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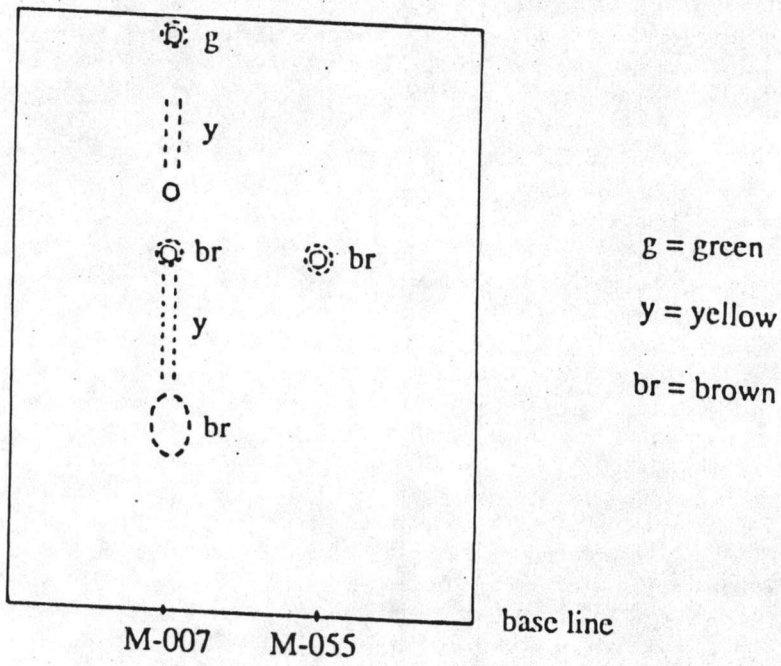
# APPENDIX




Silica gel GF 254 / solvent system ; hexane : ethyl acetate (1:1)

○ = quenching spot under UV light (254 nm)

◌ = positive with anisaldehyde-sulfuric acid

Figure 10. TLC chromatogram of fraction M-007 and M-055

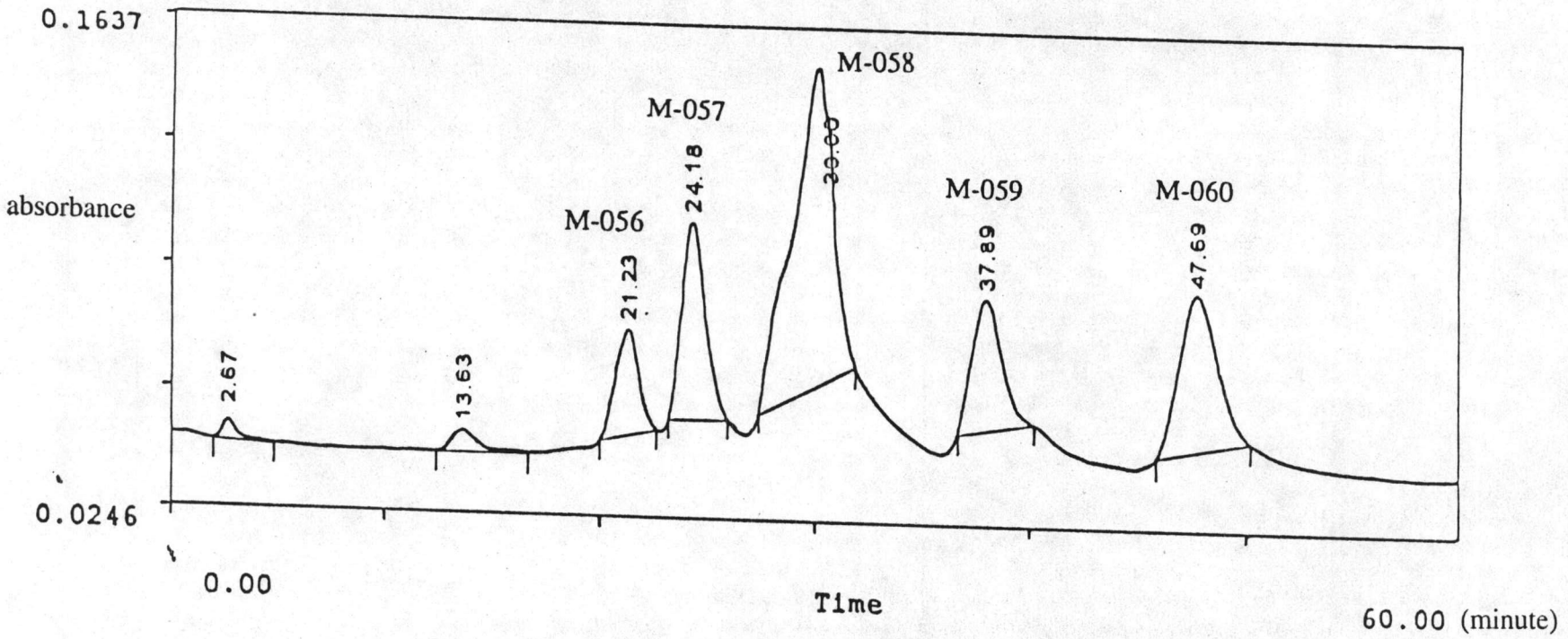
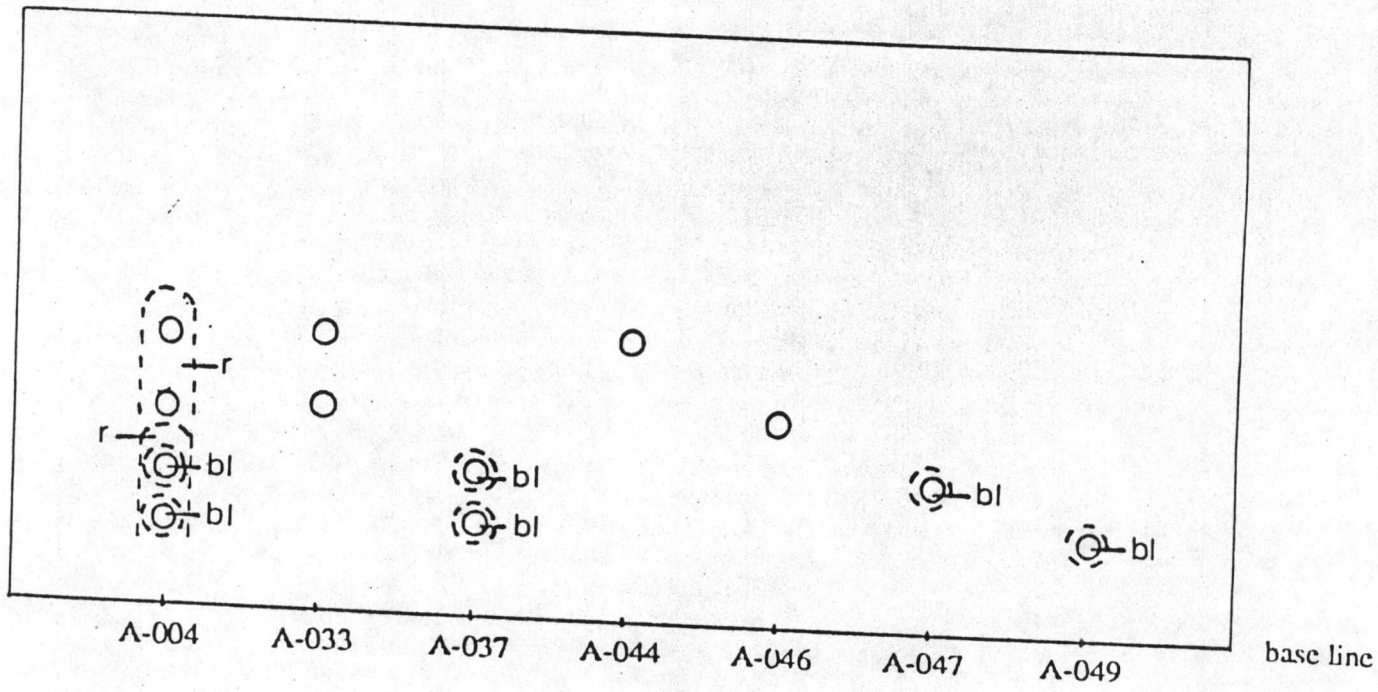



Figure 11. HPLC chromatogram of fraction M-055




Silica gel GF 254 / solvent system ; chloroform : methanol (9:1)

○ = quenching spot under UV light (254 nm)

◌ = positive with anisaldehyde-sulfuric acid

bl = blue

r = red

Figure 12. TLC chromatogram of fraction A-0 4, A-033, A-037, and compounds A-044, A-046, A-047, and A-049

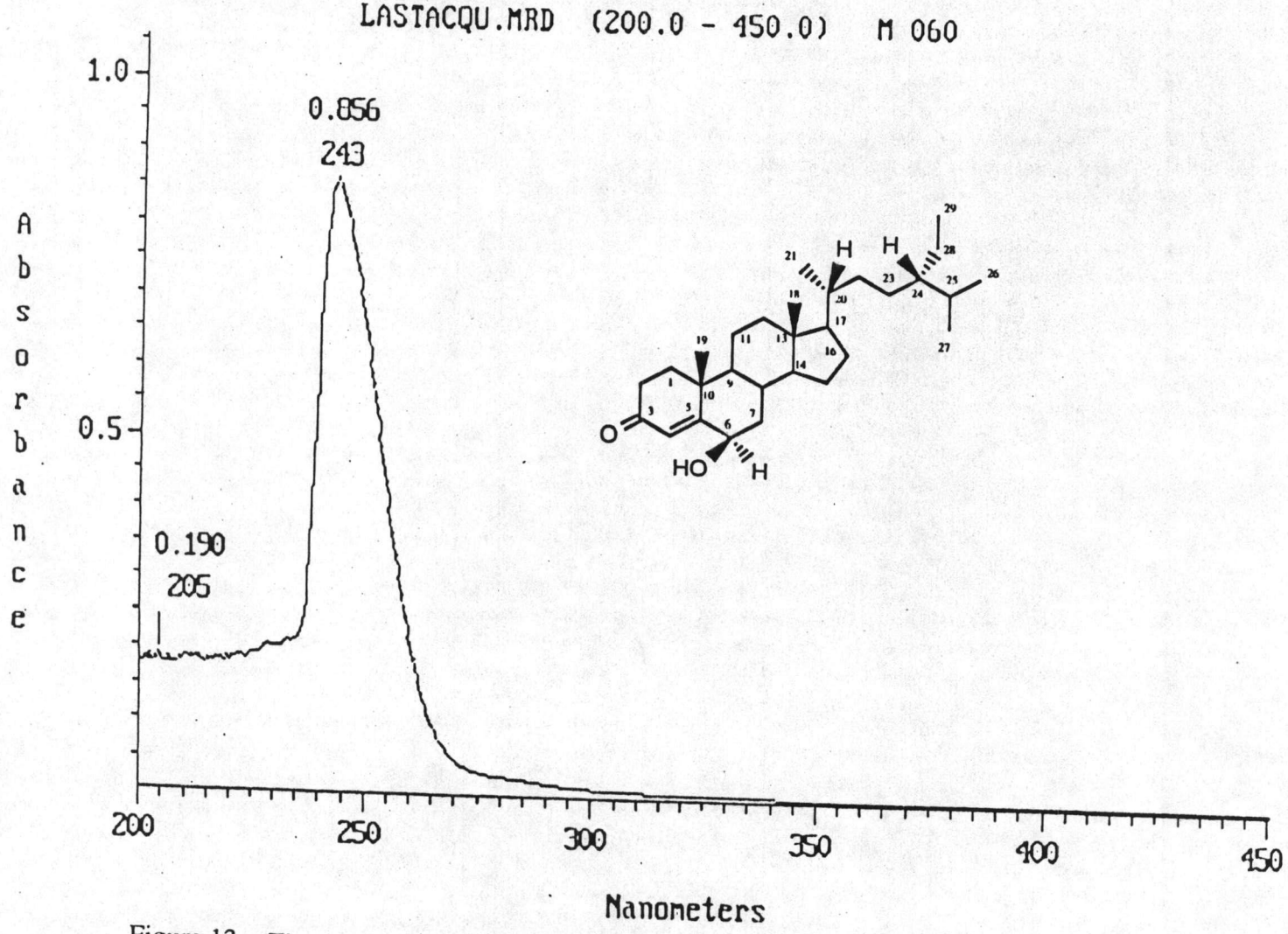



Figure 13. The uv spectrum of compound M-060 (in chloroform)

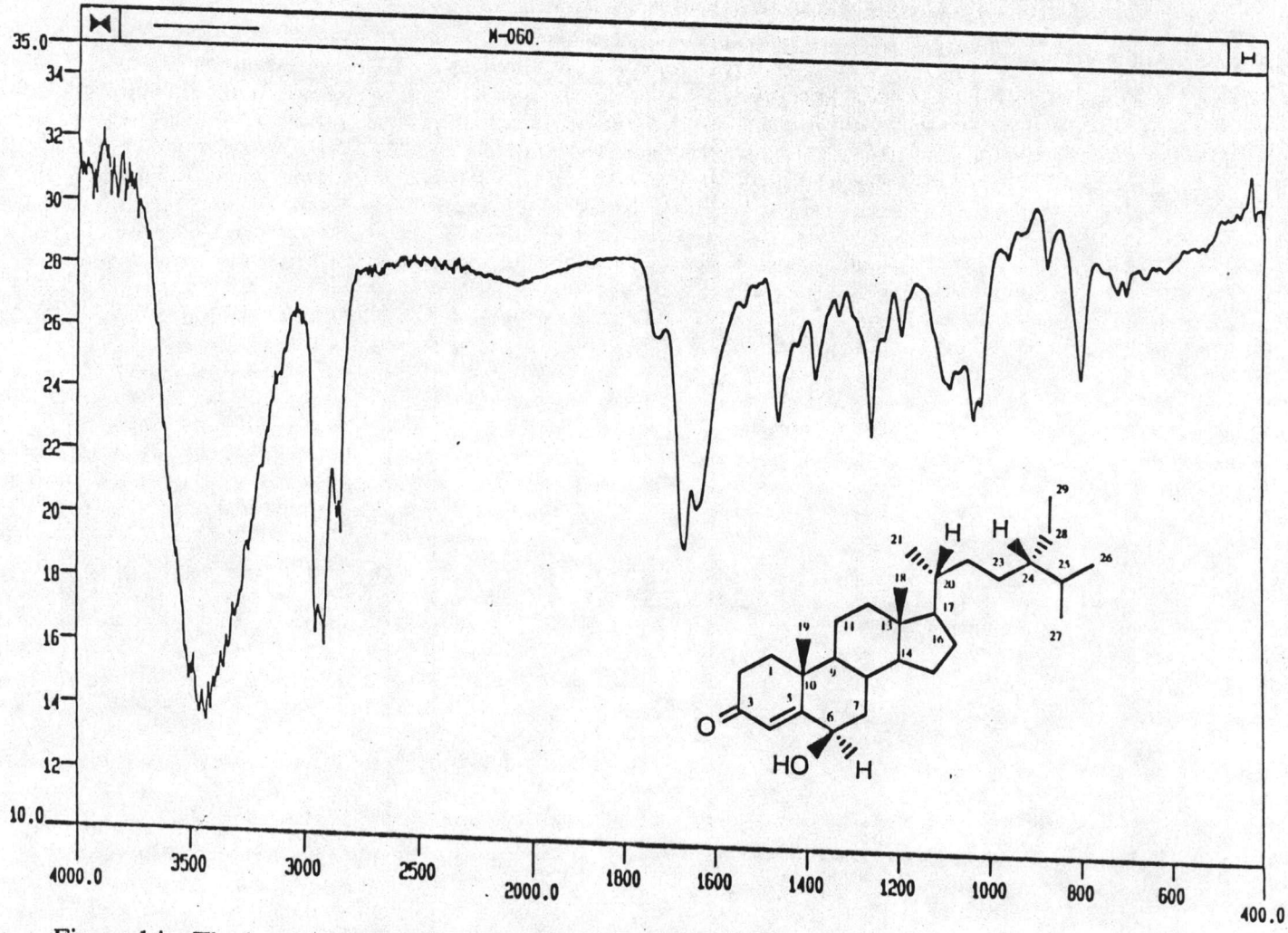



Figure 14. The ir spectrum of compound M-060 (film)

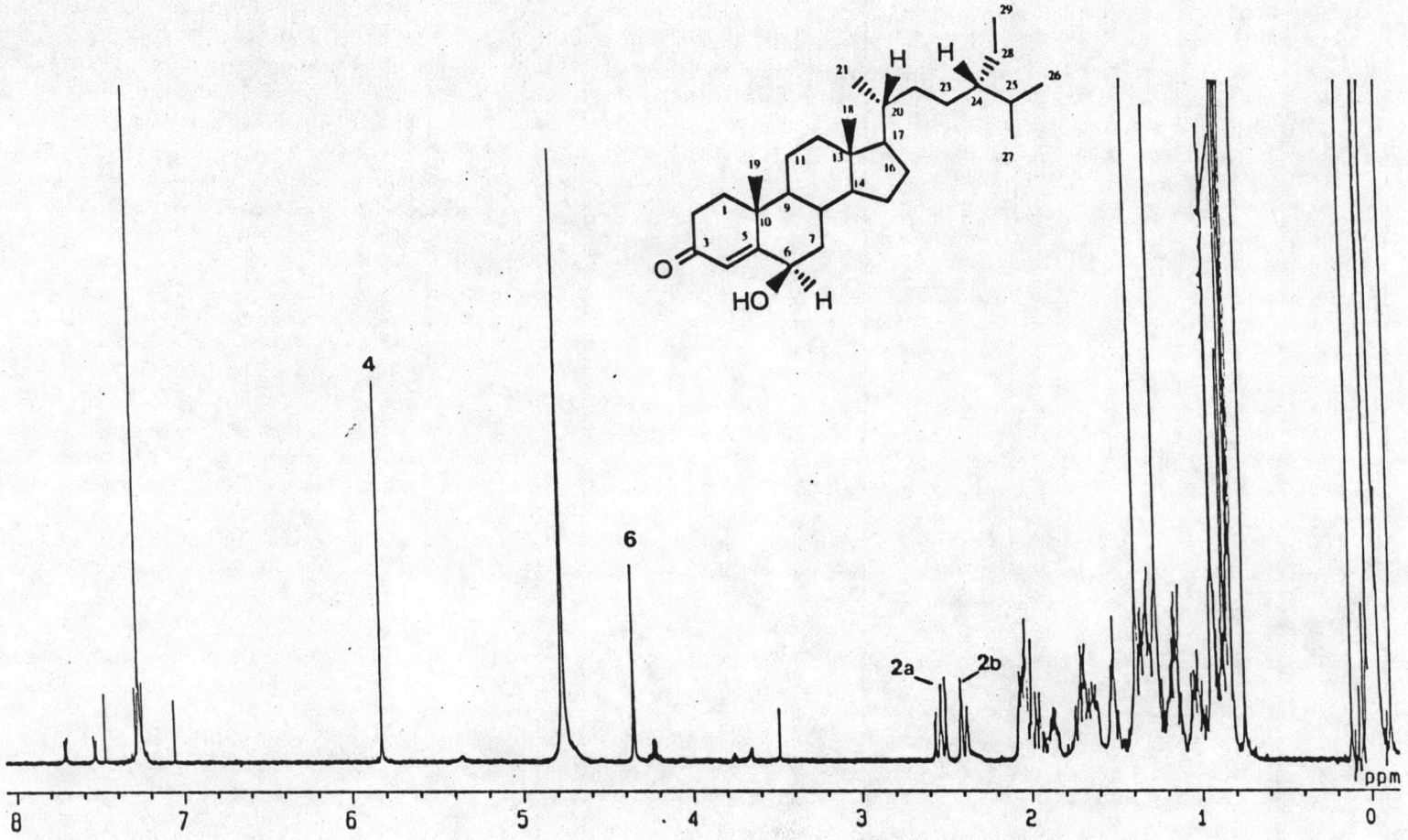



Figure 15. The 500 MHz $^1H$ nmr spectrum of compound M-060 (in $CDCl_3$ , $D_2O$ exchange)

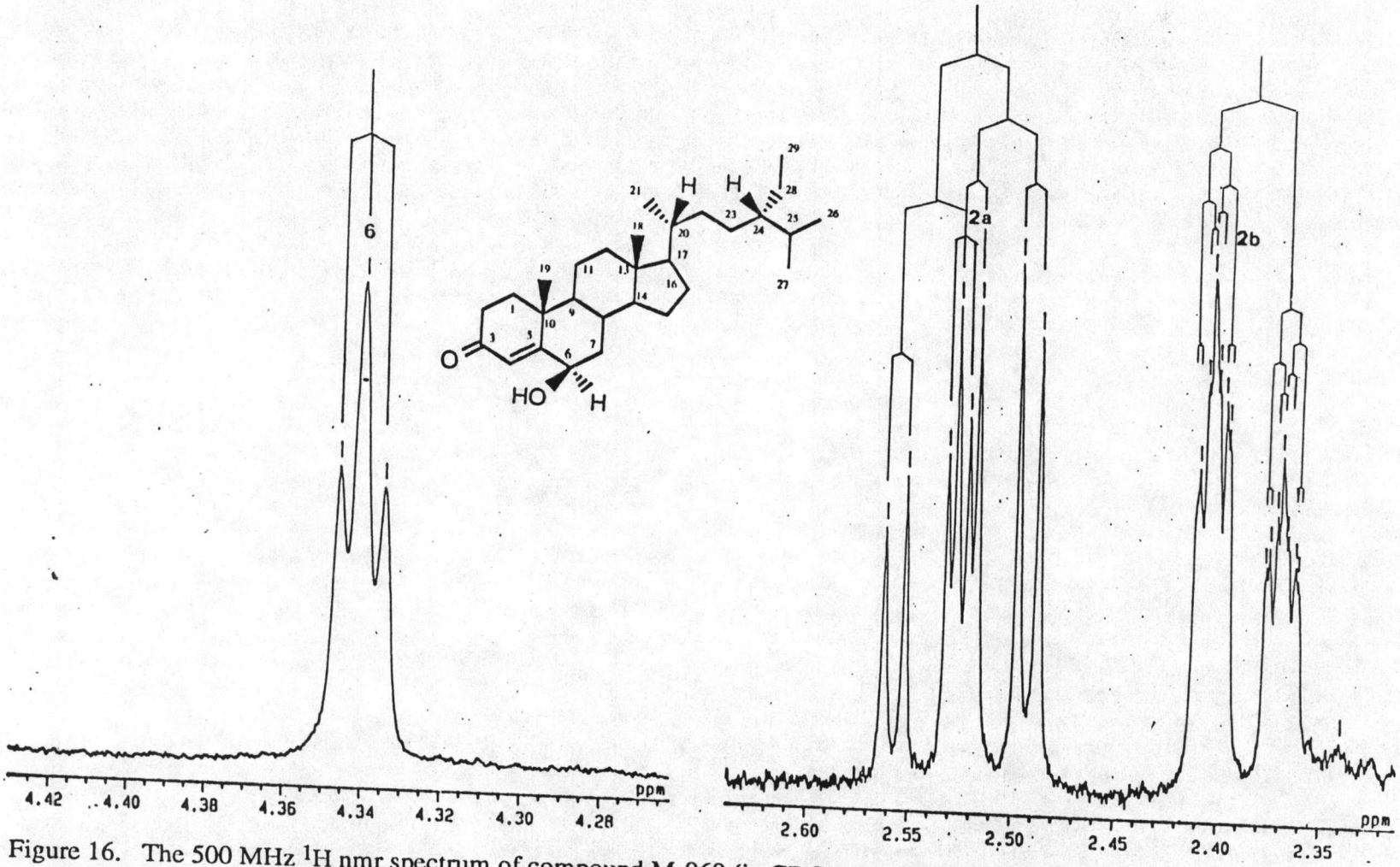



Figure 16. The 500 MHz $^1H$ nmr spectrum of compound M-060 (in $CDCl_3$ , $D_2O$ exchange)
(expanded from 2.35 ppm - 2.60 ppm and 4.28 ppm - 4.42 ppm)

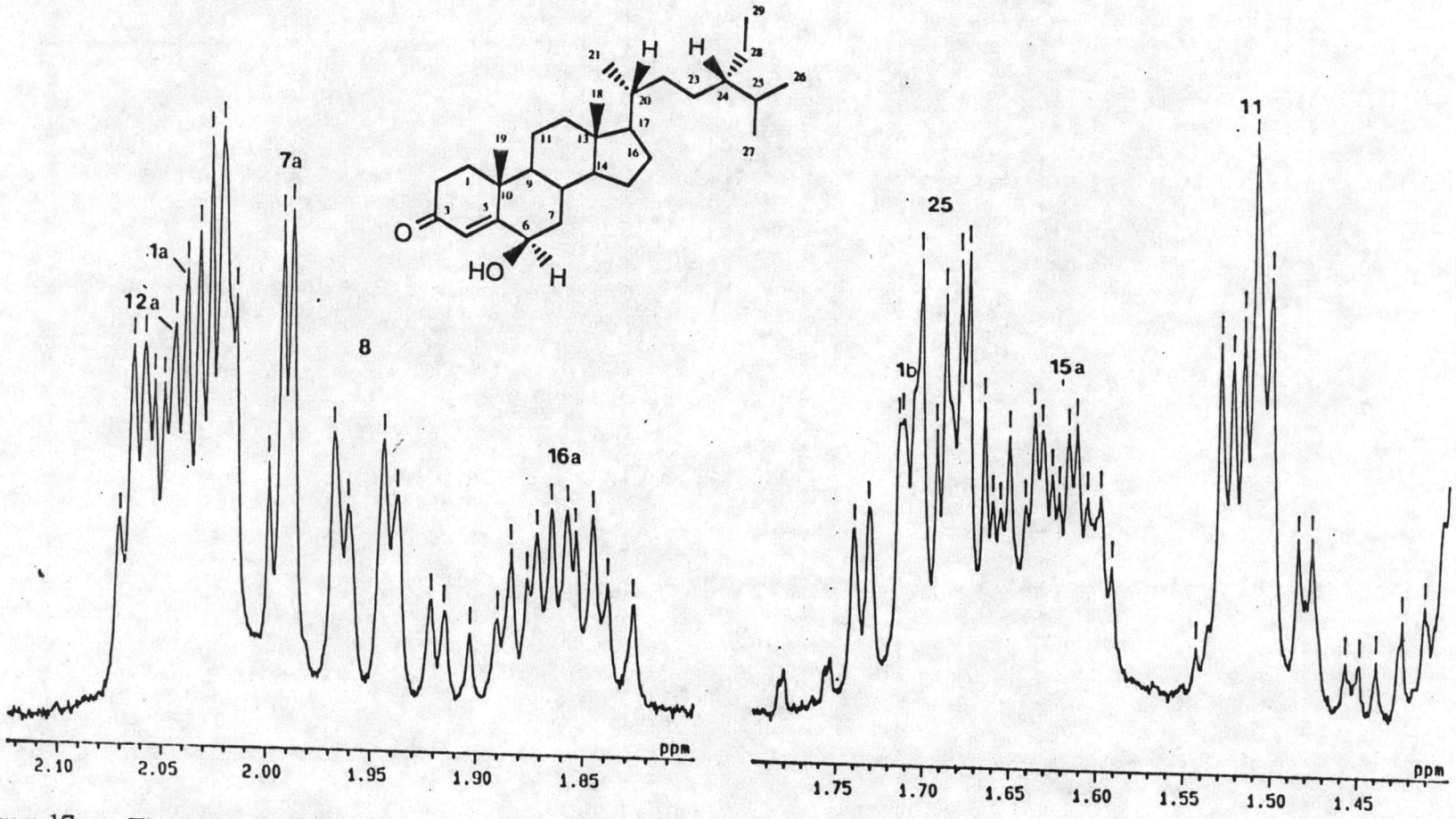



Figure 17. The 500 MHz $^1H$ nmr spectrum of compound M-060 (in $CDCl_3$ , $D_2O$ exchange) (expanded from 1.45 ppm - 2.10 ppm)

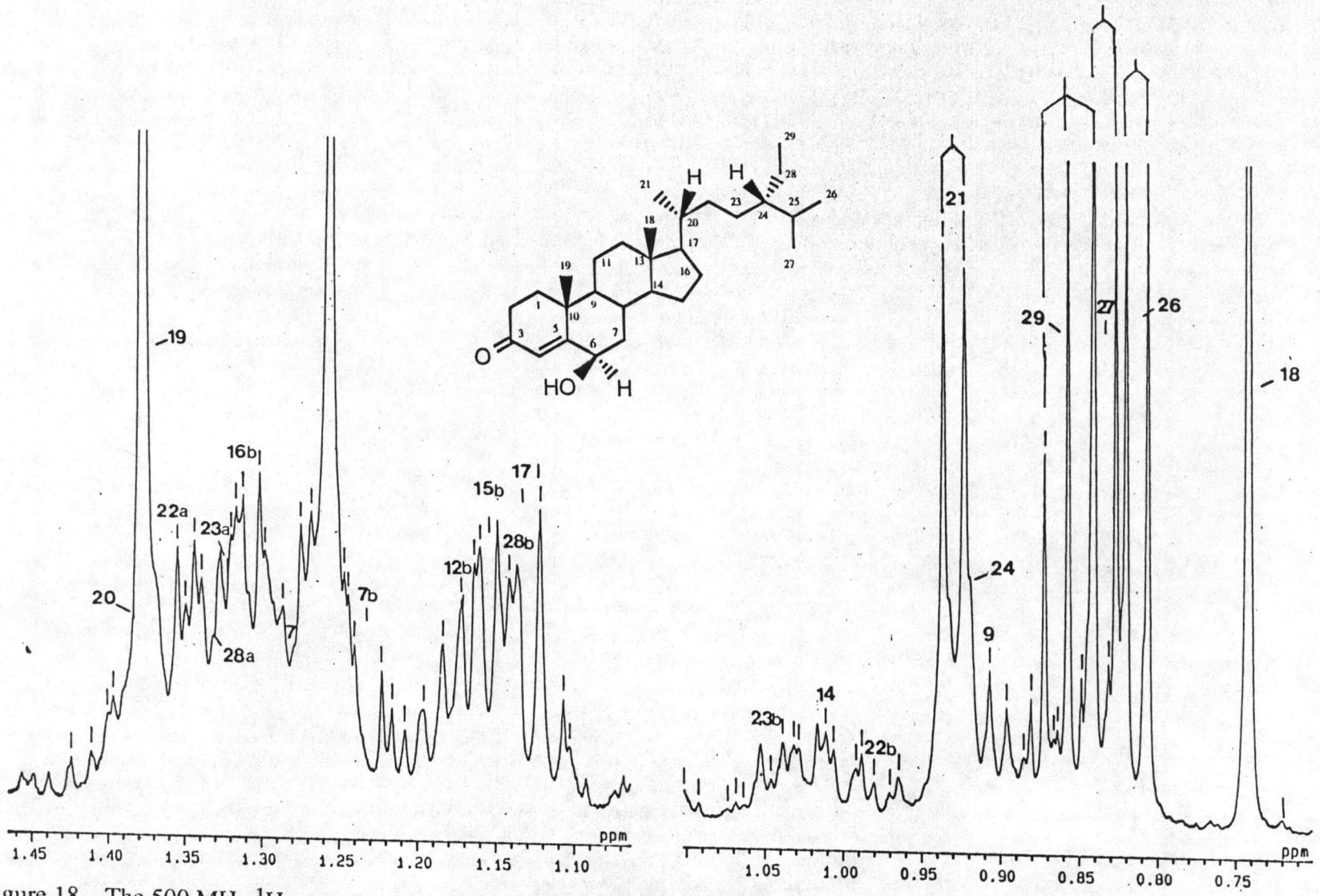



Figure 18. The 500 MHz $^1H$ nmr spectrum of compound M-060 (in $CDCl_3$ , $D_2O$ exchange)
(expanded from 0.75 ppm - 1.45 ppm)

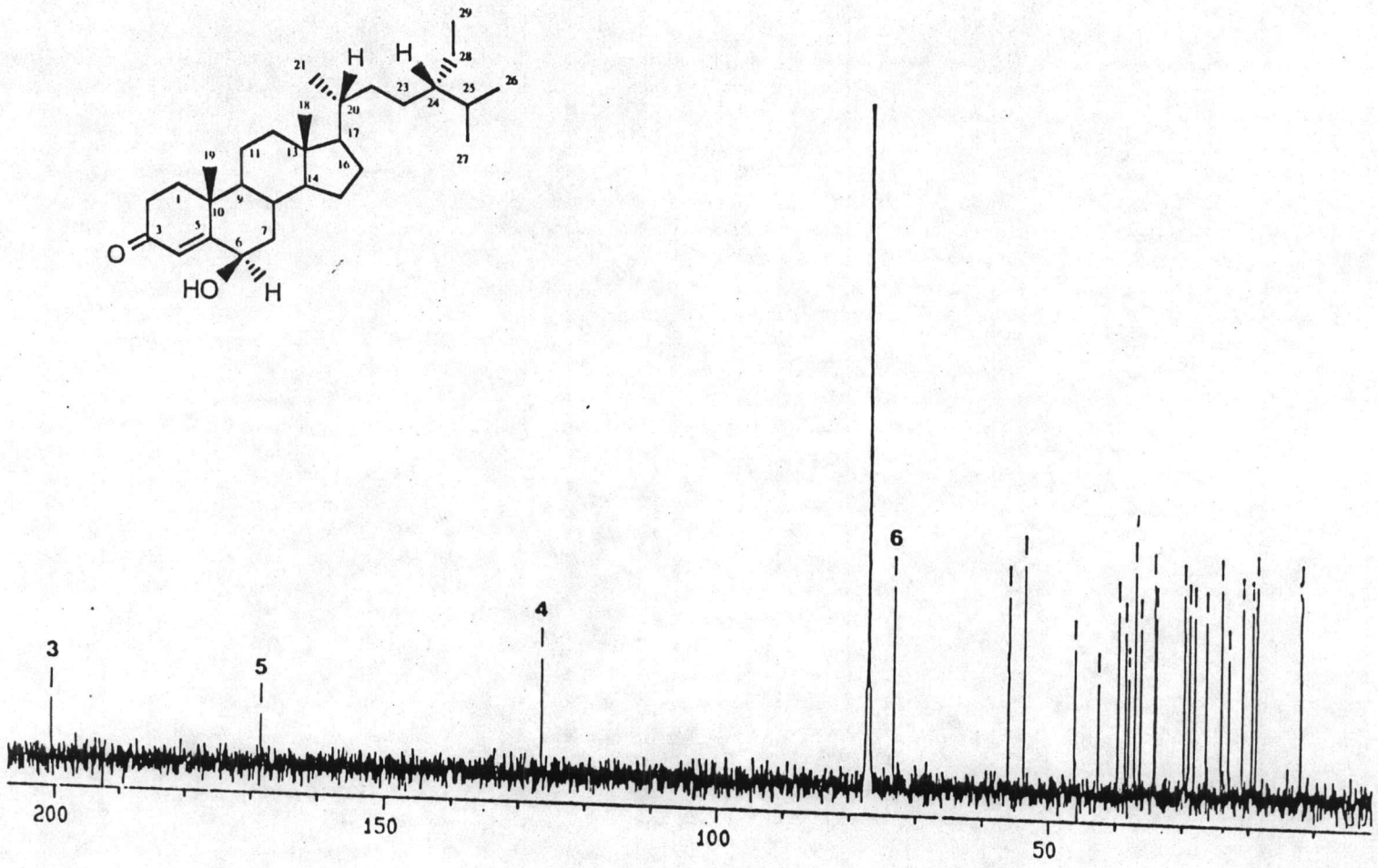



Figure 19. The 125 MHz $^{13}C$ nmr spectrum of compound M-060 (in $CDCl_3$)

