

Supplementary Materials: Syntheses of 4-Indolylquinoline Derivatives via Reductive Cyclization of Indolynitrochalcone Derivatives by Fe/HCl

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$^1\text{H-NMR}$ and $^{13}\text{C-NMR}$ Spectra copies

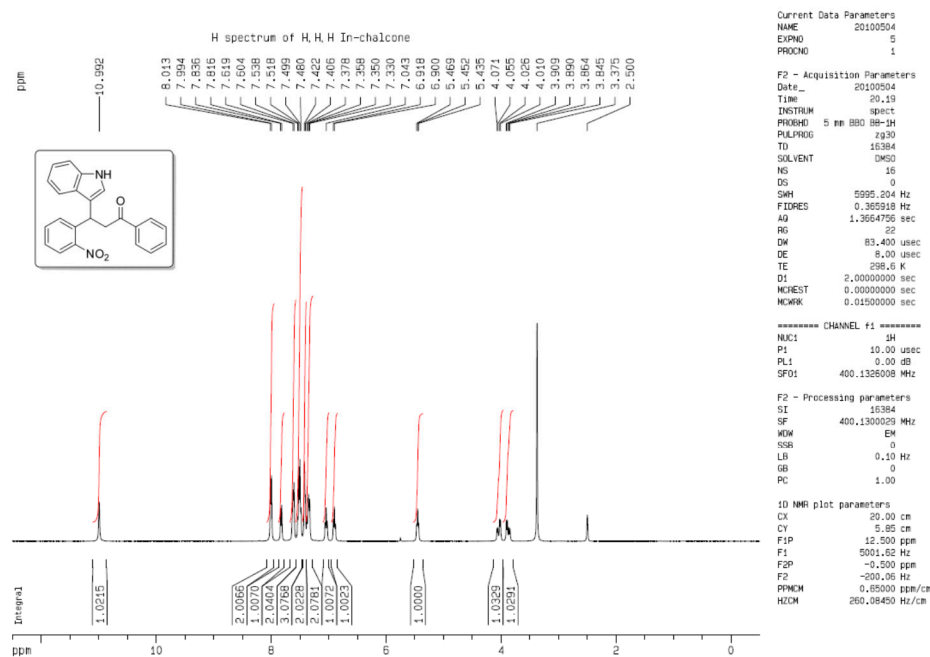


Figure S1. $^1\text{H-NMR}$ of 3-(1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3a).

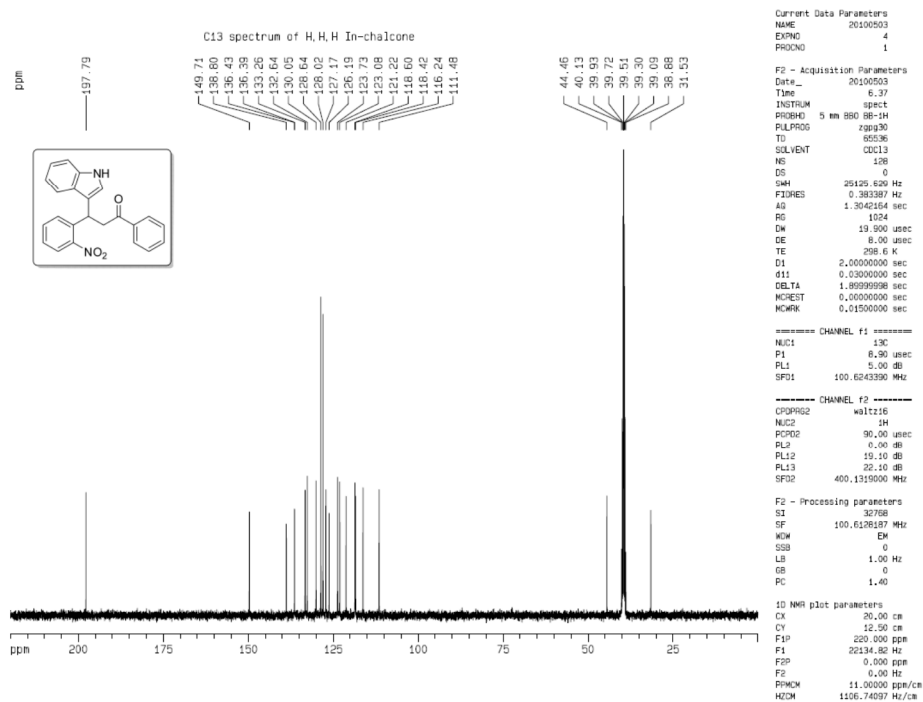


Figure S2. ¹³C-NMR of 3-(1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3a).

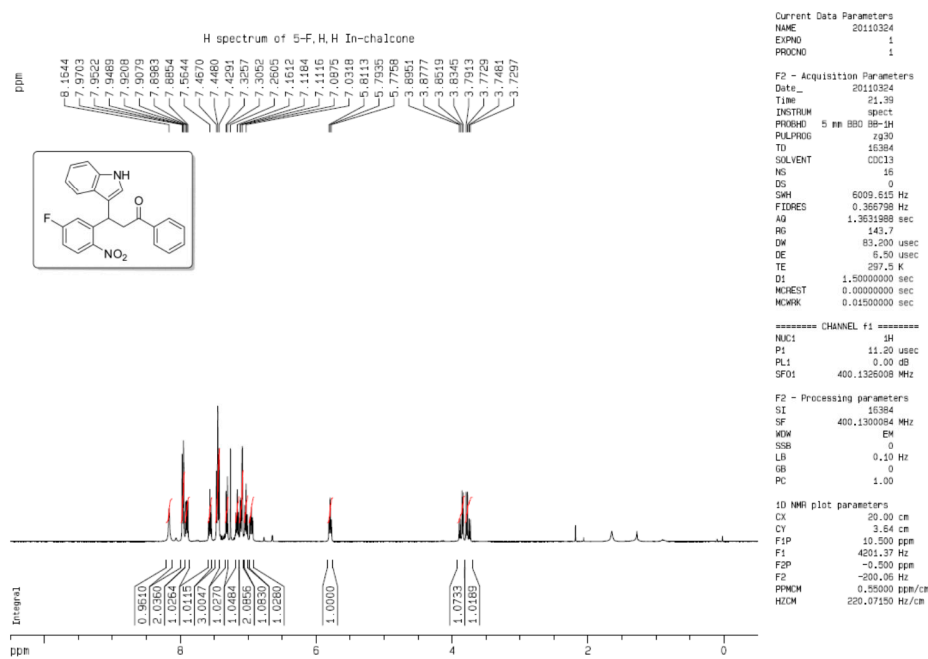


Figure S3. 3-(5-fluoro-2-nitrophenyl)-3-(1H-indol-3-yl)-1-phenylpropan-1-one (3b).

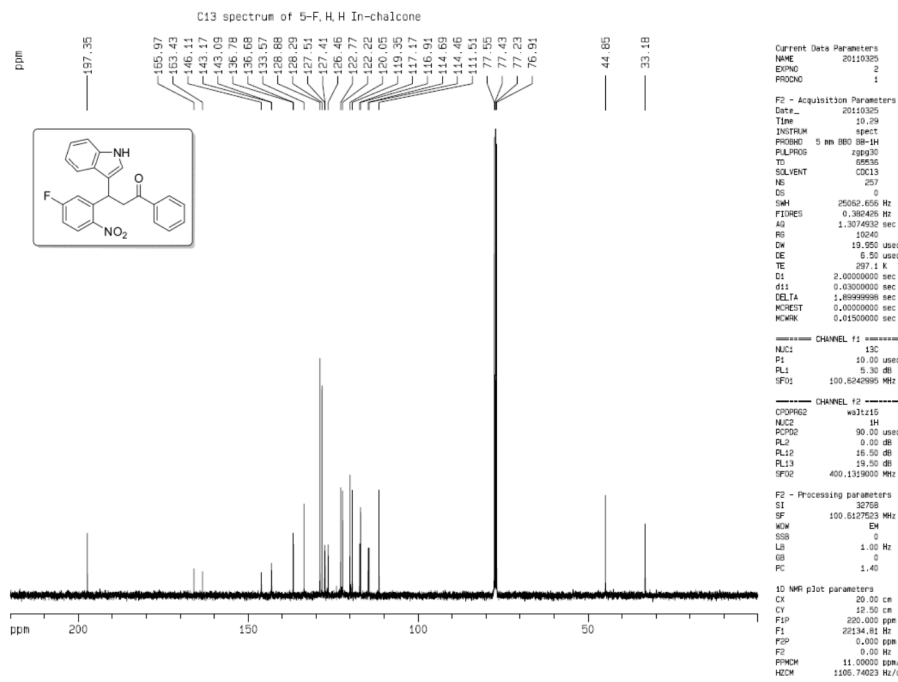


Figure S4. 3-(5-fluoro-2-nitrophenyl)-3-(1H-indol-3-yl)-1-phenylpropan-1-one (3b).

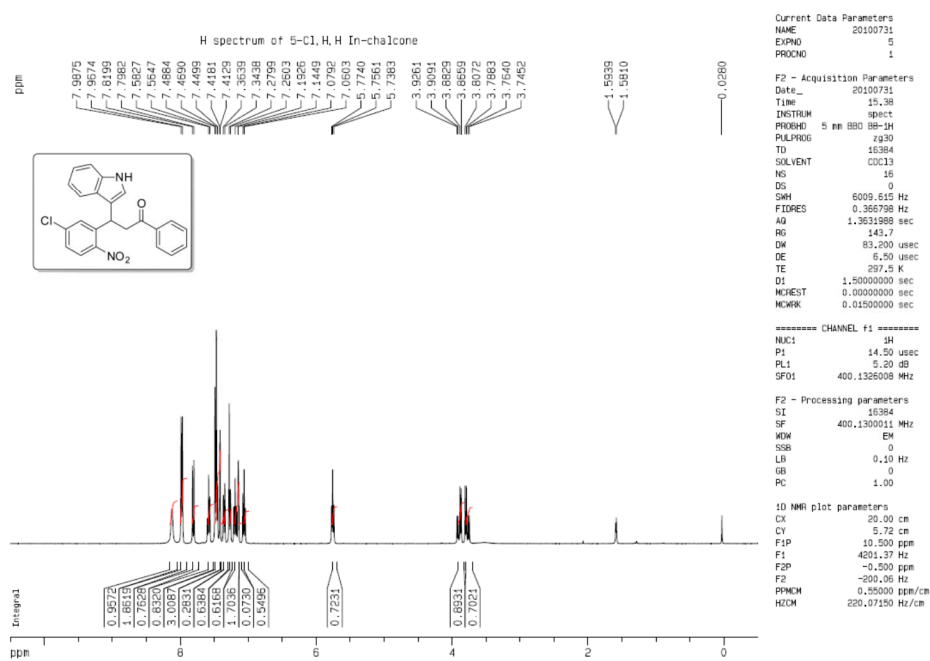


Figure S5. 3-(5-chloro-2-nitrophenyl)-3-(1H-indol-3-yl)-1-phenylpropan-1-one (3c).

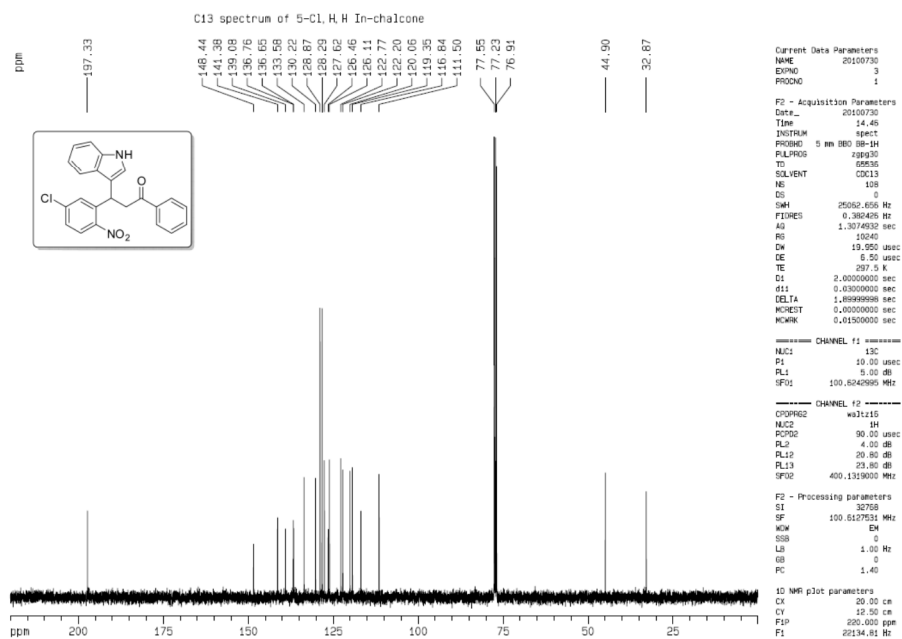


Figure S6. 3-(5-chloro-2-nitrophenyl)-3-(1H-indol-3-yl)-1-phenylpropan-1-one (3c).

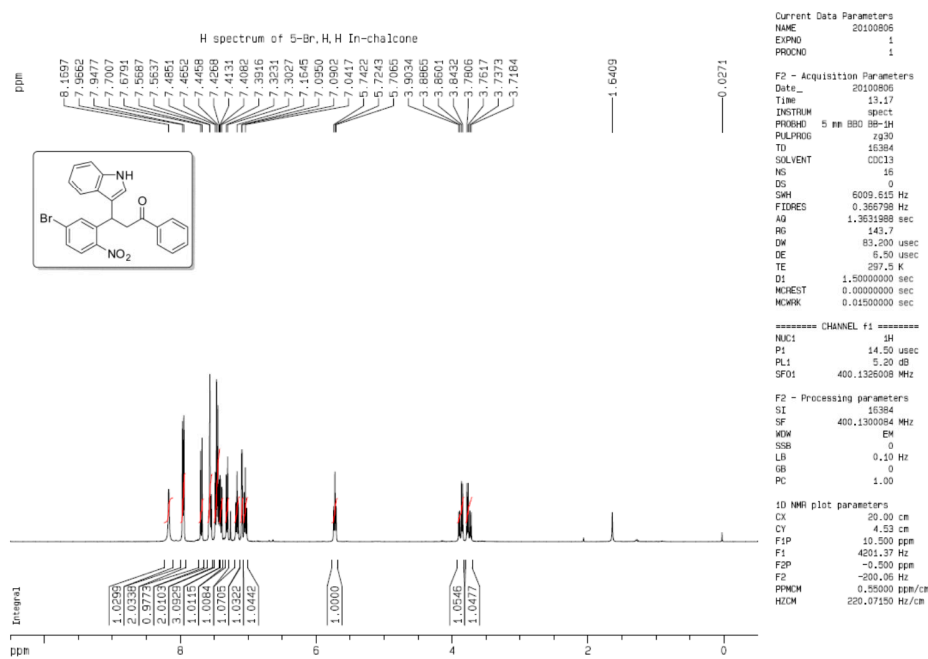


Figure S7. ¹H-NMR 3-(5-bromo-2-nitrophenyl)-3-(1H-indol-3-yl)-1-phenylpropan-1-one (3d).

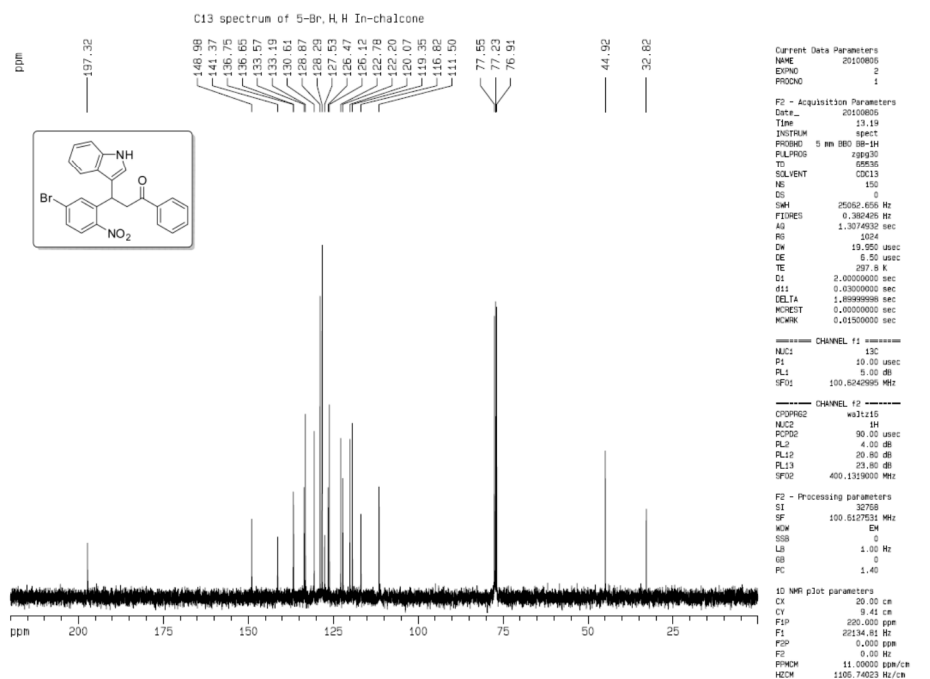


Figure S8. ¹H-NMR 3-(5-bromo-2-nitrophenyl)-3-(1H-indol-3-yl)-1-phenylpropan-1-one (3d).

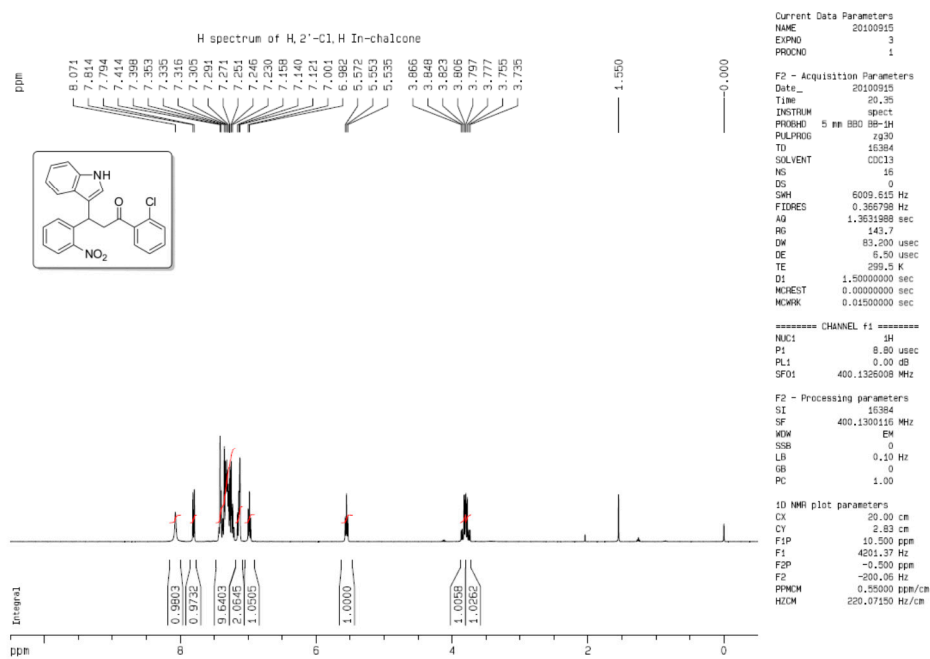


Figure S9. ¹H-NMR 1-(2-chlorophenyl)-3-(1H-indol-3-yl)-3-(2-nitrophenyl)propan-1-one (3e).

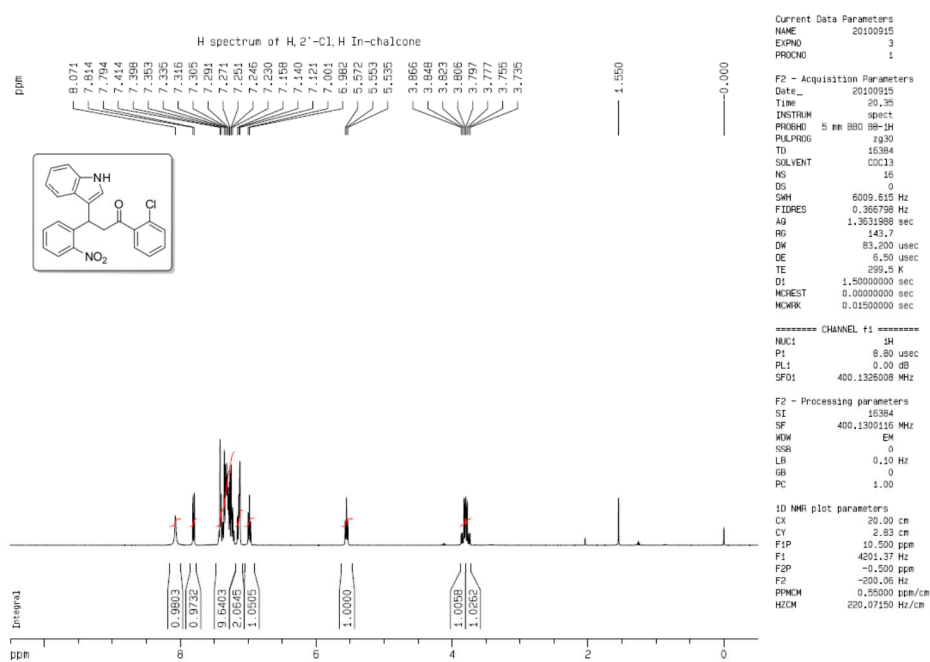


Figure S10. ¹H-NMR 1-(2-chlorophenyl)-3-(1H-indol-3-yl)-3-(2-nitrophenyl)propan-1-one (3e).

