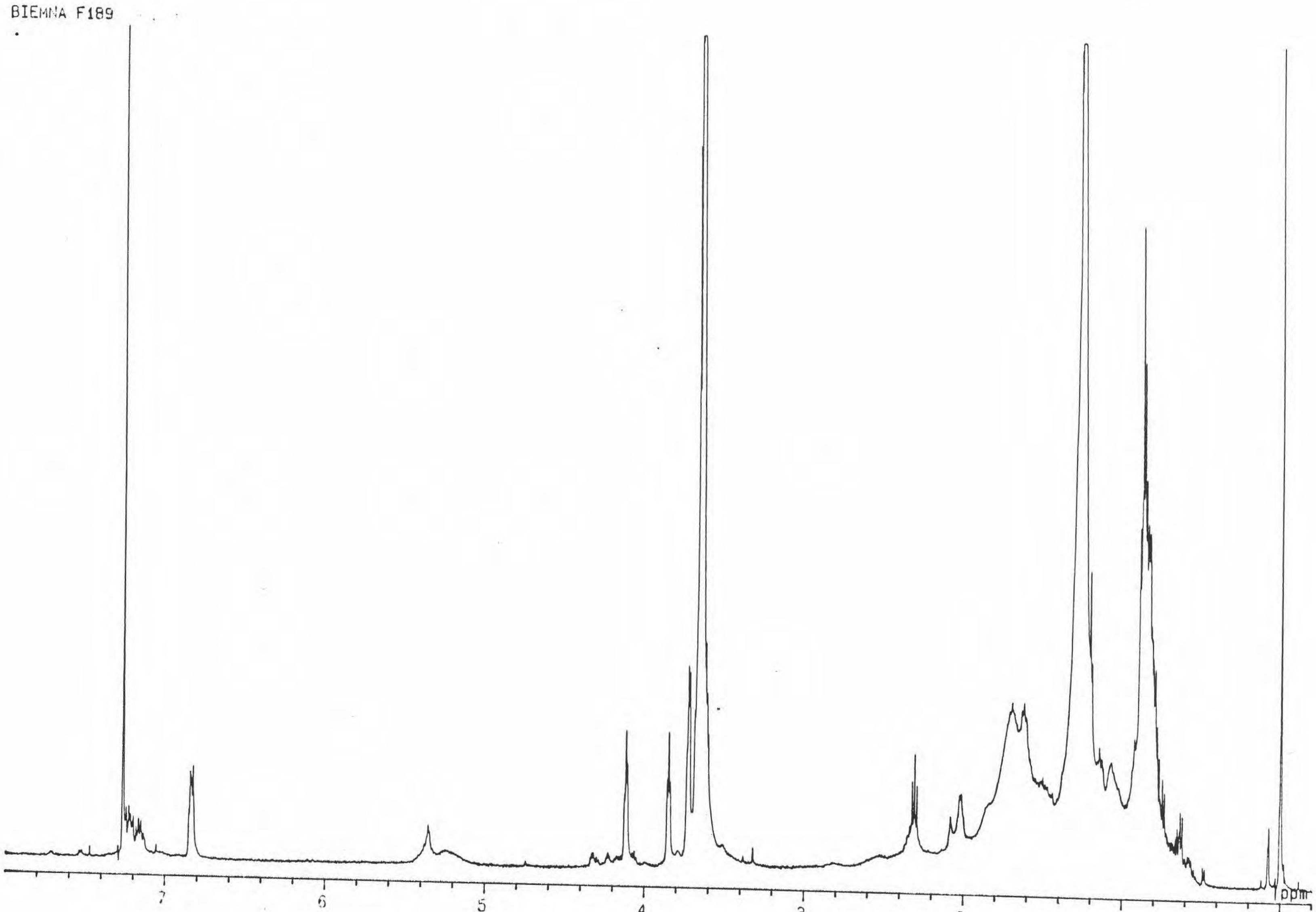



Figure 7. The 500 MHz $^{1}H$ NMR spectrum of F189 in $CDCl_3$

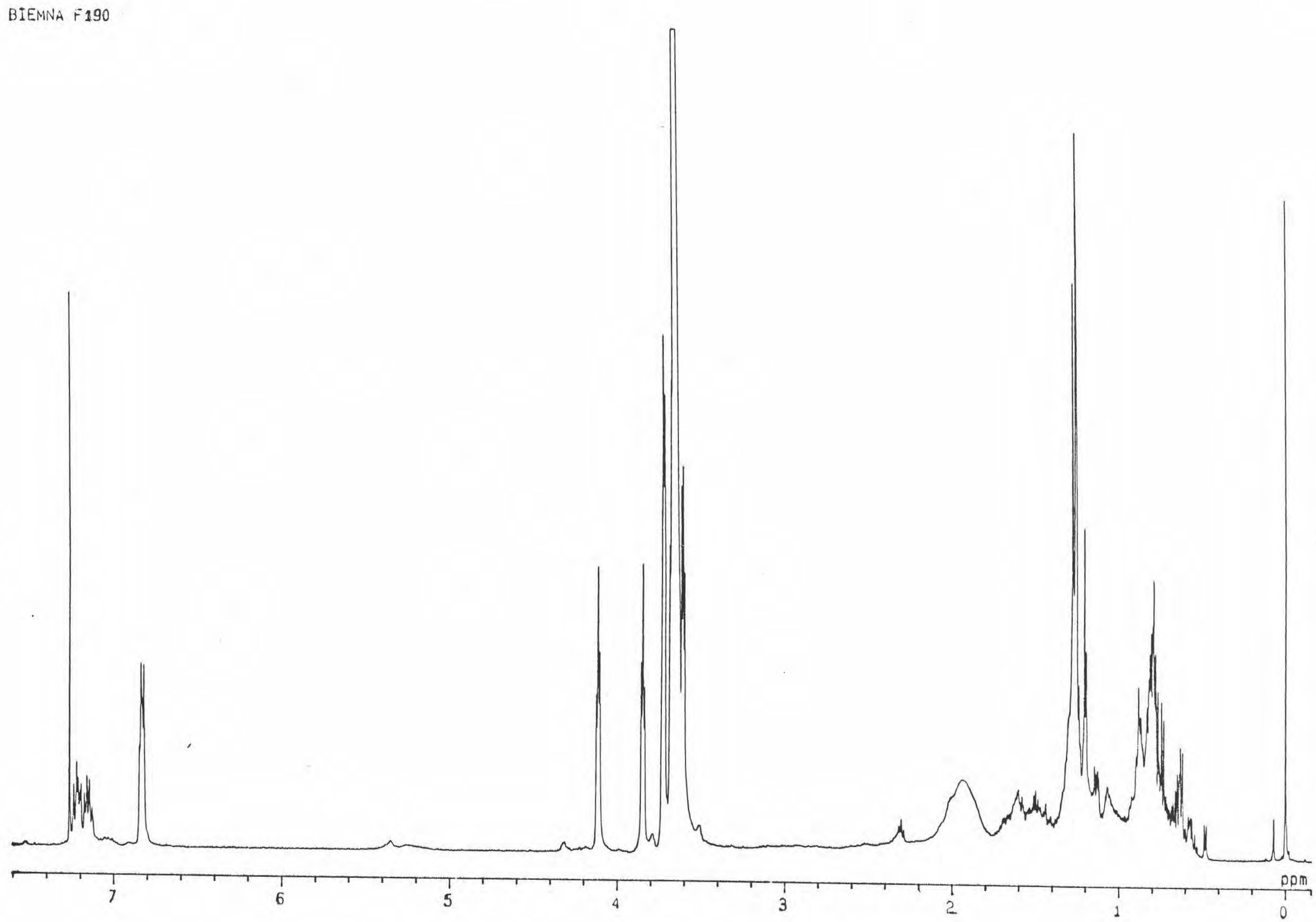



Figure 8. The 500 MHz $^1$H NMR spectrum of F190 in $CDCl_3$

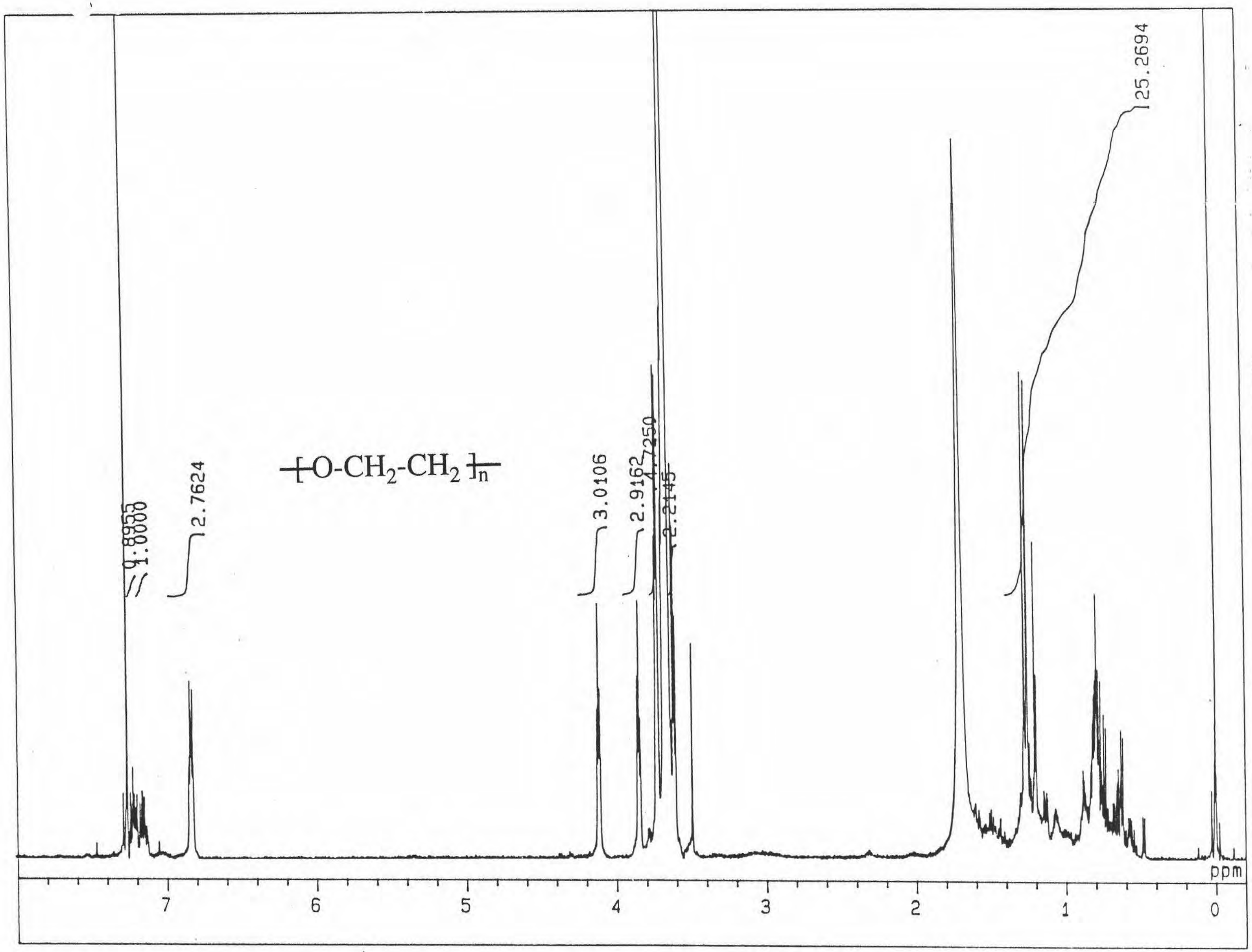



Figure 9. The 500 MHz $^1H$ NMR spectrum of F201 in $CDCl_3$

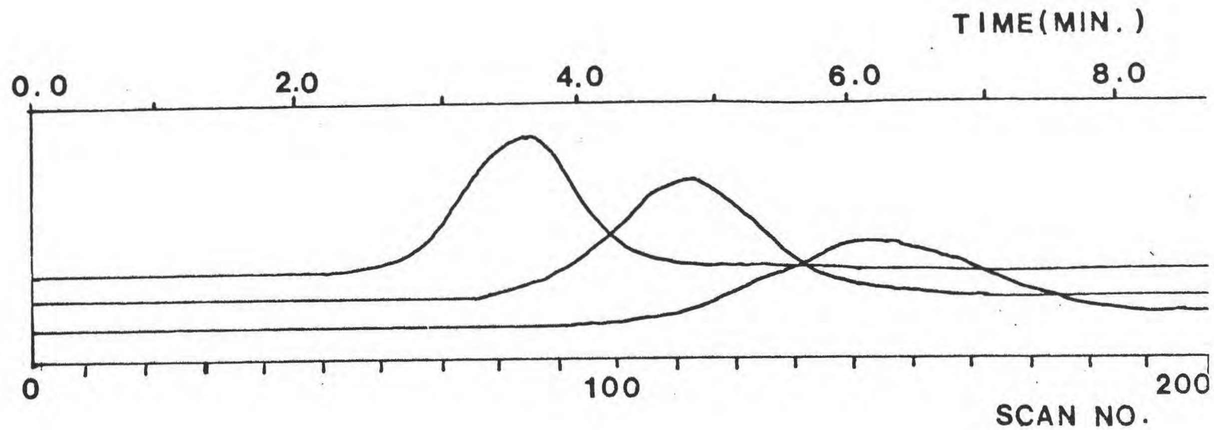



Figure. 10. The FAB MS chromatograme of F201

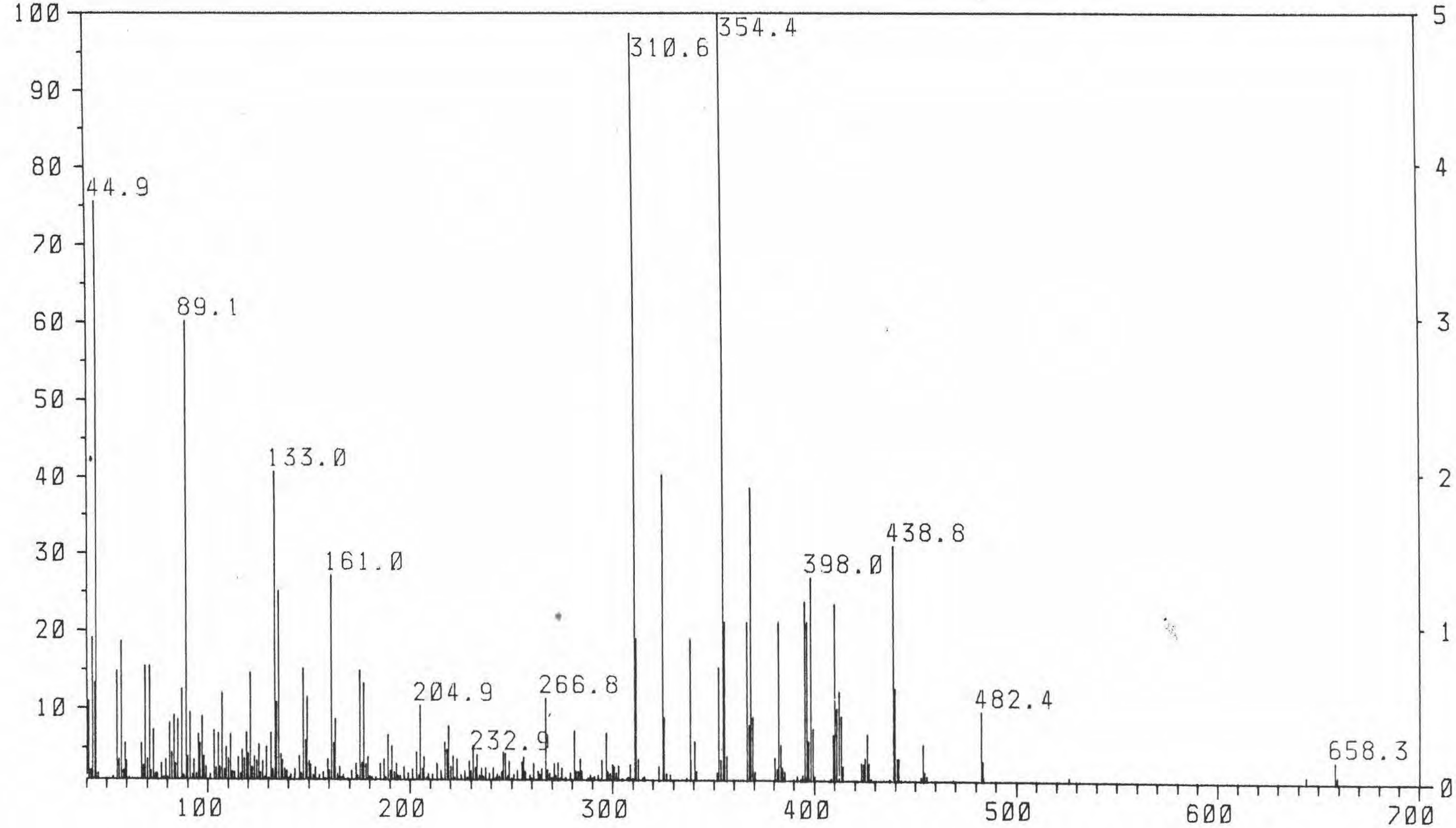



Figure 11. The FAB MS spectrum of the first main peak of F201
(Scan No.: 70x79, Time 3.0 min)

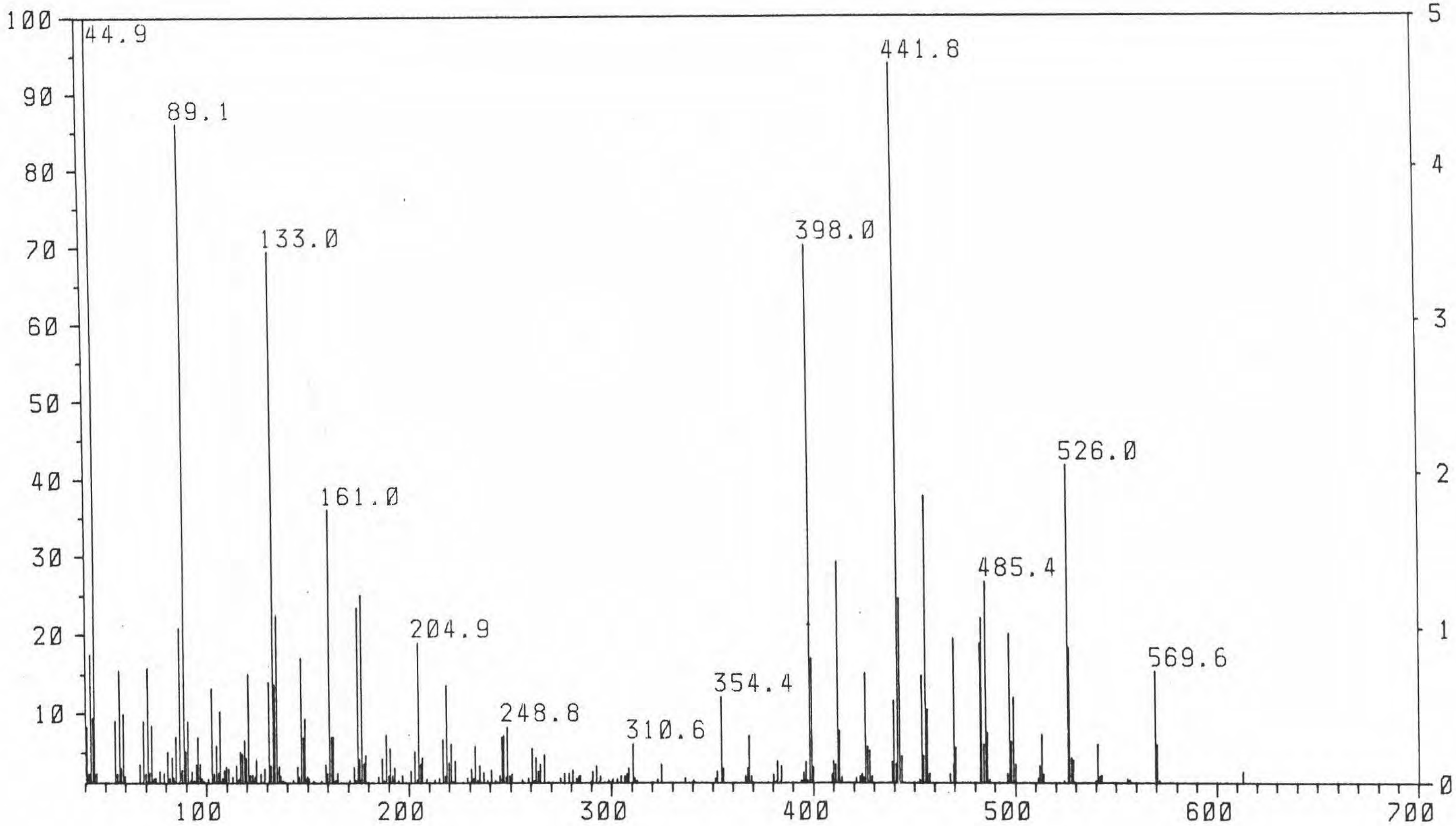



Figure 12. The FAB MS spectrum of the second main peak of F201
(Scan No.: 103x115, Time 4.4 min)

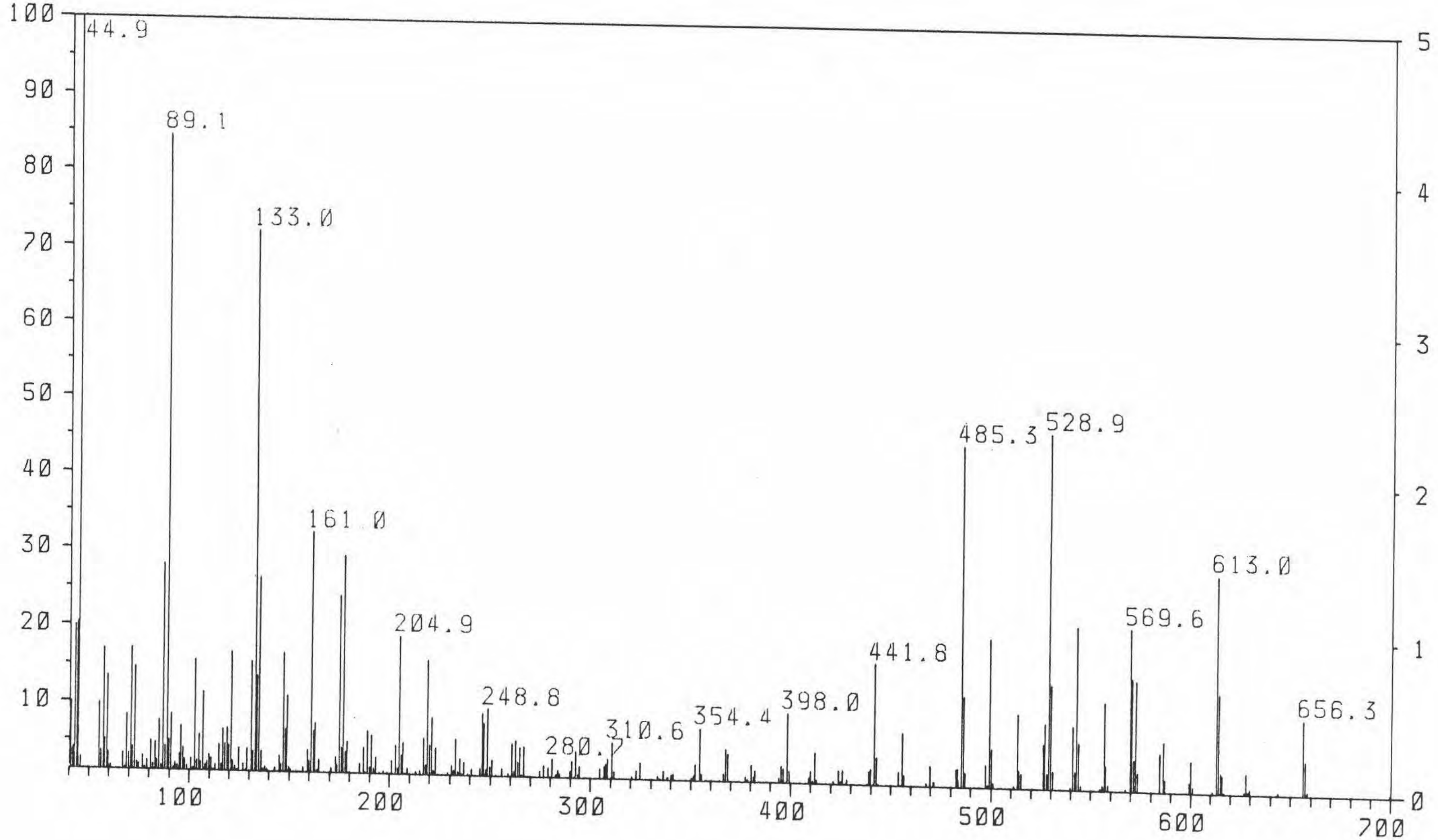
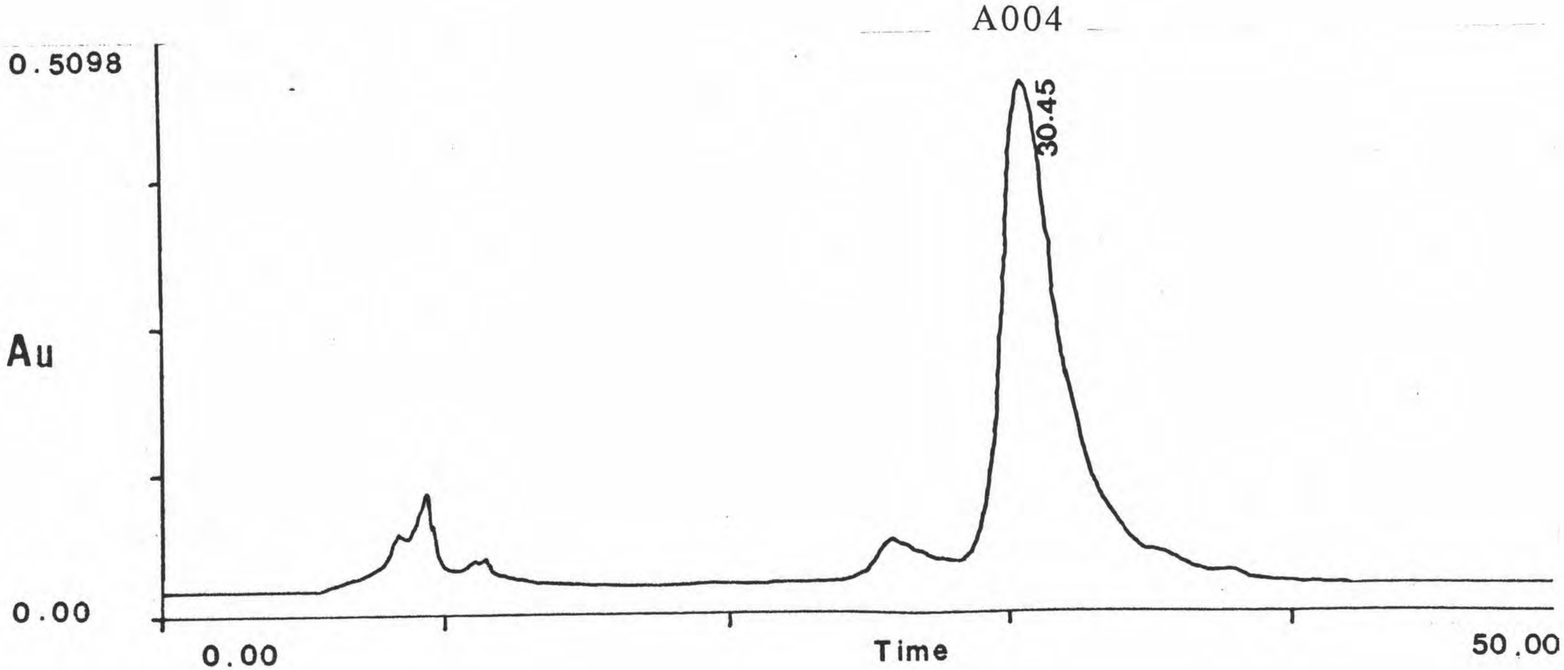



Figure 13. The FAB MS spectrum of the third main peak of F201 (Scan No.: 141x171, Time 6.1 min)




Reversed phase RP-2 column (250 x 4 mm)
Flow rate 1 ml/min
detected at $\lambda_{max}$ 233 nm

Figure 14. The HPLC chromatograme of F201 (15% $H_2O$ in $CH_3OH$)

