BISMUTH(III) TRIFLATE: AN ECONOMICAL AND ENVIRONMENTALLY FRIENDLY CATALYST FOR THE NAZAROV REACTION

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SUPPORTING INFORMATION

^{1}H NMR and ^{13}C NMR spectra

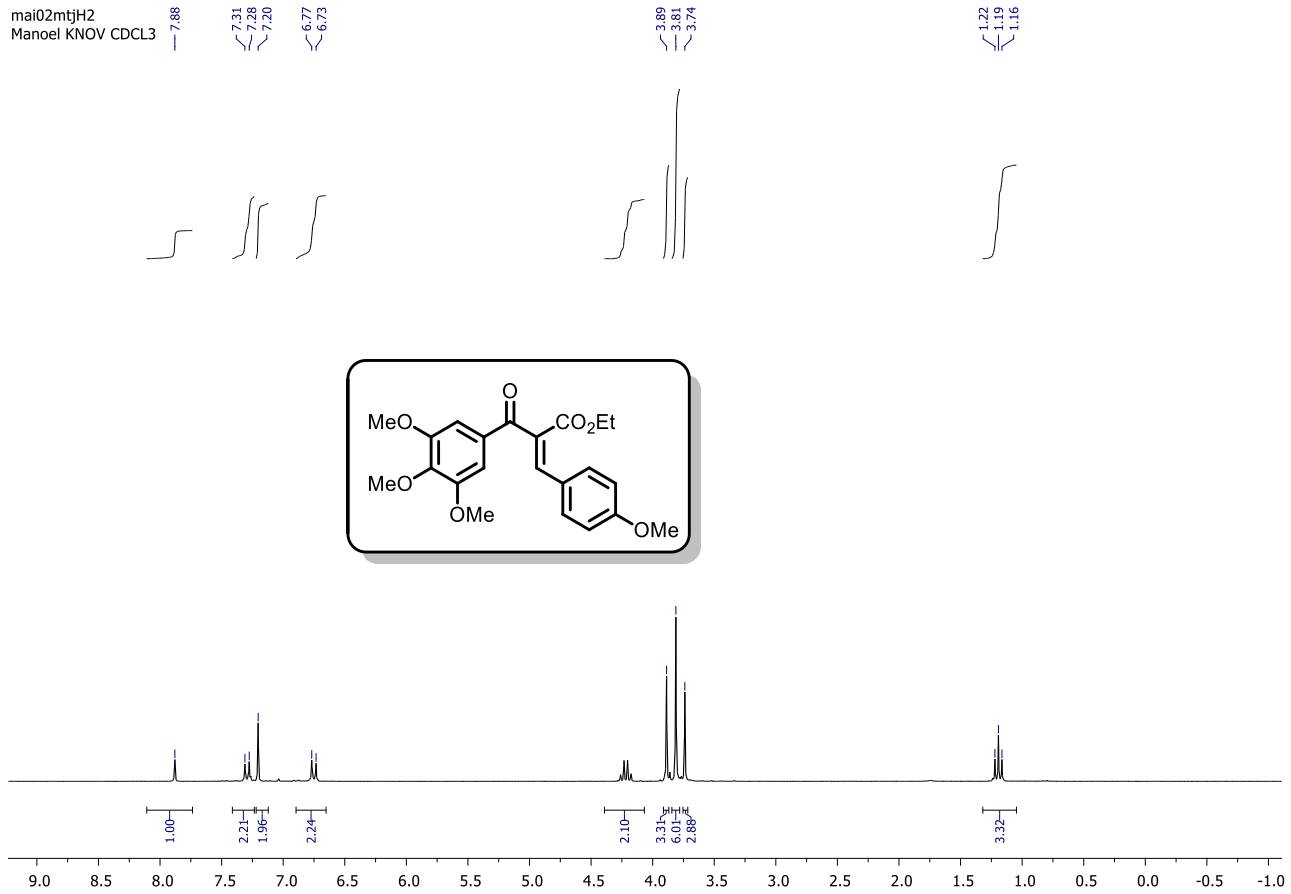

Figure S1. ^{1}H NMR spectrum (250 MHz, $CDCl_3$) of compound **9aa.**

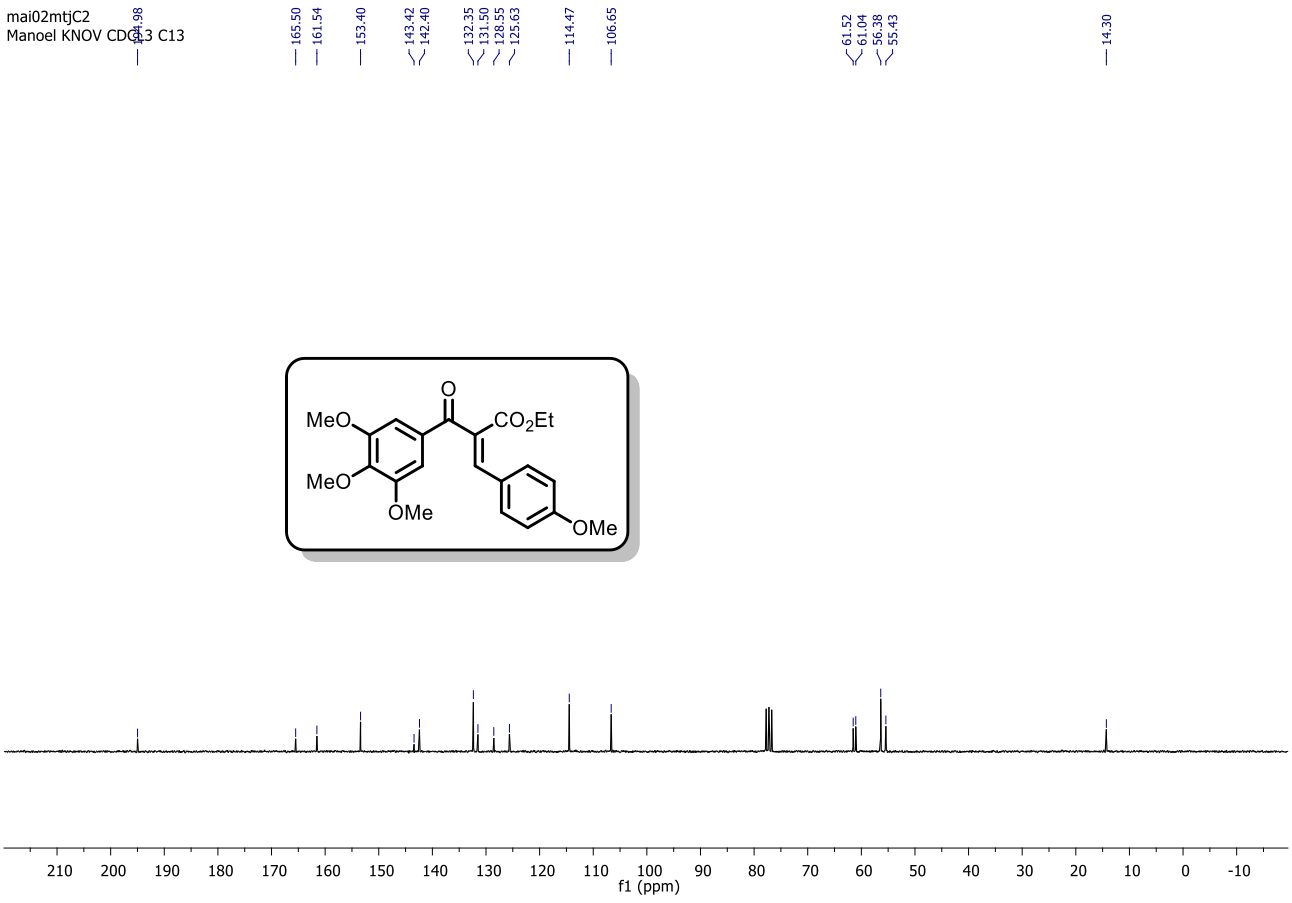

Figure S2. ^{13}C NMR spectrum (63 MHz, $CDCl_3$) of compound **9aa.**

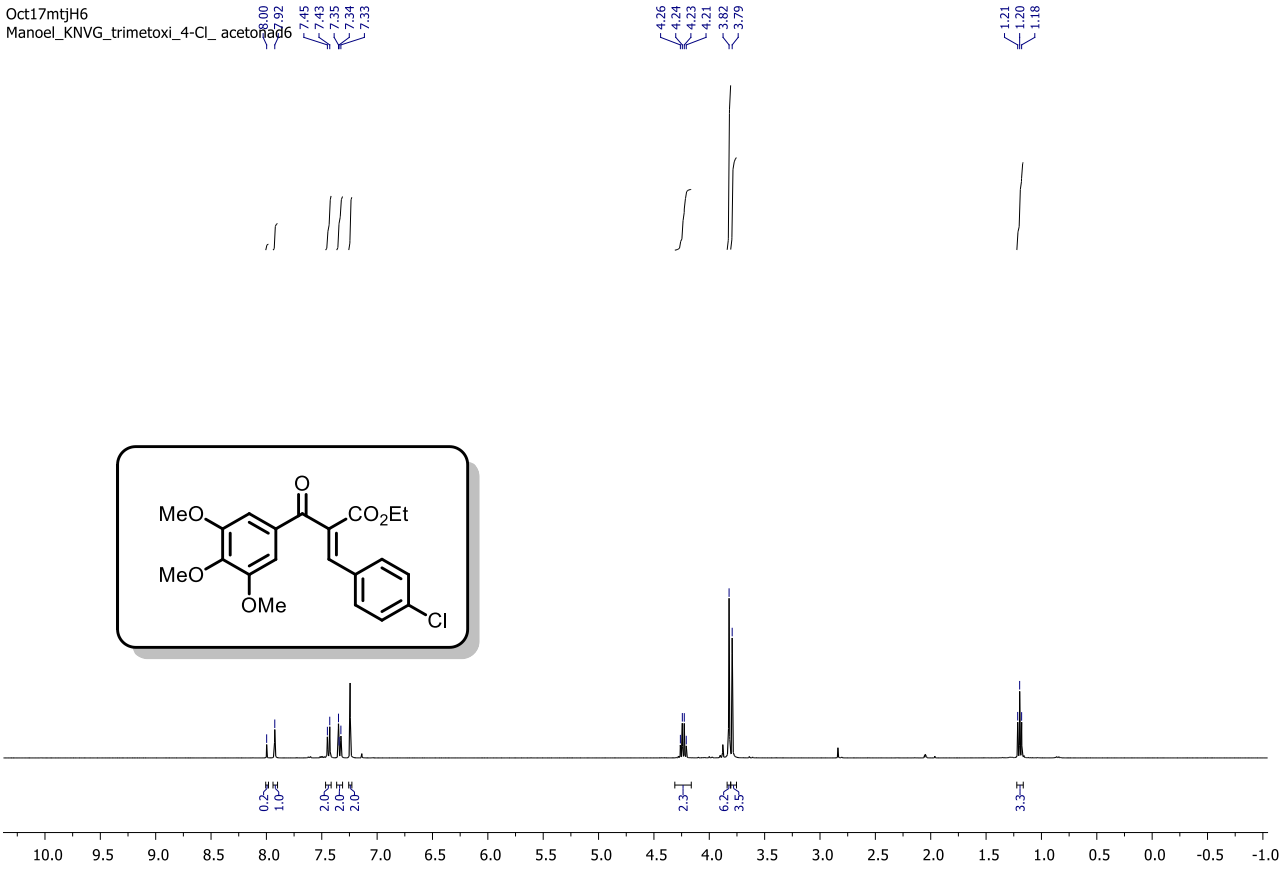

Figure S3. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **9ab.**

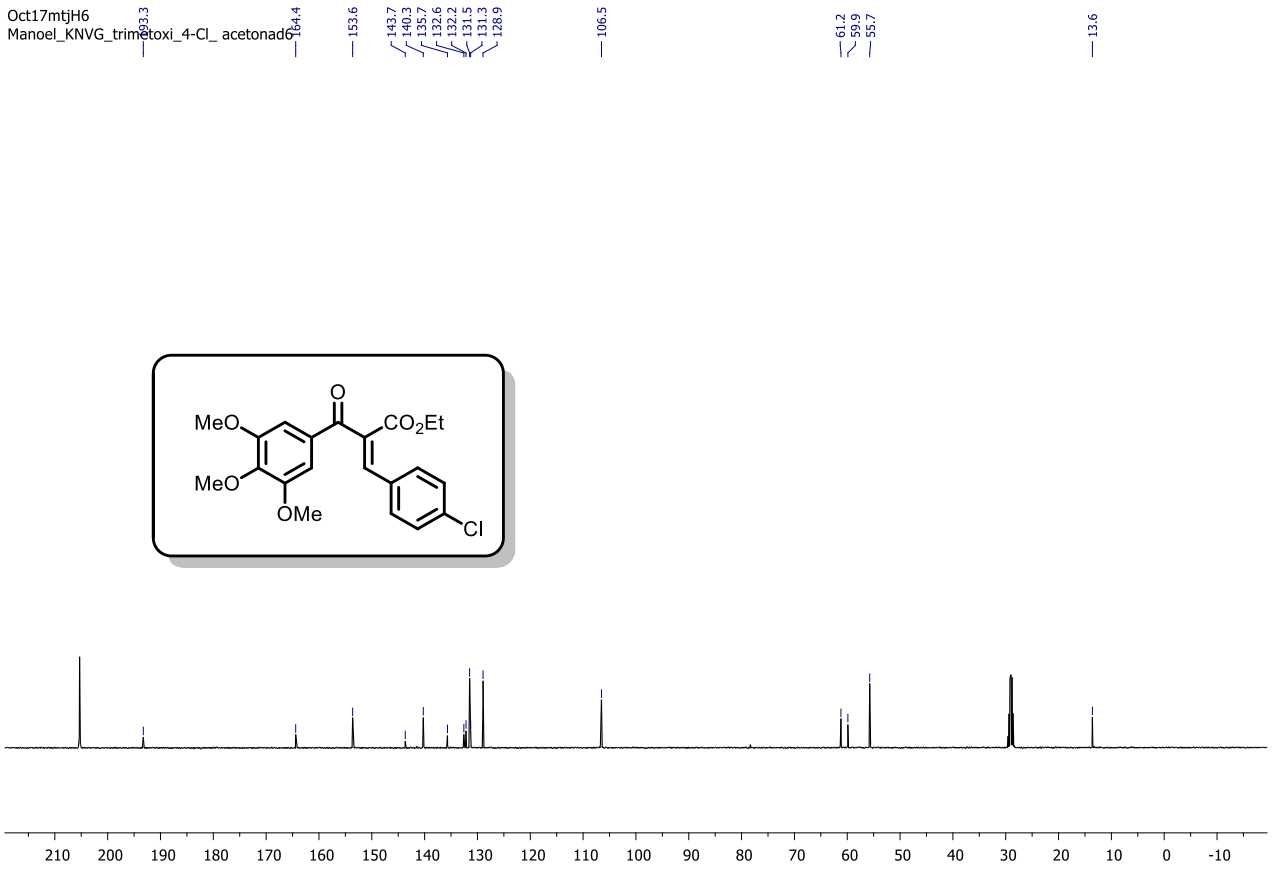

Figure S4. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **9ab.**

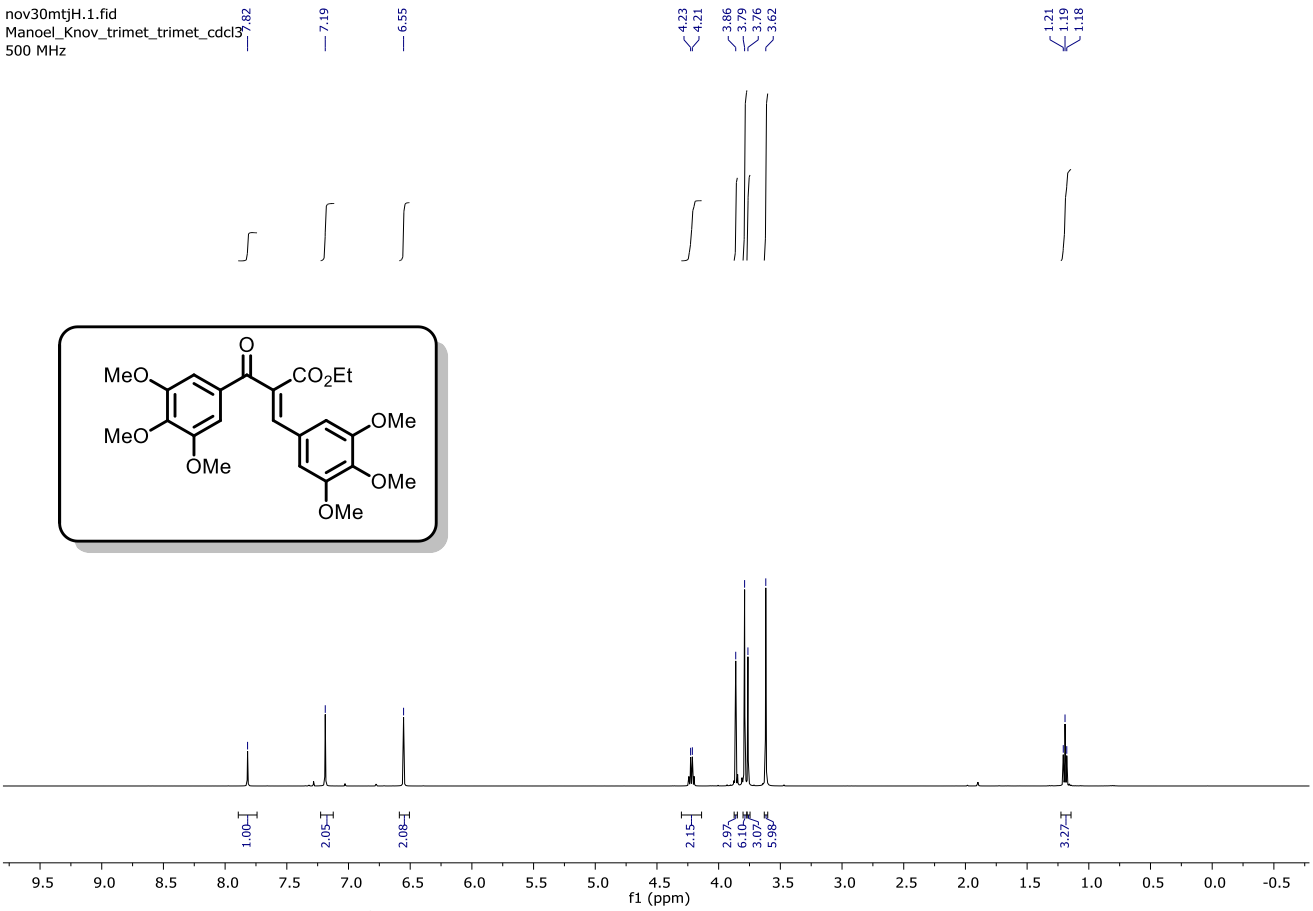

Figure S5. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **9ac.**

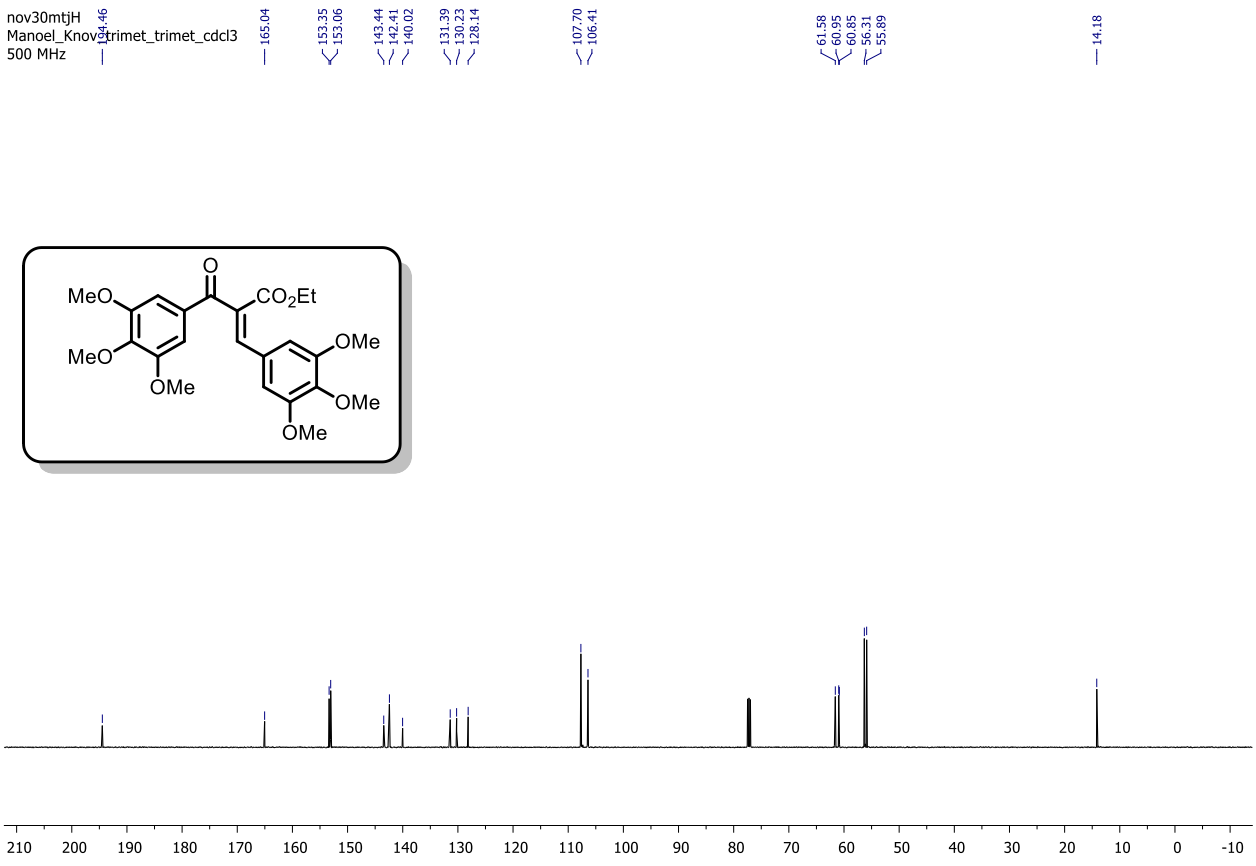

Figure S6. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **9ac.**

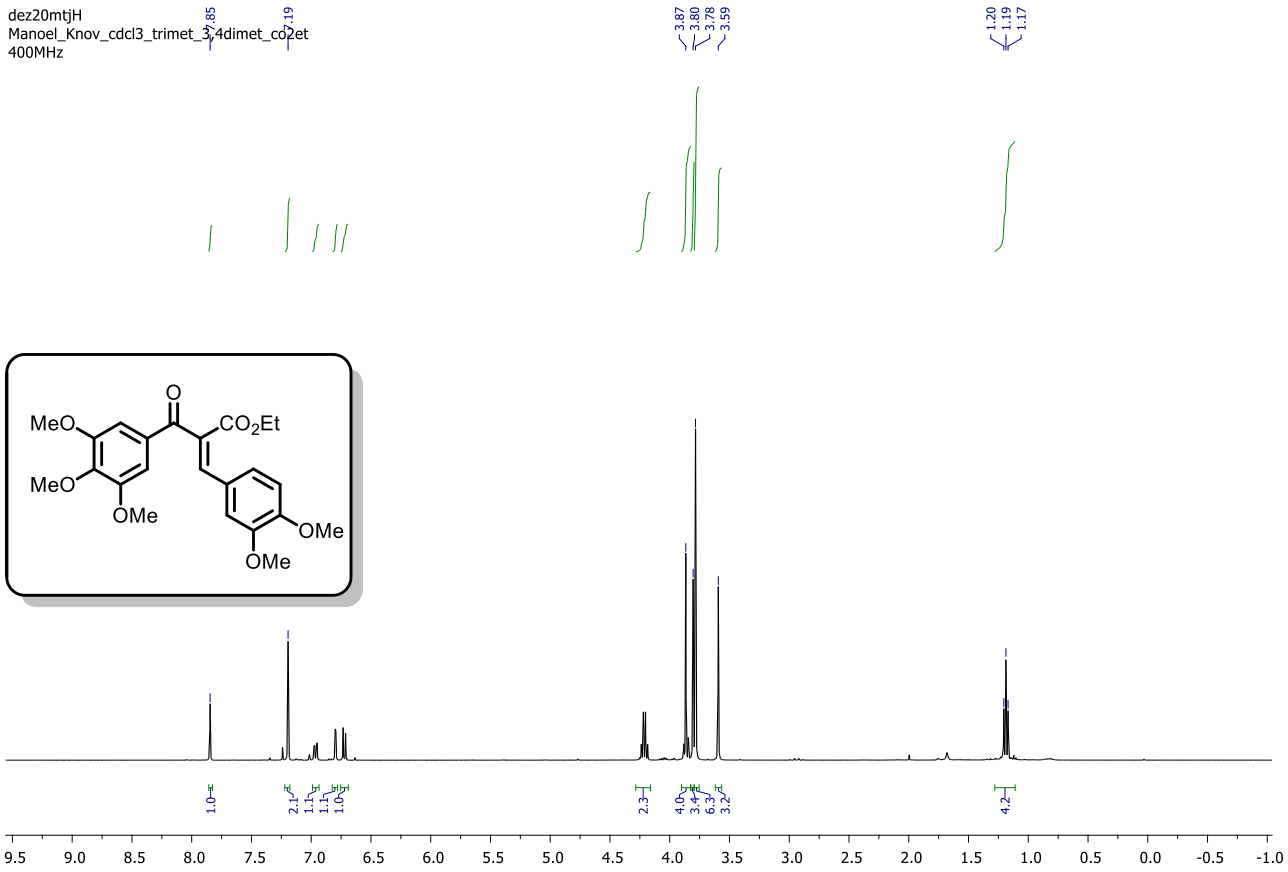

Figure S7. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **9ad.**

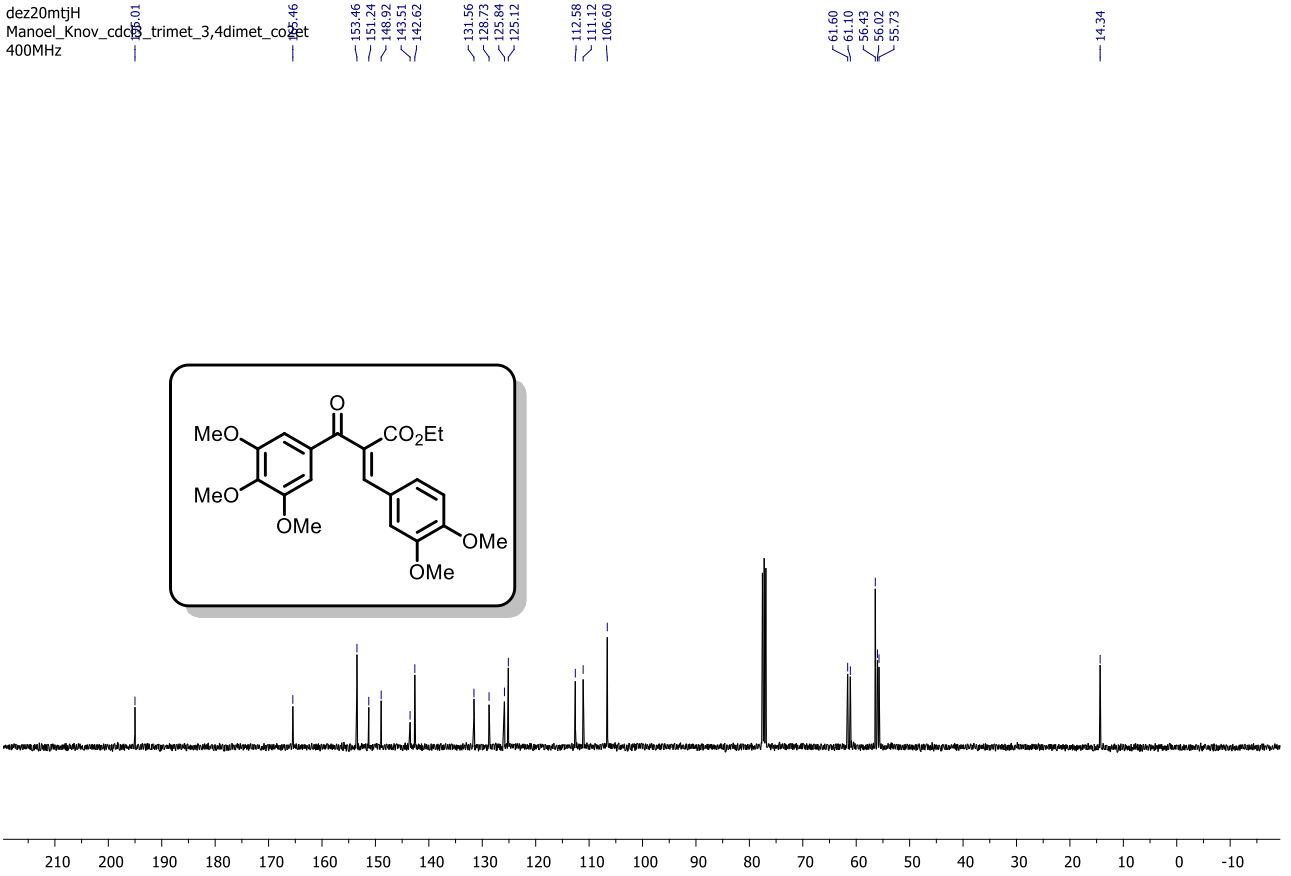

Figure S8. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **9ad.**

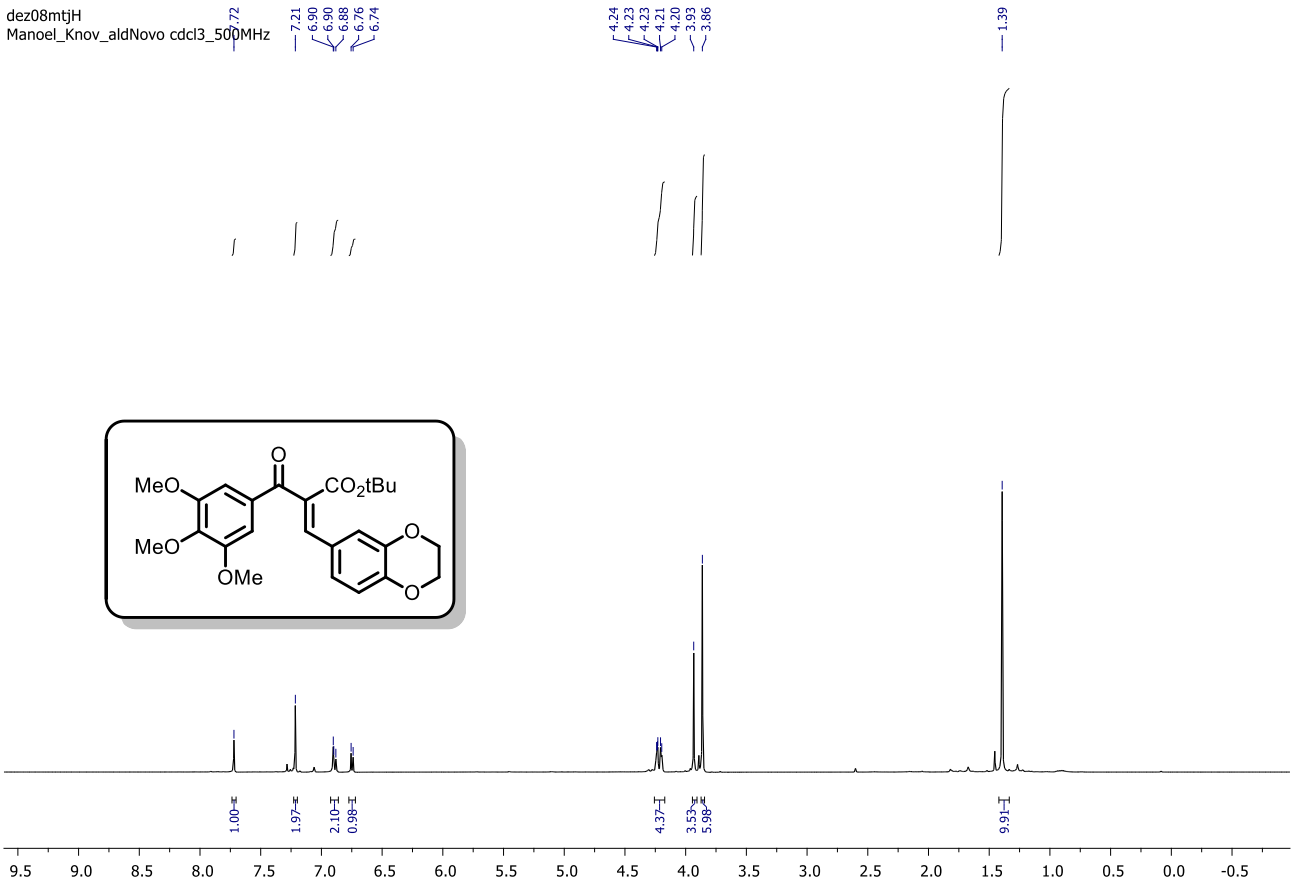

Figure S9. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **9ae.**

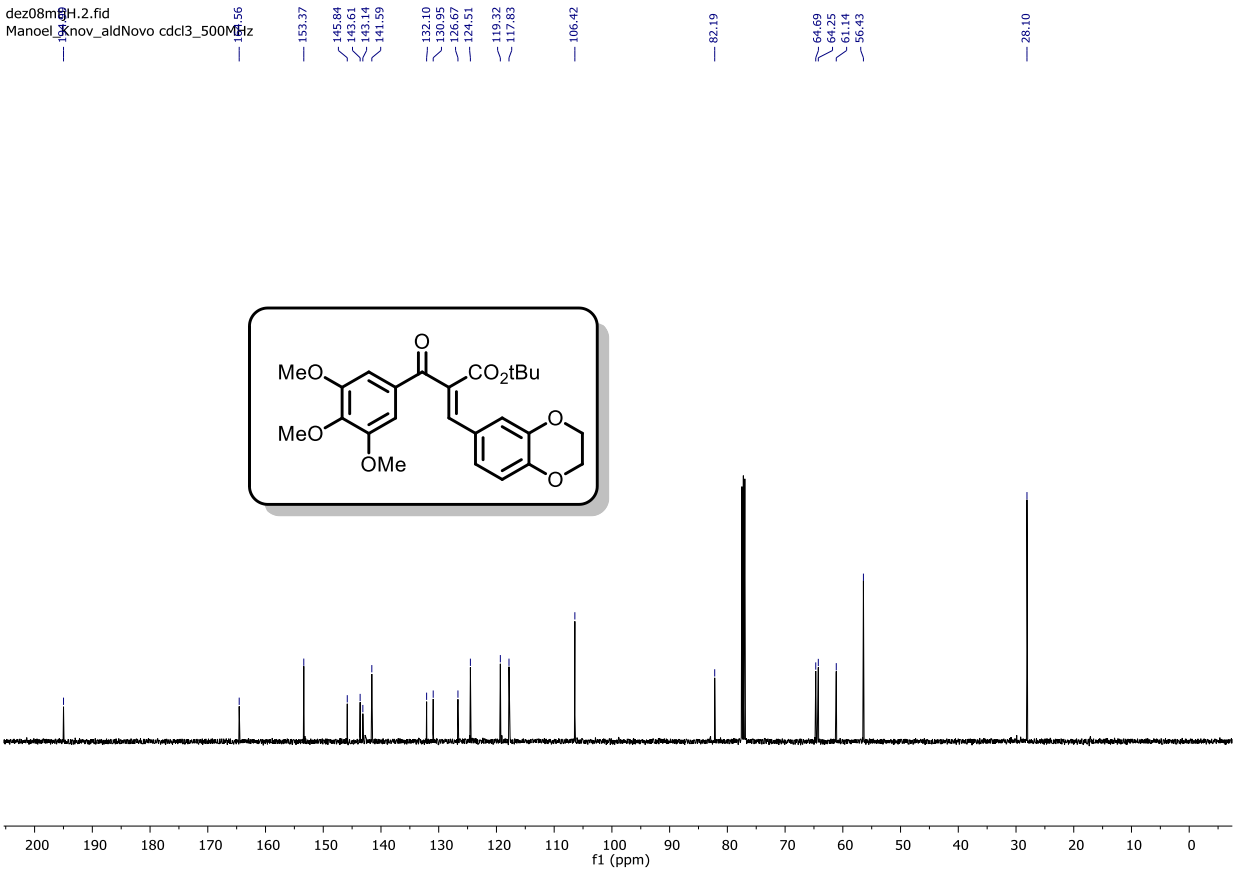