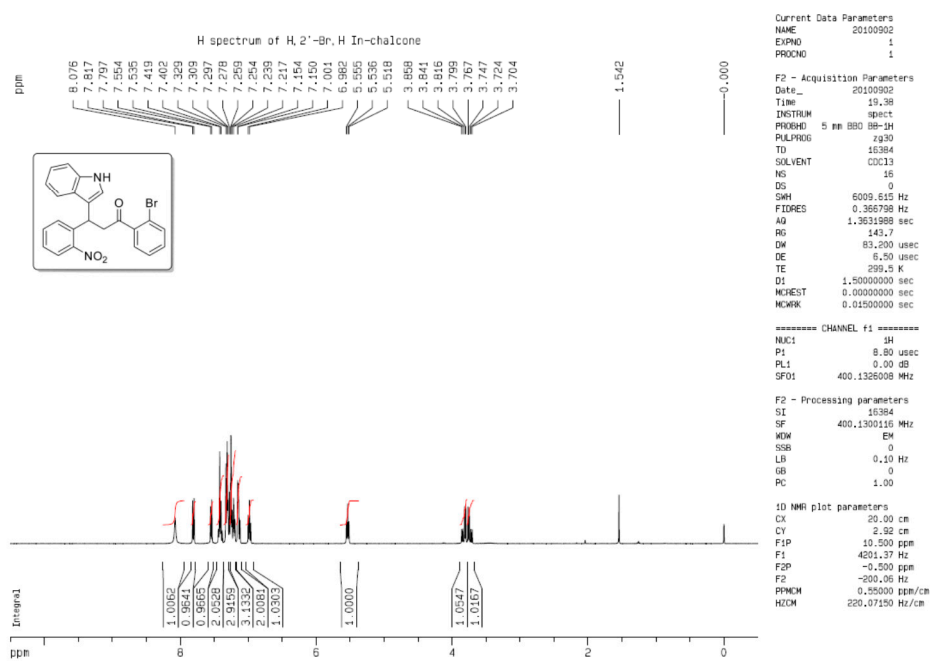


Figure S11. ¹H-NMR 1-(2-bromophenyl)-3-(1H-indol-3-yl)-3-(2-nitrophenyl)propan-1-one (3f).

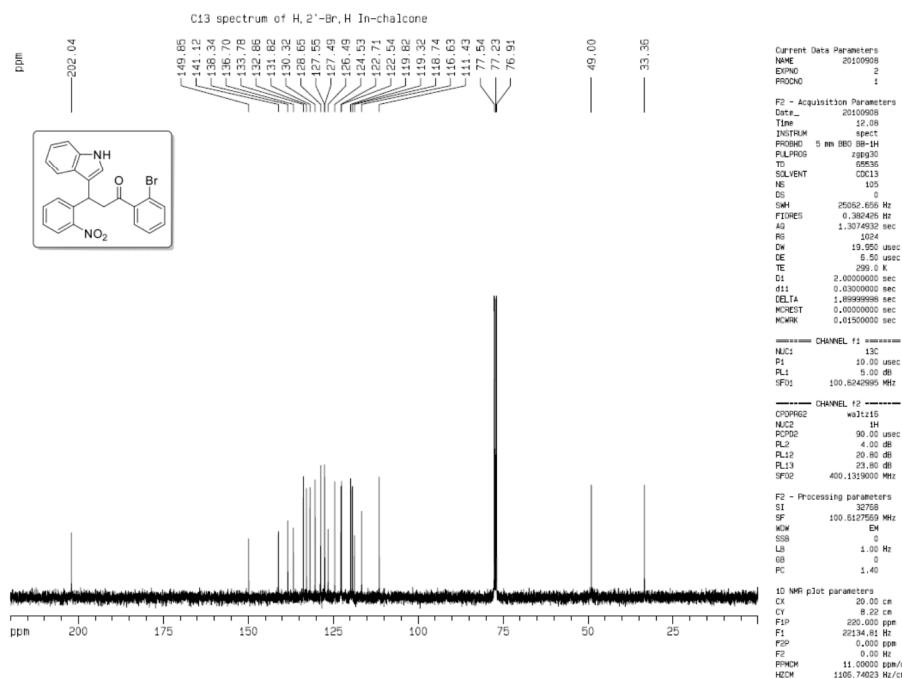


Figure S12. ^{13}C -NMR 1-(2-bromophenyl)-3-(1H-indol-3-yl)-3-(2-nitrophenyl)propan-1-one (3f).

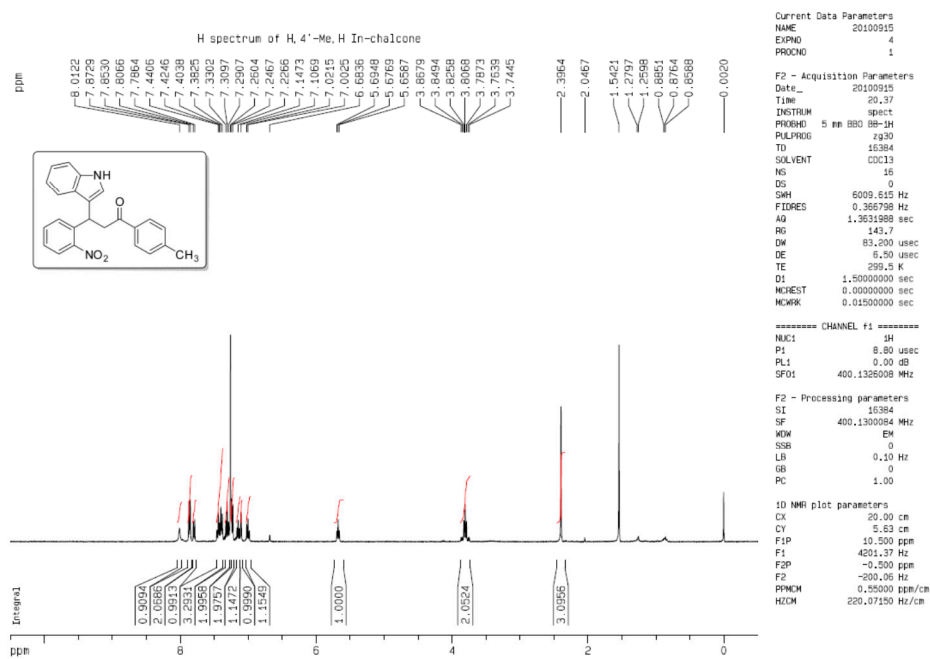


Figure S13. ^1H -NMR 3-(1H-indol-3-yl)-3-(2-nitrophenyl)-1-p-tolylpropan-1-one (3g).

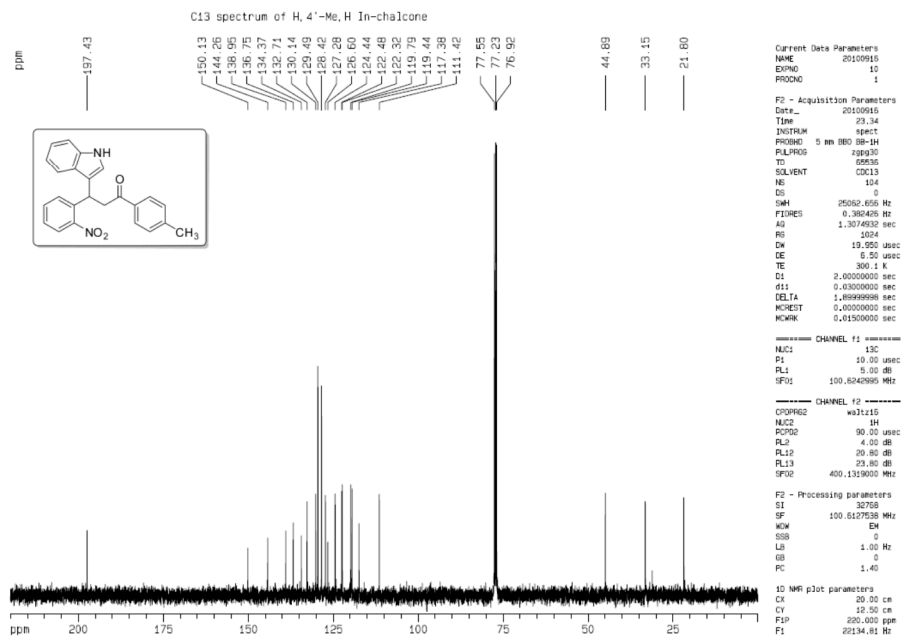


Figure S14. ¹³C-NMR 3-(1H-indol-3-yl)-3-(2-nitrophenyl)-1-p-tolylpropan-1-one (3g).

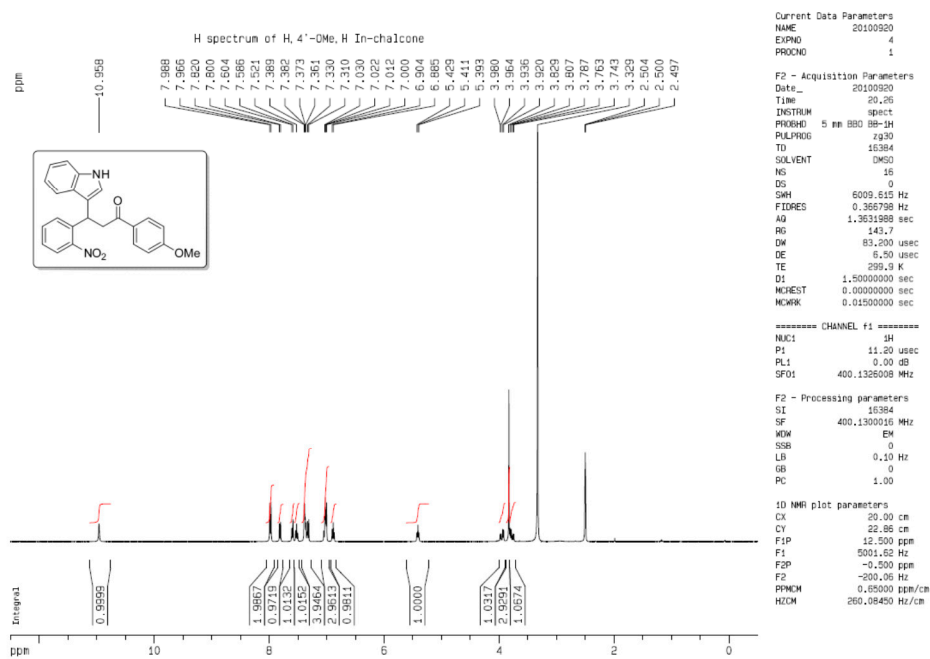


Figure S15. ¹H-NMR 3-(1H-Indol-3-yl)-1-(4-methoxyphenyl)-3-(2-nitrophenyl)propan-1-one (3h).

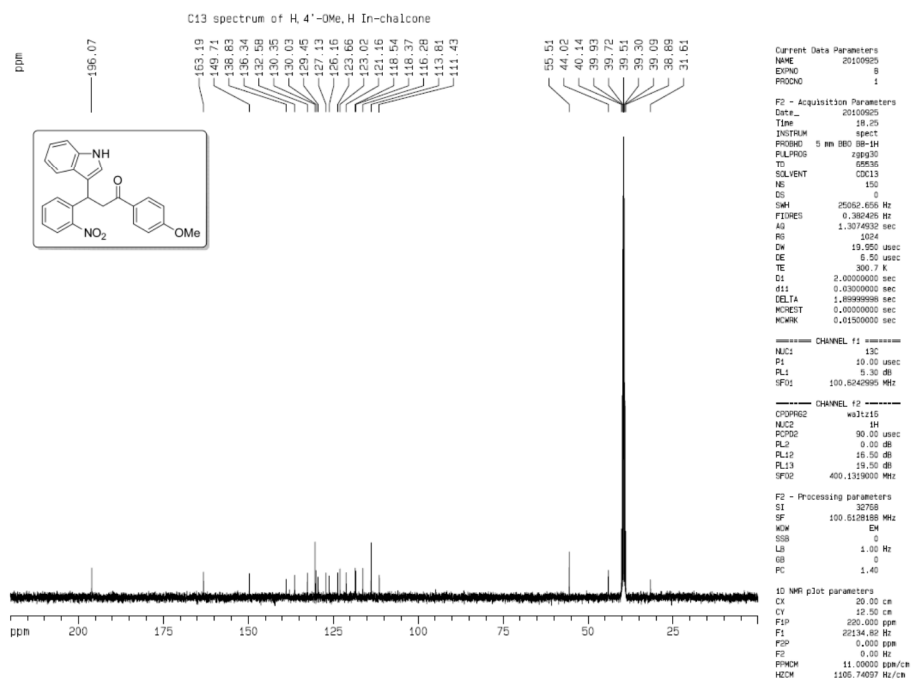


Figure S16. ¹³C-NMR-3-(1*H*-Indol-3-yl)-1-(4-methoxyphenyl)-3-(2-nitrophenyl)propan-1-one (**3h**).

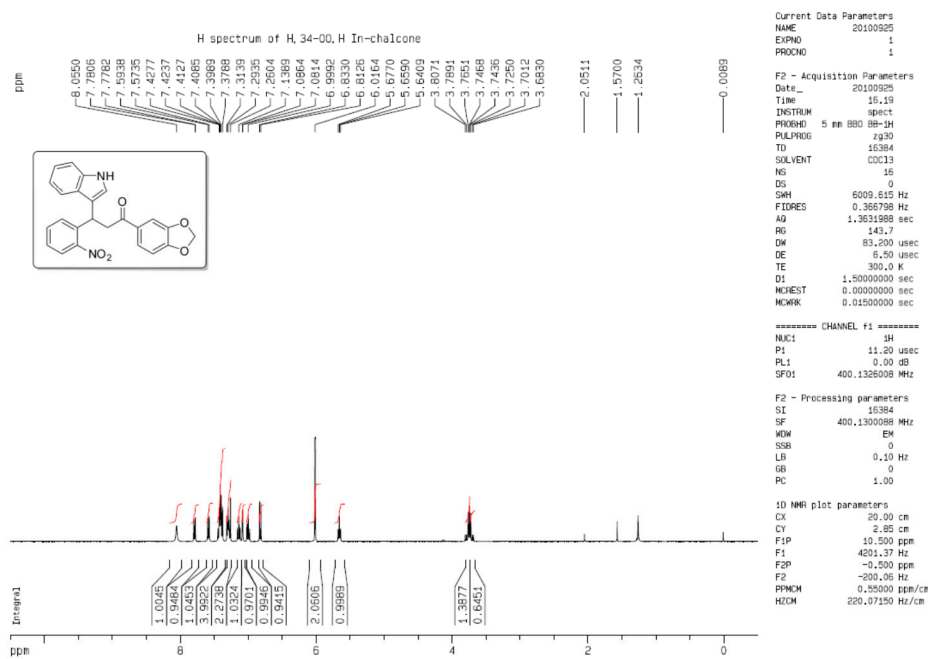


Figure S17. ¹H-NMR 1-(Benzo[d][1,3]dioxol-5-yl)-3-(1*H*-indol-3-yl)-3-(2-nitrophenyl)propan-1-one (**3i**).

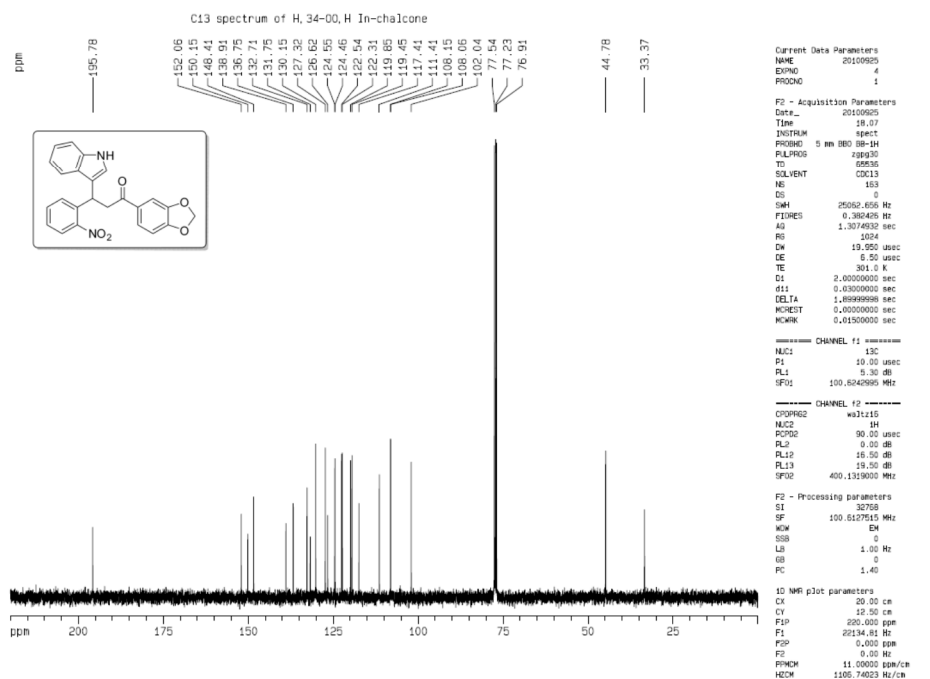


Figure S18. ¹³C-NMR 1-(Benzo[d][1,3]dioxol-5-yl)-3-(1*H*-indol-3-yl)-3-(2-nitrophenyl)propan-1-one (3i).

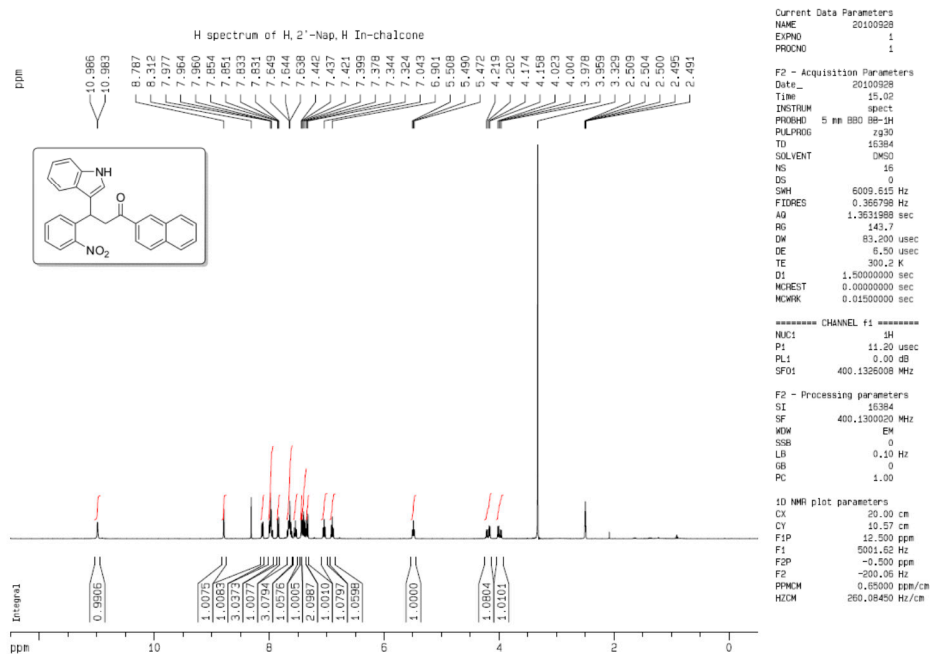


Figure S19. ¹H-NMR 3-(1*H*-Indol-3-yl)-1-(naphthalen-2-yl)-3-(2-nitrophenyl)propan-1-one (3j).

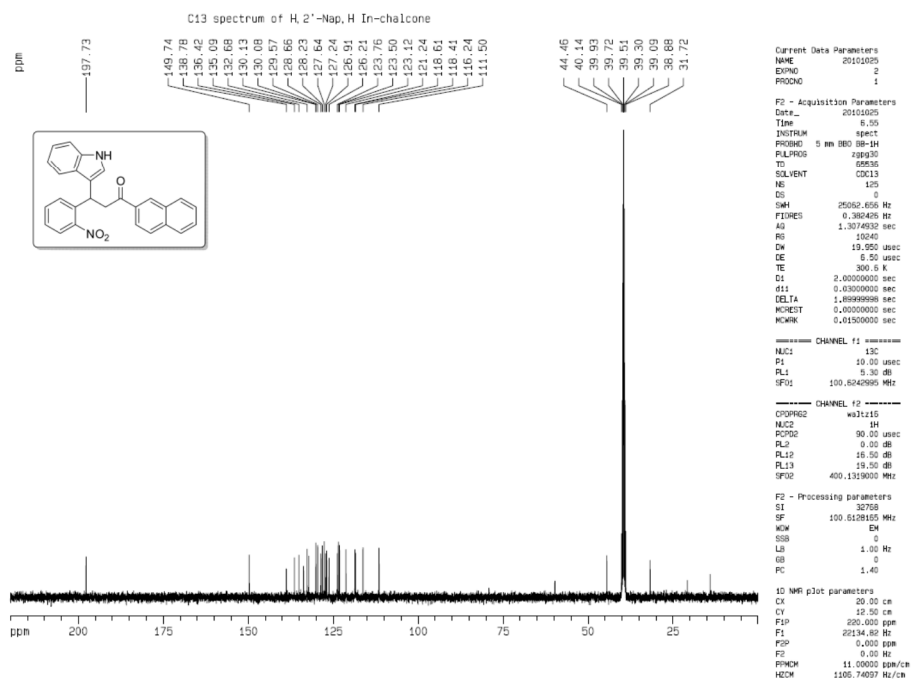


Figure S20. ^{13}C -NMR 3-(1*H*-Indol-3-yl)-1-(naphthalen-2-yl)-3-(2-nitrophenyl)propan-1-one (**3j**).

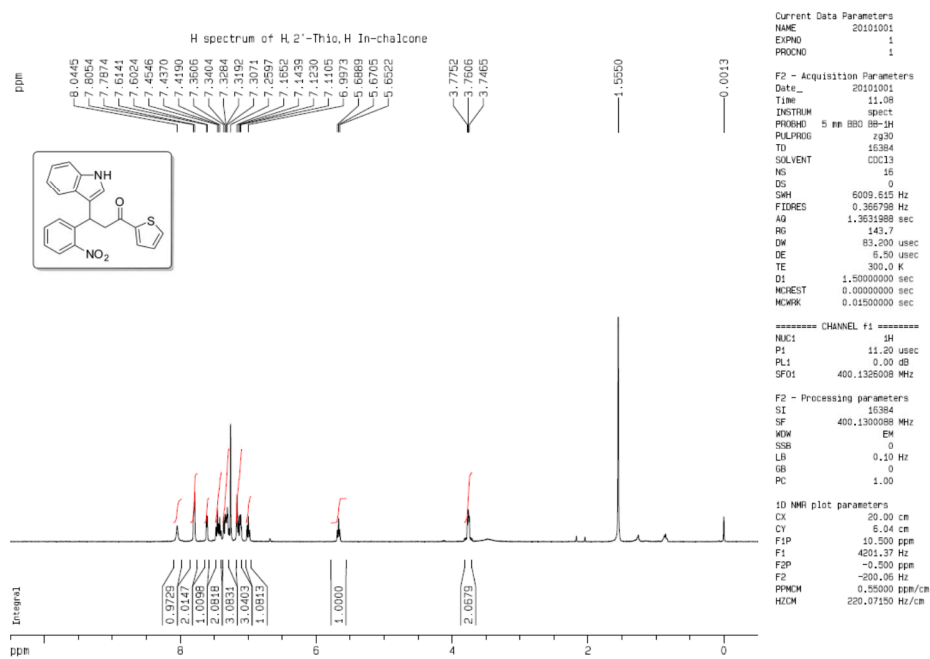


Figure S21. ^1H -NMR 3-(1*H*-Indol-3-yl)-3-(2-nitrophenyl)-1-(thiophen-2-yl)propan-1-one (**3k**).