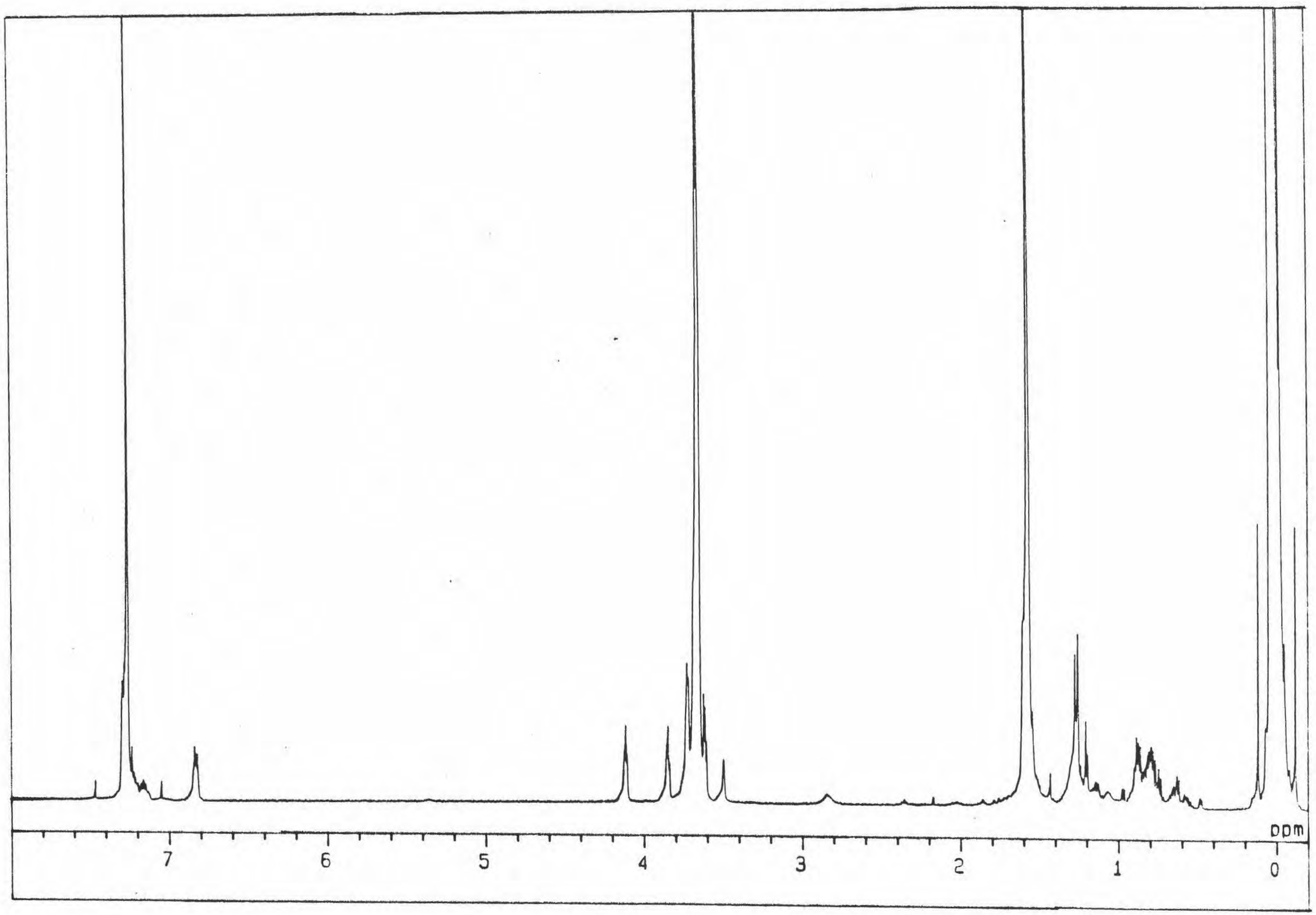



Figure 15. The 500 MHz $^{1}H$ NMR spectrum of A004 in $CDCl_3$

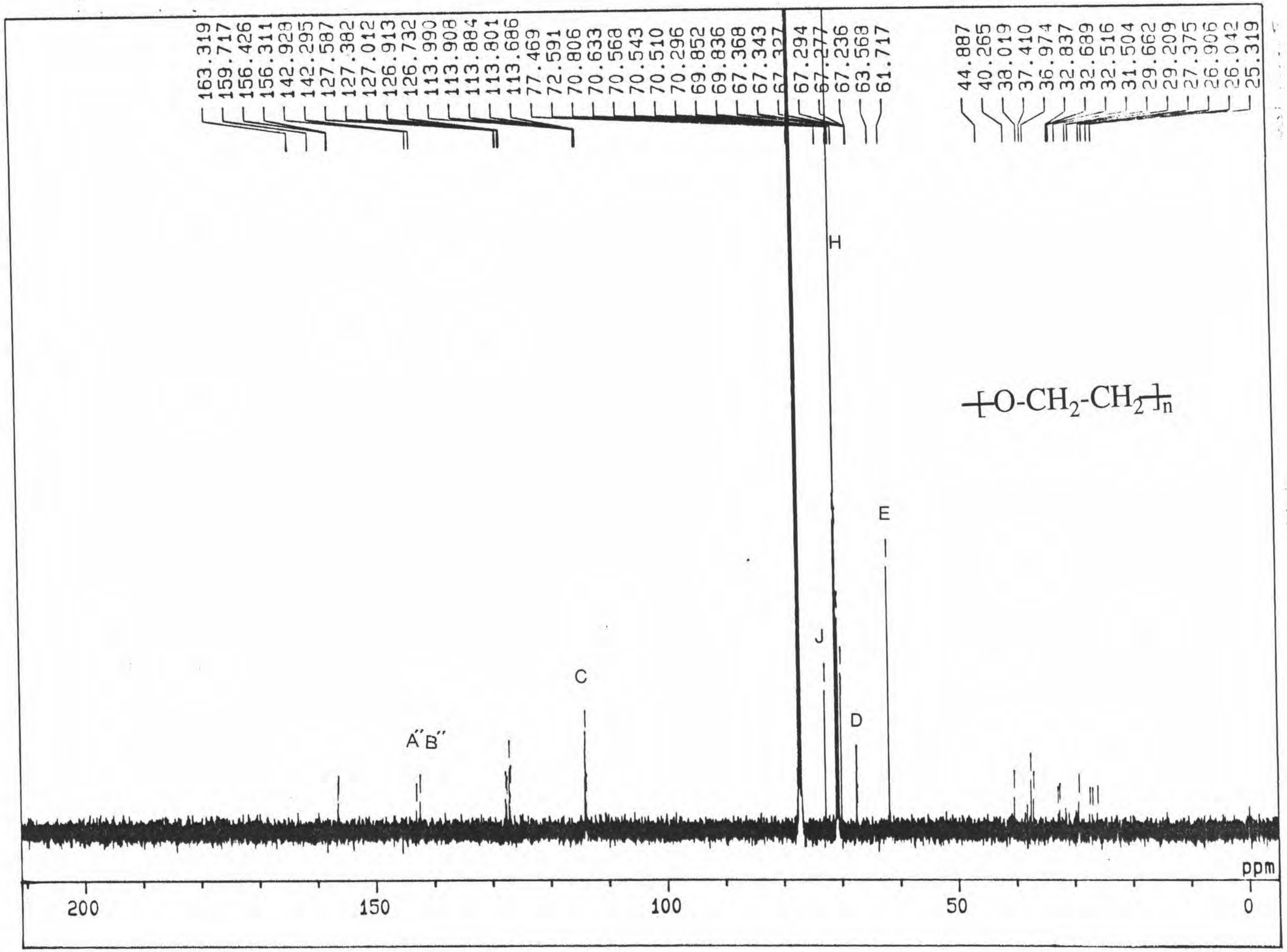



Figure 16. The 125 MHz $^{13}C$ NMR spectrum of F201 in $CDCl_3$

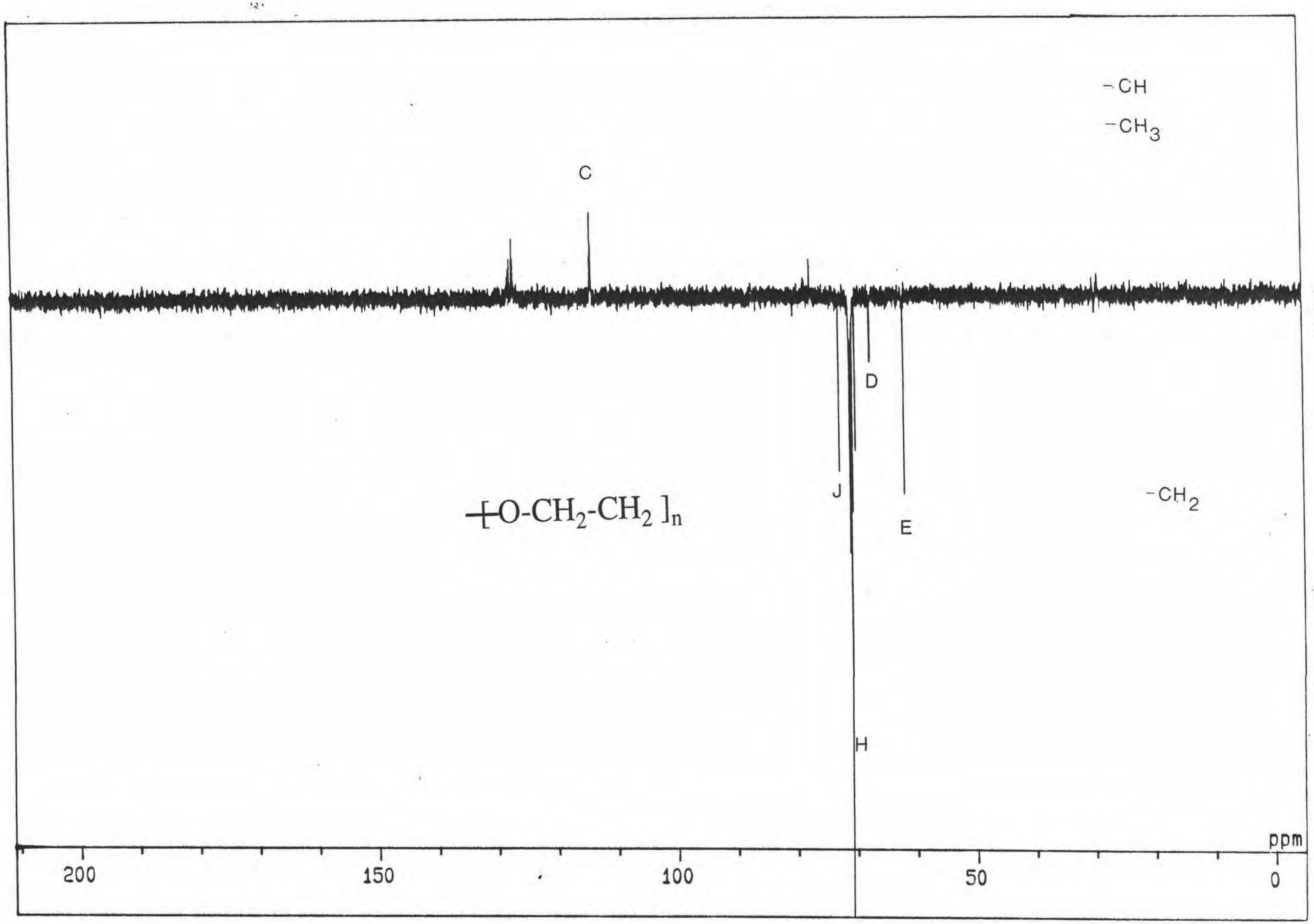



Figure 17. The DEPT 135° spectrum of F201

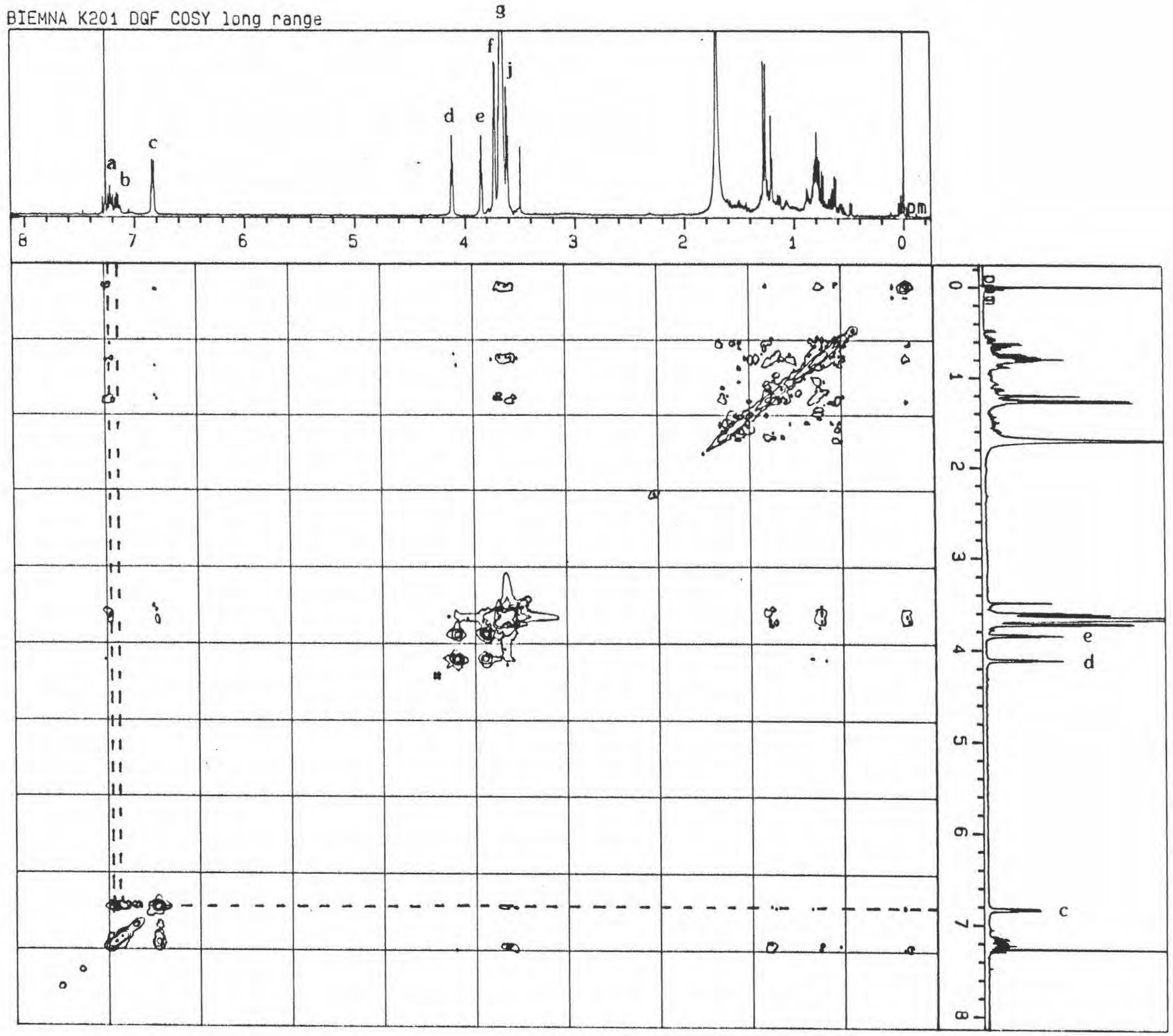



Figure 18.      The DQF long range spectrum of F201

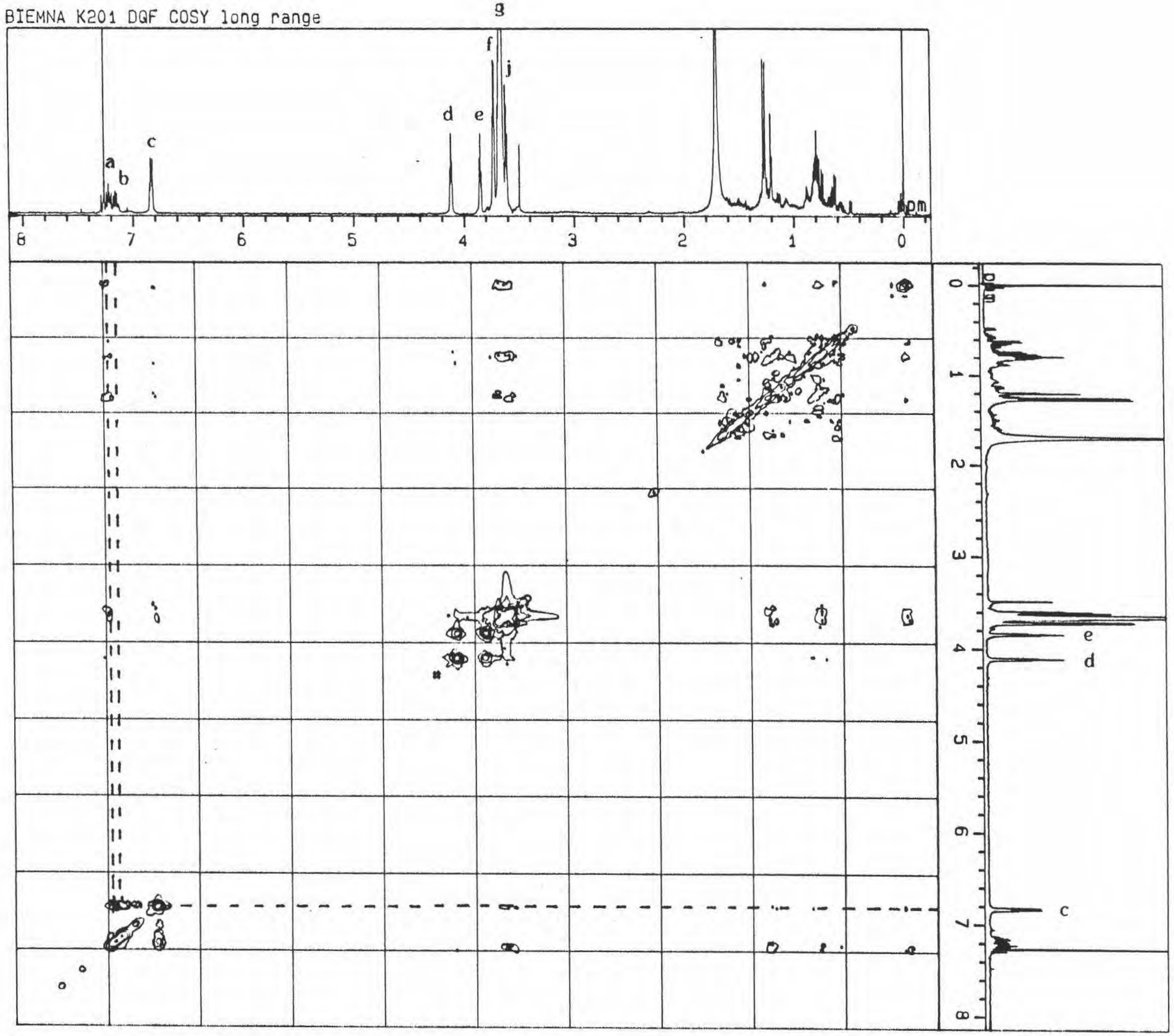



Figure 18. The DQF long range spectrum of F201

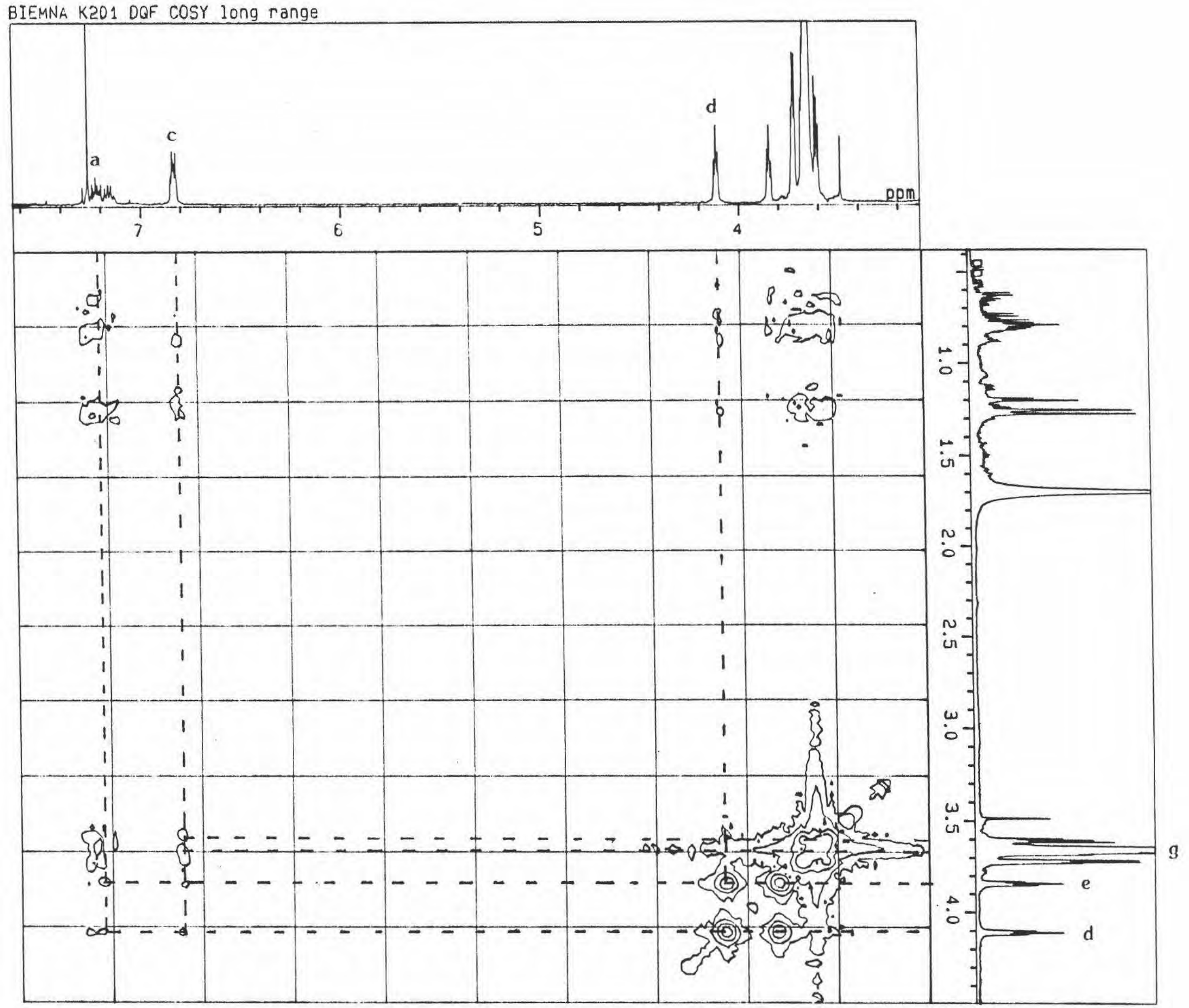



Figure 19. The partial DQF long range spectrum of F201

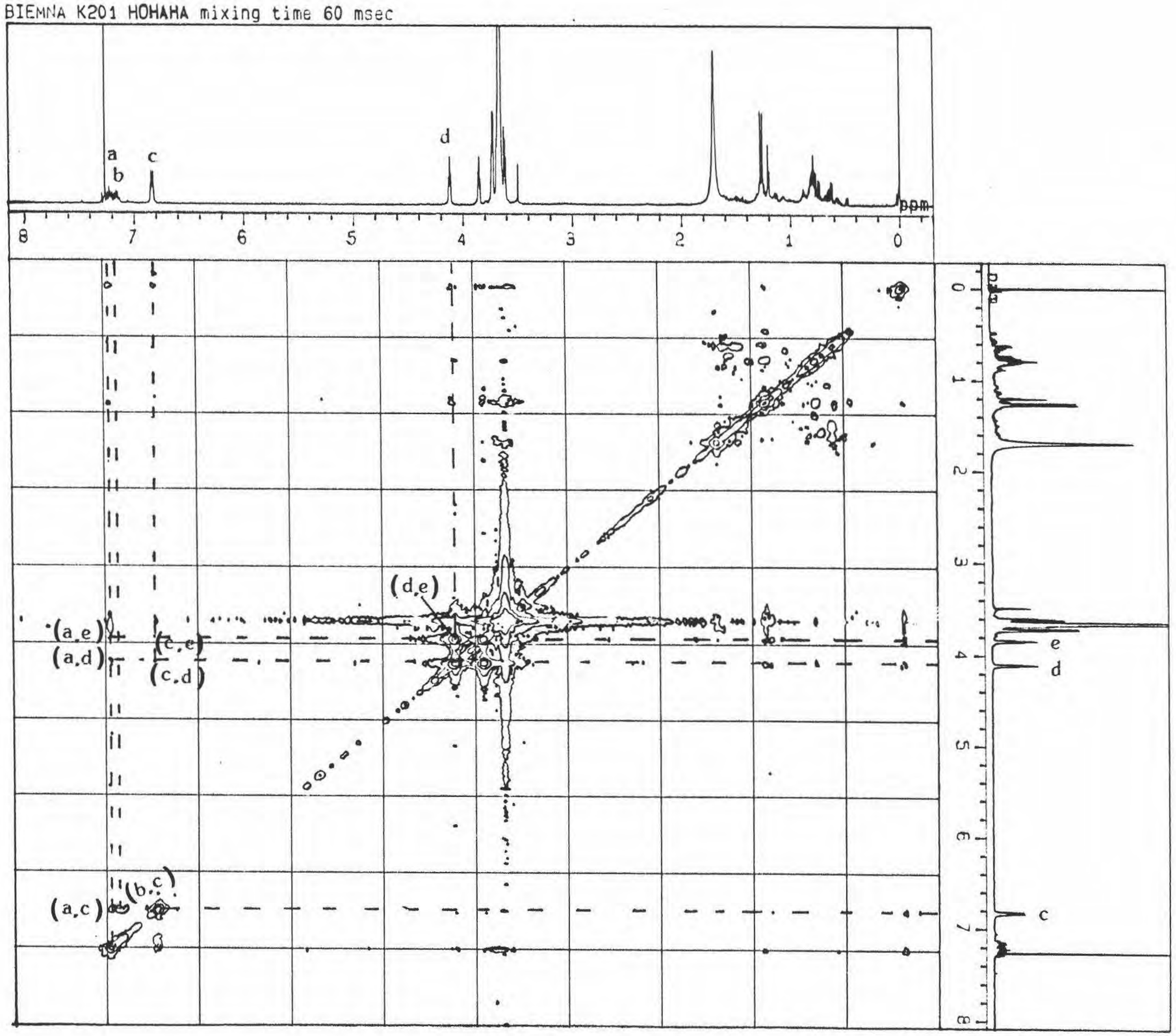
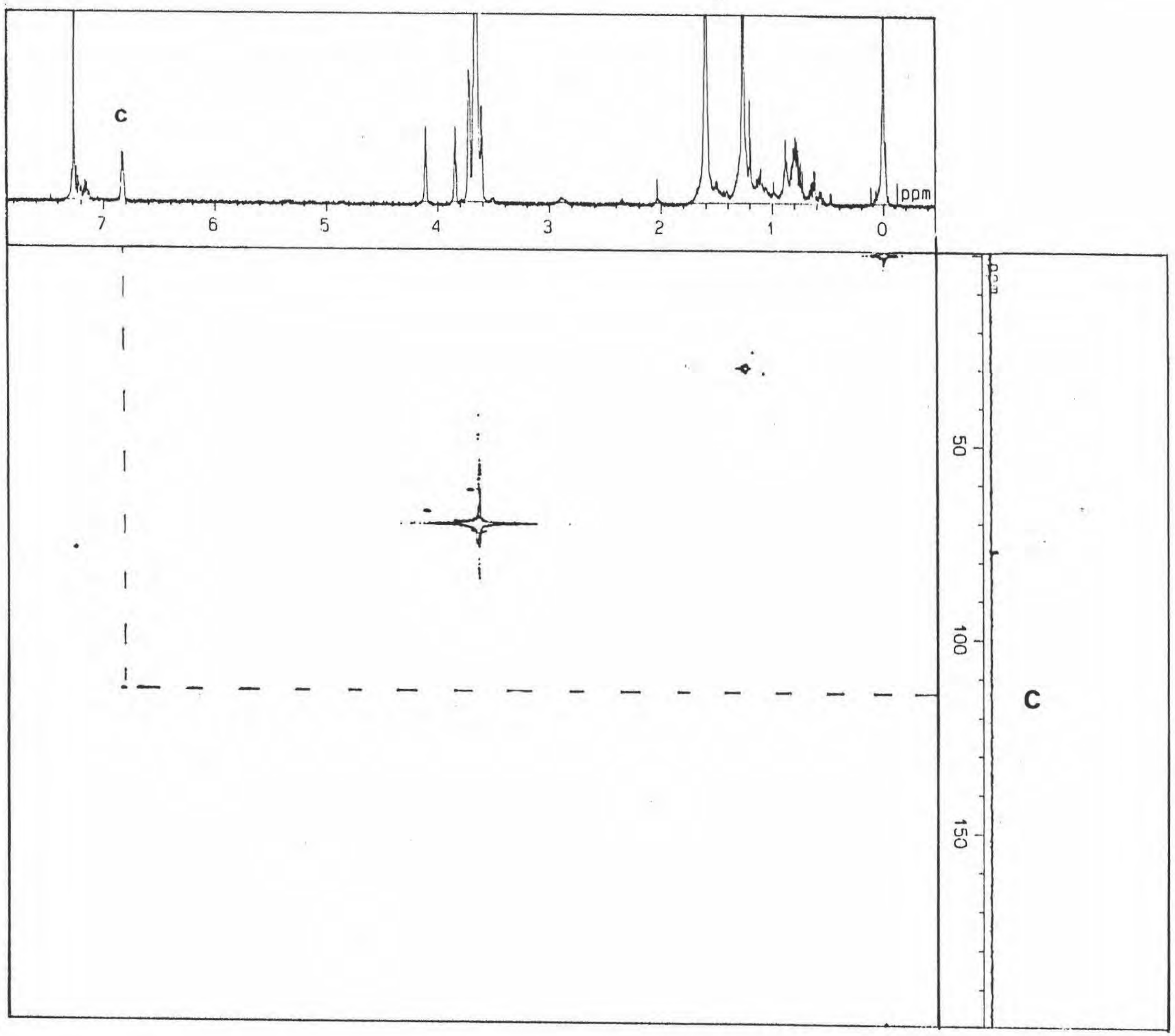



Figure 20. The HOHAHA spectrum of F201




$\text{-[O-CH}_2\text{-CH}_2\text{]}_n\text{-}$

Figure 21. The HMQC spectrum of F201

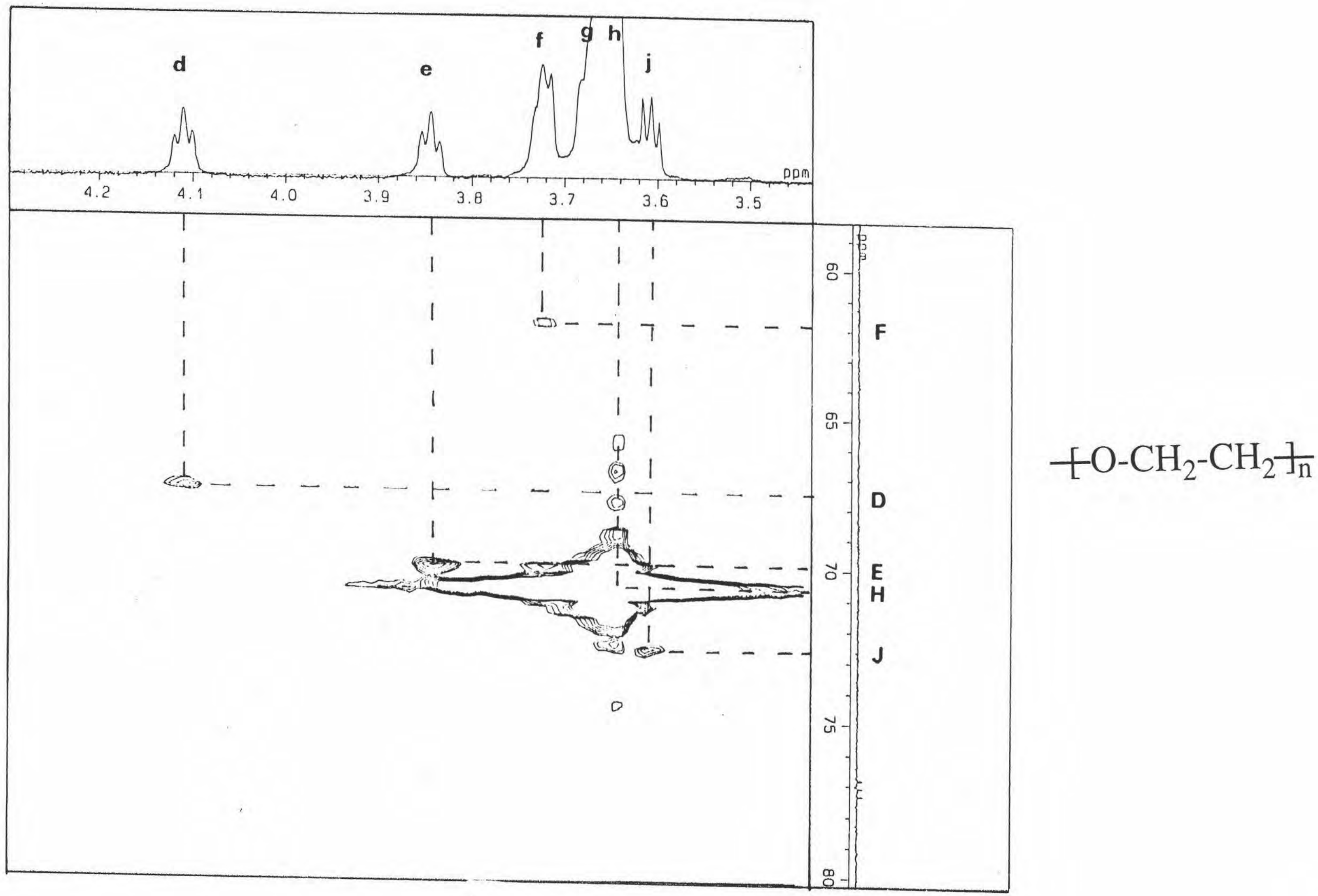



Figure 22. The HMQC spectrum of F201

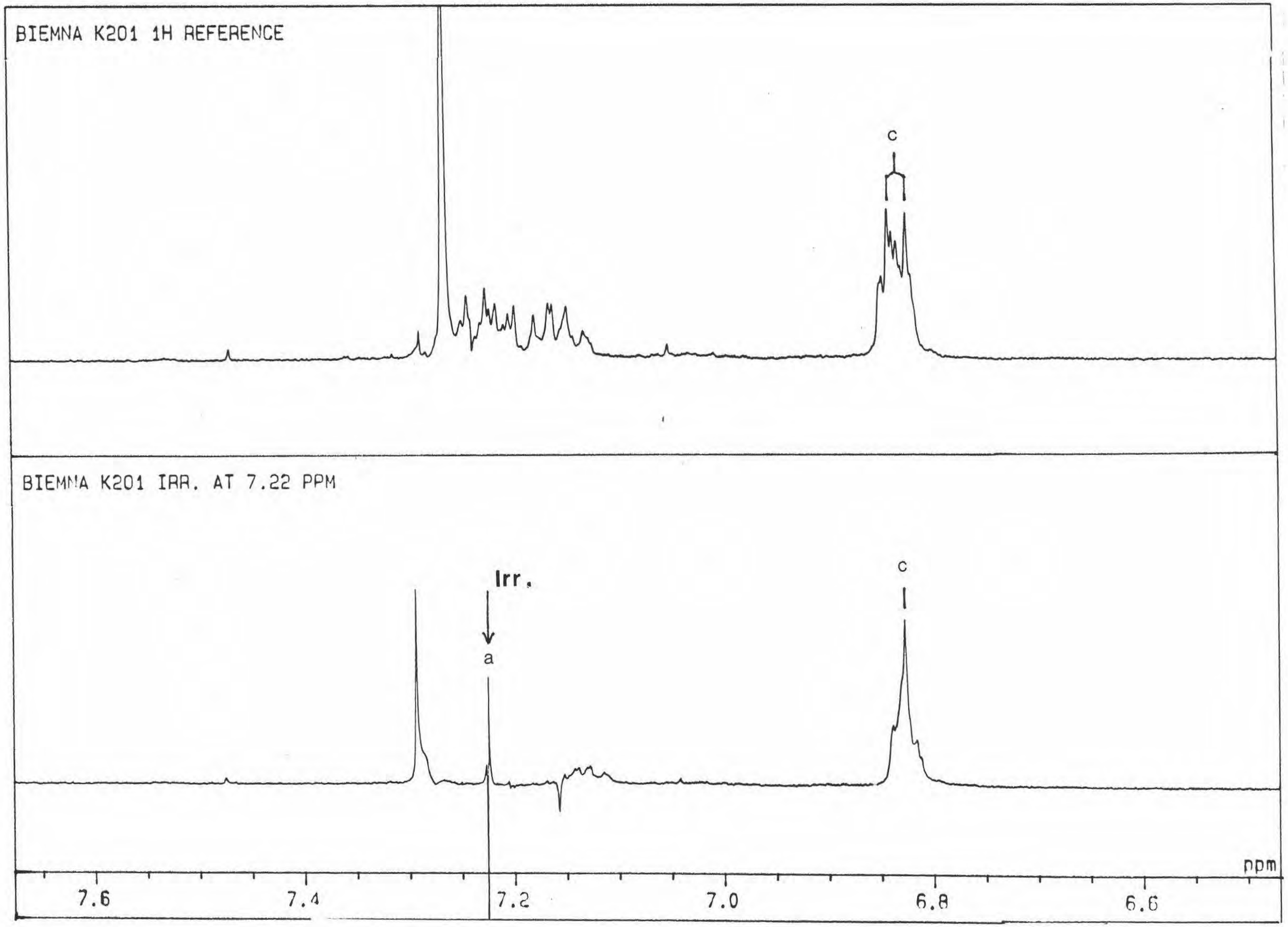



Figure 23. The Decoupling experiment spectrum of F201 (Ha)

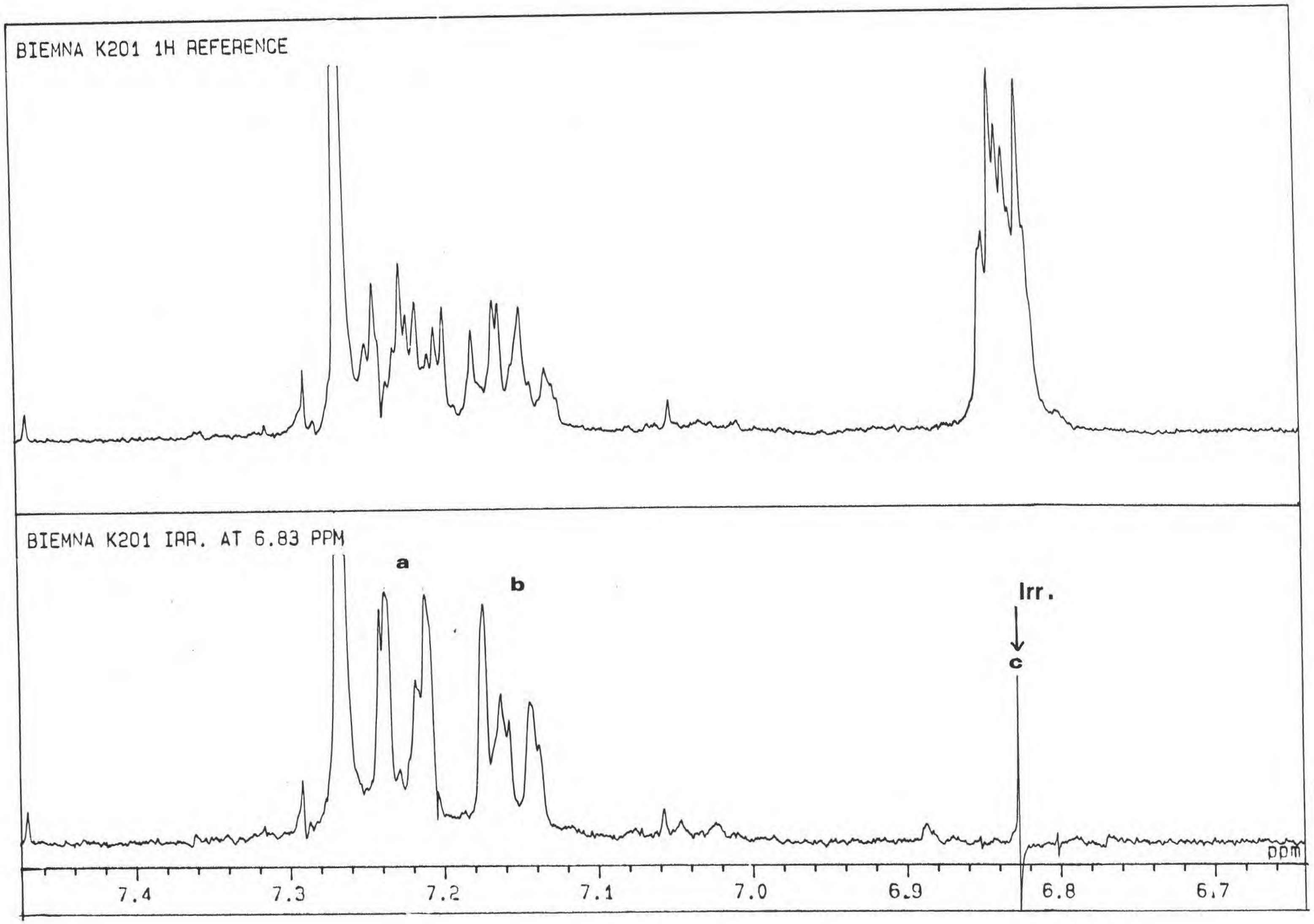



Figure 24. The Decoupling experiment spectrum of F201 (Hc)

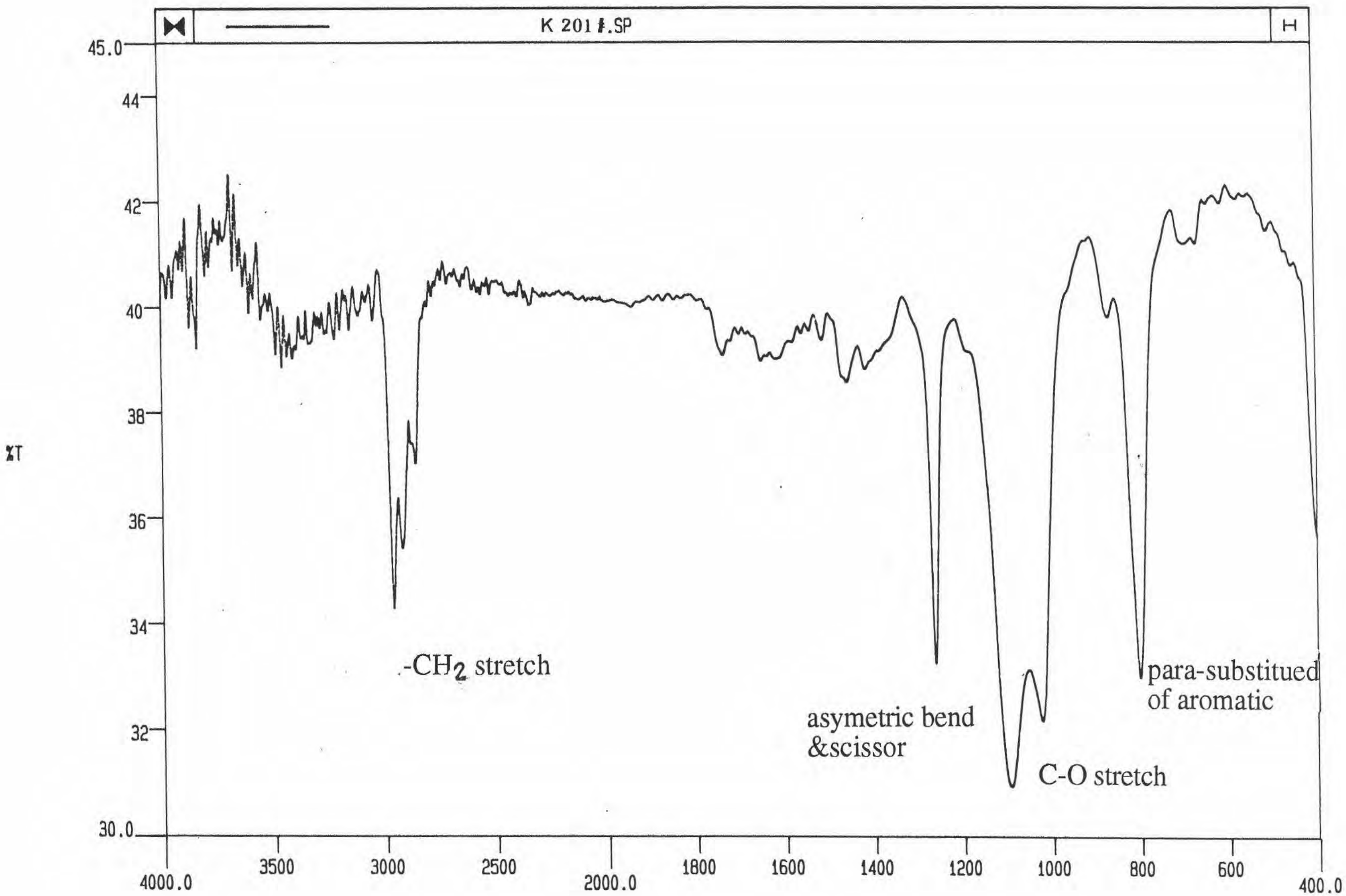



Figure 25. The IR spectrum of F201 (KBr disc)

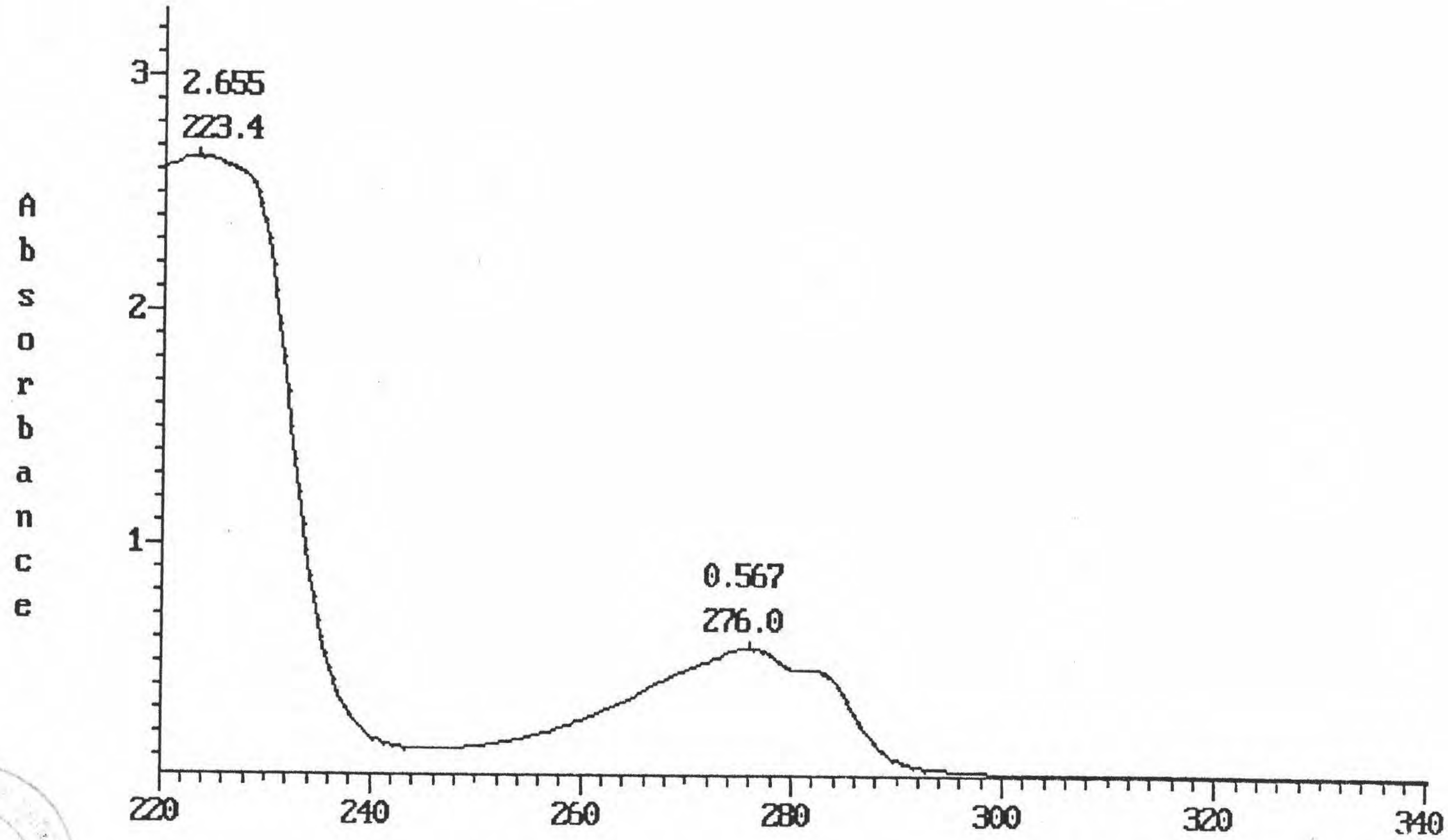



Figure 26. The UV spectrum of F201 in chloroform

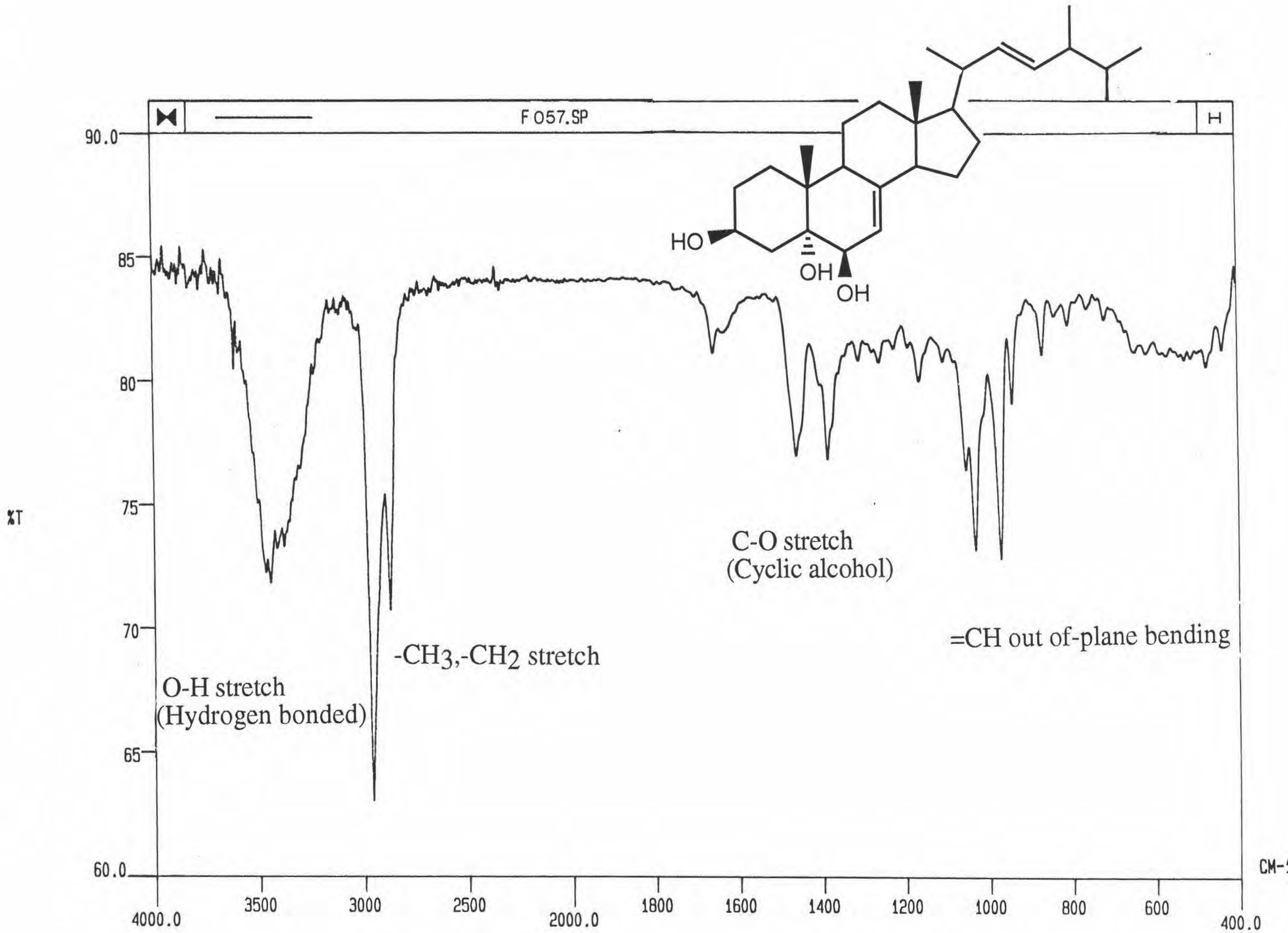



Figure 27. The IR spectrum of K057 (KBr disc)