Figure S10-. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **9ae.**

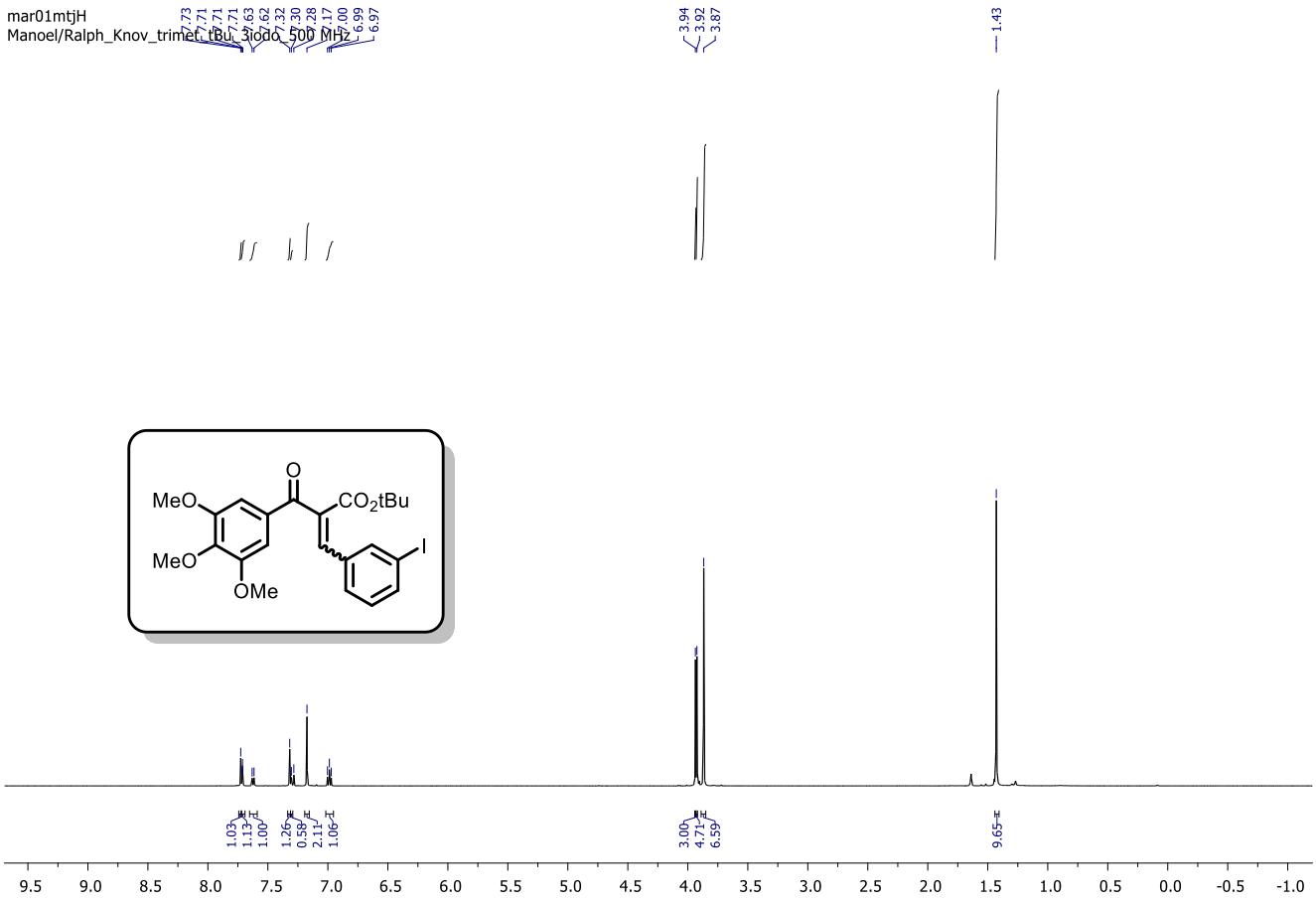

Figure S11. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **9af.**

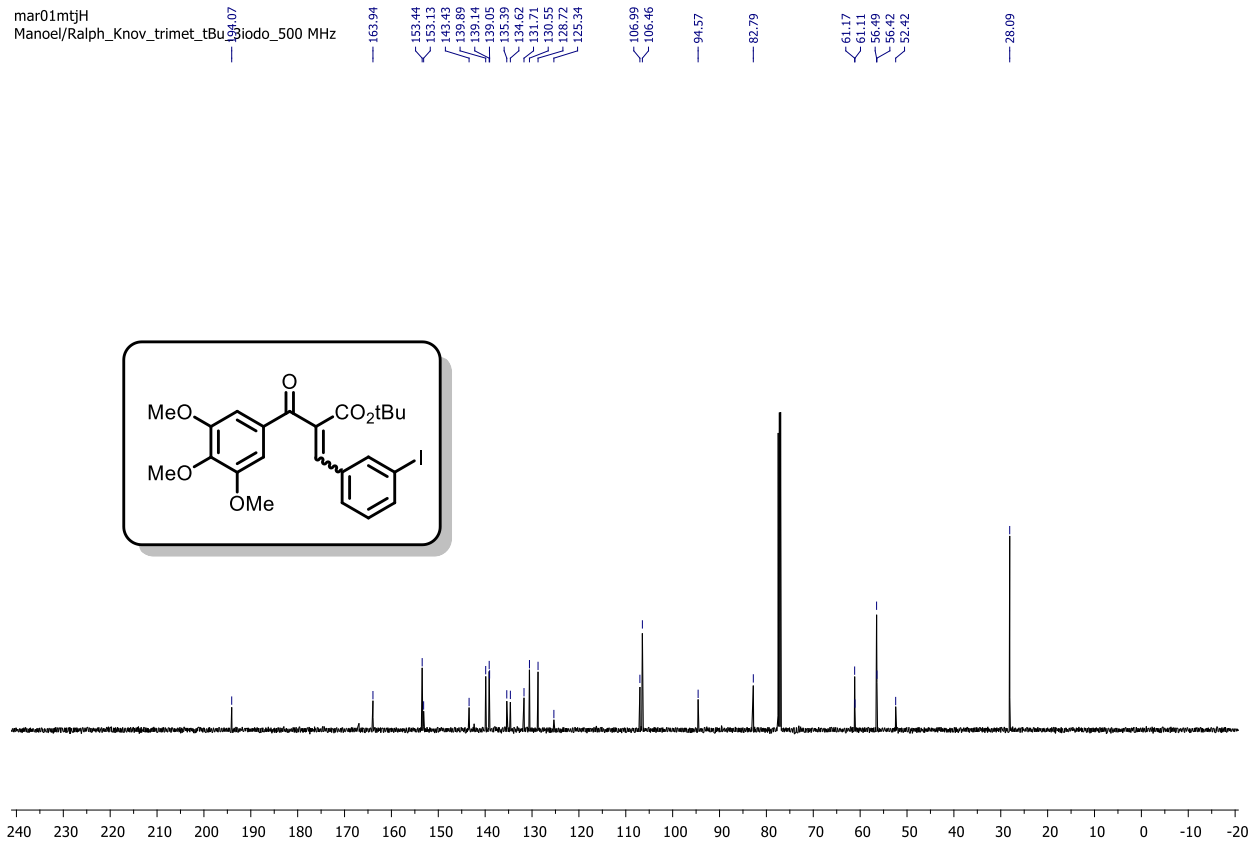

Figure S12. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **9af.**

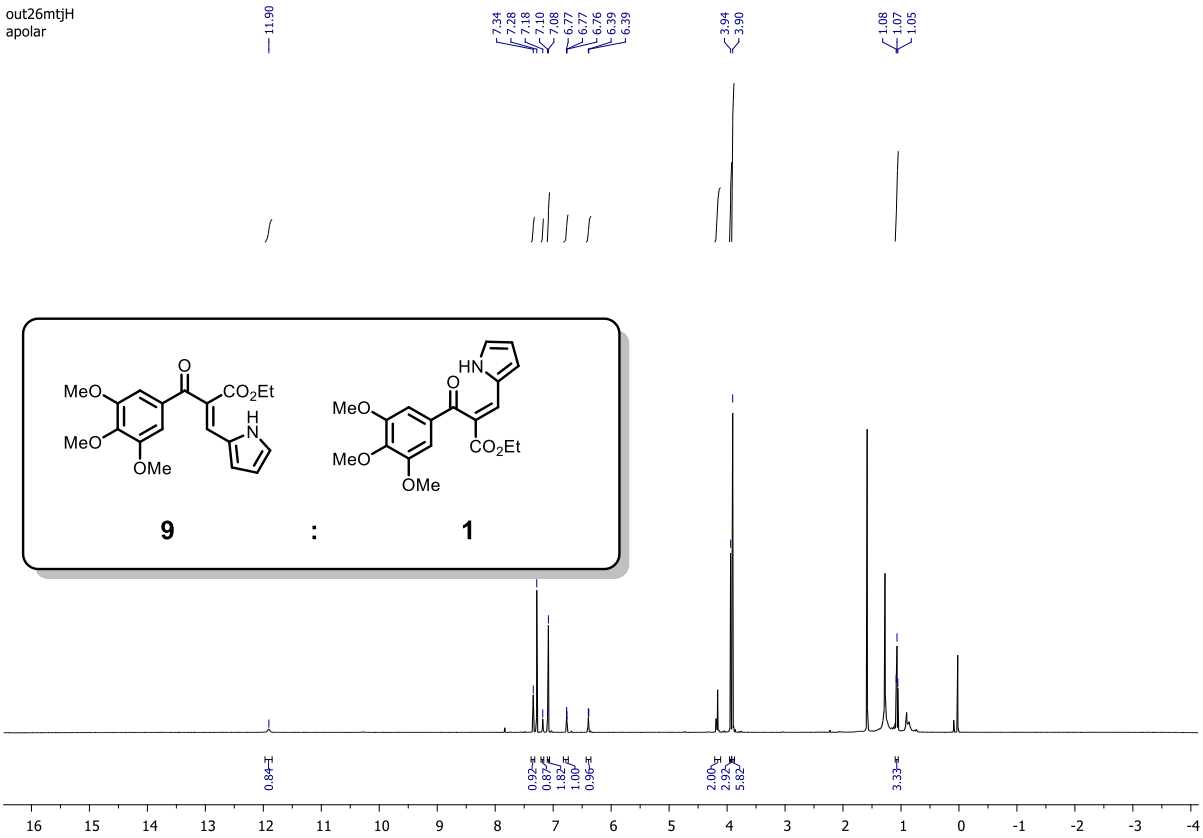

Figure 13. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **9ag.**

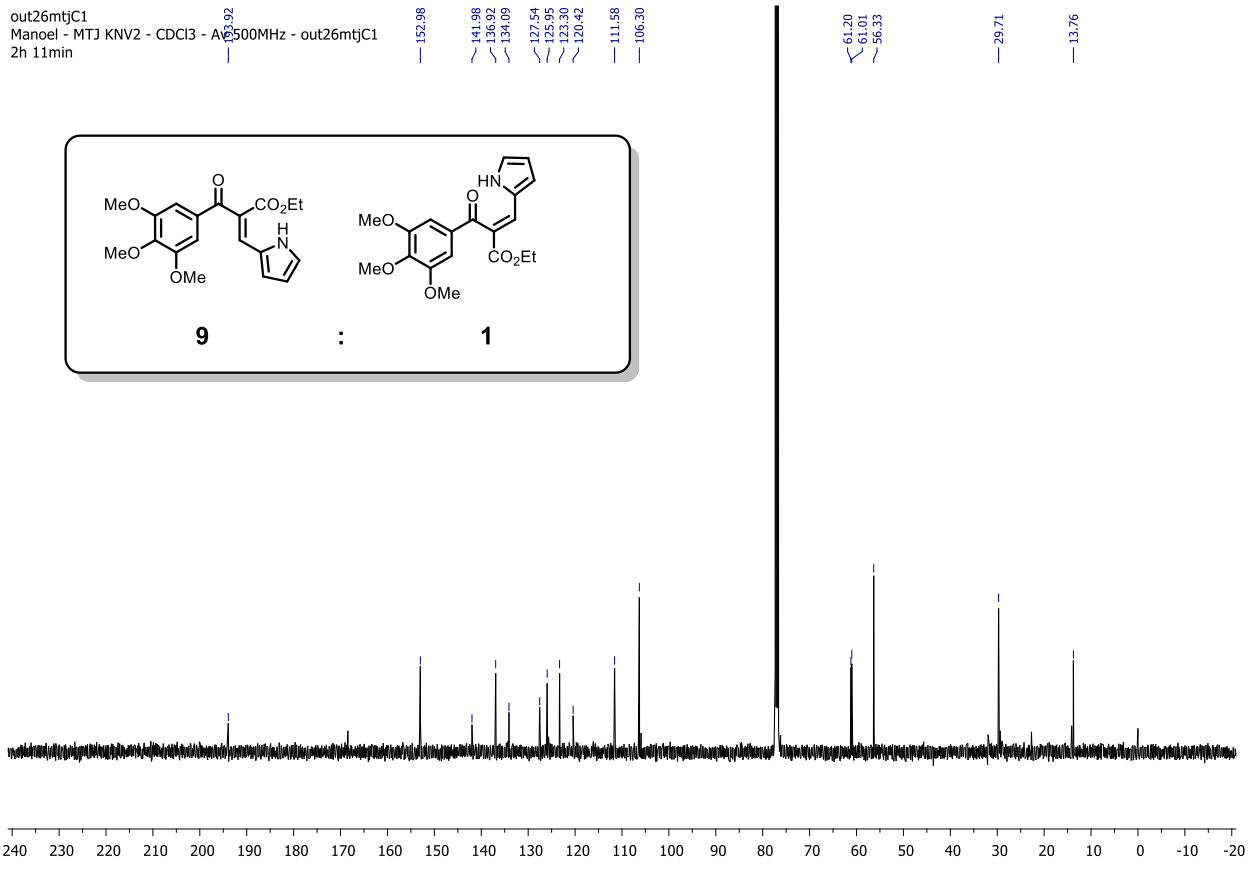

Figure S14. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **9ag.**

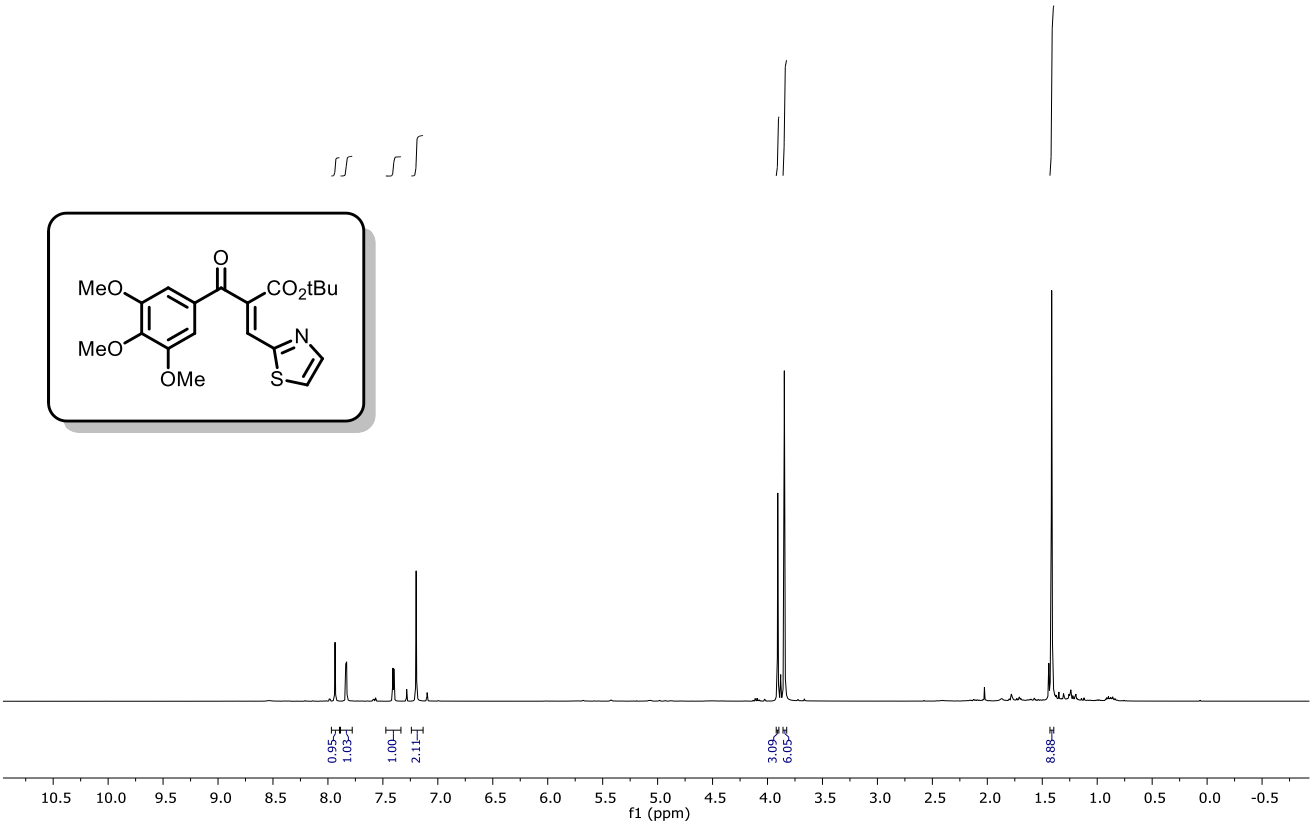

Figure S15. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **9ah.**

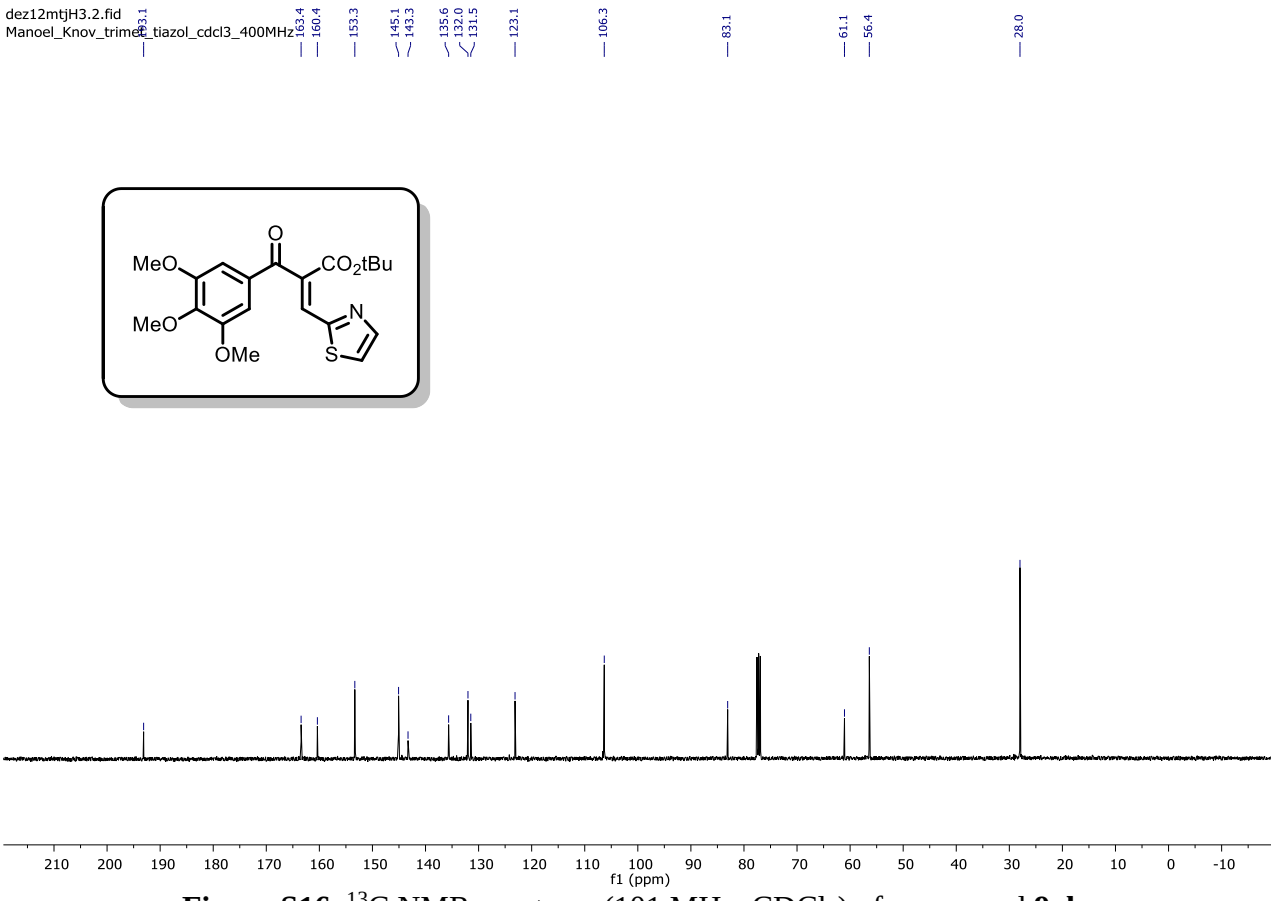

Figure S16. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **9ah.**

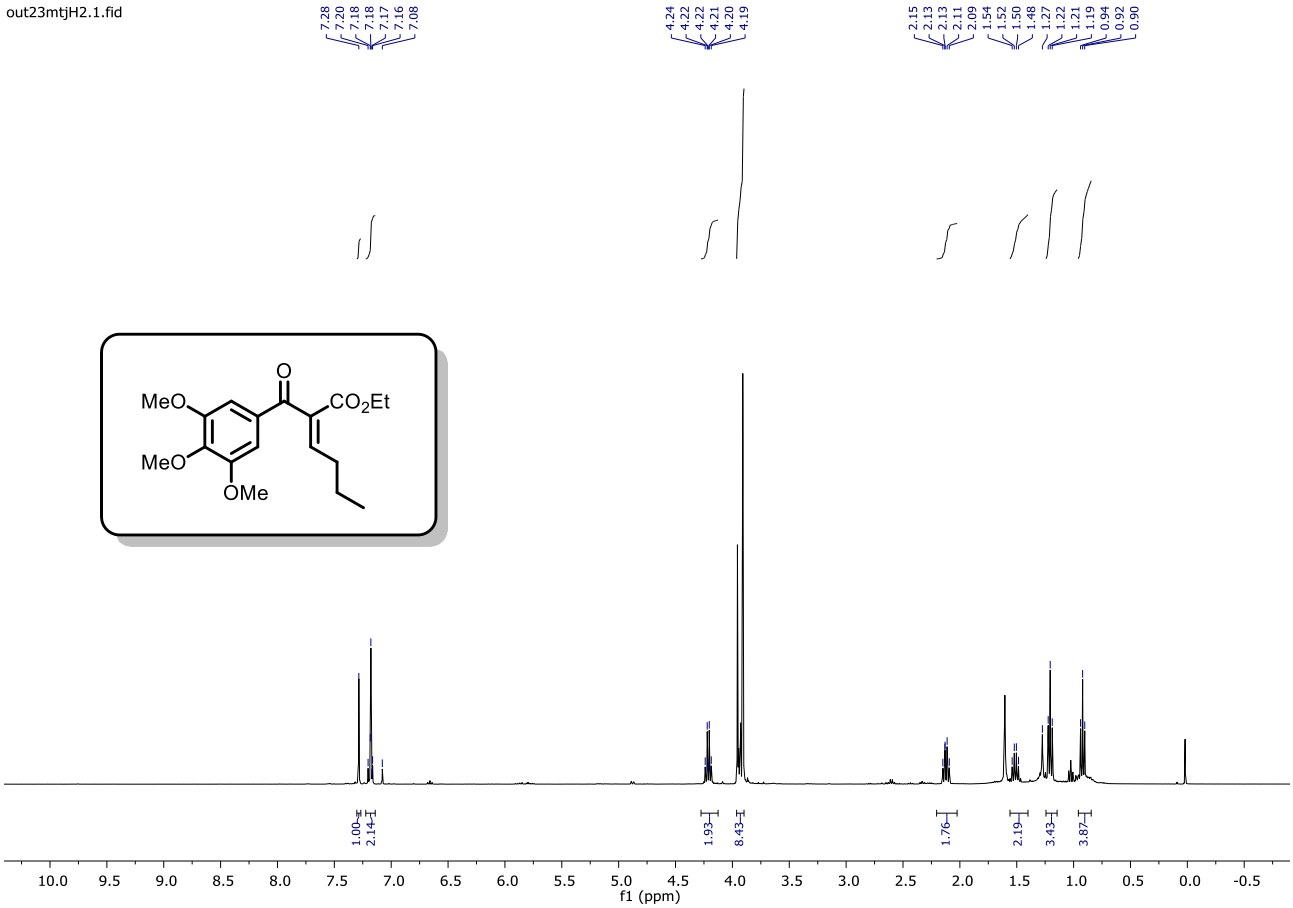

Figure S17. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **9ai.**

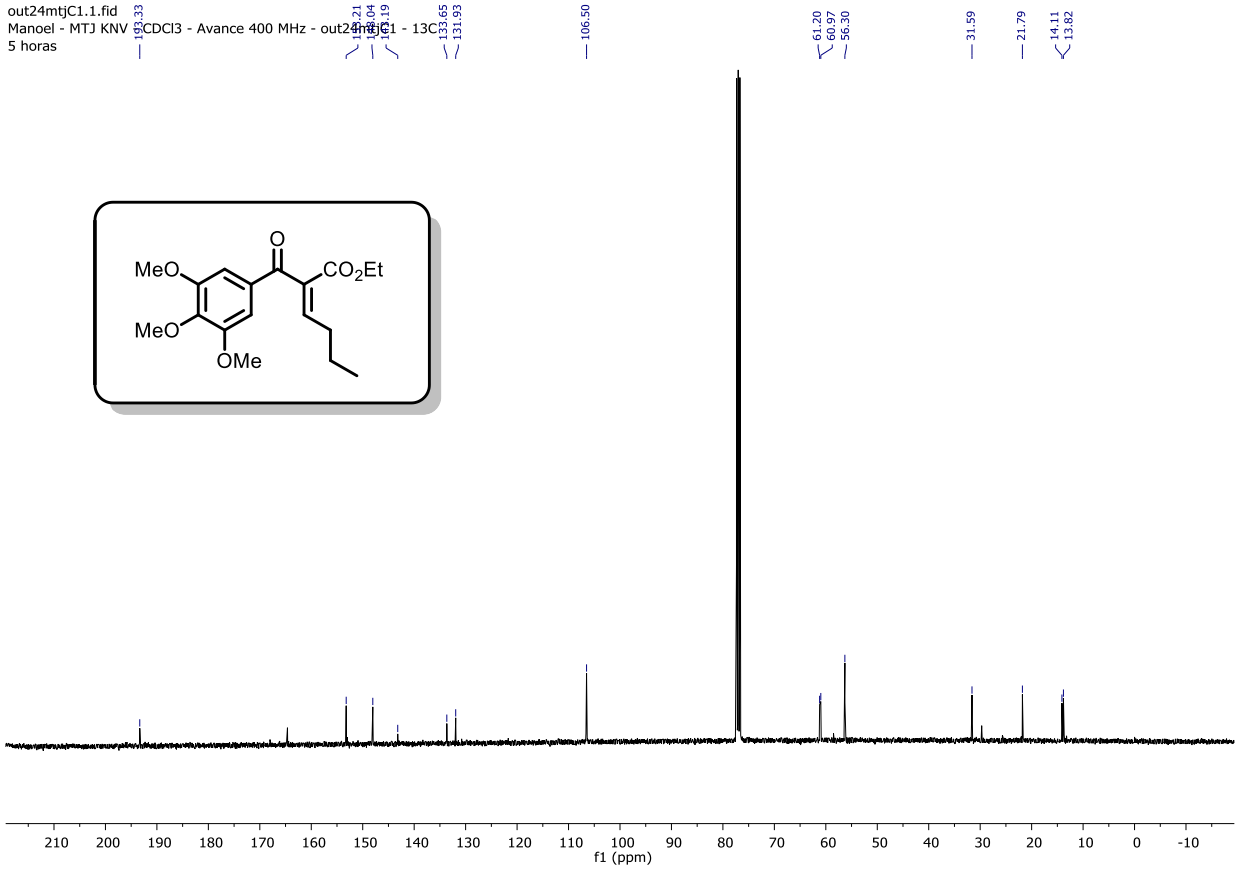

Figure S18. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **9ai.**

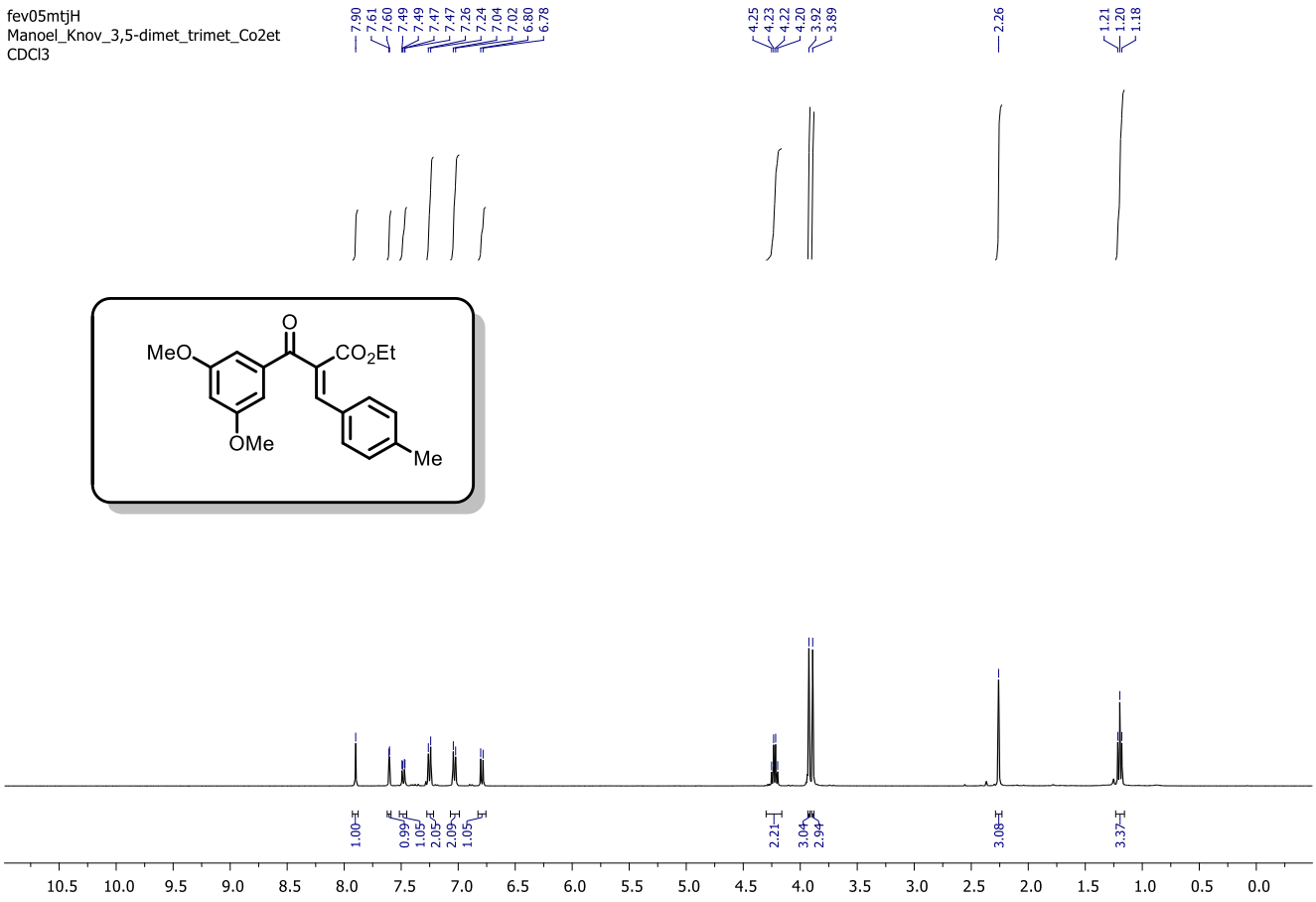

Figure S19. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **9bj.**

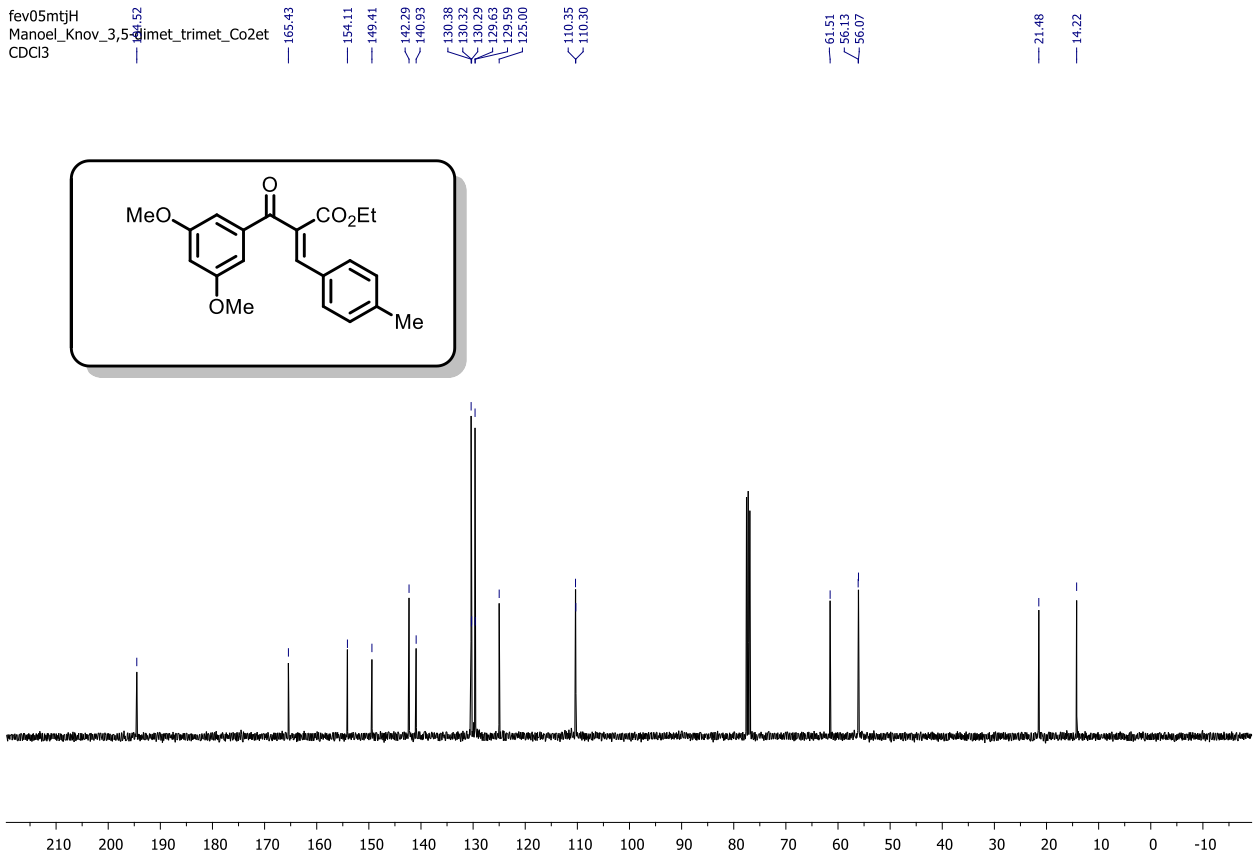

Figure S20. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **9bj.**

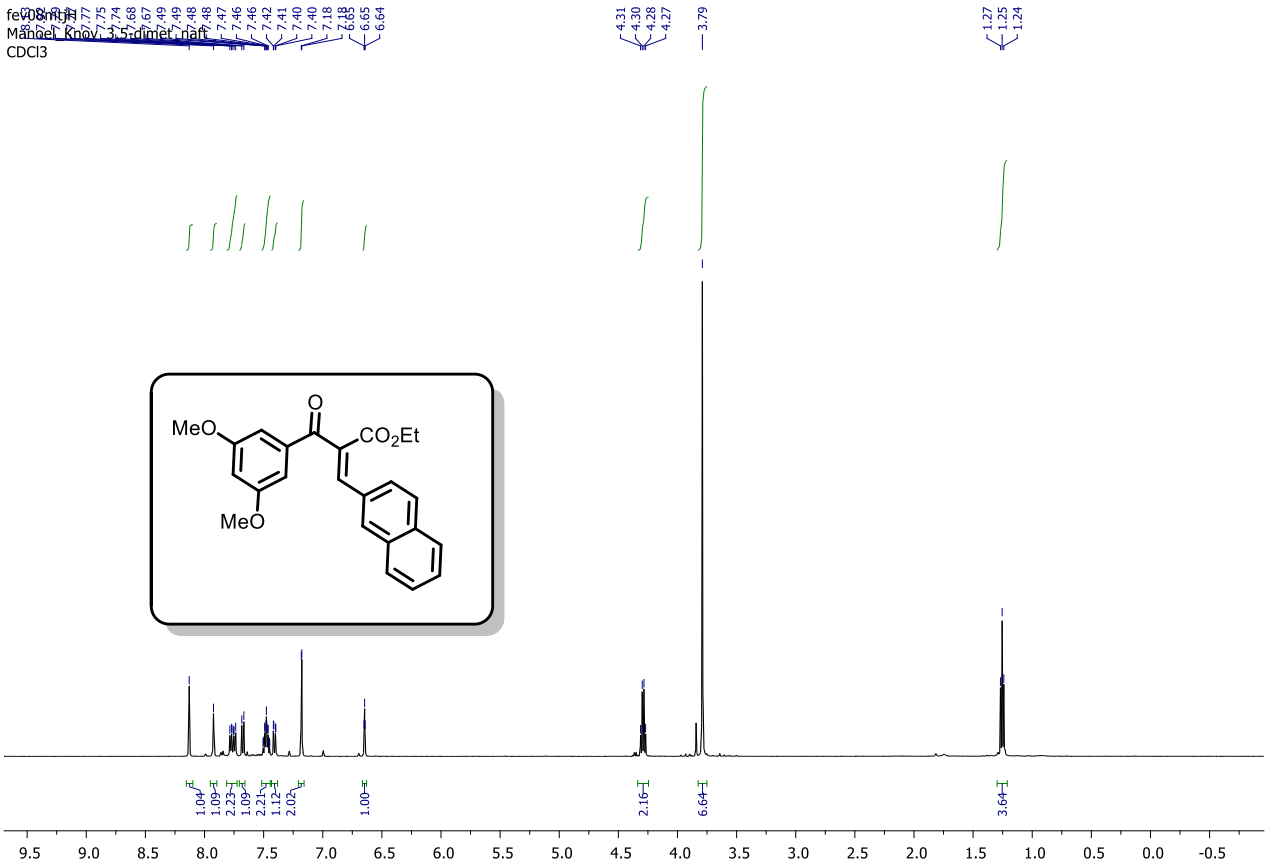

Figure S21. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **9bk.**