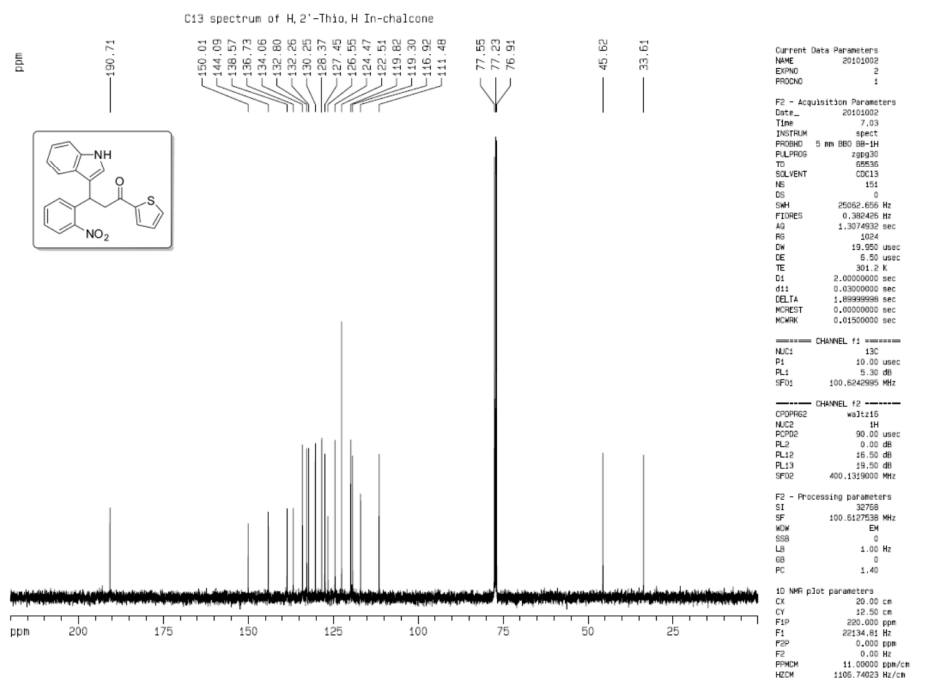


Figure S22. ¹³C-NMR 3-(1H-Indol-3-yl)-3-(2-nitrophenyl)-1-(thiophen-2-yl)propan-1-one (3k).

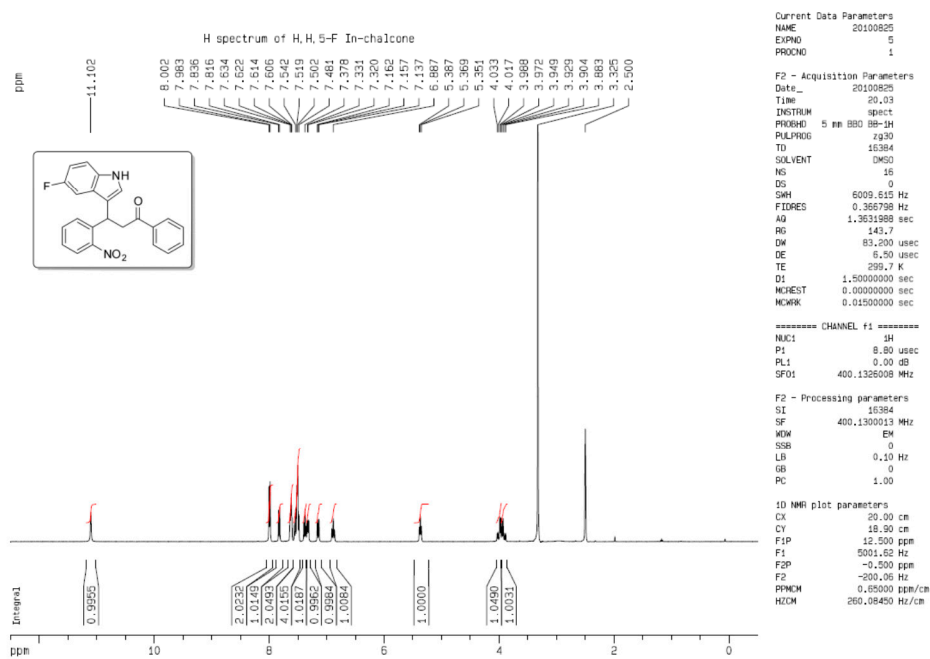


Figure S23. ¹H-NMR 3-(5-Fluoro-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3l).

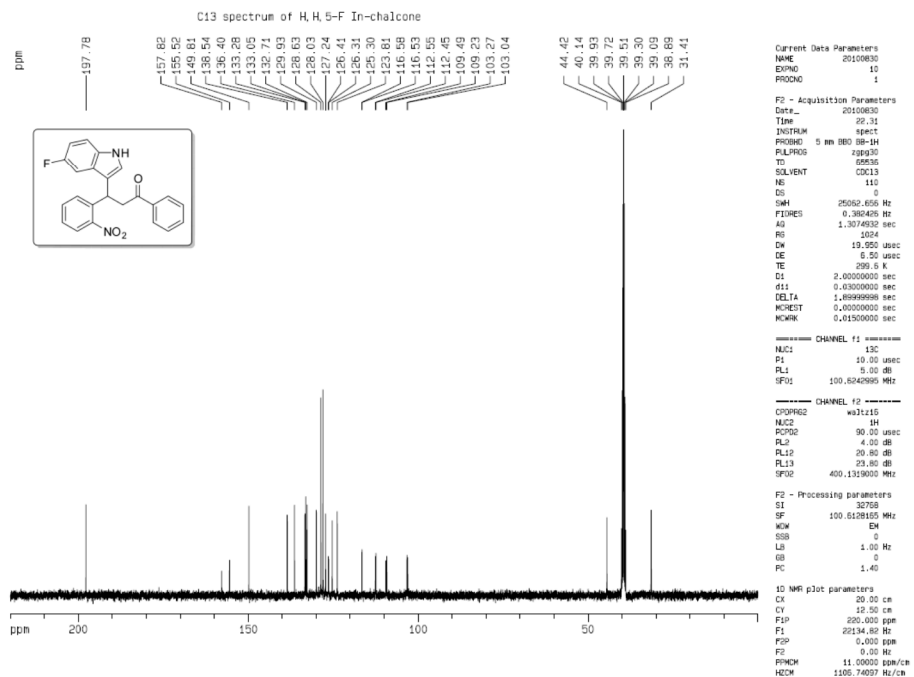


Figure S24. ¹³C-NMR 3-(5-Fluoro-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (31).

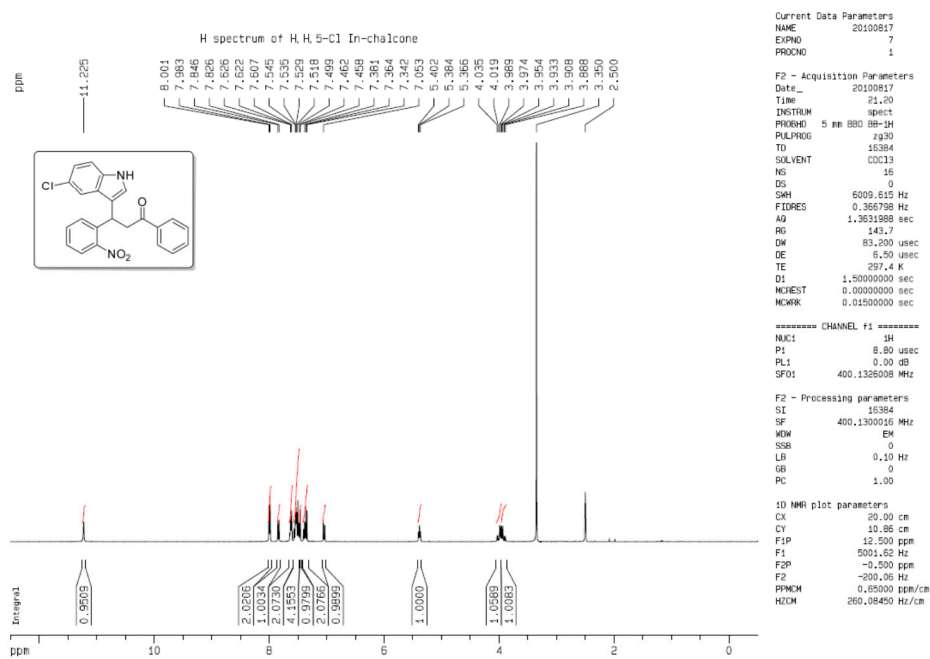


Figure S25. ¹H-NMR 3-(5-Chloro-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3m).

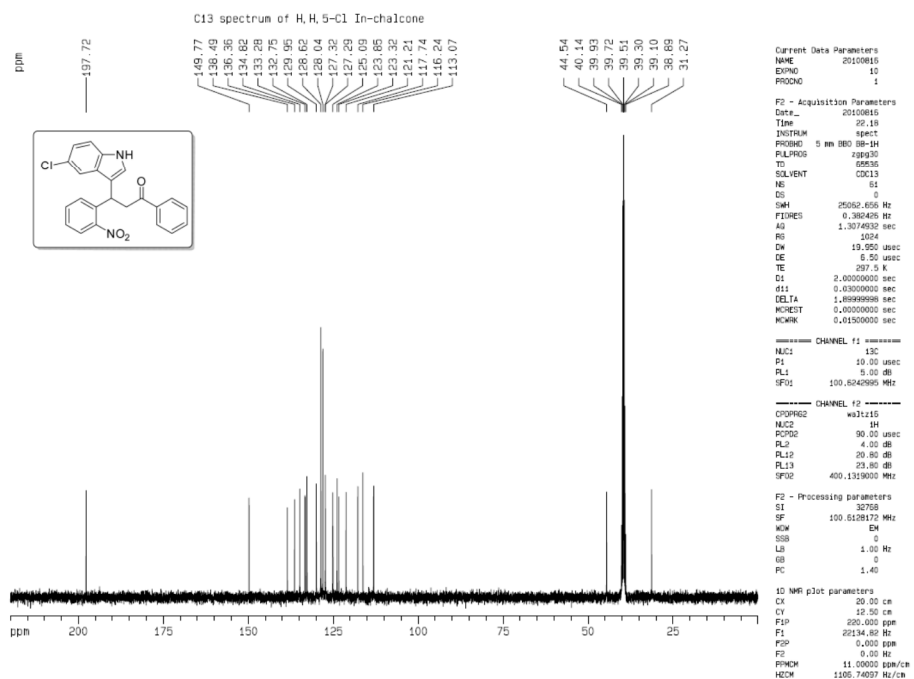


Figure S26. 3-(5-Chloro-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3m).

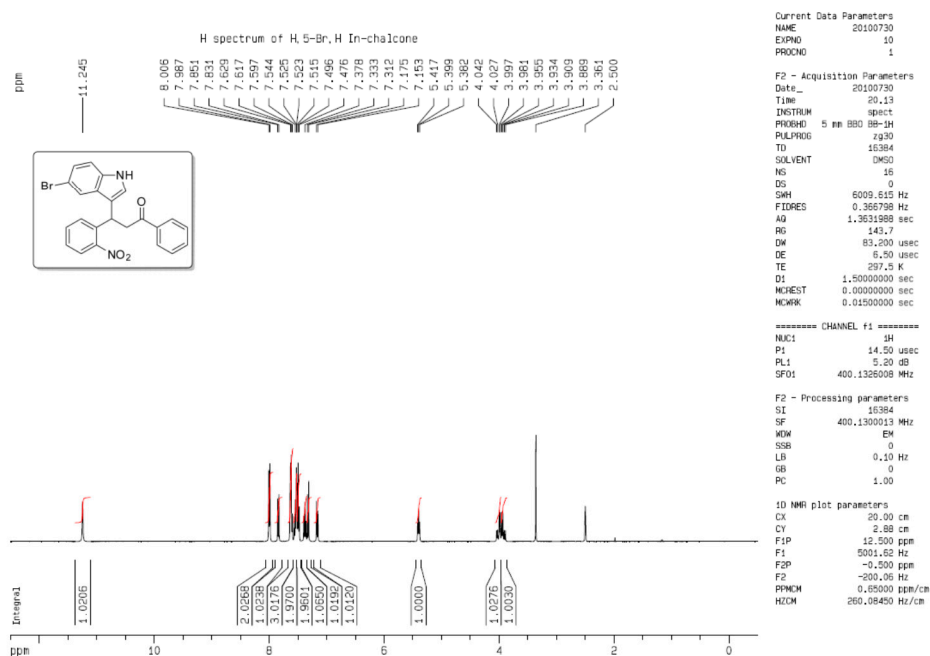


Figure S27. 3-(5-Bromo-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3n).

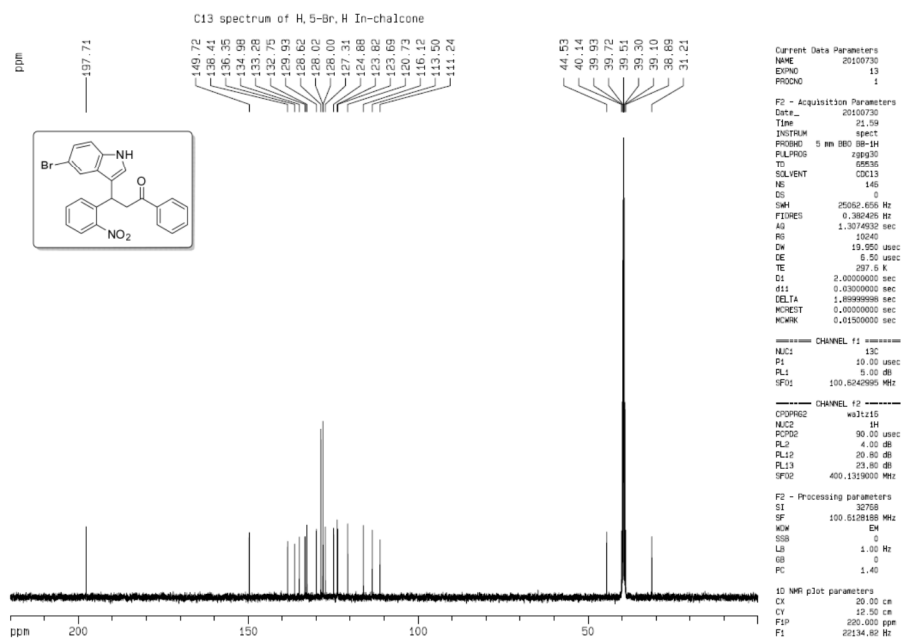


Figure S28. 3-(5-Bromo-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3n).

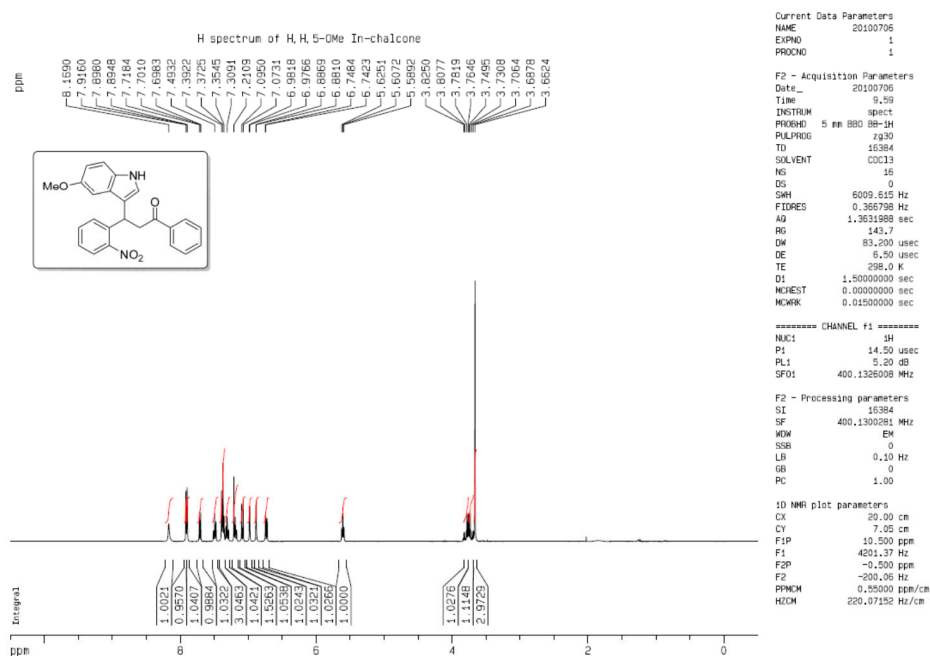


Figure S29. 3-(5-Methoxy-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3o).

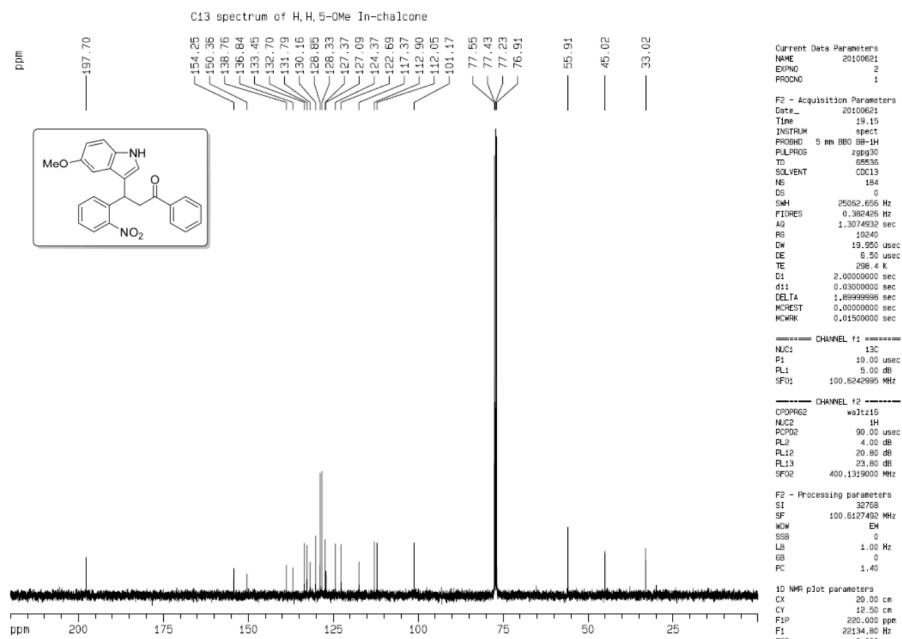


Figure S30. 3-(5-Methoxy-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3o).

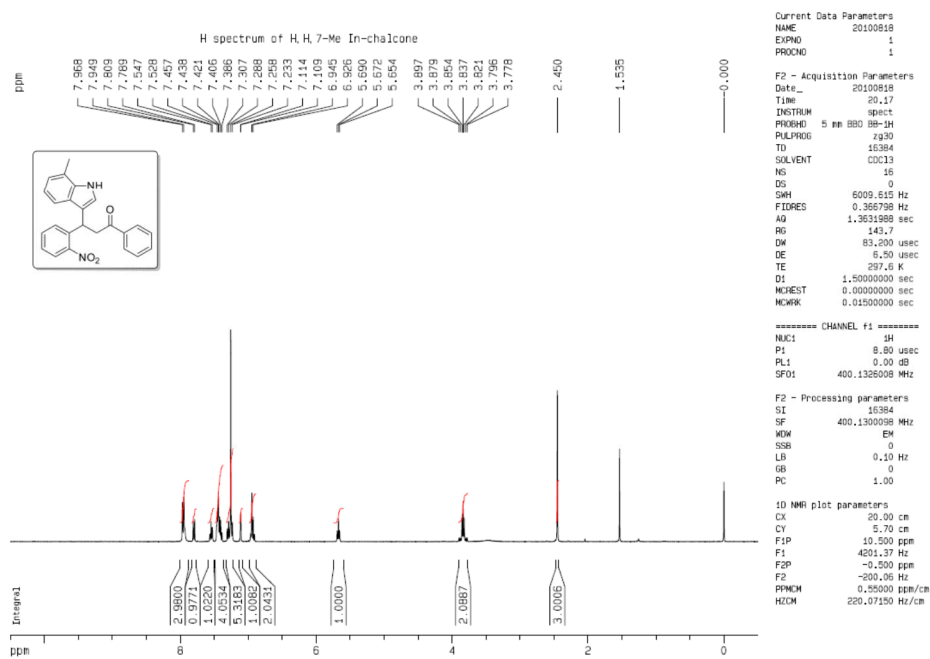


Figure S31. ¹H-NMR 3-(7-Methyl-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3p).

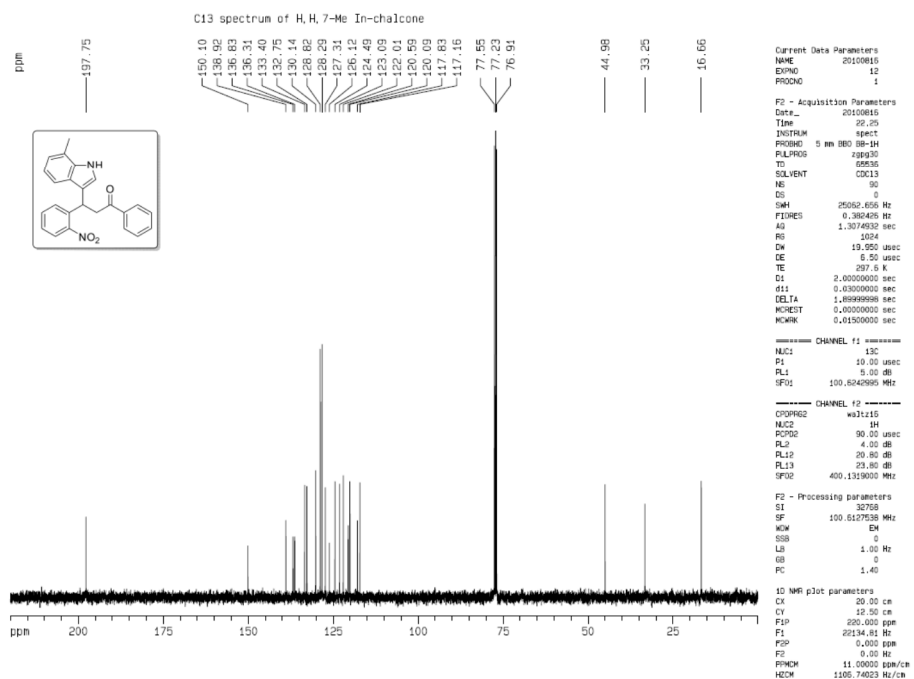


Figure S32. ¹H-NMR 3-(7-Methyl-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3p).