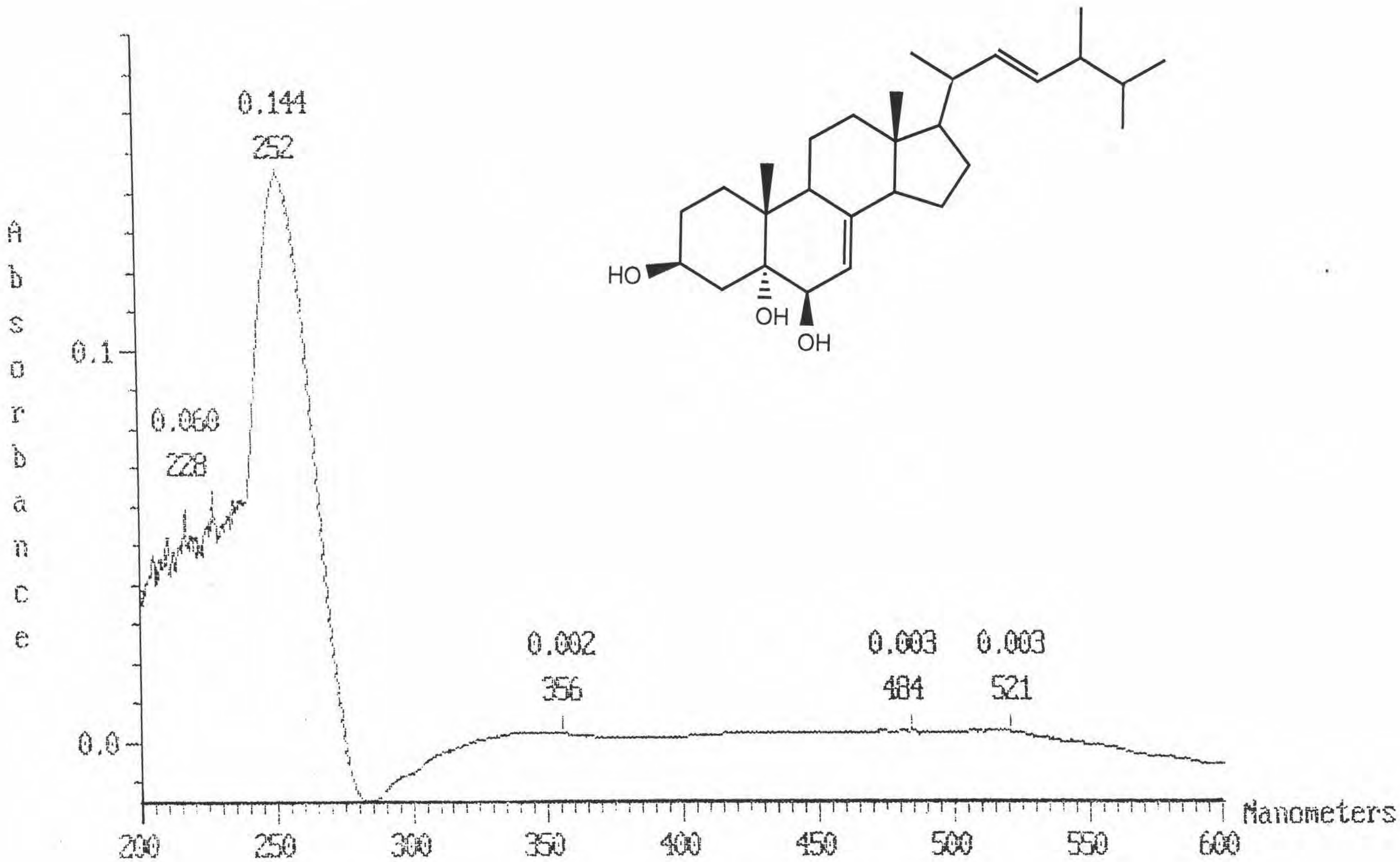



Figure 28. The UV spectrum of K057 in chloroform

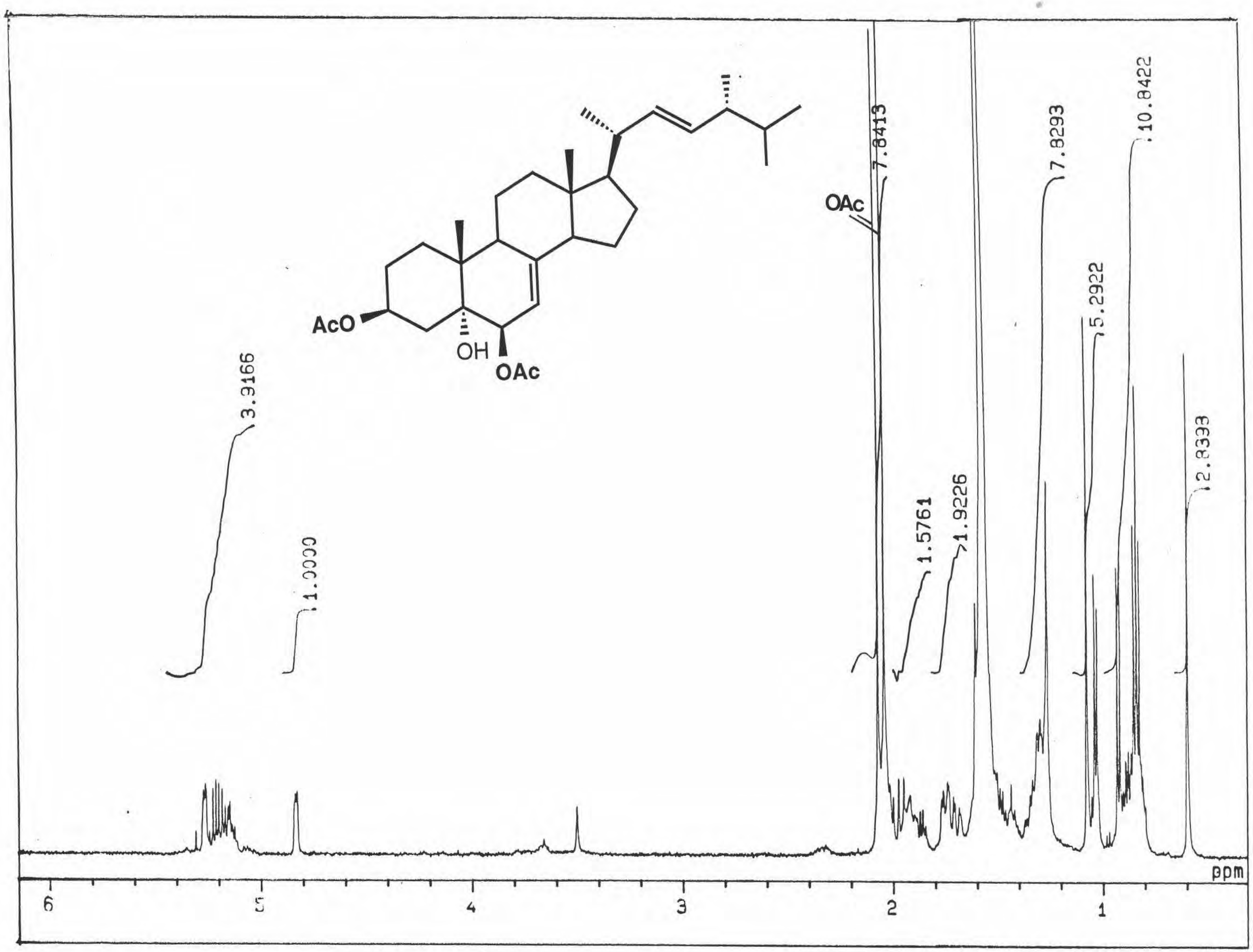



Figure 29. The 500 MHz $^{1}H$ NMR spectrum of K057 (Acetate) in 30% $CD_3OD$ in $CDCl_3$

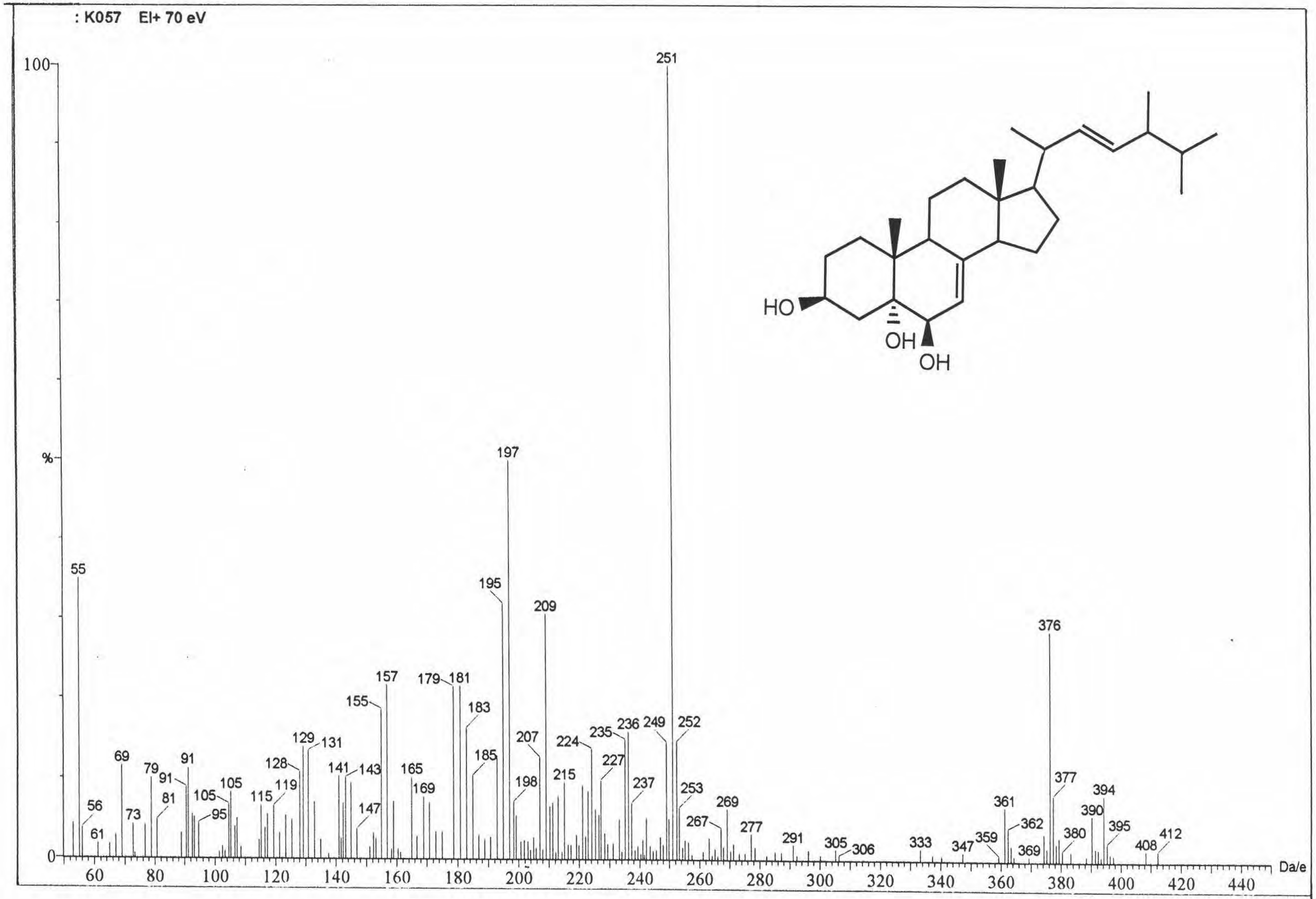



Figure 30. The EIMS spectrum of K057

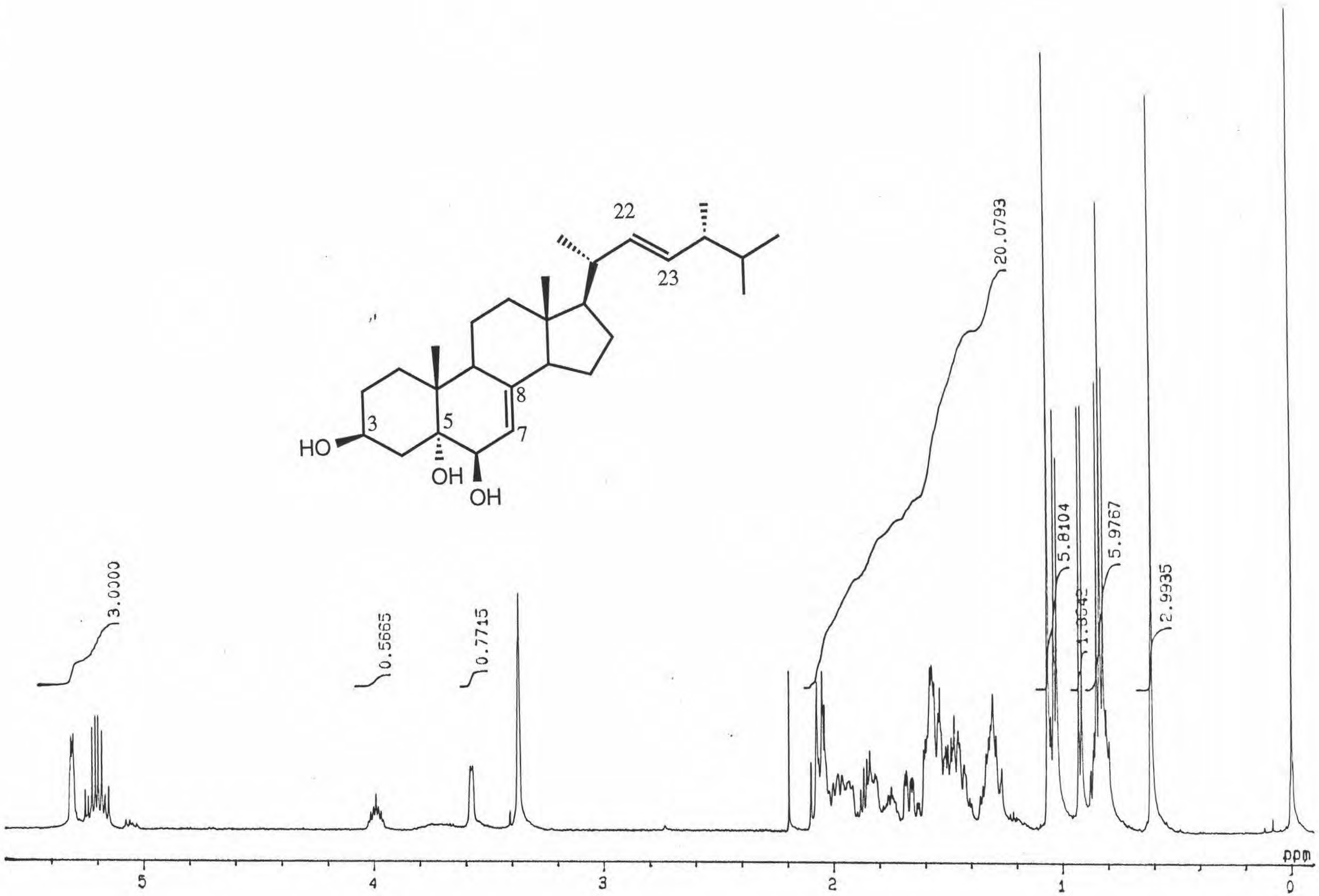



Figure 31. The 500 MHz $^{1}$H NMR spectrum of K057 in 30% $CD_3OD$ in $CDCl_3$

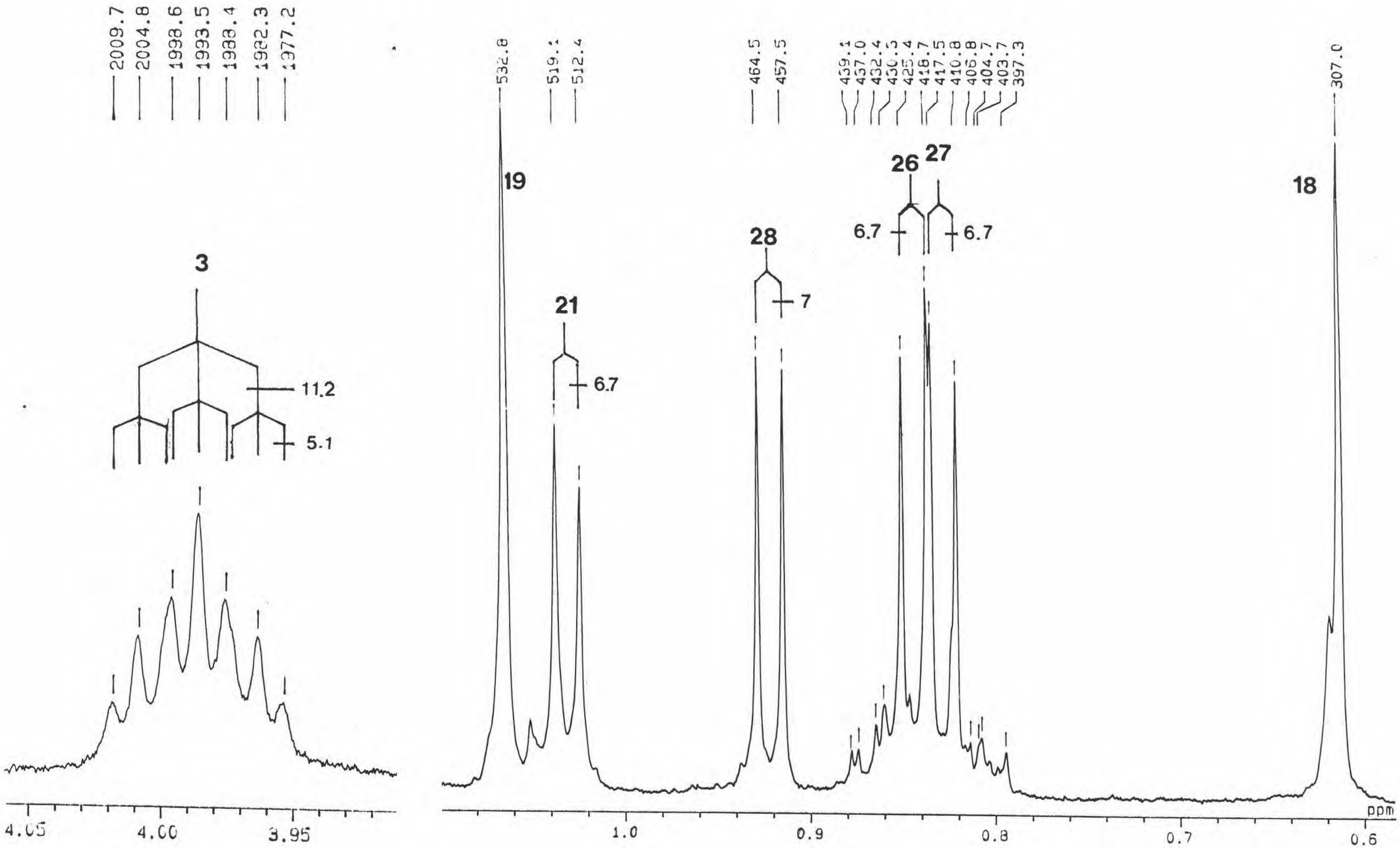



Figure 32. The 500 MHz $^{1}H$ NMR spectrum of K057 in 30% $CD_3OD$ in $CDCl_3$ (expanded)

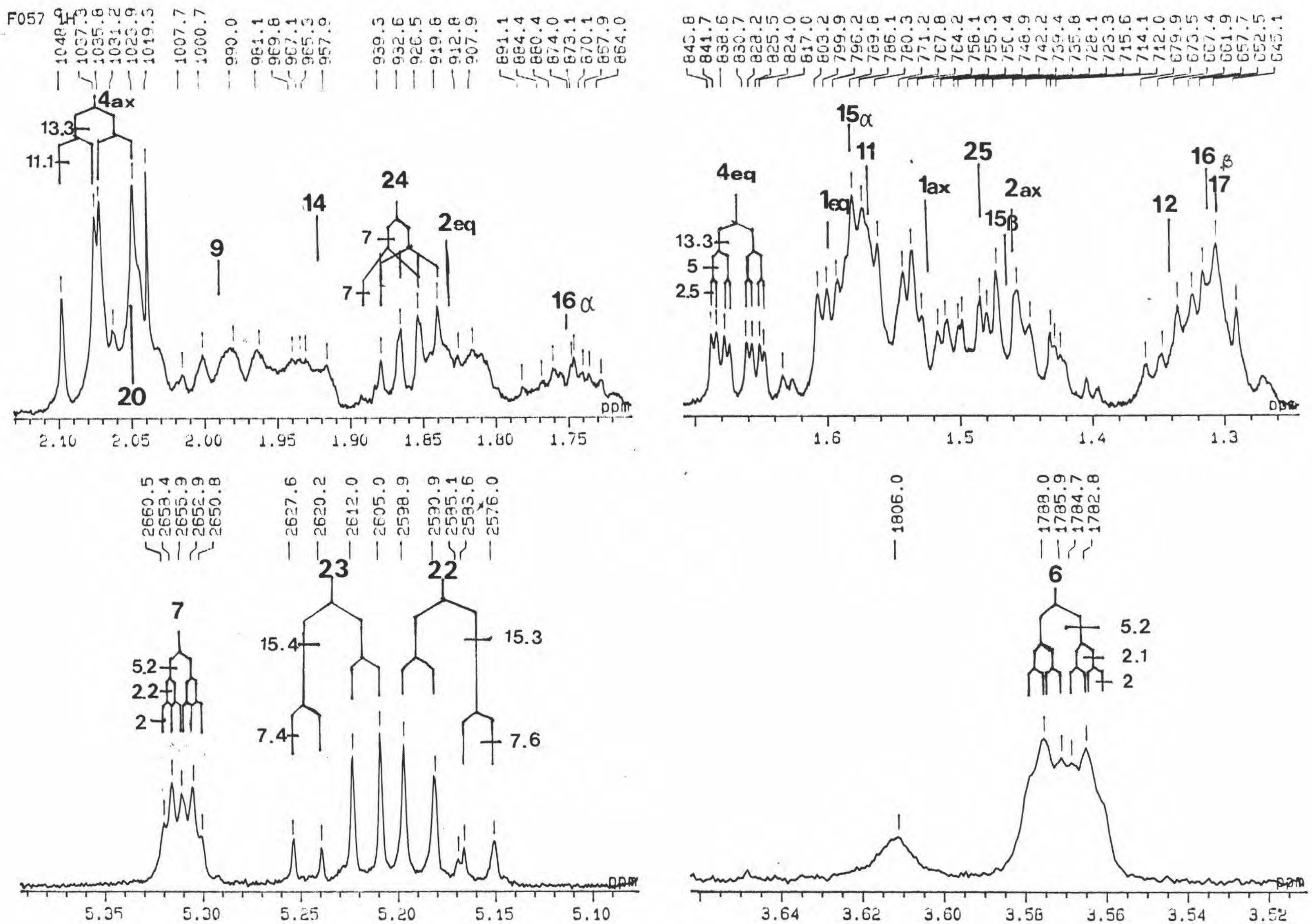



Figure 33. The 500 MHz $^1$H NMR spectrum of K057 in 30% $CD_3OD$ in $CDCl_3$ (expanded)

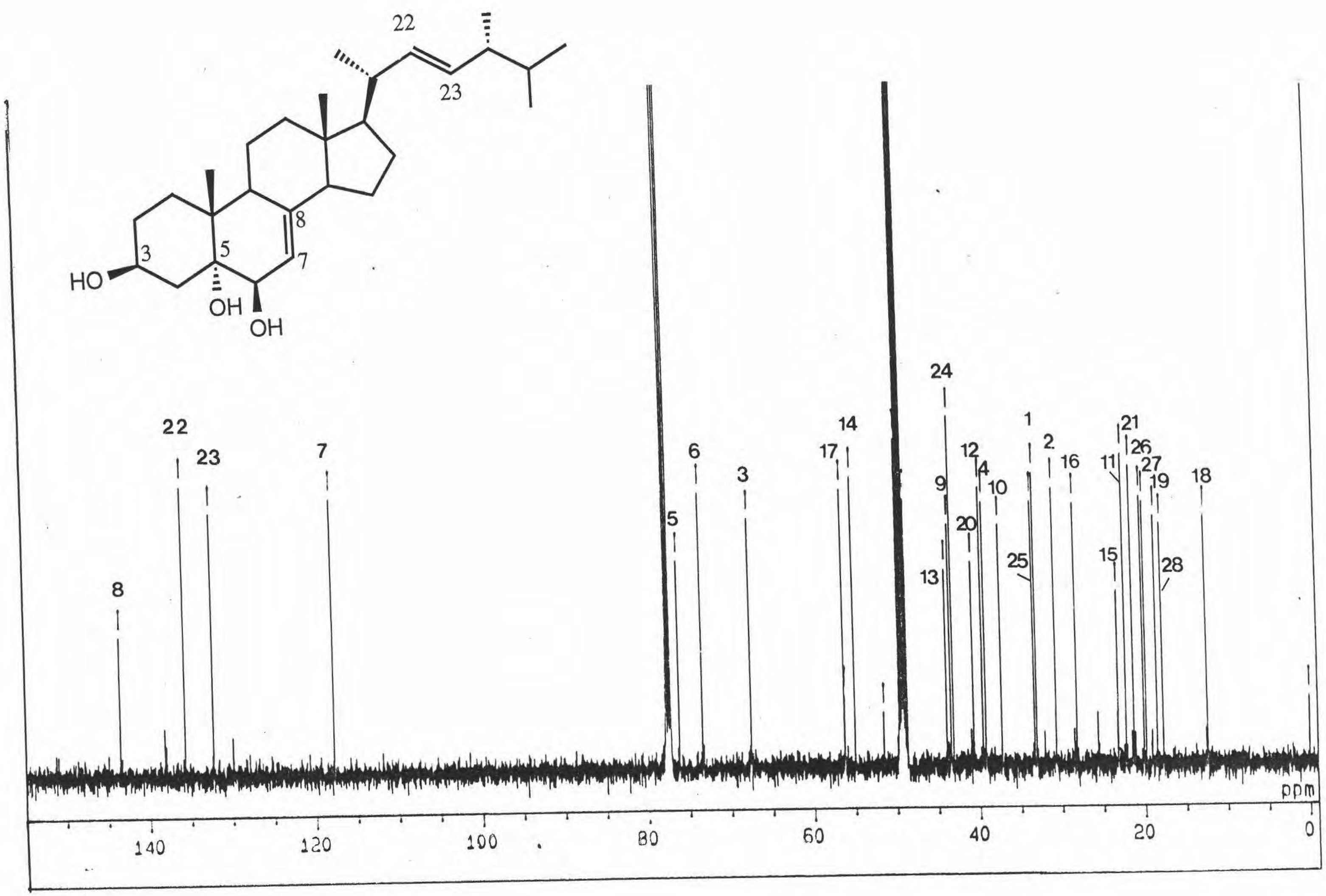



Figure 34. The 125 MHz $^{13}C$ NMR spectrum of K057 in 30% $CD_3OD$ in $CDCl_3$

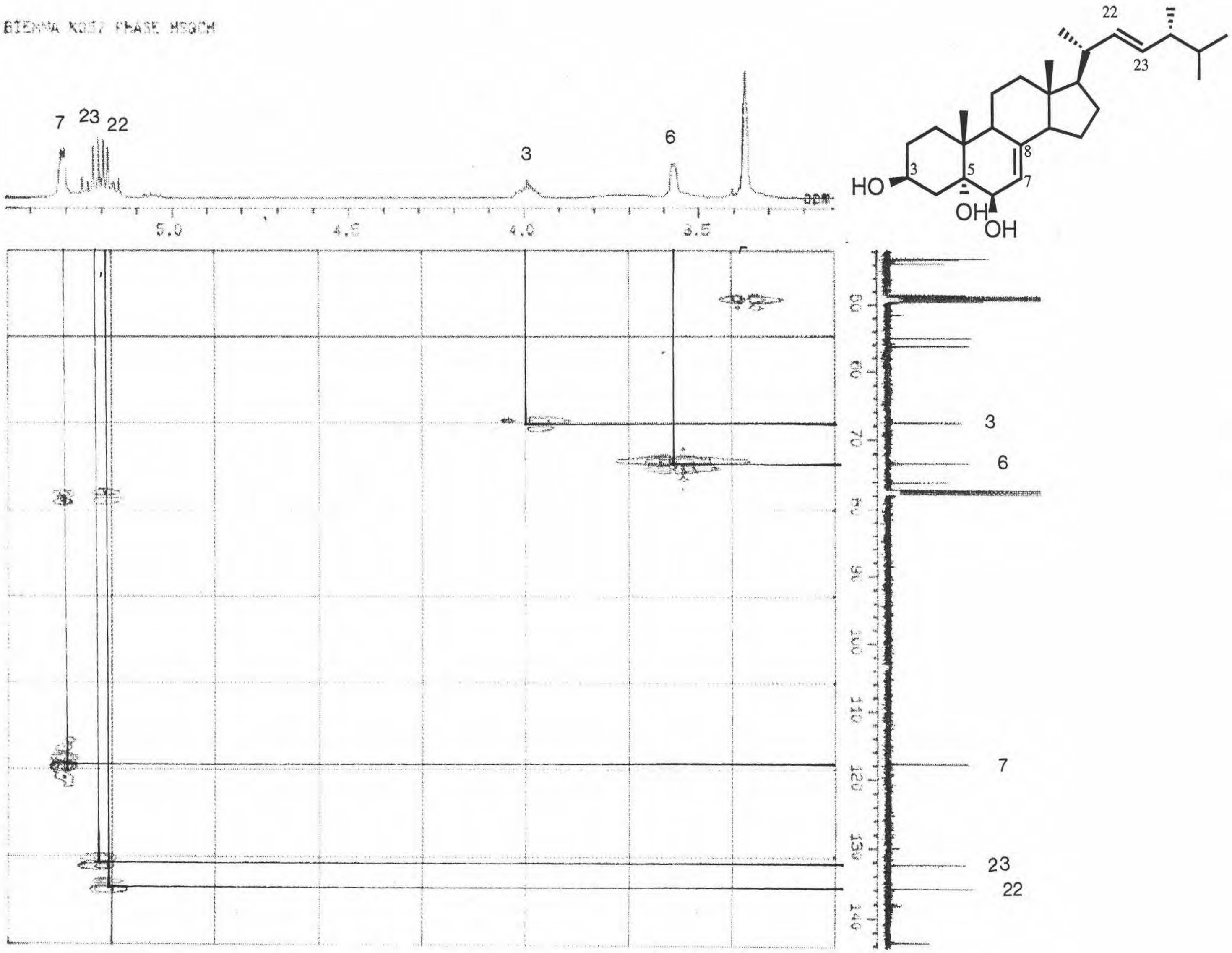



Figure 35. The partial HSQC spectrum ($\delta_H$ 3.0-5.5 ppm) of K057

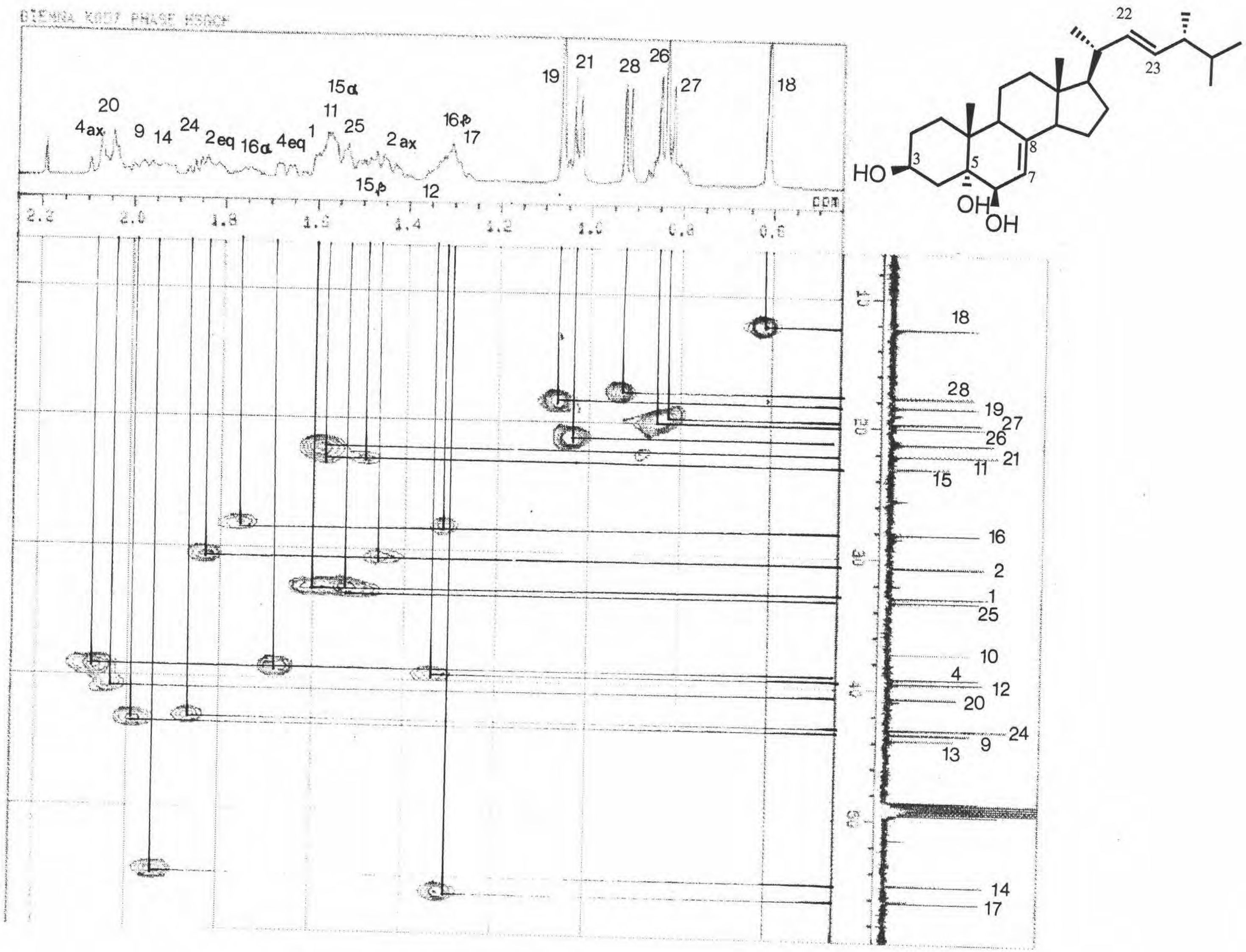



Figure 36. The partial HSQC spectrum ($\delta_H$ 0.45-2.2 ppm) of K057

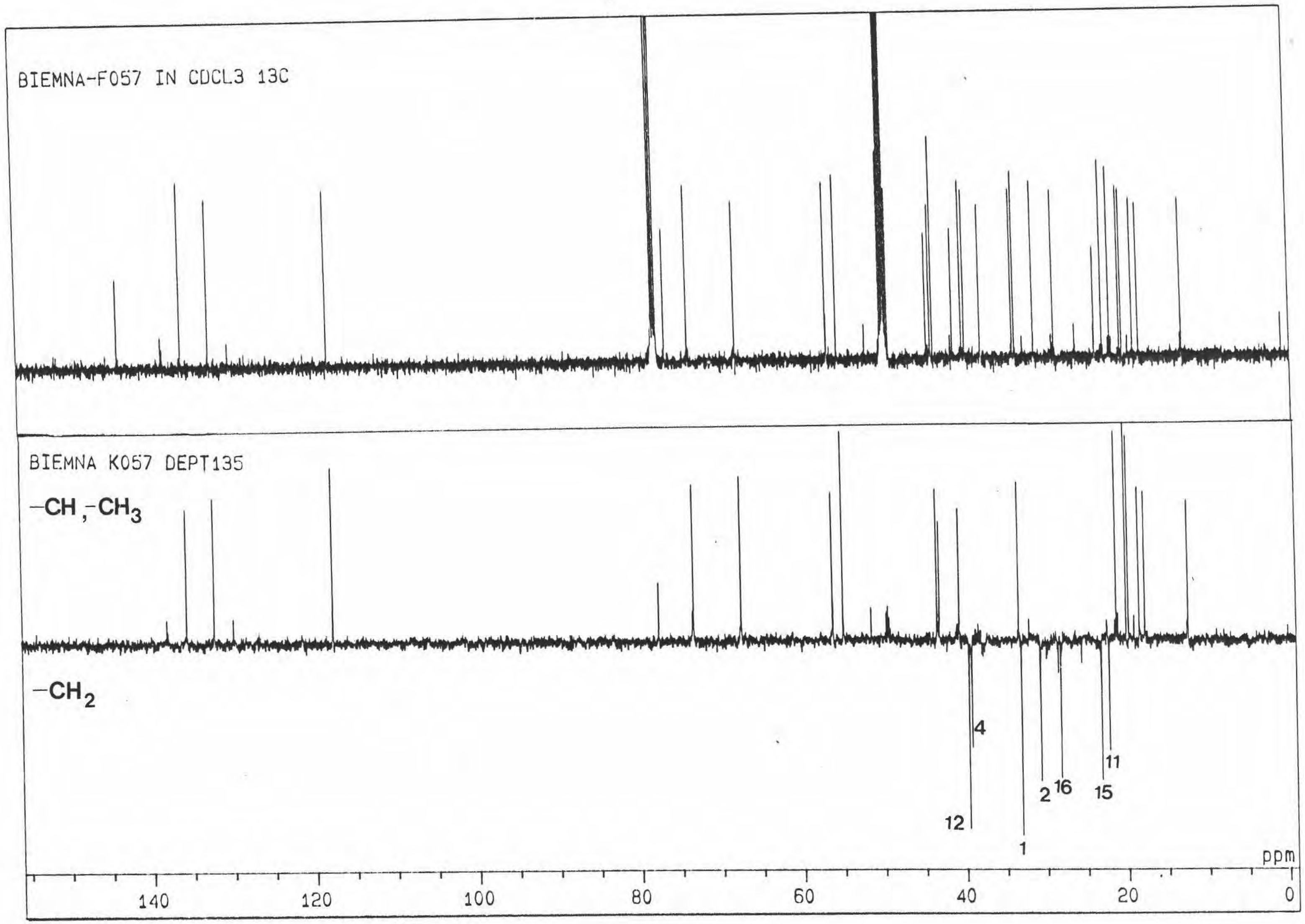



Figure 37. The DEPT 135° spectrum of K057

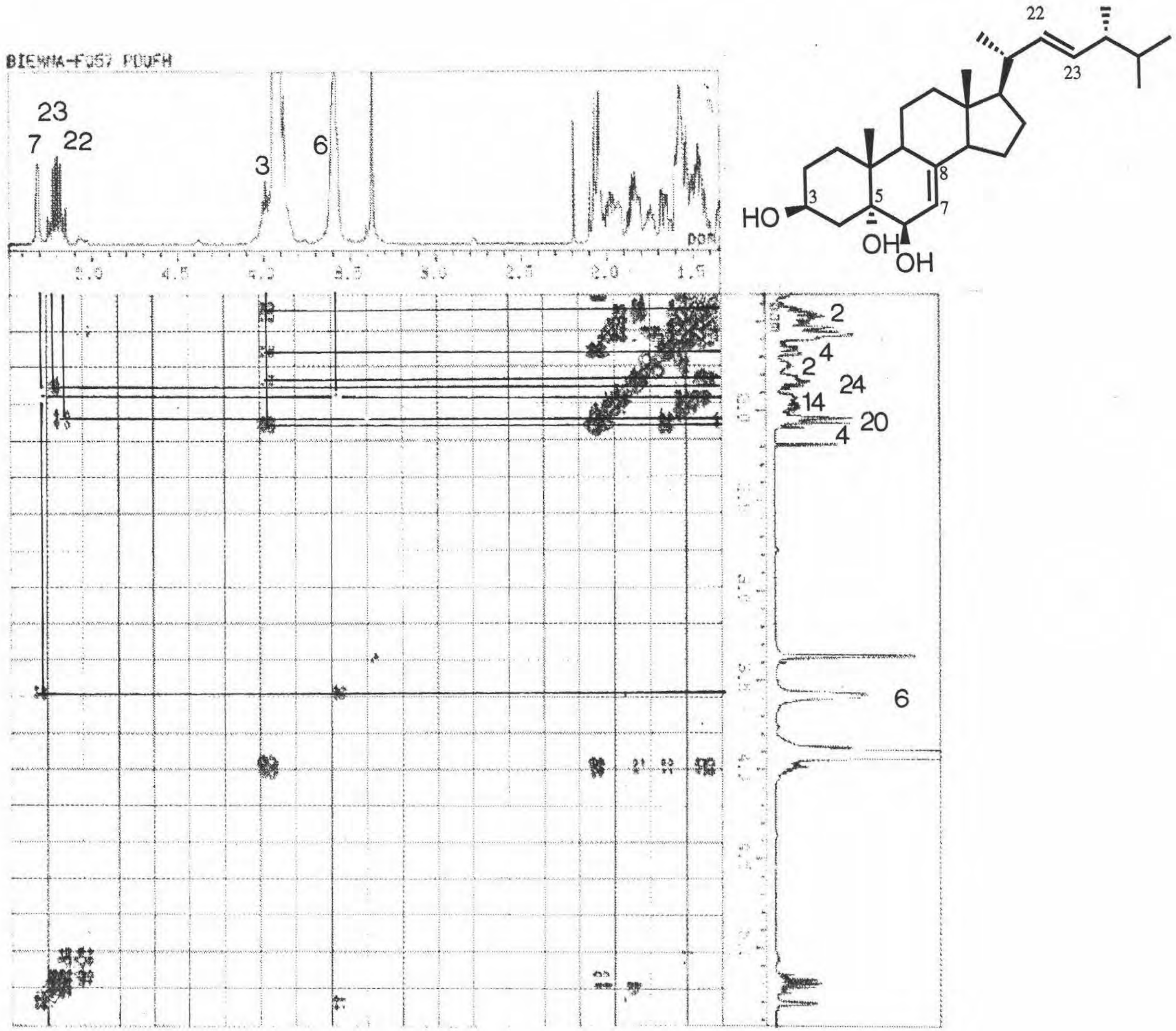



Figure 38. The partial PDQFH spectrum ($\delta_H$ 1.5-5.5 ppm) of K057

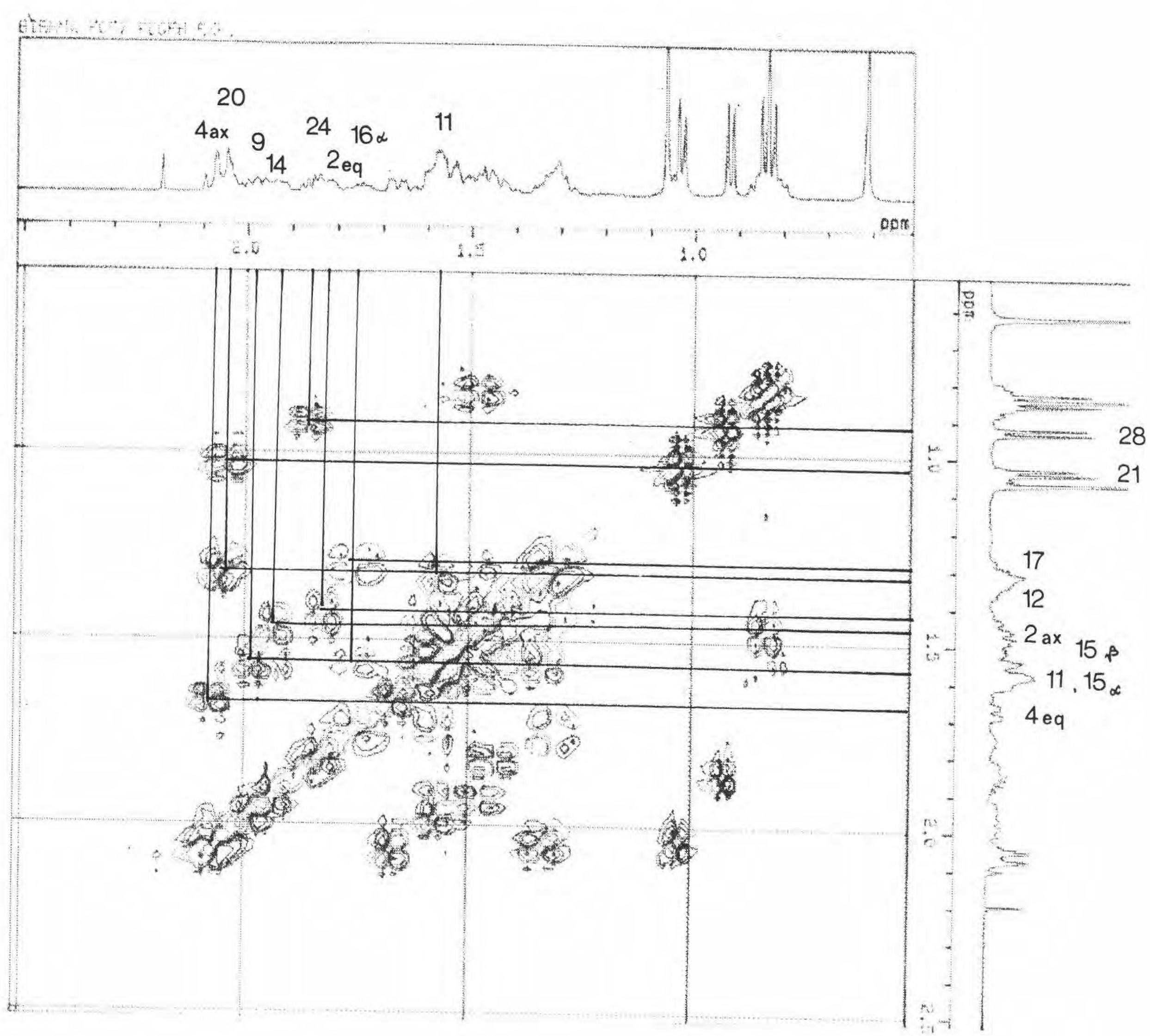



Figure 39. The partial PDQFH spectrum ($\delta_H$ 0-2.5 ppm) of K057

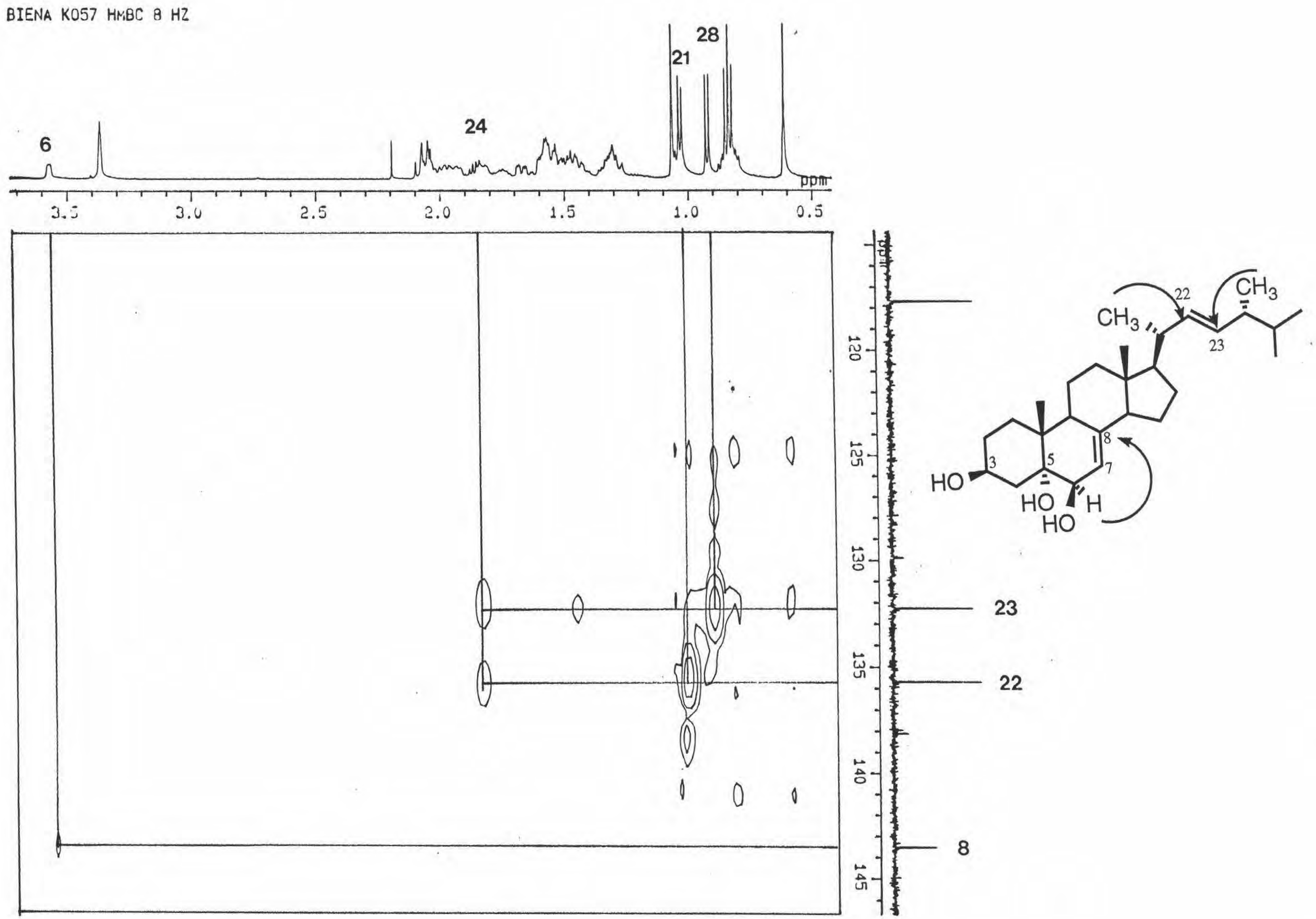



Figure 40. The partial HMBC spectrum of K057 ($^{3}J_{CH}$ = 8Hz)