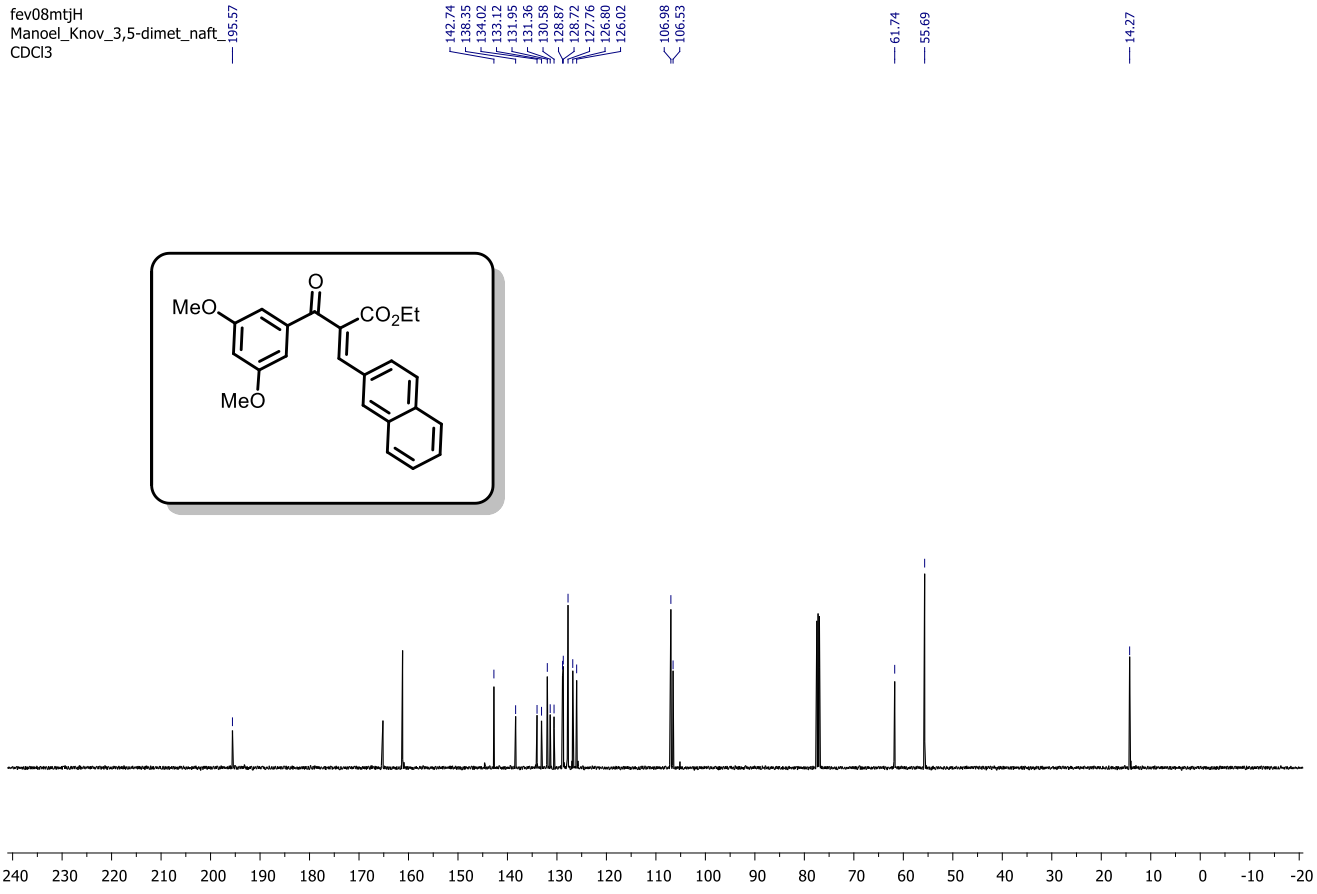

Figure S22. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **9bk.**

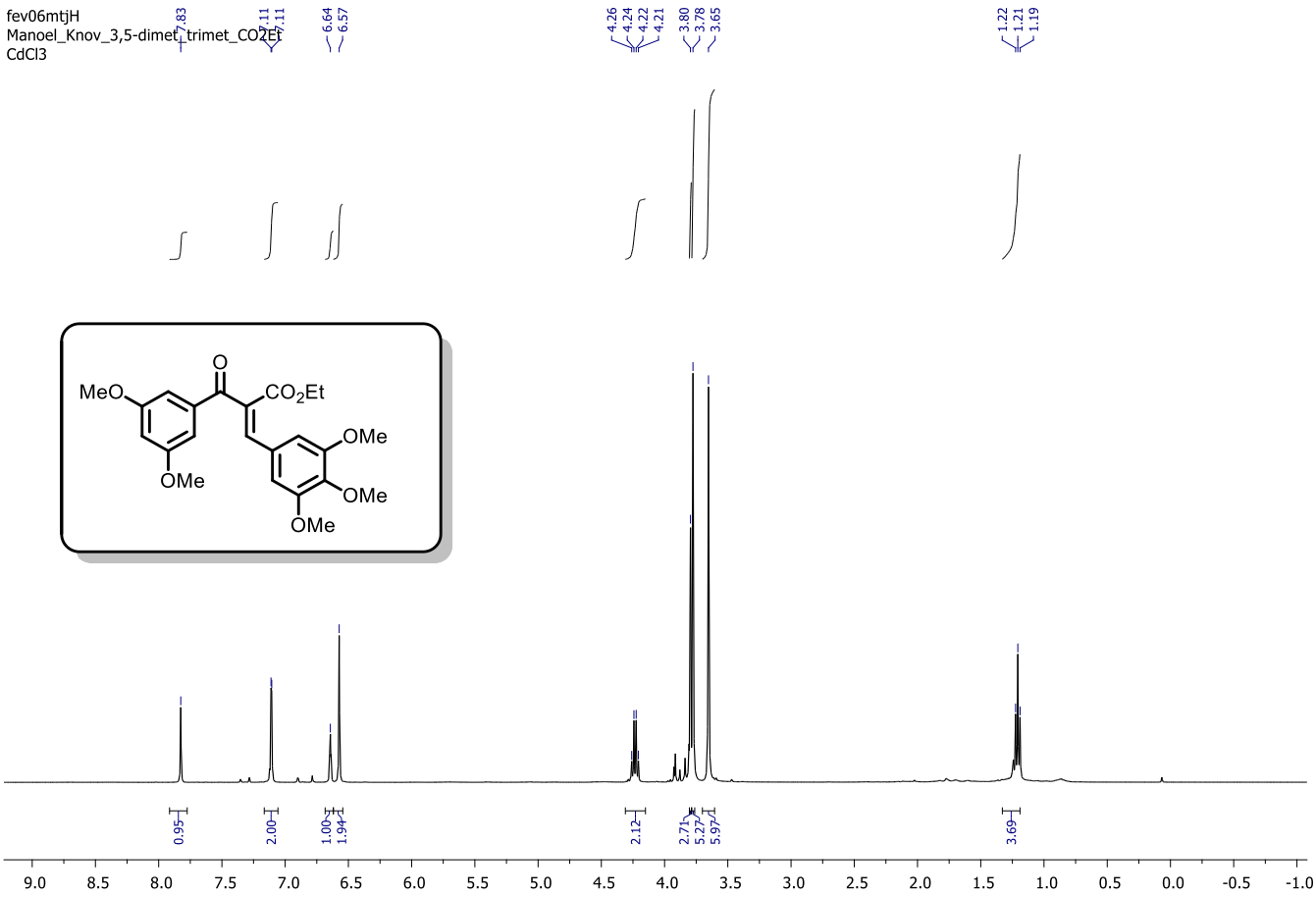

Figure S23. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **9bc.**

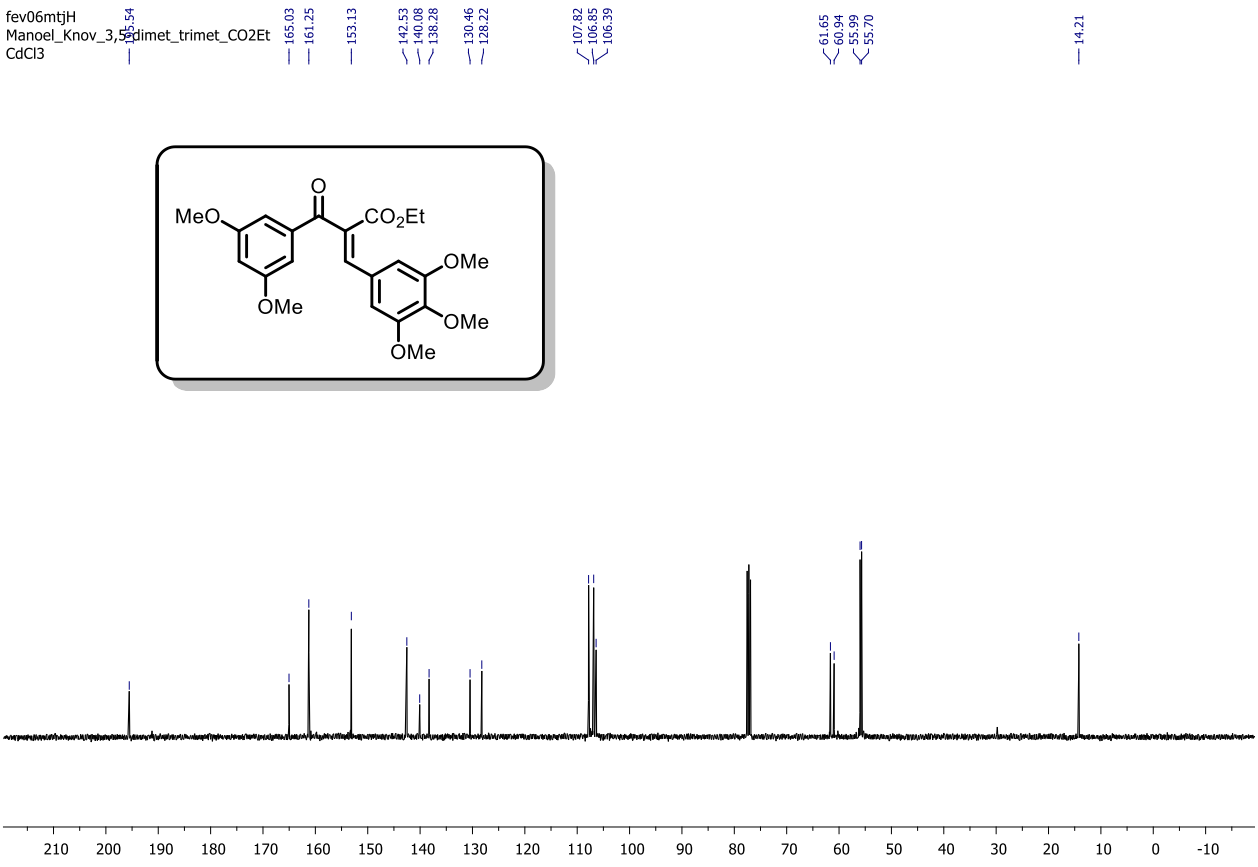

Figure S24. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **9bc.**

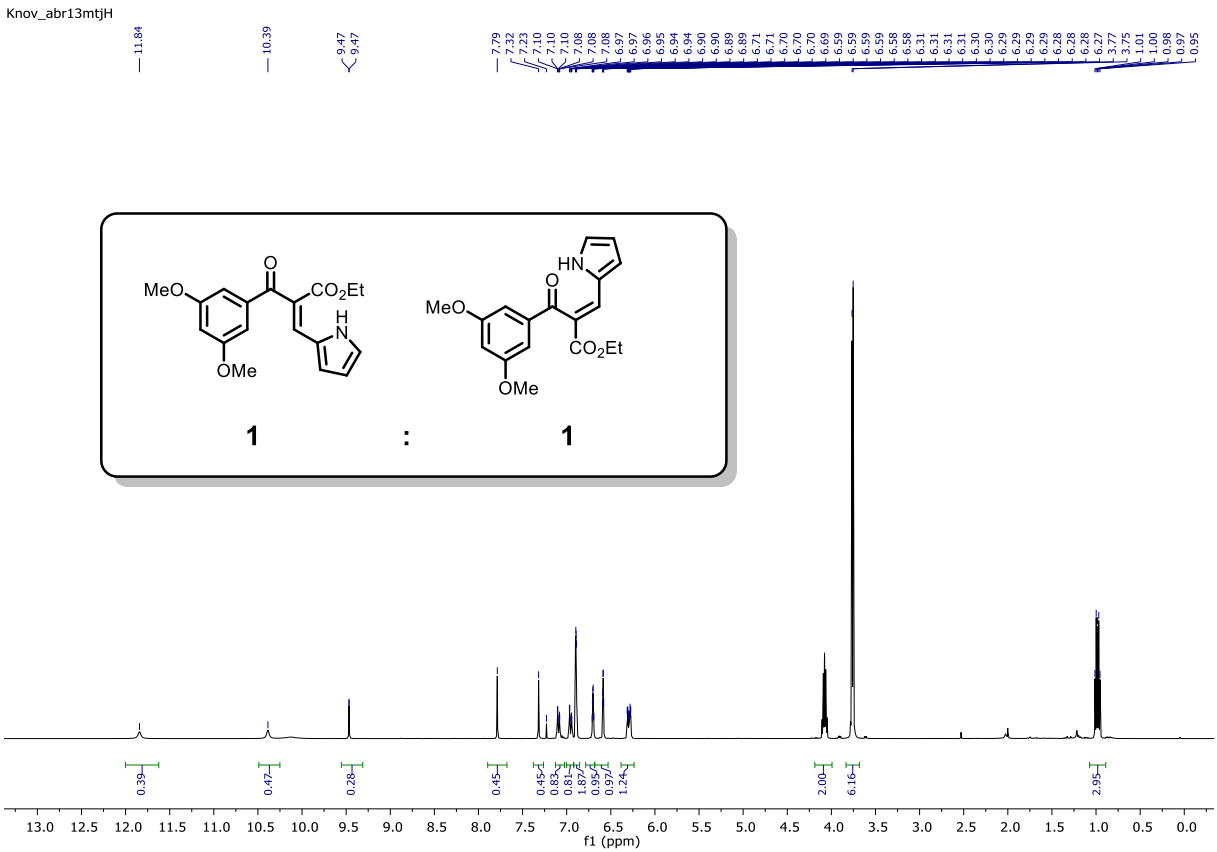

Figure S25. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **9bg.**

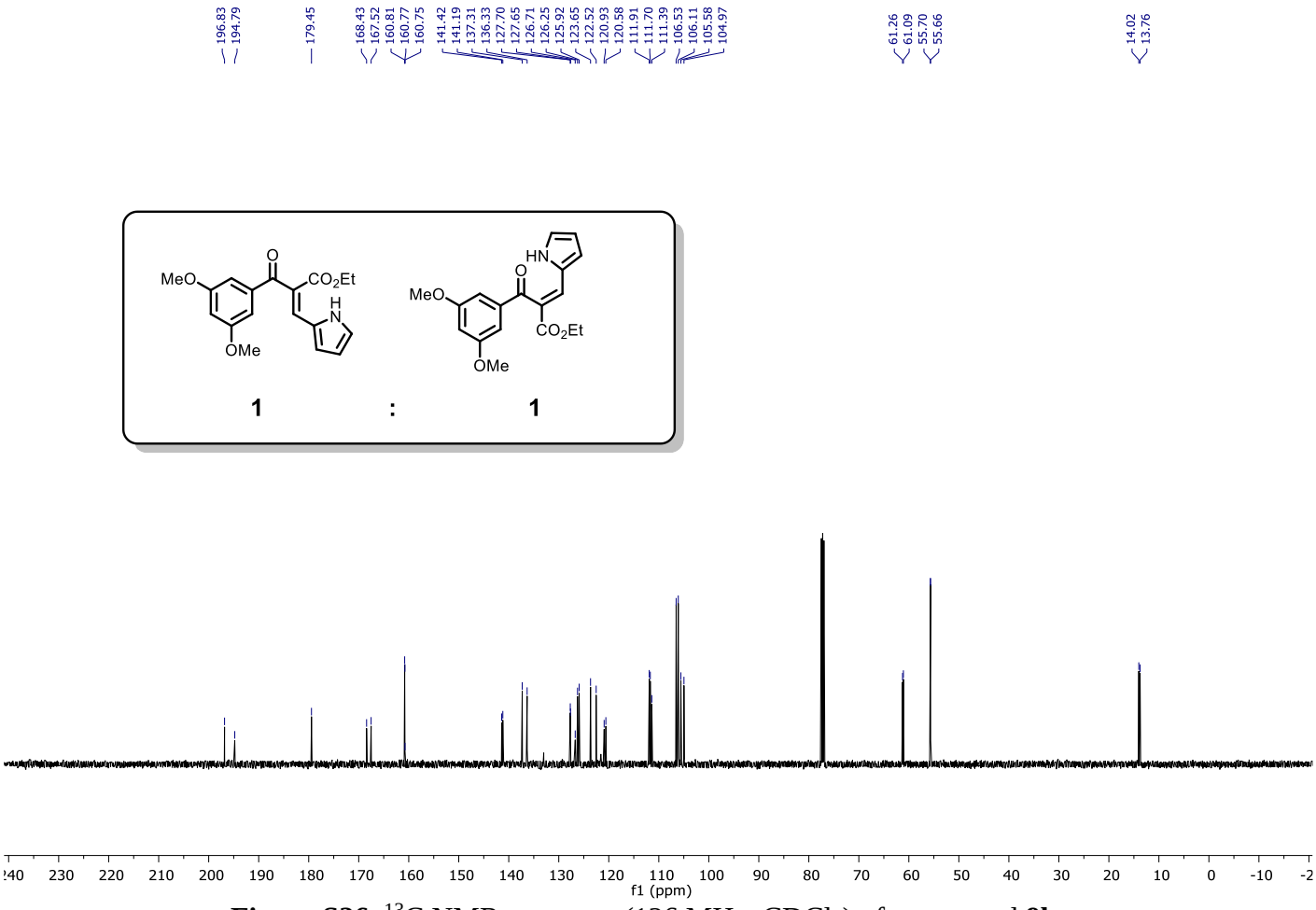

Figure S26. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **9bg.**

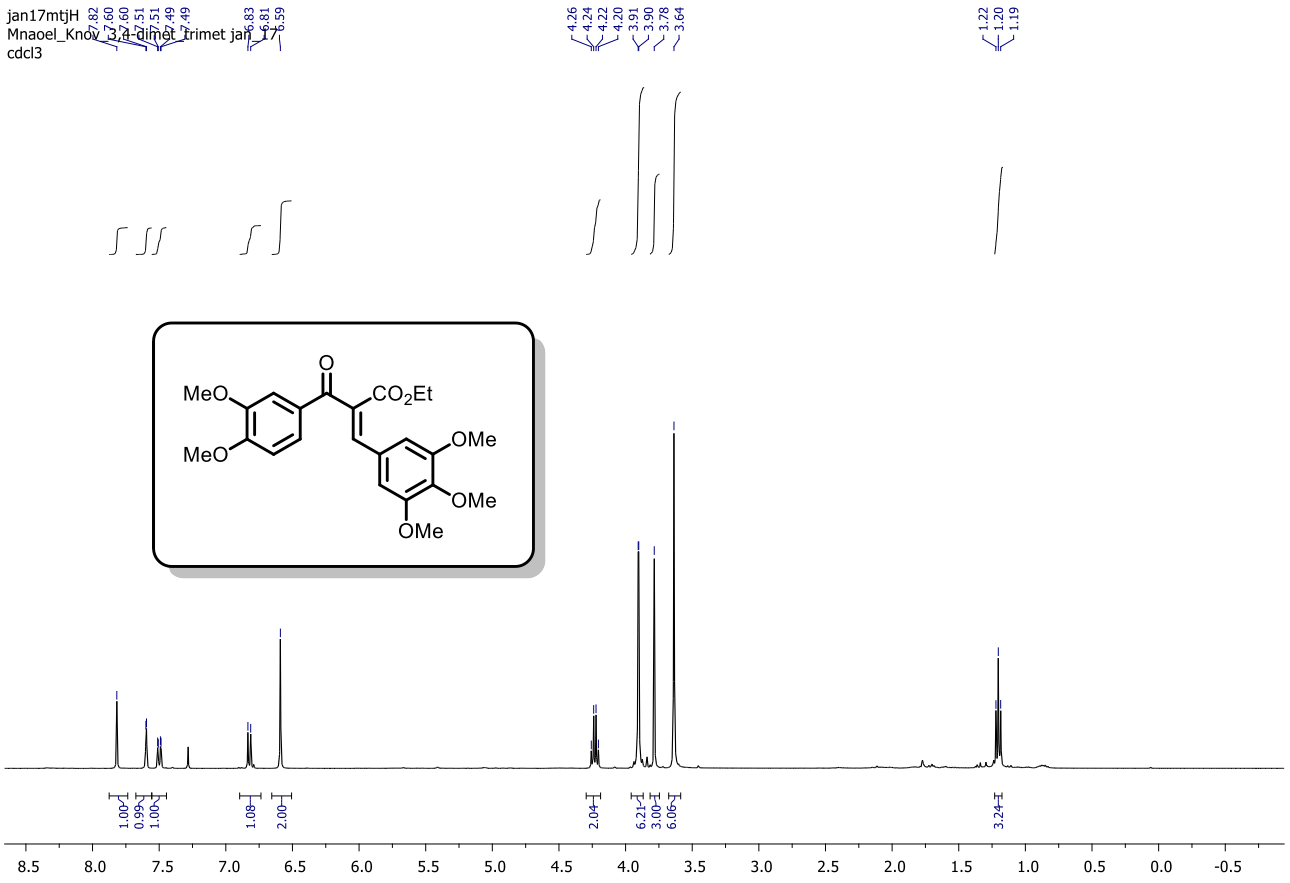

Figure S27. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **9cc.**

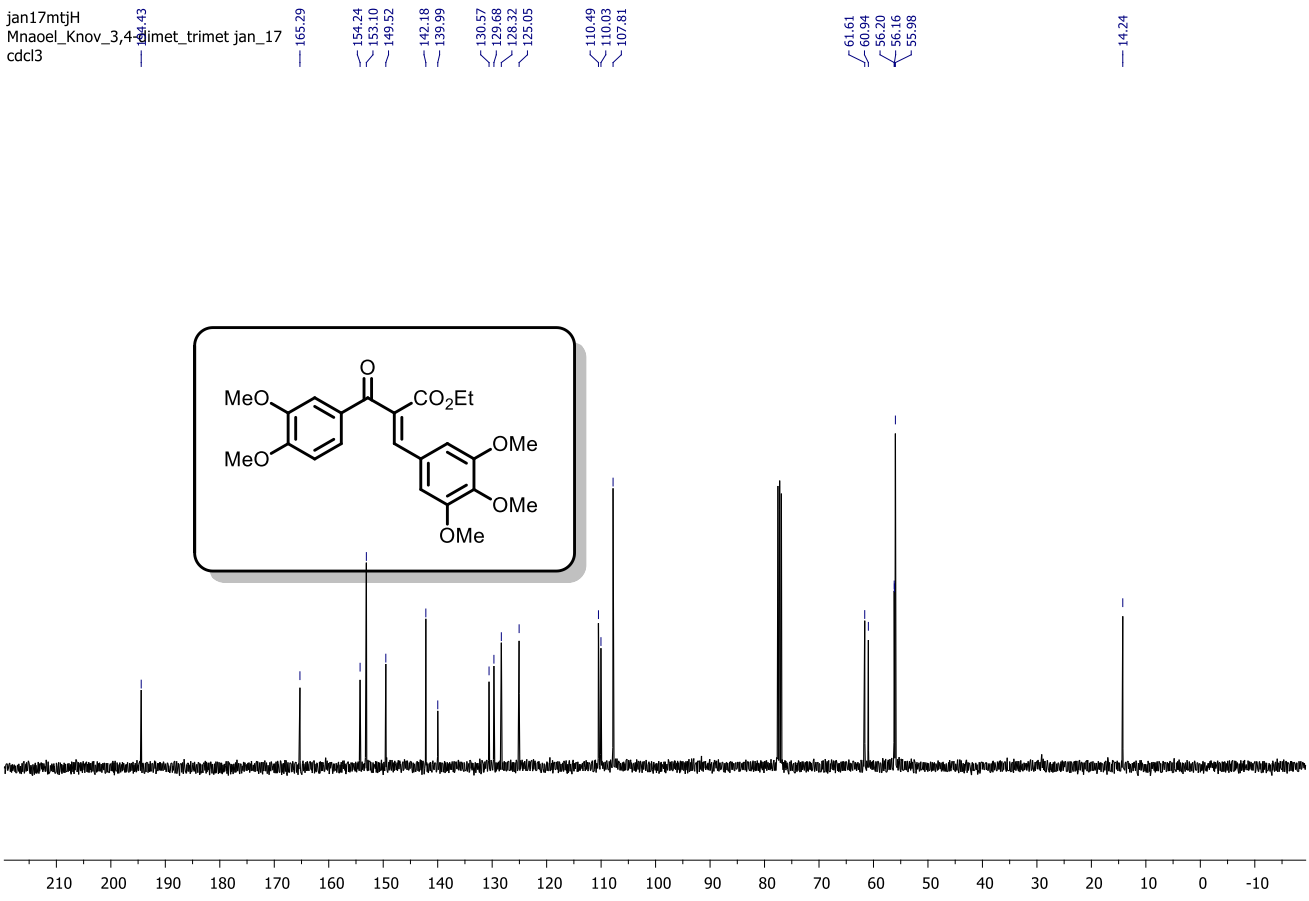

Figure S28. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **9cc.**

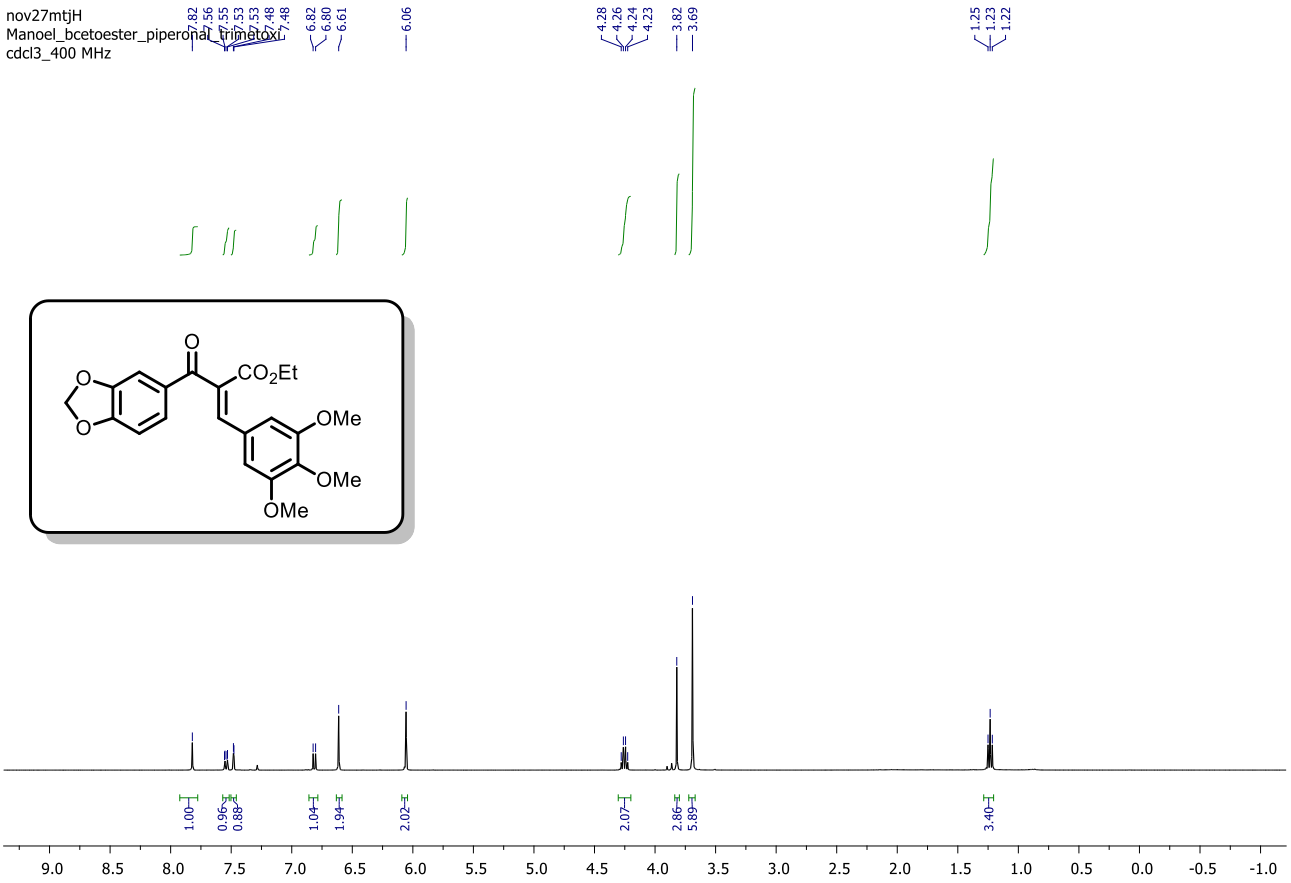

Figure S29. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **9dc.**

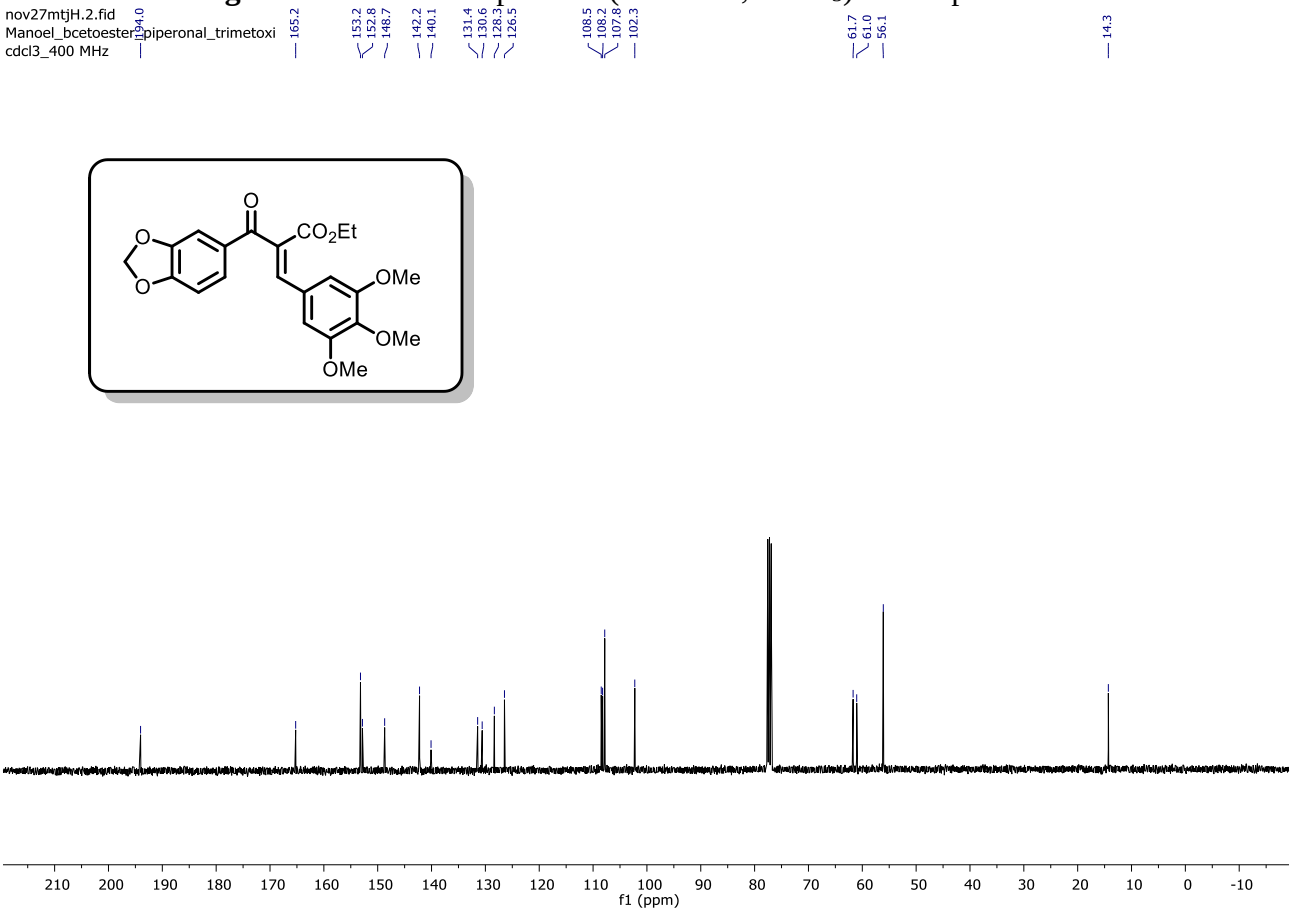

Figure S30. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **9dc.**

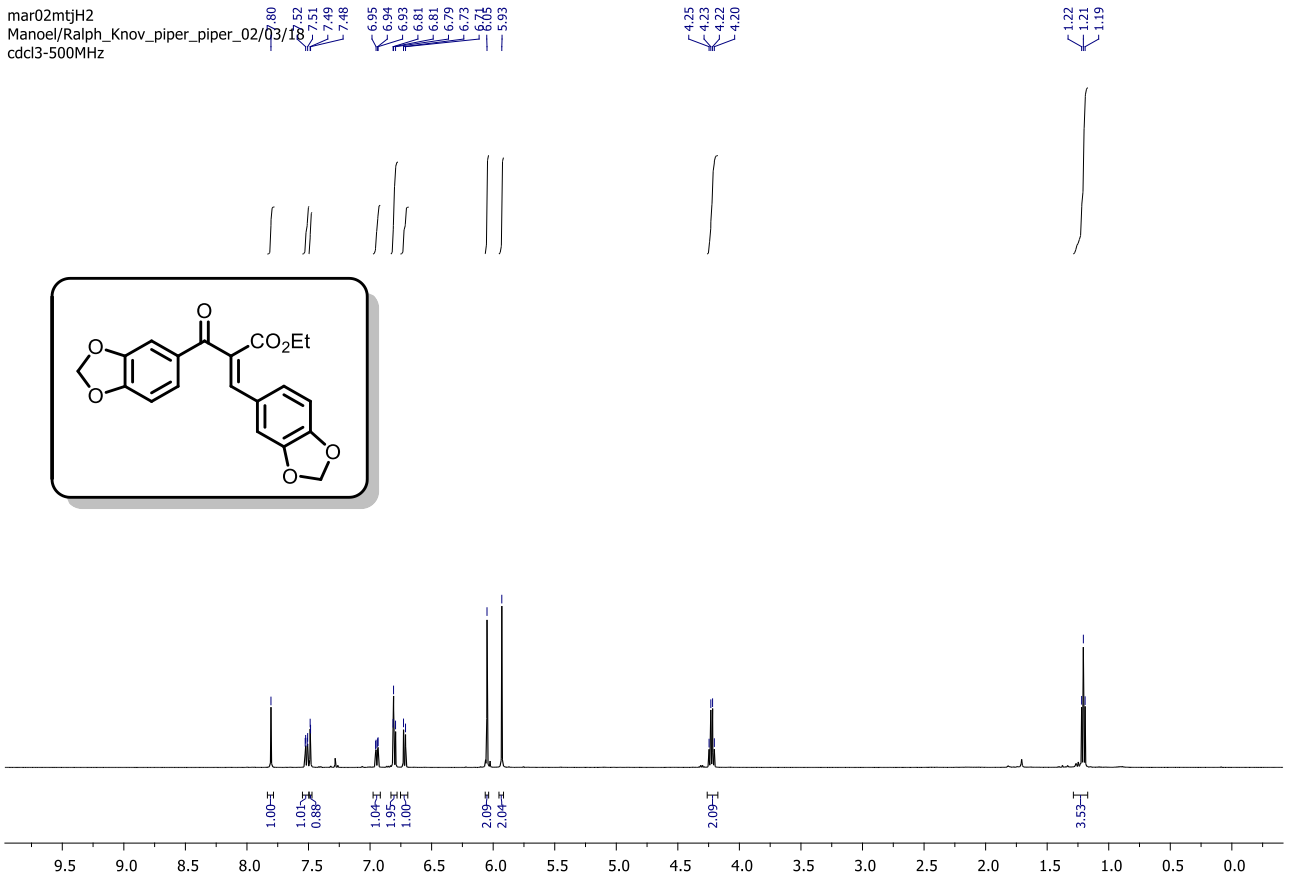

Figure S31. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **9dl.**

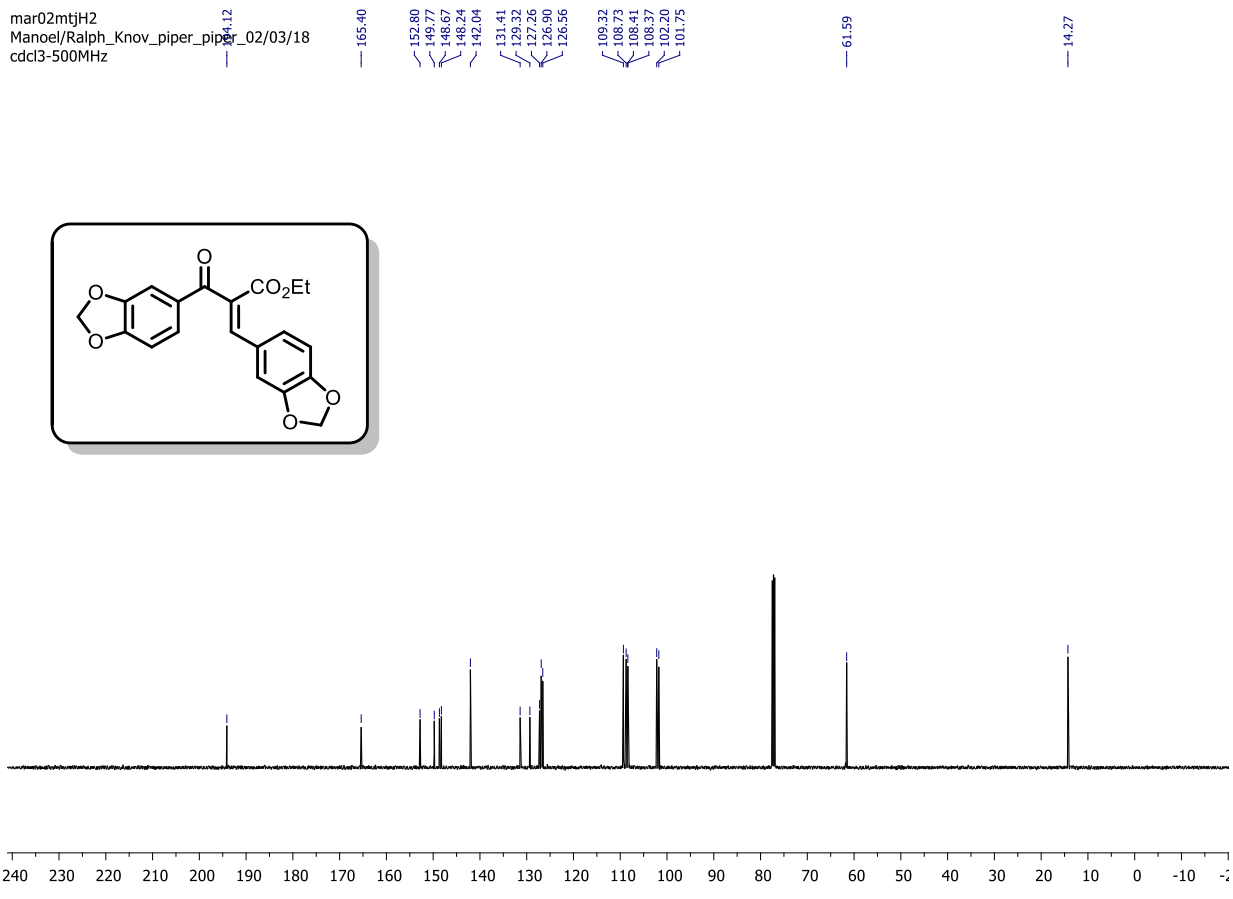

Figure S32. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **9dl.**