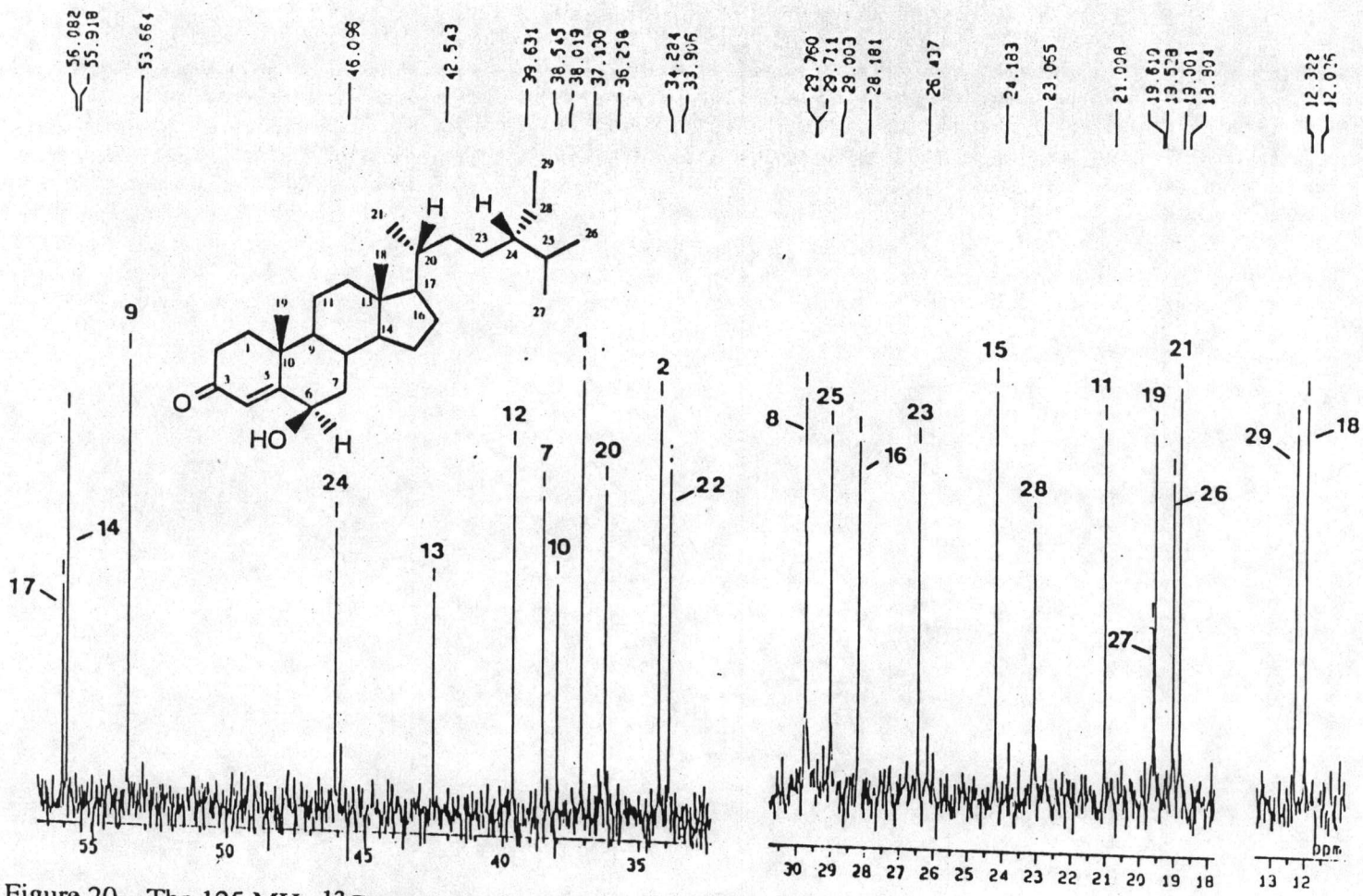



Figure 20. The 125 MHz $^{13}C$ nmr spectrum of compound M-060 (in $CDCl_3$)
(expanded from 12 ppm - 57 ppm)

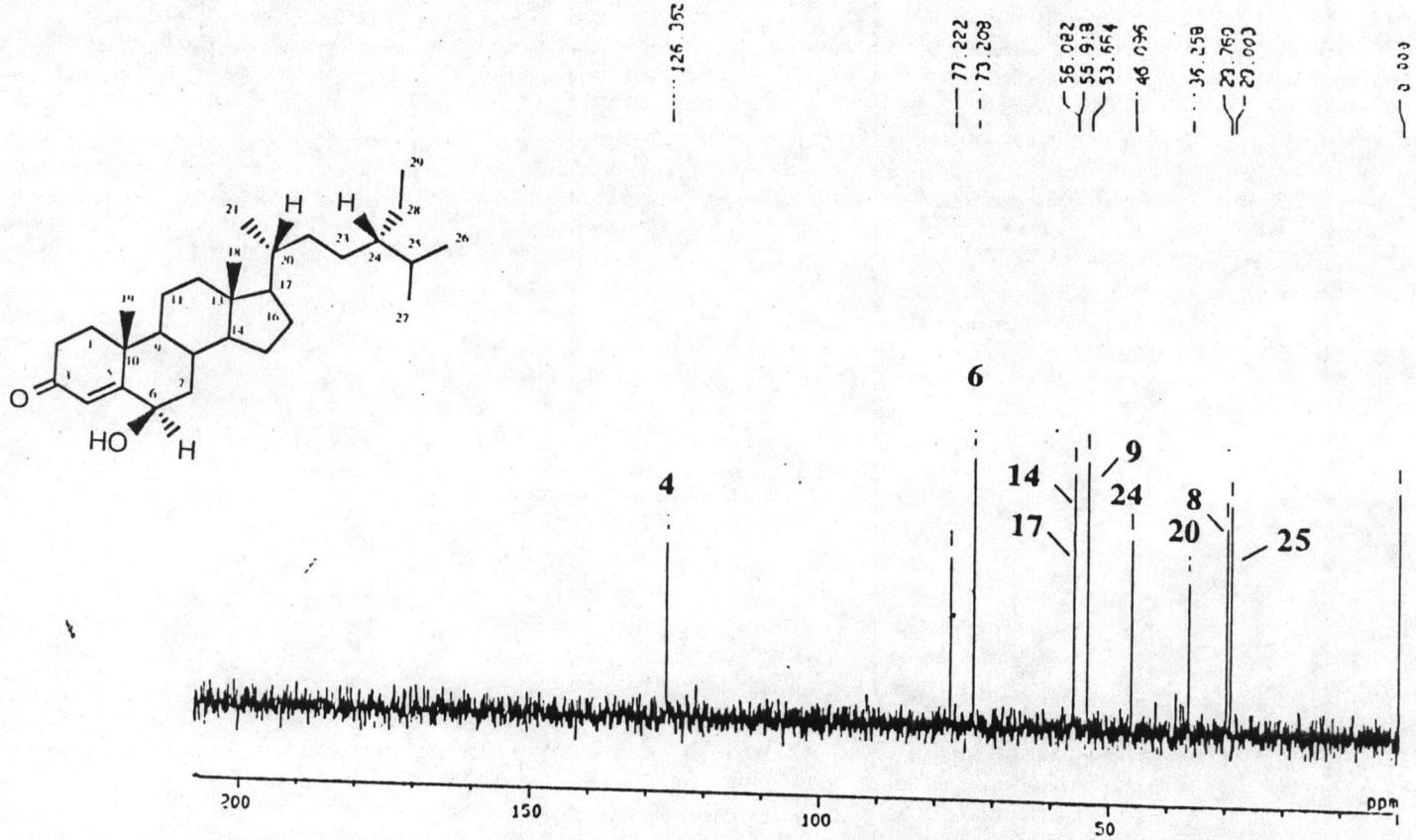



Figure 21. The 125 MHz DEPT 90 spectrum of compound M-060 (in $CDCl_3$)

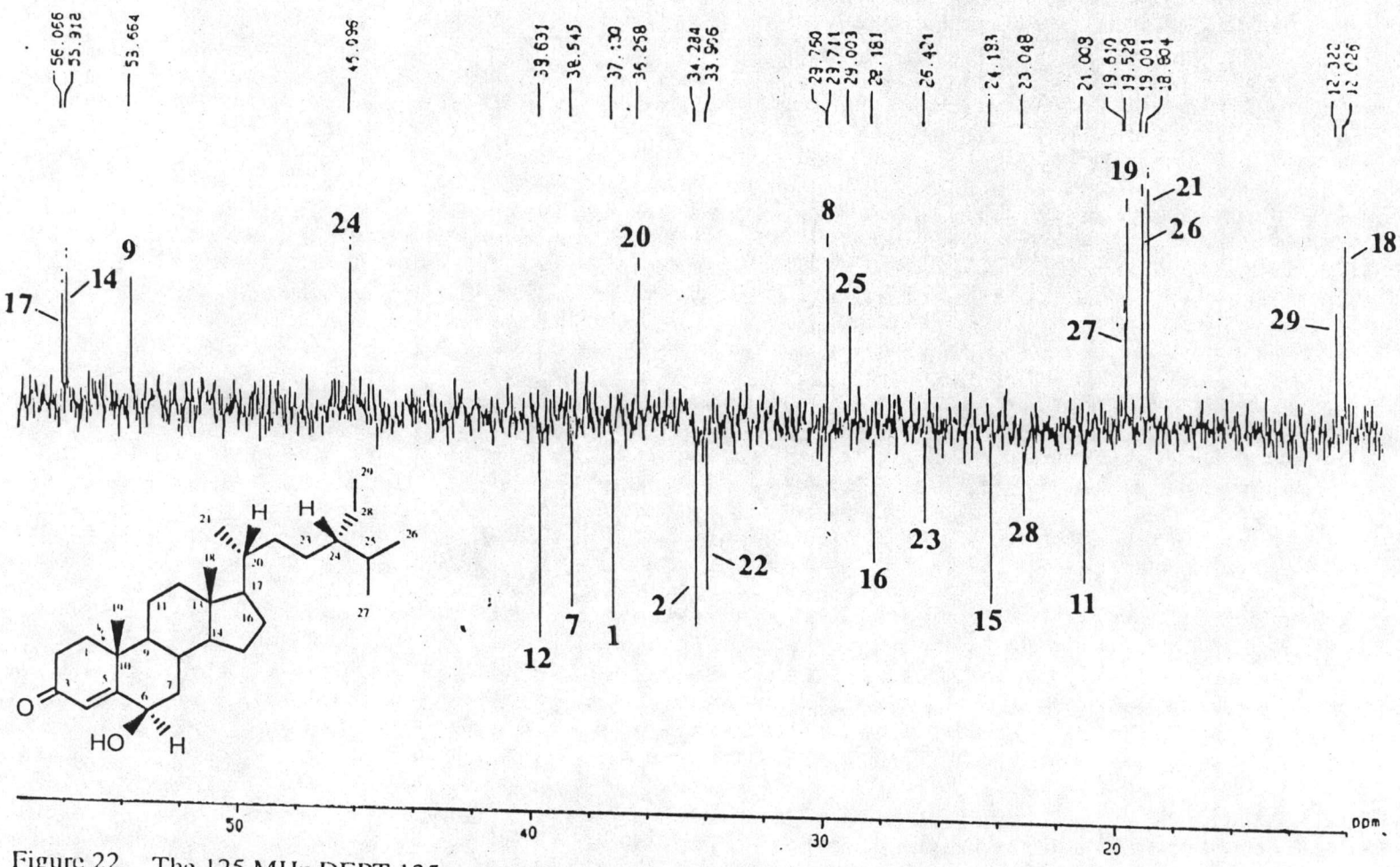



Figure 22. The 125 MHz DEPT 135 spectrum of compound M-060 (in $CDCl_3$), (expanded from 0 ppm - 58 ppm)

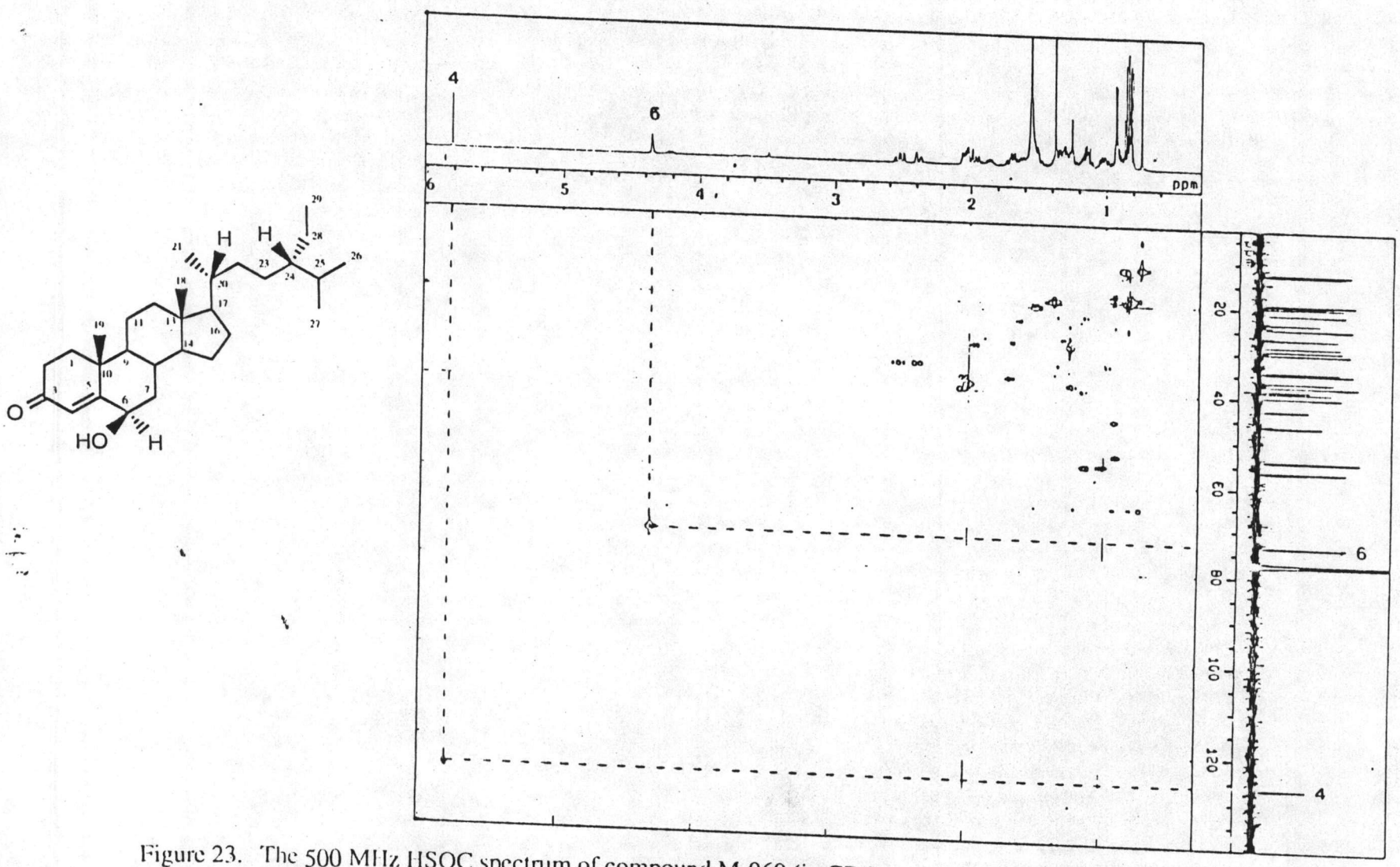



Figure 23. The 500 MHz HSQC spectrum of compound M-060 (in $CDCl_3$)

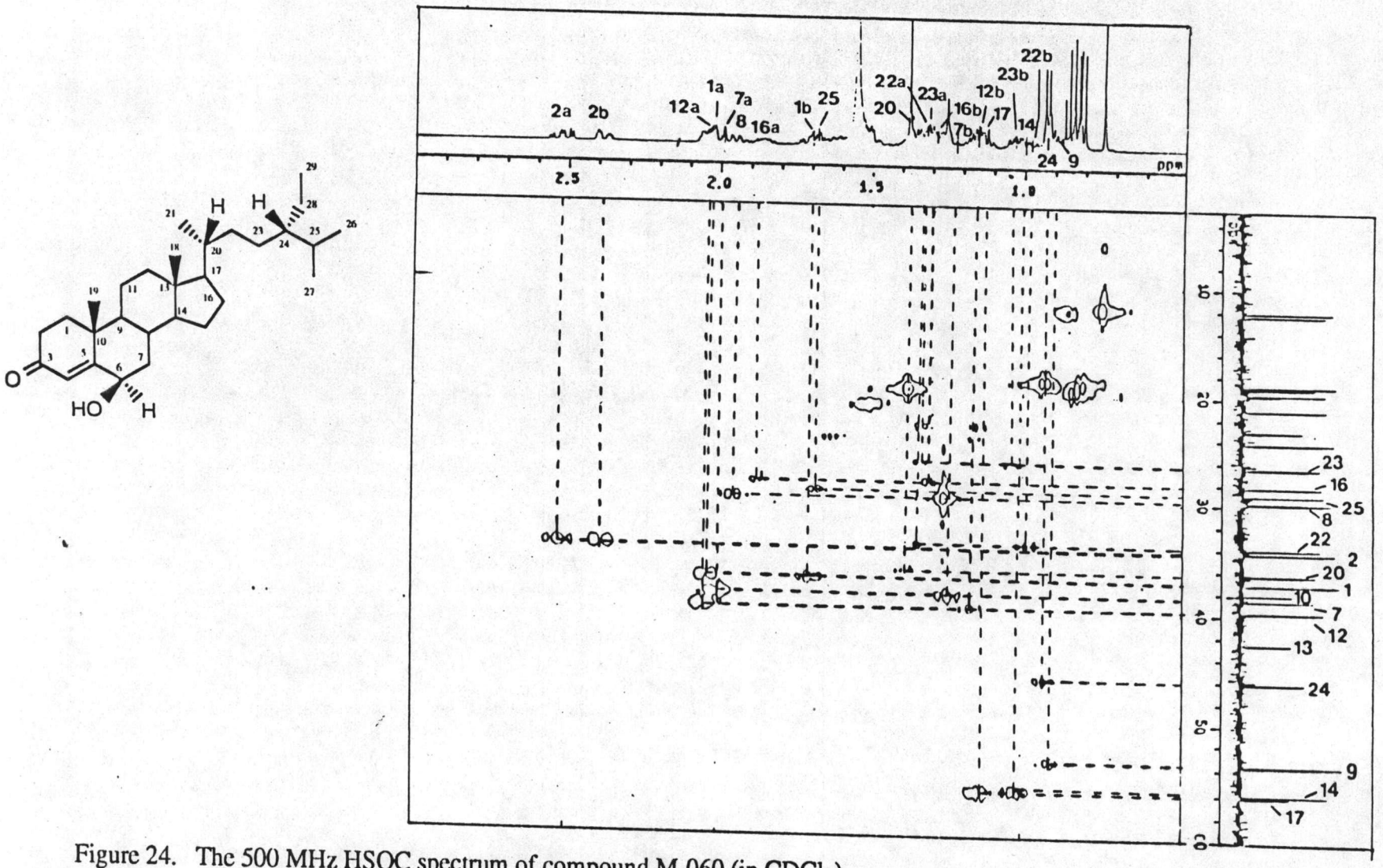



Figure 24. The 500 MHz HSQC spectrum of compound M-060 (in $CDCl_3$)
(expanded from 10 ppm - 60 ppm)

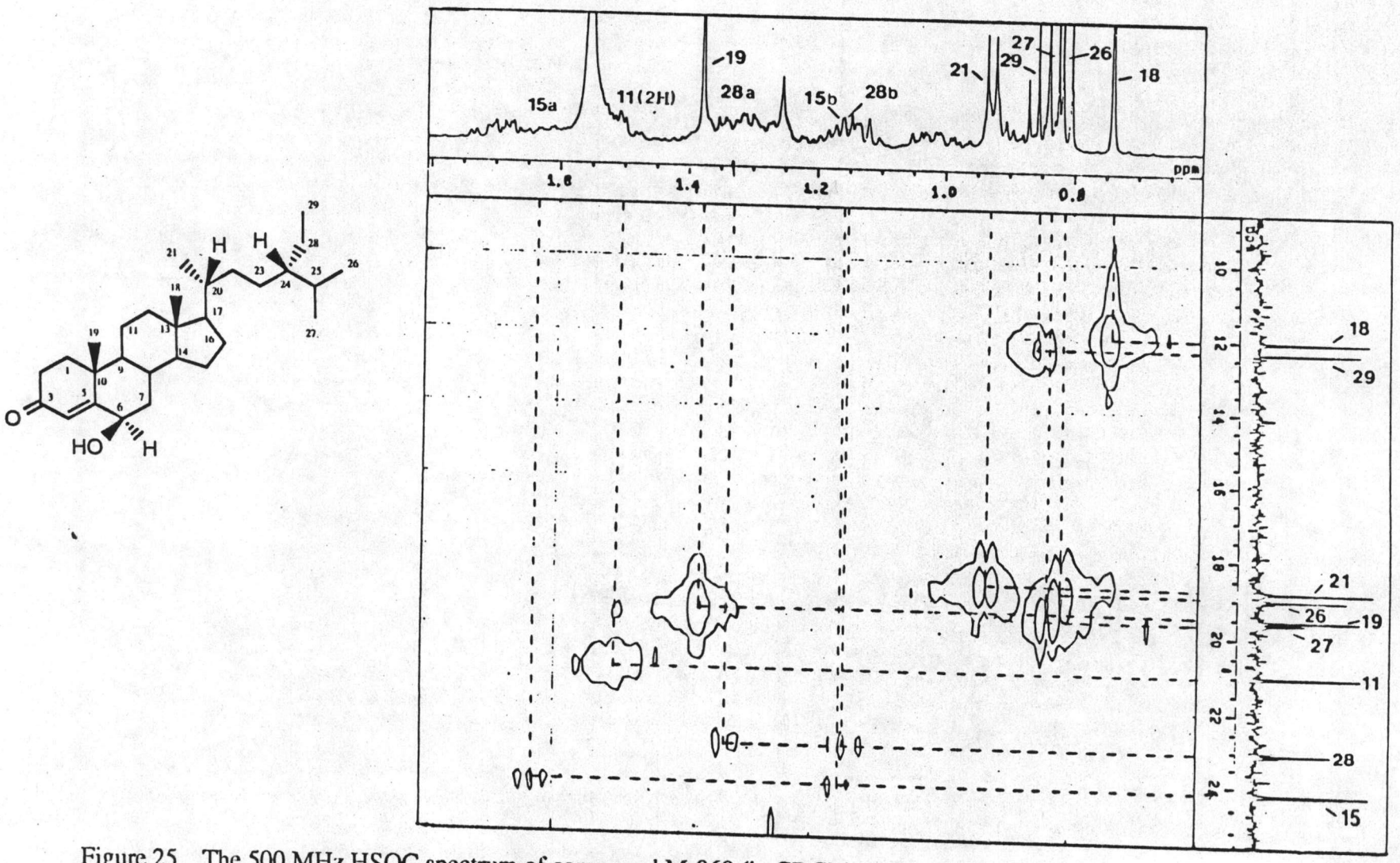



Figure 25. The 500 MHz HSQC spectrum of compound M-060 (in $CDCl_3$)
(expanded from 10 ppm - 24 ppm)

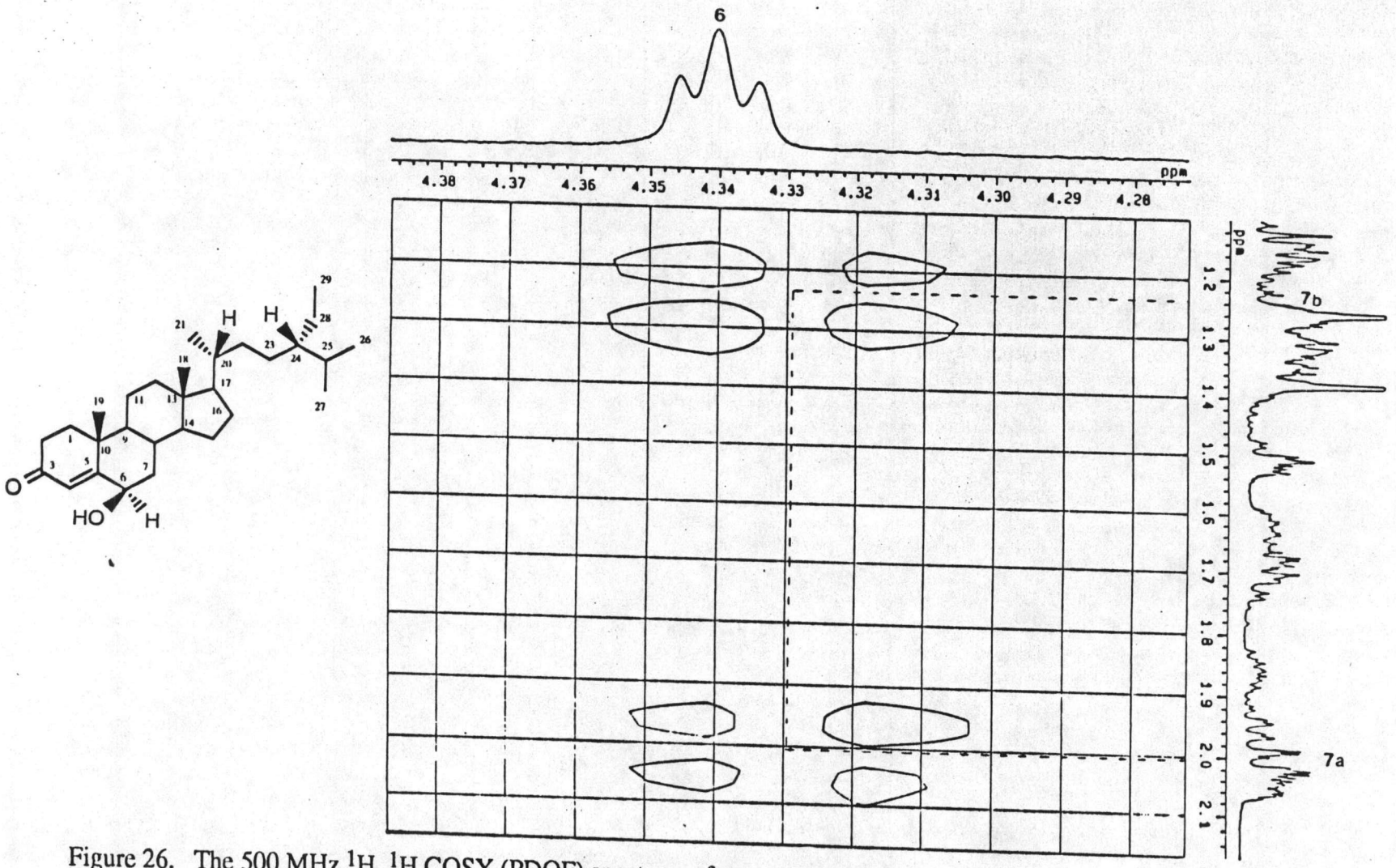



Figure 26. The 500 MHz $^1H$, $^1H$ COSY (PDQF) spectrum of compound M-060 (in $CDCl_3$), (expanded 4.28 ppm - 4.38 ppm)

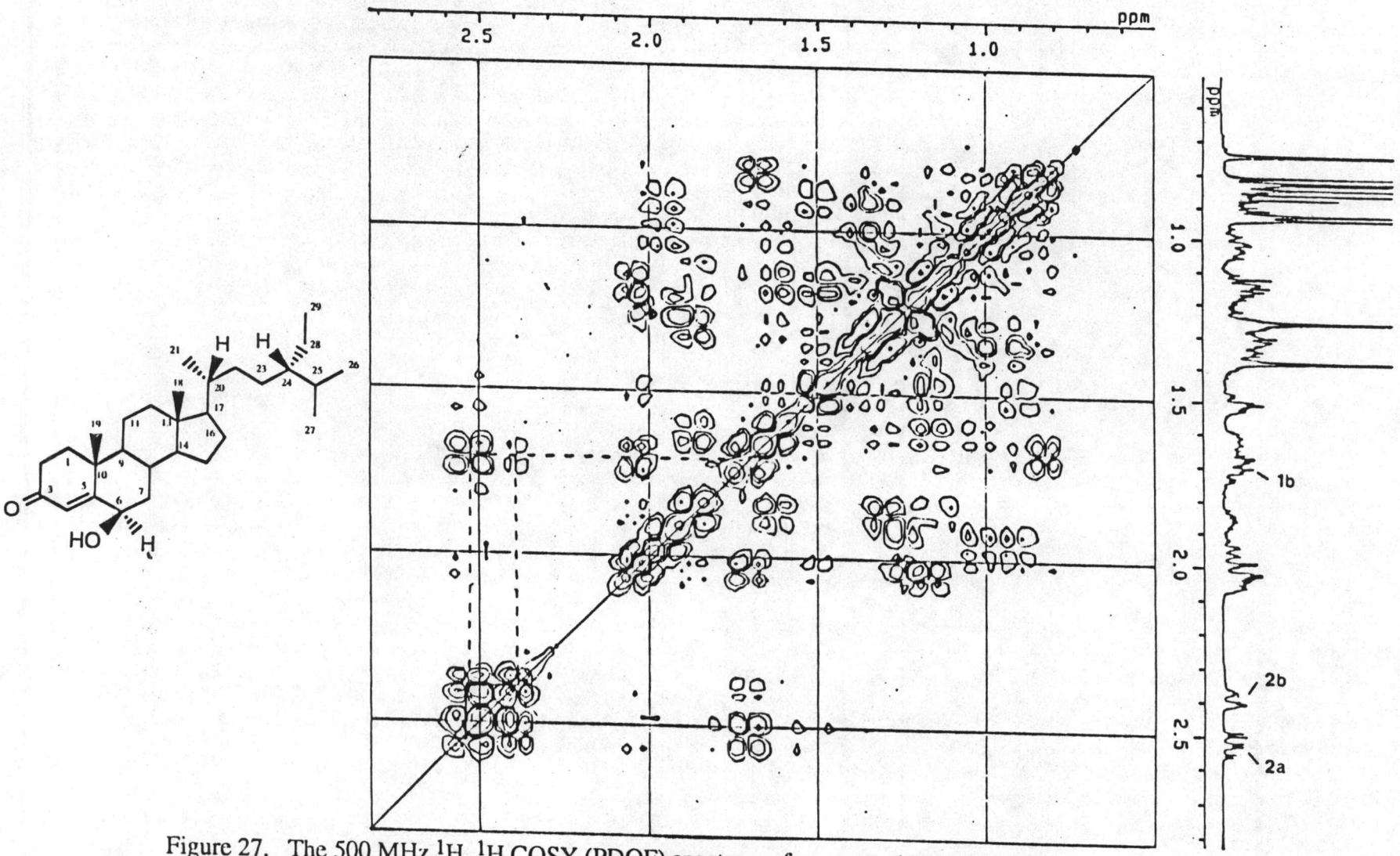



Figure 27. The 500 MHz $^1H$, $^1H$ COSY (PDQF) spectrum of compound M-060 (in $CDCl_3$), (expanded 0.60 ppm - 2.80 ppm)

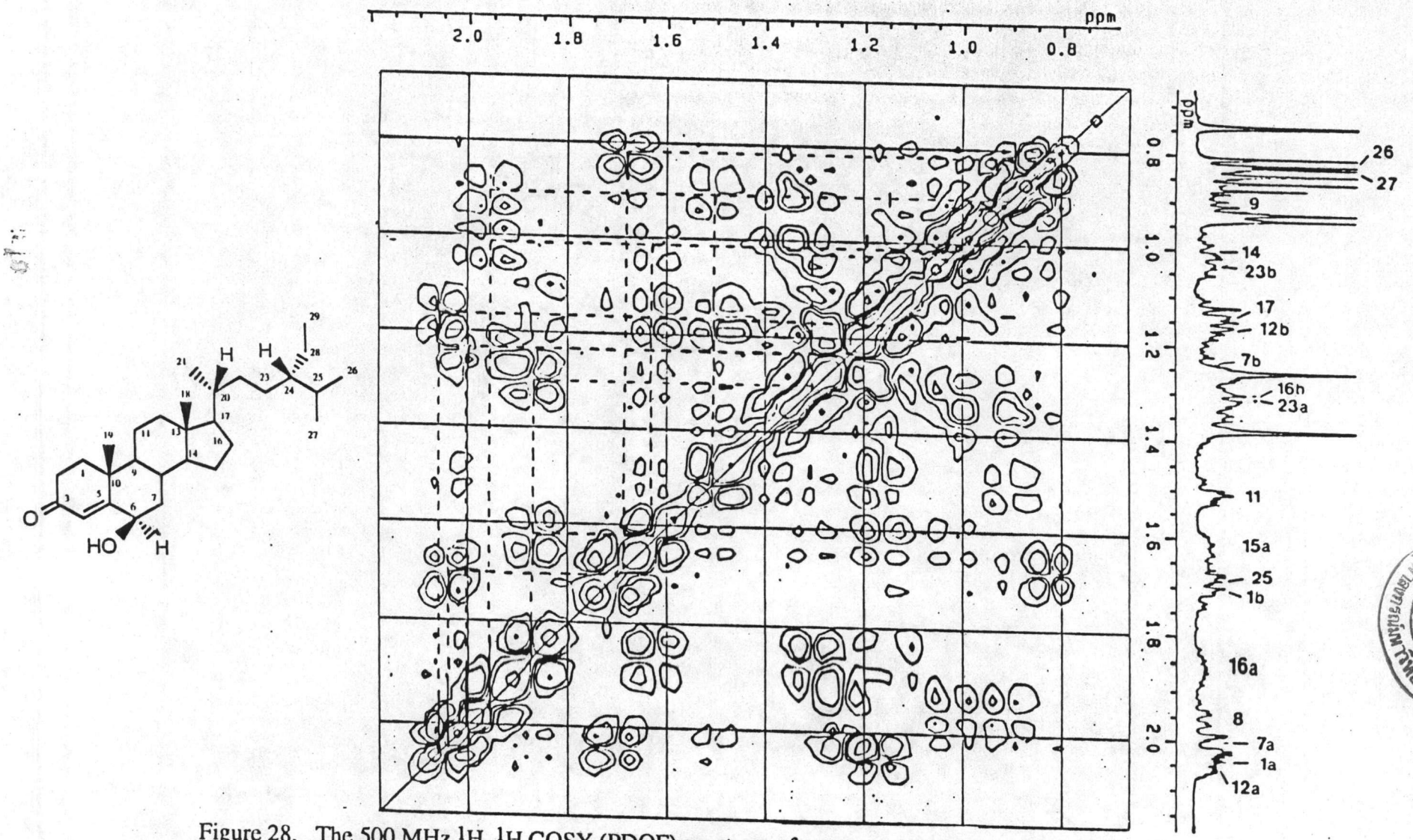



Figure 28. The 500 MHz $^1H$, $^1H$ COSY (PDQF) spectrum of compound M-060 (in $CDCl_3$), (expanded 0.70 ppm - 2.10 ppm)

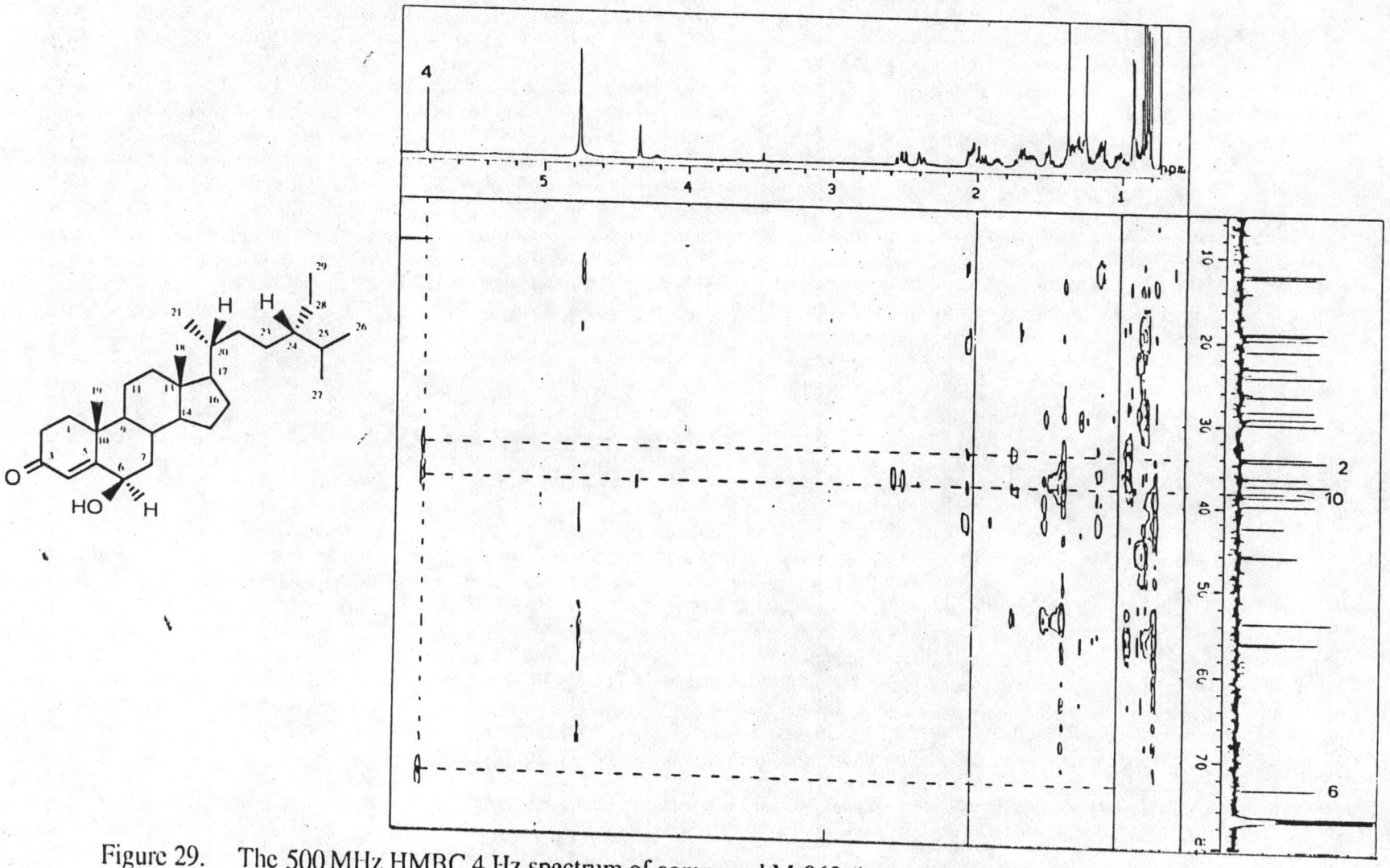



Figure 29. The 500 MHz HMBC 4 Hz spectrum of compound M-060 (in $CDCl_3$), (1)