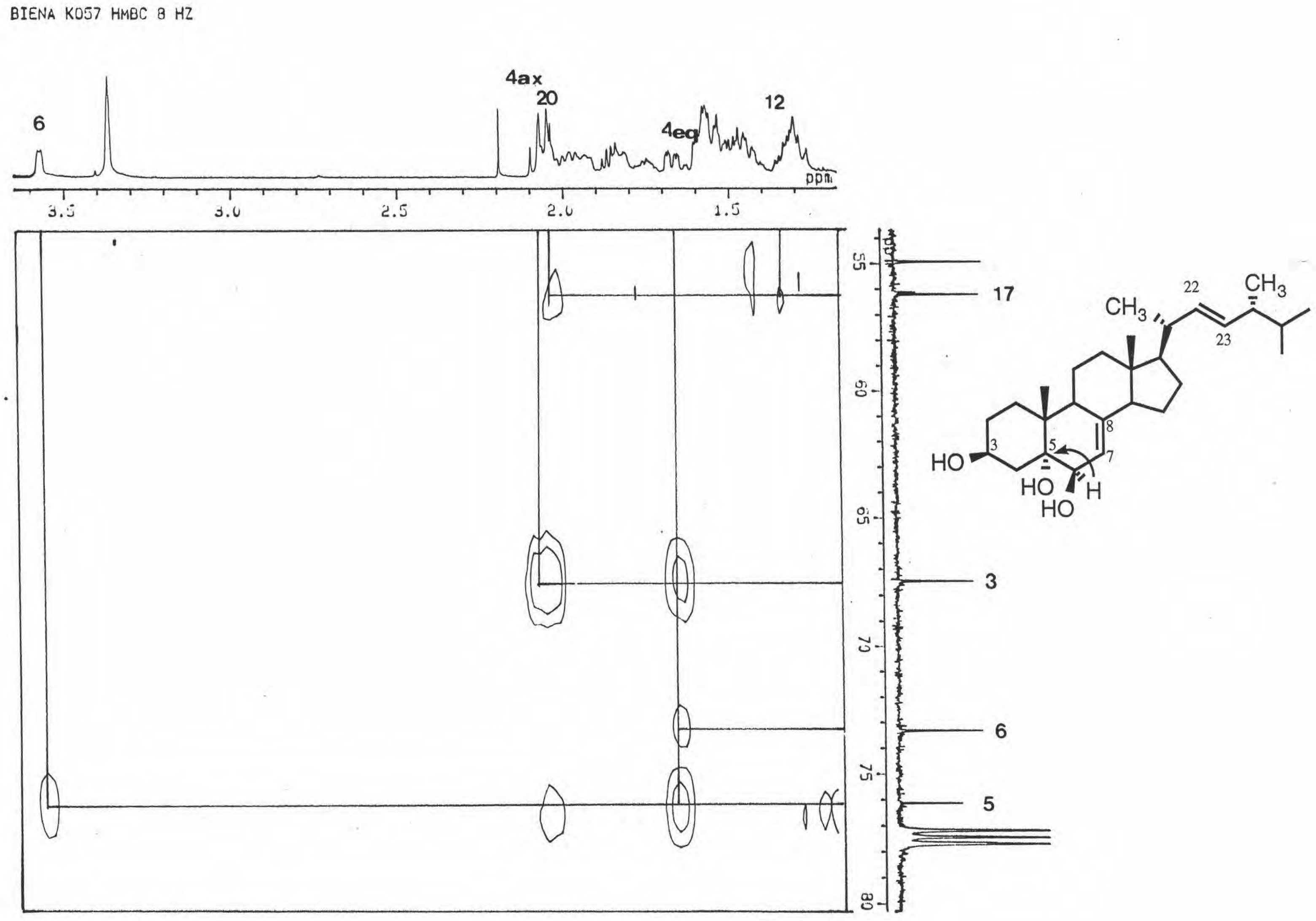



Figure 41. The partial HMBC spectrum of K057 ($^{3}J_{CH}$ = 8Hz)

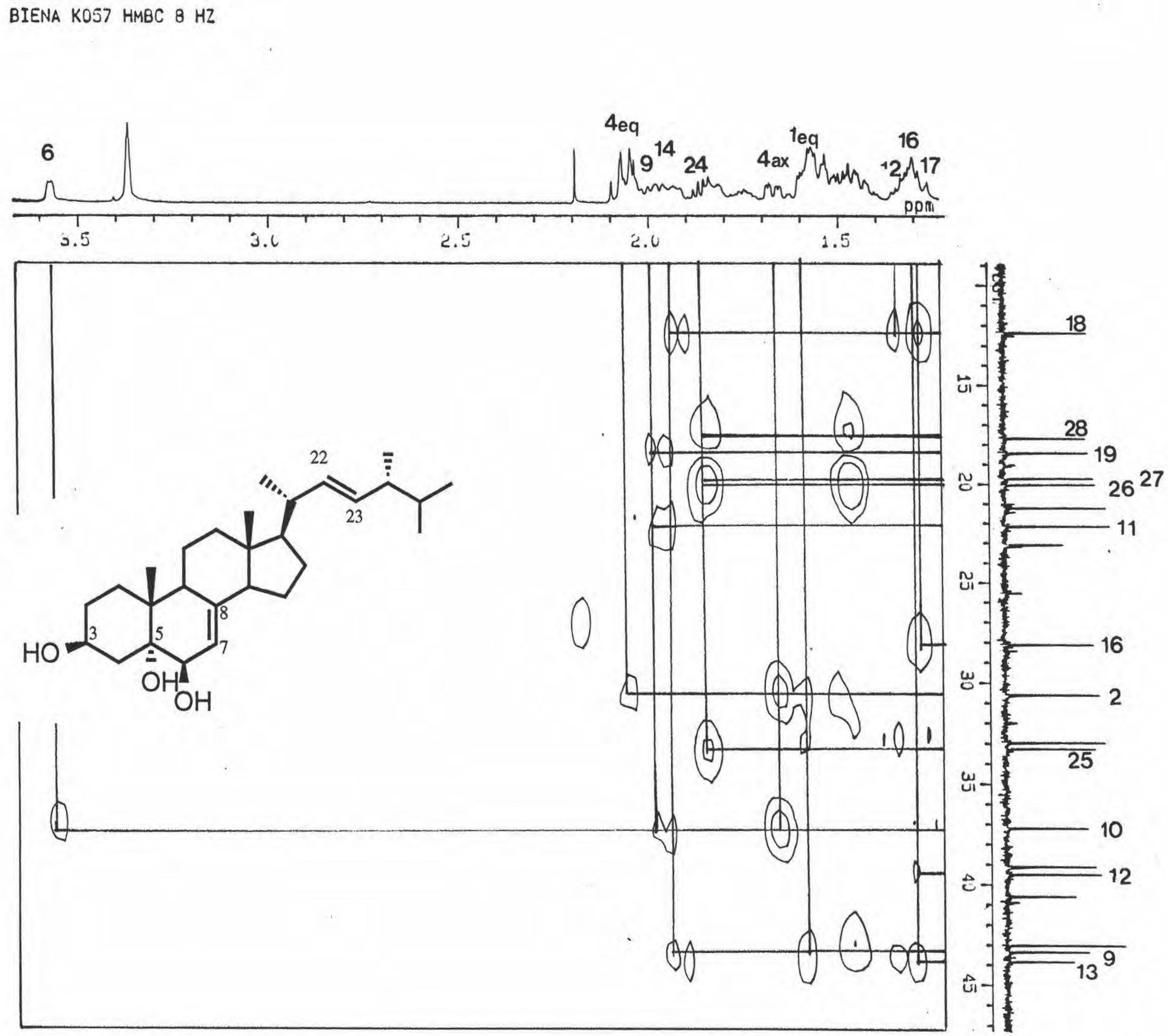



Figure 42. The partial HMBC spectrum of K057 ($^3J_{CH}$ = 8Hz)

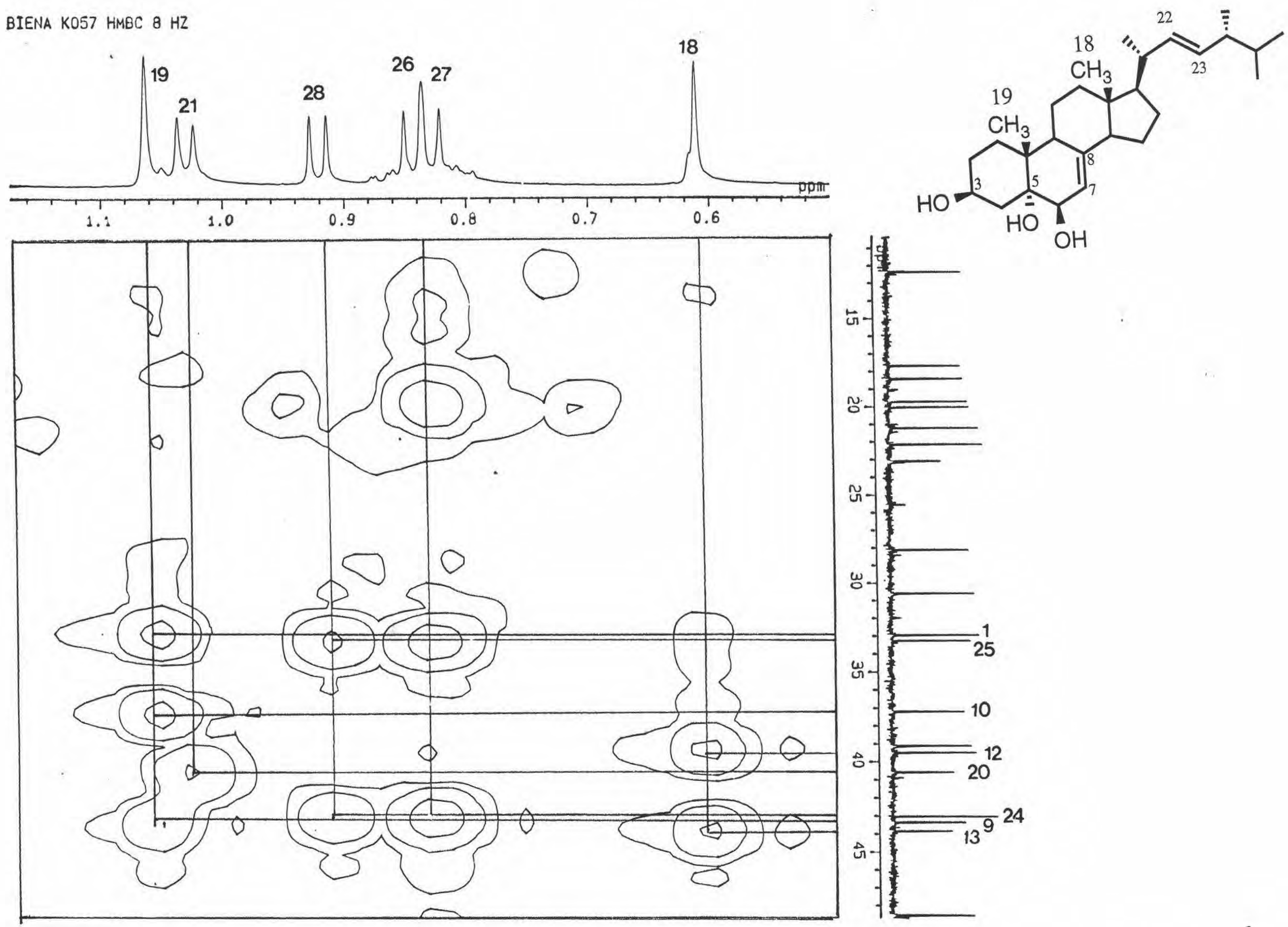



Figure 43. The partial HMBC spectrum of K057 ($^{3}J_{CH}$ = 8Hz)

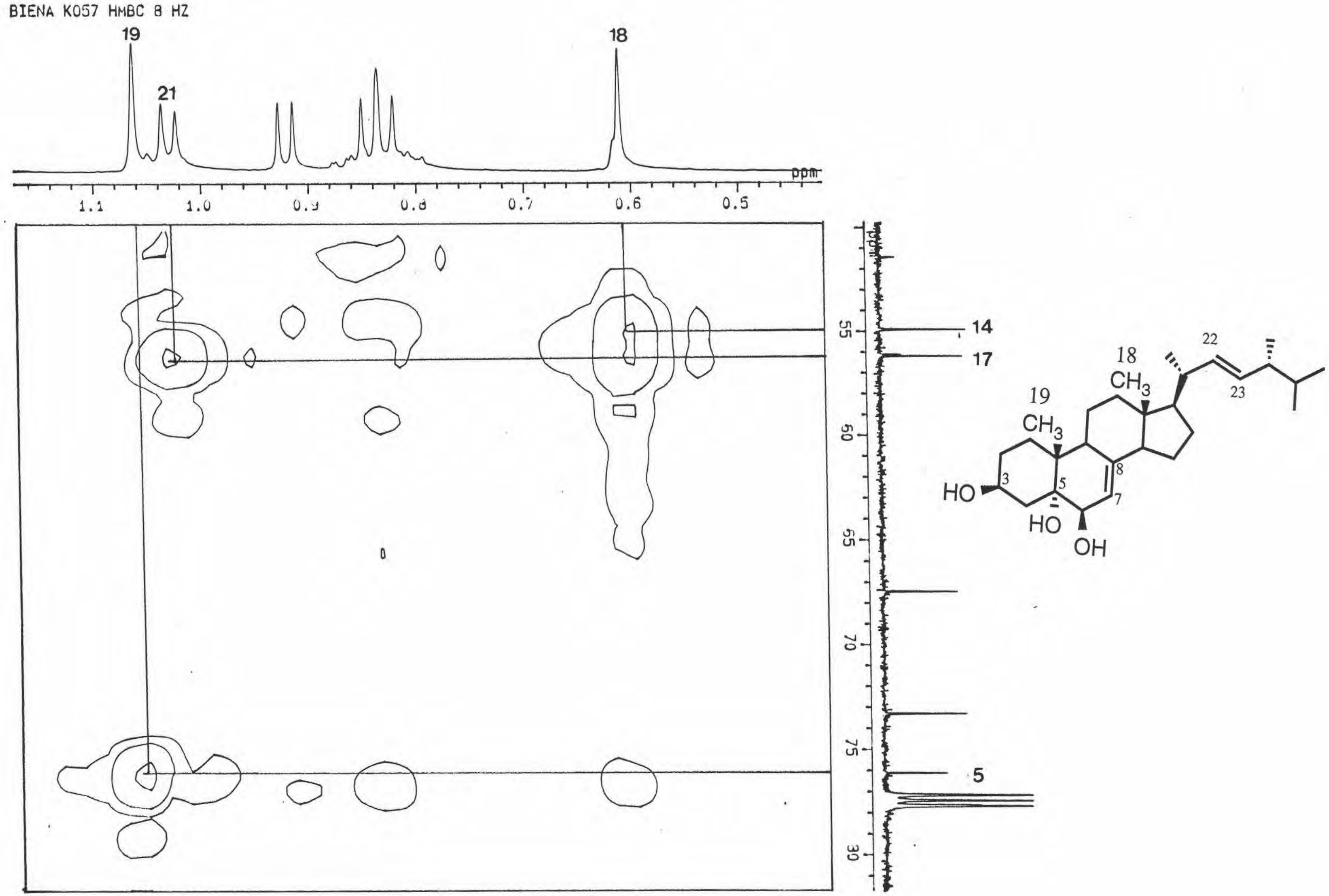



Figure 44. The partial HMBC spectrum of K057 ($^3J_{CH}$ = 8Hz)

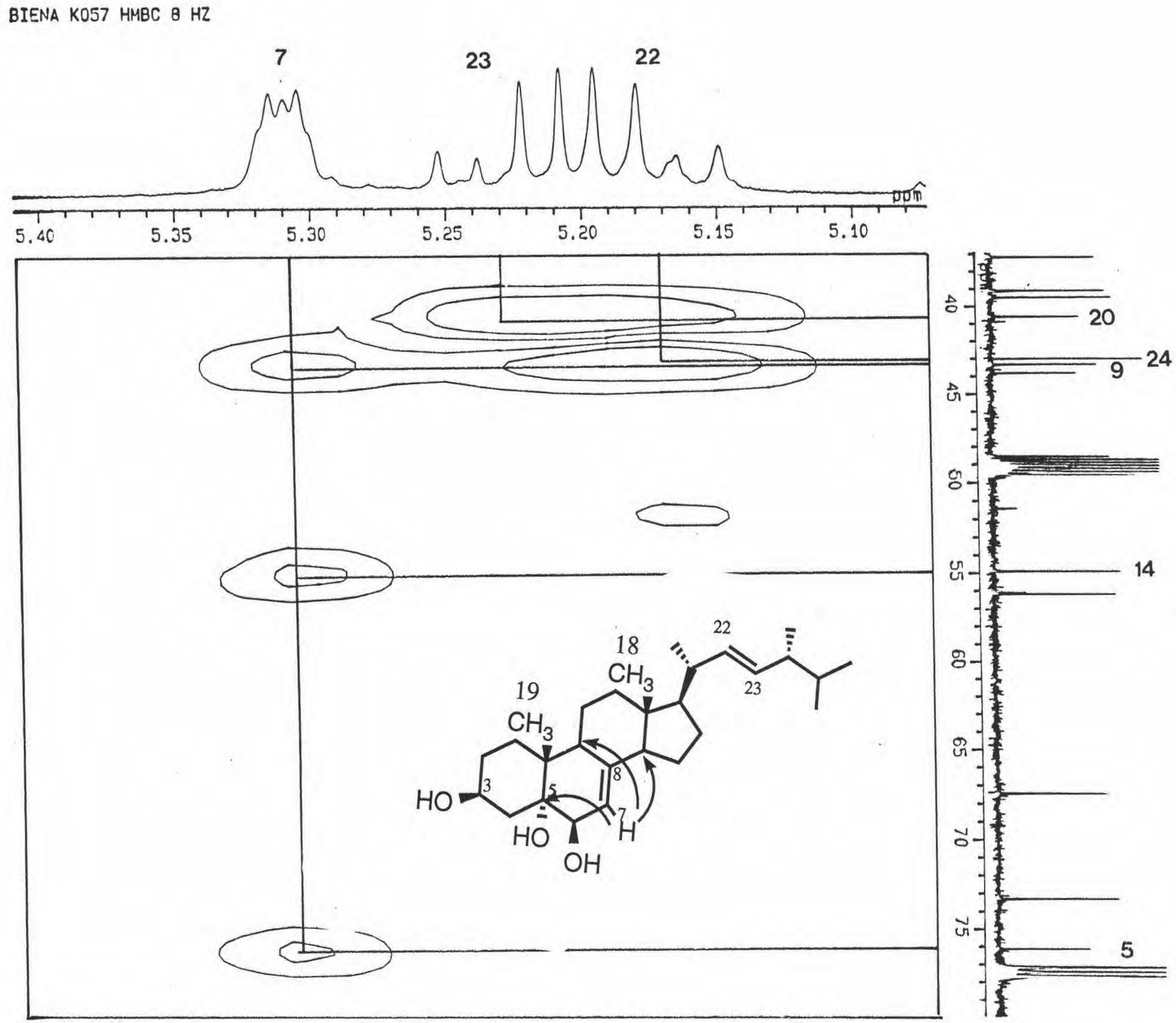



Figure 45. The partial HMBC spectrum of K057 ($^3J_{CH}$ = 8Hz)

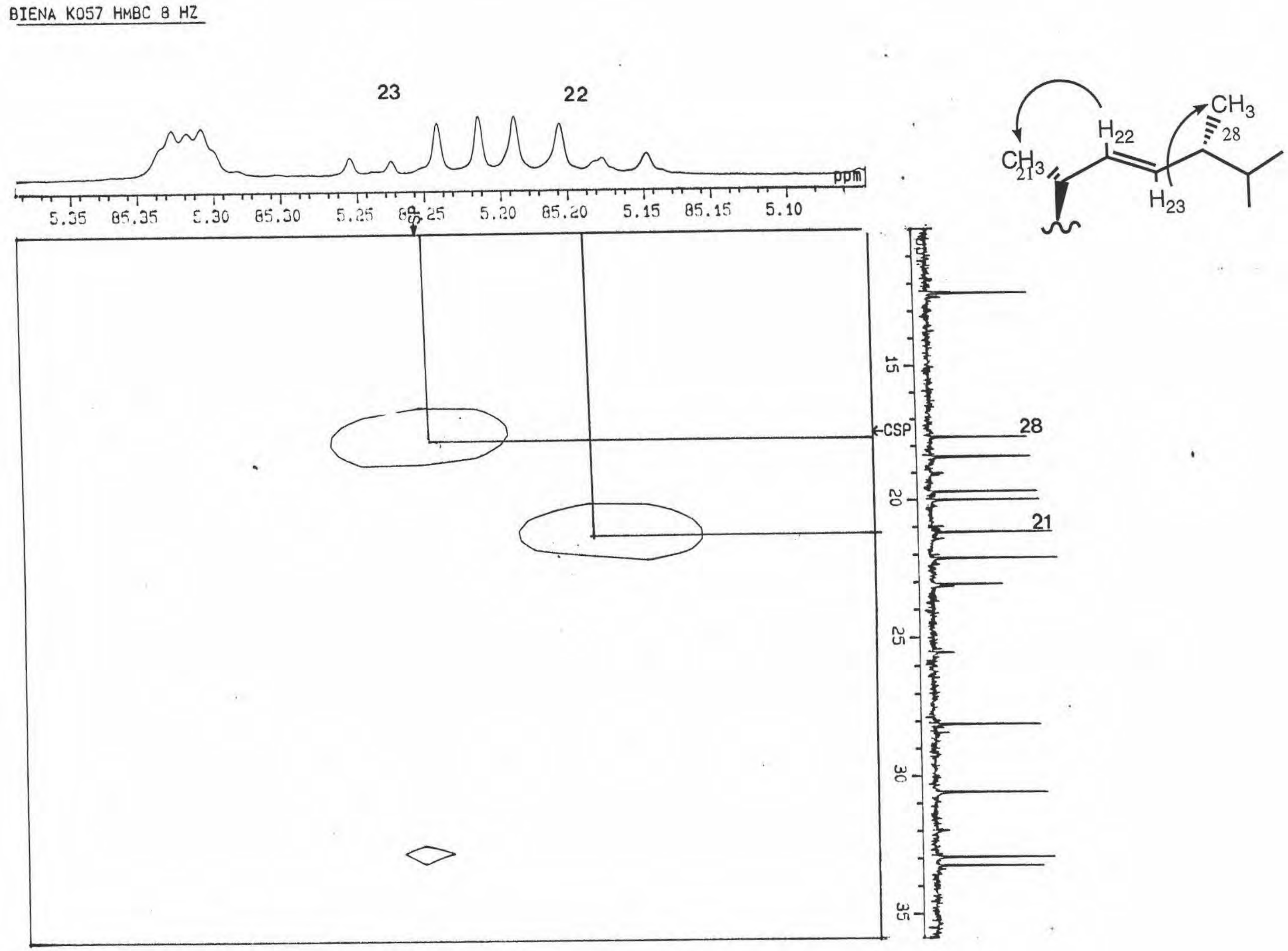



Figure 46. The partial HMBC spectrum of K057 ($^{3}J_{CH}$ = 8Hz)

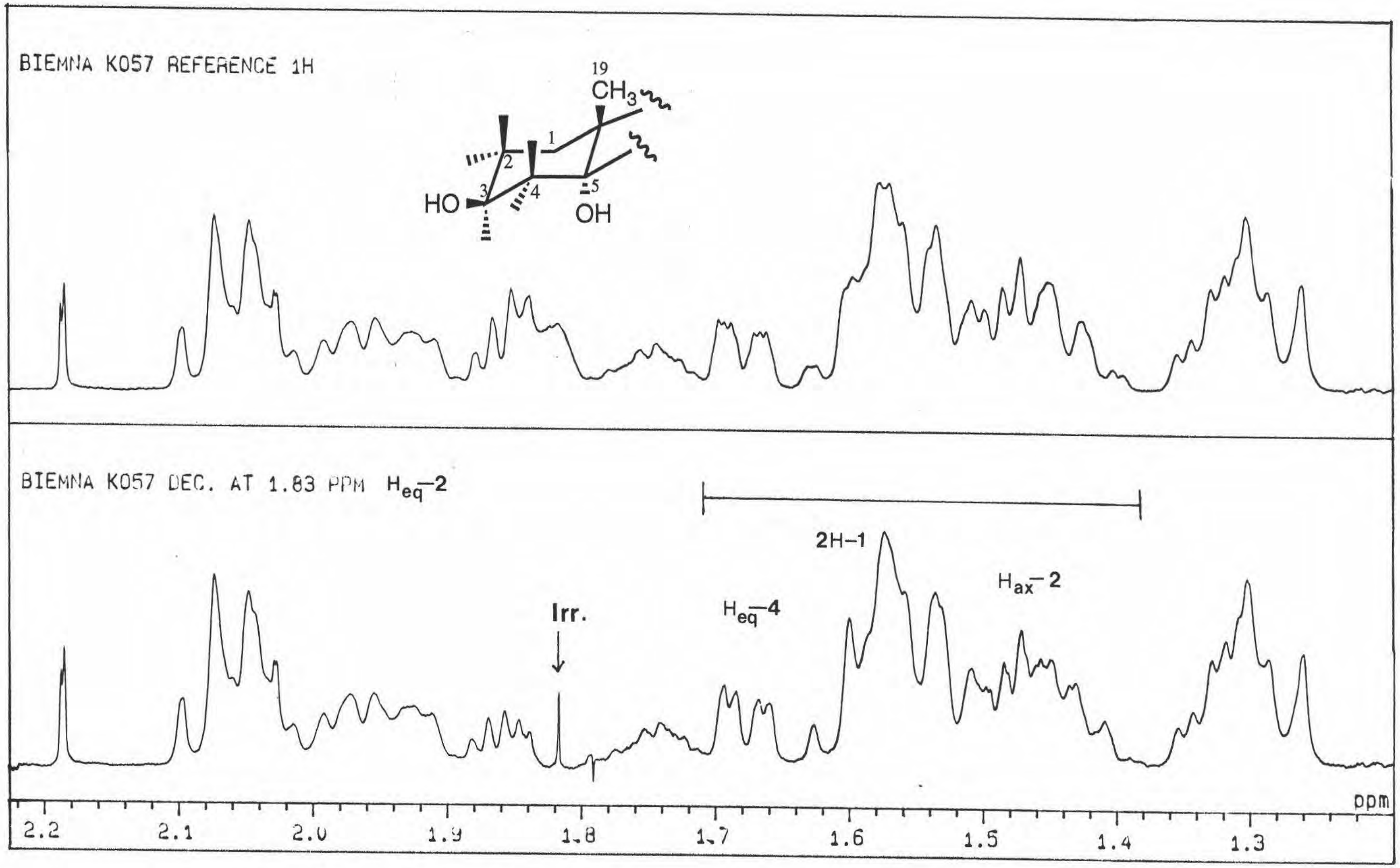



Figure 47. The Decoupling experiment spectrum of K057 ($H_{eq}$-2, δ 2.3-1.1 ppm )

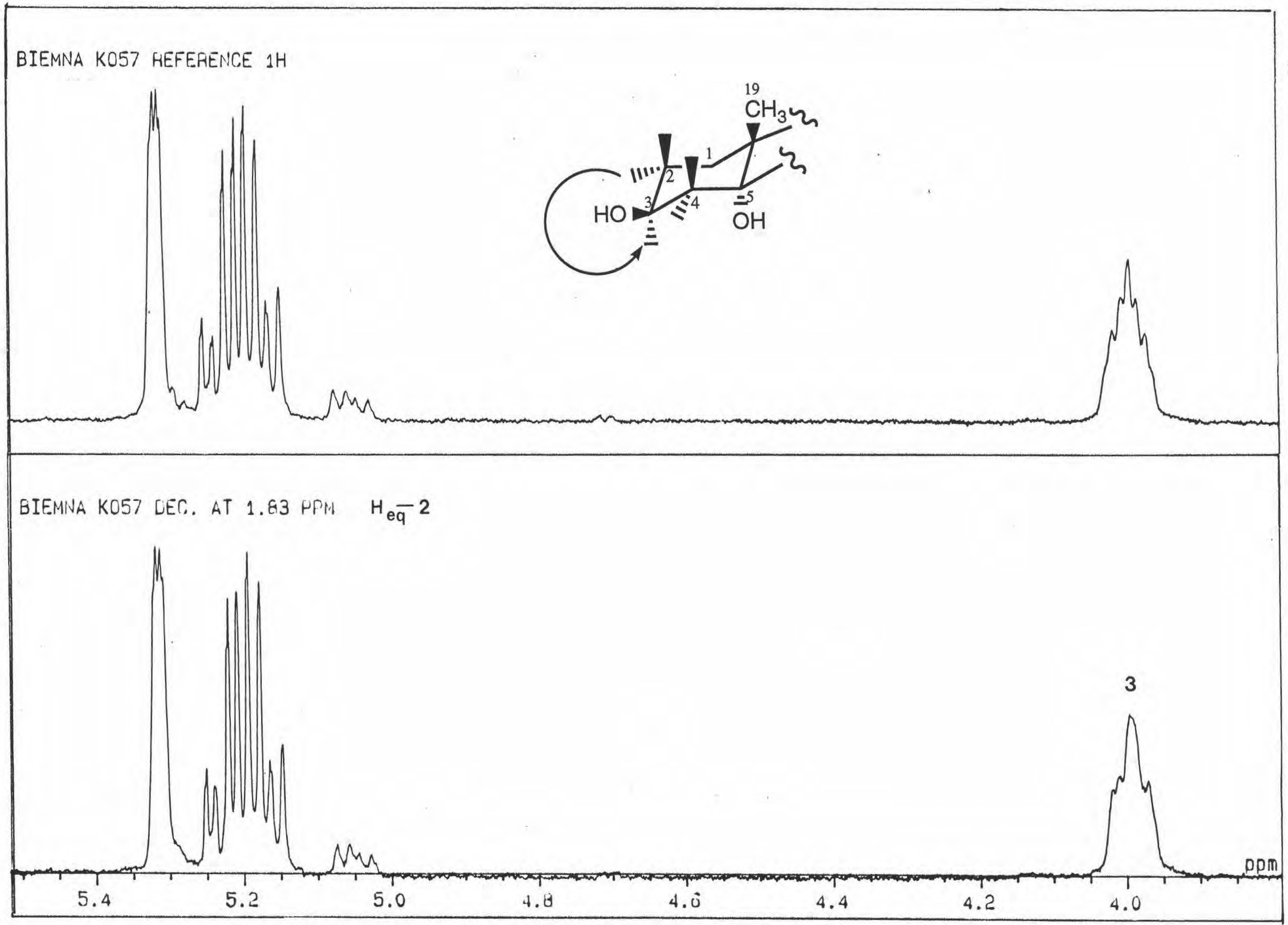



Figure 48. The Decoupling experiment spectrum of K057
($H_{eq}$-2, δ 5.5-3.8 ppm )

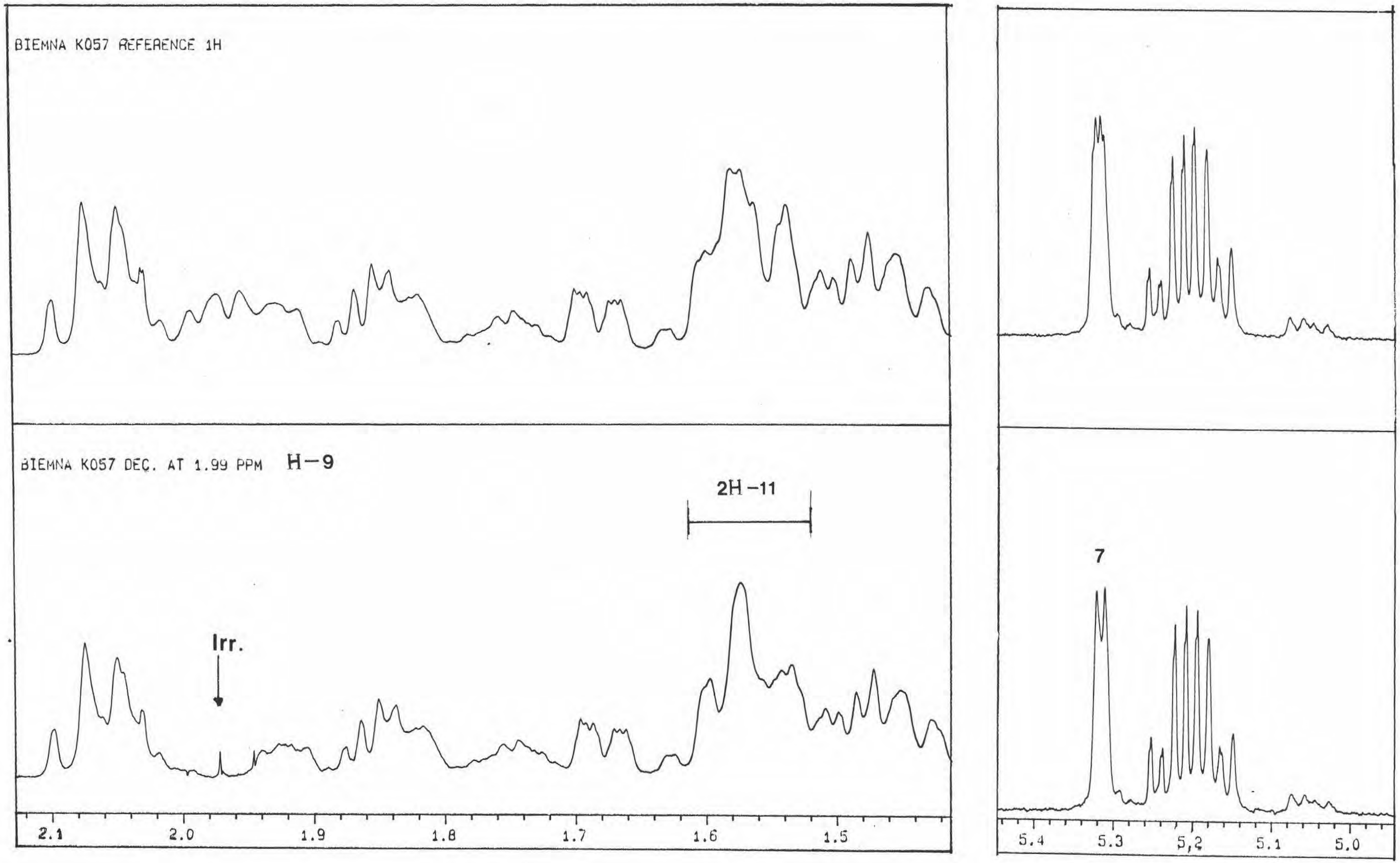



Figure 49. The Decoupling experiment spectrum of K057 (H-9)

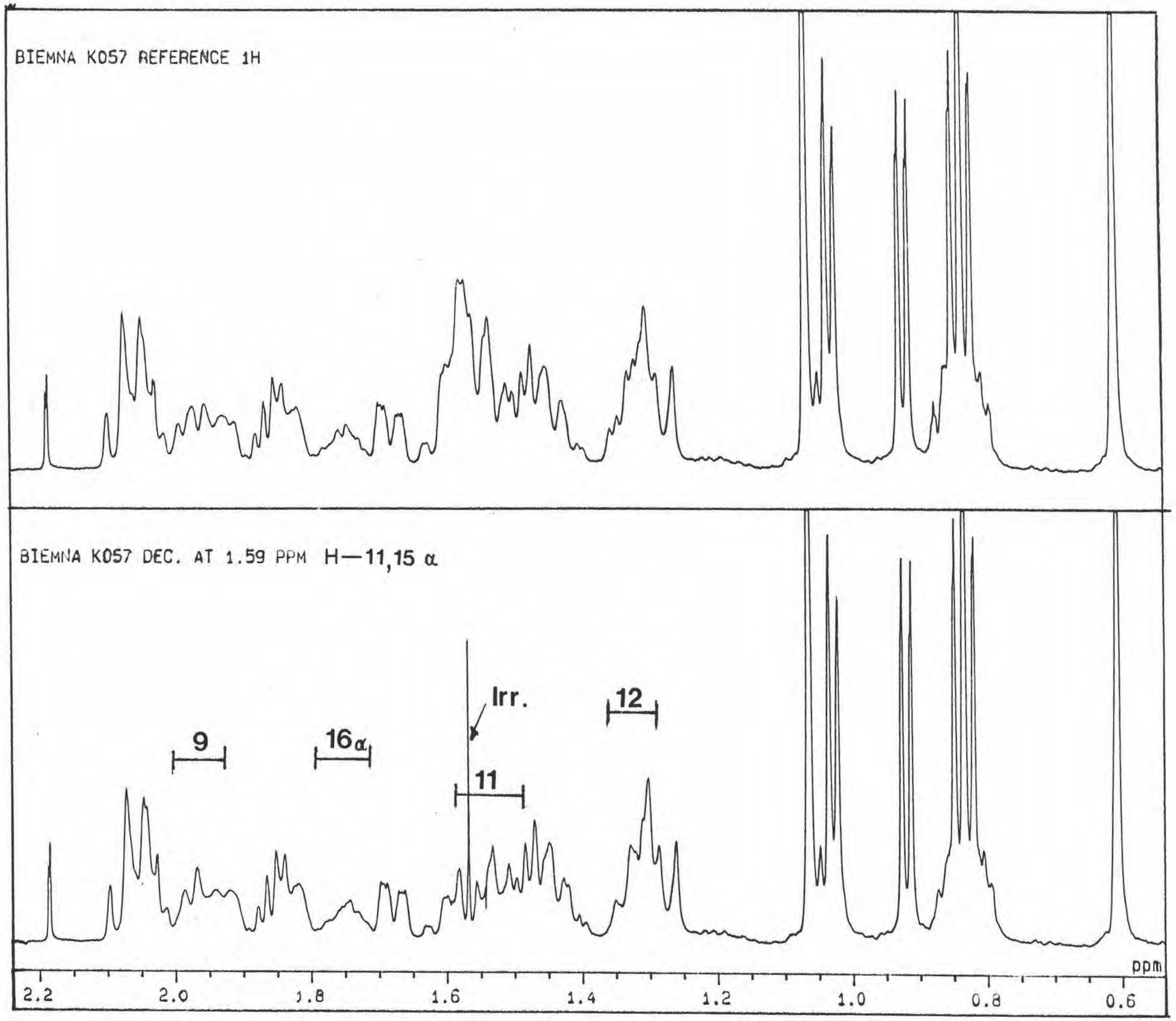



Figure 50. The Decoupling experiment spectrum of K057 (H-11, Hα-15)