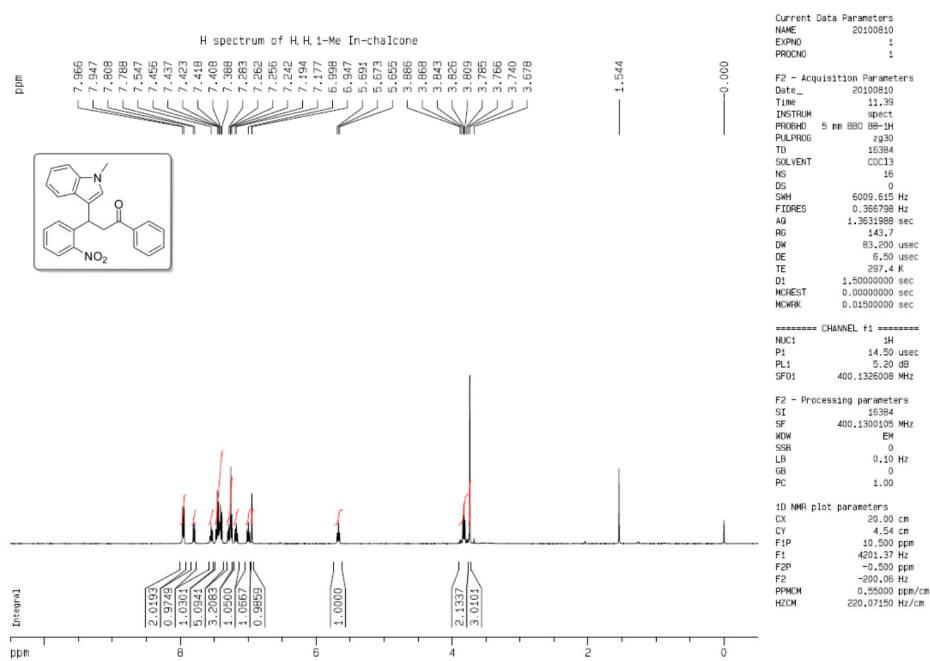


Figure S33. ¹H-NMR 3-(1-Methyl-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3q).

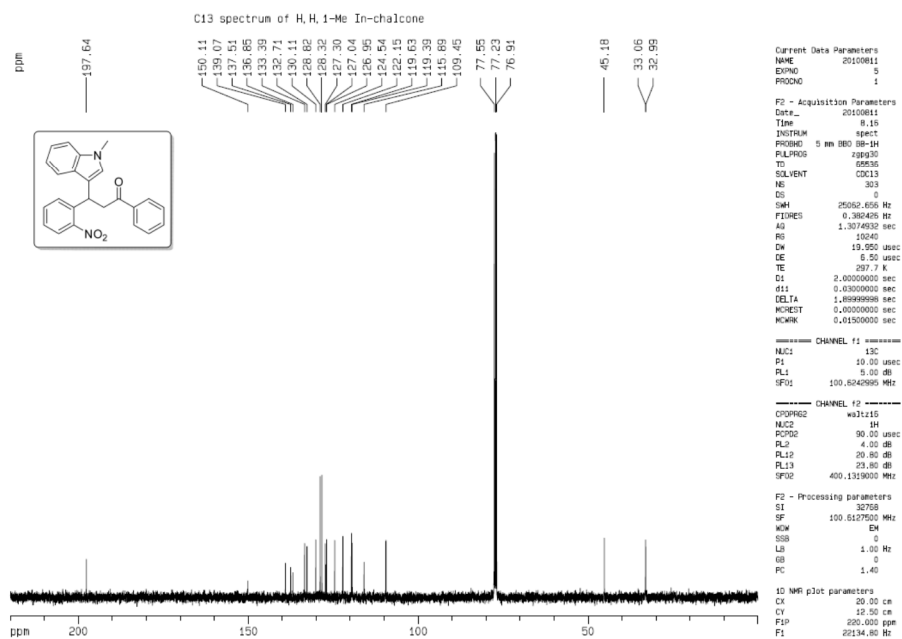


Figure S34. ¹³C-NMR 3-(1-Methyl-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3q).

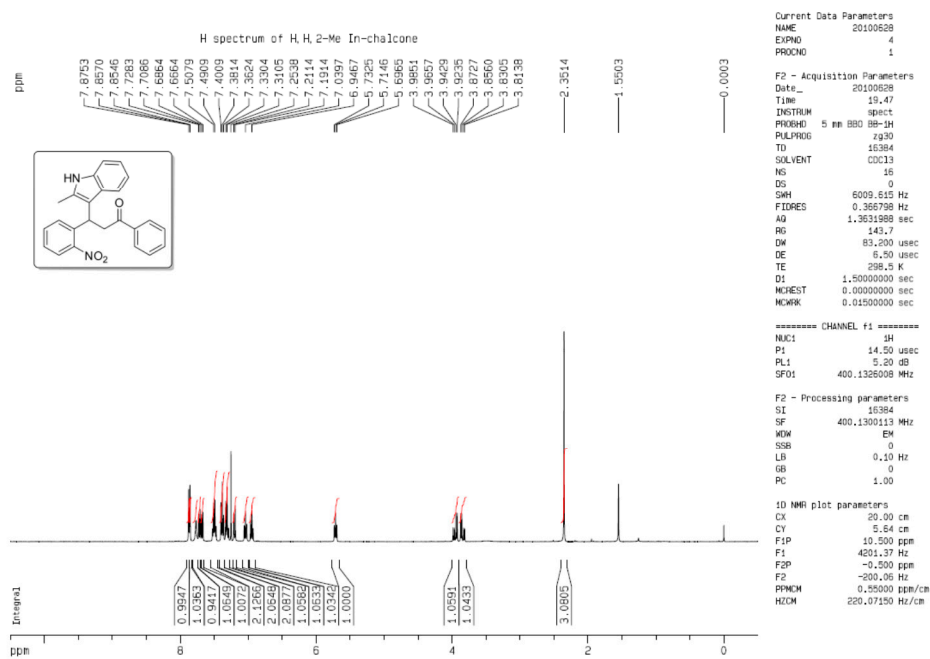


Figure S35. ¹H-NMR of 3-(2-Methyl-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3r).

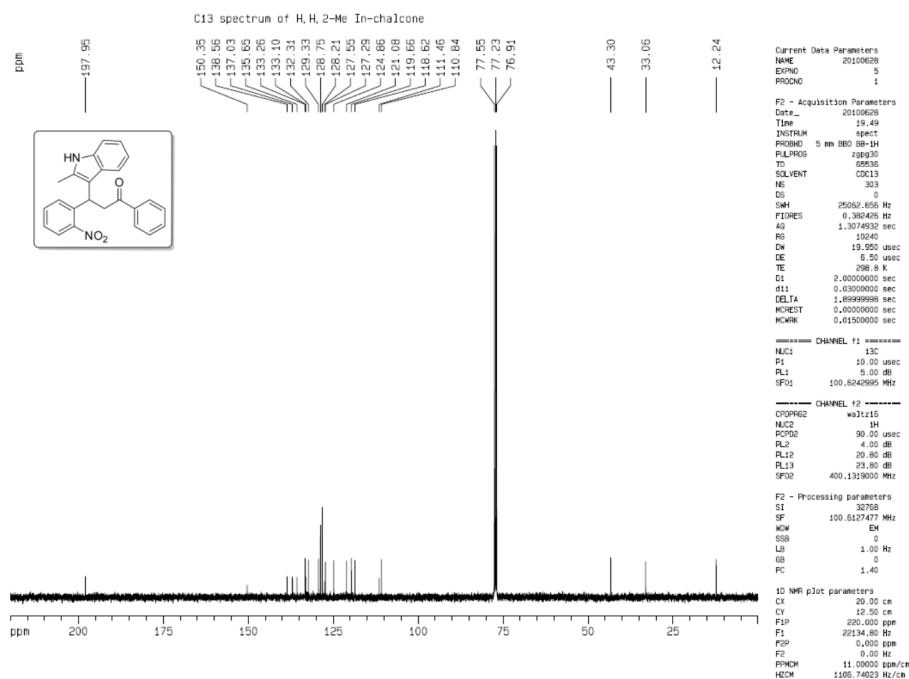


Figure S36. ^{13}C -NMR of 3-(2-Methyl-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (**3r**).

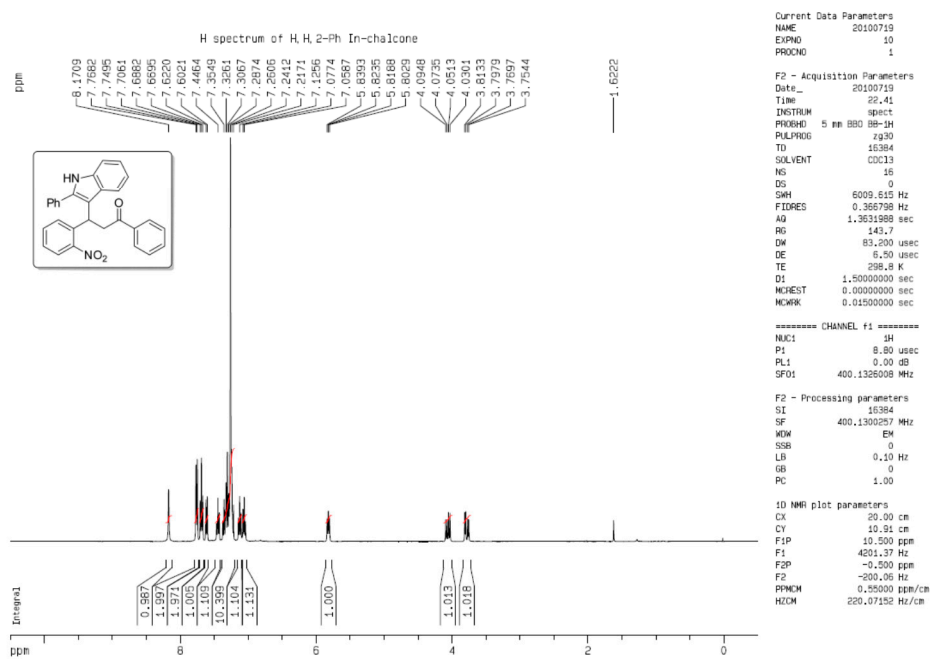


Figure S37. ^1H -NMR of 3-(2-Nitrophenyl)-1-phenyl-3-(2-phenyl-1H-indol-3-yl)propan-1-one (**3s**).

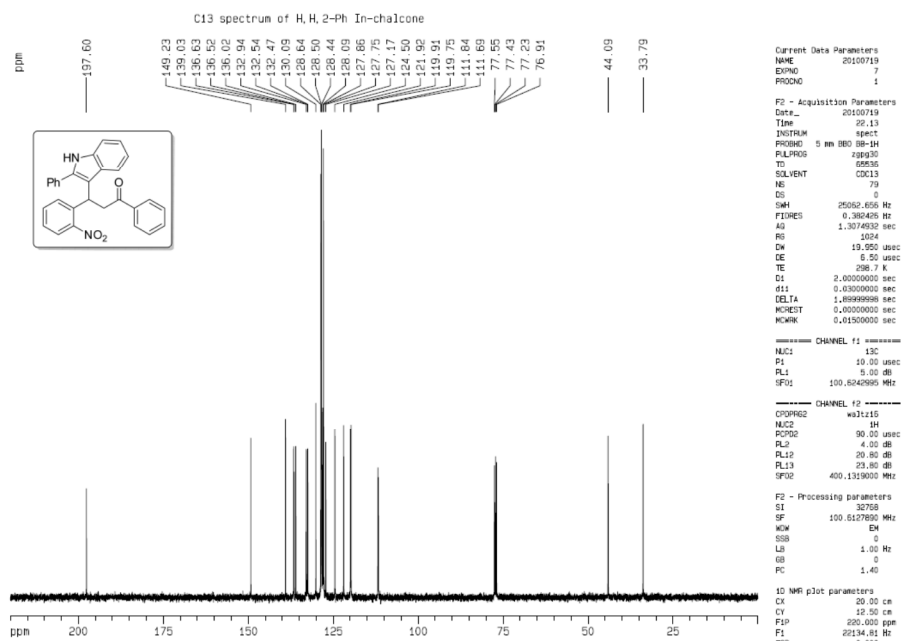


Figure S38. ^{13}C -NMR of 3-(2-Nitrophenyl)-1-phenyl-3-(2-phenyl-1H-indol-3-yl)propan-1-one (3s).

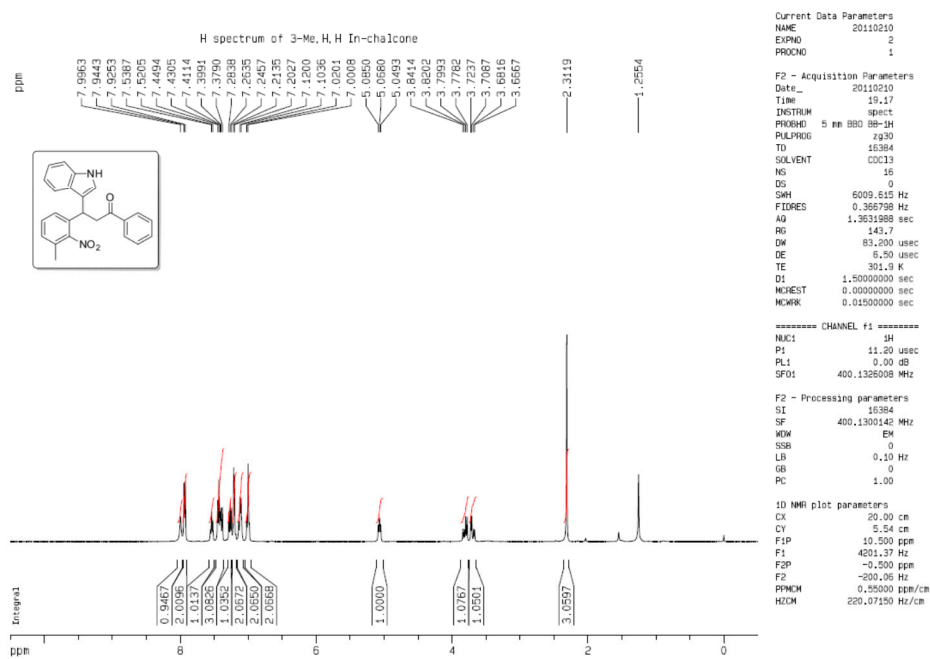


Figure S39. ^1H -NMR of 3-(1H-Indol-3-yl)-3-(3-methyl-2-nitrophenyl)-1-phenylpropan-1-one (3t).

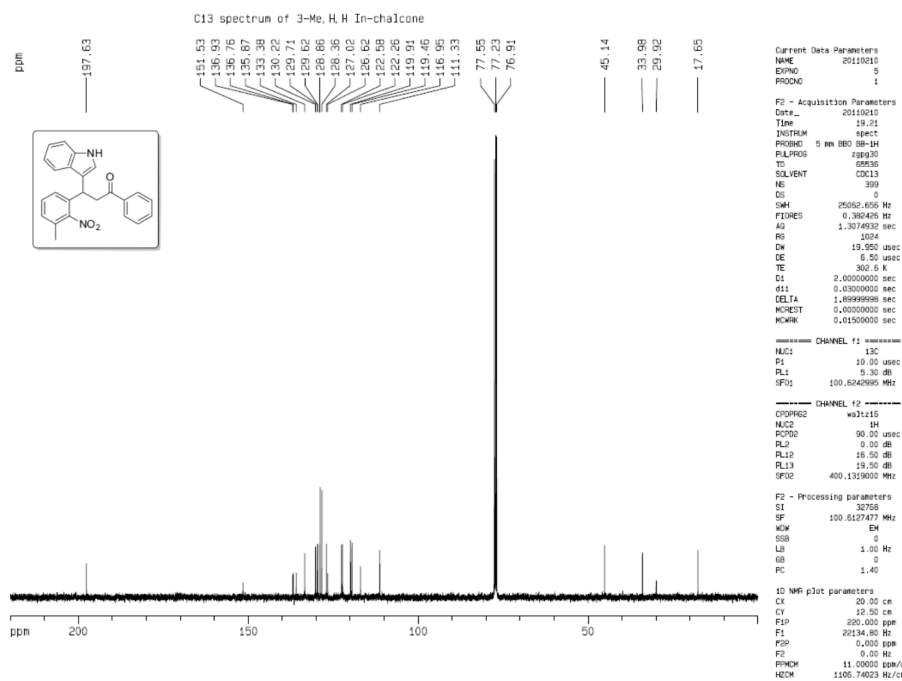


Figure S40. ¹³C-NMR of 3-(1*H*-Indol-3-yl)-3-(3-methyl-2-nitrophenyl)-1-phenylpropan-1-one (**3t**).

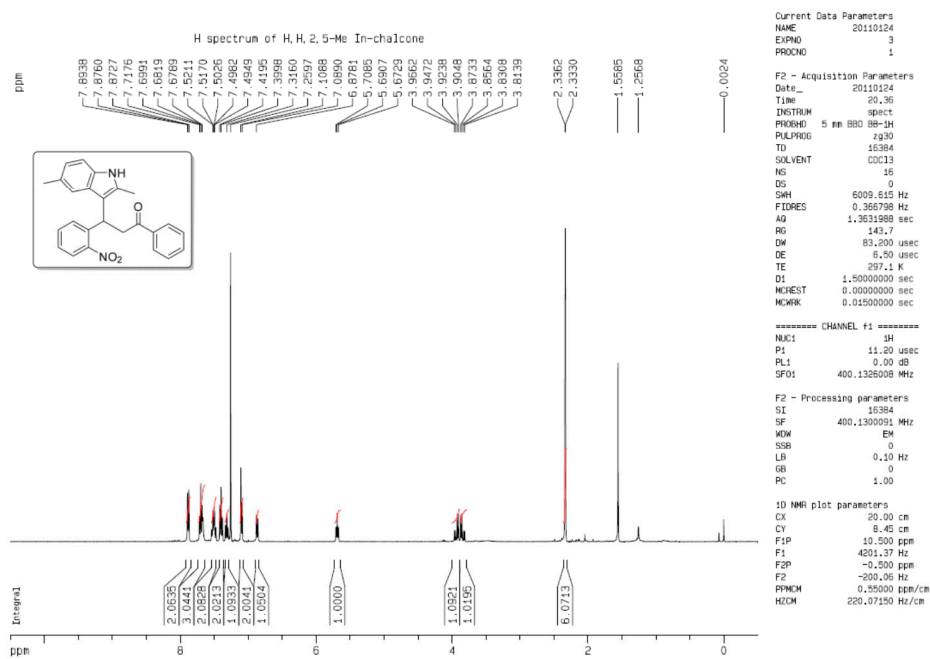


Figure S41. ¹H-NMR of 3-(2,5-Dimethyl-1*H*-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (**3u**).

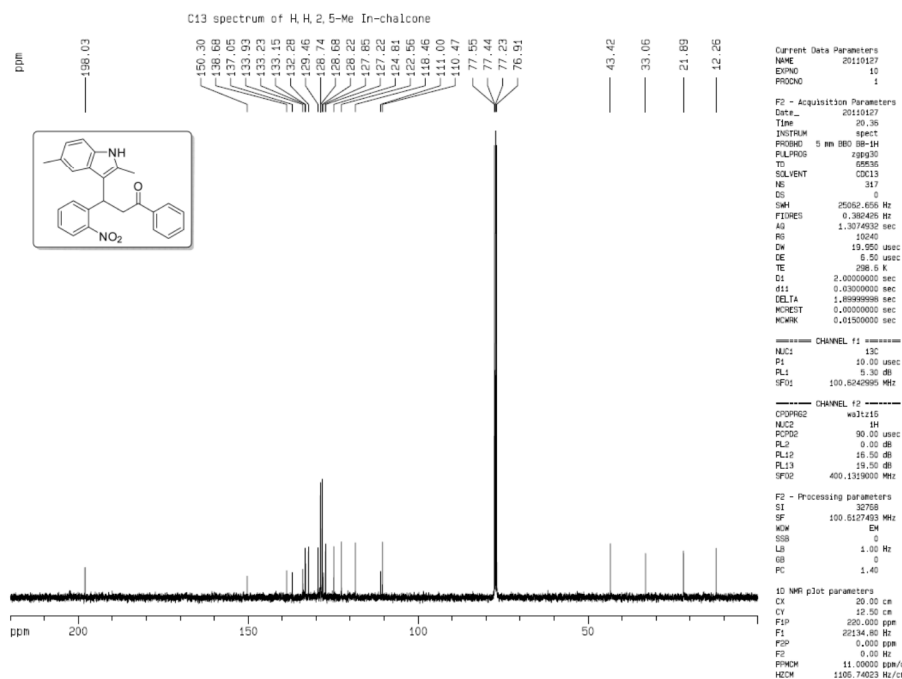


Figure S42. ^{13}C -NMR of 3-(2,5-Dimethyl-1H-indol-3-yl)-3-(2-nitrophenyl)-1-phenylpropan-1-one (3u).

