

An easy route to Synthetic Analogues of Radicamine B, Codonopsine and Codonopsinine from D-Mannitol

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1. Scanned copy of ^1H , ^{13}C and 2D-NMR Spectra.....S2-S64

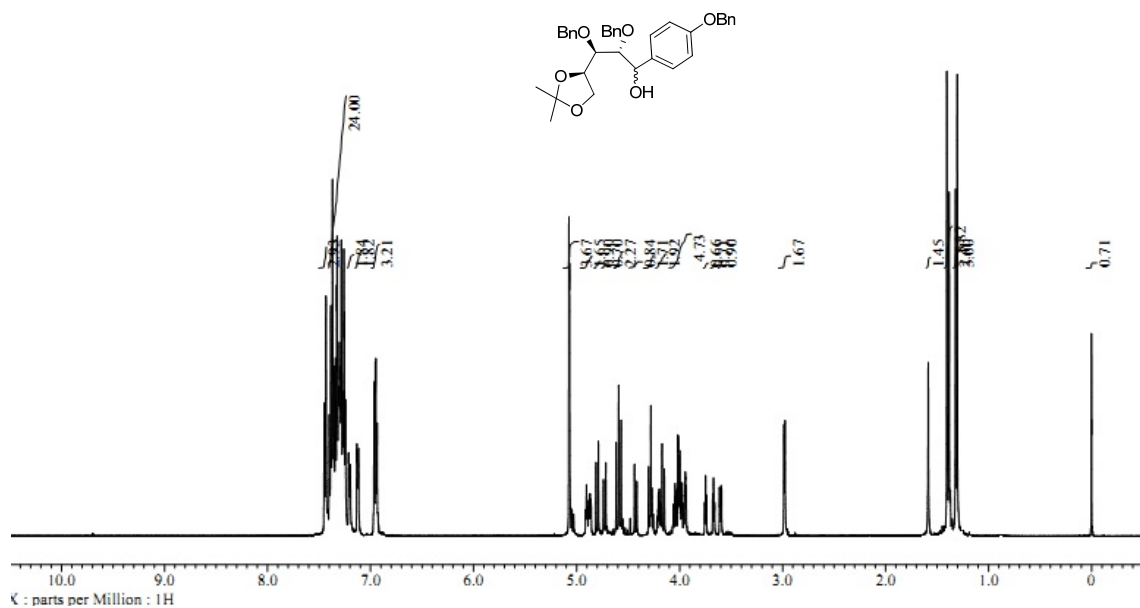


Figure 1.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound 7

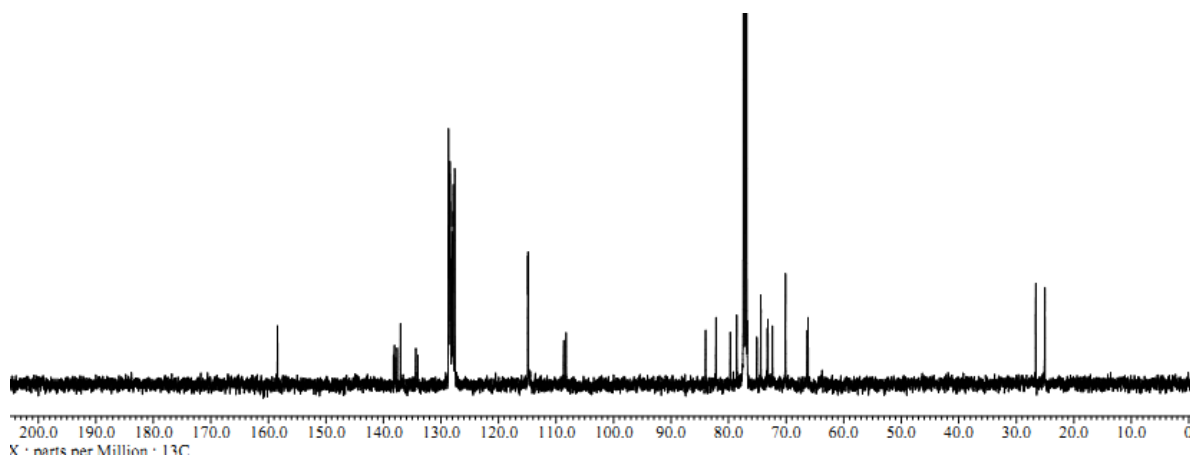


Figure 1.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound 7

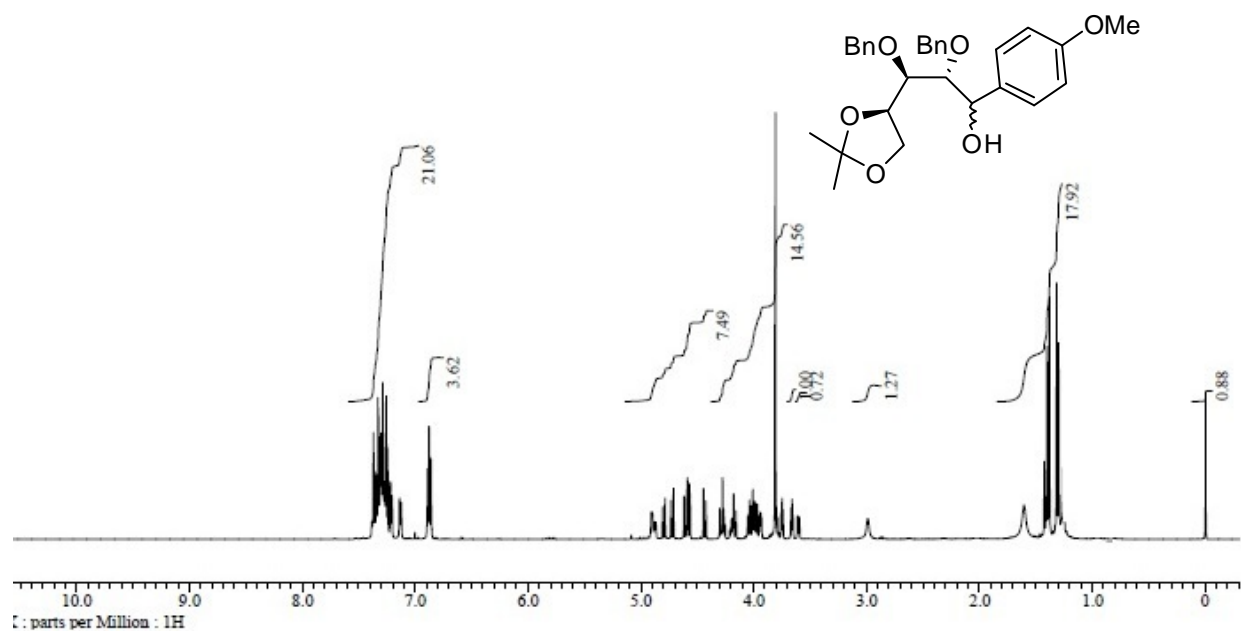


Figure 2.1: ¹H NMR (500 MHz, CDCl₃) Spectrum of Compound 15

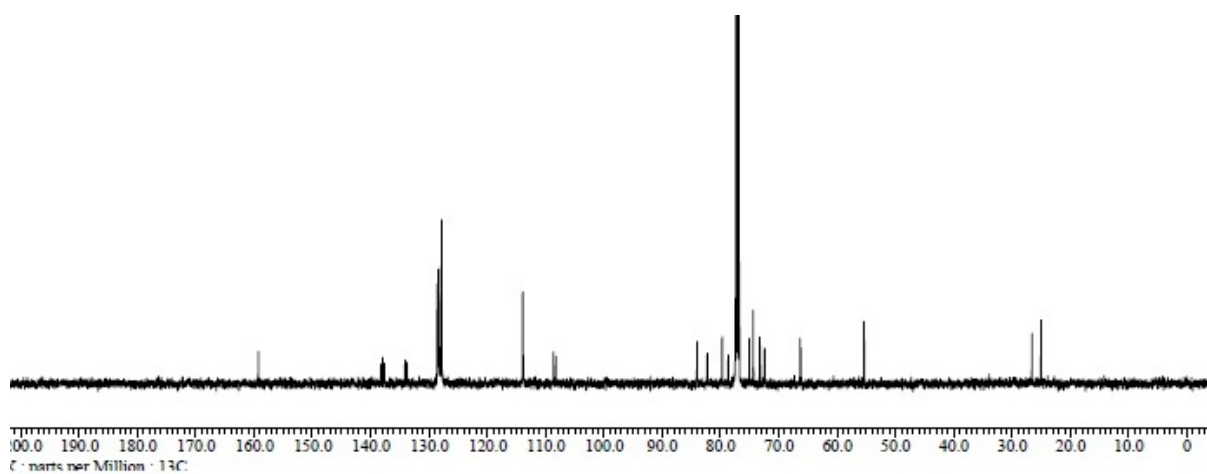
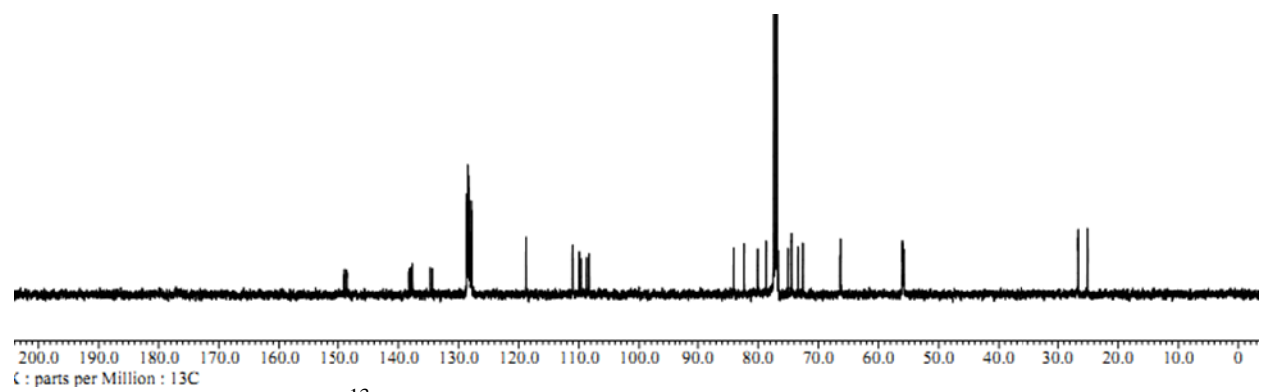
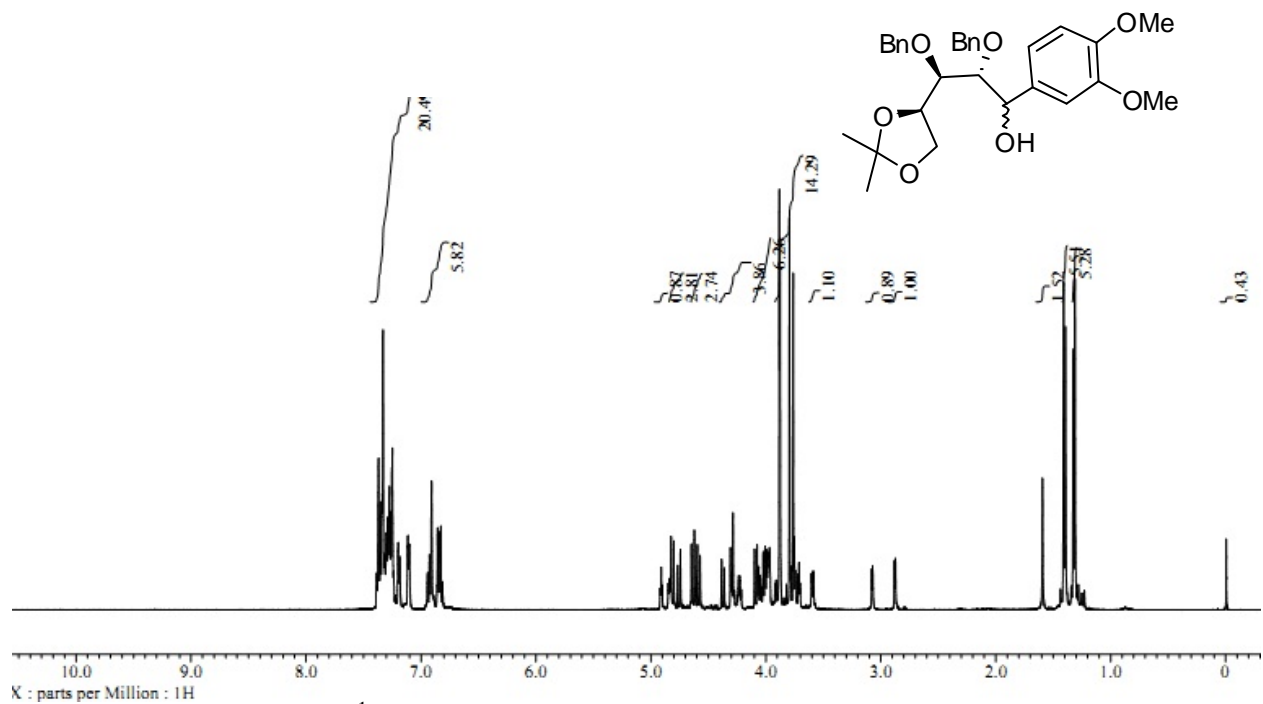