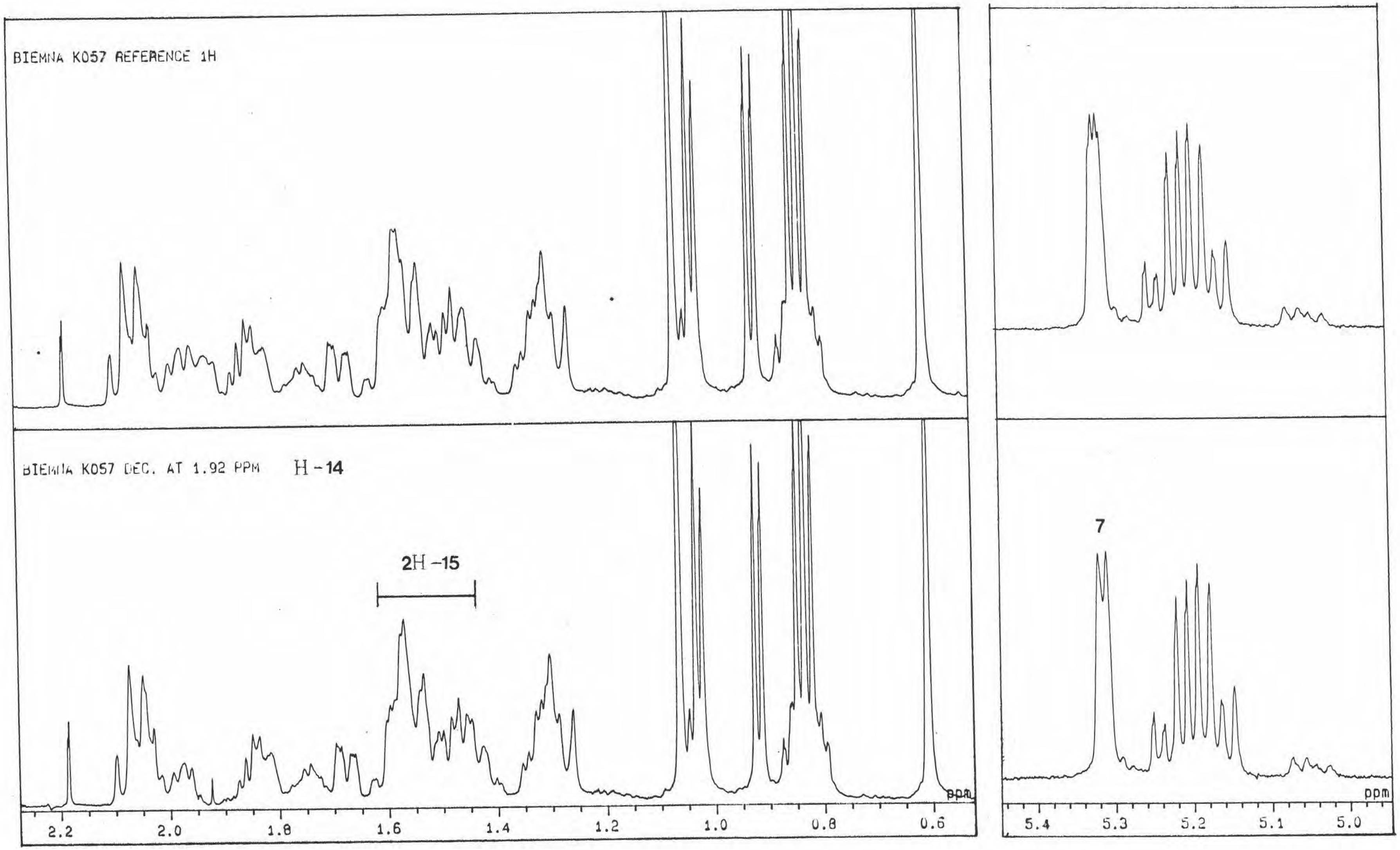



Figure 51. The Decoupling experiment spectrum of K057 (H-14)

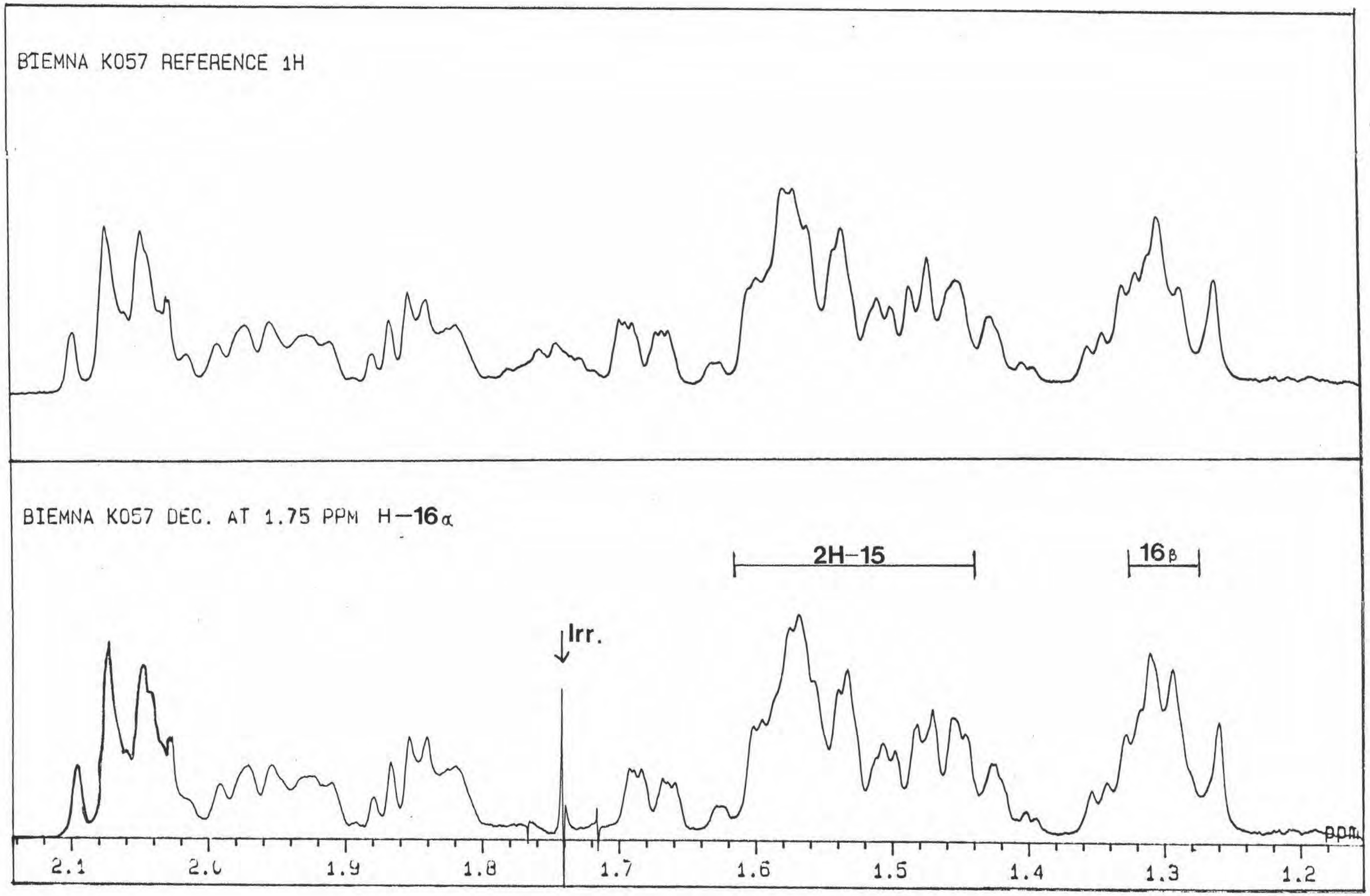



Figure 52. The Decoupling experiment spectrum of K057 (Hα-16)

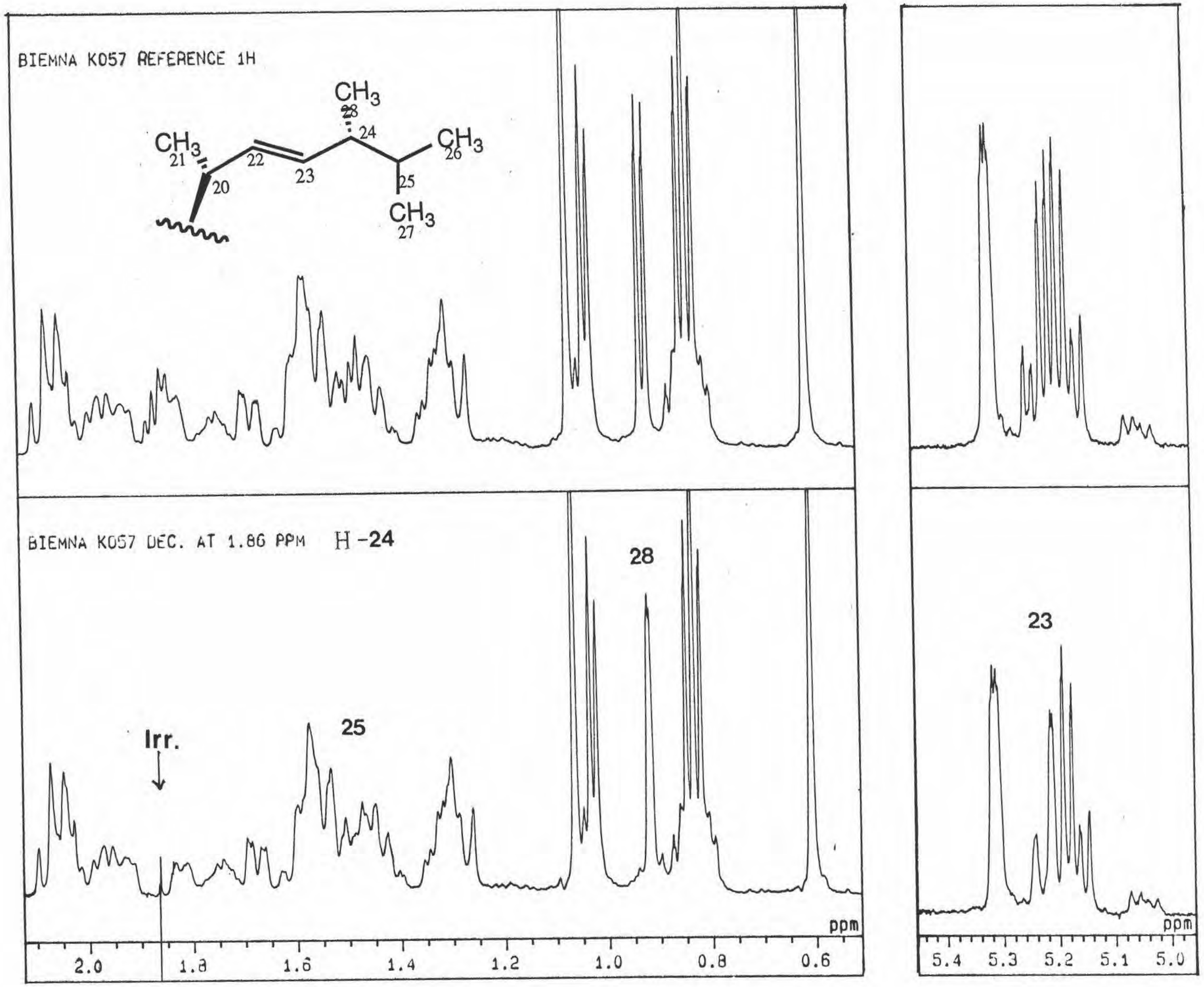



Figure 53. The Decoupling experiment spectrum of K057 (H-24)

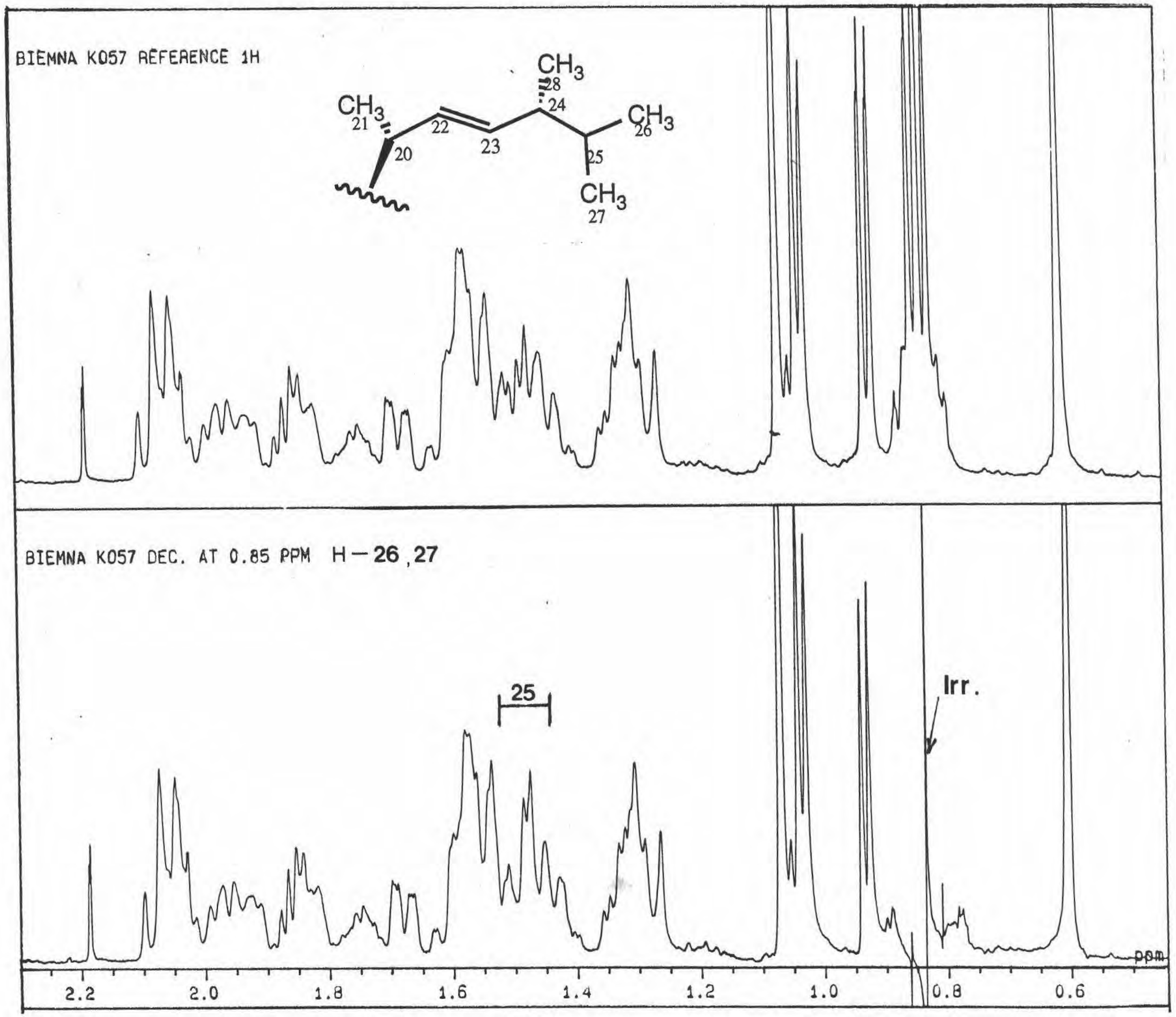



Figure 54. The Decoupling experiment spectrum of K057 (H-26, H-27)

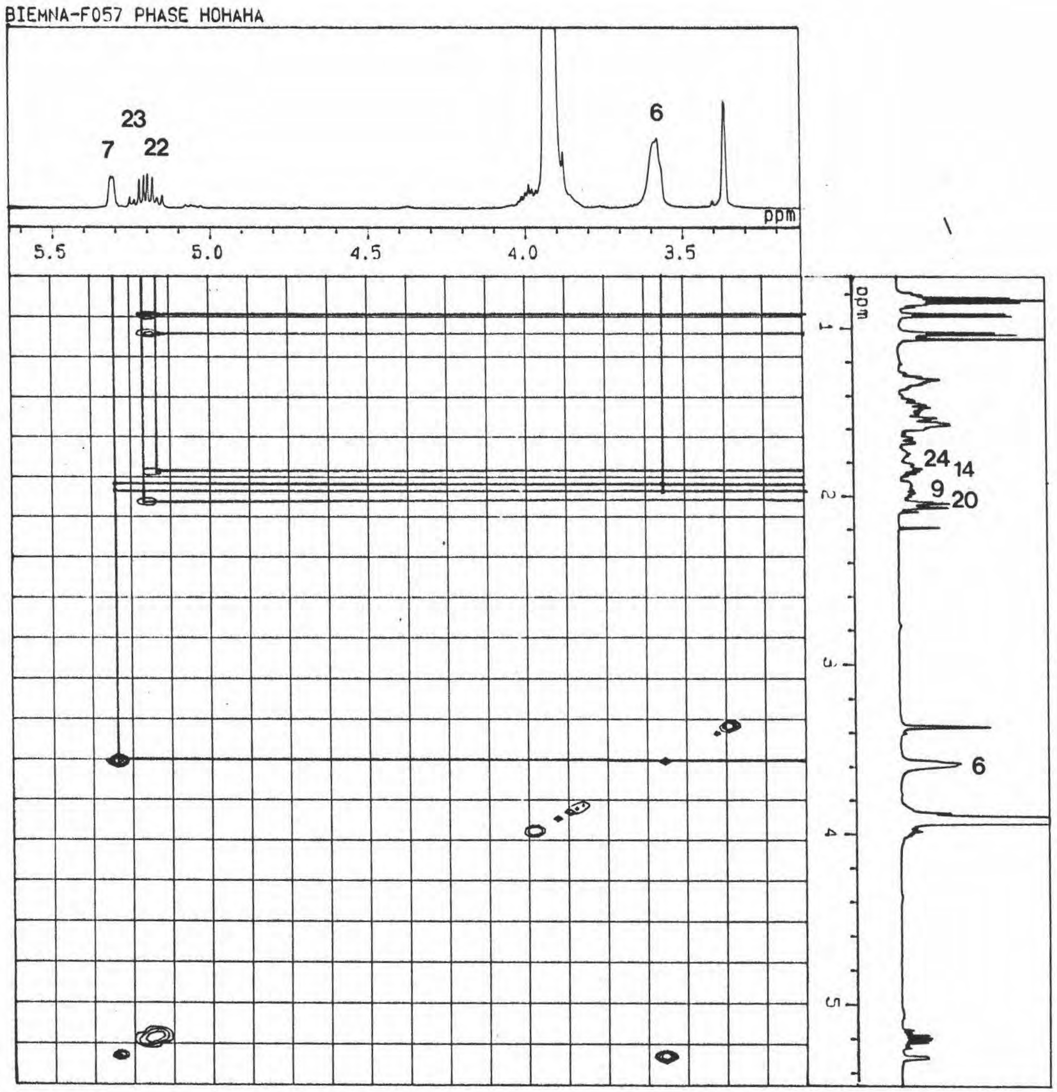



Figure 55. The partial HOHAHA spectrum ($\delta_H$ 3.0-5.5 ppm) of K057

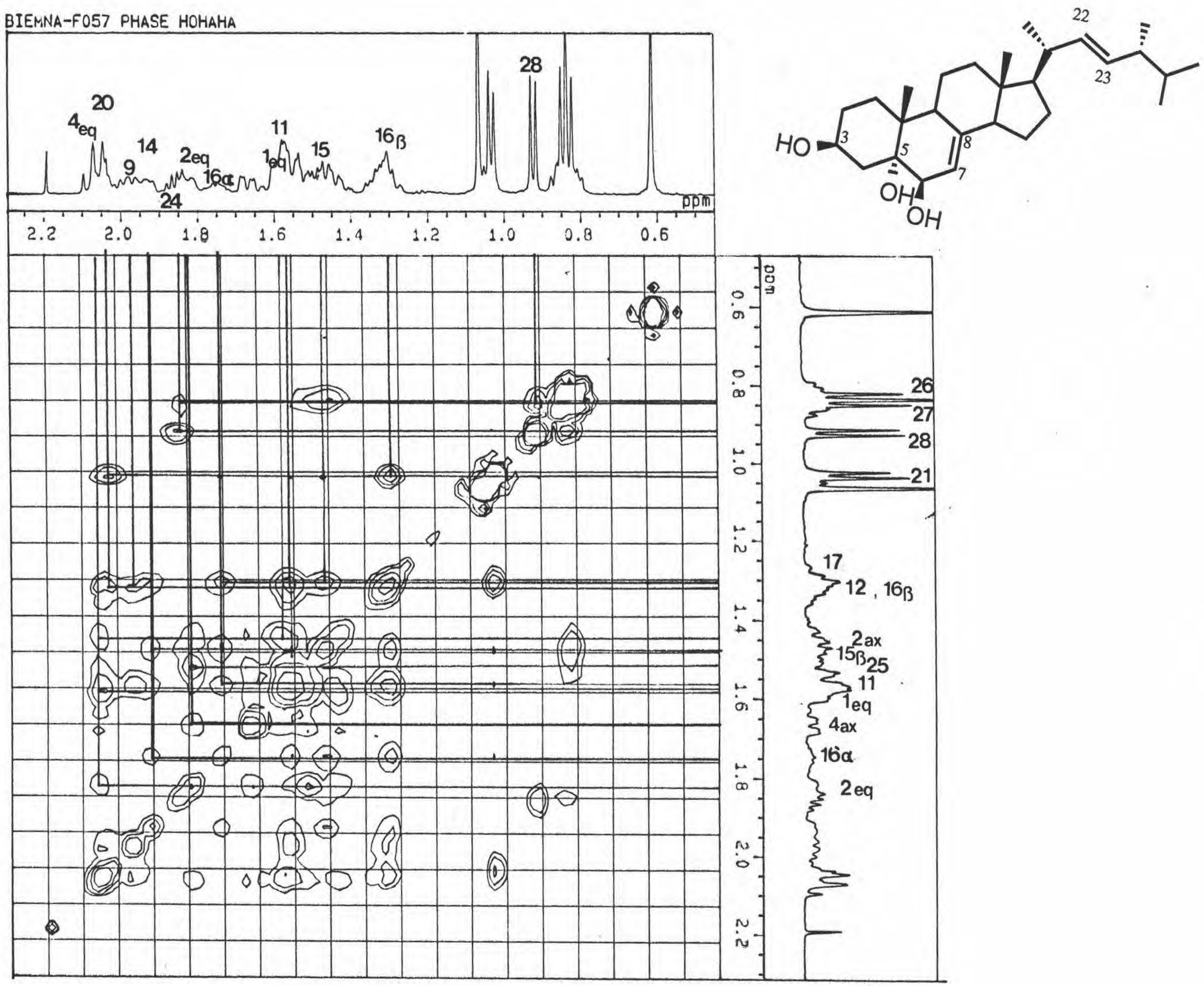



Figure 56. The partial HOHAHA spectrum ($\delta_H$ 0.5-2.2 ppm) of K057

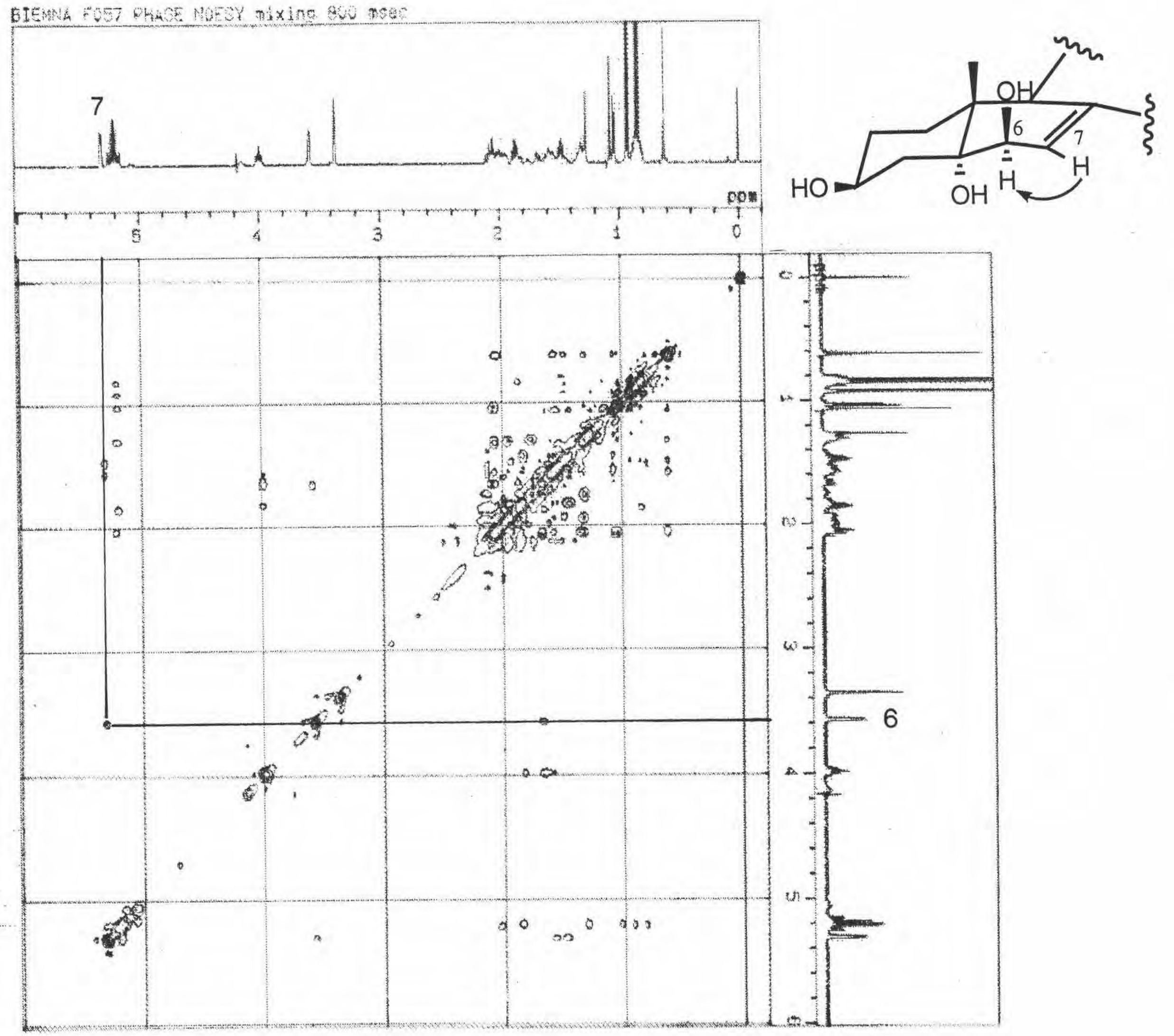



Figure 57. The NOESY spectrum of K057

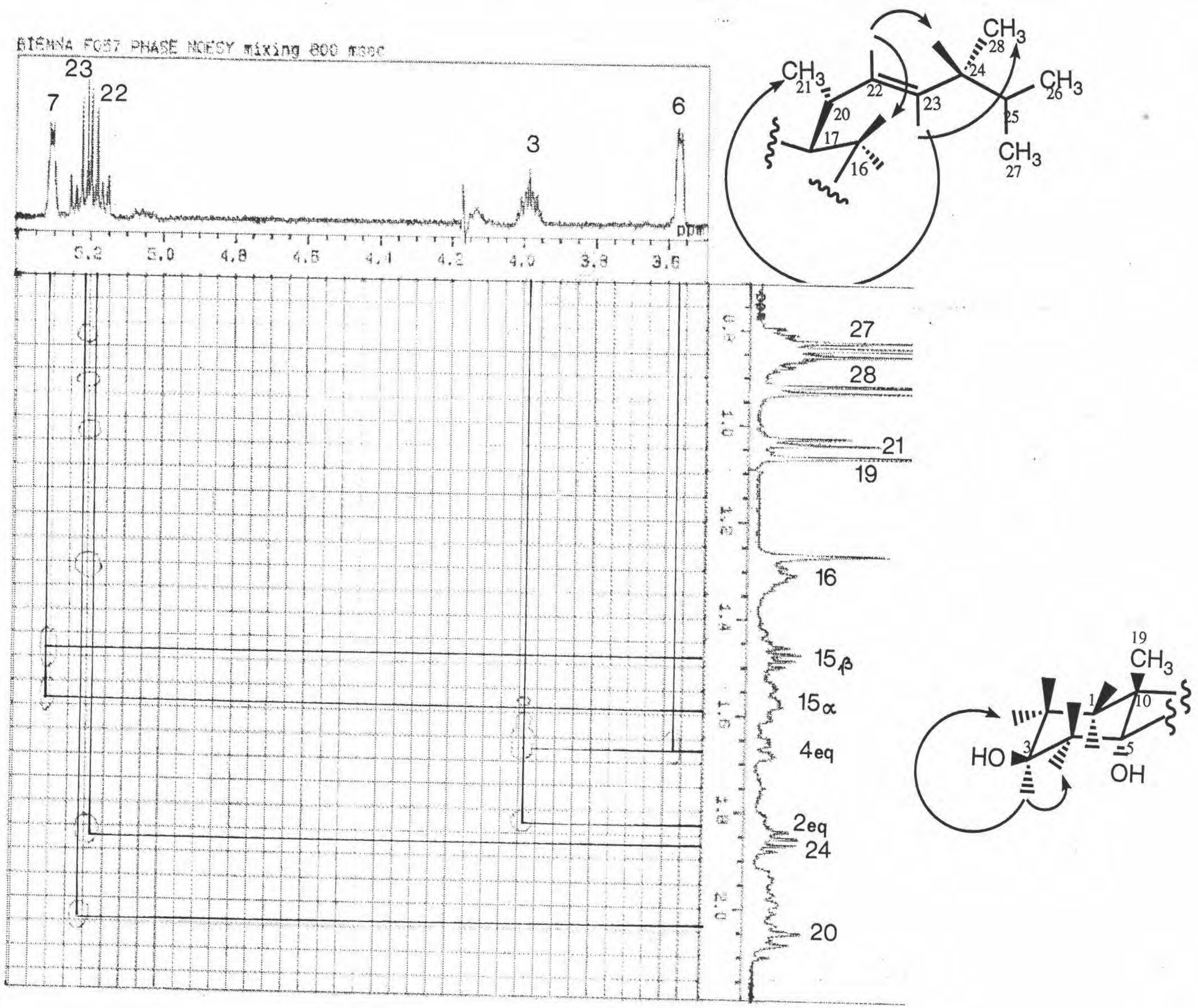



Figure 58. The partial NOESY spectrum ($\delta_H$ 3.5-5.4 ppm) of K057

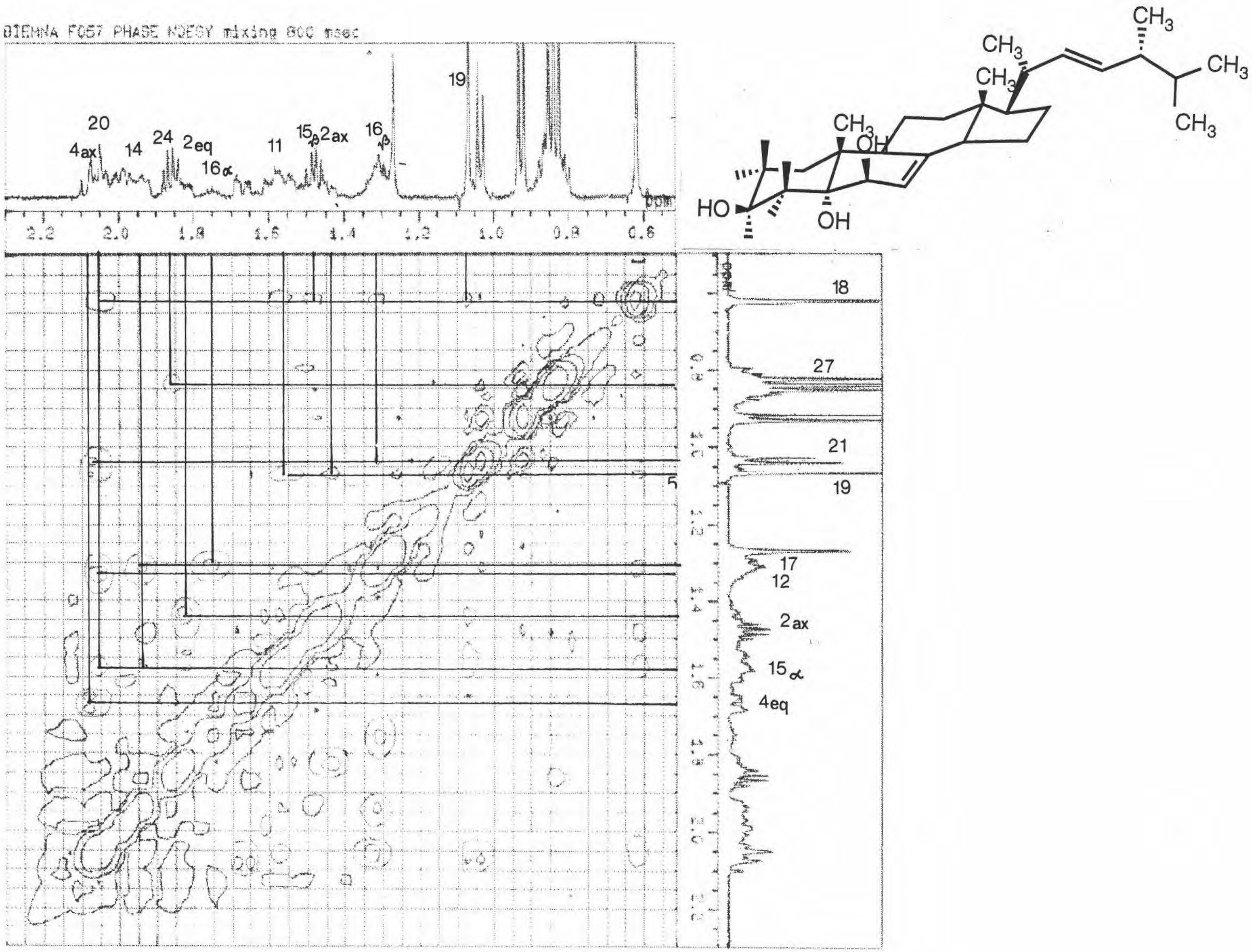



Figure 59. The partial NOESY spectrum ($\delta_H$ 0.6-2.2 ppm) of K057

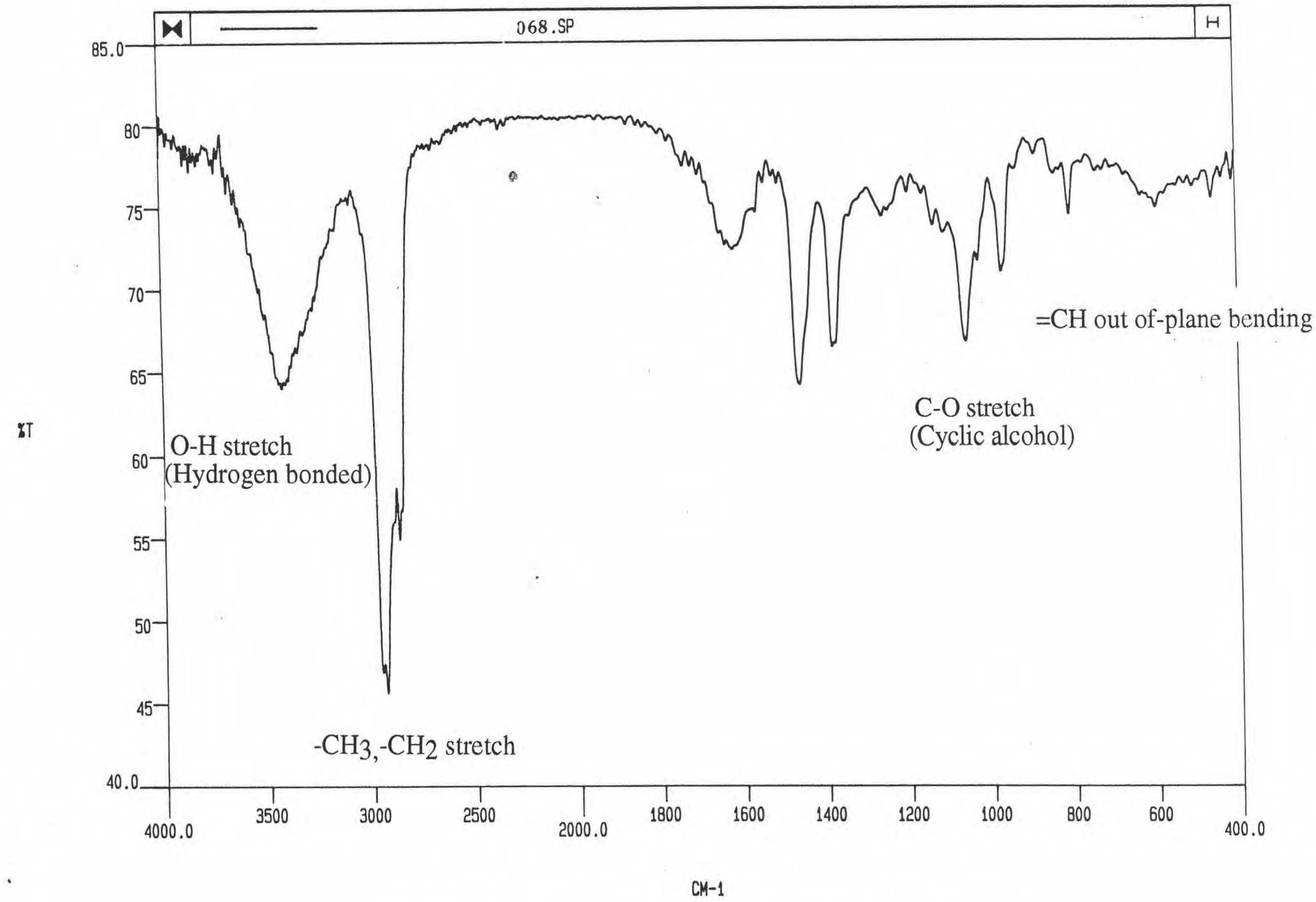



Figure 60. The IR spectrum of K068 (KBr disc)

