Supplementary Material (ESI) for Organic and Biomolecular Chemistry

Efficient Synthesis of (+)-1,8,8a-Tri-*epi*-swainsonine, (+)-1,2-Di-*epi*-lentiginosine, (+)-9a-*epi*-Homocastanospermine and (–)- 9-Deoxy-9a-*epi*-homocastanospermine from D-Glucose Derived Aziridine Carboxylate and Study of their Glycosidase Inhibitory Activities.

K S. Ajish Kumar, Vinod D Chaudhari, and Dilip D. Dhavale*

[a]*Garware Research Centre, Department of Chemistry, University of Pune, Pune – 411 007, India,*

ddd@chem.unipune.ernet.in

ddd@chem.unipune.ernet.in

General methods. Melting points were recorded with Thomas Hoover melting point apparatus and are uncorrected. IR spectra were recorded with FTIR as a thin film or in nujol mull or using KBr pellets and are expressed in cm^{-1}. ^{1}H (300 MHz), ^{13}C (100 MHz), and ^{13}C (75 MHz) NMR spectra were recorded using $CDCl_3$ or D_2O as a solvent. Chemical shifts were reported in δ unit (ppm) with reference to TMS as an internal standard and *J* values are given in Hz. Decoupling experiments confirmed the assignments of the signals. Elemental analyses were carried out with C, H-analyzer. Optical rotations were measured using polarimeter at 25 °C. Thin layer chromatography was performed on pre-coated plates (0.25 mm, silica gel 60 F_{254}). Column chromatography was carried out with silica gel (100-200 mesh). The reactions were carried out in oven-dried glassware under dry N_2. Methanol, pyridine, THF, were purified and dried before use. n-Hexane was used is the distillation fraction between 40-60 °C. 10% Pd-C was purchased from Aldrich and/or Fluka. After decomposition of the reaction with water, the work-up involves- washing of combined organic layer with water, brine, drying over anhydrous sodium sulfate and evaporation of solvent at reduced pressure. For enzyme inhibition studies substrates were purchased from Sigma Chemicals Co., USA. α-Glucosidase from yeast α-mannosidase from jack bean and β-xylanase from thermomyces ianuginosus were purchased from Sigma Chemicals Co. USA. β-Glucosidase was extracted and purified from sweet almonds and used. The crystal structure has been deposited at the Cambridge Crystallographic Data Centre and allocated the deposition number CCDC 644419.