Figure 2.2: ¹³C NMR (125 MHz, CDCl₃) Spectrum of Compound 15



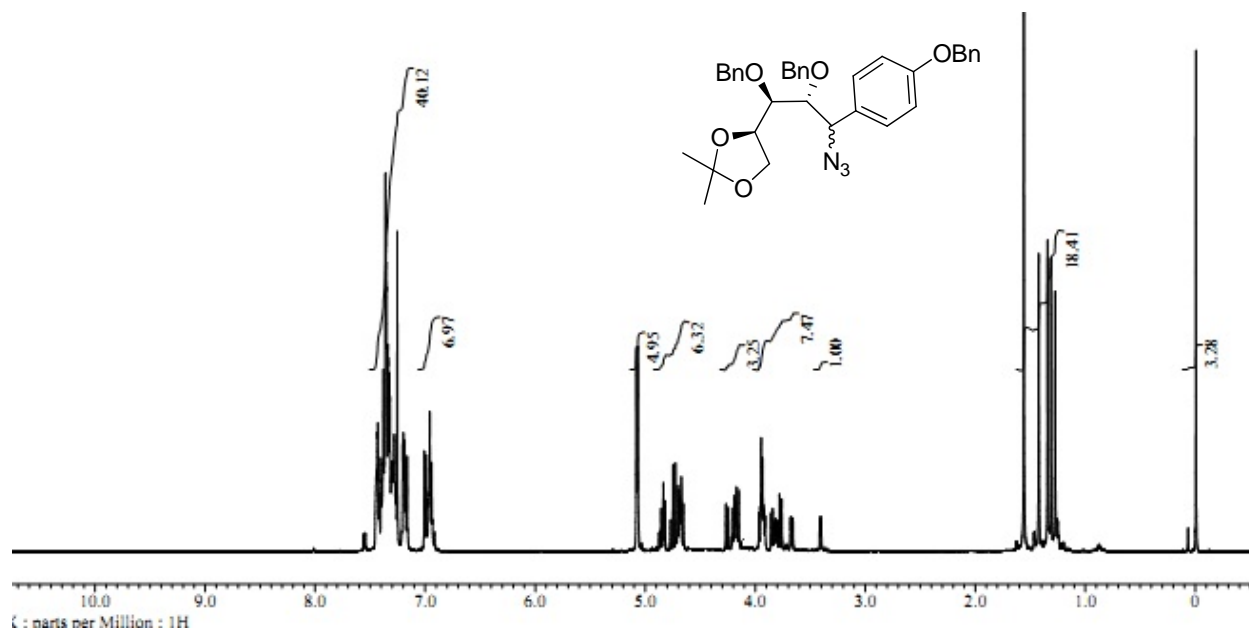


Figure 4.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound **8a**

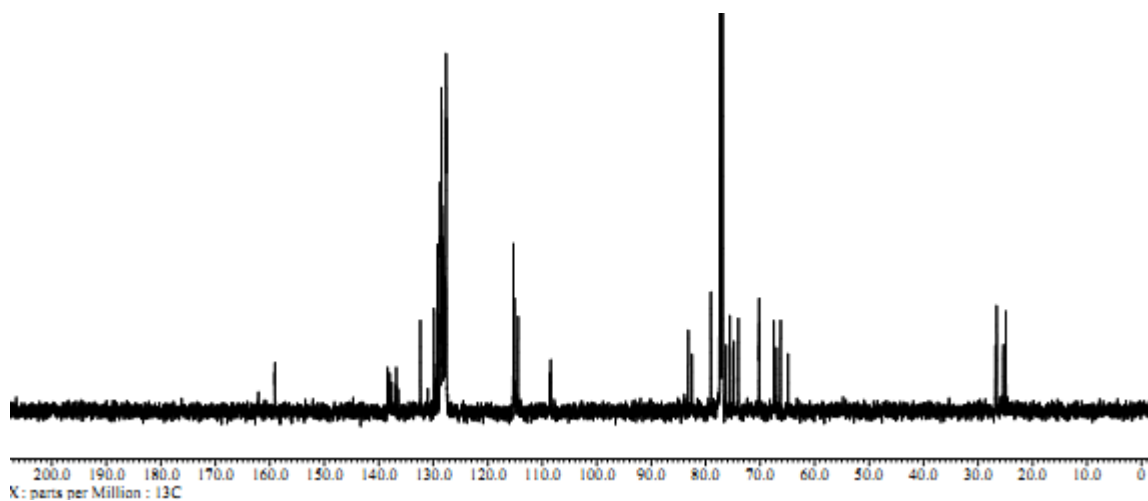


Figure 4.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound **8a**

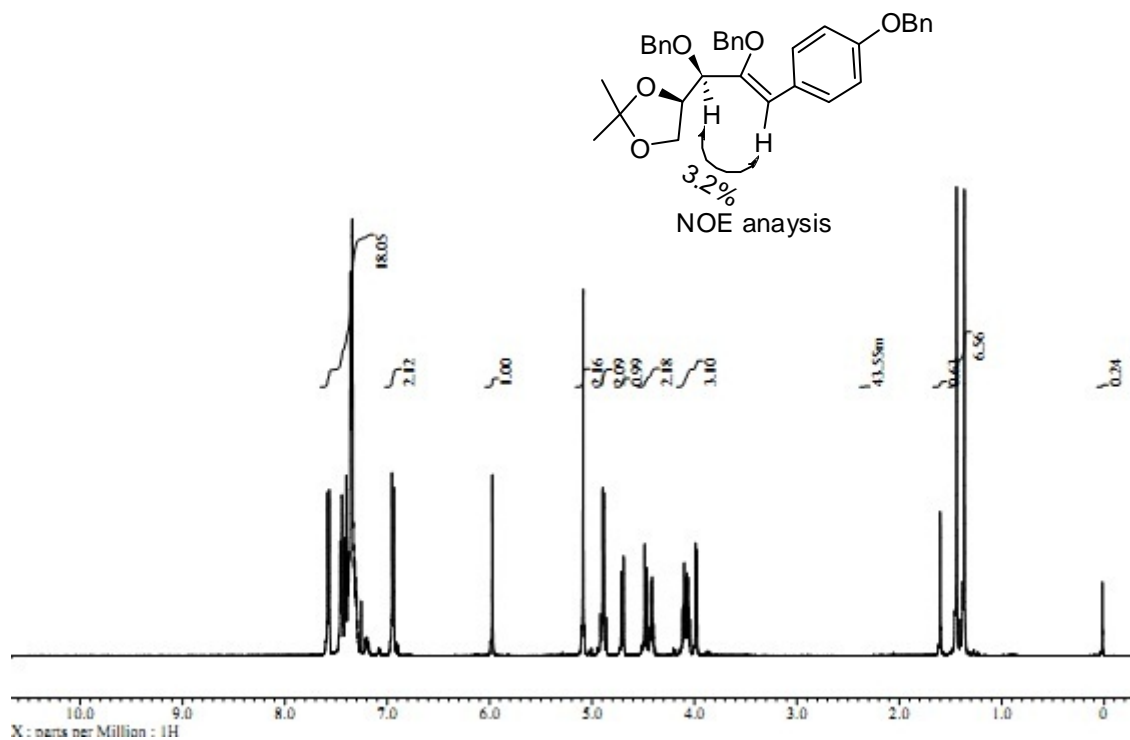


Figure 5.1: ¹H NMR (500 MHz, CDCl₃) Spectrum of Compound **8b**

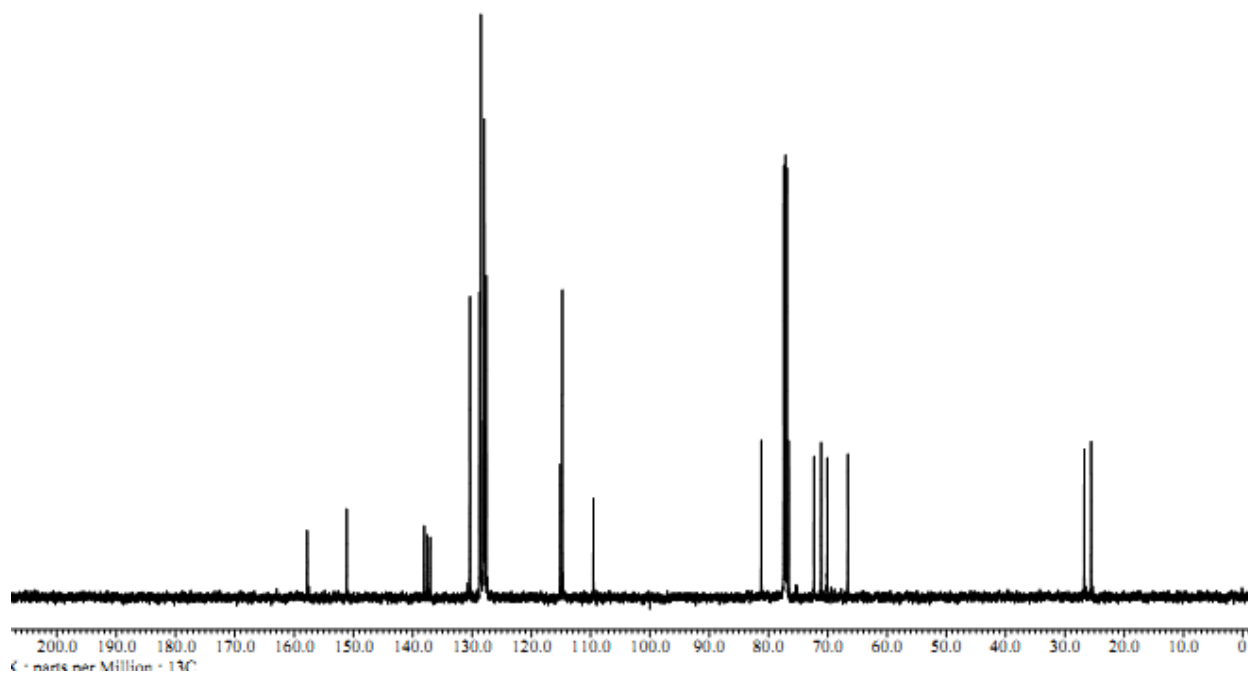


Figure 5.2: ¹³C NMR (125 MHz, CDCl₃) Spectrum of Compound **8b**

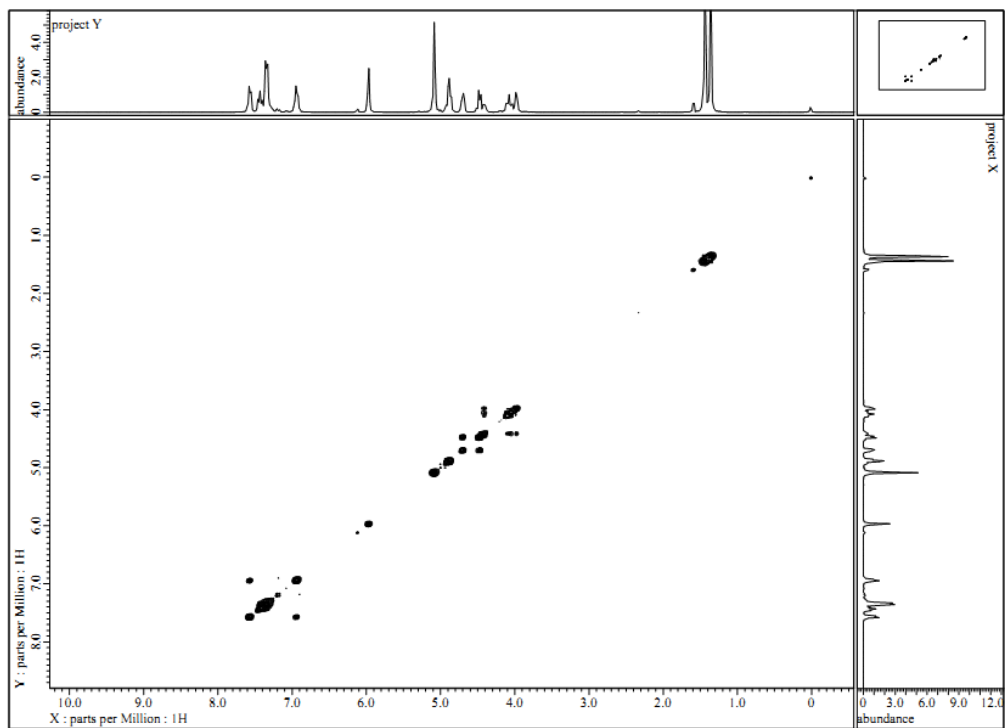


Figure 5.3: ^1H - ^1H COSY Spectrum of Compound **8b**

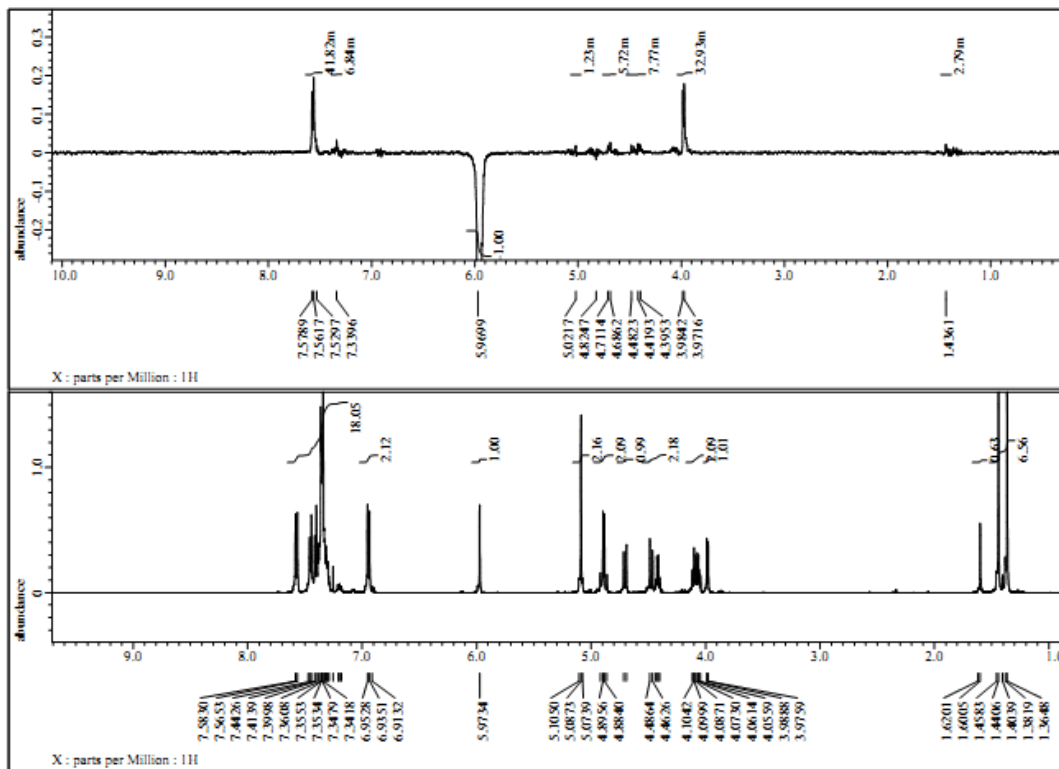


Figure 5.4: NOE irradiation of Vinylic proton of Compound **8b**

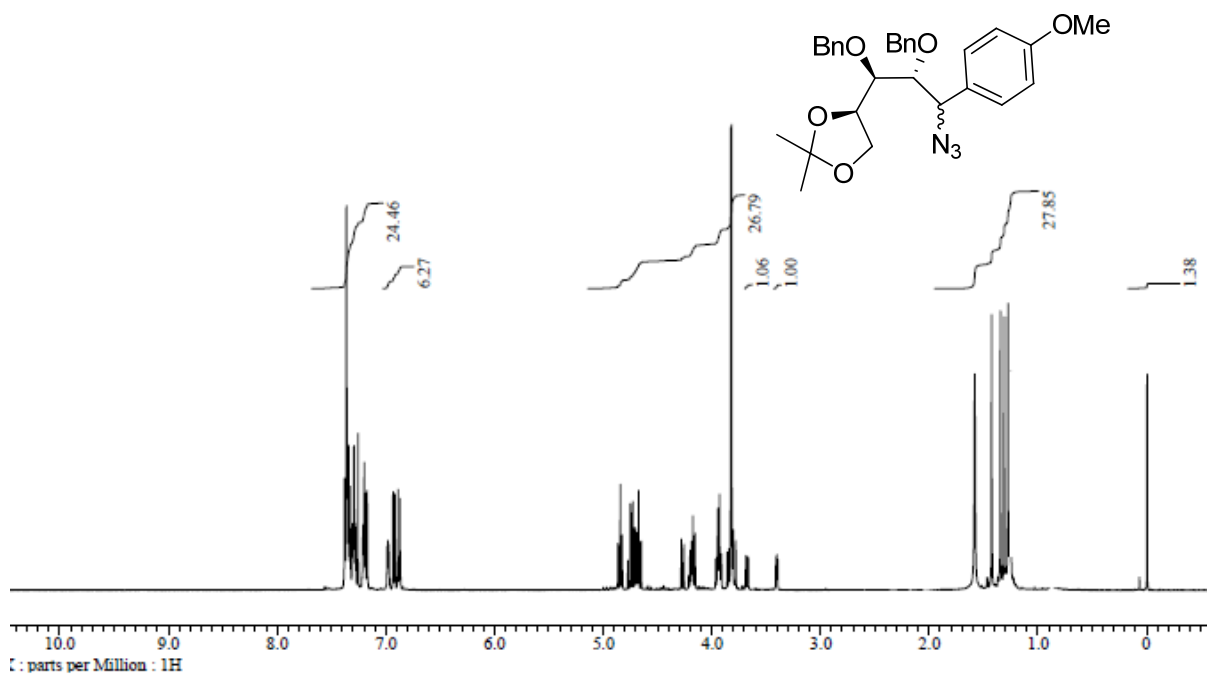


Figure 6.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound 17a

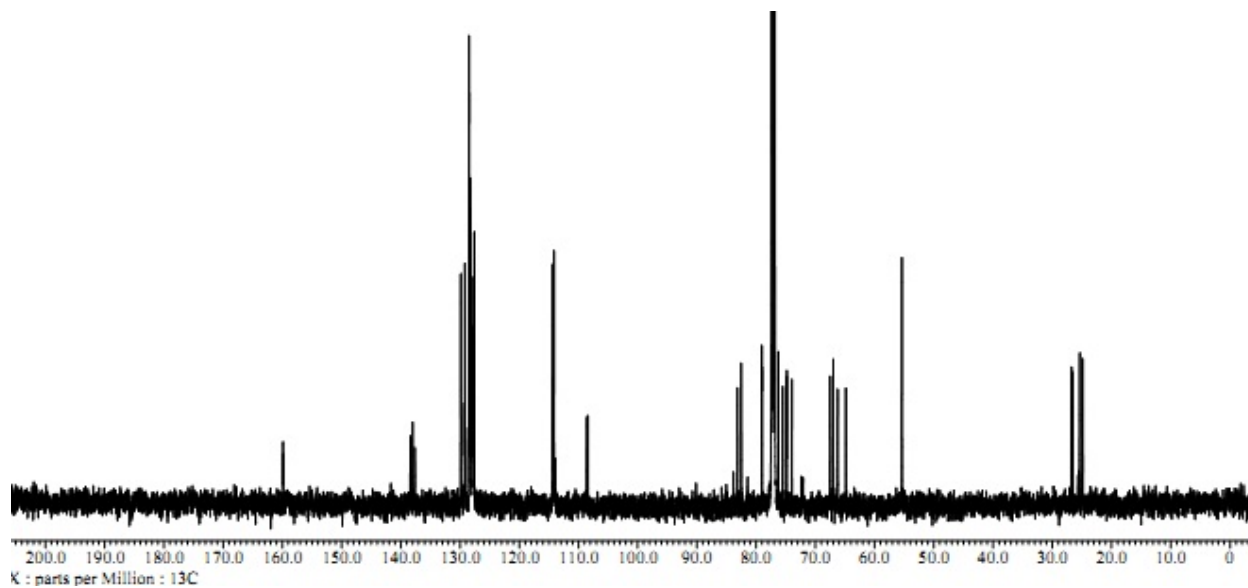


Figure 6.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound 17a

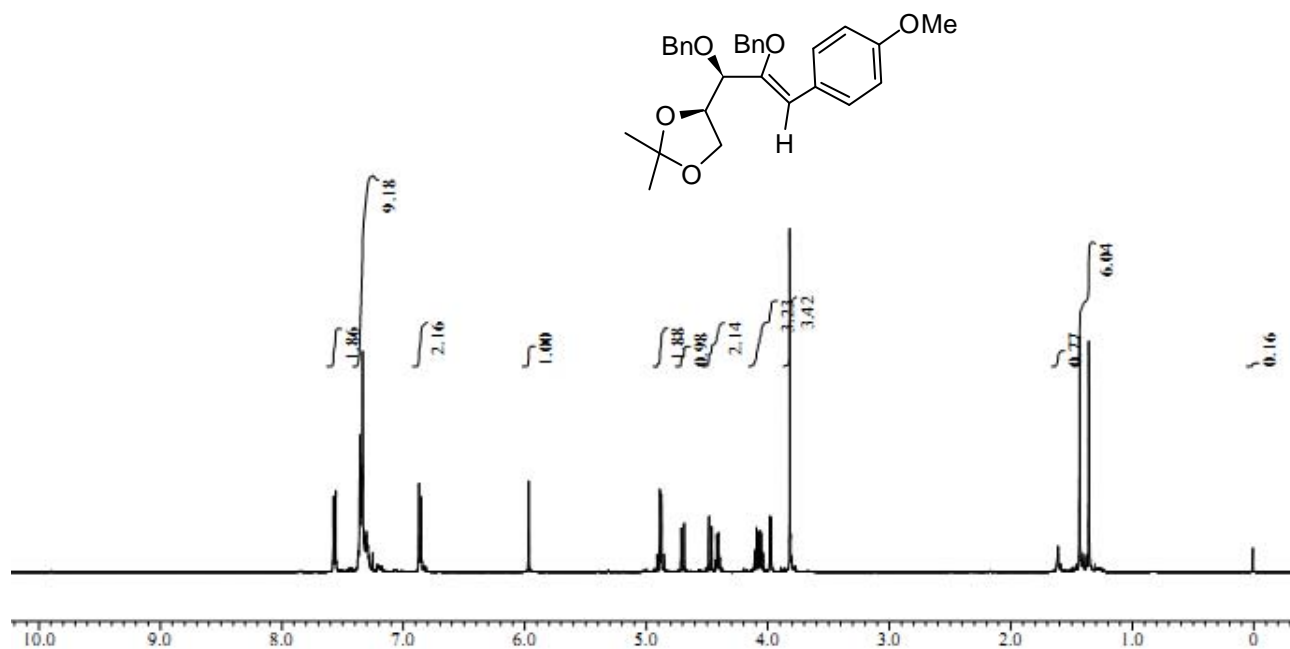


Figure 7.1: ¹H NMR (500 MHz, CDCl₃) Spectrum of Compound 17b

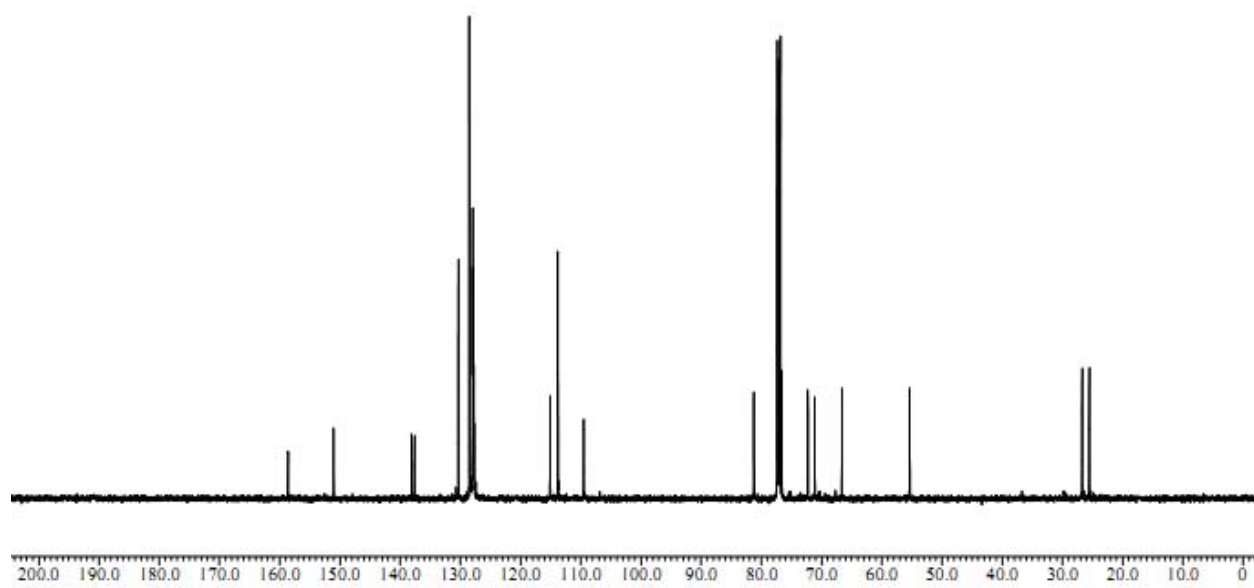


Figure 7.2: ¹³C NMR (125 MHz, CDCl₃) Spectrum of Compound 17b

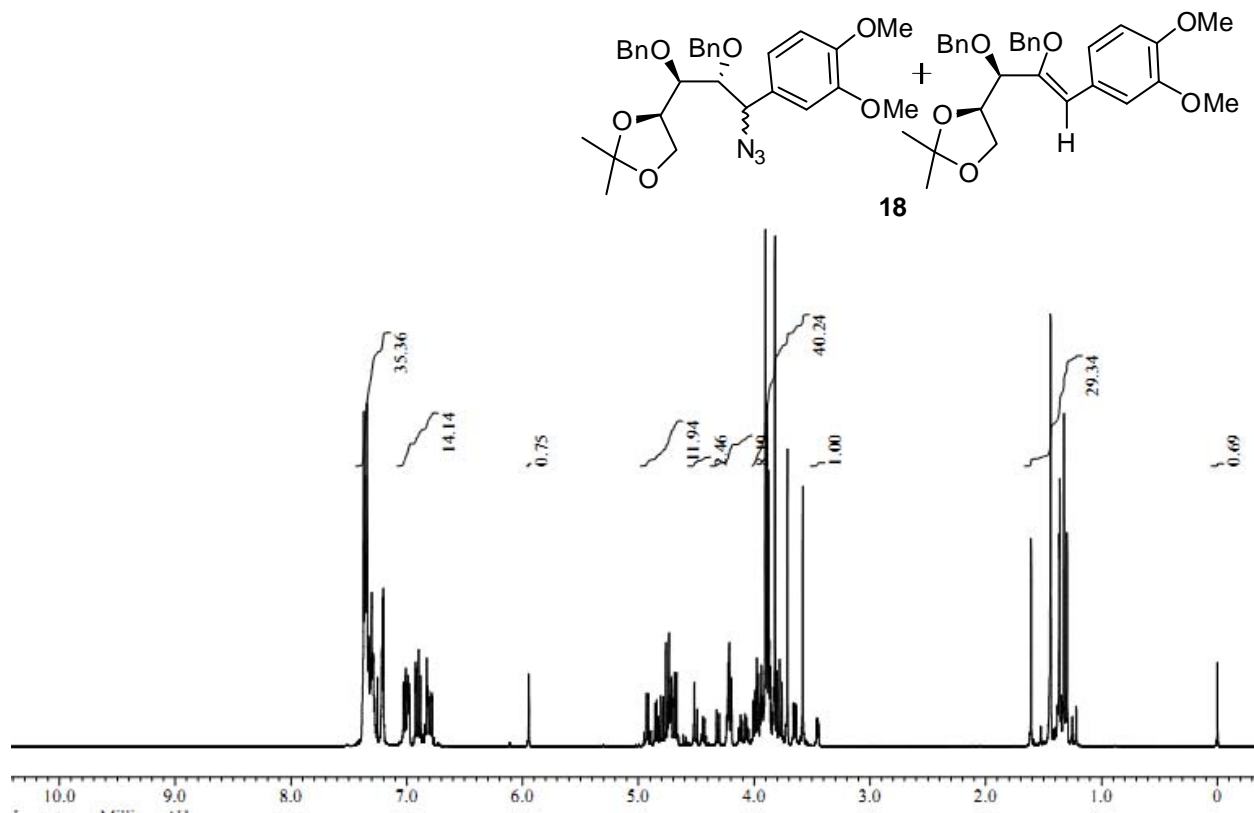


Figure 8.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound 18

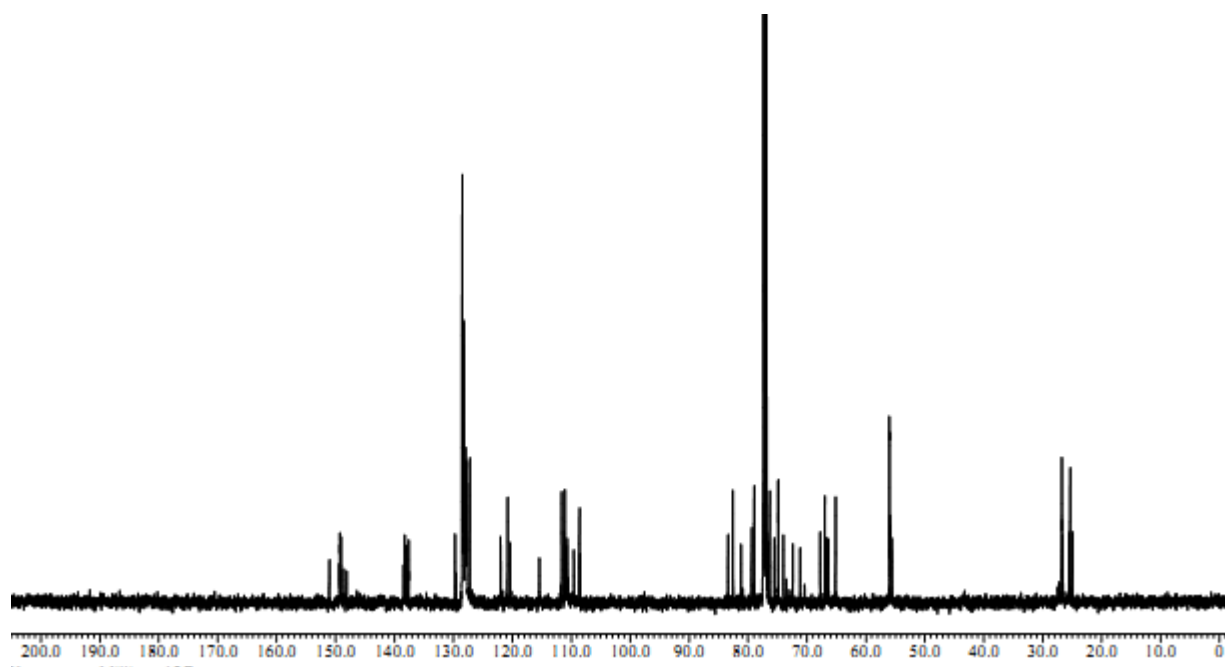


Figure 8.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound 18

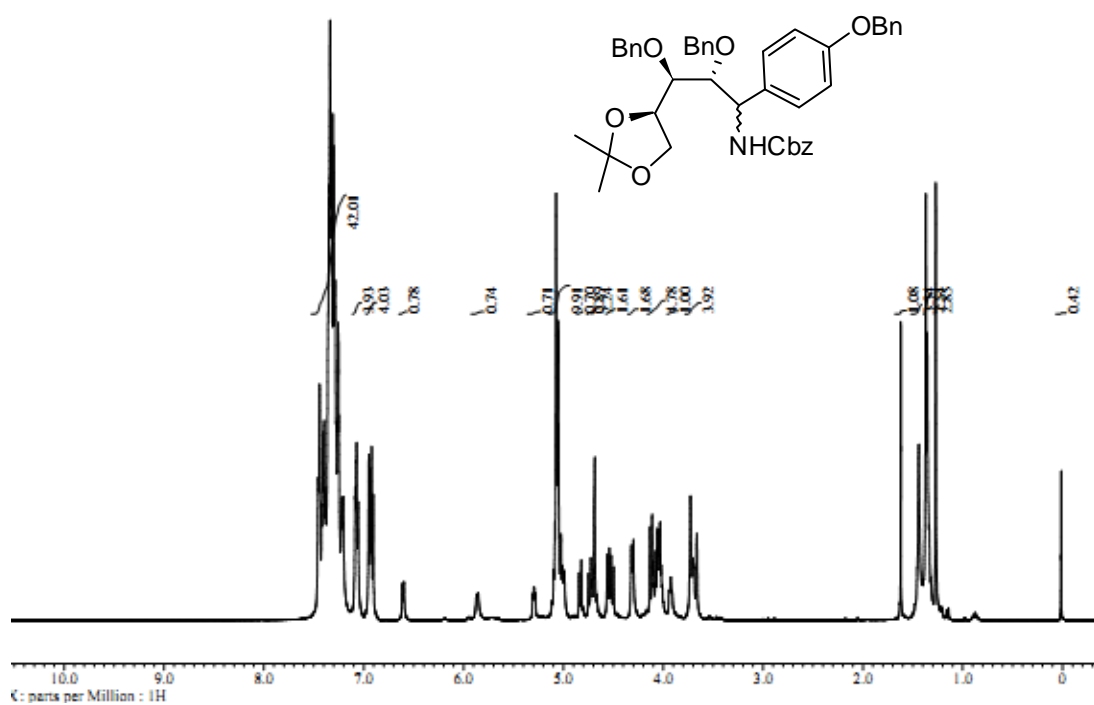


Figure 9.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound 9

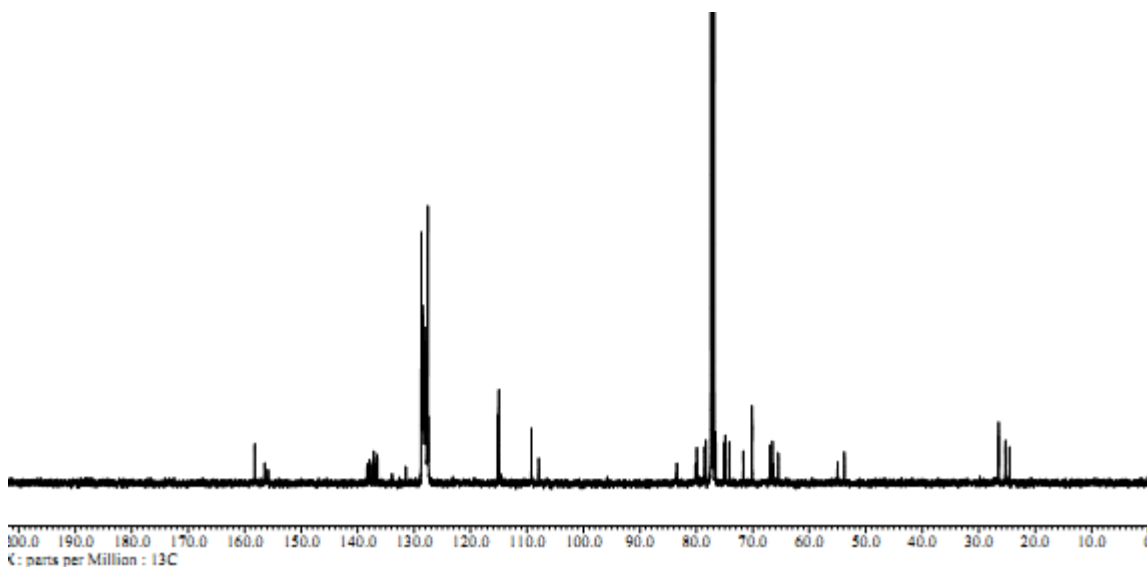


Figure 9.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound 9

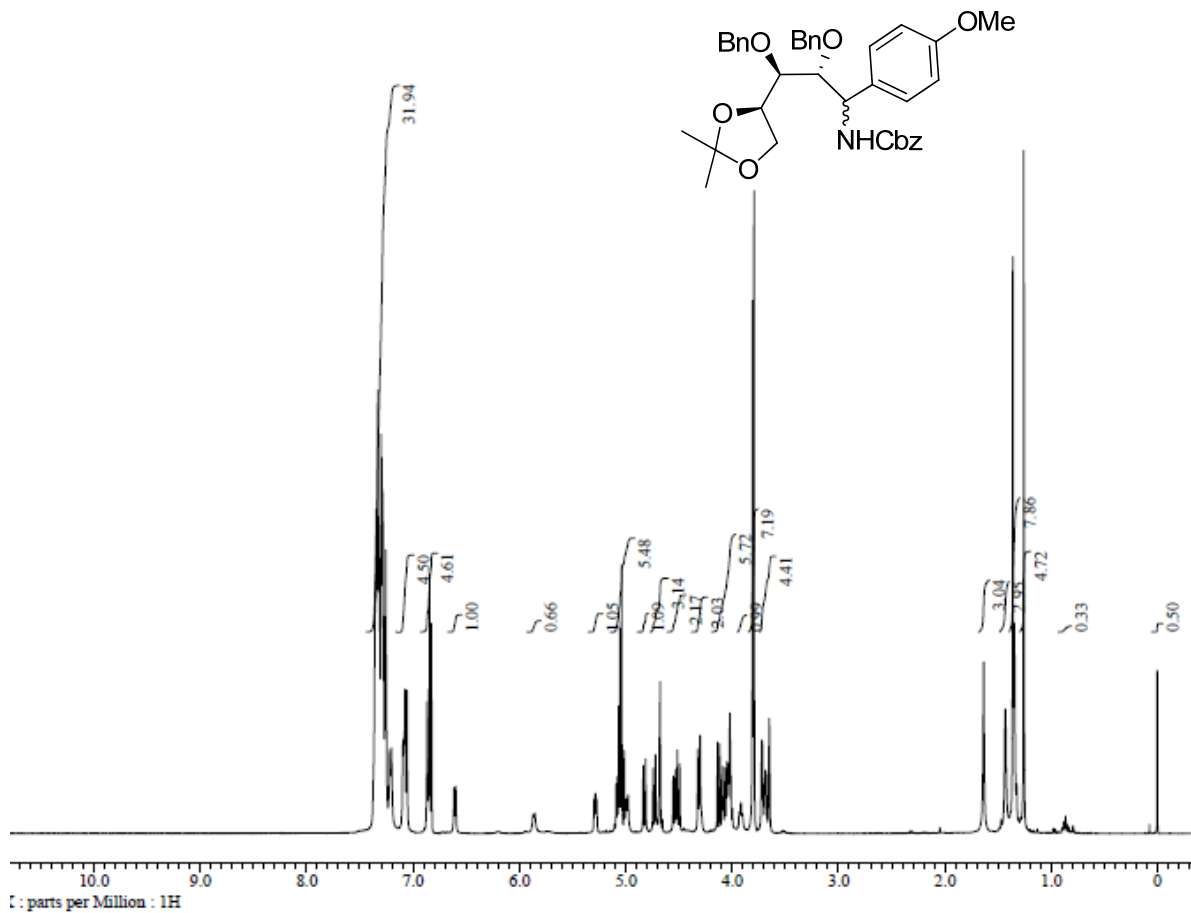


Figure 10.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound 19

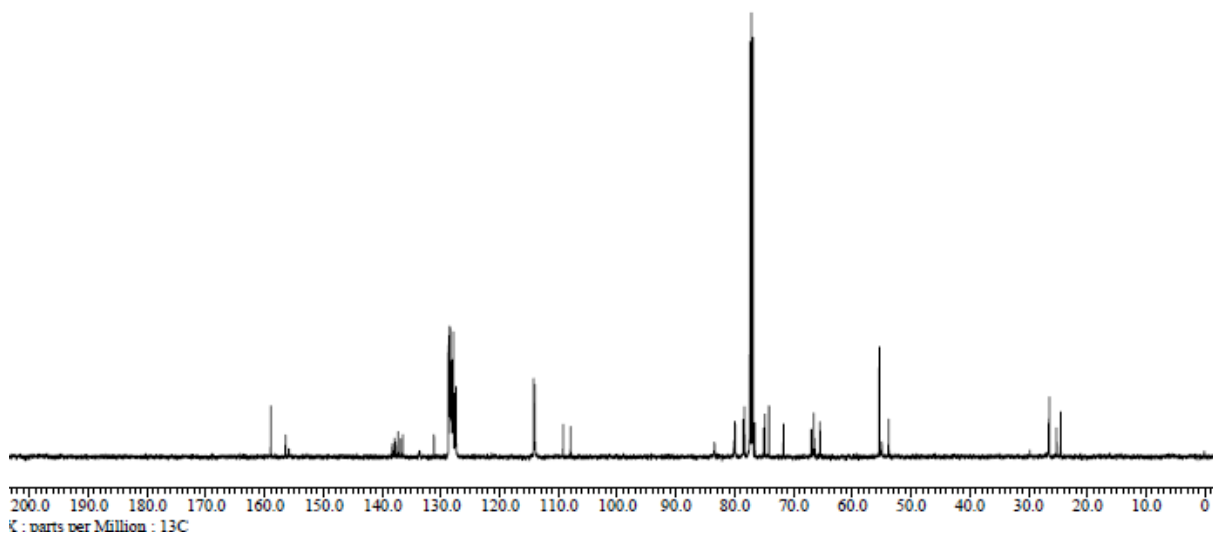


Figure 10.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound 20

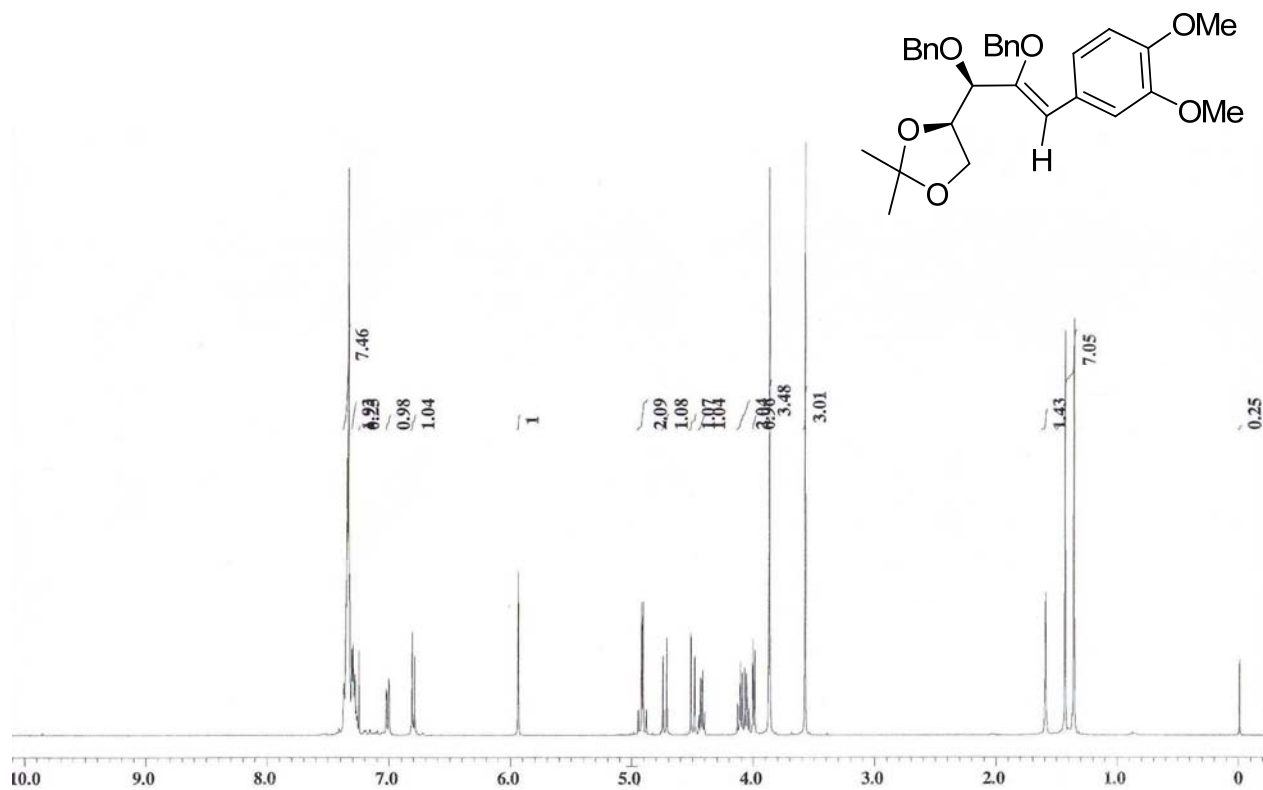


Figure 12.1: ¹H NMR (400 MHz, CDCl₃) Spectrum of Compound 20b

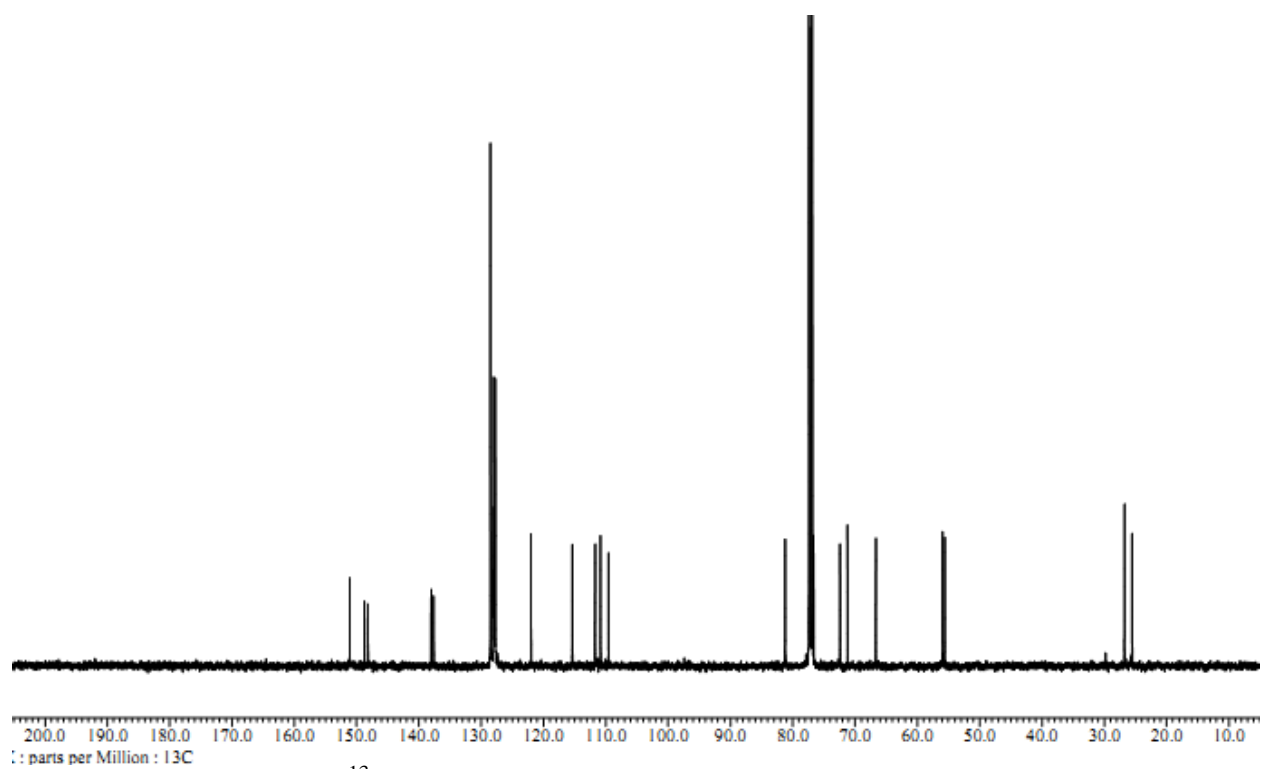


Figure 12.2: ¹³C NMR (125 MHz, CDCl₃) Spectrum of Compound 20b

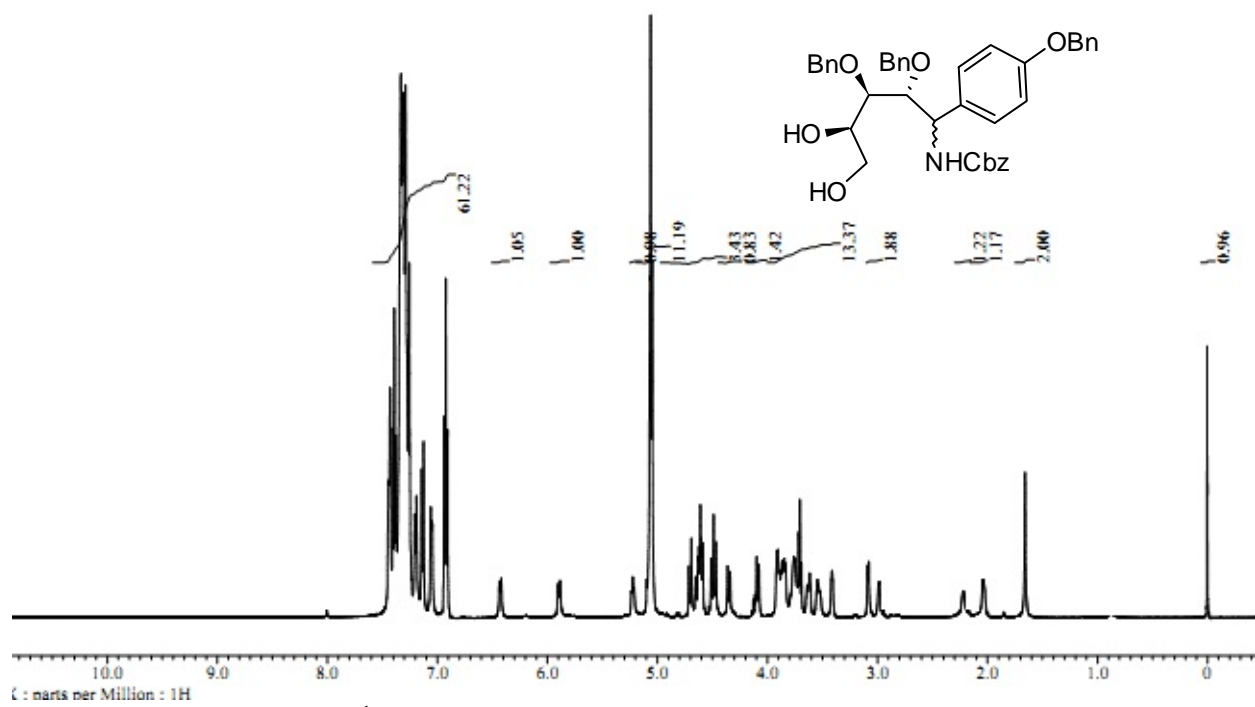


Figure 13.1: $^1\text{H NMR}$ (500 MHz, CDCl_3) Spectrum of Compound 10

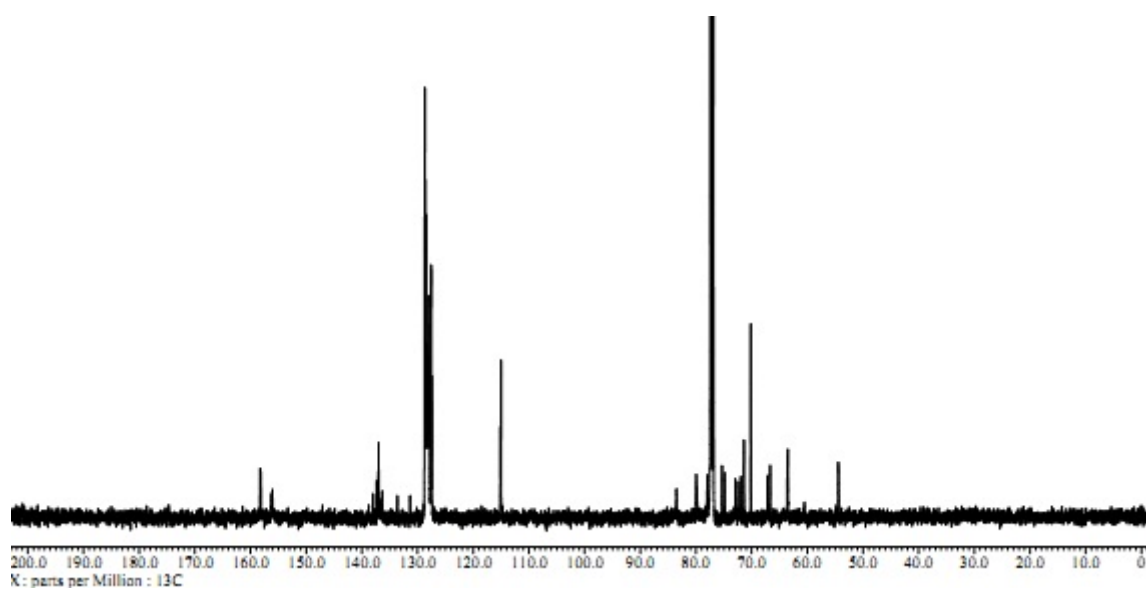
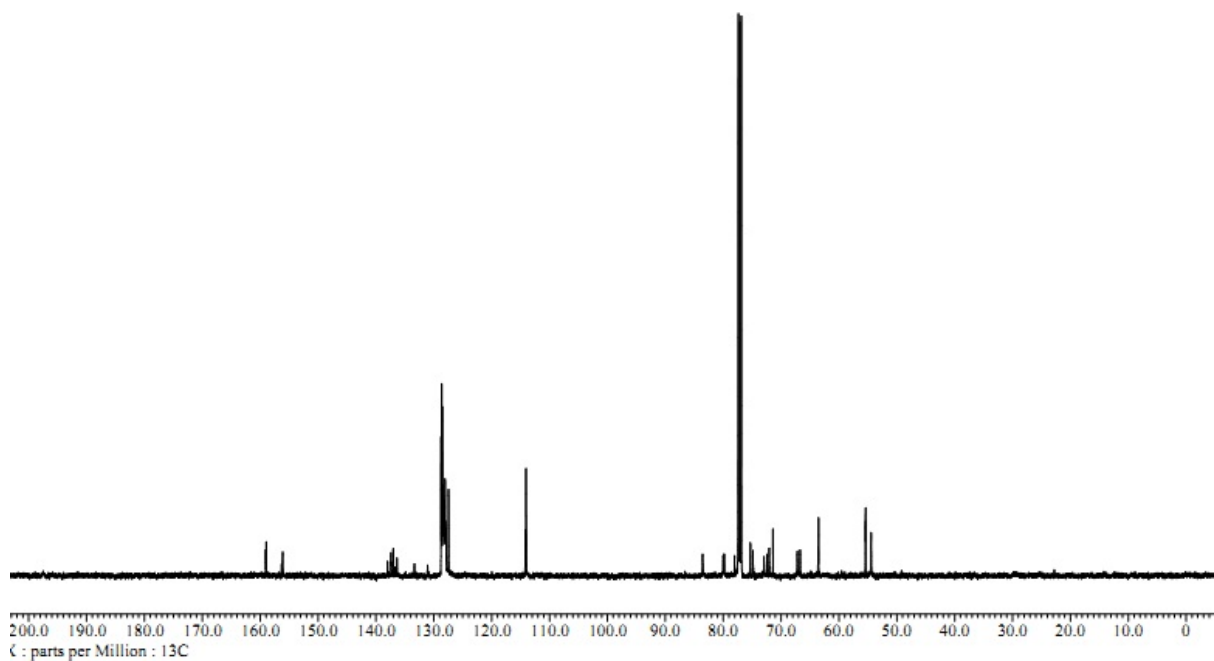
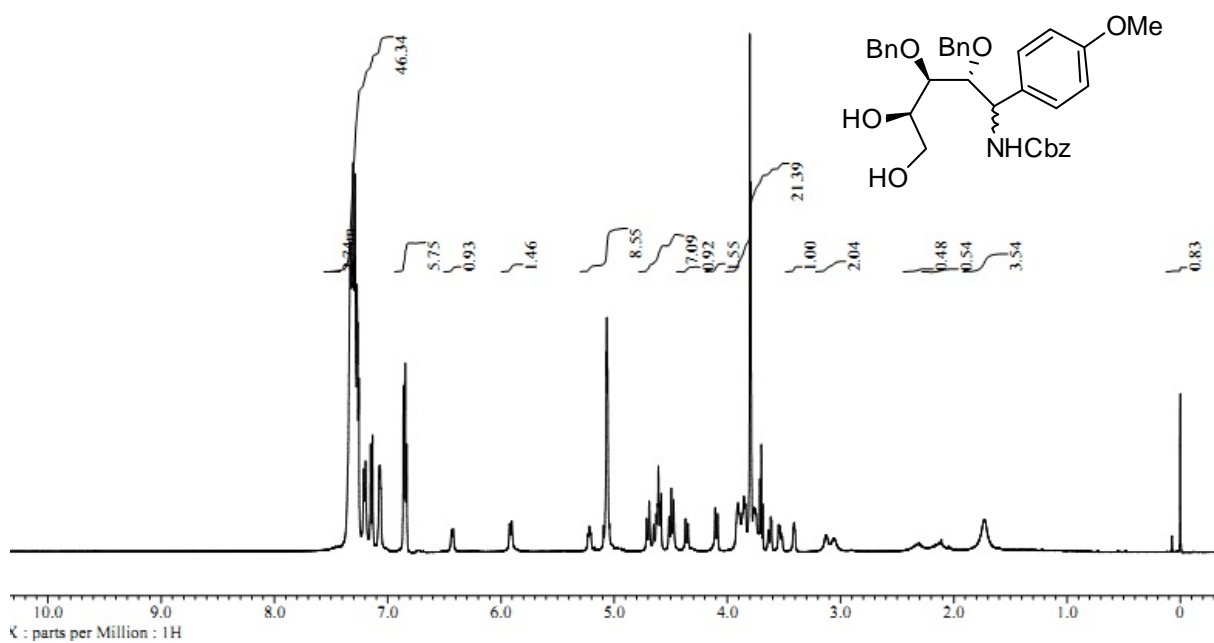