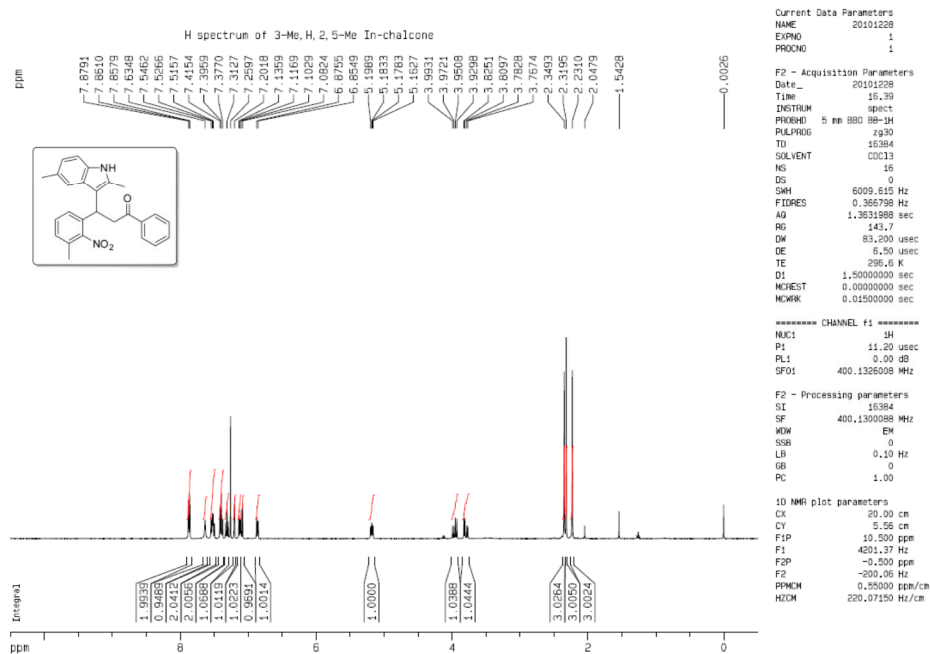


Figure S43. ^1H -NMR of 3-(2,5-Dimethyl-1H-indol-3-yl)-3-(3-methyl-2-nitrophenyl)-1-phenylpropan-1-one (3v).

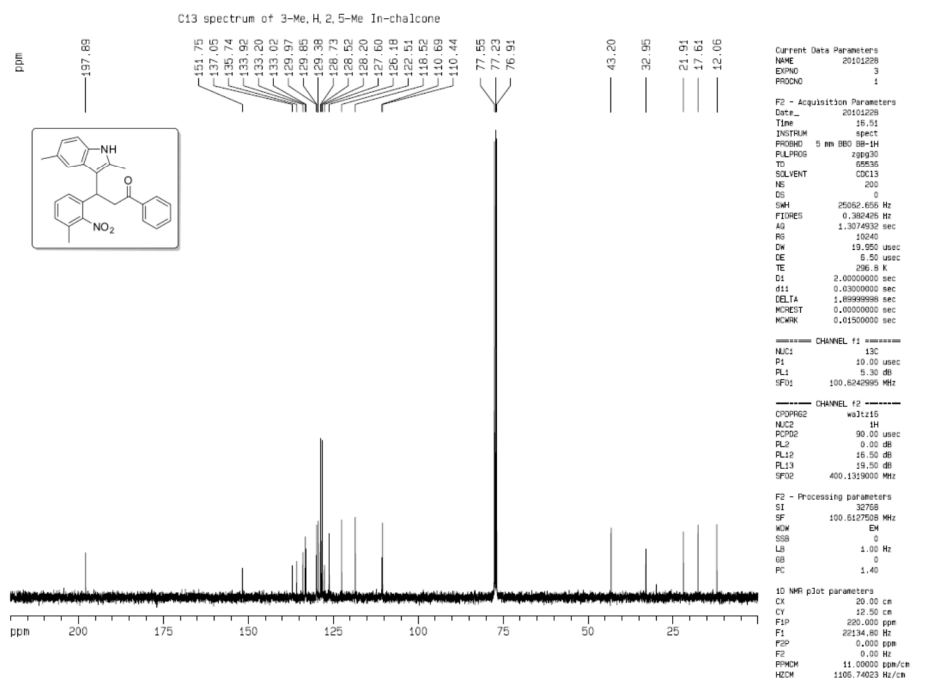


Figure S44. ^{13}C -NMR of 3-(2,5-Dimethyl-1H-indol-3-yl)-3-(3-methyl-2-nitrophenyl)-1-phenylpropan-1-one (**3v**).

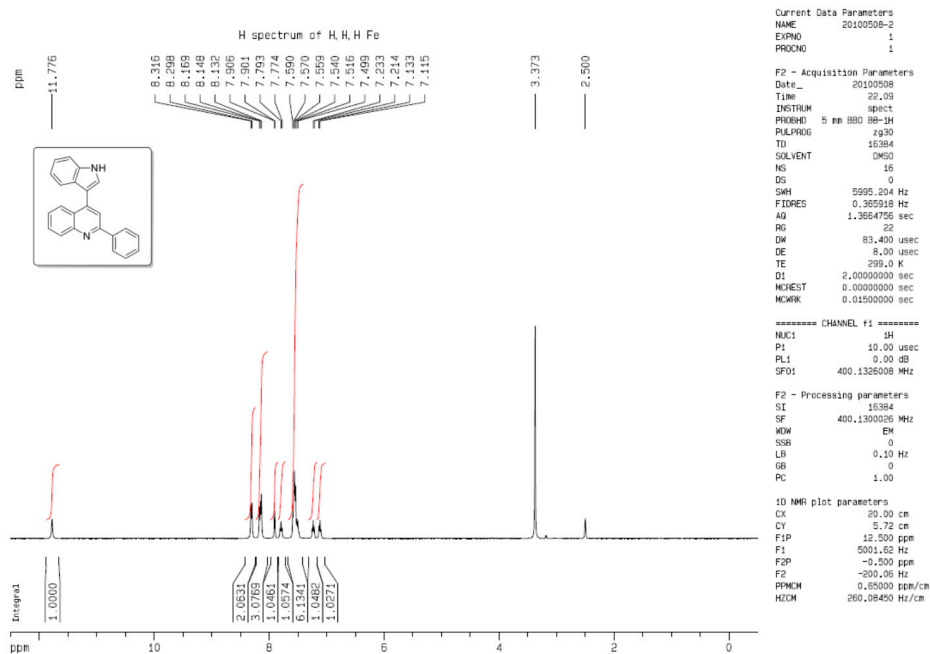


Figure S45. ^1H -NMR of 4-(1H-Indol-3-yl)-2-phenylquinoline (**4a**).

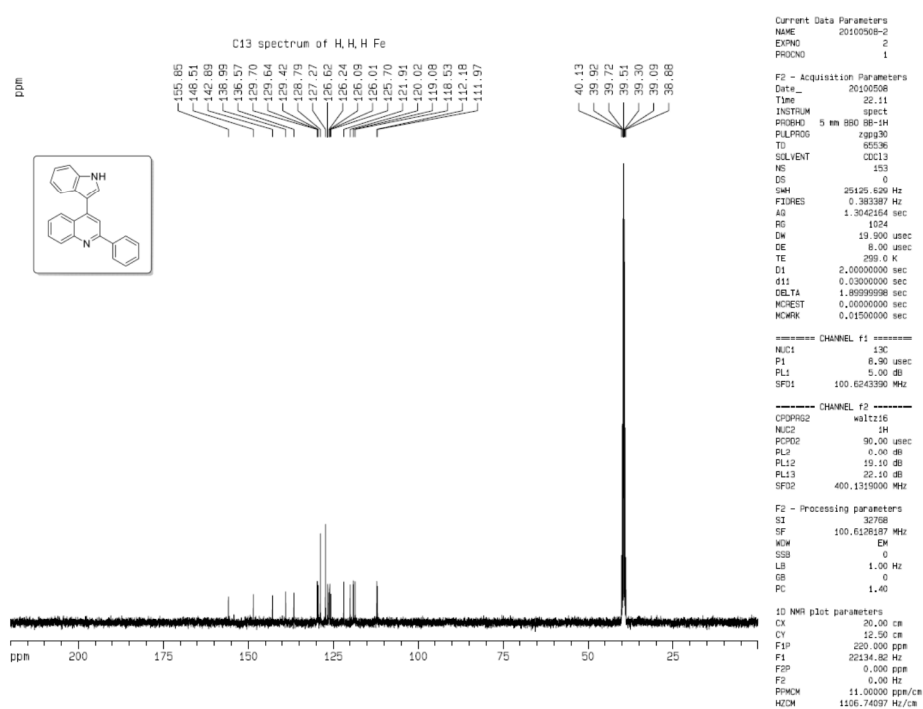


Figure S46. ^{13}C -NMR of 4-(1H-Indol-3-yl)-2-phenylquinoline (4a).

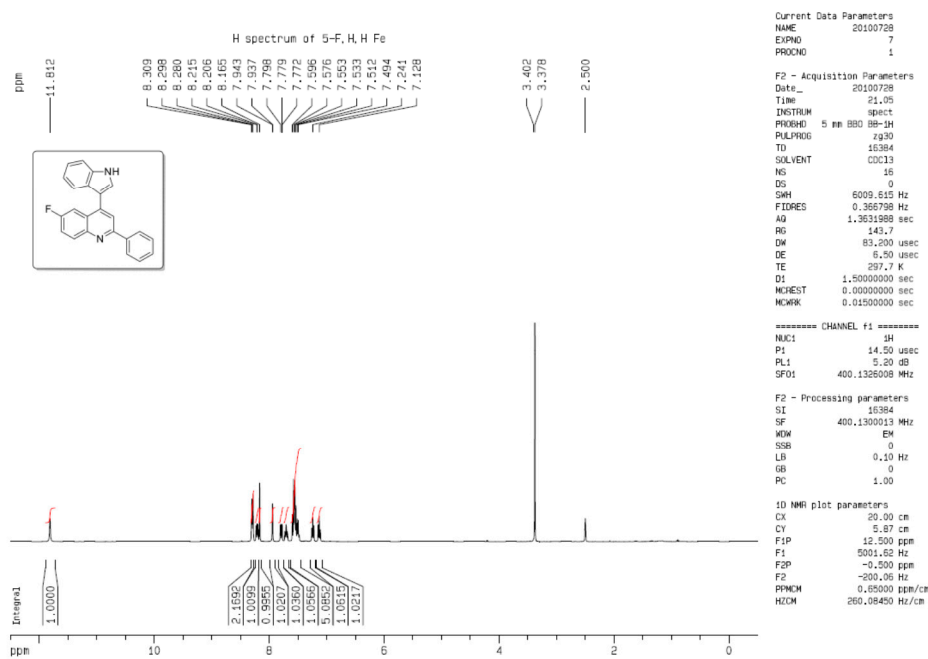


Figure S47. ^1H -NMR 6-Fluoro-4-(1H-indol-3-yl)-2-phenylquinoline (4b).

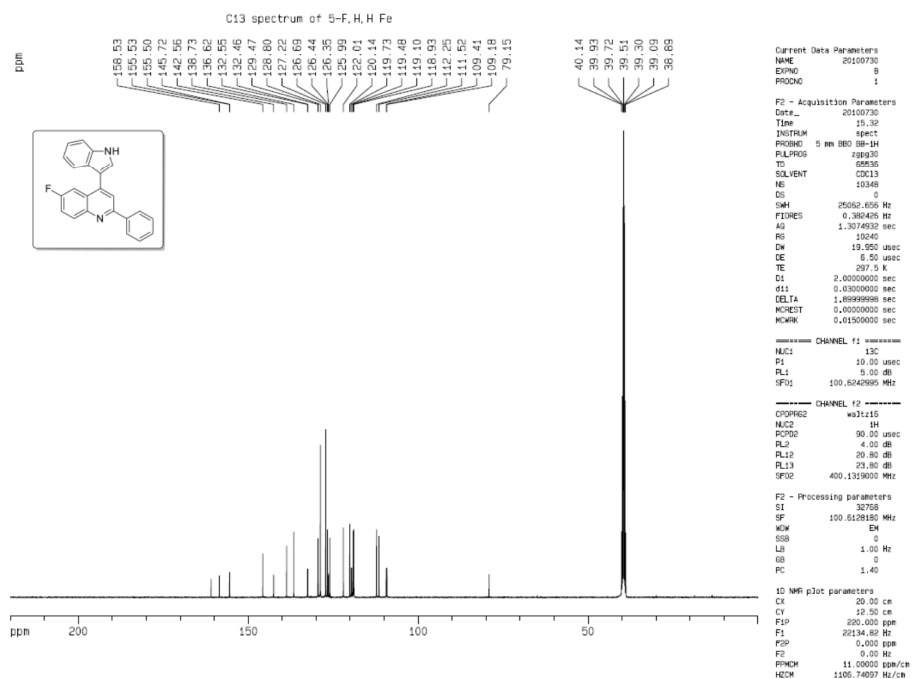


Figure S48. ^{13}C -NMR 6-Fluoro-4-(1H-indol-3-yl)-2-phenylquinoline (4b).

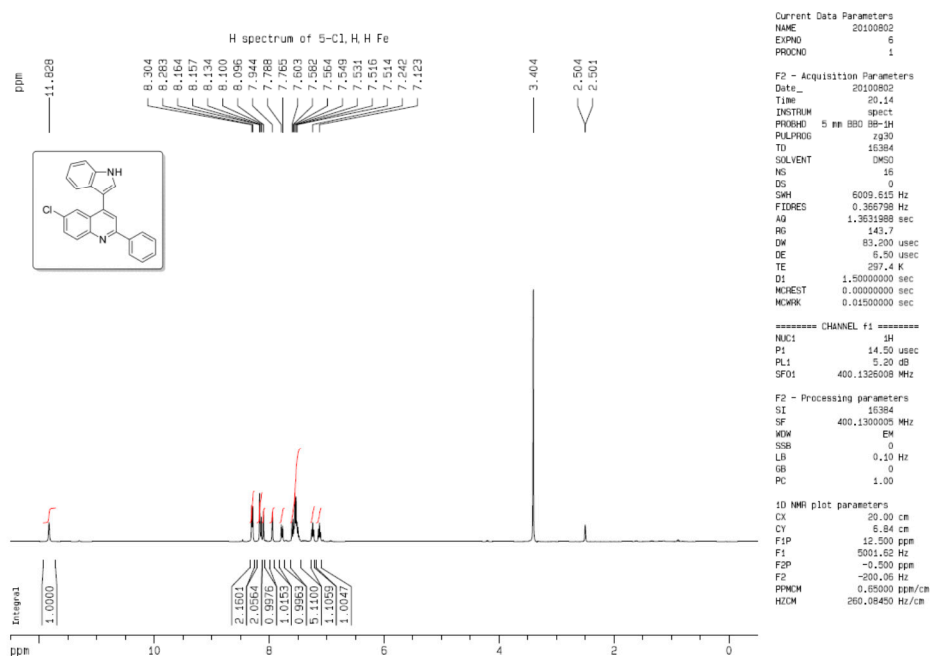


Figure S49. ^1H -NMR 6-Chloro-4-(1H-indol-3-yl)-2-phenylquinoline (4c).

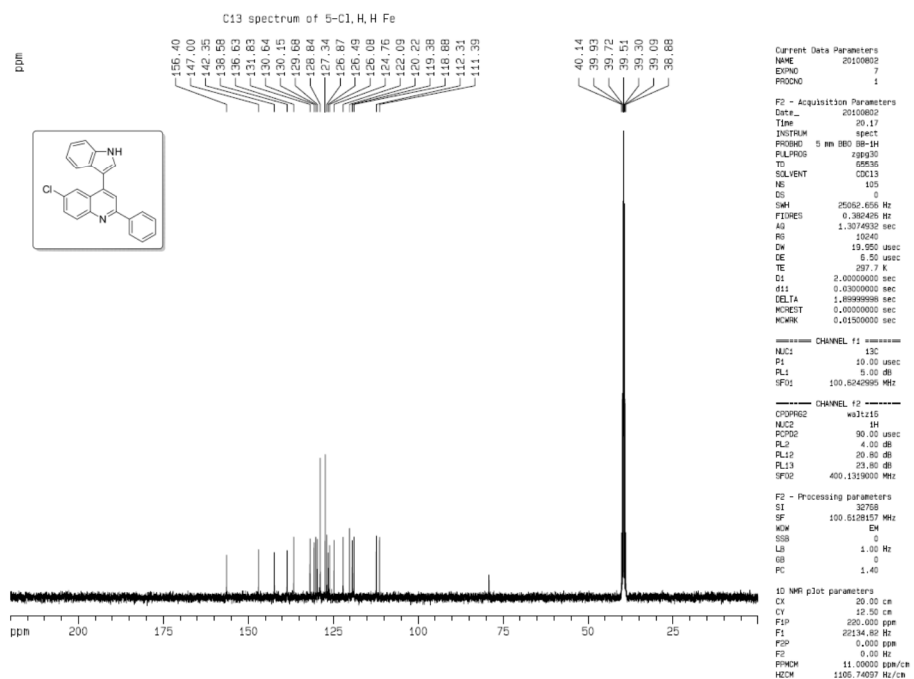


Figure S50. ¹³C-NMR 6-Chloro-4-(1H-indol-3-yl)-2-phenylquinoline (4c).

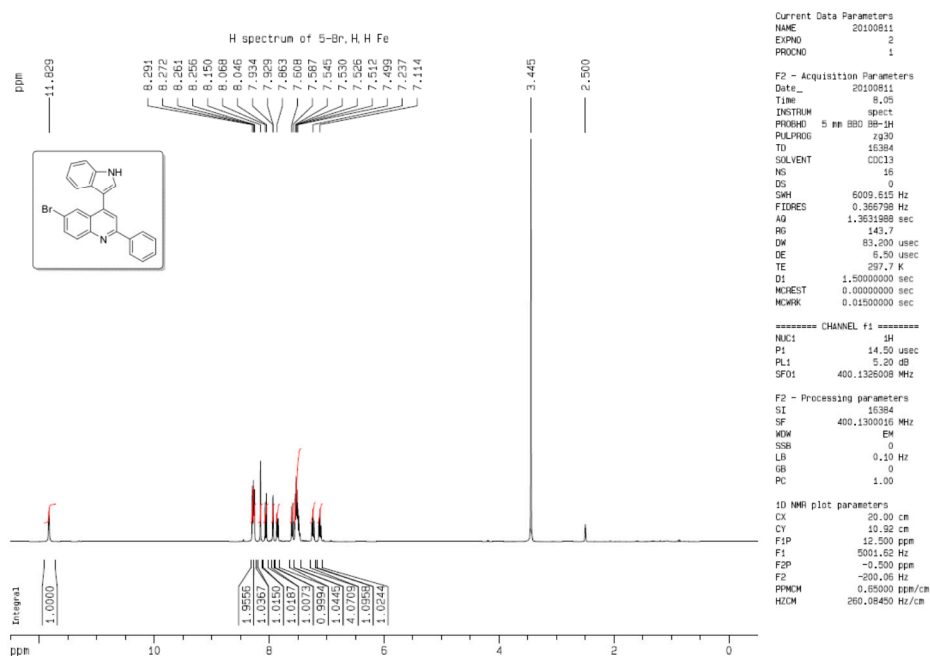


Figure S51. ¹H-NMR 6-Bromo-4-(1H-indol-3-yl)-2-phenylquinoline (4d).

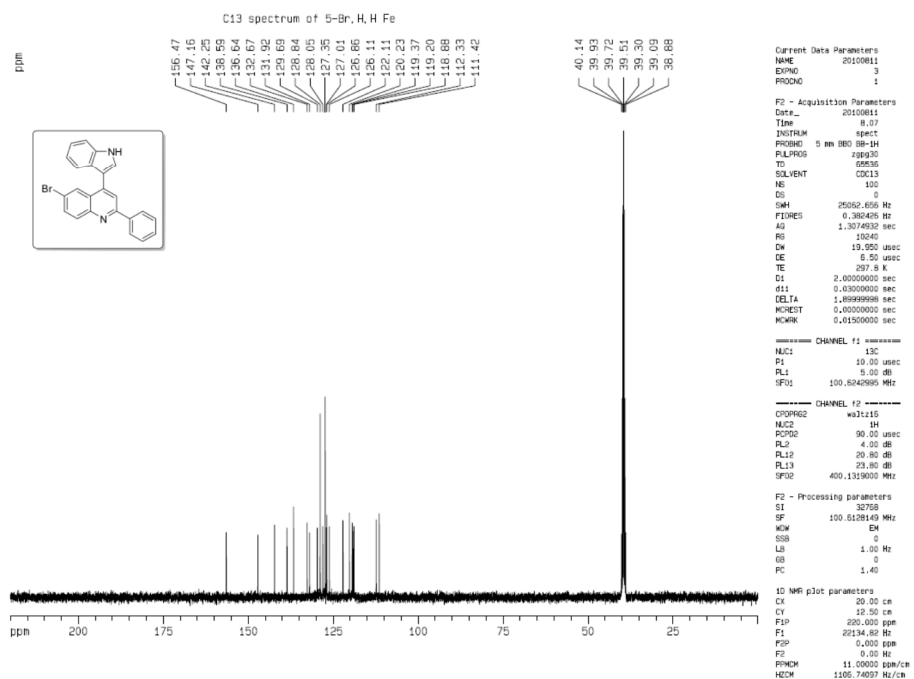


Figure S52. ¹³C-NMR 6-Bromo-4-(1H-indol-3-yl)-2-phenylquinoline (4d).

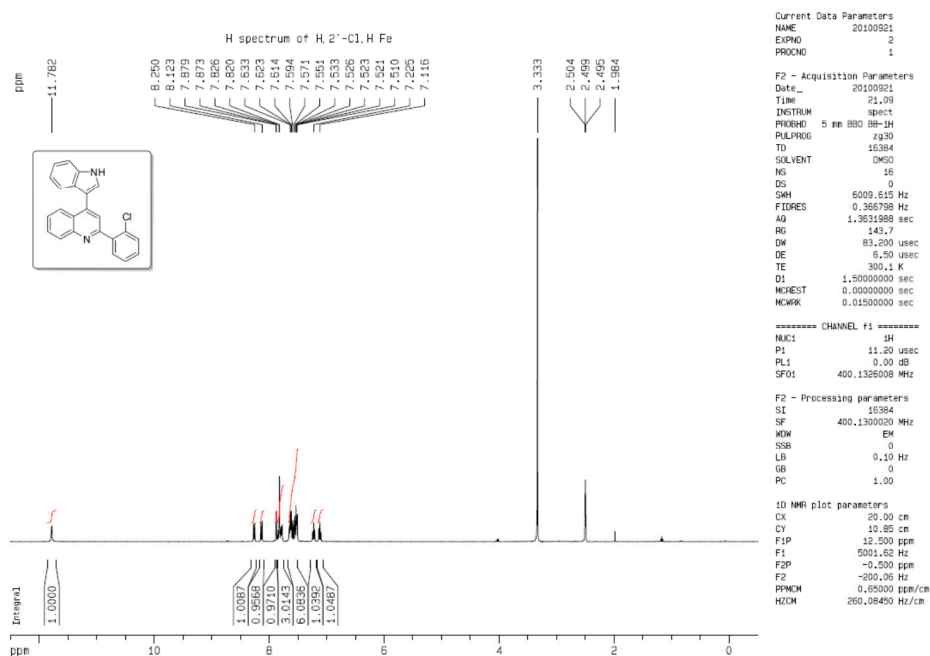


Figure S53. ¹H-NMR of 2-(2-Chlorophenyl)-4-(1H-indol-3-yl)quinoline (4e).