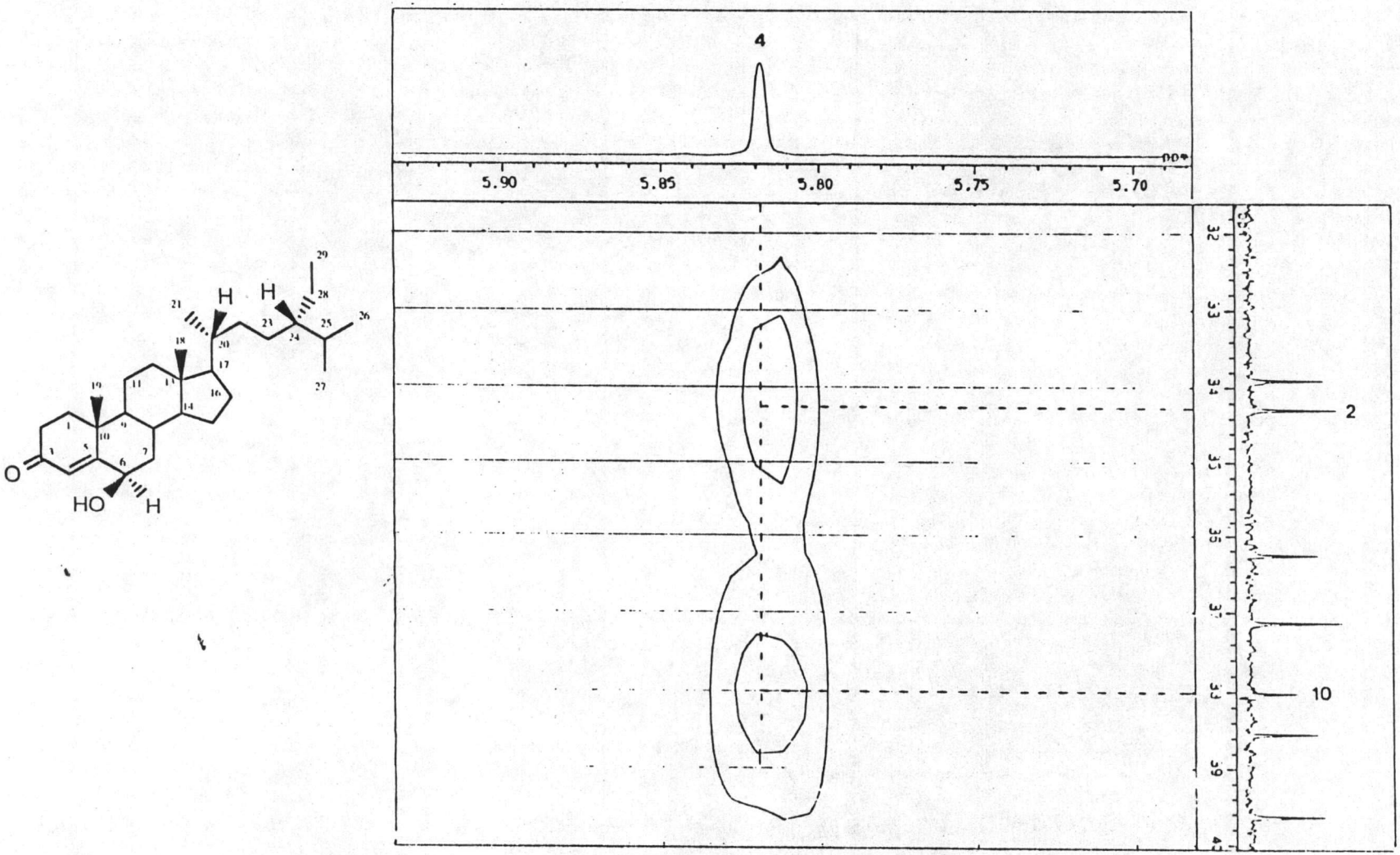



Figure 30. The 500 MHz HMBC 4 Hz spectrum of compound M-060 (in $CDCl_3$), (2)

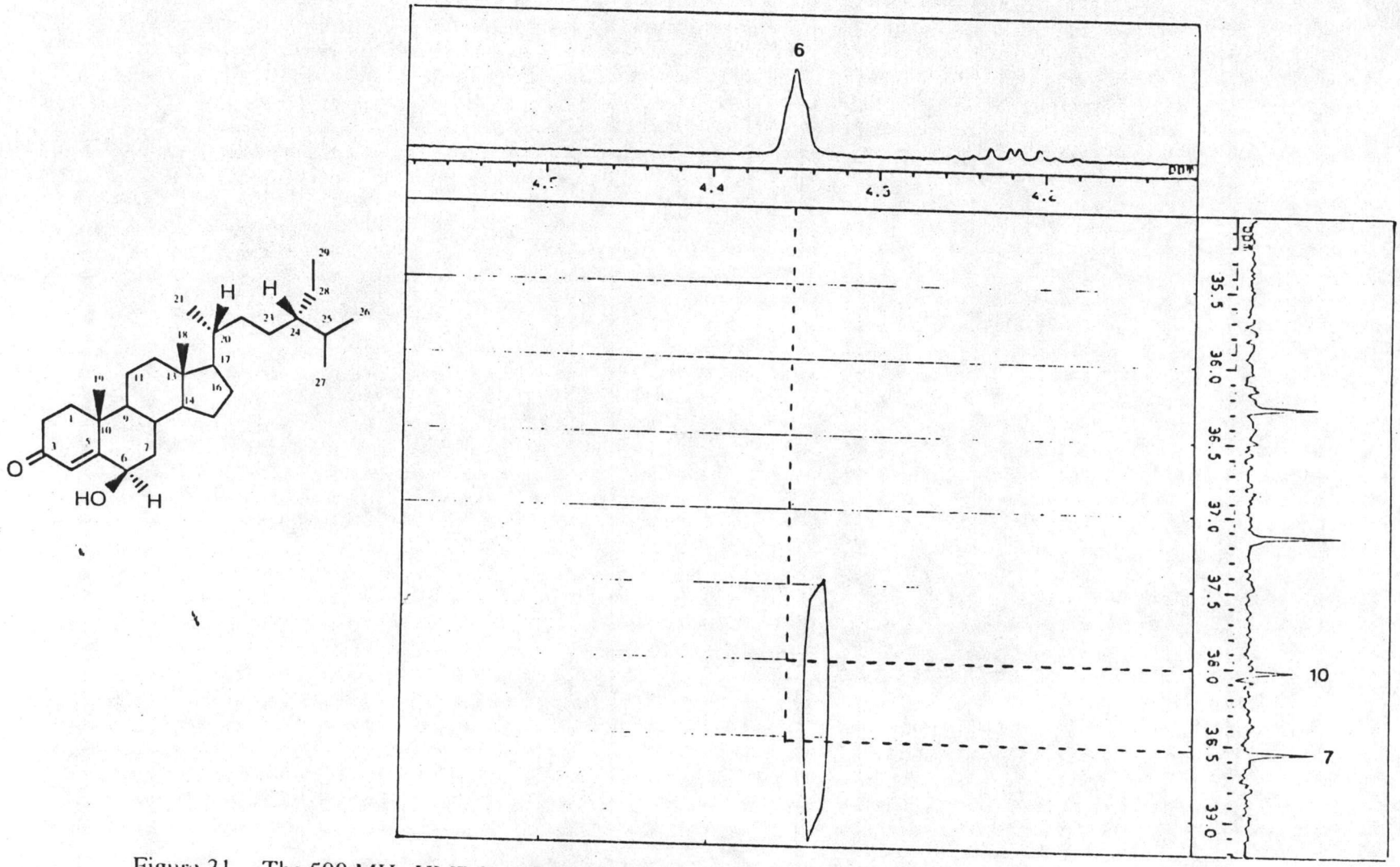



Figure 31. The 500 MHz HMBC 4 Hz spectrum of compound M-060 (in $CDCl_3$), (3)

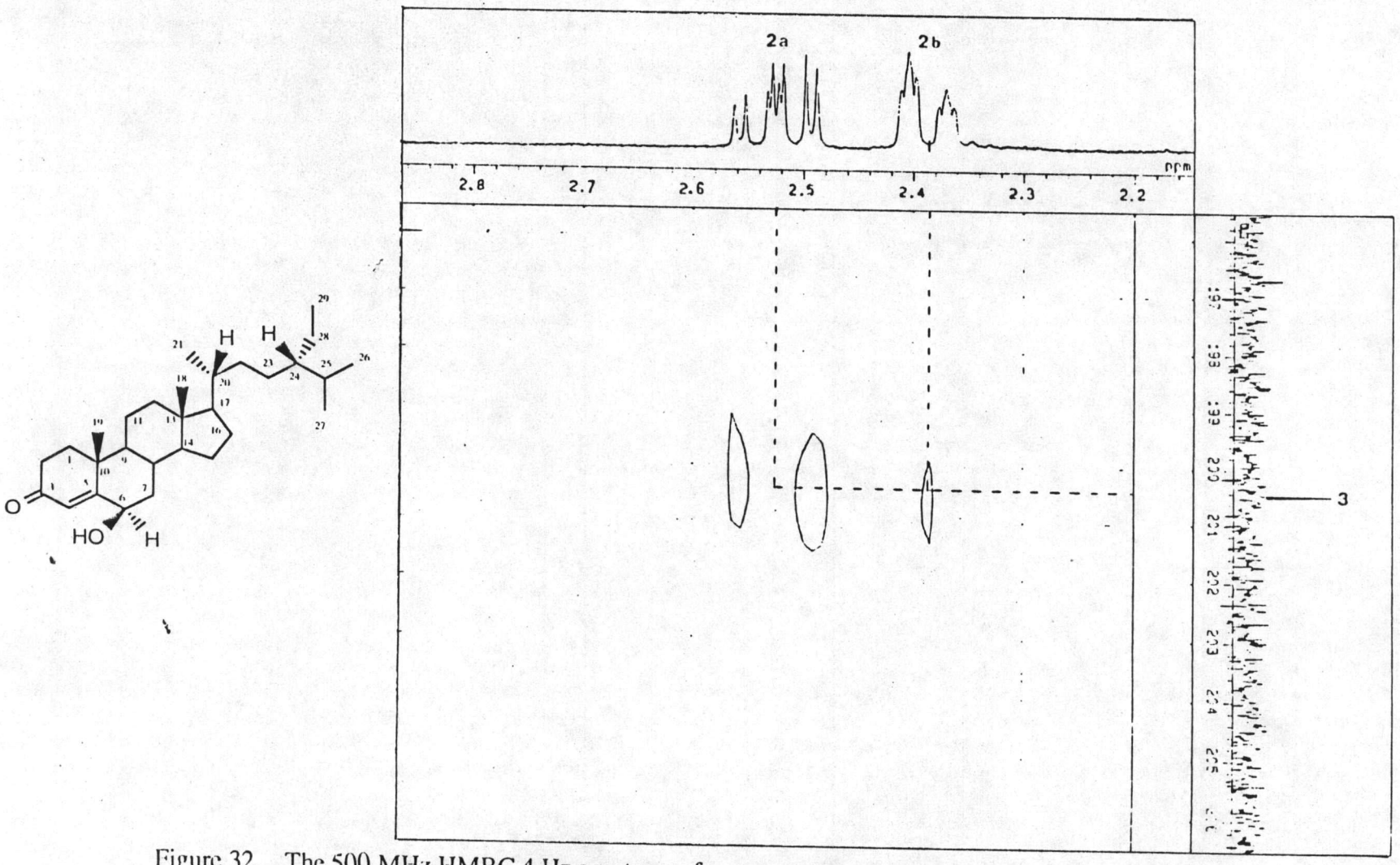



Figure 32. The 500 MHz HMBC 4 Hz spectrum of compound M-060 (in $CDCl_3$), (4)

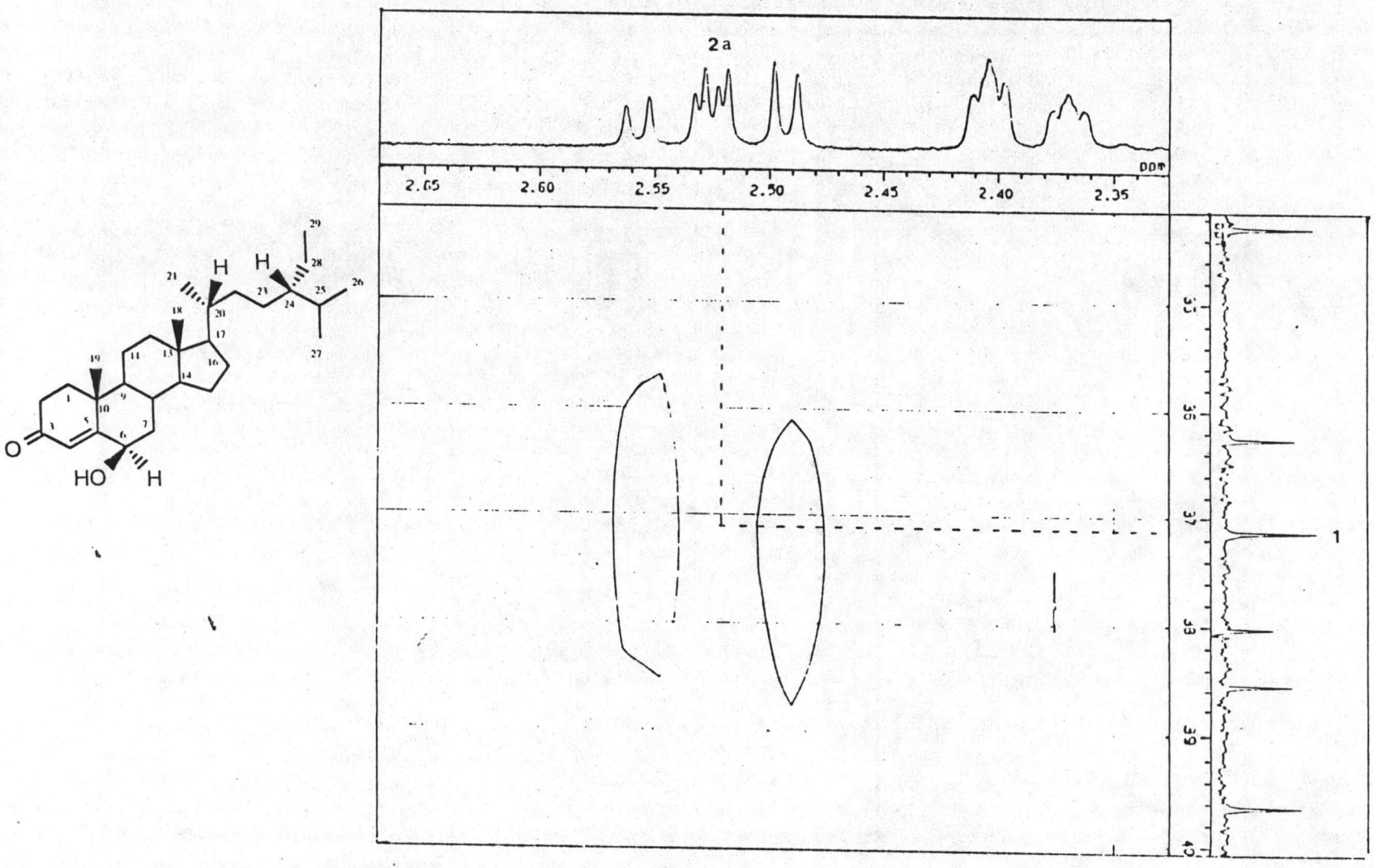



Figure 33. The 500 MHz HMBC 4 Hz spectrum of compound M-060 (in $CDCl_3$), (5)

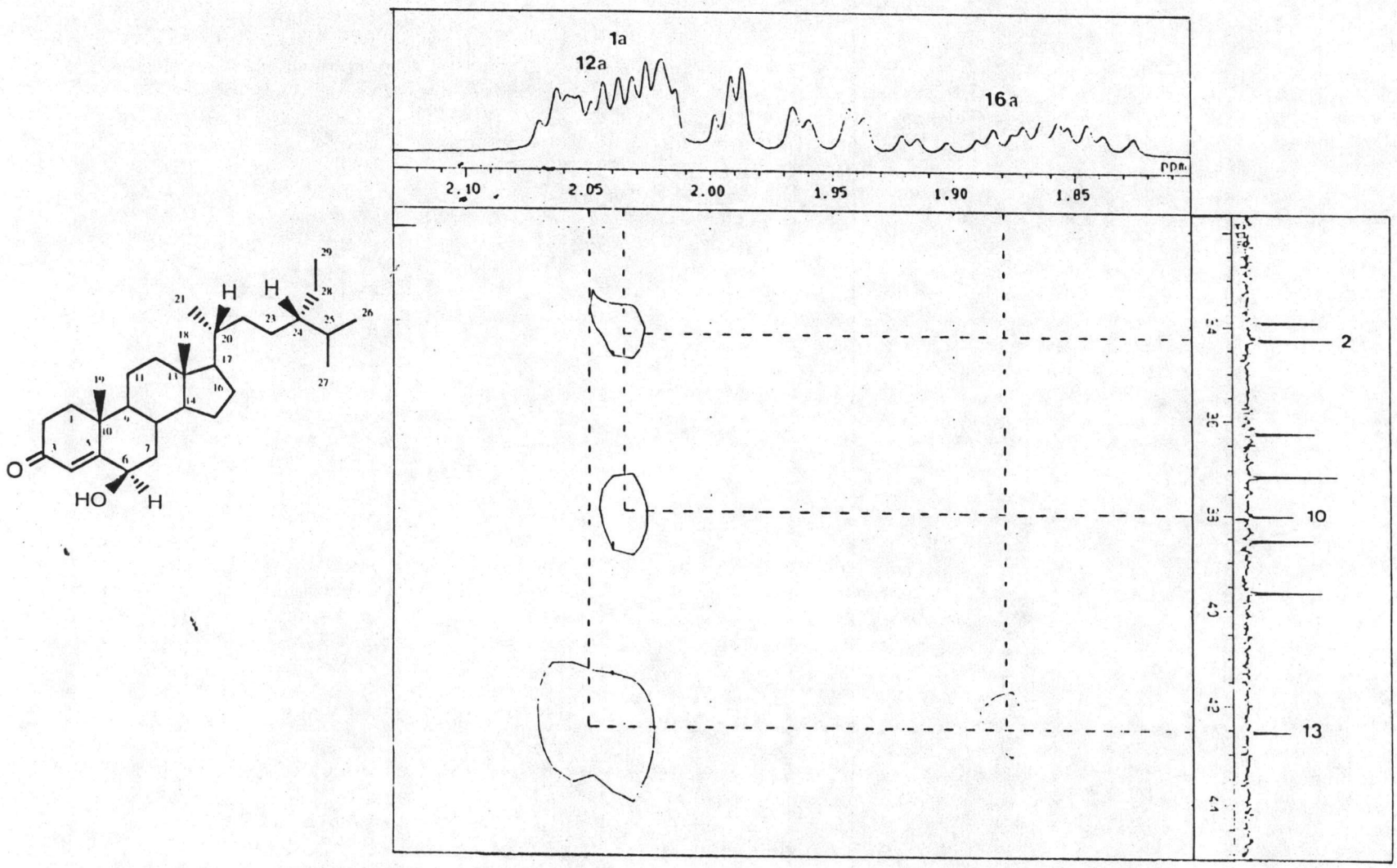



Figure 34. The 500 MHz HMBC 4 Hz spectrum of compound M-060 (in $CDCl_3$), (6)

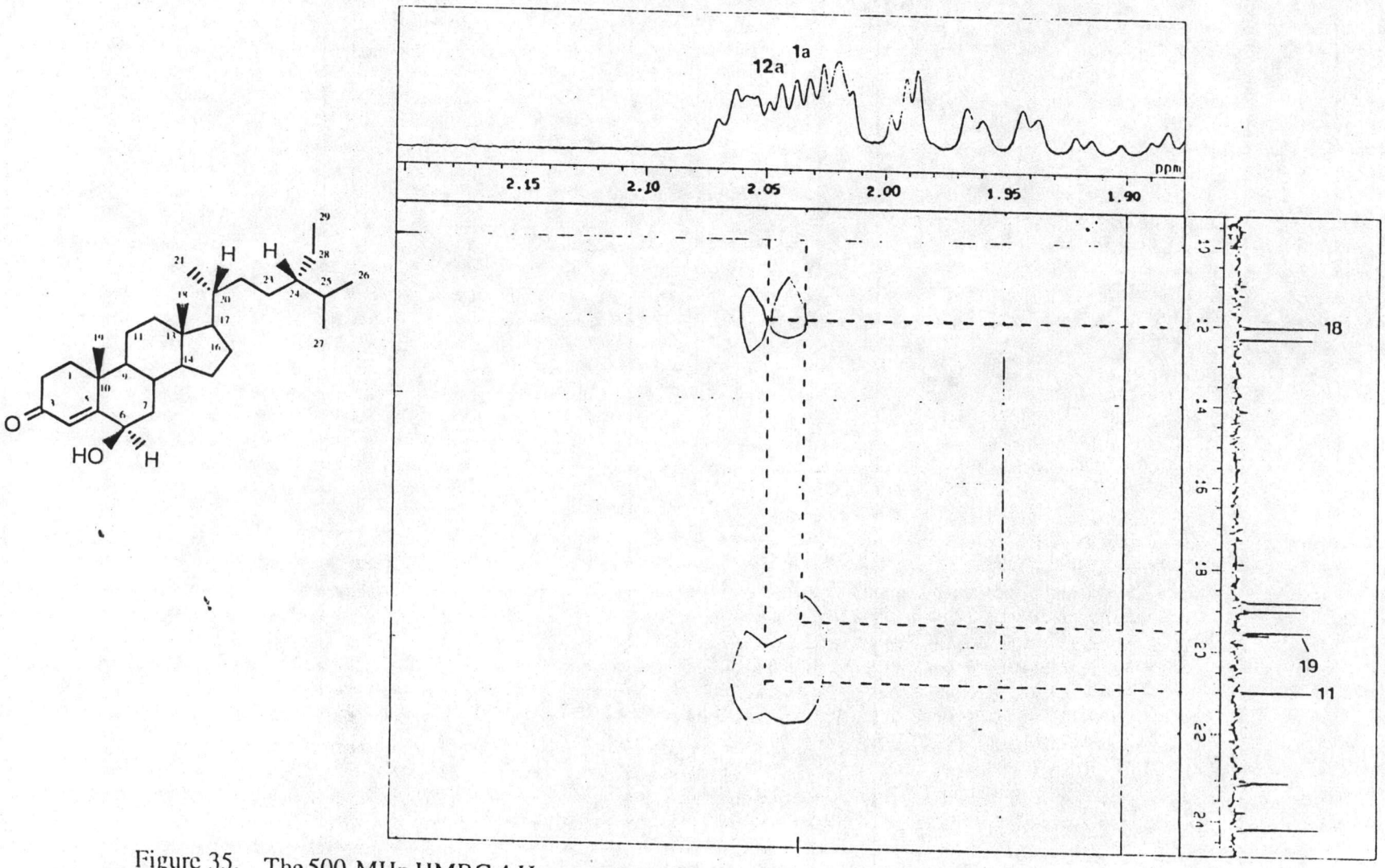



Figure 35. The 500 MHz HMBC 4 Hz spectrum of compound M-060 (in $CDCl_3$), (7)

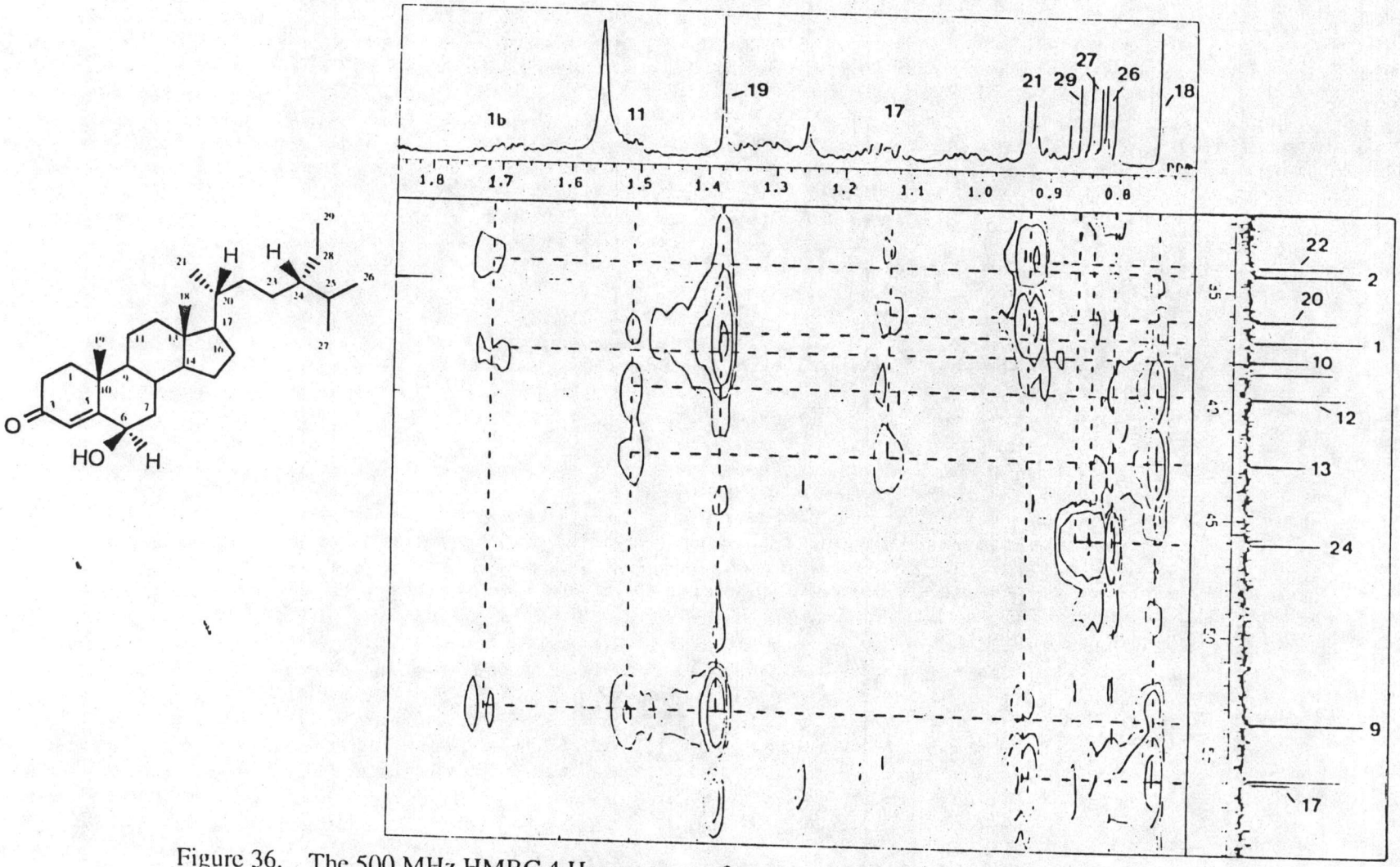



Figure 36. The 500 MHz HMBC 4 Hz spectrum of compound M-060 (in $CDCl_3$), (8)

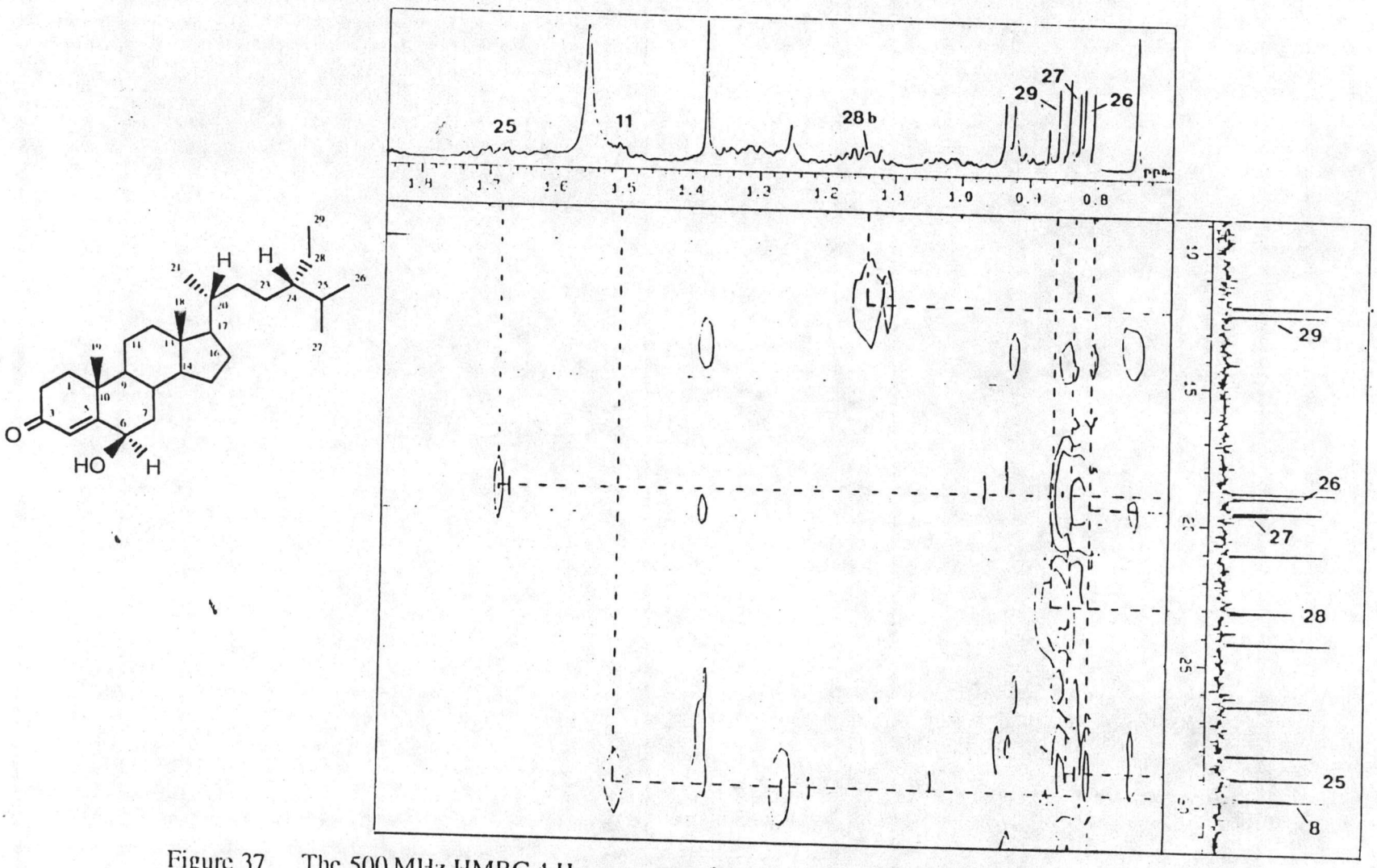



Figure 37. The 500 MHz HMBC 4 Hz spectrum of compound M-060 (in $CDCl_3$), (9)

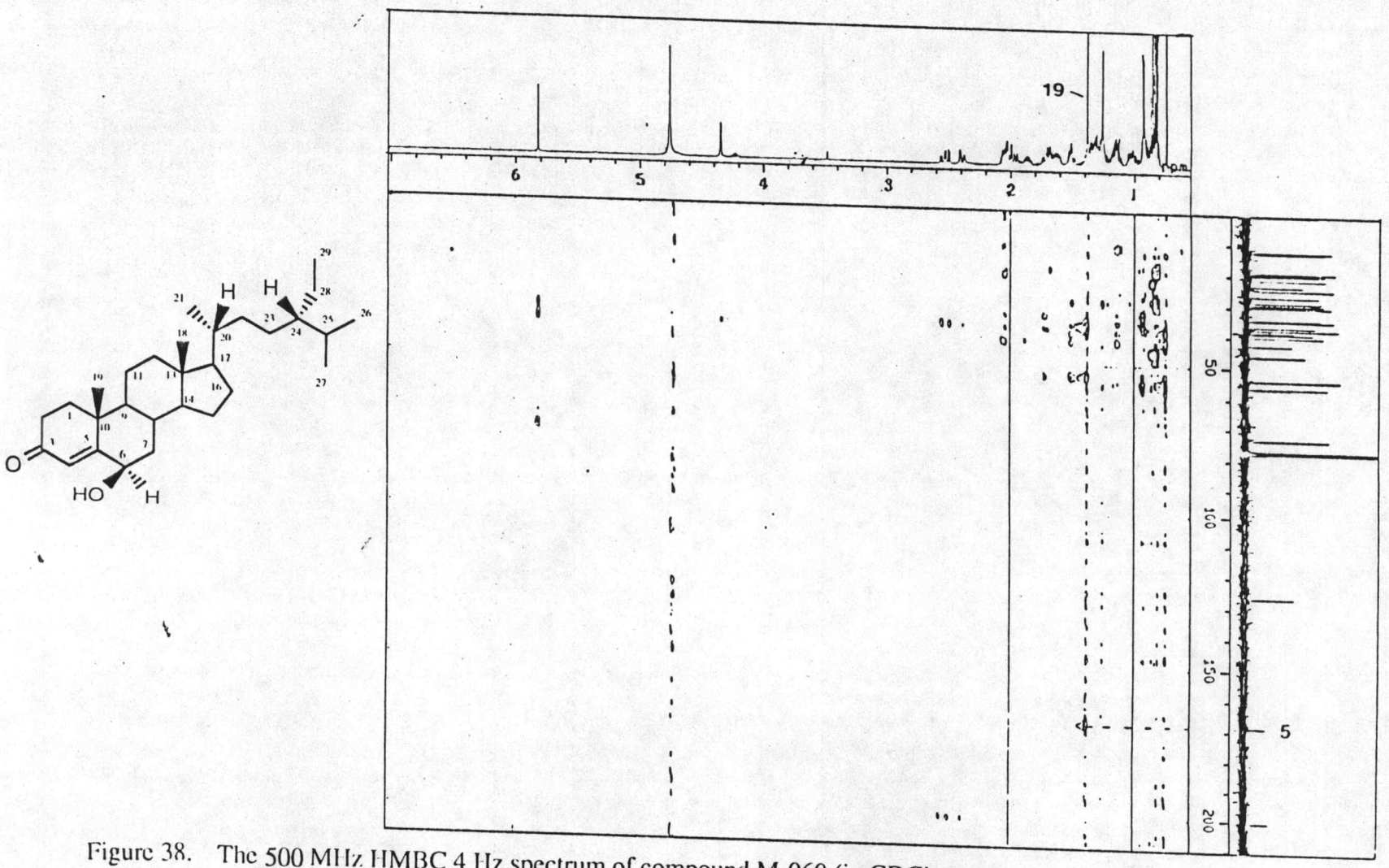



Figure 38. The 500 MHz HMBC 4 Hz spectrum of compound M-060 (in $CDCl_3$), (10)