Figure 13.2: $^{13}\text{C NMR}$ (125 MHz, CDCl_3) Spectrum of Compound 10



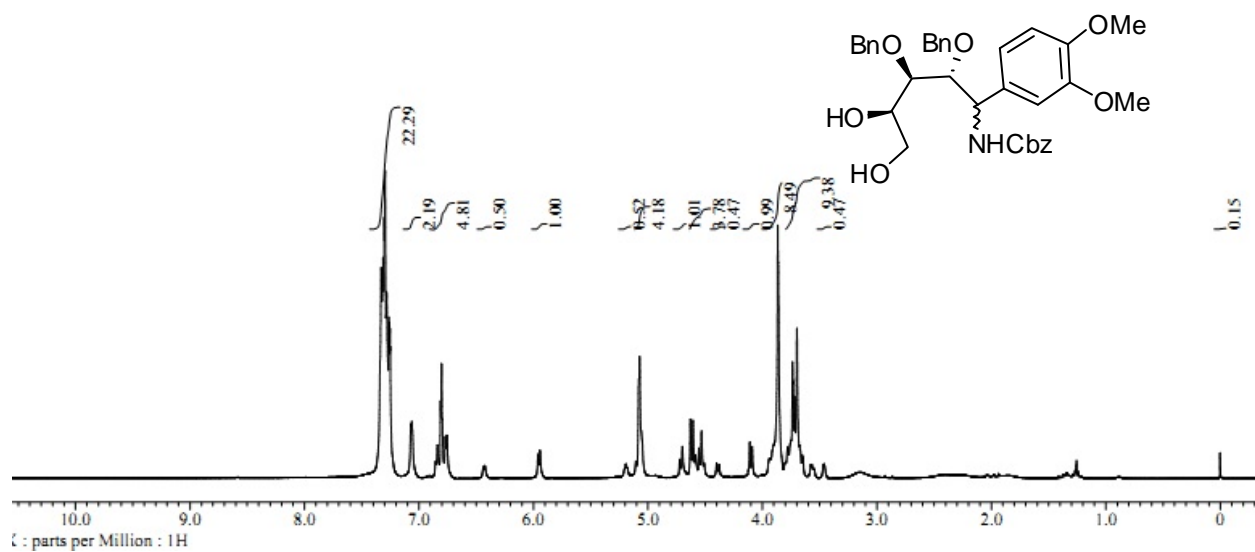


Figure 15.1: $^1\text{H NMR}$ (500 MHz, CDCl_3) Spectrum of Compound 22

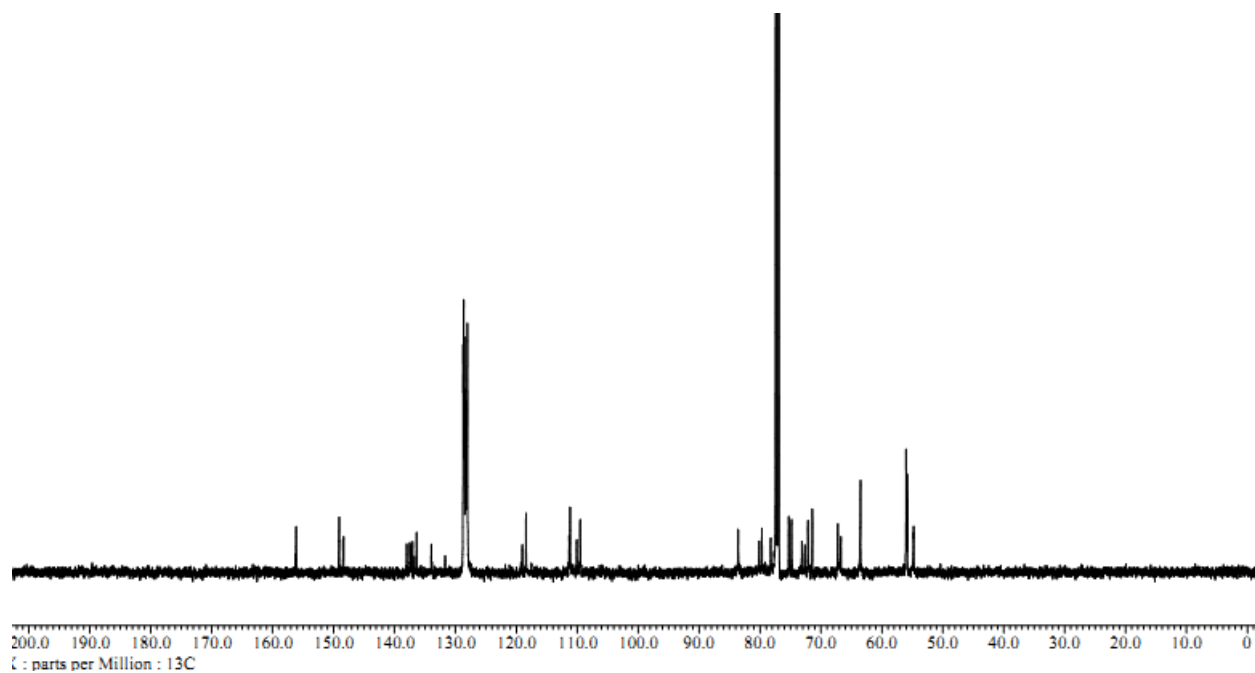
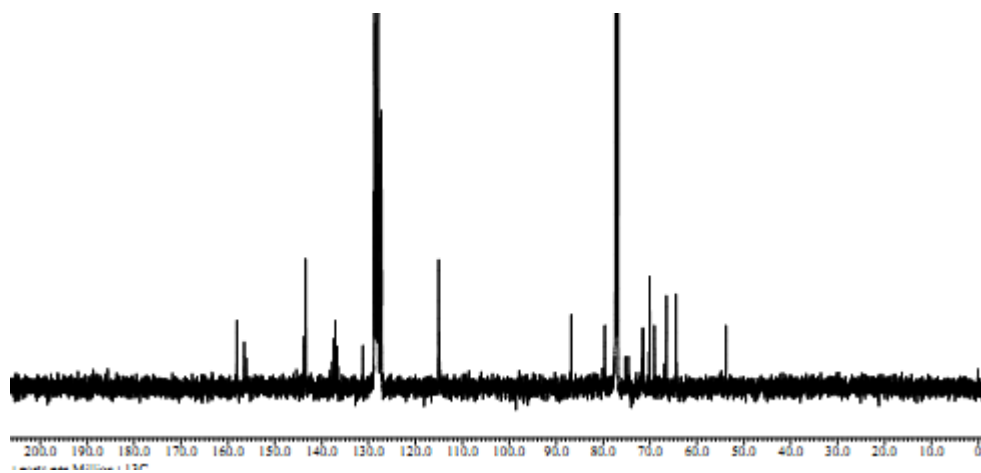
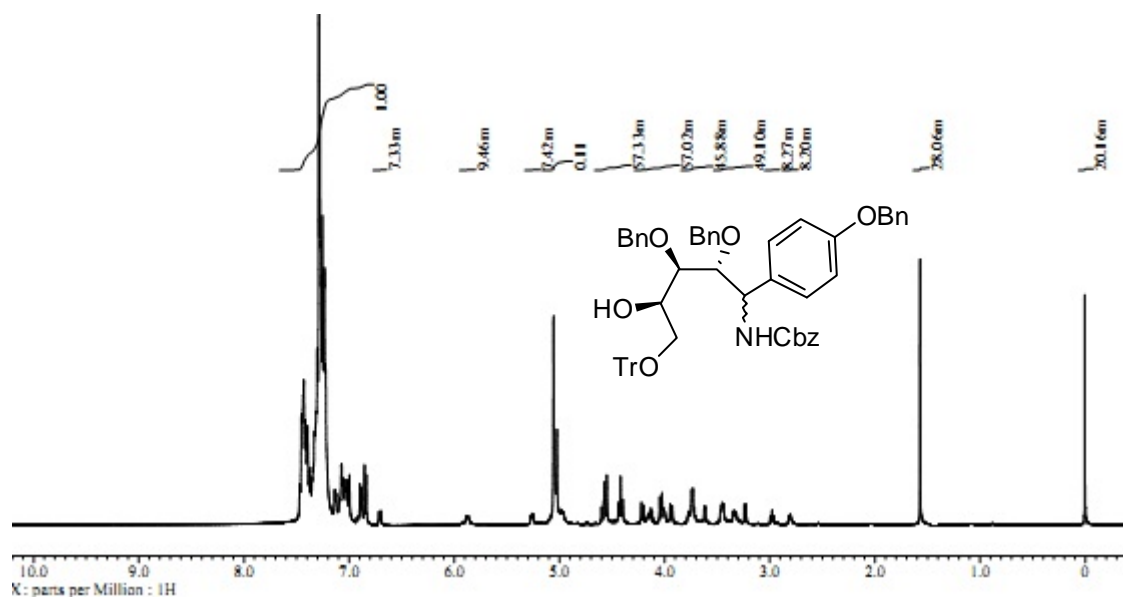


Figure 15.2: $^{13}\text{C NMR}$ (125 MHz, CDCl_3) Spectrum of Compound 22



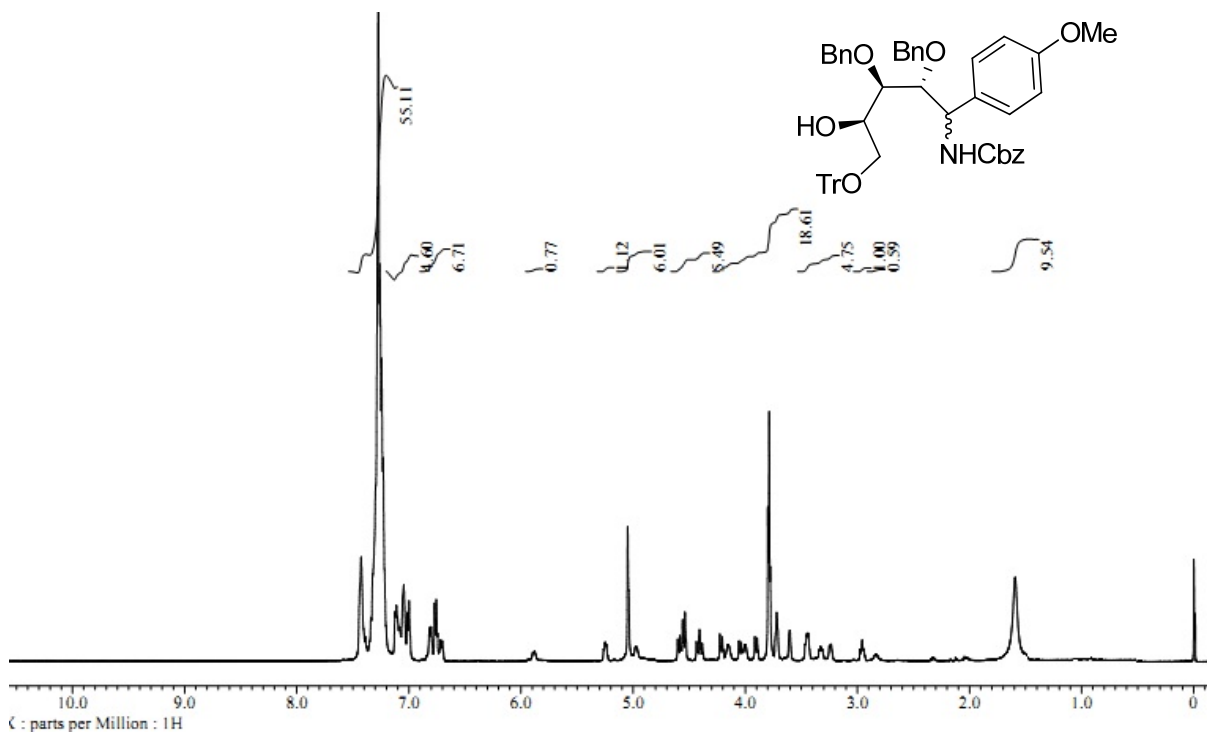


Figure 17.1: ¹H NMR (500 MHz, CDCl₃) Spectrum of Compound **23**

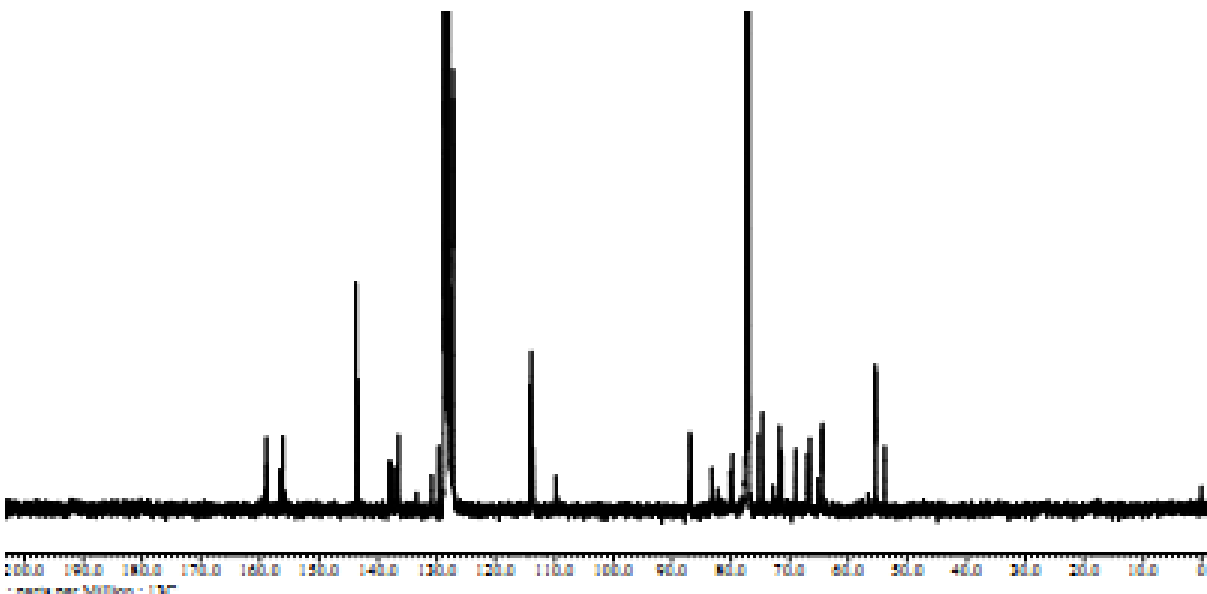
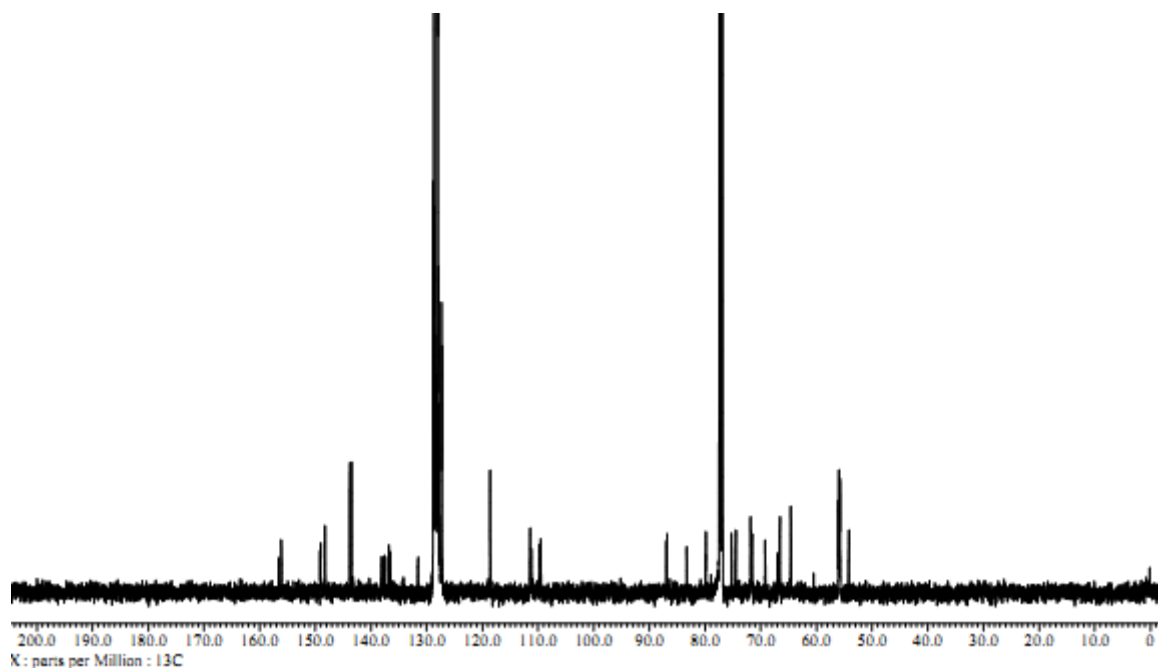
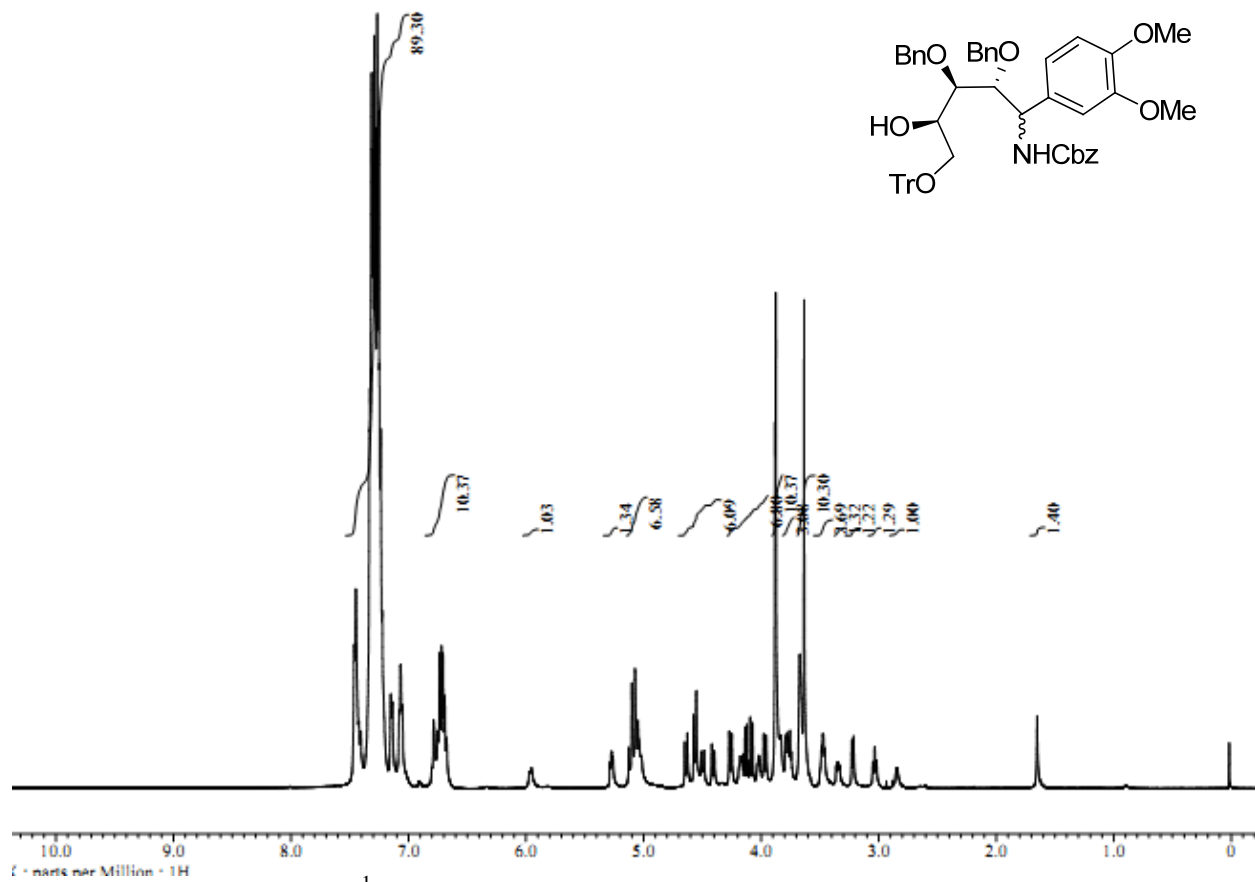