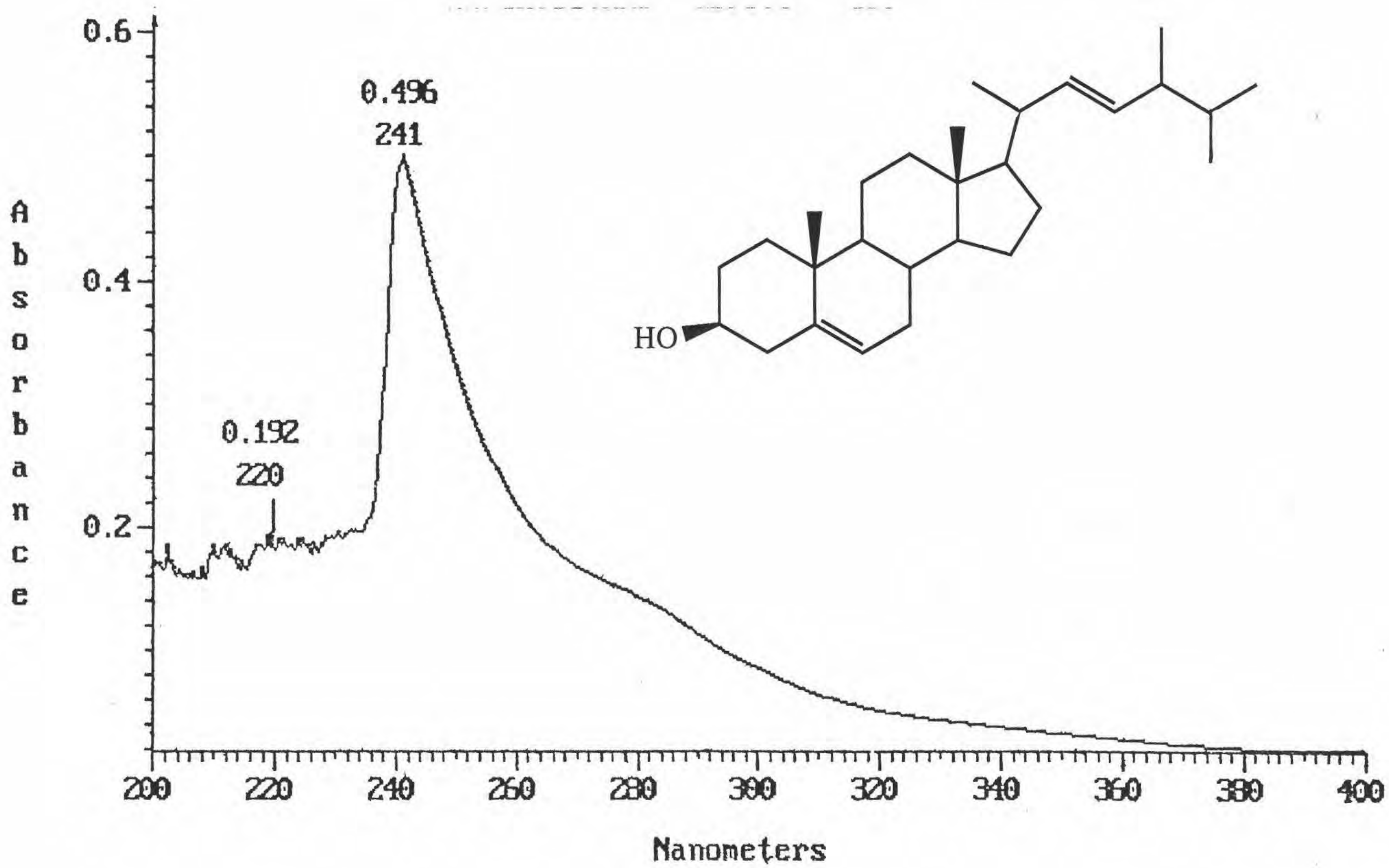



Figure 61. The UV spectrum of K068 in chloroform

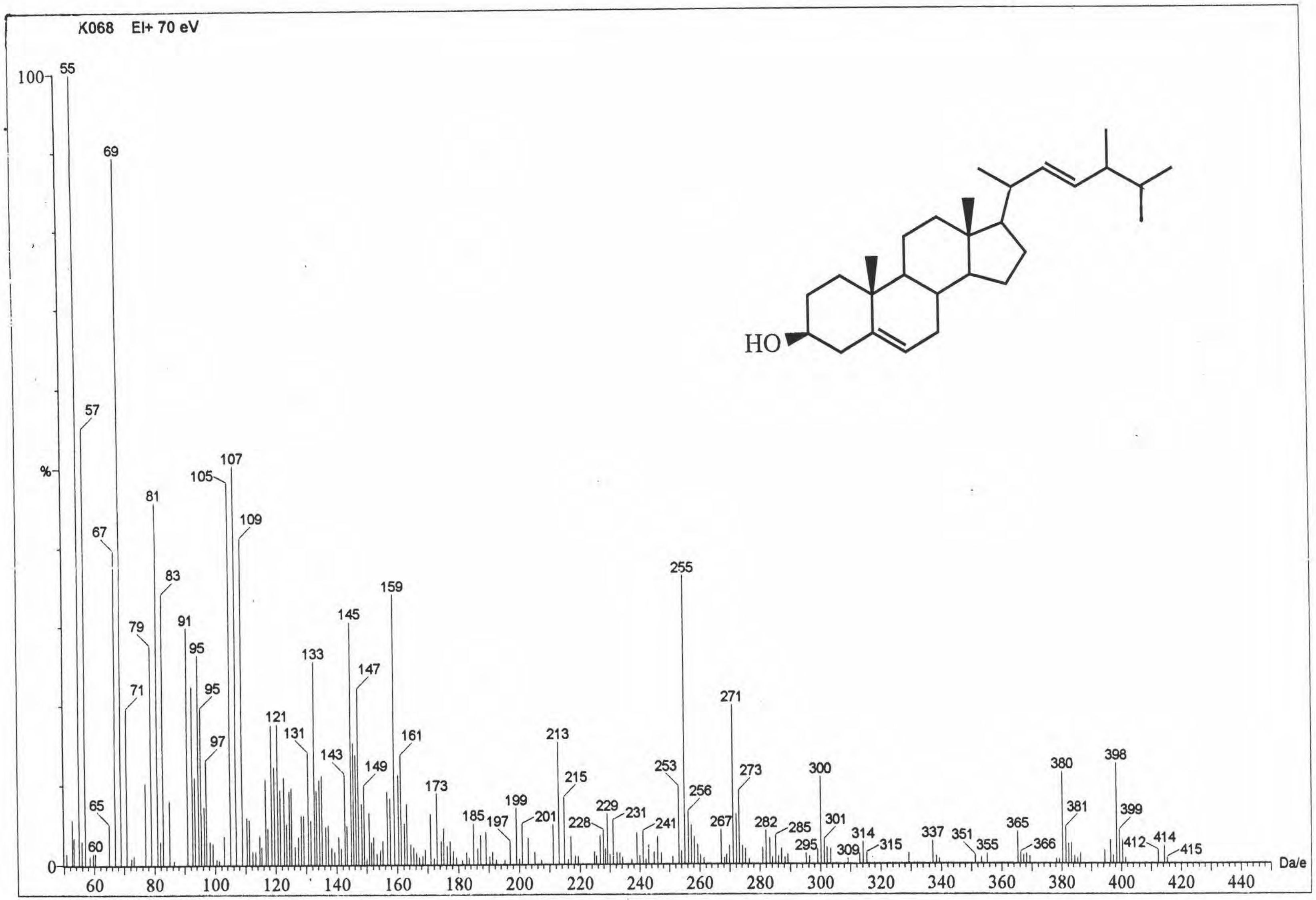



Figure 62. The EIMS spectrum of K068

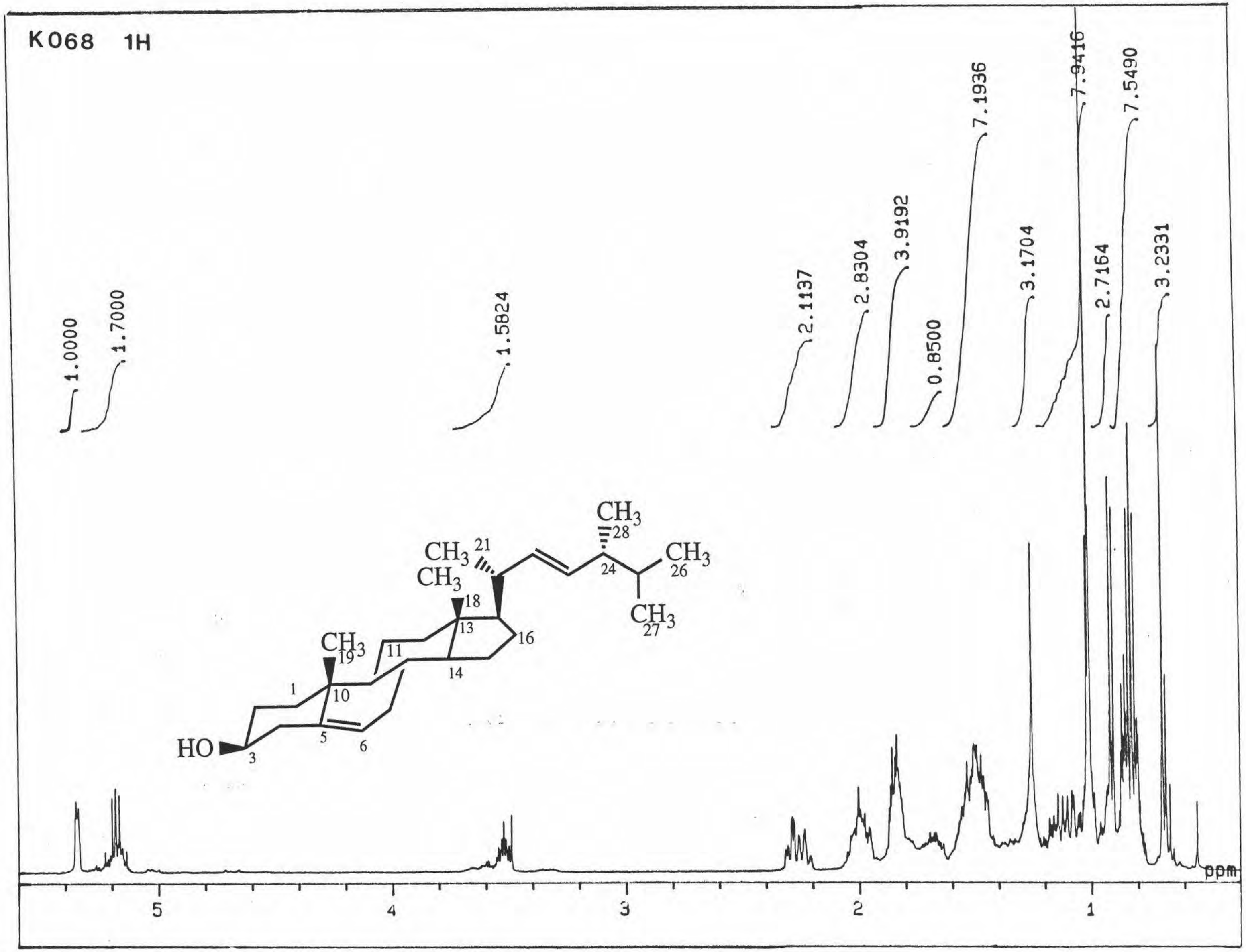



Figure 63. The 500 MHz $^1H$ NMR spectrum of K068 in $CDCl_3$

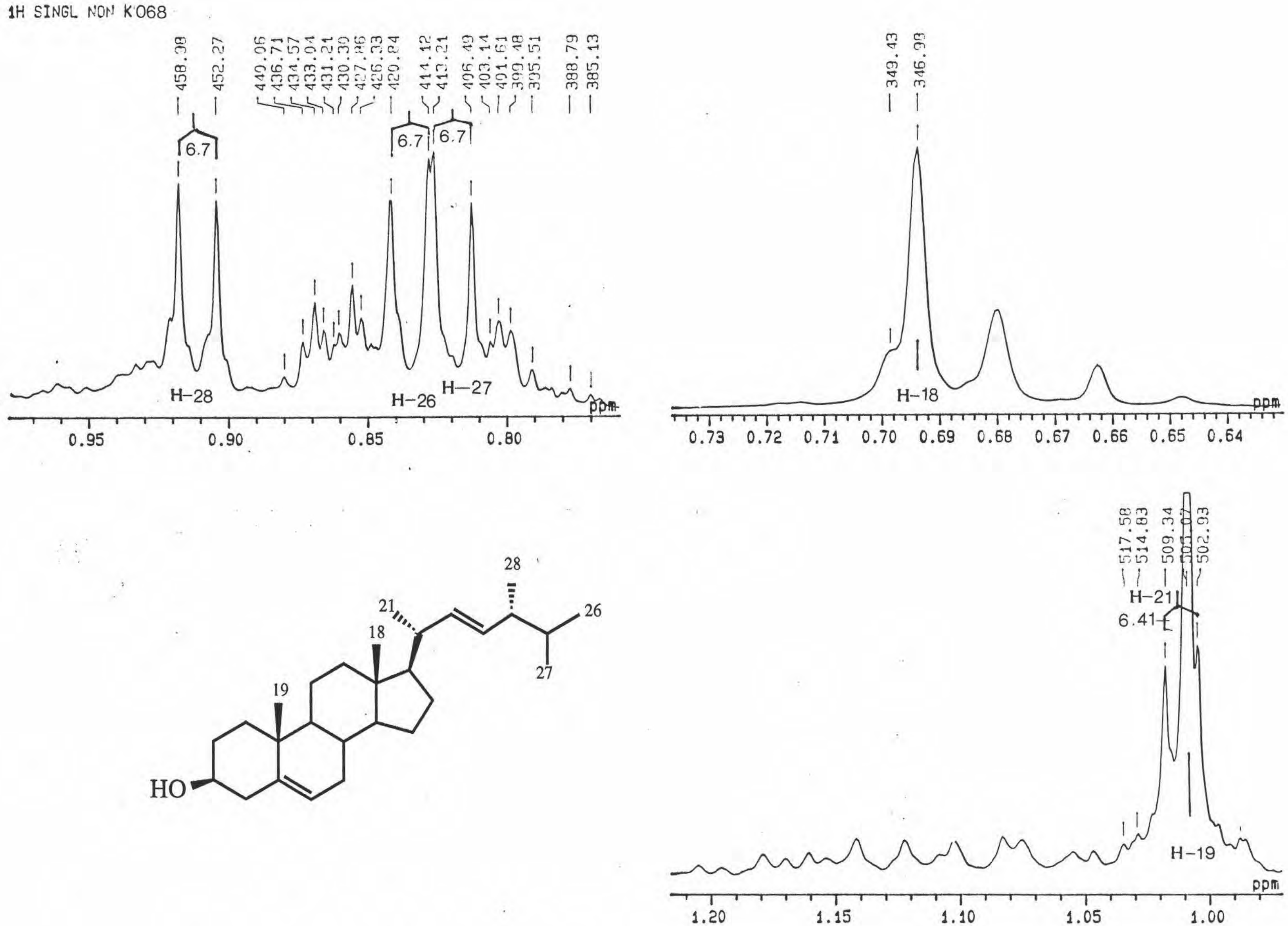



Figure 64. The 500 MHz $^{1}H$ NMR spectrum of K068 in $CDCl_3$ (expanded)

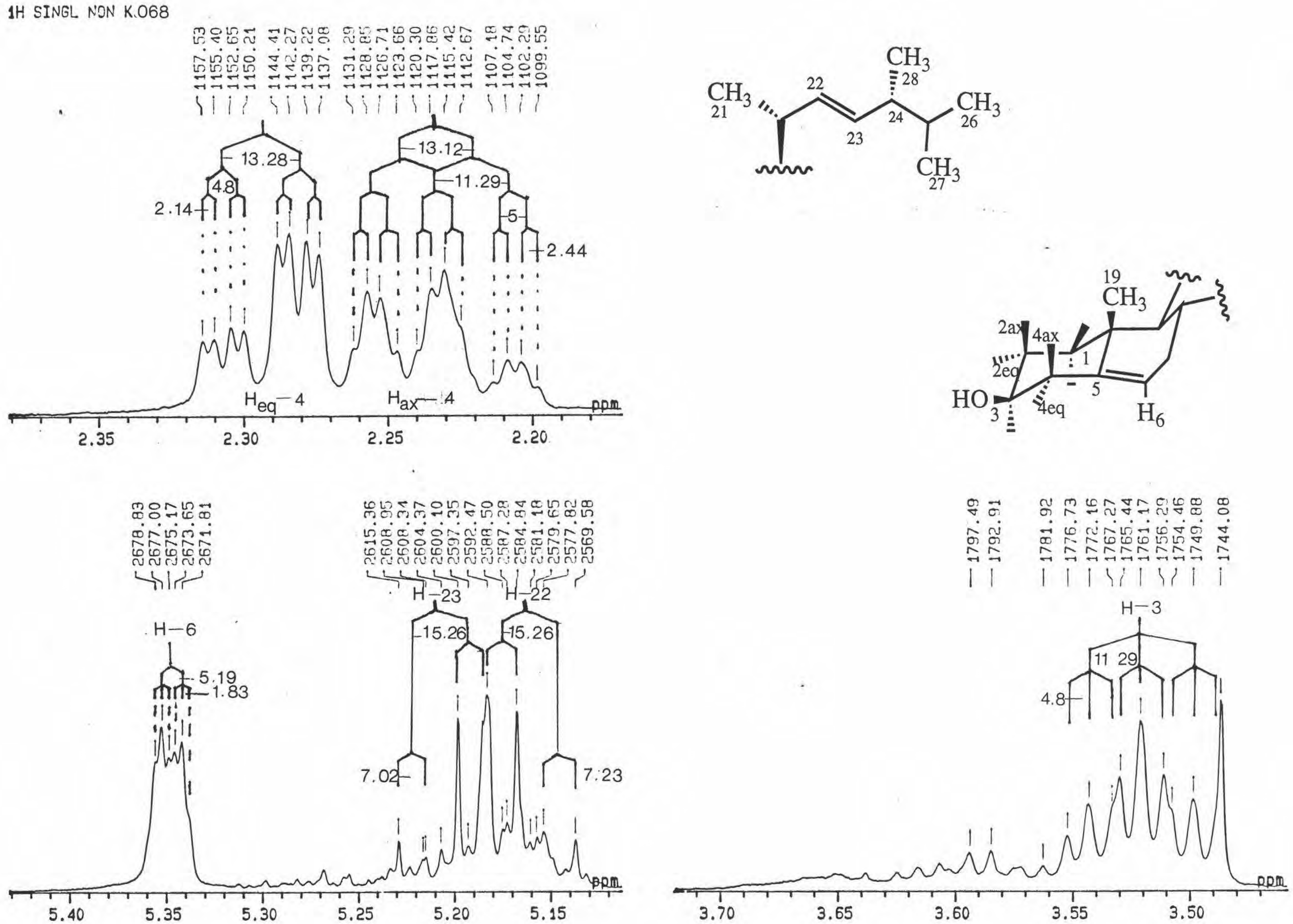



Figure 65. The 500 MHz $^1$H NMR spectrum of K068 in $CDCl_3$ (expanded)

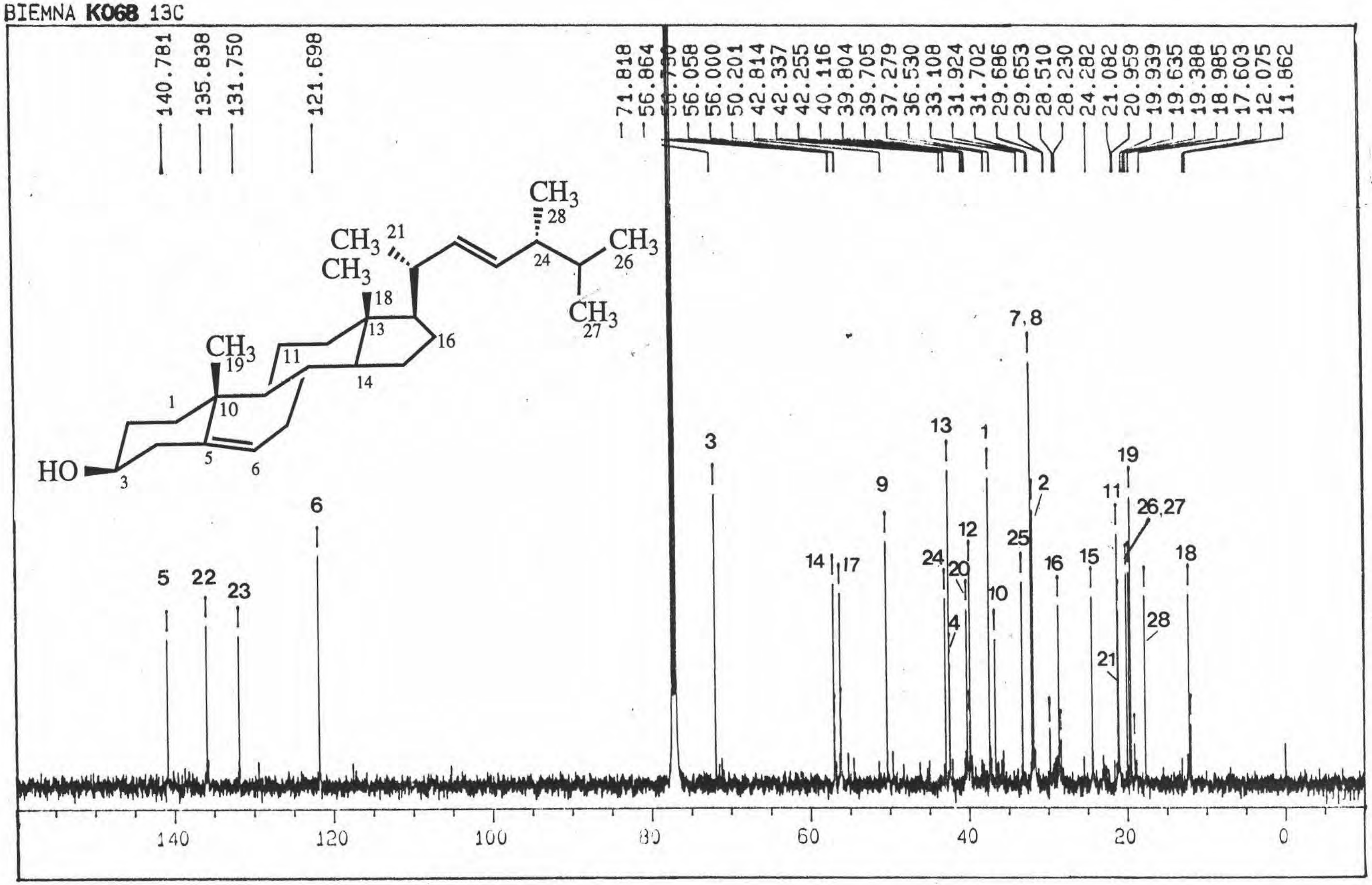



Figure 66. The 125 MHz $^{13}C$ NMR spectrum of K068 in $CDCl_3$

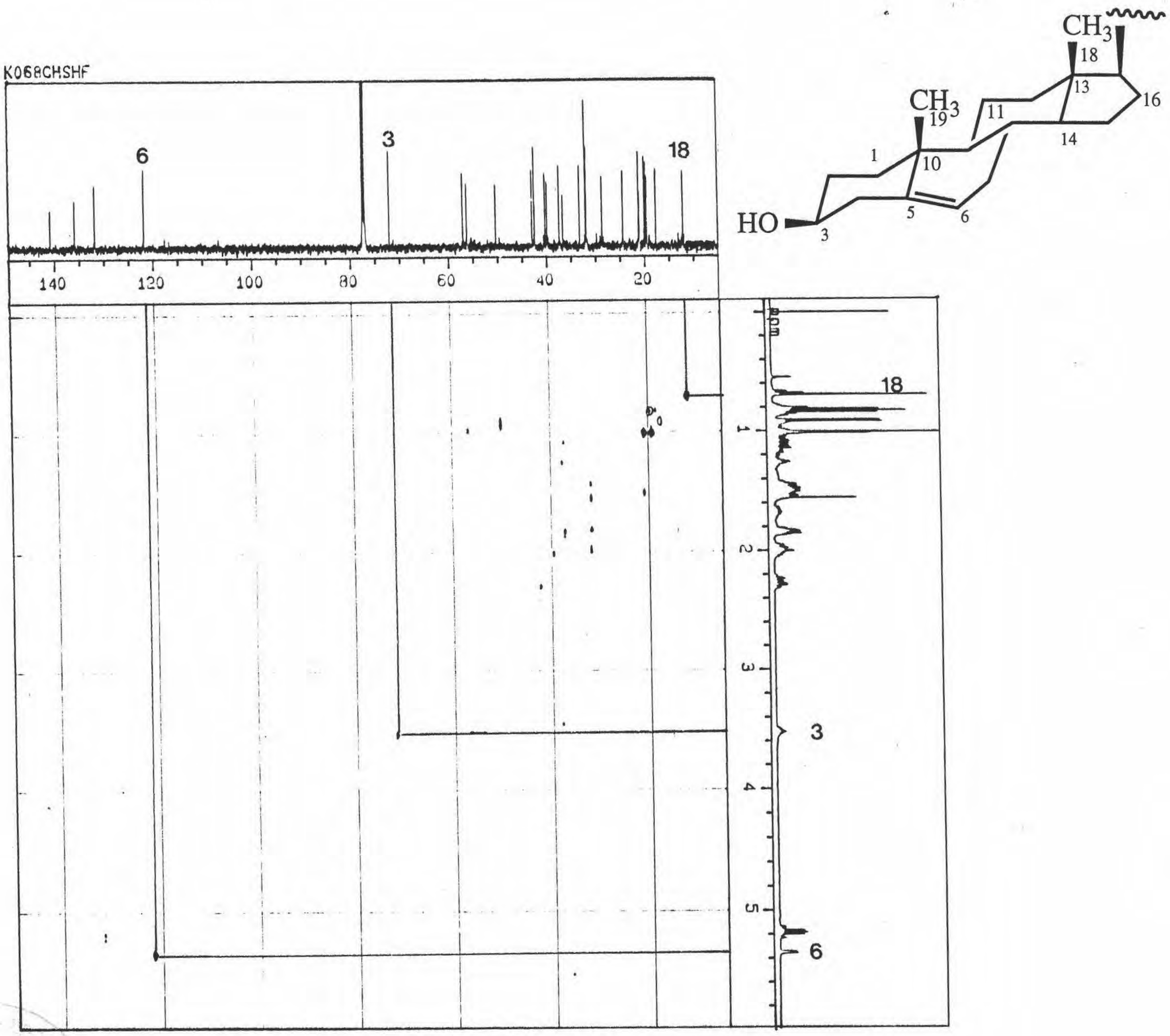



Figure 67. The CHSHF spectrum of K068

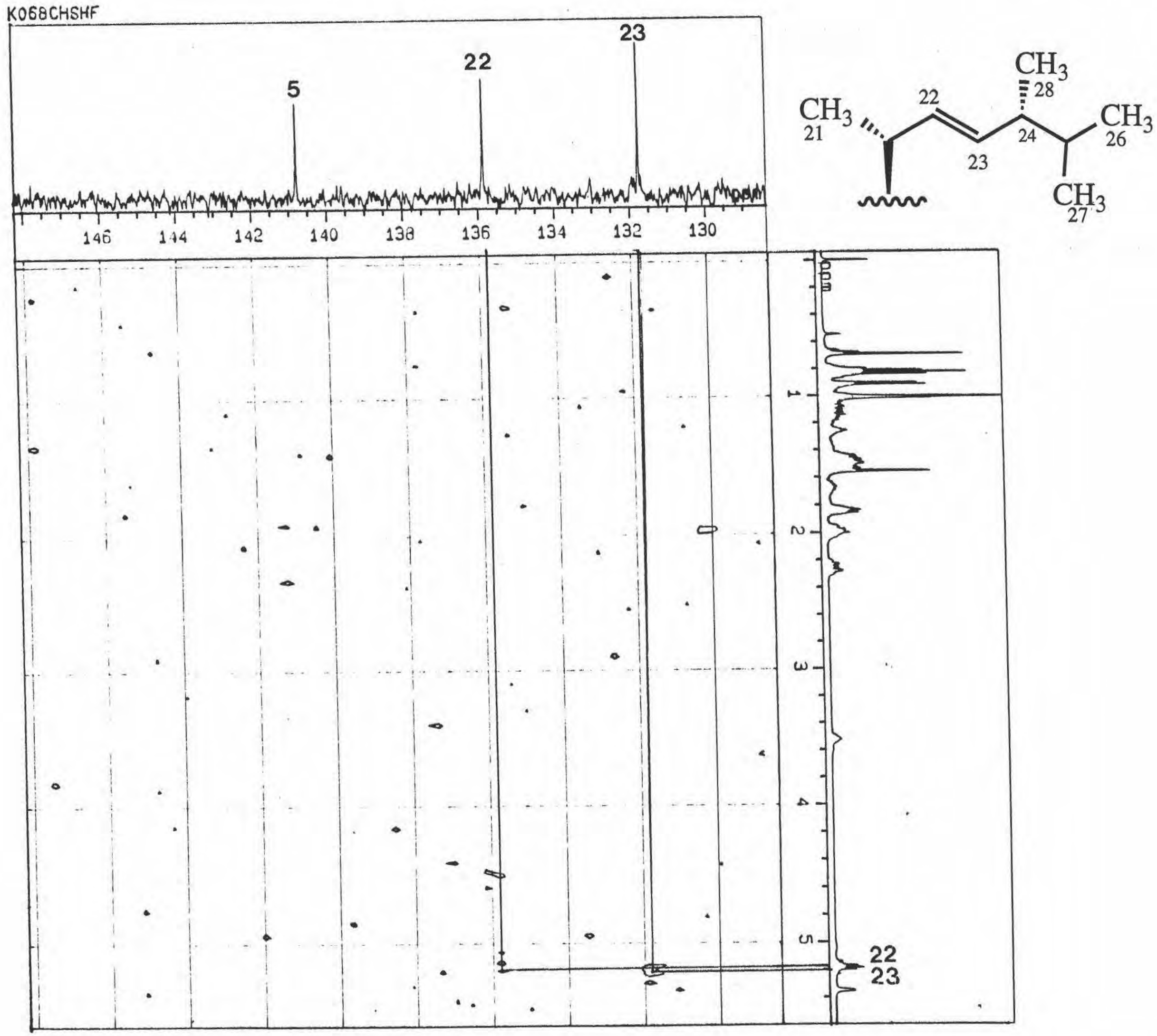



Figure 68. The partial CHSHF spectrum ($\delta_C$ 130-137 ppm) of K068

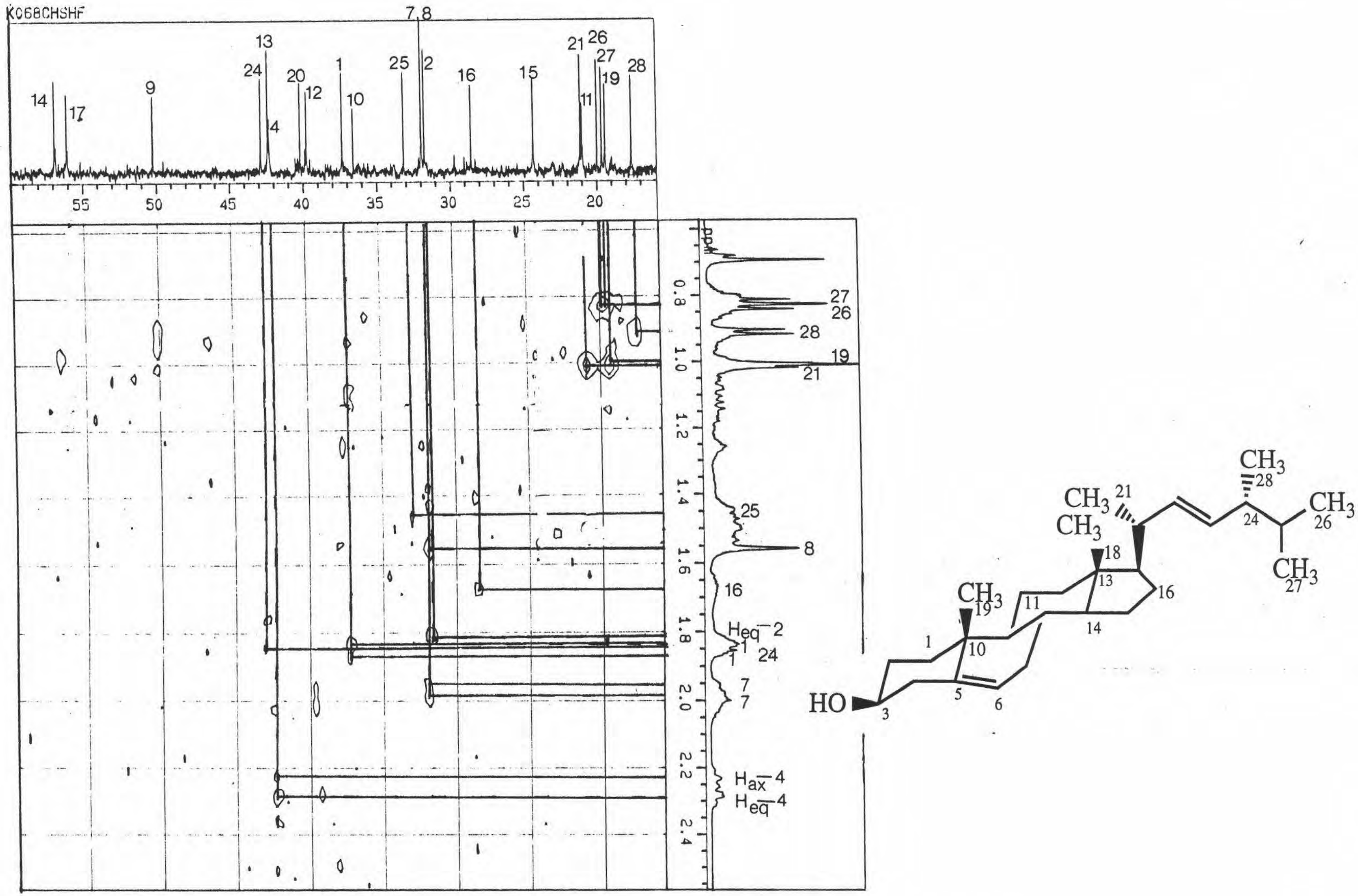



Figure 69. The partial CHSHF spectrum ($\delta_C$ 15-60 ppm) of K068

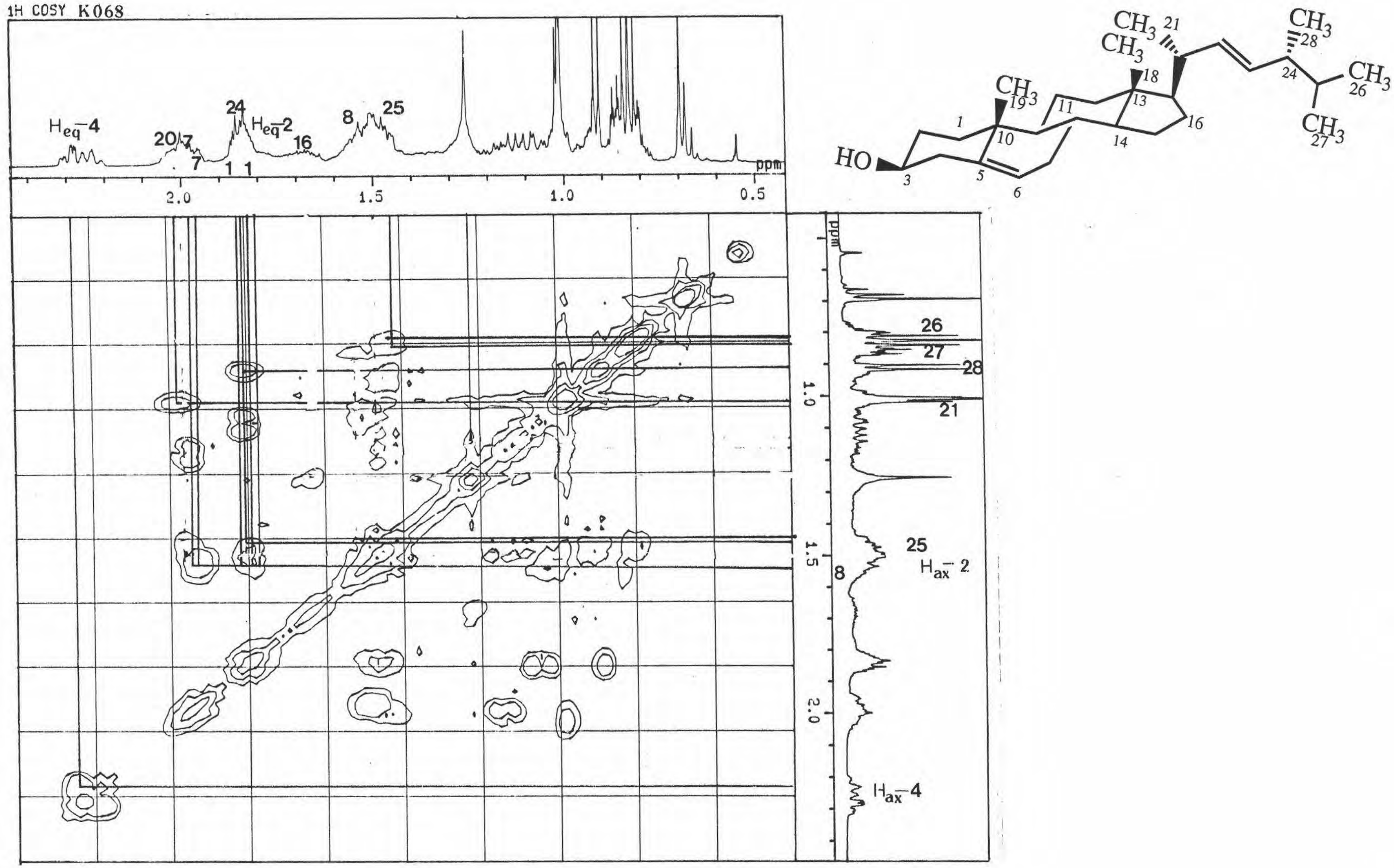



Figure 70. The $^1$H-$^1$H COSY spectrum of K068

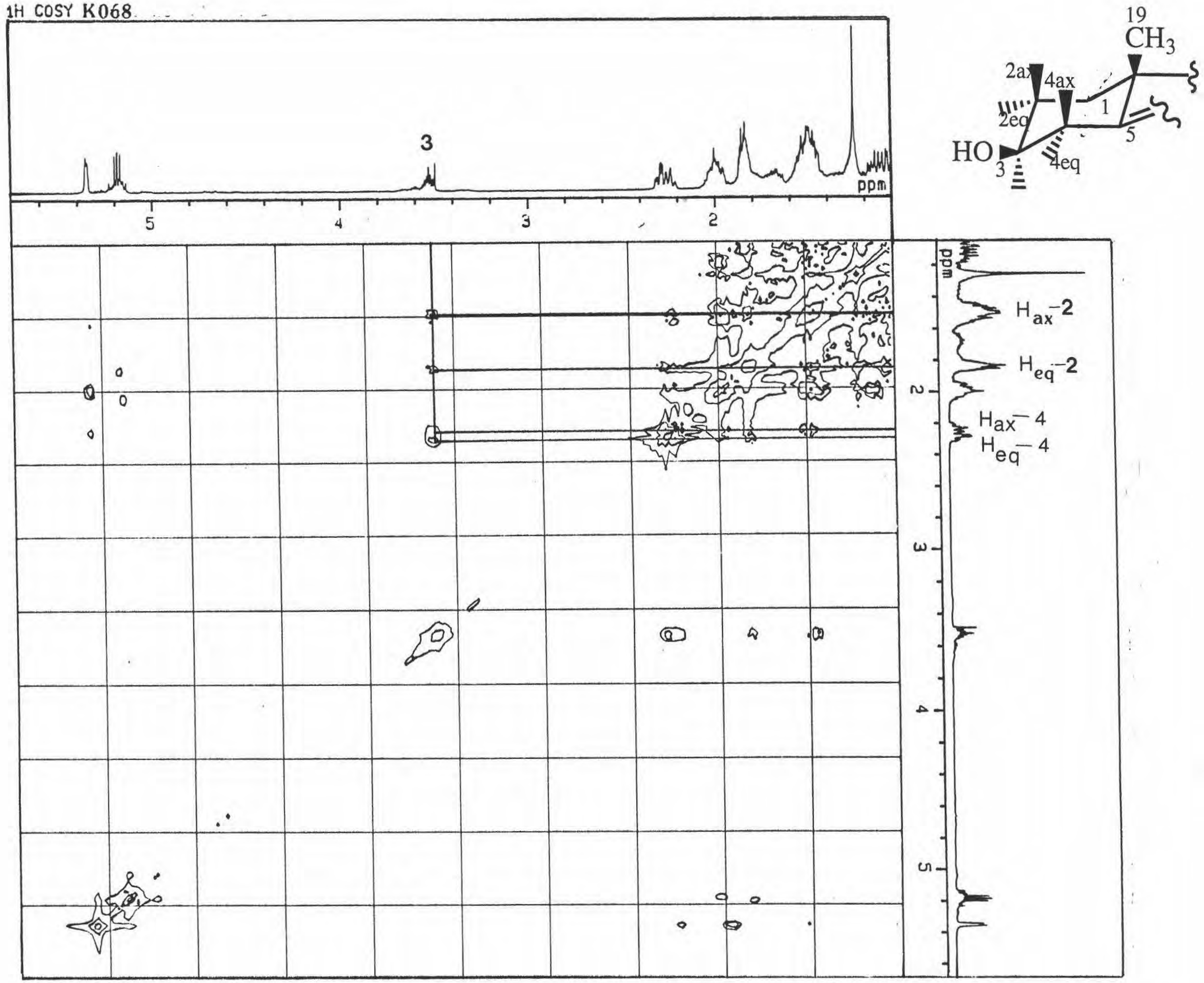



Figure 71. The partial $^{1}H$-$^{1}H$ COSY spectrum ($\delta_H$ 0.6-2.2 ppm) of K068.