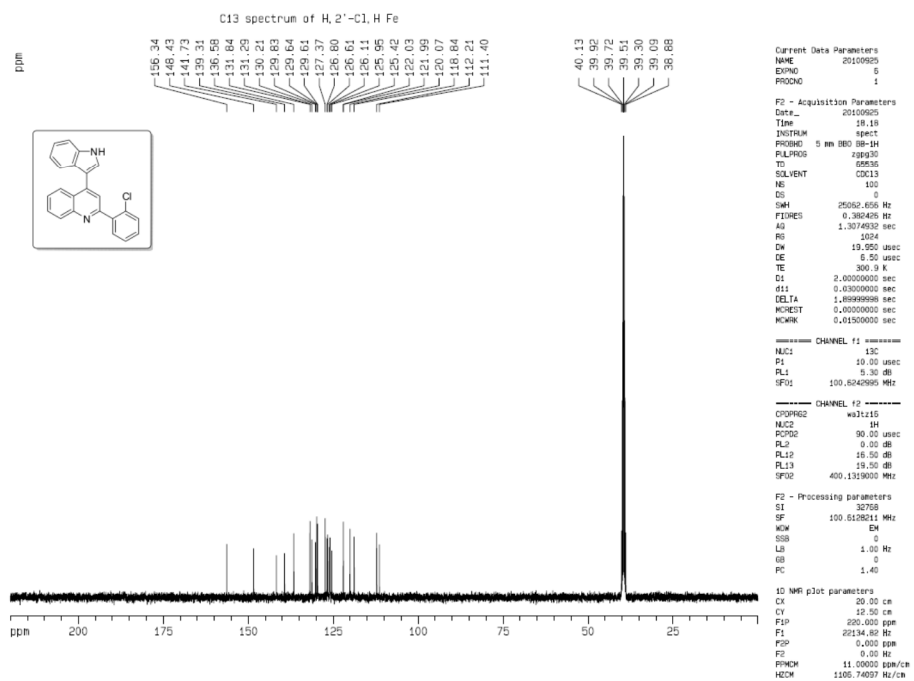


Figure S54. ¹³C-NMR of 2-(2-Chlorophenyl)-4-(1H-indol-3-yl)quinoline (4e).

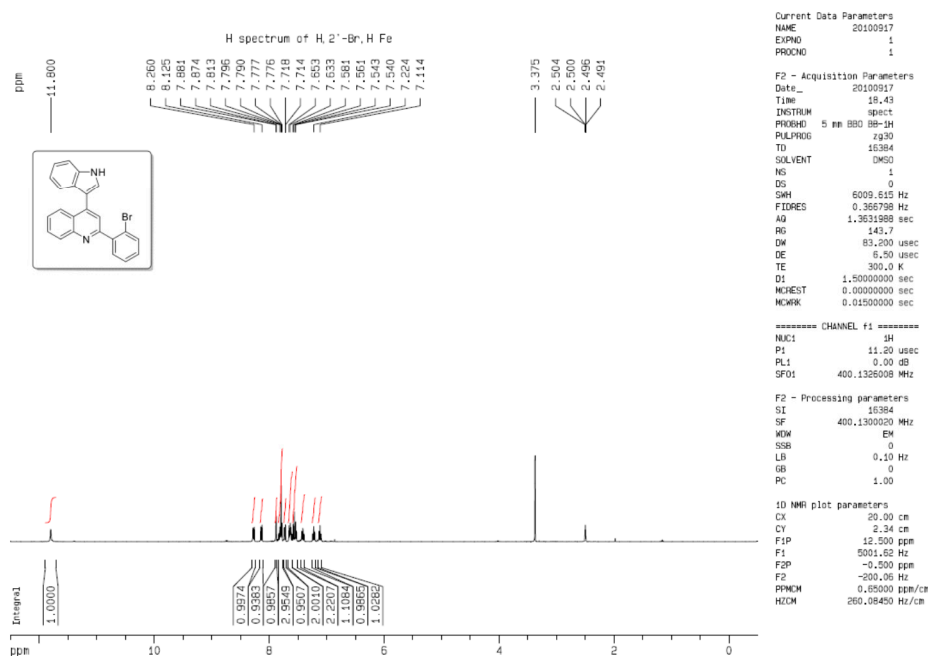


Figure S55. ¹H-NMR of 2-(2-Bromophenyl)-4-(1H-indol-3-yl)quinoline (4f).

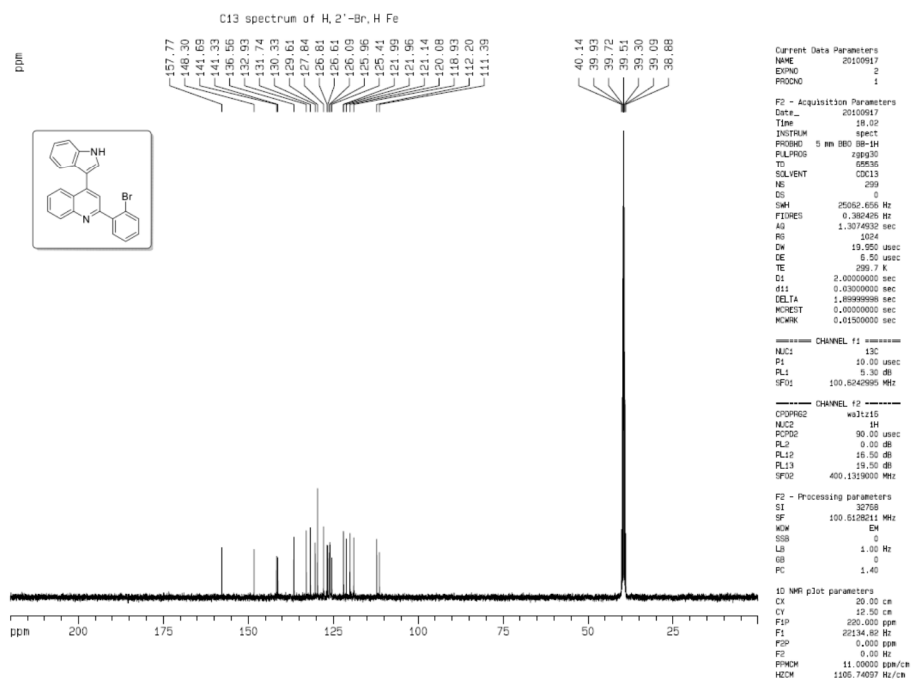


Figure S56. ¹³C-NMR of 2-(2-Bromophenyl)-4-(1H-indol-3-yl)quinoline (4f).

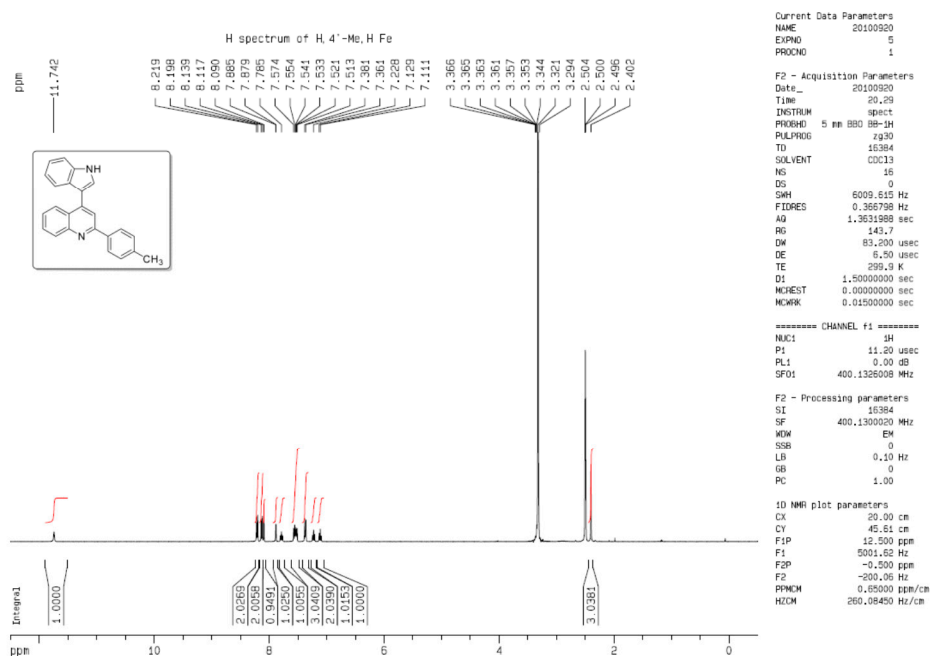


Figure S57. ¹H-NMR of 4-(1H-Indol-3-yl)-2-p-tolylquinoline (4g).

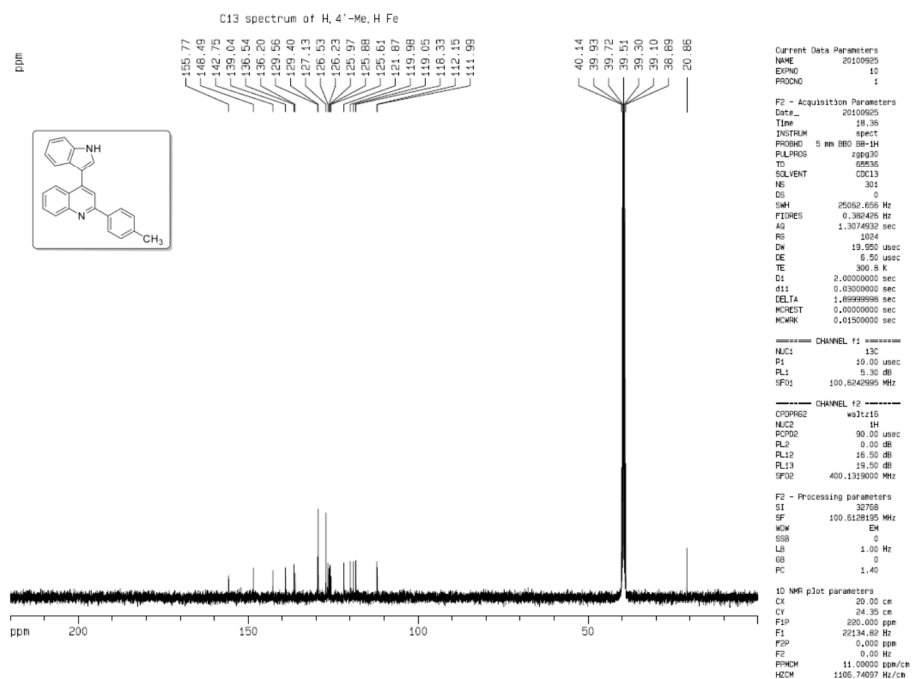


Figure S58. ^{13}C -NMR of 4-(1H-Indol-3-yl)-2-p-tolylquinoline (4g).

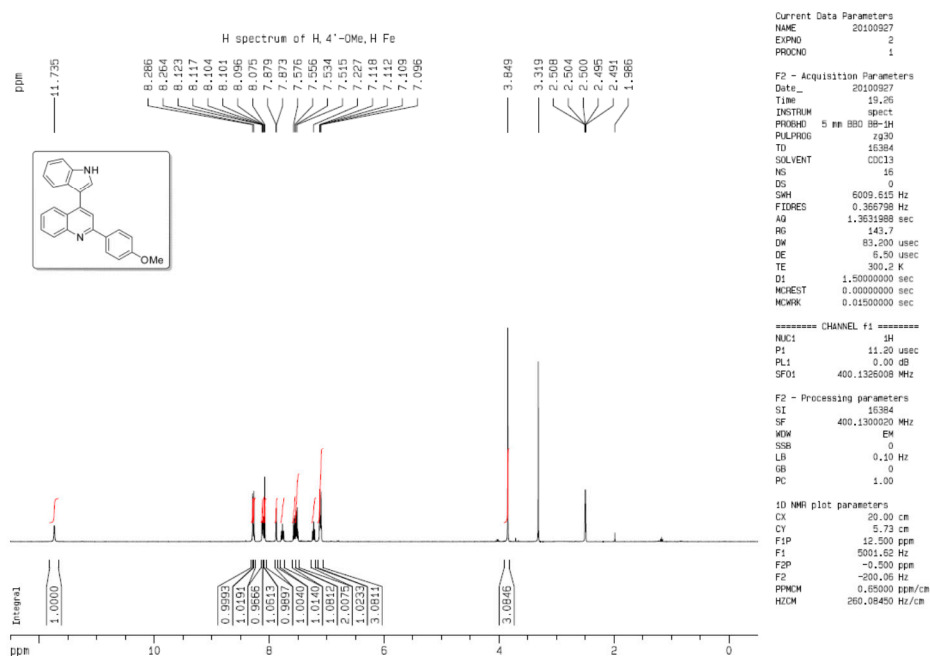


Figure S59. ^1H -NMR of 4-(1H-Indol-3-yl)-2-(4-methoxyphenyl)quinoline (4h).

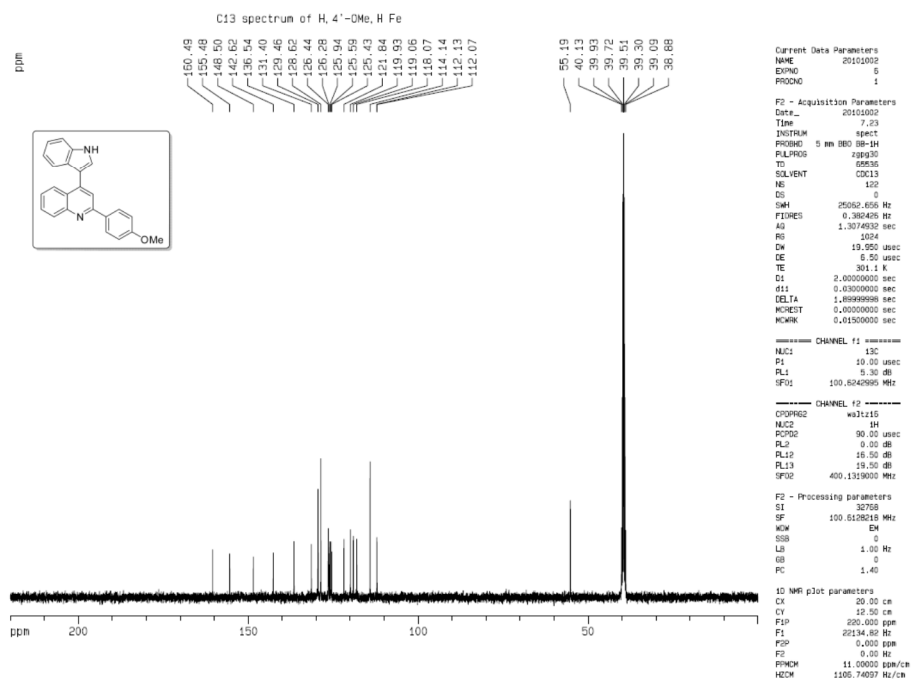


Figure S60. ^{13}C -NMR of 4-(1H-Indol-3-yl)-2-(4-methoxyphenyl)quinoline (4h).

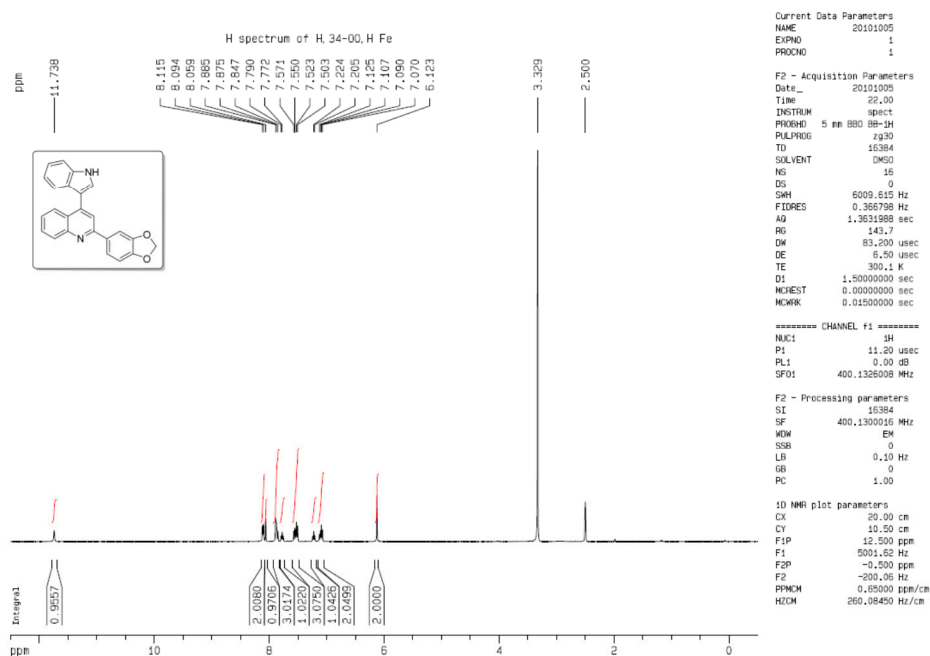


Figure S61. ^1H -NMR of 2-(Benzo[d][1,3]dioxol-5-yl)-4-(1H-indol-3-yl)quinoline (4i).

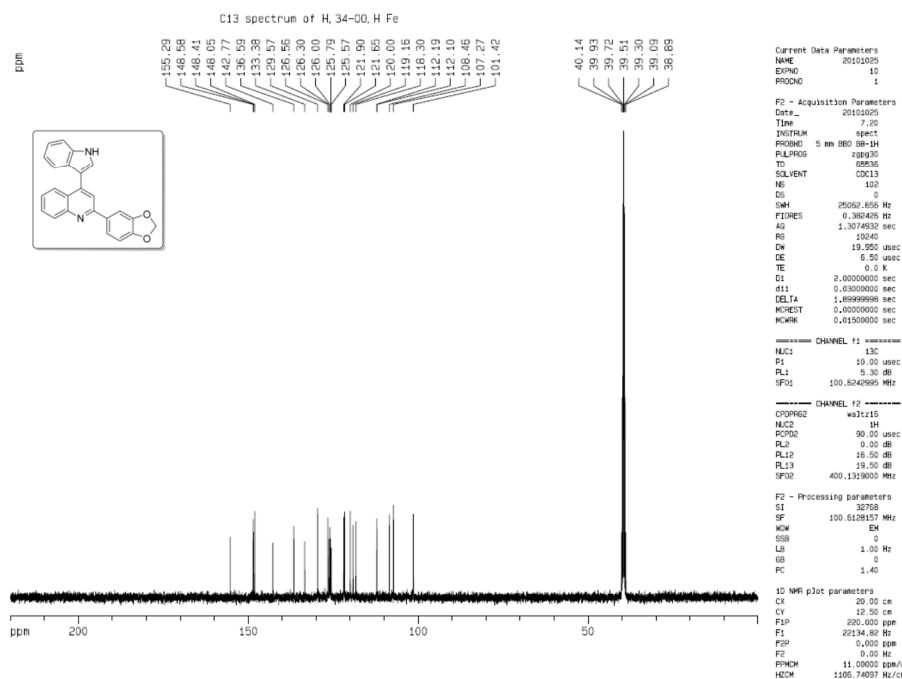


Figure S62. ^{13}C -NMR of 2-(Benzo[d][1,3]dioxol-5-yl)-4-(1*H*-indol-3-yl)quinoline (**4i**).

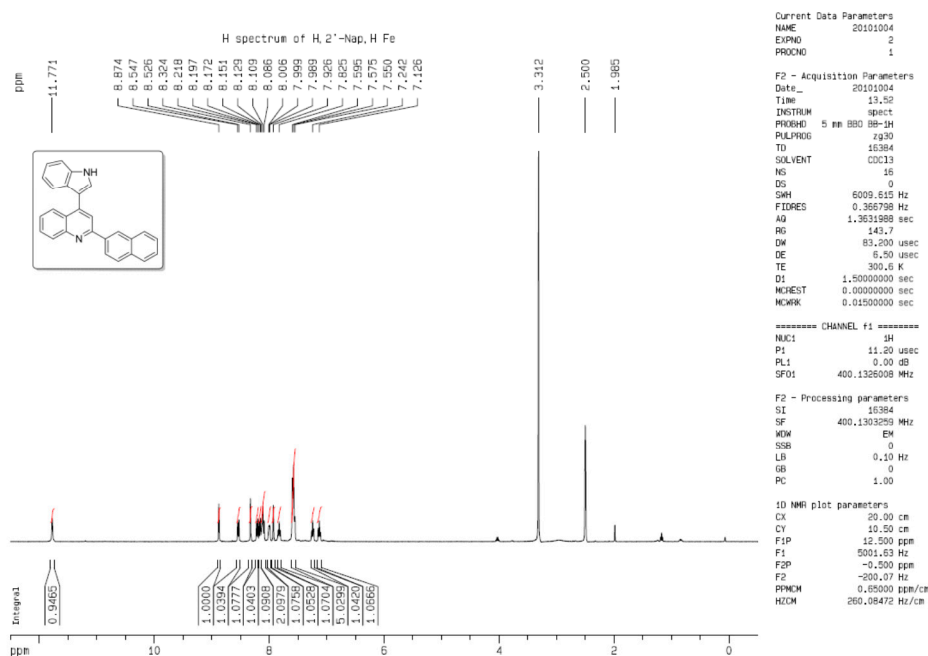


Figure S63. ^1H -NMR of 4-(1*H*-Indol-3-yl)-2-(naphthalen-2-yl)quinoline (**4j**).