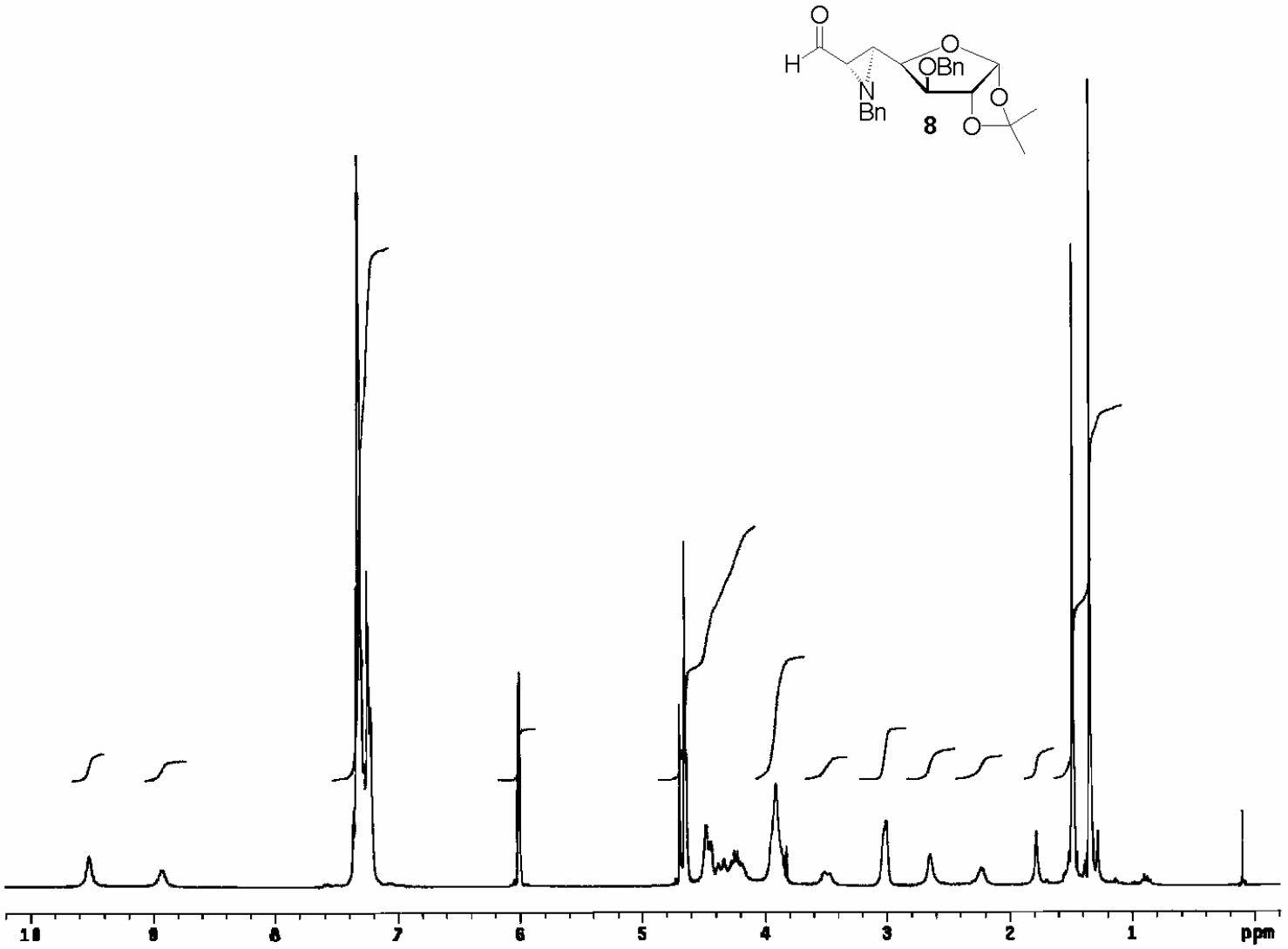


Figure 1: ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **8**

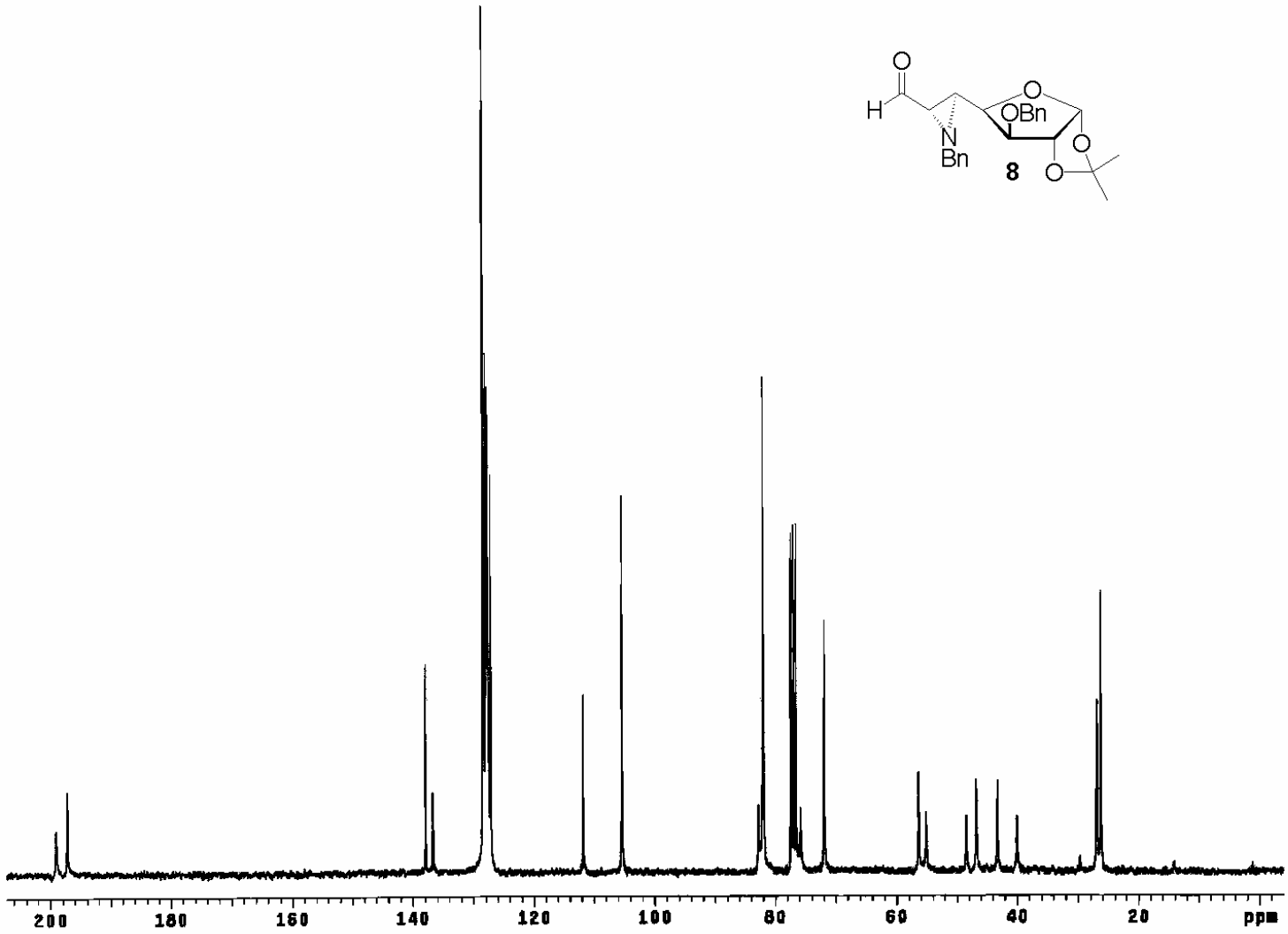


Figure 2: ^{13}C NMR (75 MHz, $CDCl_3$) spectrum of compound **8**

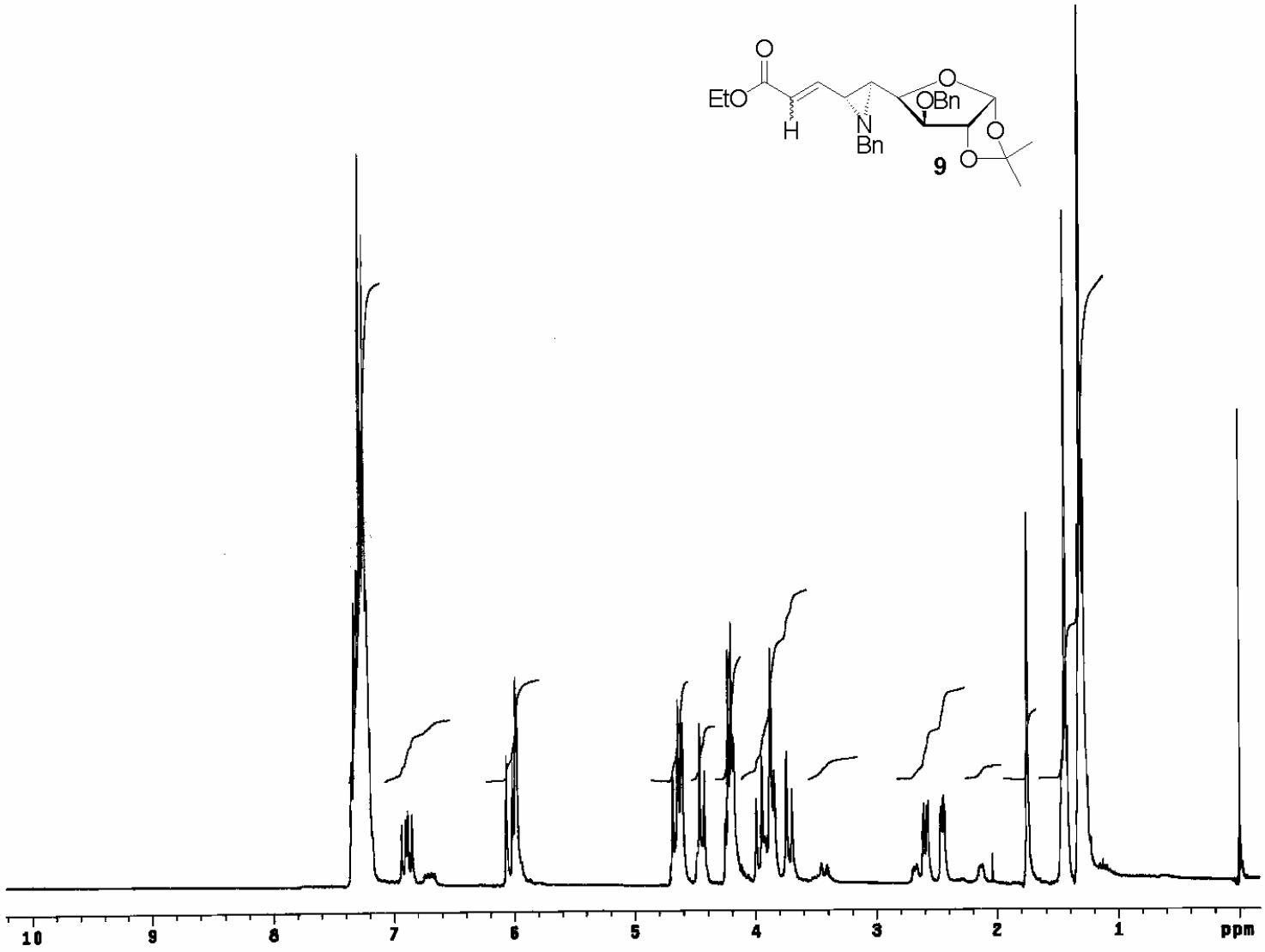


Figure 3: ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **9**

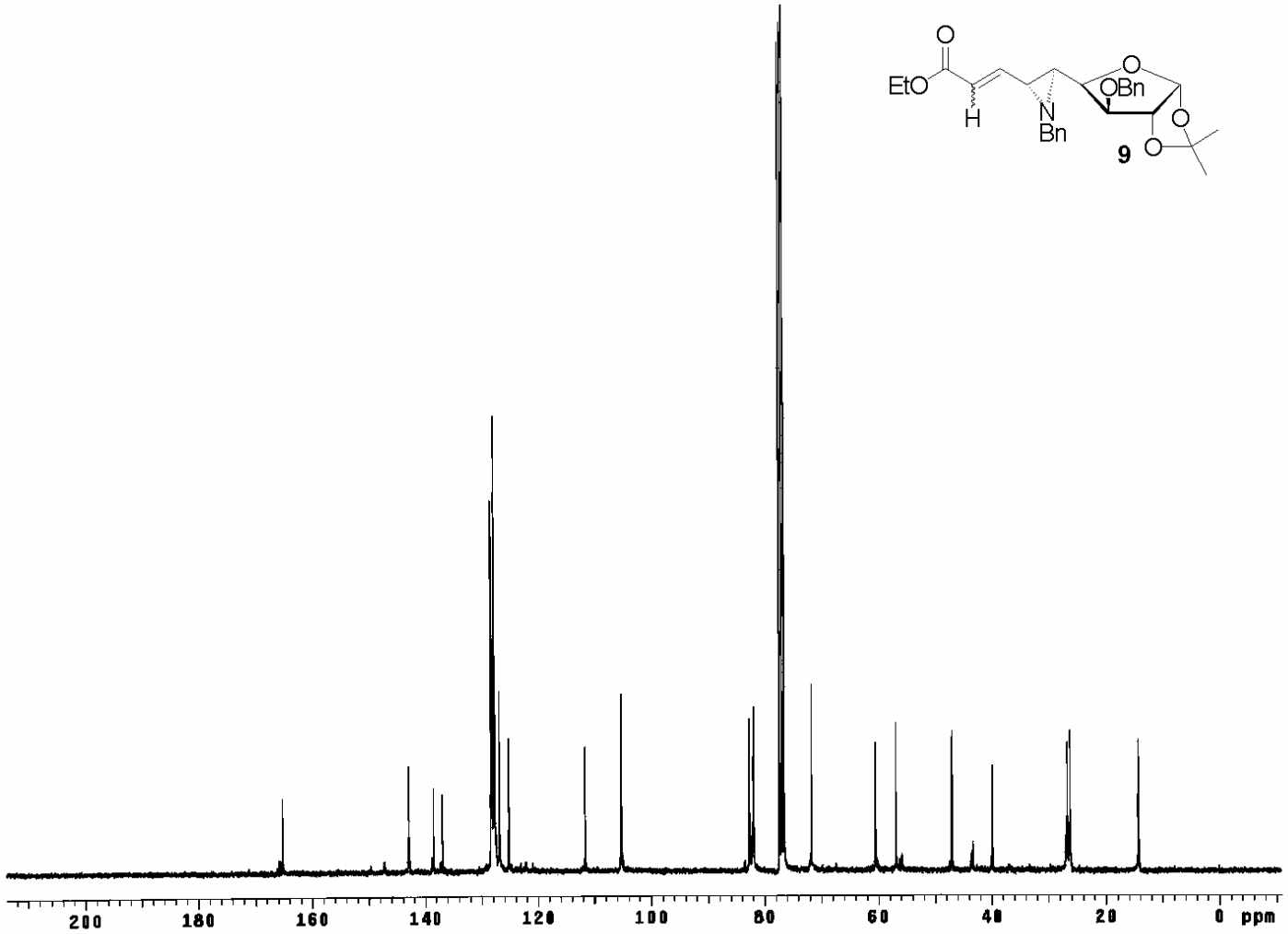


Figure 4: ^{13}C NMR (75 MHz, $CDCl_3$) spectrum of compound **9**

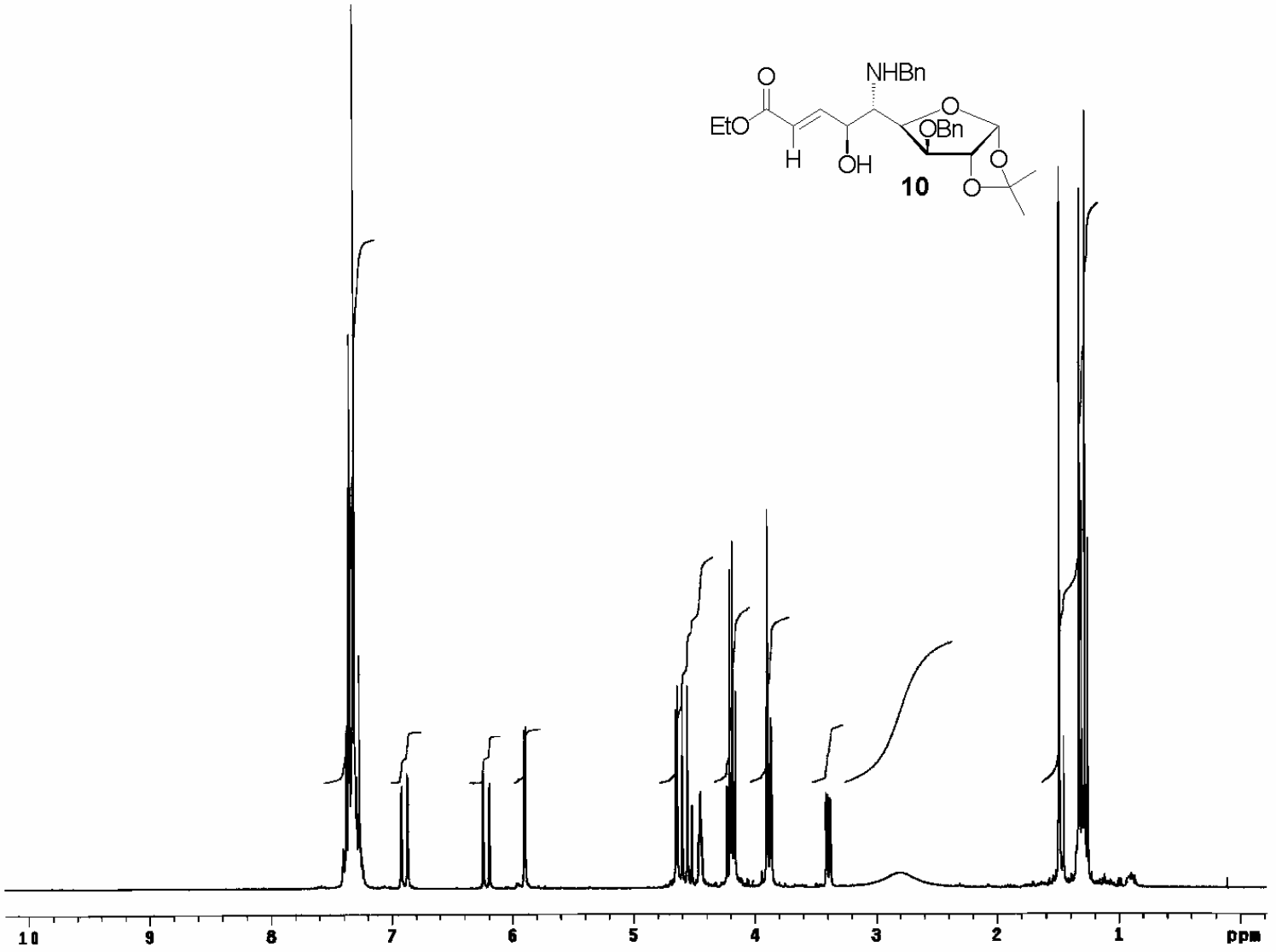