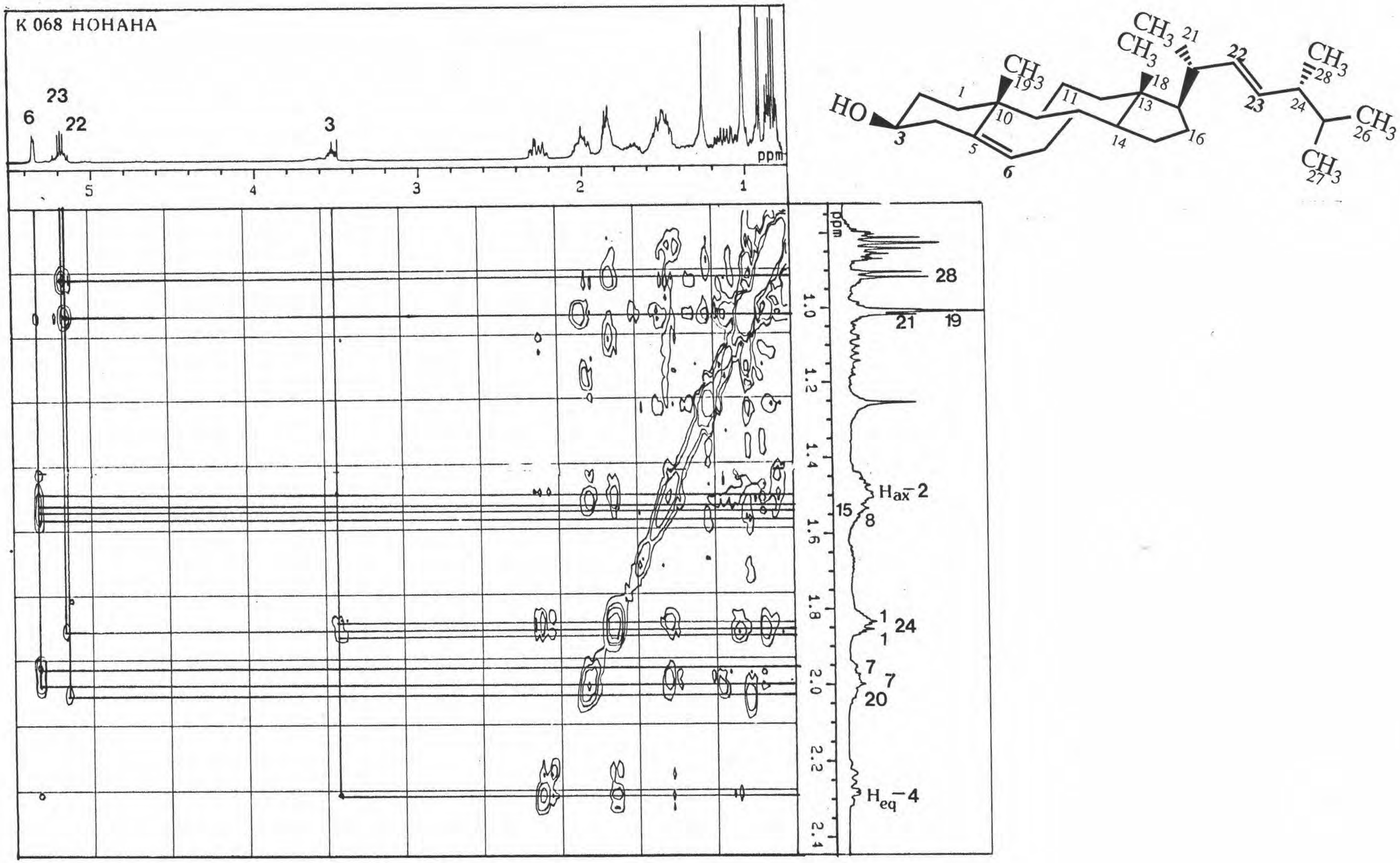



Figure 72. The HOHAHA spectrum of K068

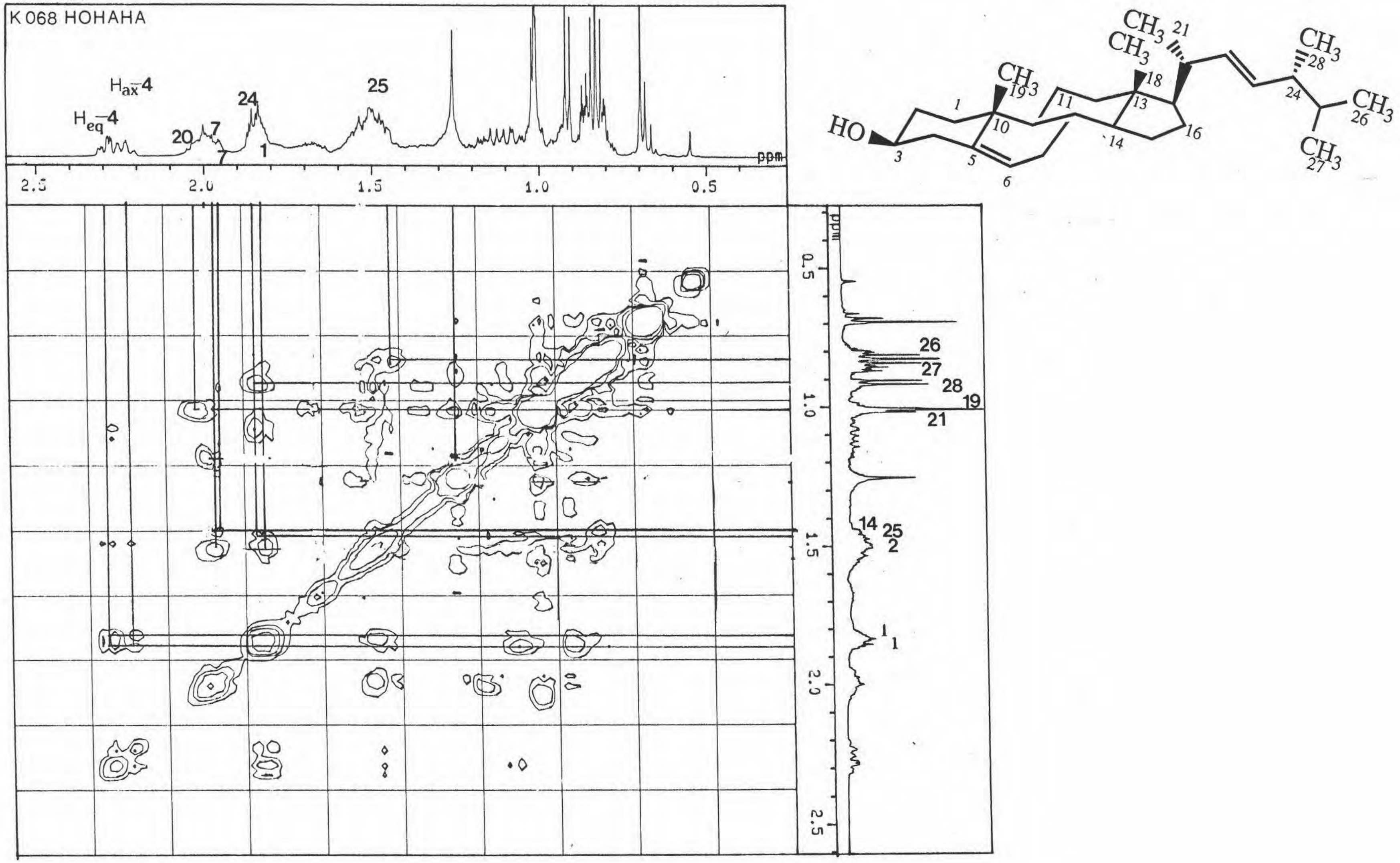



Figure 73. The partial HOHAHA spectrum ($\delta_H$ 0.6-2.2 ppm) of K068

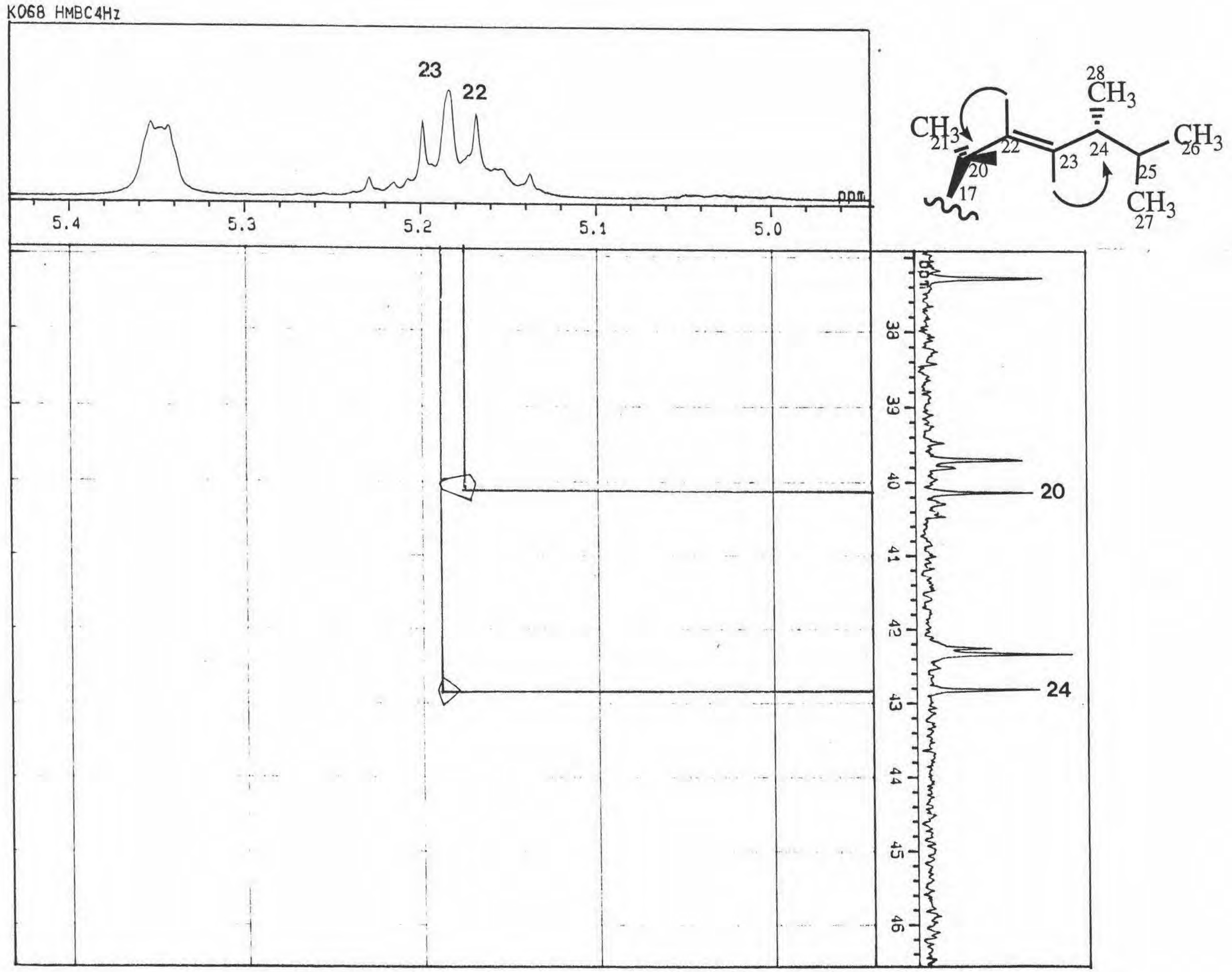



Figure 74. The partial HMBC spectrum ($\delta_H$ 5.0-5.4 ppm) of K068 ($^3J_{CH}$ = 4 Hz)

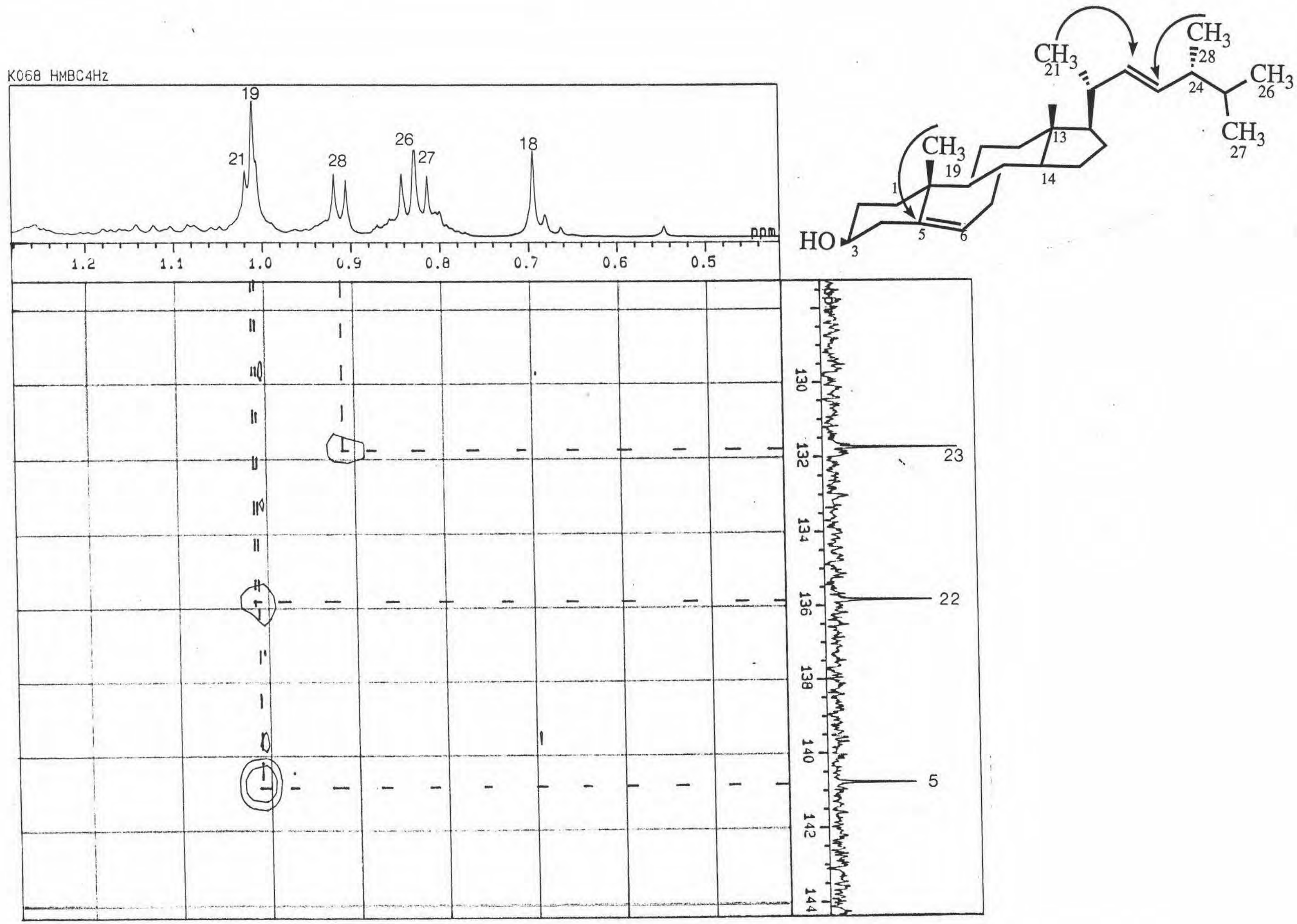



Figure 75. The partial HMBC spectrum ($\delta_H$ 0.5-1.2 ppm) of K068 ($^3J_{CH}$ = 4 Hz)

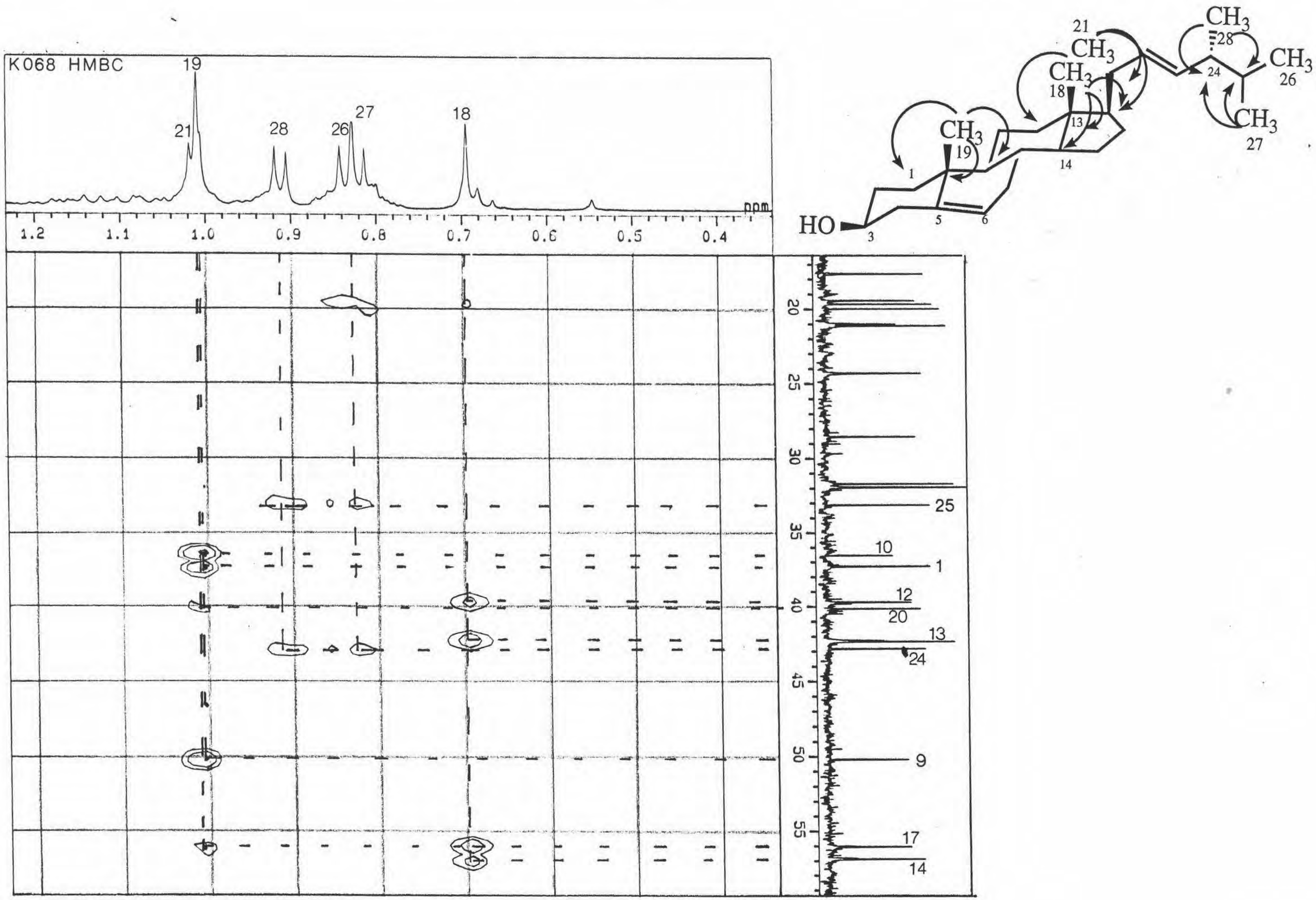
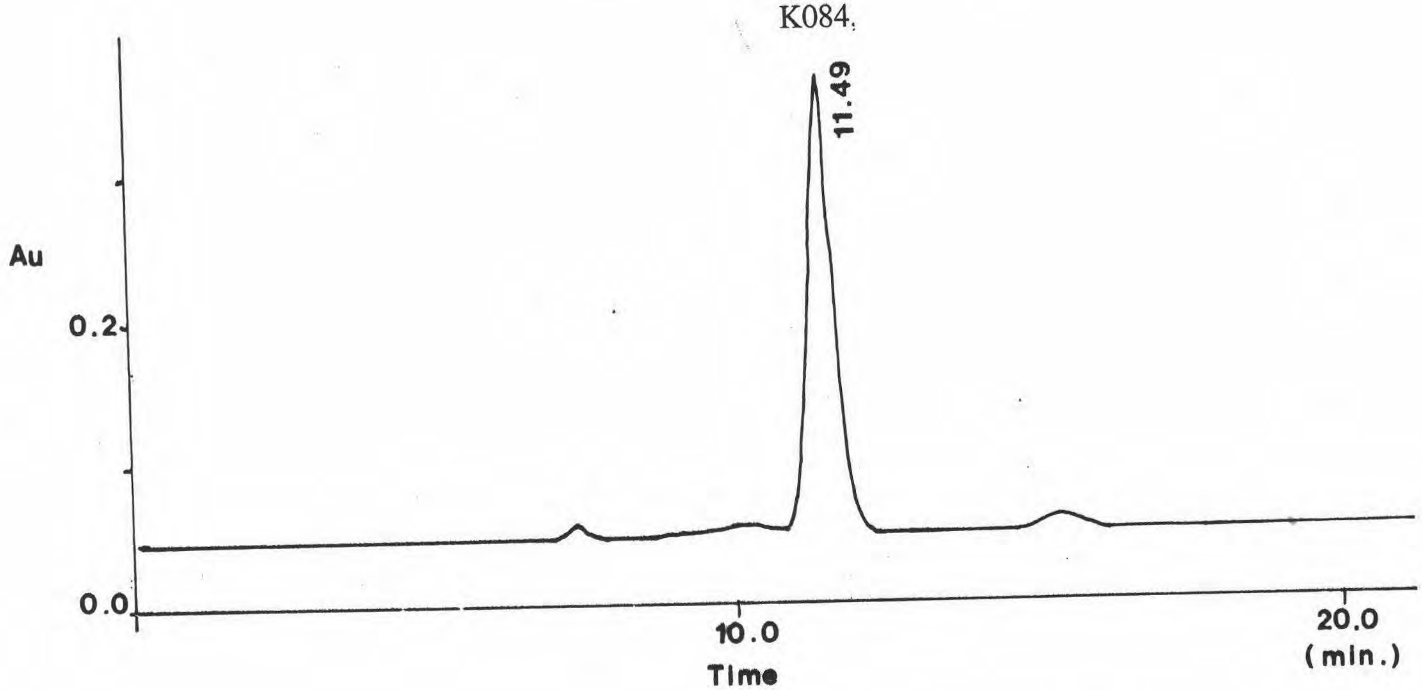
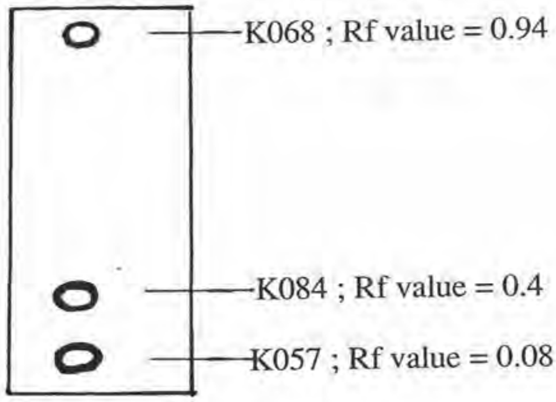



Figure 76. The partial HMBC spectrum ($\delta_H$ 0.4-1.2 ppm) of K068 ($^3J_{CH}$ = 4 Hz)

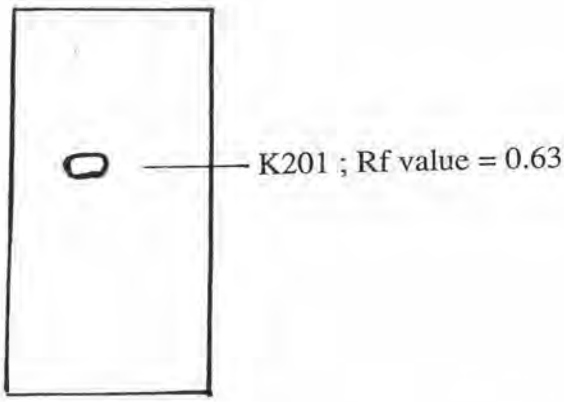



Normal phase column (125 x 4 mm)
Flow rate 1 ml/min
detected at $\lambda_{max}$ 250 nm

Figure 77. The HPLC chromatograme of K084
($2\%$ $CH_3OH$ in $CHCl_3$)




The TLC pattern of K068, K084, K057 (95% $CH_3OH$ in $CHCl_3$)




The RP2-TLC pattern of F201 (20% $H_2O$ in $CH_3OH$)

Figure 78. The TLC pattern of K068, K084, K057 (5% $CH_3OH$ in $CHCl_3$) and the RP2-TLC pattern of F201 (20% $H_2O$ in $CH_3OH$)

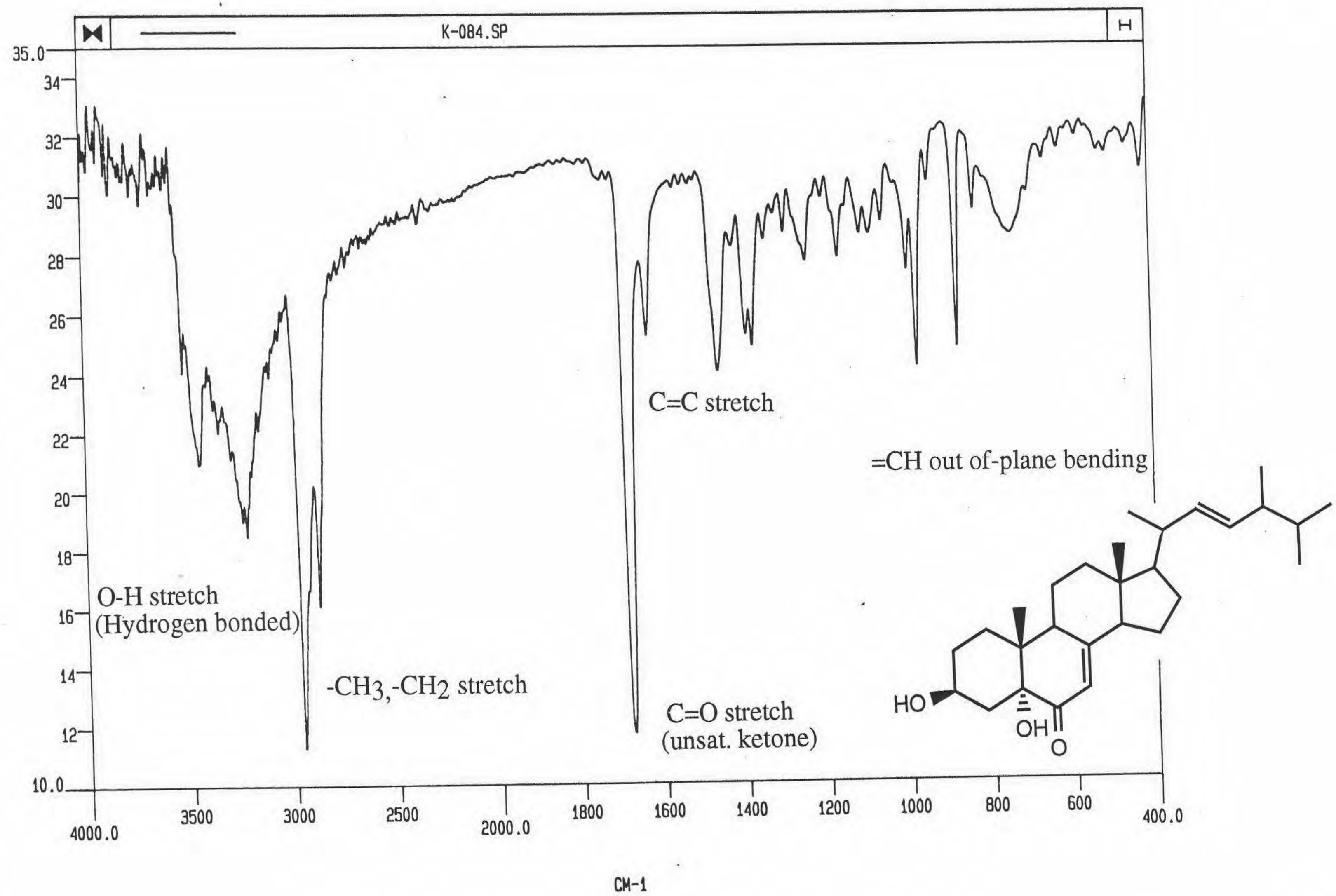



Figure 79. The IR spectrum of K084 (KBr disc)

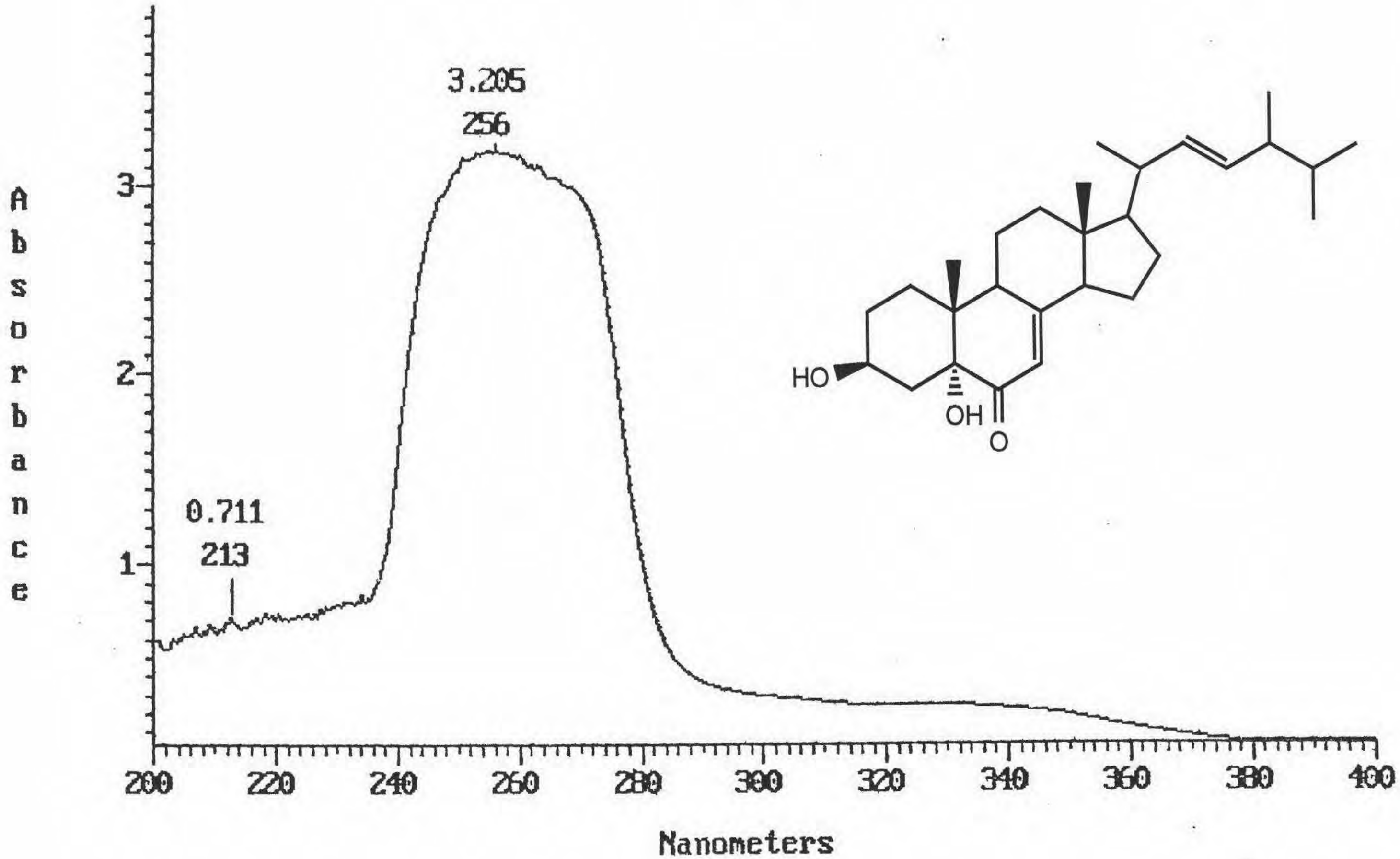



Figure 80. The UV spectrum of K084 in chloroform

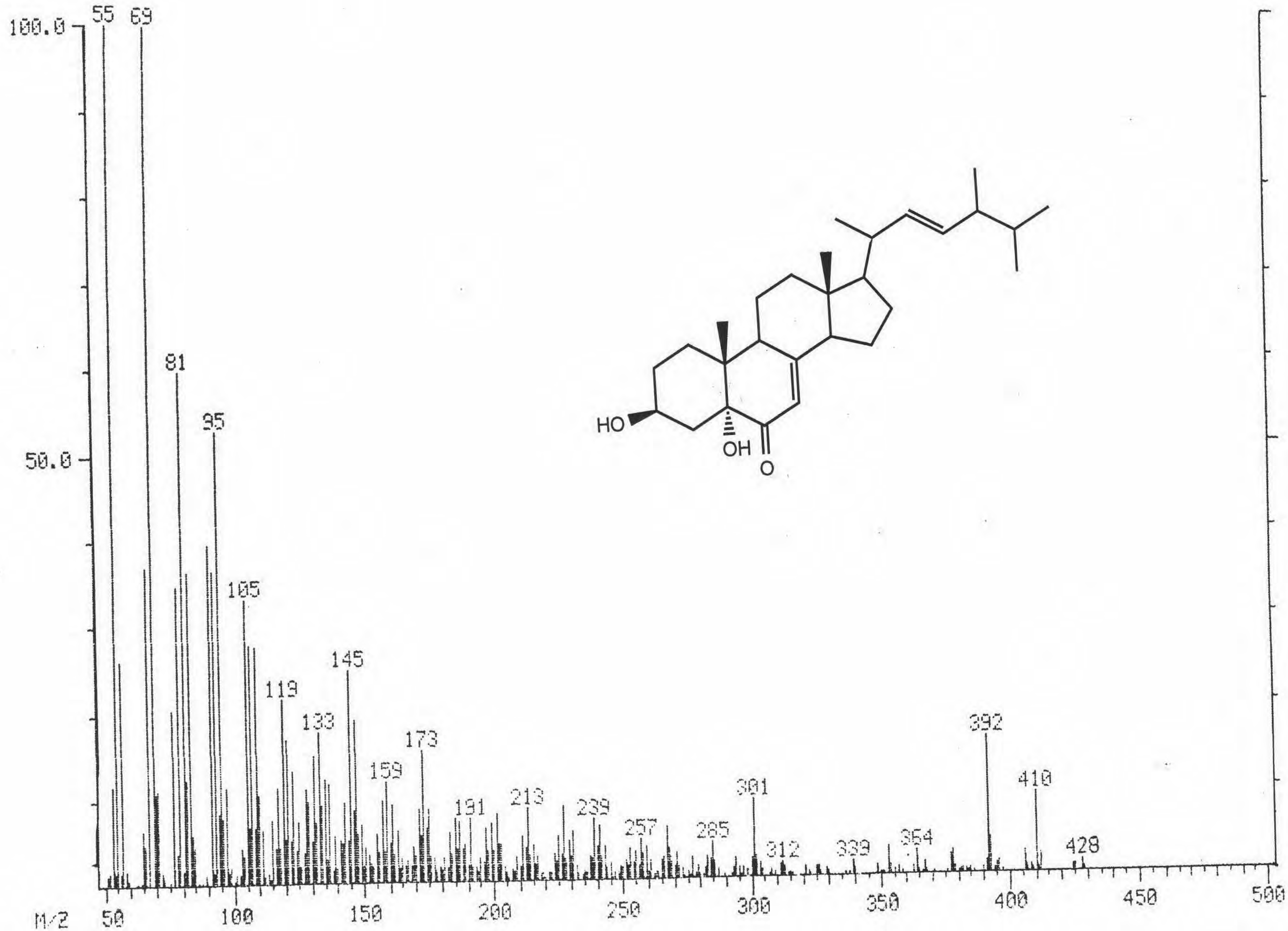



Figure 81. The EIMS spectrum of K084

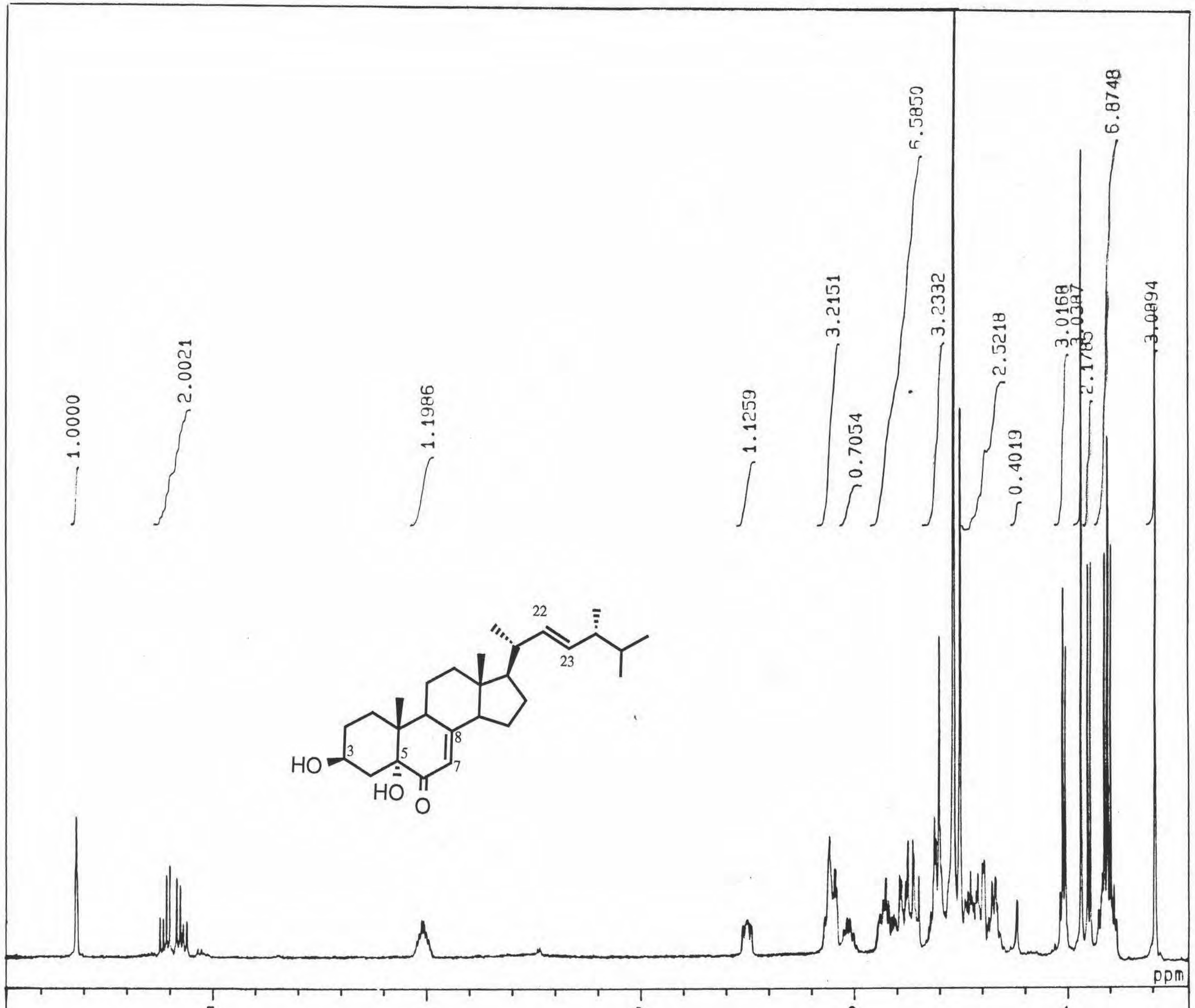



Figure 82. The 500 MHz $^{1}H$ NMR spectrum of K084 in $CDCl_3$

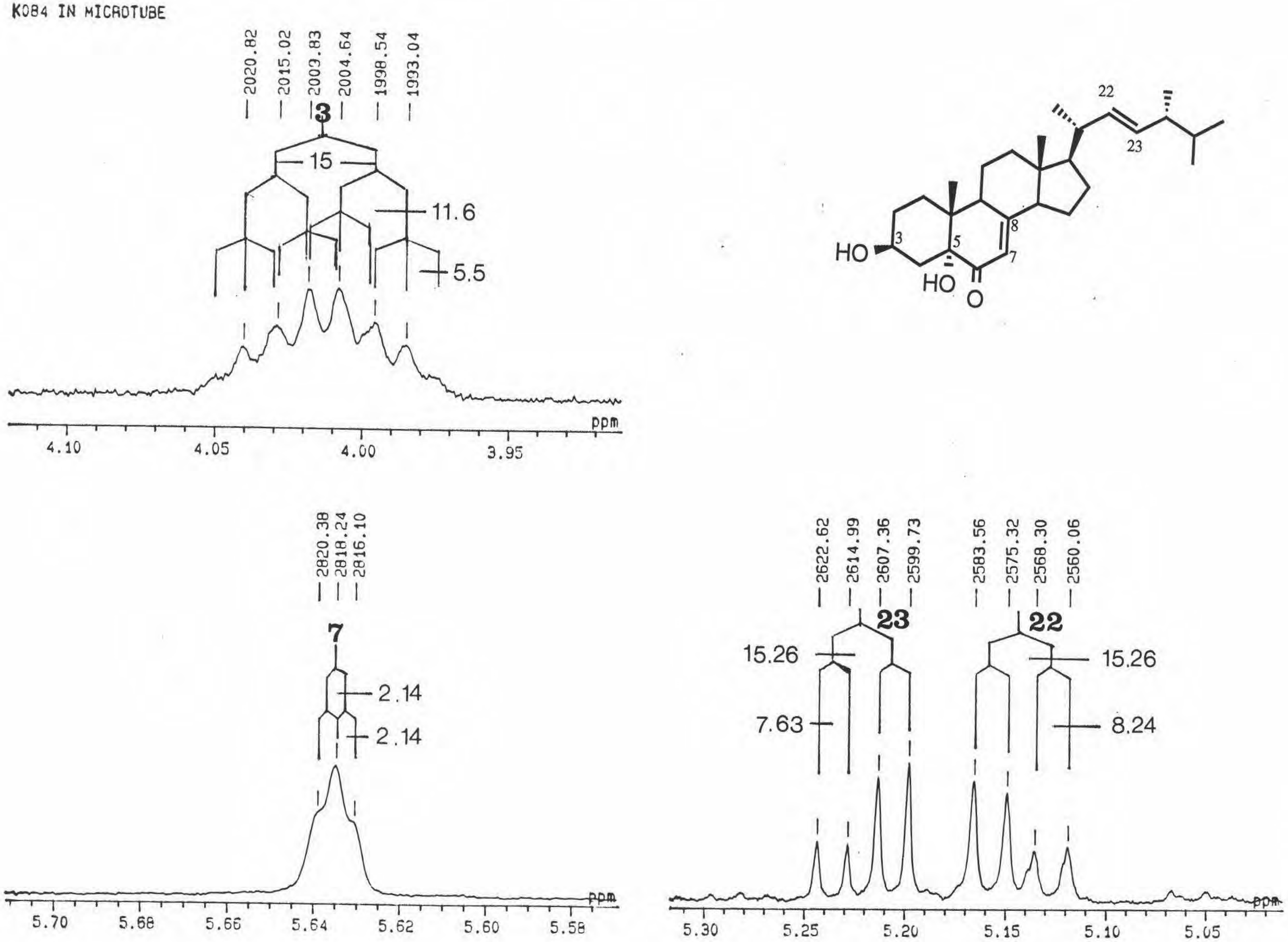



Figure 83. The 500 MHz $^1$H NMR spectrum of K084 in $CDCl_3$ (expanded)