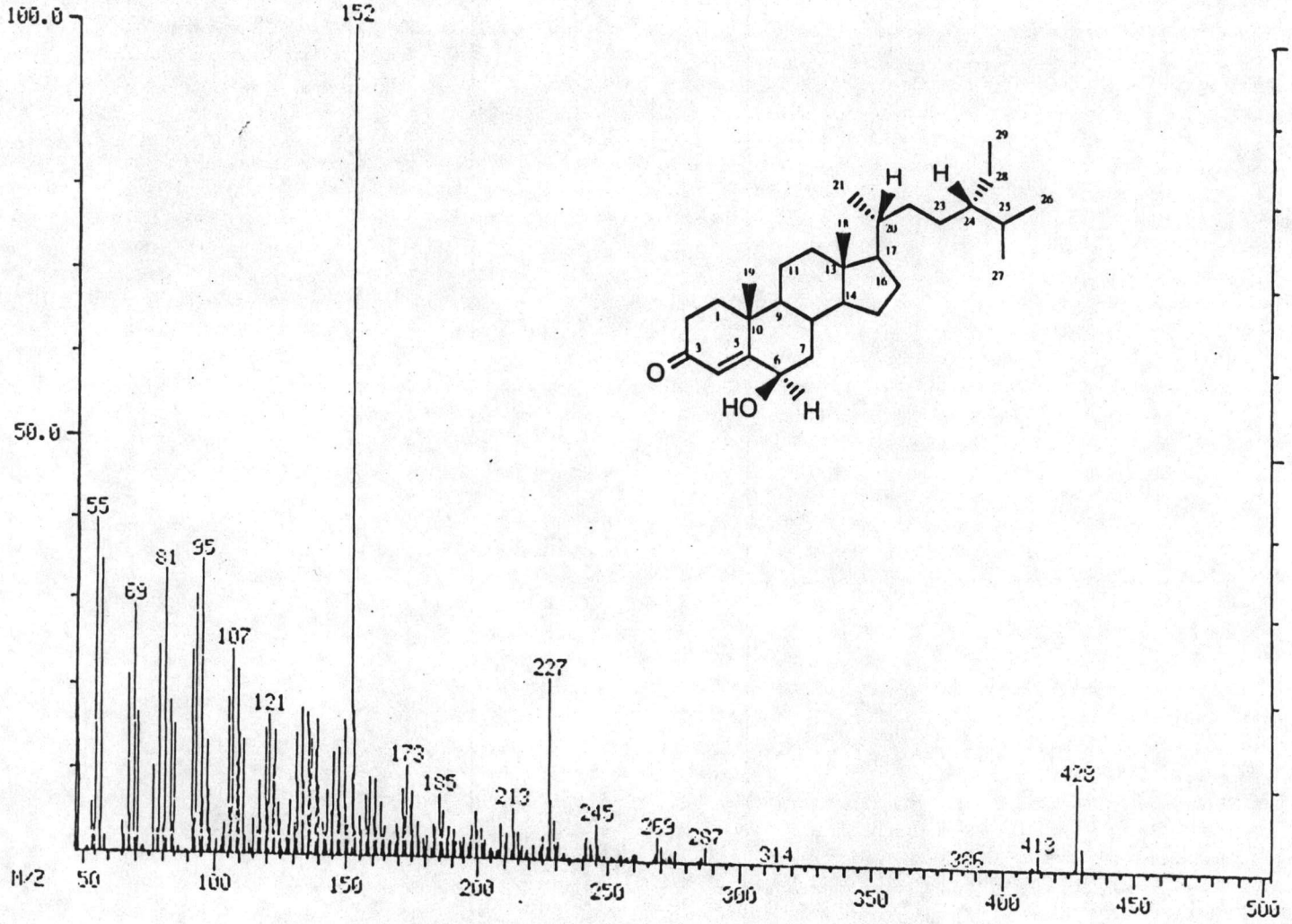



Figure 39. The eims spectrum of compound M-060

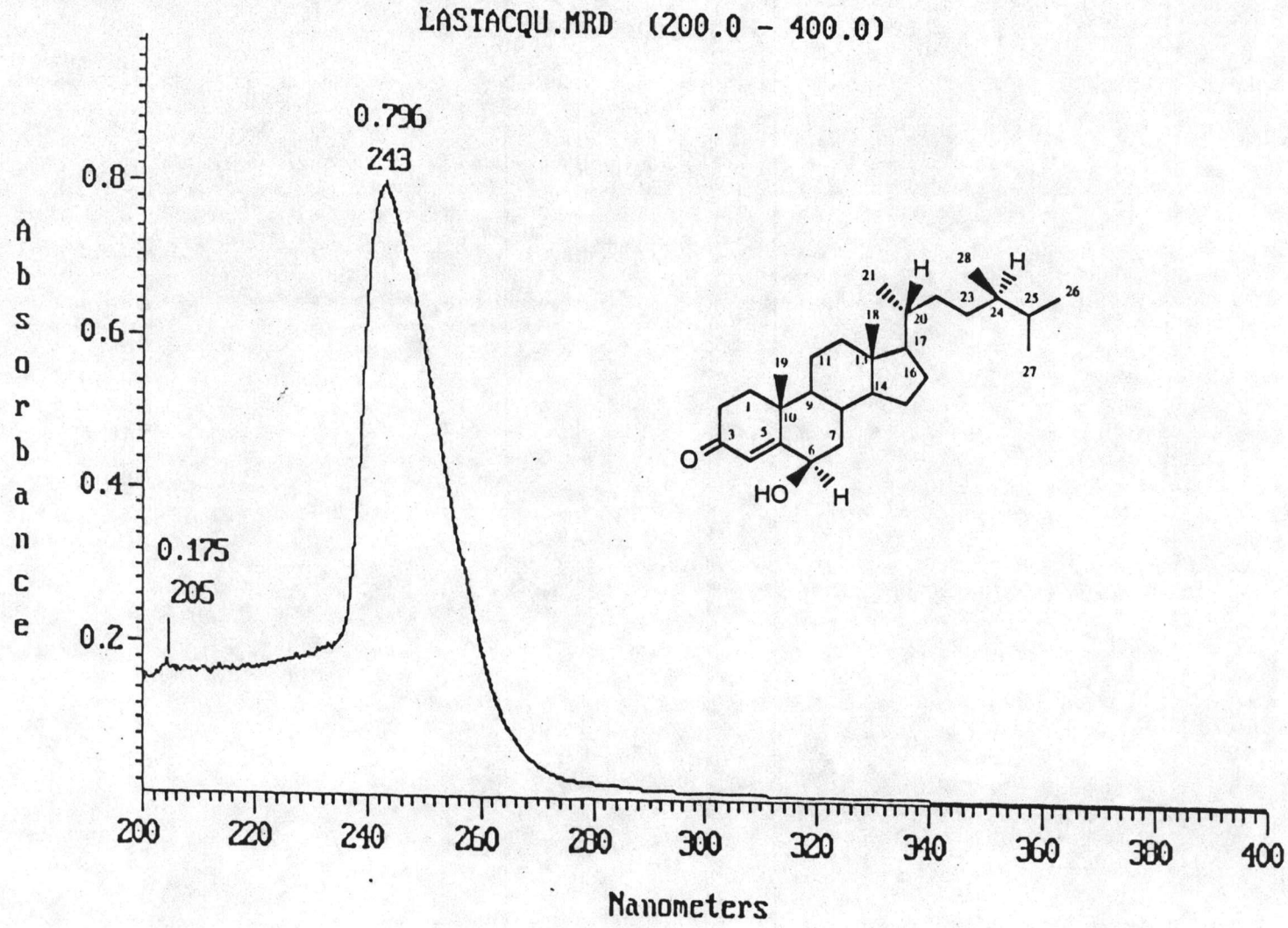



Figure 40. The uv spectrum of compound M-059 (in chloroform)

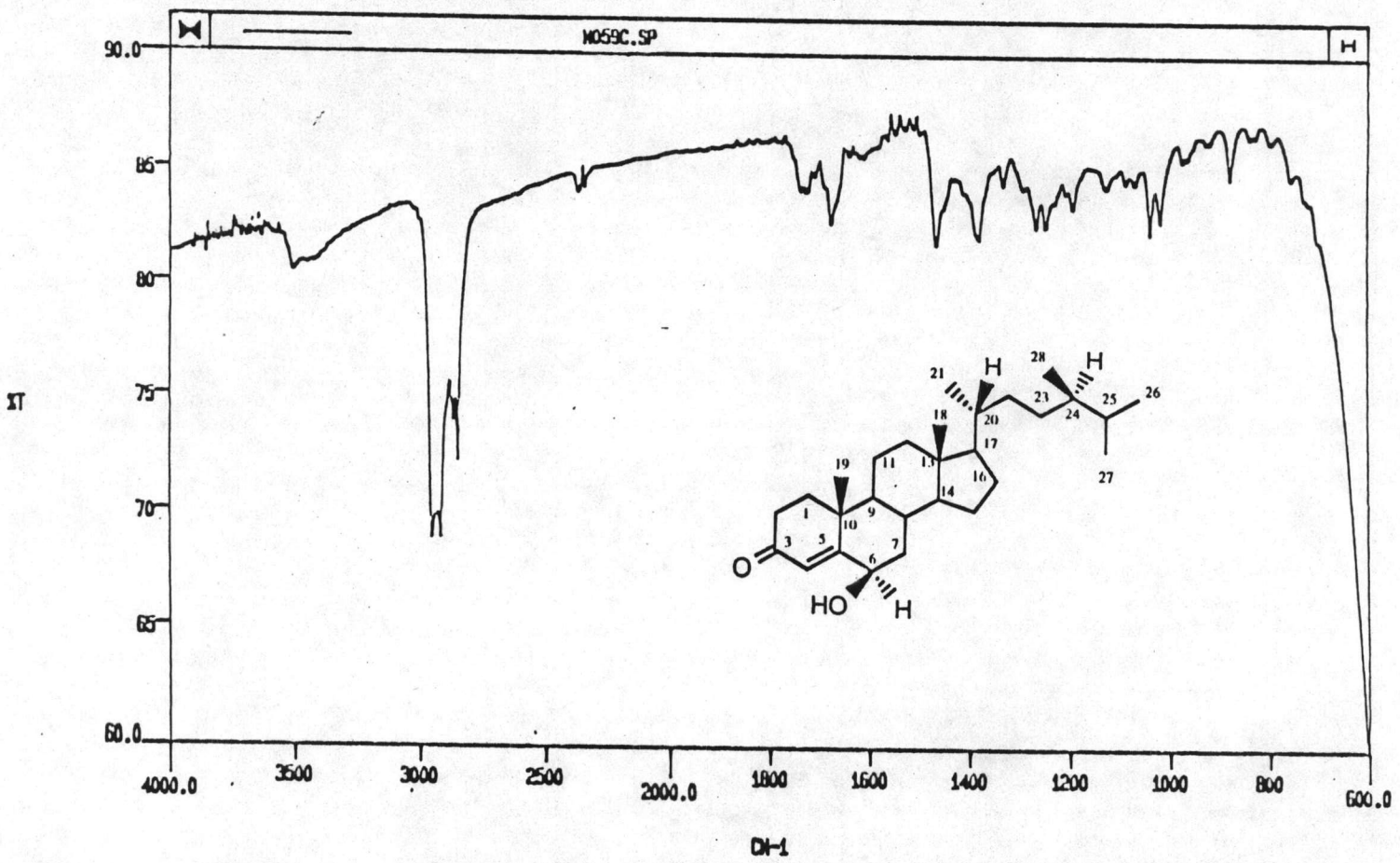



Figure 41. The ir spectrum of compound M-059 (film)

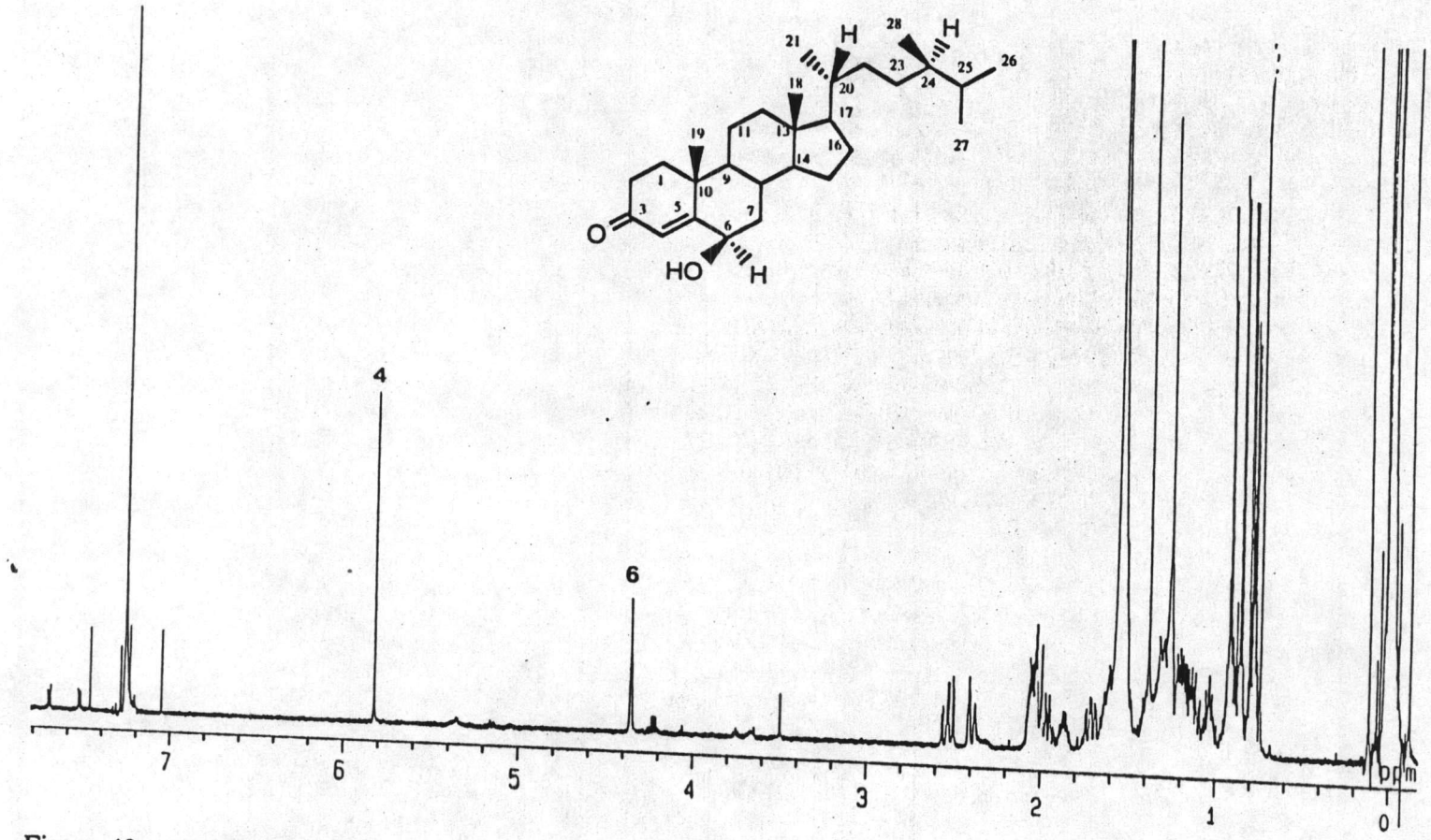



Figure 42. The 500 MHz $^1H$ nmr spectrum of compound M-059 (in $CDCl_3$)

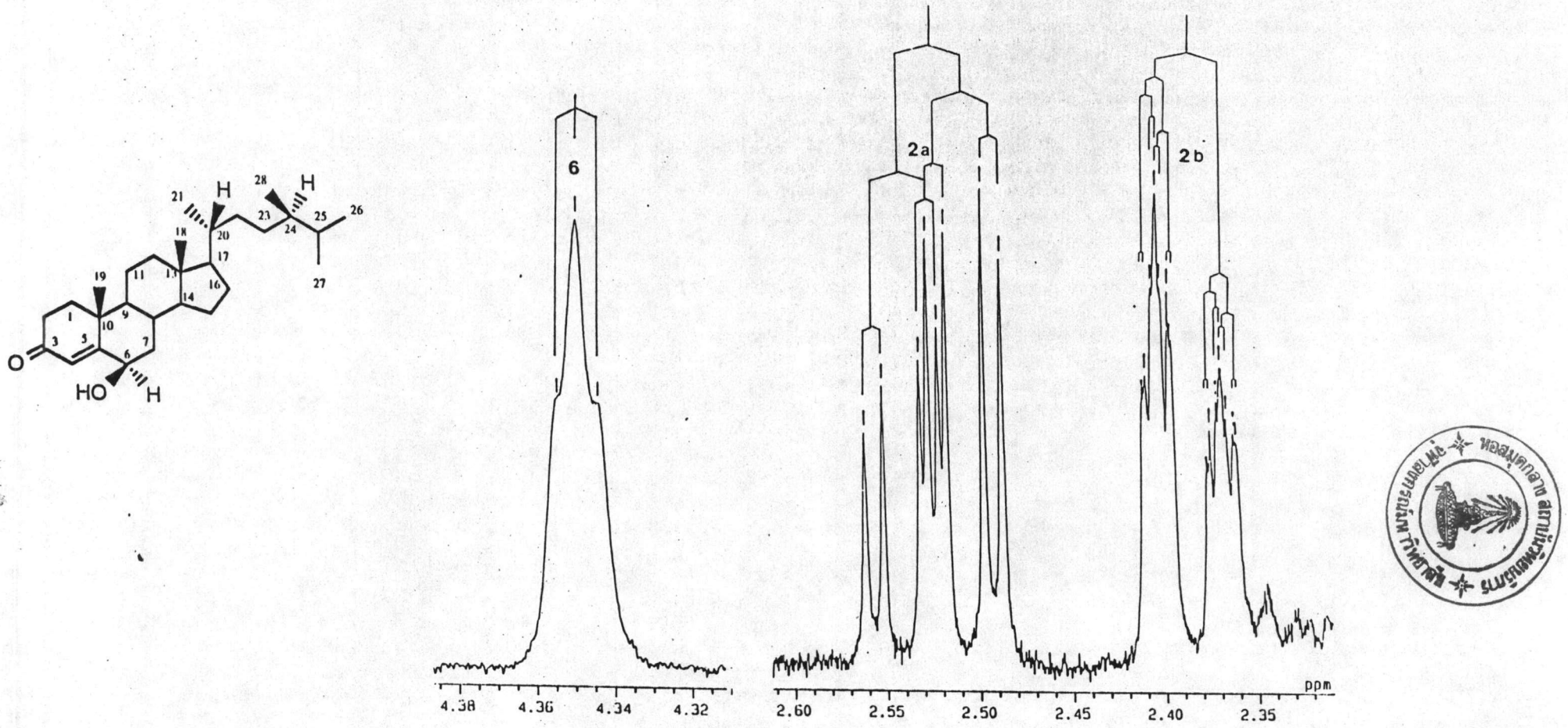



Figure 43. The 500 MHz $^1H$ nmr spectrum of compound M-059 (in $CDCl_3$) (expanded from 2.35 ppm - 2.60 ppm and 4.32 ppm - 4.38 ppm)

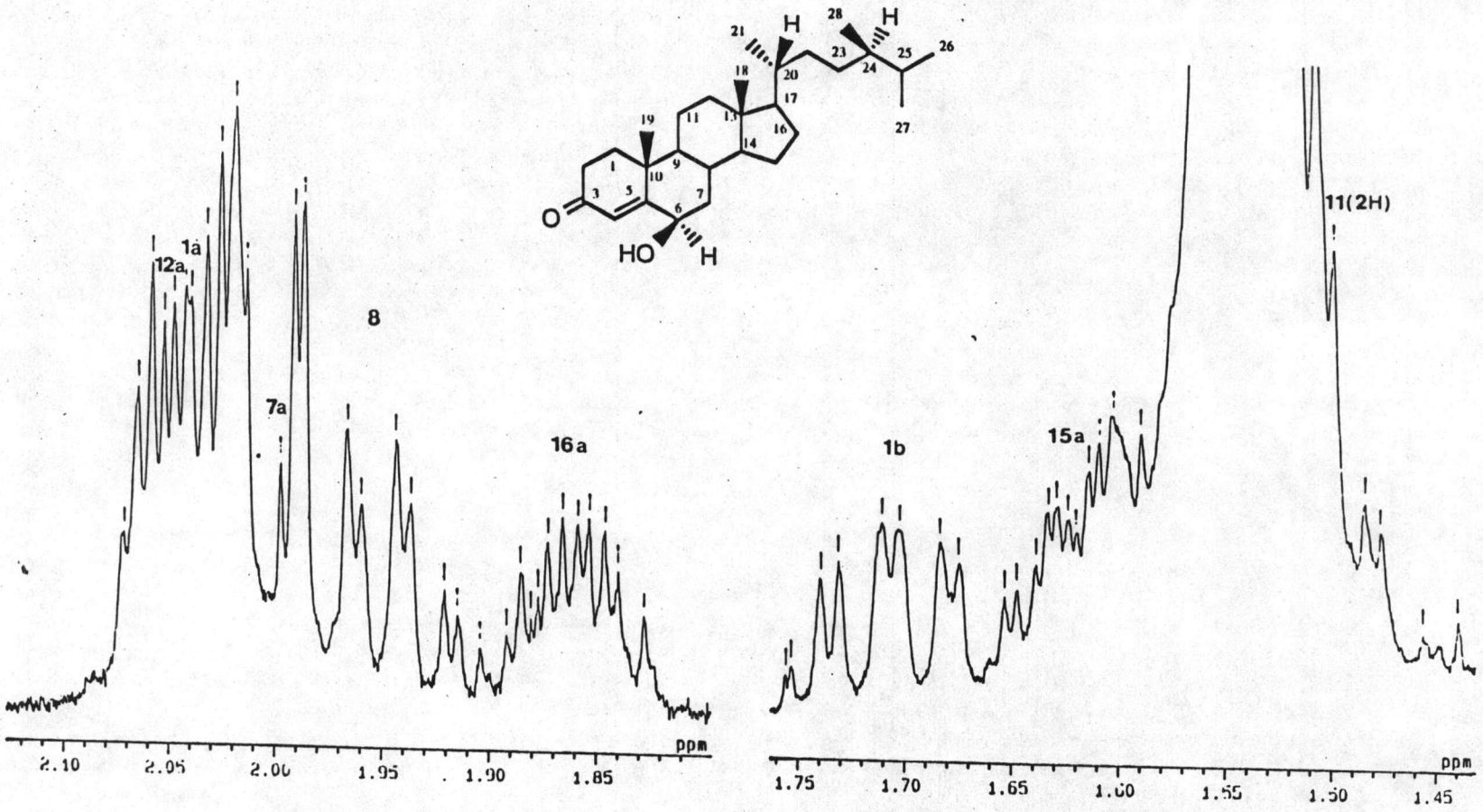



Figure 44. The 500 MHz $^1H$ nmr spectrum of compound M-059 (in $CDCl_3$)
(expanded from 1.45 ppm - 2.10 ppm)

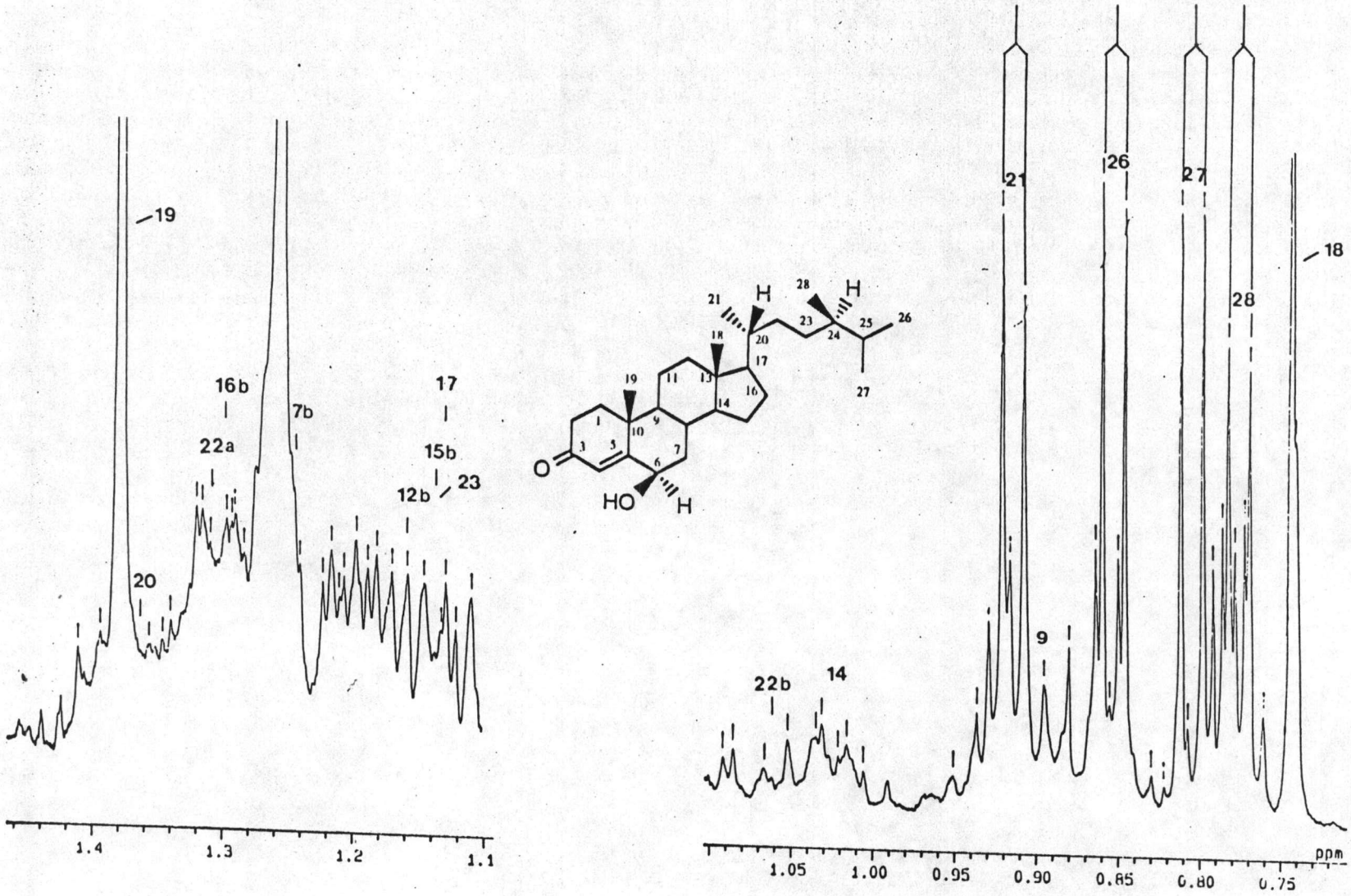



Figure 45. The 500 MHz $^1H$ nmr spectrum of compound M-059 (in $CDCl_3$)
(expanded from 0.75 ppm - 1.40 ppm)

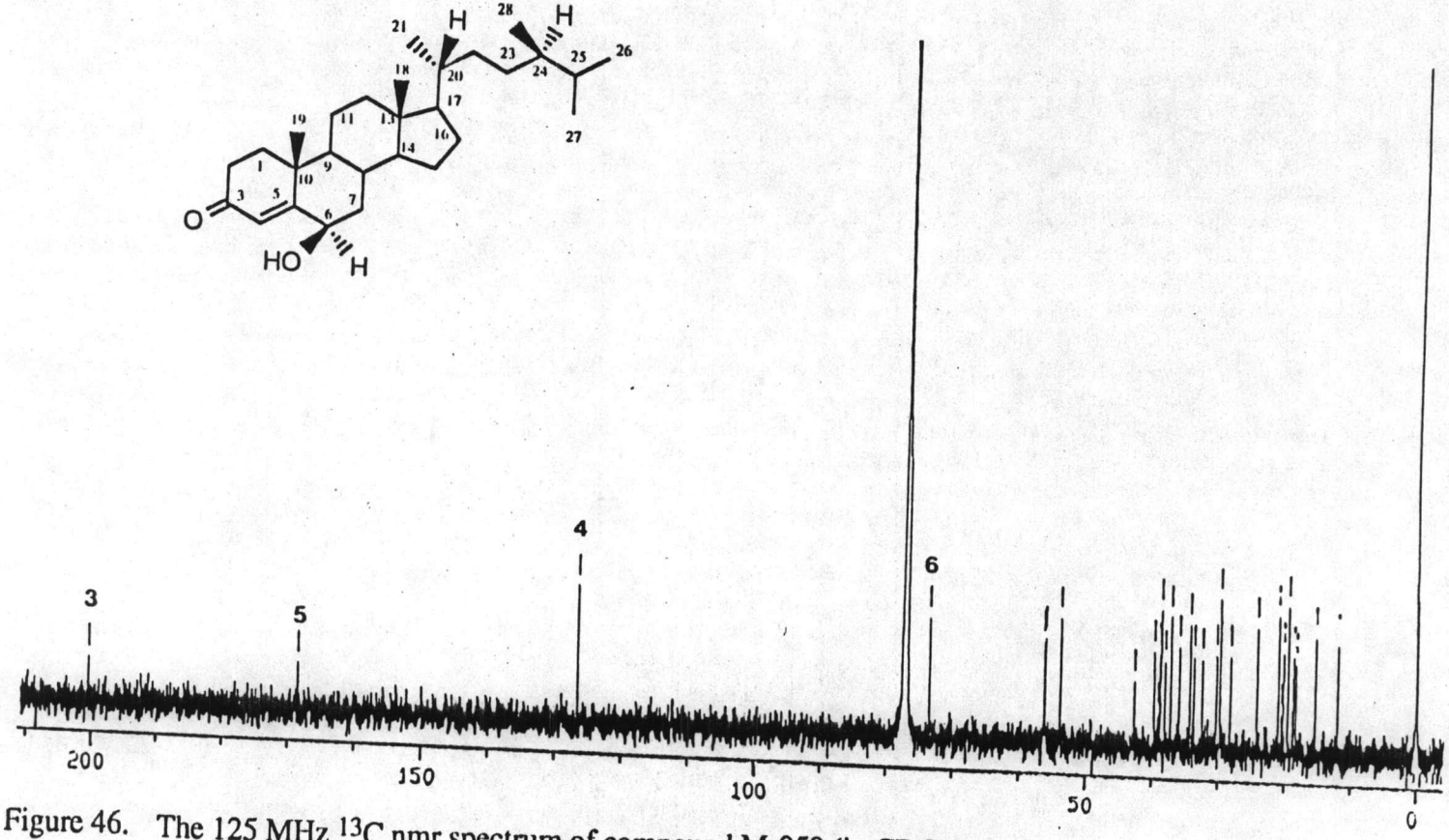



Figure 46. The 125 MHz $^{13}C$ nmr spectrum of compound M-059 (in $CDCl_3$)

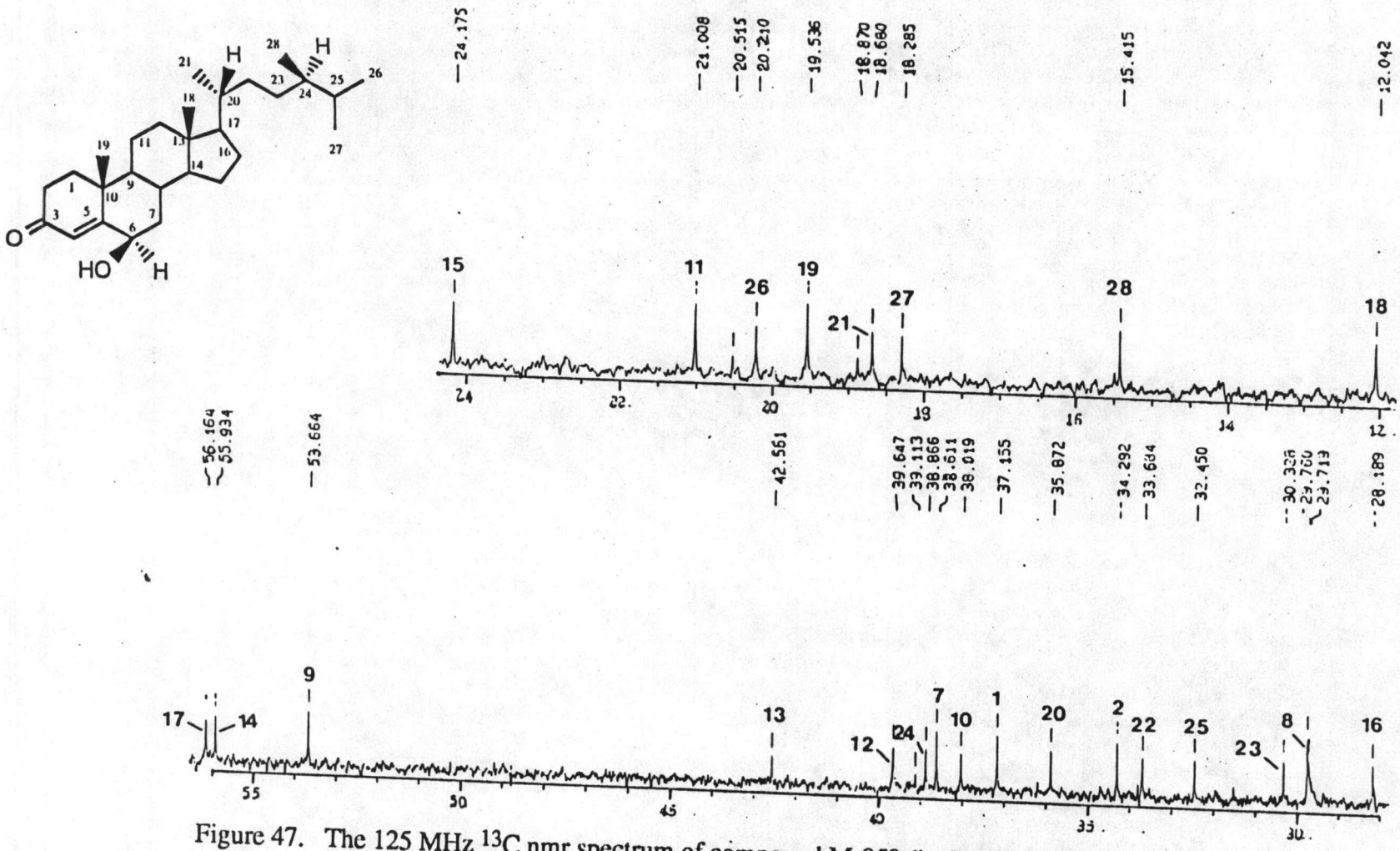
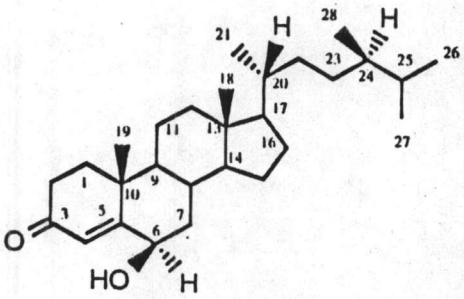



Figure 47. The 125 MHz $^{13}C$ nmr spectrum of compound M-059 (in $CDCl_3$)
(expanded from 12.ppm - 56 ppm)



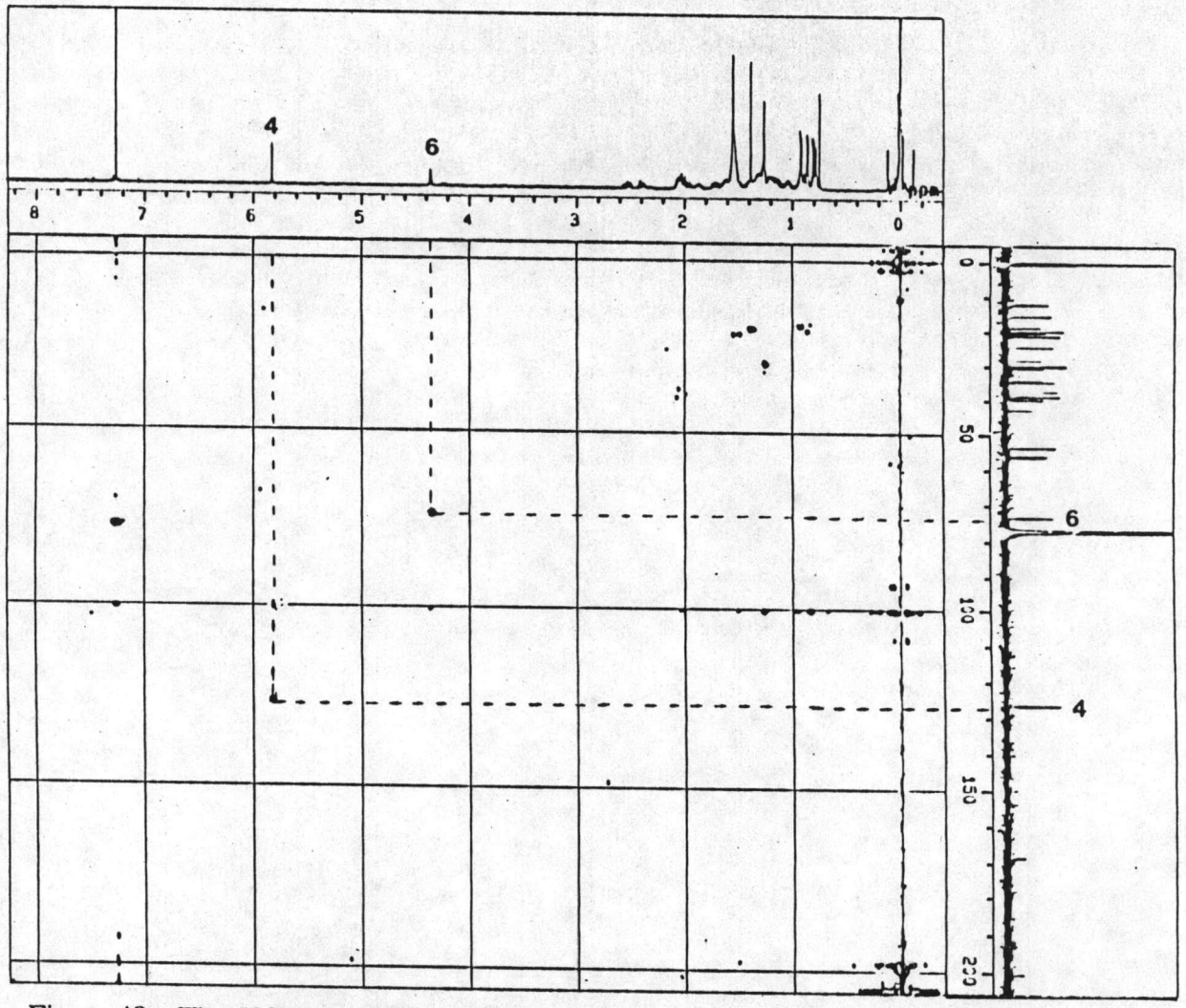




Figure 48. The 500 MHz HSQC spectrum of compound M-059 (in $CDCl_3$)