Figure 5: ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **10**

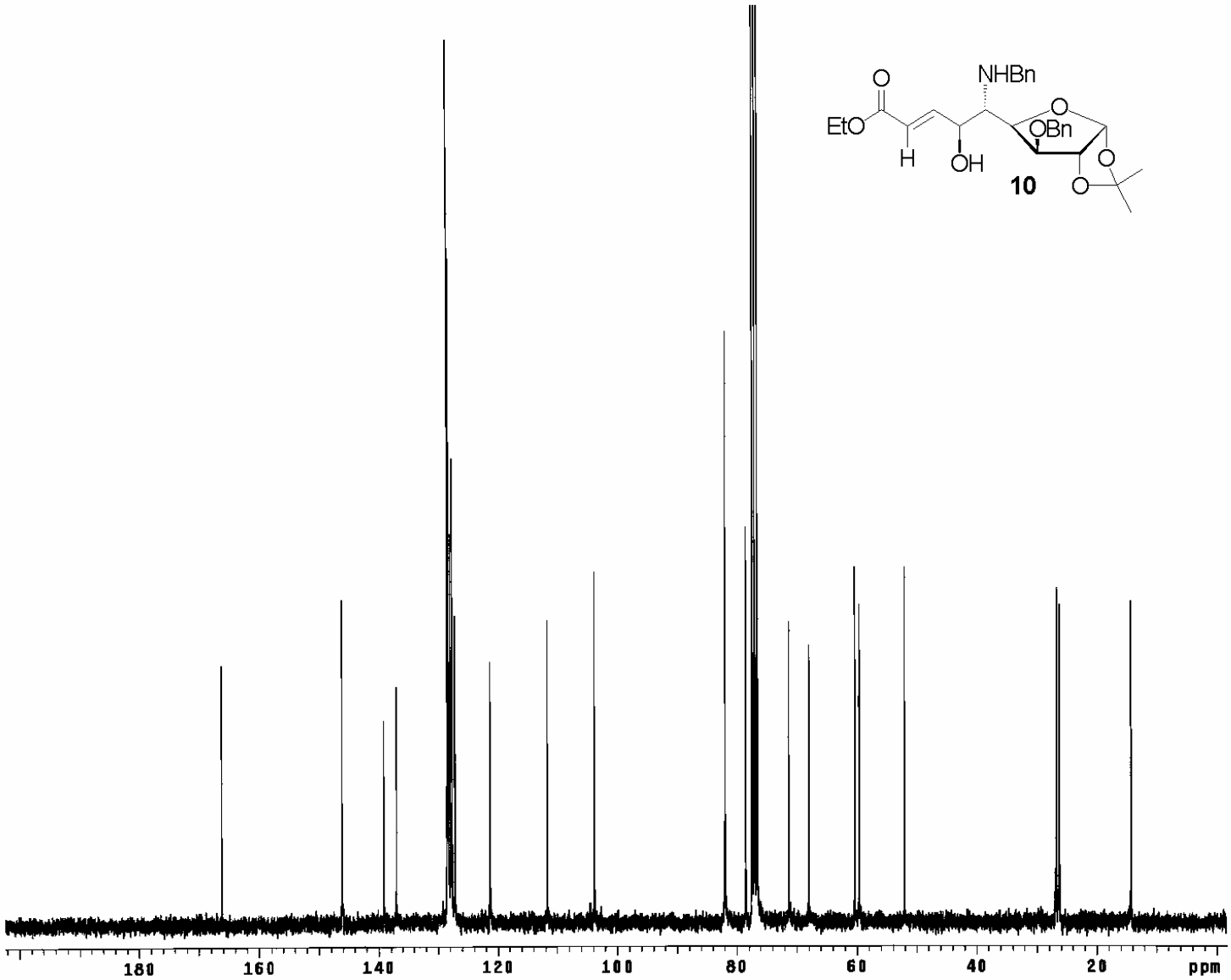


Figure 6: ^{13}C NMR (75 MHz, $CDCl_3$) spectrum of compound **10**

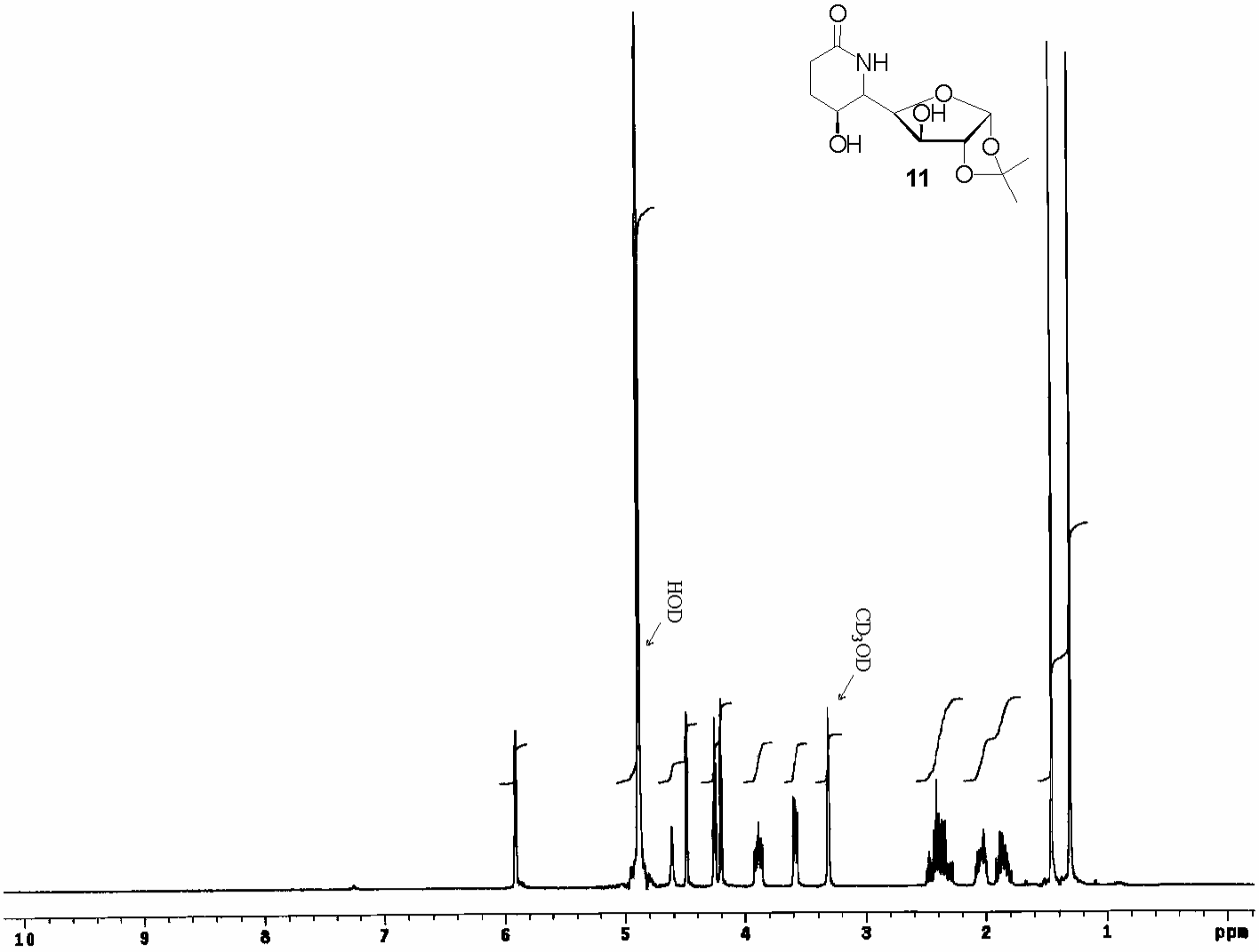


Figure 7: ^{1}H NMR (300 MHz, CD_3OD) spectrum of compound **11**

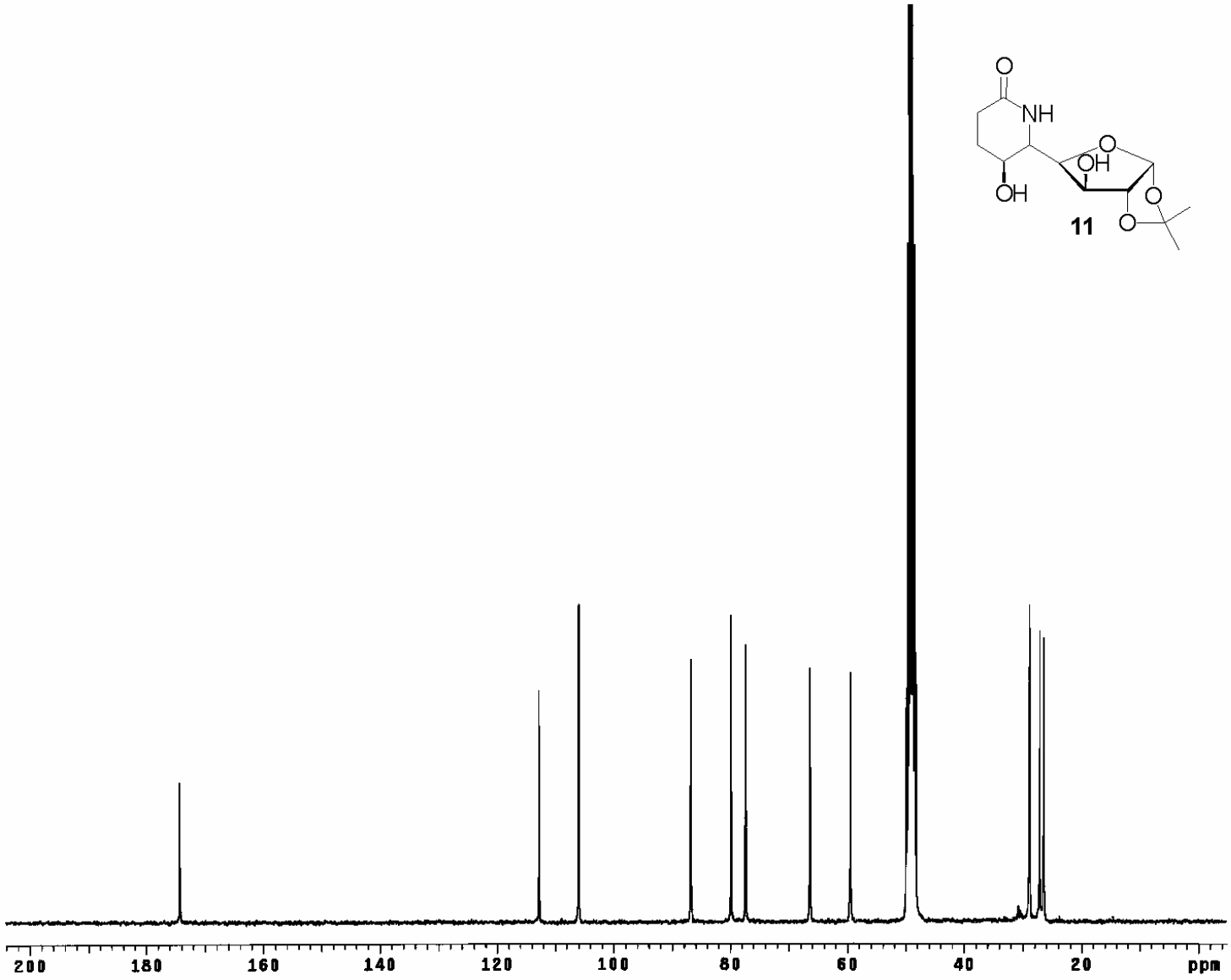


Figure 8: ^{13}C NMR (75 MHz, CD_3OD) spectrum of compound **11**

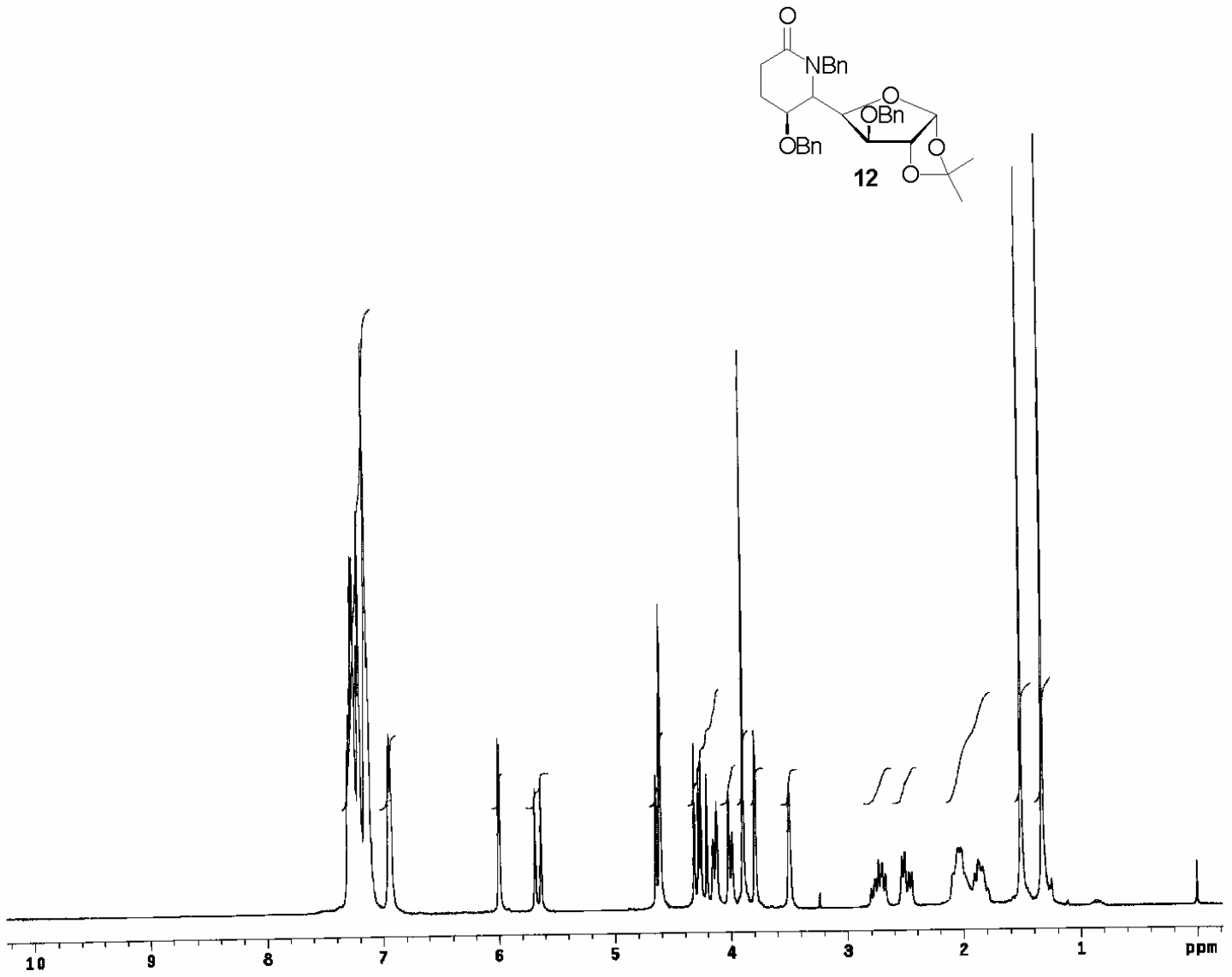


Figure 9: ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **12**