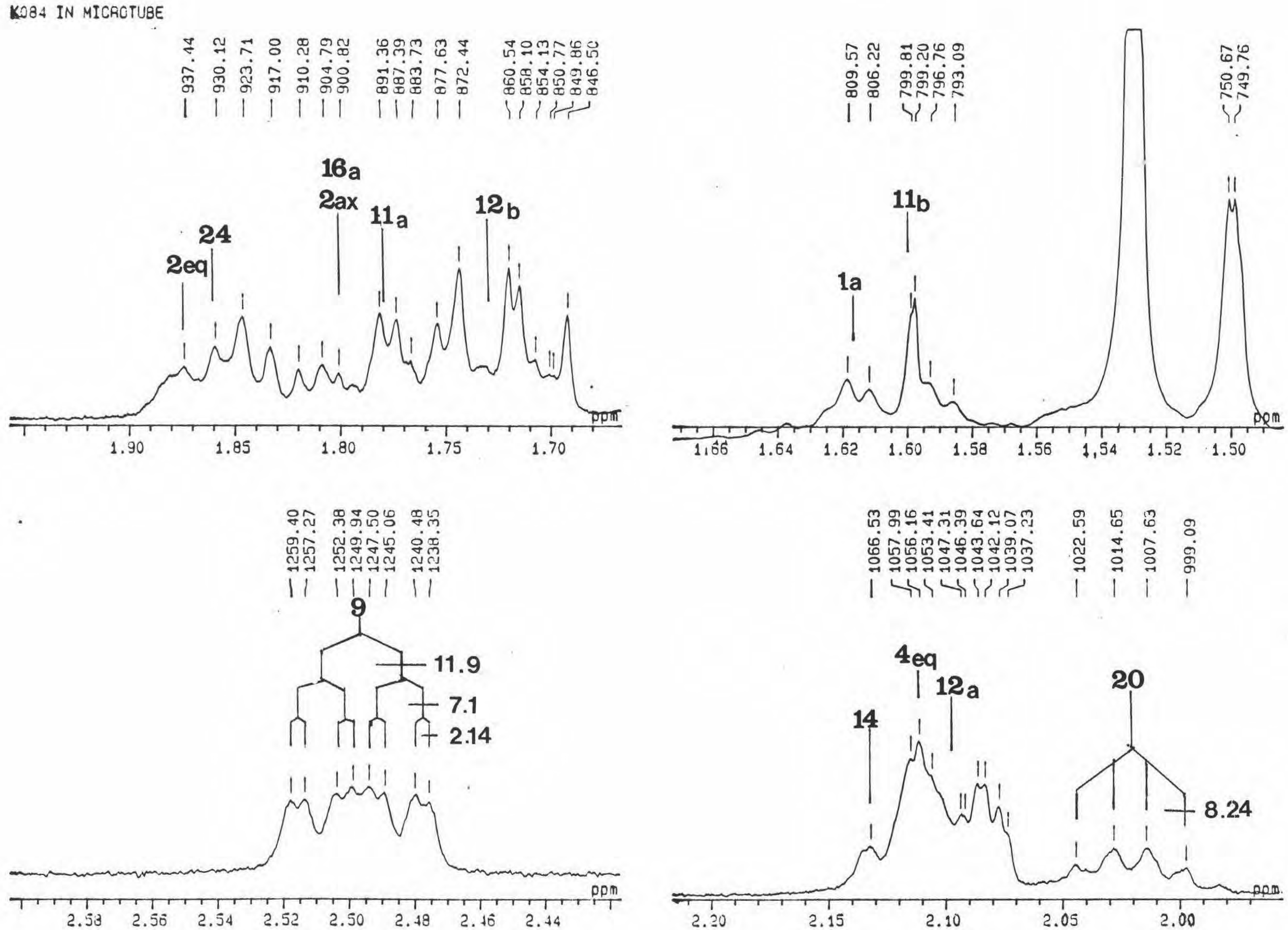



Figure 84. The 500 MHz $^{1}$H NMR spectrum of K084 in $CDCl_3$ (expanded)

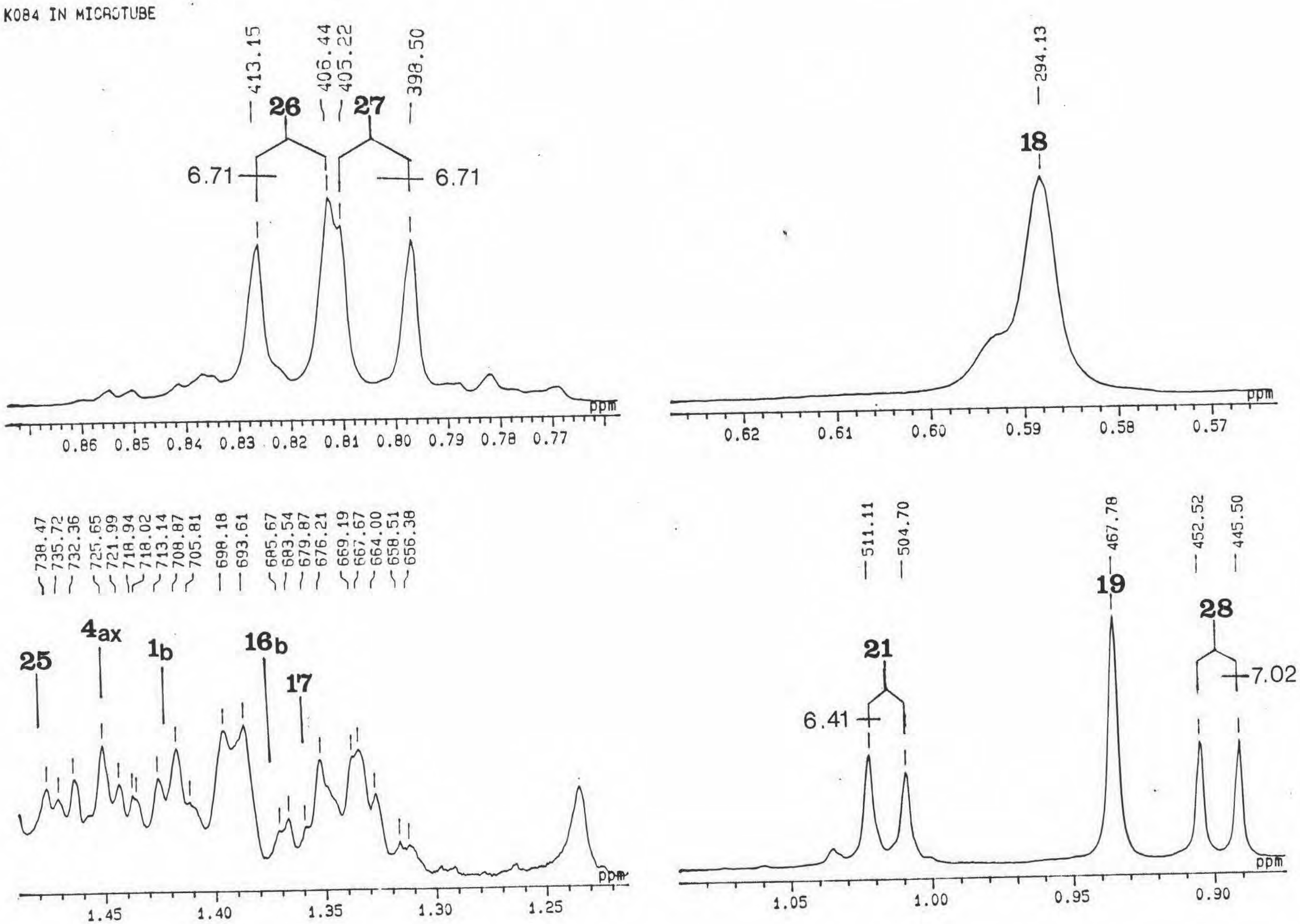



Figure 85. The 500 MHz $^{1}H$ NMR spectrum of K084 in $CDCl_3$ (expanded)

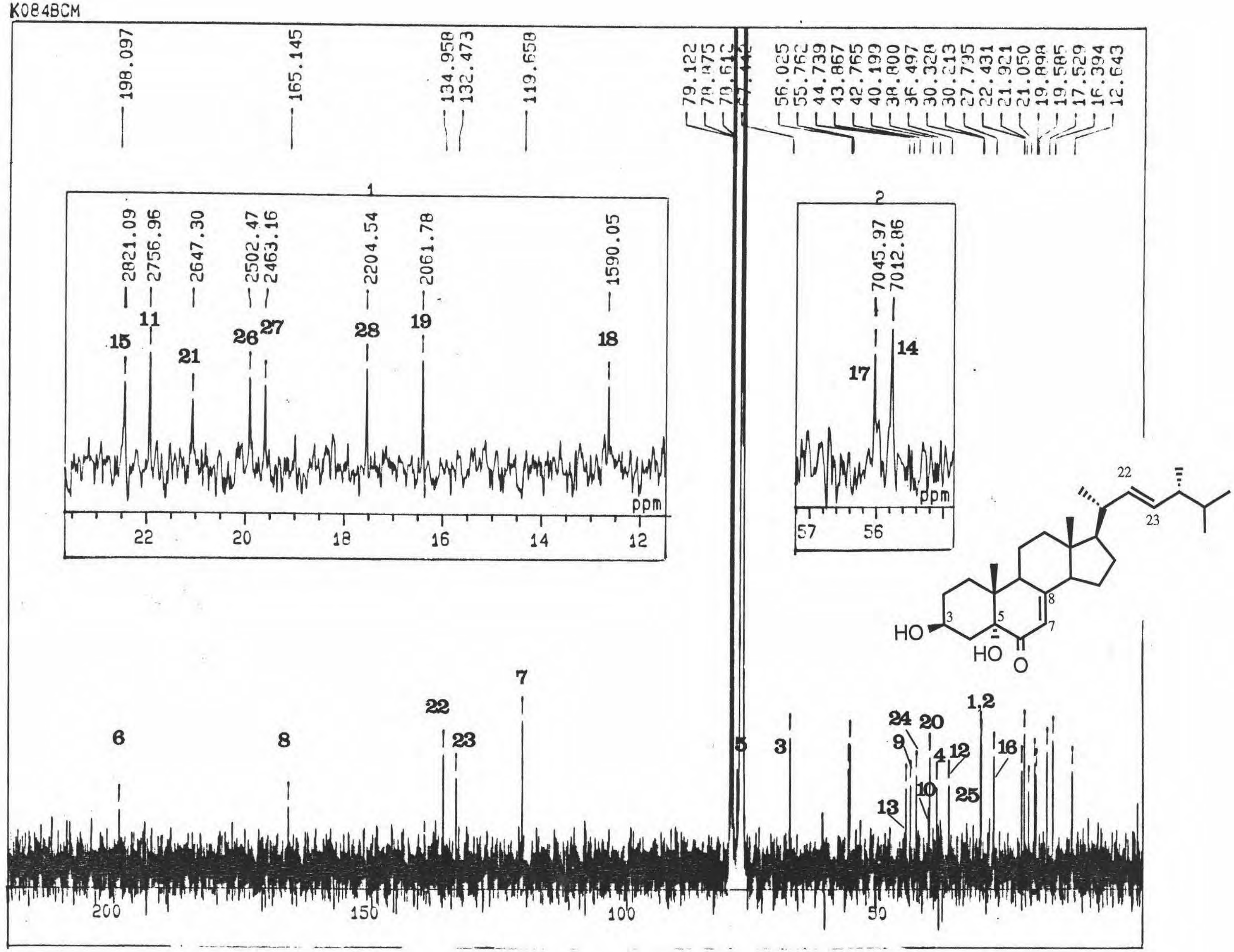



Figure 86. The 125 MHz $^{13}C$ NMR spectrum of K084 in $CDCl_3$

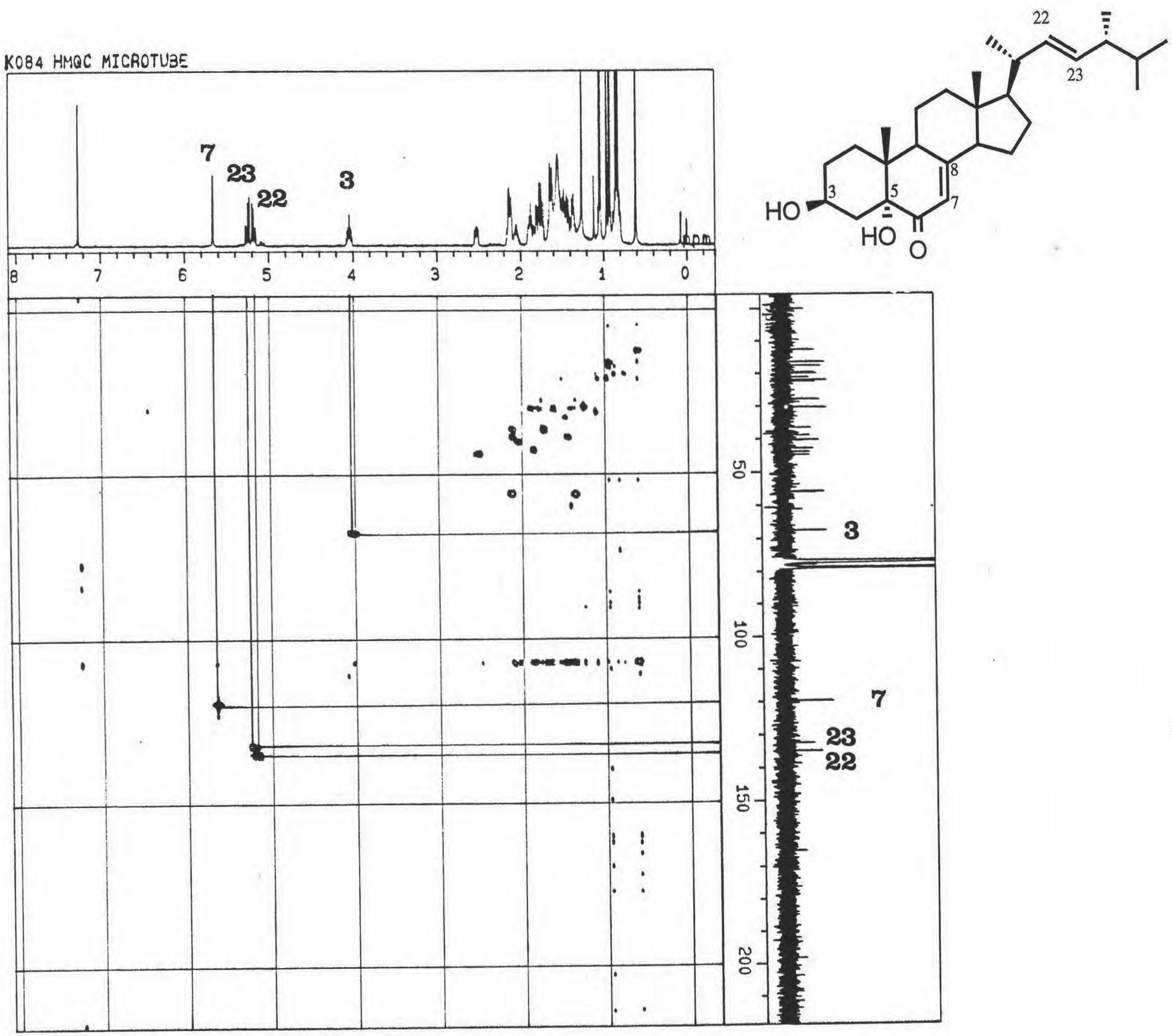



Figure 87. The HMQC spectrum of K084

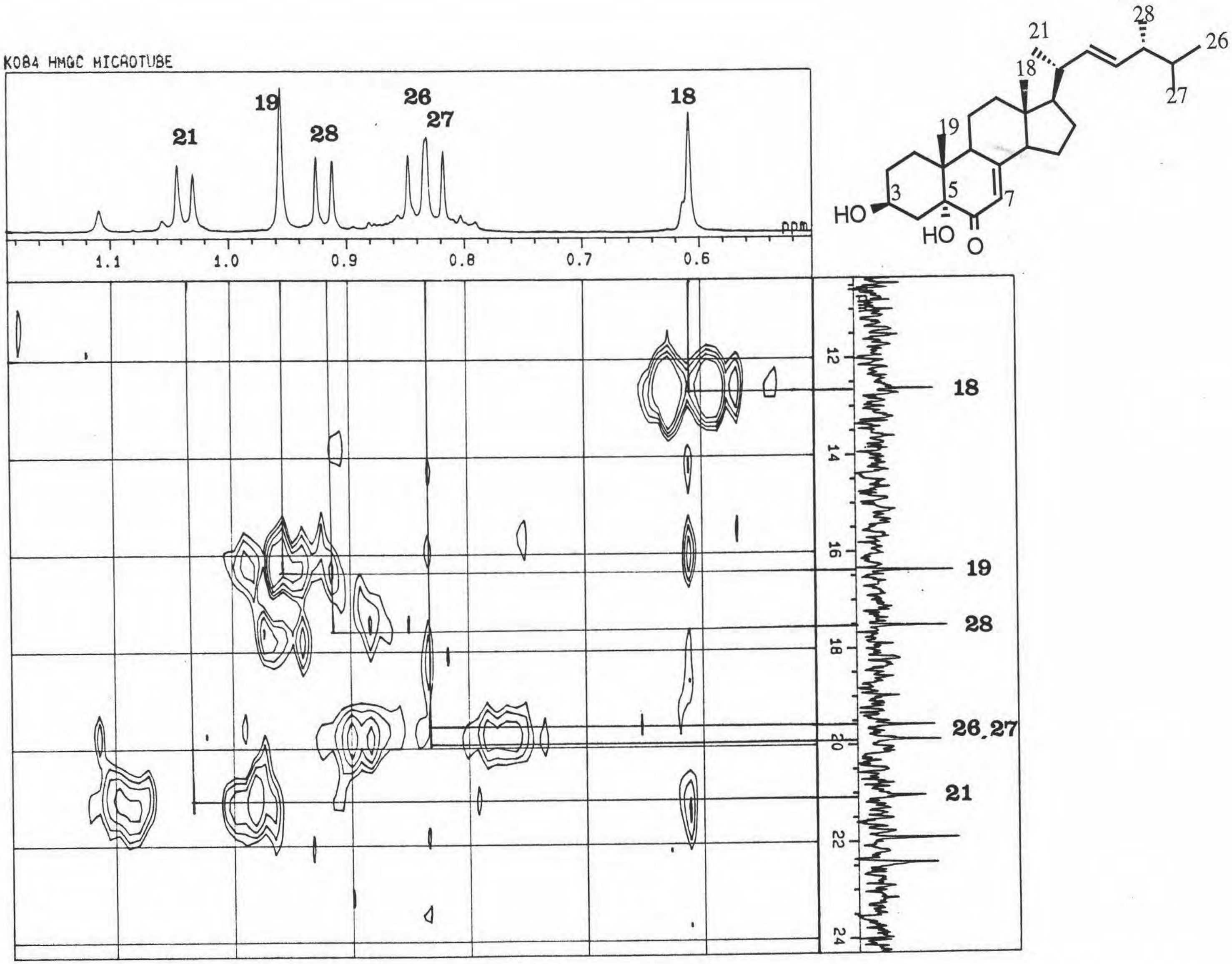



Figure 88. The partial HMQC spectrum ($\delta_H$ 0.5-1.2 ppm) of K084

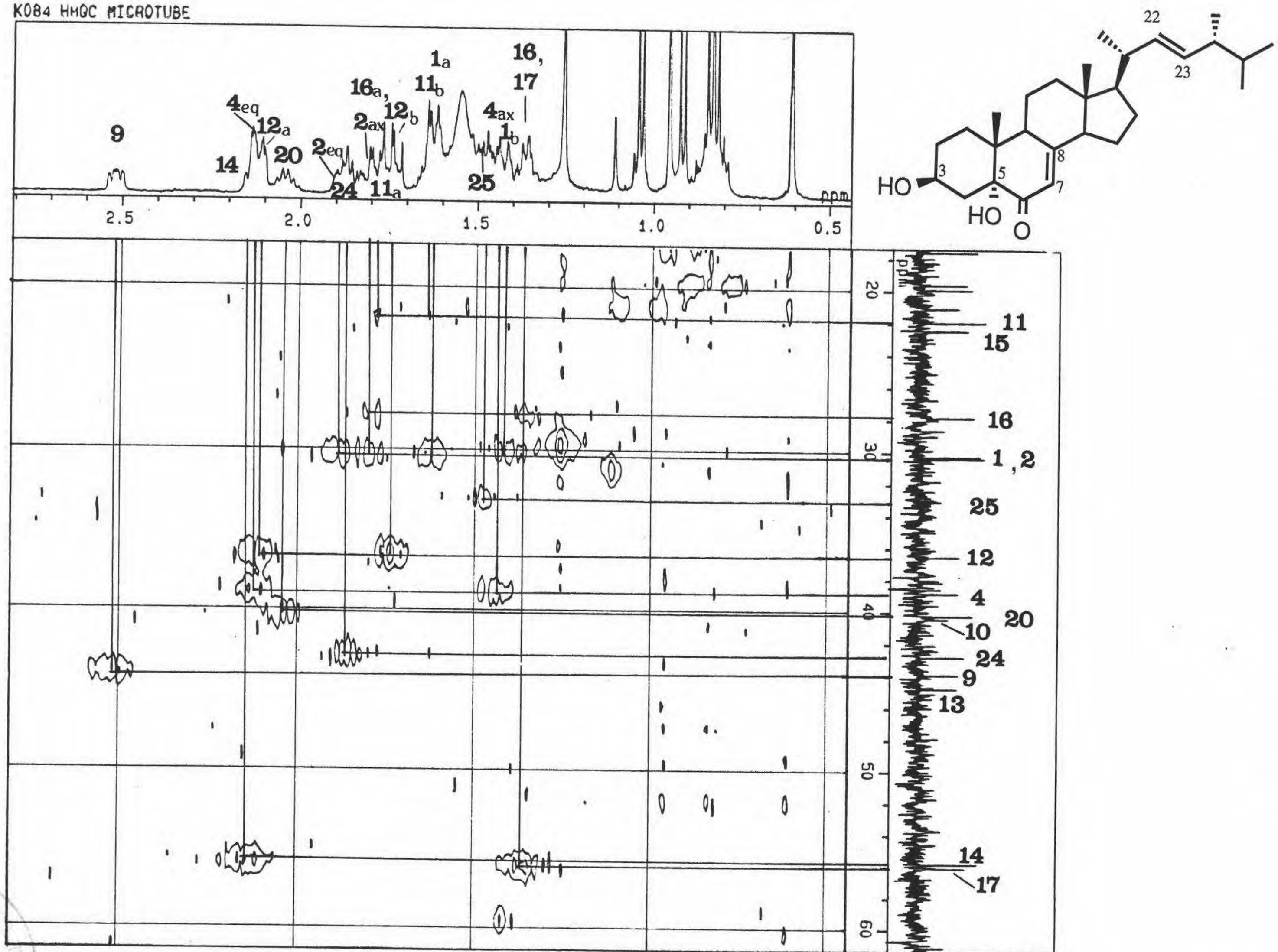



Figure 89. The partial HMQC spectrum ($\delta_H$ 0.5-2.6 ppm) of K084

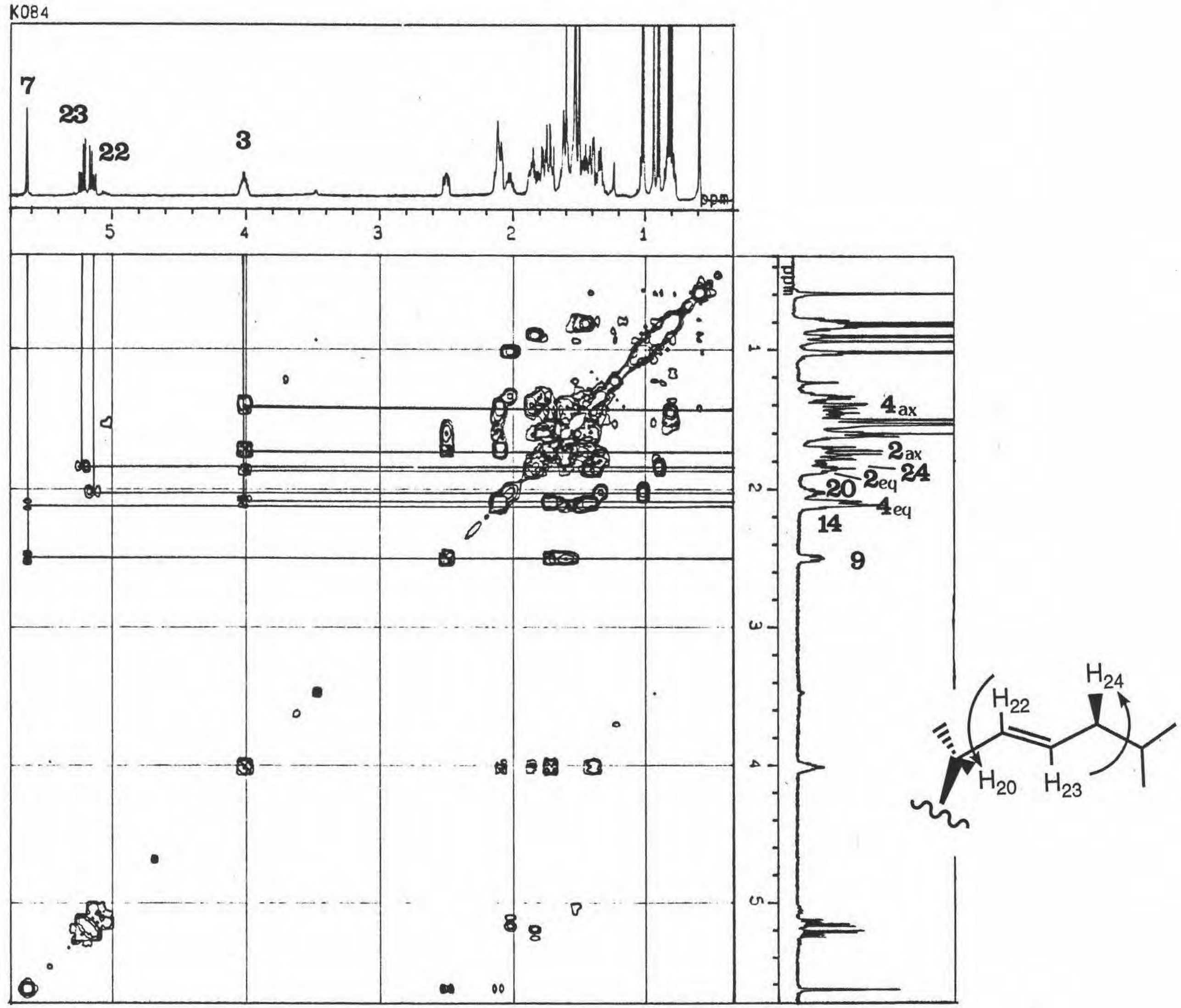



Figure 90. The $^{1}H$-$^{1}H$ COSY spectrum of K084

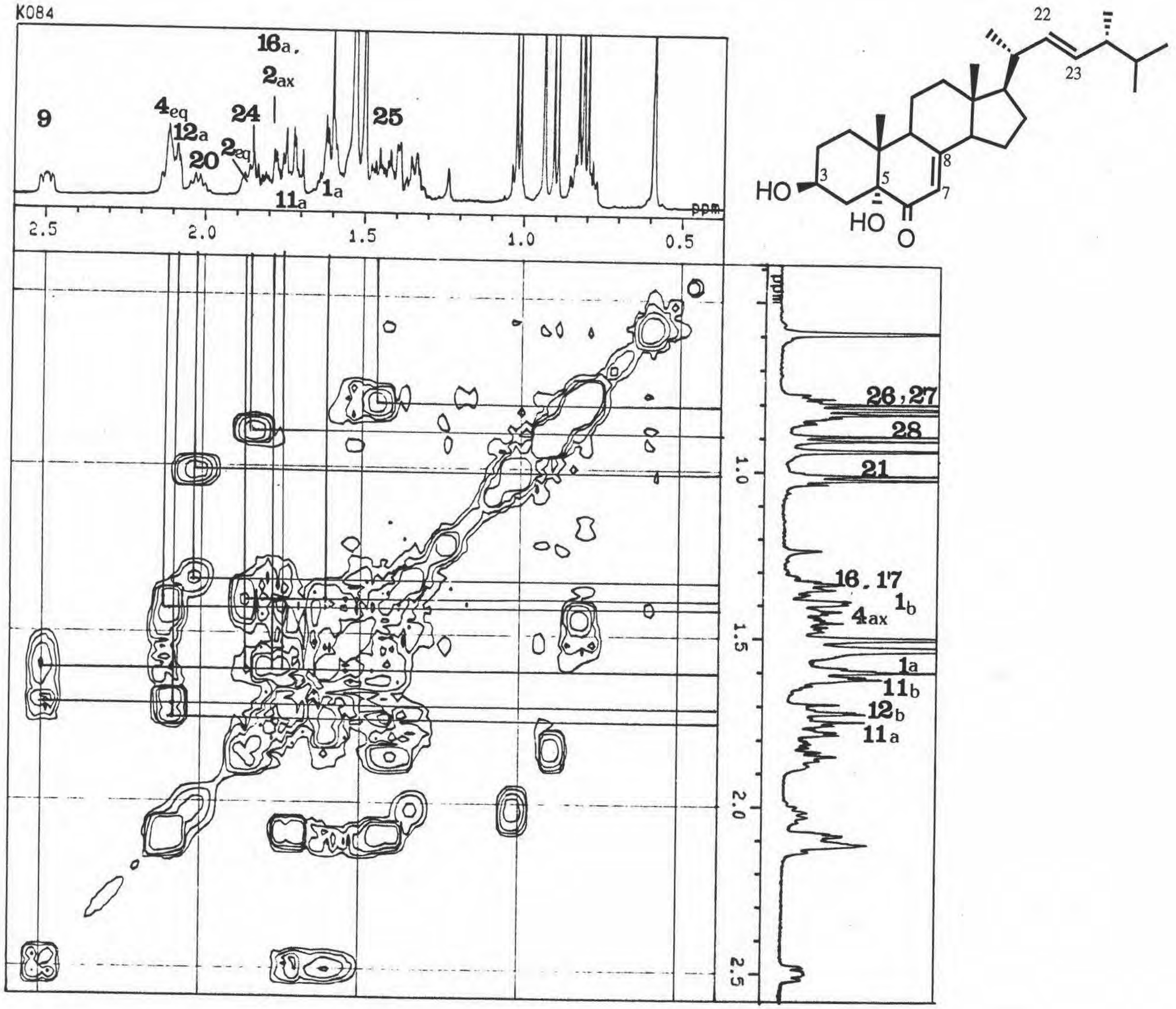



Figure 91. The partial $^1H$-$^1H$ COSY spectrum ($\delta_H$ 0.5-2.6 ppm) of K084

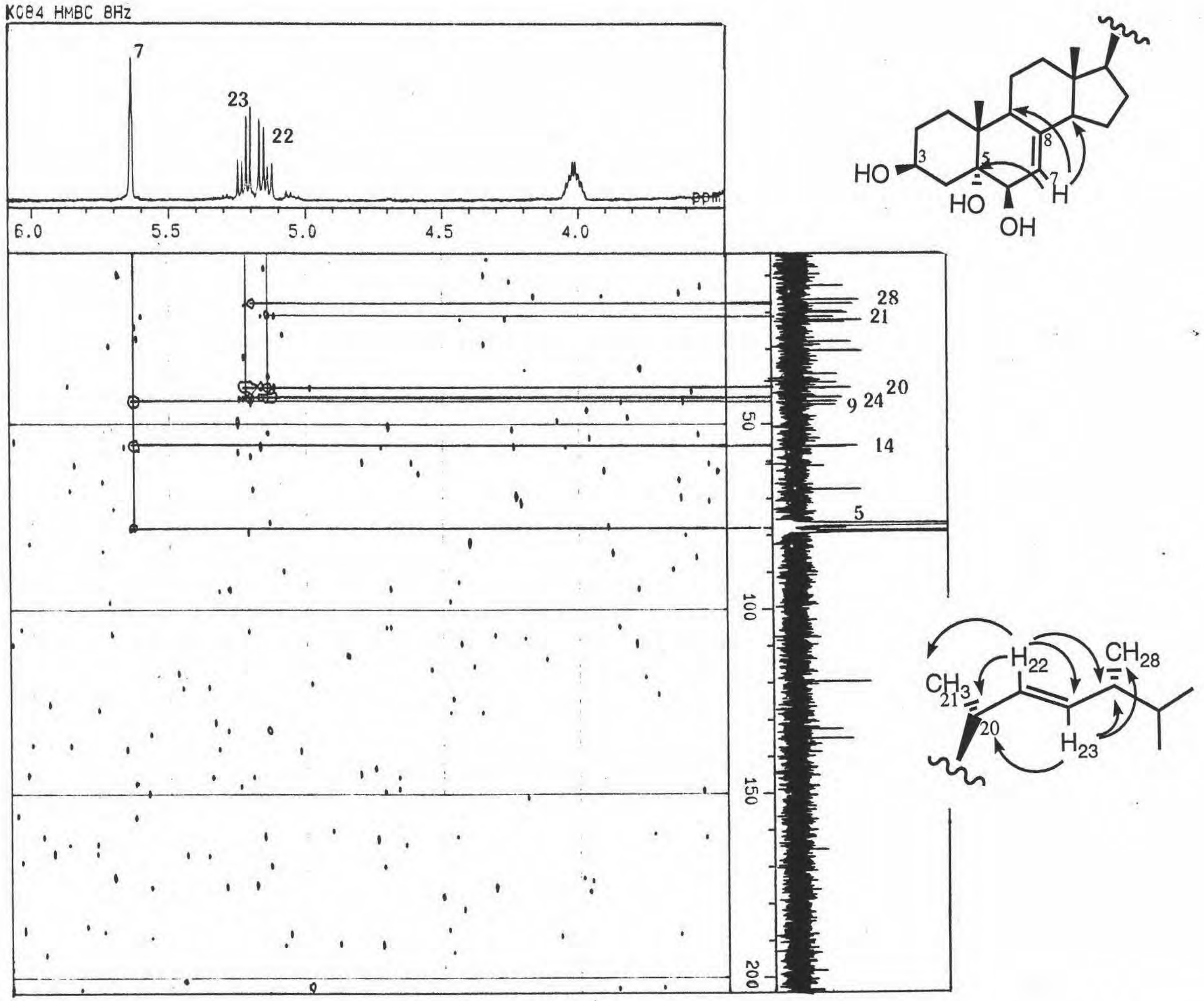



Figure 92. The partial HMBC spectrum ($\delta_H$ 3.6-6.0 ppm) of K084 ($^3J_{CH}$ = 4 Hz)

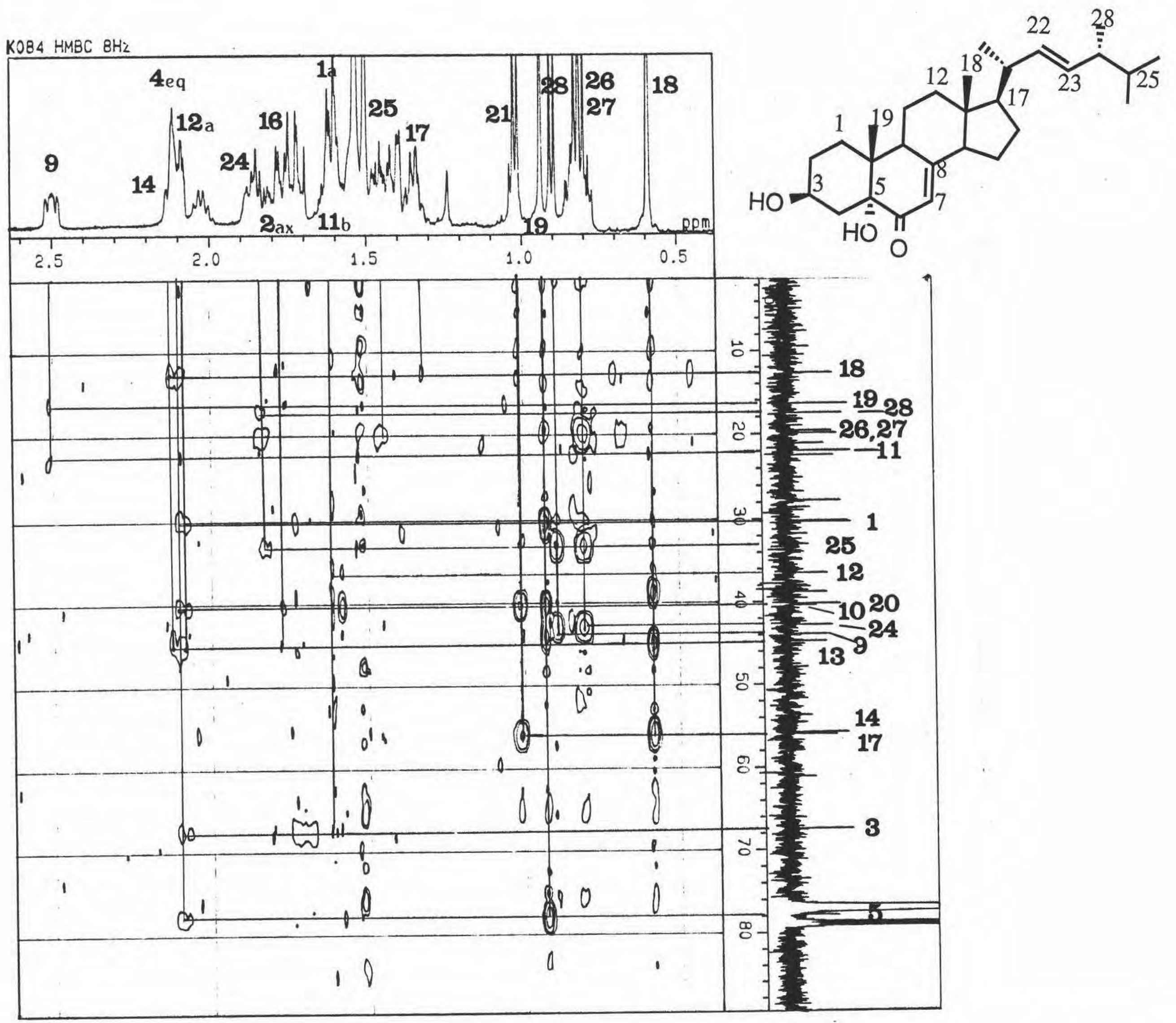



Figure 93. The partial HMBC spectrum ($\delta_H$ 0.5-2.6 ppm) of K084 ($^3J_{CH}$ = 4 Hz)

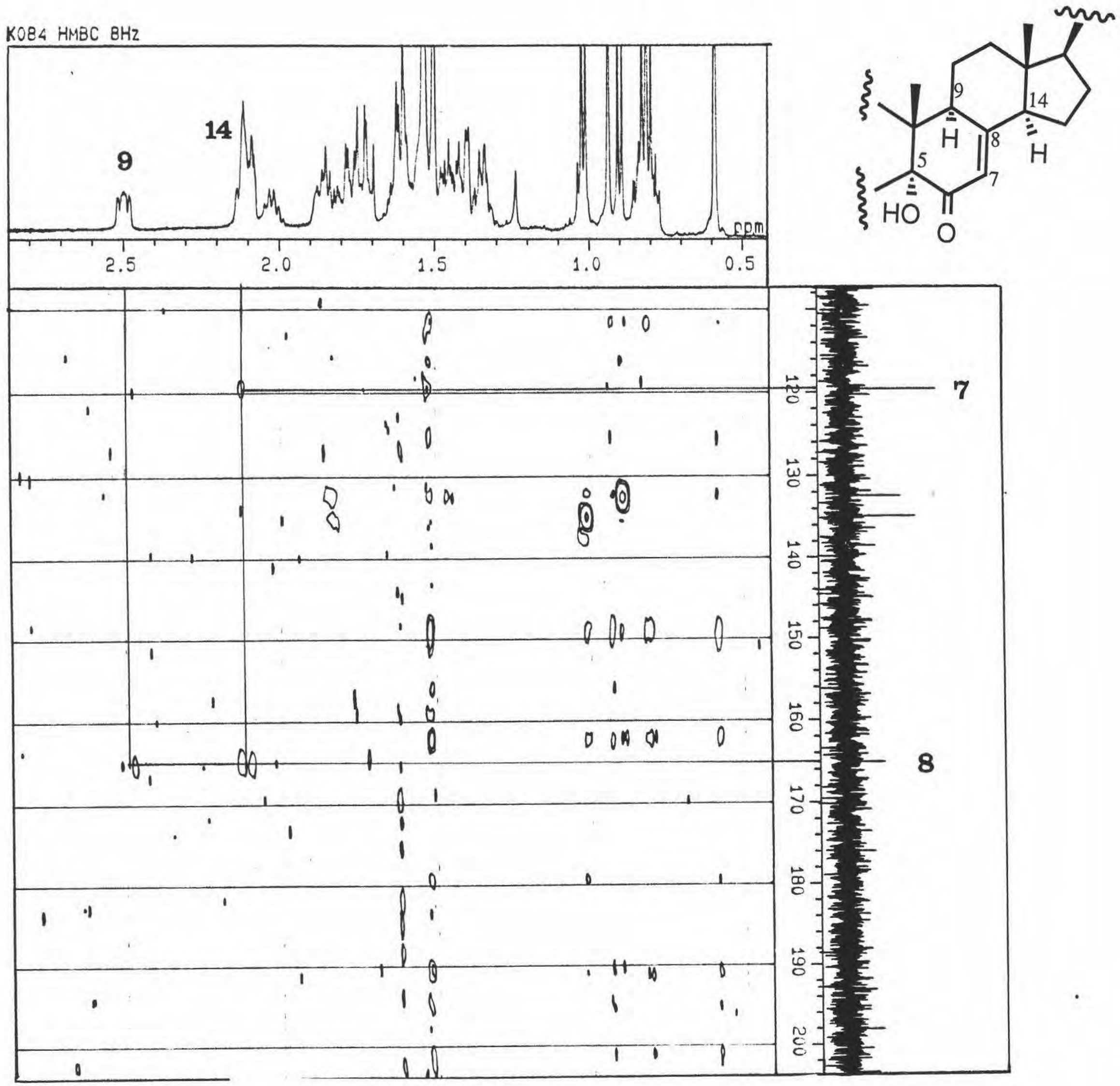



Figure 94. The partial HMBC spectrum ($\delta_H$ 0.4-1.2 ppm) of K084 ($^3J_{CH}$ = 4 Hz)

# VITA

Miss Ladda Thitithanaphuk was born on February 19, 1969 in Lampang, Thailand. She received her Bachelor degree of Science in Pharmacy in 1992 from the faculty of Pharmaceutical Sciences, Chiang Mai University, Chiang Mai, Thailand. At present, she is a faculty member of the Department of Medicinal Chemistry and Natural Products, Faculty of Pharmacy, Naresuan University, Phitsanulok, Thailand.