Figure 17.2: ¹³C NMR (125 MHz, CDCl₃) Spectrum of Compound **23**



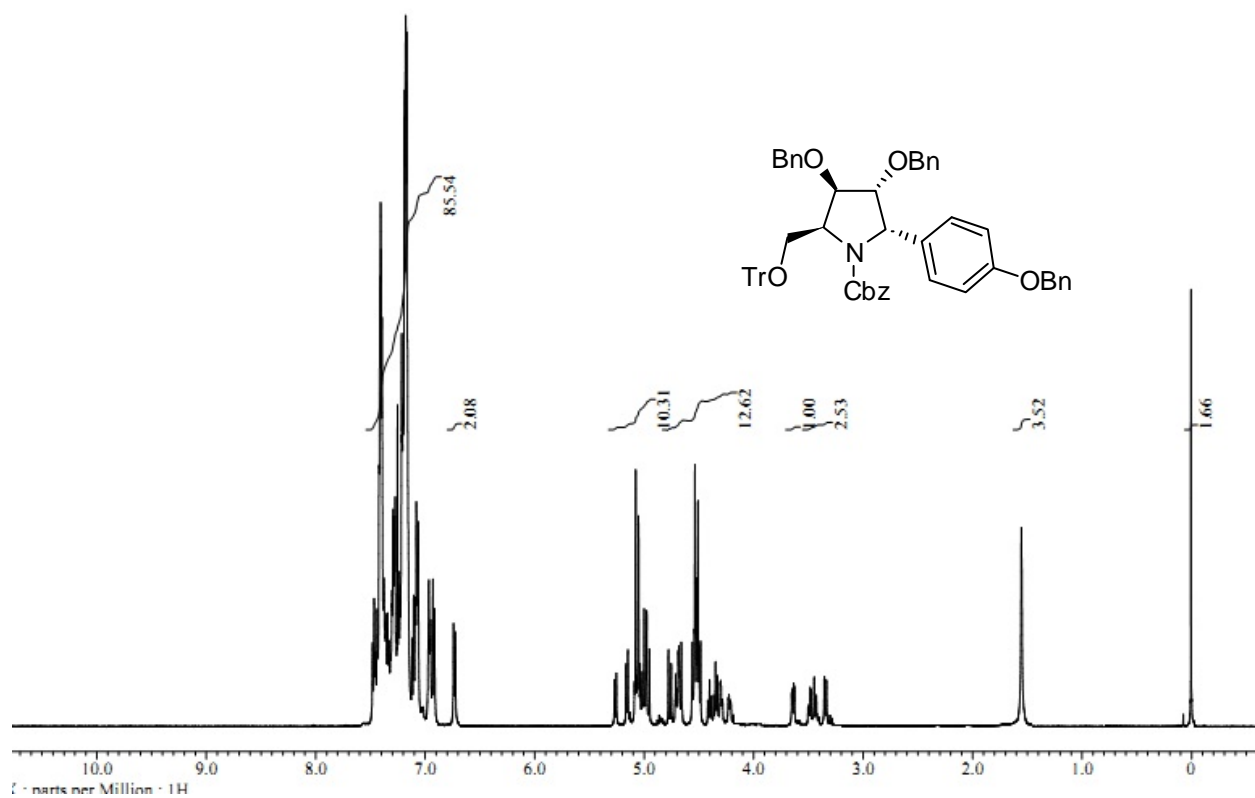


Figure 19.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound **12a**

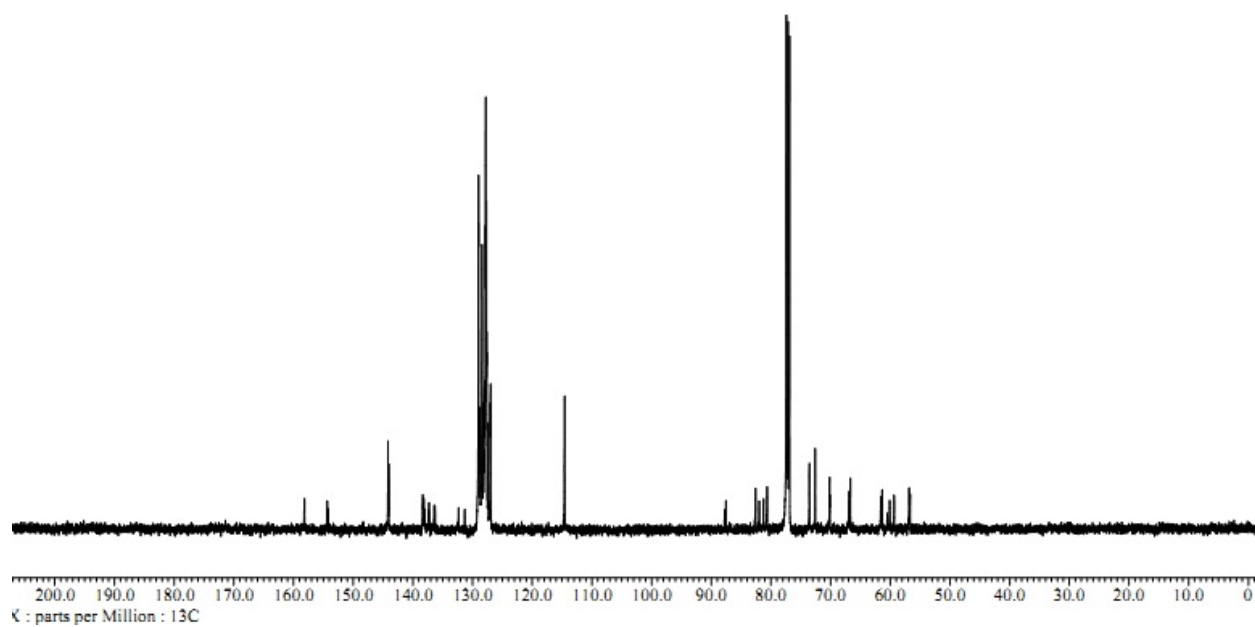


Figure 19.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound **12a**

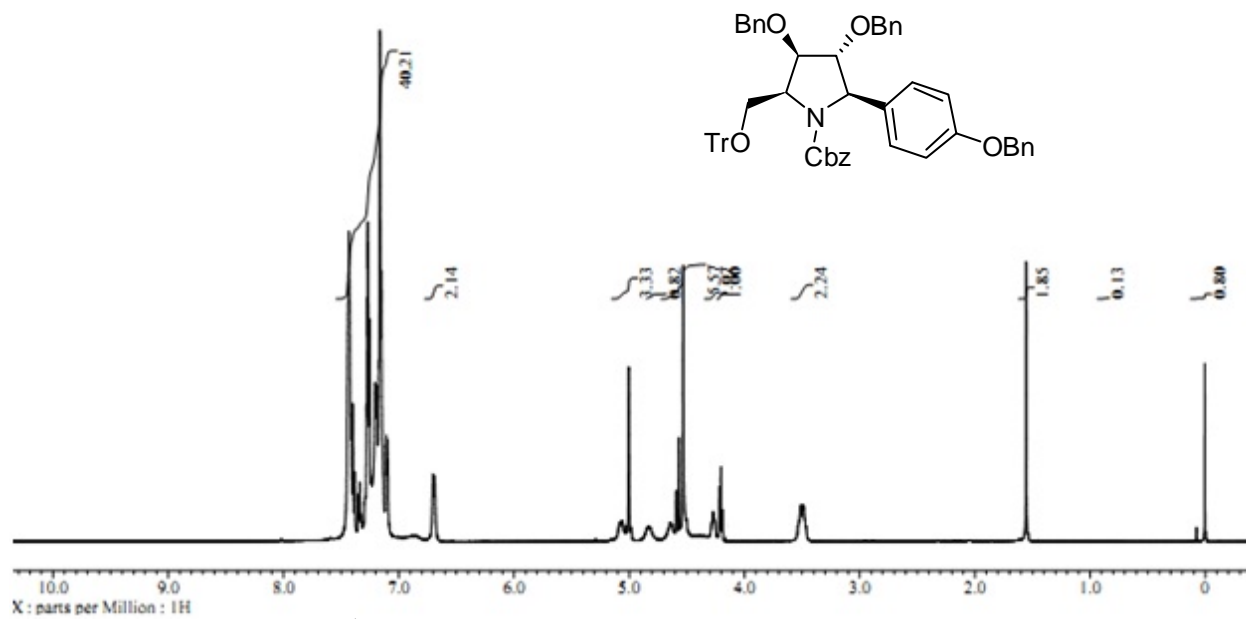


Figure 20.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound **12b**

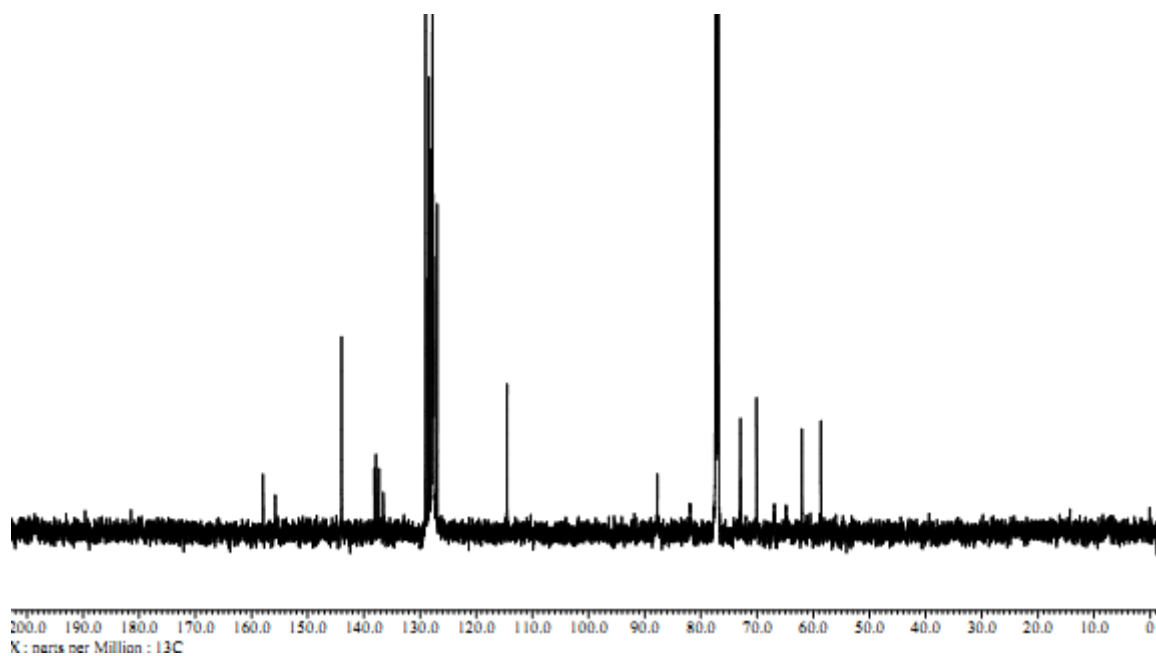


Figure 20.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound **12b**

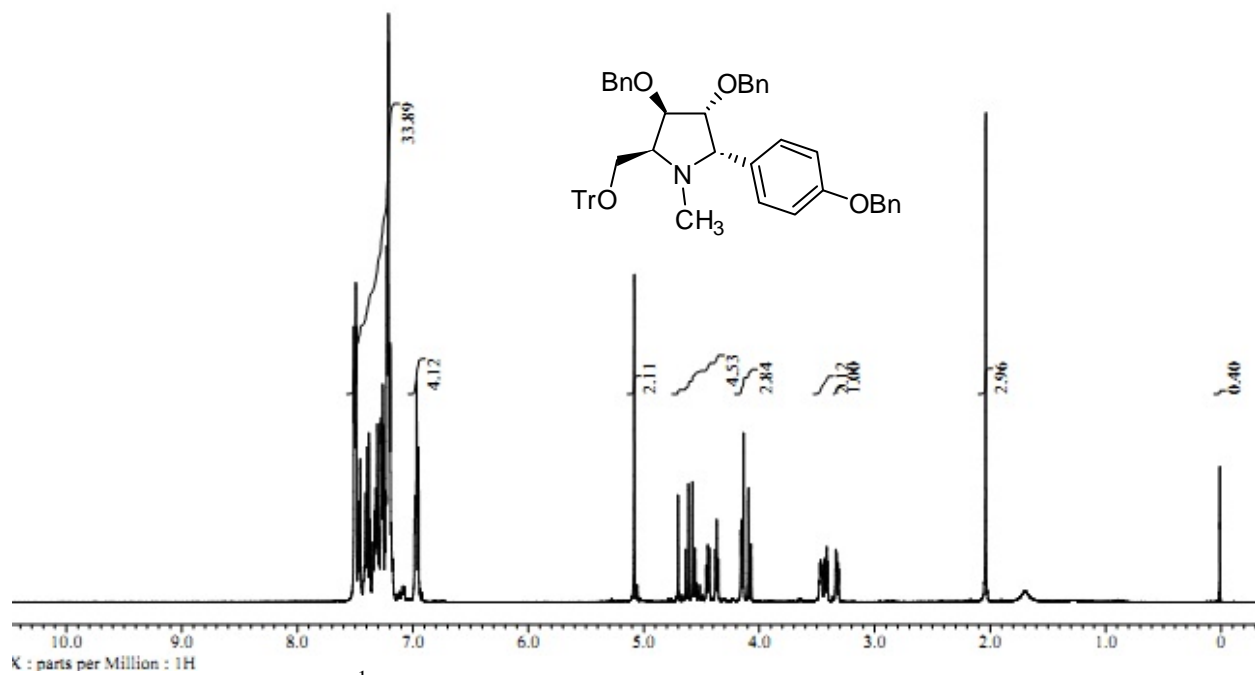


Figure 21.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound 13a

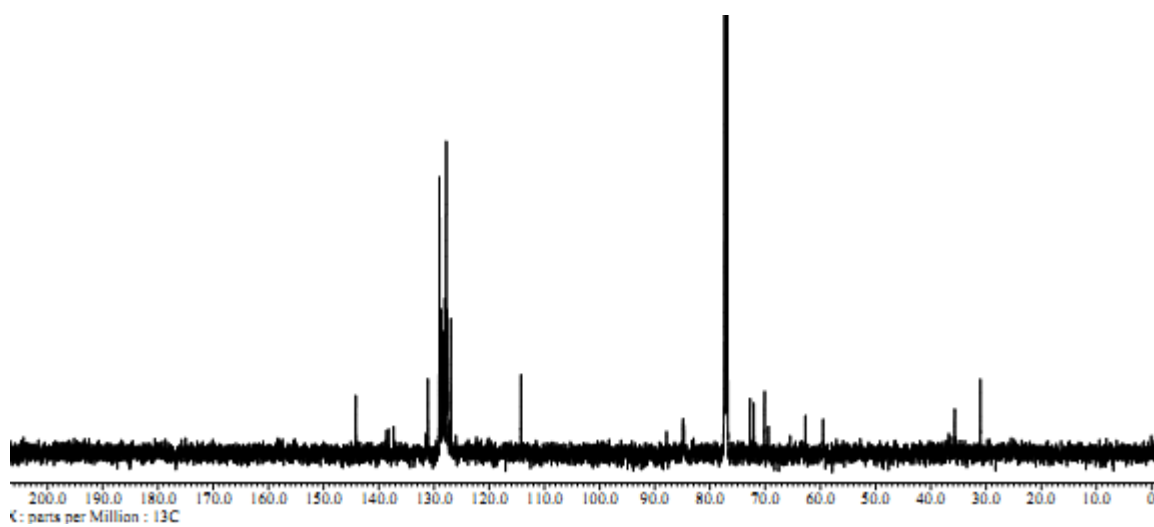


Figure 21.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound 13a

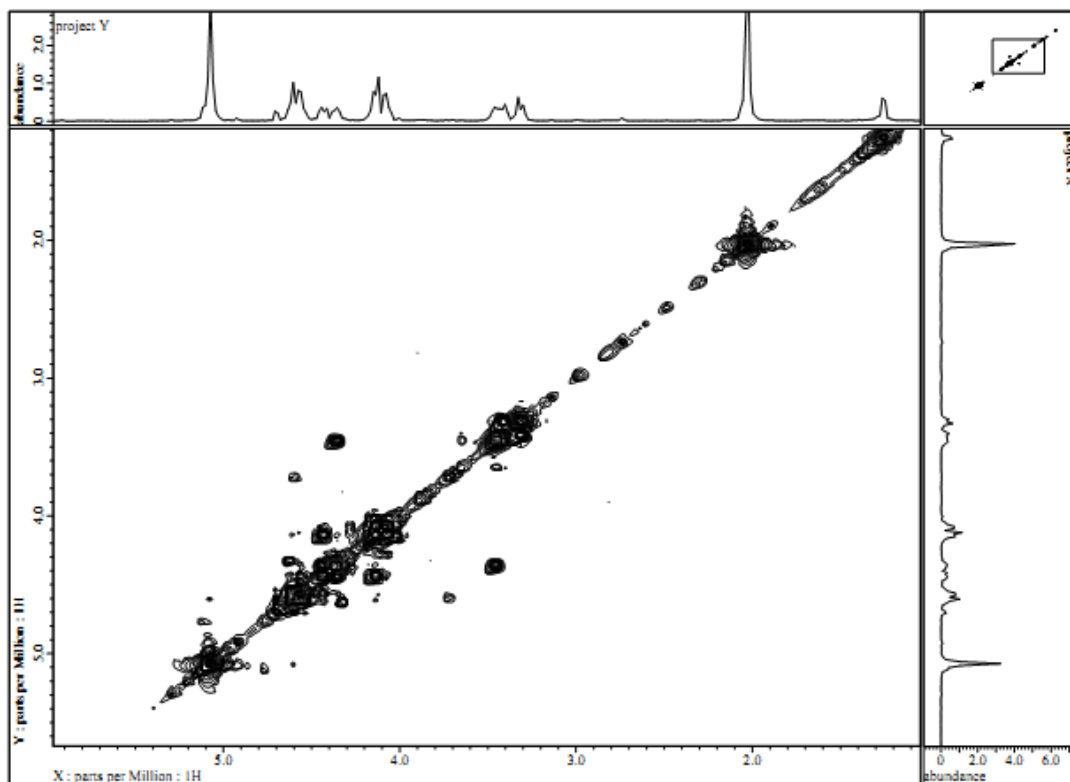


Figure 21.3: $^1\text{H}-^1\text{H}$ COSY Spectrum of Compound 13a

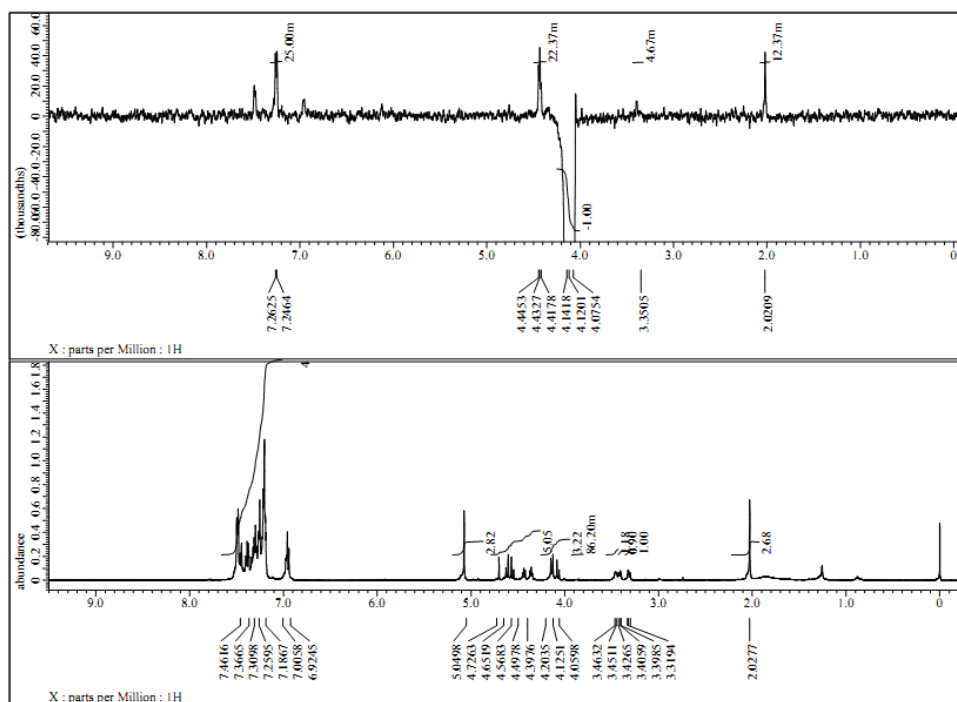


Figure 21.4: NOE irradiation of H-2 proton Spectrum of Compound 13a

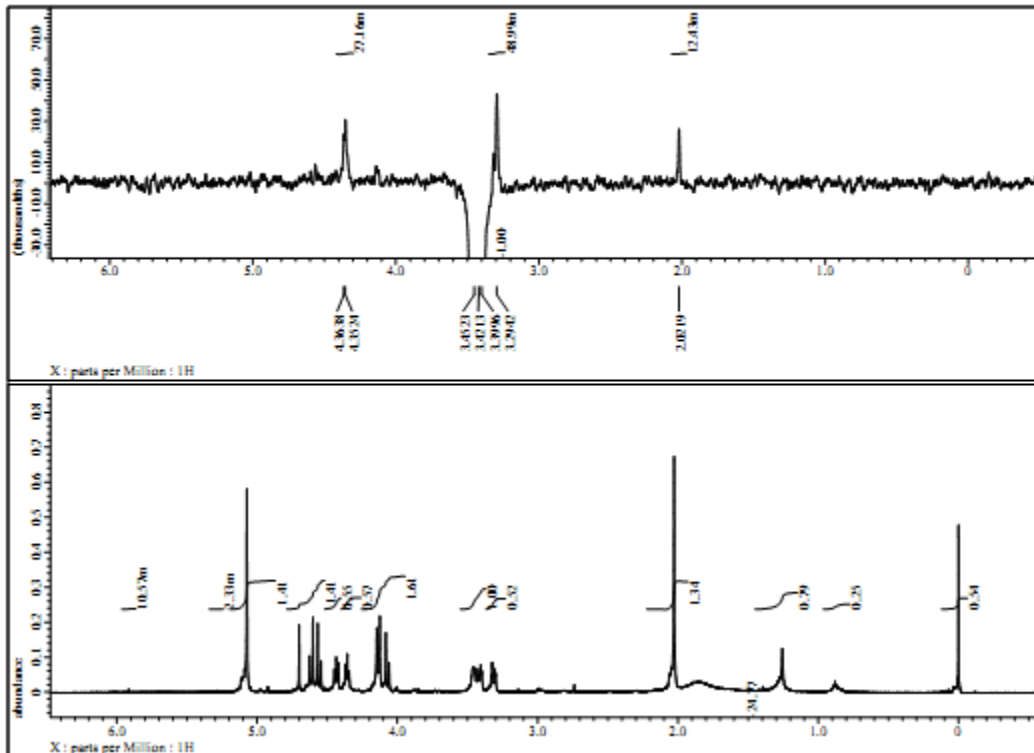


Figure 21.5: NOE irradiation of H-5 proton Spectrum of Compound 13a

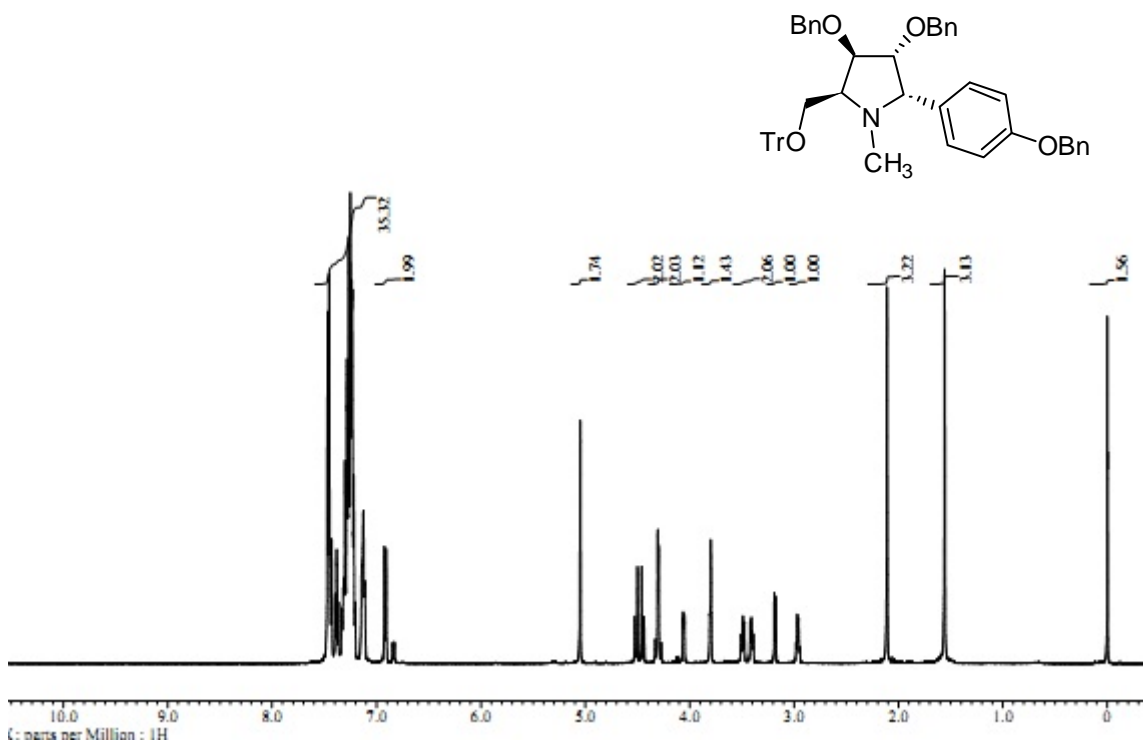


Figure 22.1: ¹H NMR (500 MHz, CDCl₃) Spectrum of Compound 13b

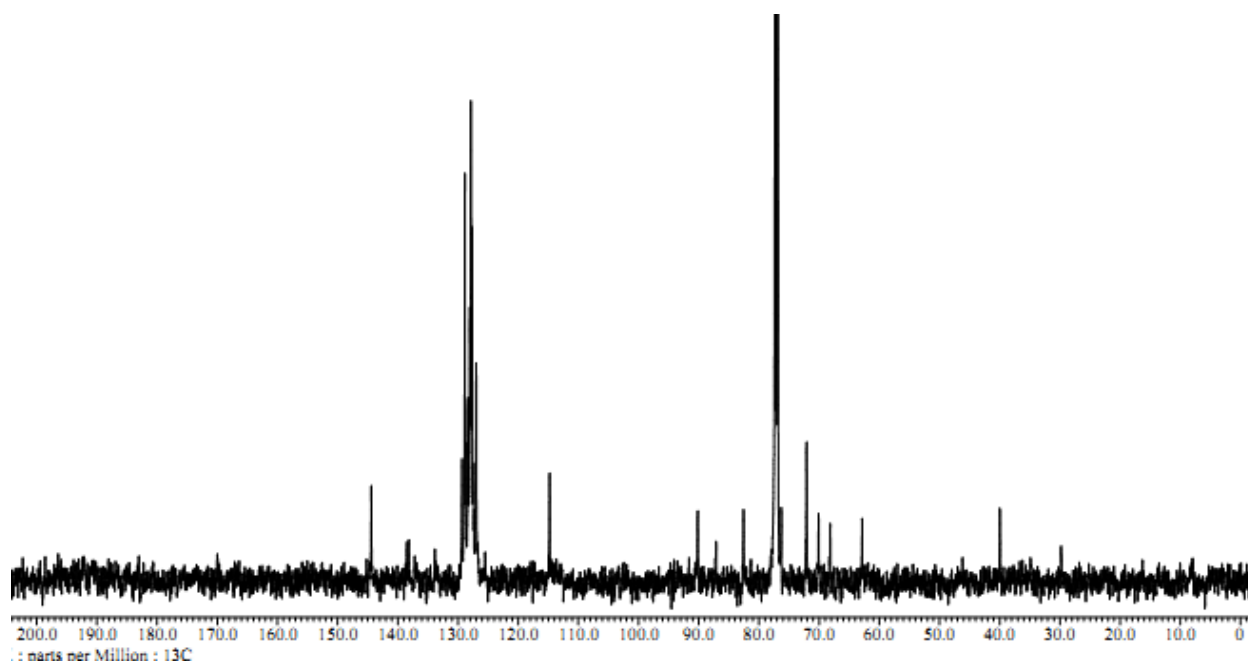


Figure 22.2: ¹³C NMR (125 MHz, CDCl₃) Spectrum of Compound 13b

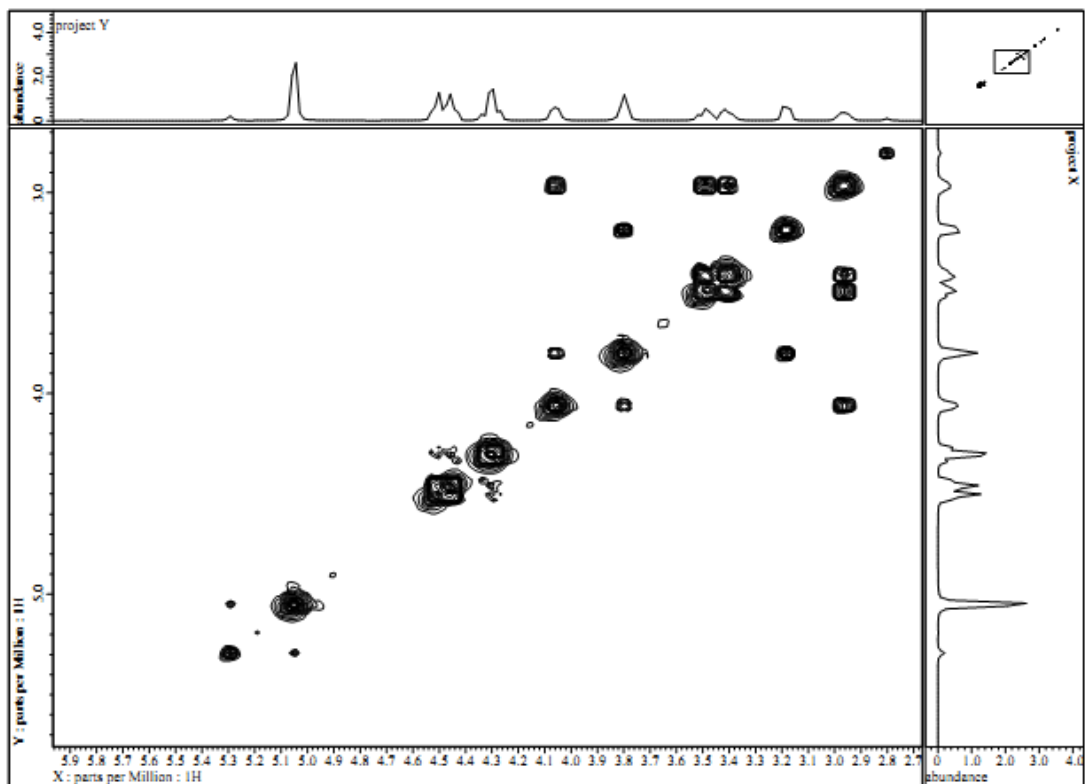


Figure 22.3: ^1H - ^1H COSY Spectrum of Compound **13b**

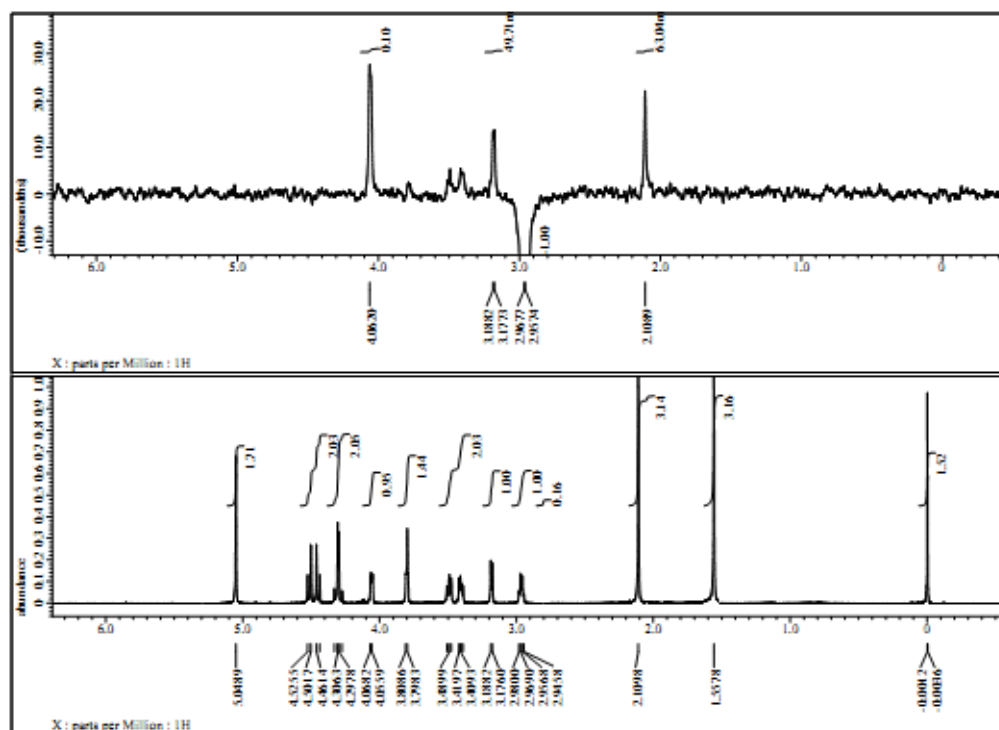


Figure 22.4: NOE irradiation of H-5 proton Spectrum of Compound **13b**

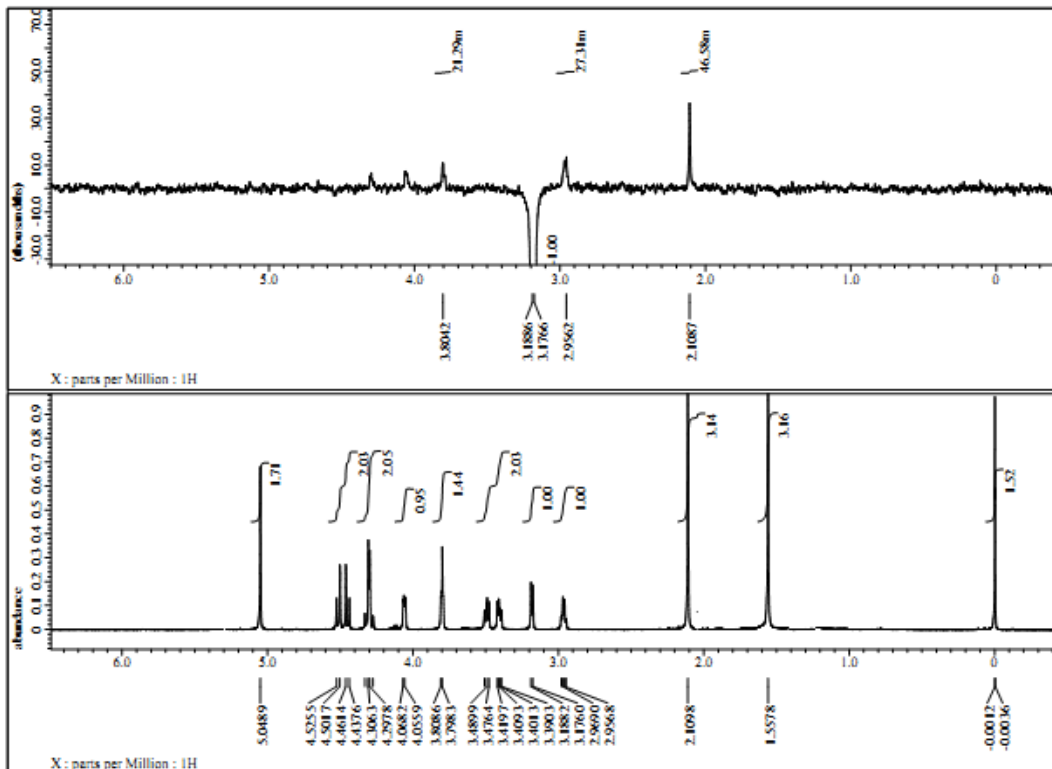


Figure 22.5: NOE irradiation of H-2 proton Spectrum of Compound 13b

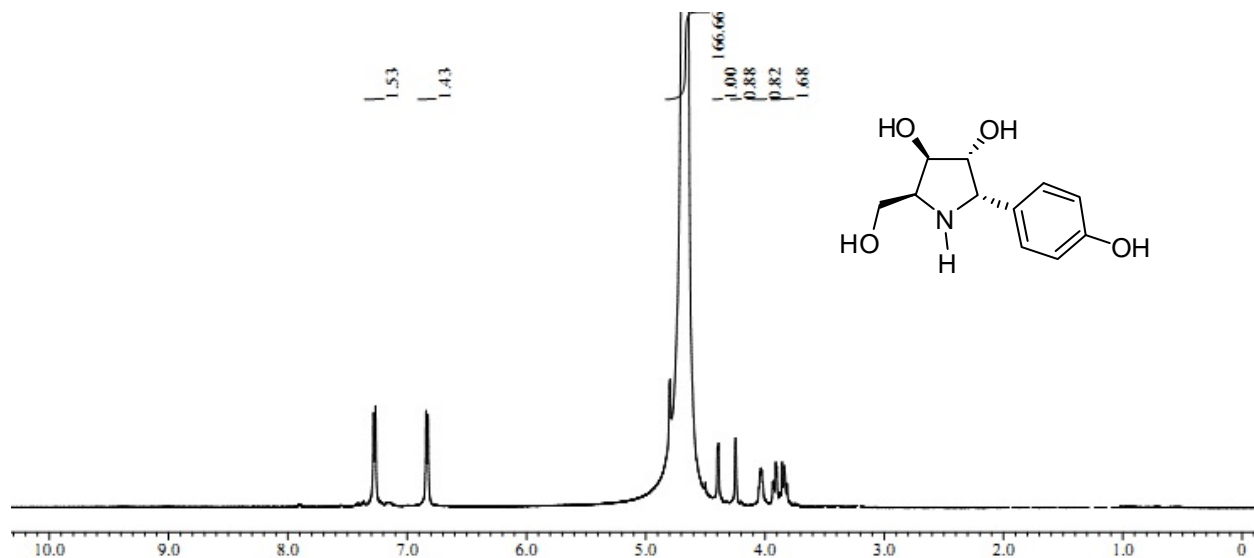


Figure 23.1: ^1H NMR (500 MHz, D_2O) Spectrum of Compound 14a

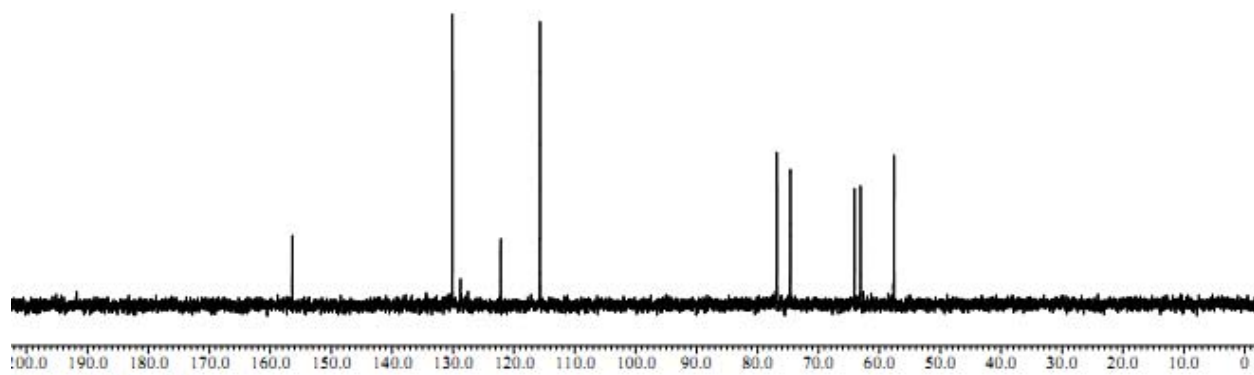


Figure 23.2: ^{13}C NMR (125 MHz, D_2O) Spectrum of Compound 14a

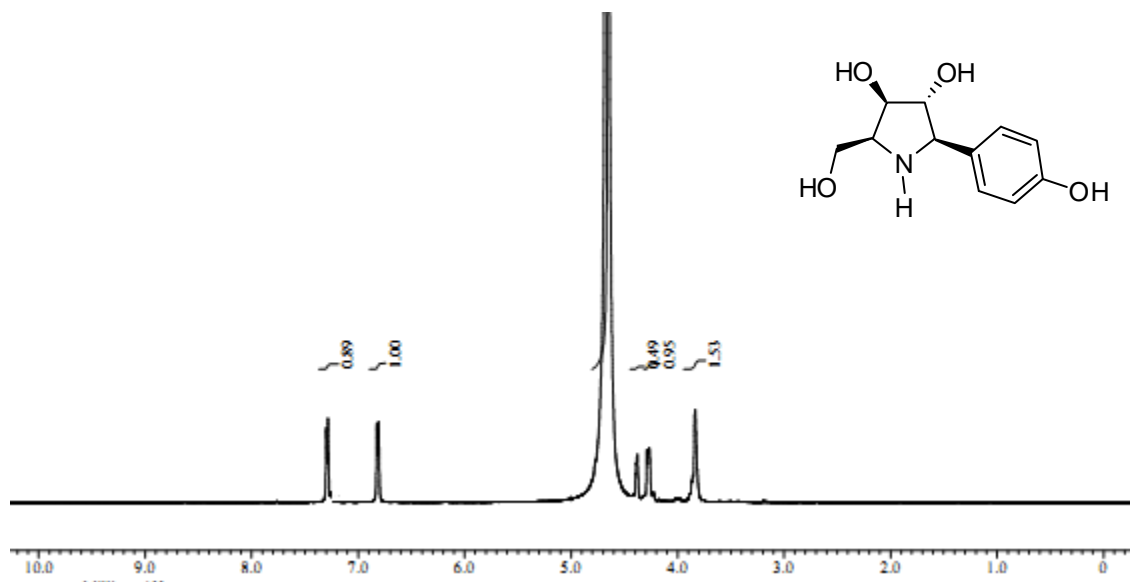


Figure 24.1: ^1H NMR (500 MHz, D_2O) Spectrum of Compound **14b**

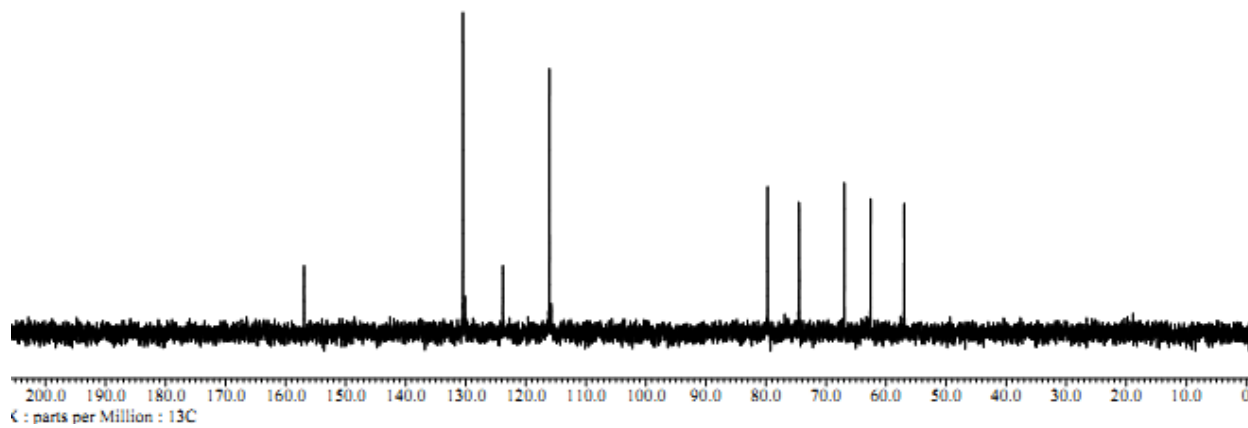
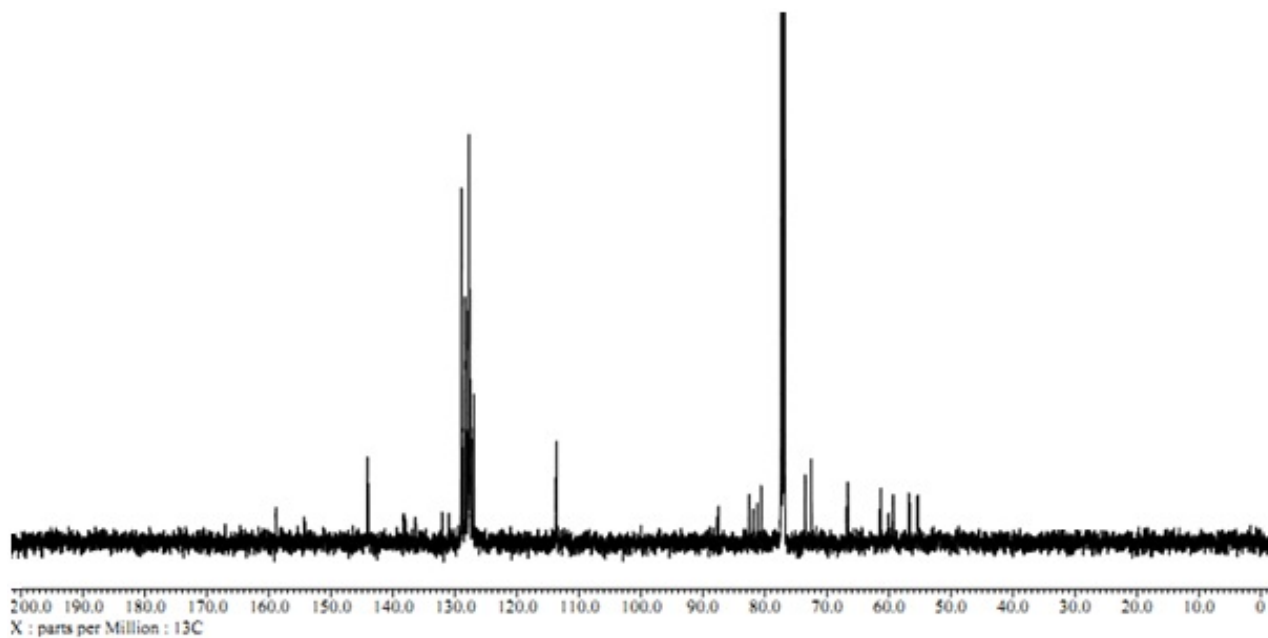
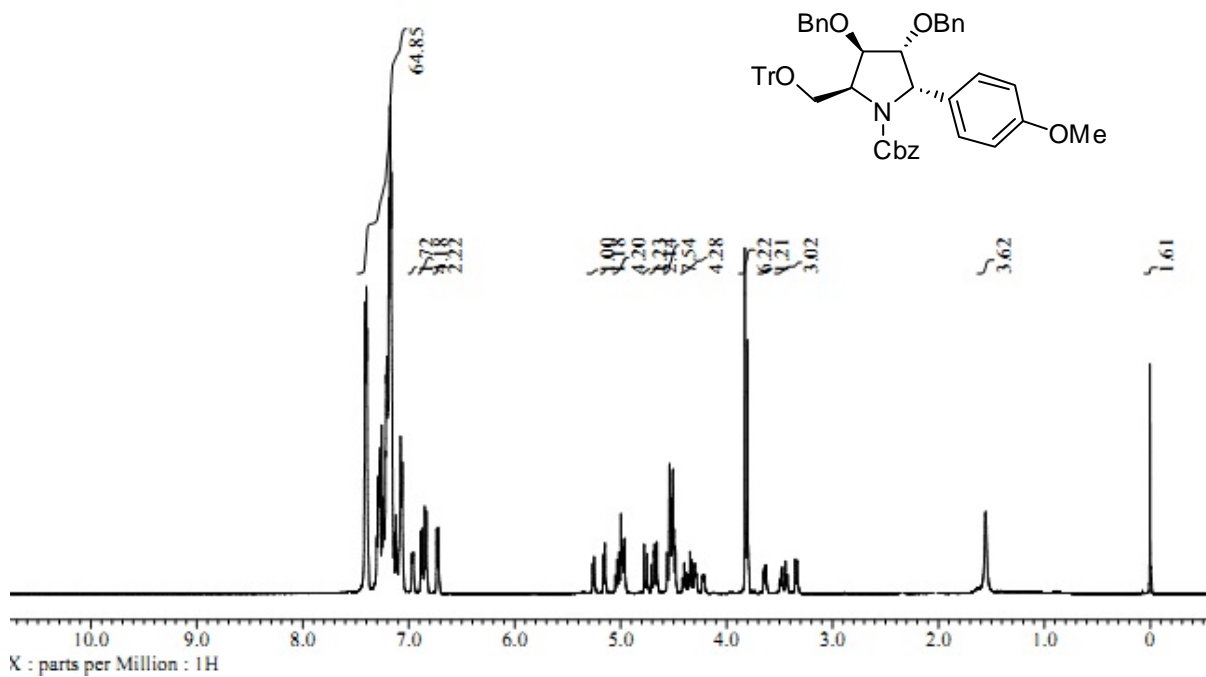
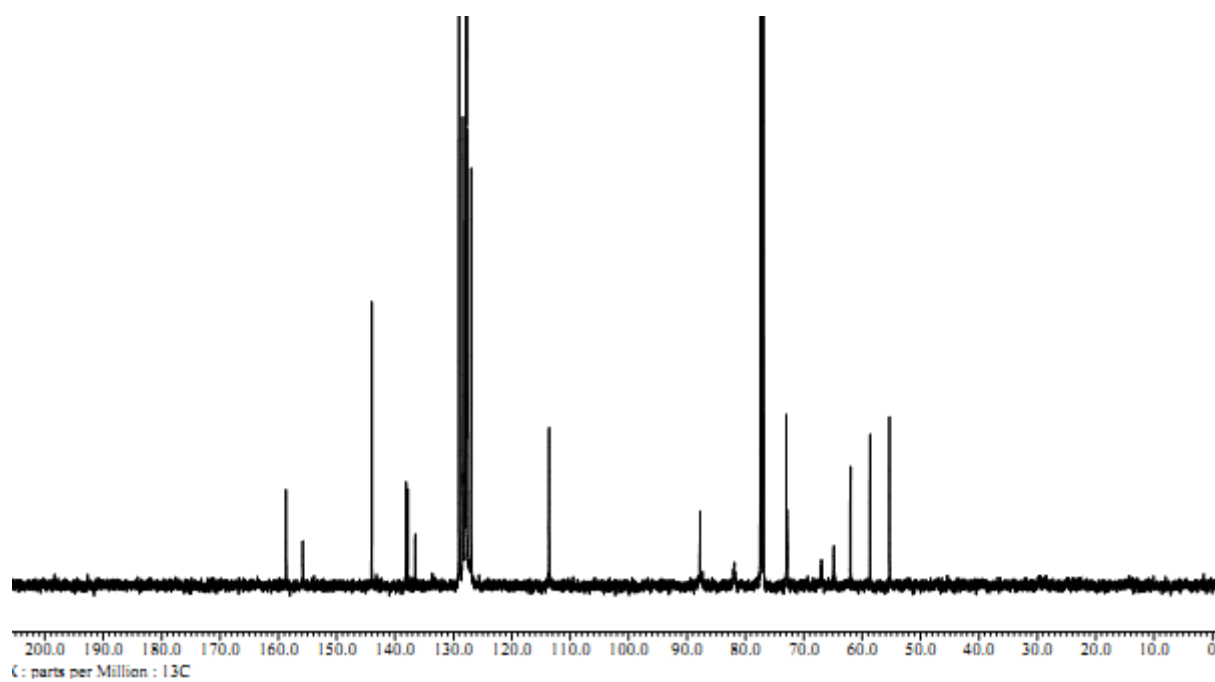
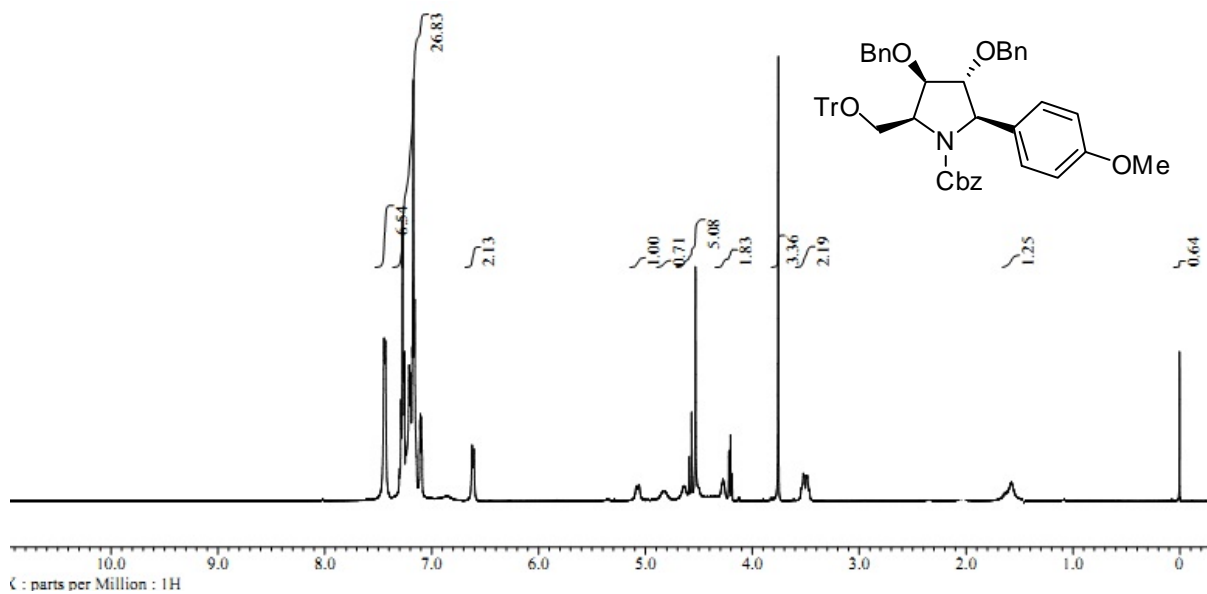
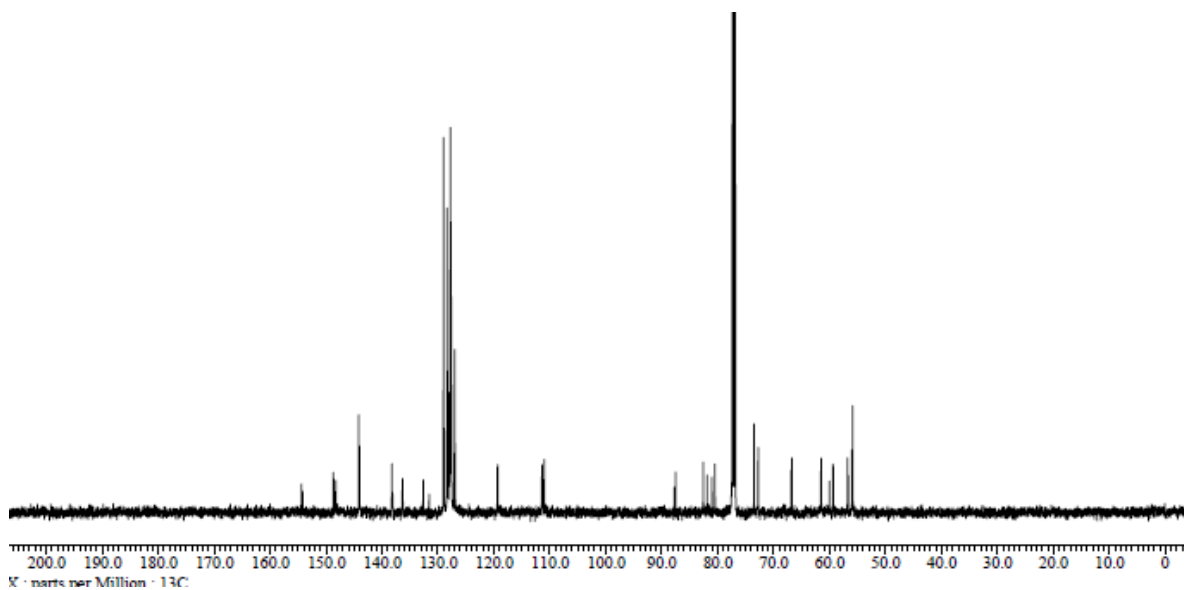
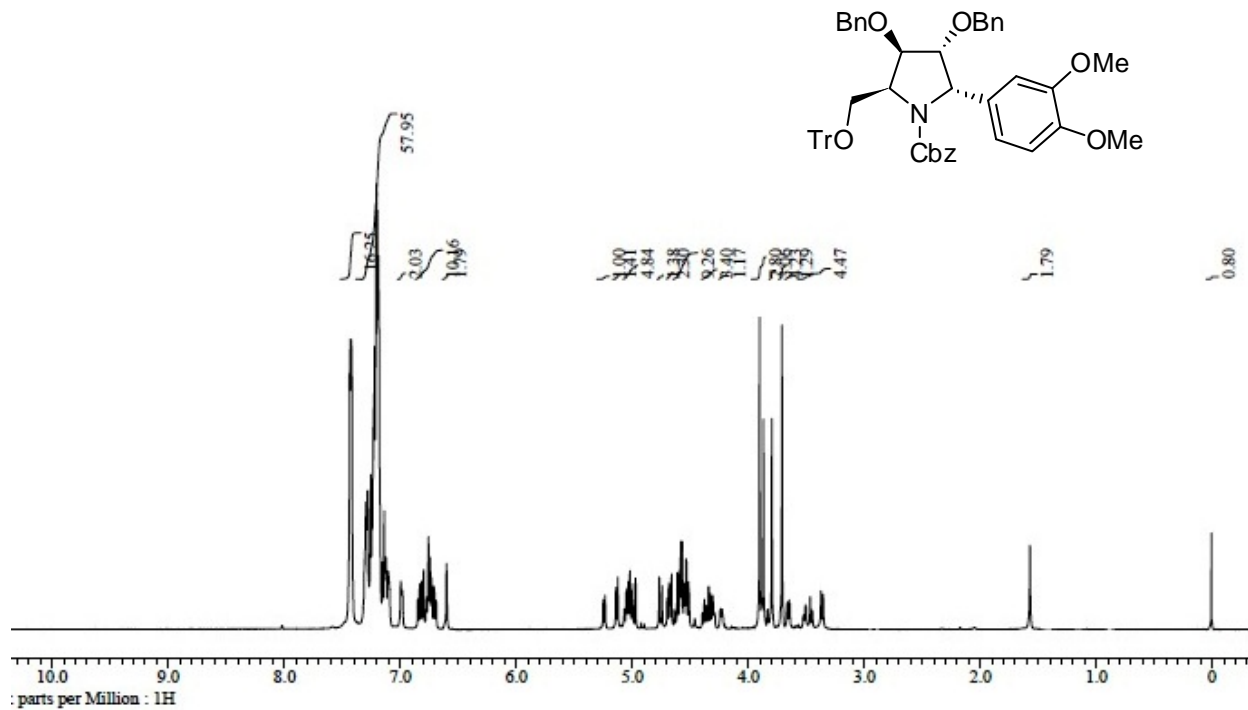


