

CHAPTER V

CONCLUSION

The phytochemical investigation of the roots of *Prismatomeris sessiliflora* Pierre ex Pitard and *Diospyros montana* Roxb. led to the isolation of six pure compounds. Two of them were isolated from the roots of *Prismatomeris sessiliflora* Pierre ex Pitard, and were identified as rubiadin (PS-A) and rubiadin-1-methyl ether (PS-B). Both are anthraquinones. The other four pure compounds were isolated from the roots of *Diospyros montana* Roxb. These compounds are the naphthoquinone diospyrin (DM-A), the triterpenoids lupeol (DM-C) and betulinic acid (DM-D) and the naphthalene derivative 5-hydroxy-4-methoxy-2-naphthaldehyde (DM-B). The unambiguous ^{13}C NMR assignments of 5-hydroxy-4-methoxy-2-naphthaldehyde (DM-B) were obtained for the first time in this study. The ^1H NMR assignments of rubiadin and the ^1H and ^{13}C NMR assignments of diospyrin were revised. The findings in this study should provide additional information on the chemistry of plants in the genera *Prismatomeris* and *Diospyros*.

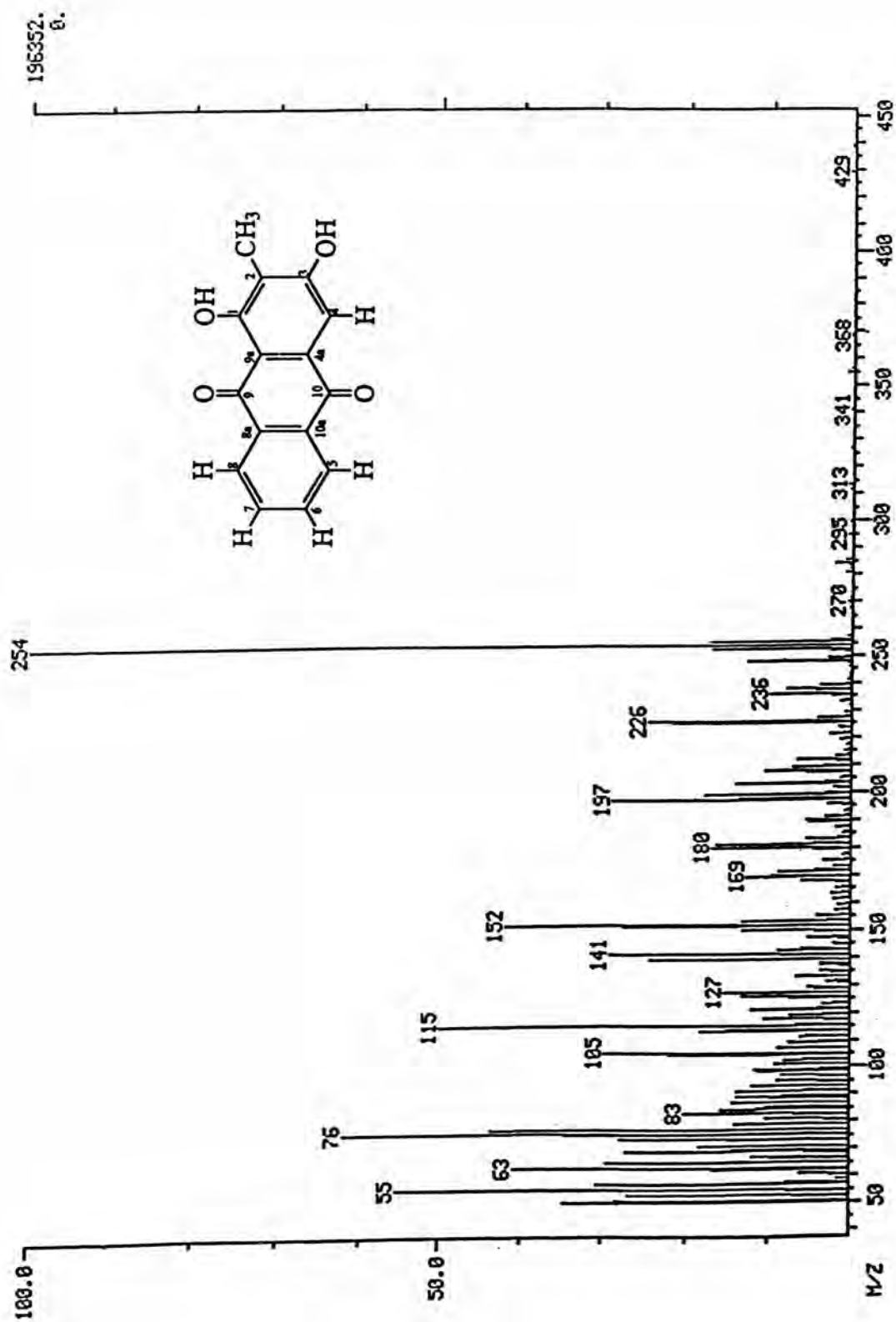


Figure 3 EI mass spectrum of compound PS-A

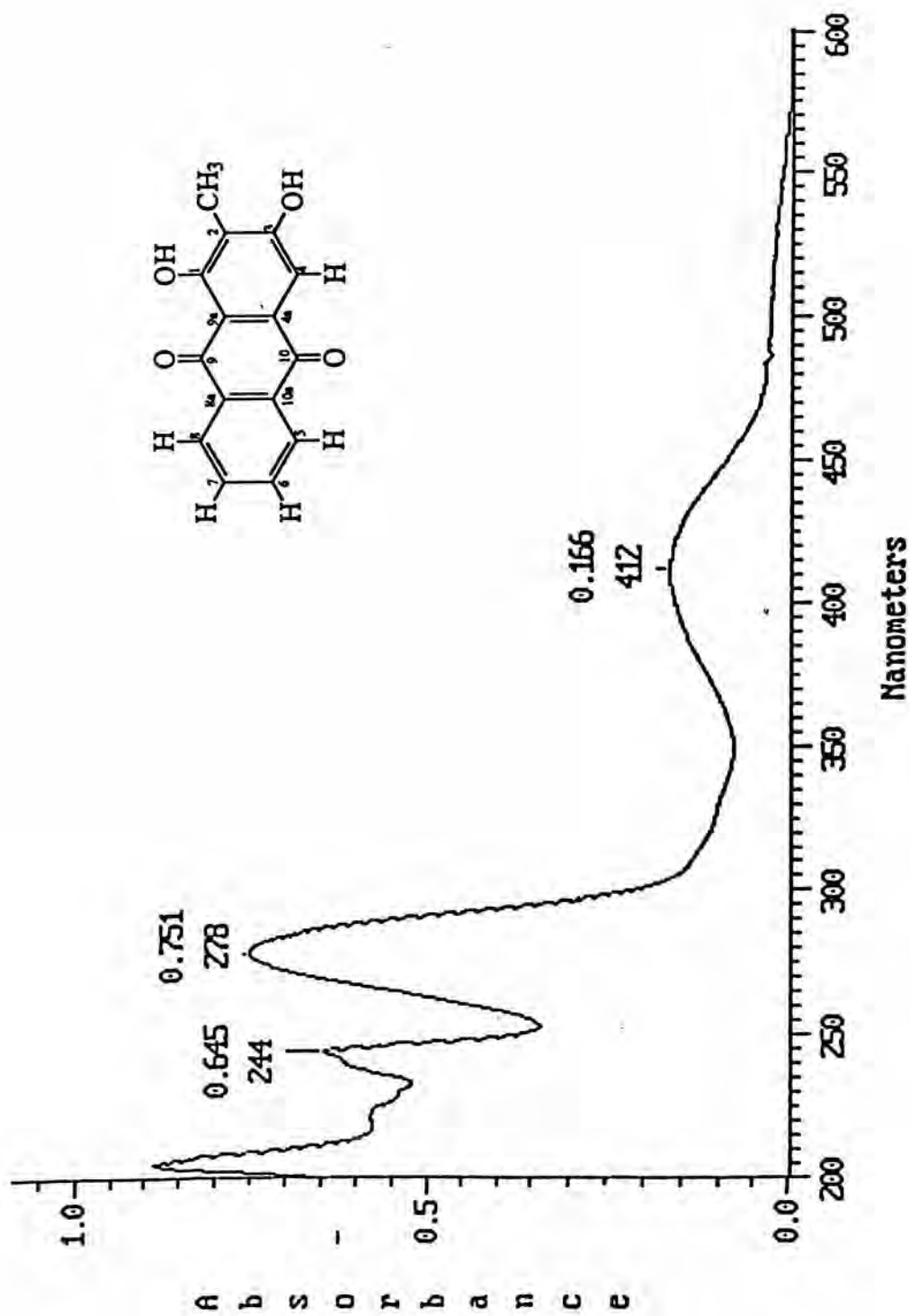


Figure 4 UV spectrum of compound PS-A (in methanol)

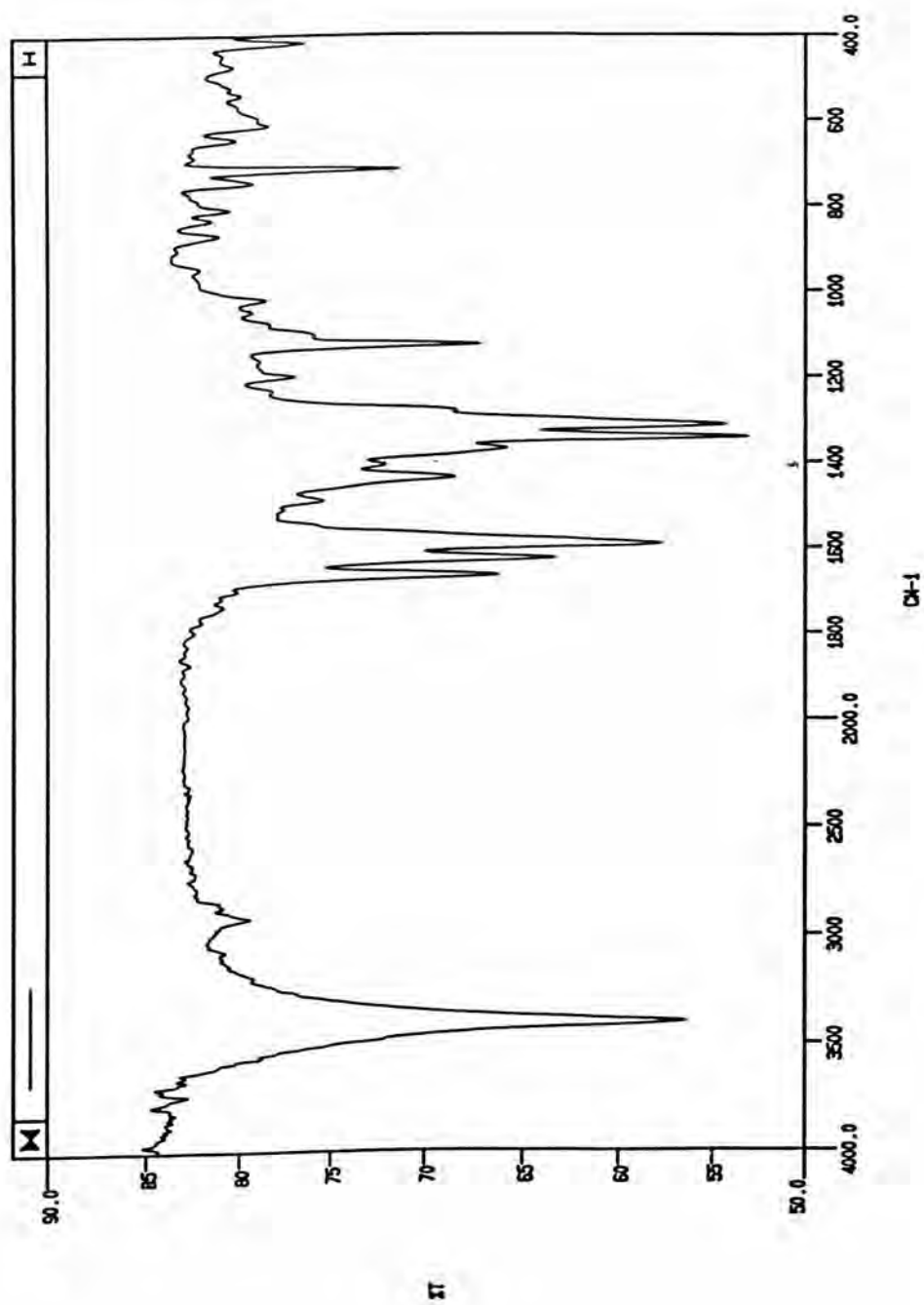


Figure 5 IR spectrum of compound PS-A (KBr disc)

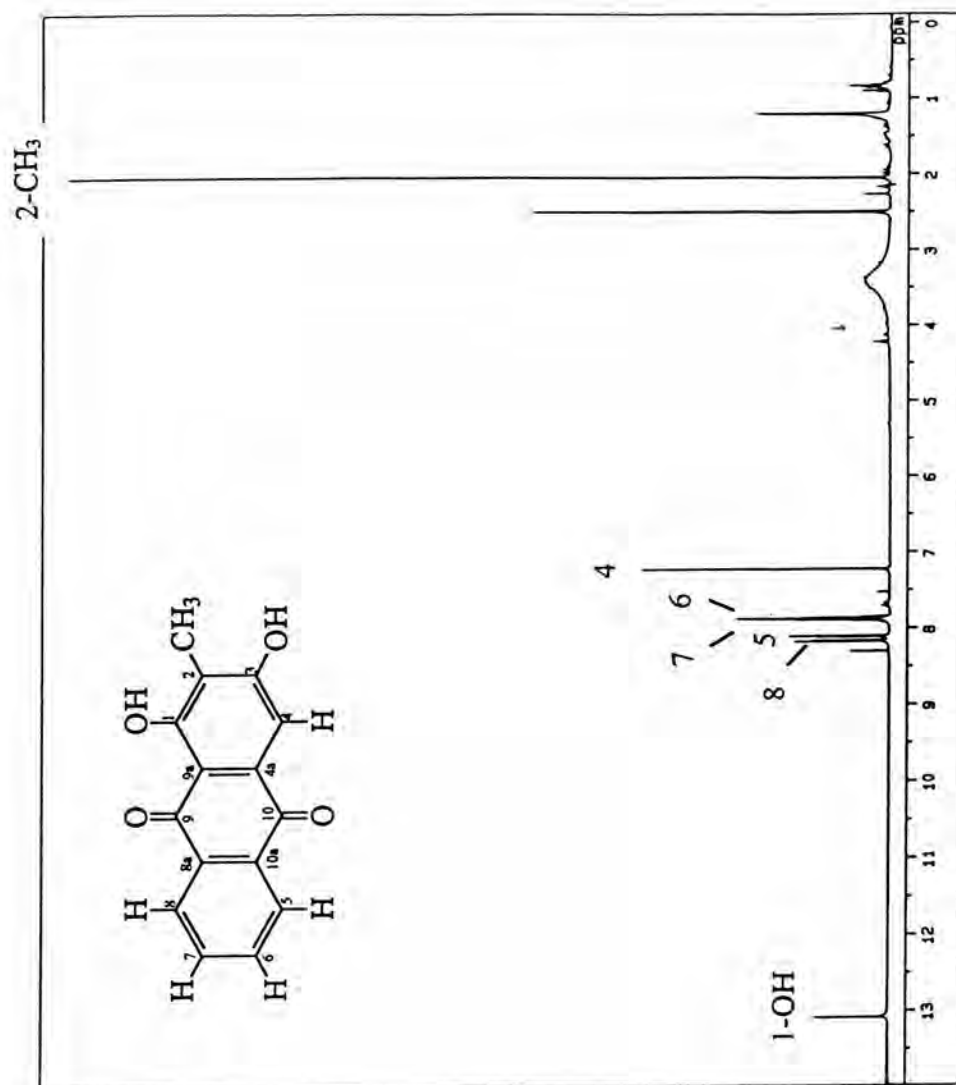


Figure 6a 500 MHz ^1H NMR spectrum of compound PS-A (in $\text{DMSO}-d_6$)

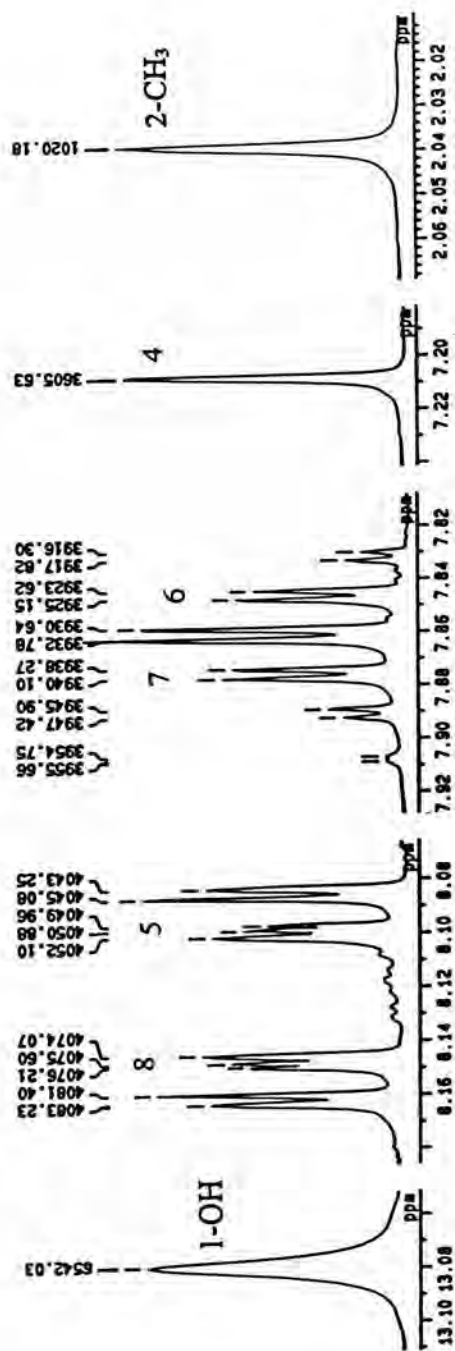
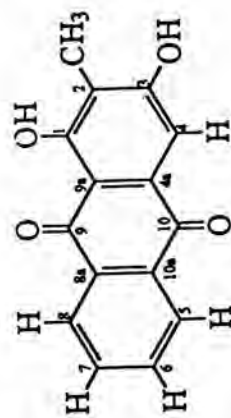
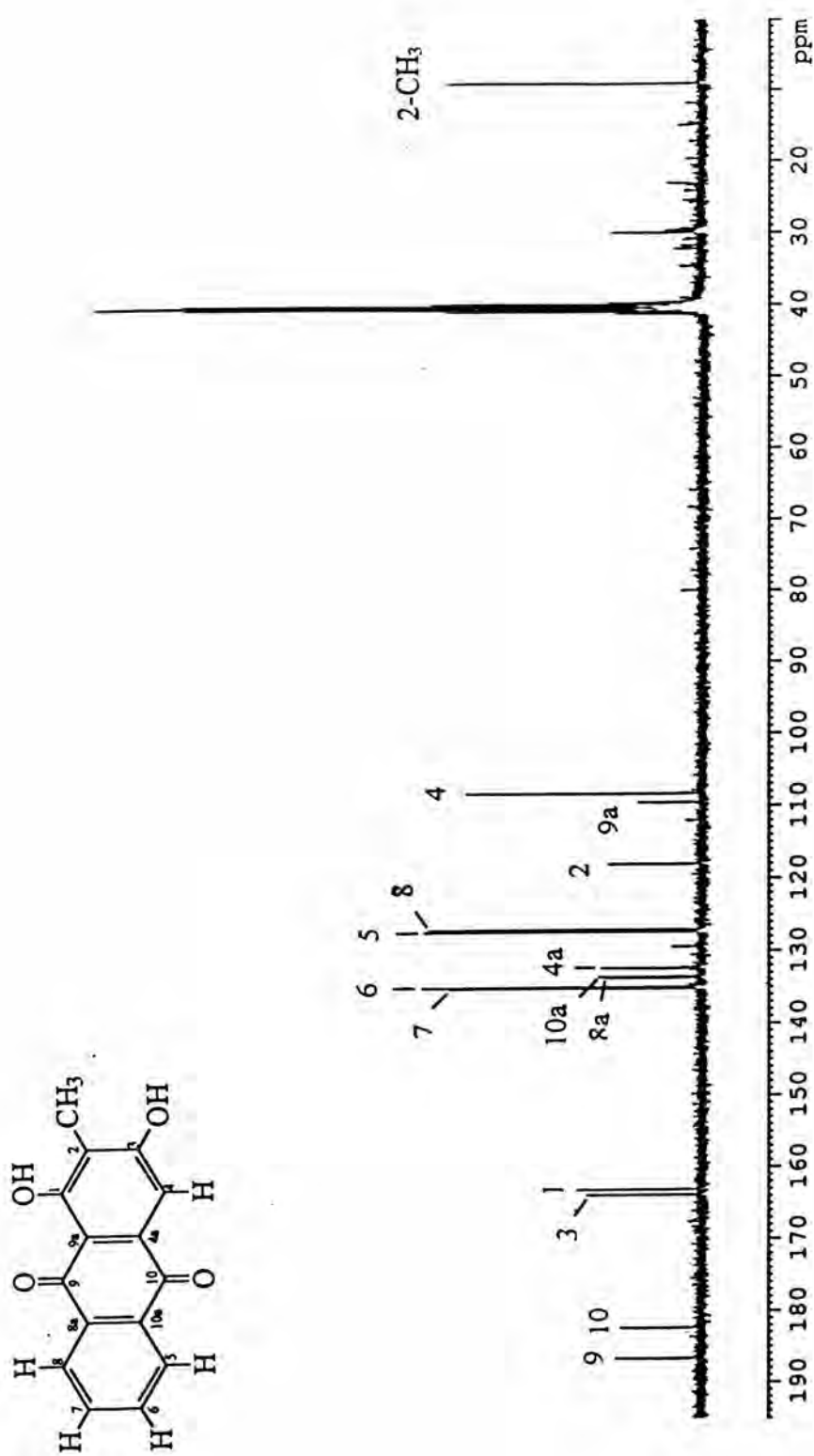


Figure 6b 500 MHz ¹H NMR spectrum of compound PS-A (in DMSO-*d*₆) (expanded from 2.02 to 13.10 ppm)

Figure 7a 75 MHz ^{13}C NMR spectrum of compound PS-A (in DMSO- d_6)

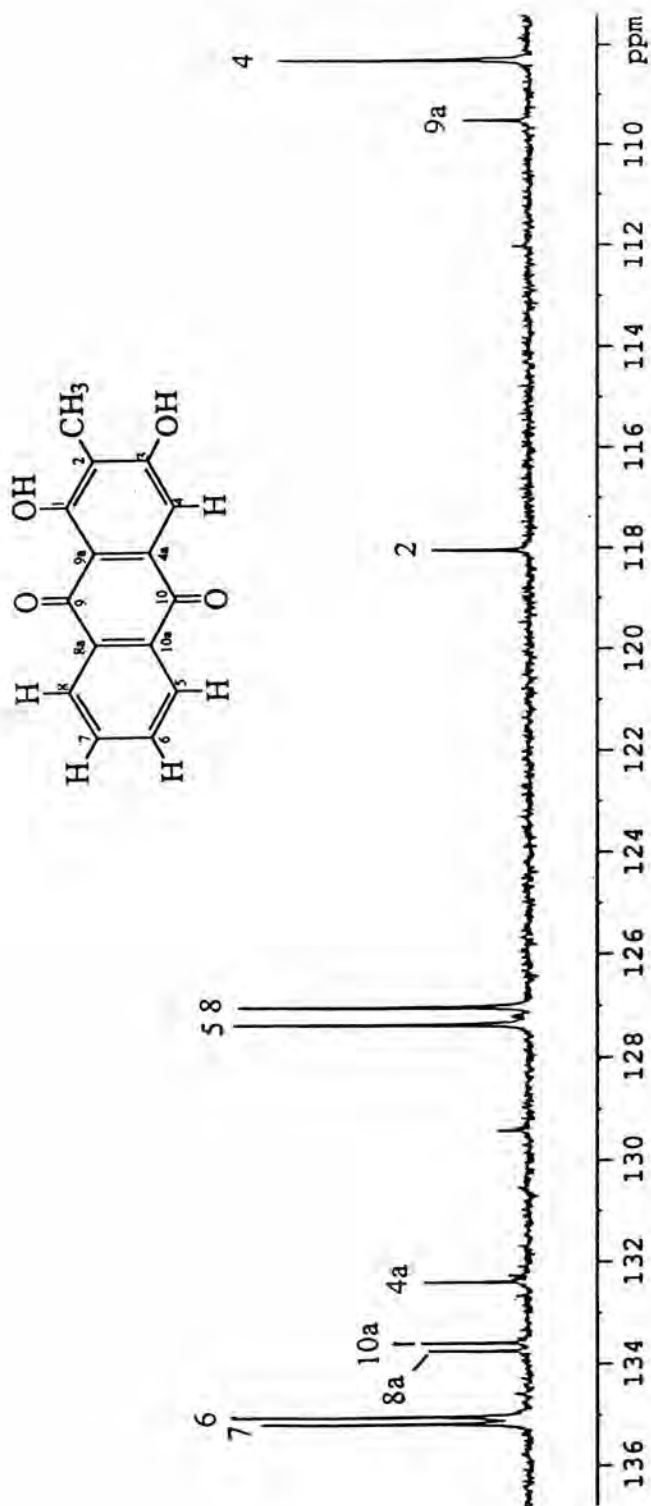


Figure 7b 75 MHz ^{13}C NMR spectrum of compound PS-A (in $\text{DMSO-}d_6$)

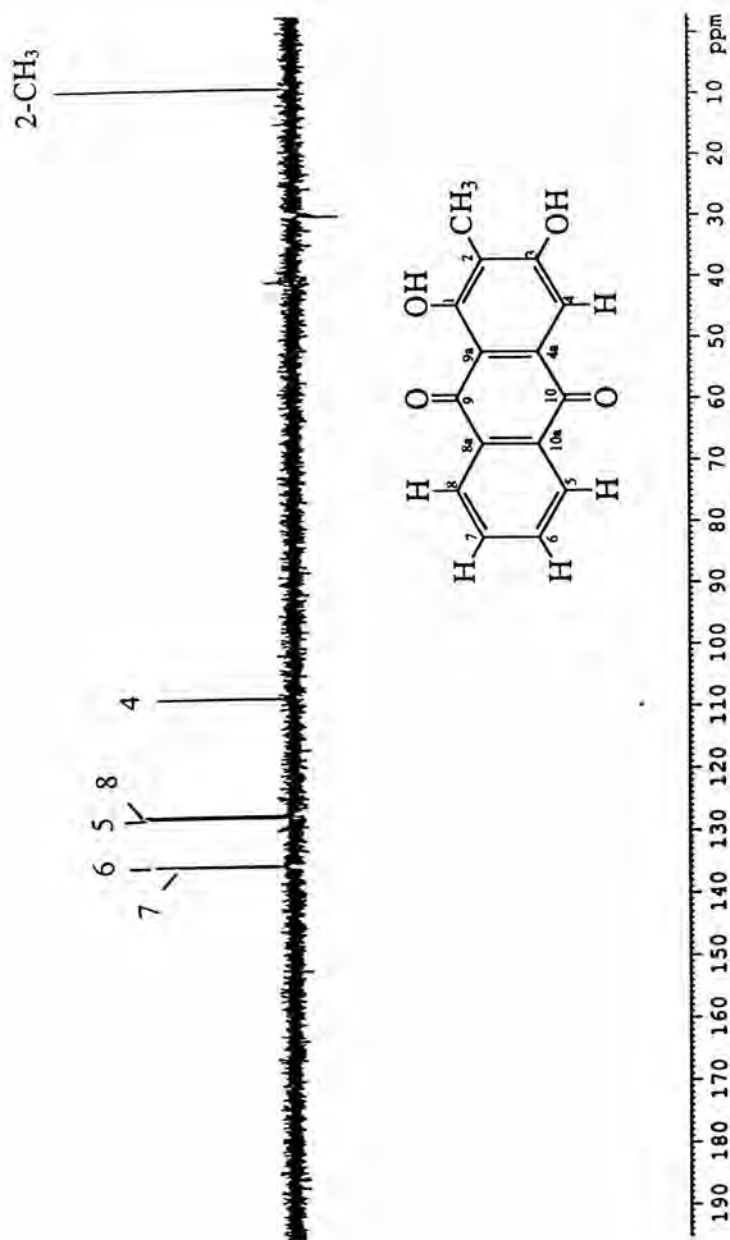


Figure 8a DEPT 135 spectrum of compound PS-A (in DMSO- d_6)

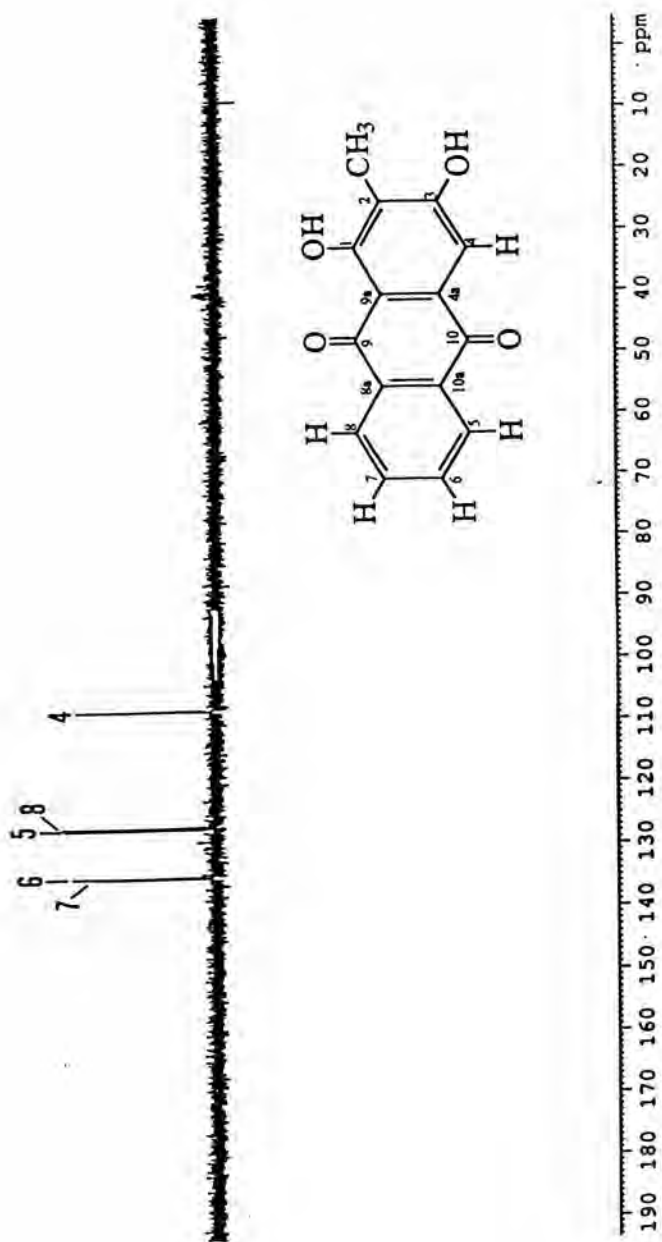
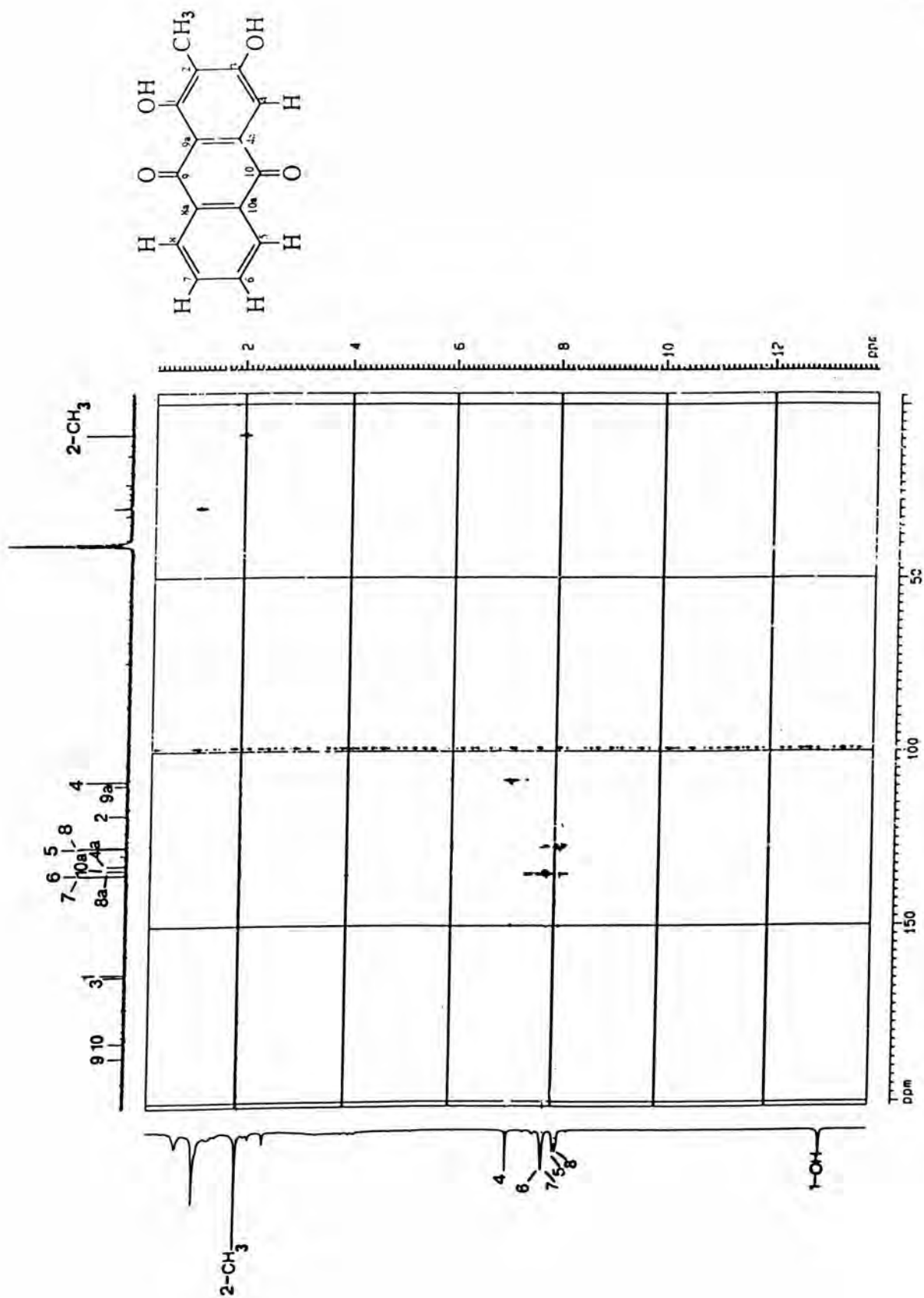


Figure 8b DEPT 90 spectrum of compound PS-A (in DMSO-*d*₆)

Figure 9a HETCOR spectrum of compound PS-A (in DMSO- d_6)