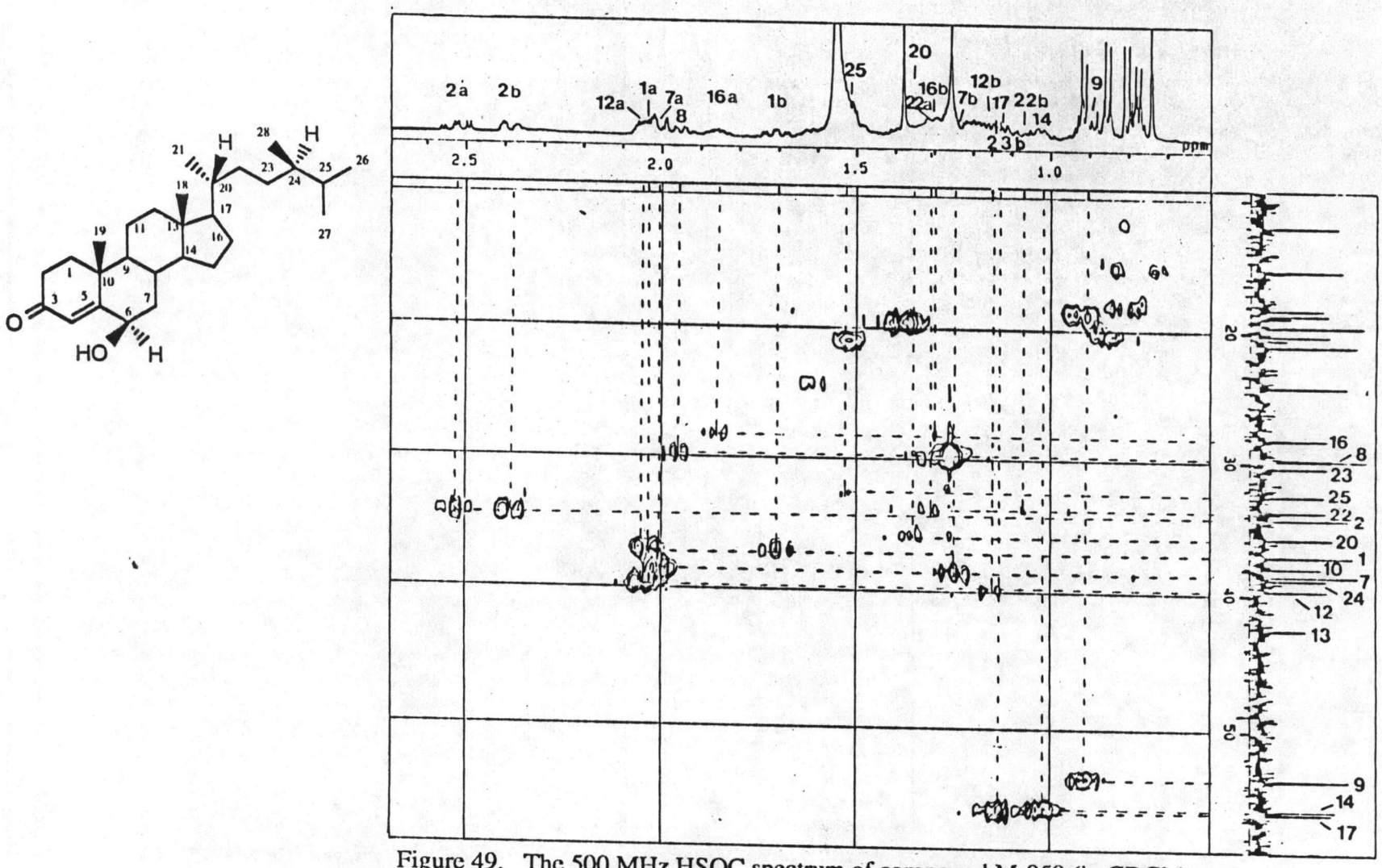
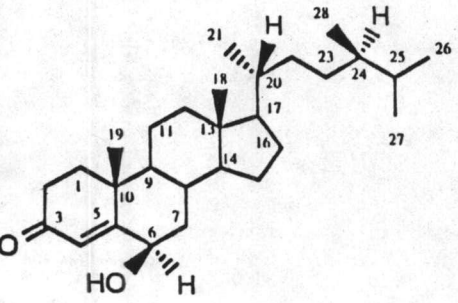



Figure 49. The 500 MHz HSQC spectrum of compound M-059 (in $CDCl_3$)
(expanded from 10 ppm - 60 ppm)



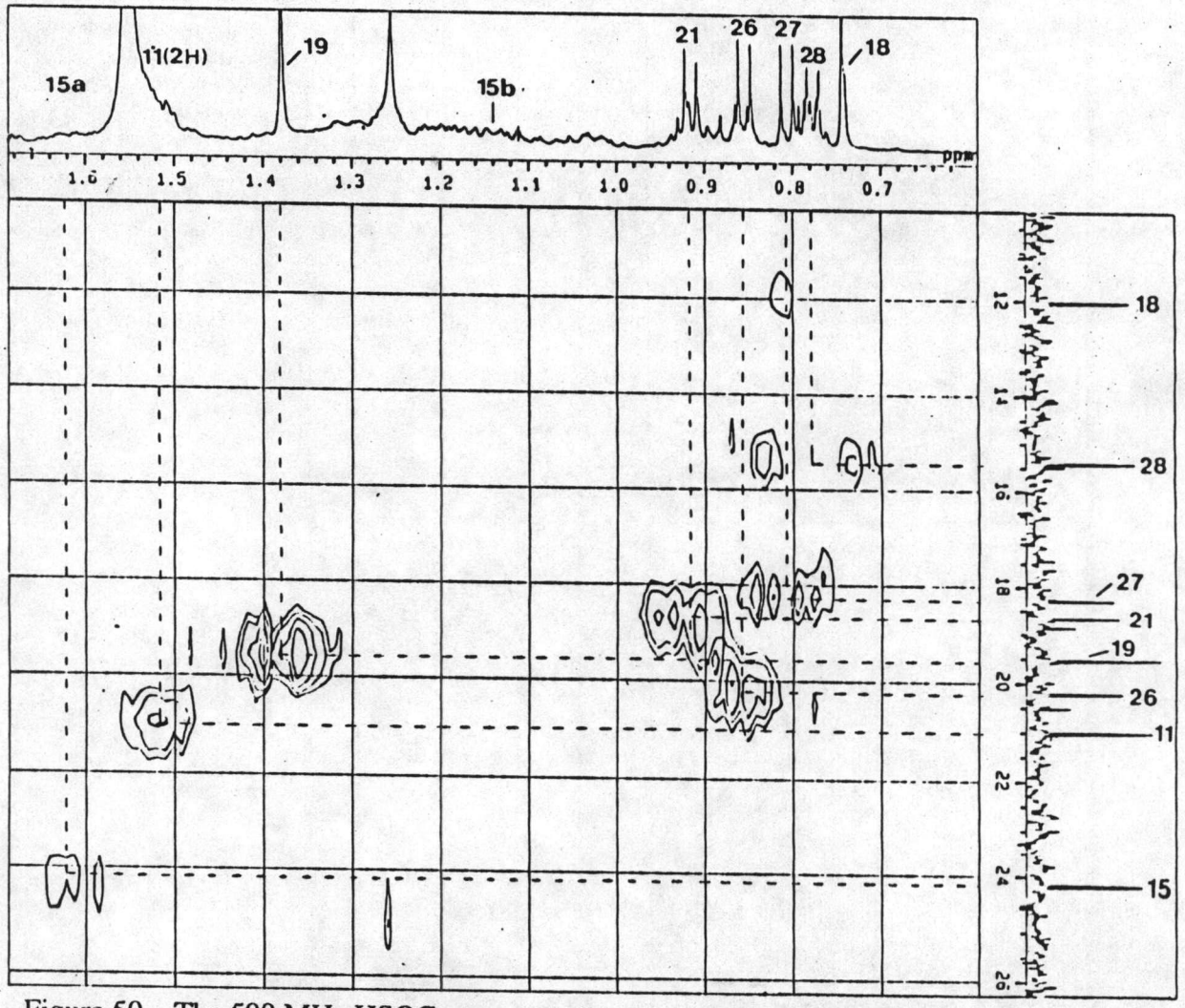
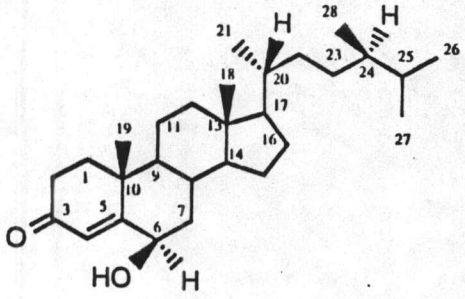




Figure 50. The 500 MHz HSQC spectrum of compound M-059 (in $CDCl_3$)
(expanded from 10 ppm - 26 ppm)



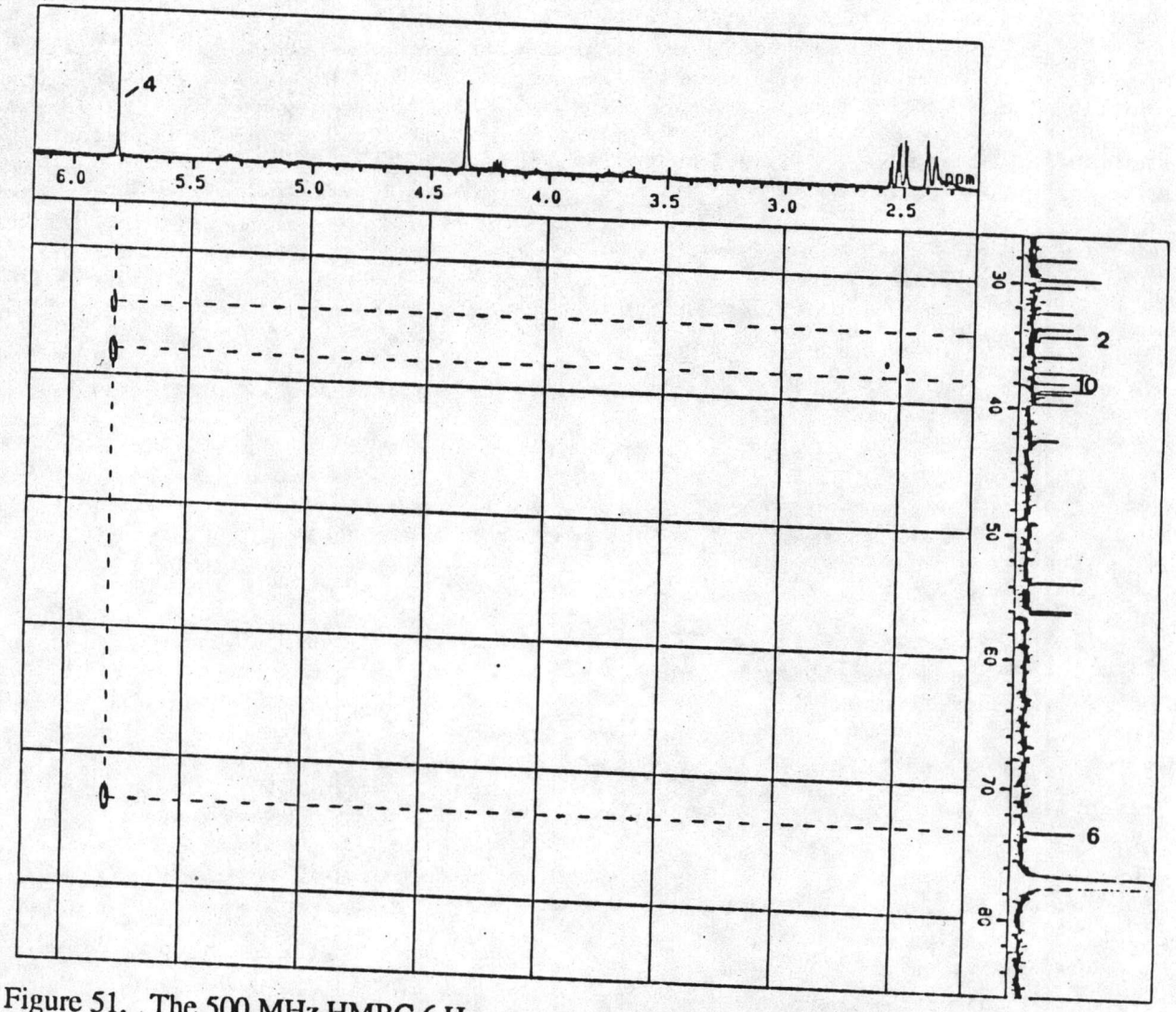




Figure 51. The 500 MHz HMBC 6 Hz spectrum of compound M-059 (in $CDCl_3$), (1)

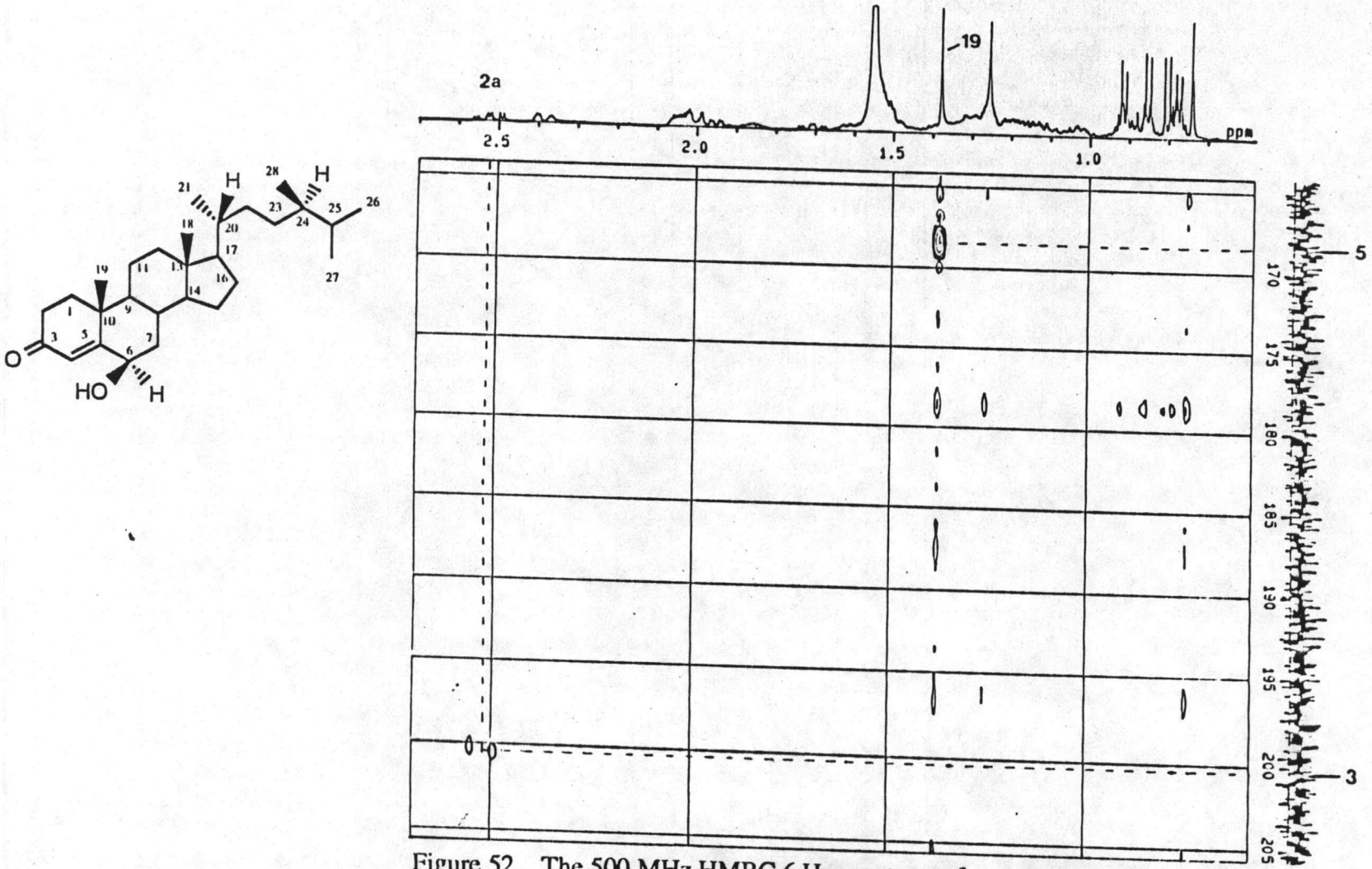



Figure 52. The 500 MHz HMBC 6 Hz spectrum of compound M-059 (in $CDCl_3$), (2)

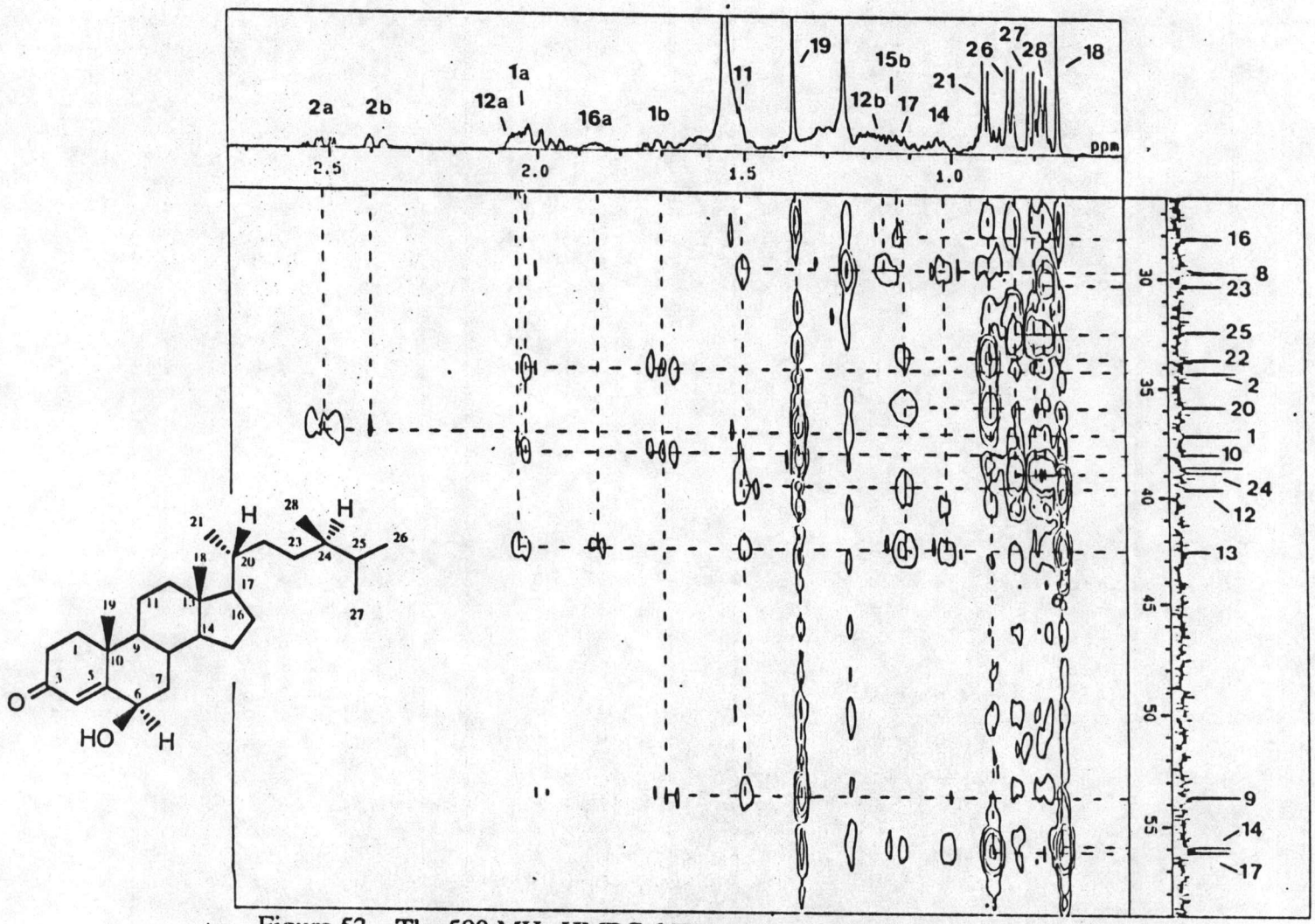



Figure 53. The 500 MHz HMBC 6 Hz spectrum of compound M-059 (in $CDCl_3$), (3)

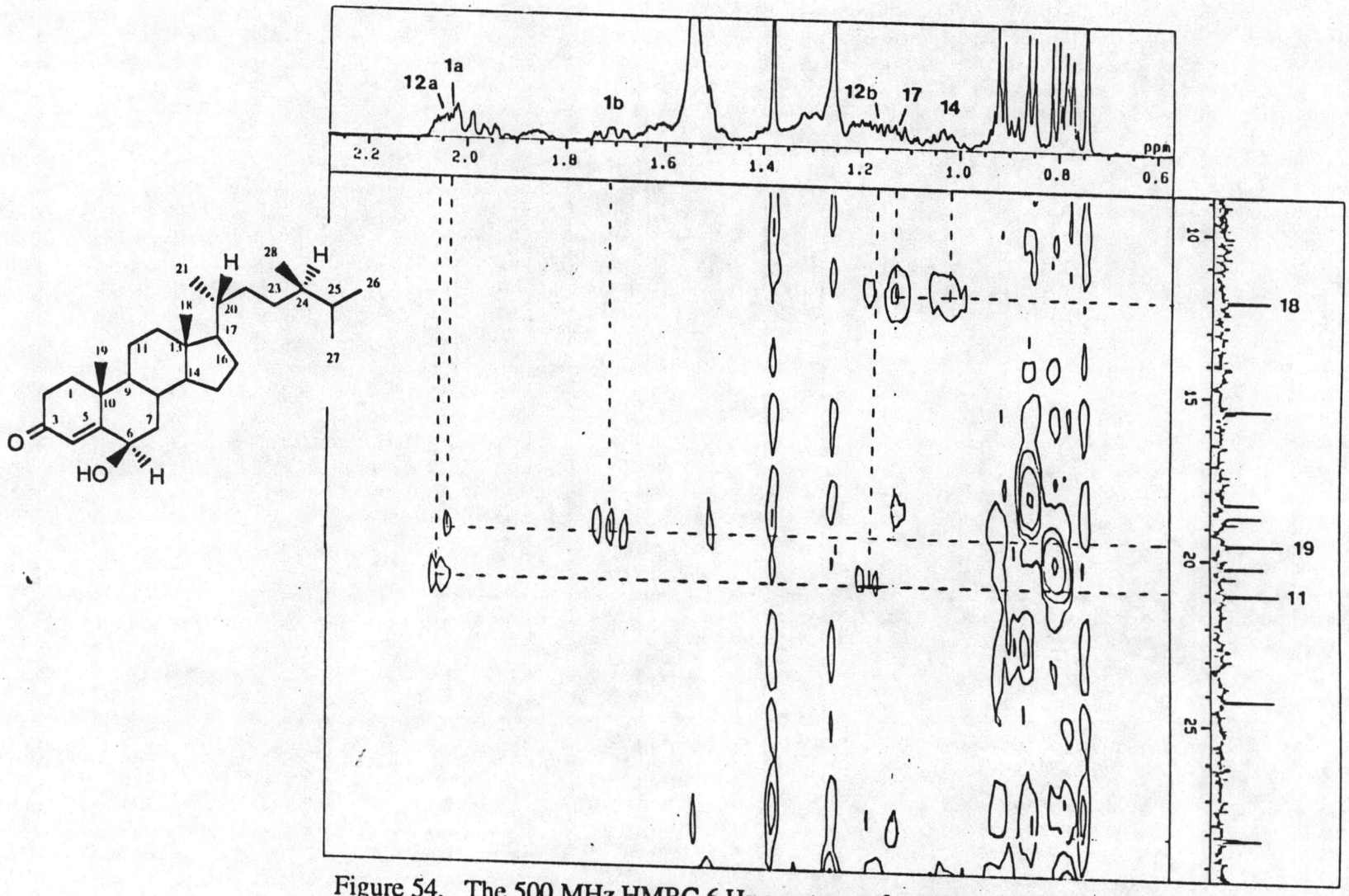



Figure 54. The 500 MHz HMBC 6 Hz spectrum of compound M-059 (in $CDCl_3$), (4)

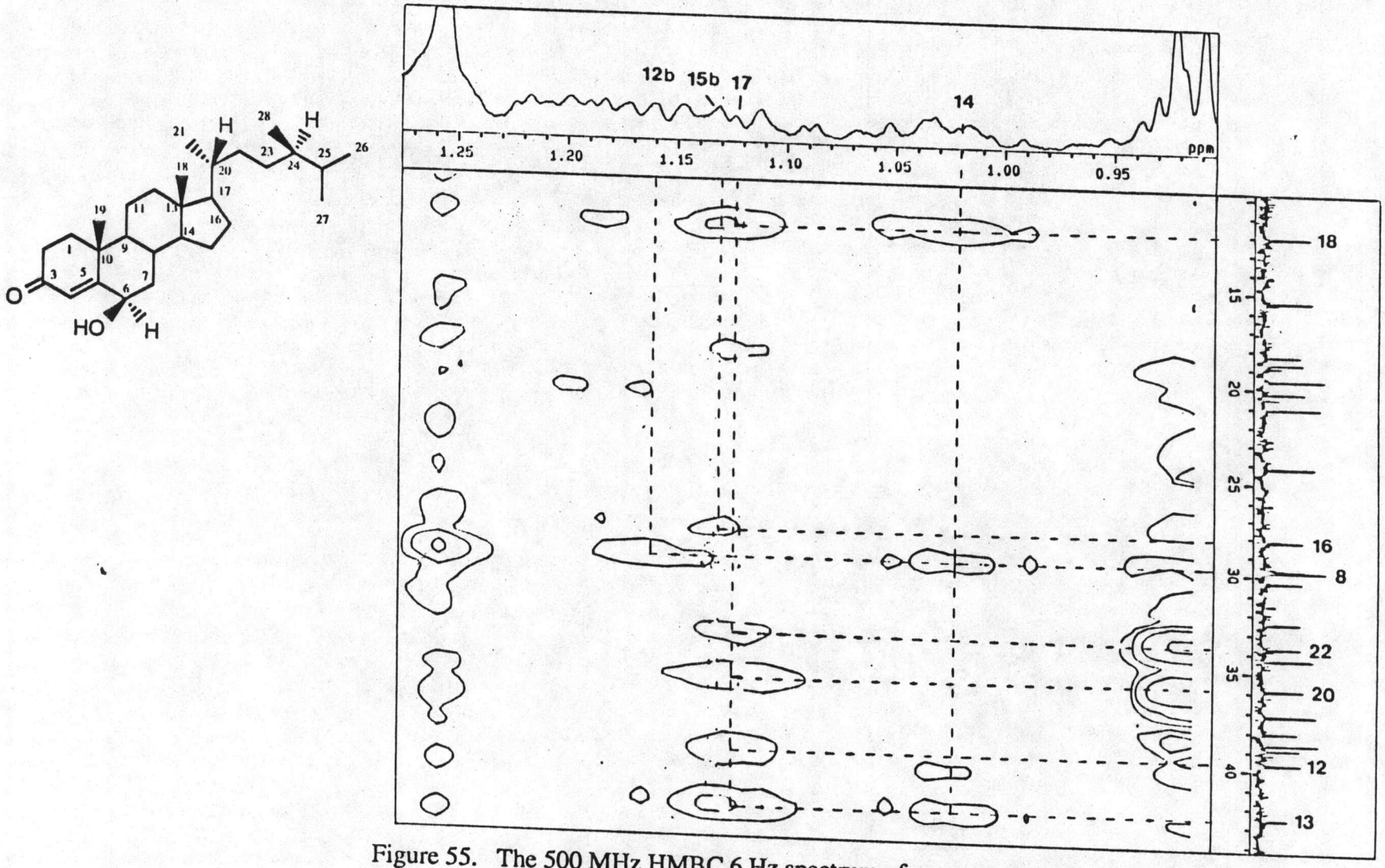



Figure 55. The 500 MHz HMBC 6 Hz spectrum of compound M-059 (in $CDCl_3$), (5)

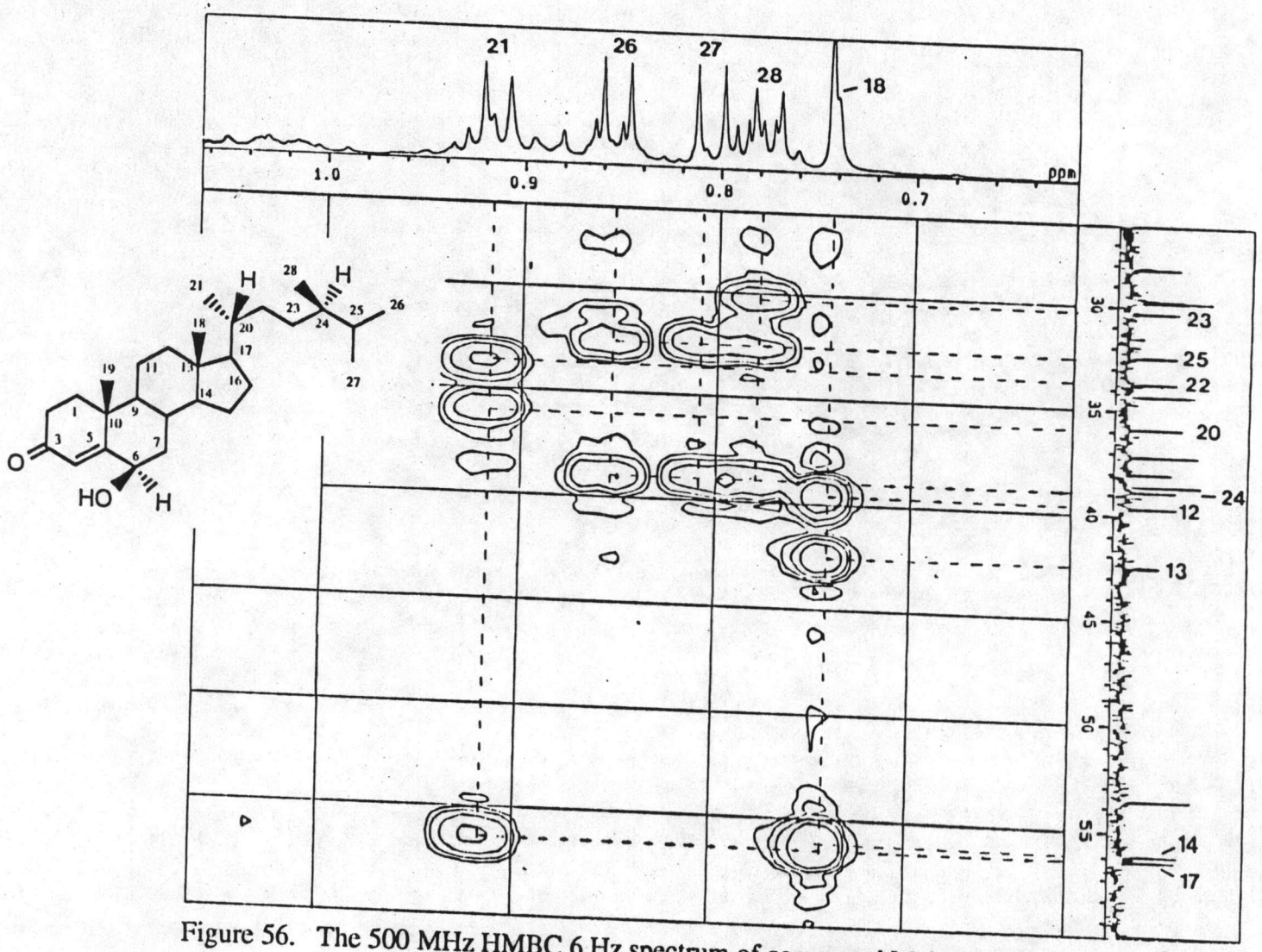



Figure 56. The 500 MHz HMBC 6 Hz spectrum of compound M-059 (in $CDCl_3$), (6)