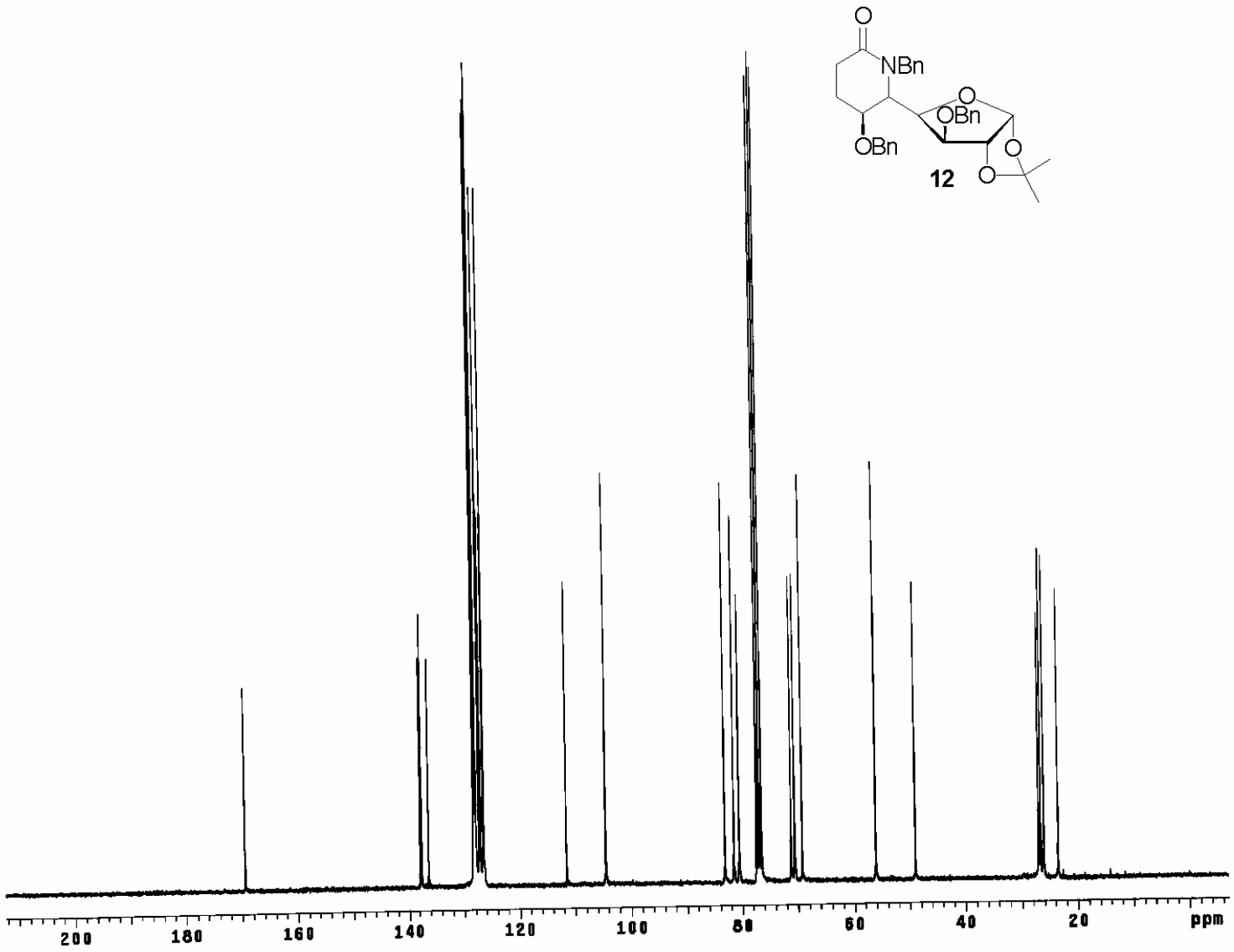


Figure 10: ^{13}C NMR (75 MHz, $CDCl_3$) spectrum of compound **12**

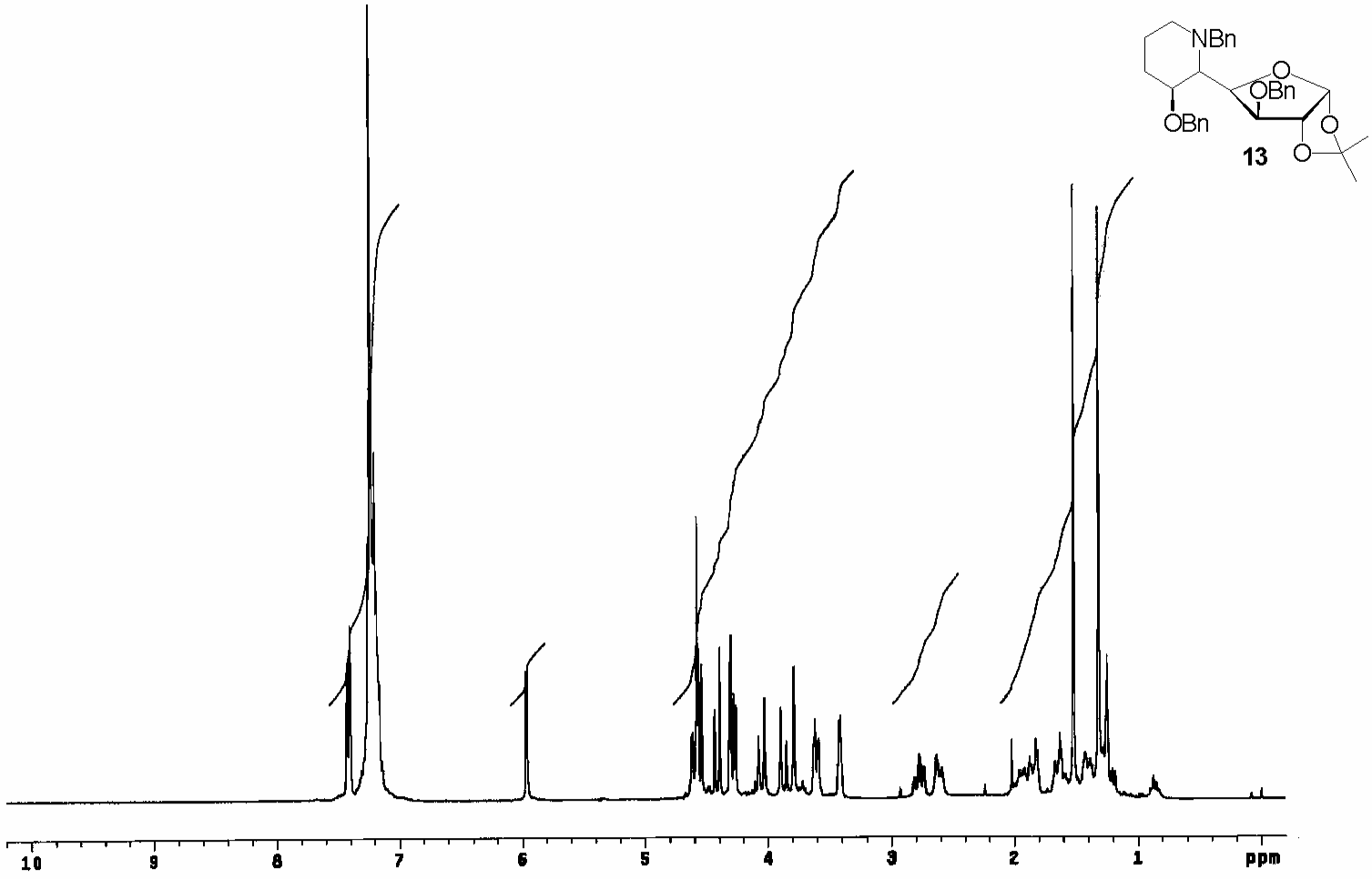


Figure 11: ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **13**

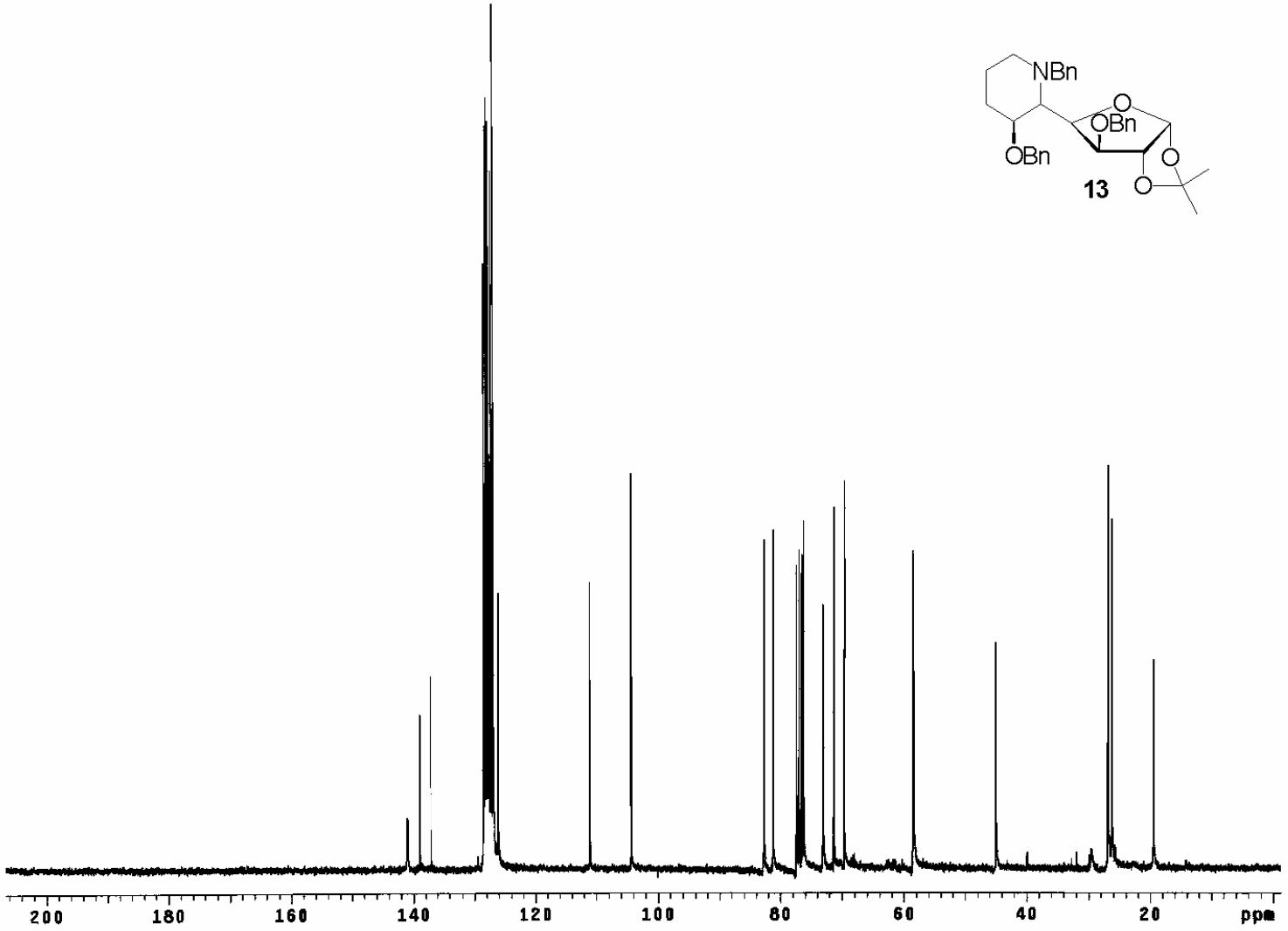


Figure 12: ^{13}C NMR (75 MHz, $CDCl_3$) spectrum of compound **13**

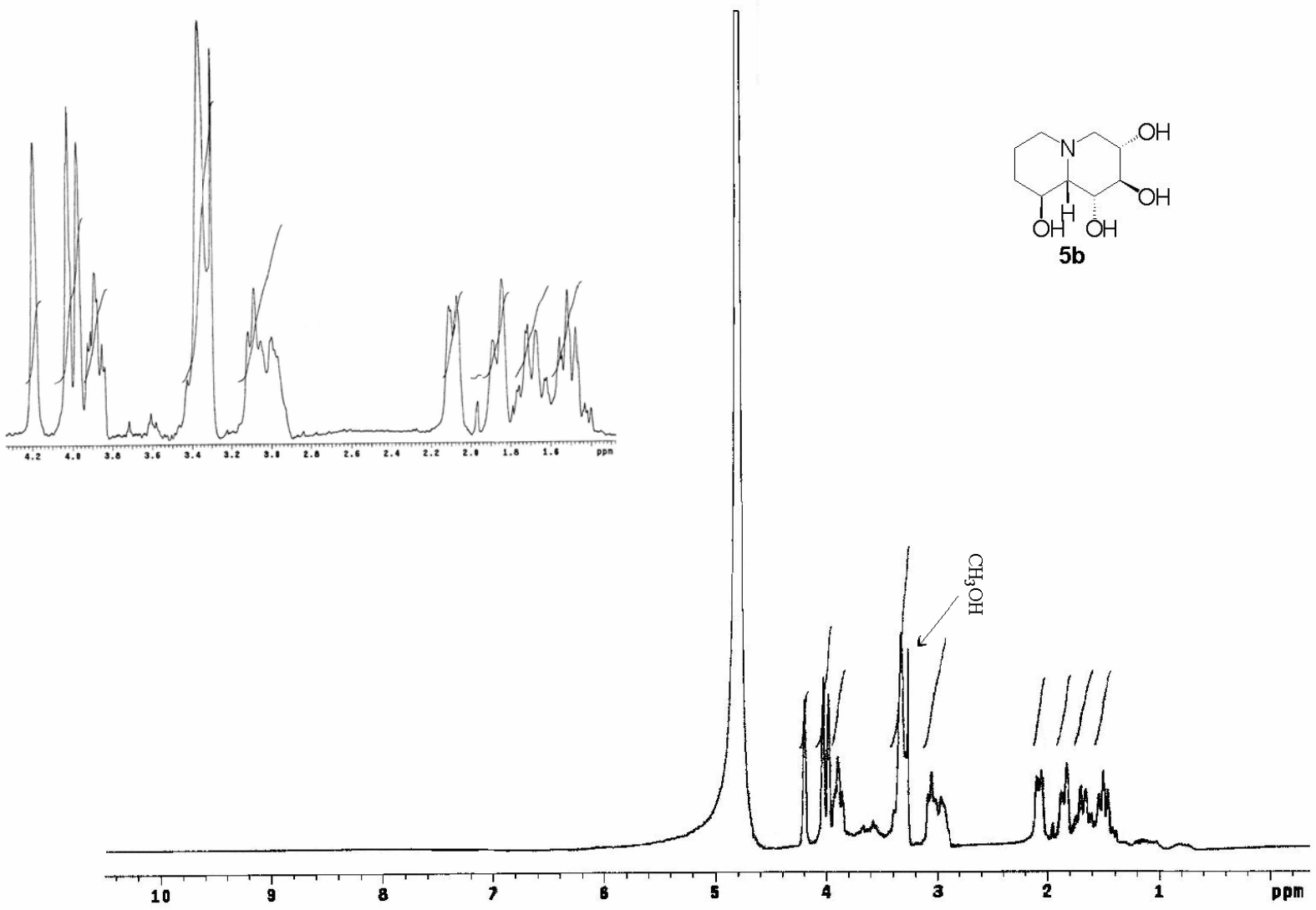


Figure 13: ^{1}H NMR (300 MHz, D_2O) spectrum of compound **5b**

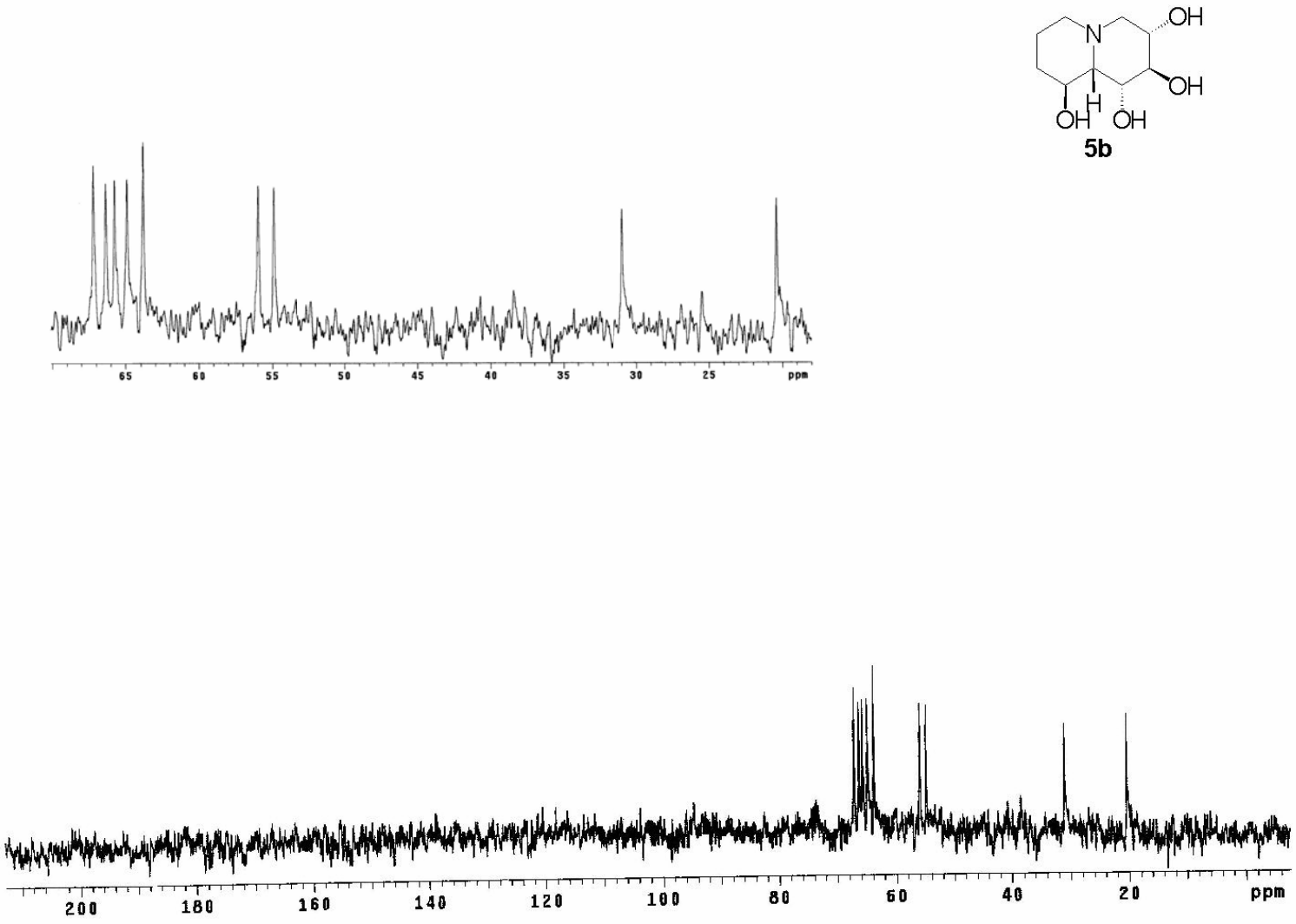