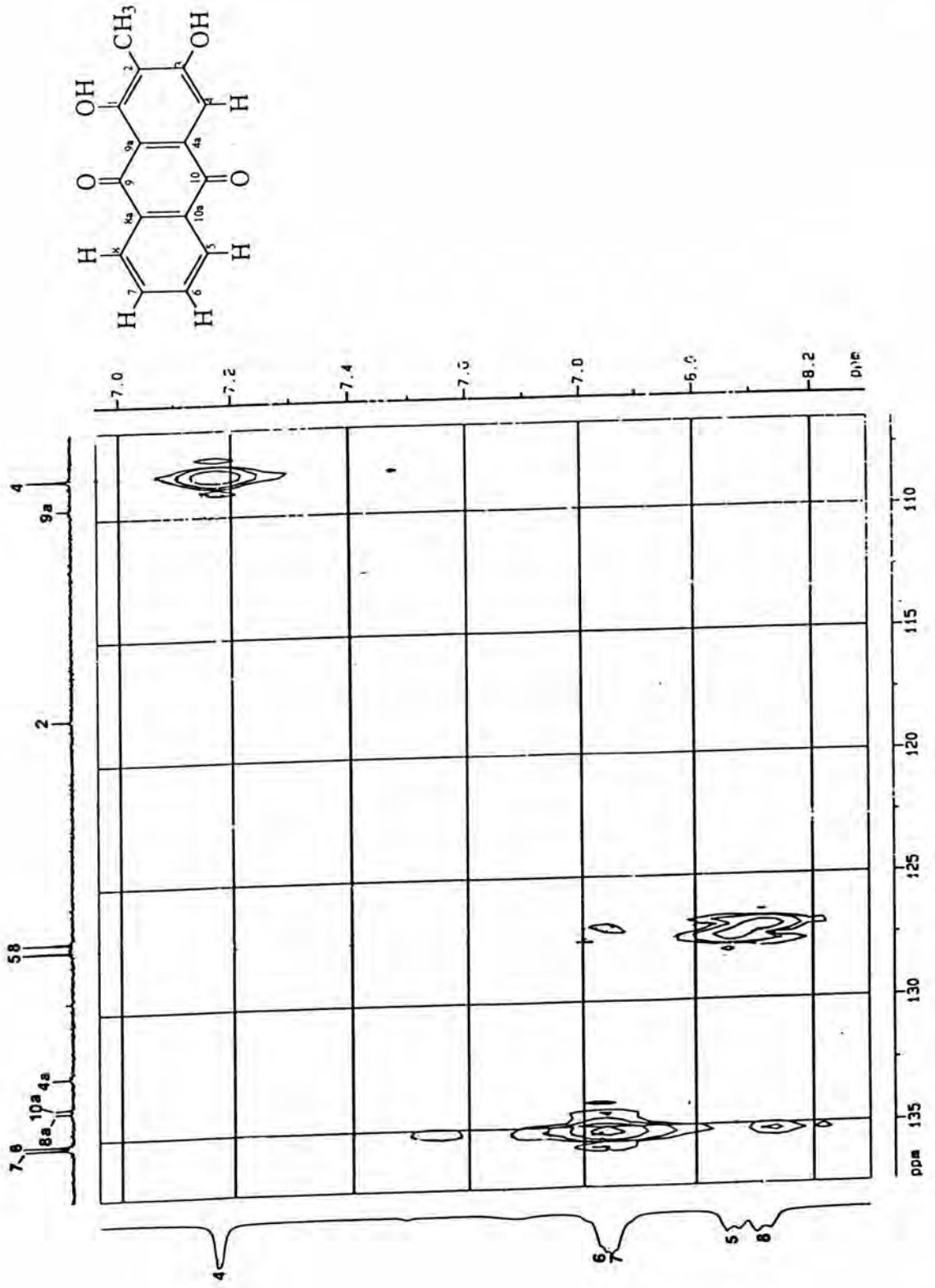


Figure 9b HETCOR spectrum of compound PS-A (in DMSO-*d*₆) [δ_{H} 7.0-8.2 ppm, δ_{C} 107.5-137.5 ppm]

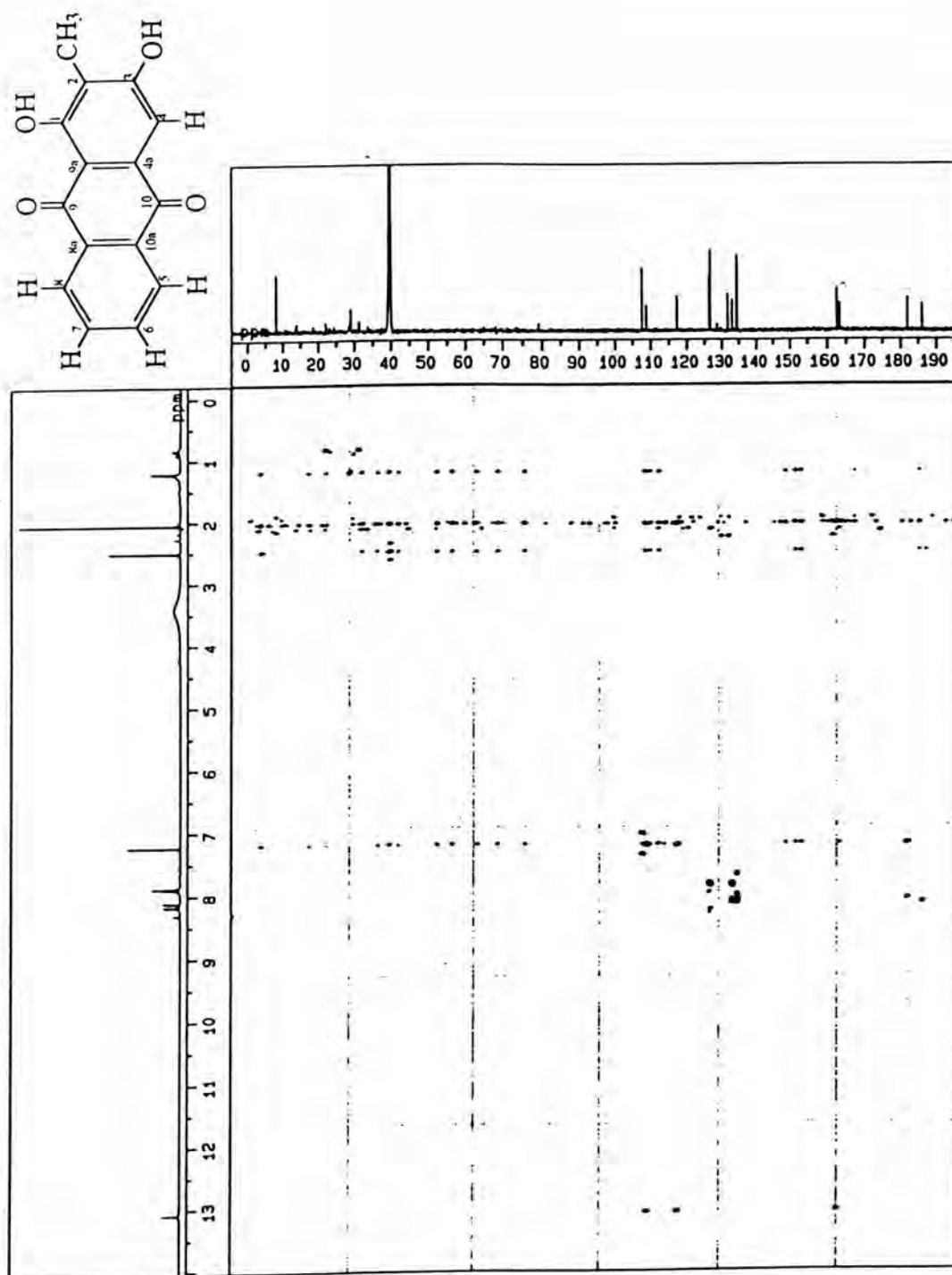


Figure 10a HMBC spectrum of compound PS-A (in $\text{DMSO-}d_6$) [δ_{H} 0.00-14.00 ppm, δ_{C} 0-195 ppm]

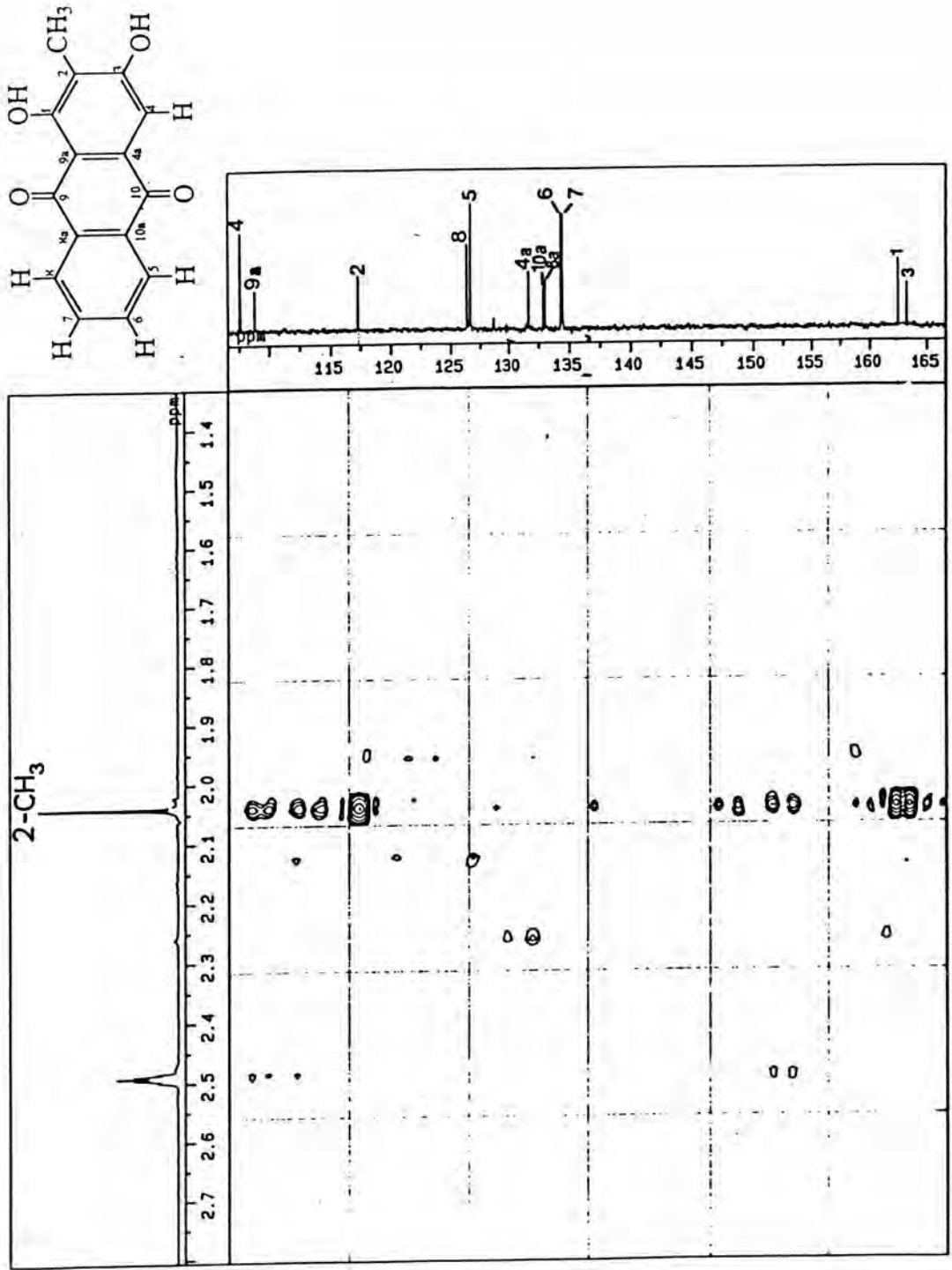


Figure 10b HMBC spectrum of compound PS-A (in $\text{DMSO-}d_6$) [δ_{H} 1.40-2.80 ppm, δ_{C} 107.5-165 ppm]

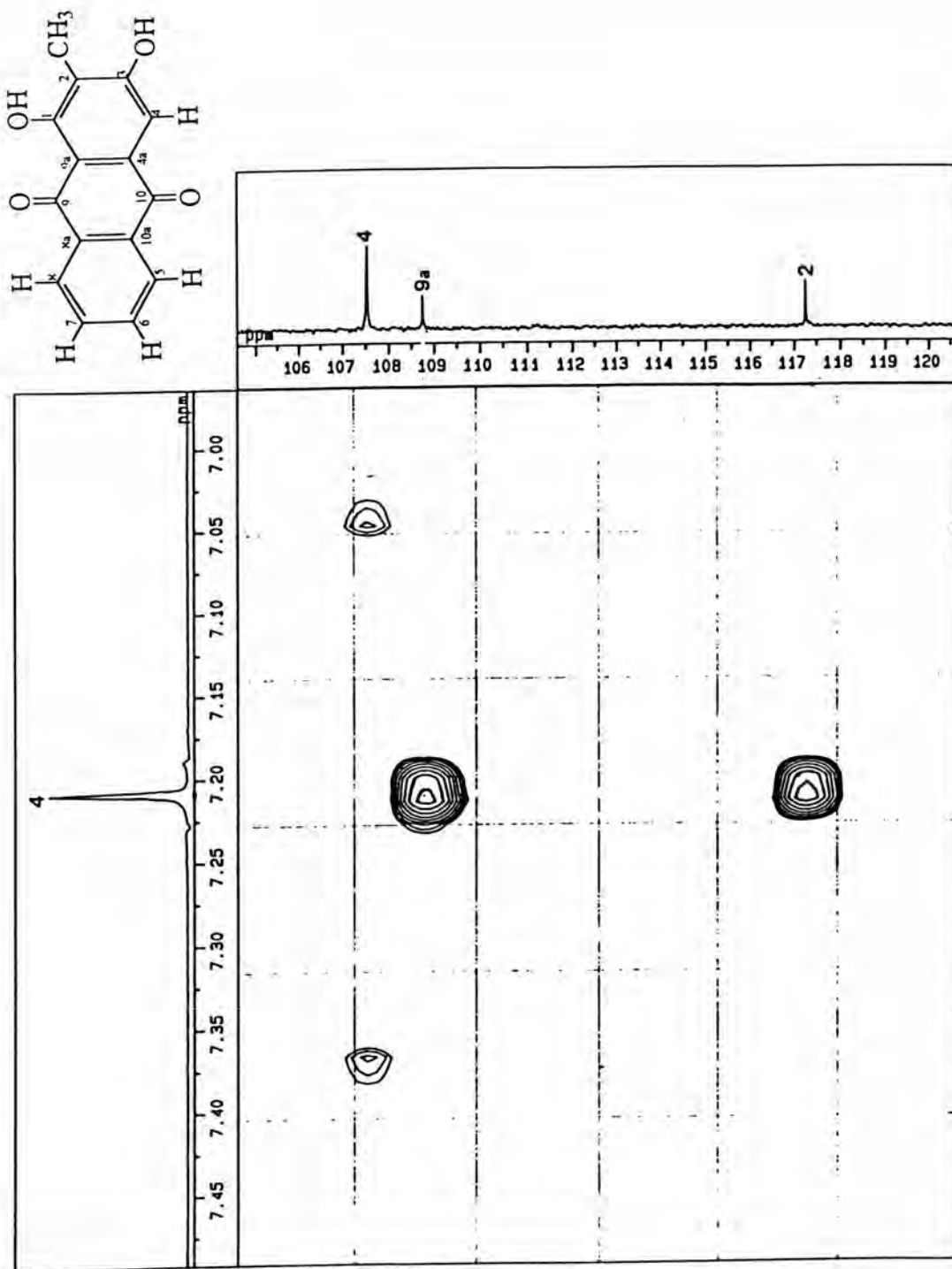


Figure 10c HMBC spectrum of compound PS-A (in DMSO-*d*₆) [δ_{H} 7.00–7.45 ppm, δ_{C} 106–120 ppm]

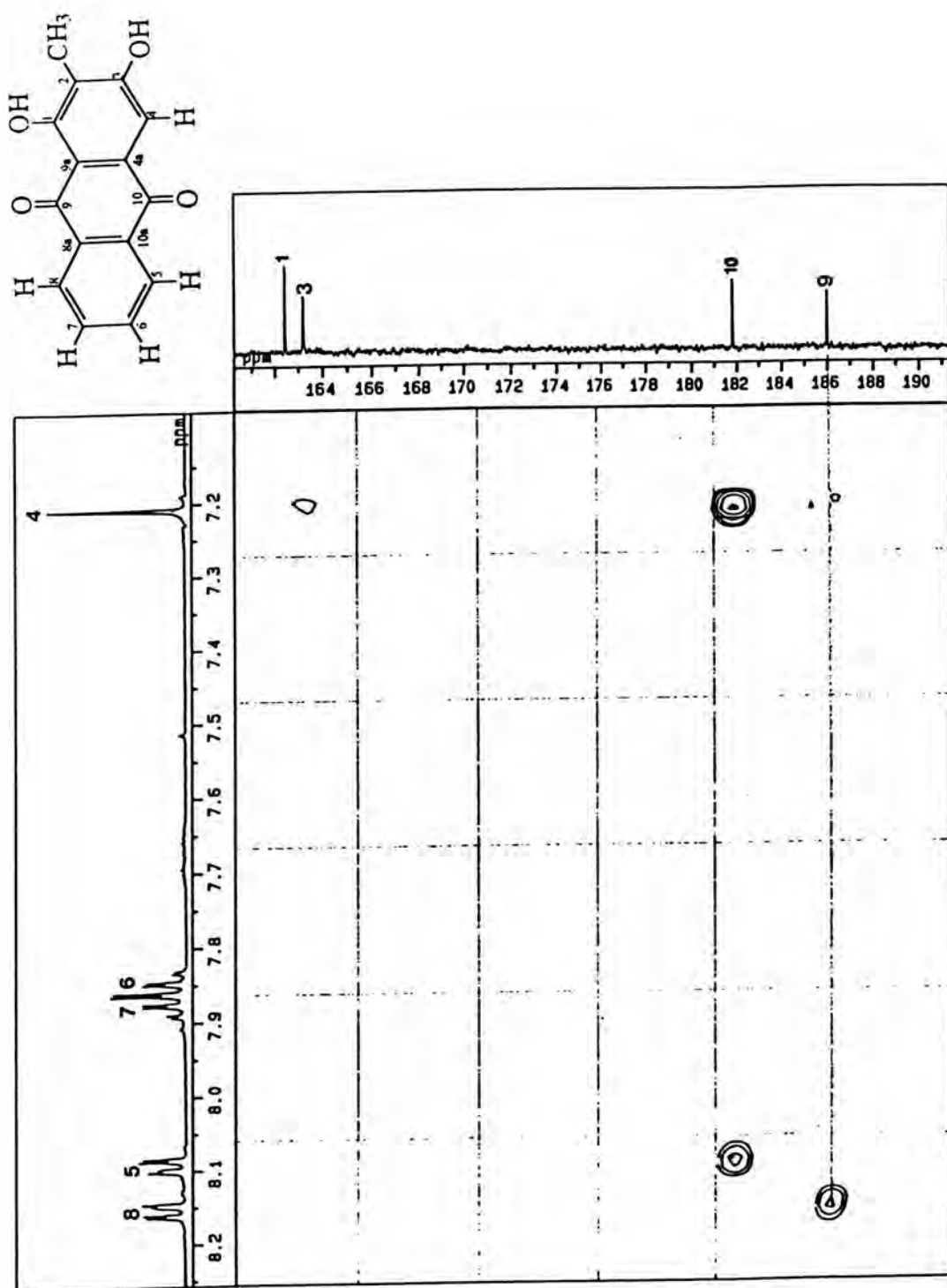


Figure 10d HMBC spectrum of compound PS-A (in DMSO-*d*₆) [δ_{H} 7.15-8.25 ppm, δ_{C} 161-191 ppm]

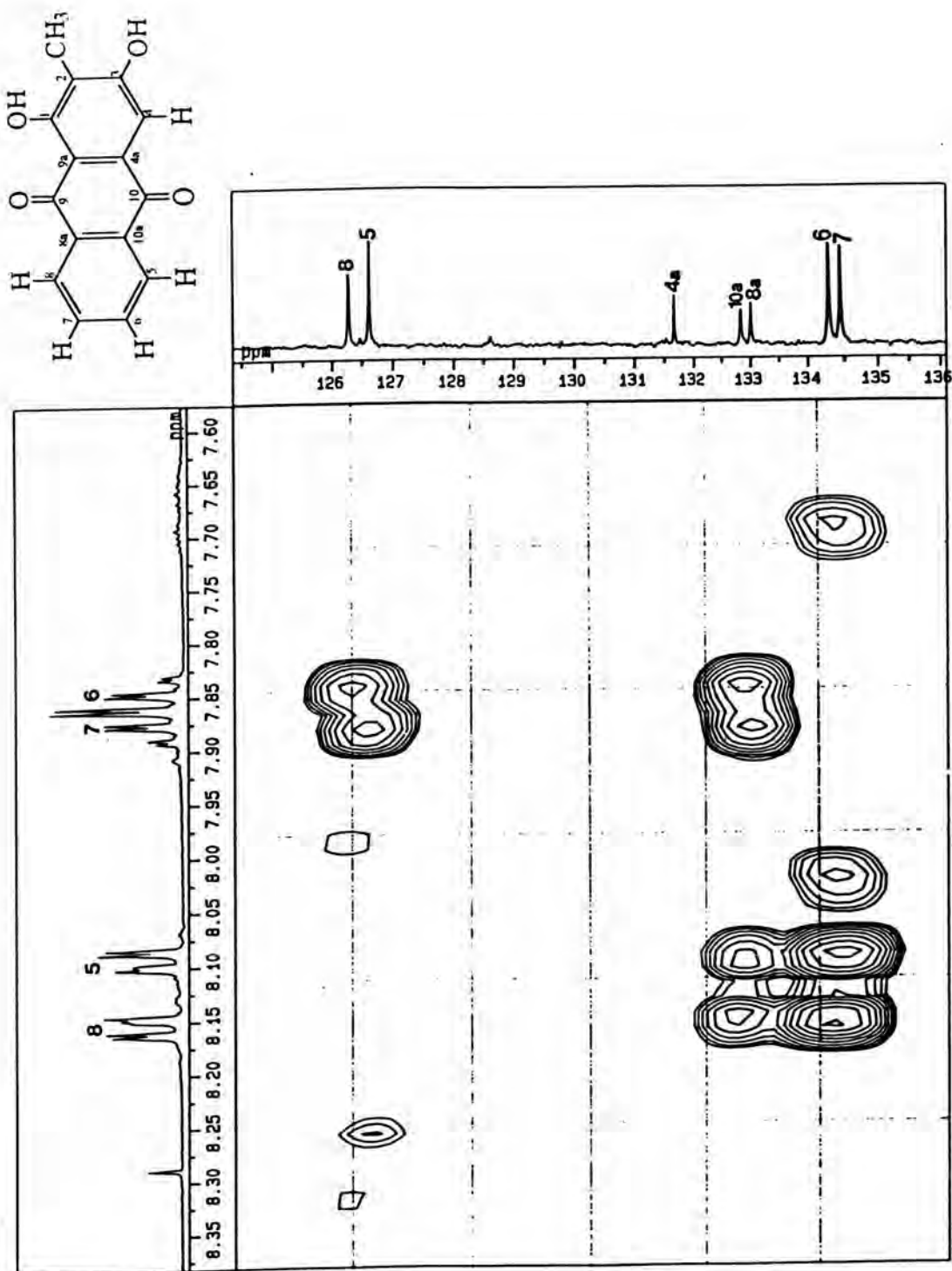


Figure 10e HMBC spectrum of compound PS-A (in DMSO- d_6) [δ_{H} 7.60-8.35 ppm, δ_{C} 125-136 ppm]

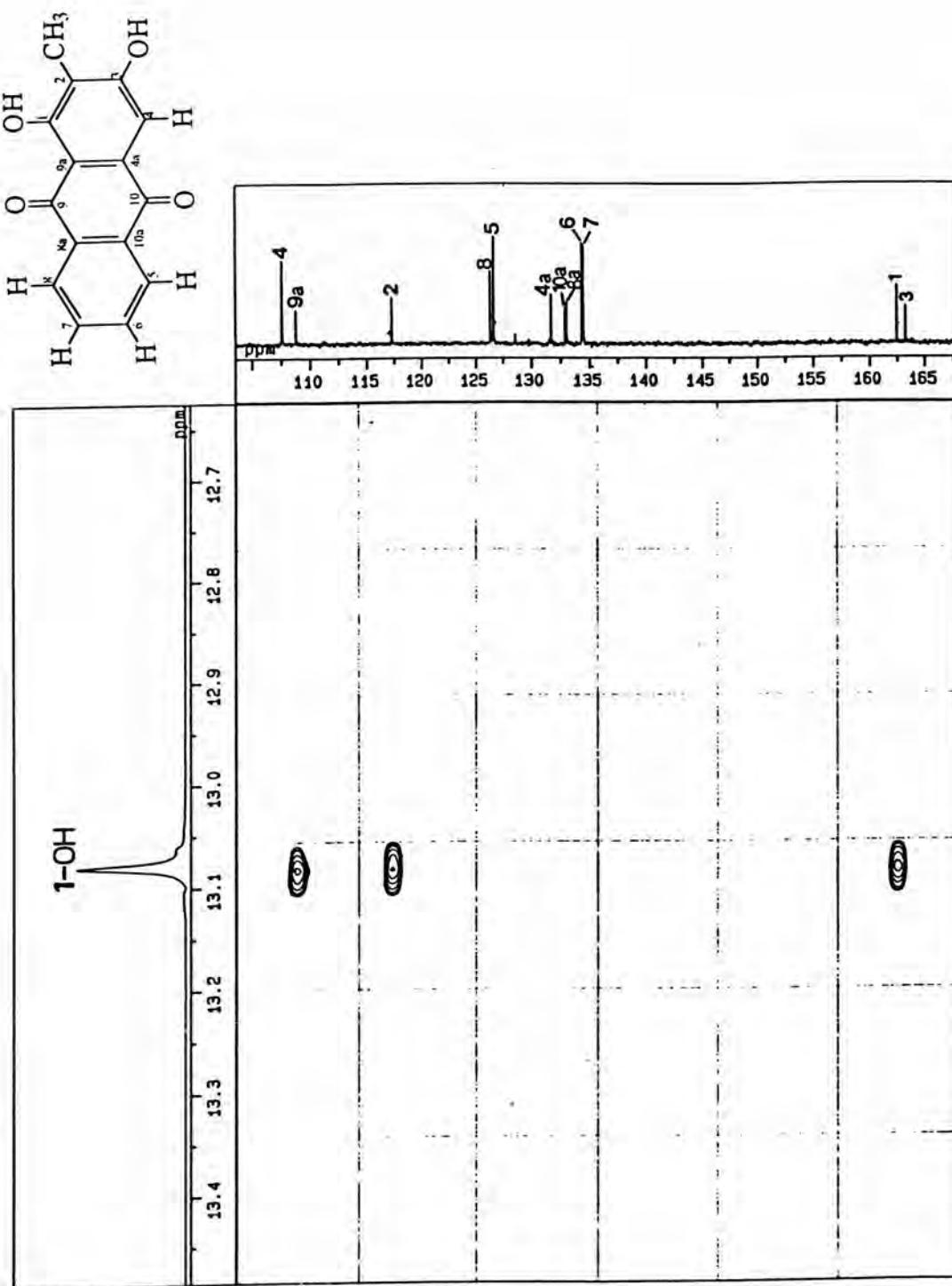


Figure 10f HMBC spectrum of compound PS-A (in $\text{DMSO}-d_6$) [δ_{H} 12.70-13.40 ppm, δ_{C} 105-165 ppm]

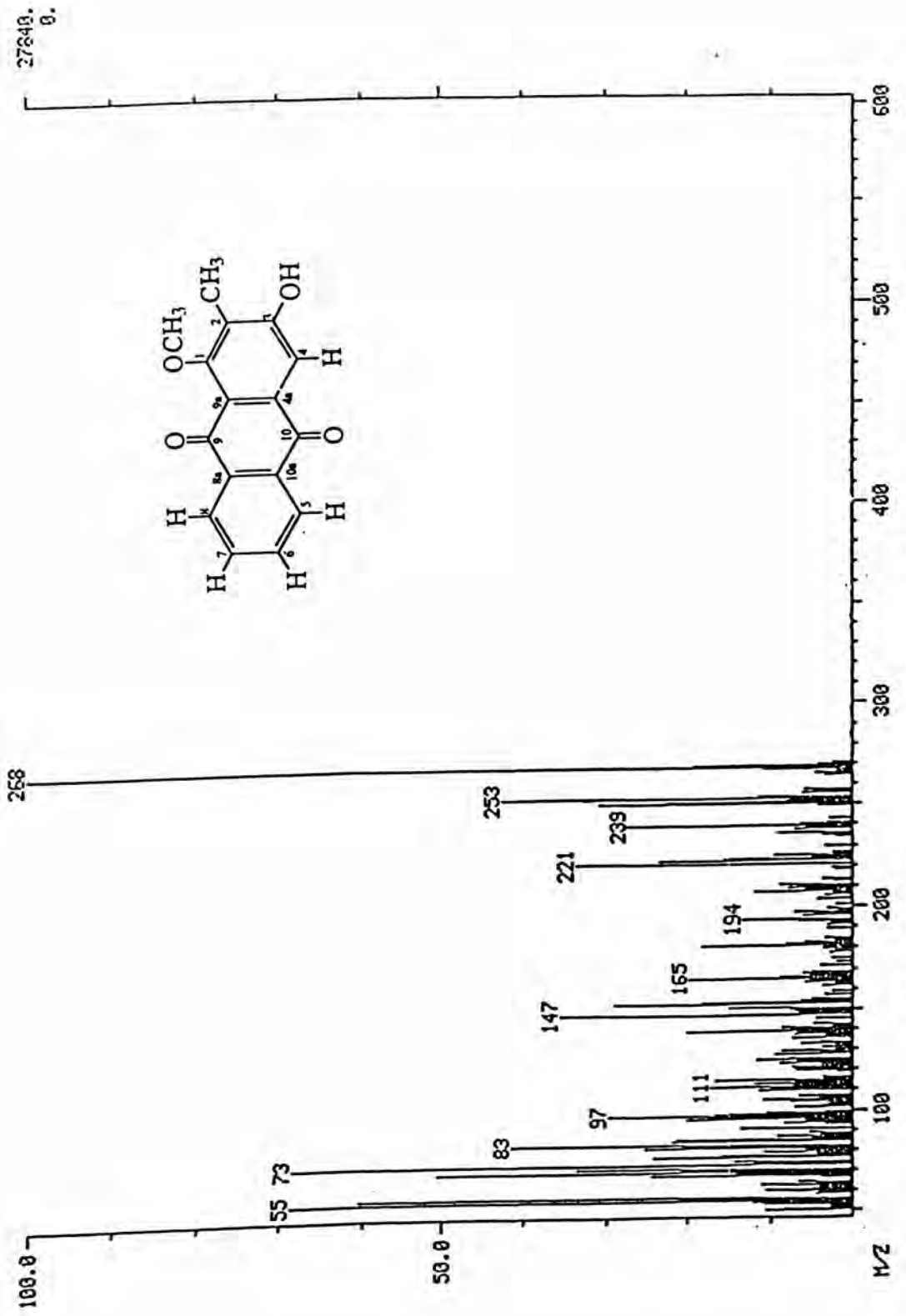


Figure 12 EI mass spectrum of compound PS-B

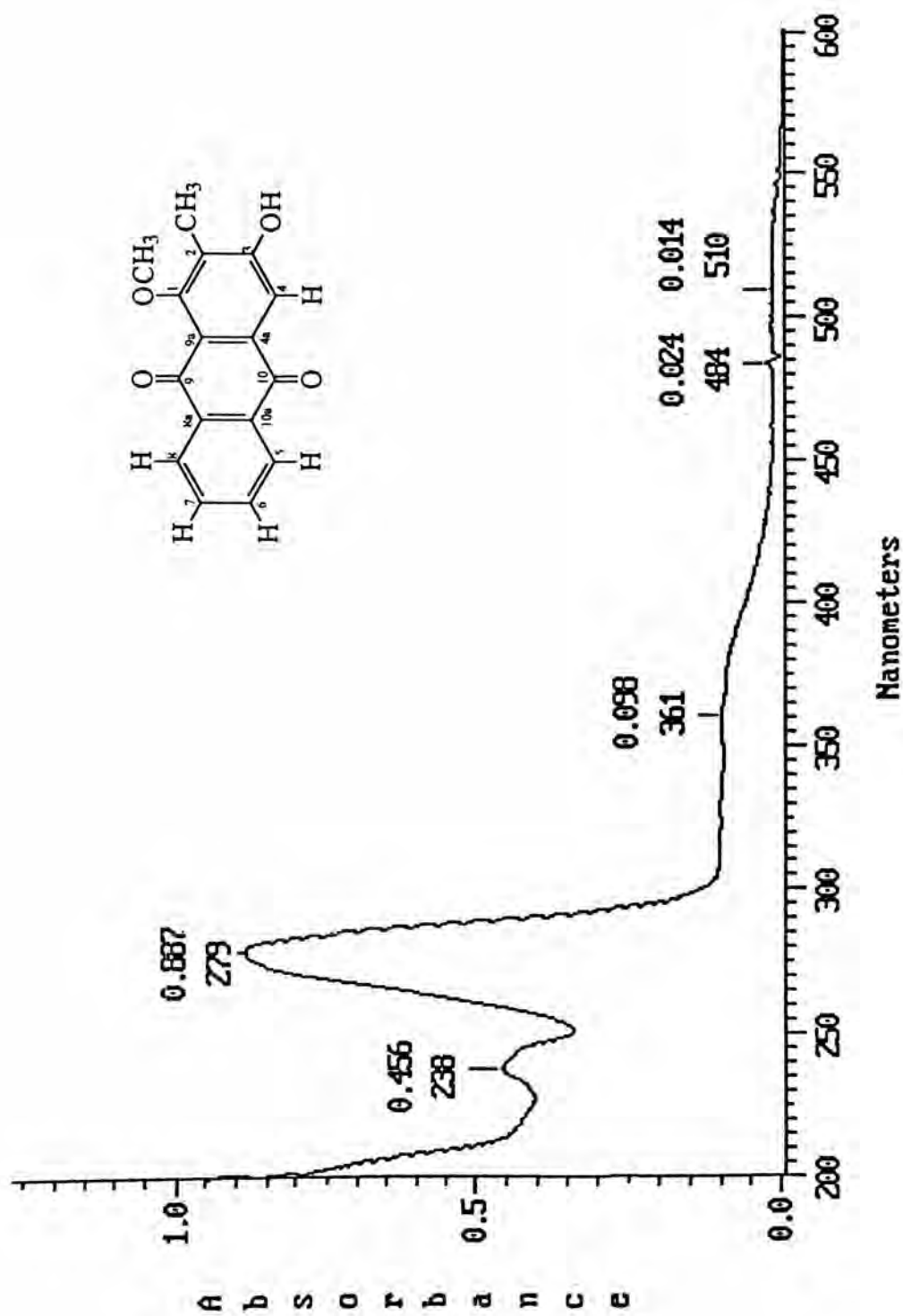


Figure 13 UV spectrum of compound PS-B (in methanol)

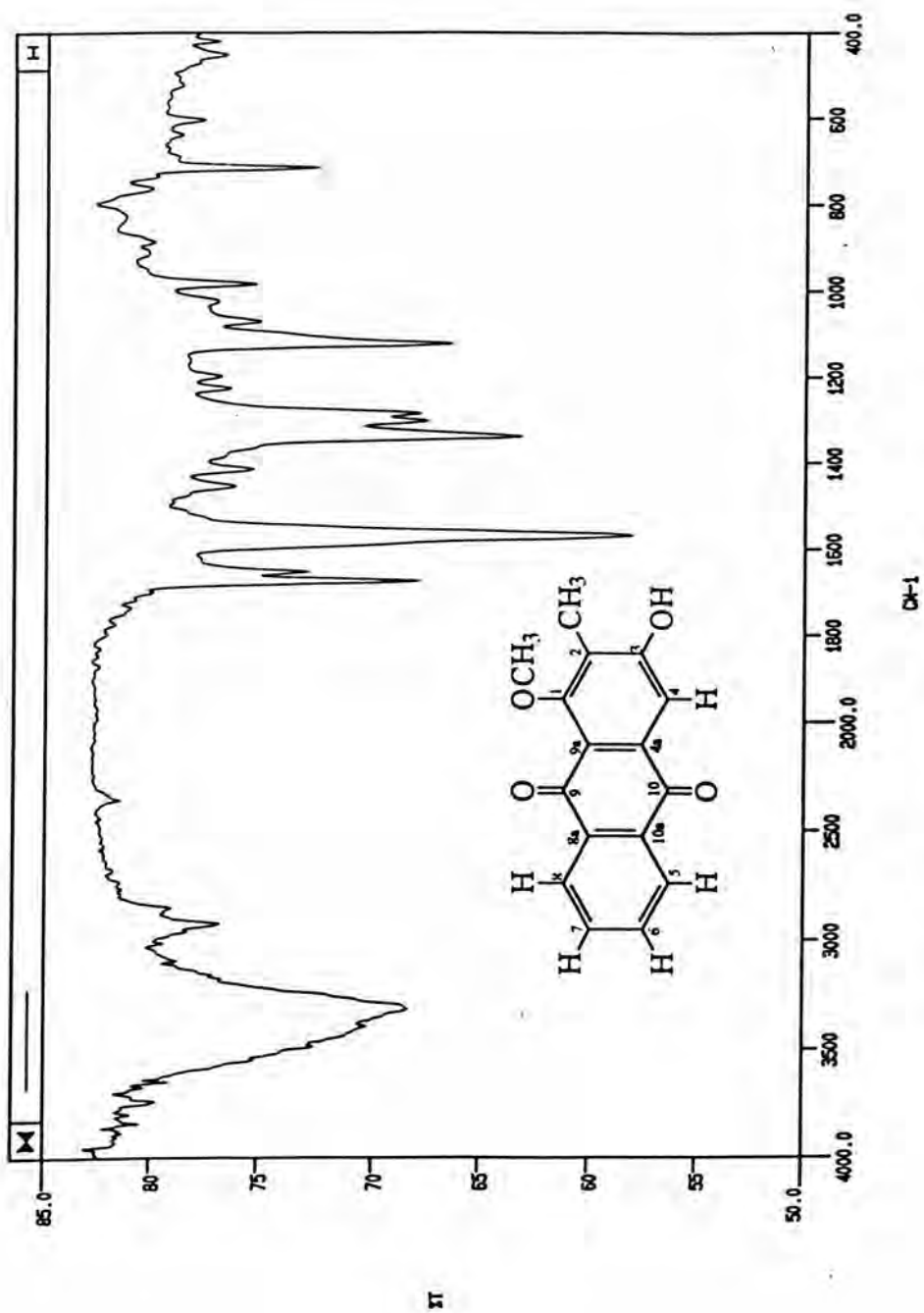


Figure 14 IR spectrum of compound PS-B (KBr disc)