Figure 24.2: ^{13}C NMR (125 MHz, D_2O) Spectrum of Compound **14b**







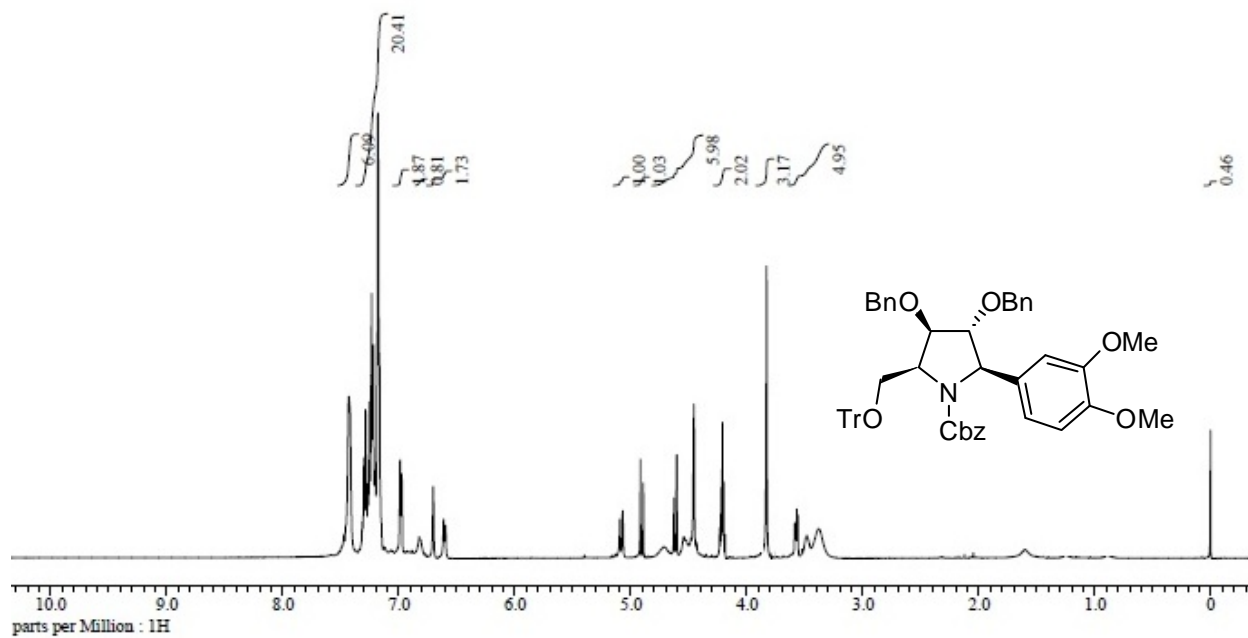


Figure 28.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound **26b**

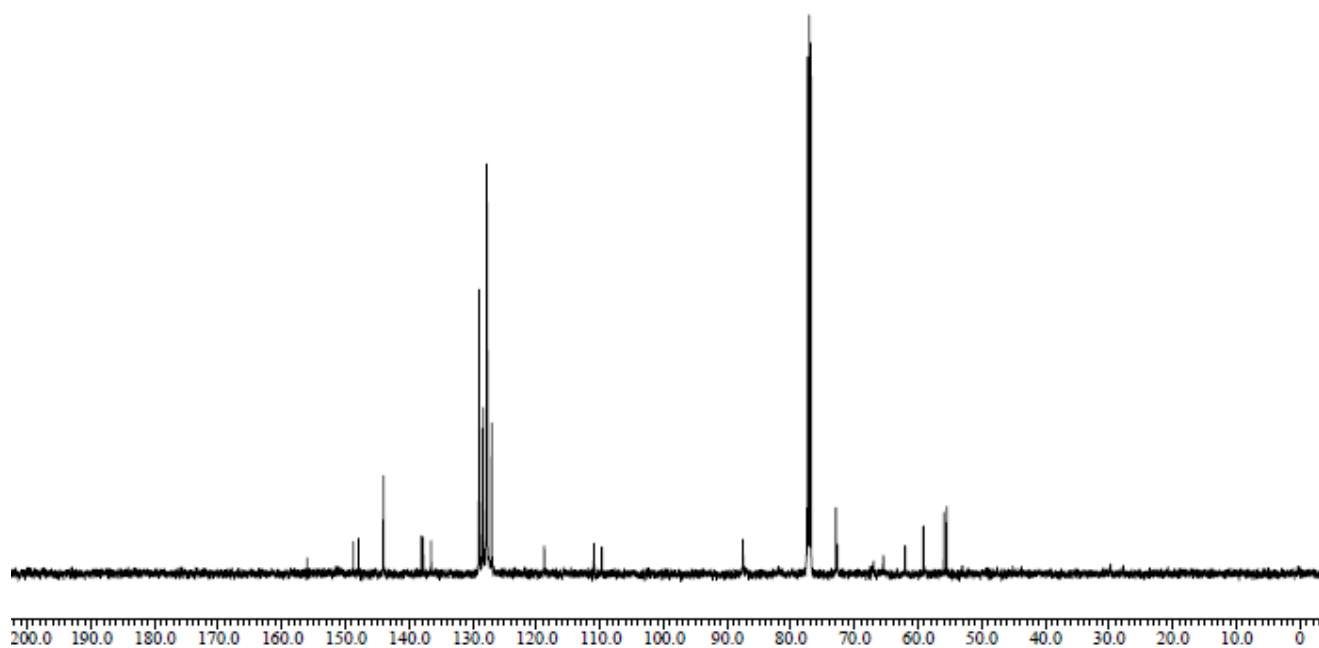
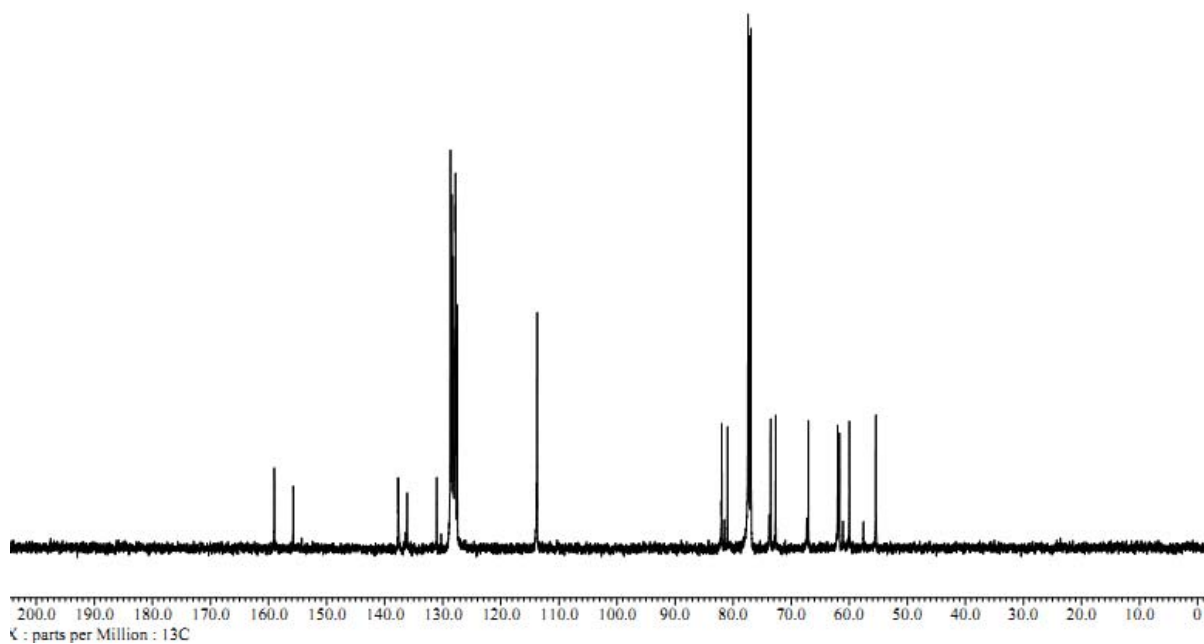
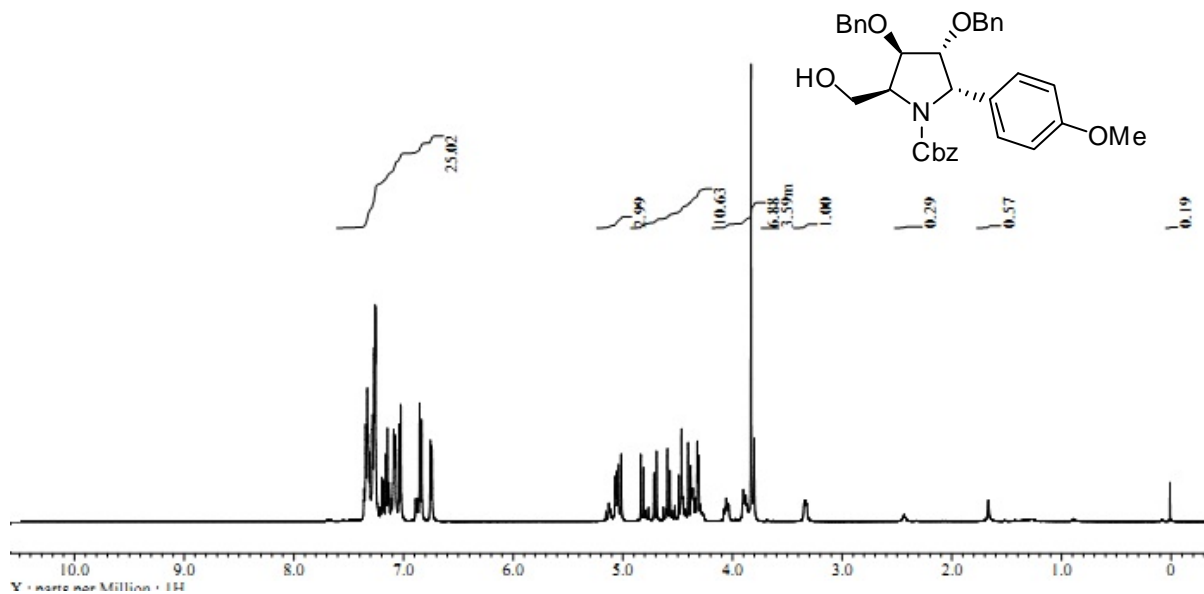


Figure 28.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound **26b**



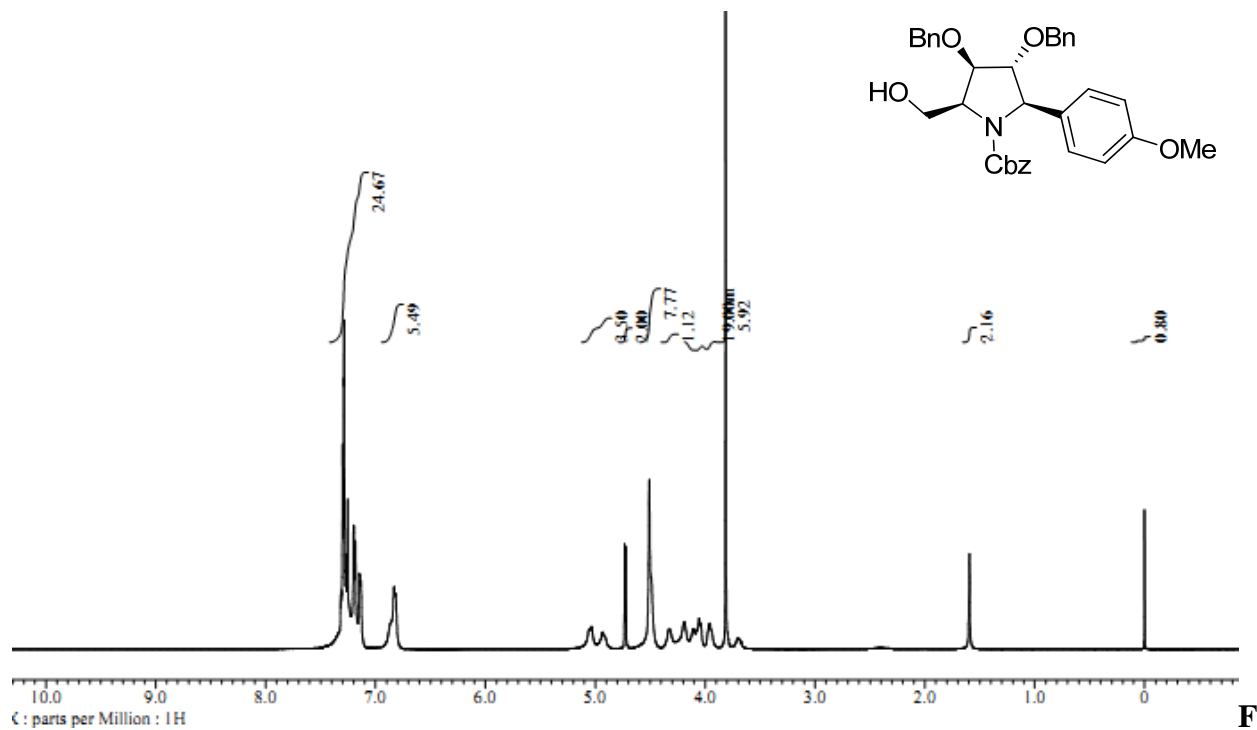


figure 30.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound 27b

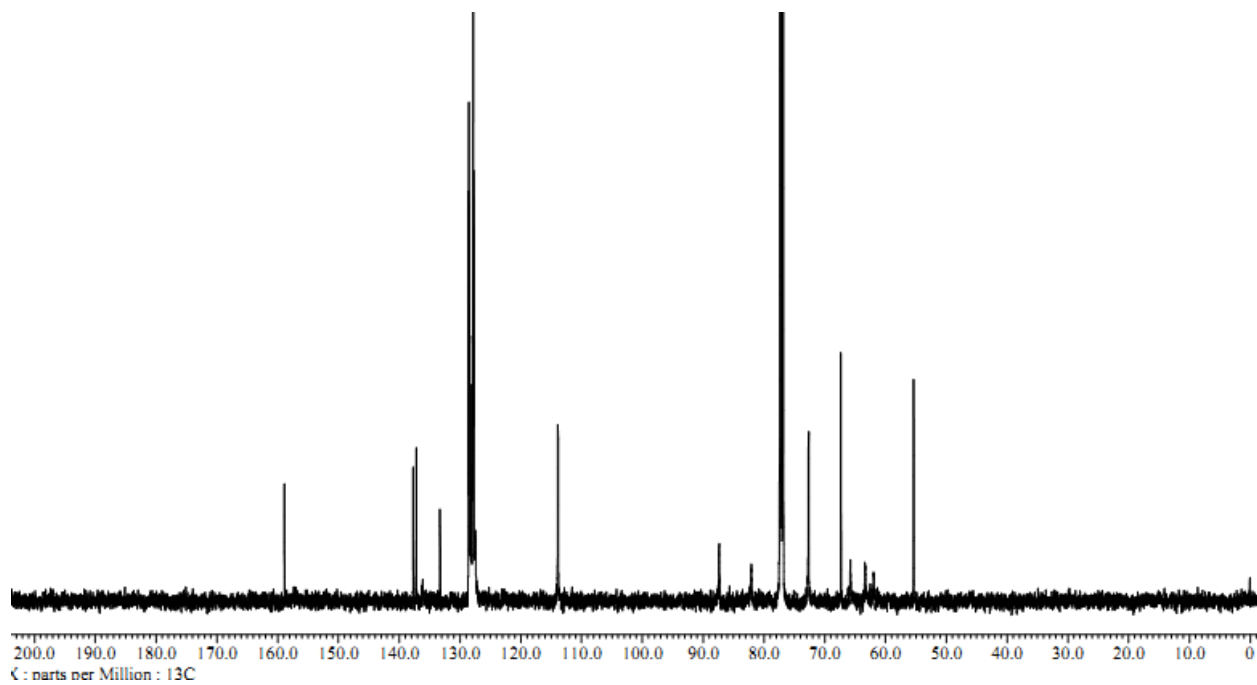
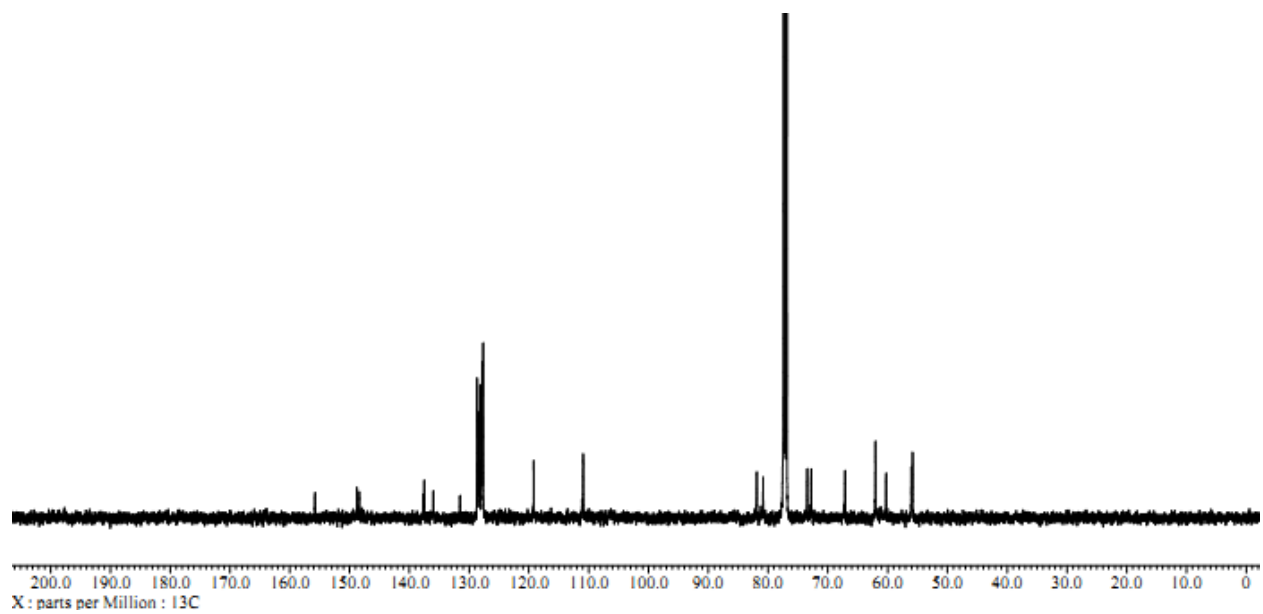
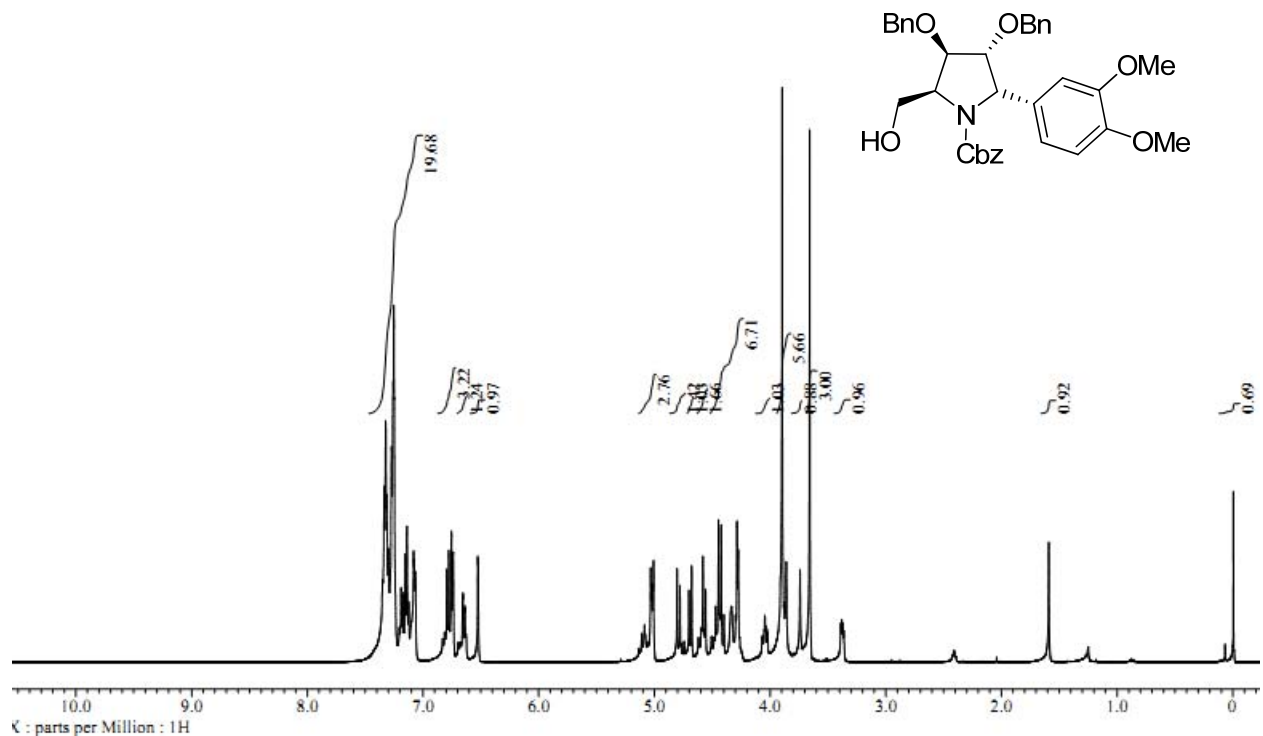
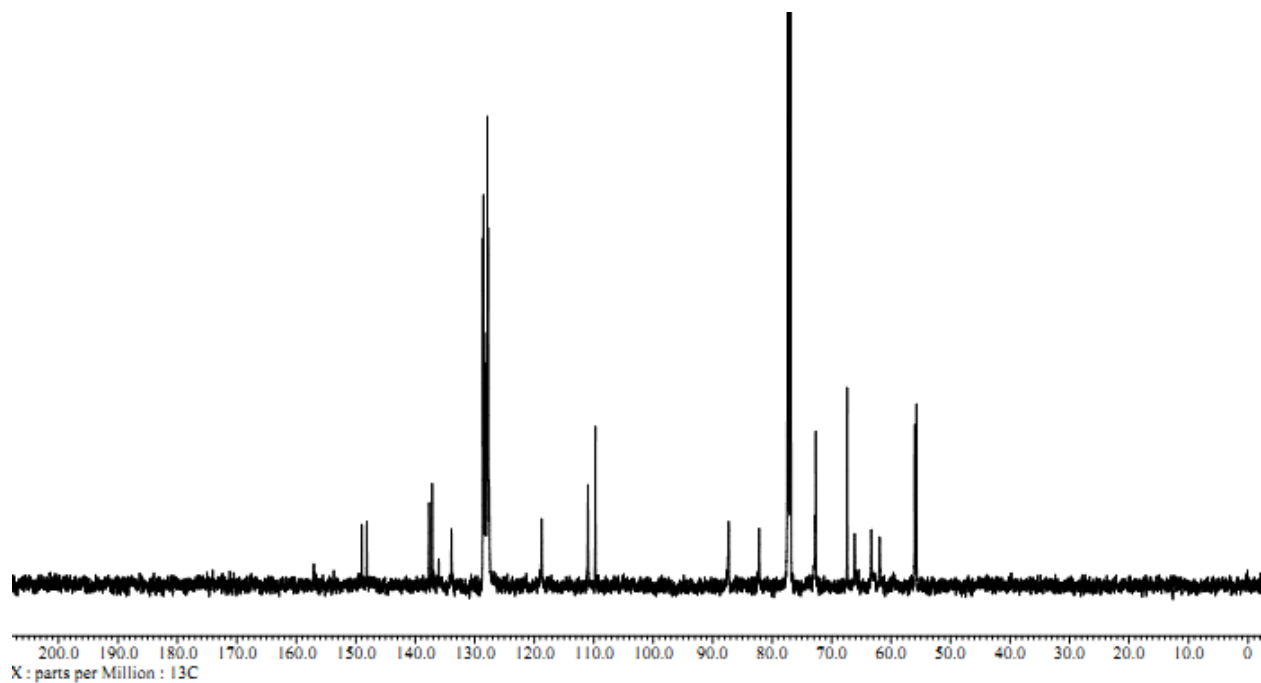
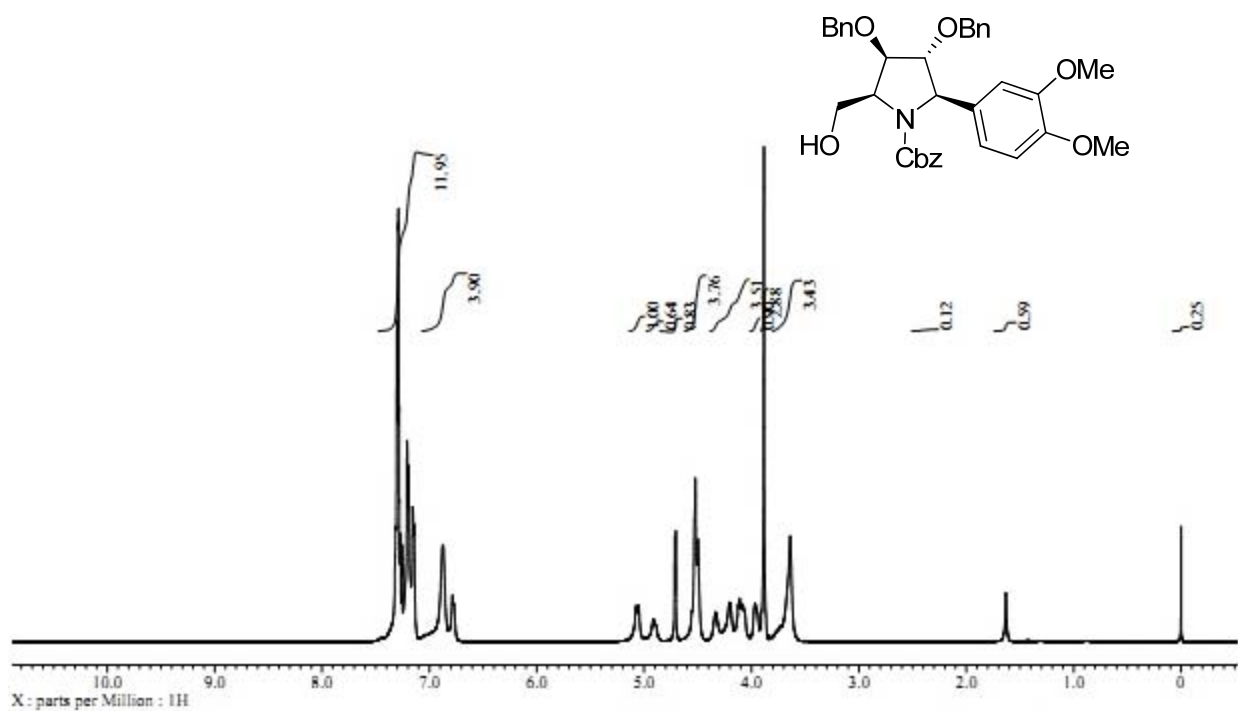
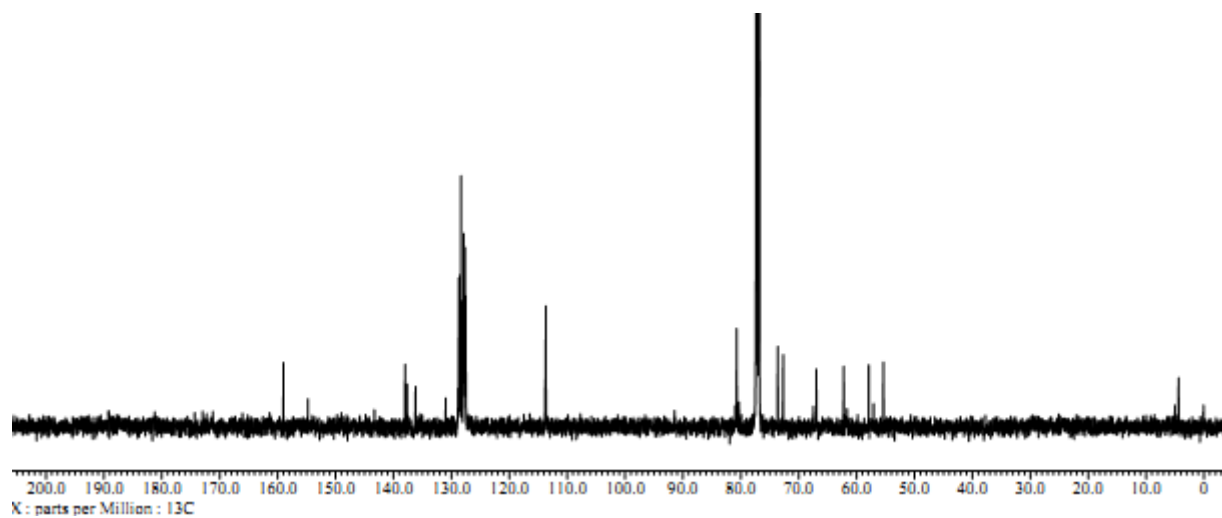
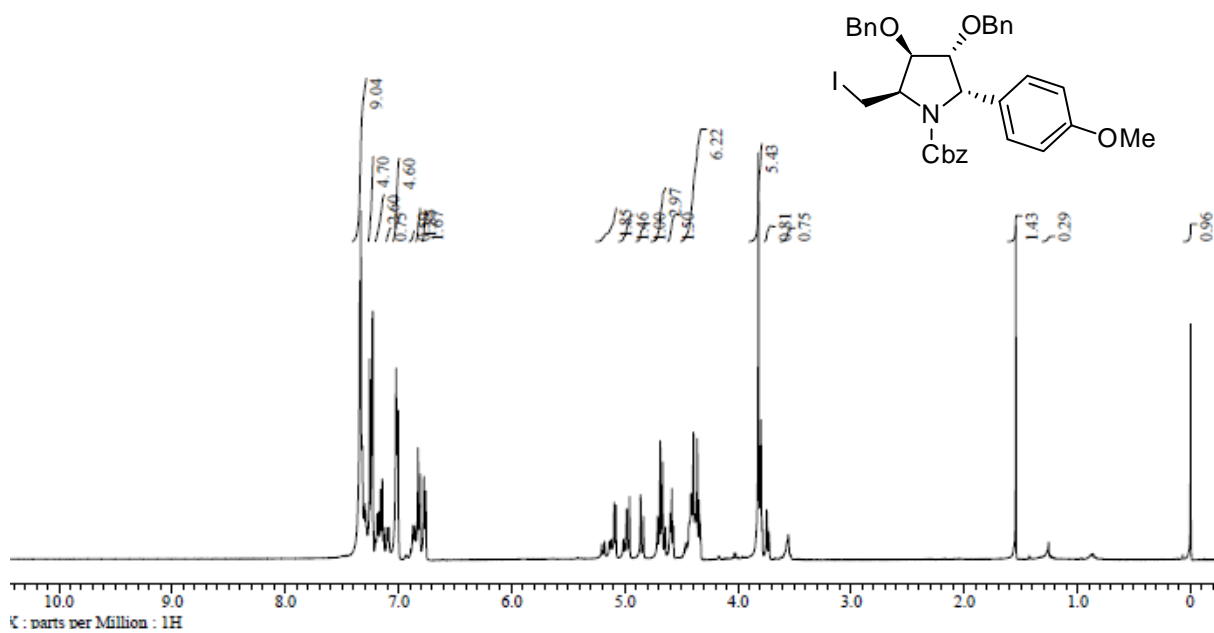