Figure 14: ^{13}C NMR (75 MHz, D_2O) spectrum of compound **5b**

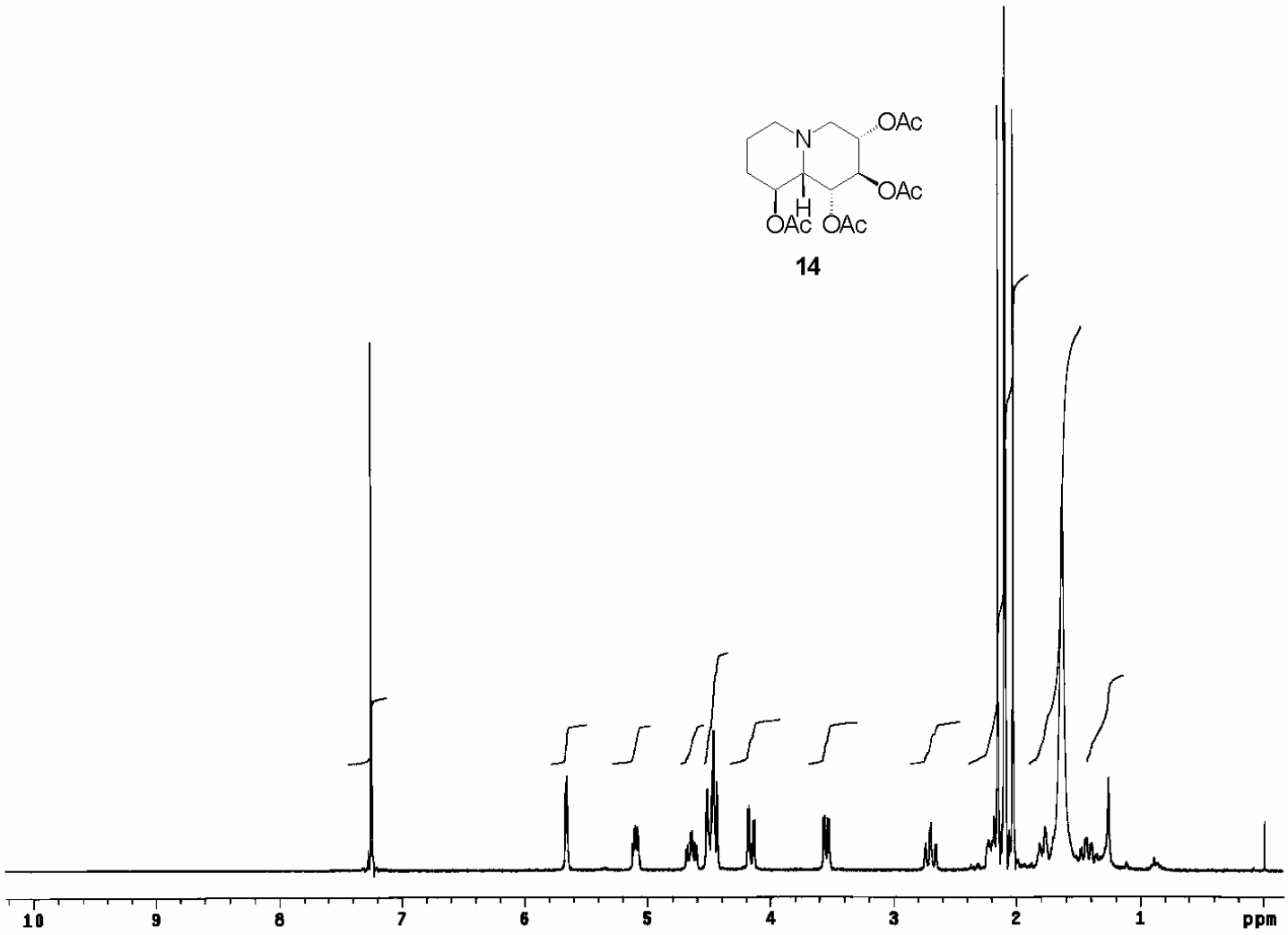


Figure 15: ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **14**

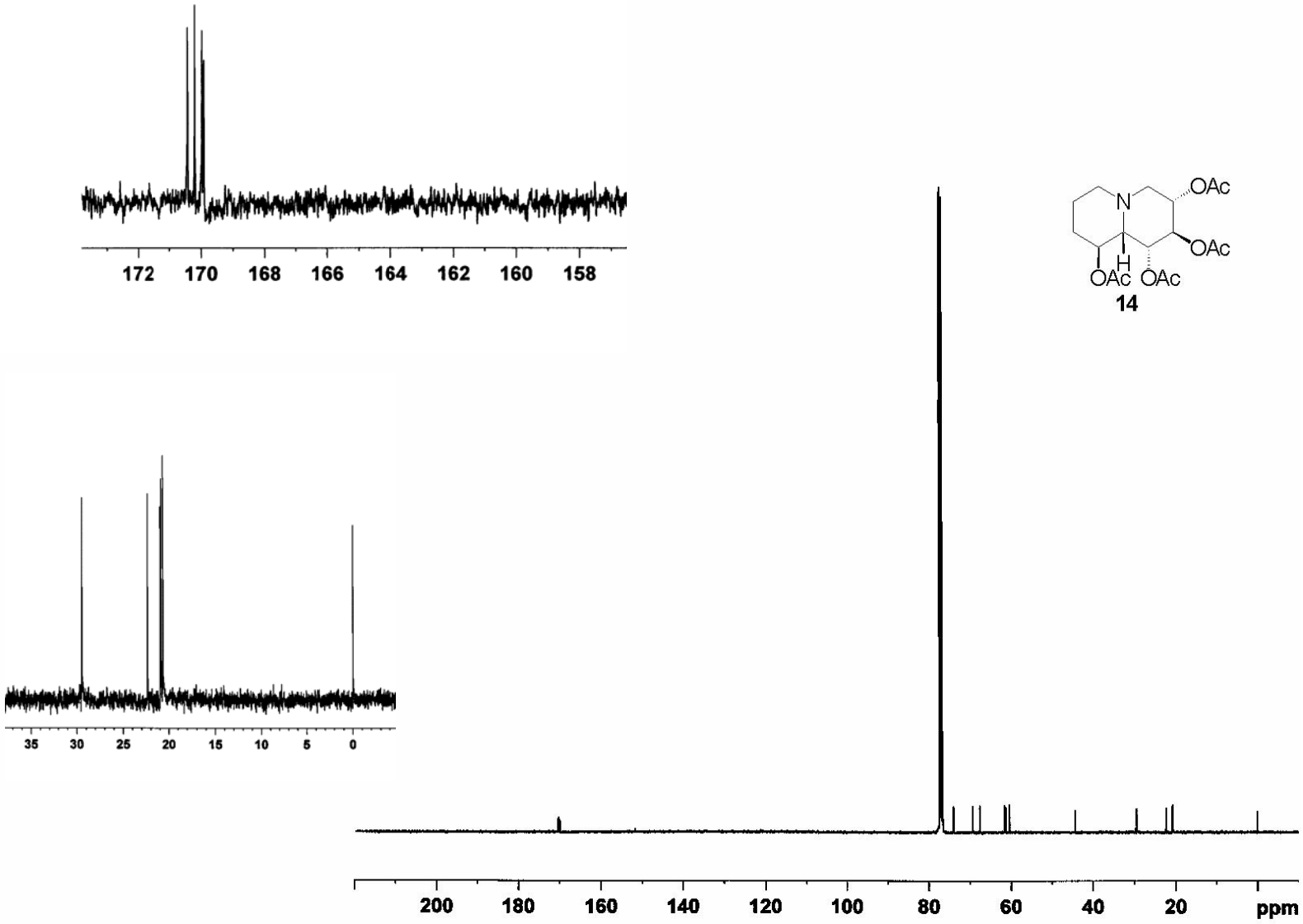


Figure 16: ^{13}C NMR (100 MHz, $CDCl_3$) spectrum of compound **14**

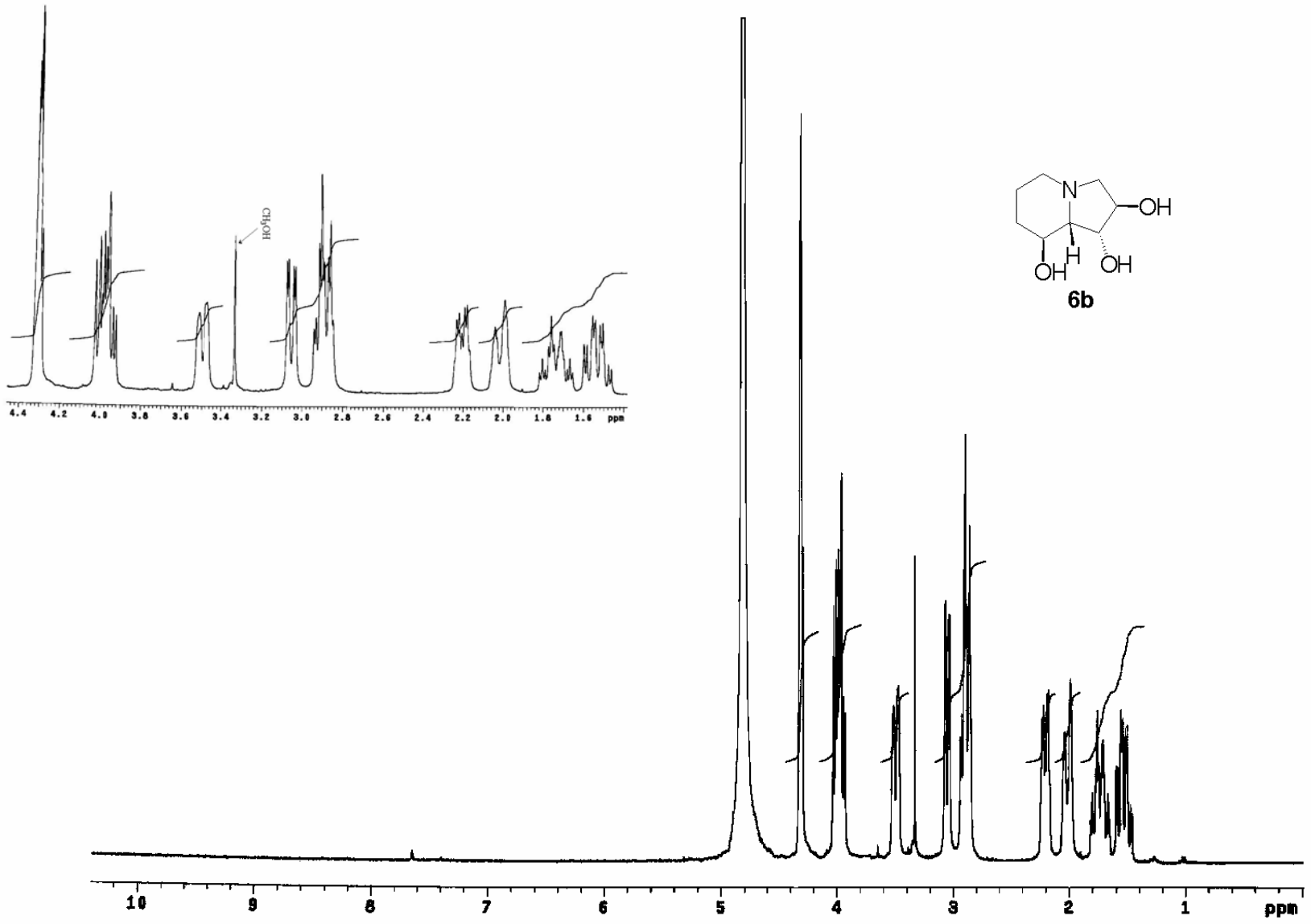


Figure 17: ^{1}H NMR (300 MHz, D_2O) spectrum of compound **6b**

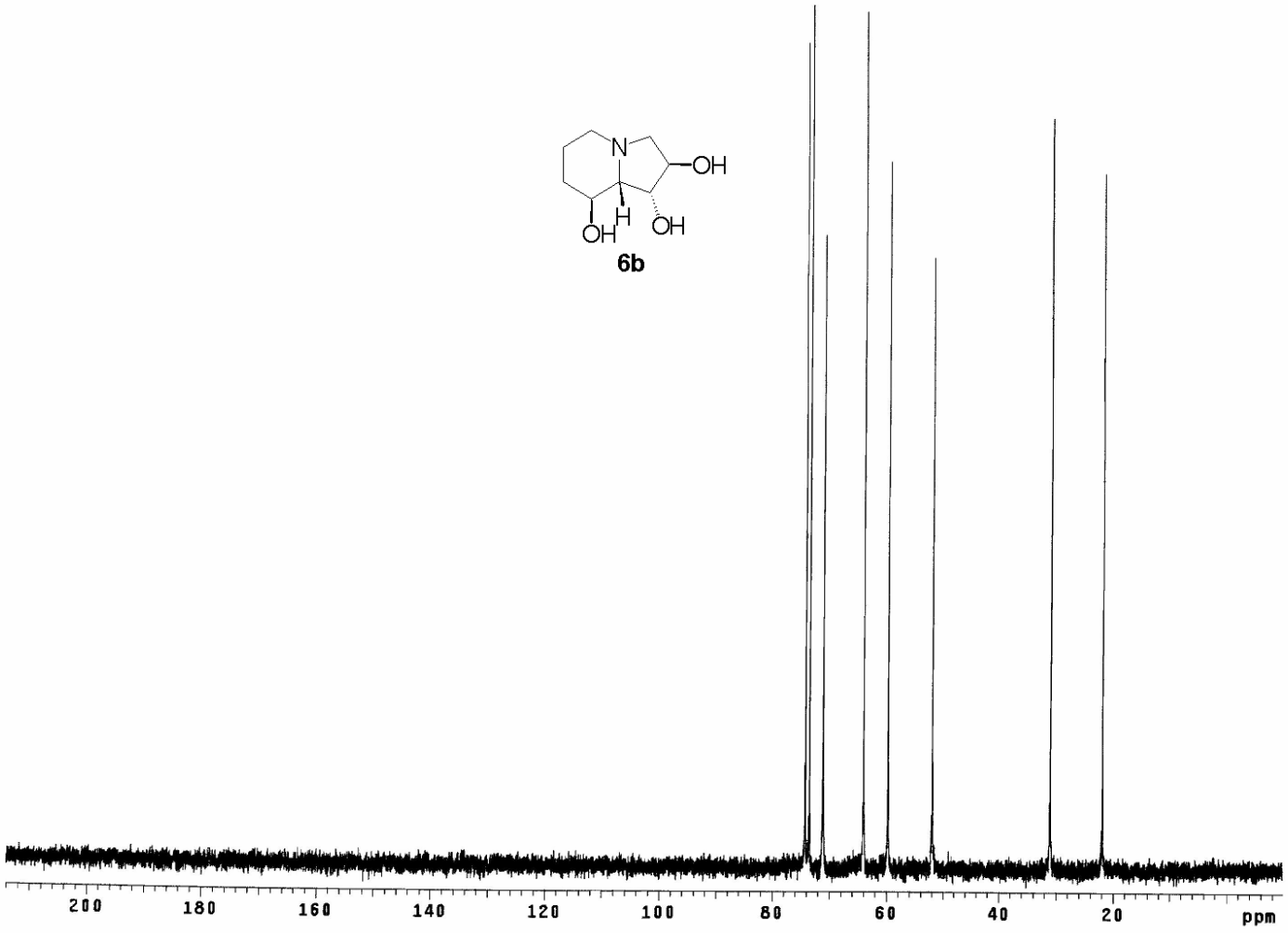


Figure 18: ^{13}C NMR (75 MHz, D_2O) spectrum of compound **6b**