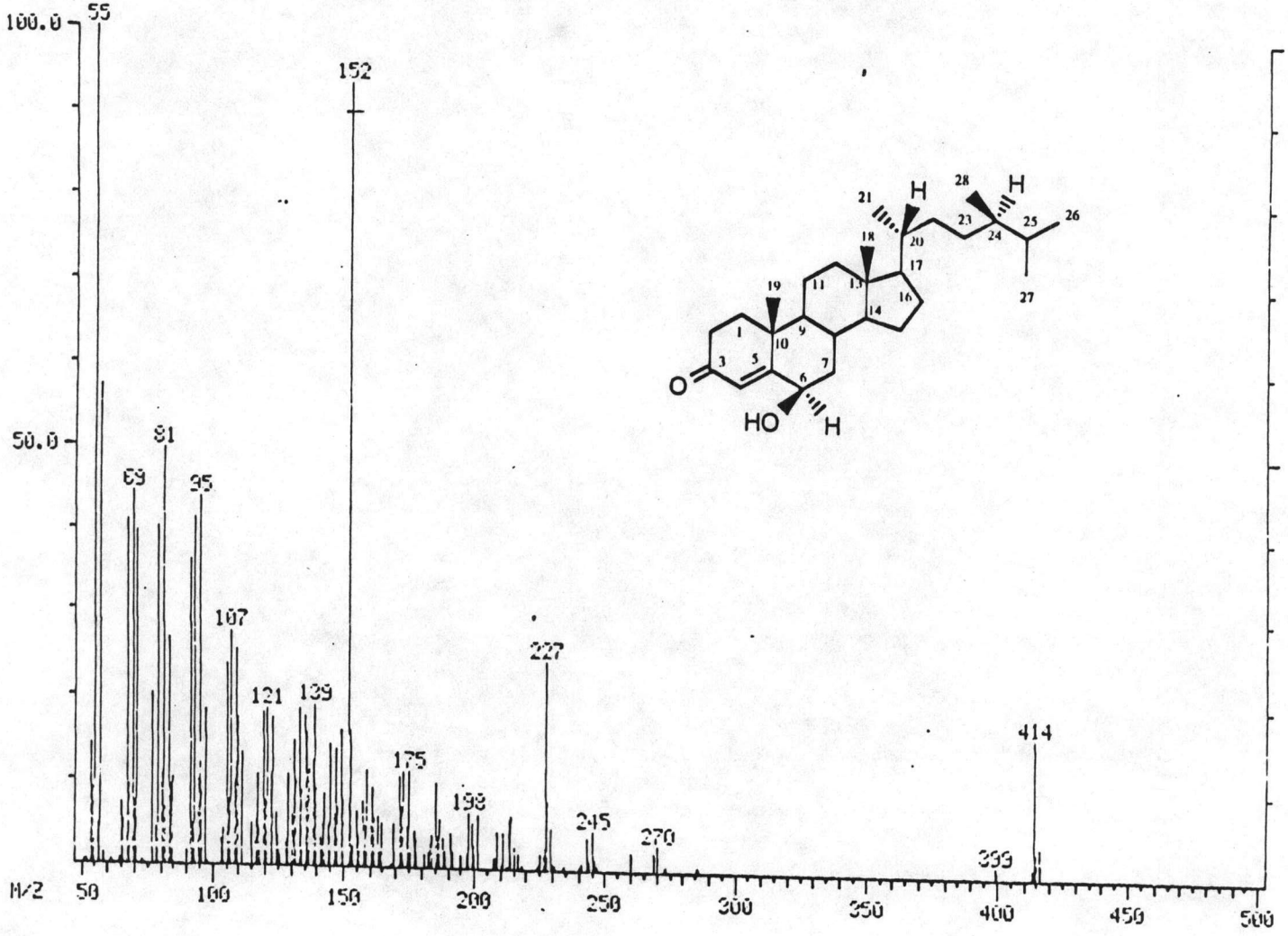



Figure 57. The eims spectrum of compound M-059

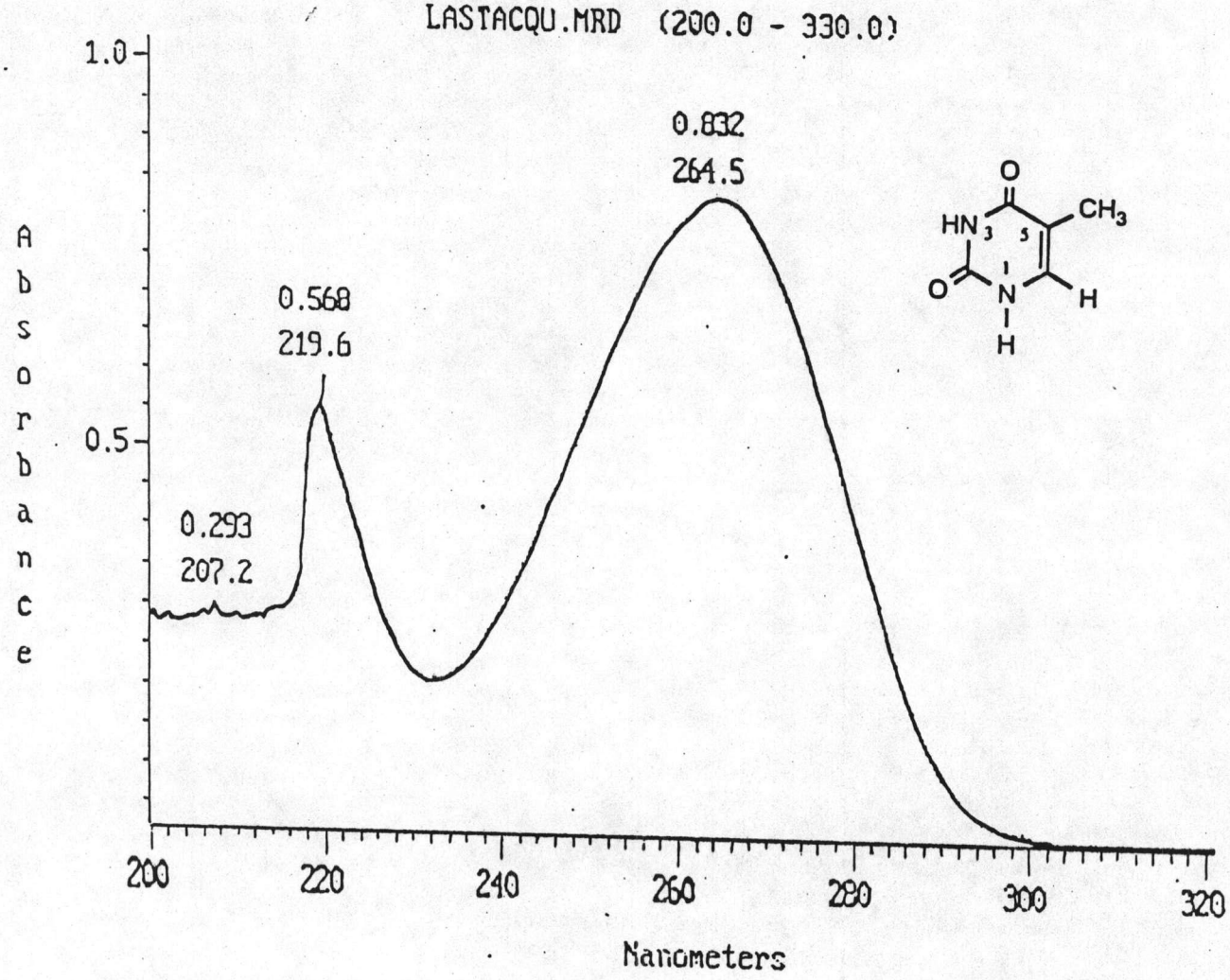
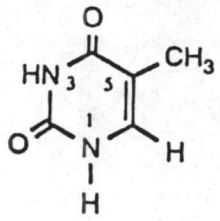



Figure 58. The uv spectrum of compound A-044 (in methanol)



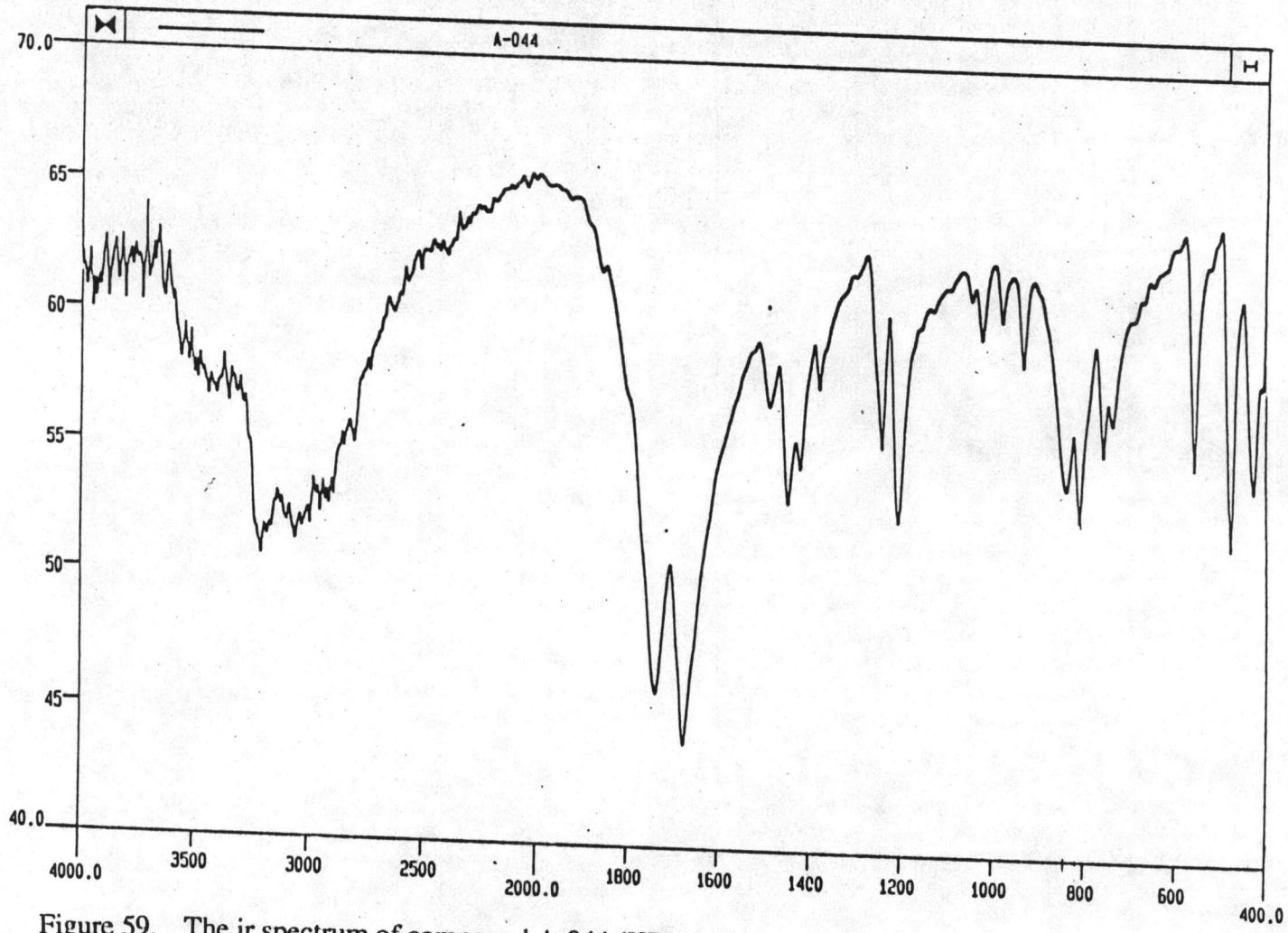




Figure 59. The ir spectrum of compound A-044 (KBr disc)

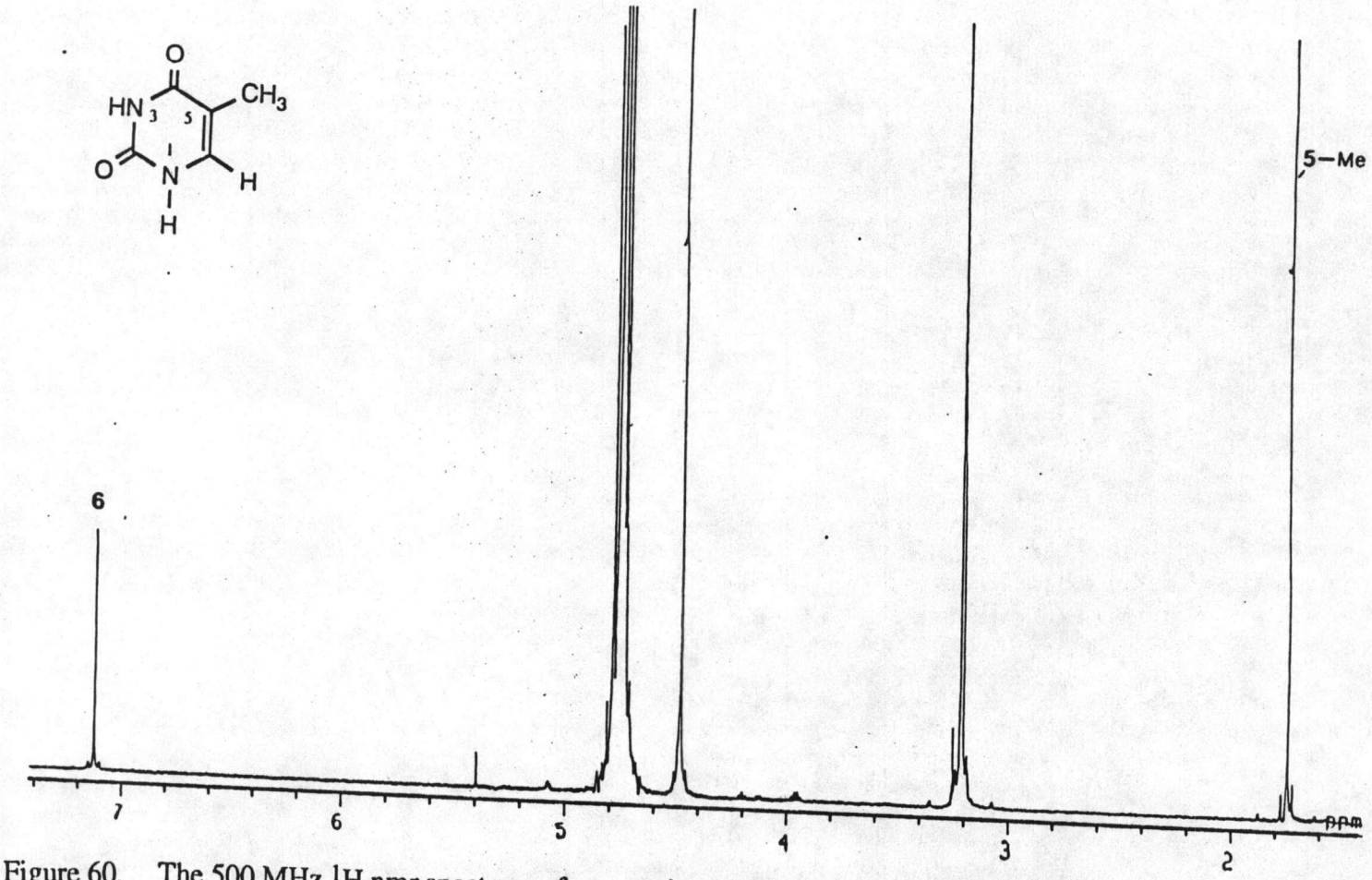



Figure 60. The 500 MHz $^1H$ nmr spectrum of compound A-044 (in $CD_3OD$)

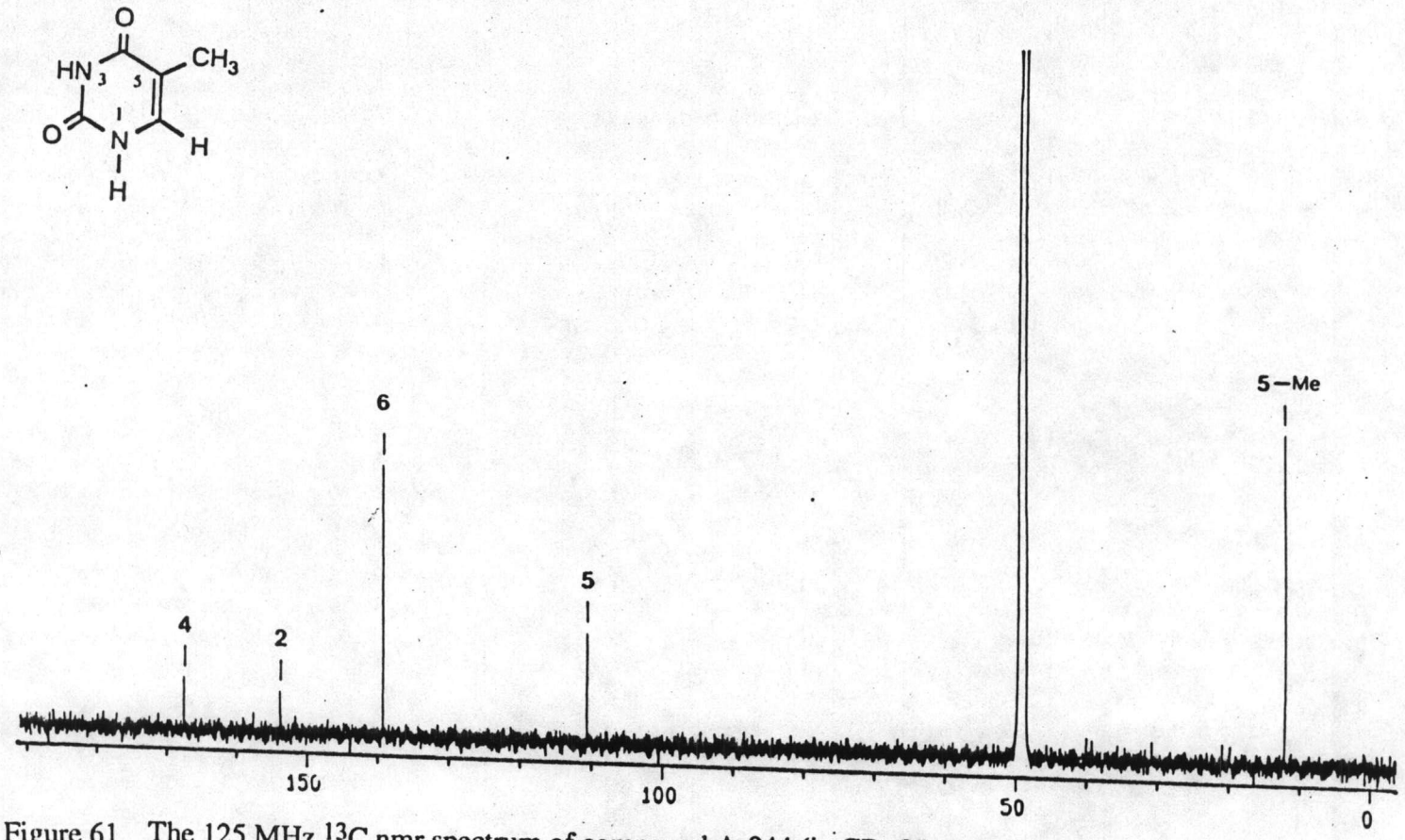



Figure 61. The 125 MHz $^{13}C$ nmr spectrum of compound A-044 (in $CD_3OD$)

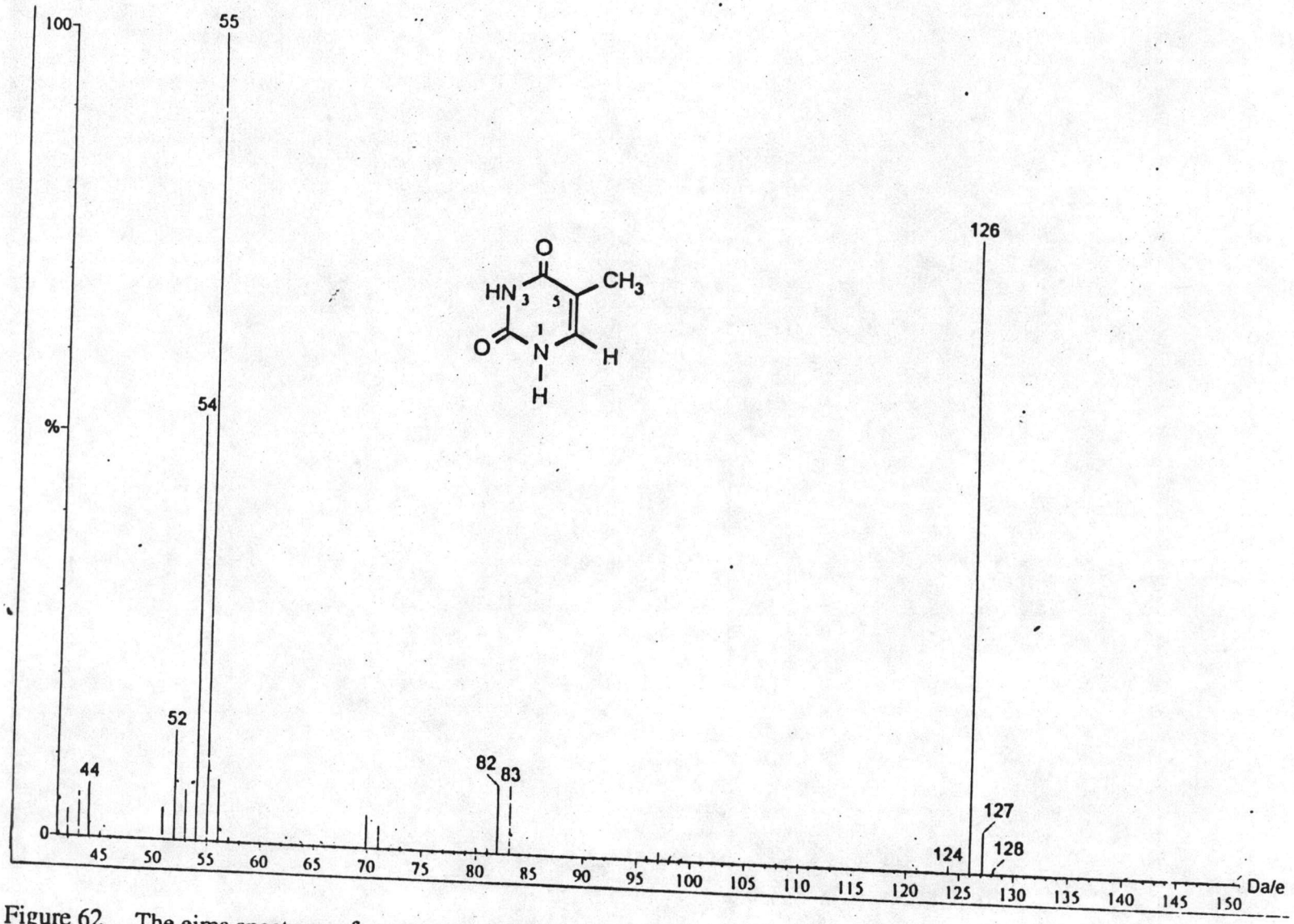



Figure 62. The eims spectrum of compound A-044

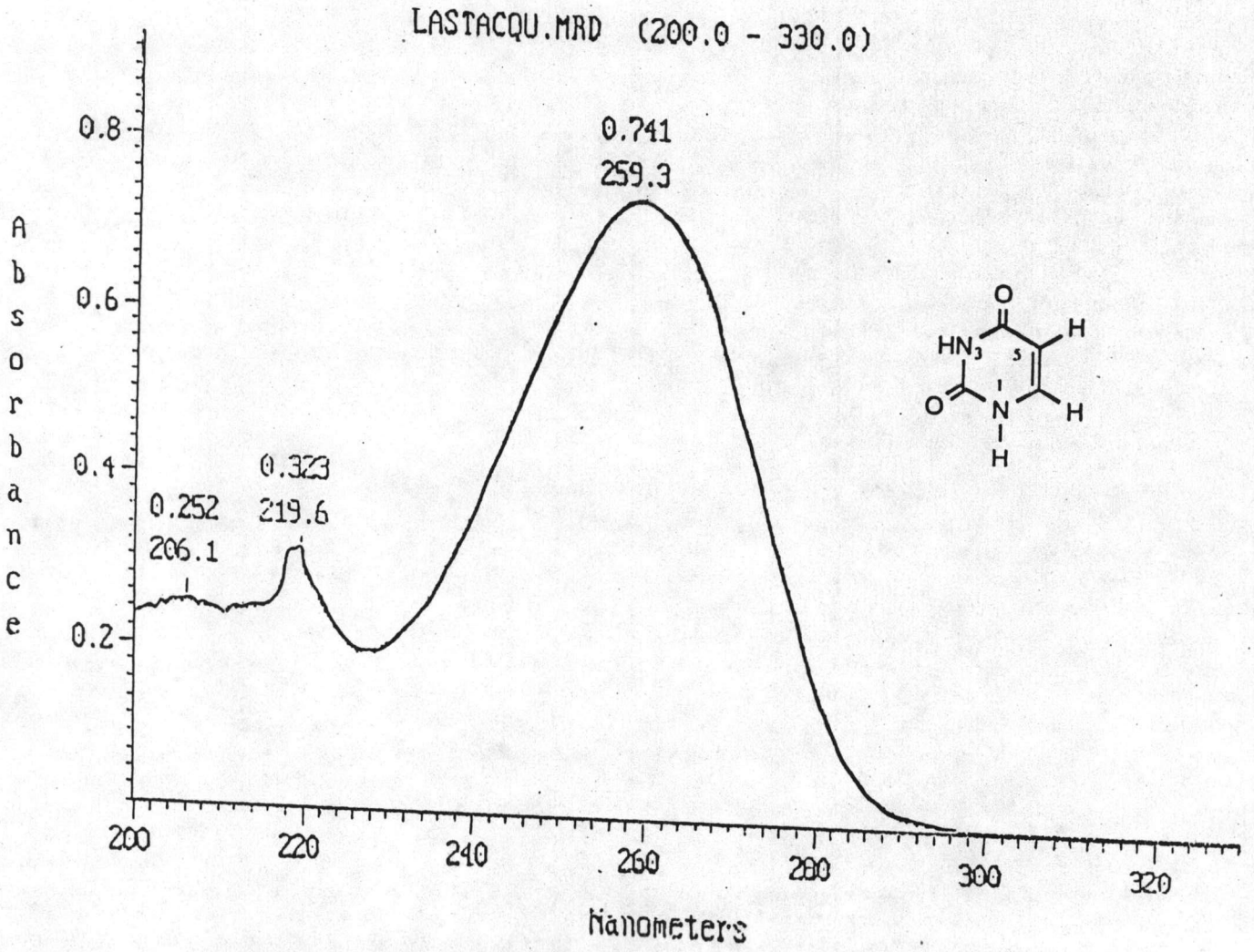



Figure 63. The uv spectrum of compound A-046 (in methanol)

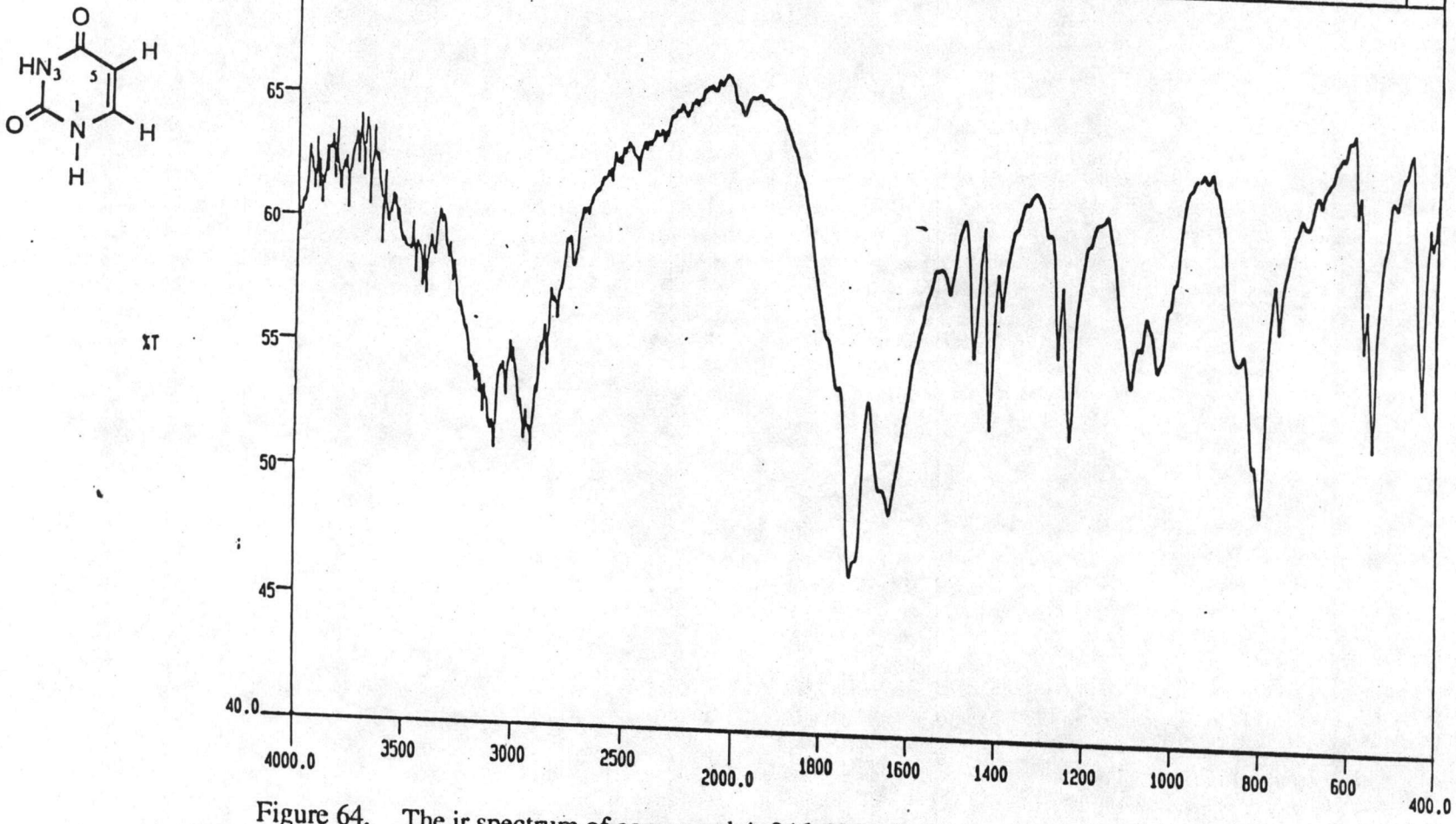



Figure 64. The ir spectrum of compound A-046 (KBr disc)

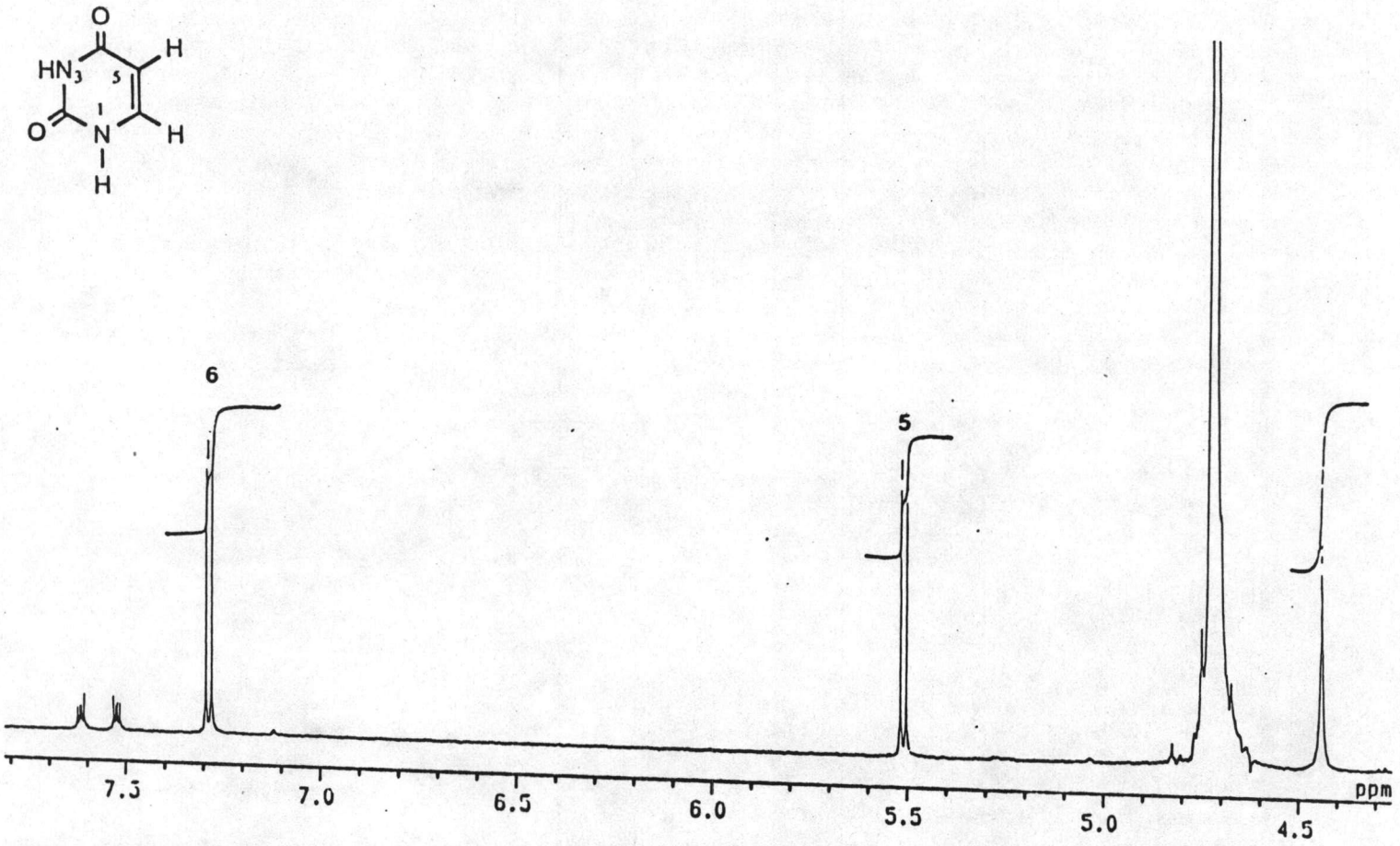



Figure 65. The 500 MHz $^1H$ nmr spectrum of compound A-046 (in $CD_3OD$)

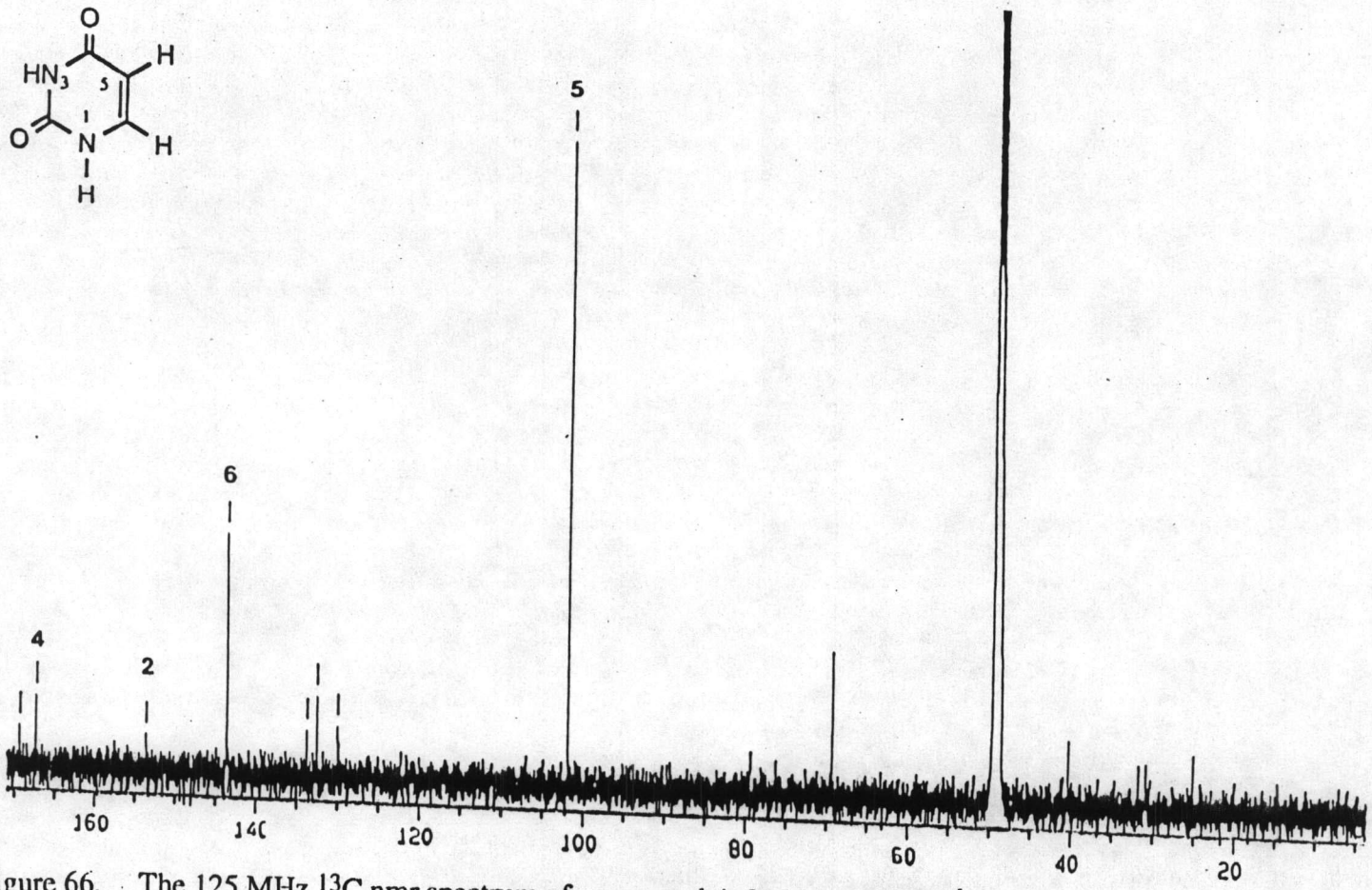



Figure 66. The 125 MHz $^{13}C$ nmr spectrum of compound A-046(in $CD_3OD$)