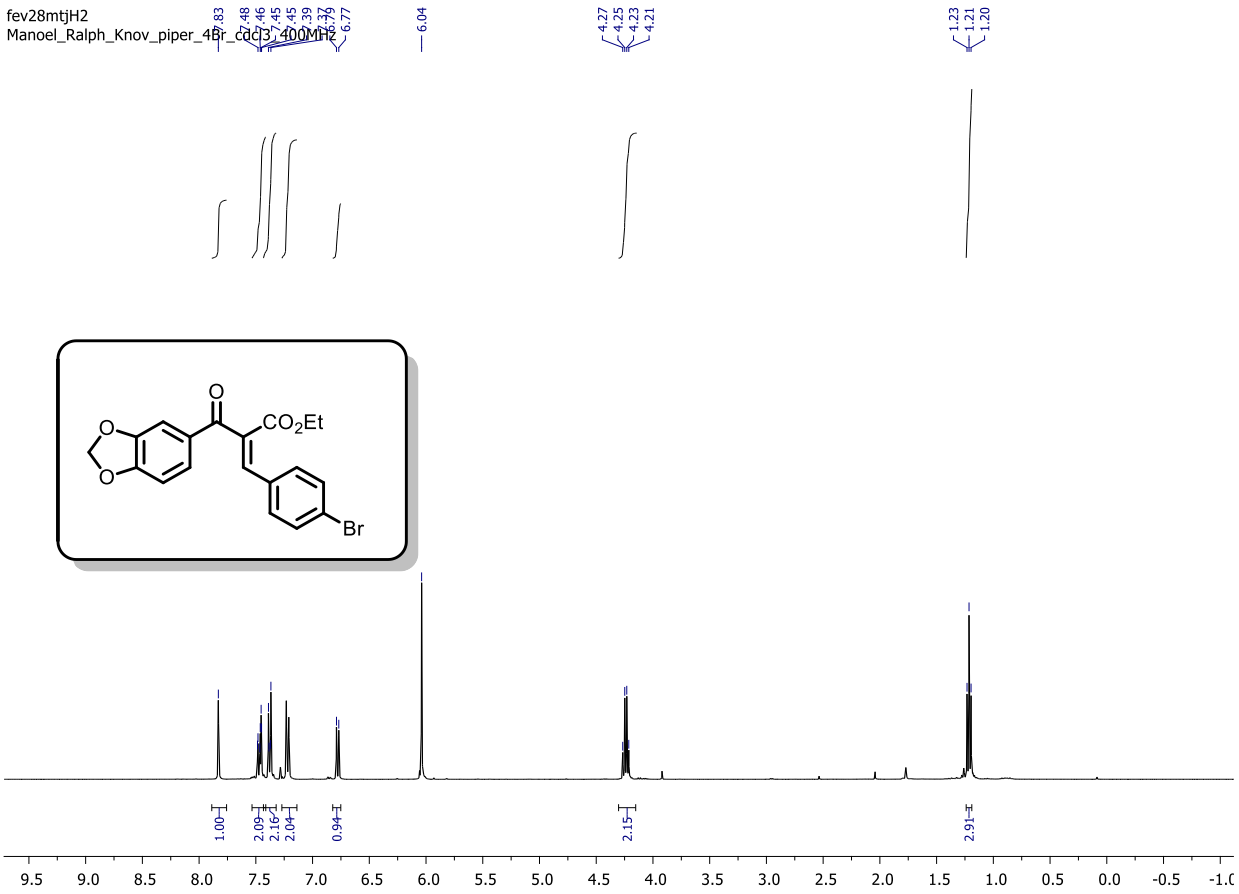

Figure S33. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **9dm.**

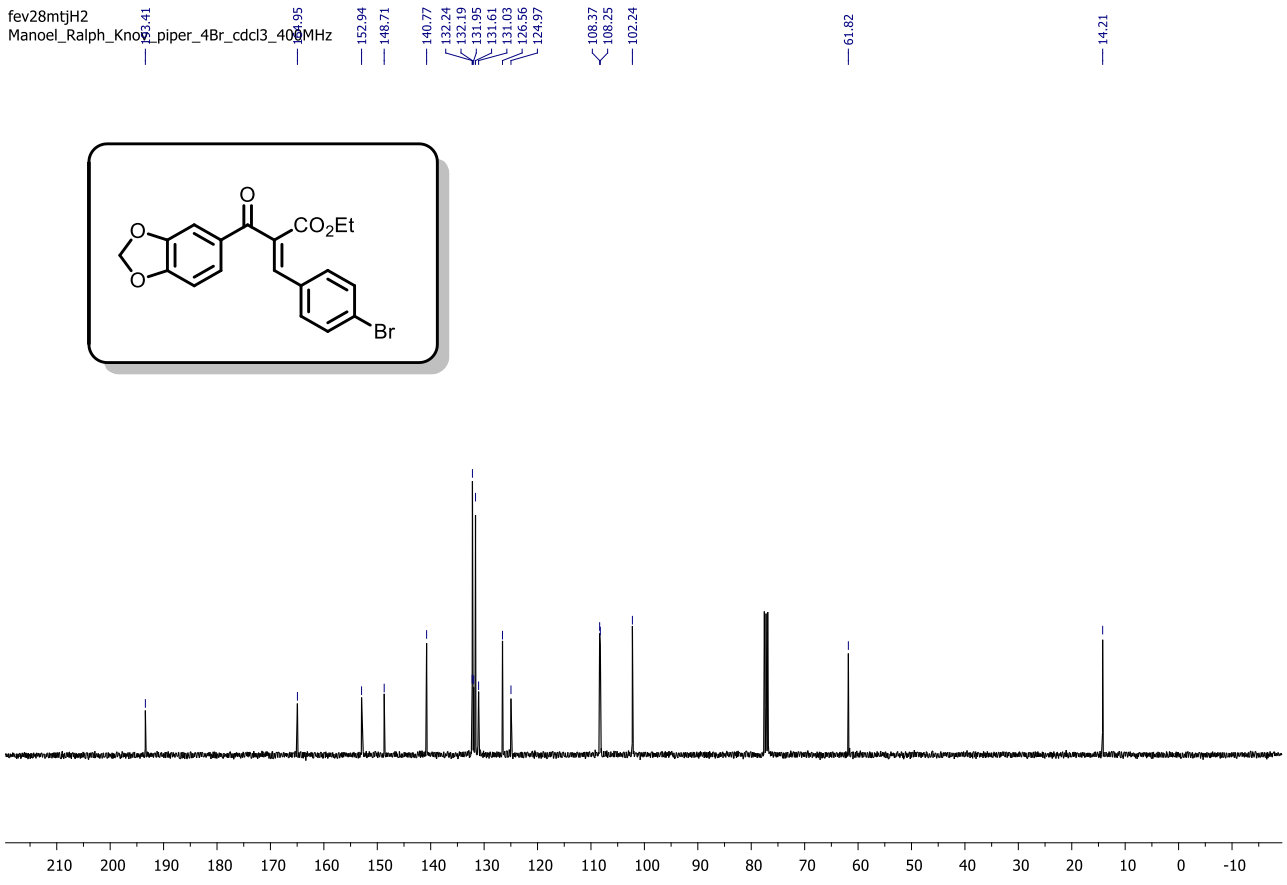

Figure S34. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **9dm.**

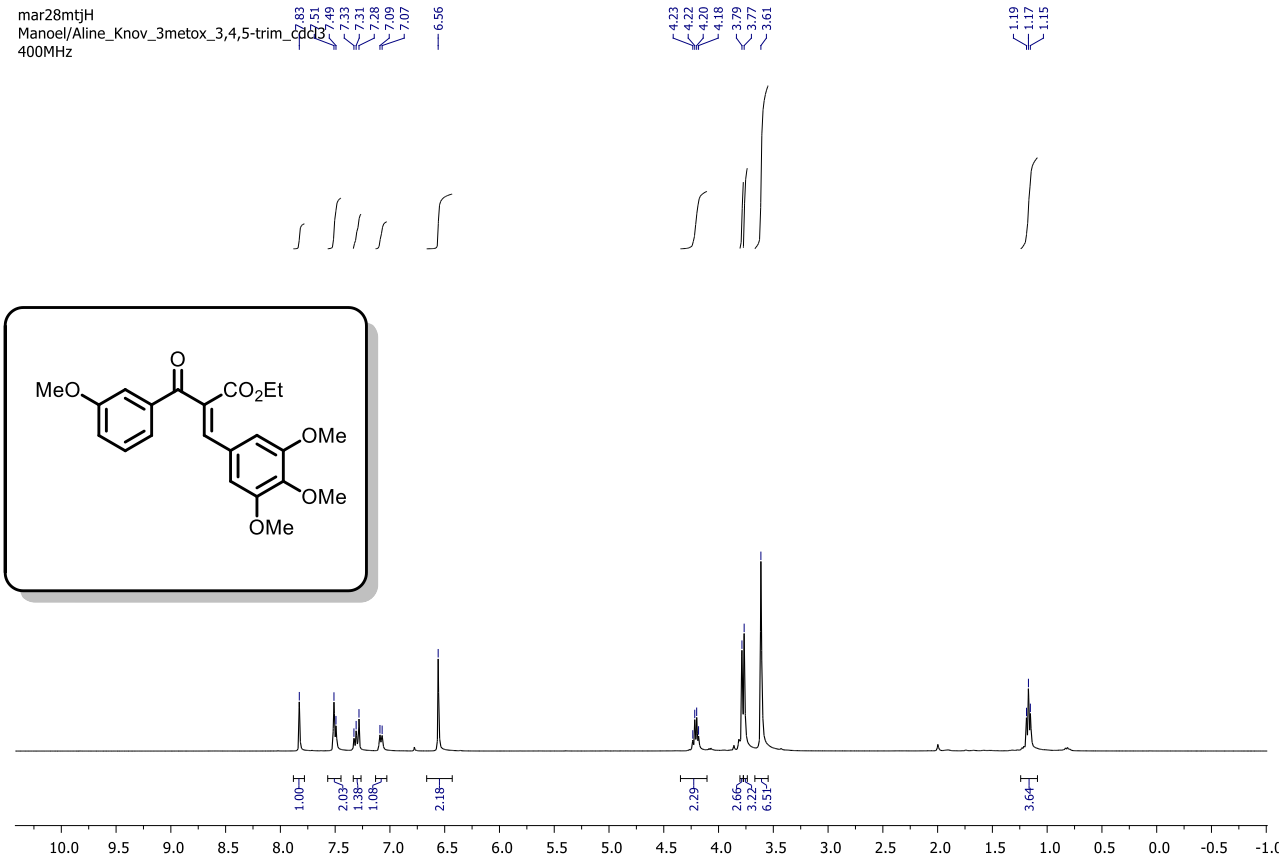

Figure S35. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **9ec.**

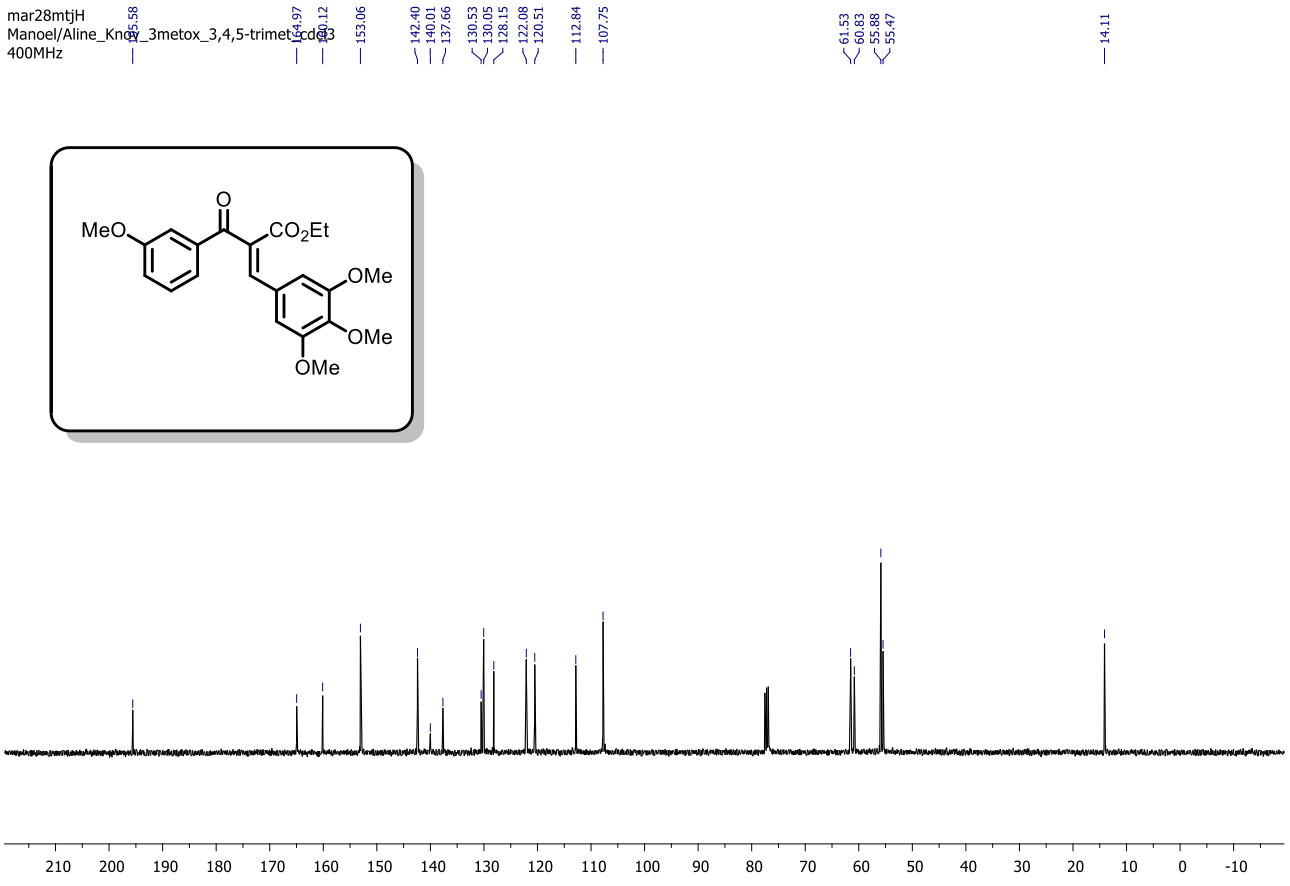

Figure S36. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **9ec.**

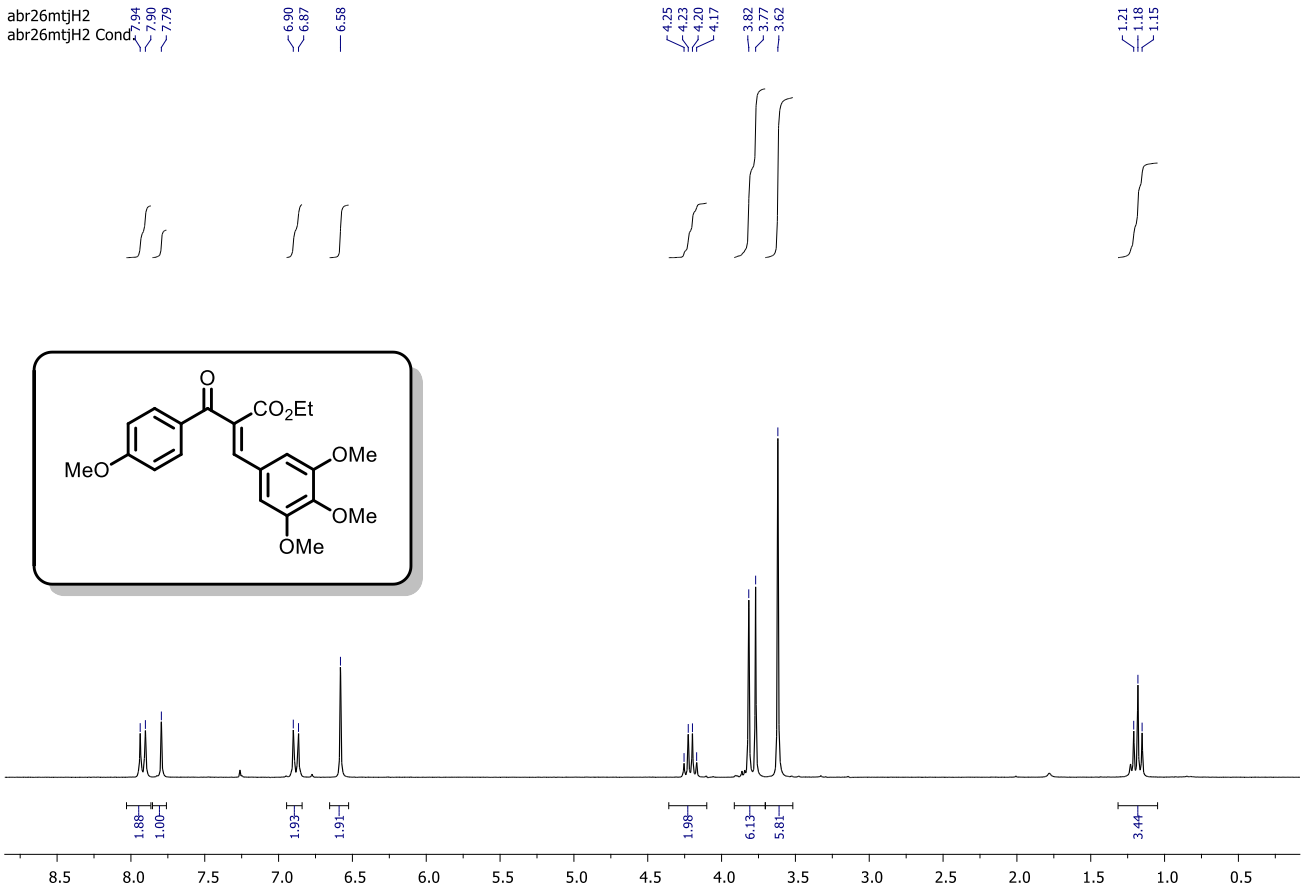

Figure S37. ^{1}H NMR spectrum (250 MHz, $CDCl_3$) of compound **9fc.**

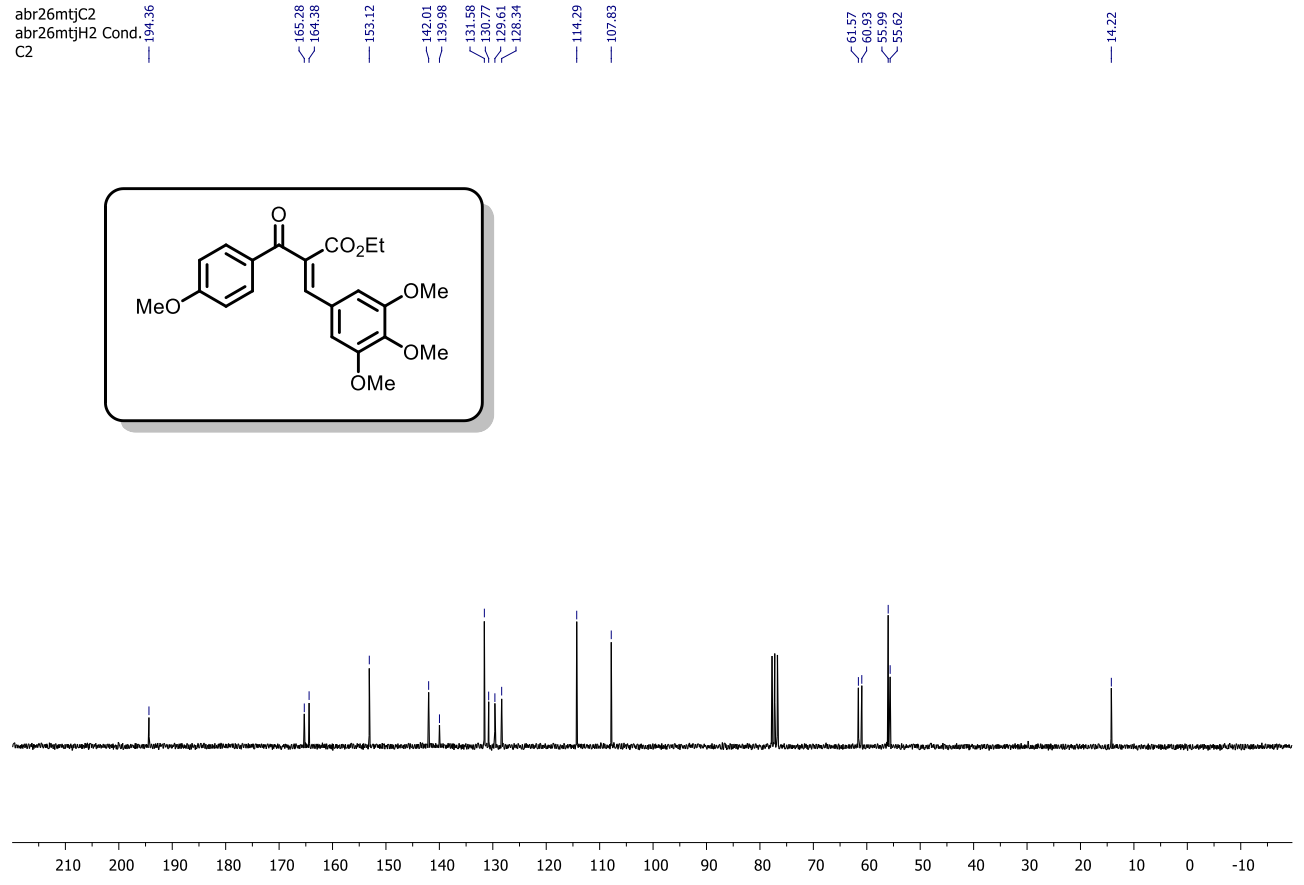

Figure S38. ^{13}C NMR spectrum (63 MHz, $CDCl_3$) of compound **9fc.**

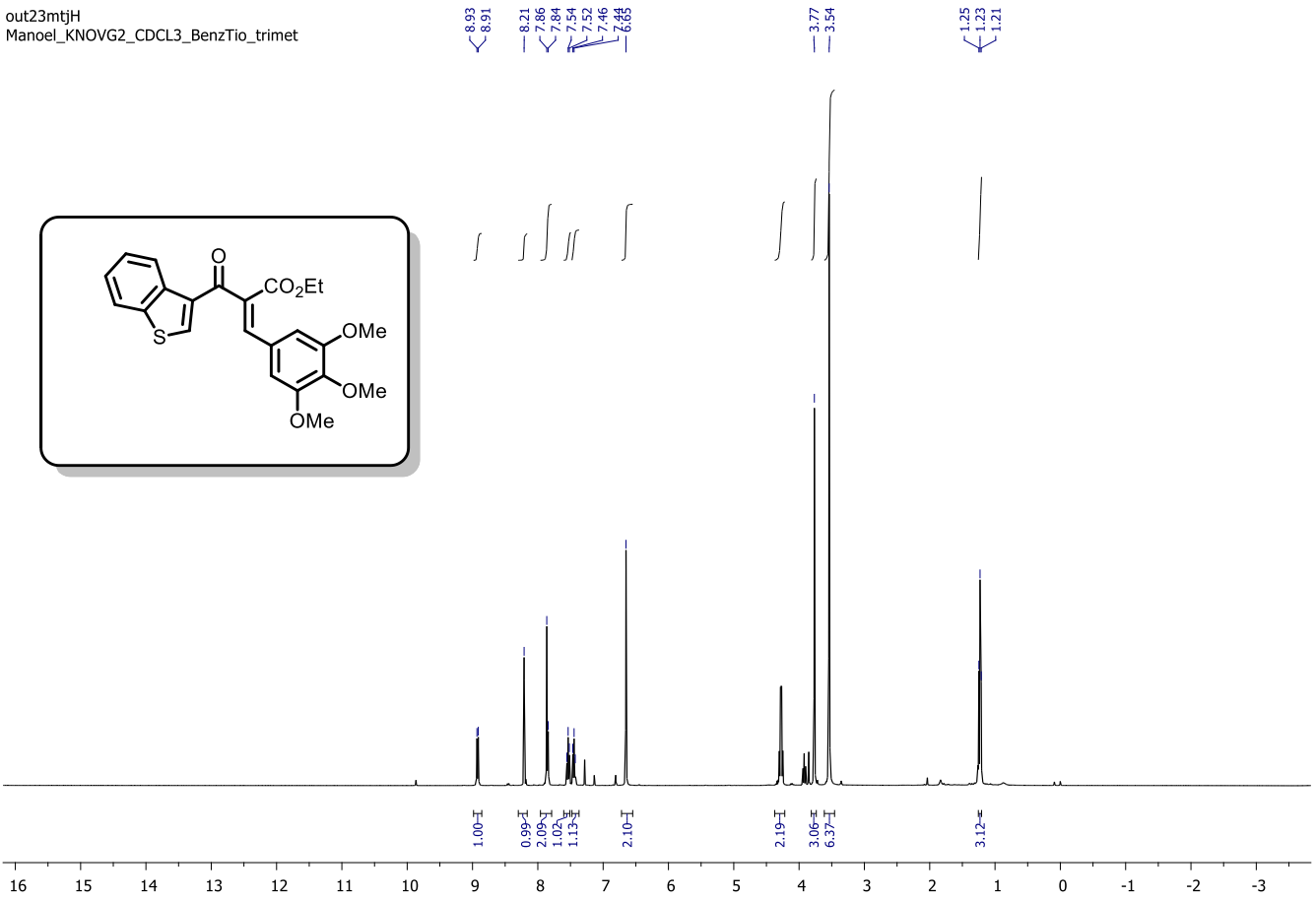

Figure S39. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **9gc.**

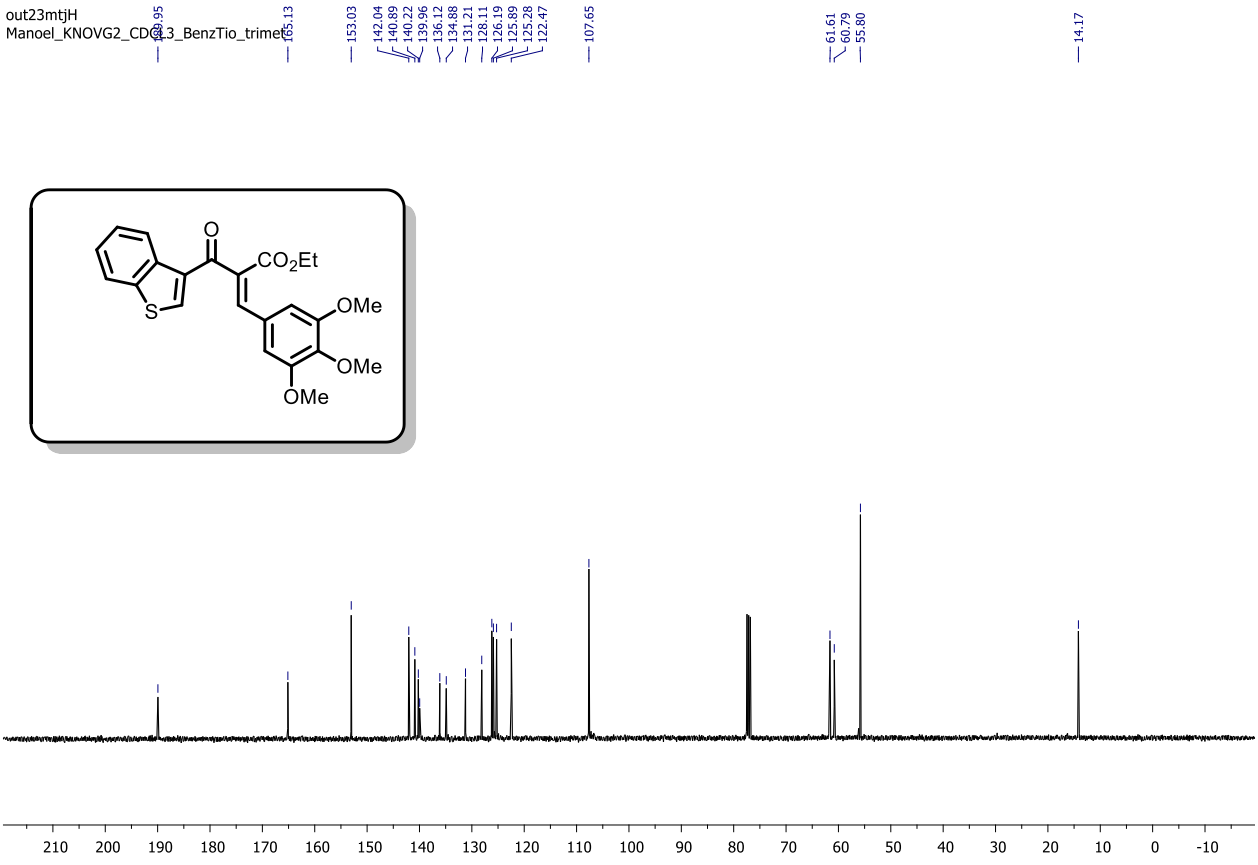

Figure S40. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **9gc.**

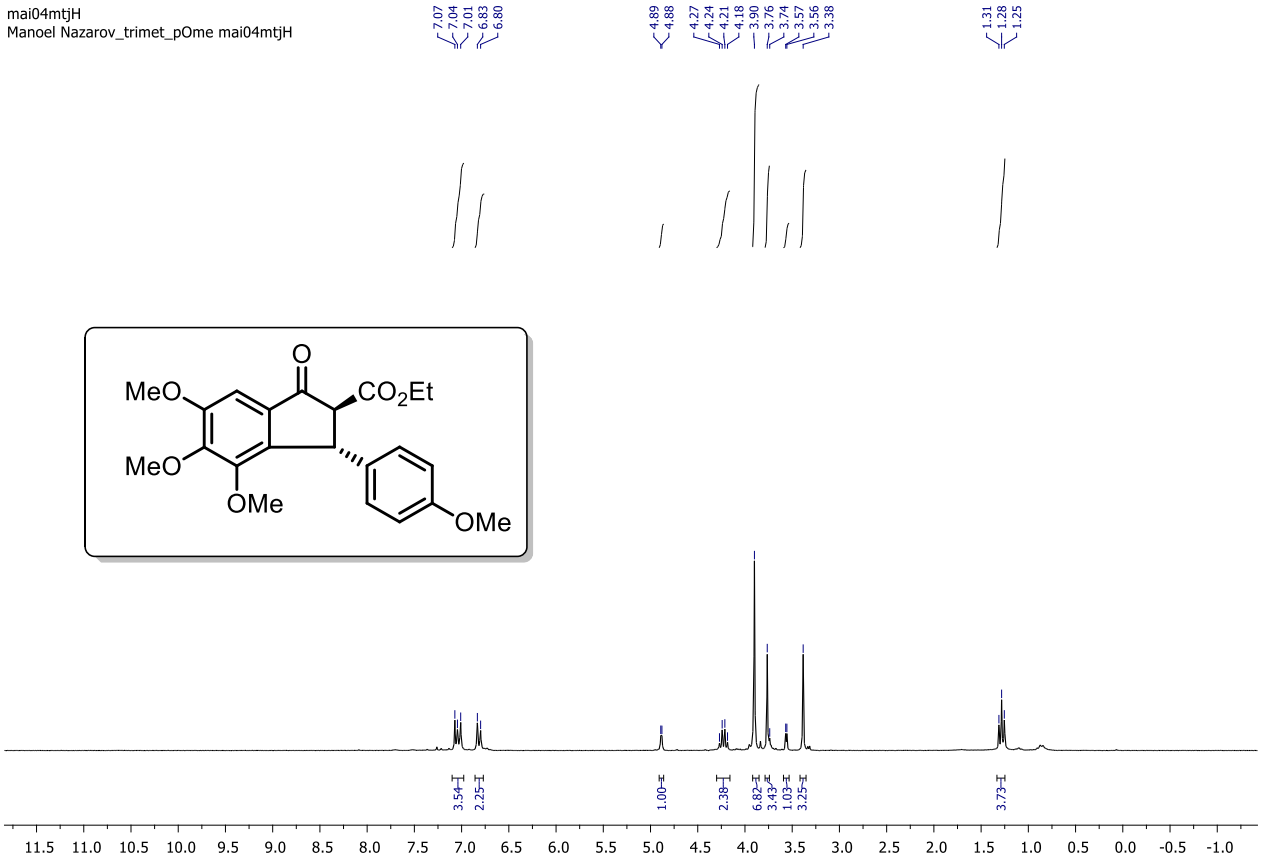

Figure S41. ^{1}H NMR spectrum (250 MHz, $CDCl_3$) of compound **10aa.**

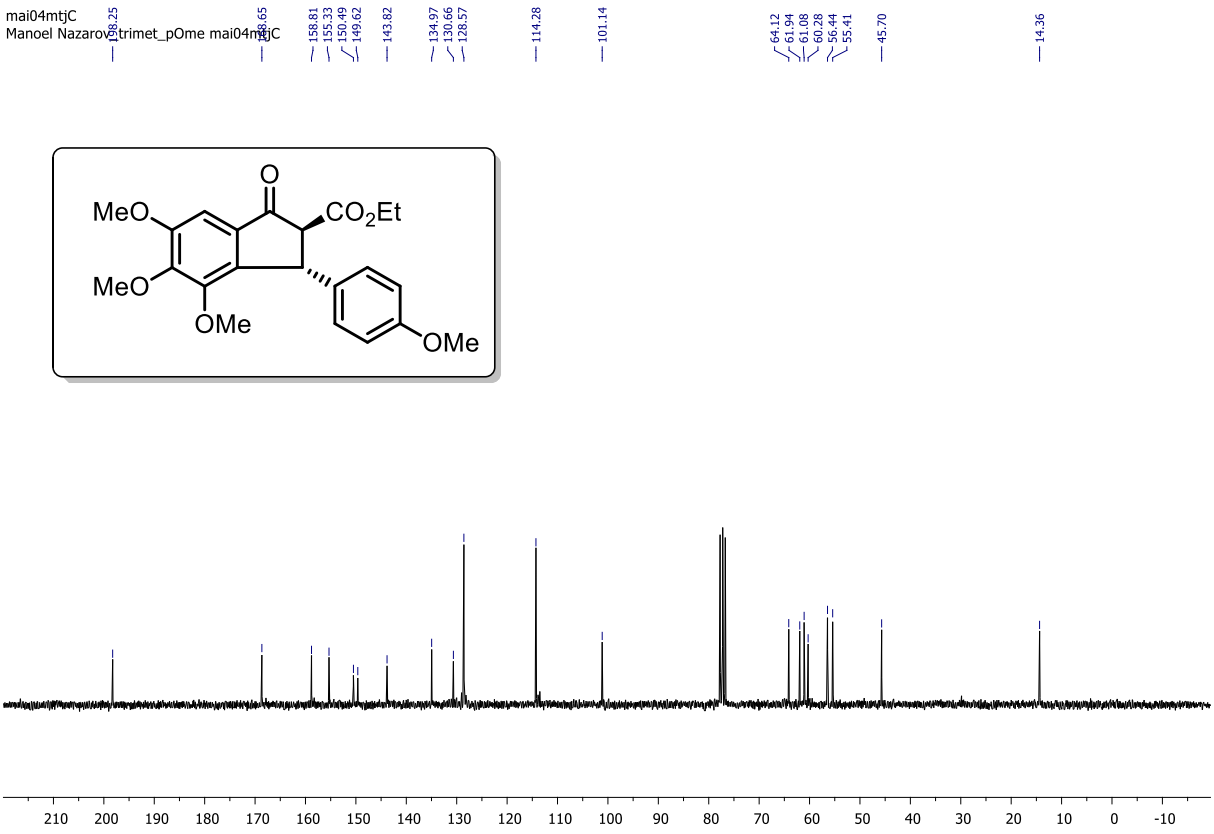

Figure S42. ^{13}C NMR spectrum (63 MHz, $CDCl_3$) of compound 10**aa.**

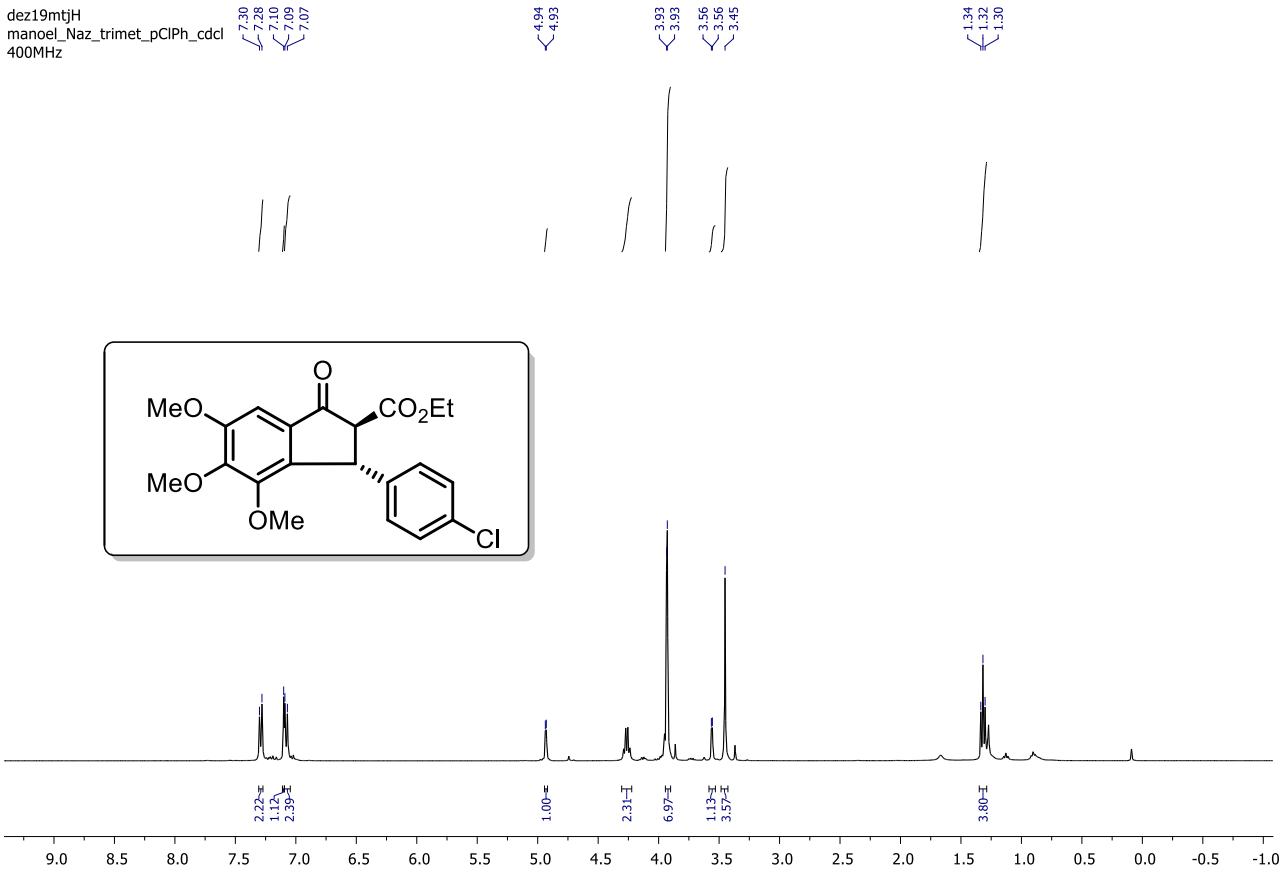

Figure S43. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **10ab.**

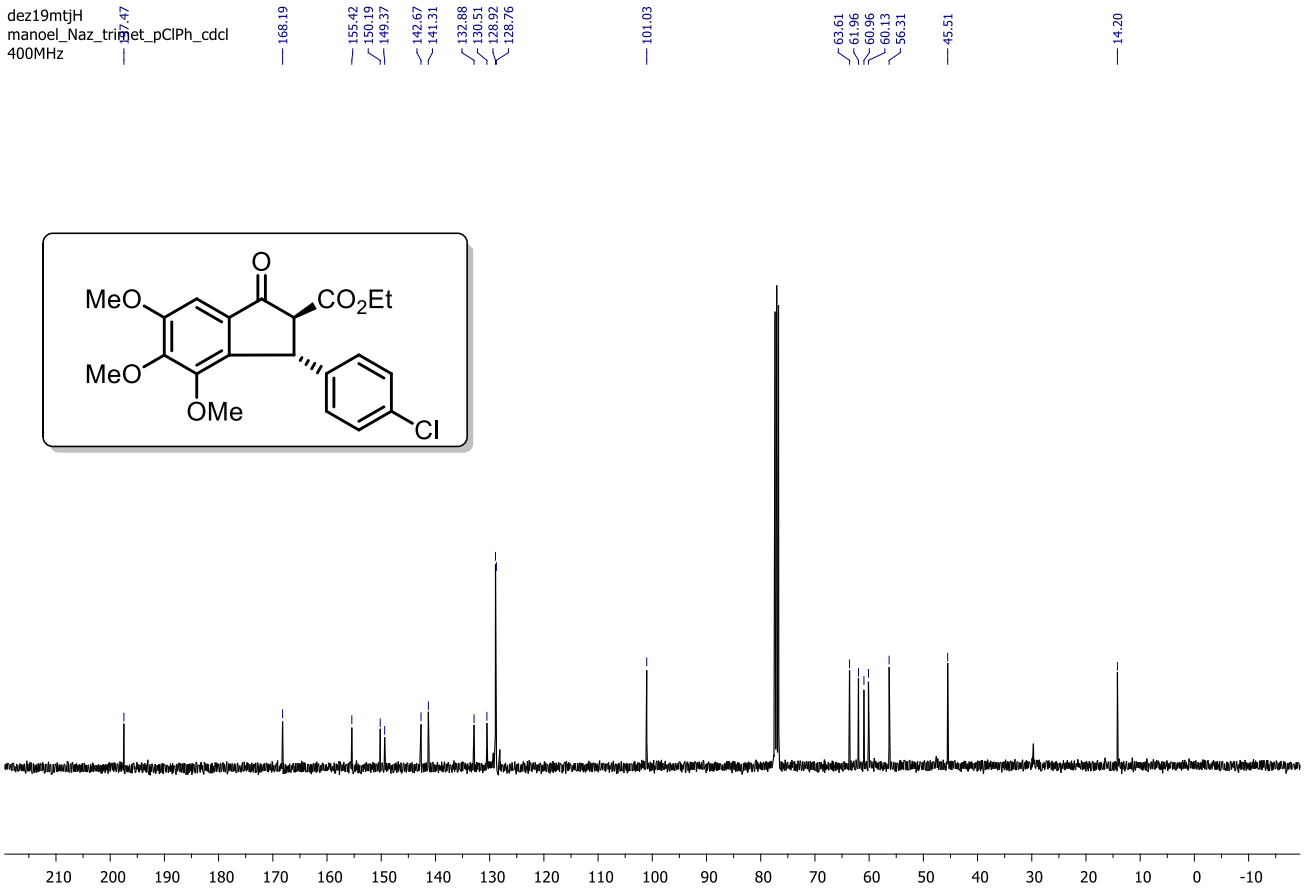