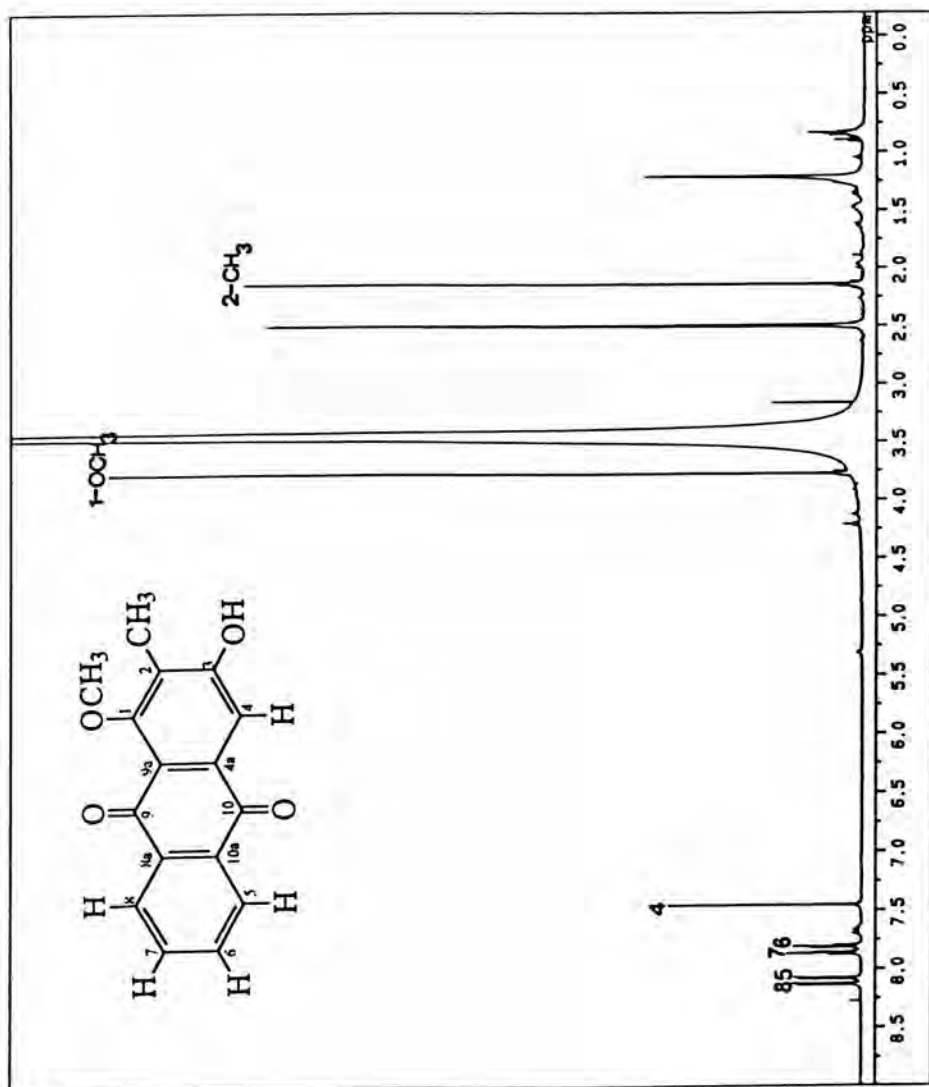


Figure 15a 500 MHz ^1H NMR spectrum of compound PS-B (in $\text{DMSO}-d_6$)

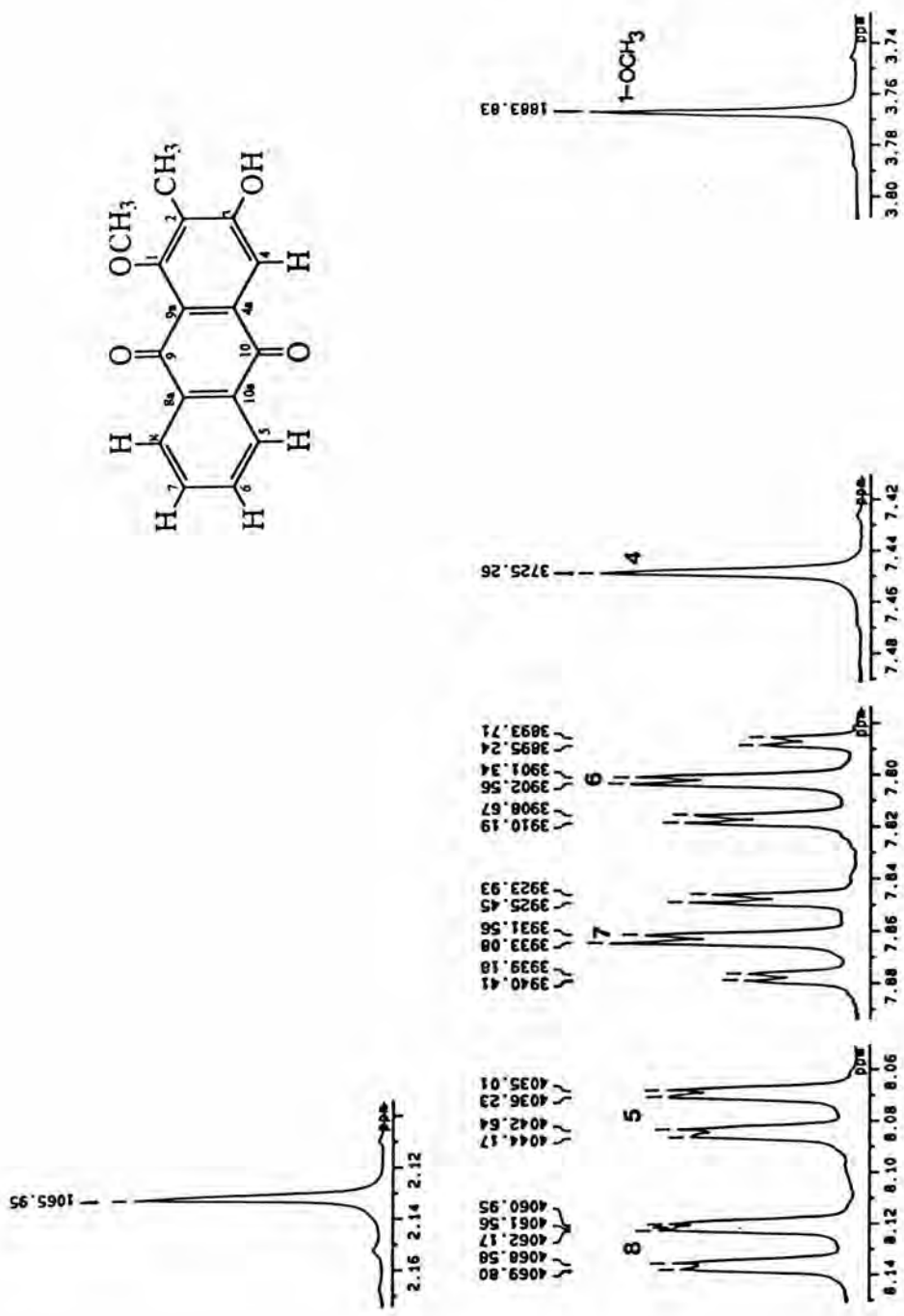


Figure 15b 500 MHz ^1H NMR spectrum of compound PS-B (in DMSO- d_6) (expanded from 2.12 to 8.14 ppm)

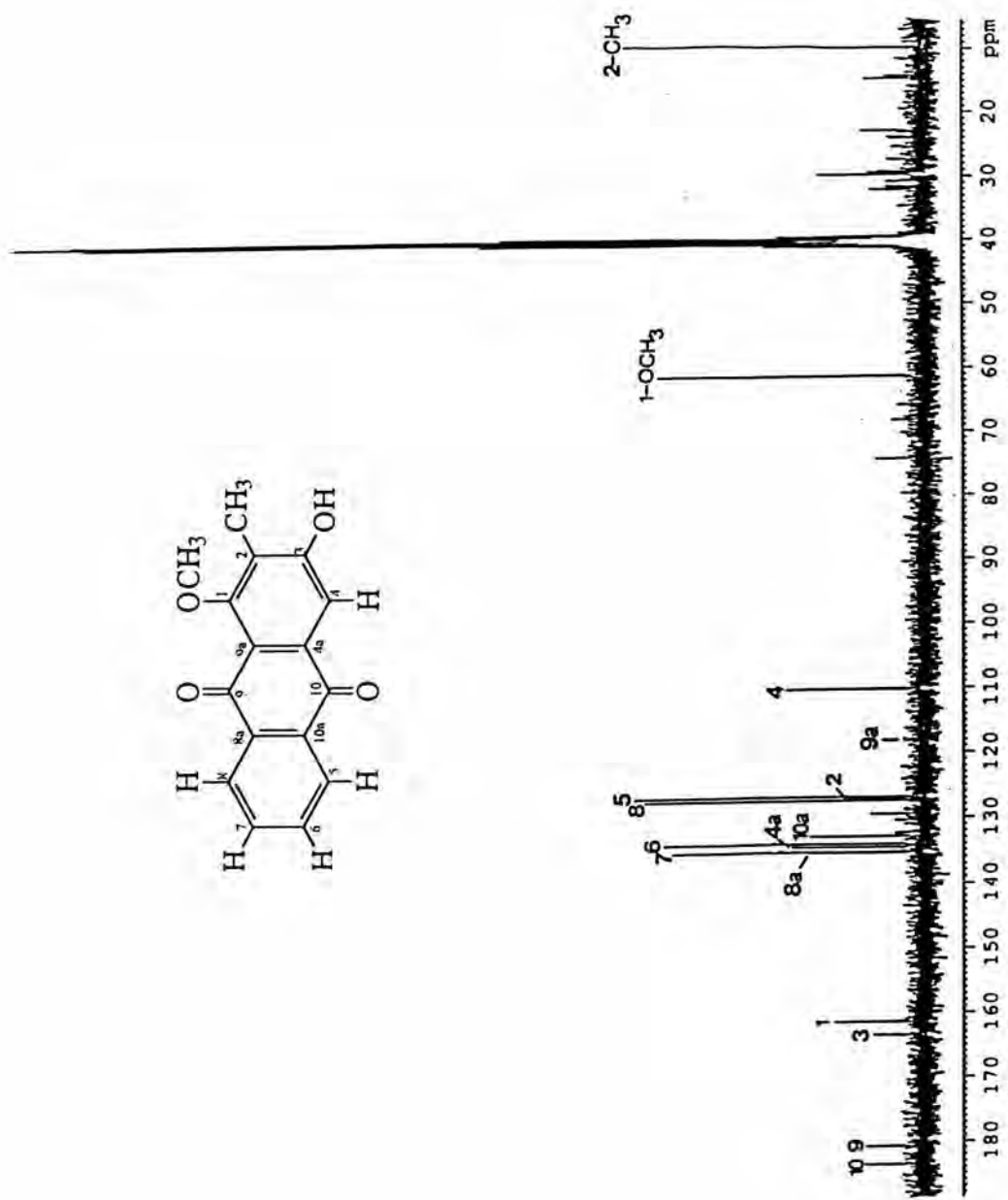


Figure 16a 75 MHz ^{13}C NMR spectrum of compound PS-B (in $\text{DMSO-}d_6$)

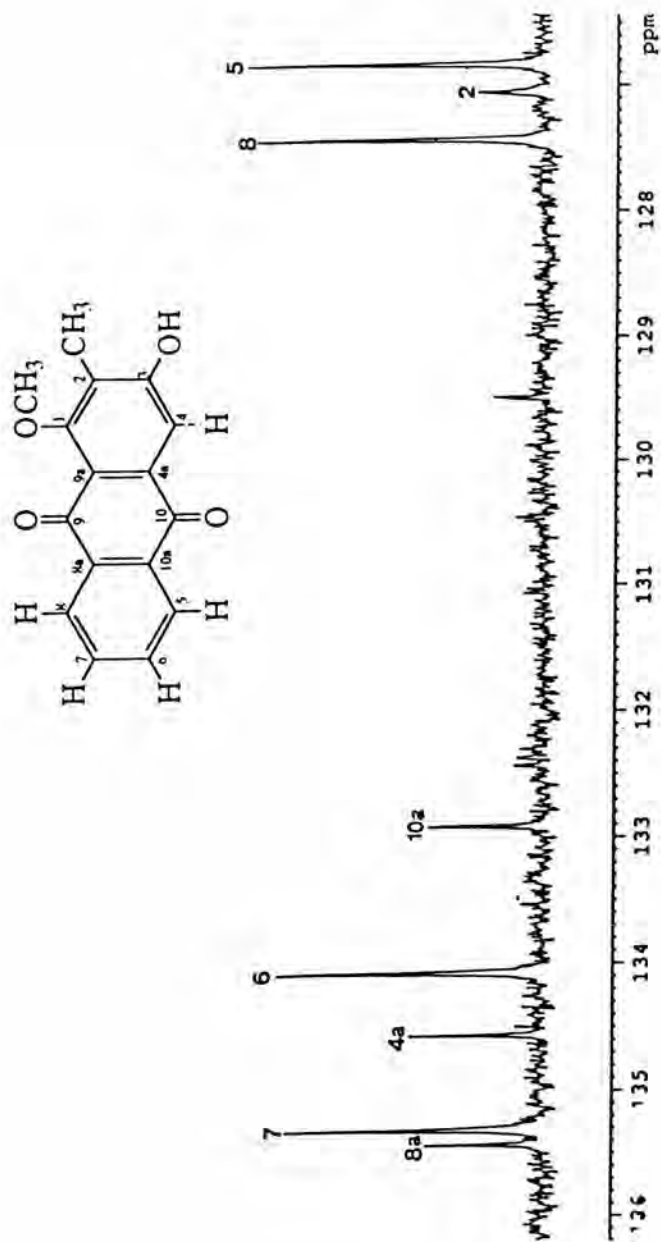


Figure 16b 75 MHz ^{13}C NMR spectrum of compound PS-B (in DMSO-*d*₆) (expanded from 126.5 to 136.2 ppm)

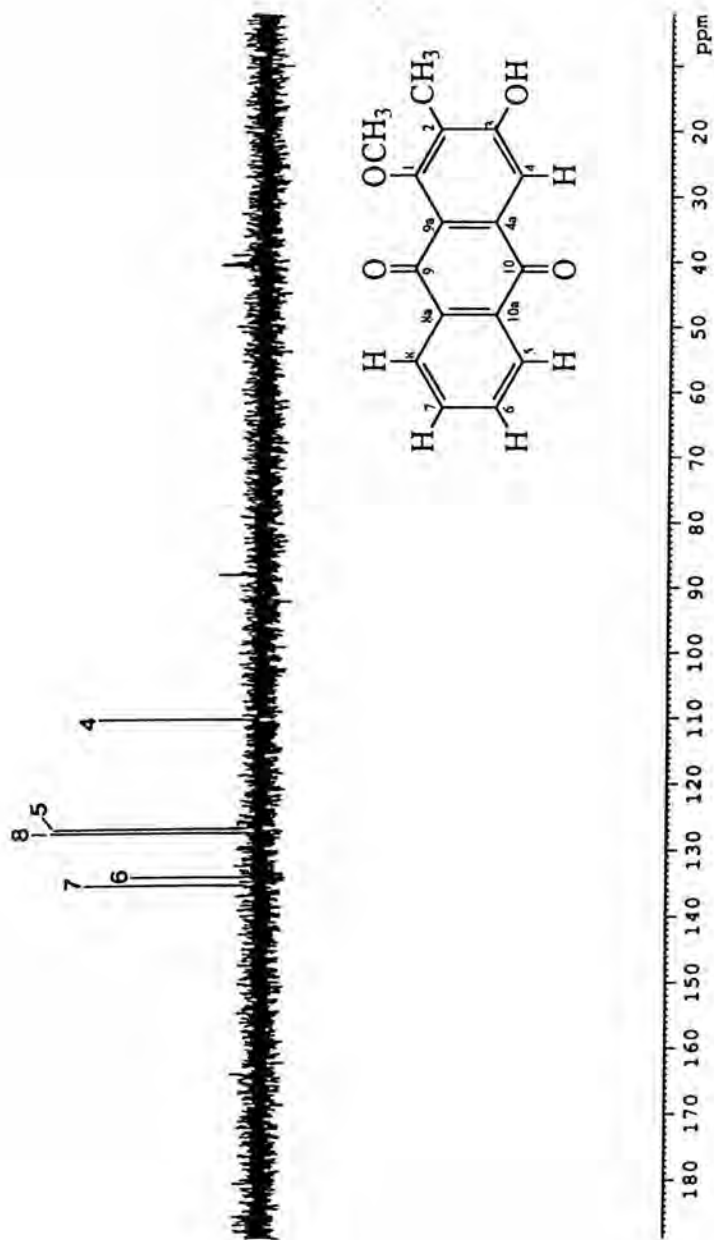


Figure 17a DEPT 90 spectrum of compound PS-B (in DMSO- d_6)

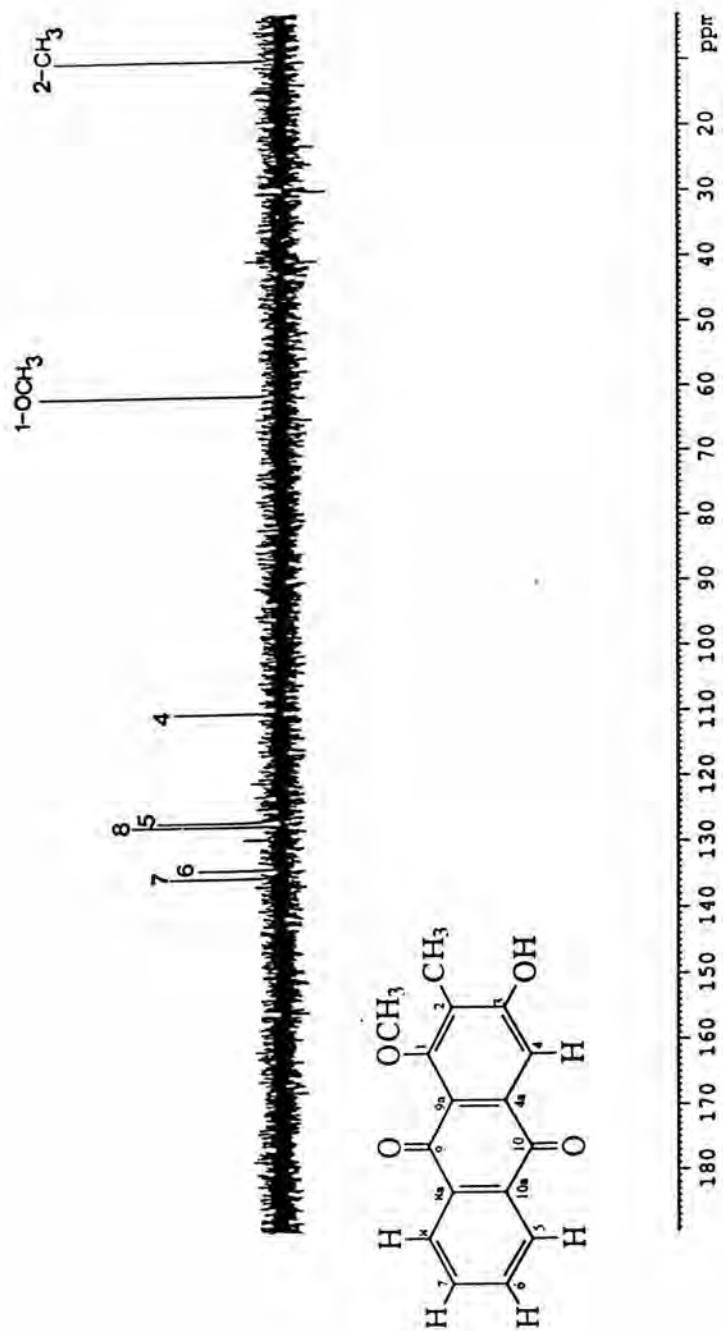


Figure 17b DEPT 135 spectrum of compound PS-B (in DMSO- d_6)

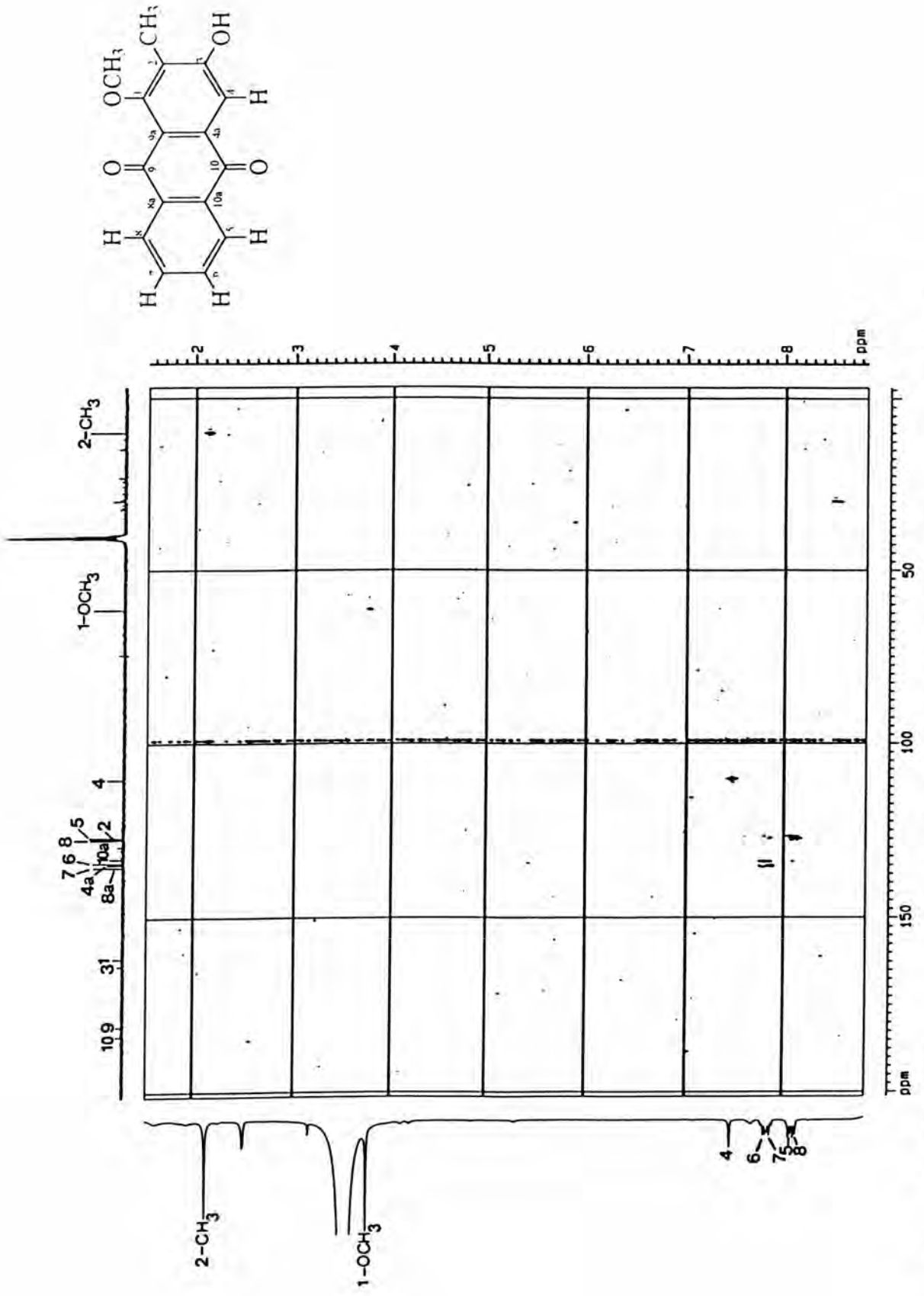


Figure 18a HETCOR spectrum of compound PS-B (in DMSO-*d*₆) [δ_H 1.6-8.8 ppm, δ_C 0-200 ppm]

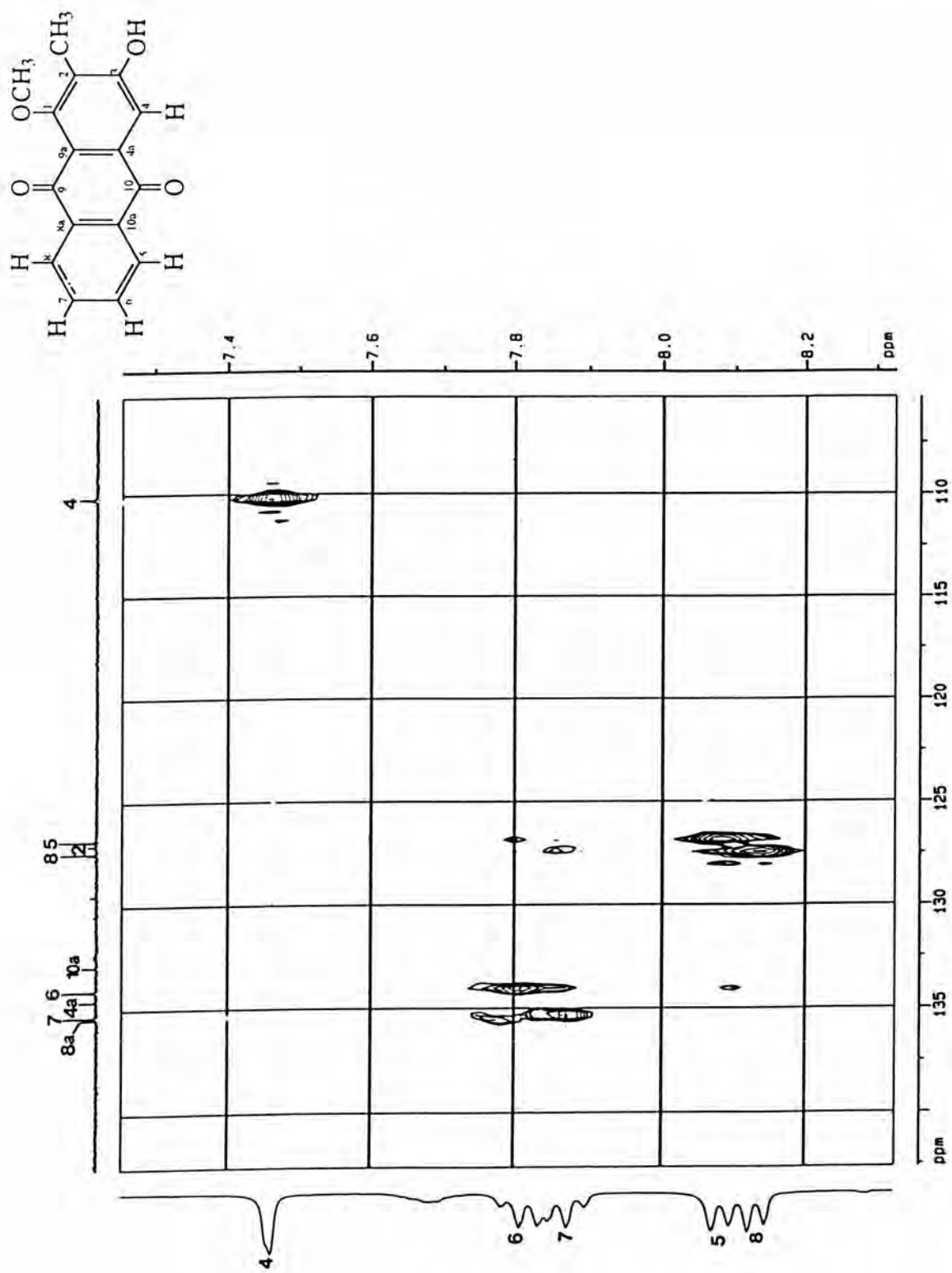


Figure 18b HETCOR spectrum of compound PS-B (in DMSO-*d*₆) [δ_{H} 7.3-8.3 ppm, δ_{C} 107.5-142.5 ppm]

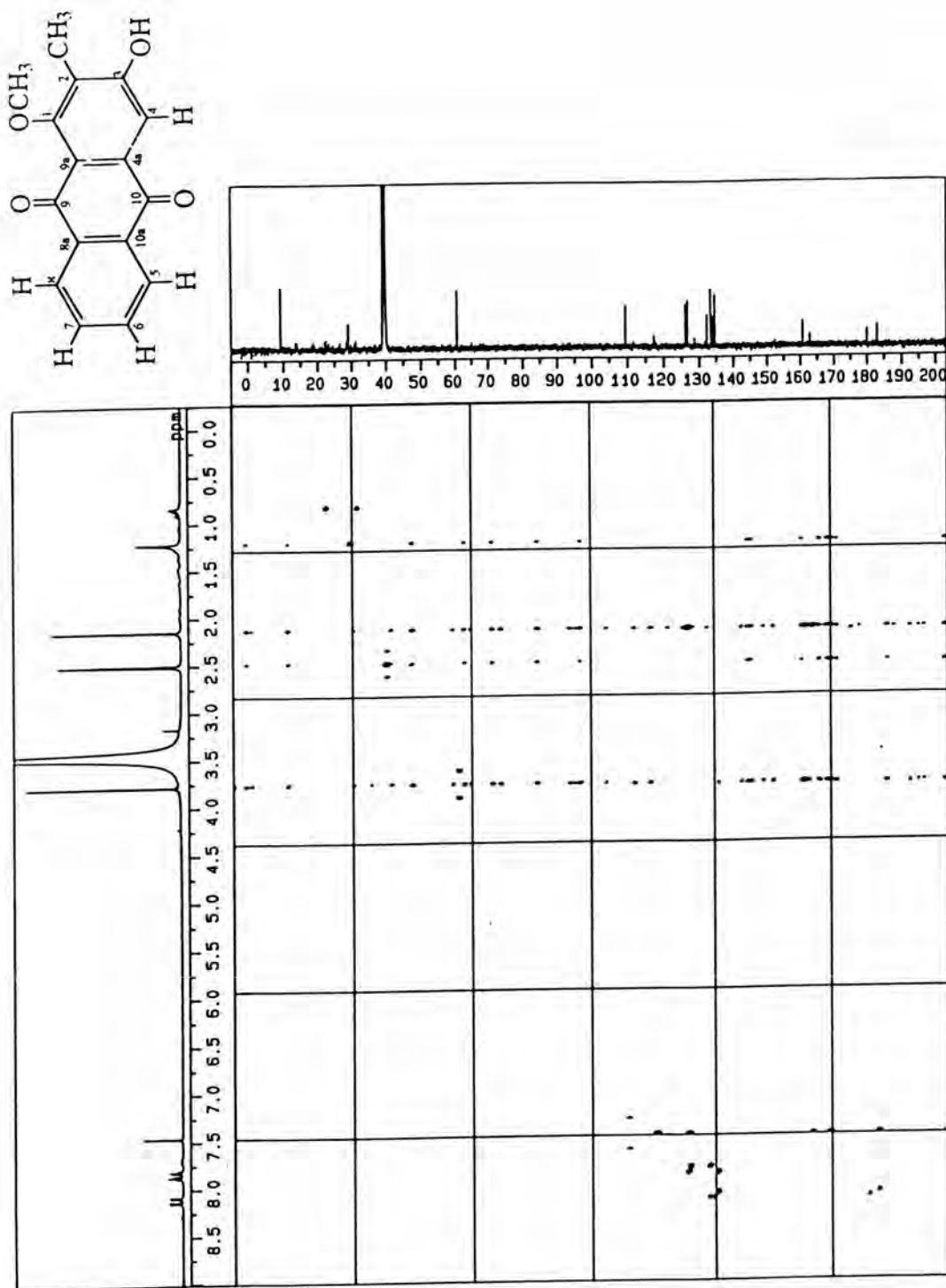


Figure 19a HMBC spectrum of compound PS-B (in DMSO-*d*₆) [δ_{H} 0.0-8.5 ppm, δ_{C} 0-200 ppm]

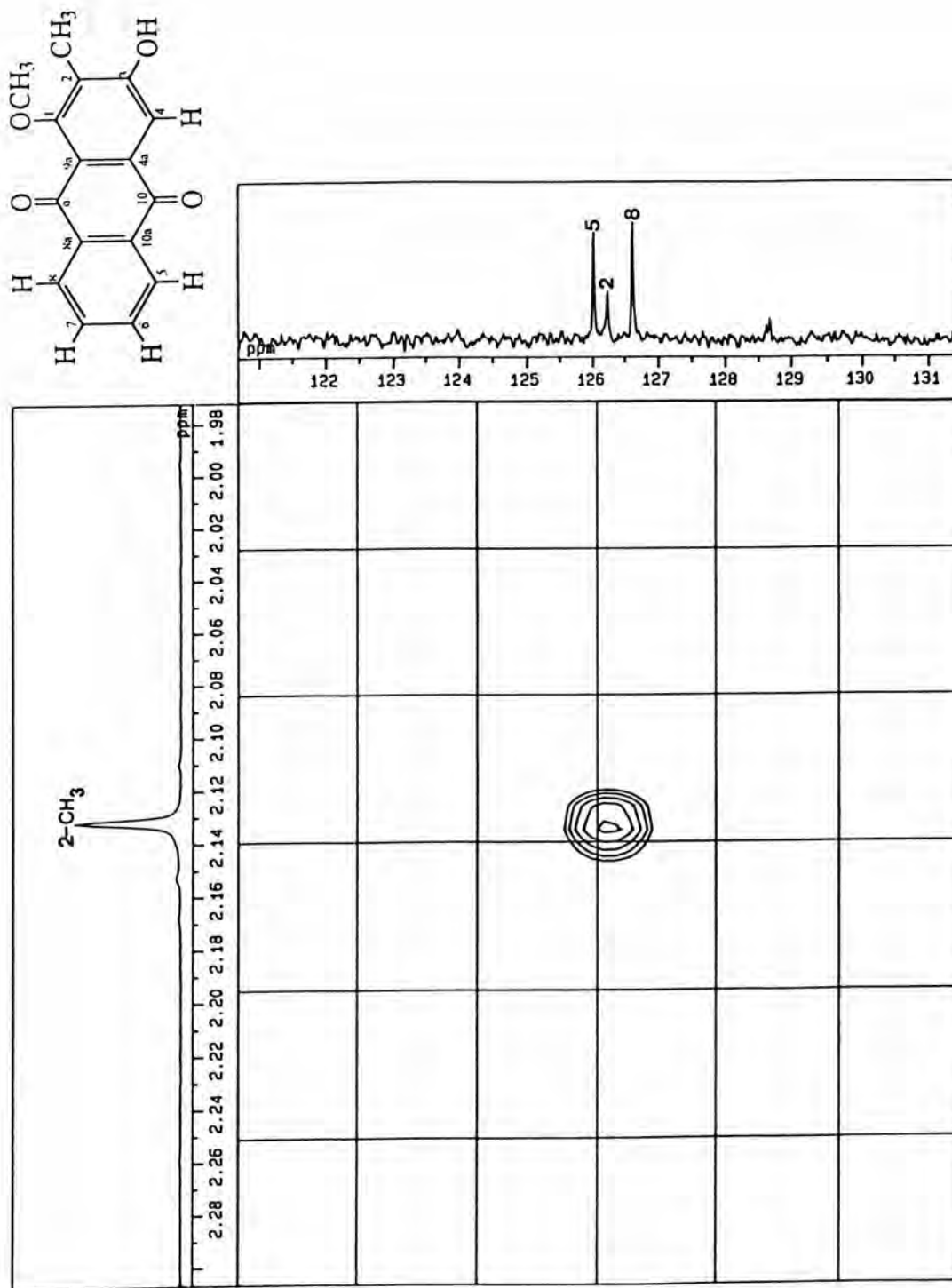


Figure 19b HMBC spectrum of compound PS-B (in DMSO-*d*₆) [δ_{H} 1.98-2.28 ppm, δ_{C} 121-131 ppm]