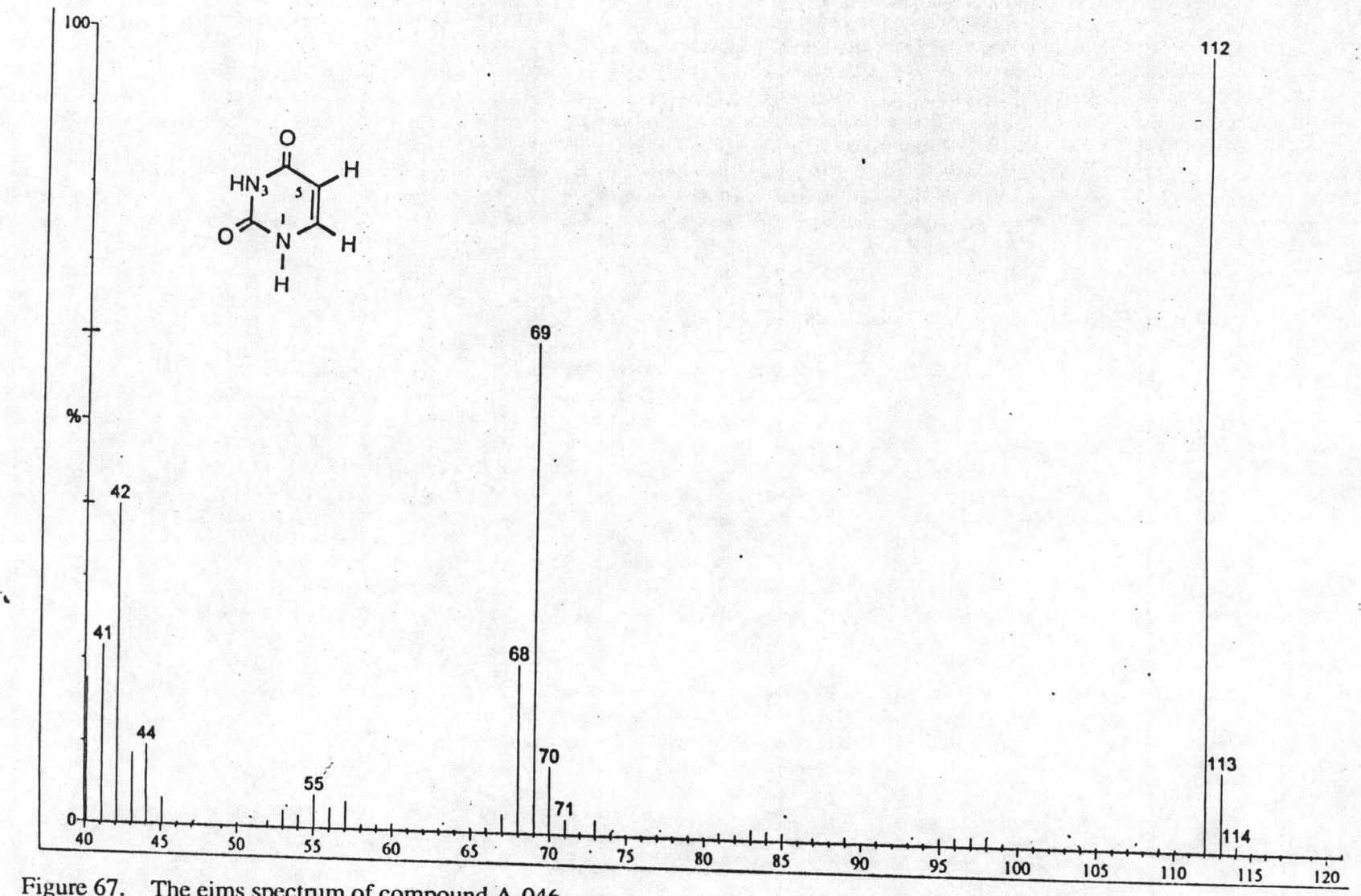



Figure 67. The eims spectrum of compound A-046

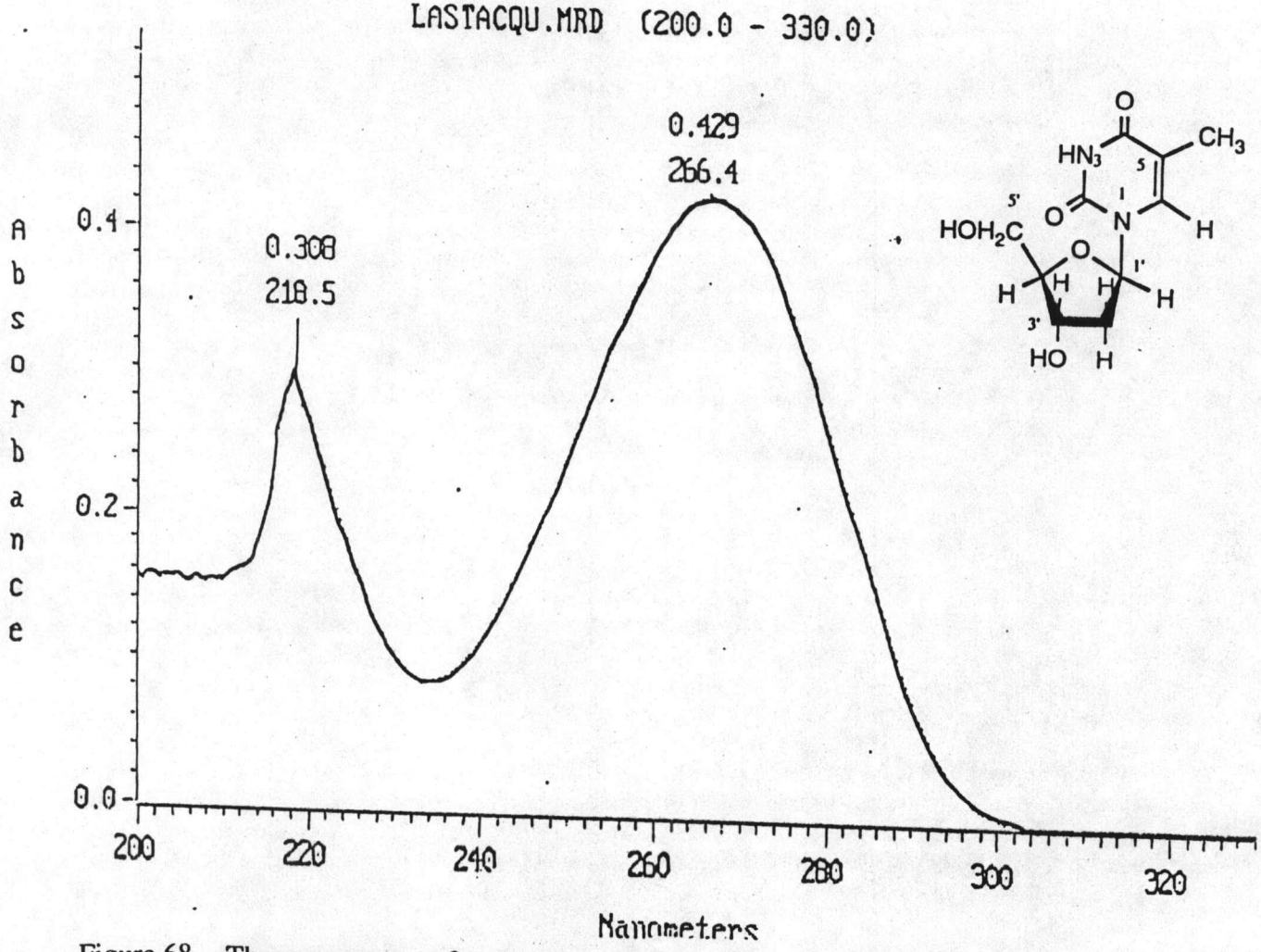
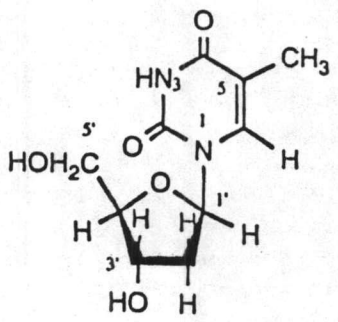



Figure 68. The uv spectrum of compound A-047 (in methanol)




XT

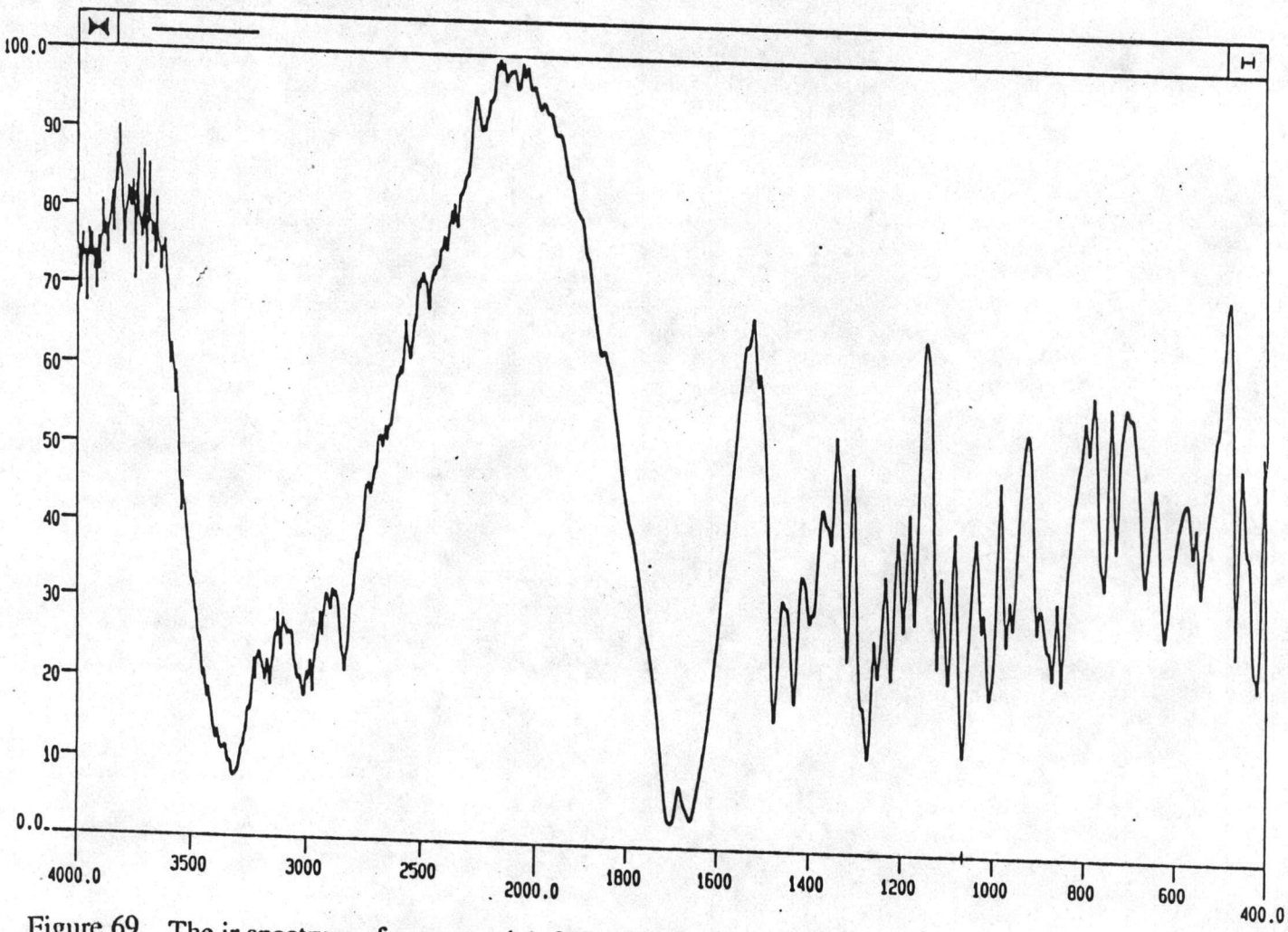



Figure 69. The ir spectrum of compound A-047 (KBr disc)

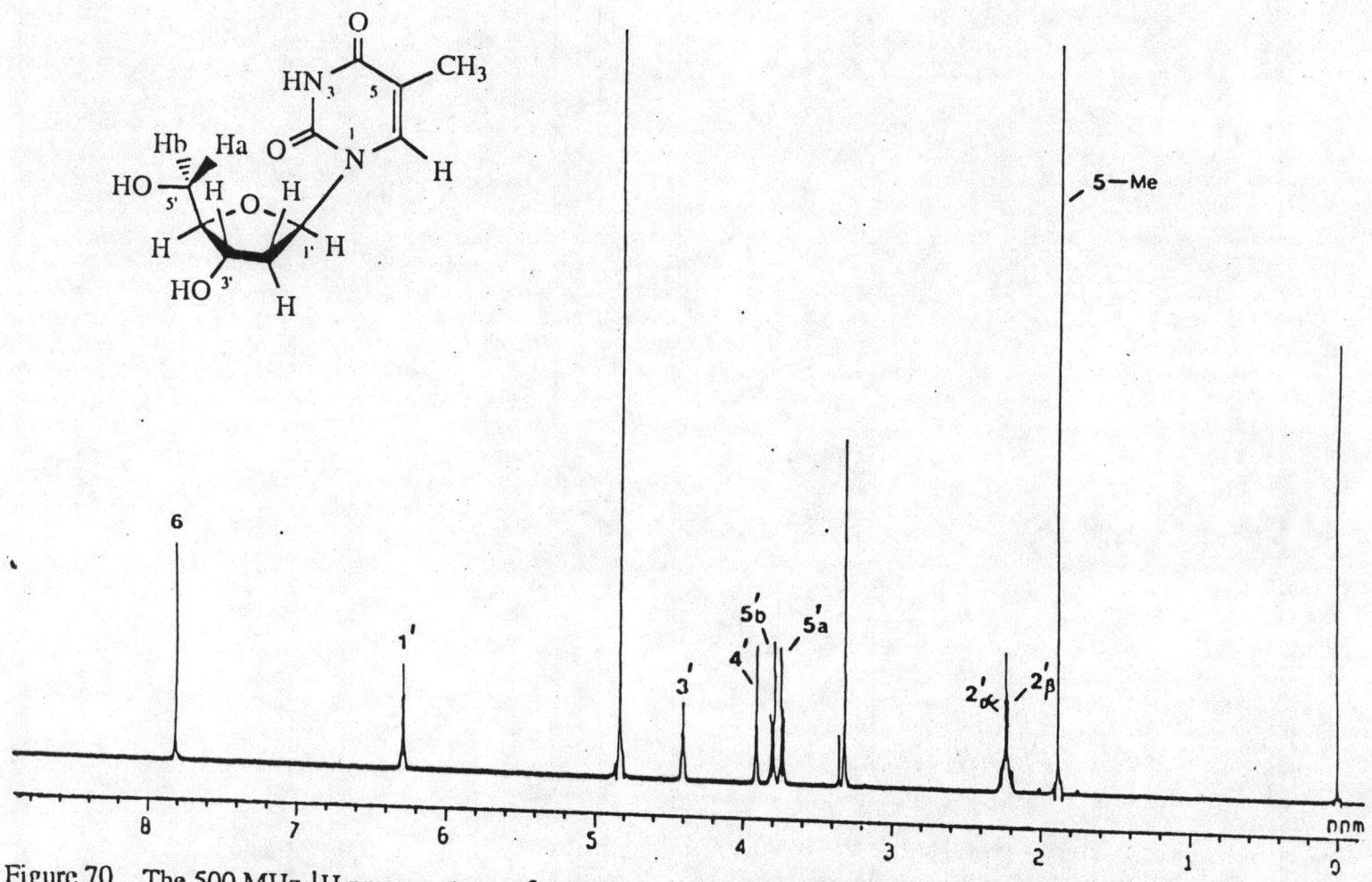



Figure 70. The 500 MHz $^1H$ nmr spectrum of compound A-047 (in $CD_3OD$)

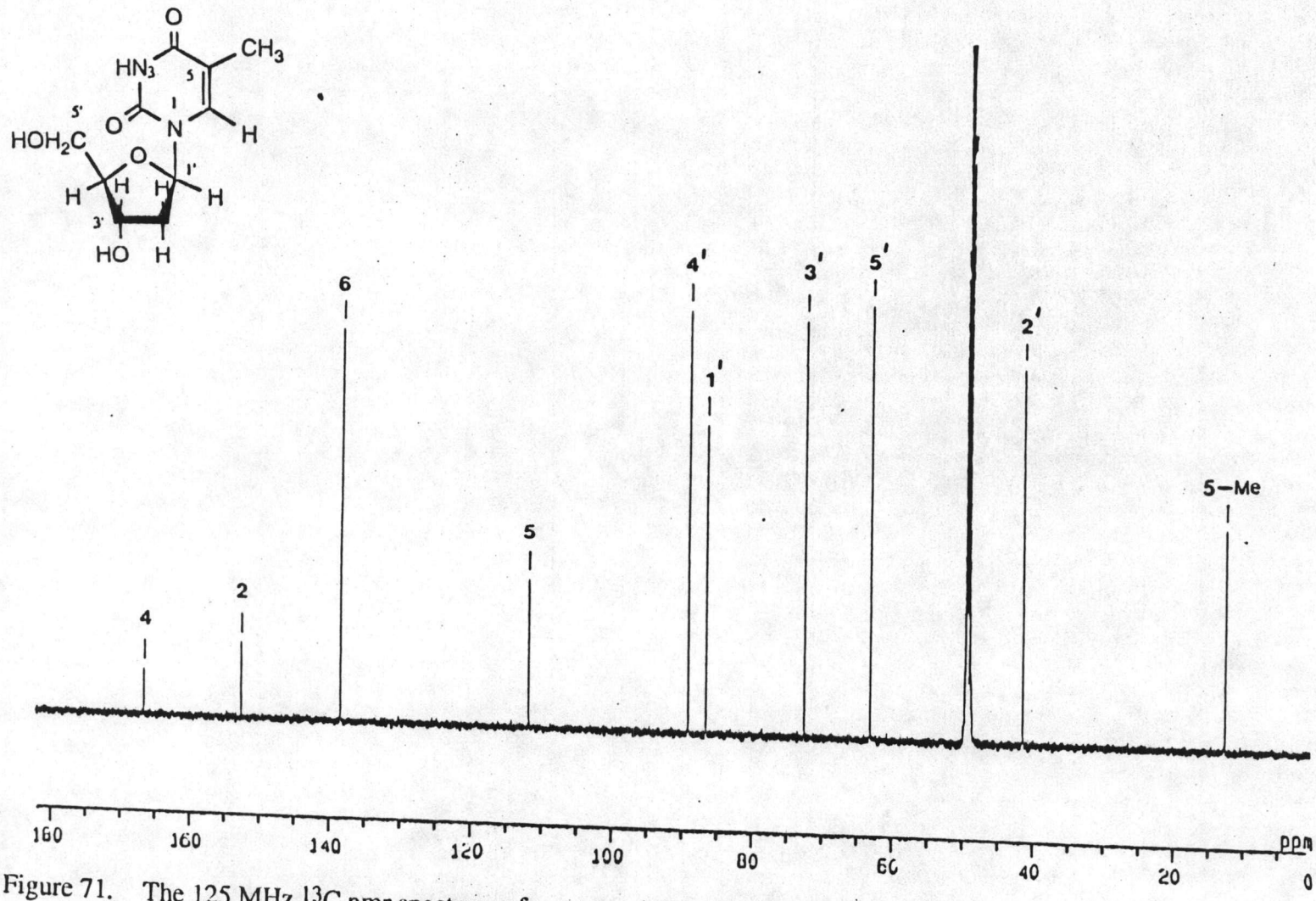



Figure 71. The 125 MHz $^{13}C$ nmr spectrum of compound A-047 (in $CD_3OD$)

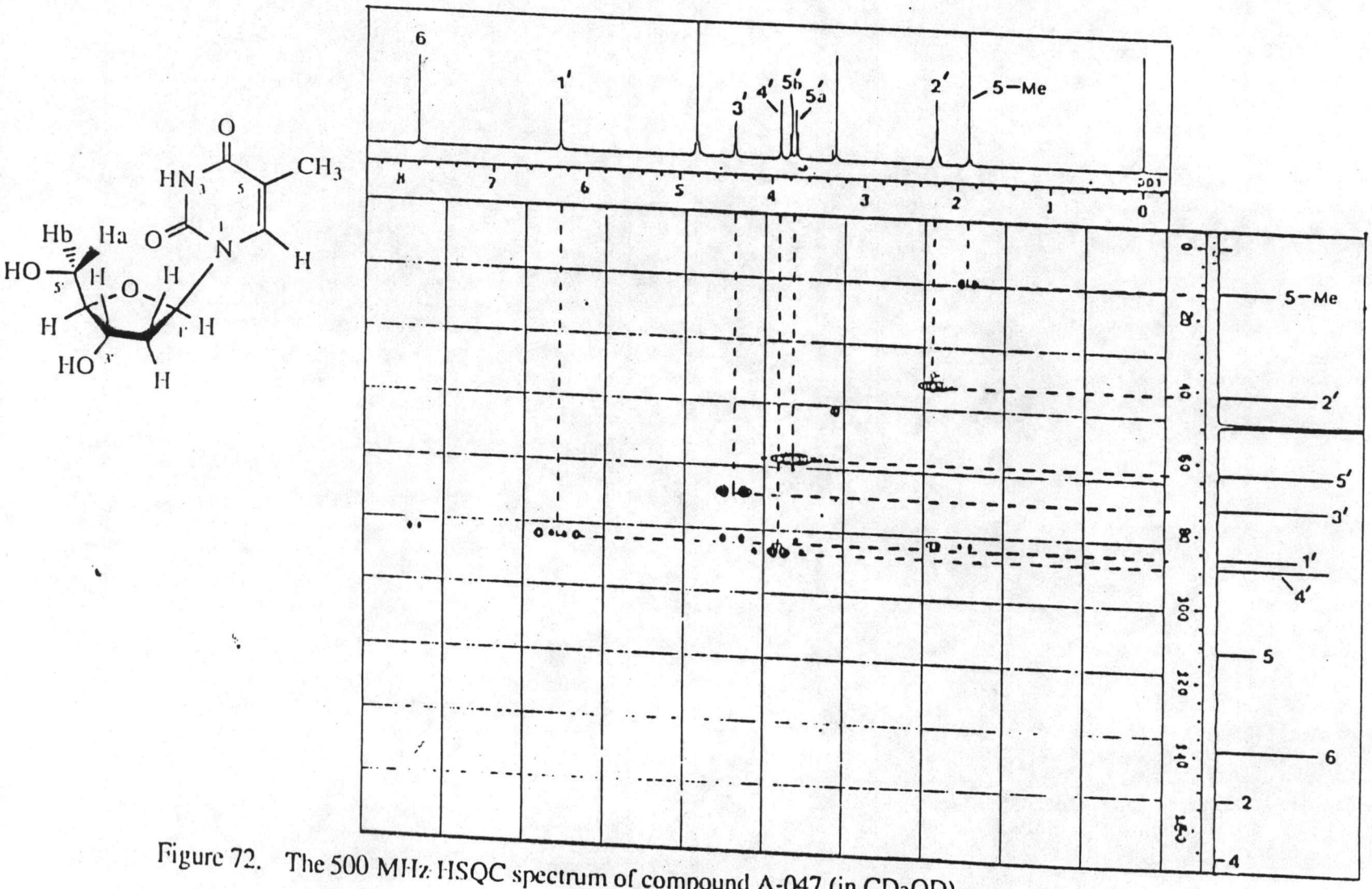



Figure 72. The 500 MHz HSQC spectrum of compound A-047 (in $CD_3OD$)

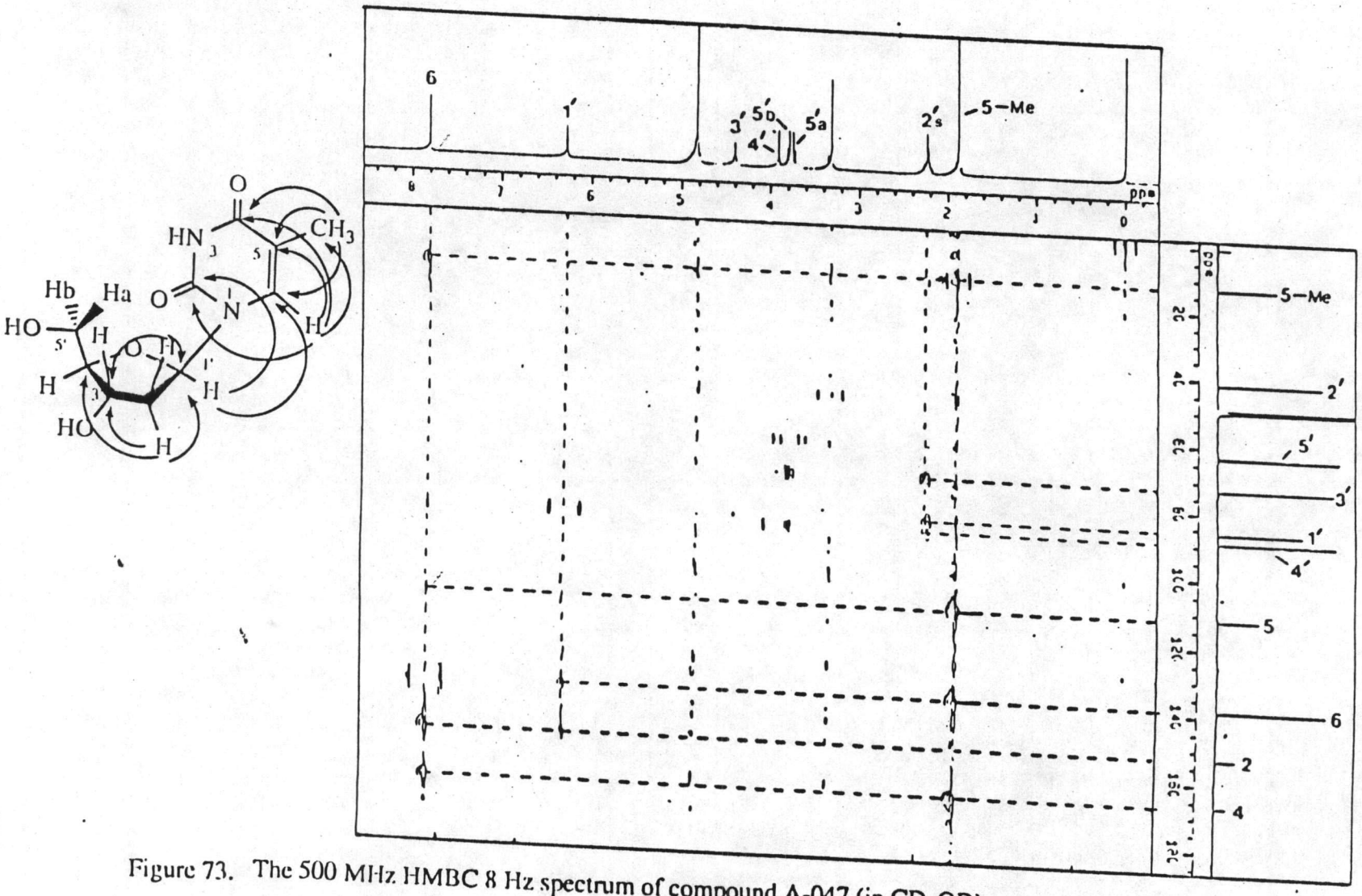



Figure 73. The 500 MHz HMBC 8 Hz spectrum of compound A-047 (in $CD_3OD$)

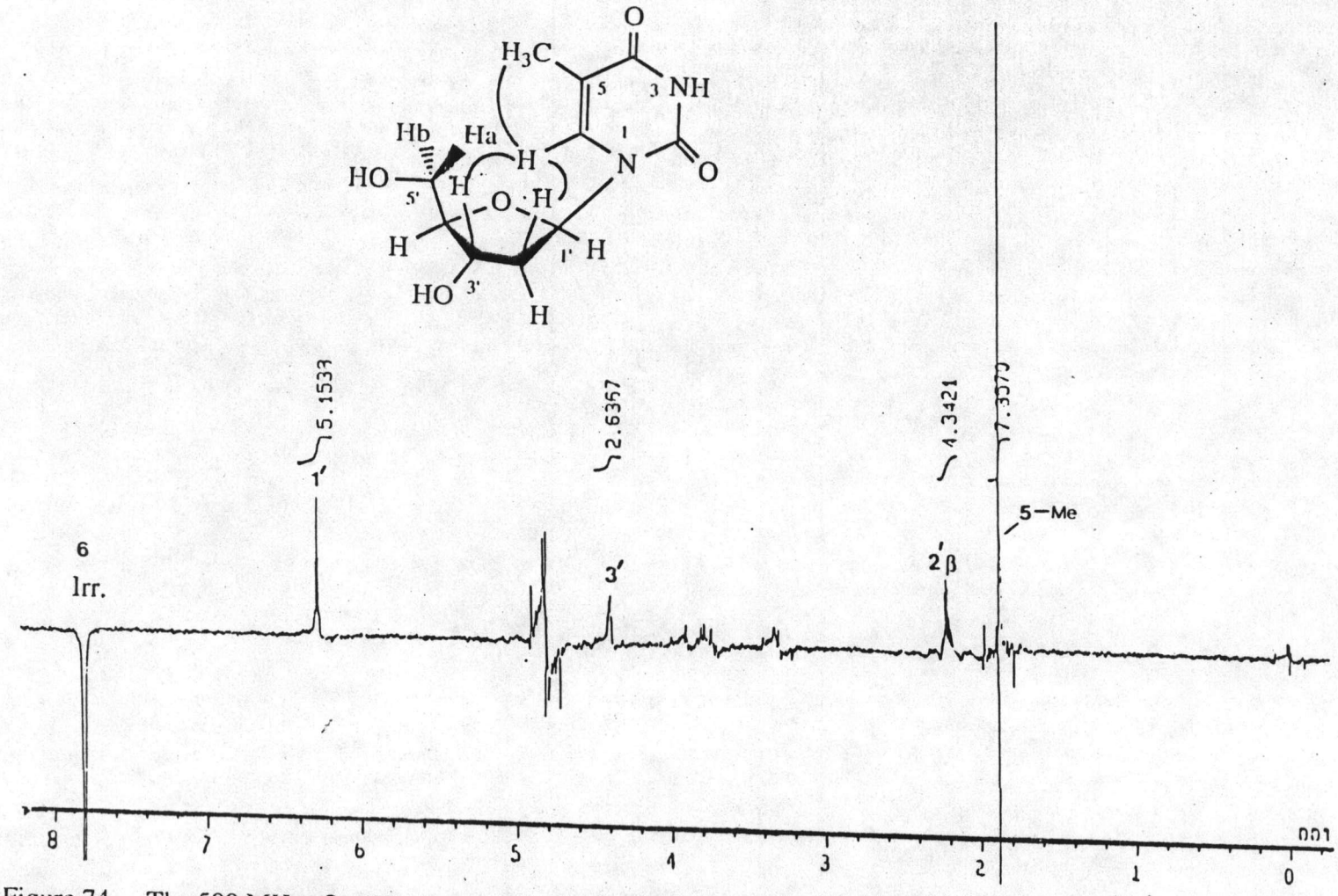



Figure 74. The 500 MHz nOe difference spectrum of compound A-047 ($CD_3OD$), irradiation at 7.81 ppm (H-6)

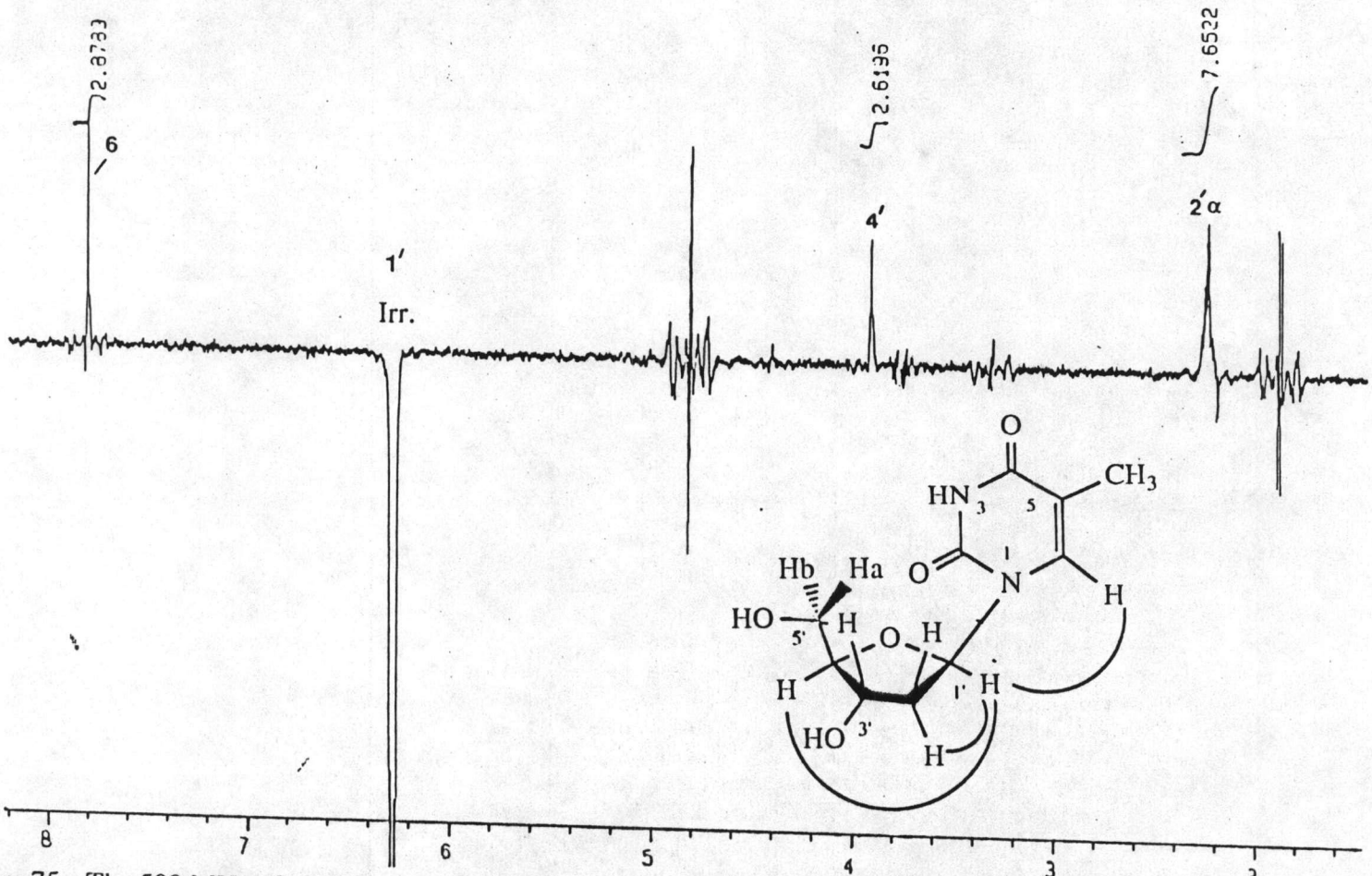



Figure 75. The 500 MHz nOe difference spectrum of compound A-047 ($CD_3OD$), irradiation at 6.27 ppm (H-1')

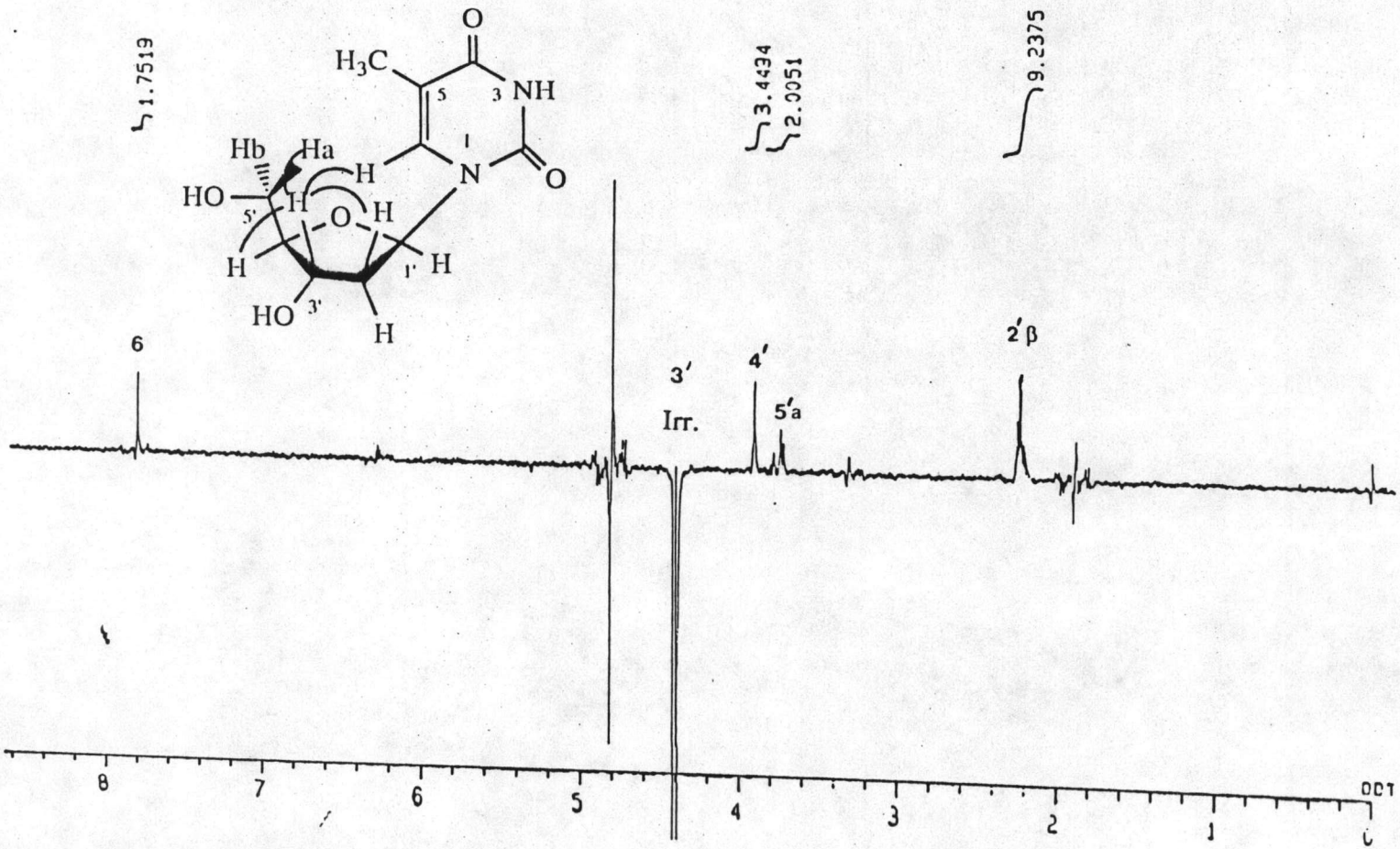



Figure 76. The 500 MHz nOe difference spectrum of compound A-047 ($CD_3OD$), irradiation at 4.39 ppm (H-3')