Figure S44. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **10ab.**

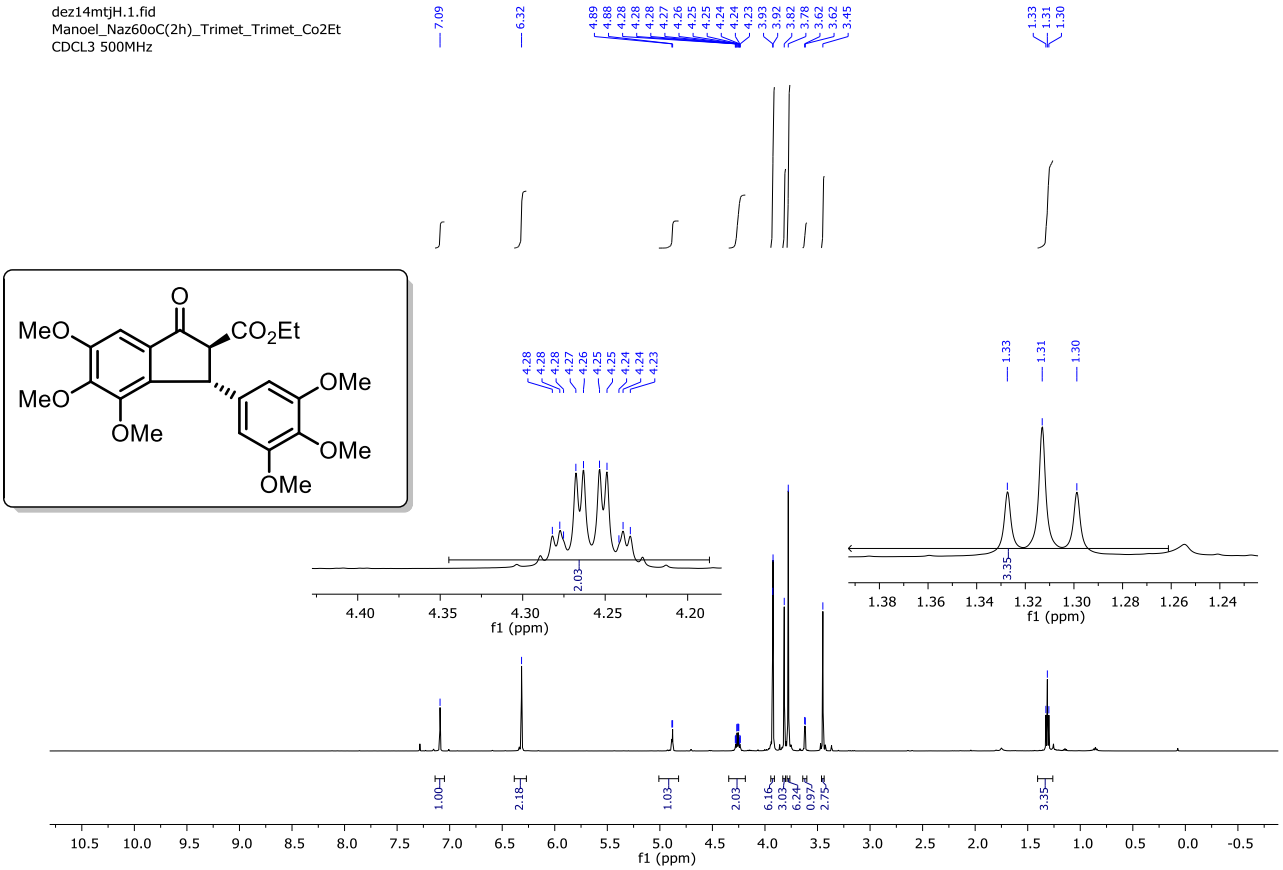

Figure S45. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **10ac.**

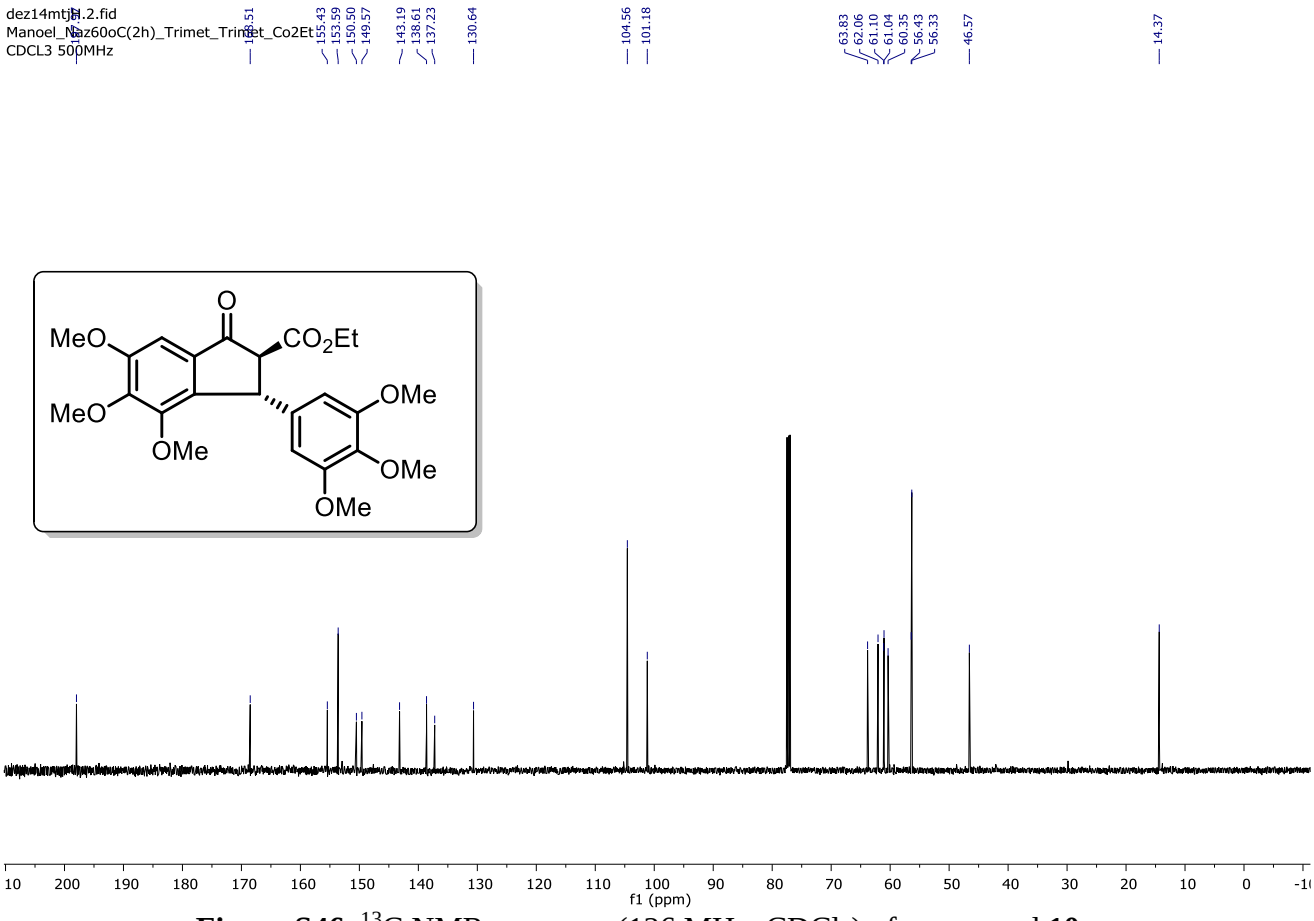

Figure S46. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **10ac.**

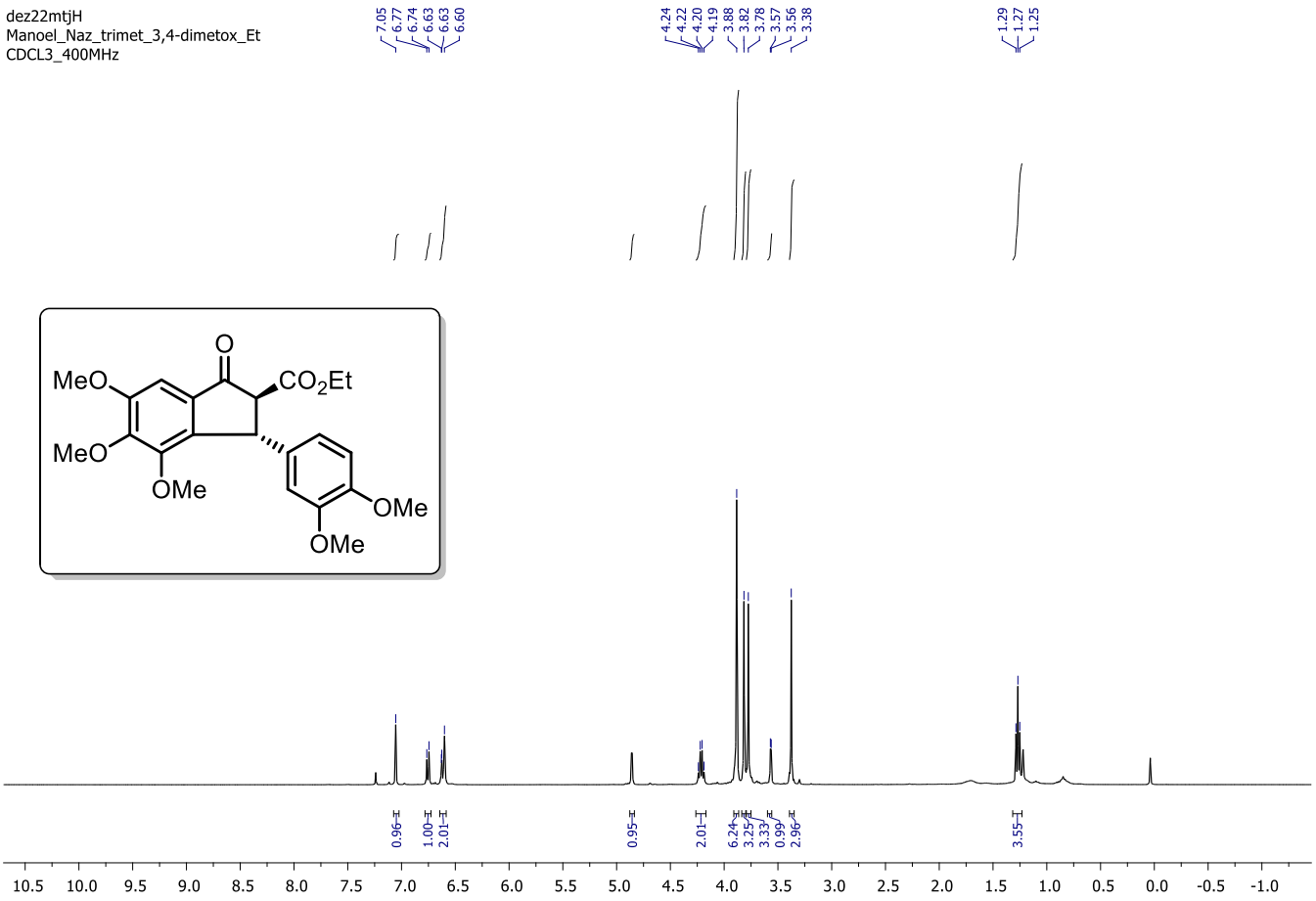

Figure S47. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **10ad.**

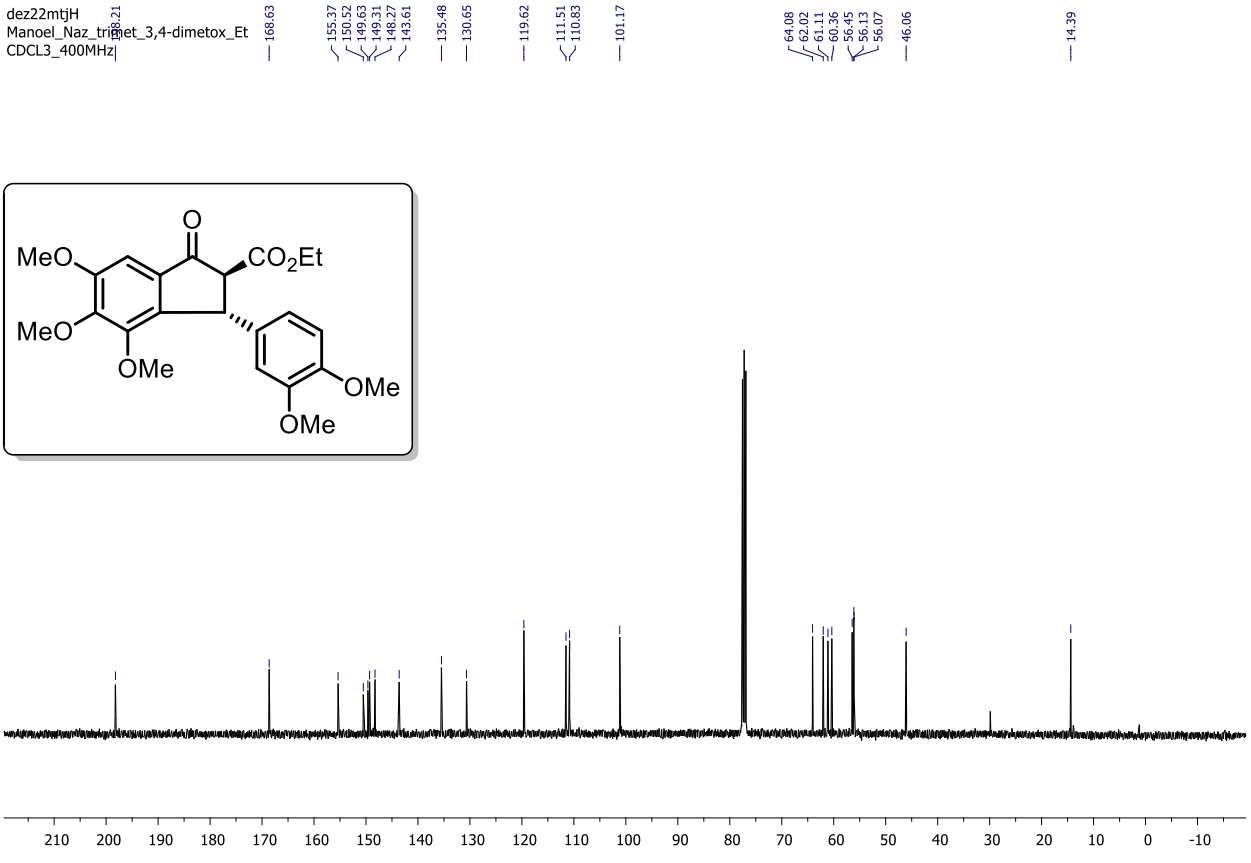

Figure S48. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **10ad.**

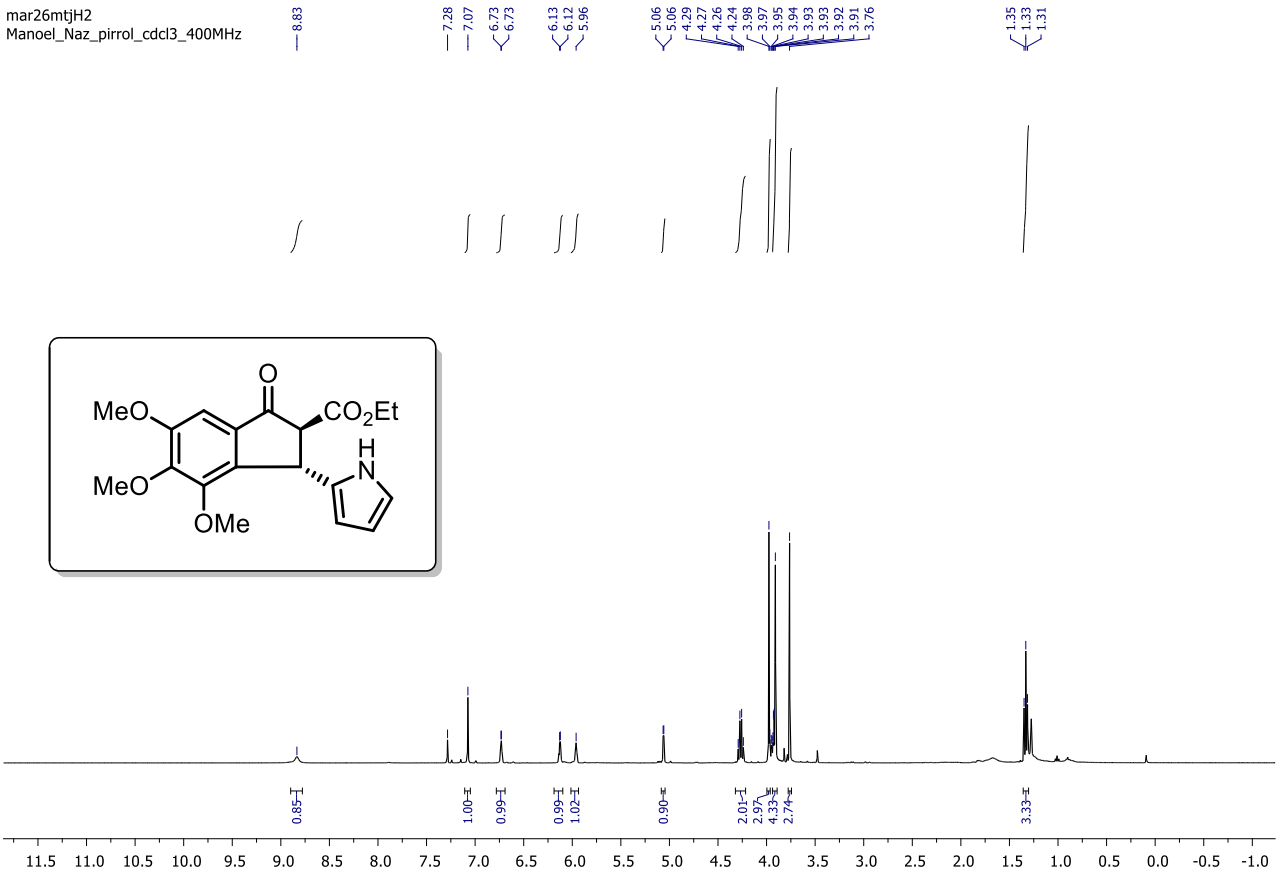

Figure S49. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **10ag.**

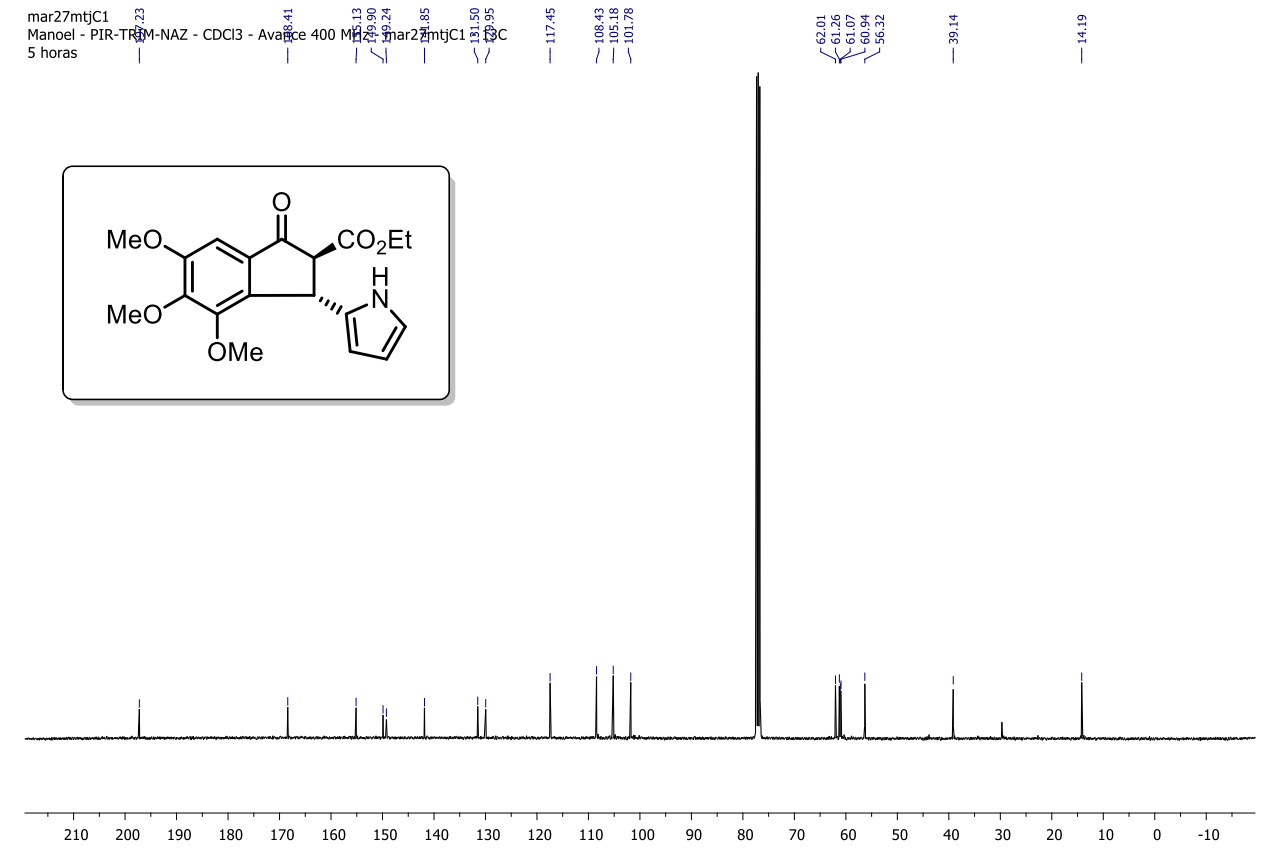

Figure S50. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **10ag.**

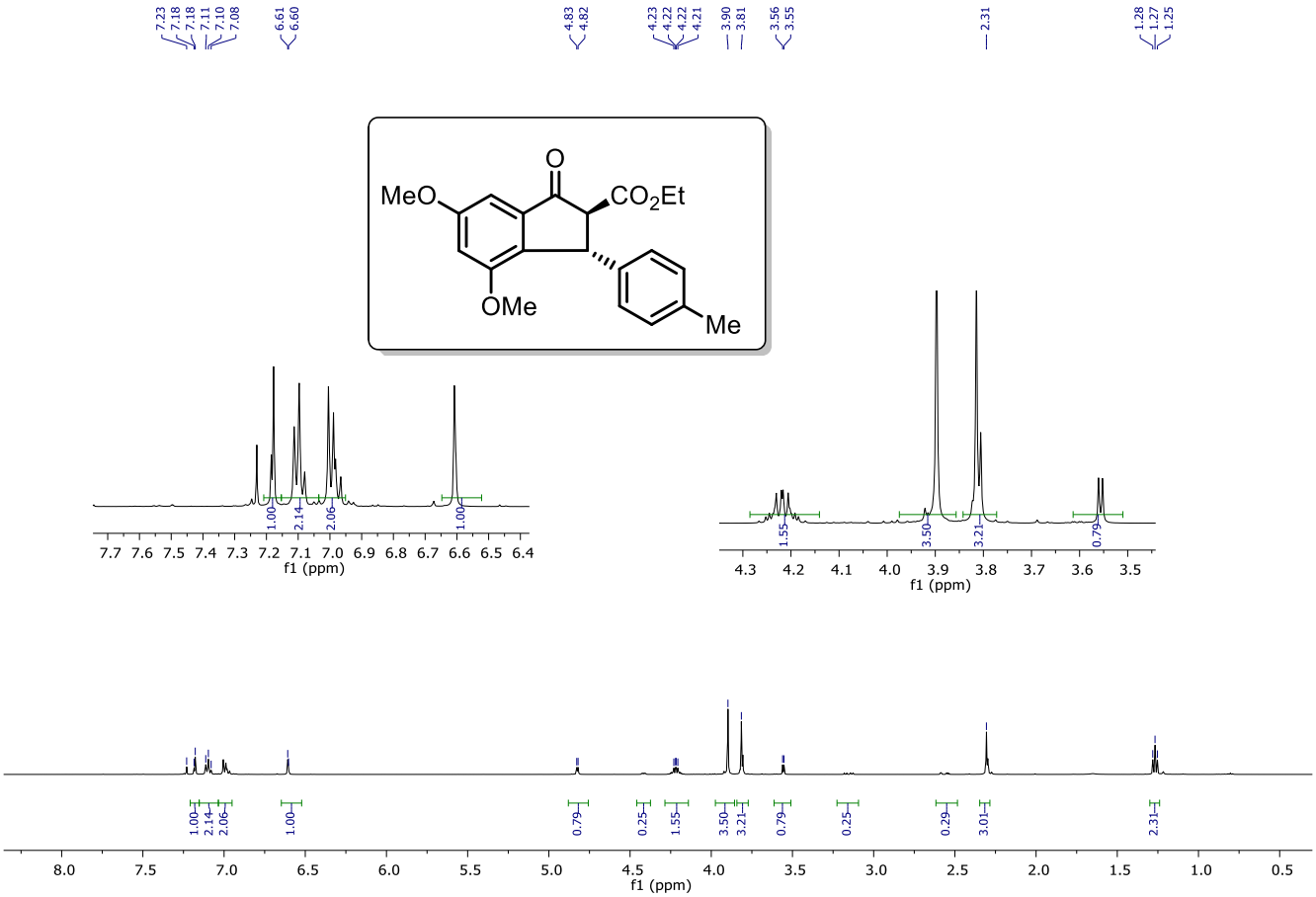

Figure S51. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **10bj.**

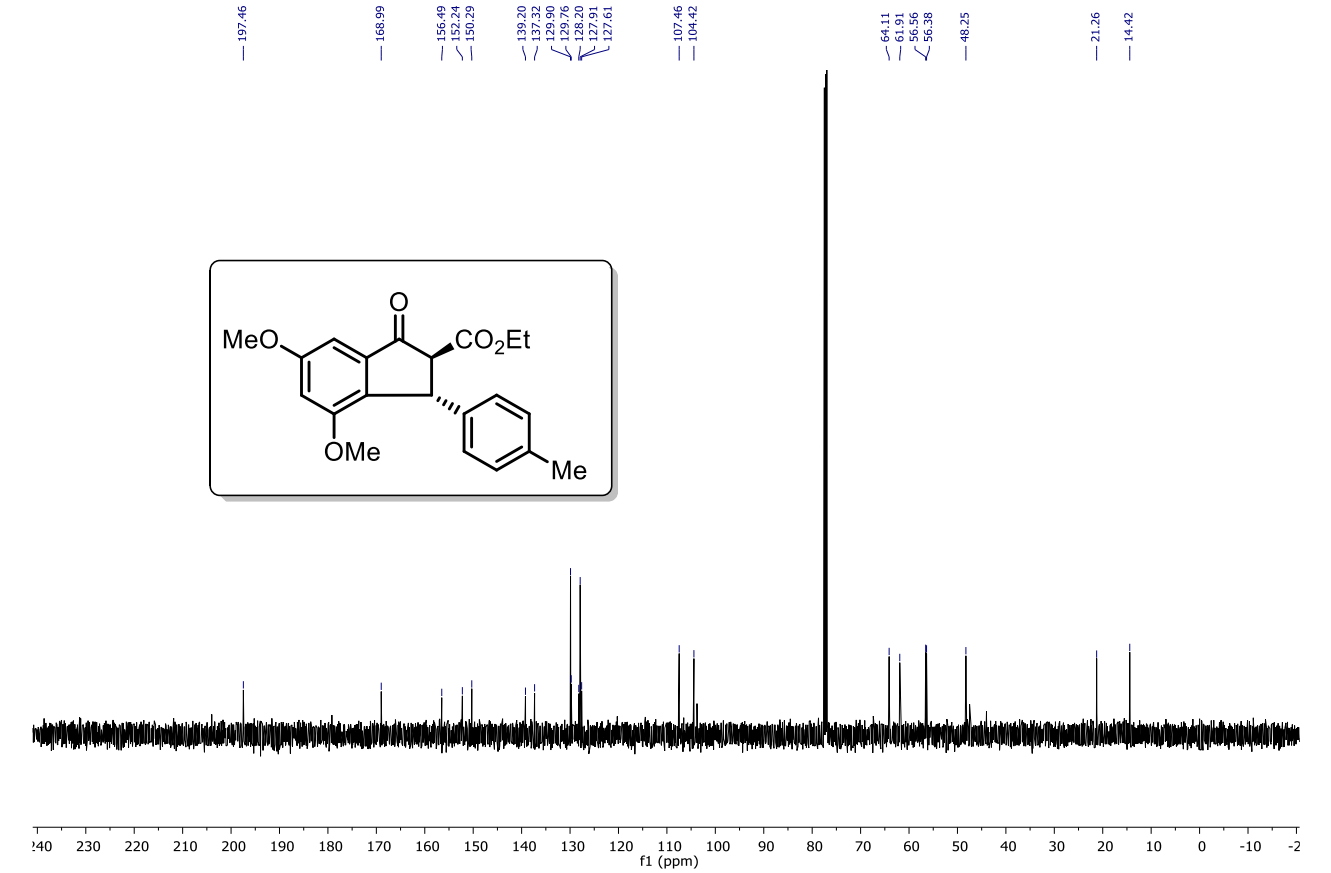

Figure S52. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **10bj.**

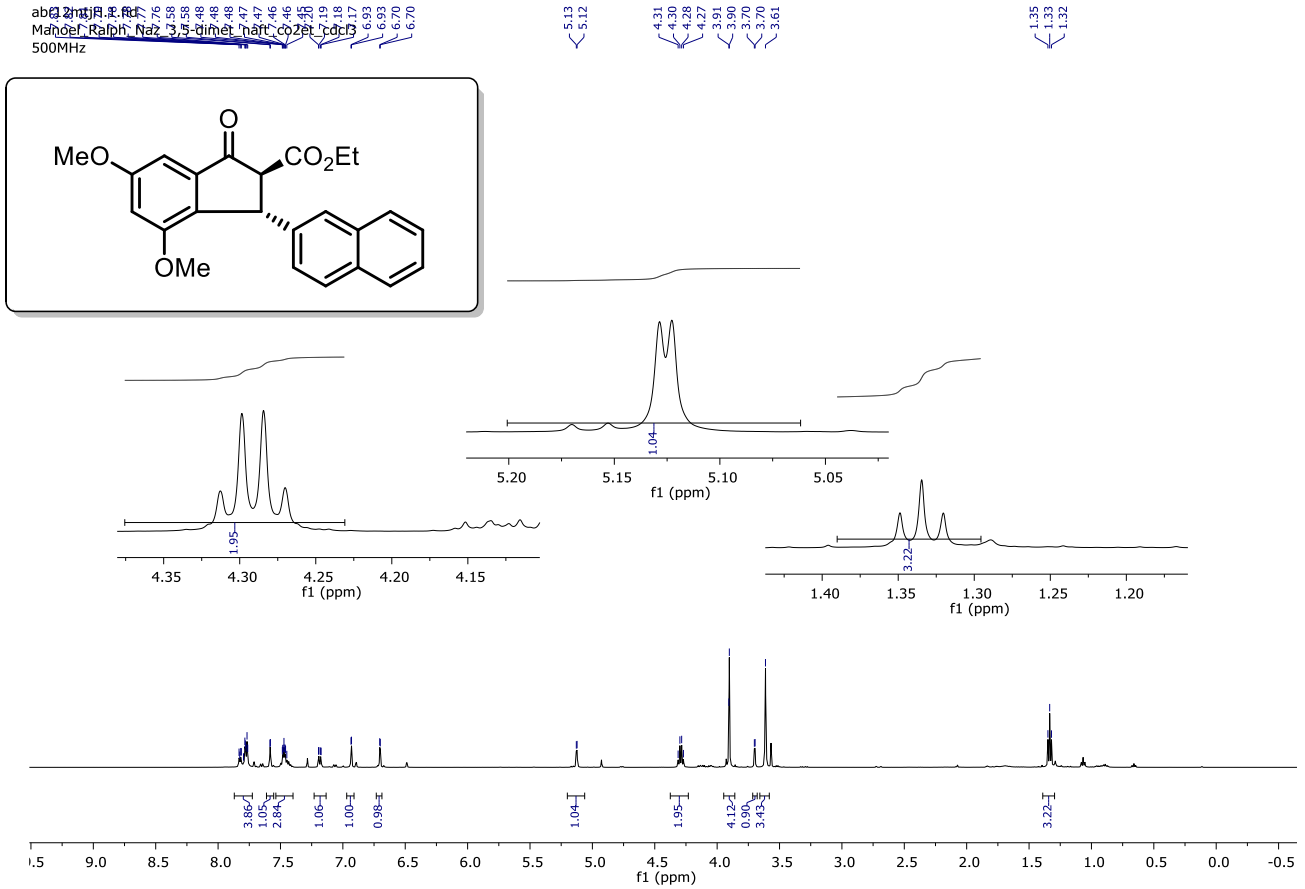

Figure S53. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **10bk.**

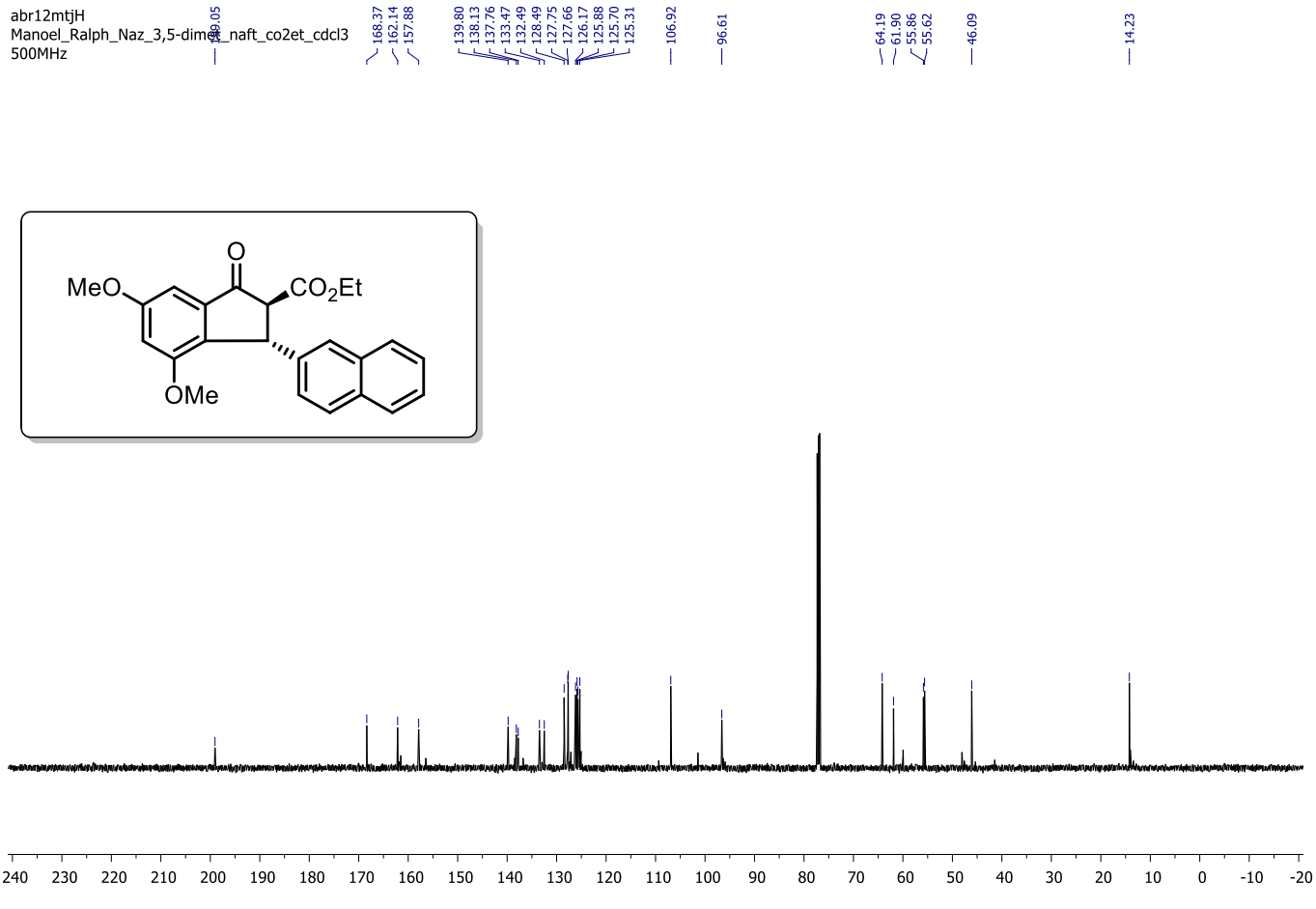

Figure S54. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **10bk.**

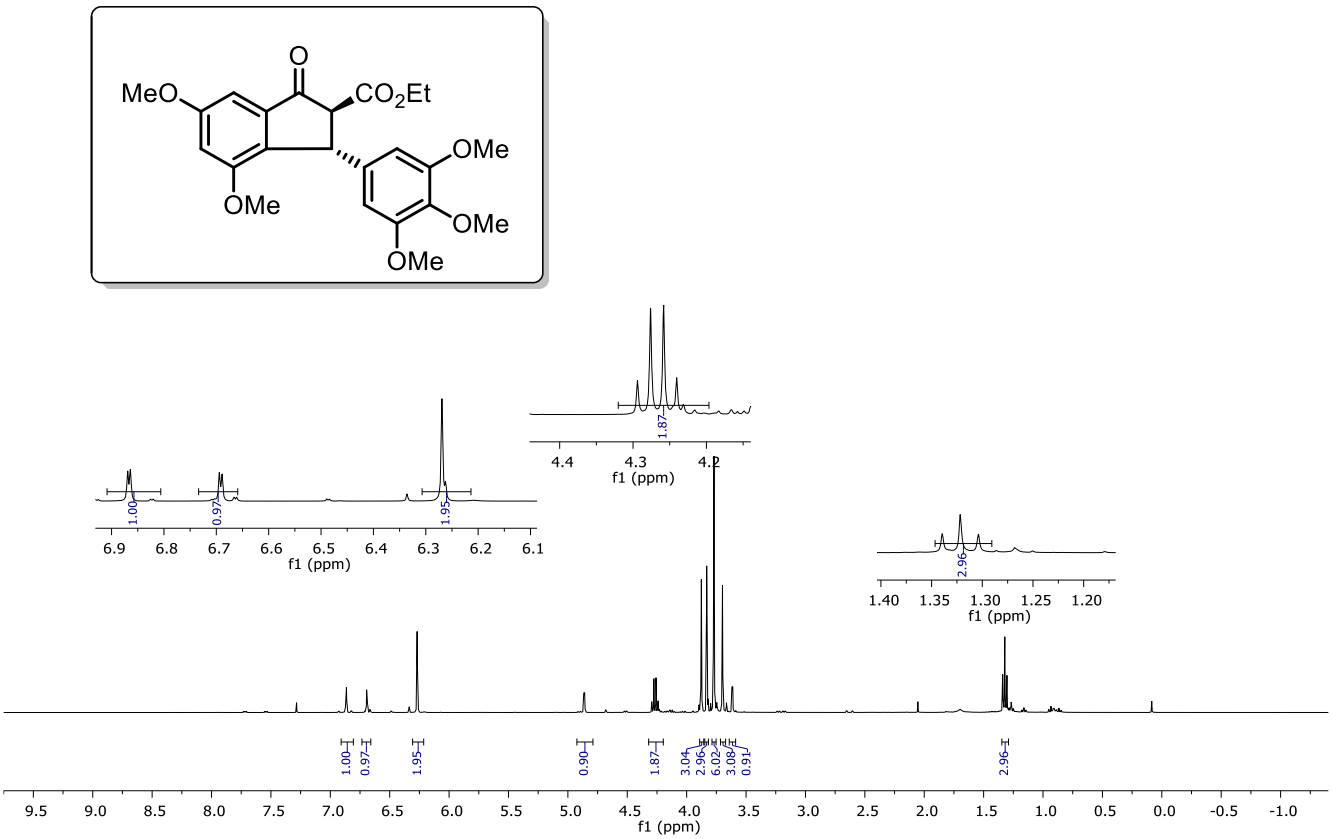