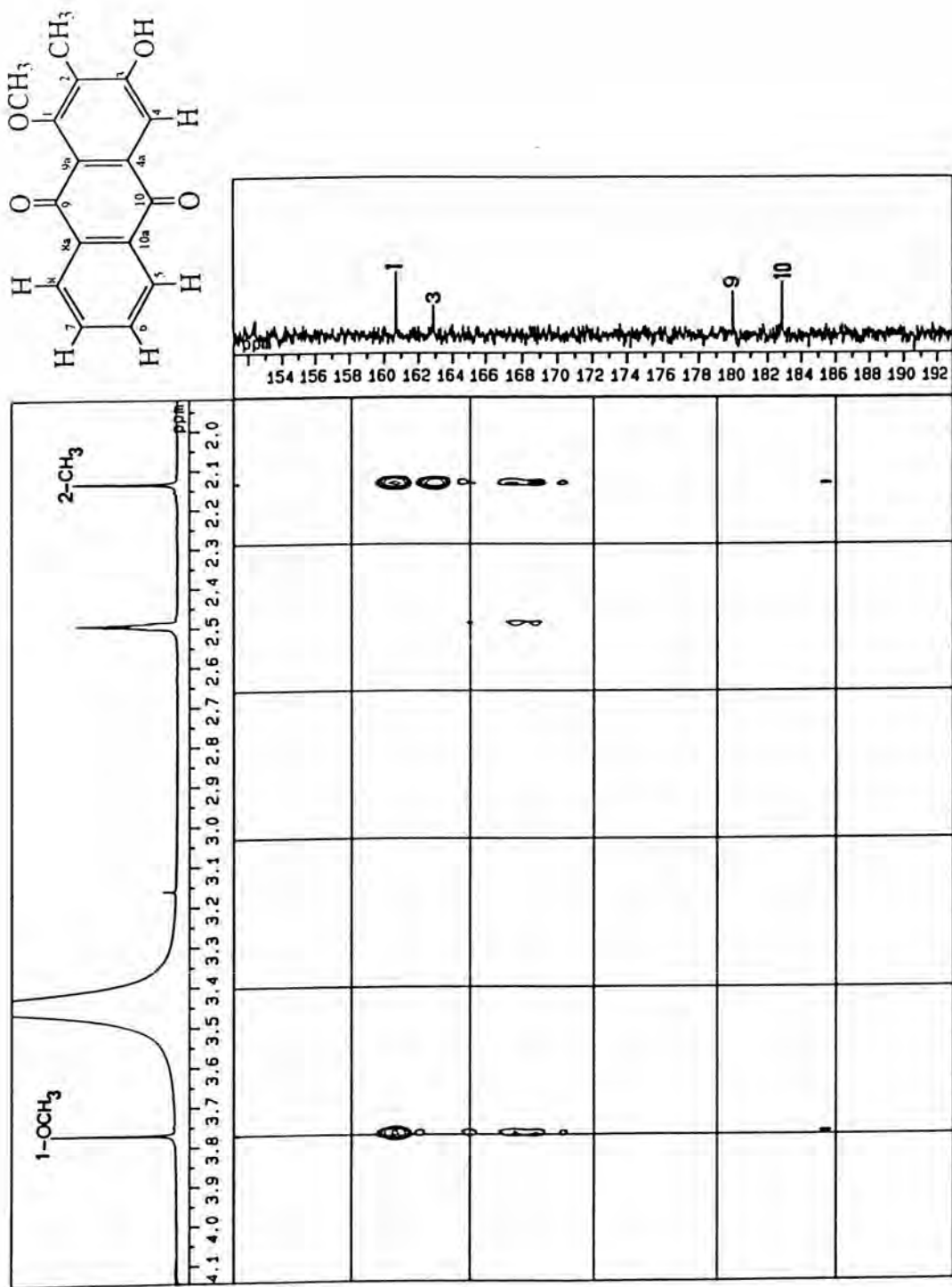


Figure 19c HMBC spectrum of compound PS-B (in DMSO-*d*₆) [δ_{H} 2.0-4.1 ppm, δ_{C} 154-192 ppm]

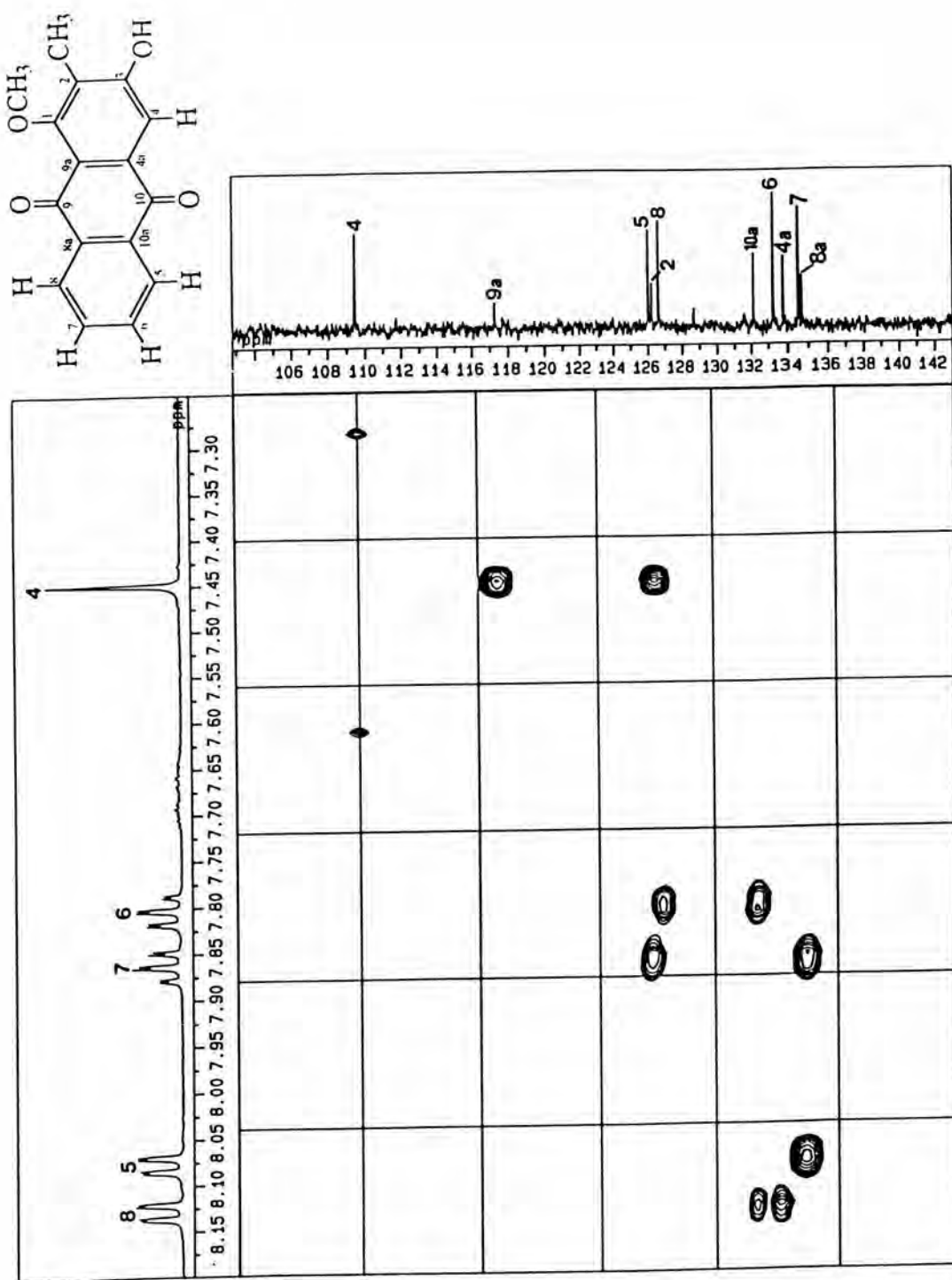


Figure 19d HMBC spectrum of compound PS-B (in $\text{DMSO-}d_6$) [δ_{H} 7.30-8.15 ppm, δ_{C} 106-142 ppm]

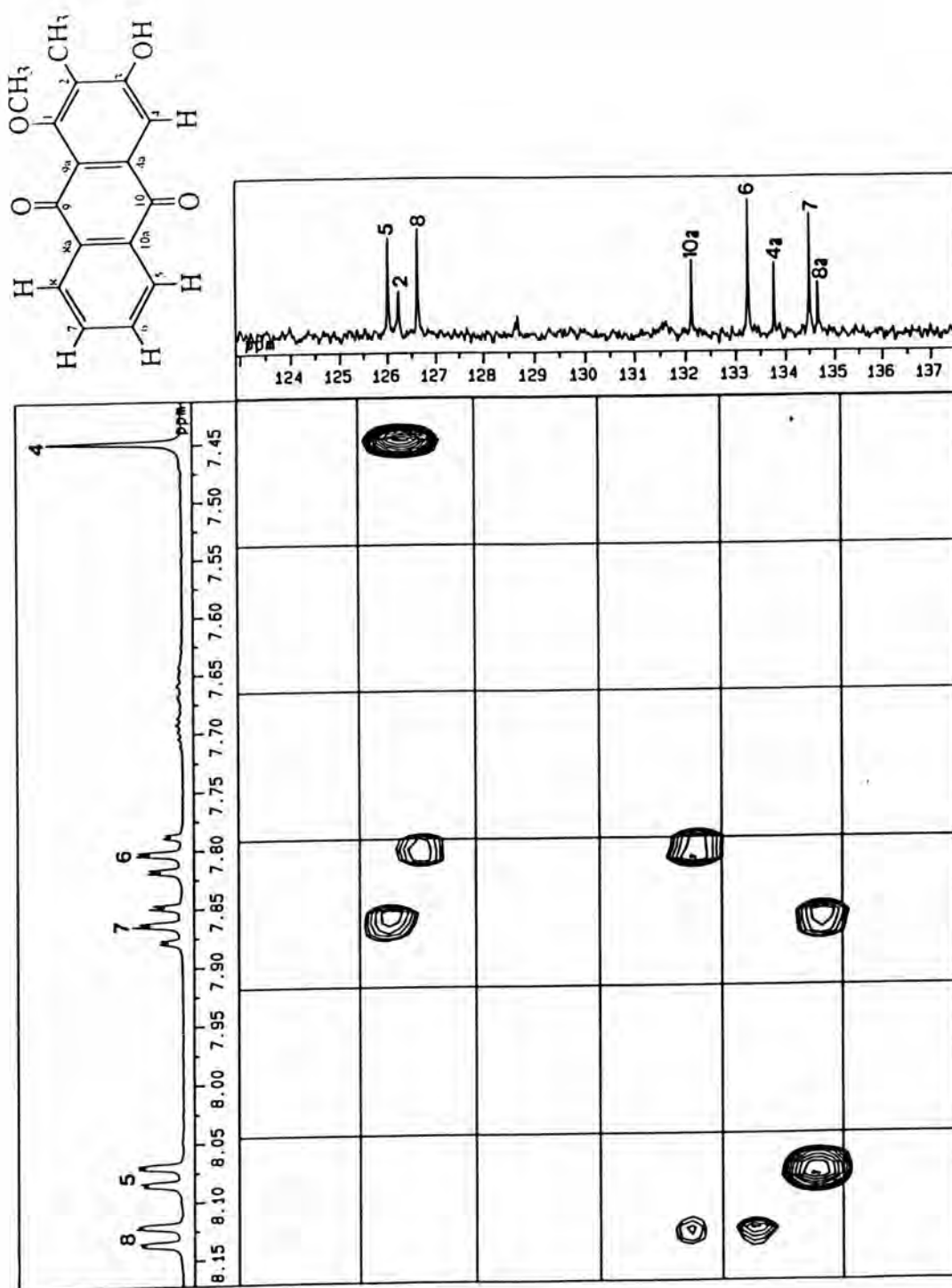


Figure 19e HMBC spectrum of compound PS-B (in $\text{DMSO}-d_6$) [δ_{H} 7.45–8.15 ppm, δ_{C} 124–137 ppm]

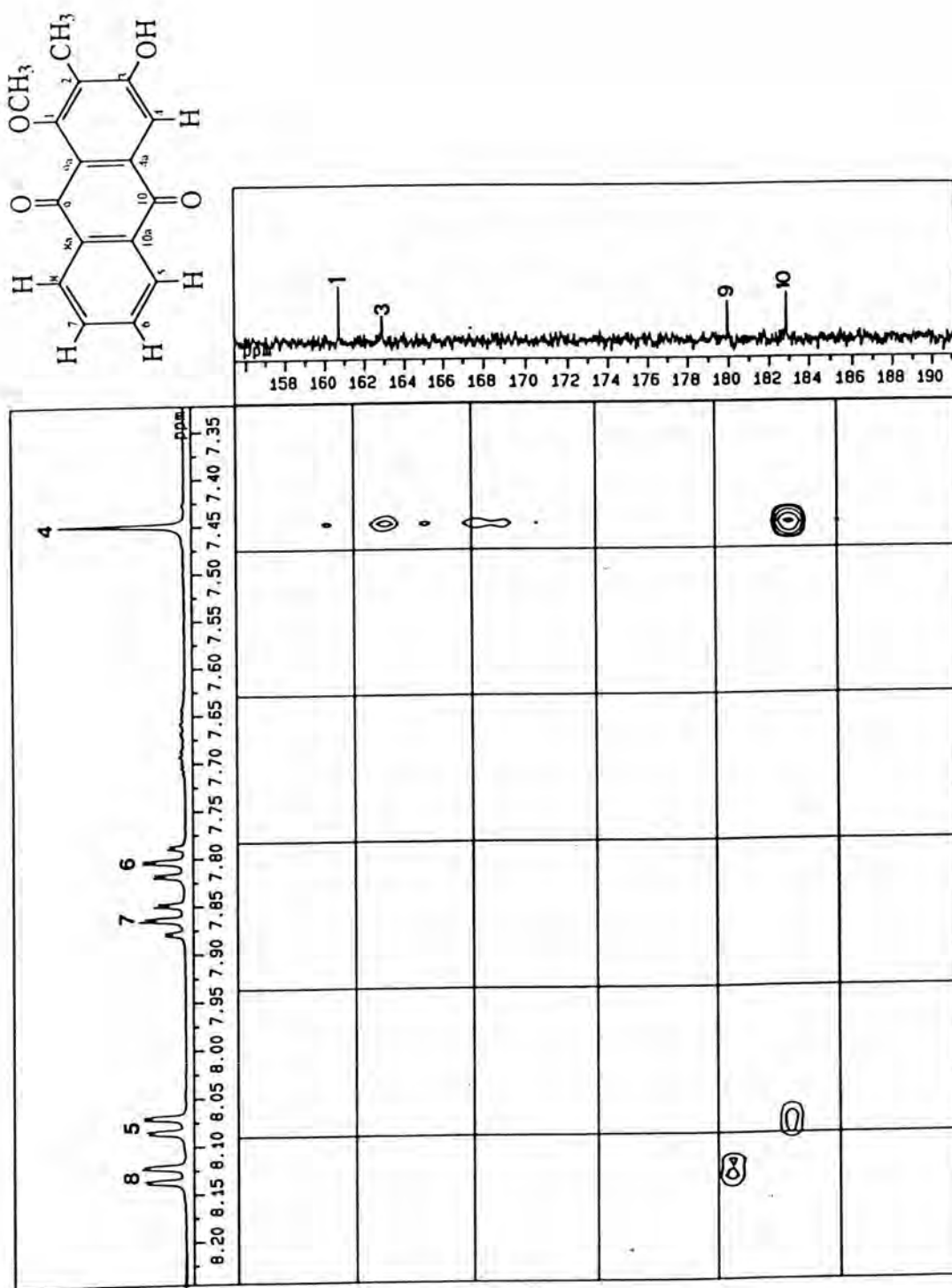


Figure 19f HMBC spectrum of compound PS-B (in DMSO-*d*₆) [δ_{H} 7.35-8.20 ppm, δ_{C} 158-190 ppm]

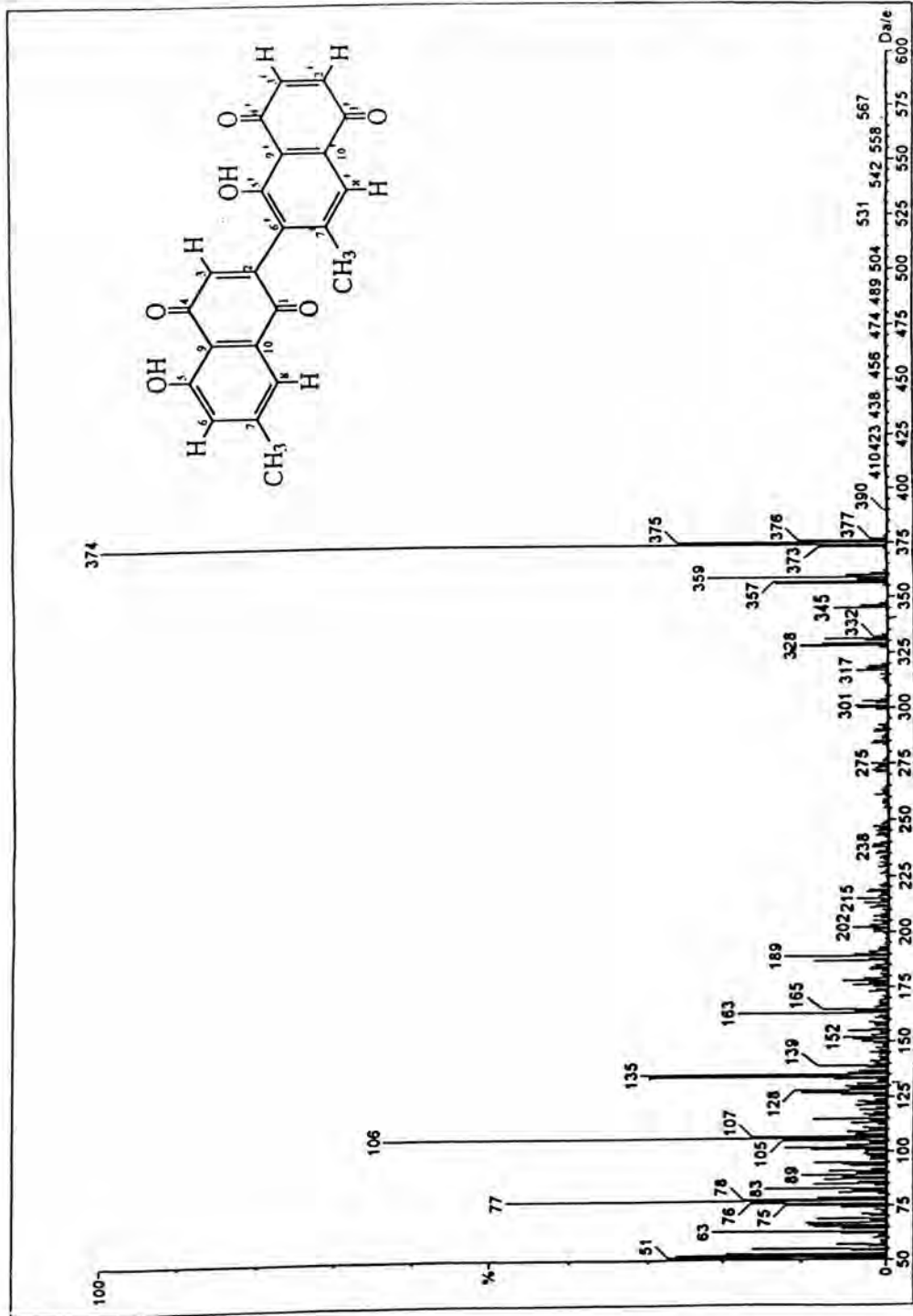


Figure 21 EI mass spectrum of compound DM-A

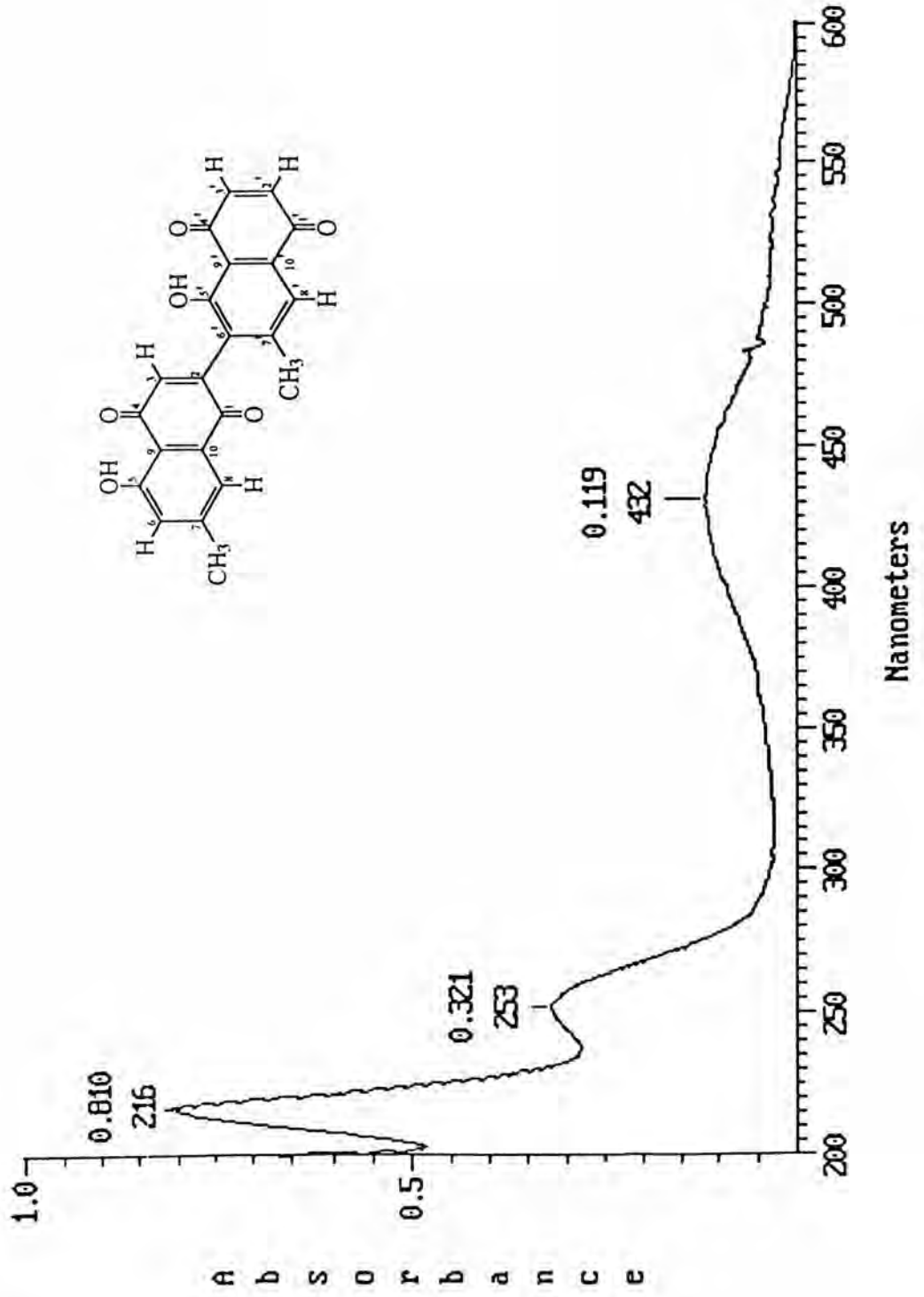


Figure 22 UV spectrum of compound DM-A (in methanol)

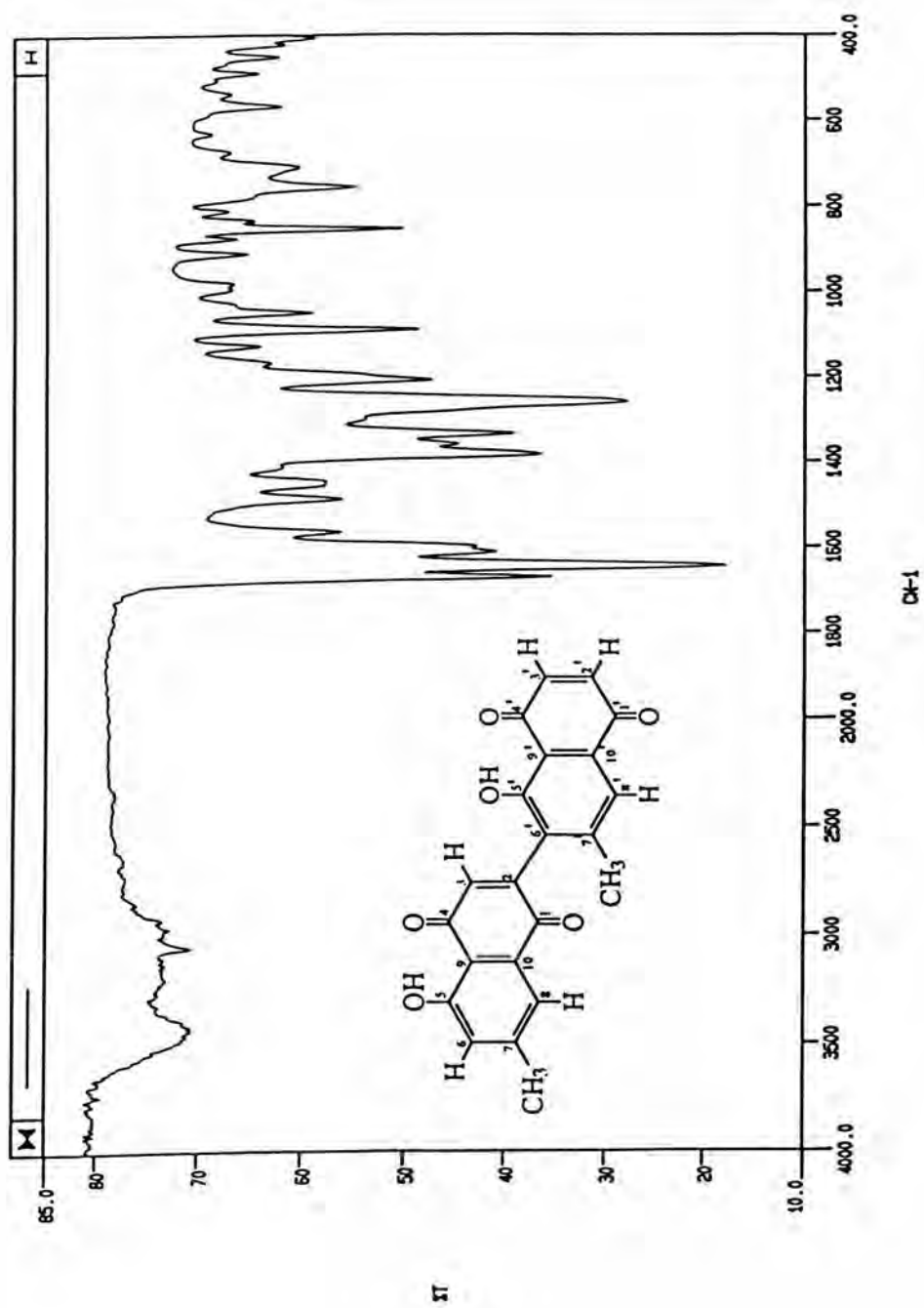


Figure 23 IR spectrum of compound DM-A (KBr disc)

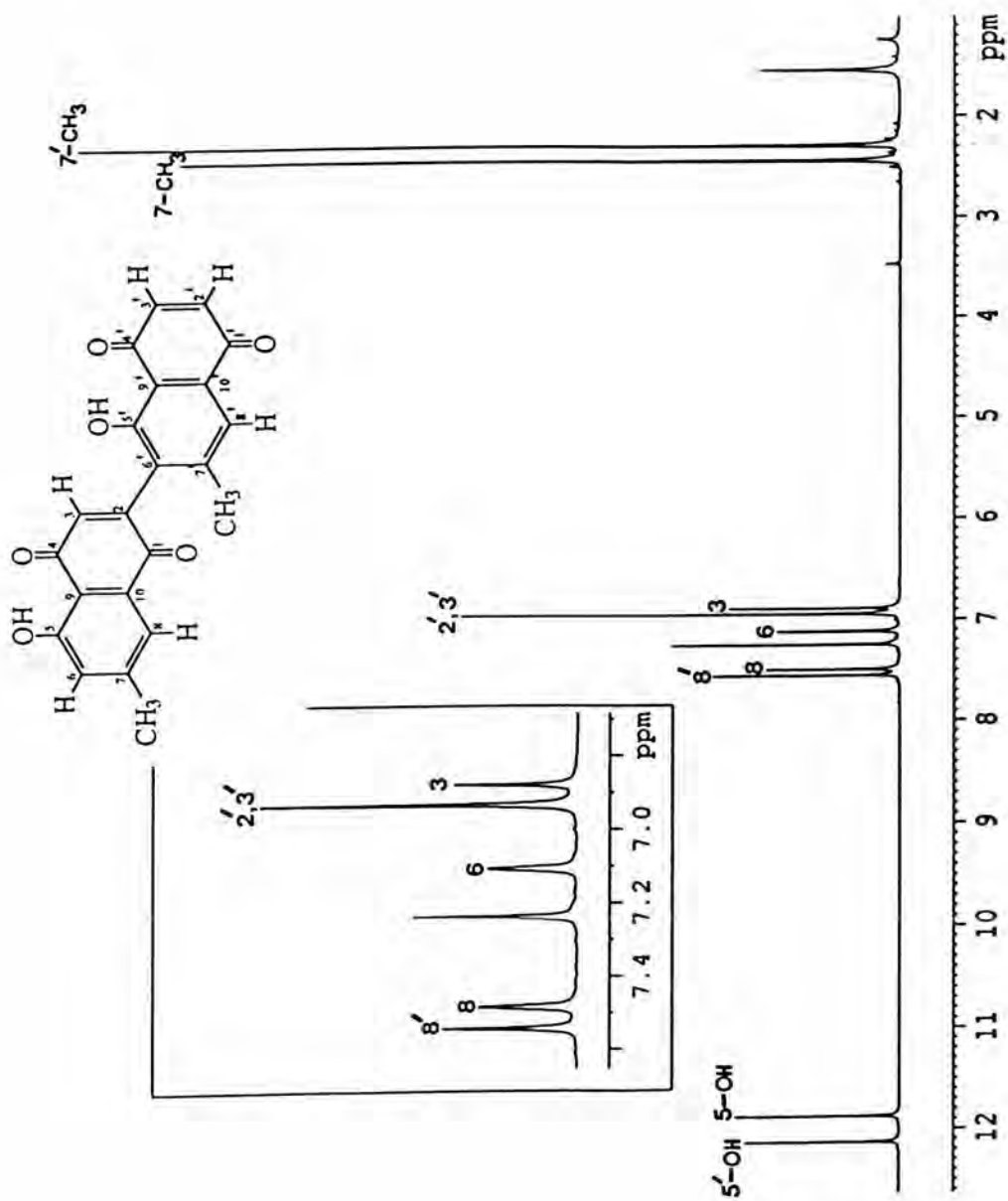


Figure 24 300 MHz ^1H NMR spectrum of compound DM-A (in CDCl₃)

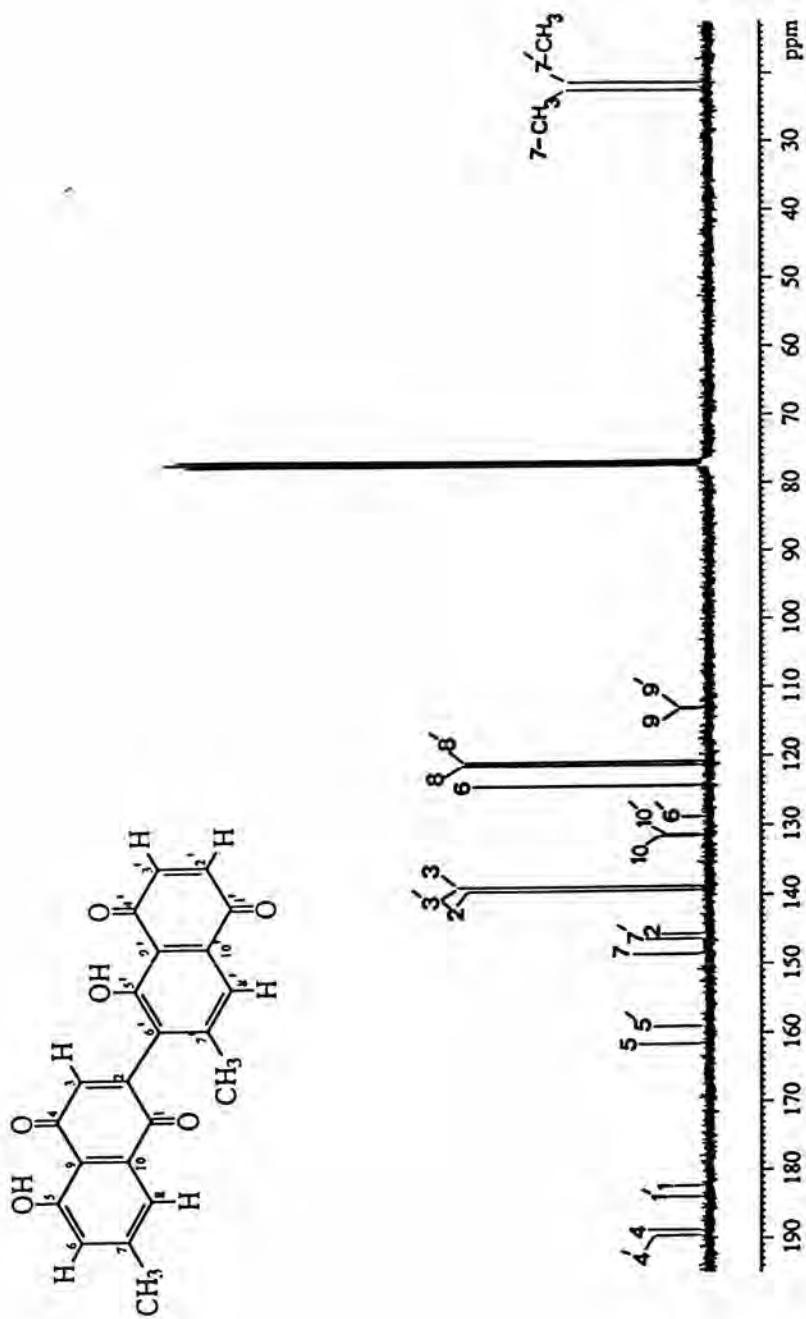


Figure 25 75 MHz ^{13}C NMR spectrum of compound DM-A (in CDCl₃)