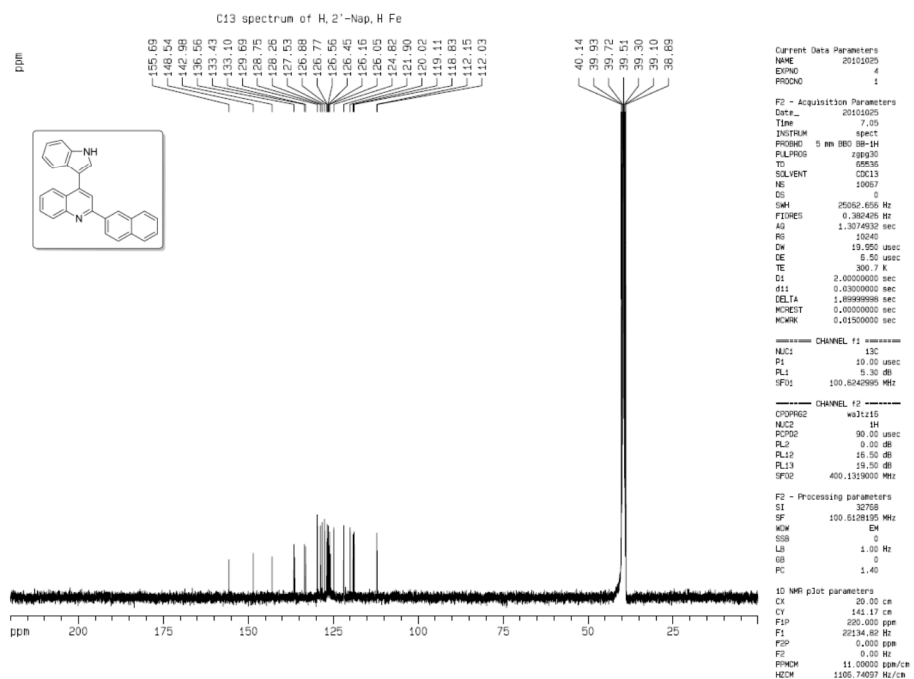


Figure S64. ^{13}C -NMR of 4-(1*H*-Indol-3-yl)-2-(naphthalen-2-yl)quinoline (**4j**).

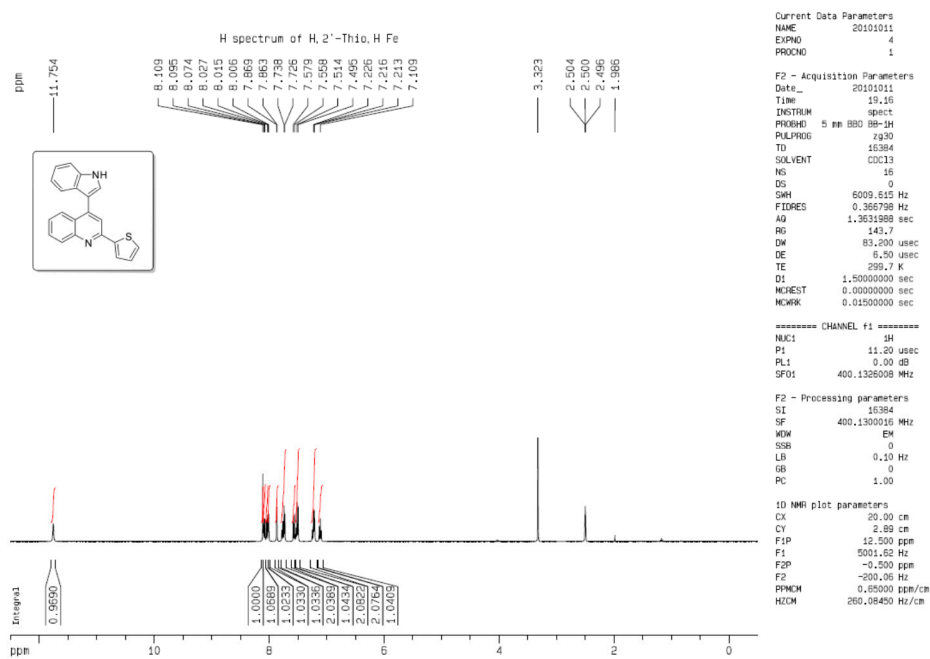


Figure S65. ^1H -NMR of 4-(1*H*-Indol-3-yl)-2-(thiophen-2-yl)quinoline (**4k**).

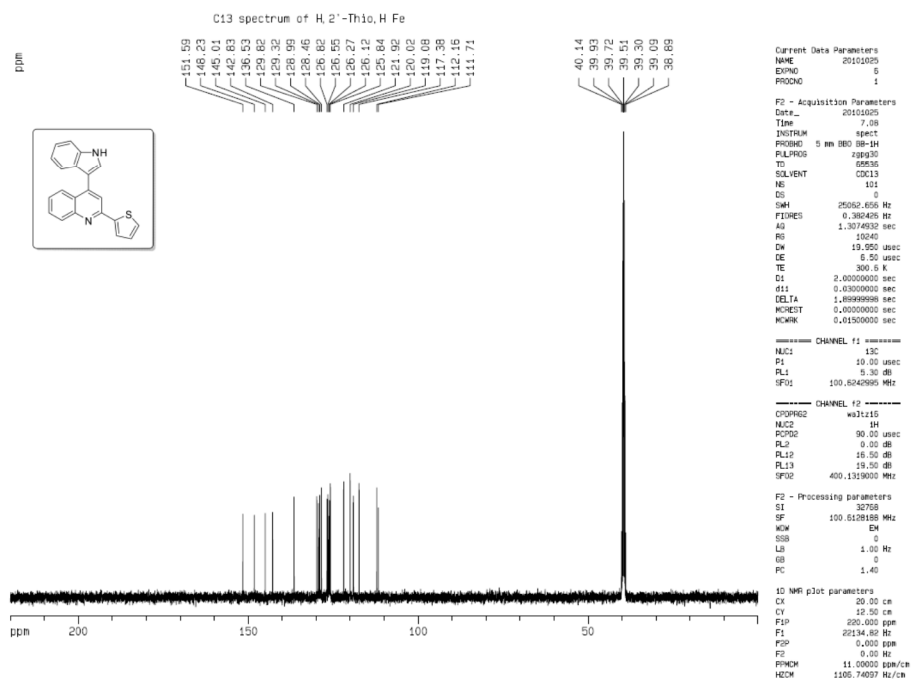


Figure S66. ^{13}C -NMR of 4-(1*H*-Indol-3-yl)-2-(thiophen-2-yl)quinoline (**4k**).

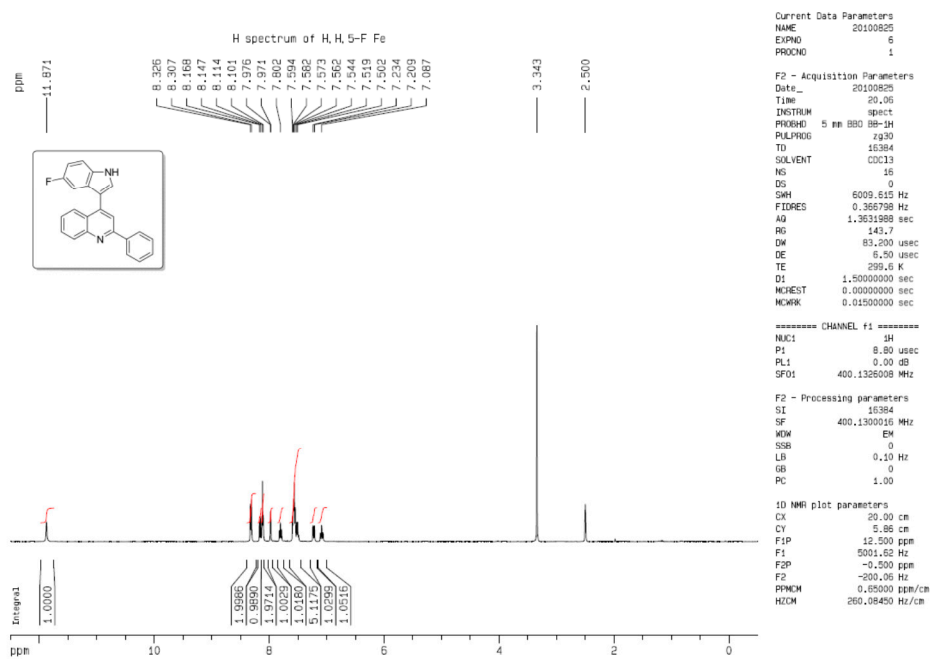


Figure S67. ^1H -NMR of 4-(5-Fluoro-1*H*-indol-3-yl)-2-phenylquinoline (**4l**).

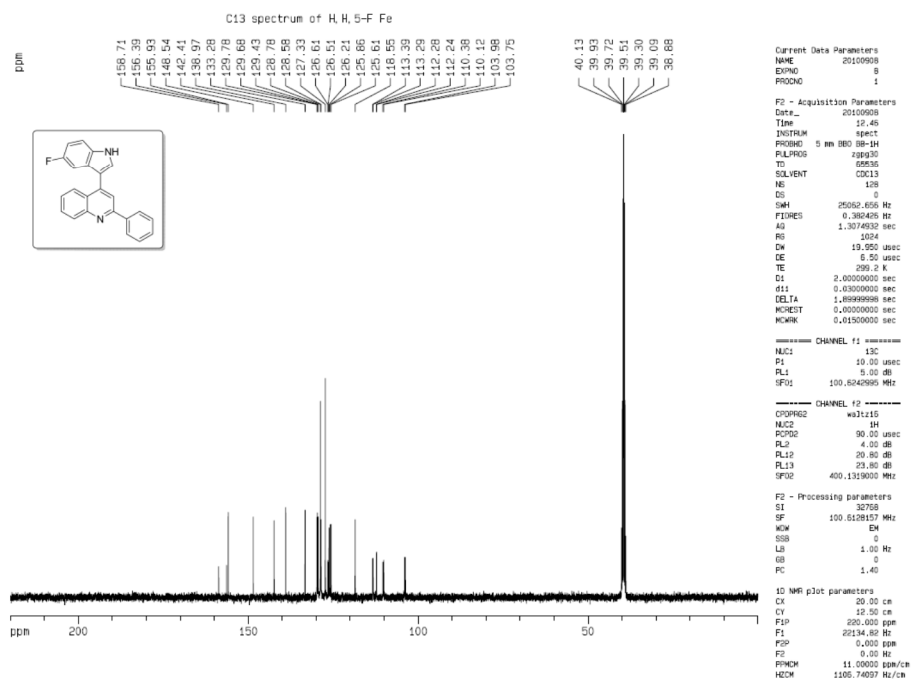


Figure S68. ^{13}C -NMR of 4-(5-Fluoro-1*H*-indol-3-yl)-2-phenylquinoline (**4l**).

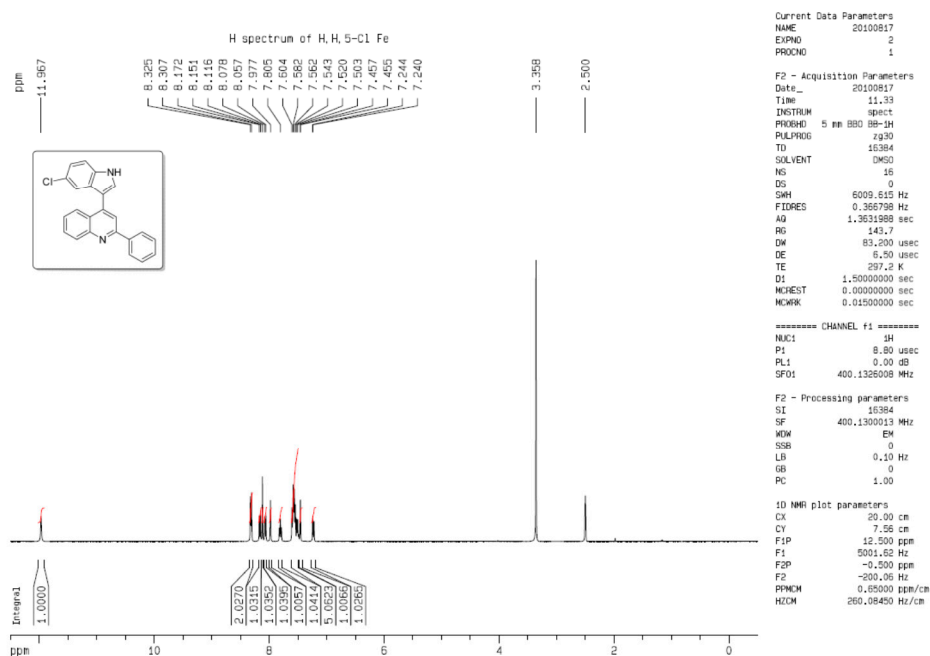


Figure S69. ^1H -NMR of 4-(5-Chloro-1*H*-indol-3-yl)-2-phenylquinoline (**4m**).

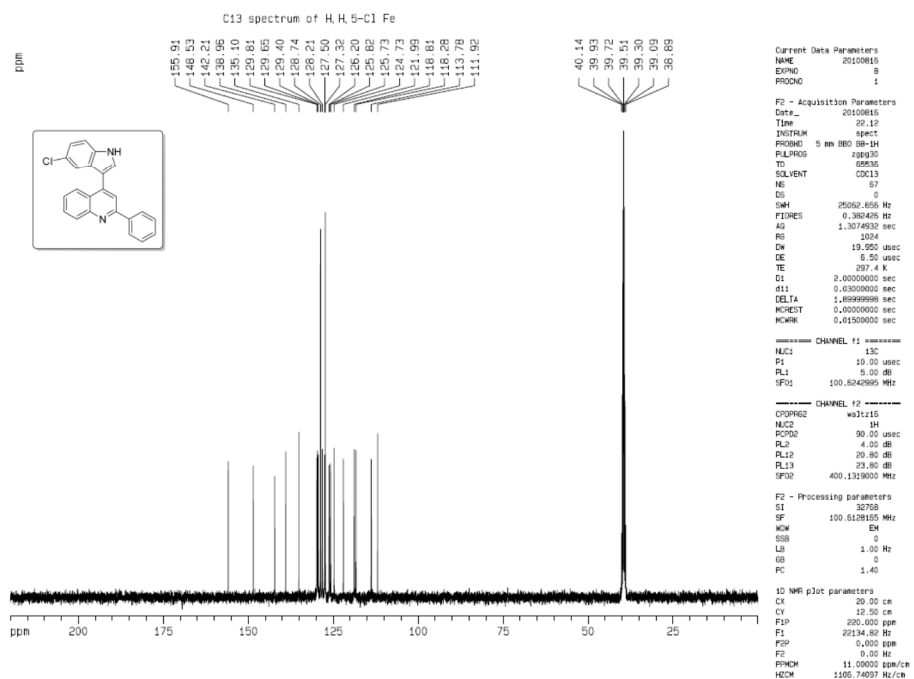


Figure S70. ¹³C-NMR of 4-(5-Chloro-1H-indol-3-yl)-2-phenylquinoline (4m).

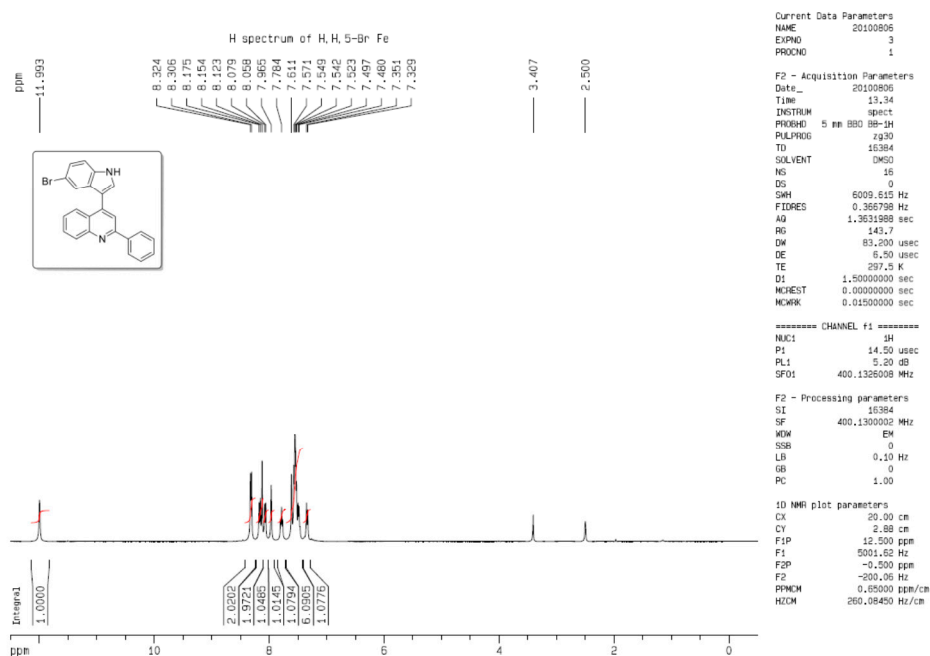


Figure S71. ¹H-NMR of 4-(5-Bromo-1H-indol-3-yl)-2-phenylquinoline (4n).

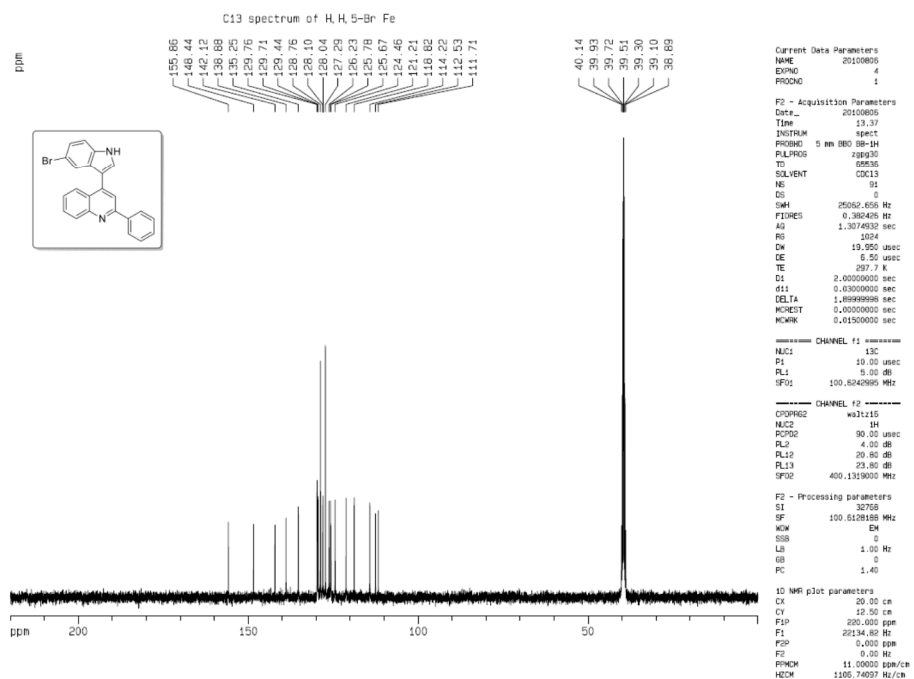


Figure S72. ¹³C-NMR of 4-(5-Bromo-1*H*-indol-3-yl)-2-phenylquinoline (**4n**).

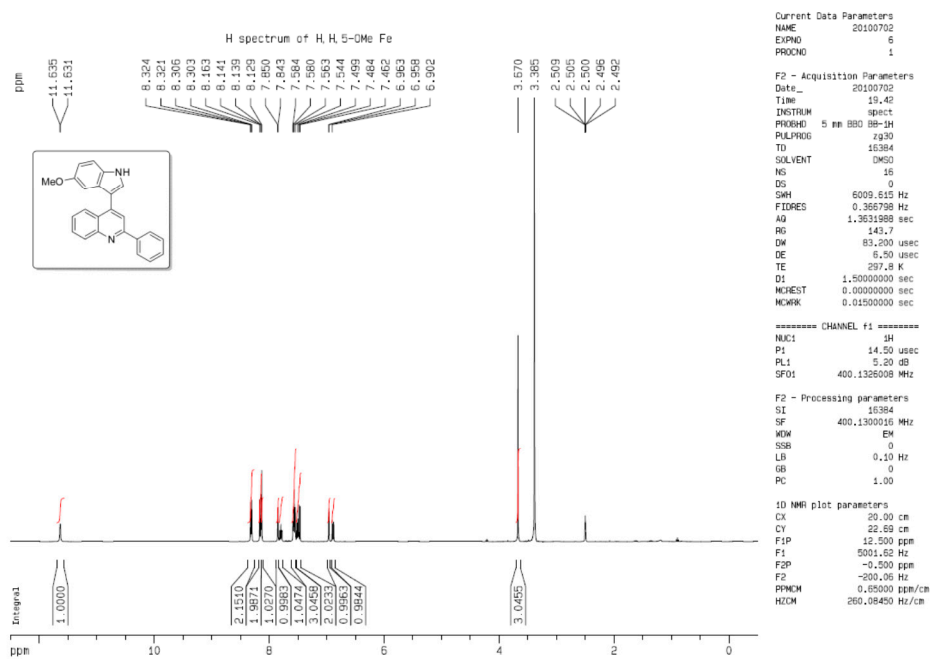


Figure S73. ¹H-NMR of 4-(5-Methoxy-1*H*-indol-3-yl)-2-phenylquinoline (**4o**).

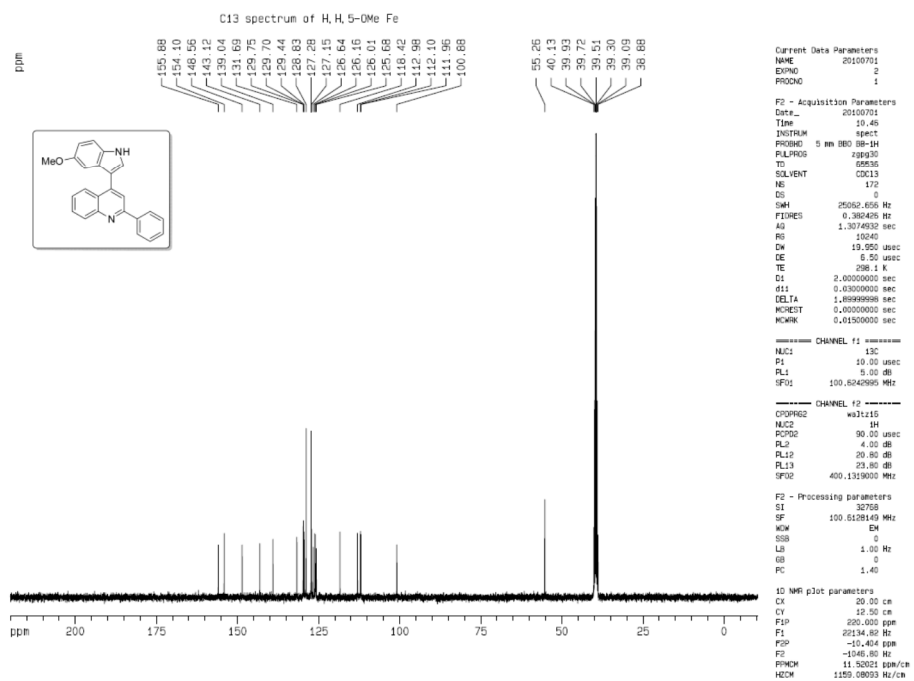


Figure S74. ^{13}C -NMR of 4-(5-Methoxy-1H-indol-3-yl)-2-phenylquinoline (**4o**).