Figure S55. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **10bc.**

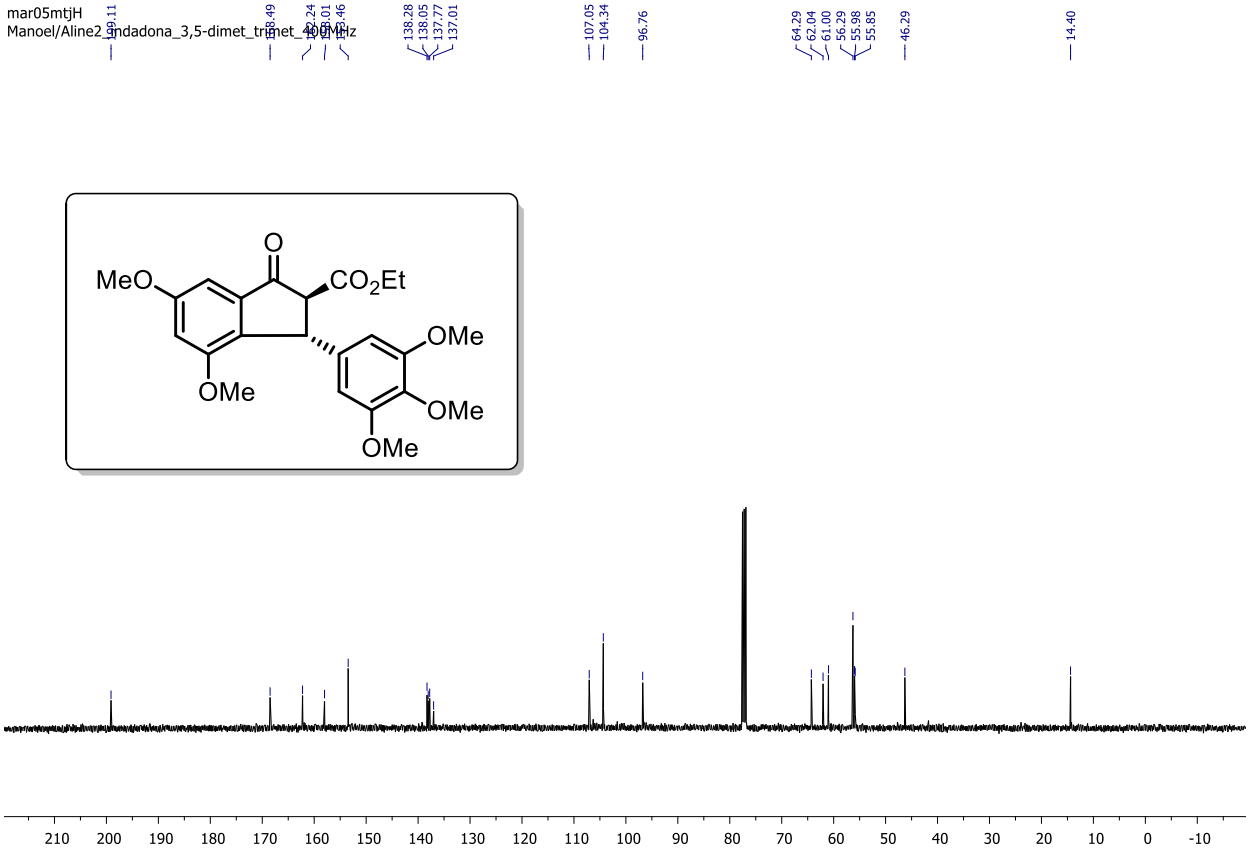

Figure S56. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **10bc.**

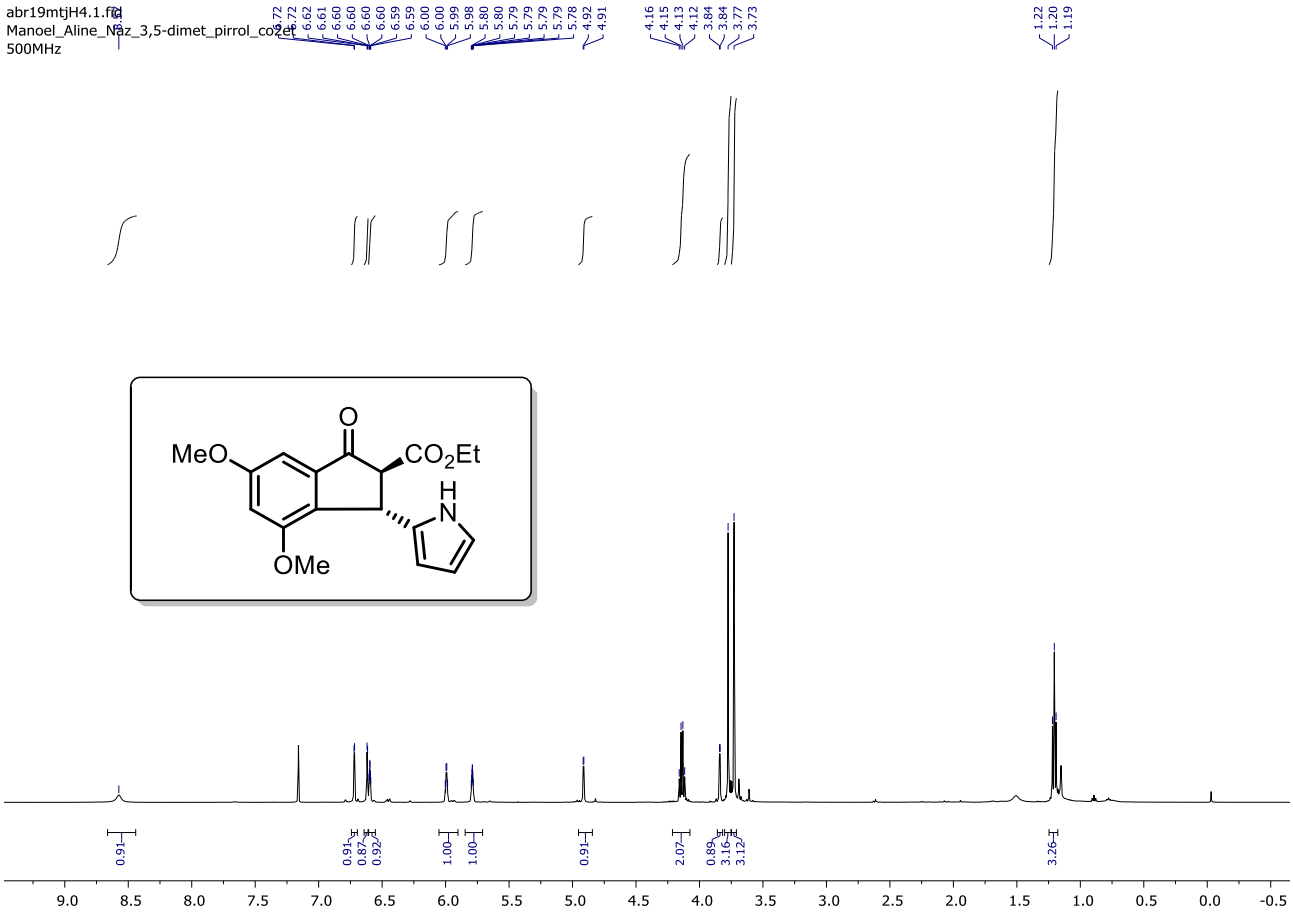

Figure S57. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **10bg.**

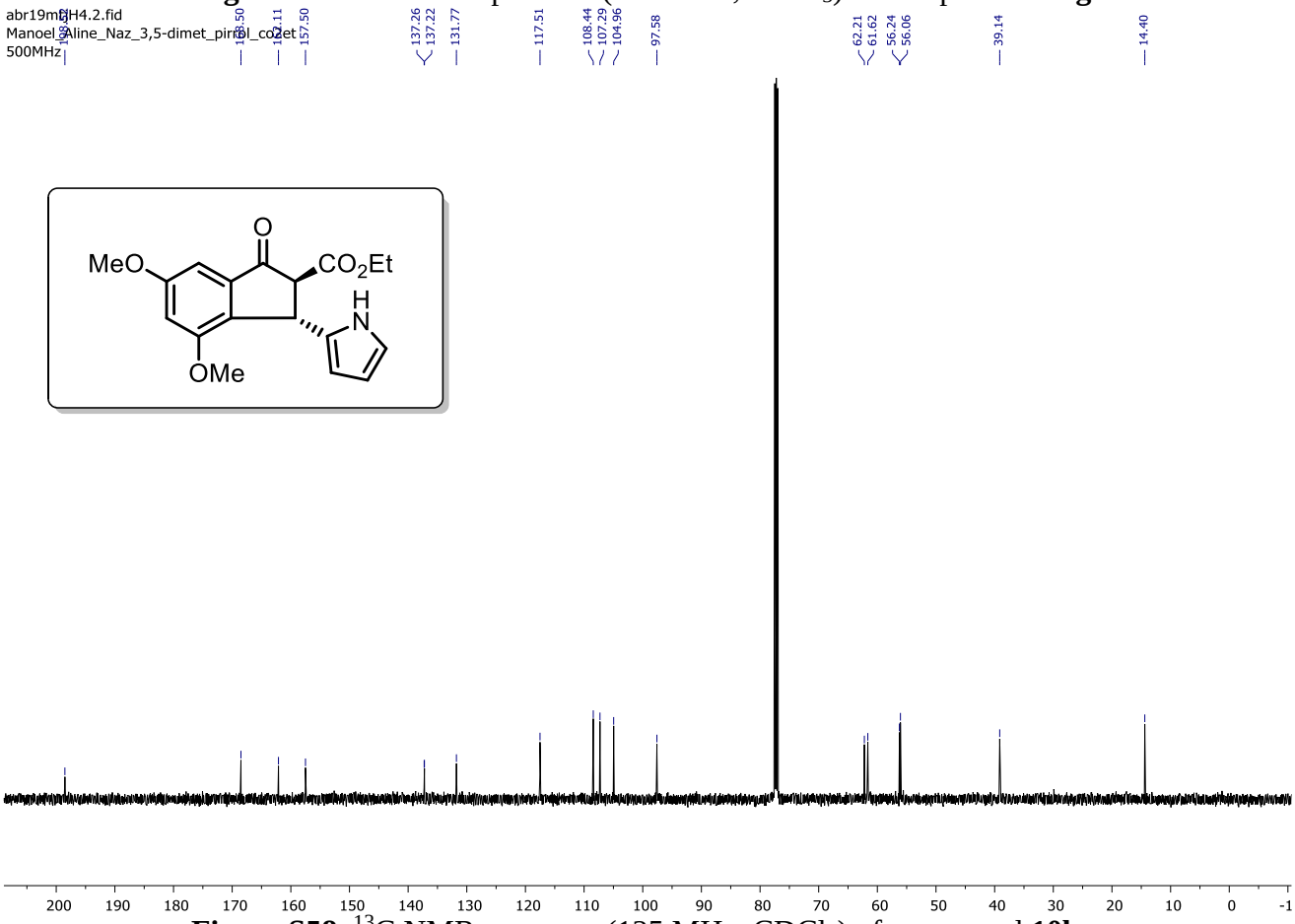

Figure S58. ^{13}C NMR spectrum (125 MHz, $CDCl_3$) of compound **10bg.**

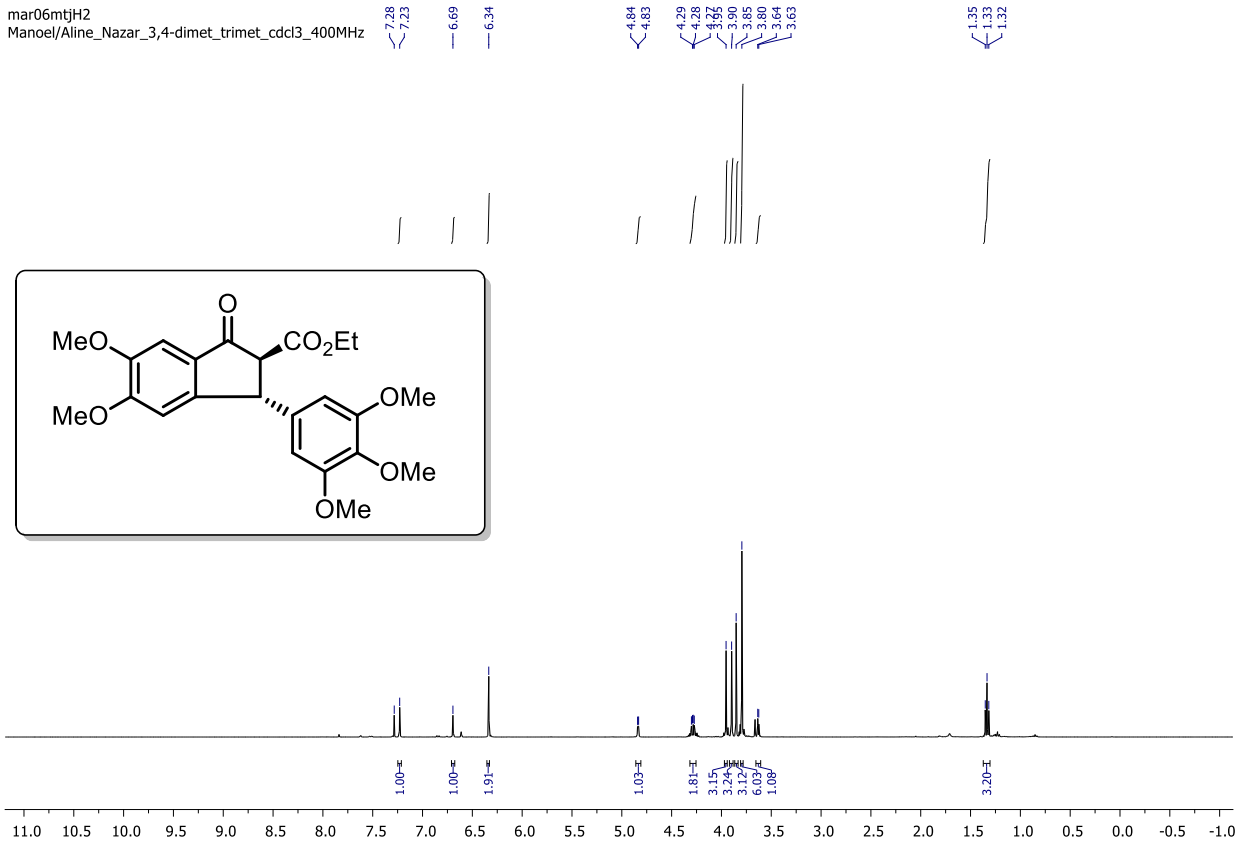

Figure S59. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **10cc.**

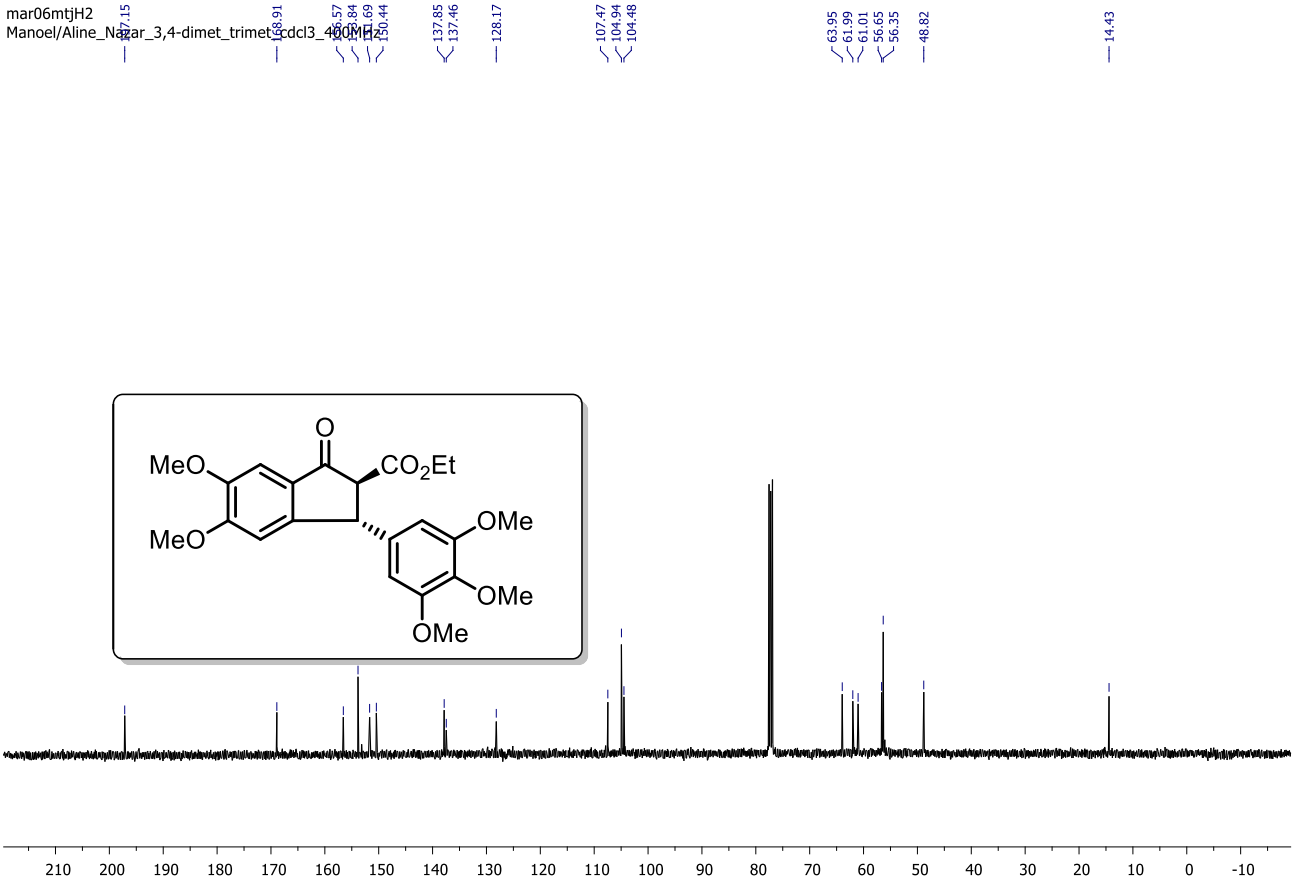

Figure S60. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **10cc.**

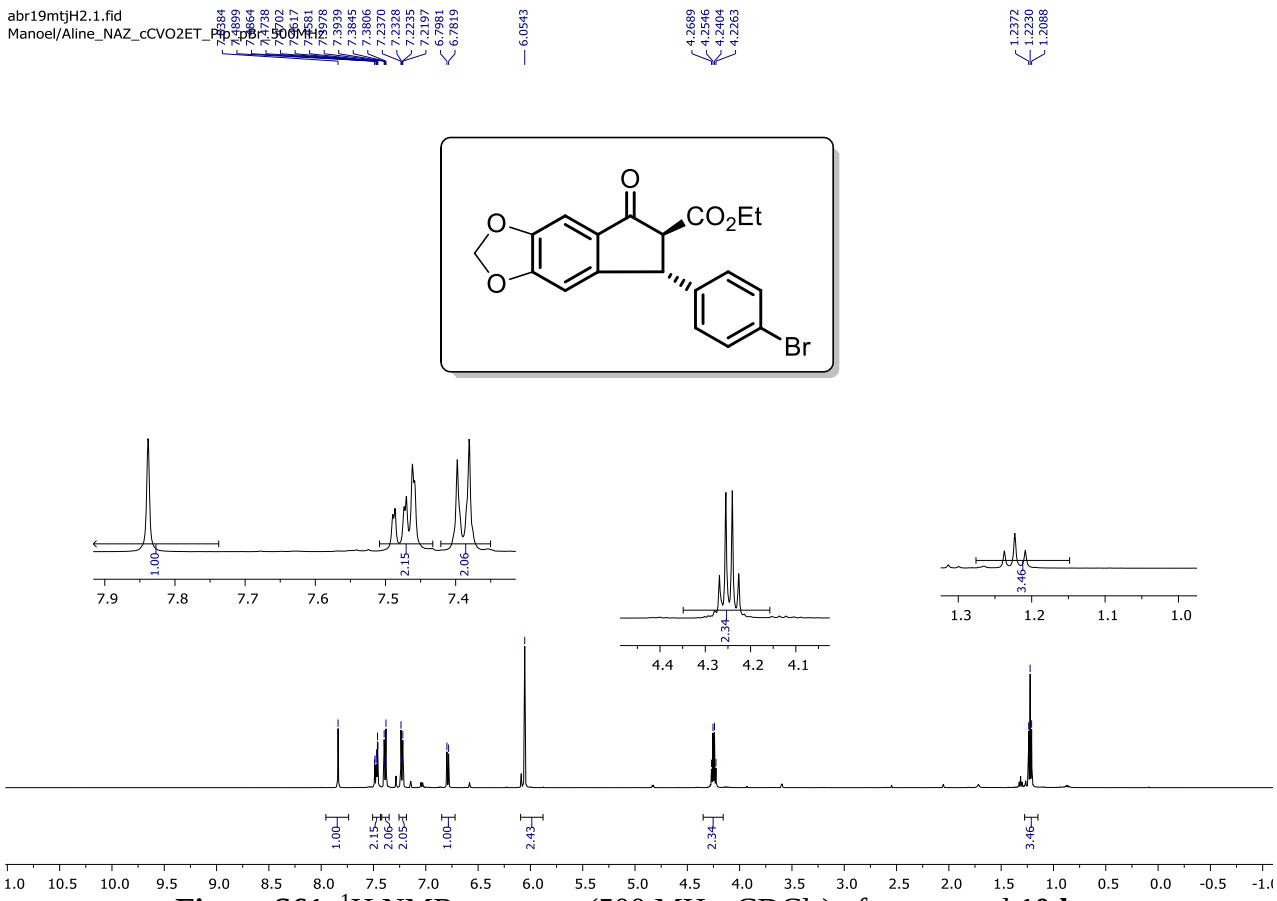

Figure S61. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **10dm.**

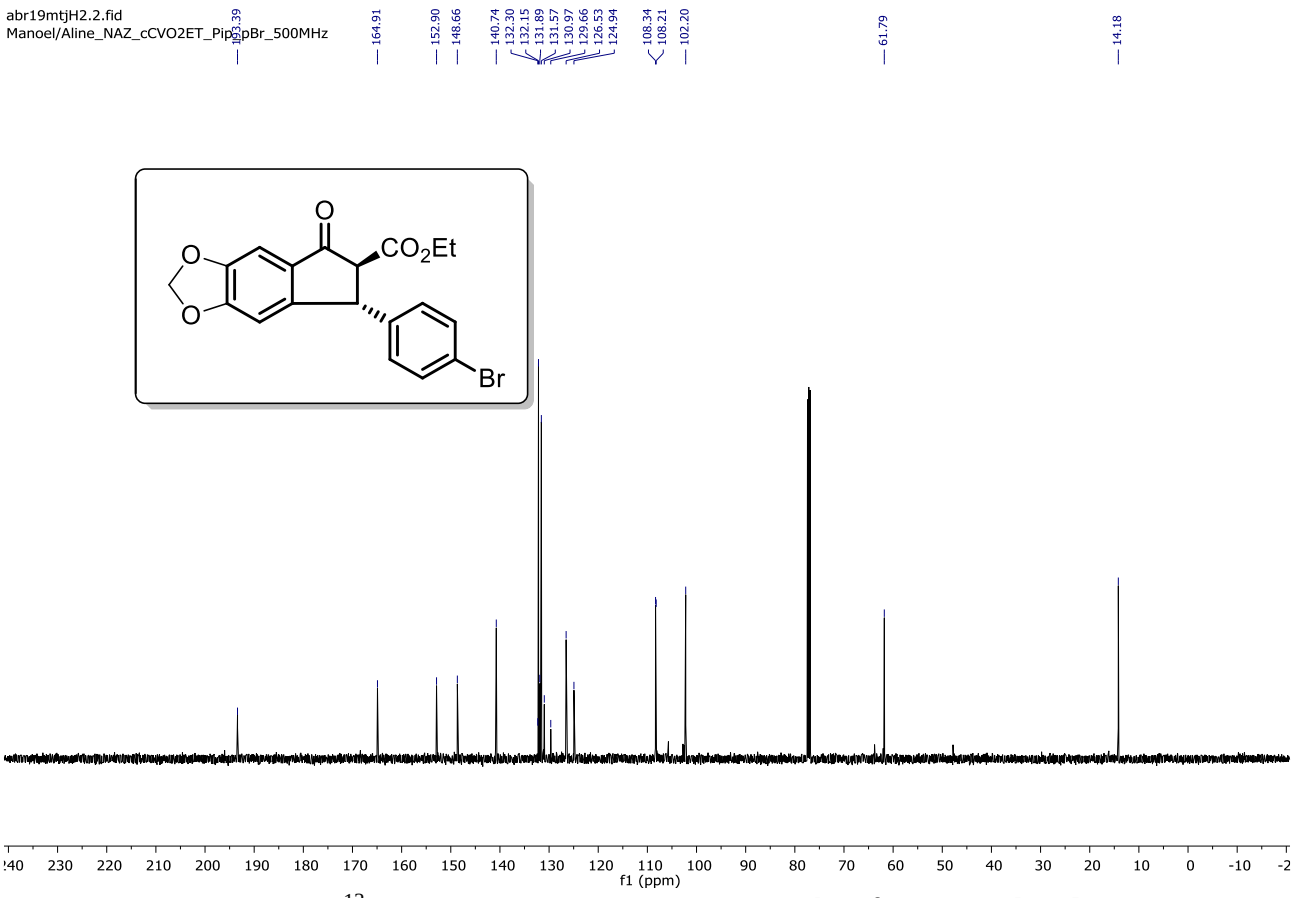

Figure S62. ^{13}C NMR spectrum (125 MHz, $CDCl_3$) of compound **10dm.**

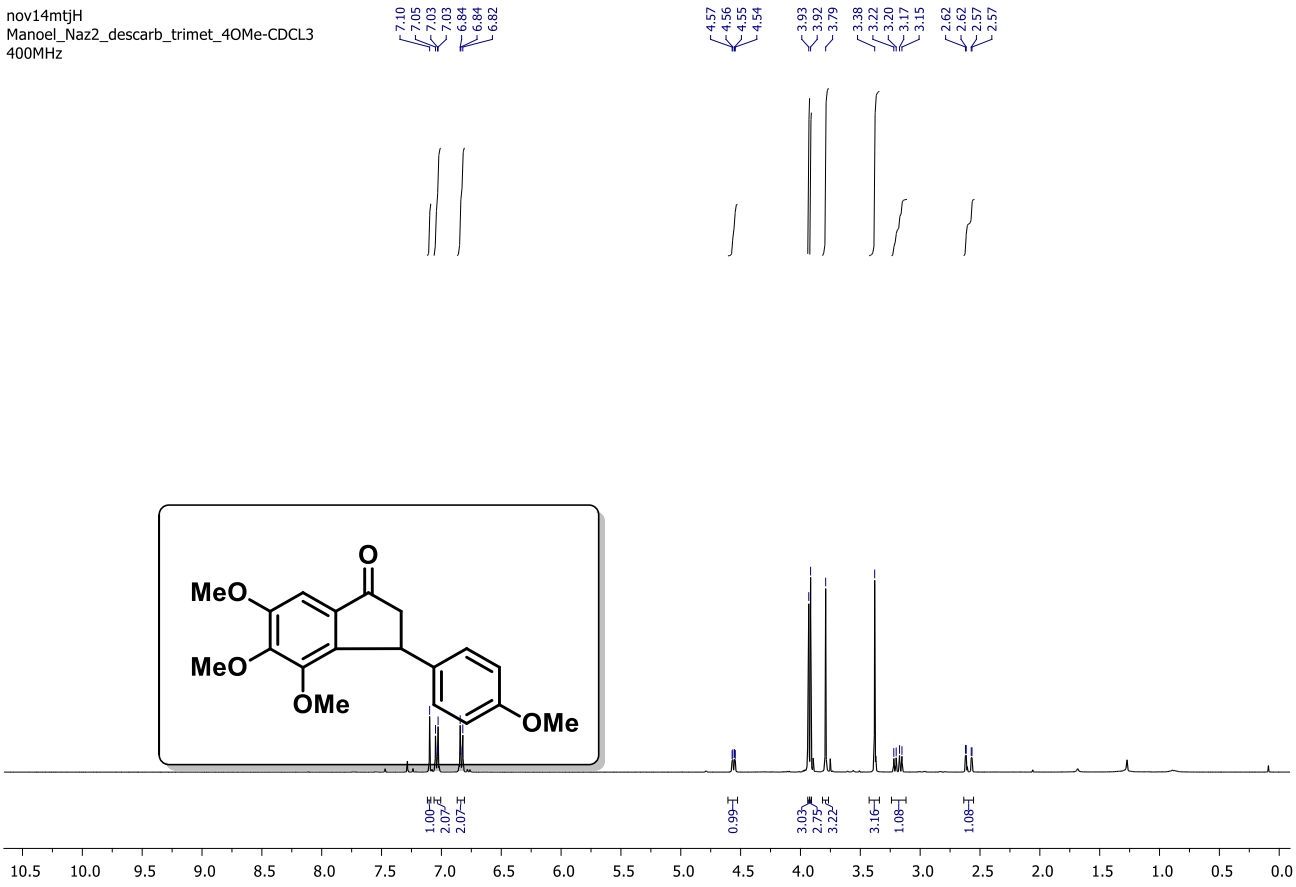

Figure S63. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **11aa.**

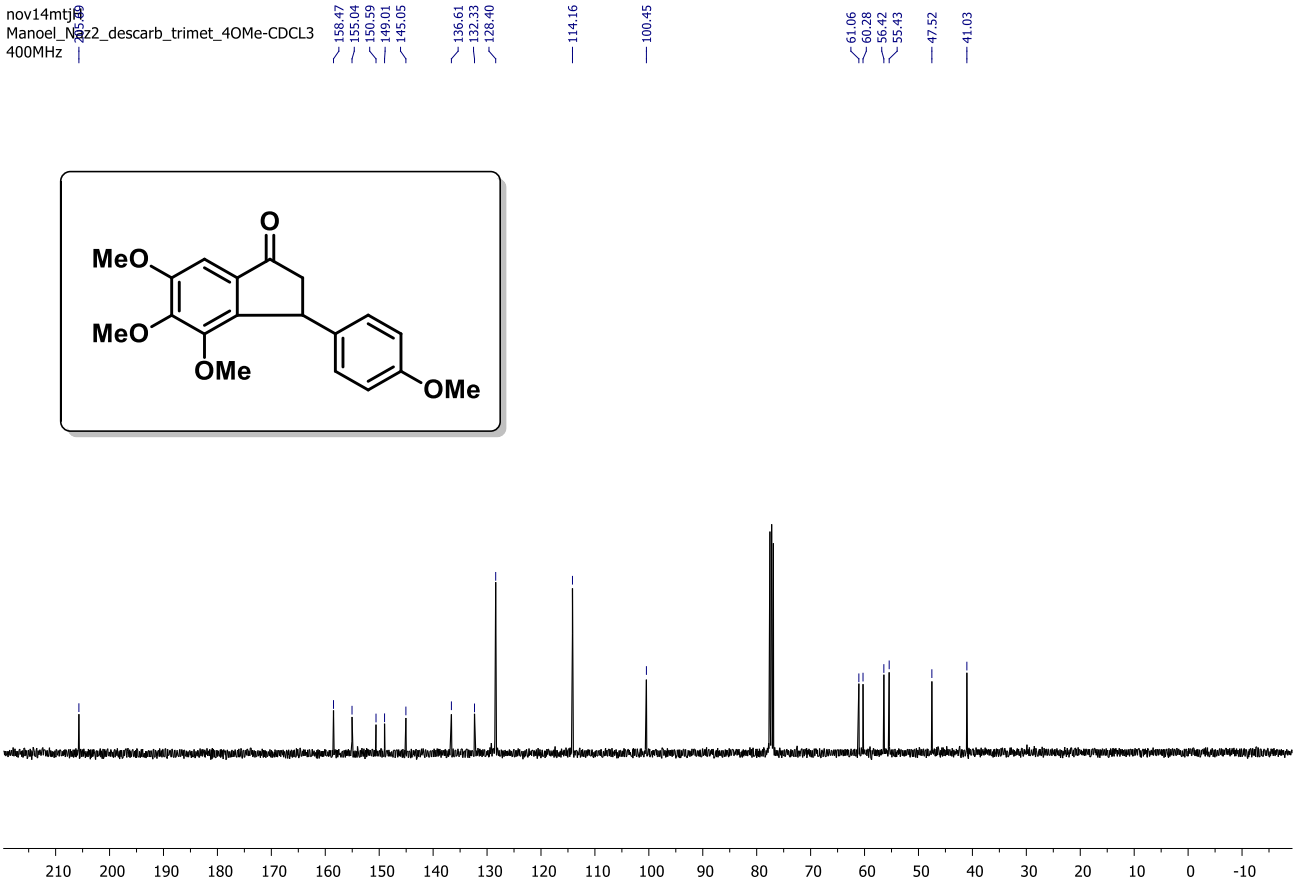

Figure S64. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **11aa.**

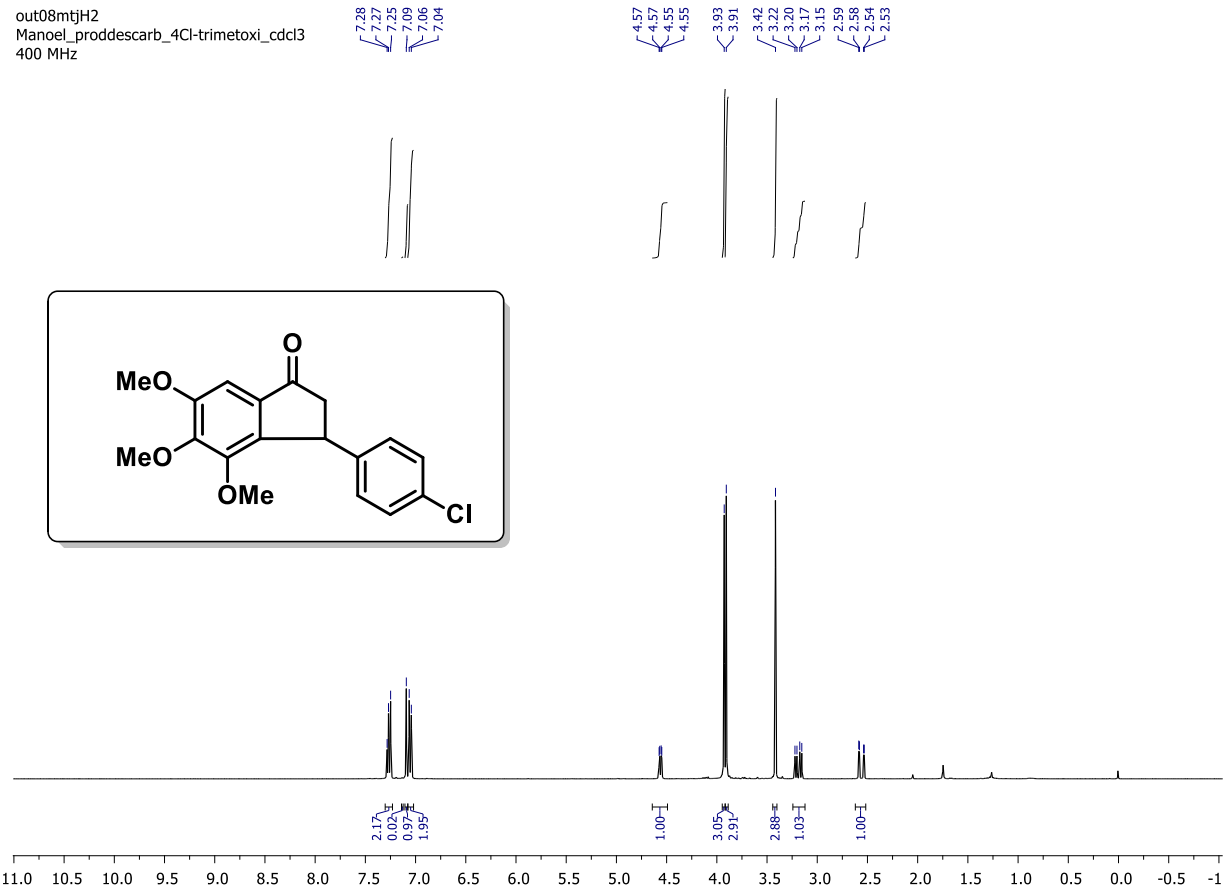

Figure S65. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **11ab.**

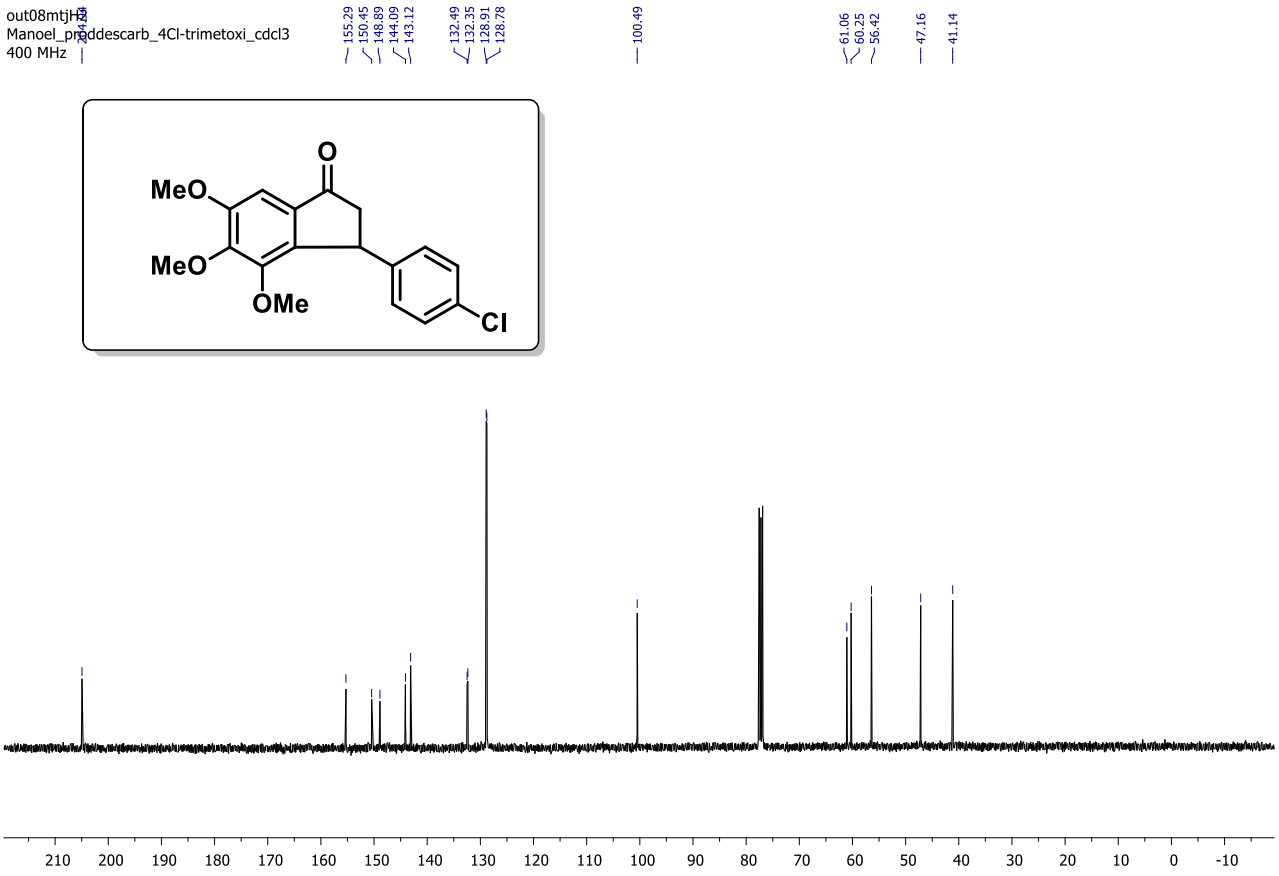