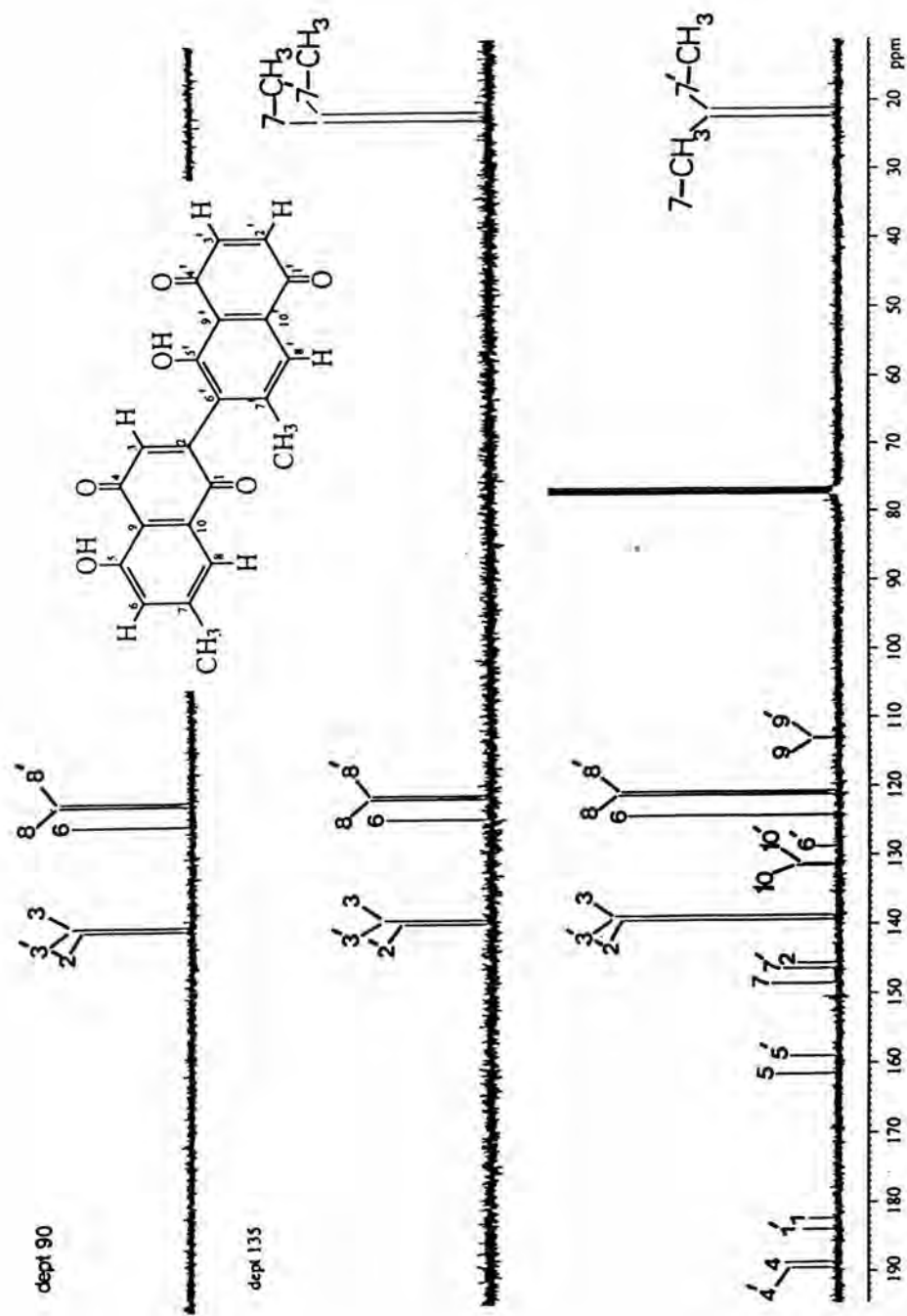
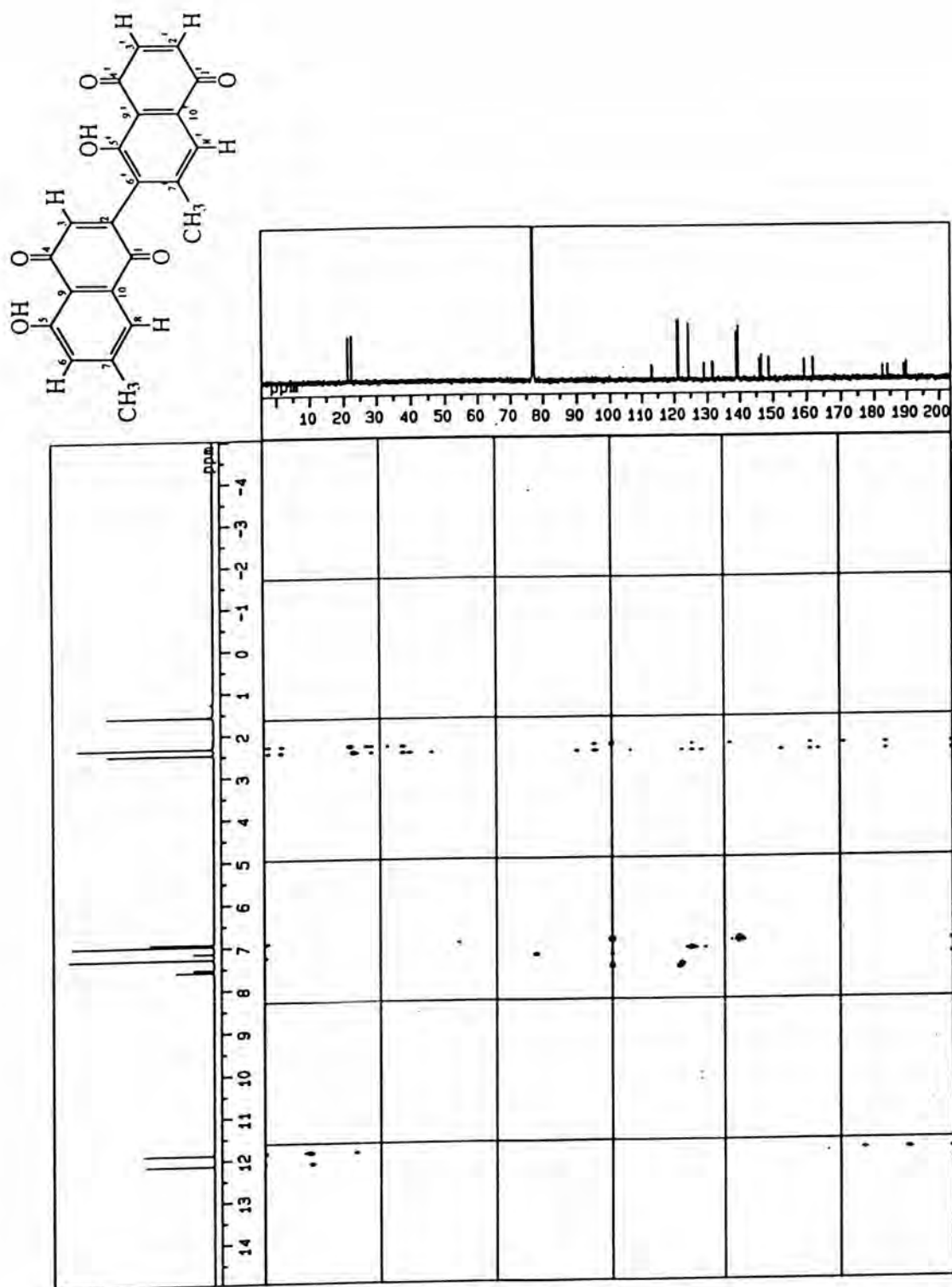


Figure 26 DEPT spectra of compound DM-A (in CDCl₃)

Figure 27a HMQC spectrum of compound DM-A (in CDCl₃)

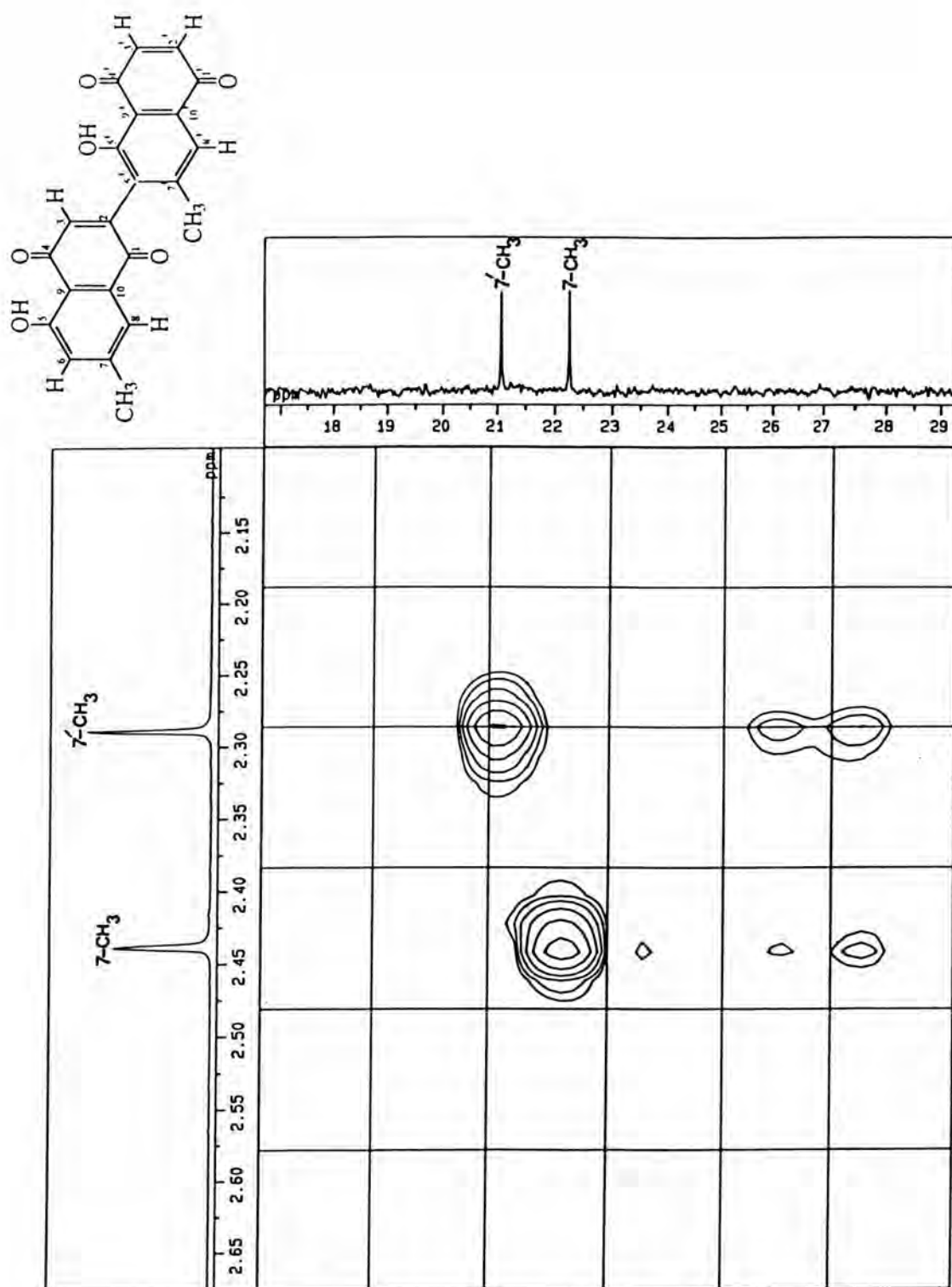


Figure 27b HMQC spectrum of compound DM-A (in CDCl₃) [δ_H 2.15-2.65 ppm, δ_C 18-29 ppm]

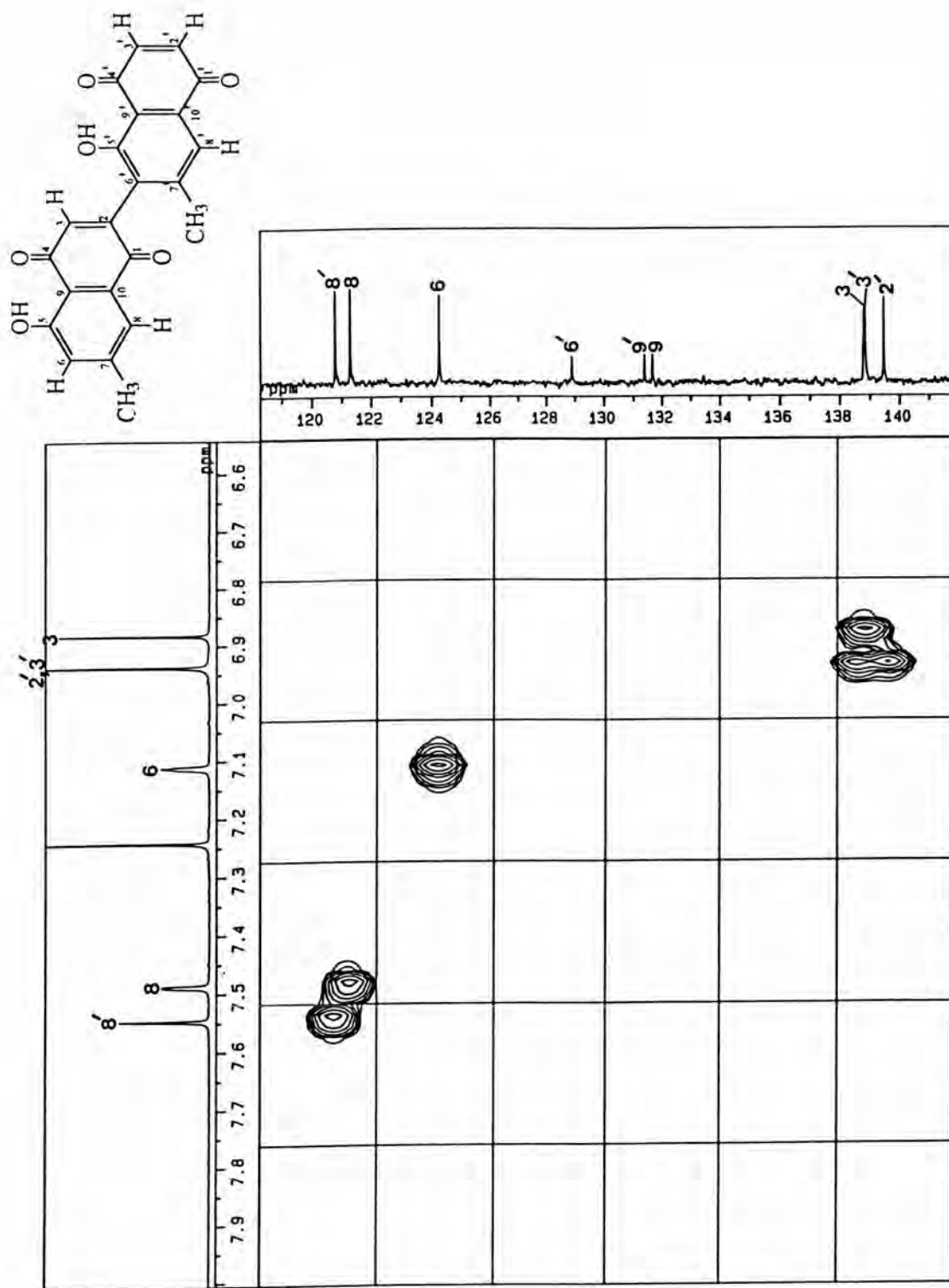


Figure 27c HMQC spectrum of compound DM-A (in CDCl₃) [δ_{H} 6.6-7.9 ppm, δ_{C} 119-141 ppm]

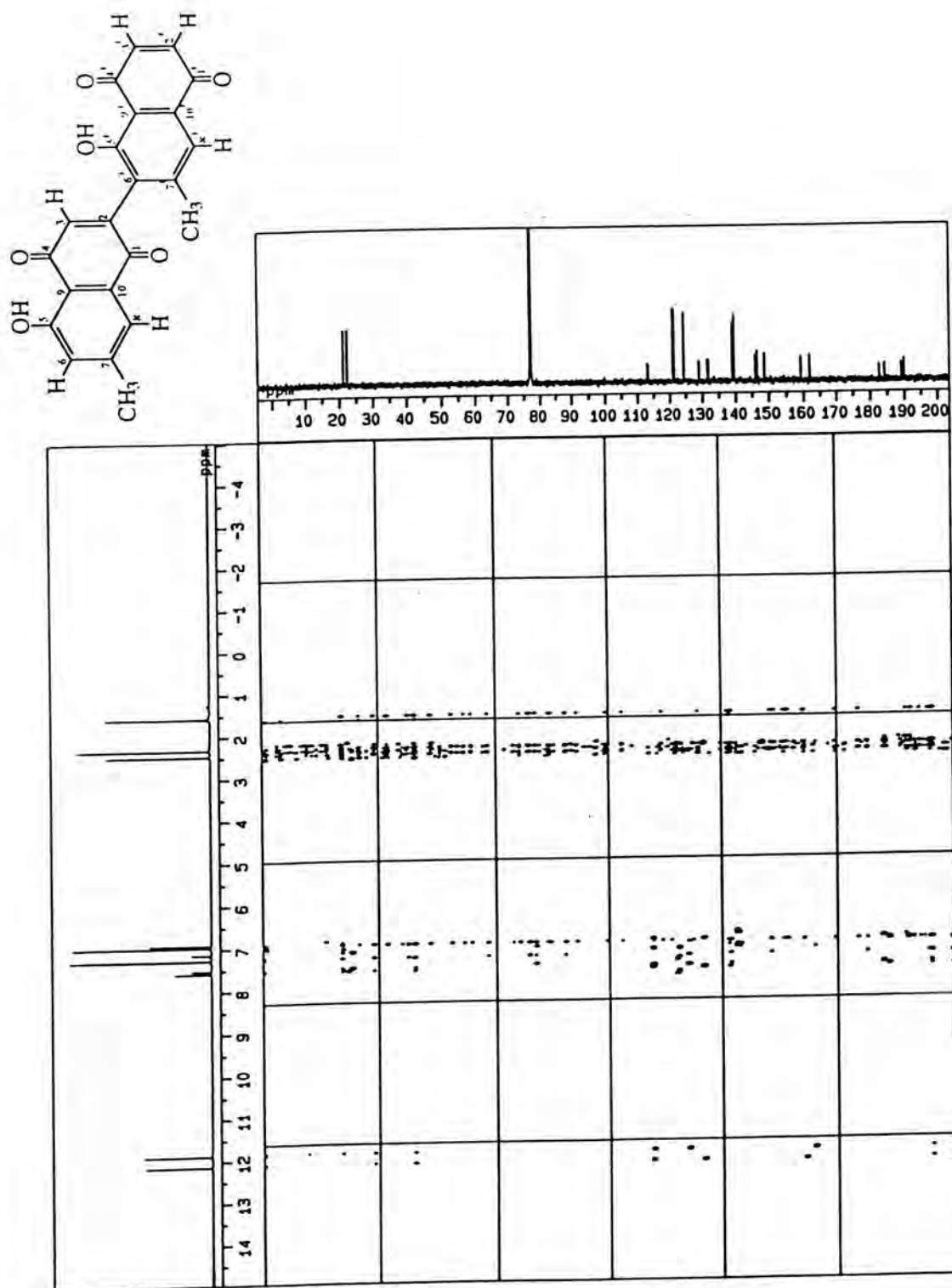


Figure 28a HMBC spectrum of compound DM-A (in CDCl₃)

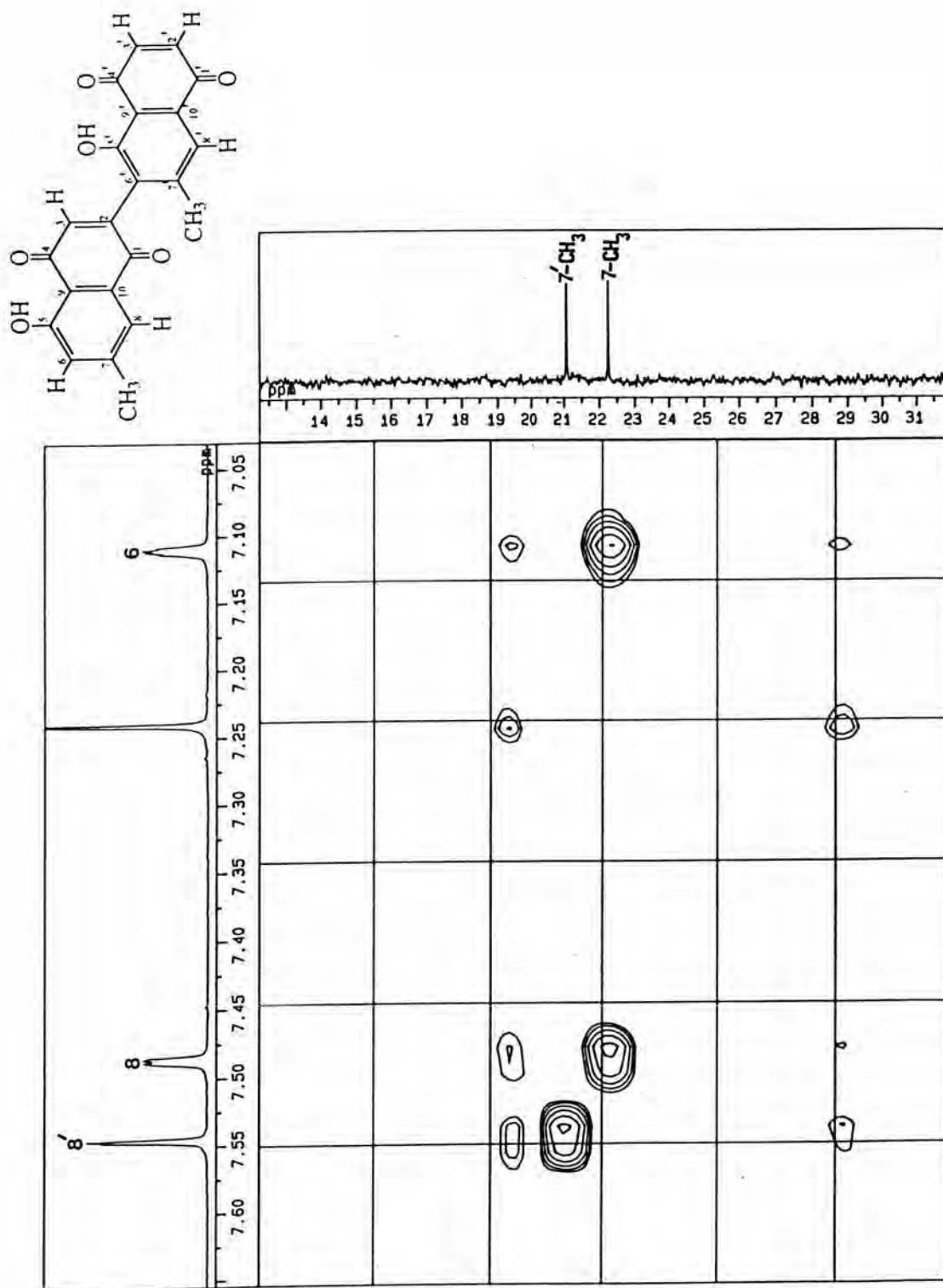


Figure 28b HMBC spectrum of compound DM-A (in CDCl₃) [δ_{H} 7.05-7.60 ppm, δ_{C} 14-31 ppm]

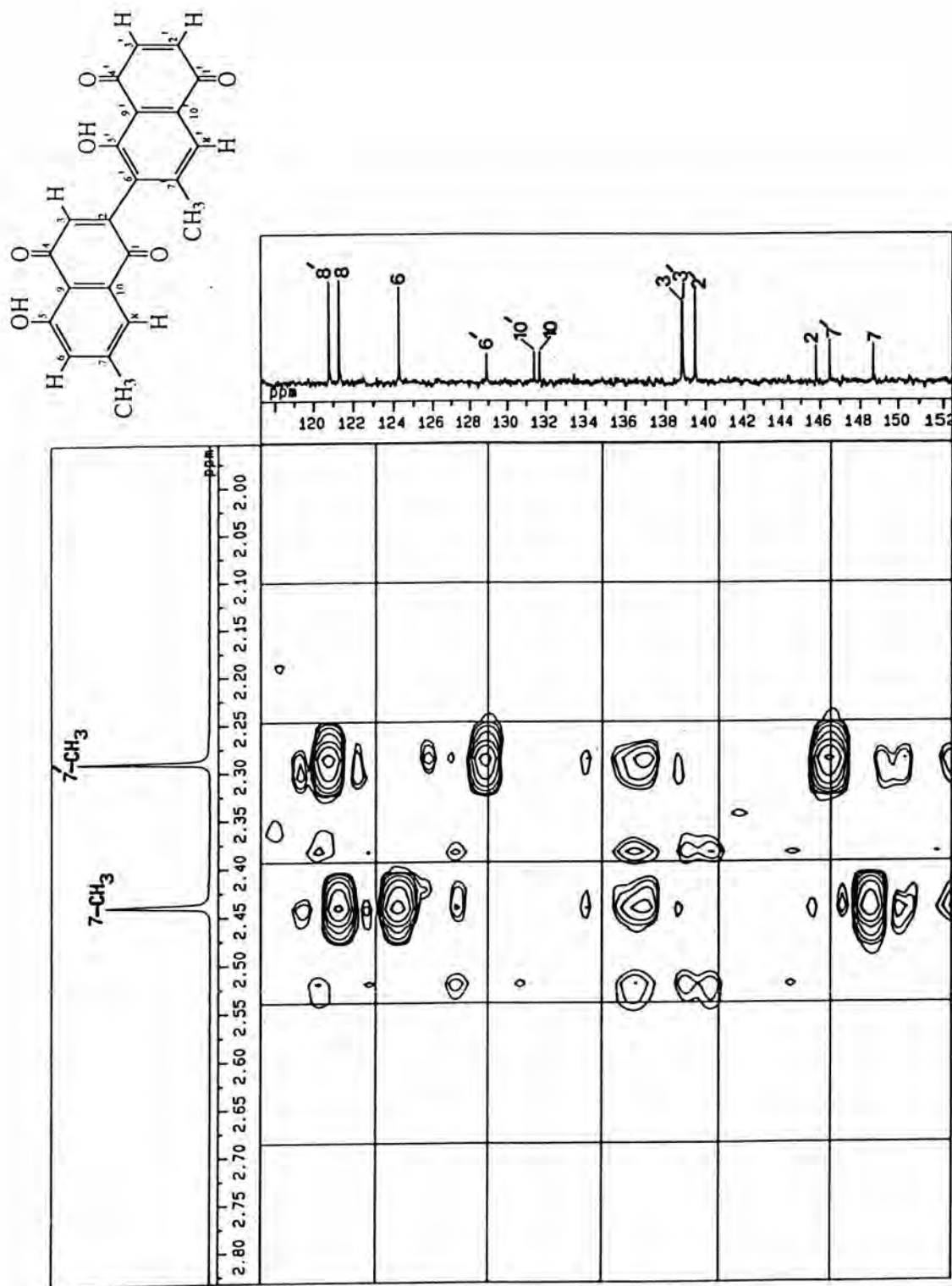


Figure 28c HMBC spectrum of compound DM-A (in CDCl₃) [δ_{H} 2.00-2.80 ppm, δ_{C} 118-152 ppm]

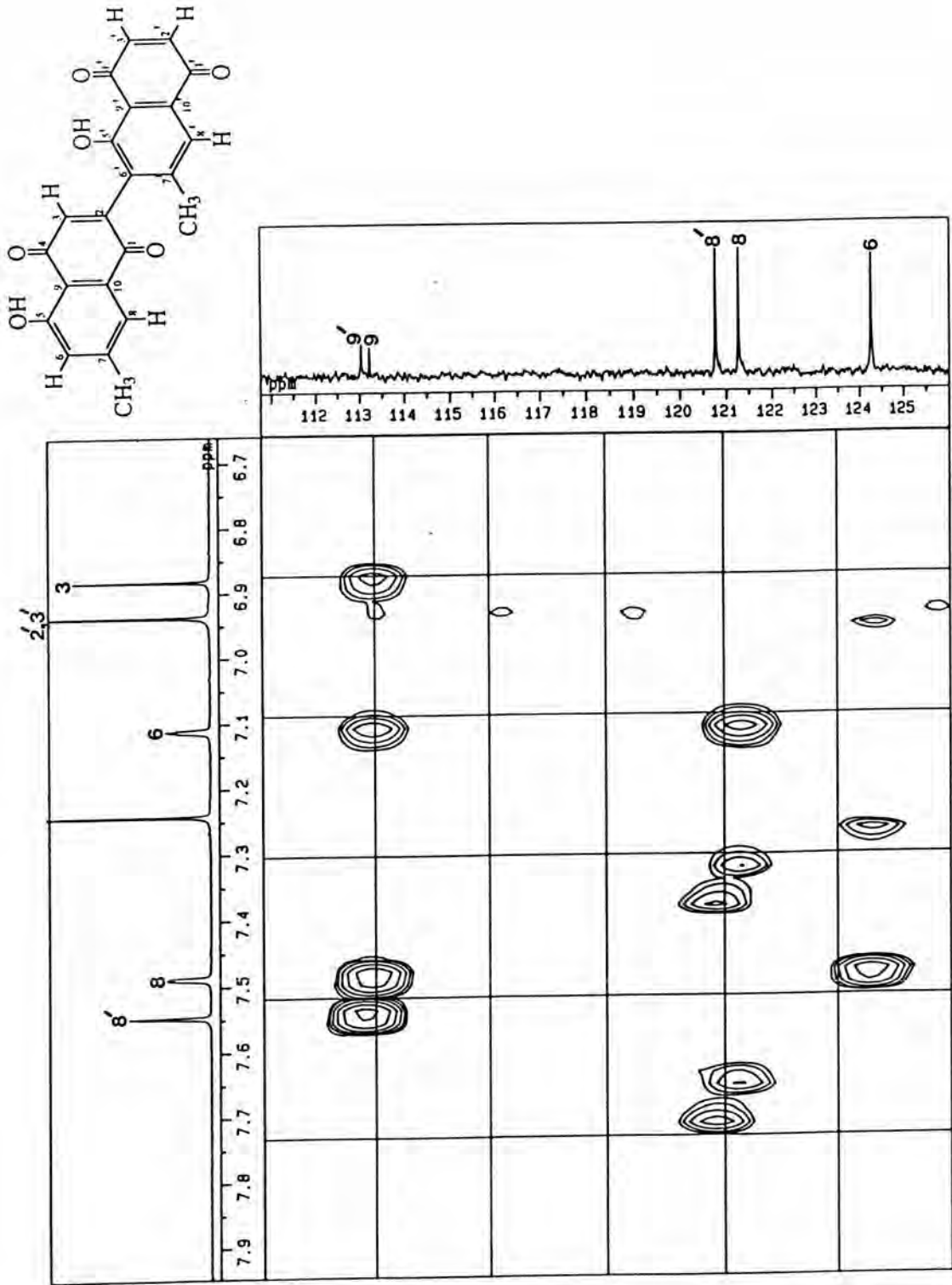


Figure 28d HMBC spectrum of compound DM-A (in CDCl_3) [δ_{H} 6.7-7.9 ppm, δ_{C} 111-125 ppm]

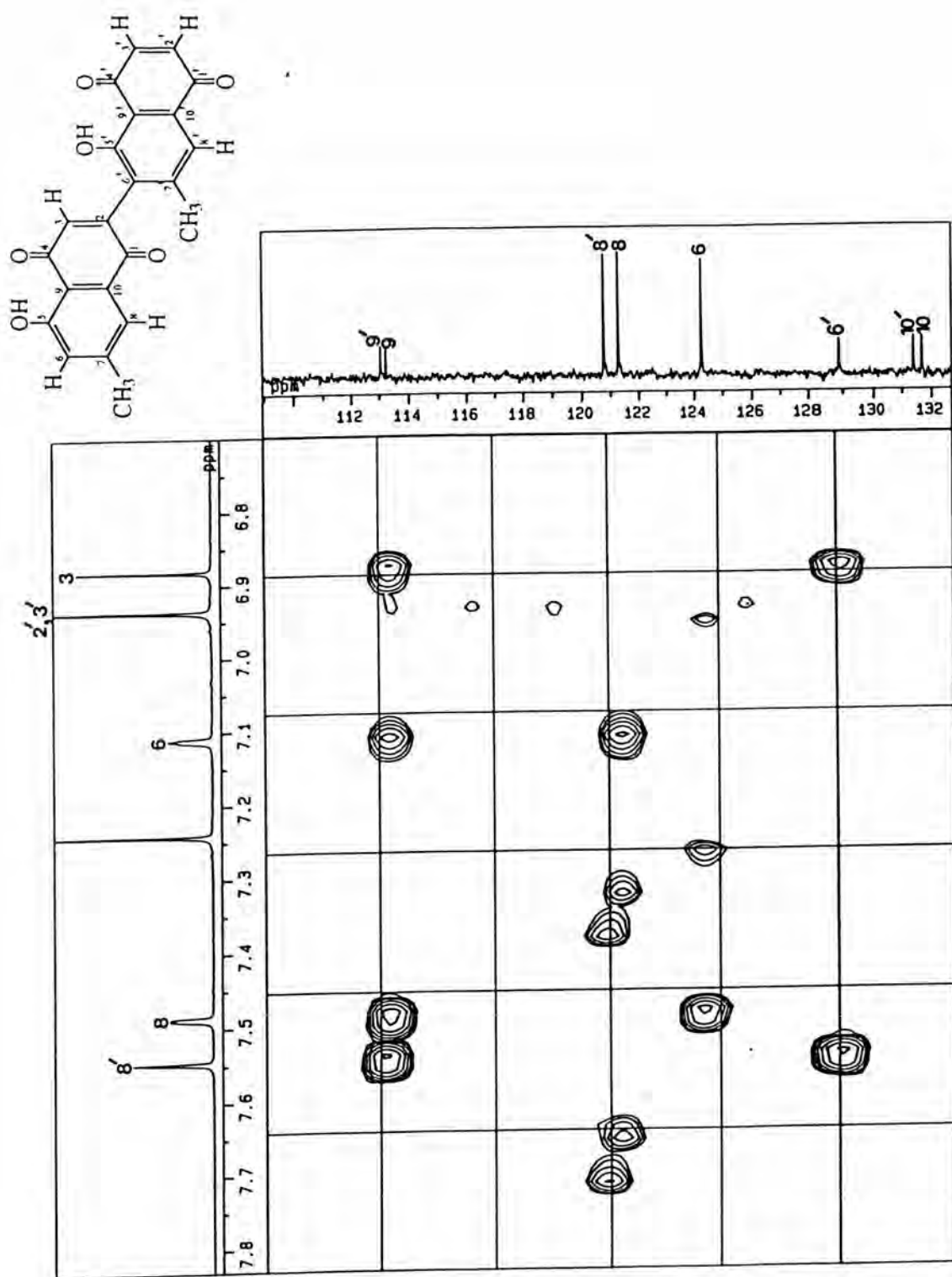


Figure 28e HMBC spectrum of compound DM-A (in CDCl_3) [δ_{H} 6.8-7.8 ppm, δ_{C} 110-132 ppm]

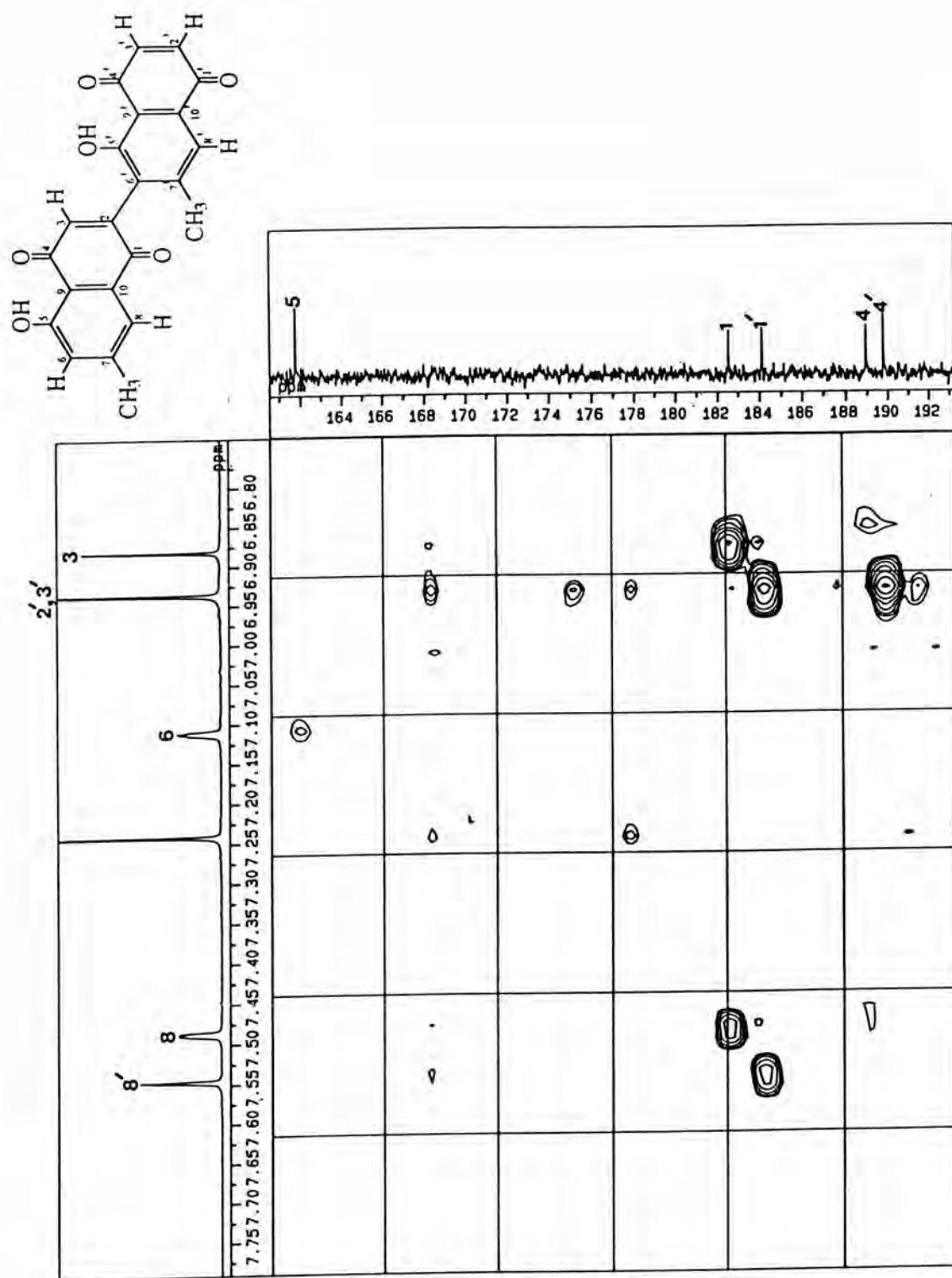


Figure 28f HMBC spectrum of compound DM-A (in CDCl₃) [δ_H 6.80-7.75 ppm, δ_C 162-192 ppm]