Figure 30.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound 27b







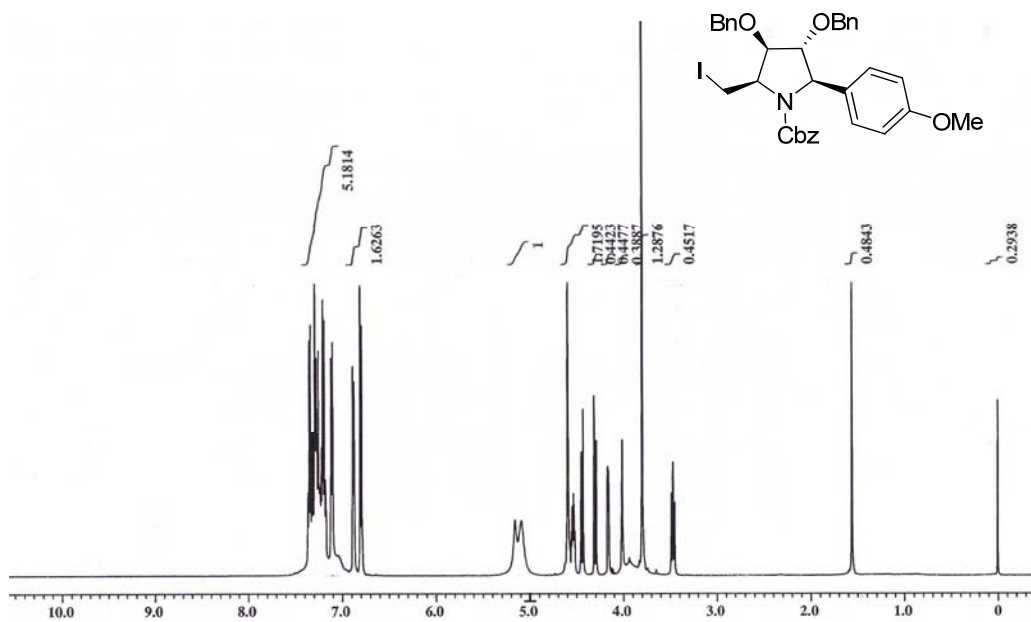


Figure 34.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound 29b

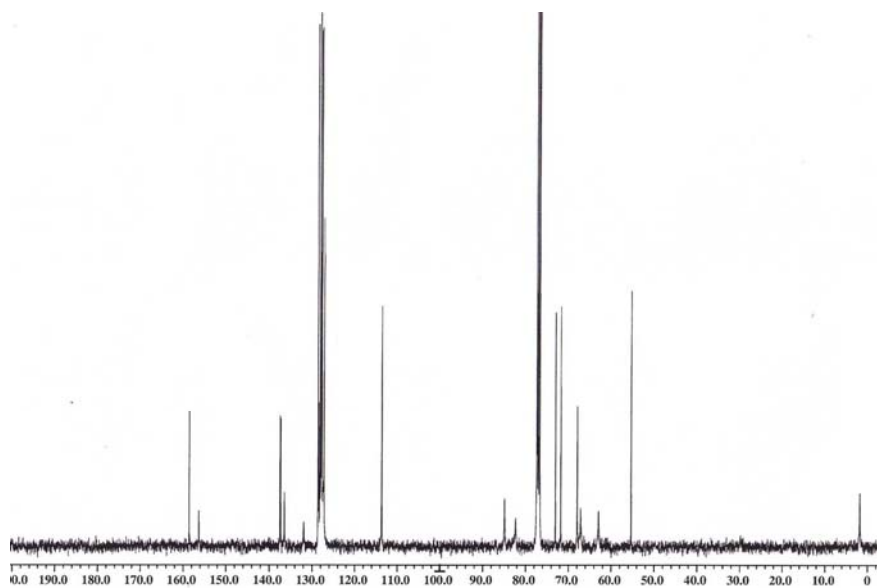


Figure 34.2: ^{13}C NMR (100 MHz, CDCl_3) Spectrum of Compound 29b

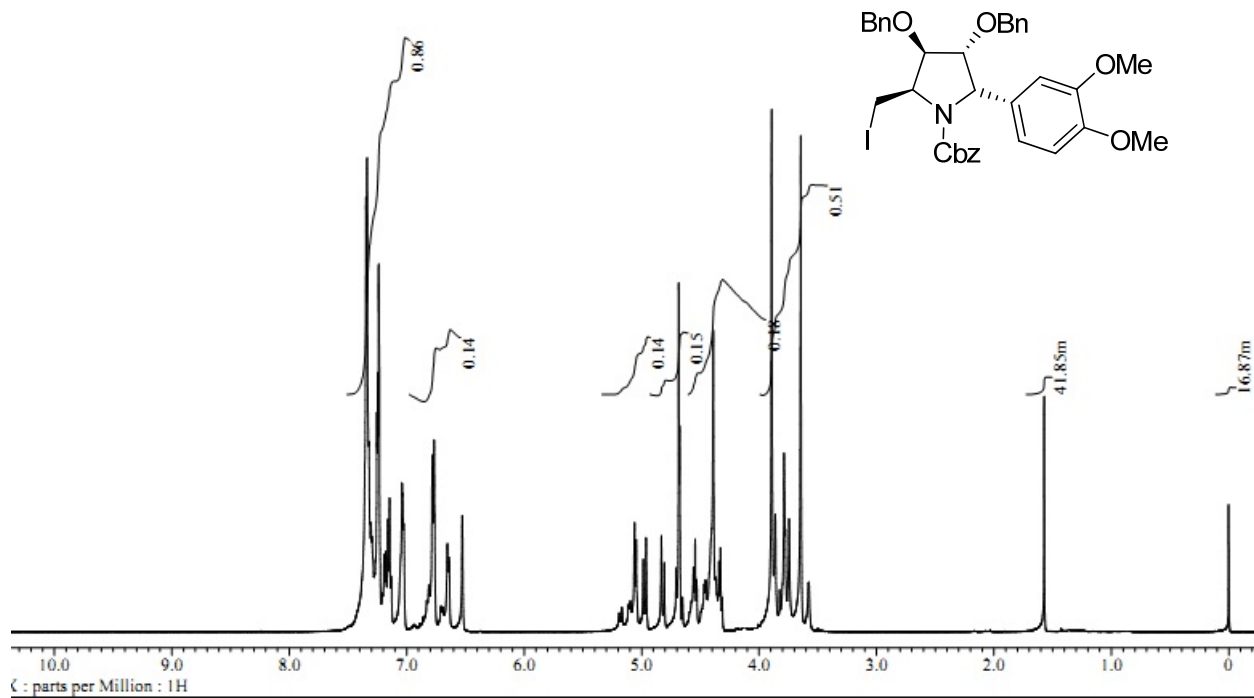


Figure 35.1: $^1\text{H NMR}$ (500 MHz, CDCl_3) Spectrum of Compound 30a

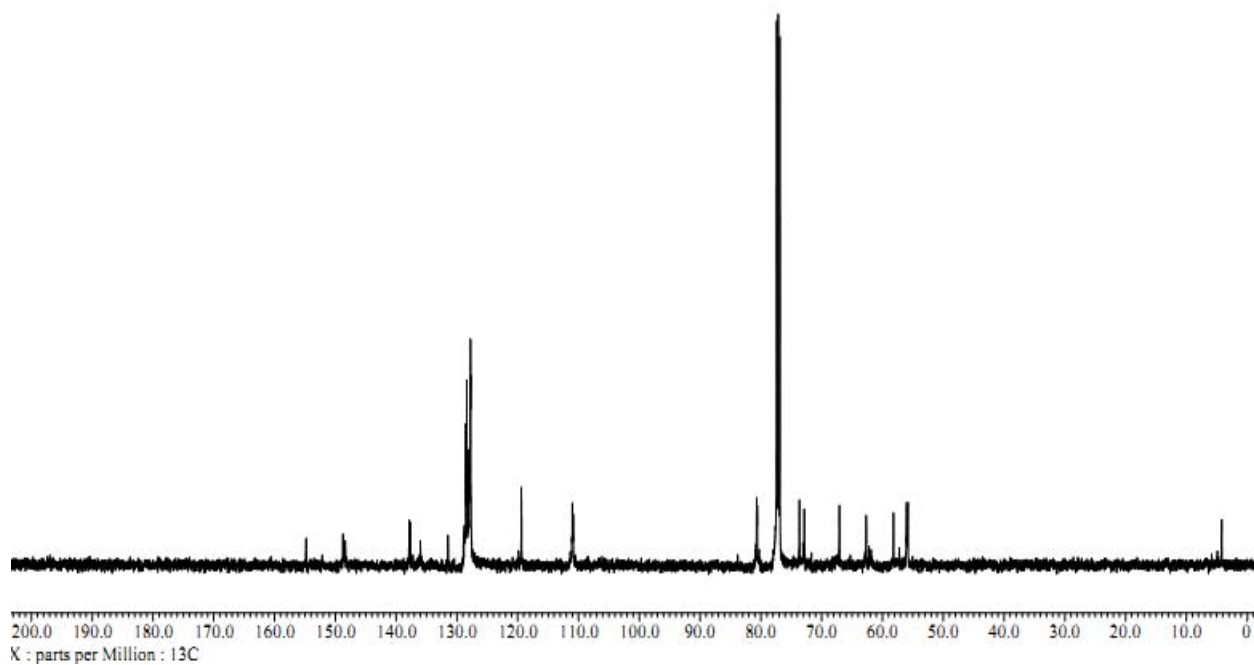
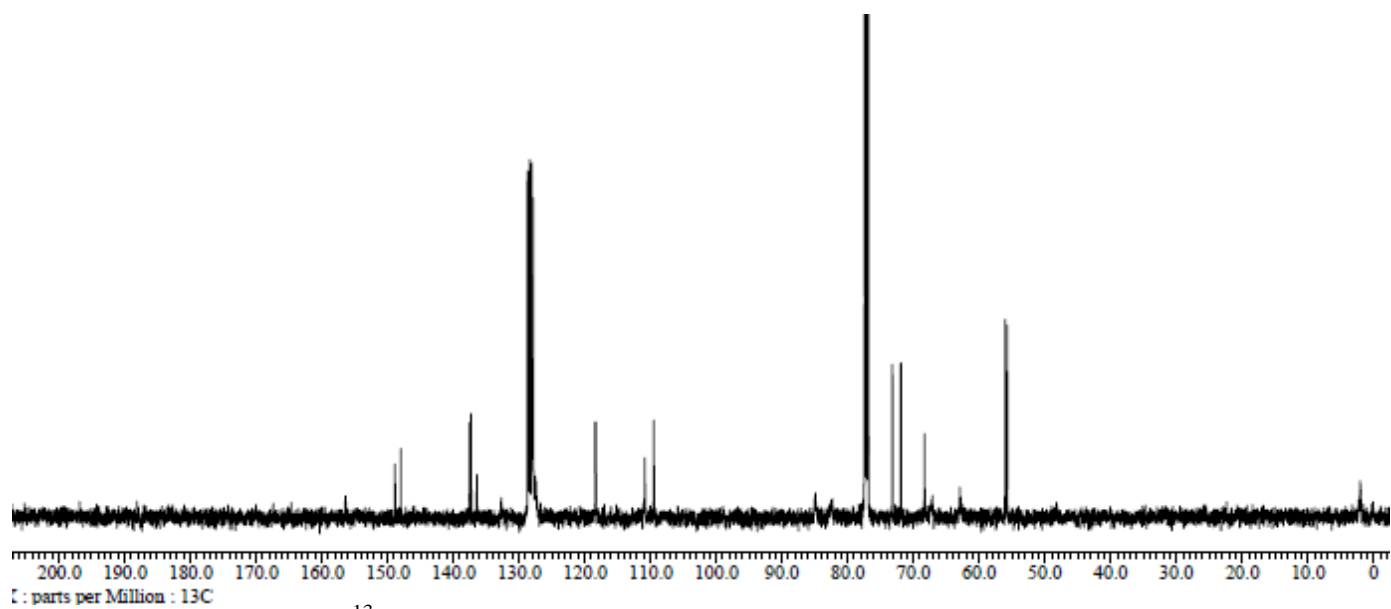
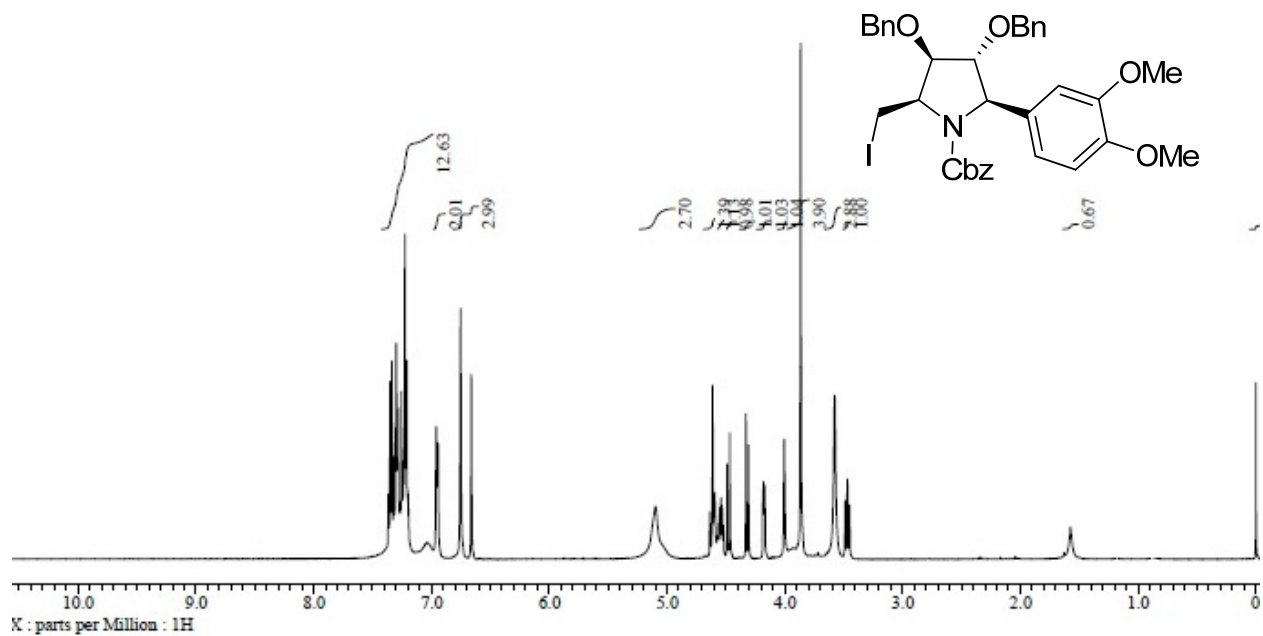


Figure 35.2: $^{13}\text{C NMR}$ (125 MHz, CDCl_3) Spectrum of Compound 30a



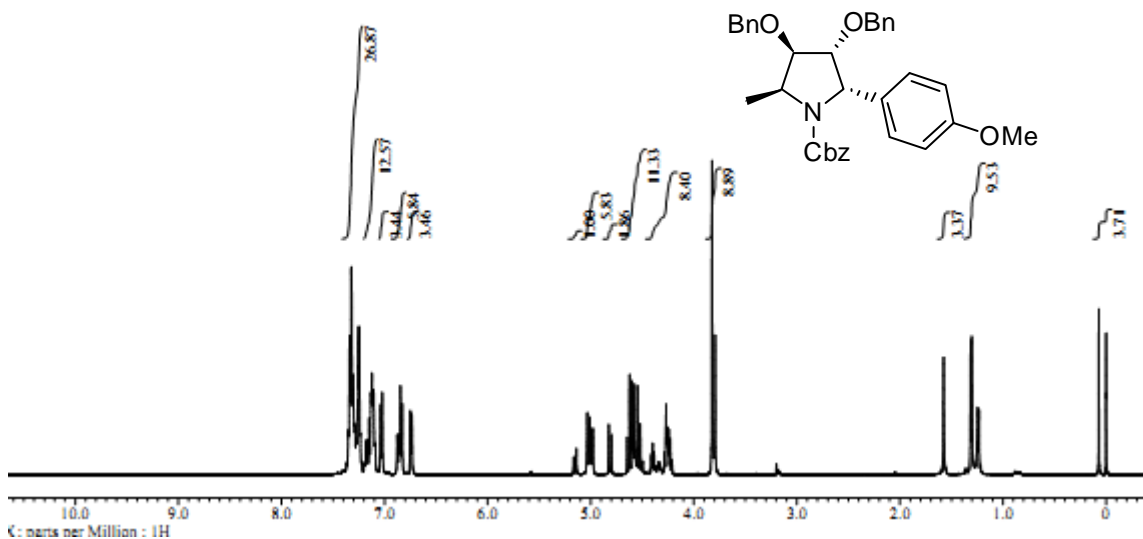


Figure 37.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound **31a**

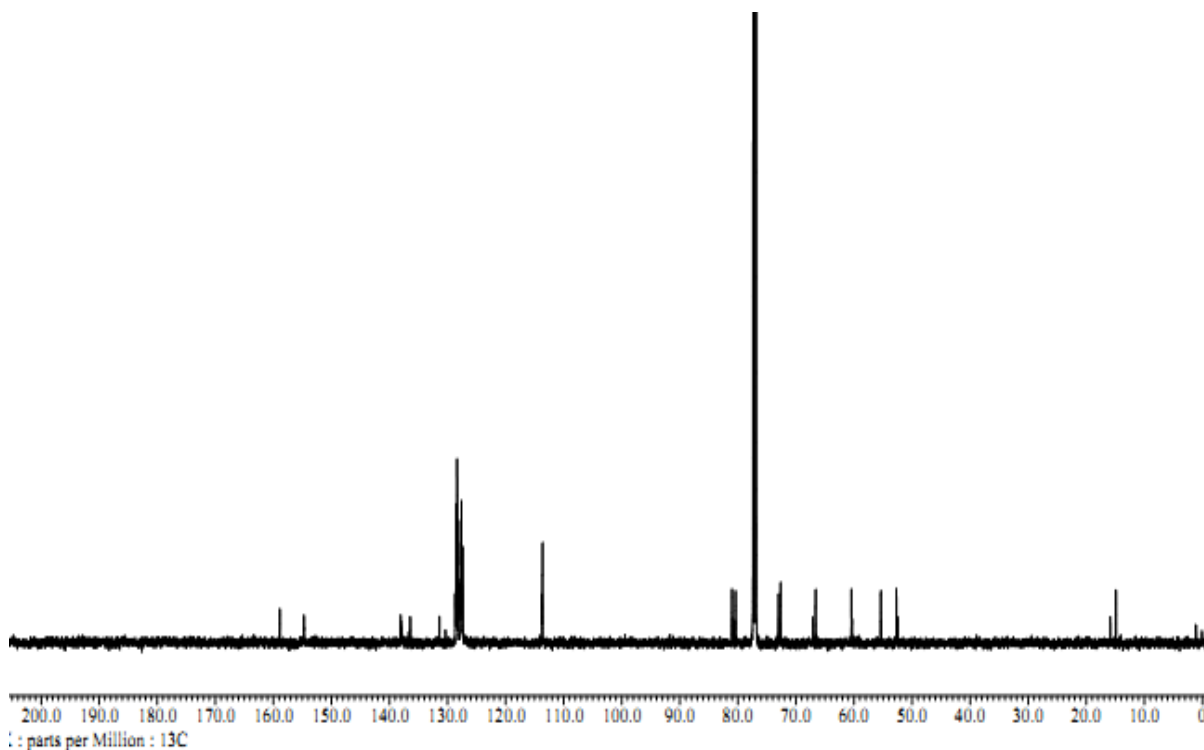


Figure 37.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound **31a**

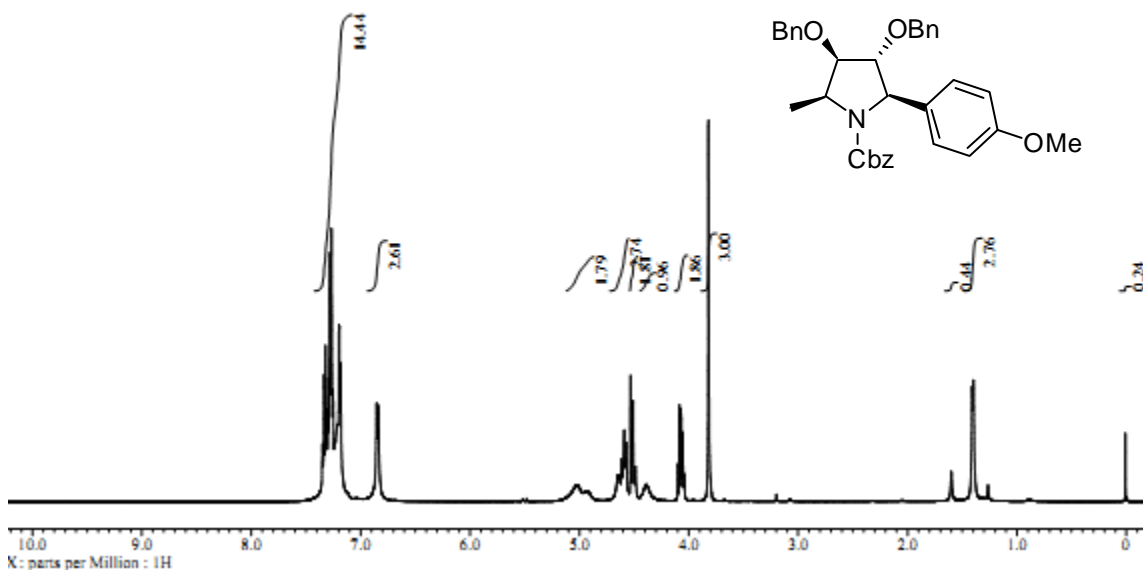


Figure 38.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound **31b**

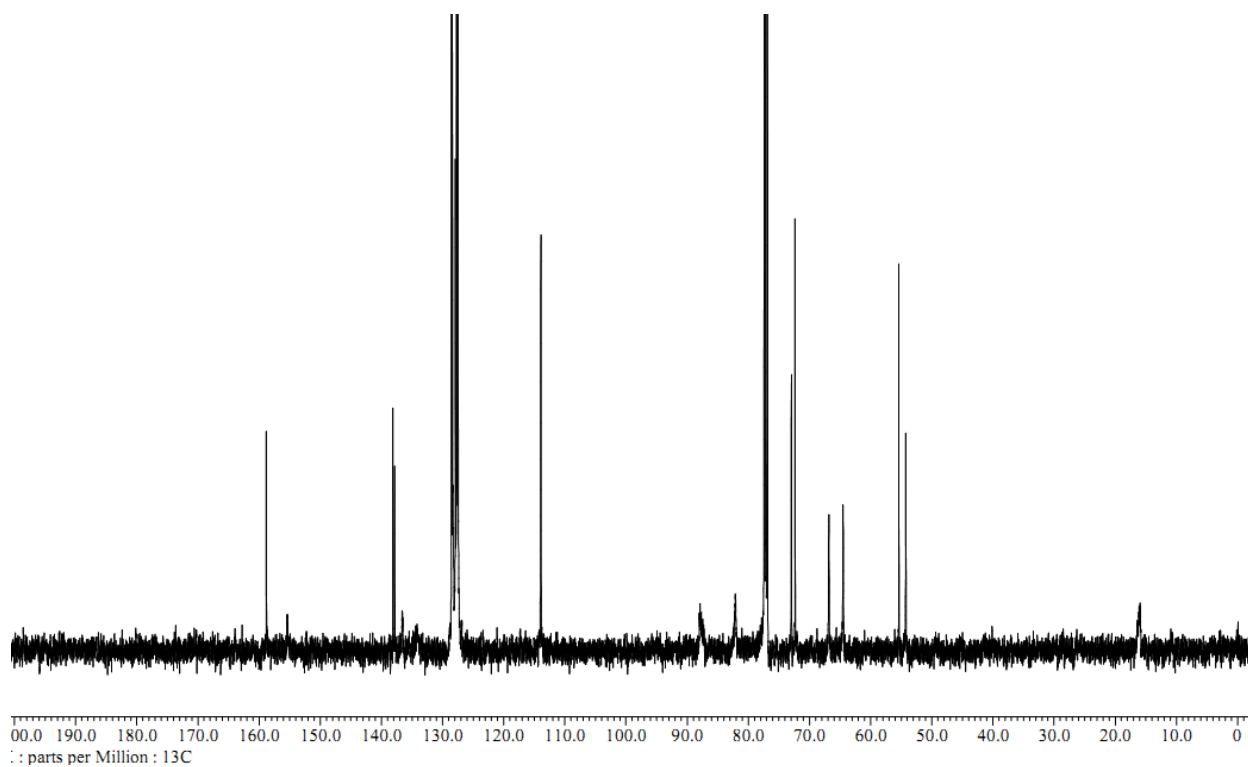
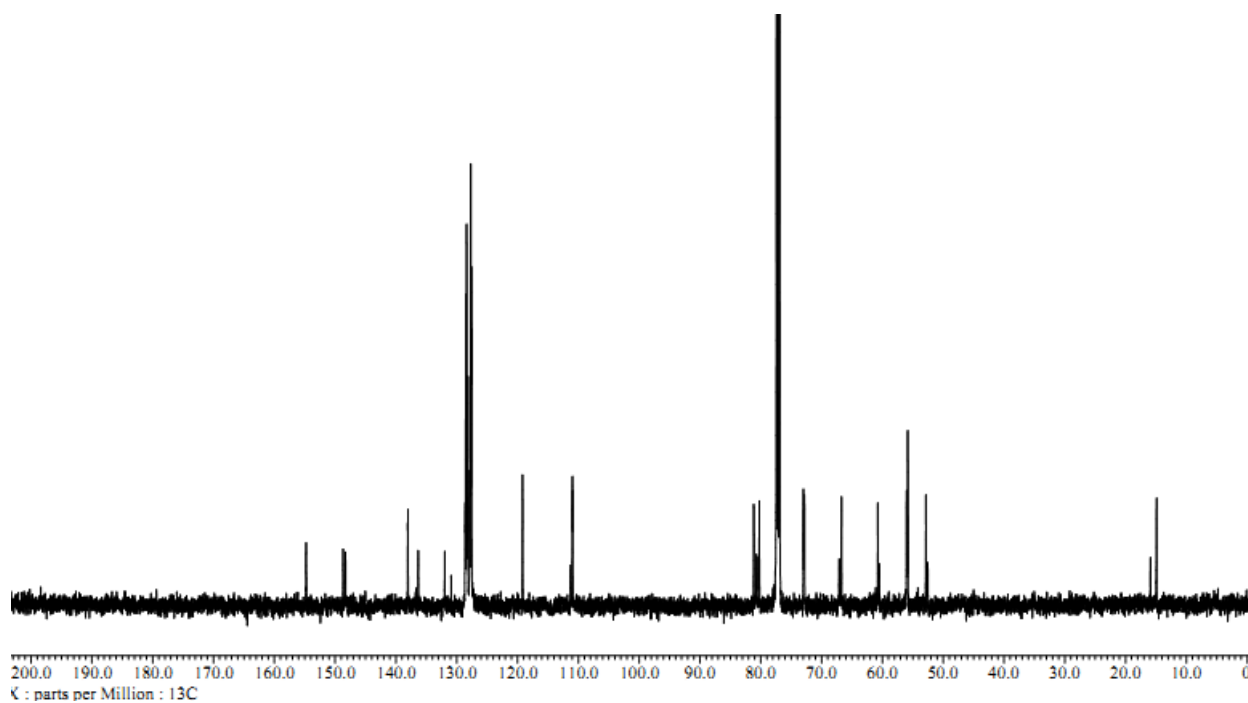
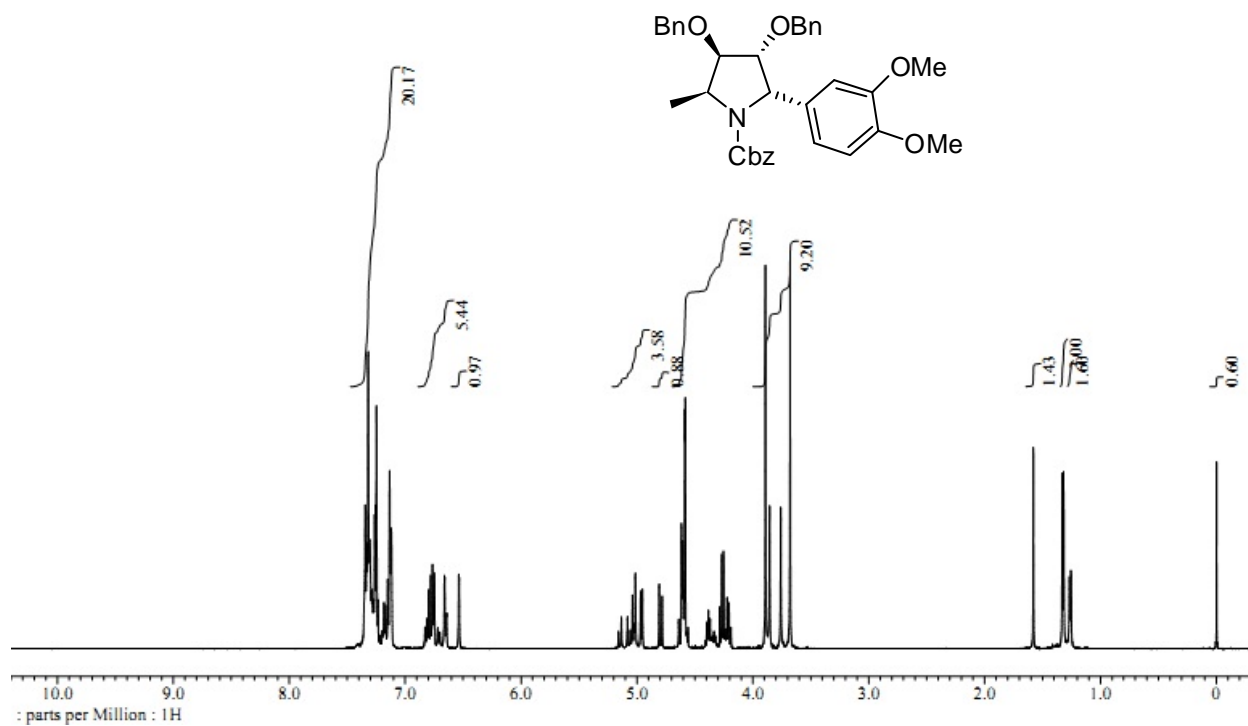
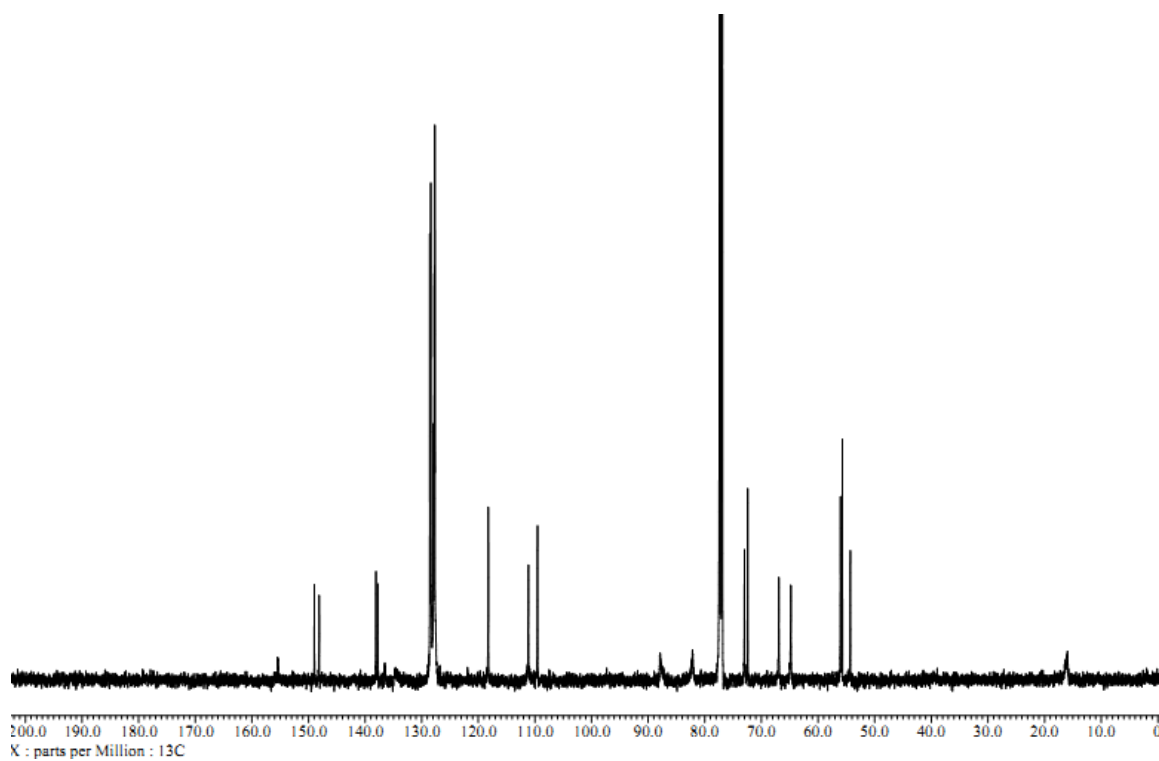
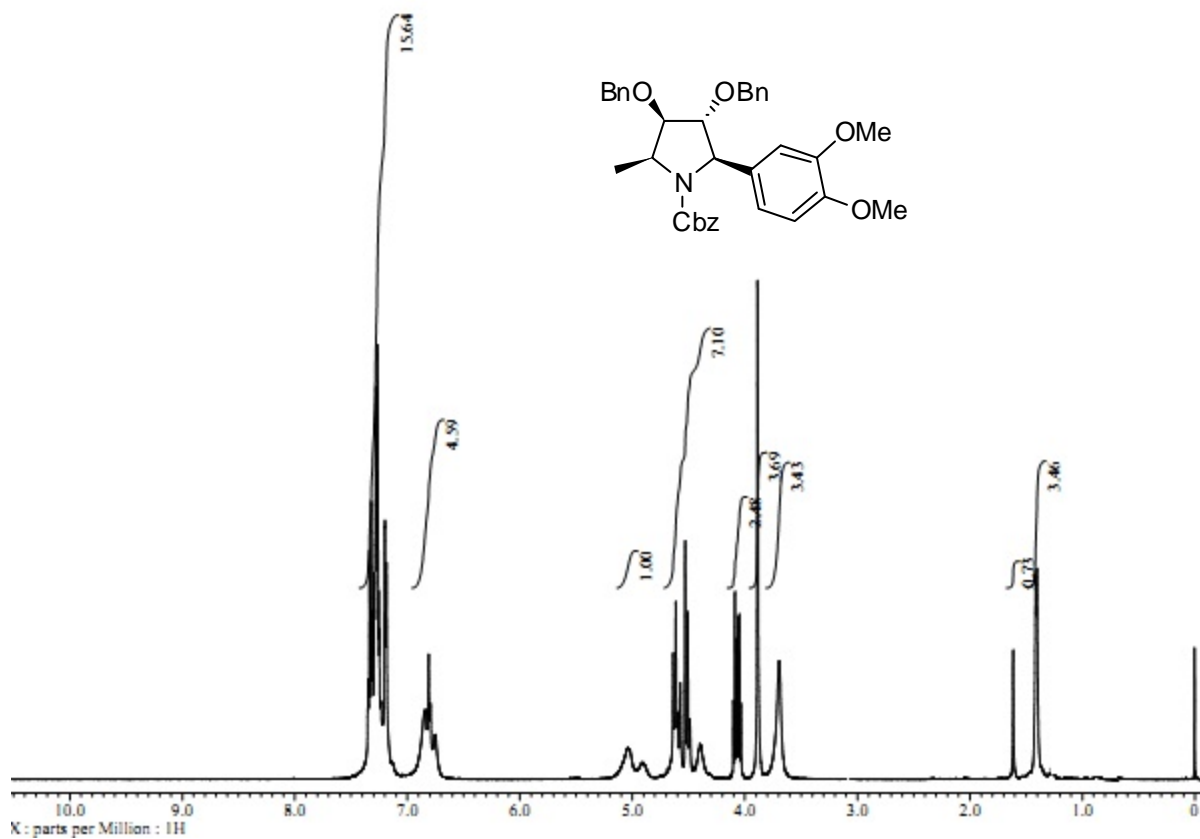