Figure S66. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **11ab.**

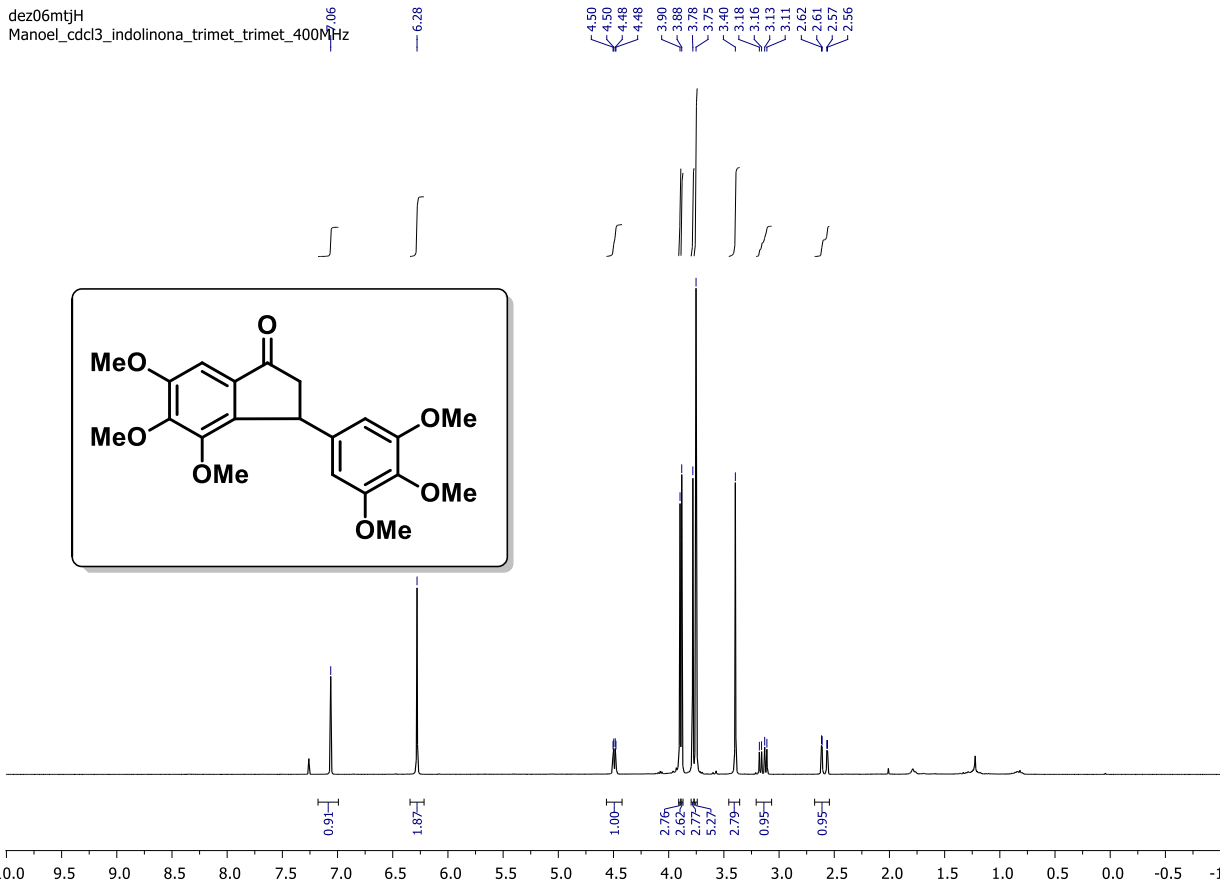

Figure S67. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **11ac.**

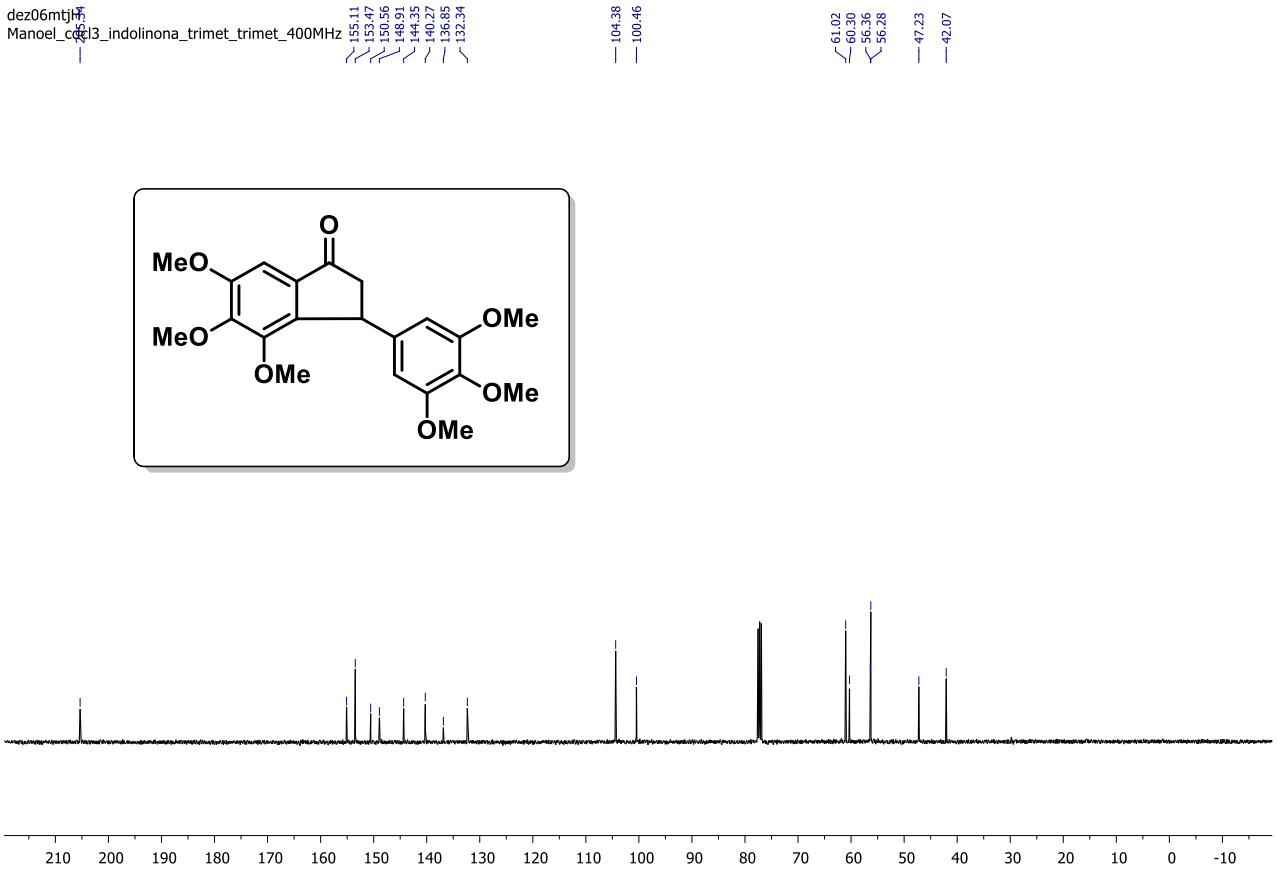

Figure S68. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **11ac.**

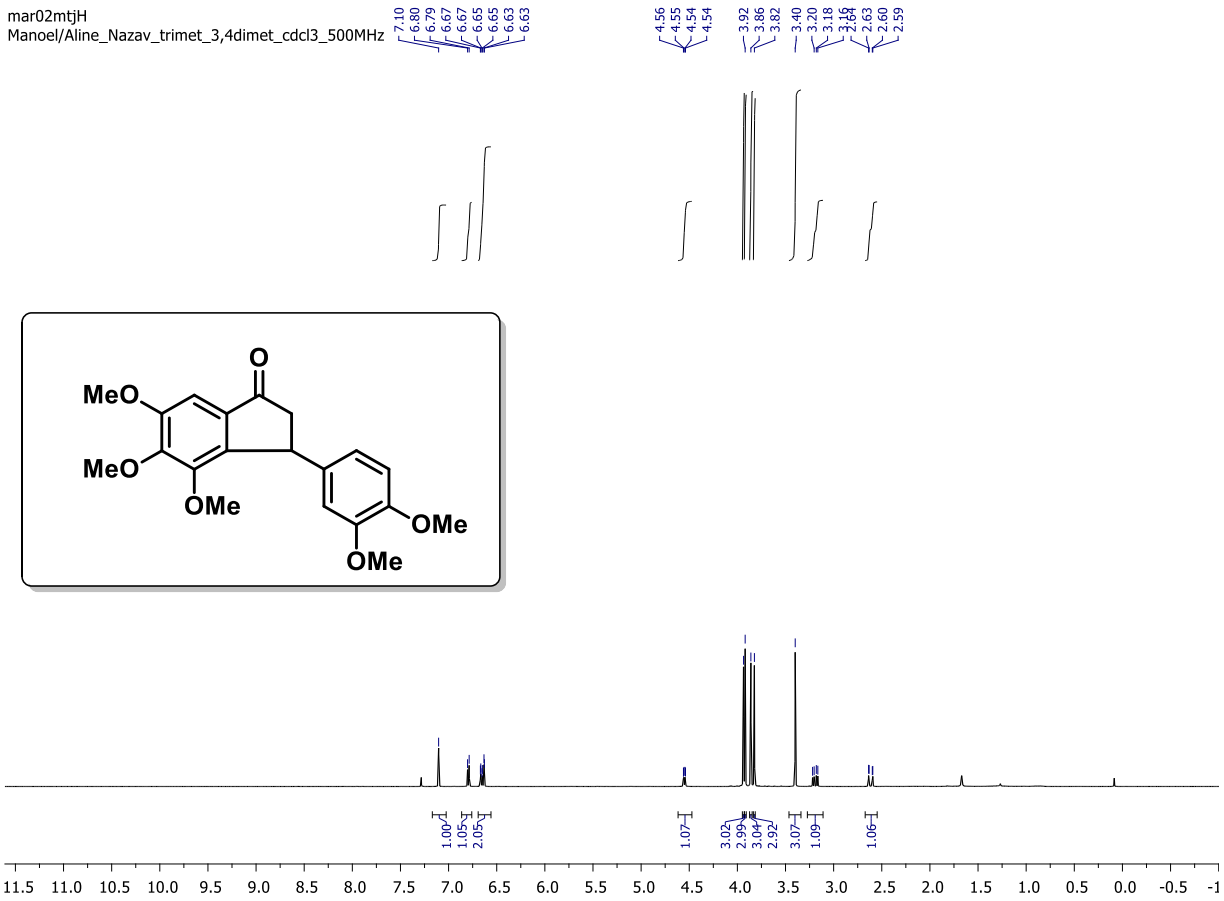

Figure S69. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **11ad.**

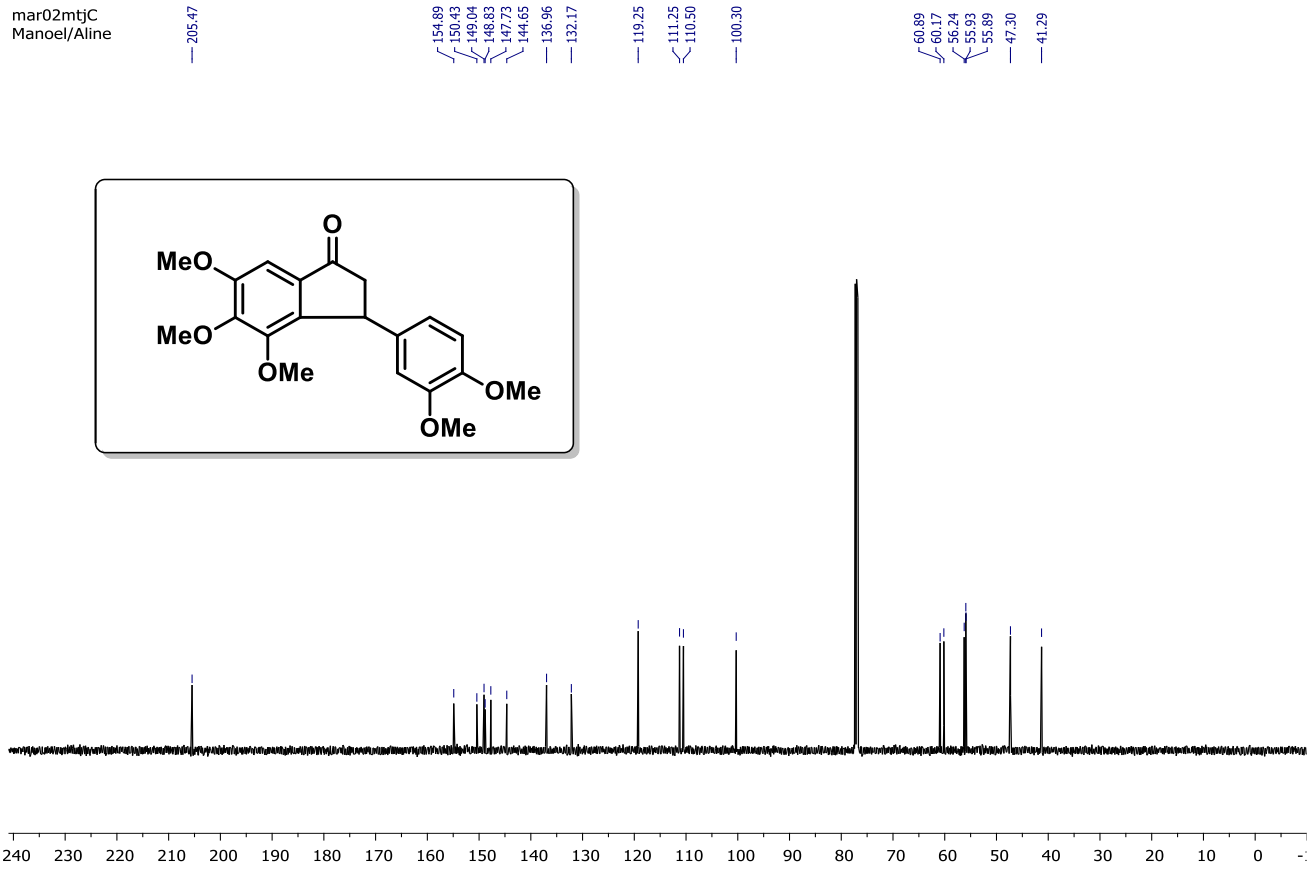

Figure S70. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **11ad.**

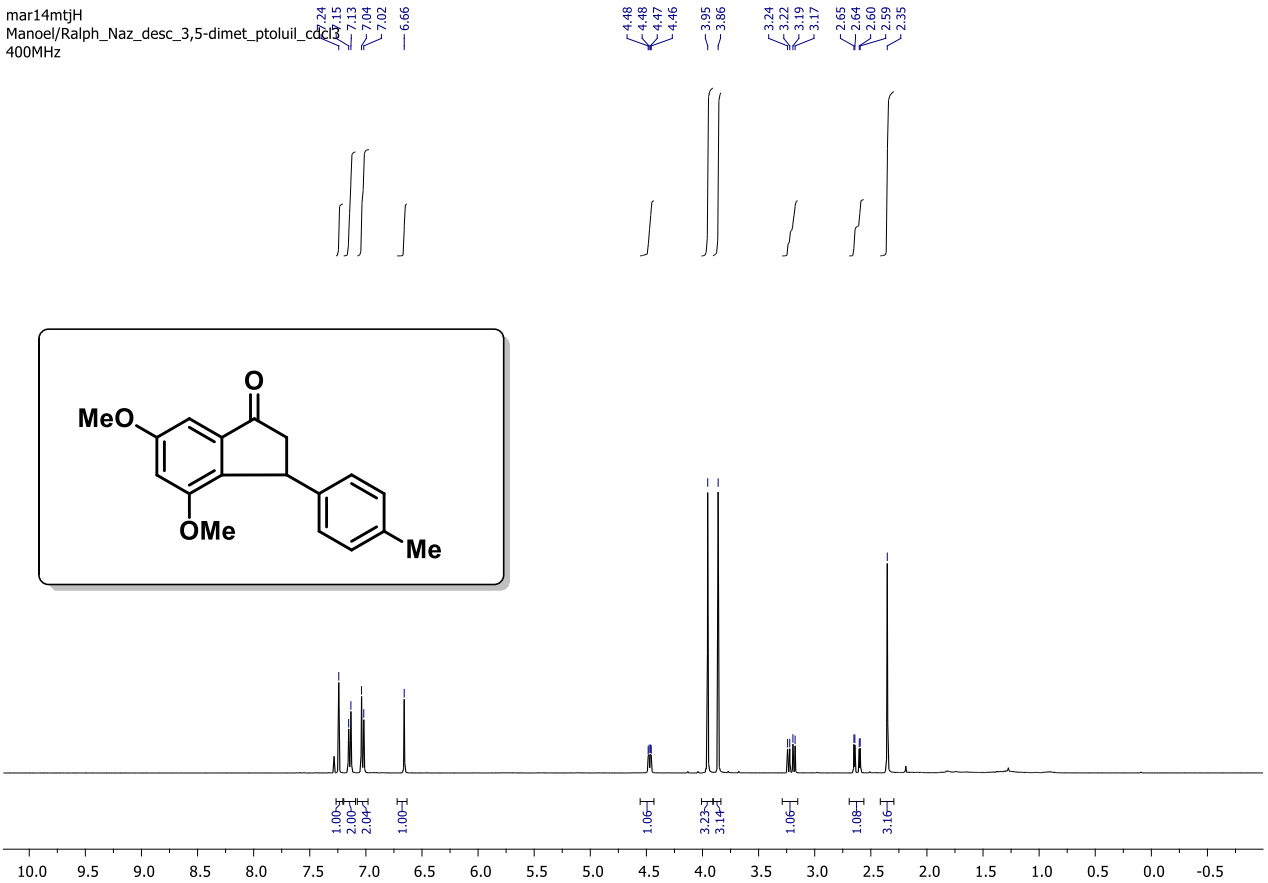

Figure S71. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **11bj.**

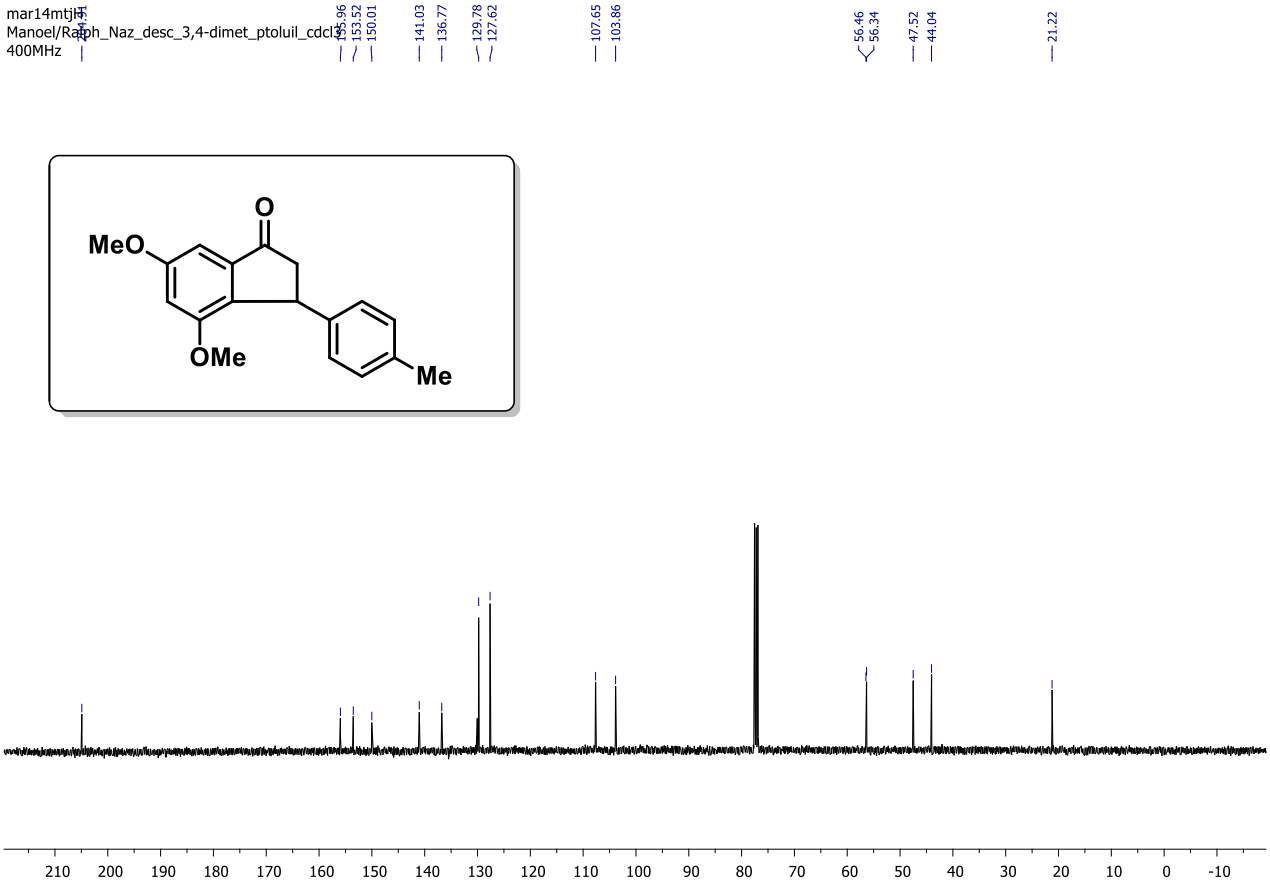

Figure S72. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **11bj.**

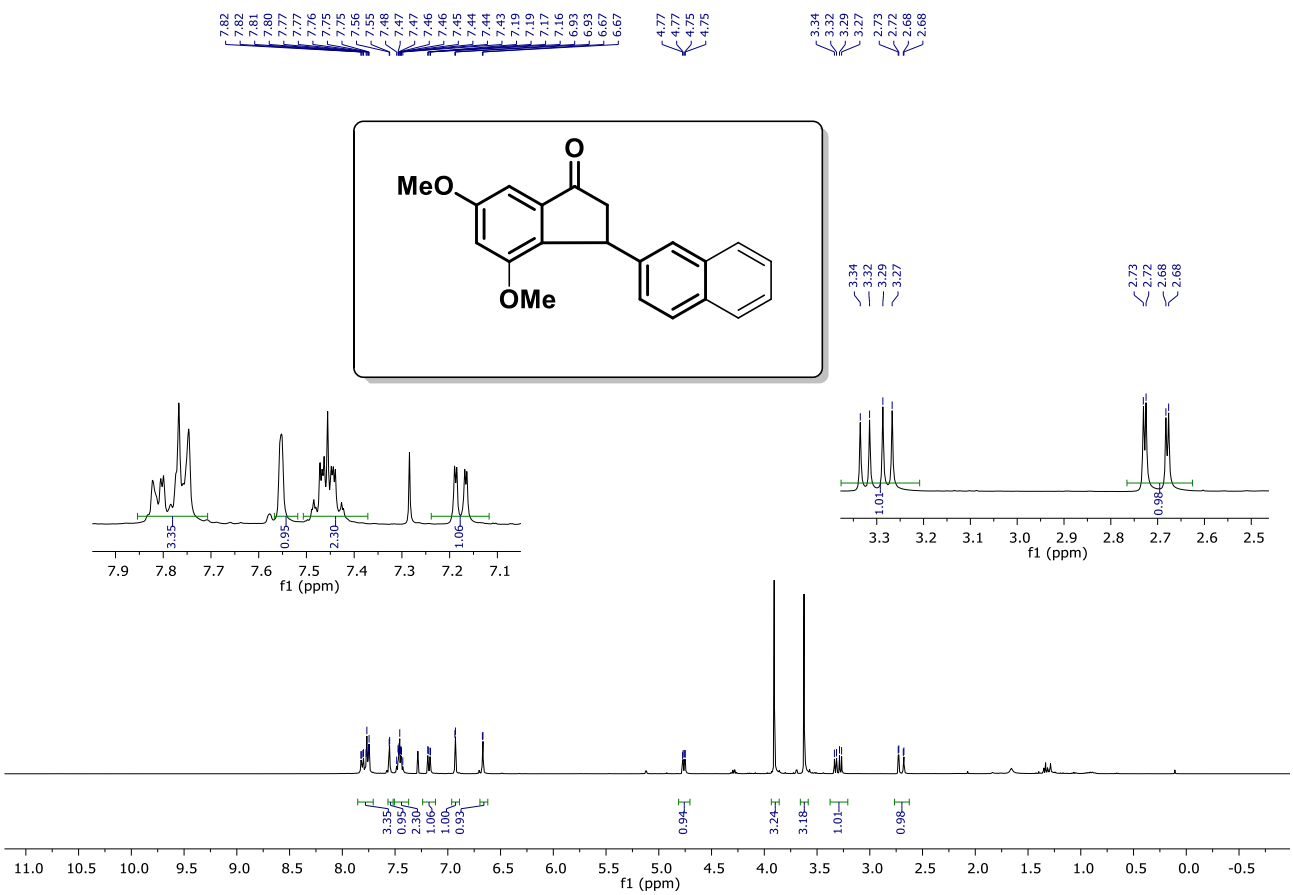

Figure S73. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **11bk.**

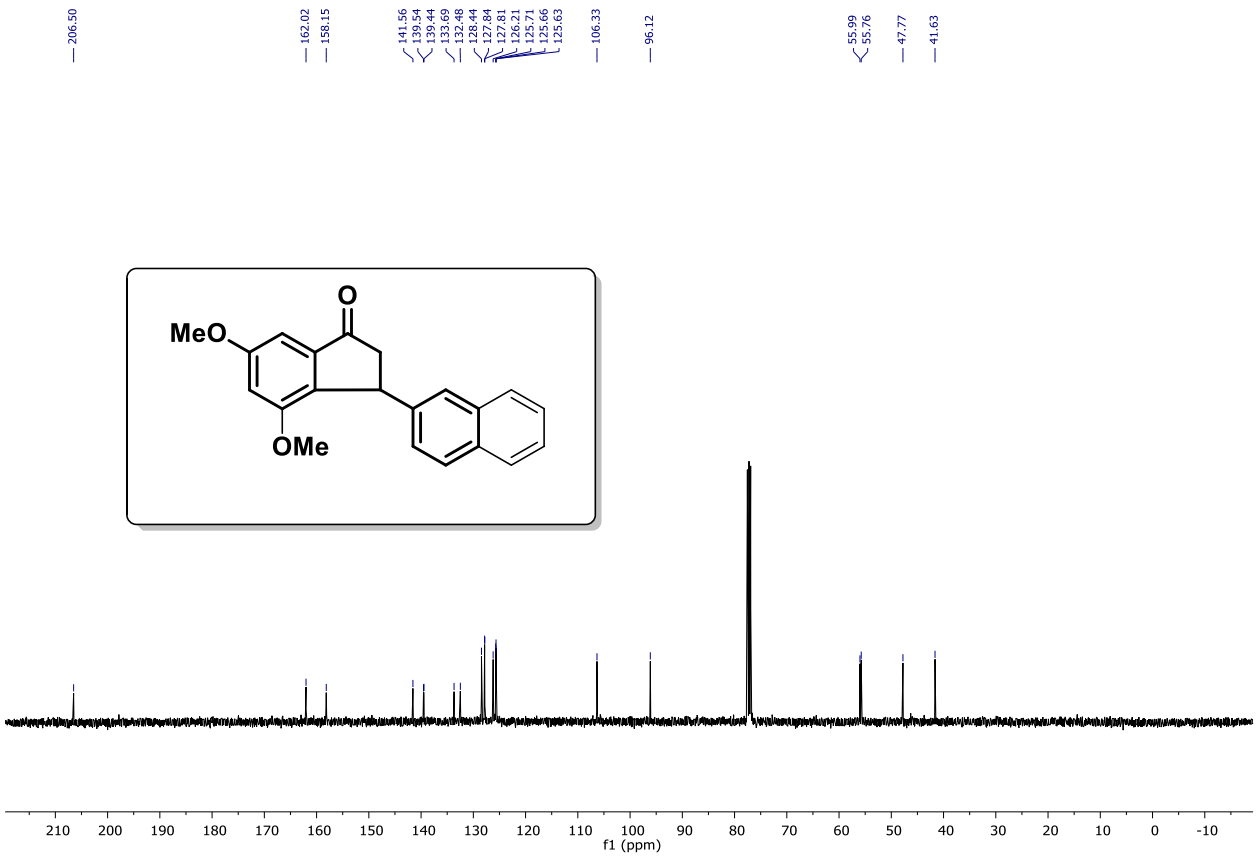

Figure S74. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **11bk.**

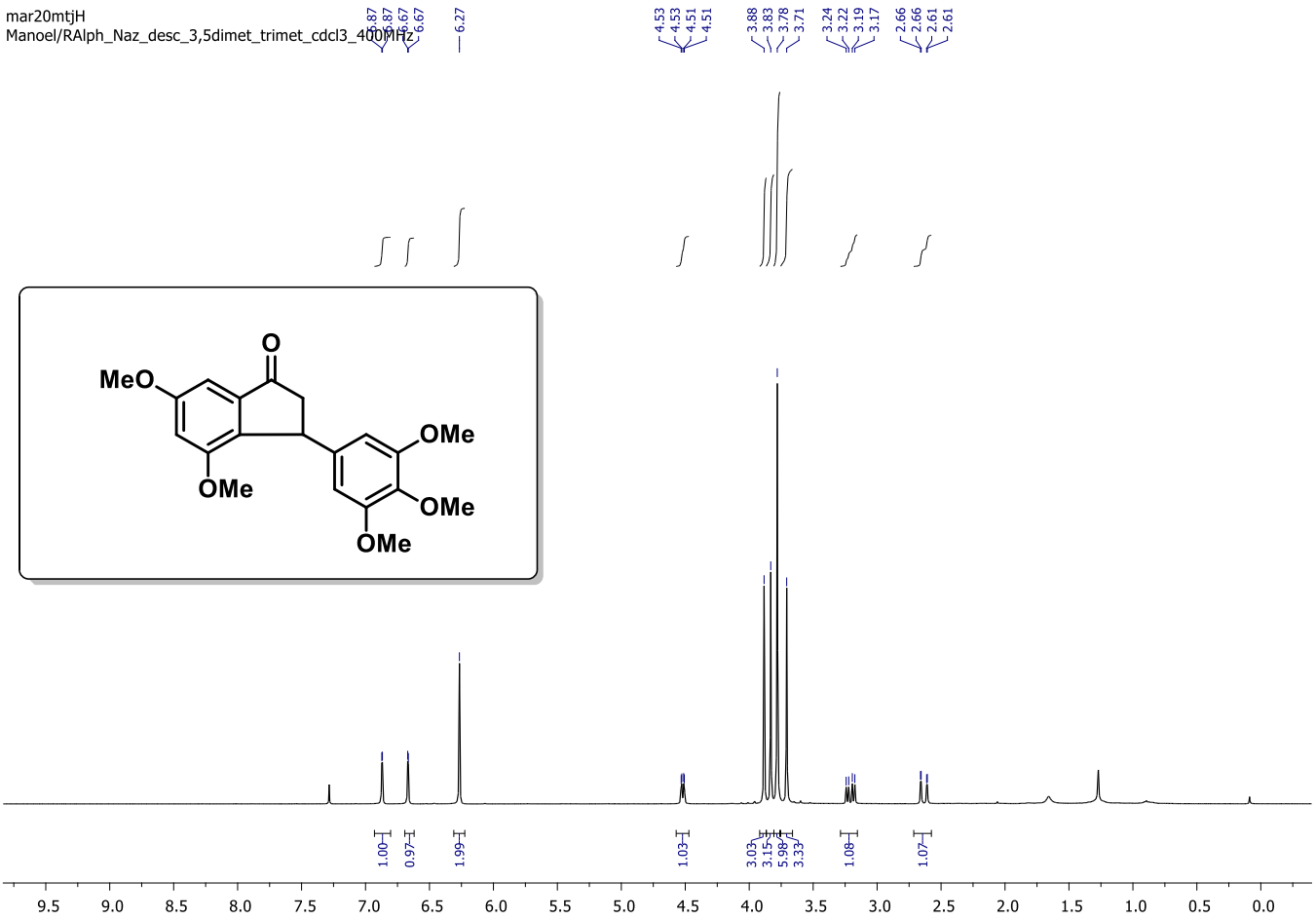

Figure S75. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **11bc.**

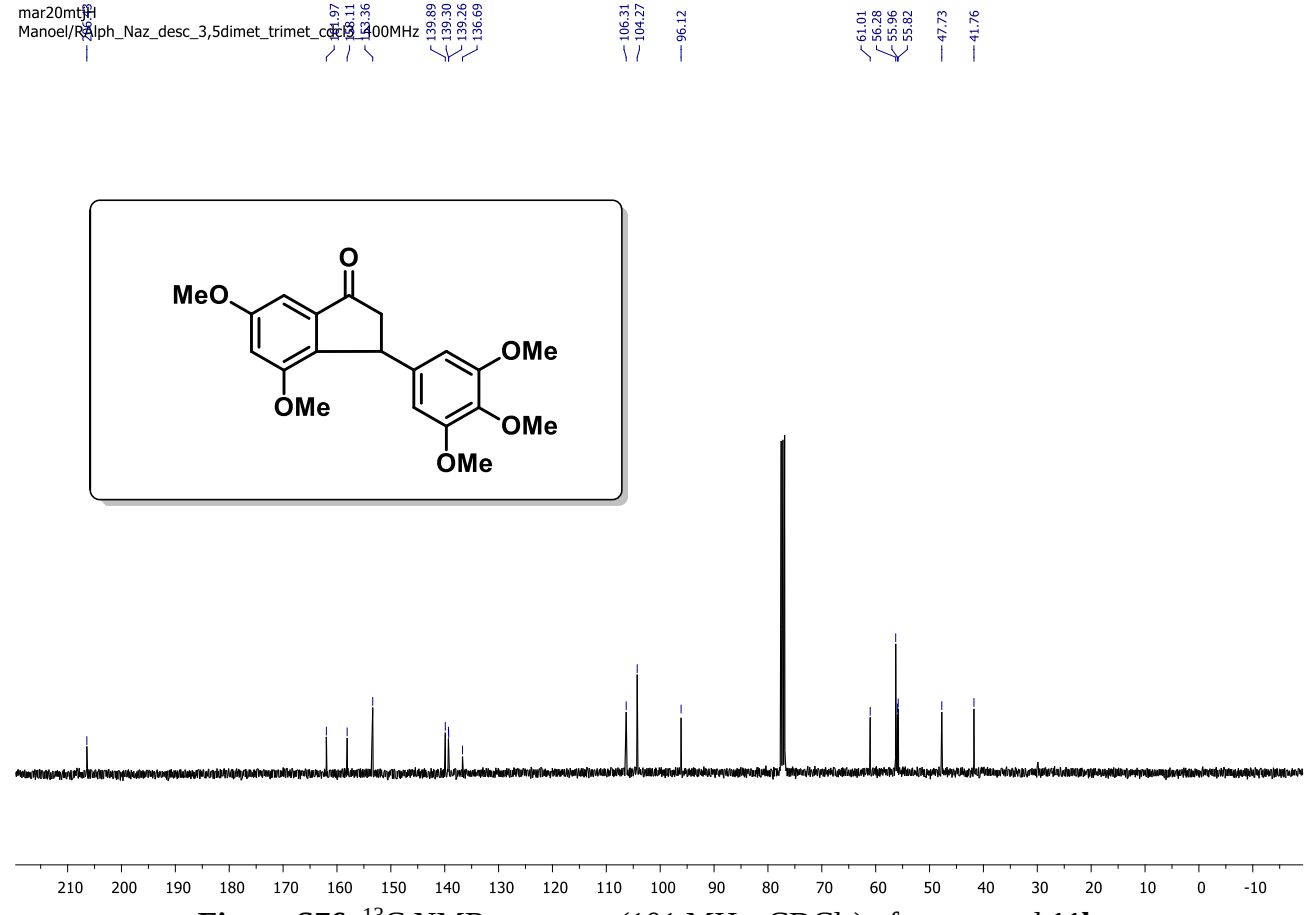

Figure S76. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **11bc.**

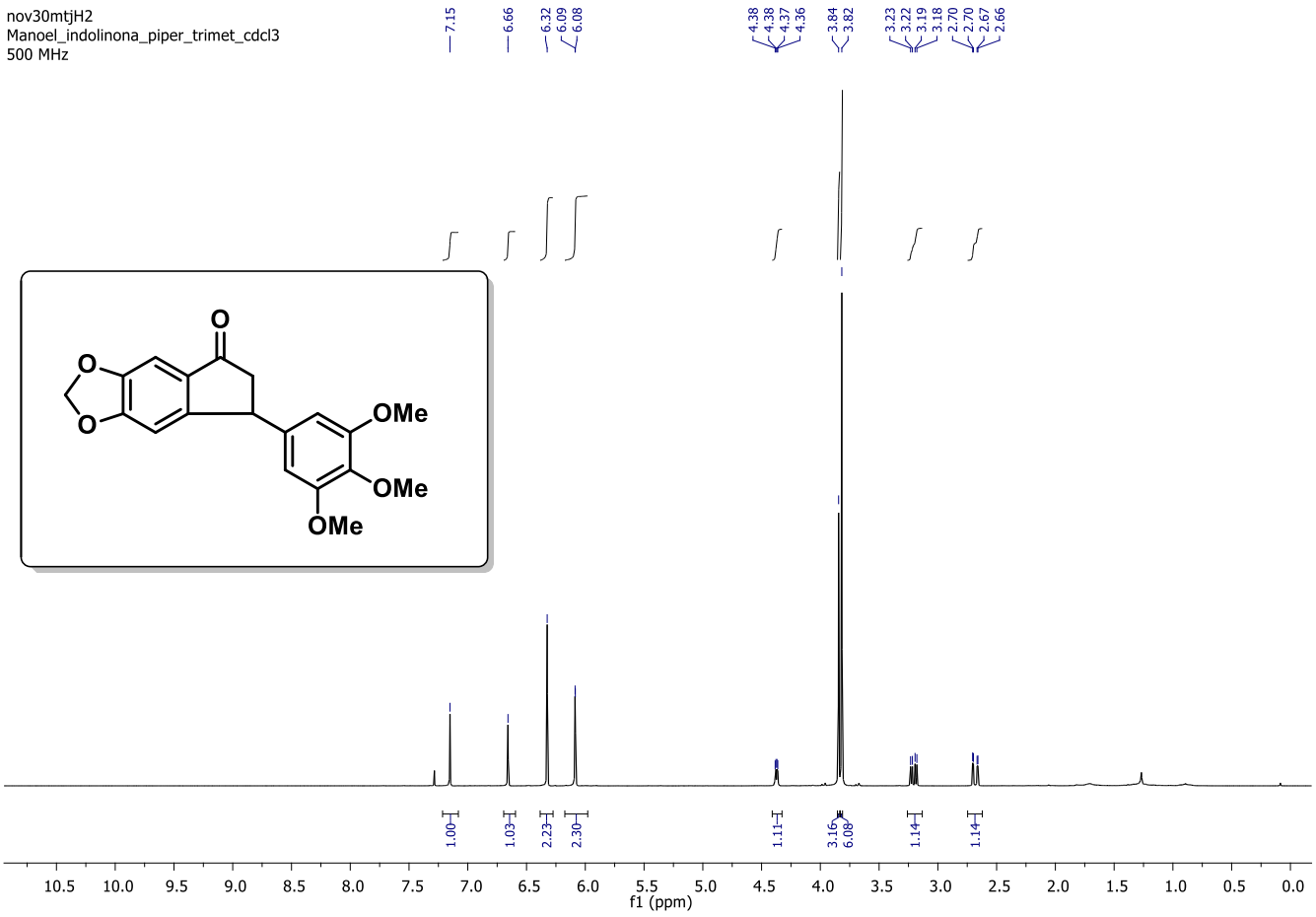

Figure S77. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **11dc.**