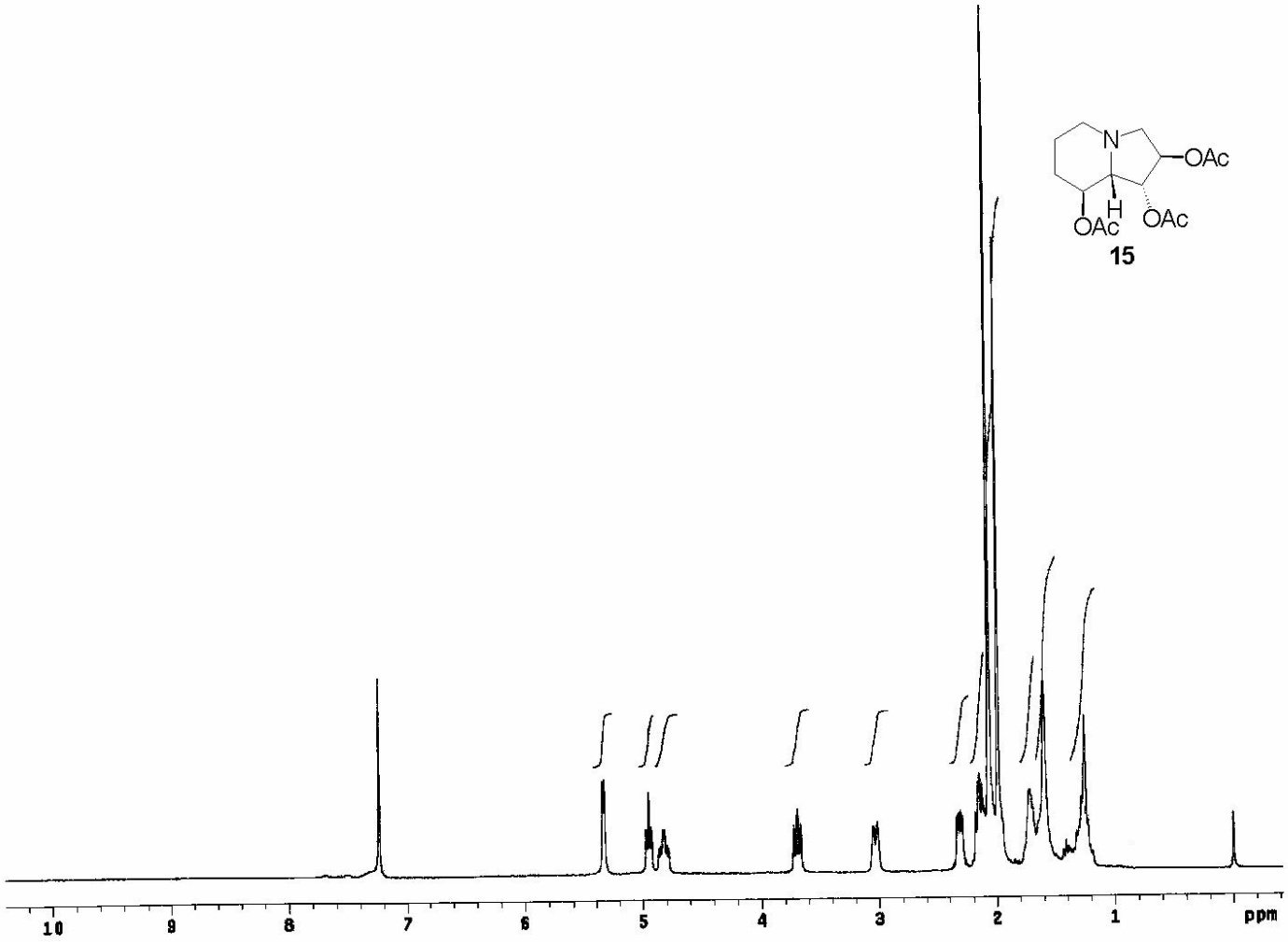


Figure 19: ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **15**

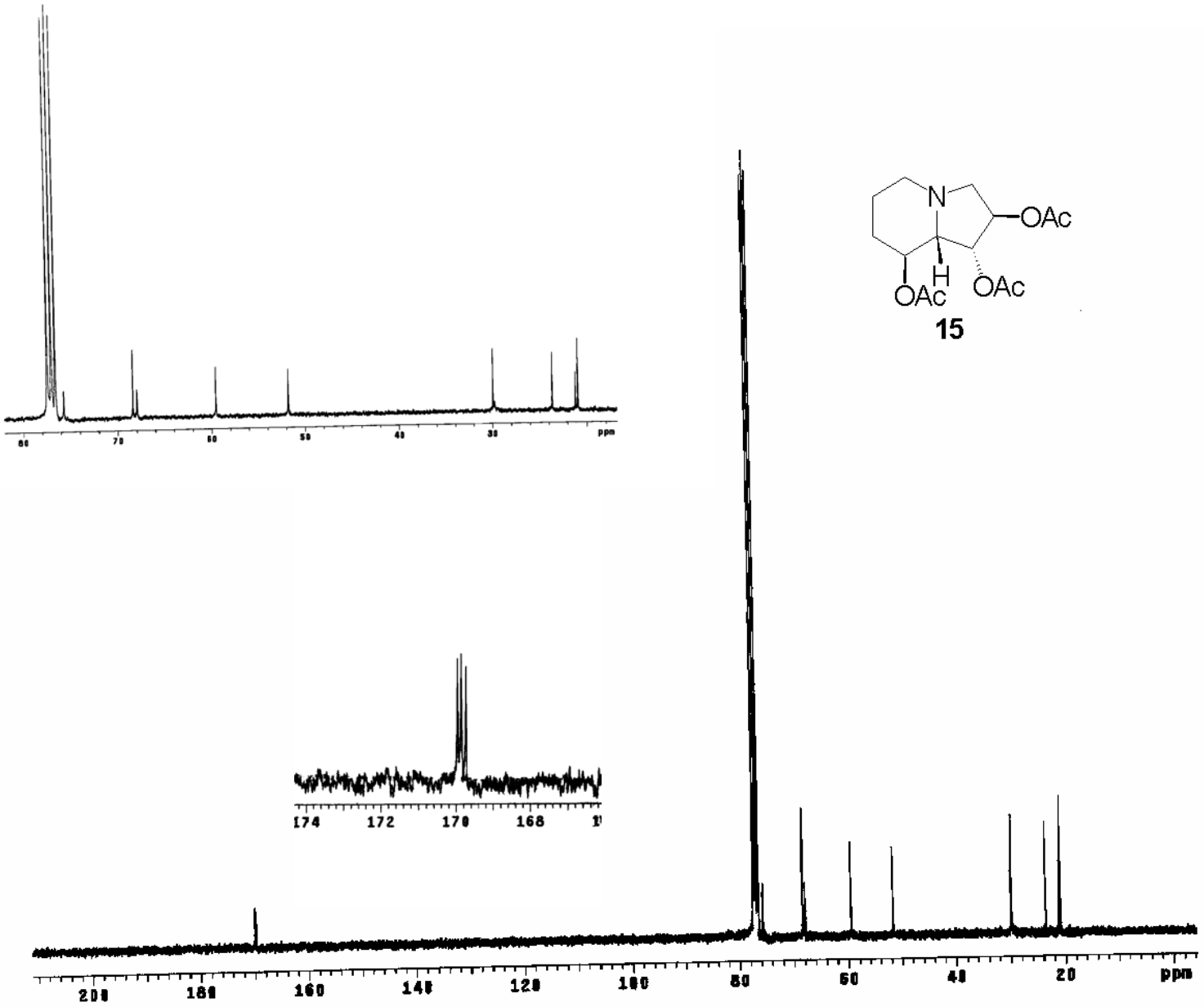


Figure 20: ^{13}C NMR (75 MHz, $CDCl_3$) spectrum of compound **15**

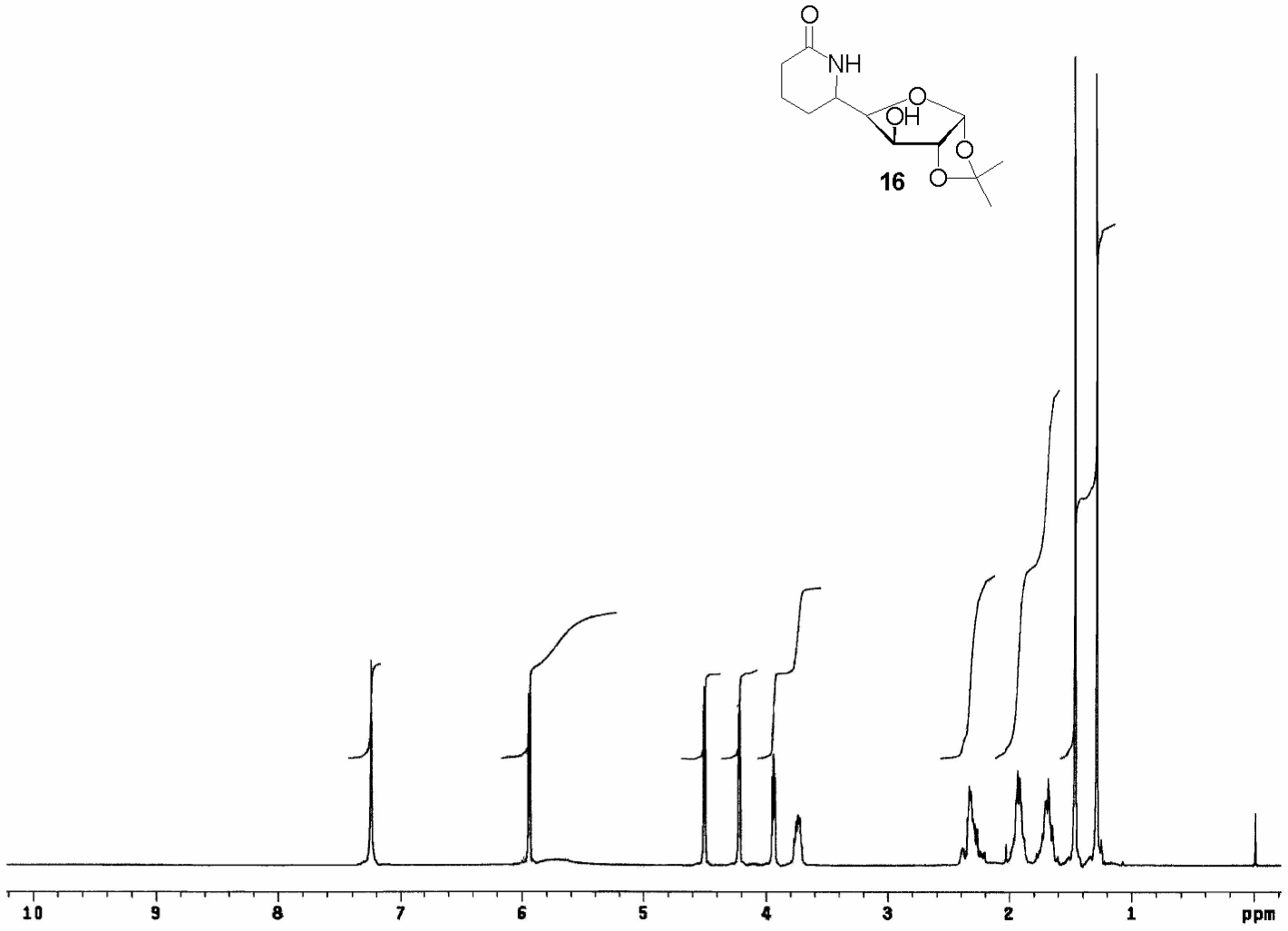


Figure 21: ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **16**

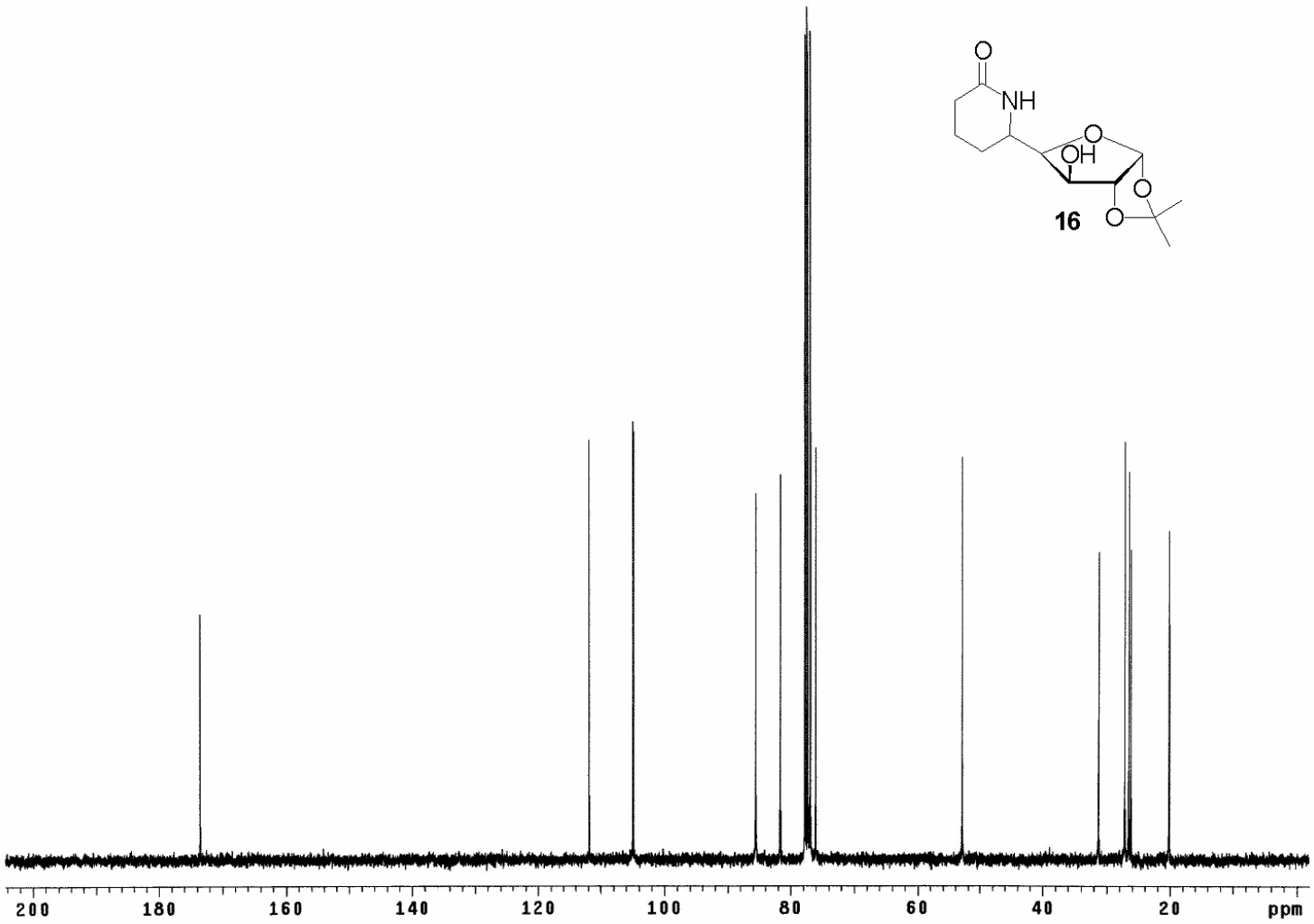


Figure 22: ^{13}C NMR (75 MHz, $CDCl_3$) spectrum of compound **16**

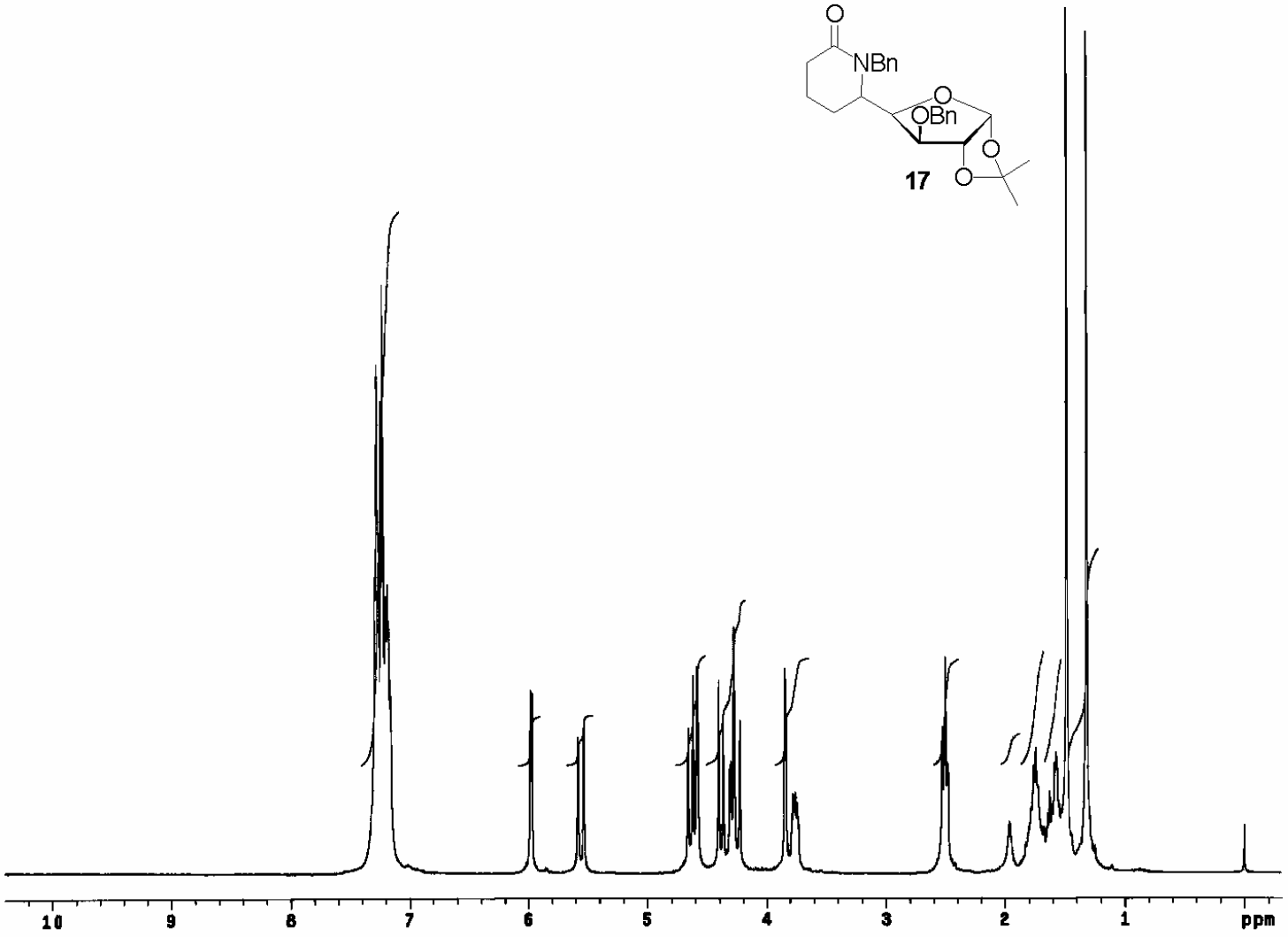