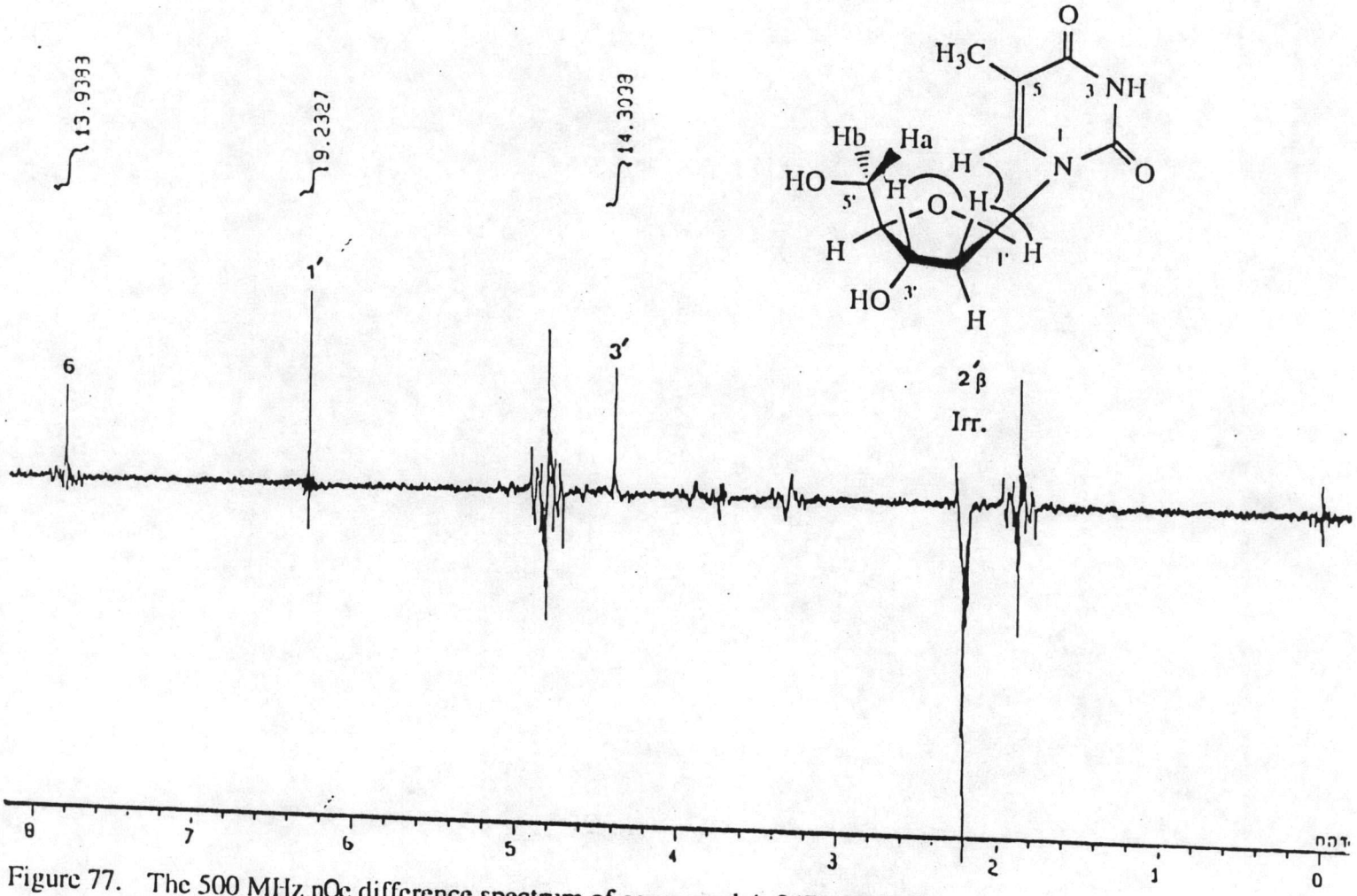



Figure 77. The 500 MHz nOe difference spectrum of compound A-047 ($CD_3OD$), irradiation at 2.20 ppm (Hβ-2')

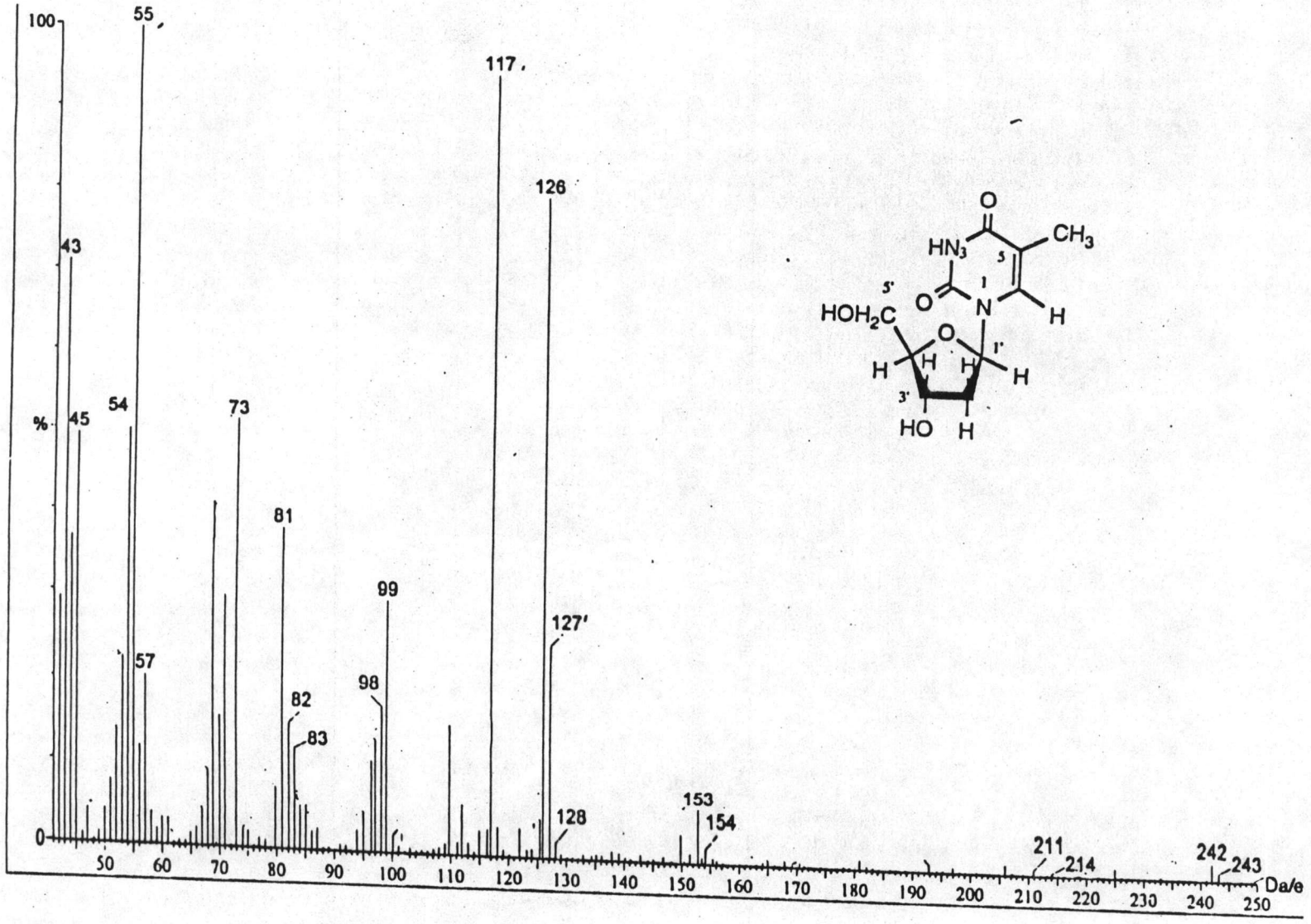



Figure 78. The eims spectrum of compound A-047

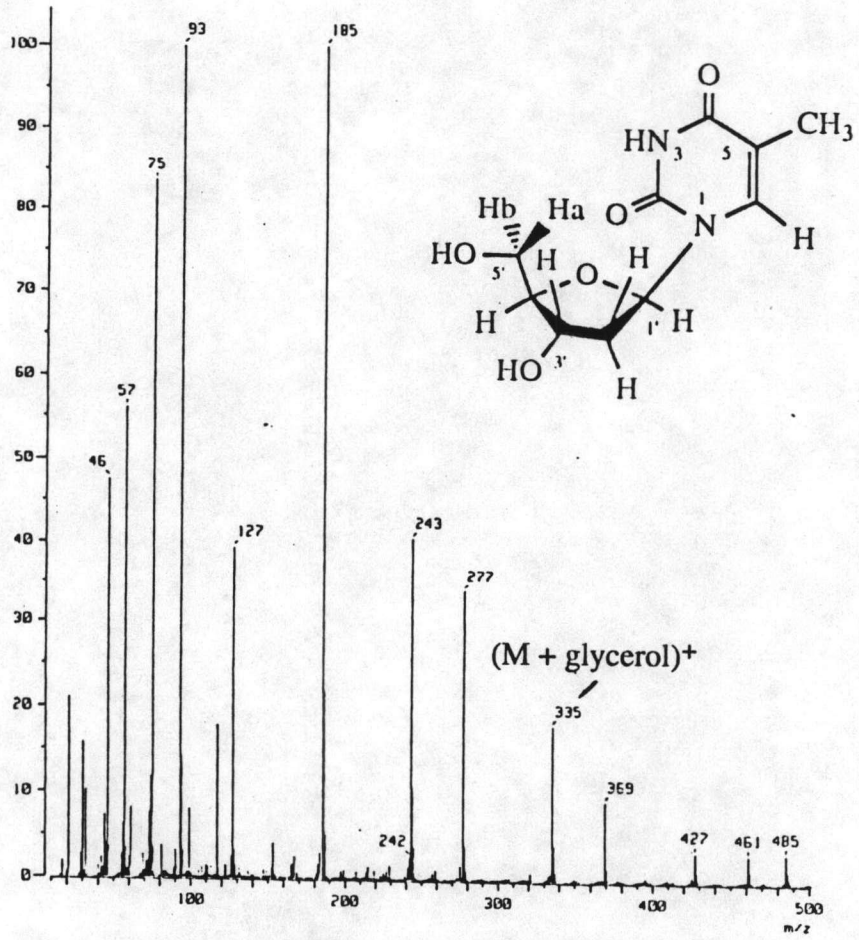



Figure 79. The fab mass spectrum of compound A-047 (glycerol matrix)

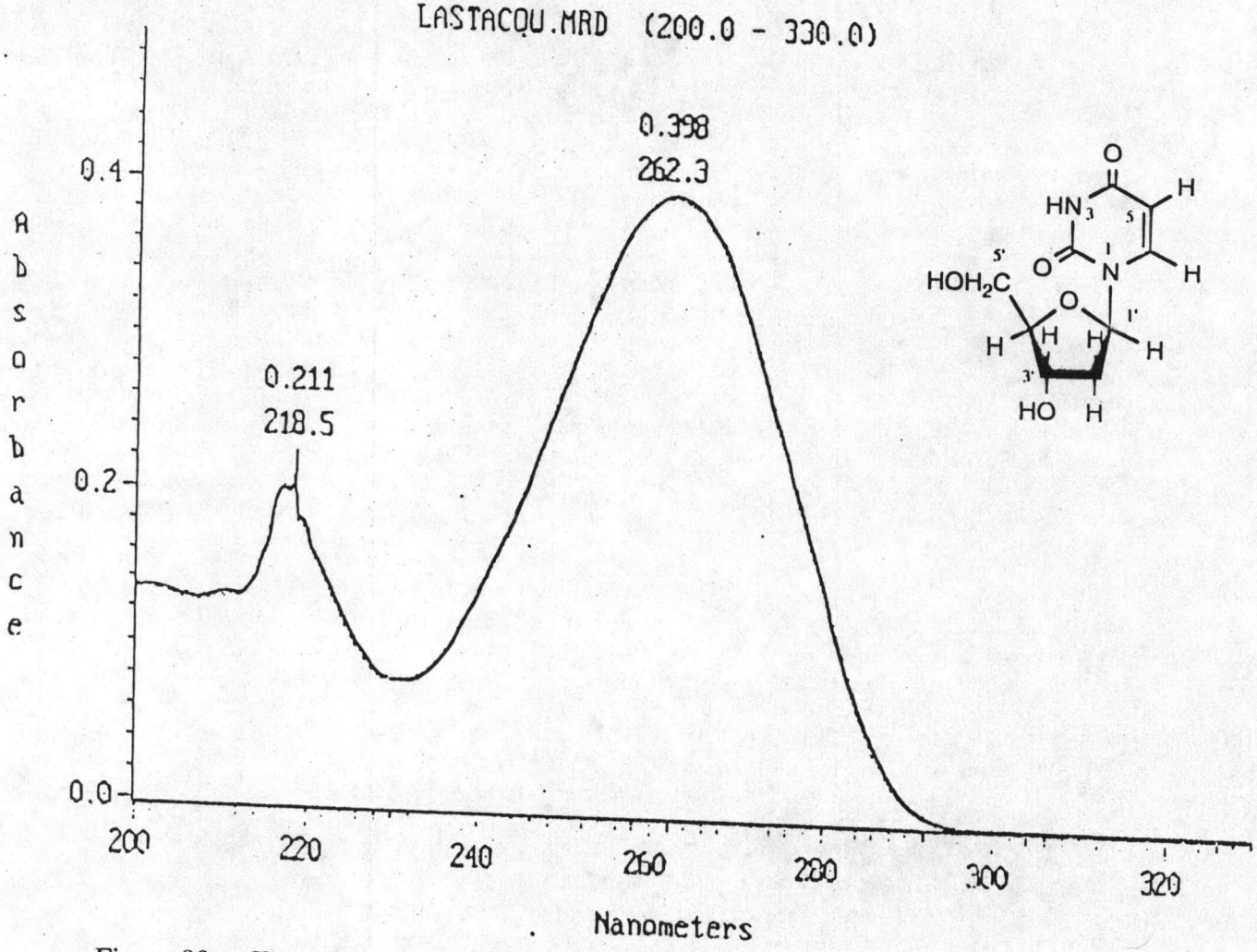



Figure 80. The uv spectrum of compound A-049 (in methanol)

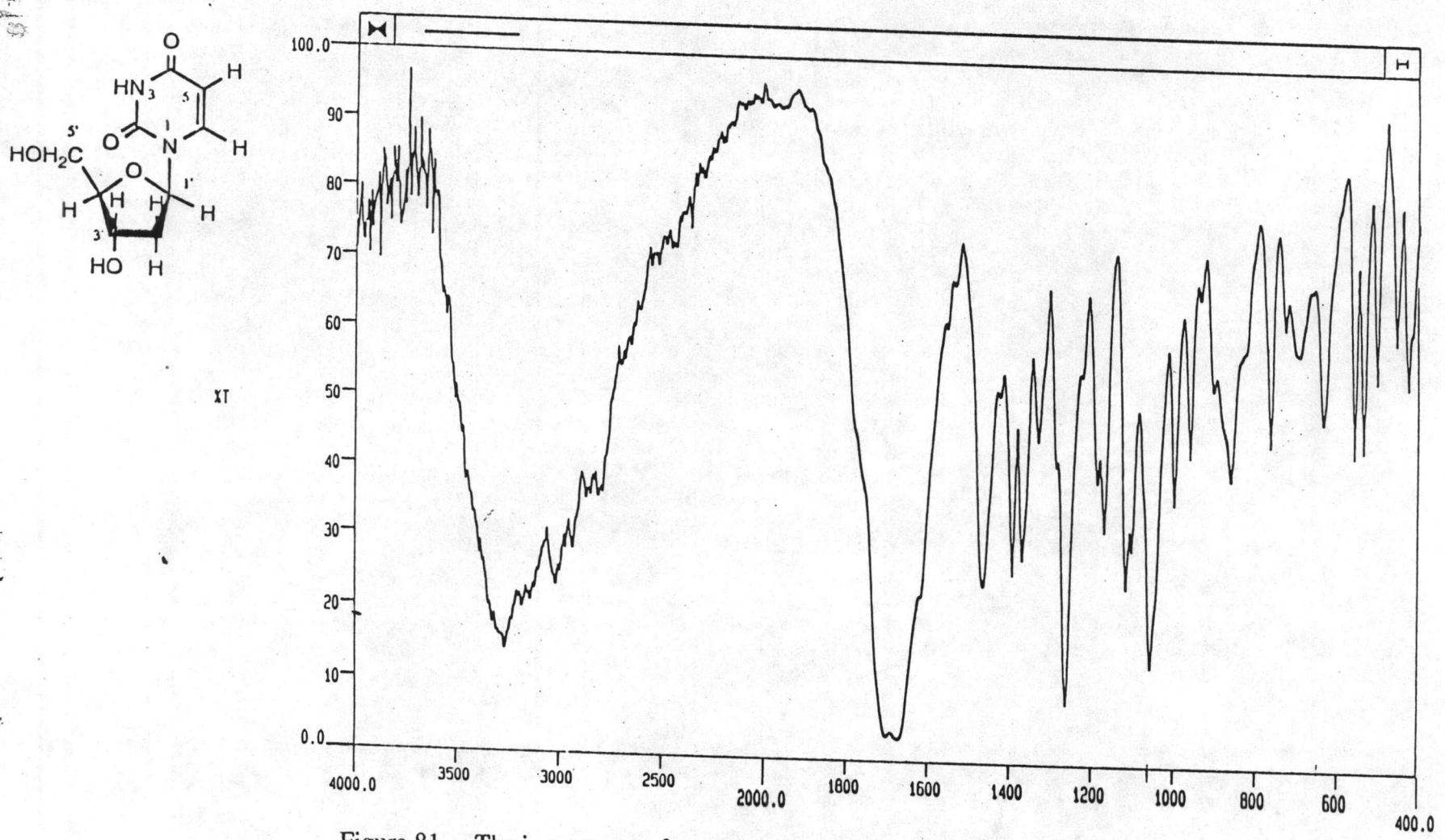



Figure 81. The ir spectrum of compound A-049 (KBr disc)

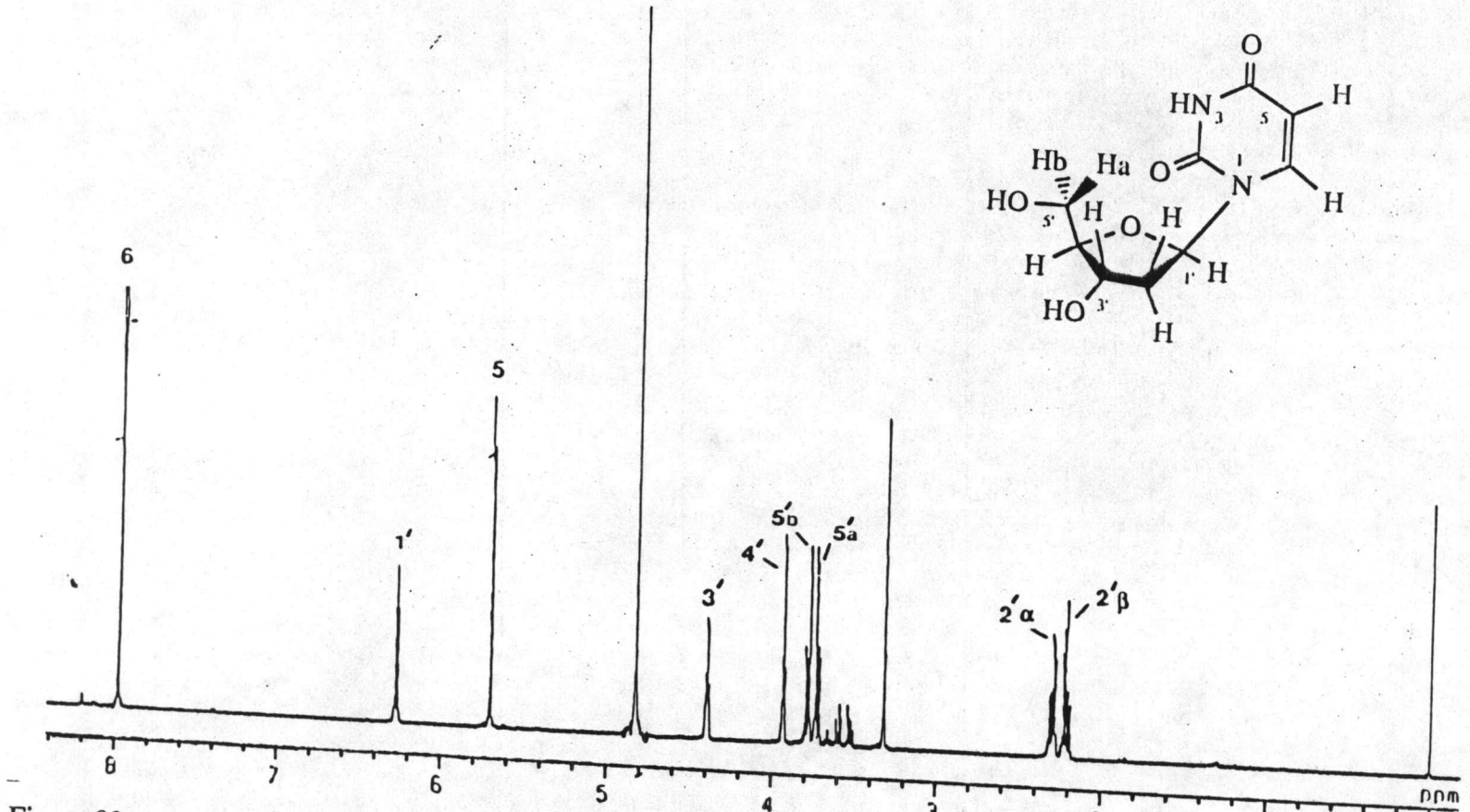



Figure 82. The 500 MHz $^1H$ nmr spectrum of compound A-049 (in $CD_3OD$)

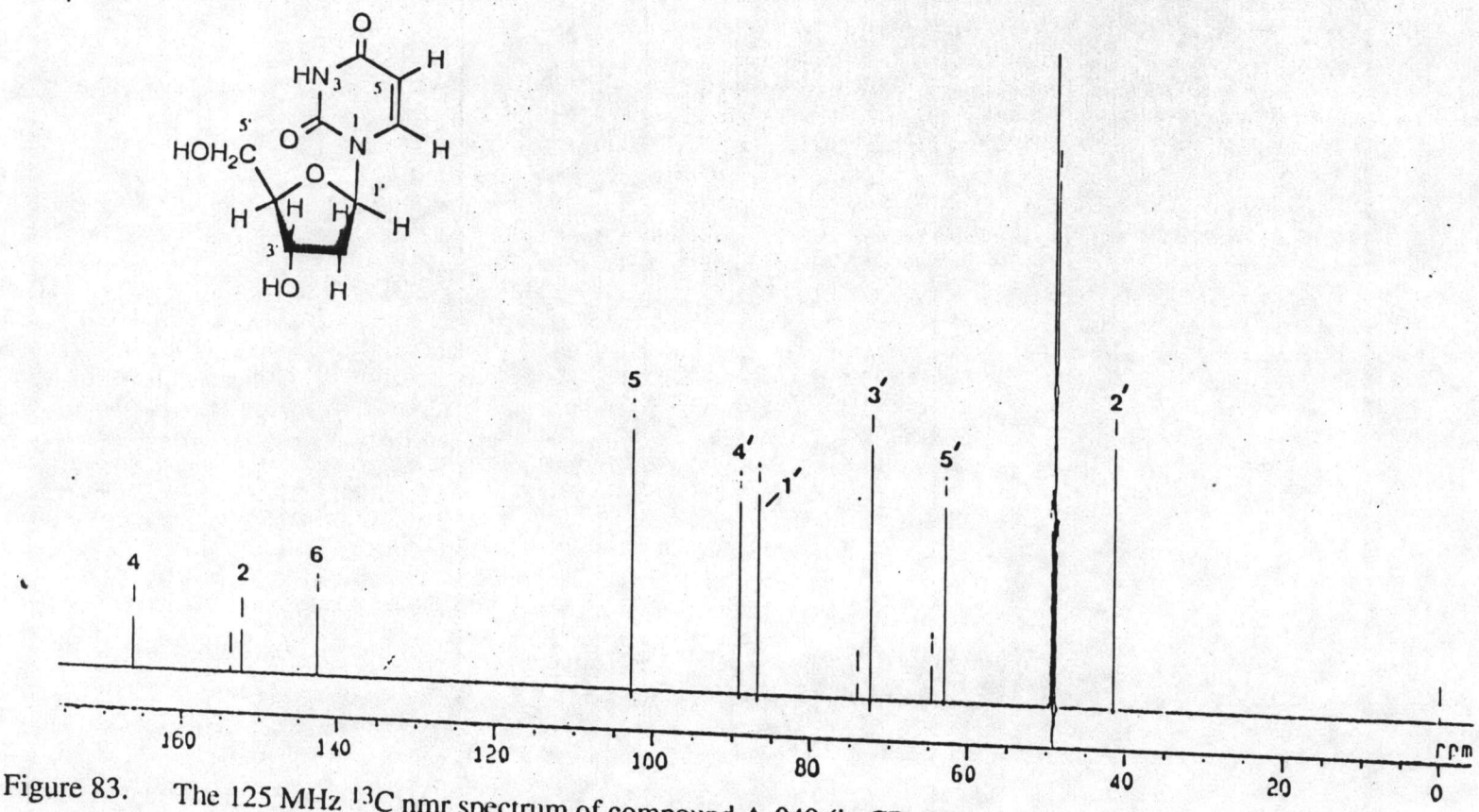
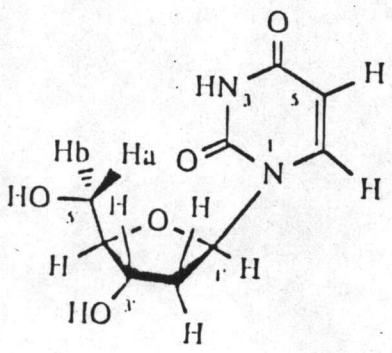



Figure 83. The 125 MHz $^{13}C$ nmr spectrum of compound A-049 (in $CD_3OD$)



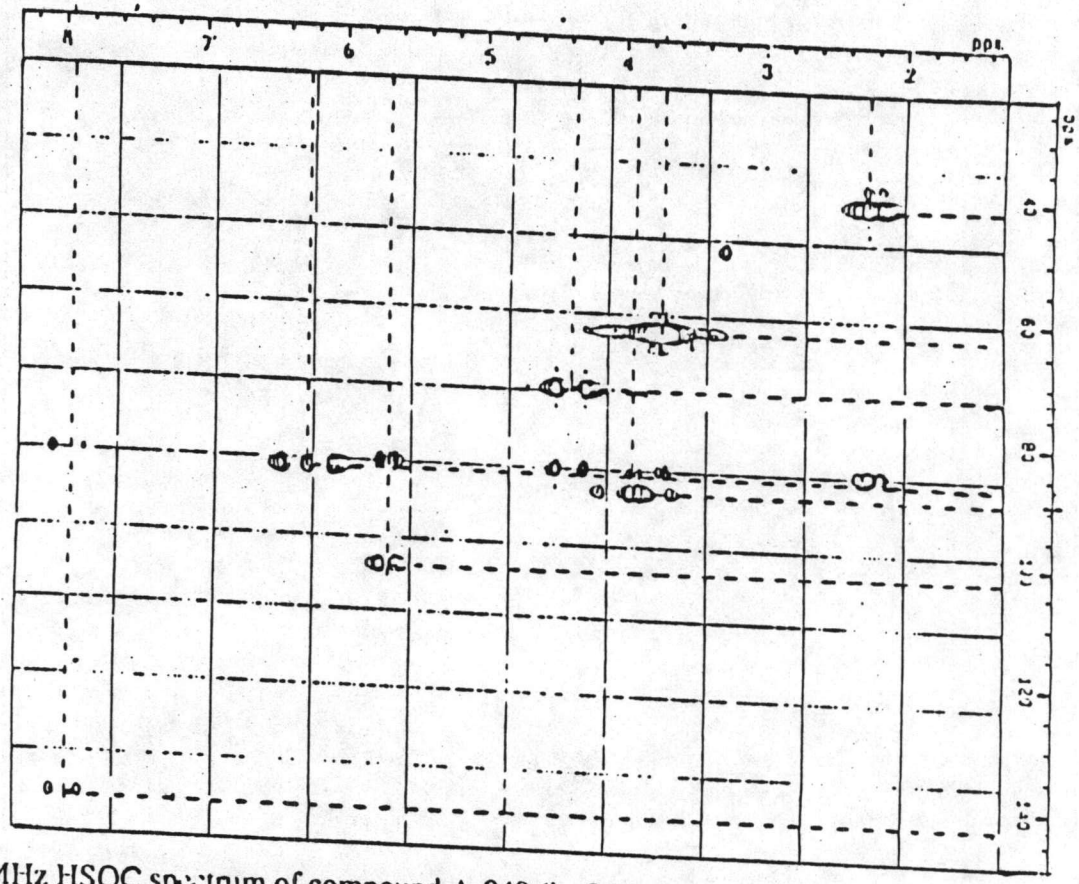




Figure 84. The 500 MHz HSQC spectrum of compound A-049 (in $CD_3OD$)

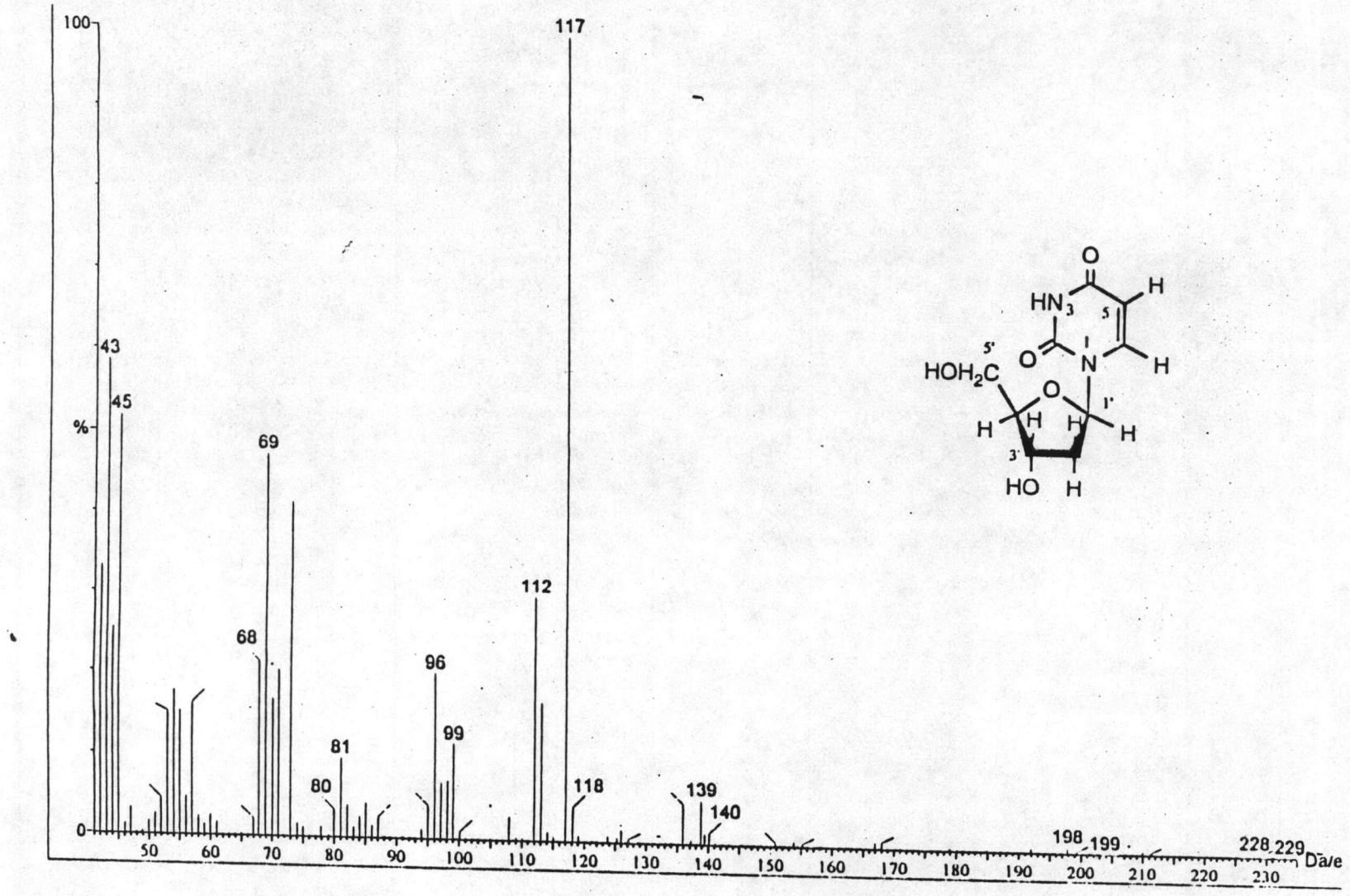



Figure 85. The eims spectrum of compound A-049

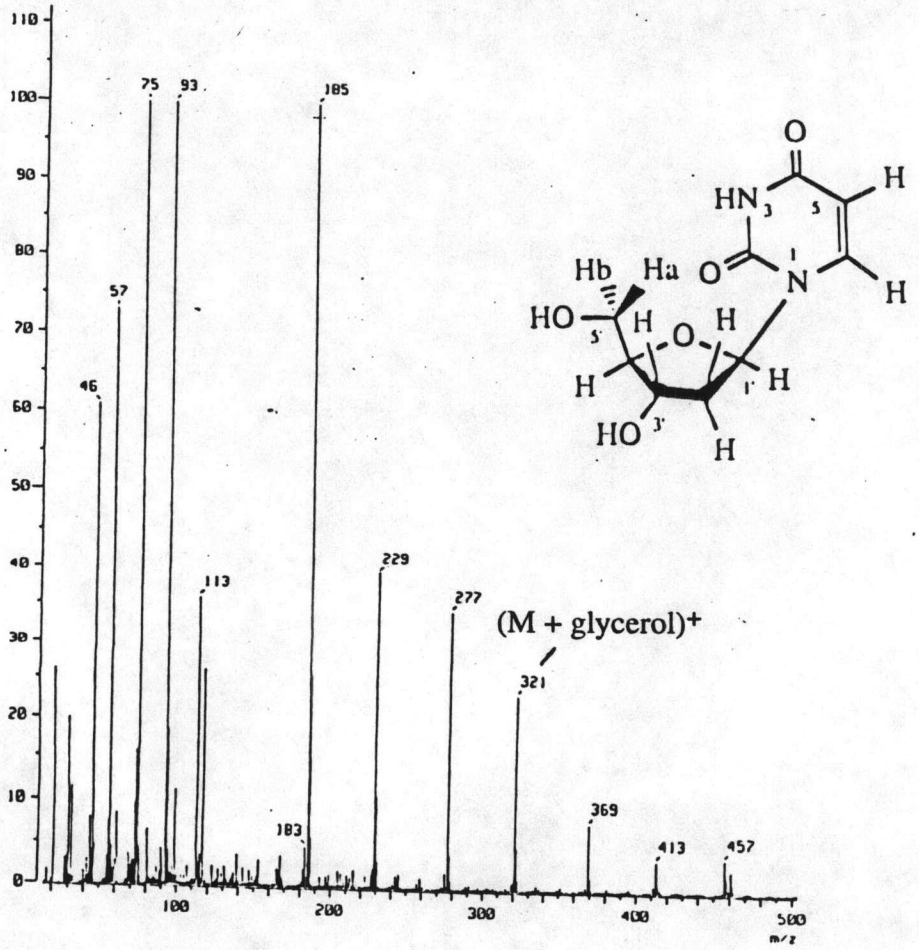



Figure 86. The fab mass spectrum of compound A-049 (glycerol matrix)

# VITA

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