Figure 38.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound **31b**





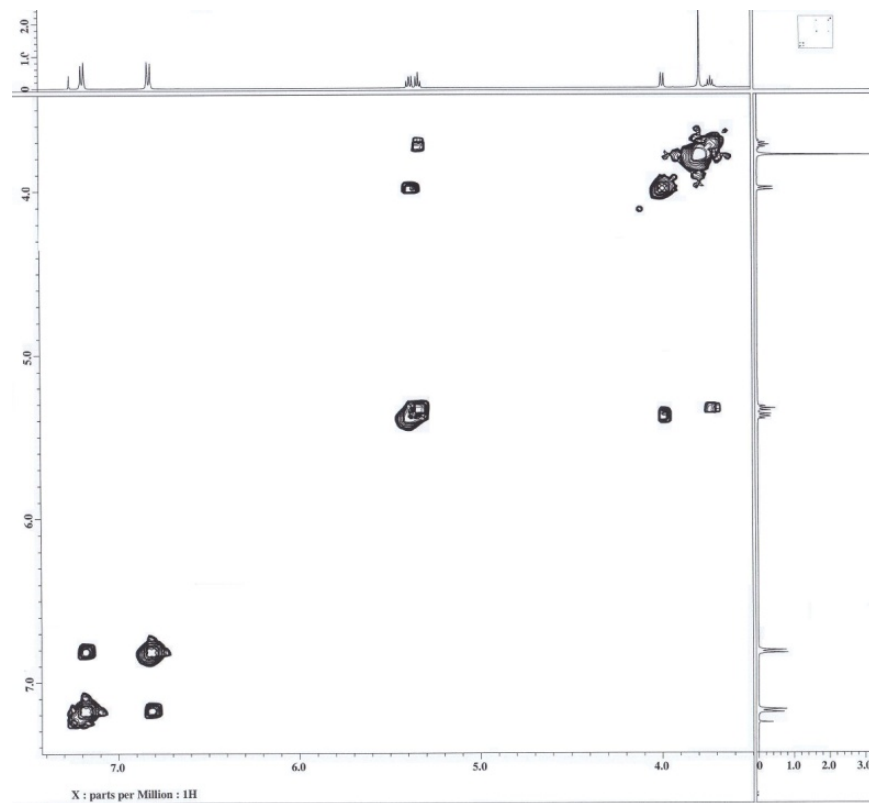


Figure 41.3: ^1H - ^1H COSY Spectrum of Compound **33a**

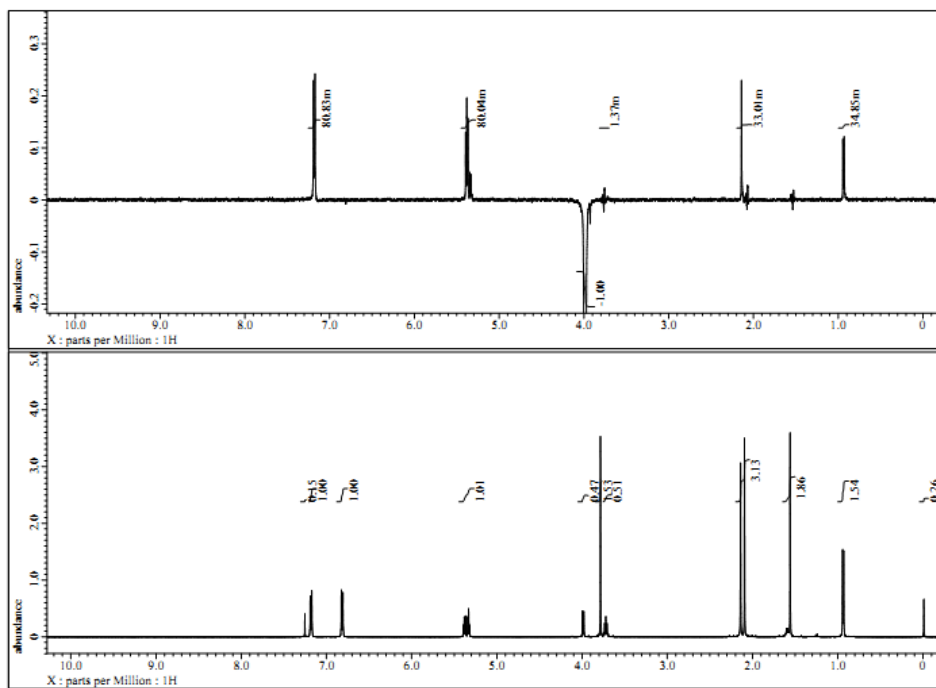


Figure 41.4: NOE Irradiation Spectrum of H-2 proton of Compound **33a**

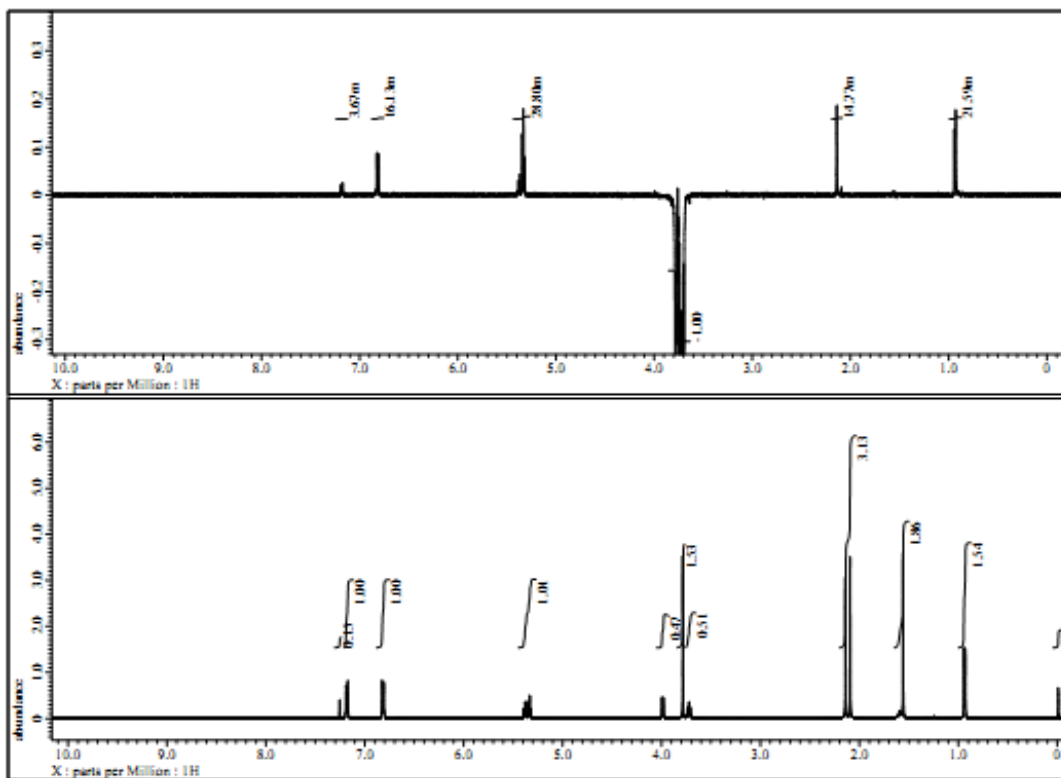


Figure 41.5: NOE Irradiation Spectrum of H-5 proton of Compound **33a**

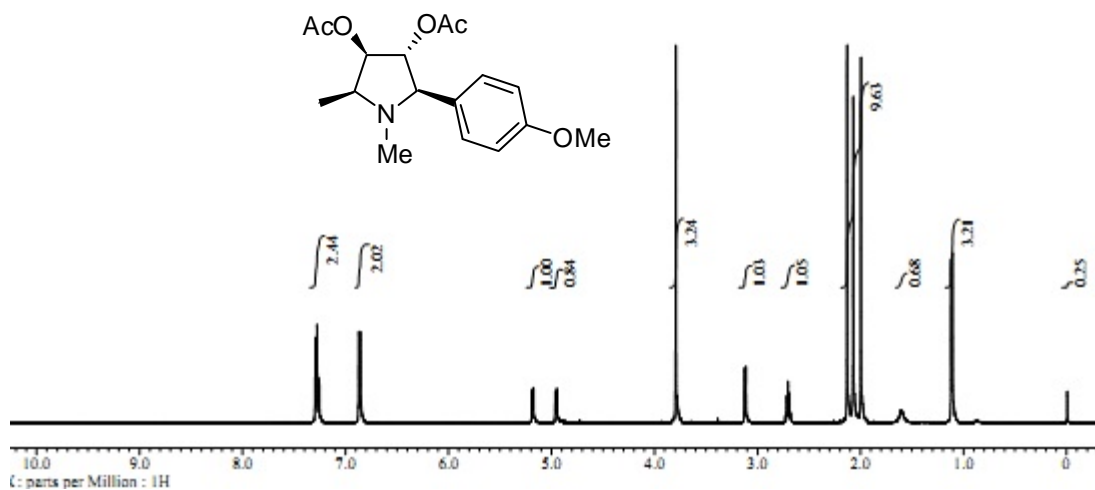


Figure 42.1: $^1\text{H NMR}$ (500 MHz, CDCl_3) Spectrum of Compound 33b

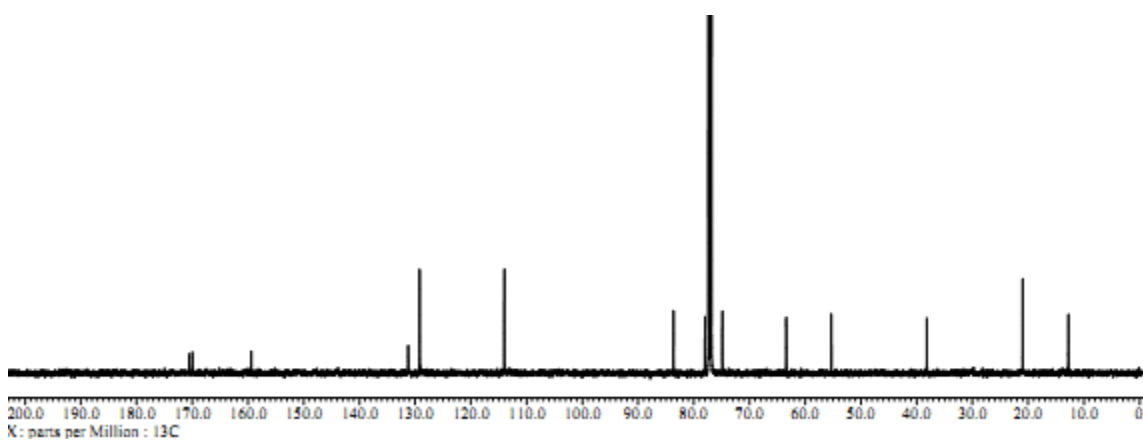


Figure 42.2: $^{13}\text{C NMR}$ (125 MHz, CDCl_3) Spectrum of Compound 33b

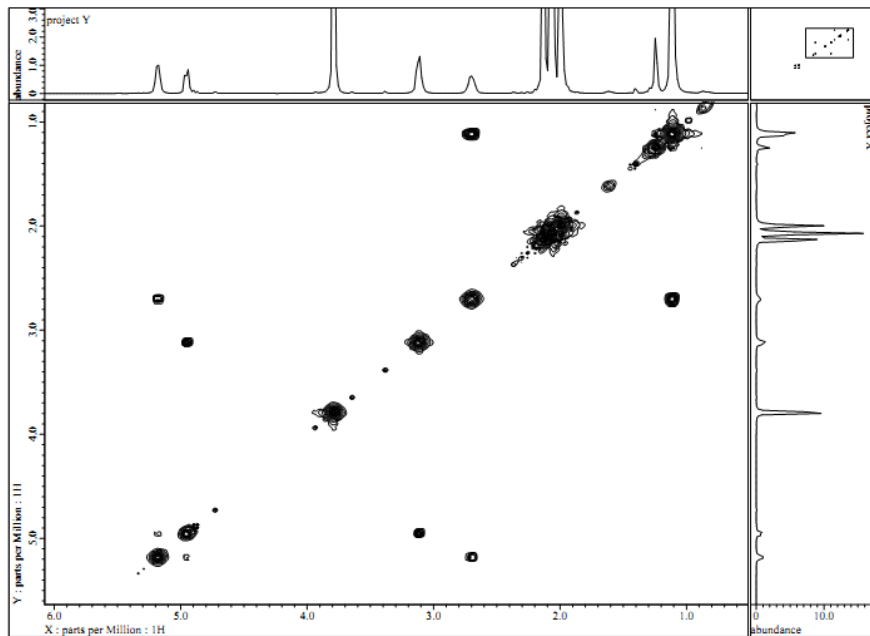


Figure 42.3: ^1H - ^1H COSY Spectrum of Compound **33b**

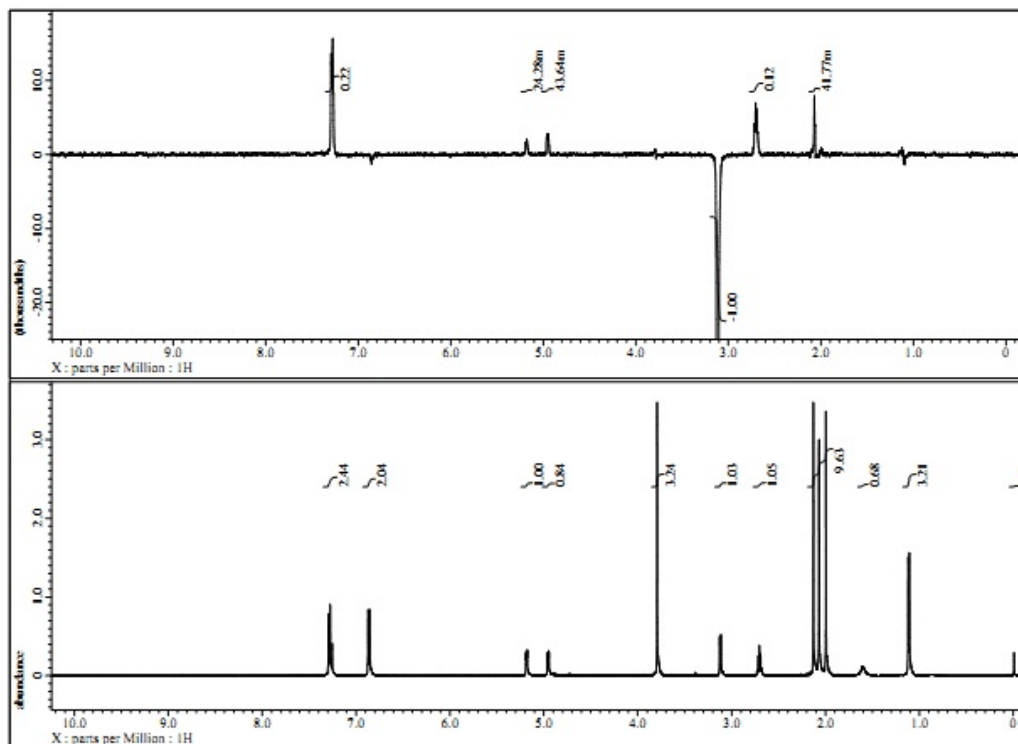


Figure 42.4: NOE Irradiation Spectrum of H-2 proton of Compound **33b**

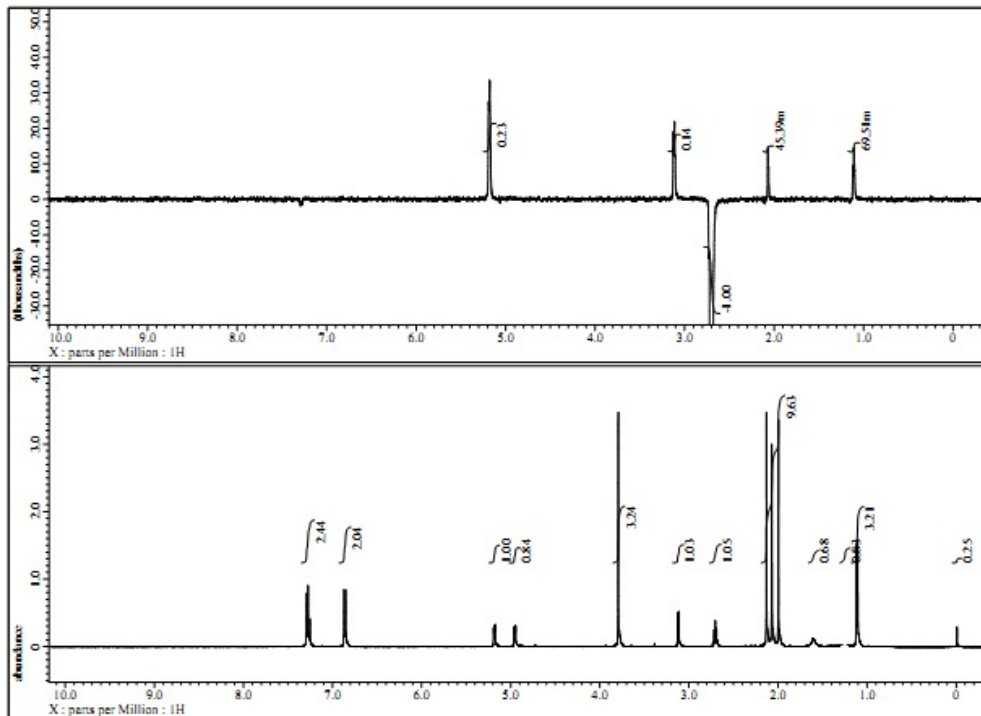


Figure 42.5: NOE Irradiation Spectrum of H-2 proton of Compound **33b**

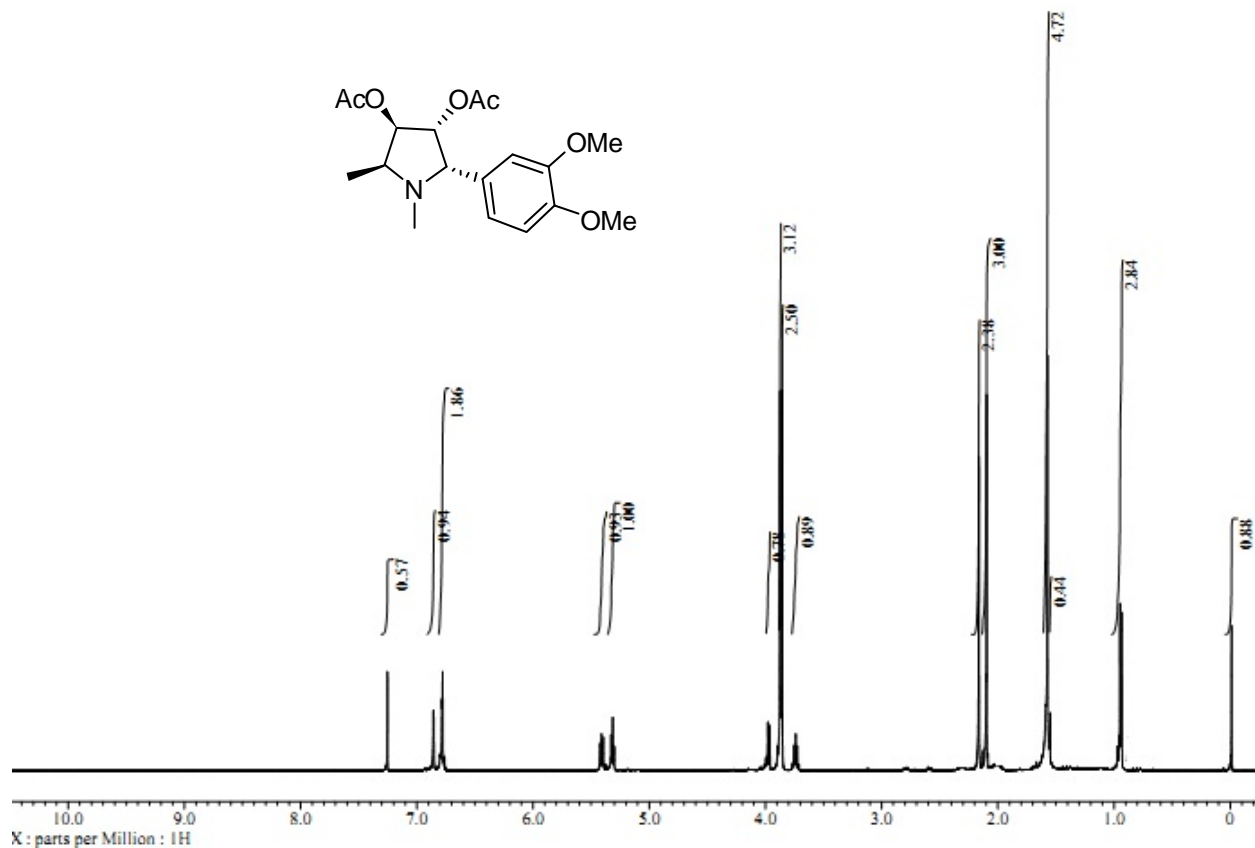


Figure 43.1: ¹H NMR (500 MHz, CDCl₃) Spectrum of Compound 34a

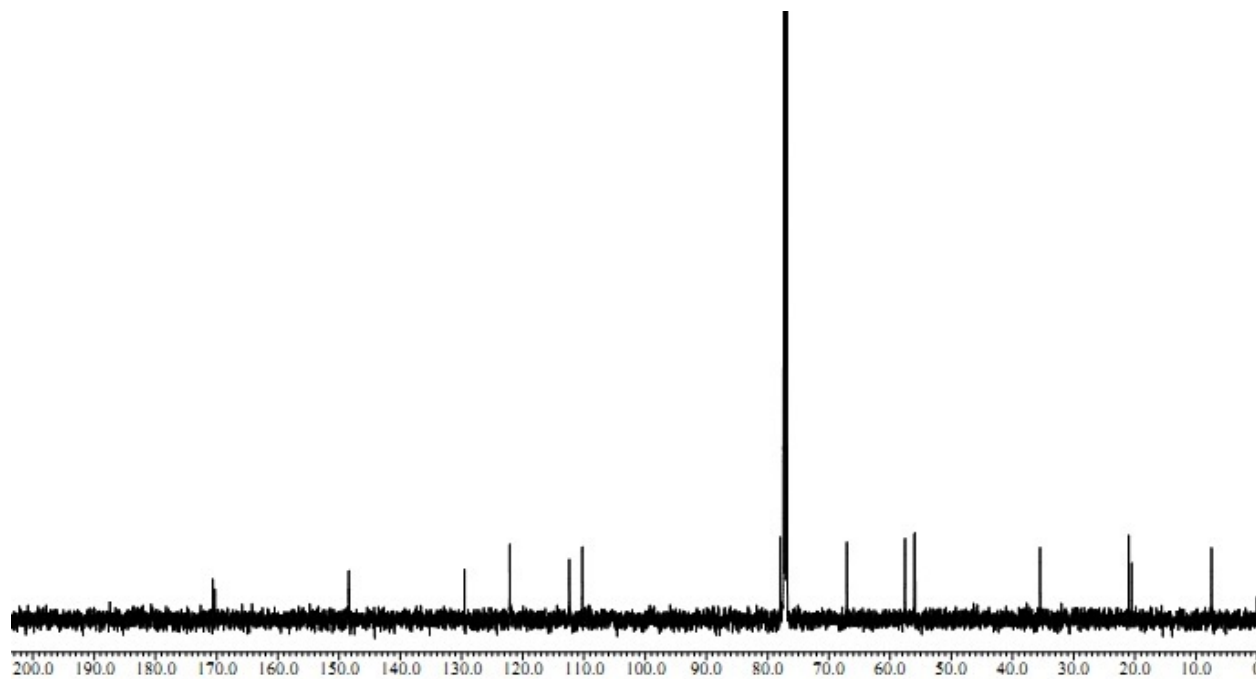


Figure 43.2: ¹³C NMR (125 MHz, CDCl₃) Spectrum of Compound 34a

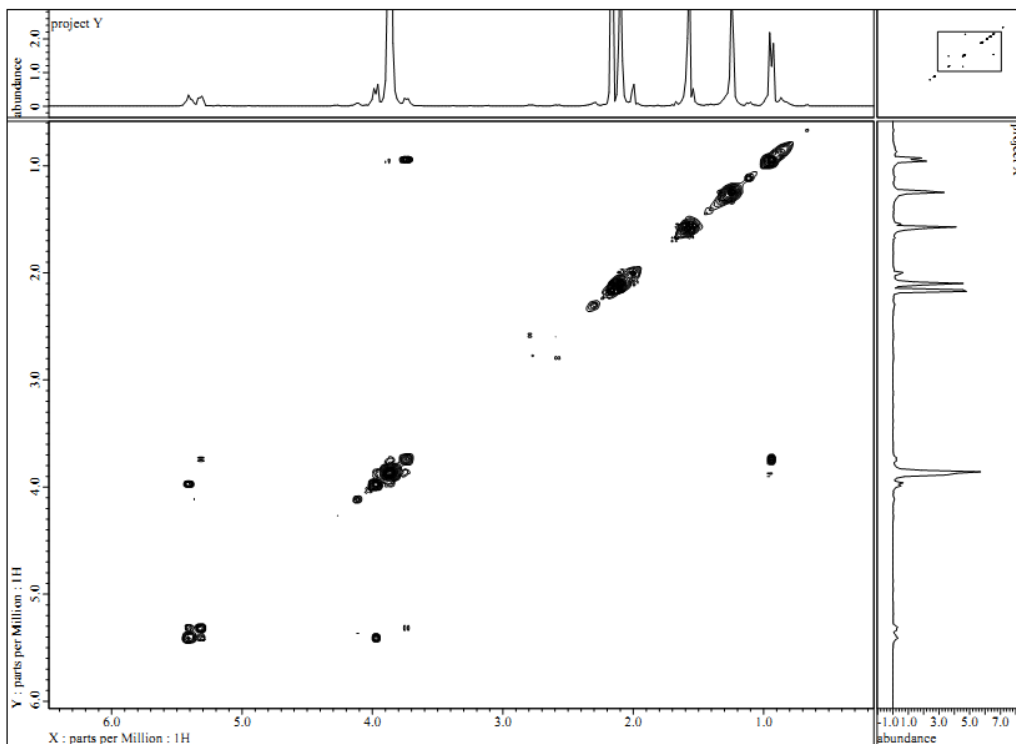


Figure 43.3: ^1H - ^1H COSY Spectrum of Compound **34a**

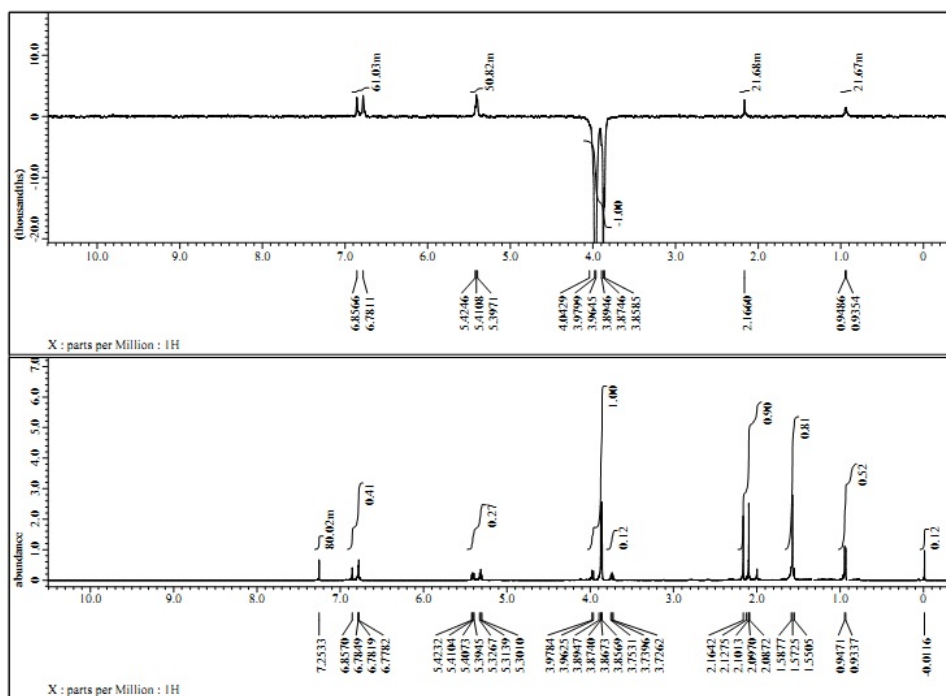


Figure 43.4: NOE irradiation of H-2 proton Spectrum of Compound **34a**

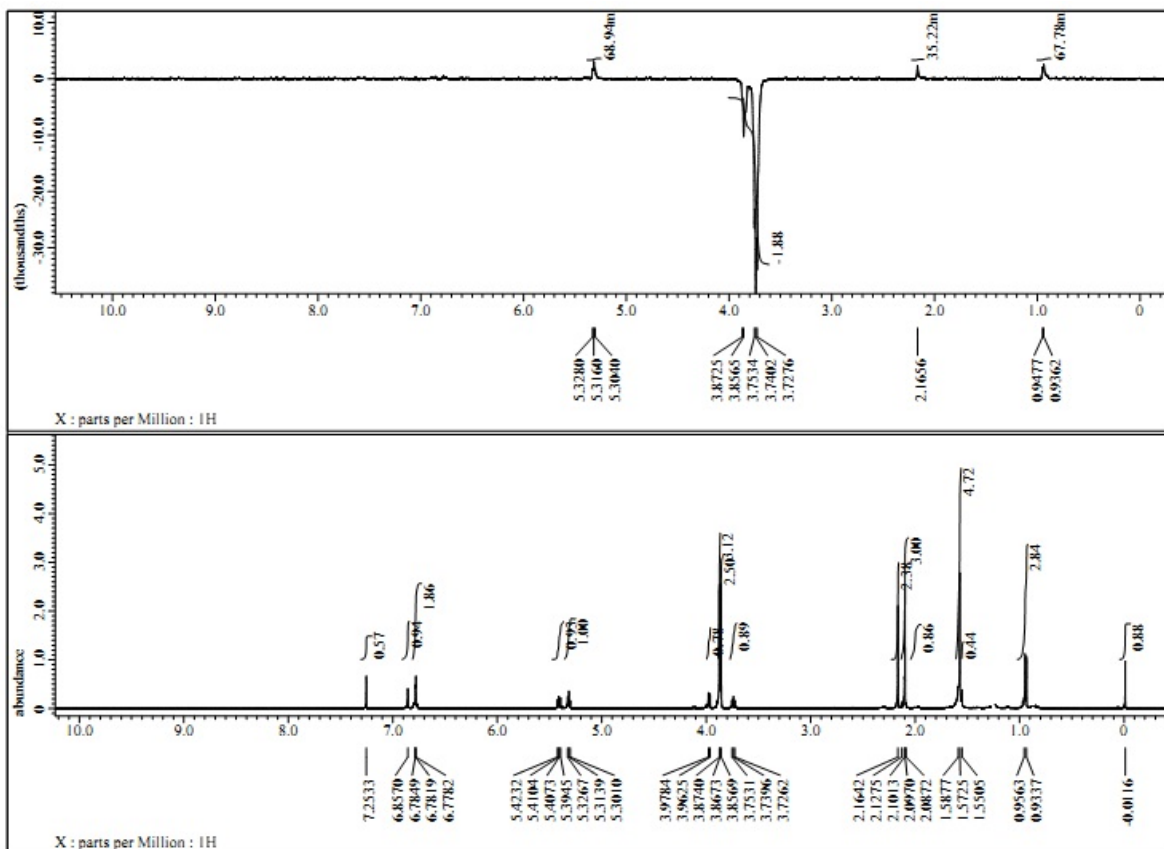