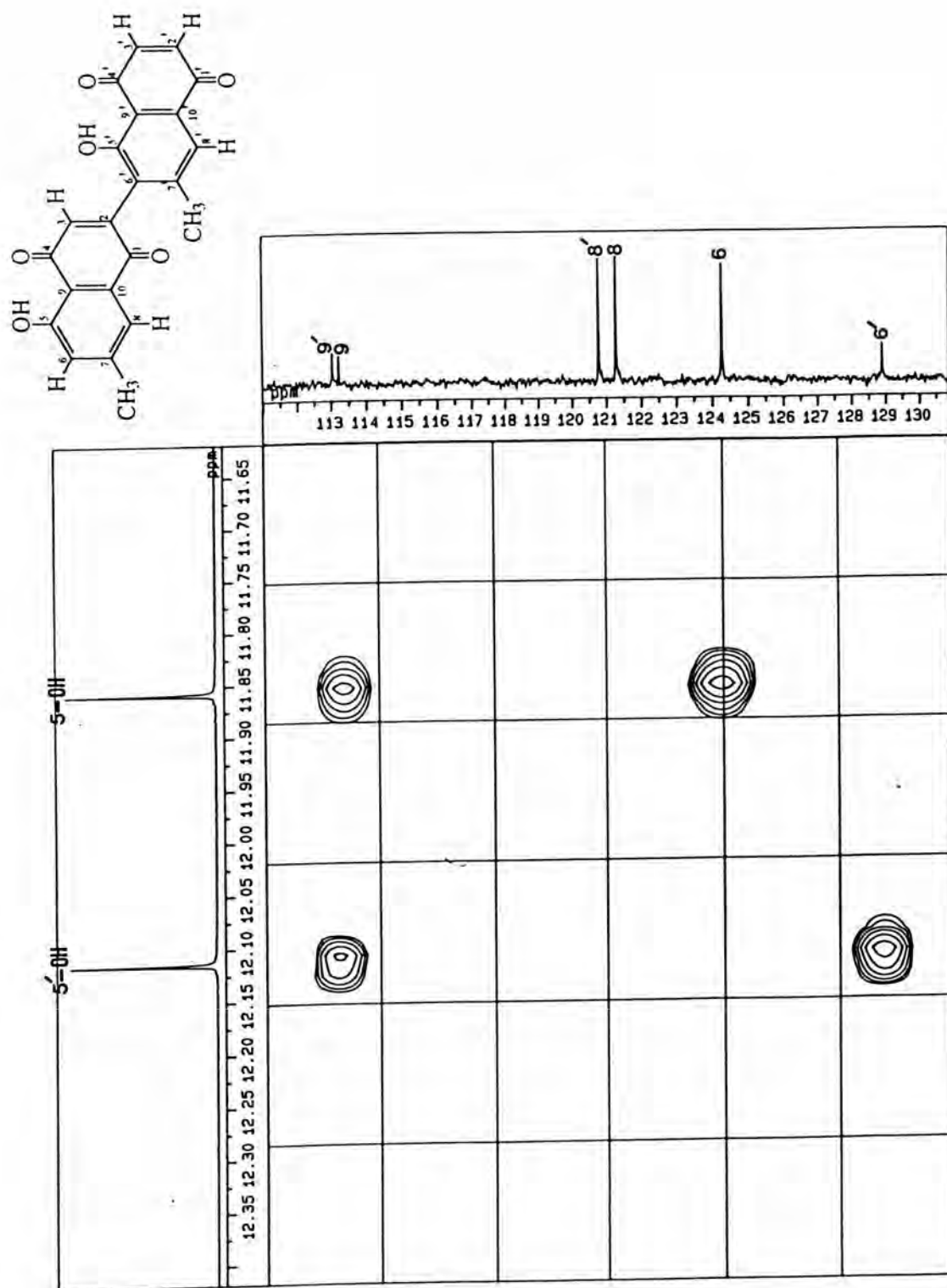


Figure 28g HMBC spectrum of compound DM-A (in CDCl₃) [δ_H 11.65-12.35 ppm, δ_C 111-130 ppm]

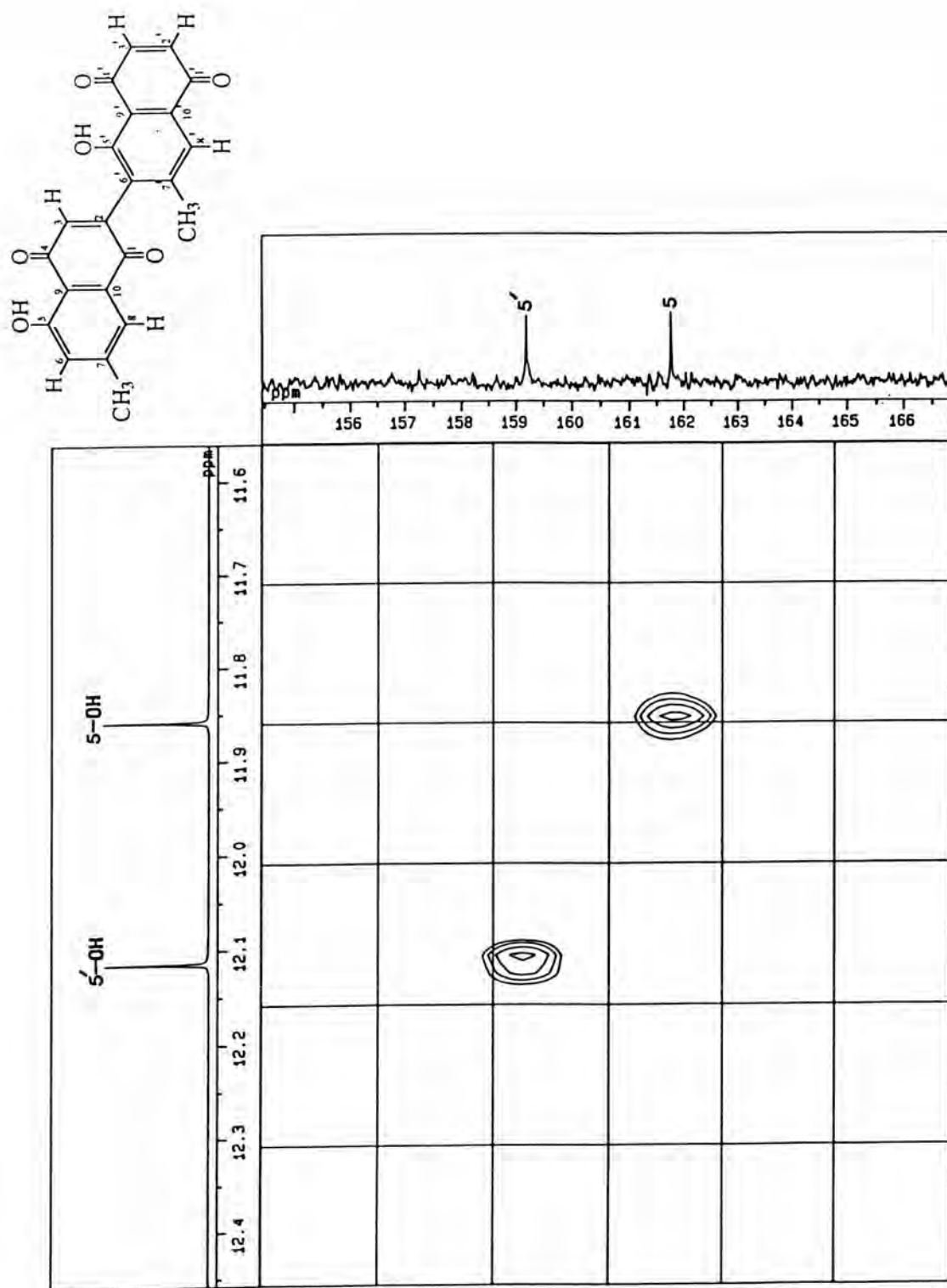


Figure 28h HMBC spectrum of compound DM-A (in CDCl_3) [δ_{H} 11.6-12.4 ppm, δ_{C} 156-166 ppm]

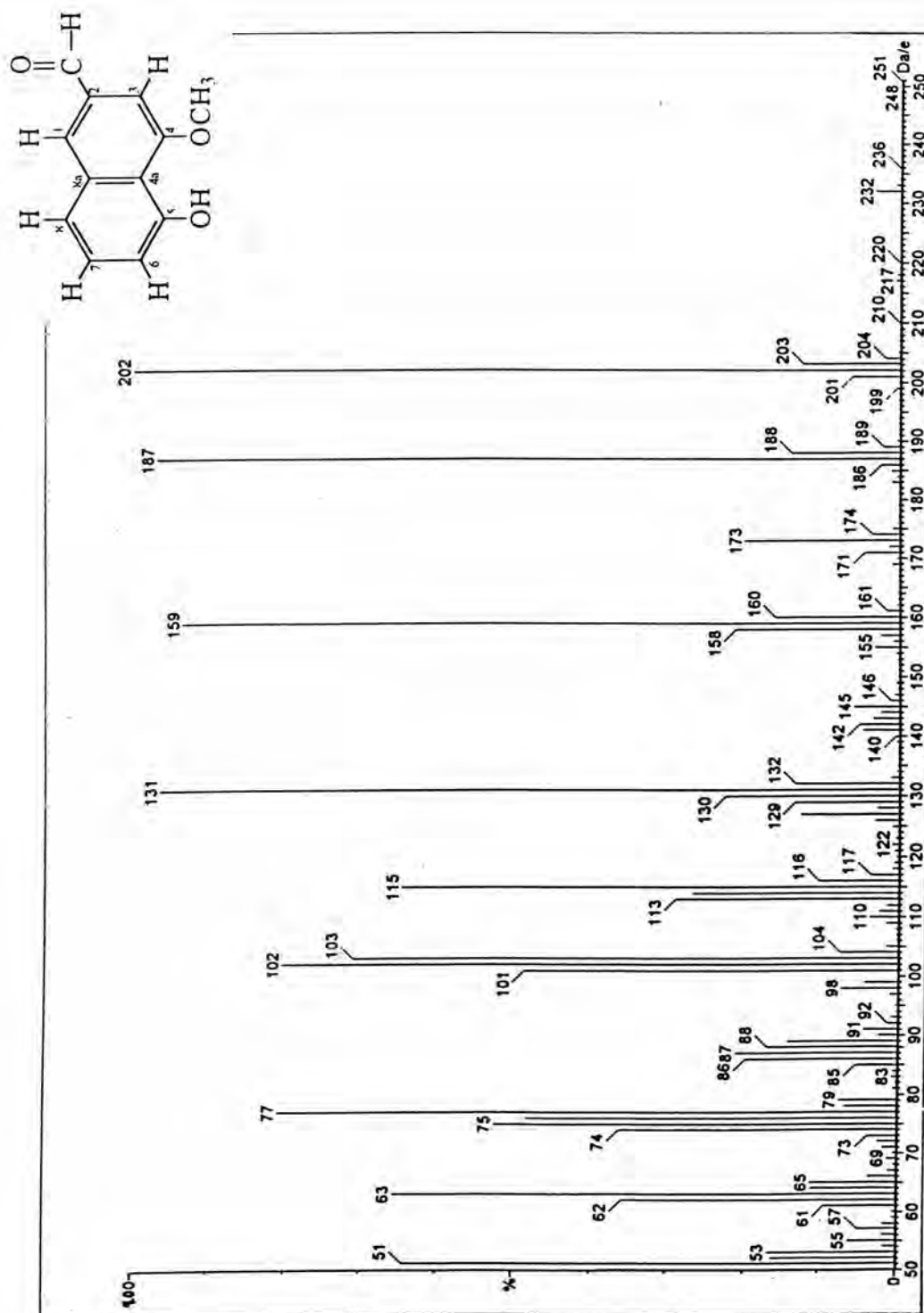


Figure 30 EI mass spectrum of compound DM-B

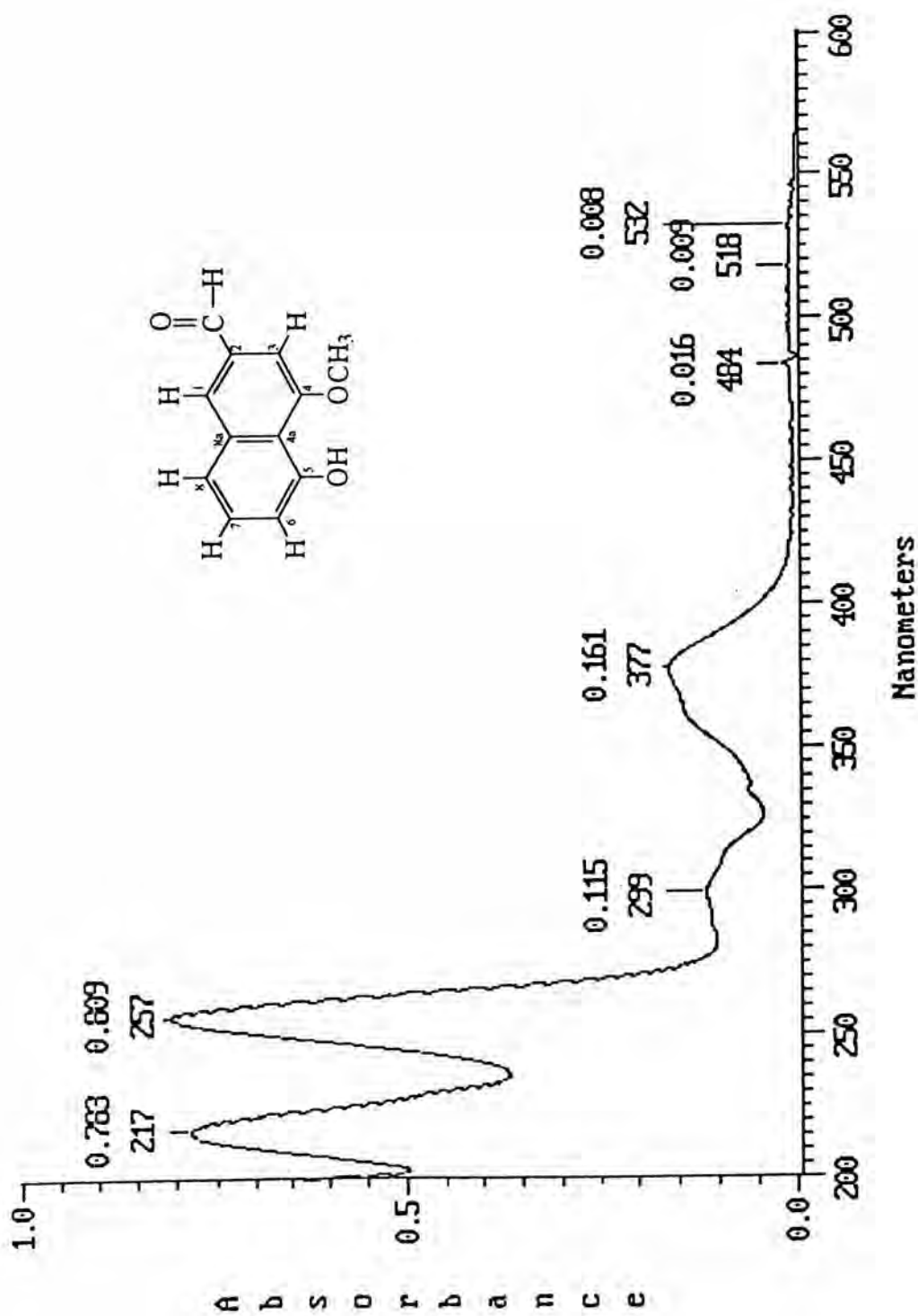


Figure 31 UV spectrum of compound DM-B (in methanol)

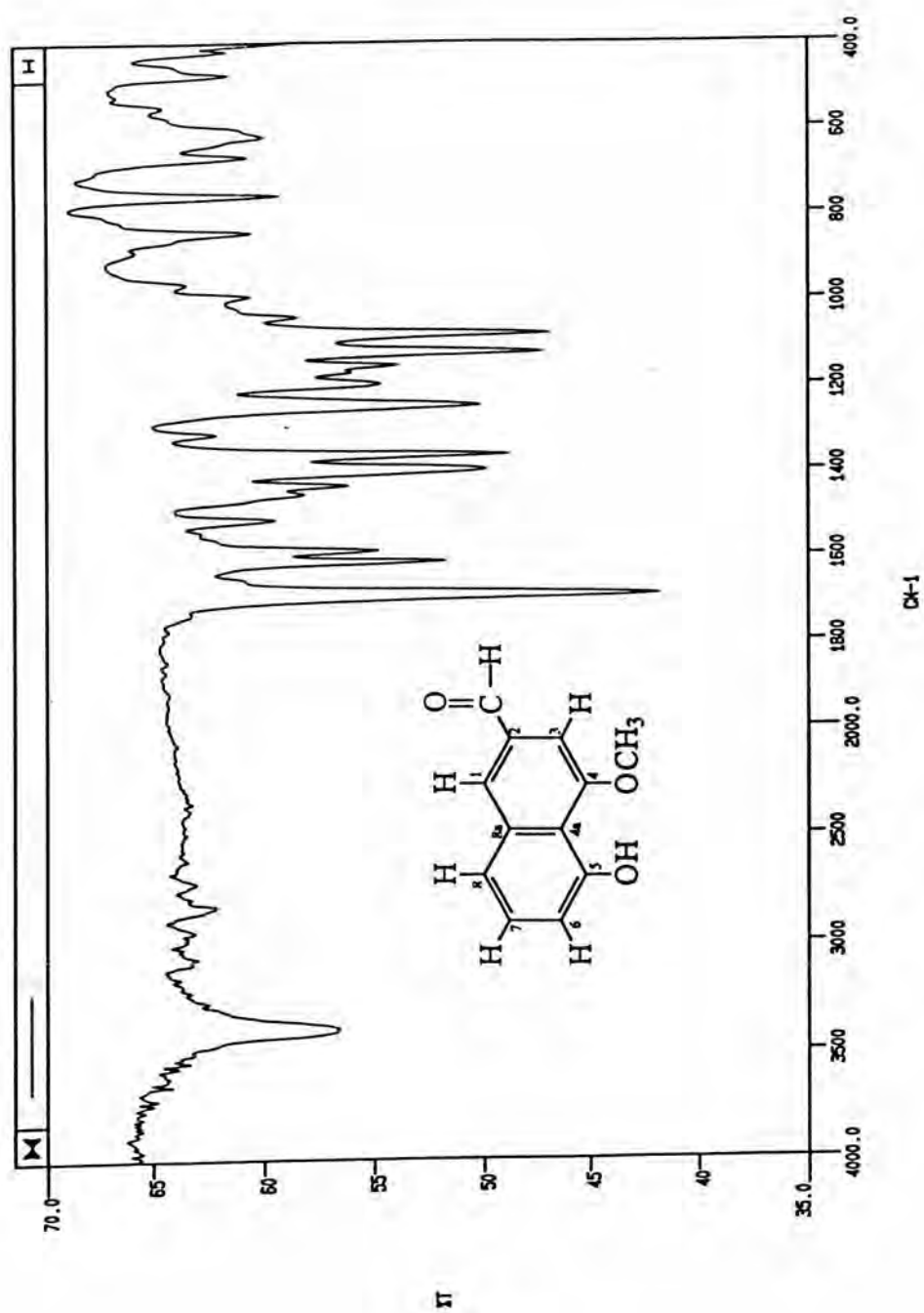


Figure 32 IR spectrum of compound DM-B (film)

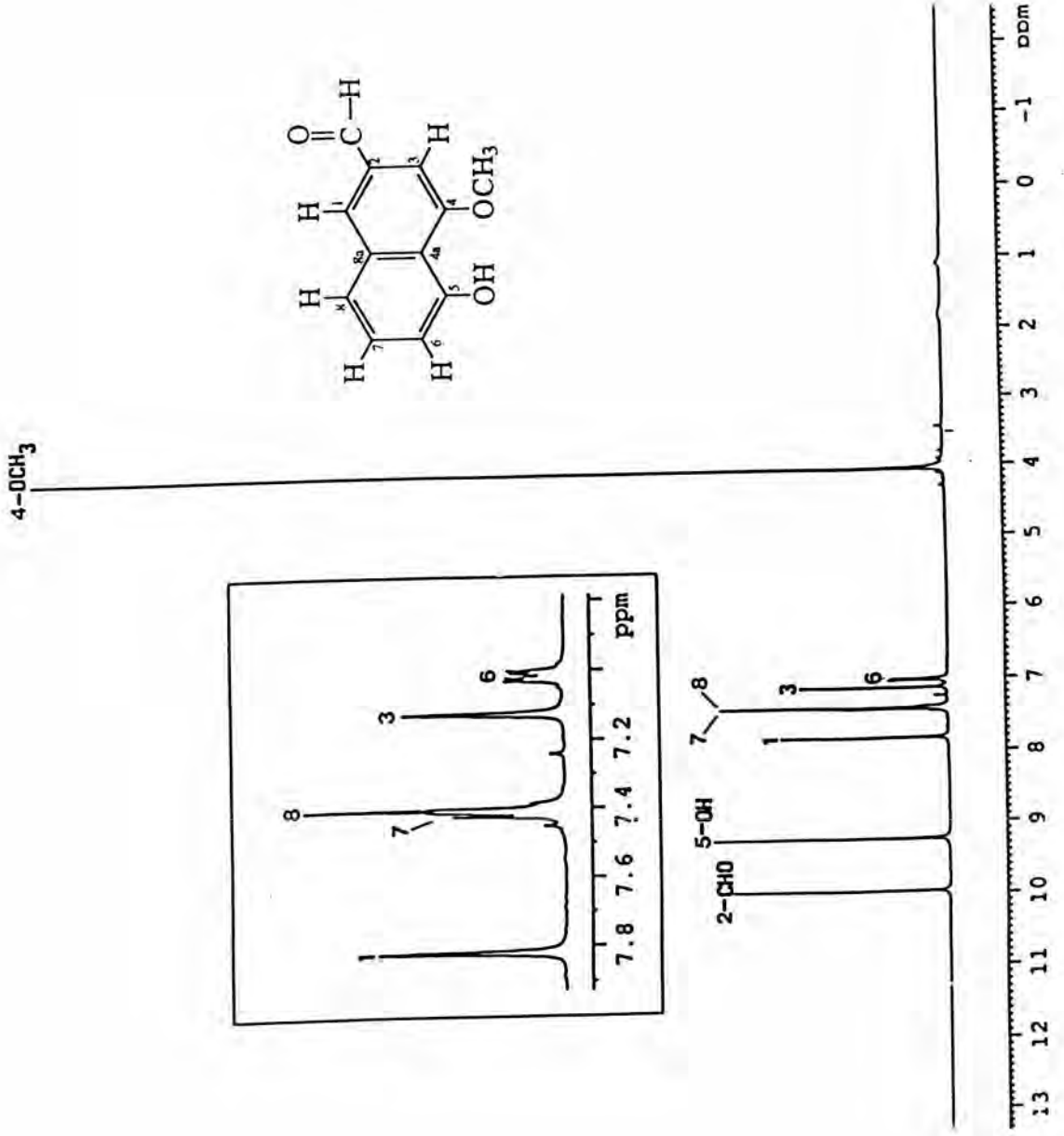


Figure 33 300 MHz ¹H NMR spectrum of compound DM-B (in CDCl₃)

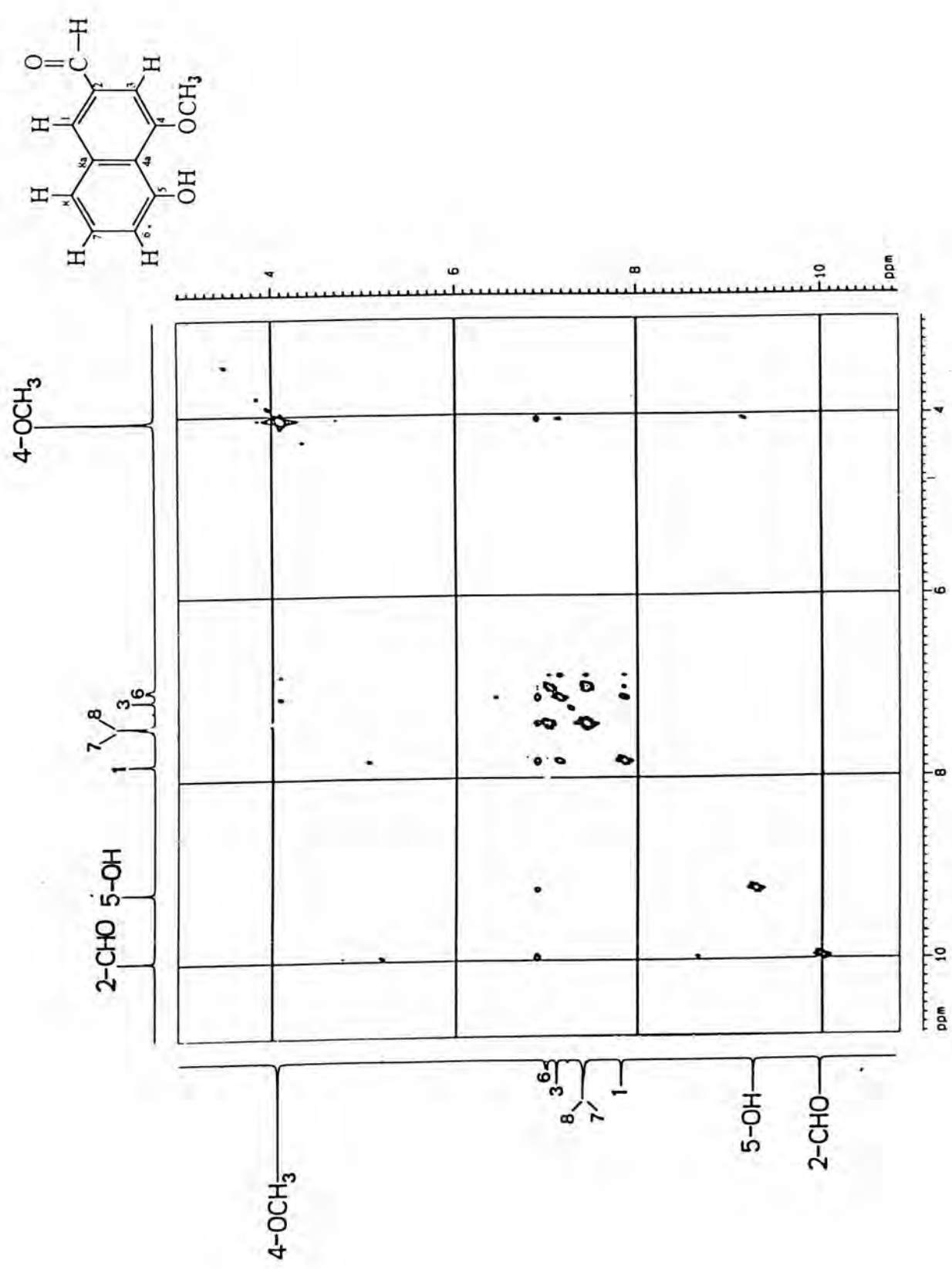


Figure 34a ¹H-¹H COSY spectrum of compound DM-B (in CDCl₃)

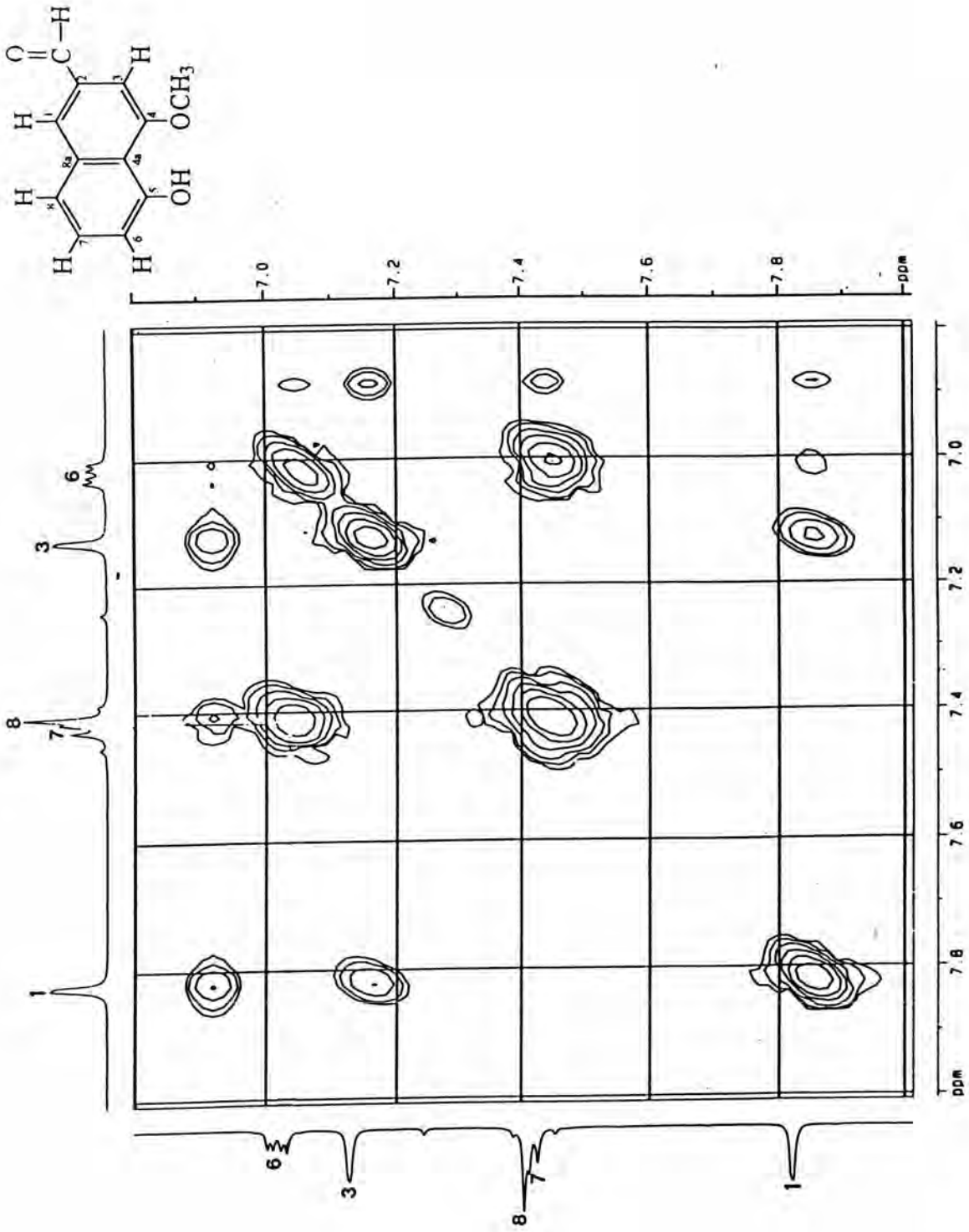


Figure 34b ¹H-¹H COSY spectrum of compound DM-B (in CDCl₃) (expanded from 6.8 to 8.0 ppm)

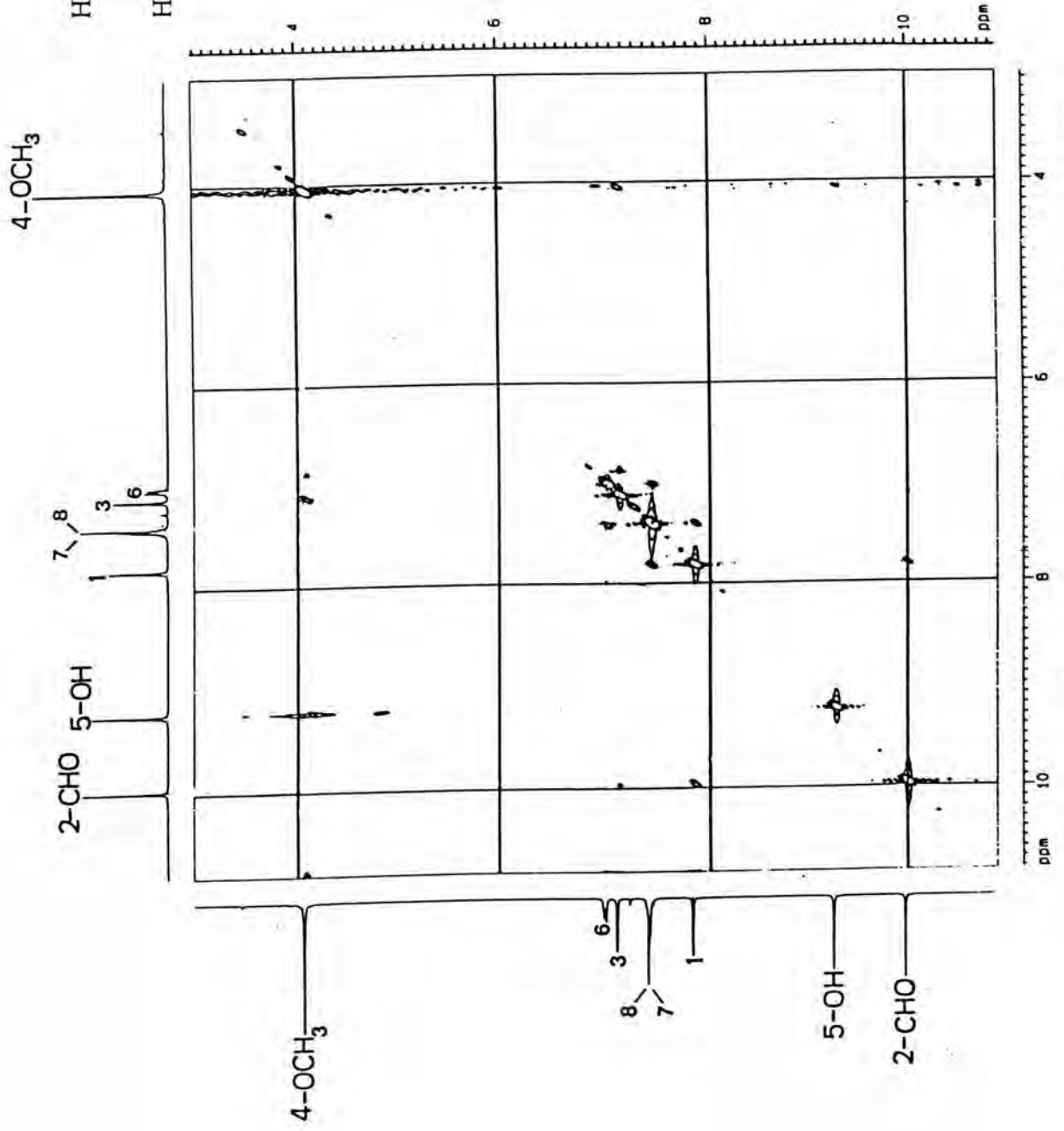
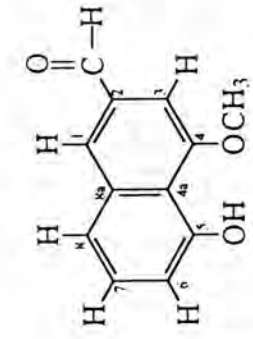


Figure 35a NOESY spectrum of compound DM-B (in CDCl₃)

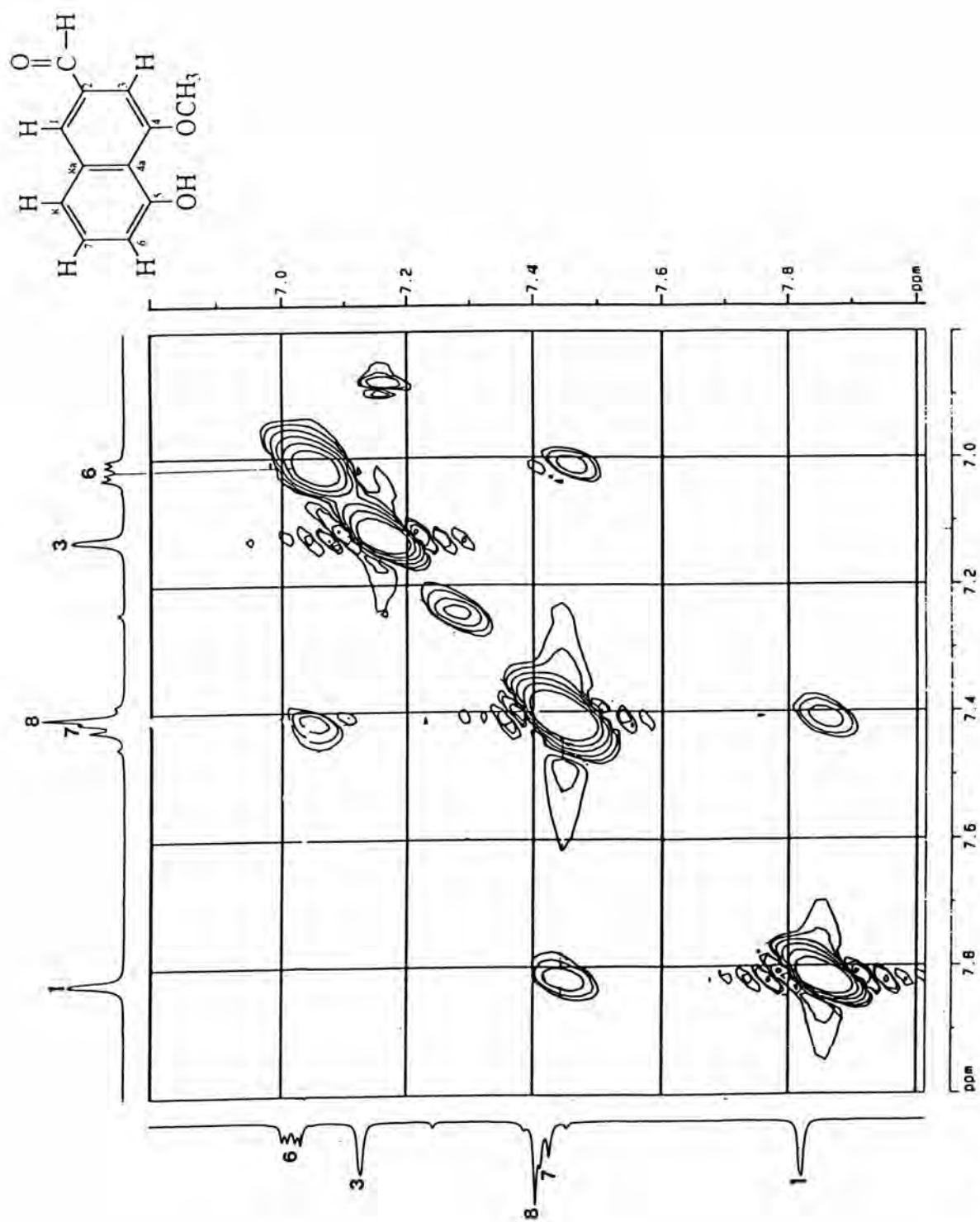


Figure 35b NOESY spectrum of compound DM-B (in CDCl_3) (expanded from 6.8 to 8.0 ppm)