Figure 23: ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **17**

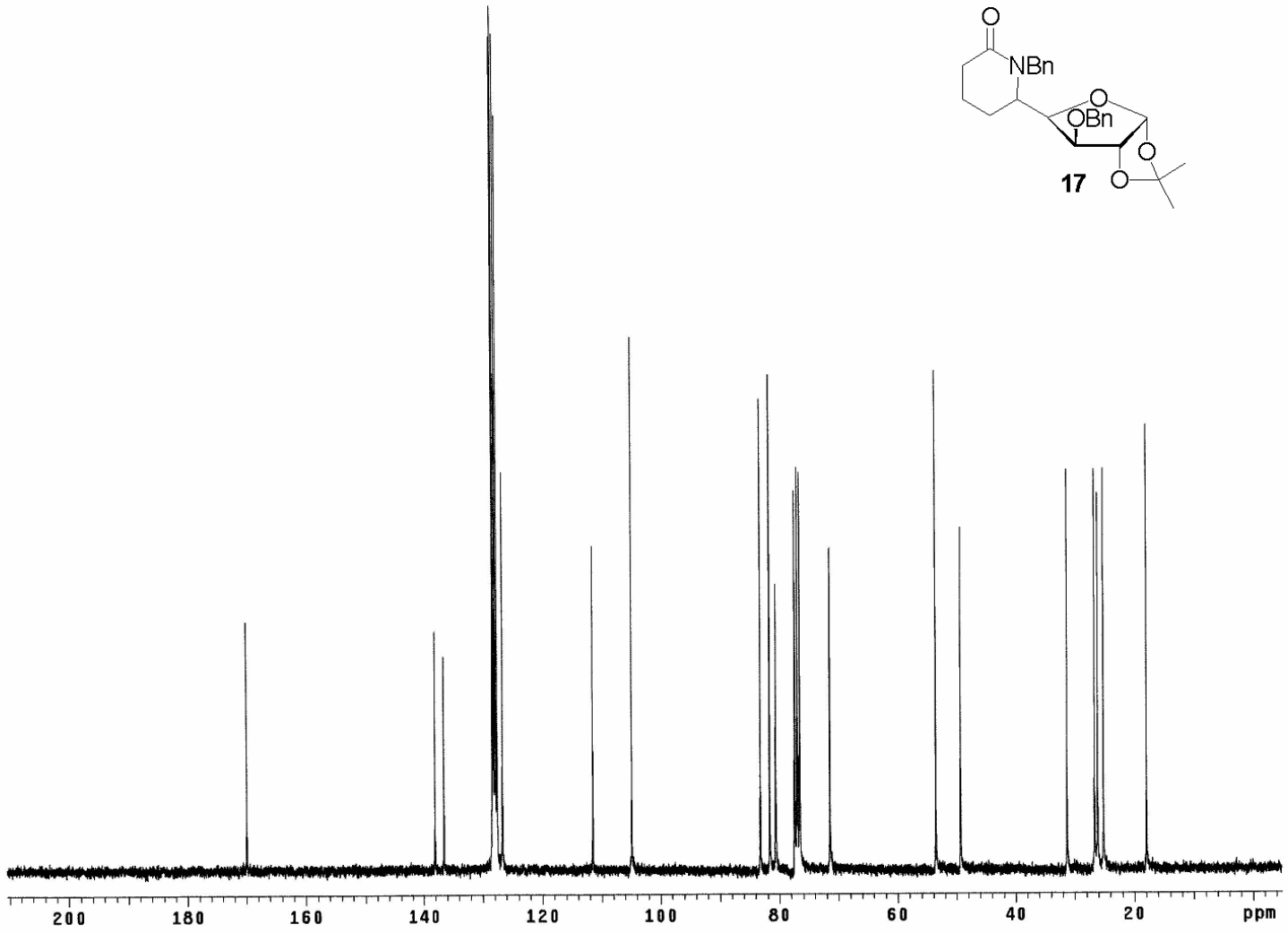


Figure 24: ^{13}C NMR (75 MHz, $CDCl_3$) spectrum of compound **17**

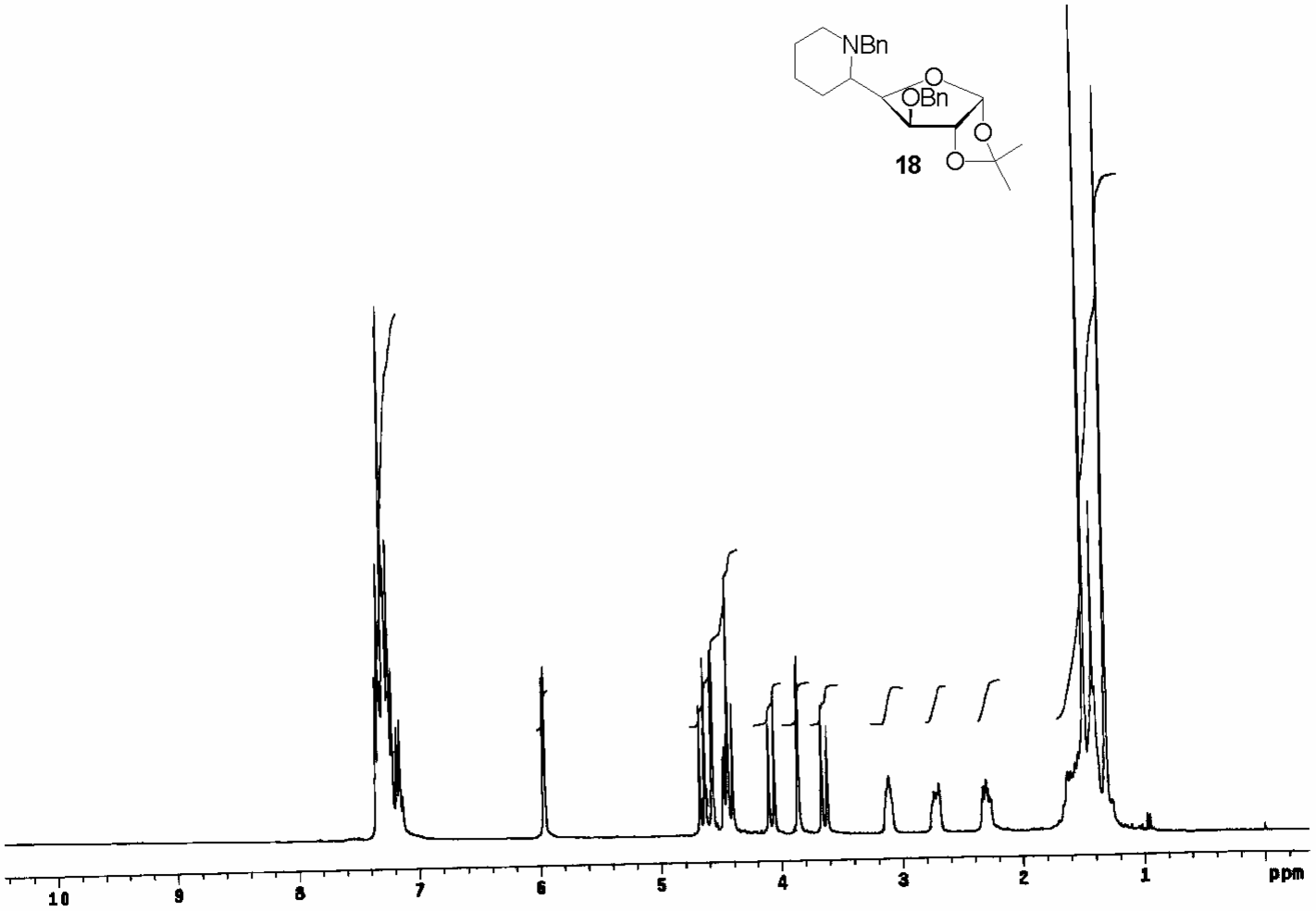


Figure 25: ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **18**

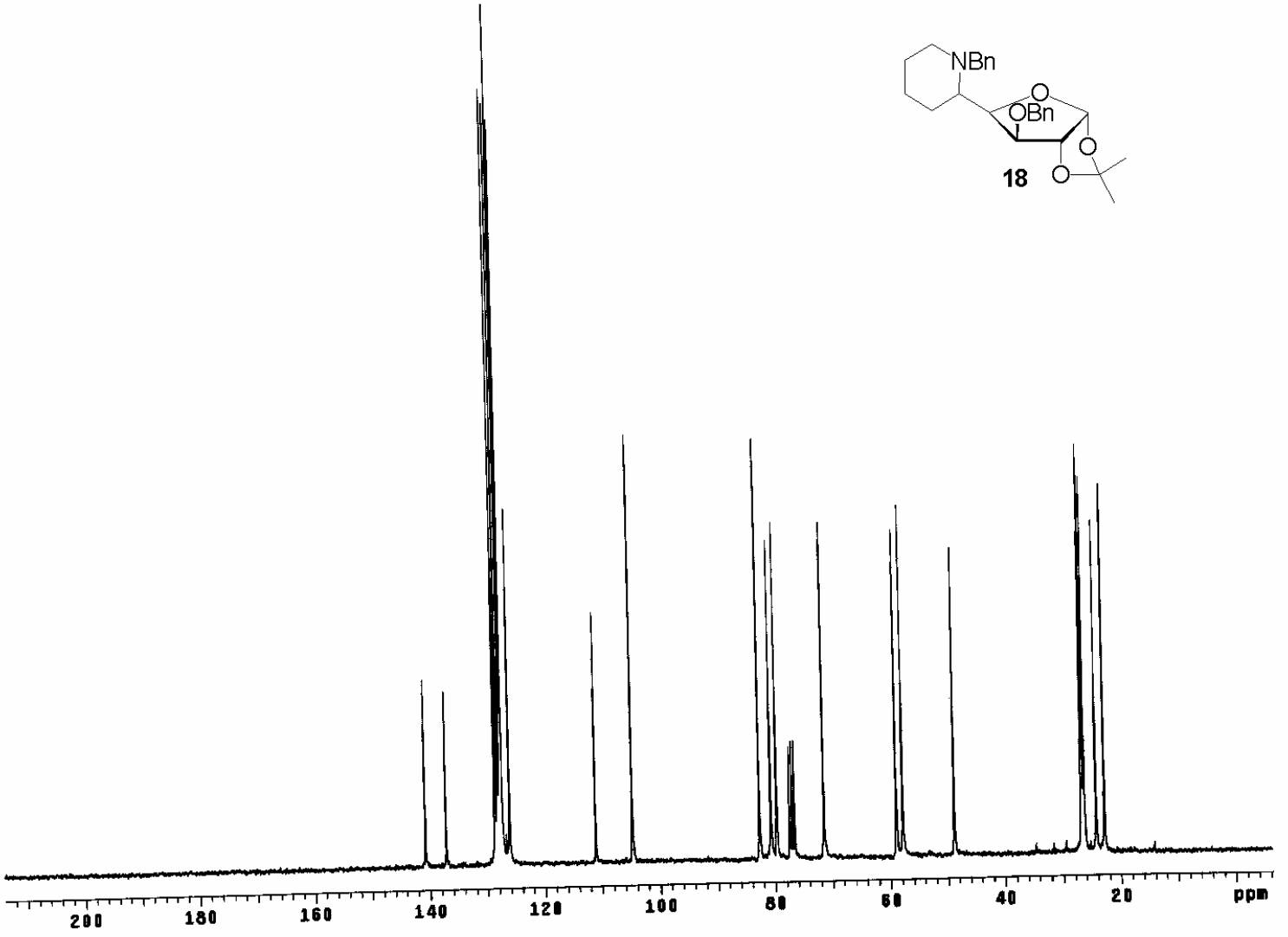


Figure 26: ^{13}C NMR (75 MHz, $CDCl_3$) spectrum of compound **18**

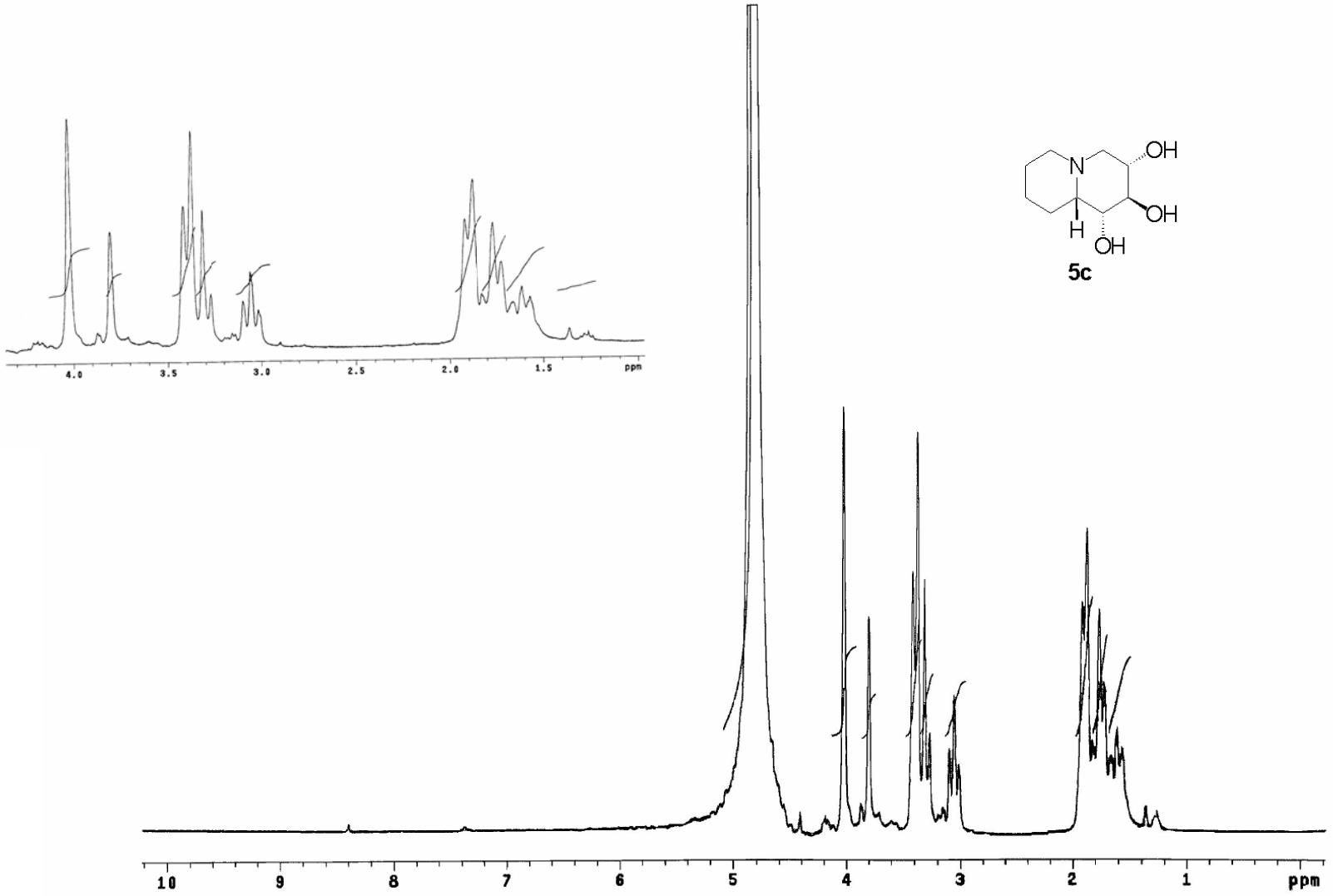
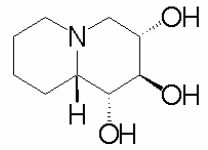