Figure 43.5: NOE irradiation of H-5 proton Spectrum of Compound 34a

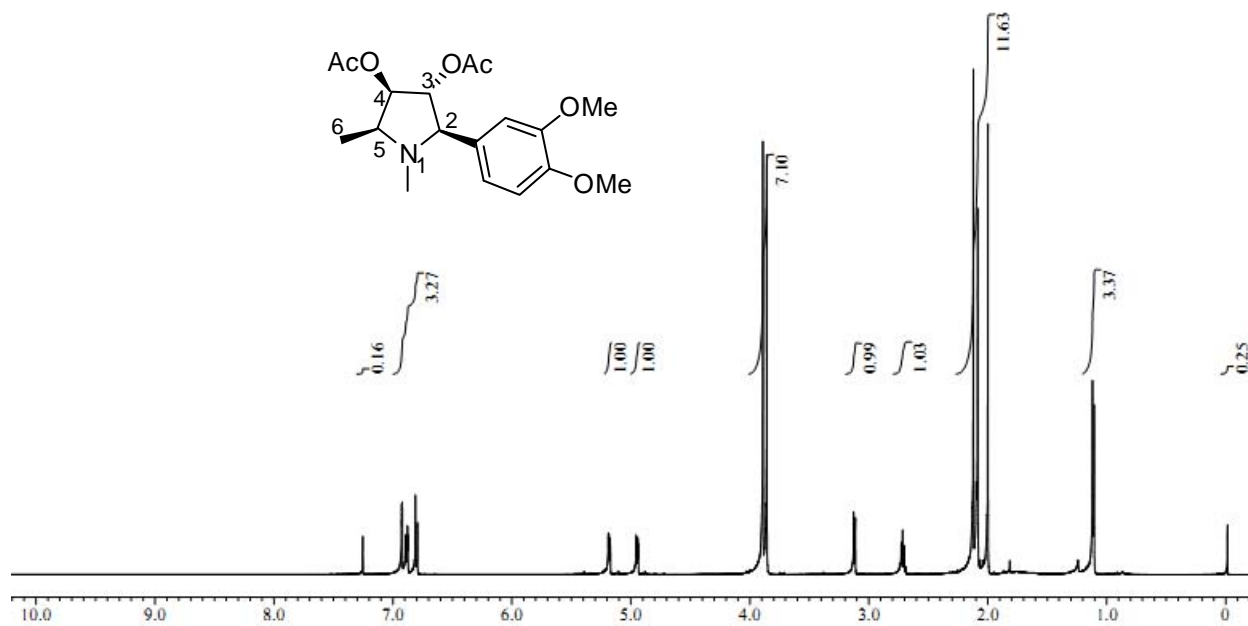


Figure 44.1: ¹H NMR (500 MHz, CDCl₃) Spectrum of Compound 34b

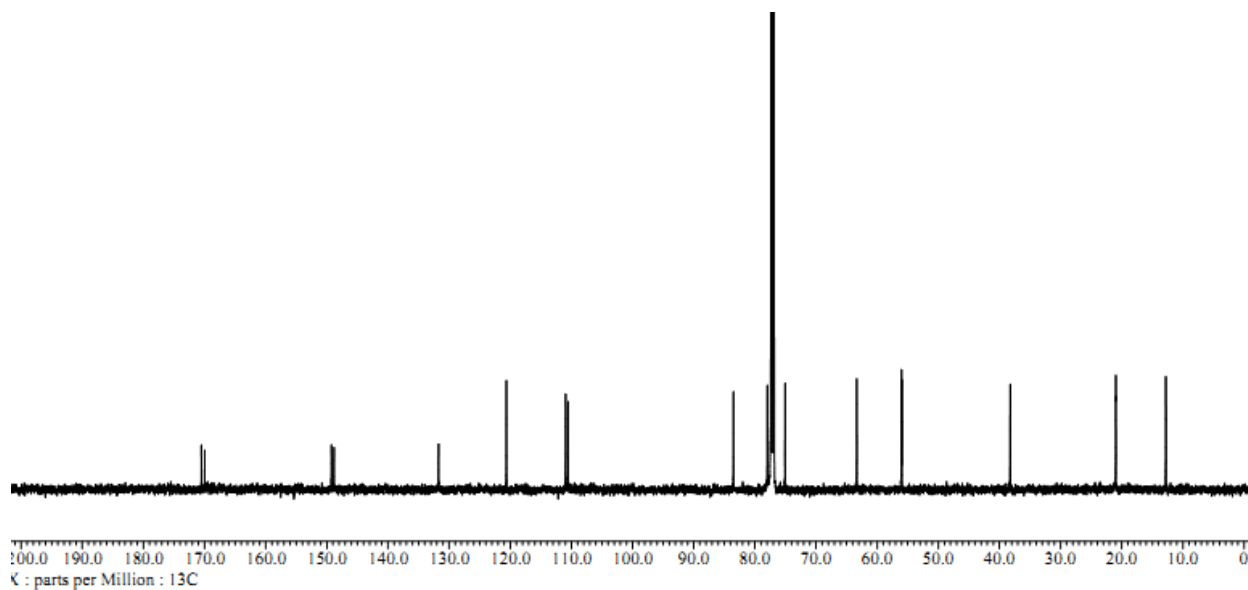


Figure 44.2: ¹³C NMR (125 MHz, CDCl₃) Spectrum of Compound 34b

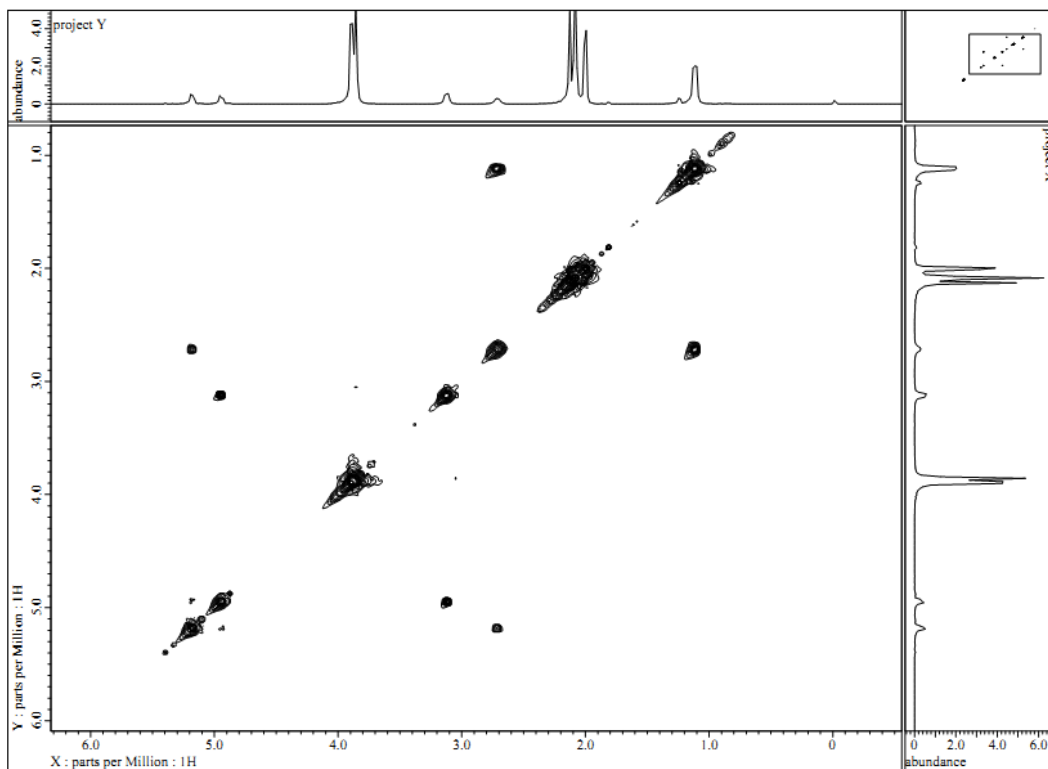


Figure 44.3: ^1H - ^1H COSY Spectrum of Compound **34b**

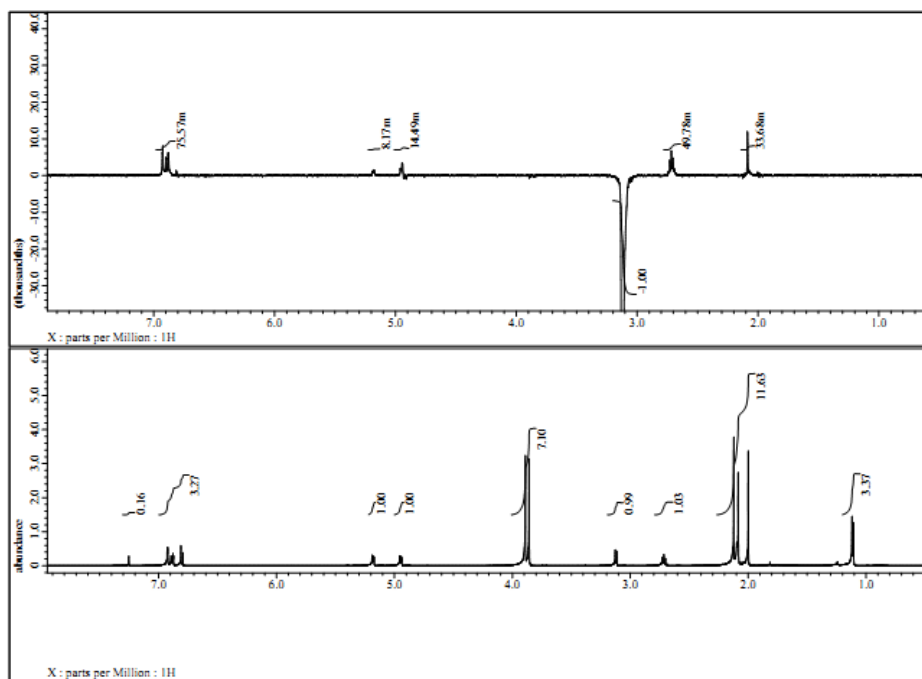


Figure 44.4: NOE irradiation of H-2 proton Spectrum of Compound **34b**

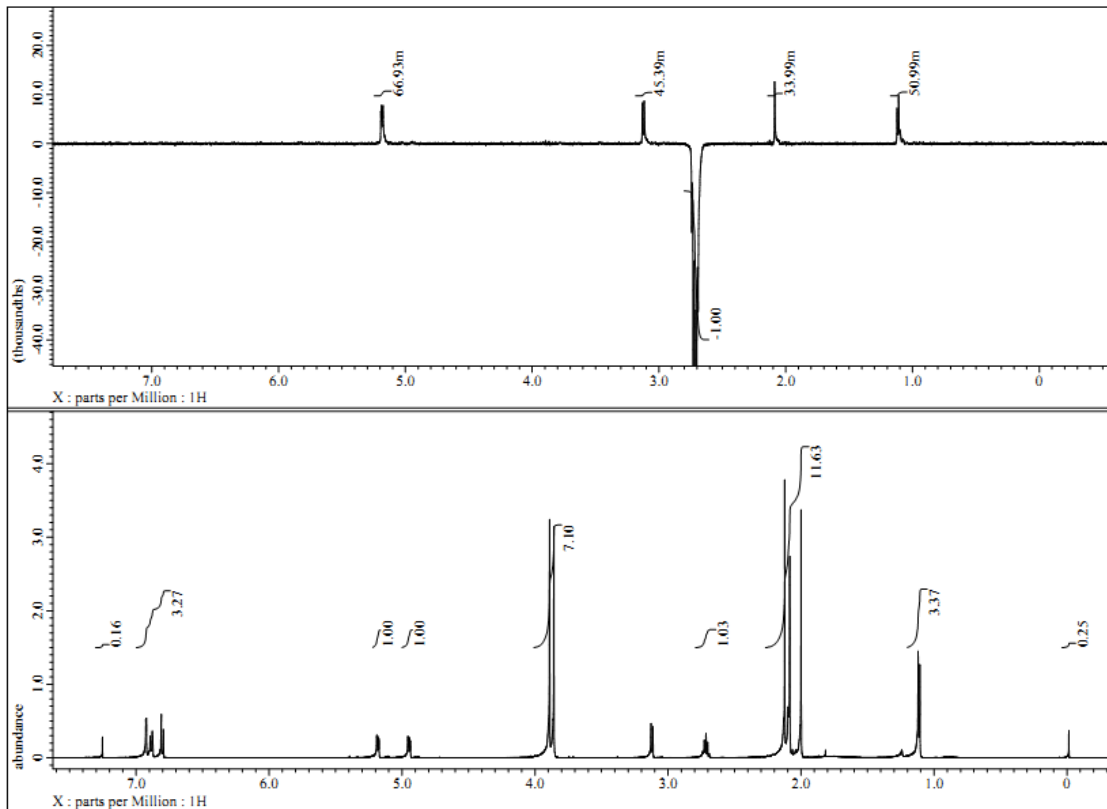
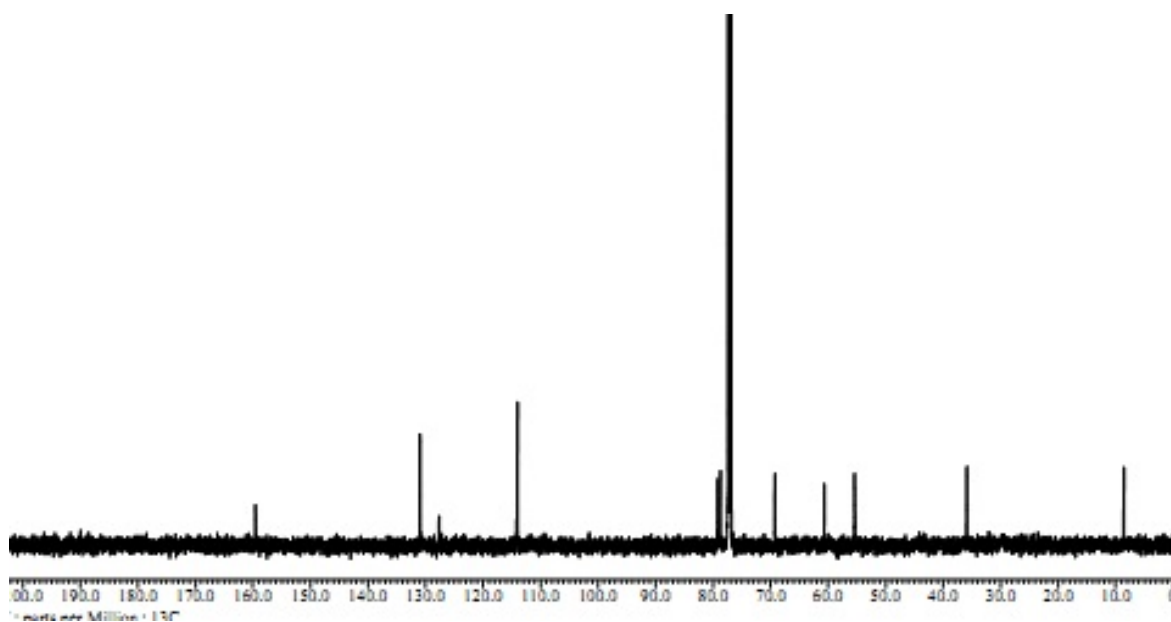
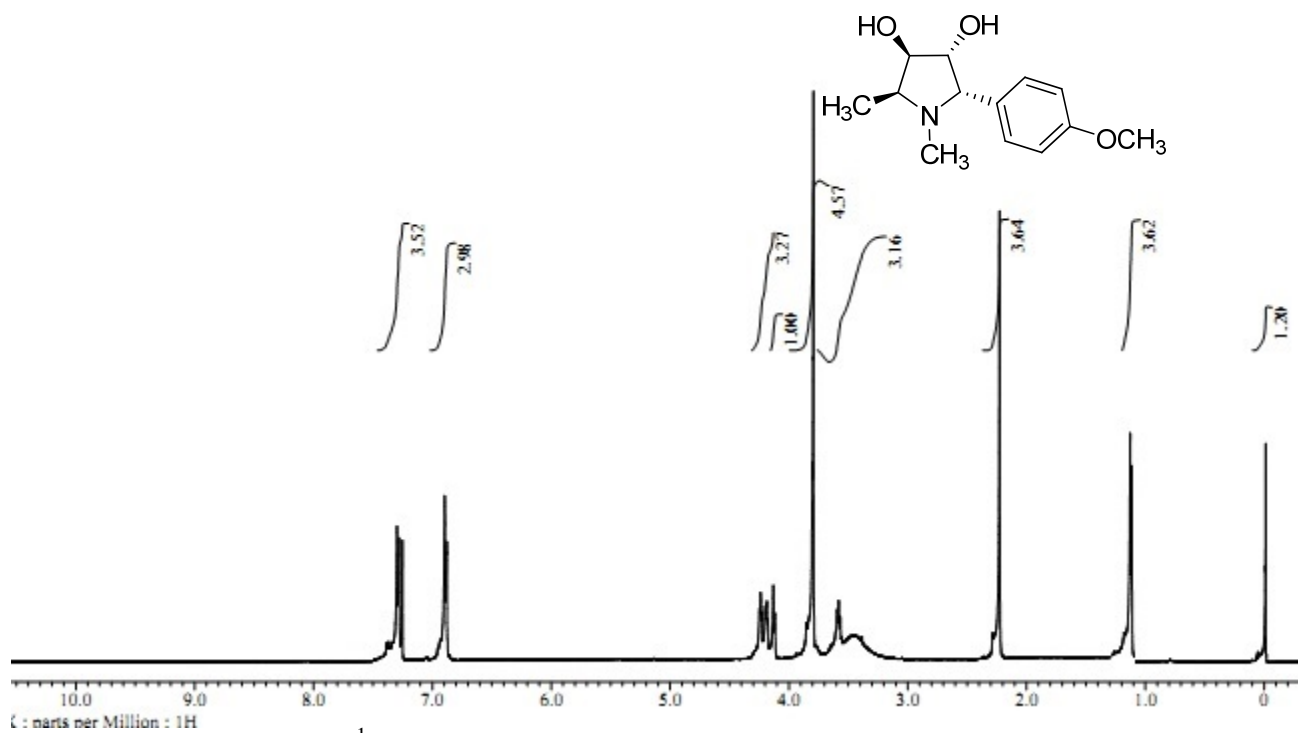
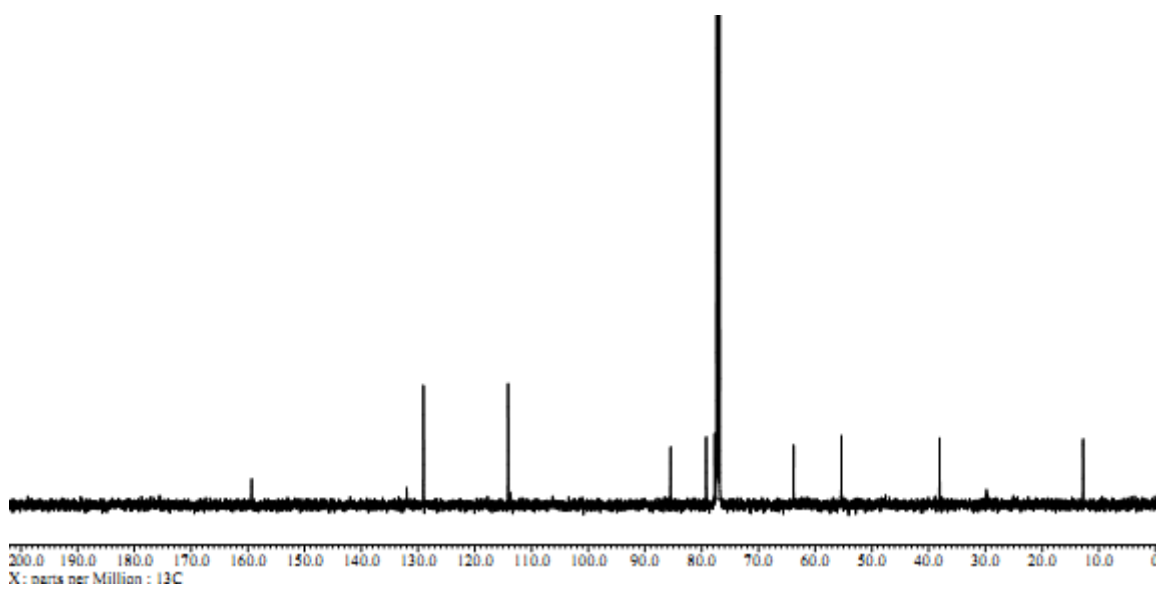
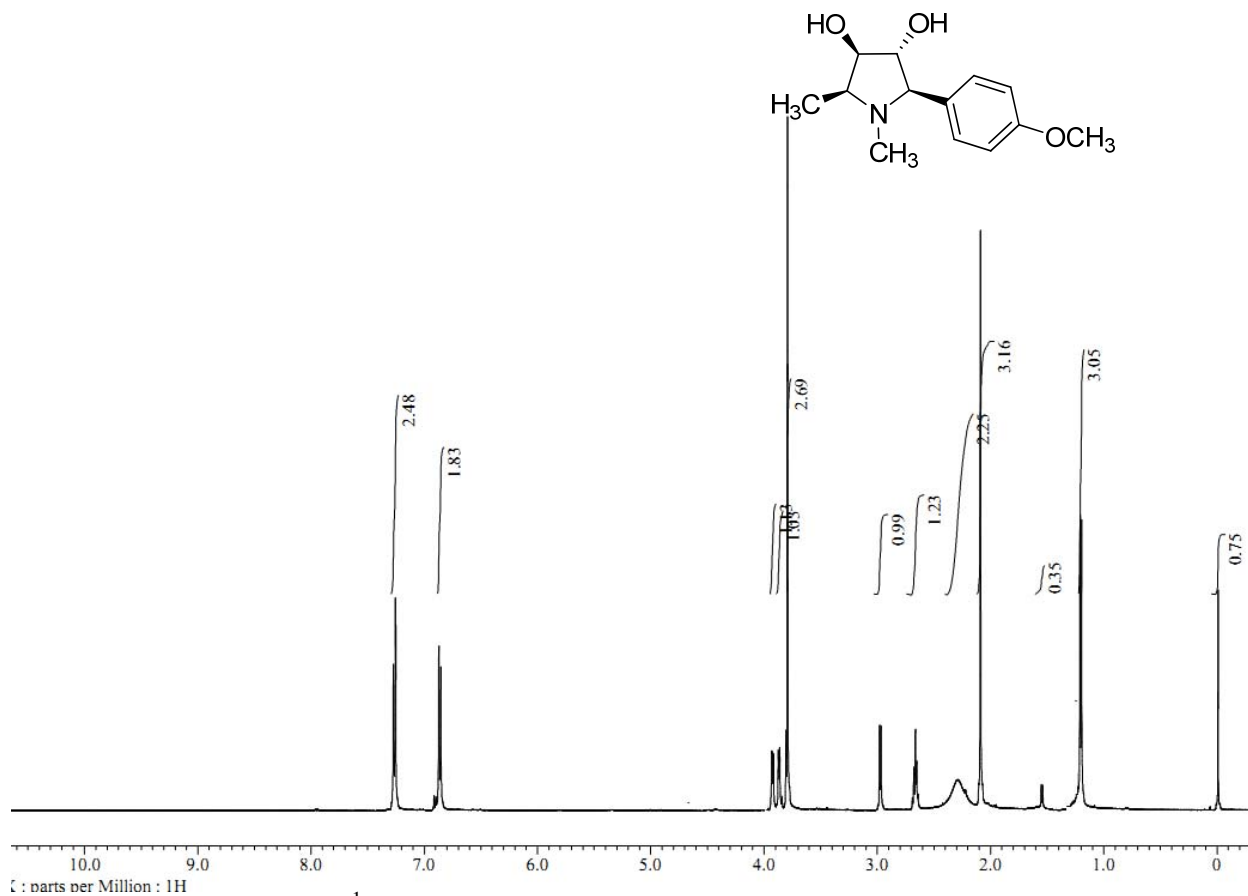


Figure 44.5: NOE irradiation of H-5 proton Spectrum of Compound **34b**





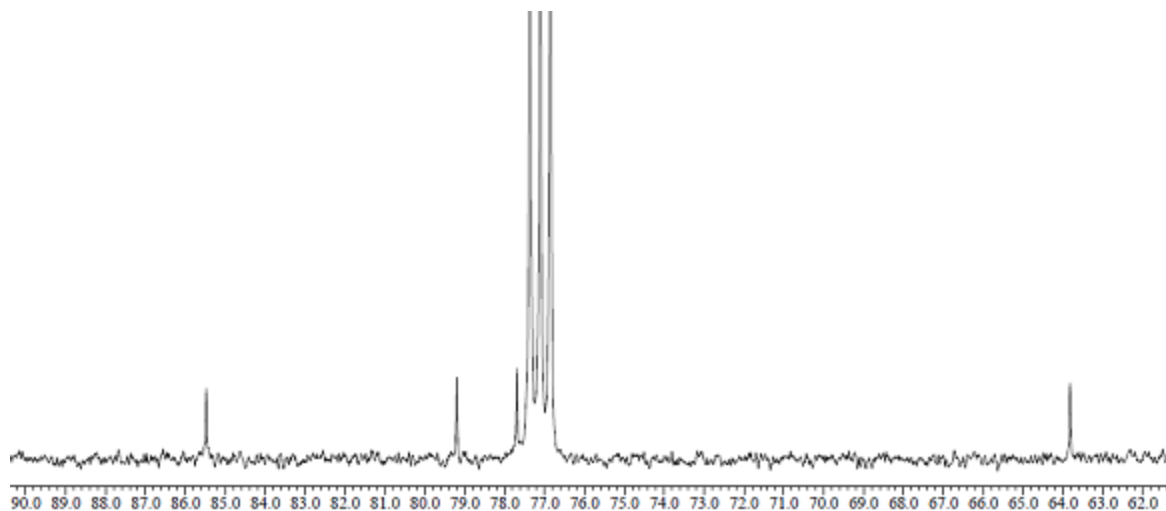


Figure 46.3: Expansion of ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound **35b**

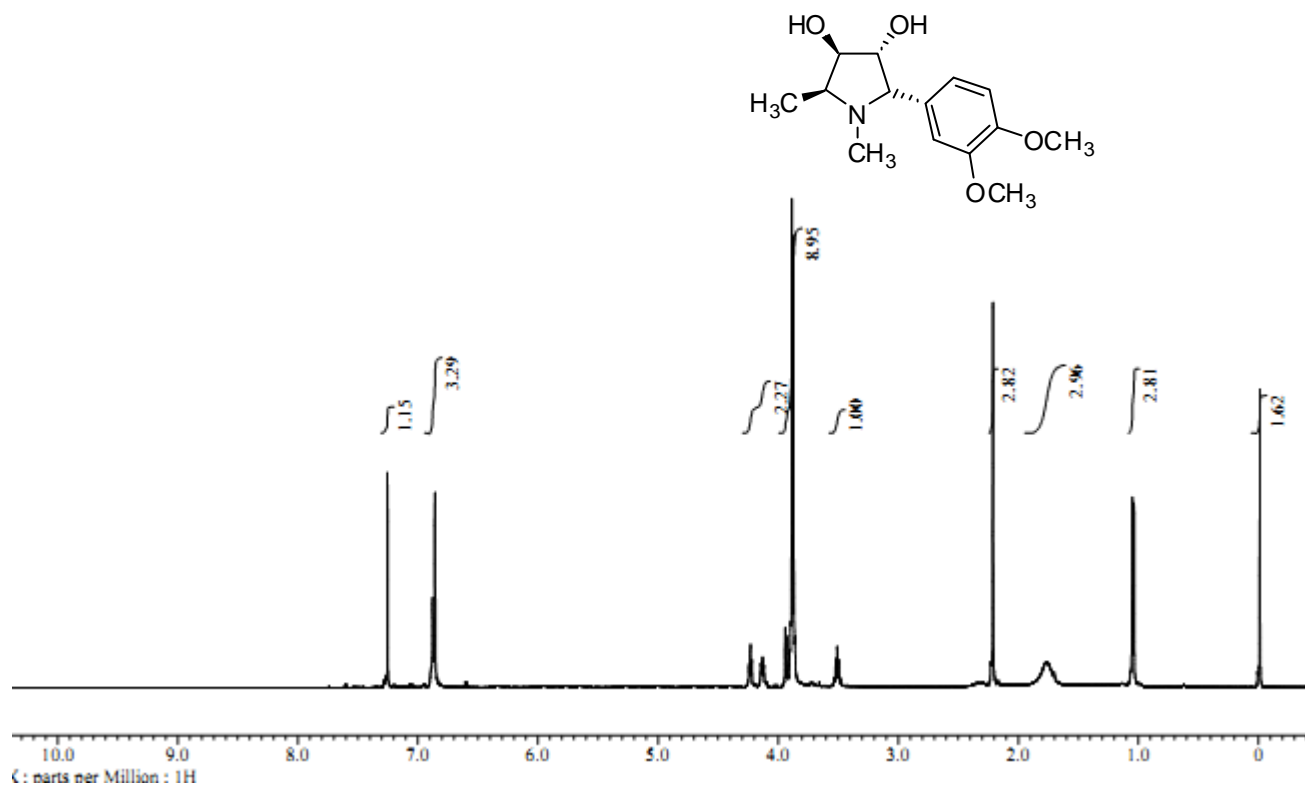


Figure 47.1: ^1H NMR (500 MHz, CDCl_3) Spectrum of Compound 36a

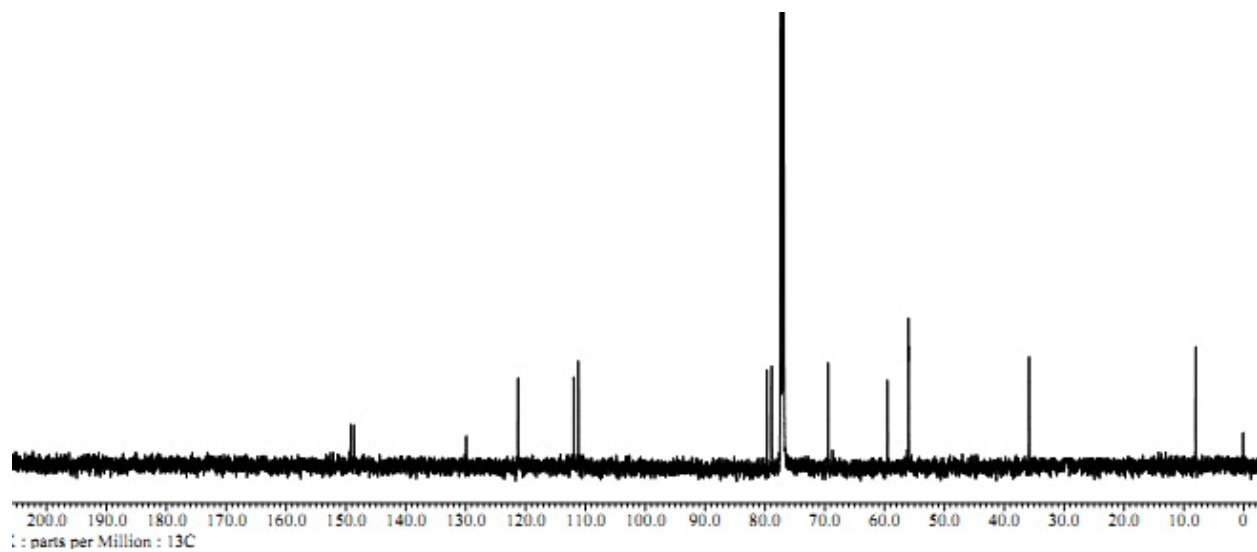


Figure 47.2: ^{13}C NMR (125 MHz, CDCl_3) Spectrum of Compound 36a

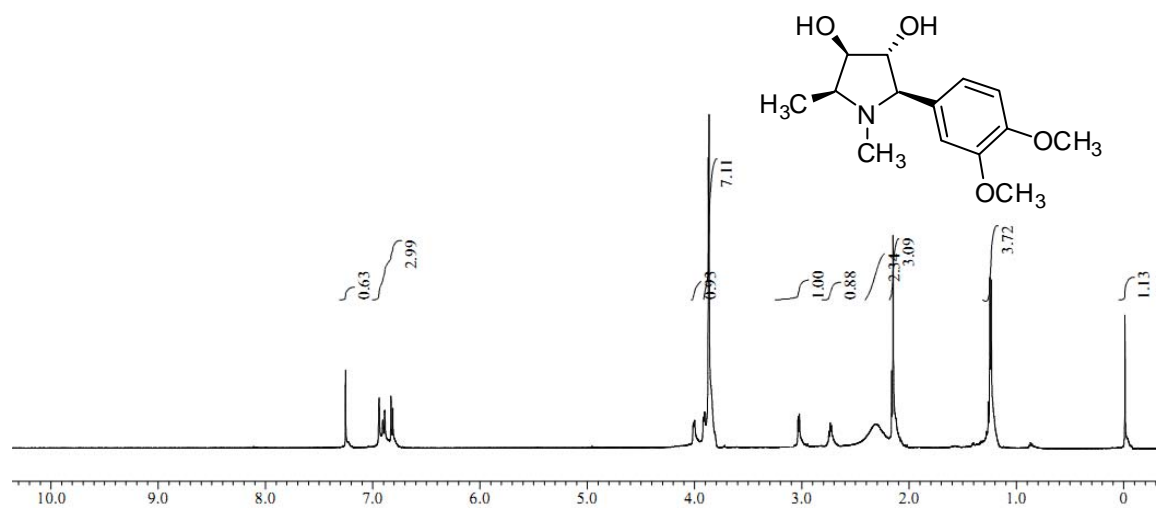


Figure 48.1: ¹H NMR (500 MHz, CDCl₃) Spectrum of Compound **36b**

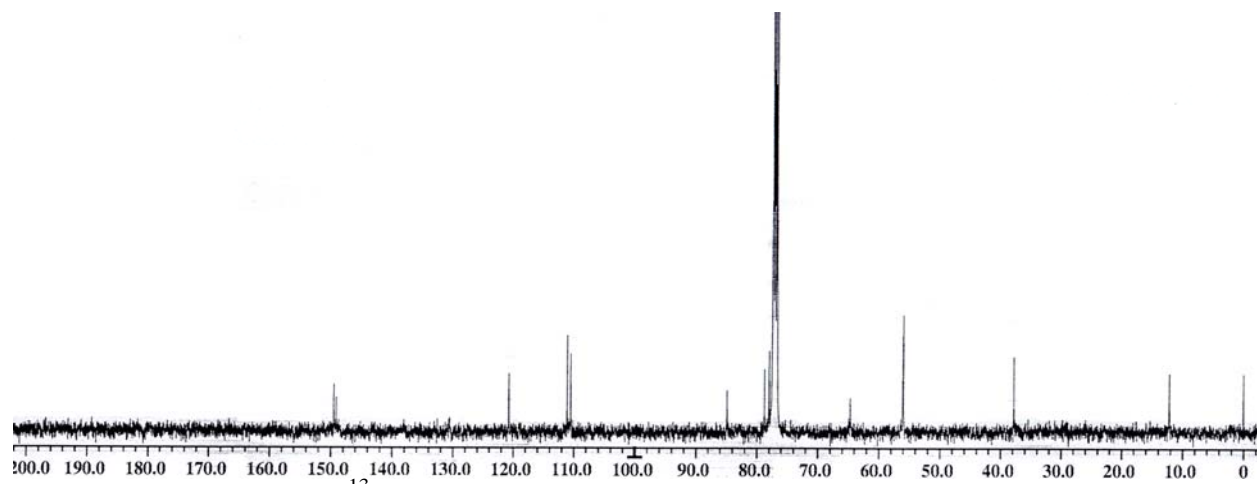


Figure 48.2: ¹³C NMR (100 MHz, CDCl₃) Spectrum of Compound **36b**

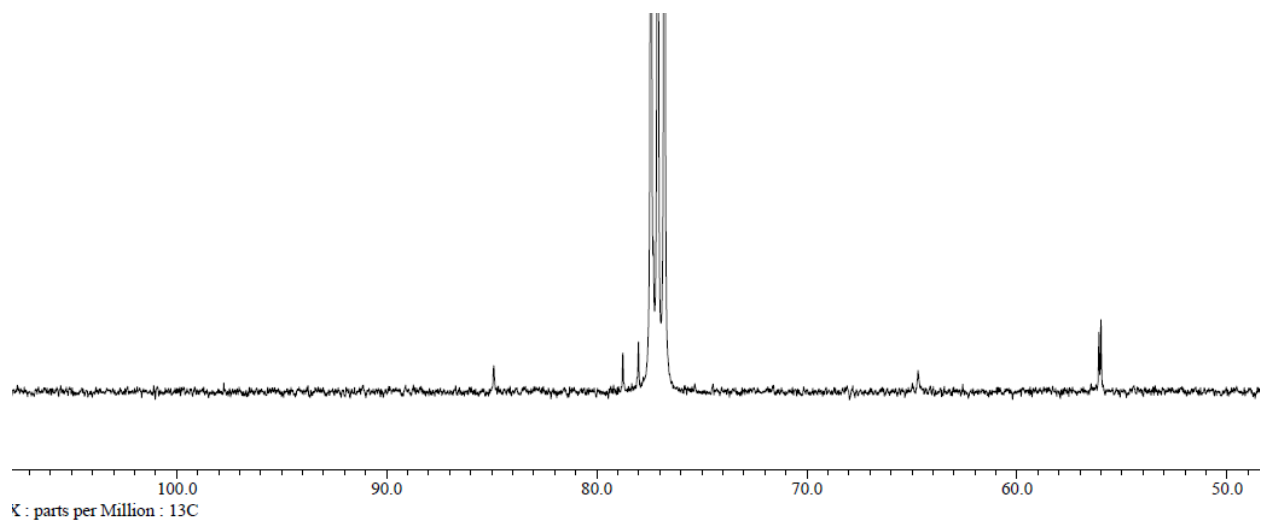


Figure 48.3: Expansion of ^{13}C NMR (100 MHz, CDCl_3) Spectrum of Compound **36b**