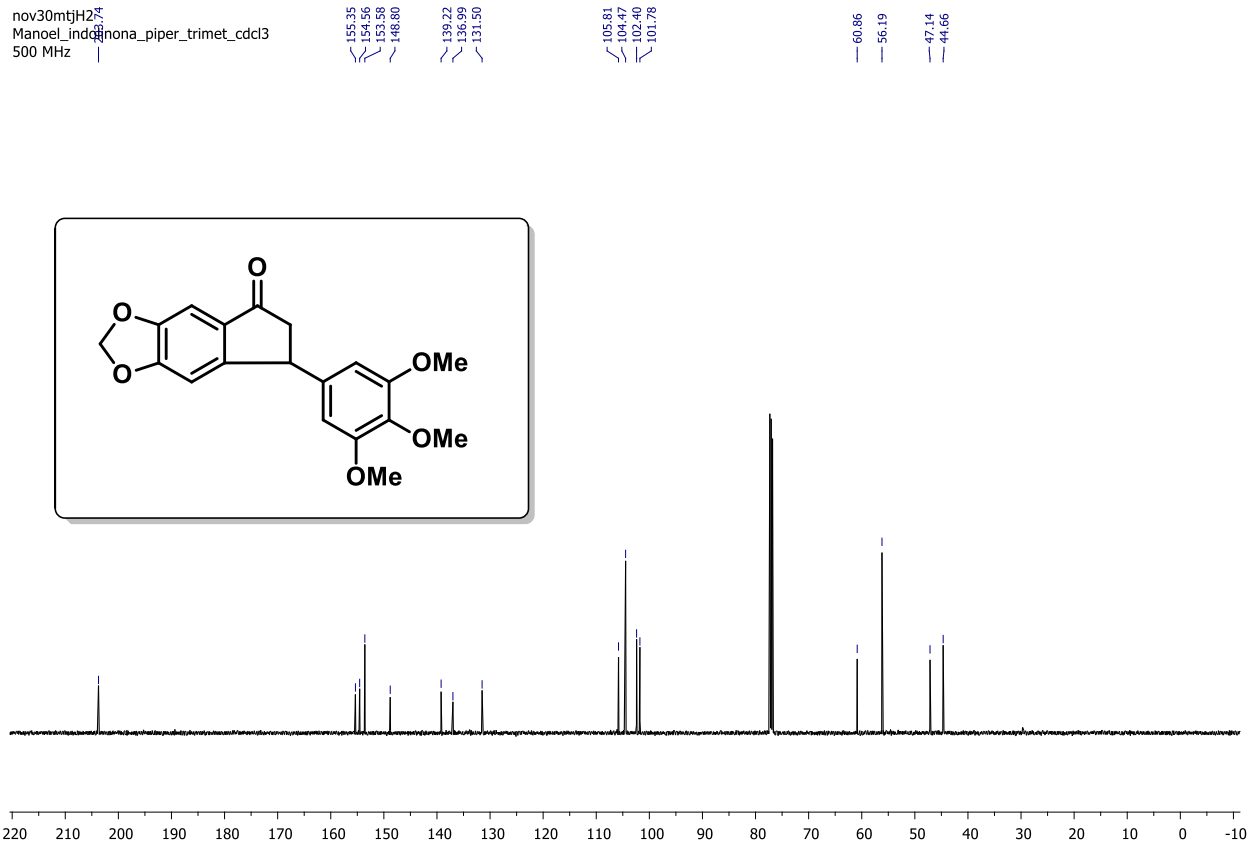

Figure S78. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **11dc.**

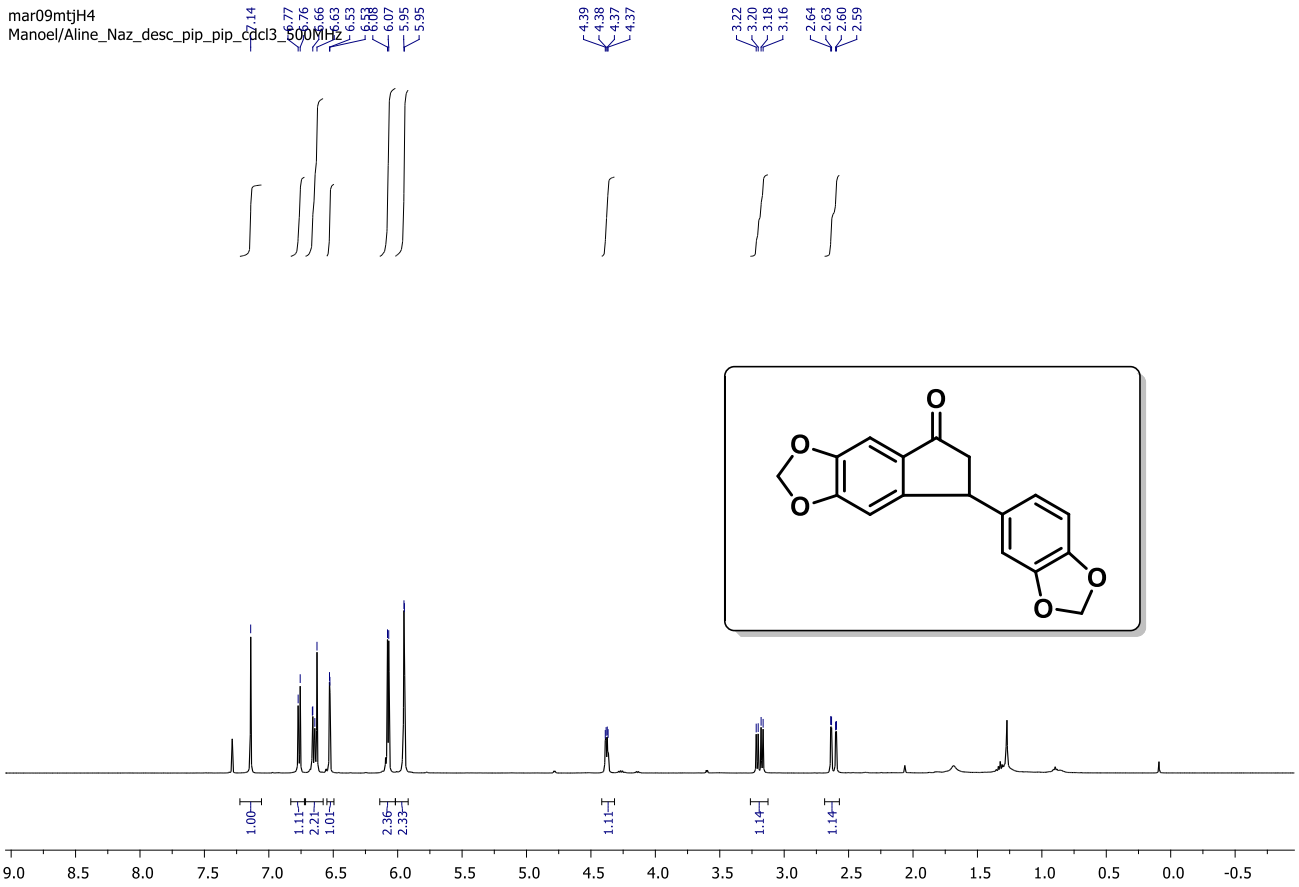

Figure S79. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **11dl.**

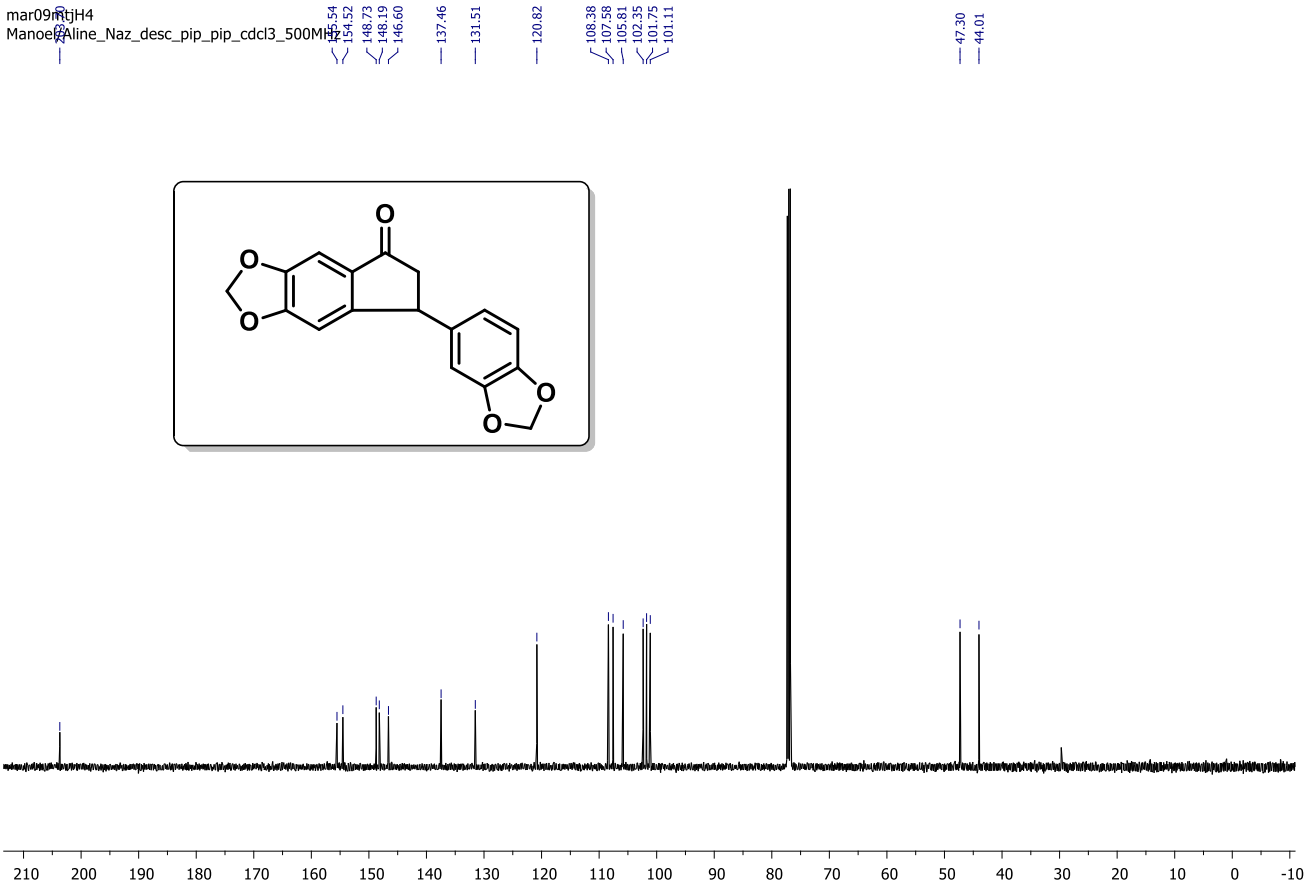

Figure S80. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **11dl.**

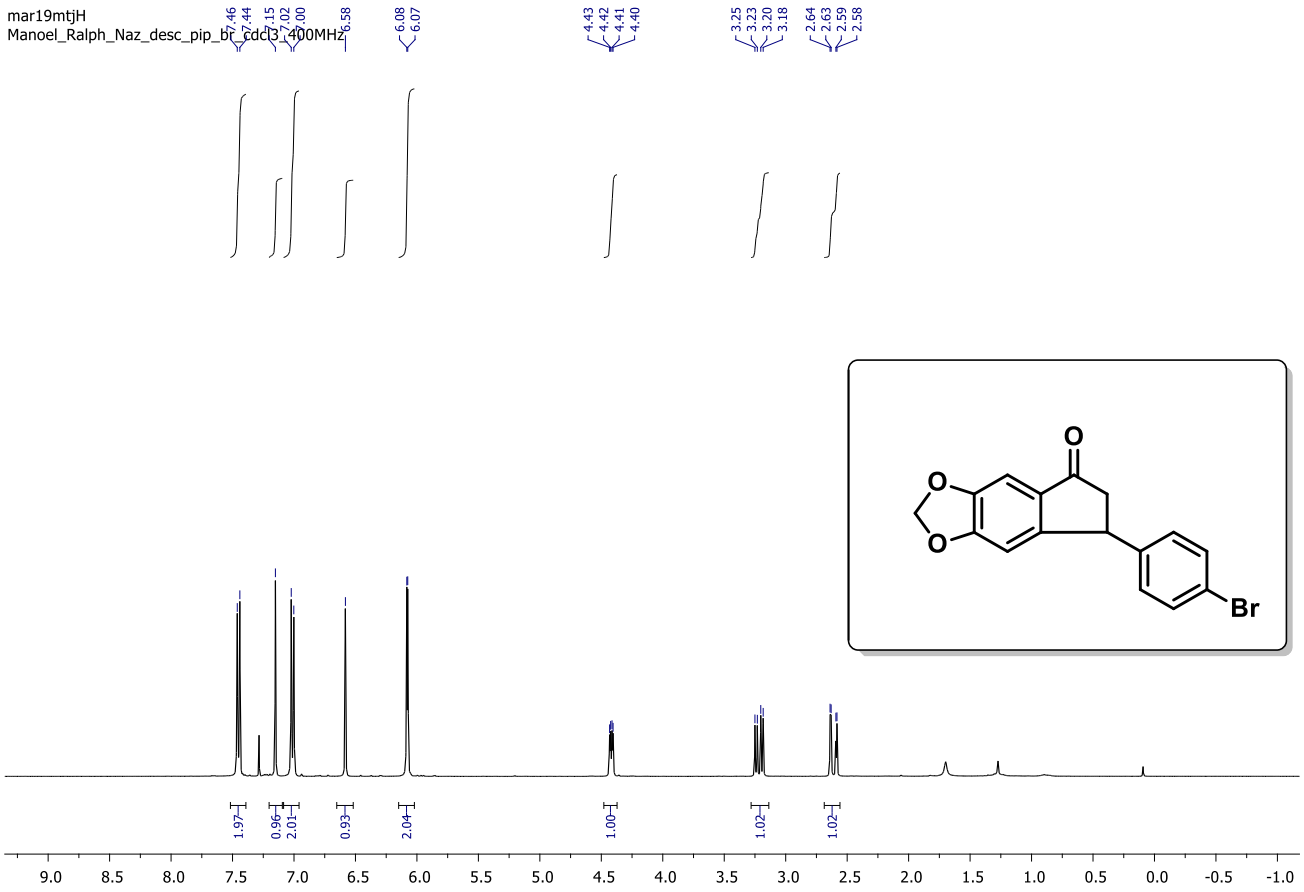

Figure S81. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **11dm.**

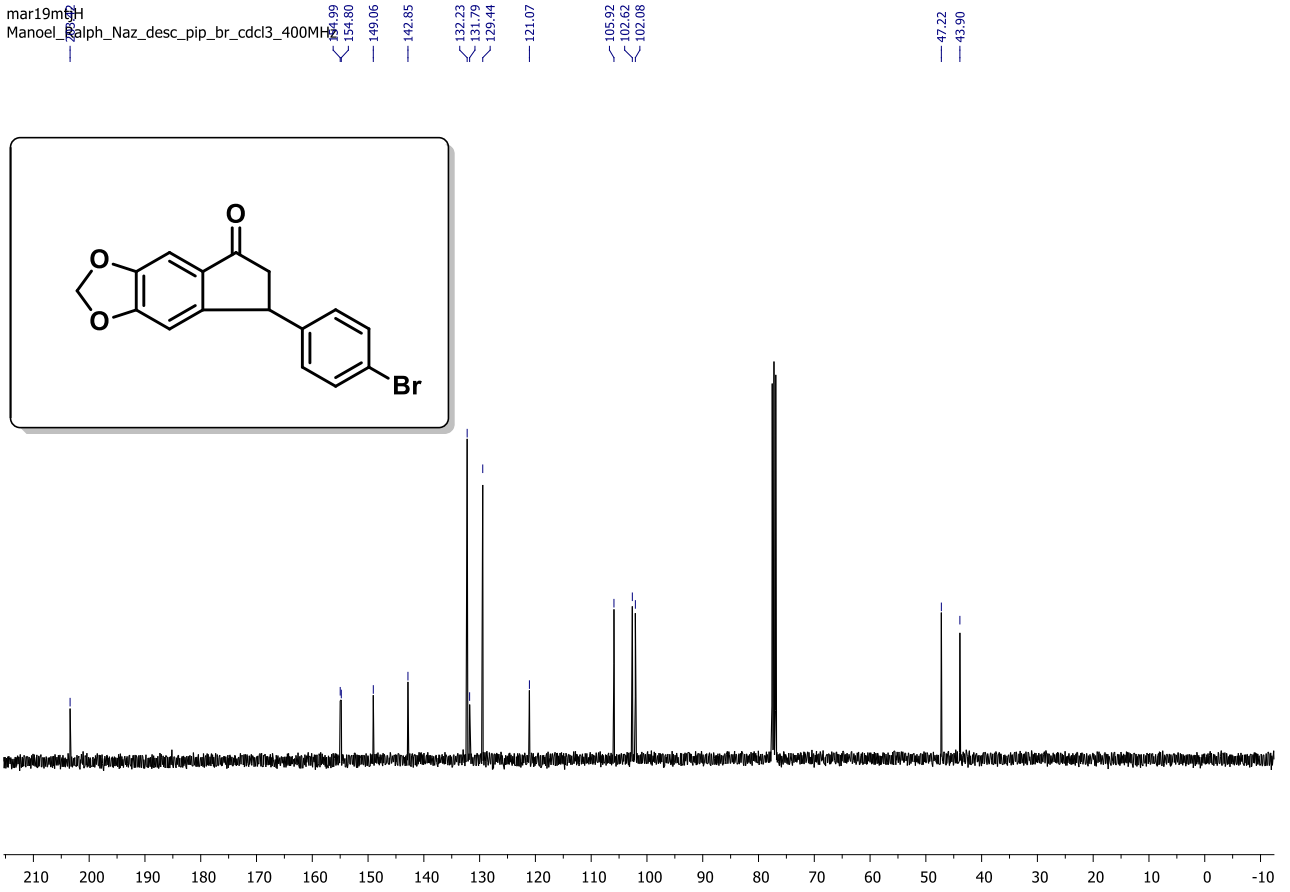

Figure S82. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **11dm.**

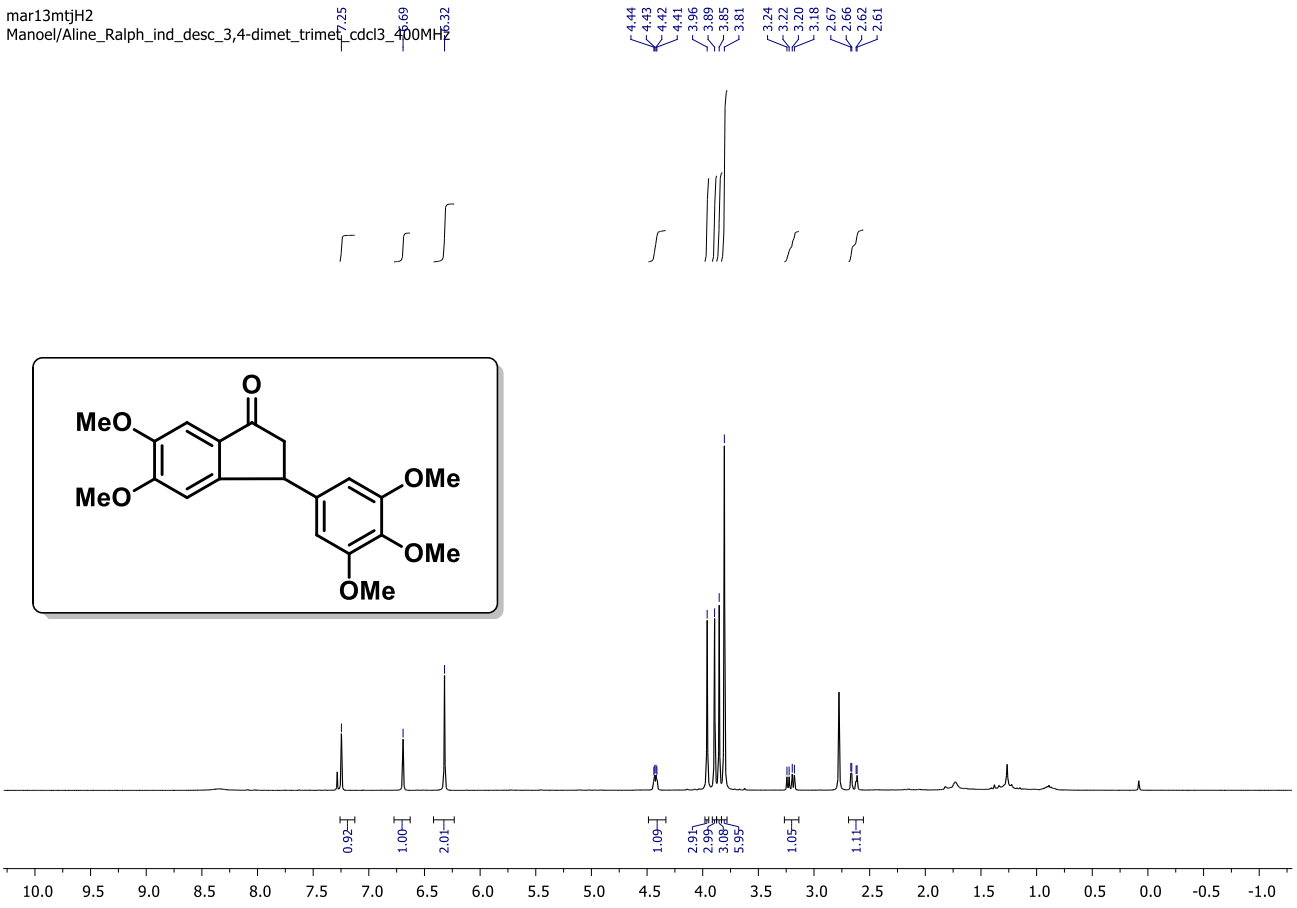

Figure S83. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **11cc.**

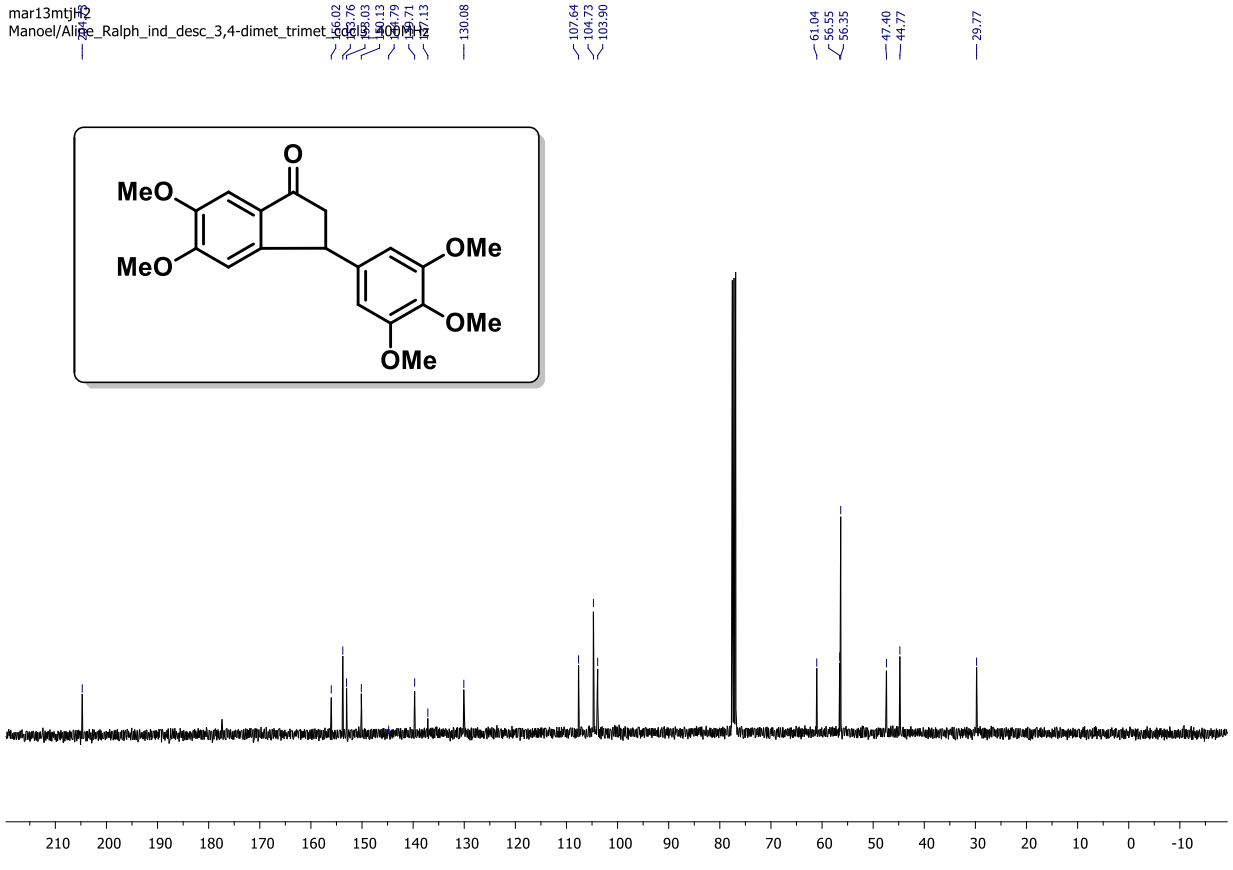

Figure S84. ^{13}C NMR spectrum (101 MHz, $CDCl_3$) of compound **11cc.**

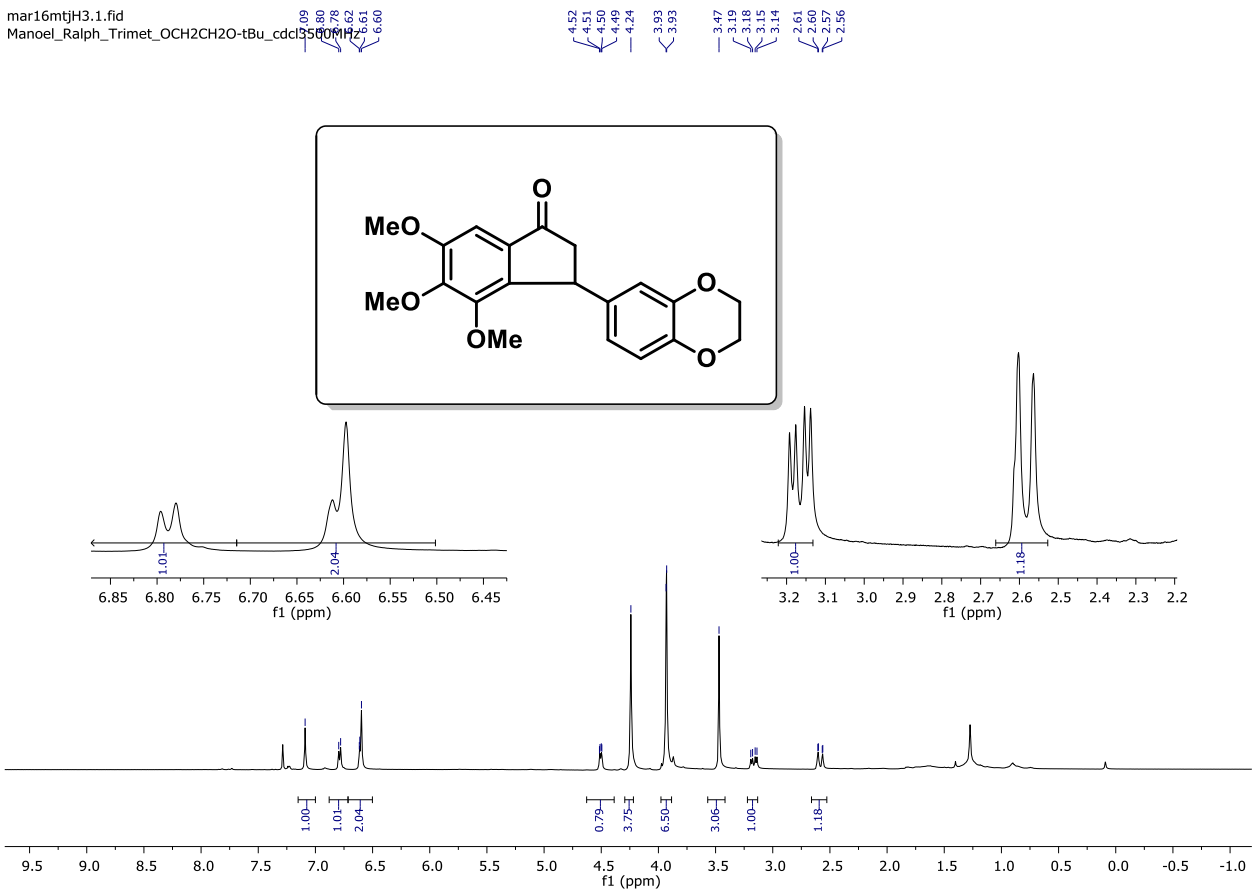

Figure S85. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **11ae.**

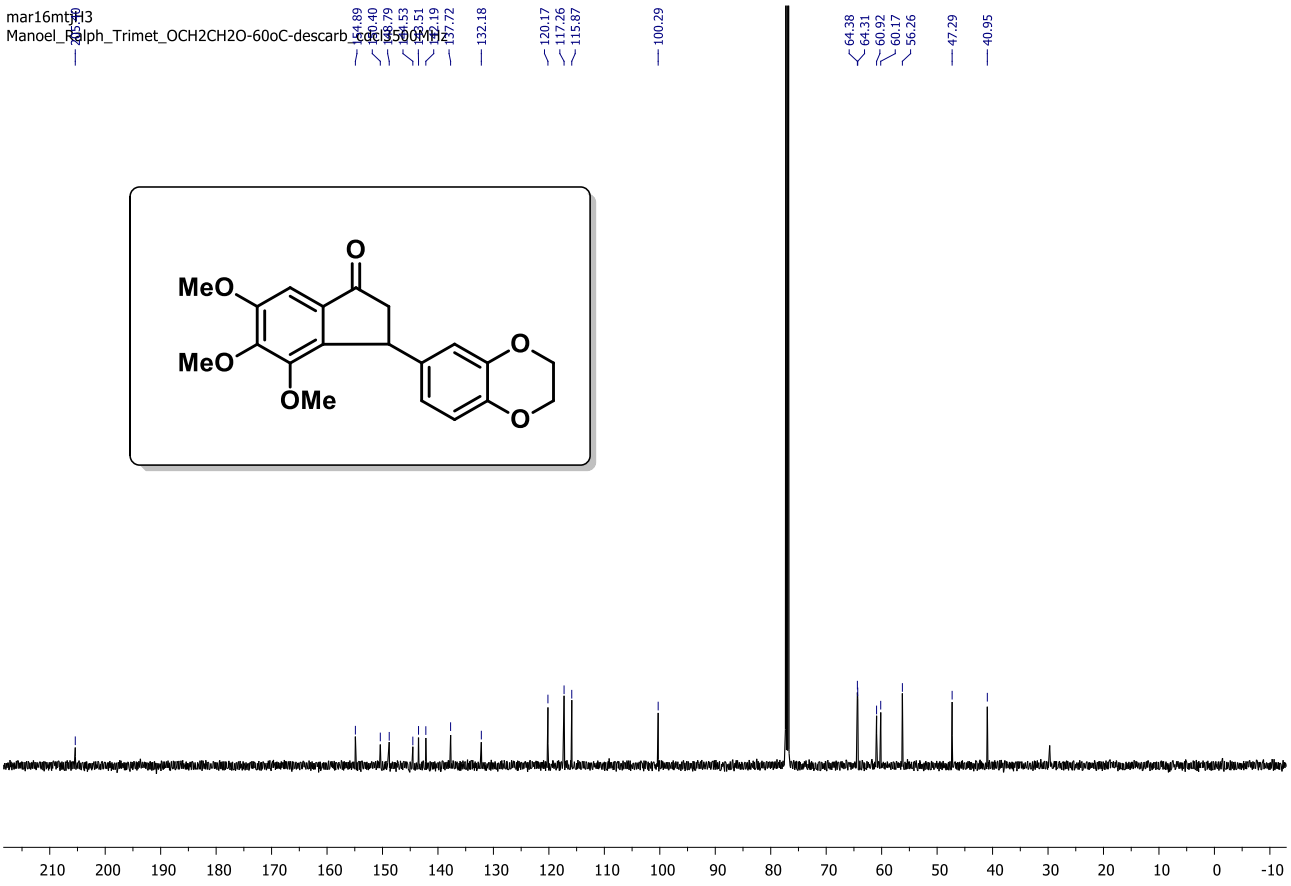

Figure S86. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **11ae.**

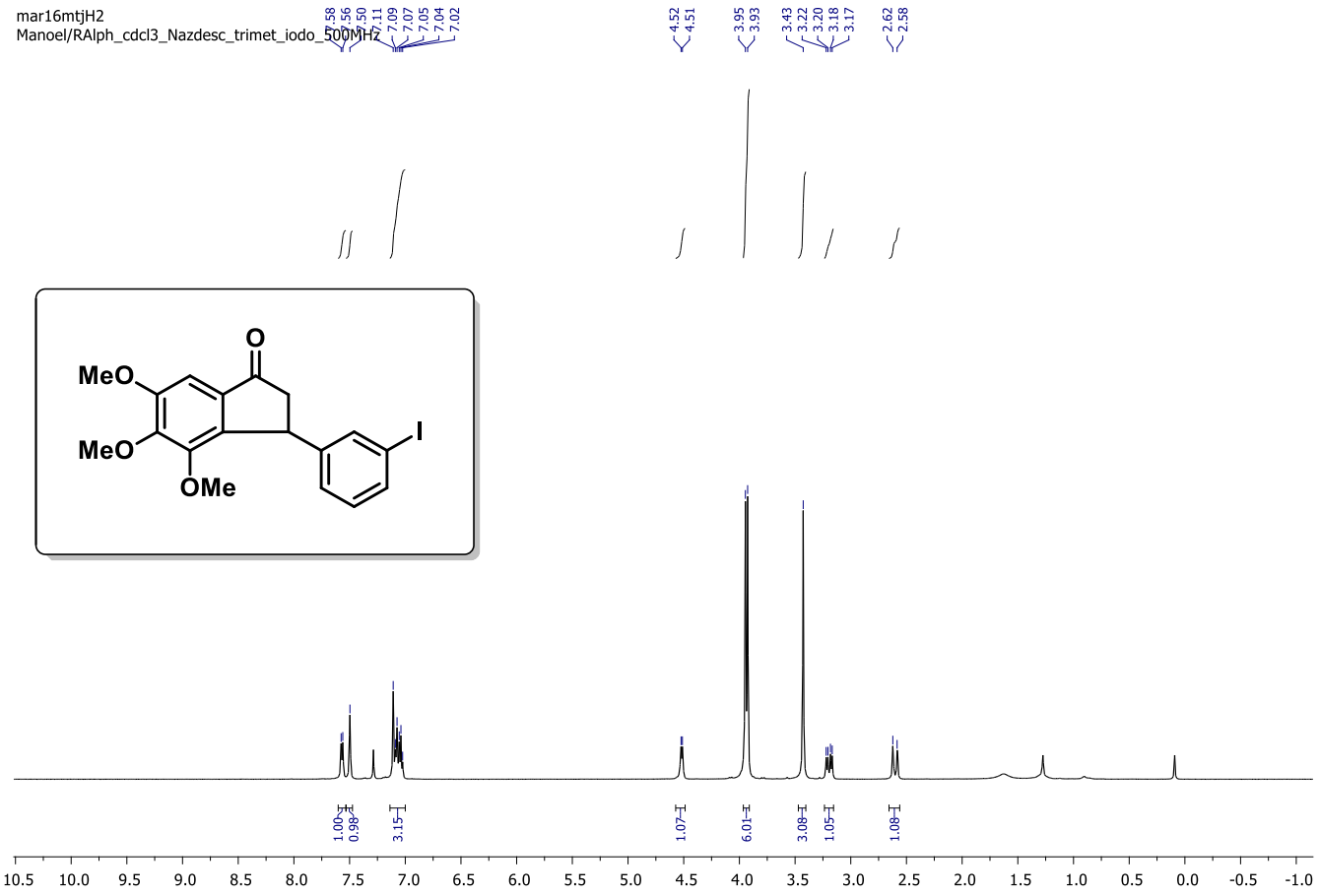

Figure S87. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **11af.**

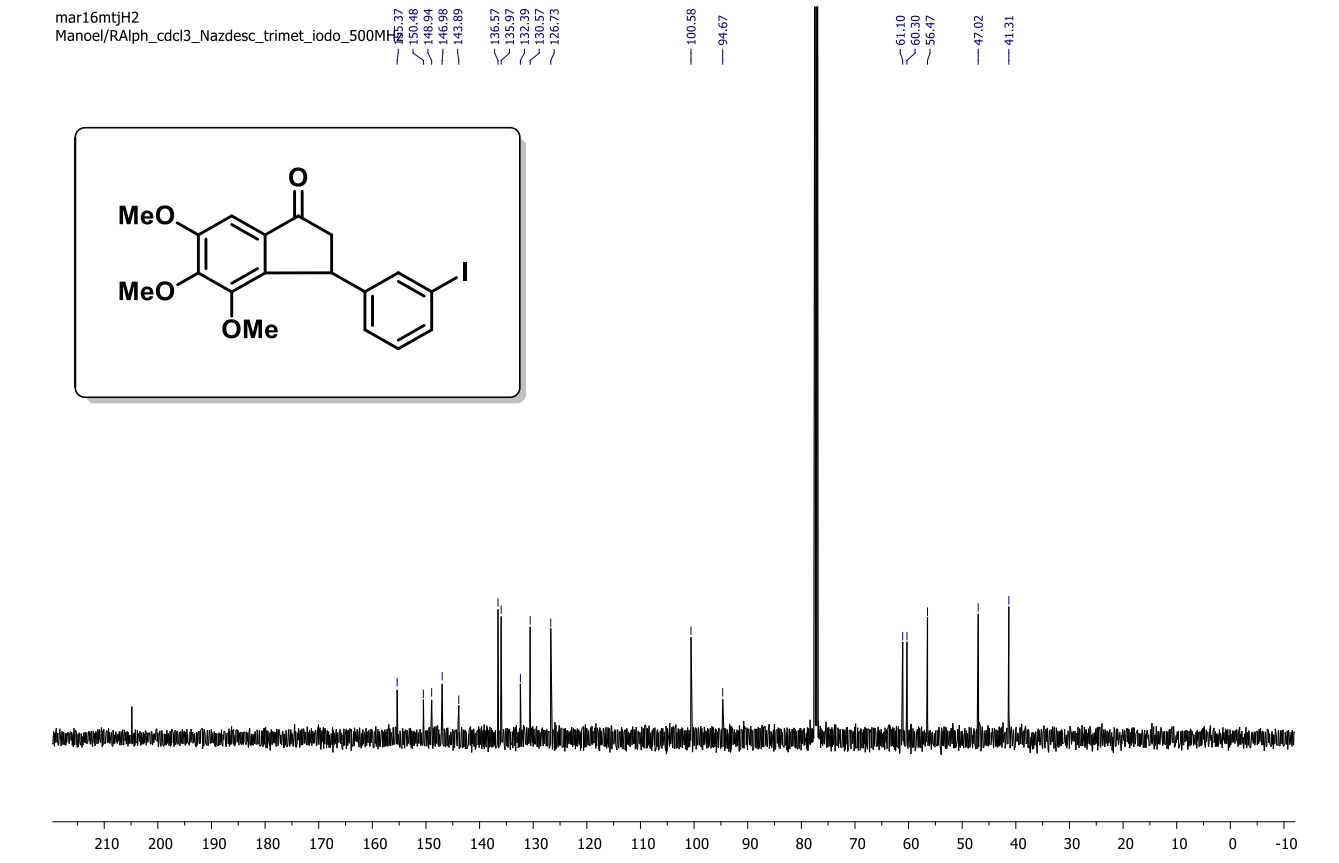

Figure S88. ^{13}C NMR spectrum (126 MHz, $CDCl_3$) of compound **11af.**