Figure 27: ^{1}H NMR (300 MHz, D_2O) spectrum of compound **5c**



5c

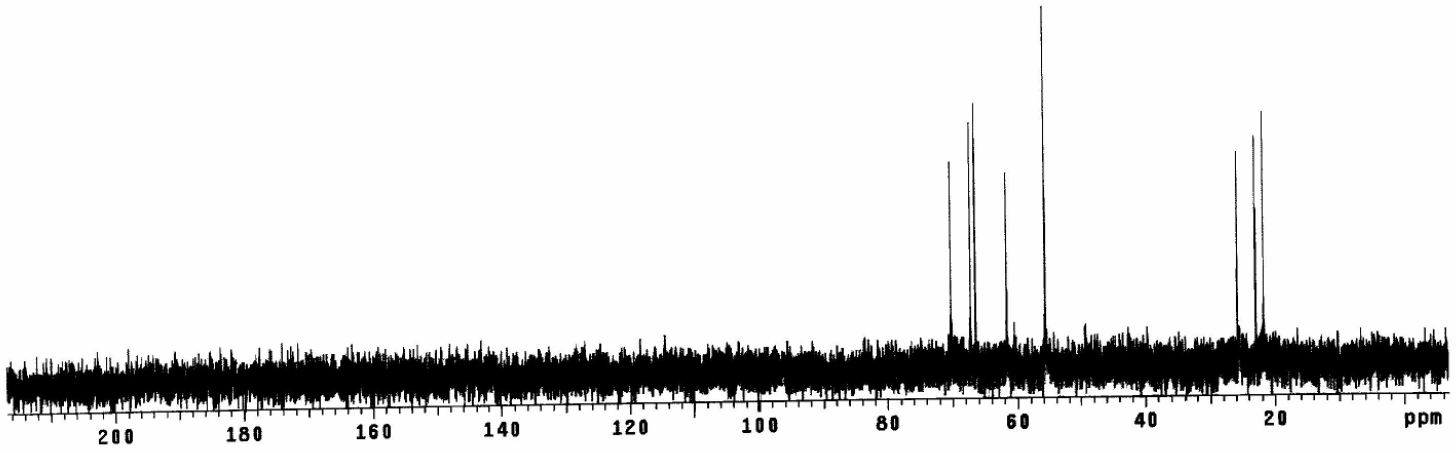


Figure 28: ^{13}C NMR (75 MHz, D_2O) spectrum of compound **5c**

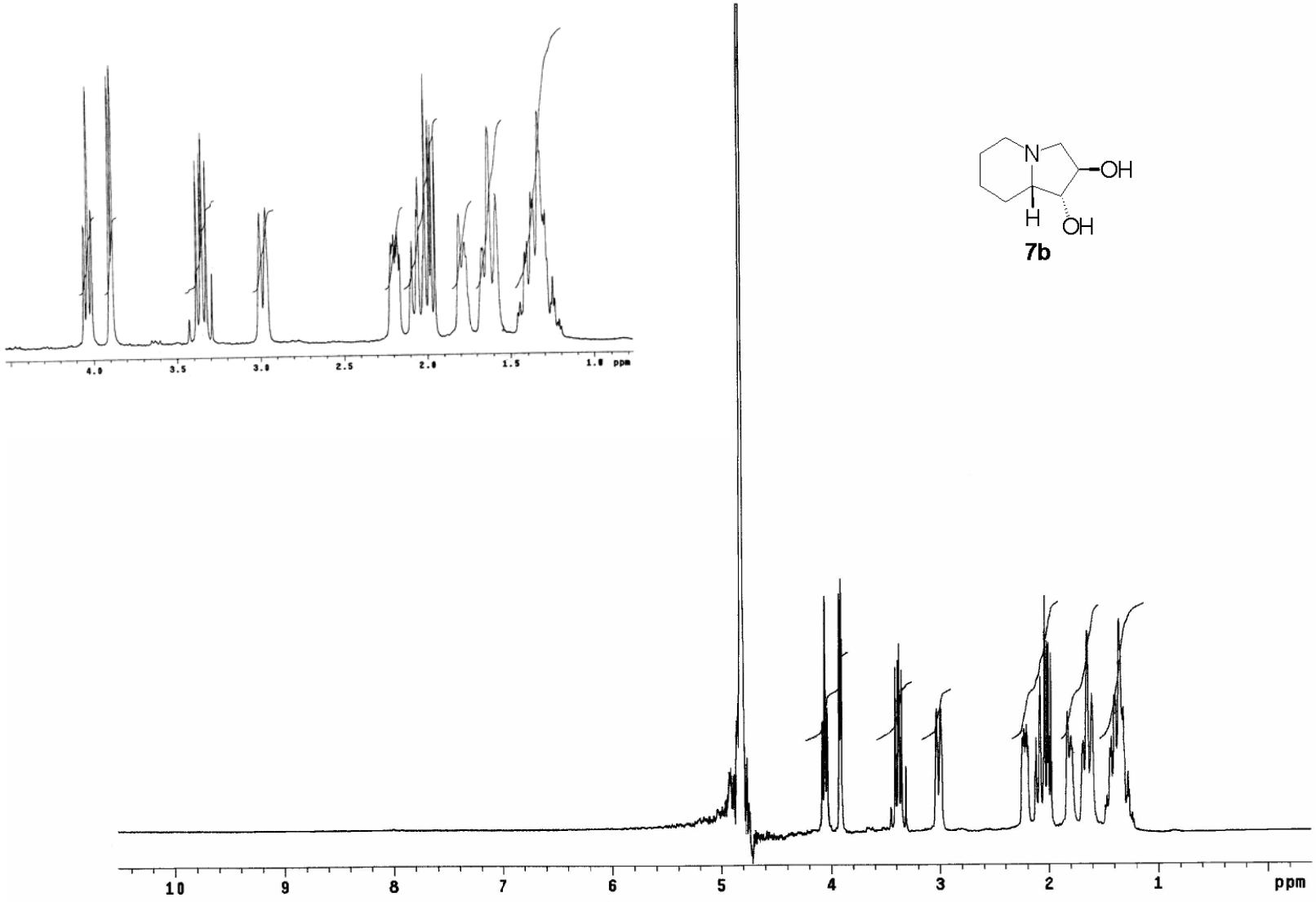


Figure 29: ^{1}H NMR (300 MHz, D_2O) spectrum of compound **7b**

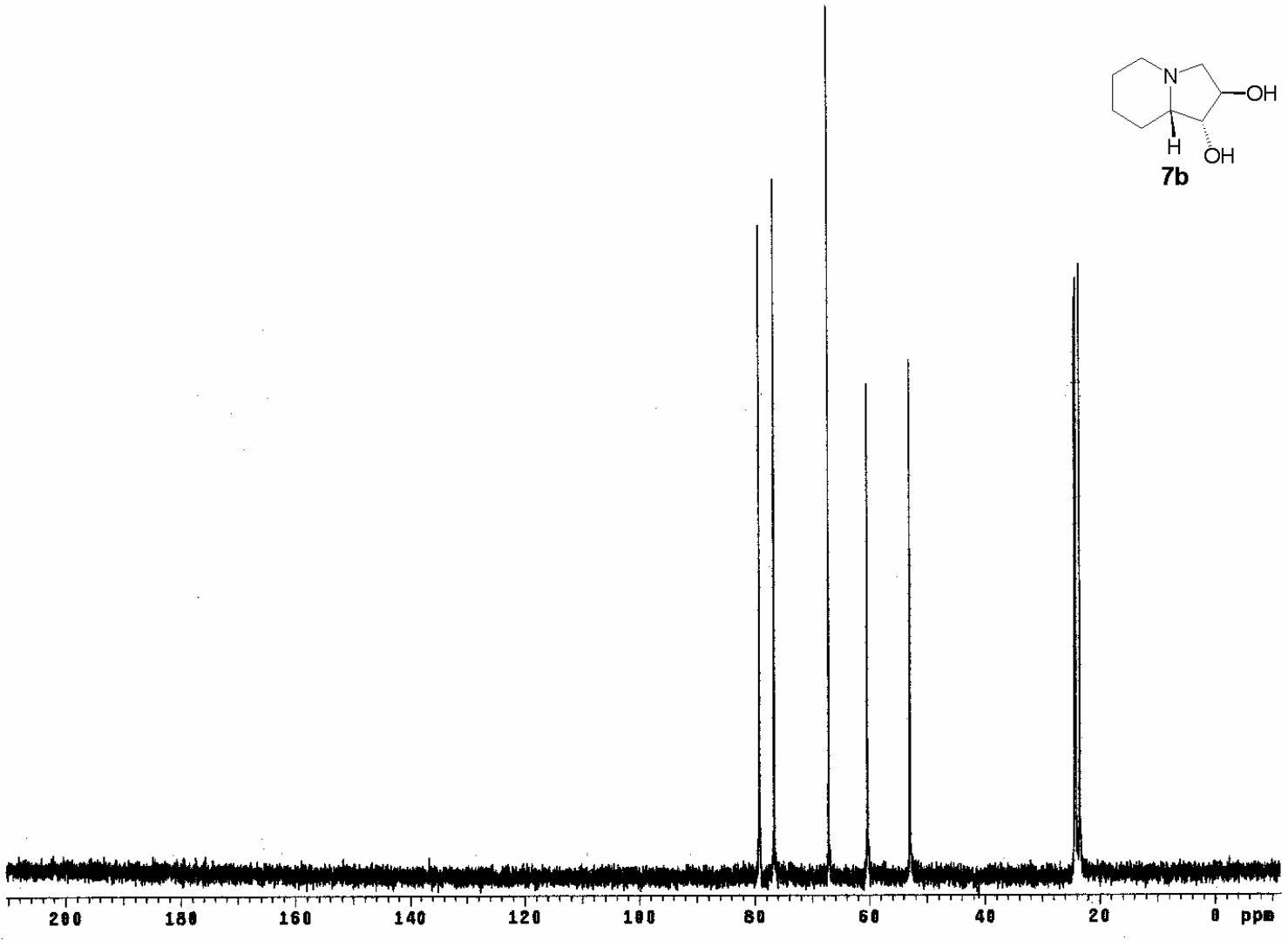


Figure 30: ^{13}C NMR (75 MHz, D_2O) spectrum of compound **7b**

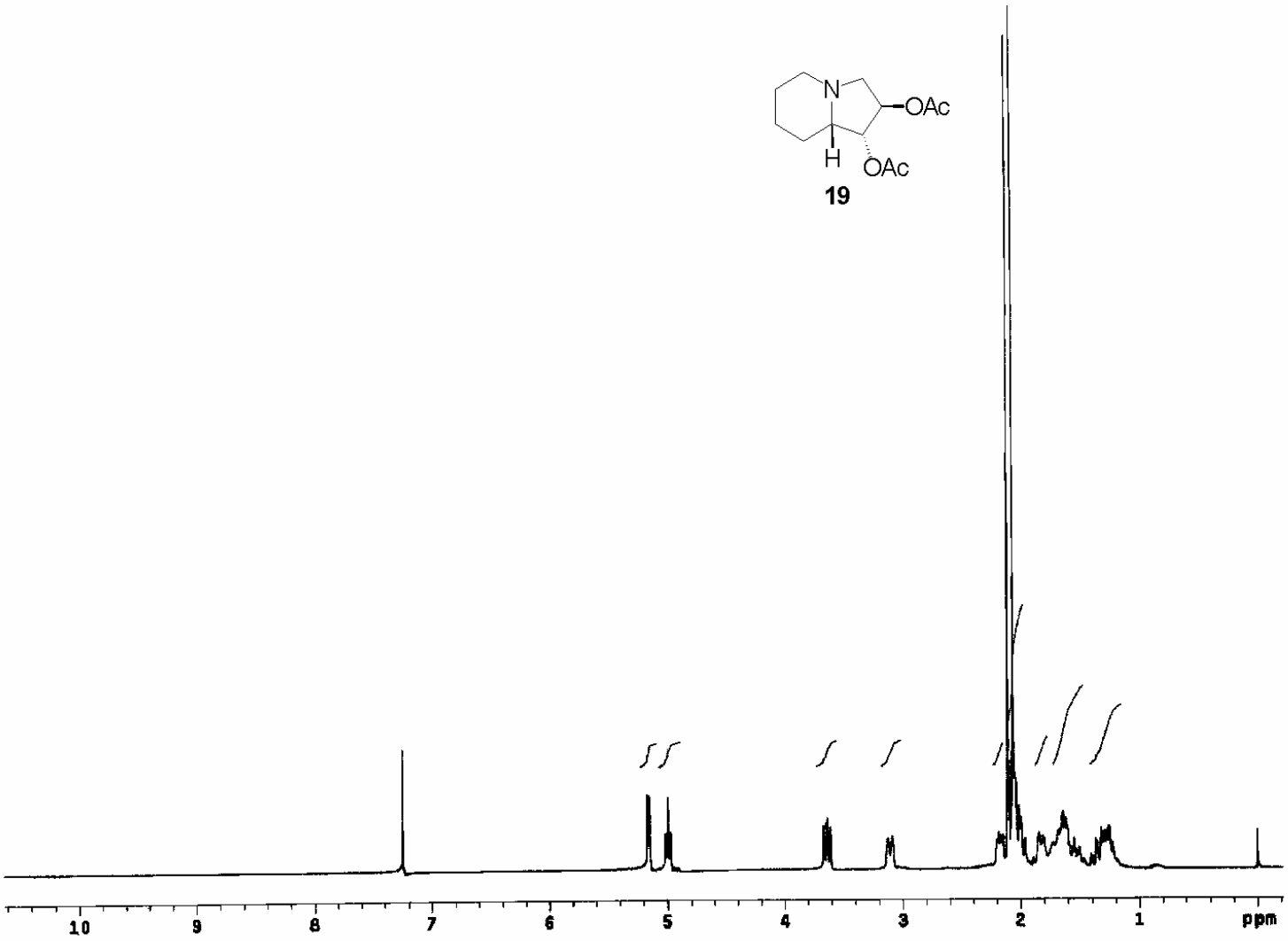


Figure 31: ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **19**

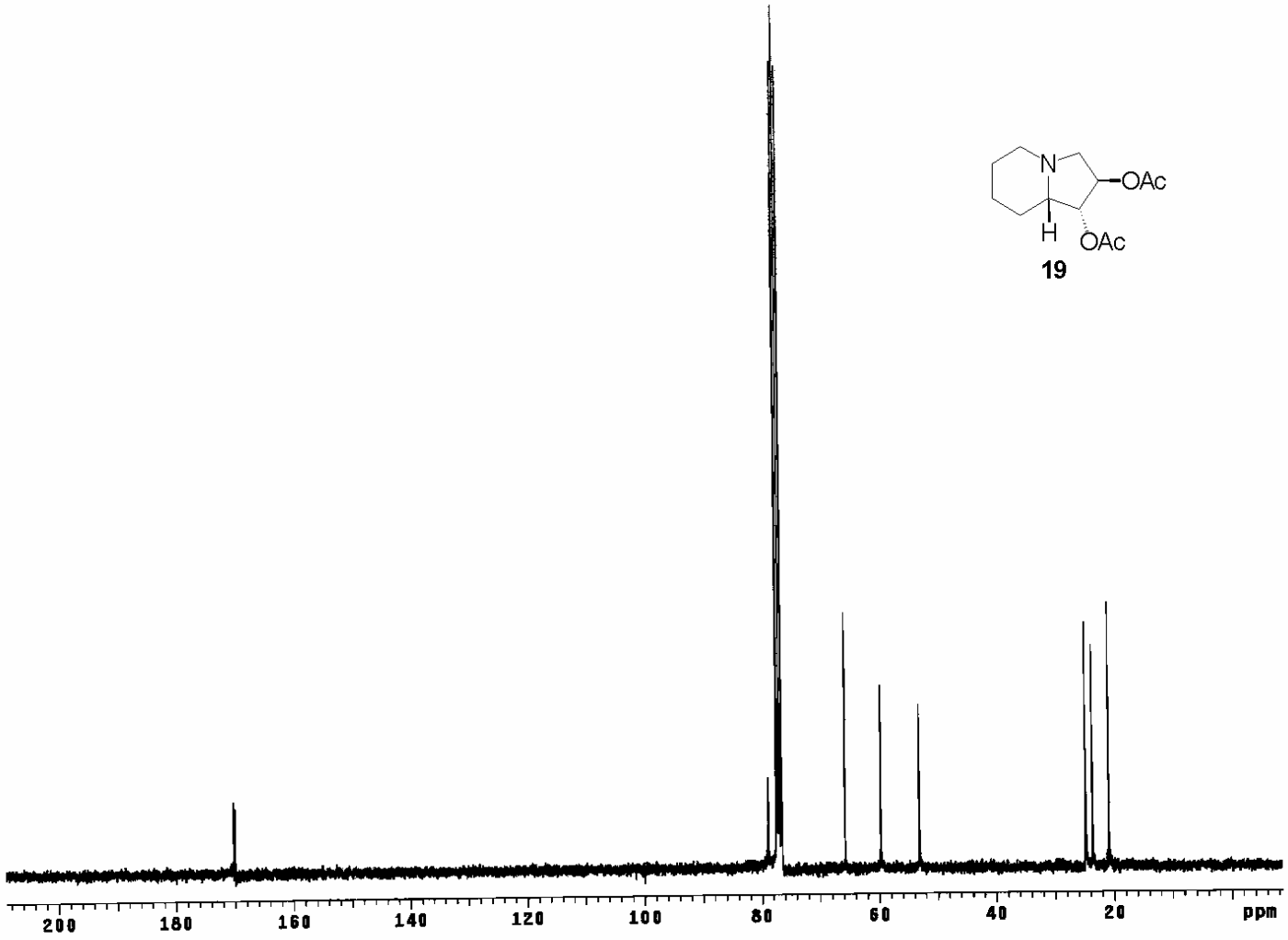


Figure 32: ^{13}C NMR (75 MHz, $CDCl_3$) spectrum of compound **19**