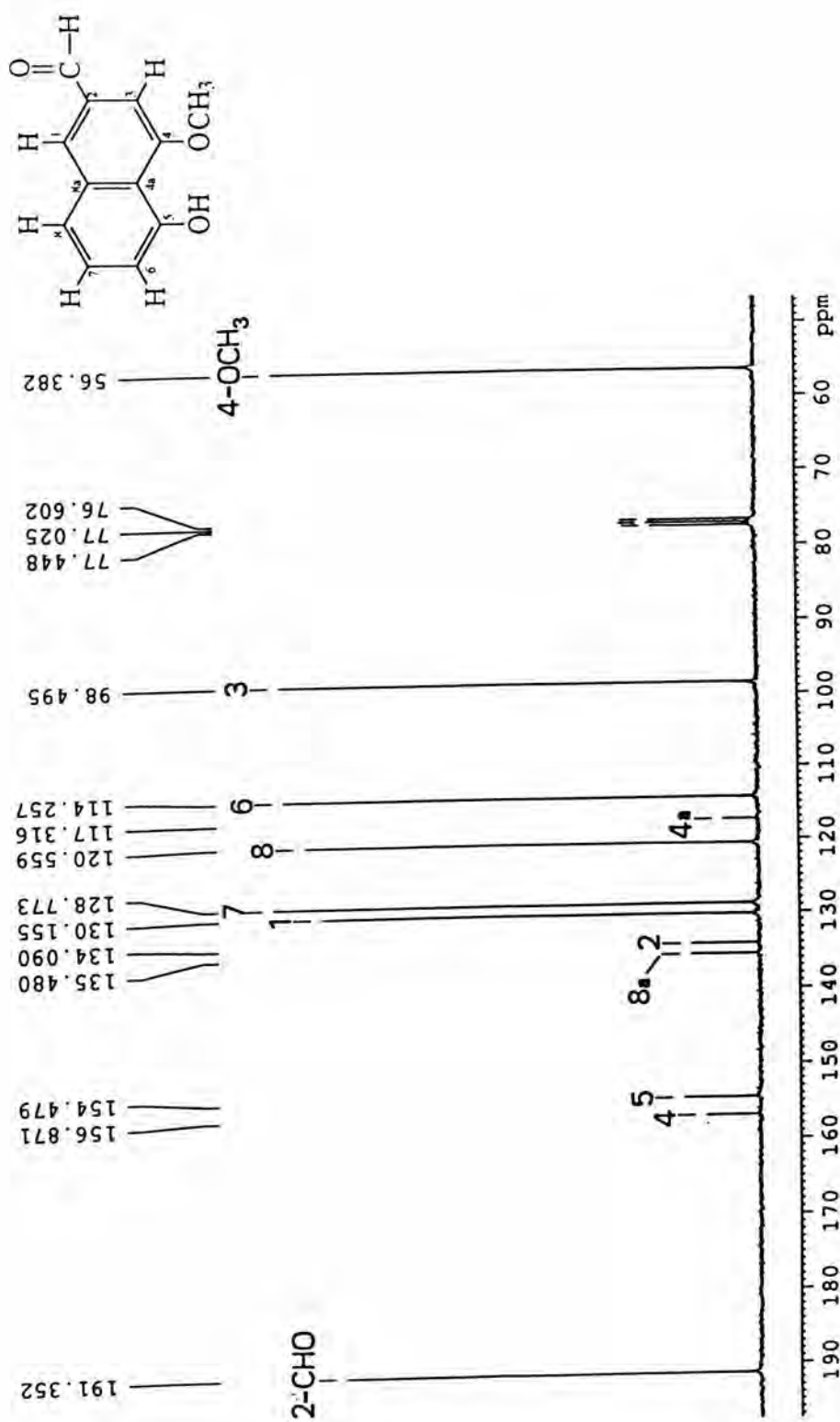


Figure 37 75 MHz ^{13}C NMR spectrum of compound DM-B (in CDCl_3)

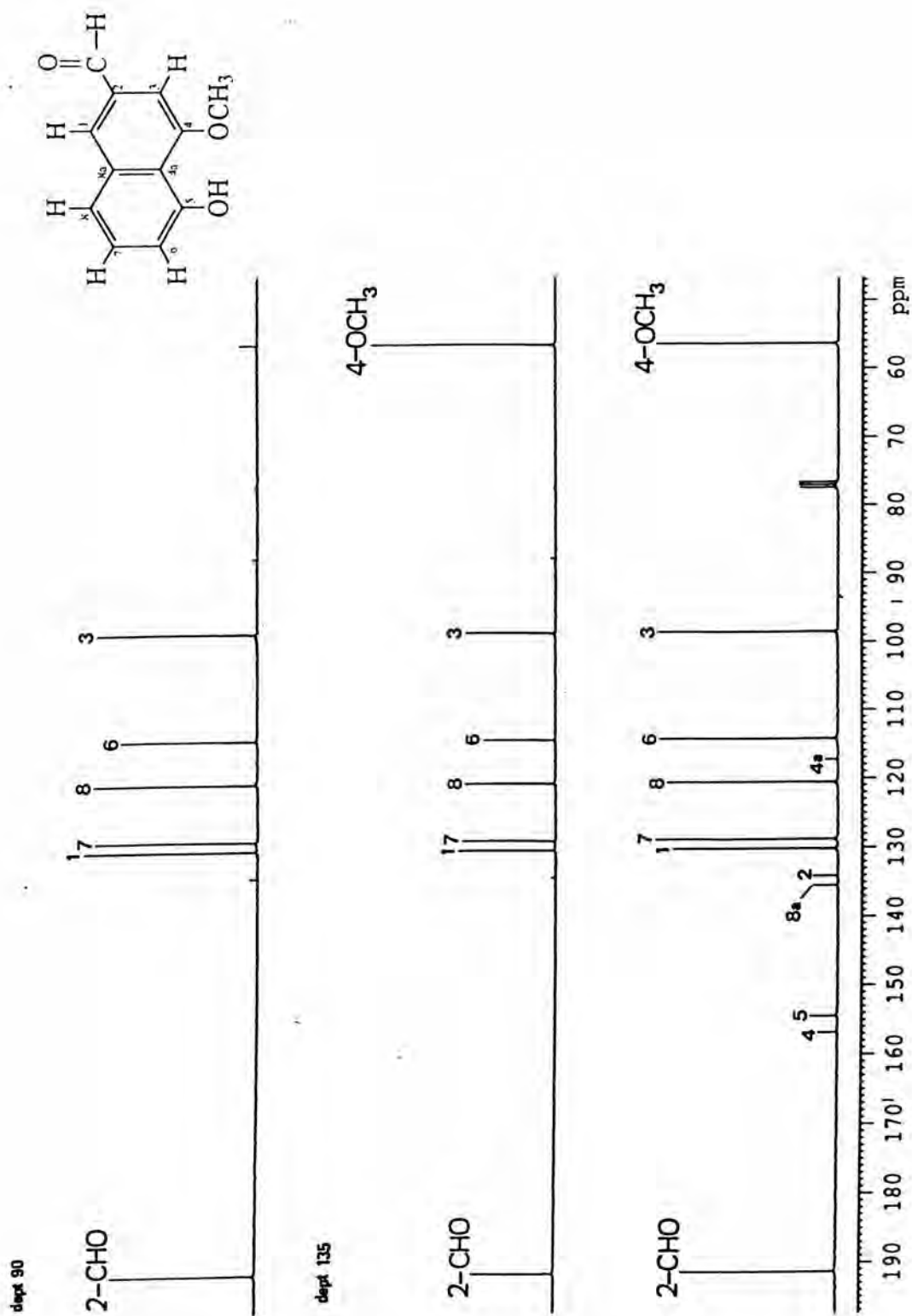


Figure 38 DEPT spectra of compound DM-B (in CDCl₃)

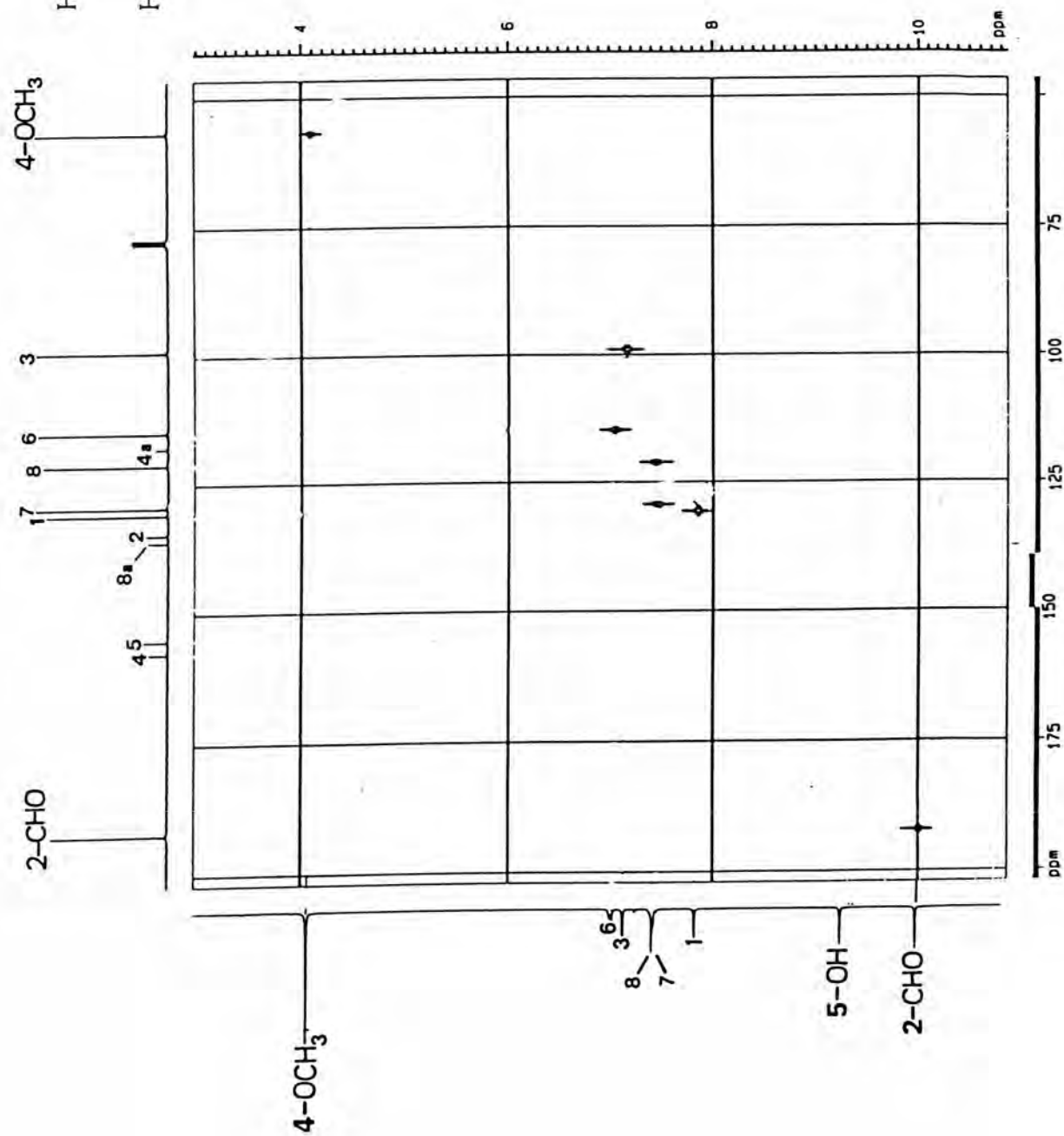
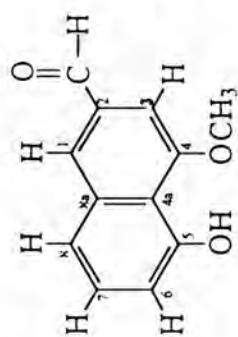


Figure 39 HETCOR spectrum of compound DM-B (in CDCl₃)

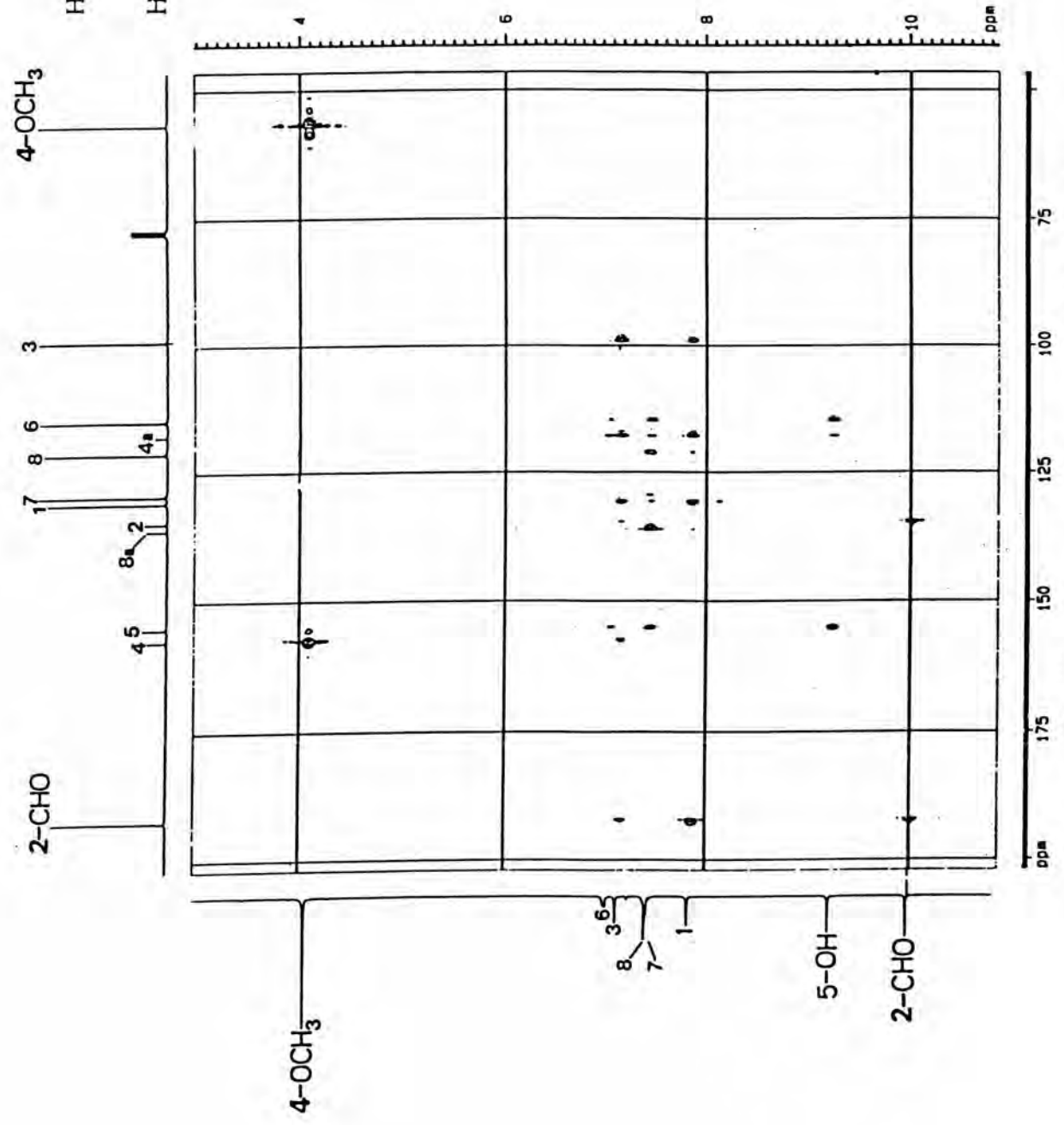
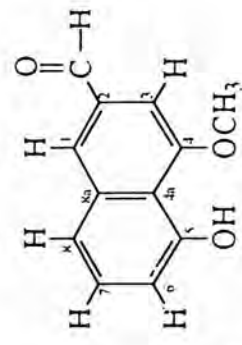


Figure 40a COLOC spectrum of compound DM-B (in CDCl₃)

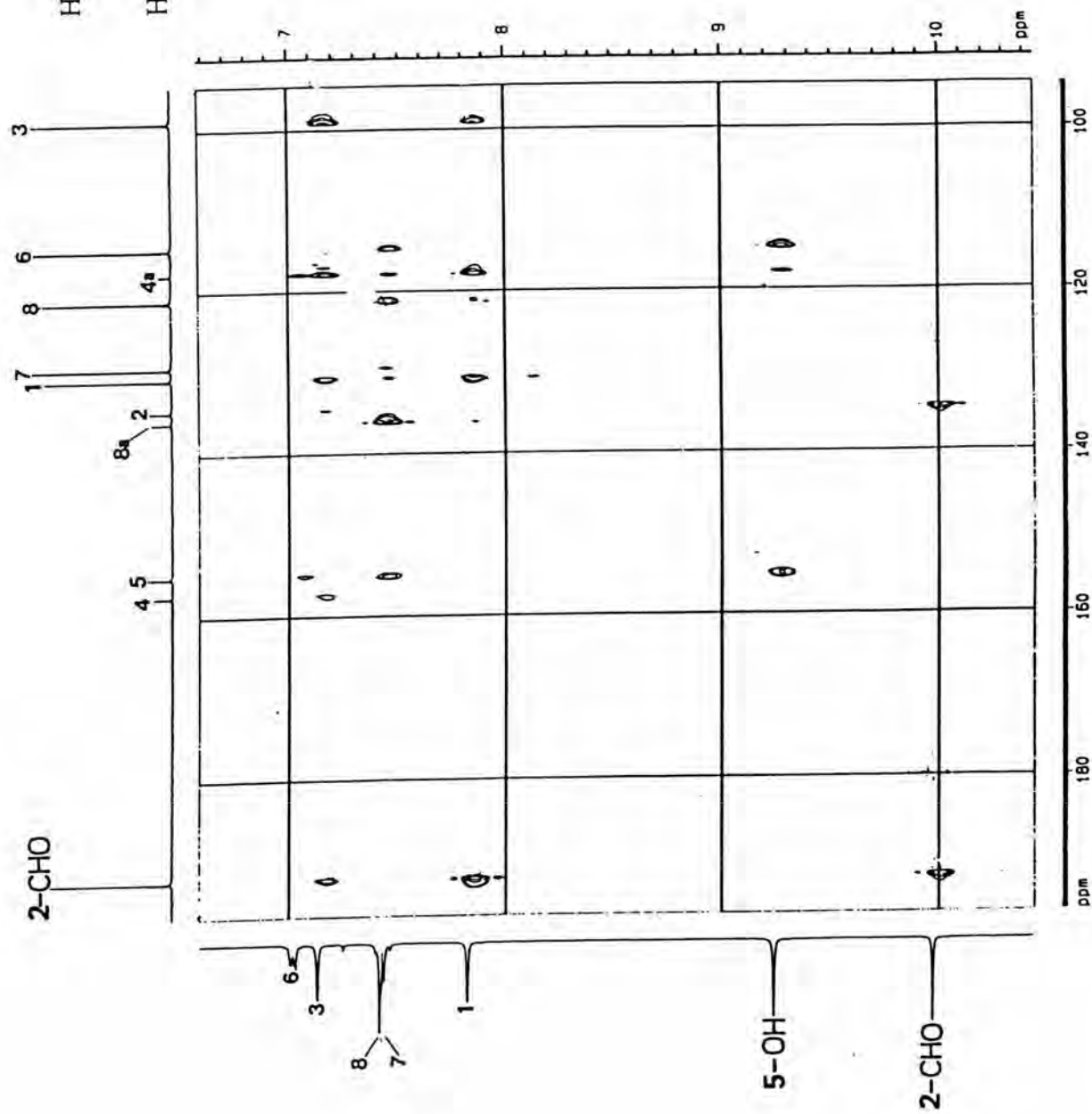
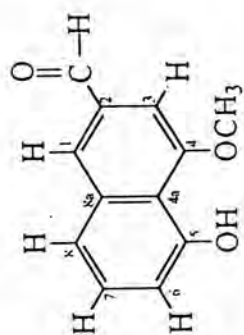


Figure 40b COLOC spectrum of compound DM-B (in CDCl_3) [δ_{H} 6.6-10.4 ppm, δ_{C} 94.5-196.6 ppm]

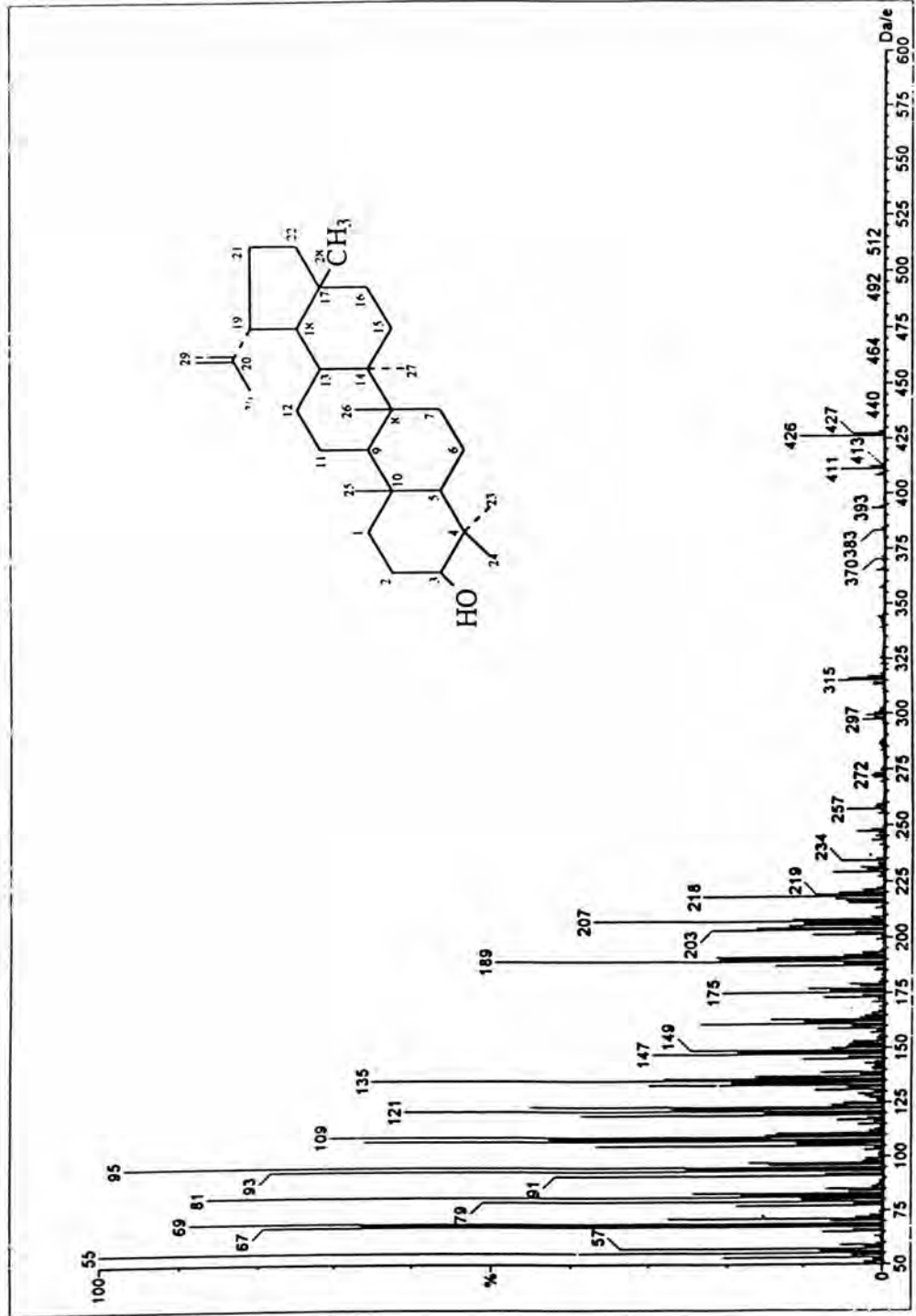


Figure 42 EI mass spectrum of compound DM-C

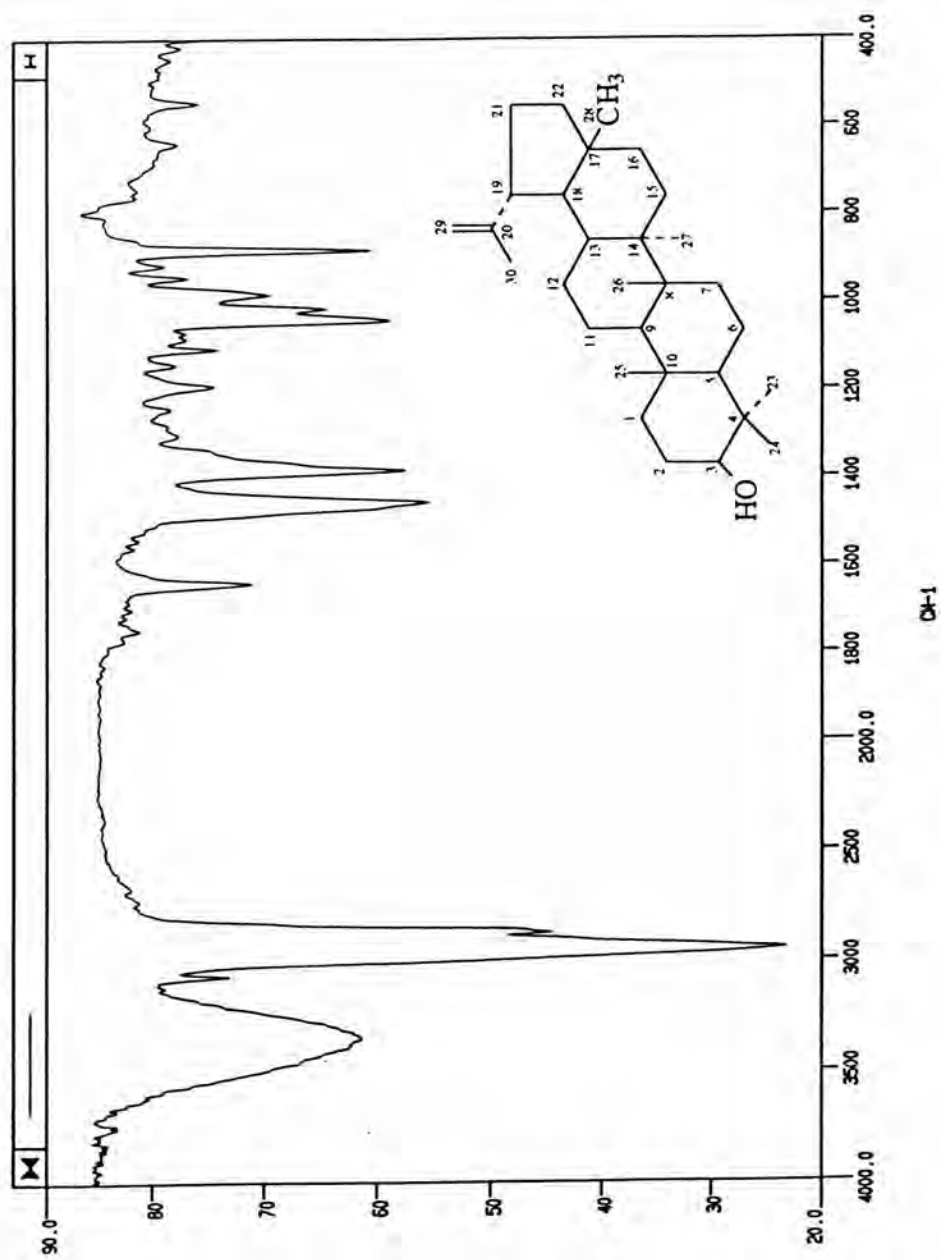


Figure 43 IR spectrum of compound DM-C (KBr disc)

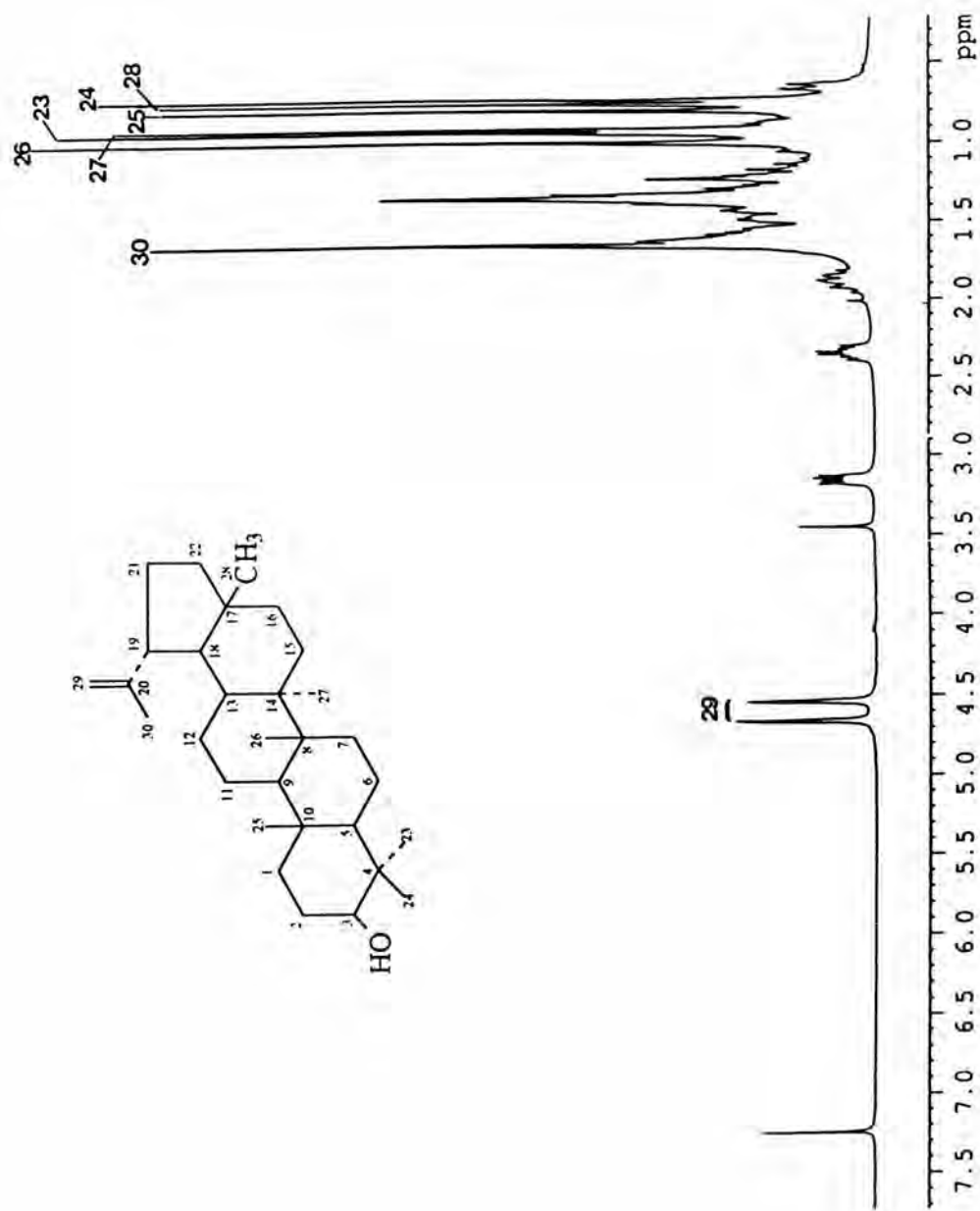


Figure 44a 300 MHz ^1H NMR spectrum of compound DM-C (in CDCl_3)

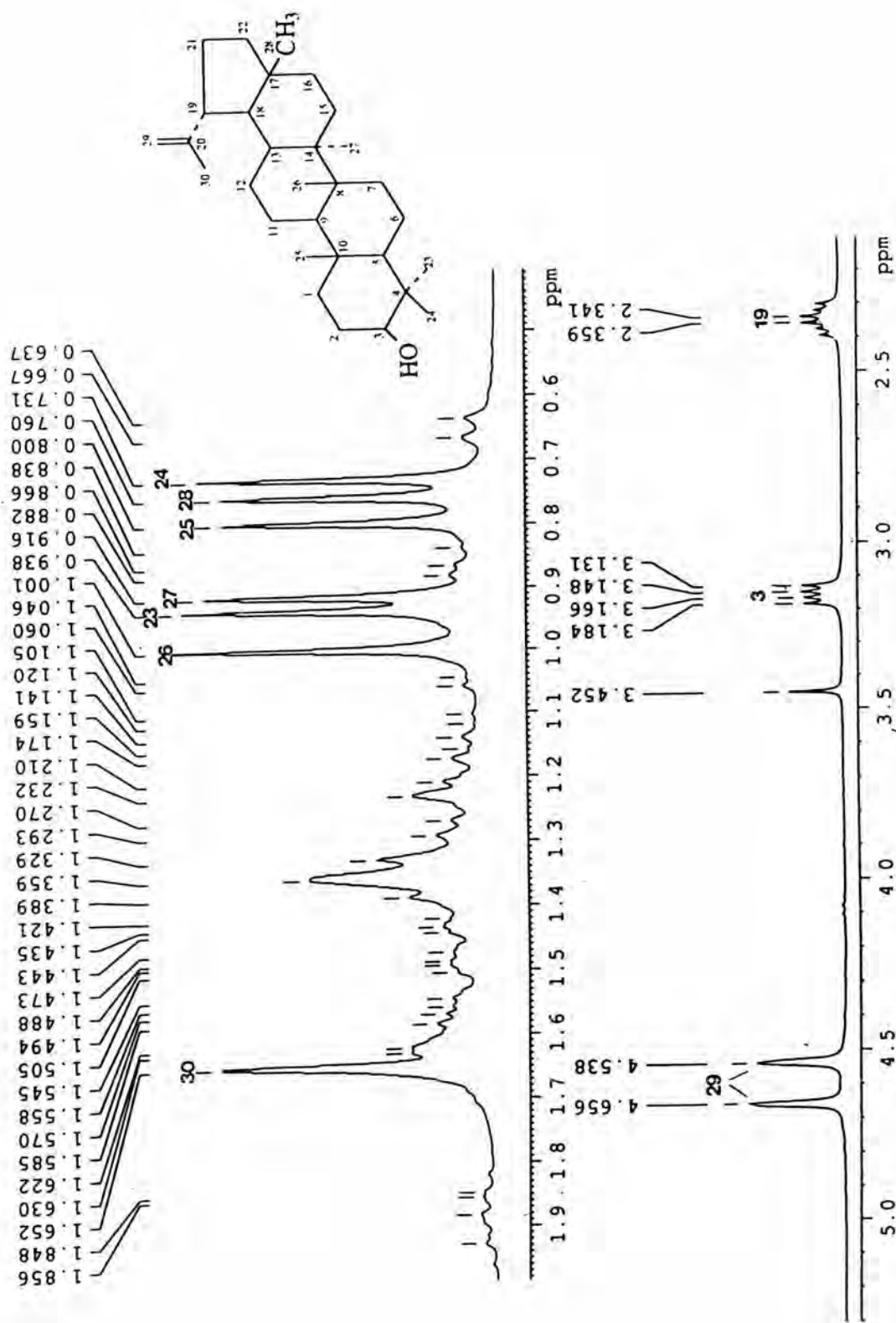


Figure 44b 300 MHz ¹H NMR spectrum of compound DM-C (in CDCl₃) (expanded from 0.40 to 5.30 ppm)

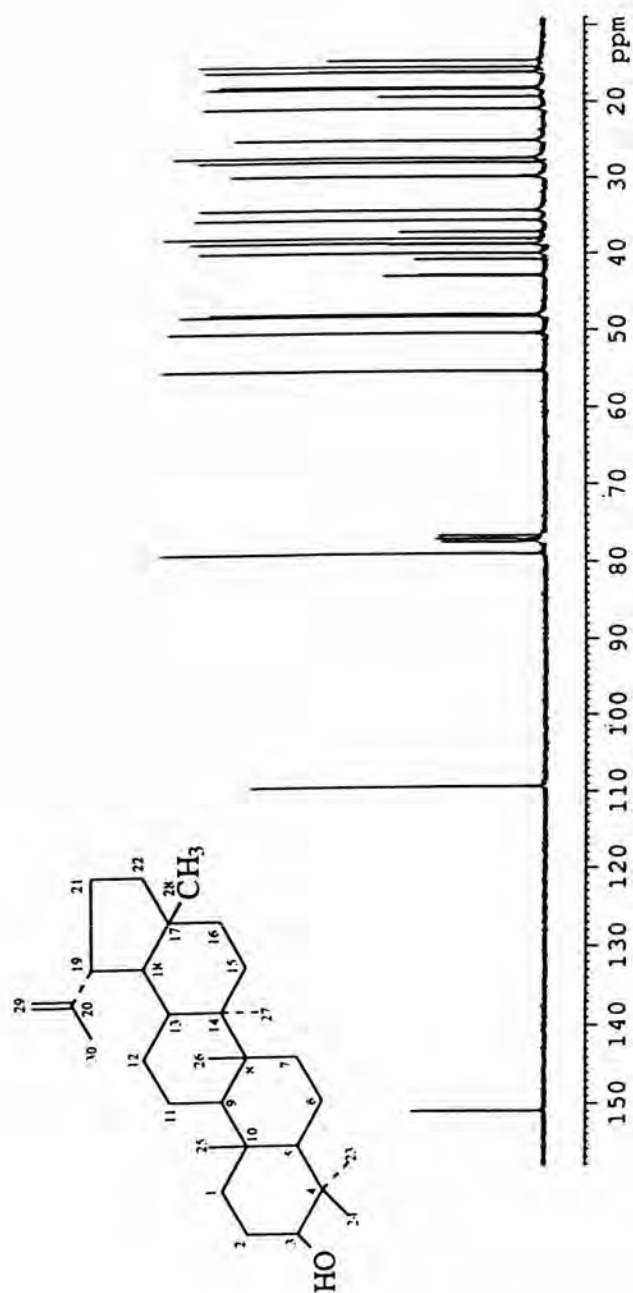


Figure 45a 75 MHz ^{13}C NMR spectrum of compound DM-C (in CDCl_3)

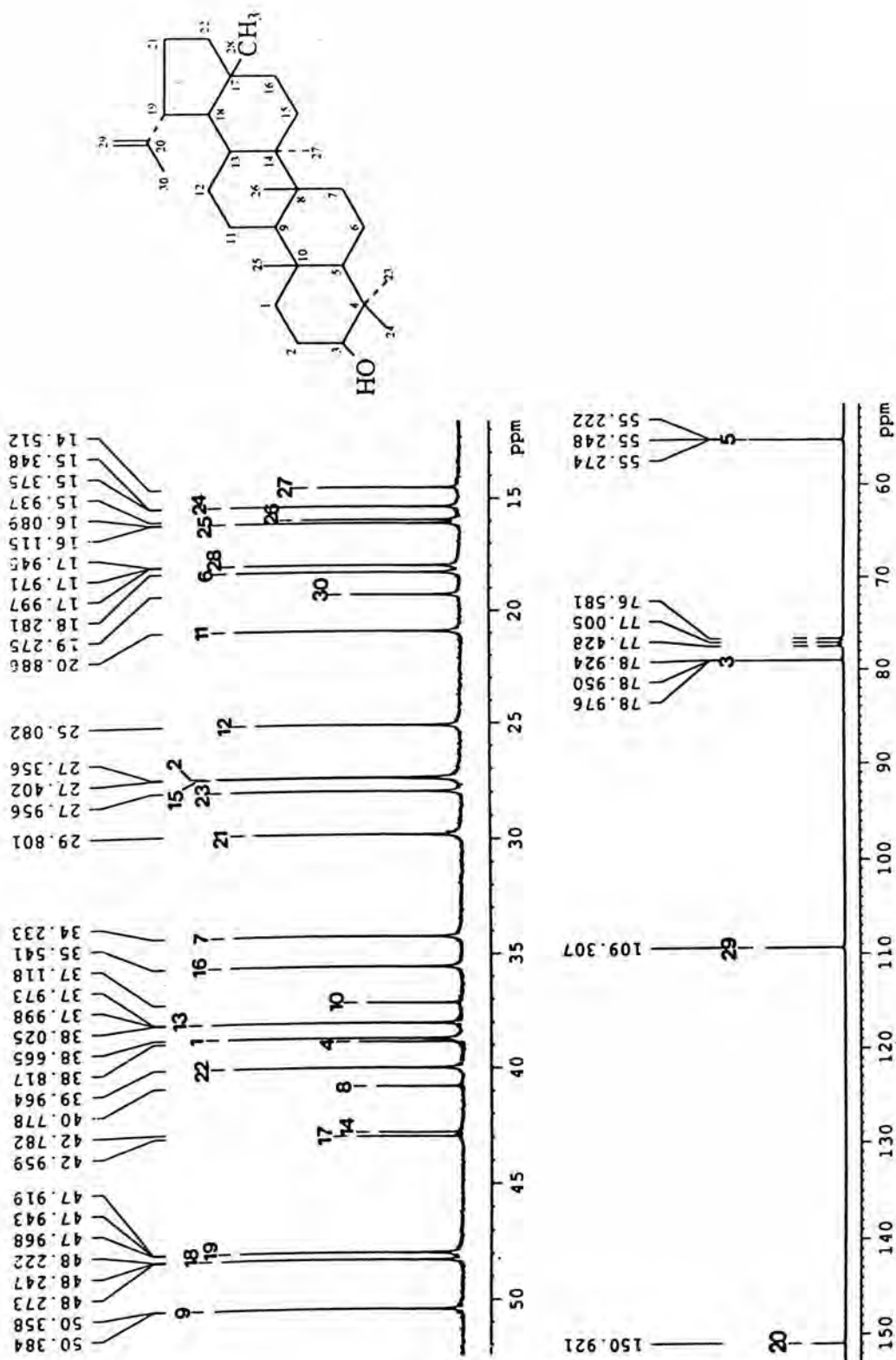


Figure 45b 75 MHz ^{13}C NMR spectrum of compound DM-C (in CDCl_3) (expanded from 12 to 153 ppm)

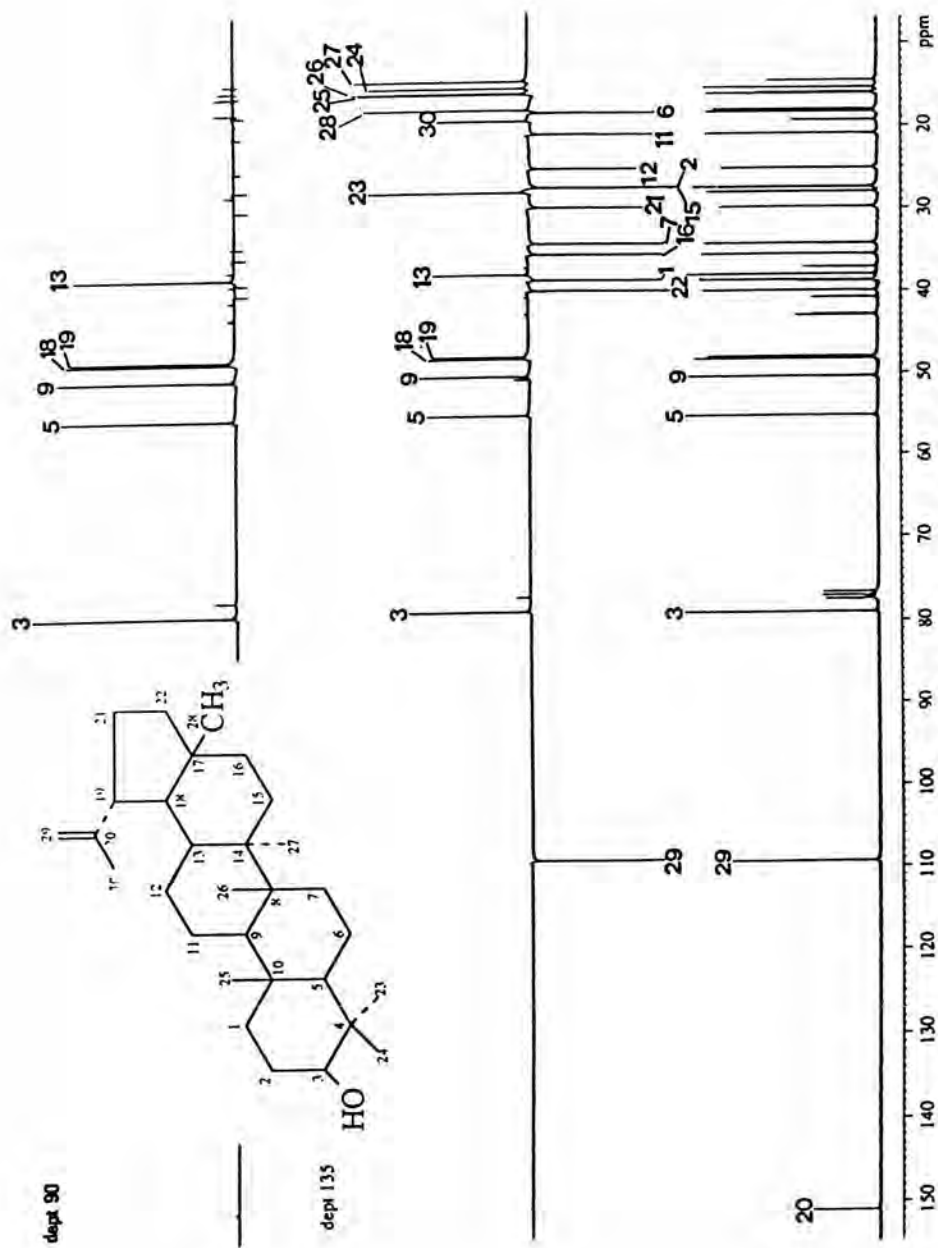


Figure 46 DEPT spectra of compound DM-C (in CDCl₃)

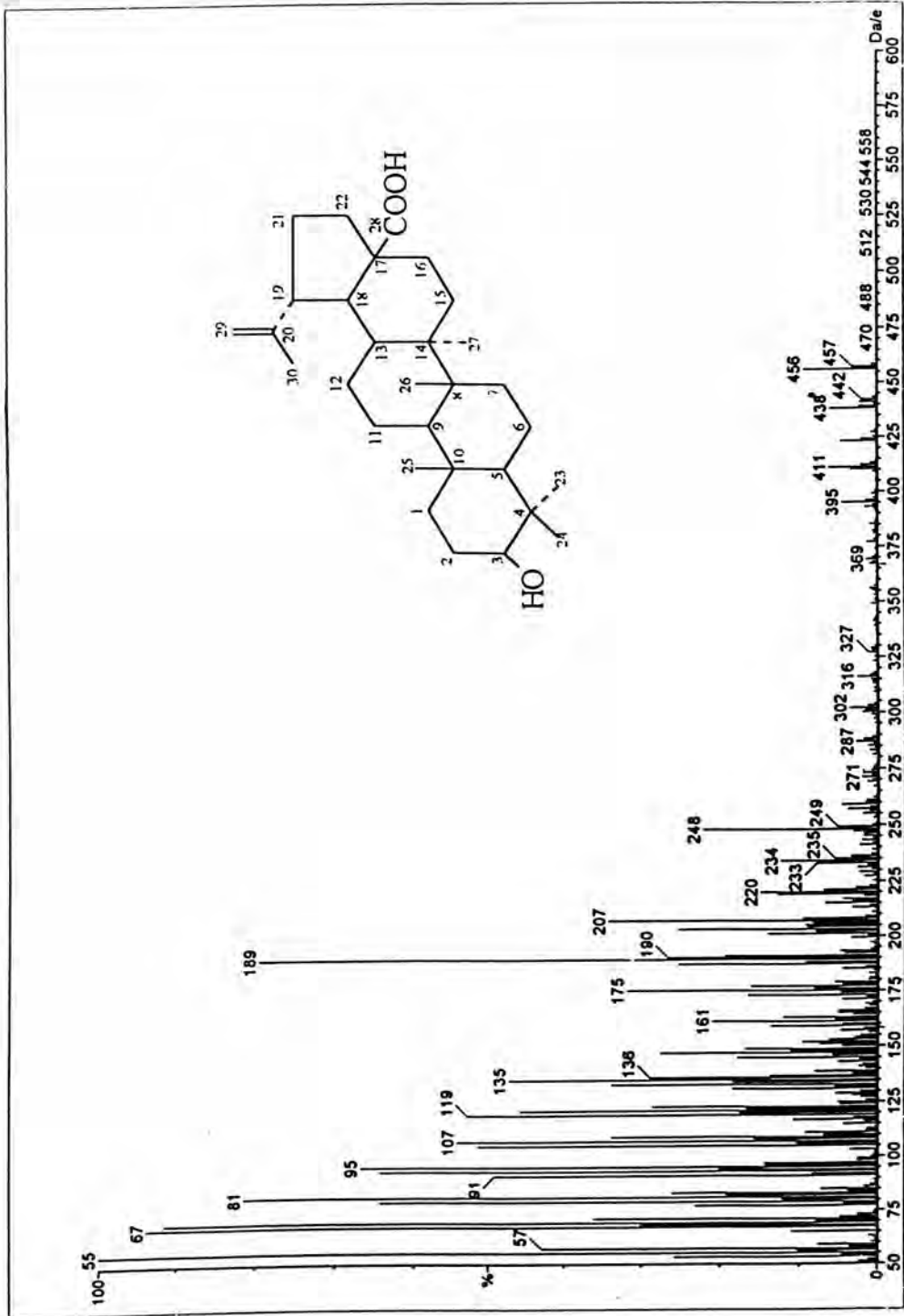


Figure 48 EI mass spectrum of compound DM-D

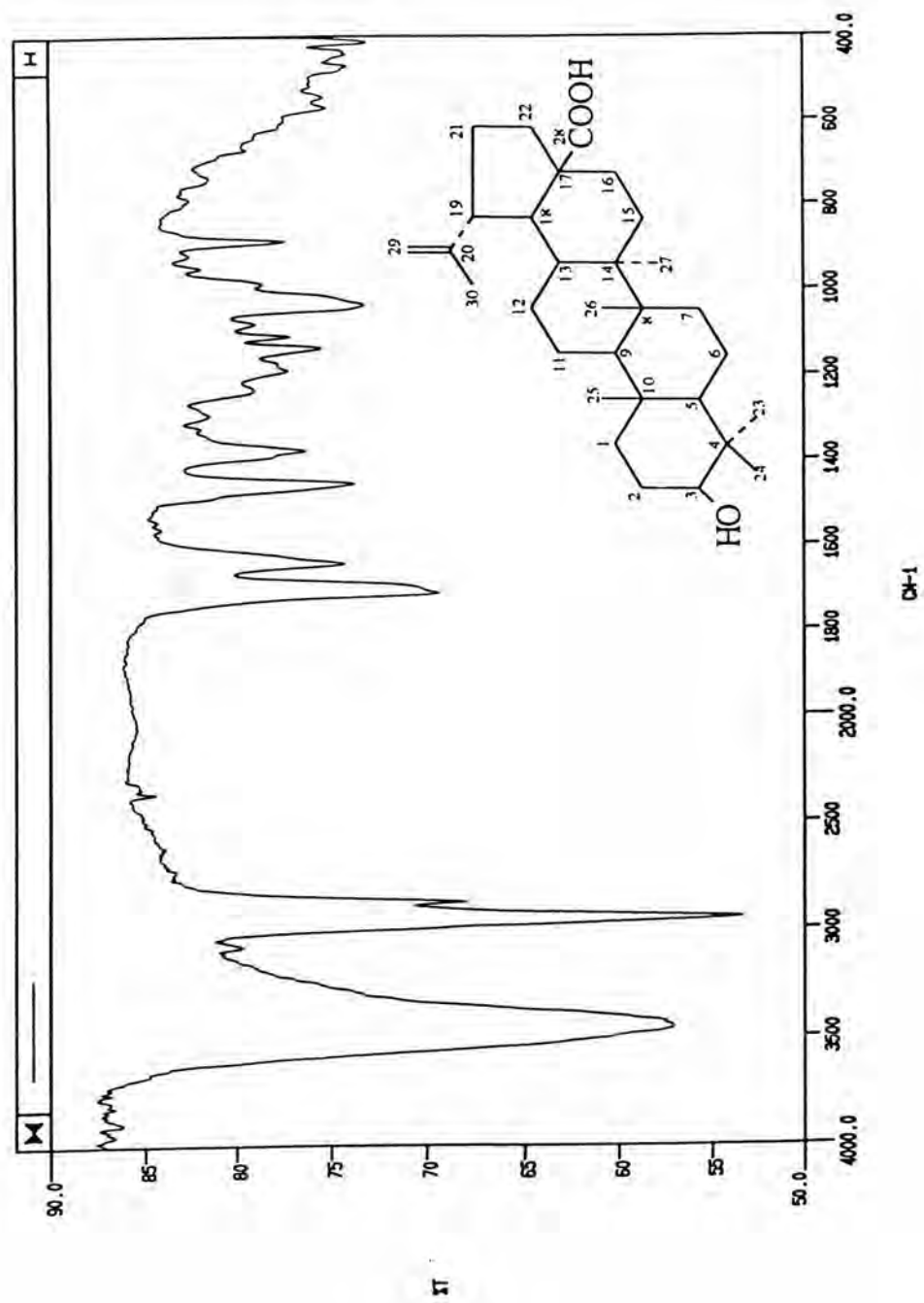


Figure 49 IR spectrum of compound DM-D (KBr disc)

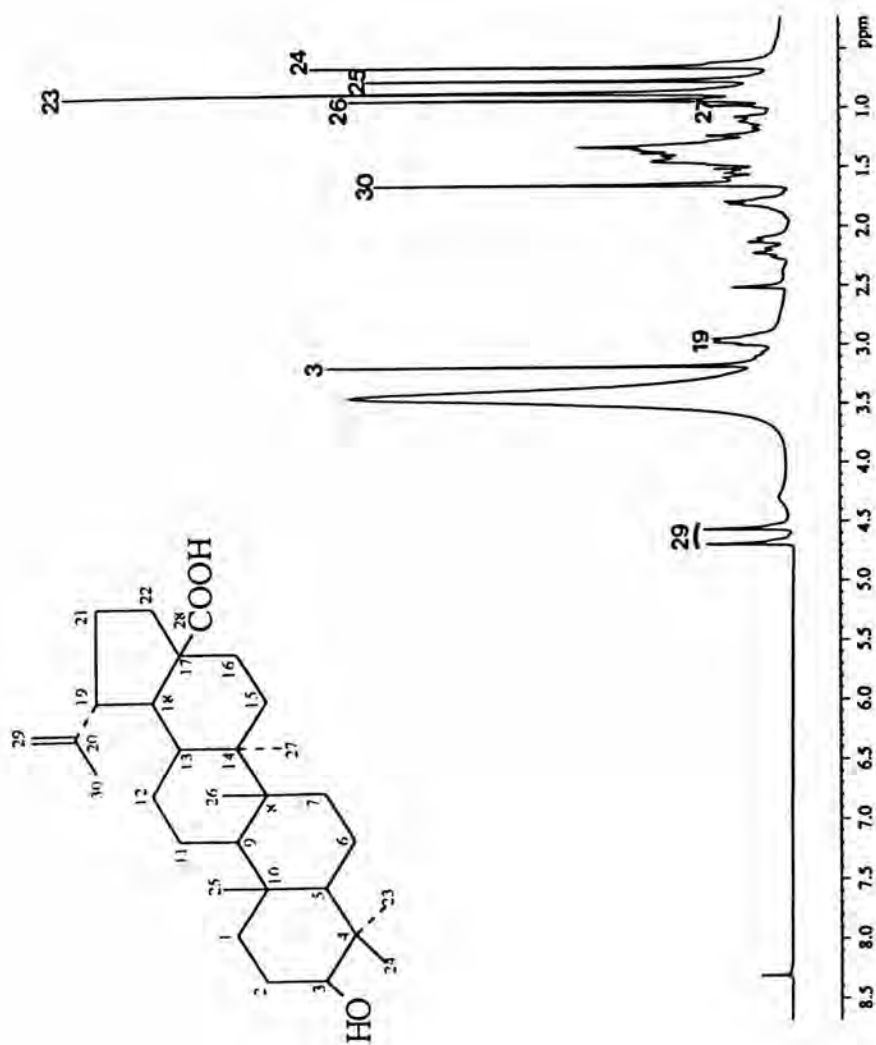


Figure 50a 300 MHz ¹H NMR spectrum of compound DM-D (in DMSO-*d*₆)

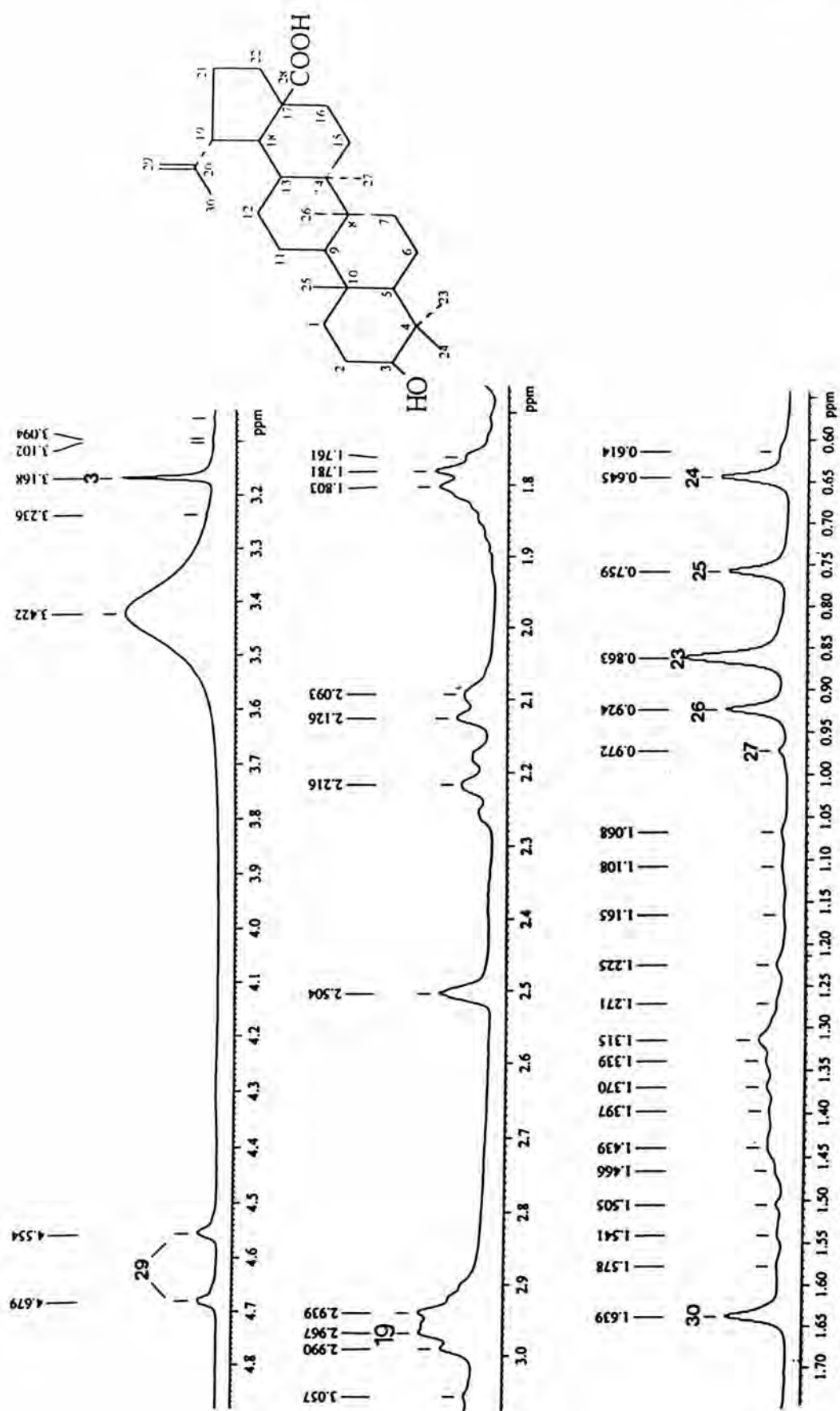


Figure 50b 300 MHz ^1H NMR spectrum of compound DM-D (in DMSO- d_6) (expanded from 0.55 to 4.88 ppm)

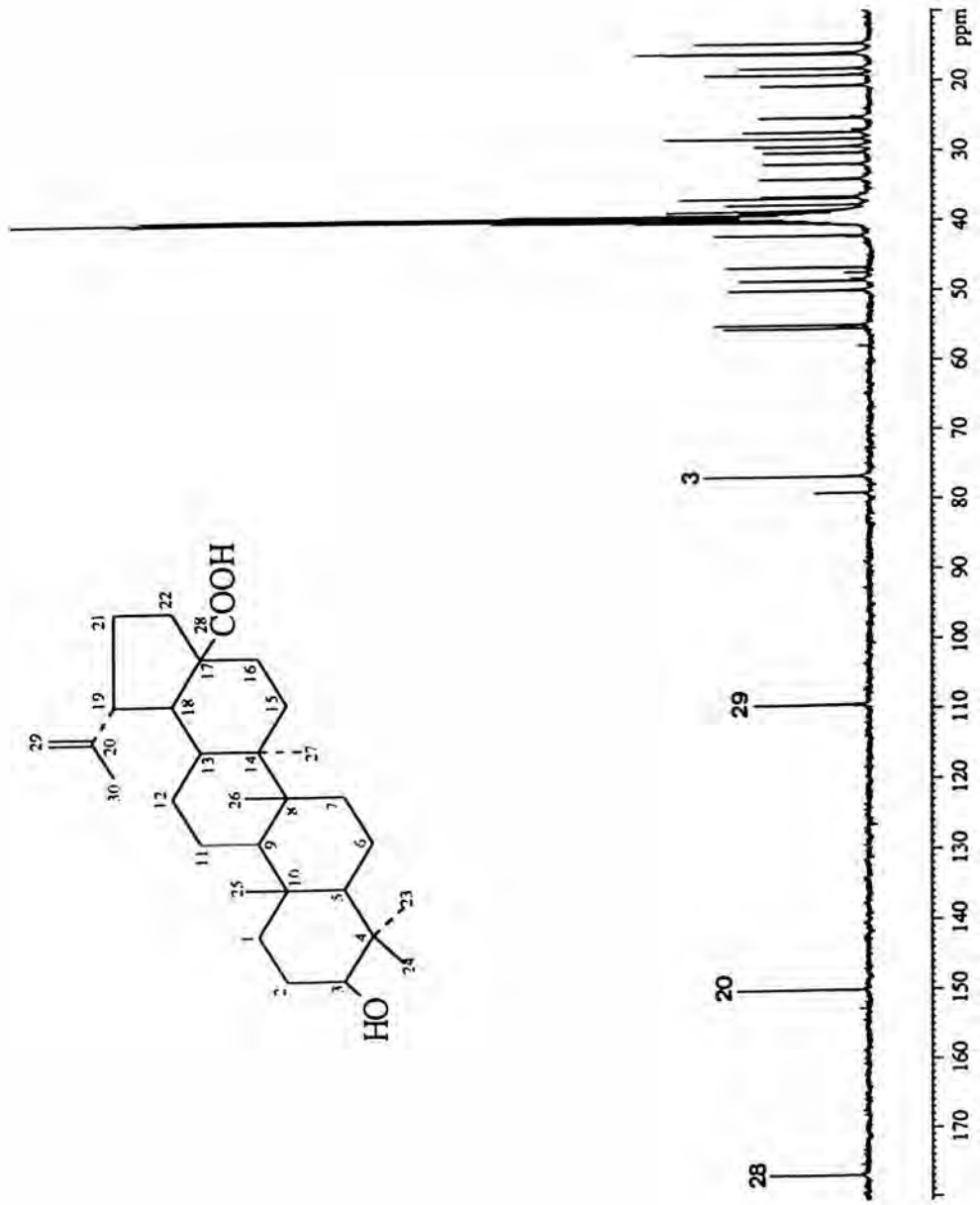


Figure S1a 75 MHz ^{13}C NMR spectrum of compound DM-D (in $\text{DMSO-}d_6$)

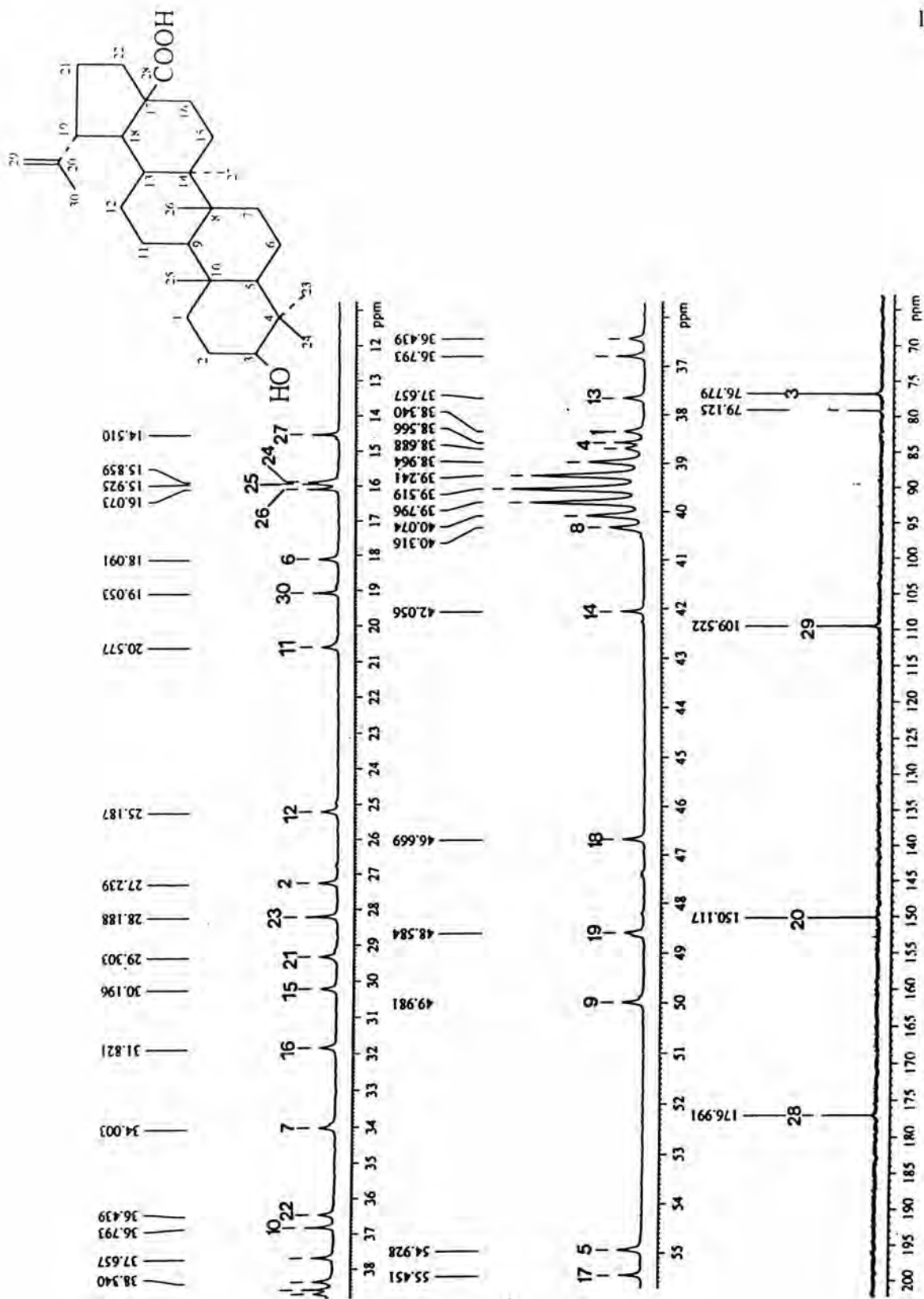
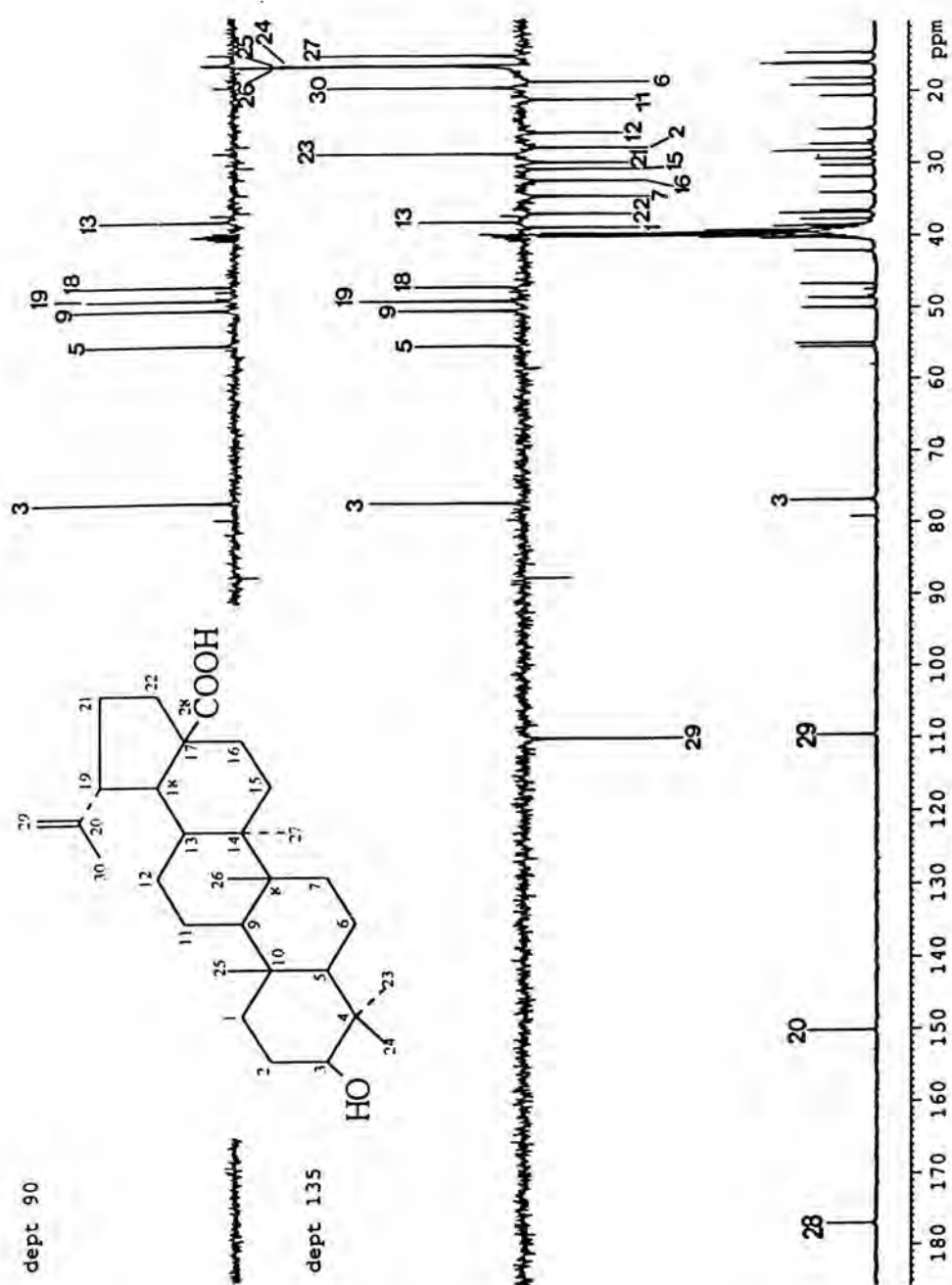


Figure 51b 75 MHz ^{13}C NMR spectrum of compound DM-D (in $\text{DMSO-}d_6$) (expanded from 11 to 200 ppm)

Figure 52 DEPT spectra of compound DM-D (in DMSO- d_6)