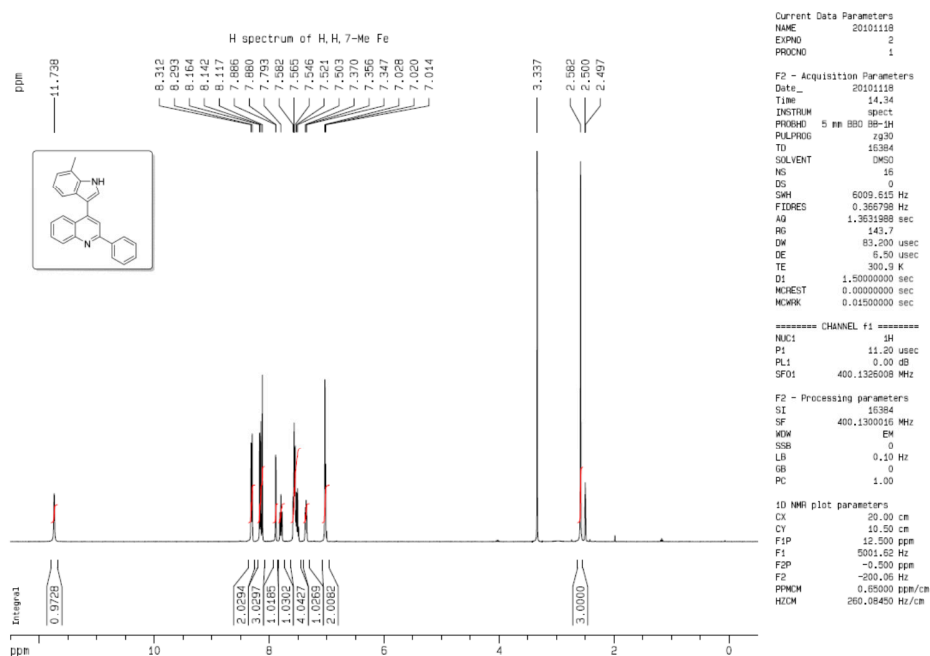


Figure S81. ^1H -NMR of 4-(7-Methyl-1H-indol-3-yl)-2-phenylquinoline (**4p**).

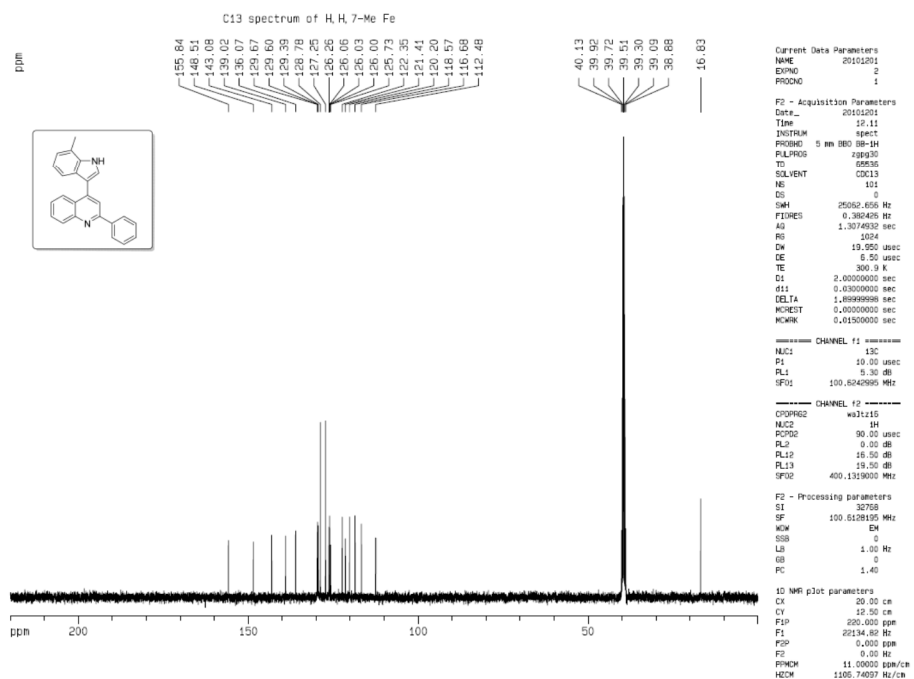


Figure S76. ¹³C-NMR of 4-(7-Methyl-1H-indol-3-yl)-2-phenylquinoline (**4p**).

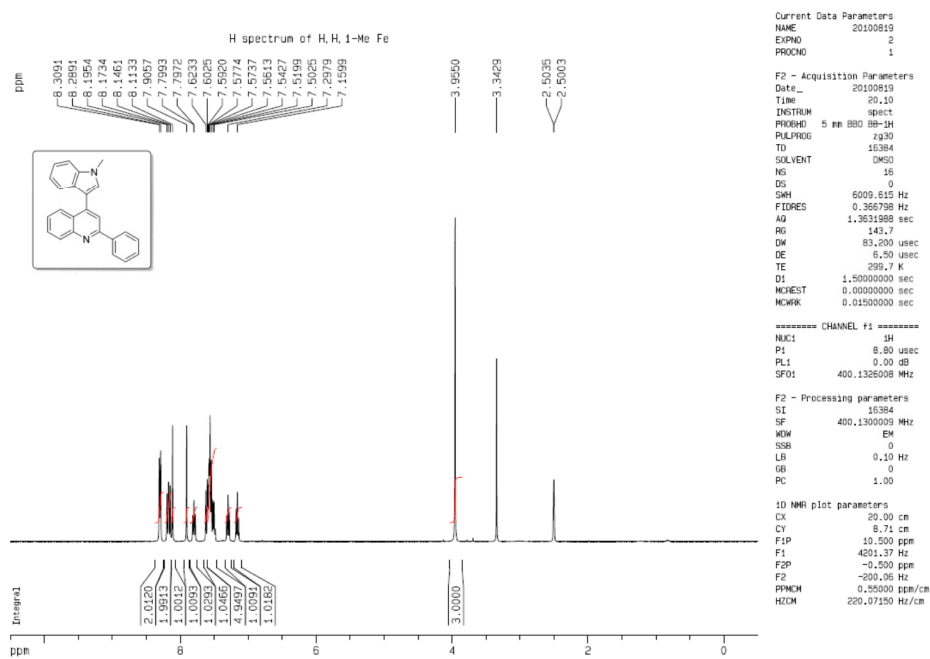


Figure S77. ¹H-NMR of 4-(1-Methyl-1H-indol-3-yl)-2-phenylquinoline (**4q**).

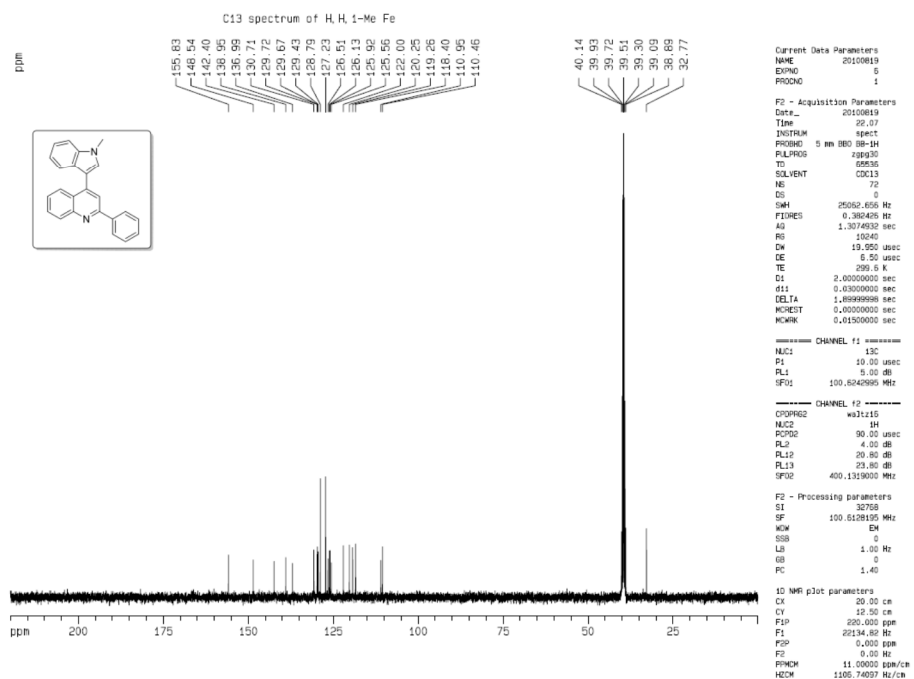


Figure S78. ^{13}C -NMR of 4-(1-Methyl-1H-indol-3-yl)-2-phenylquinoline (**4q**).

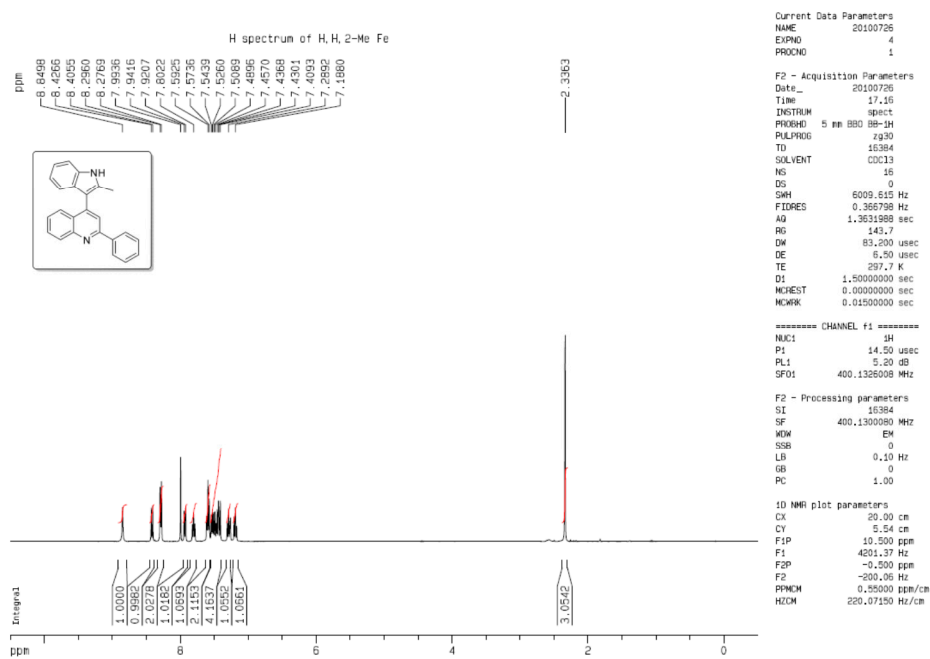


Figure S79. ^1H -NMR of 4-(2-Methyl-1H-indol-3-yl)-2-phenylquinoline (**4r**).

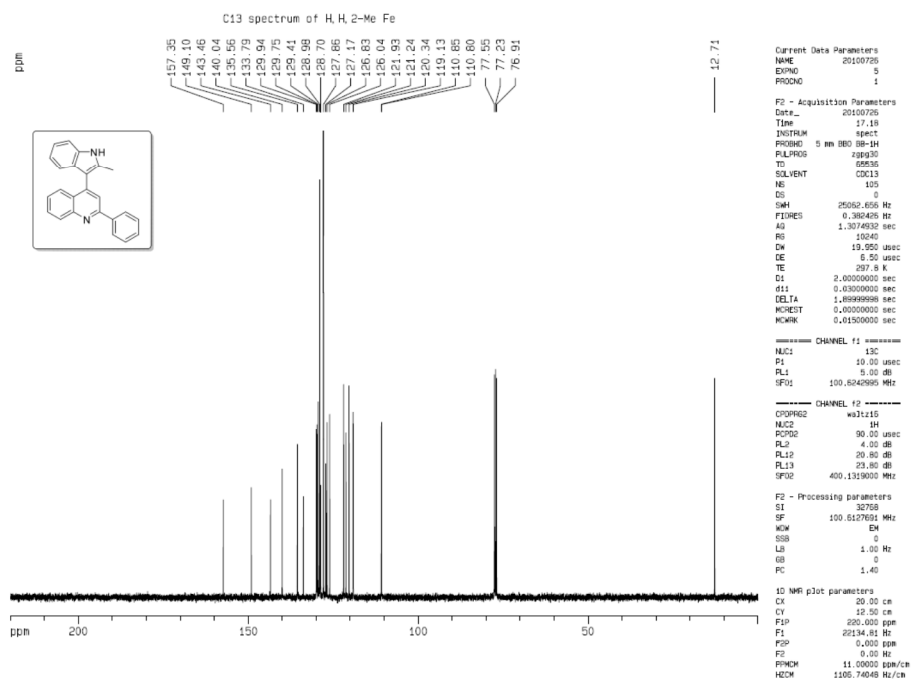


Figure S80. ¹³C-NMR of 4-(2-Methyl-1H-indol-3-yl)-2-phenylquinoline (4r).

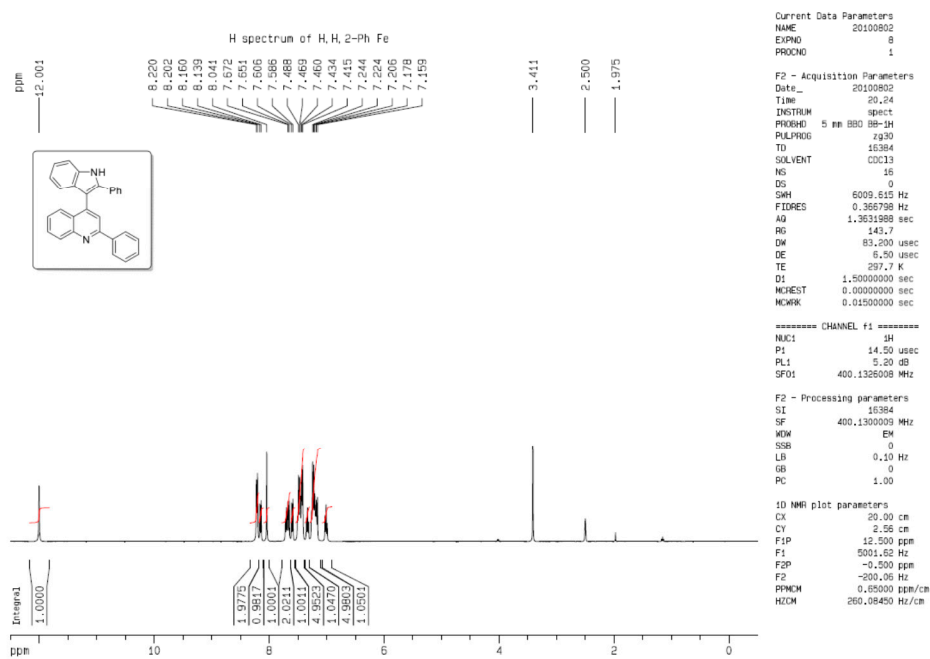


Figure S81. ¹H-NMR of 2-Phenyl-4-(2-phenyl-1H-indol-3-yl)quinoline (4s).

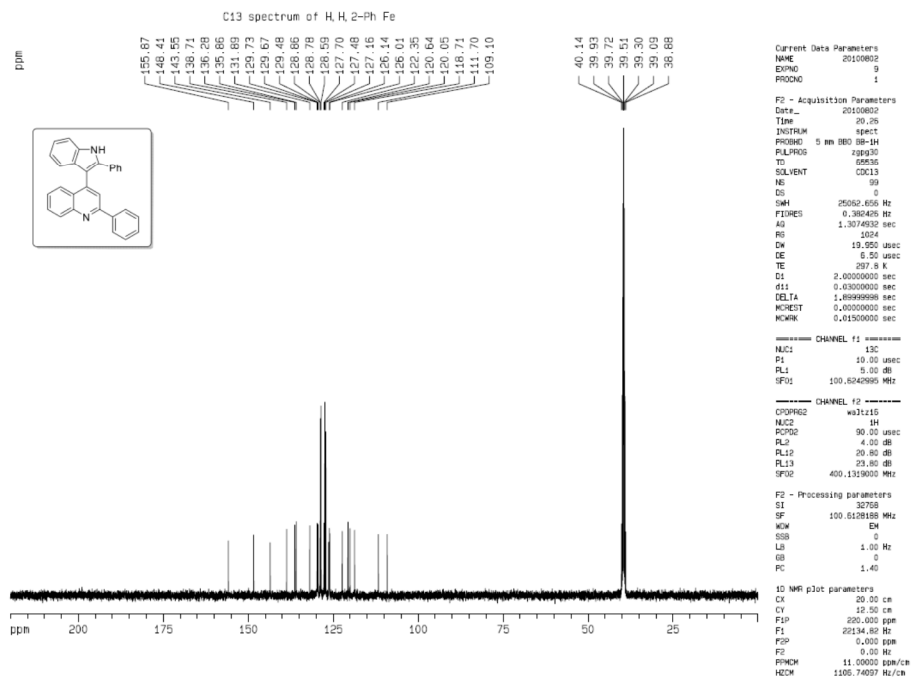


Figure S82. ¹³C-NMR of 2-Phenyl-4-(2-phenyl-1H-indol-3-yl)quinoline (4s).

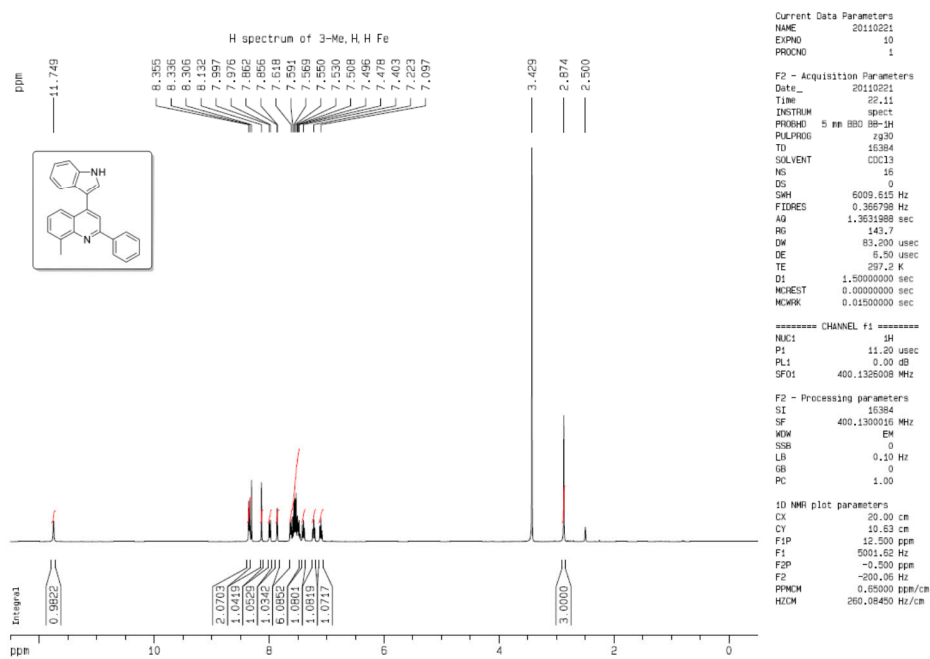


Figure S83. ¹H-NMR of 4-(1H-Indol-3-yl)-8-methyl-2-phenylquinoline (4t).

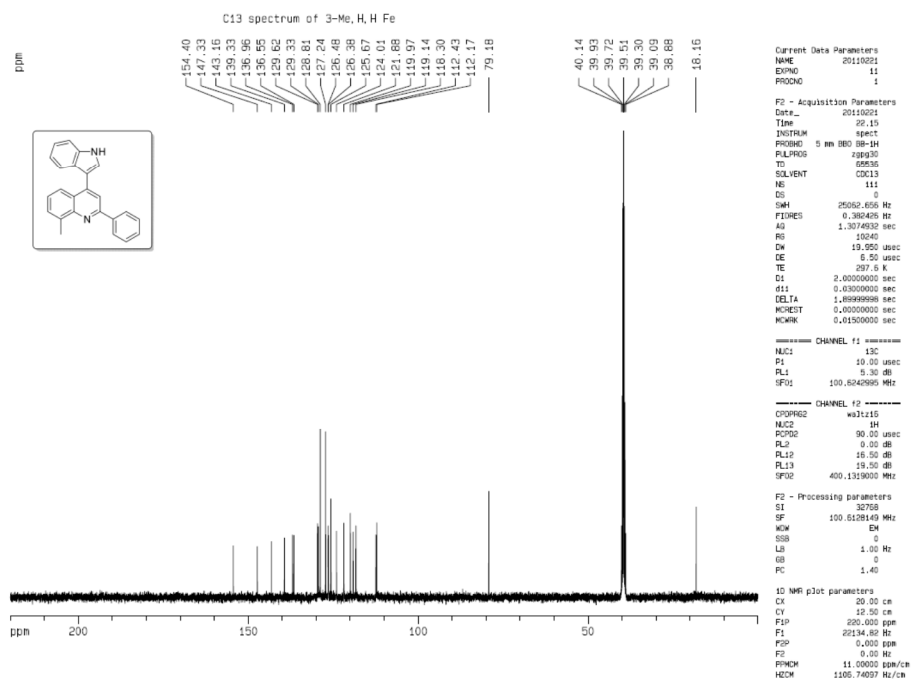


Figure S84. ^{13}C -NMR of 4-(1*H*-Indol-3-yl)-8-methyl-2-phenylquinoline (**4t**).

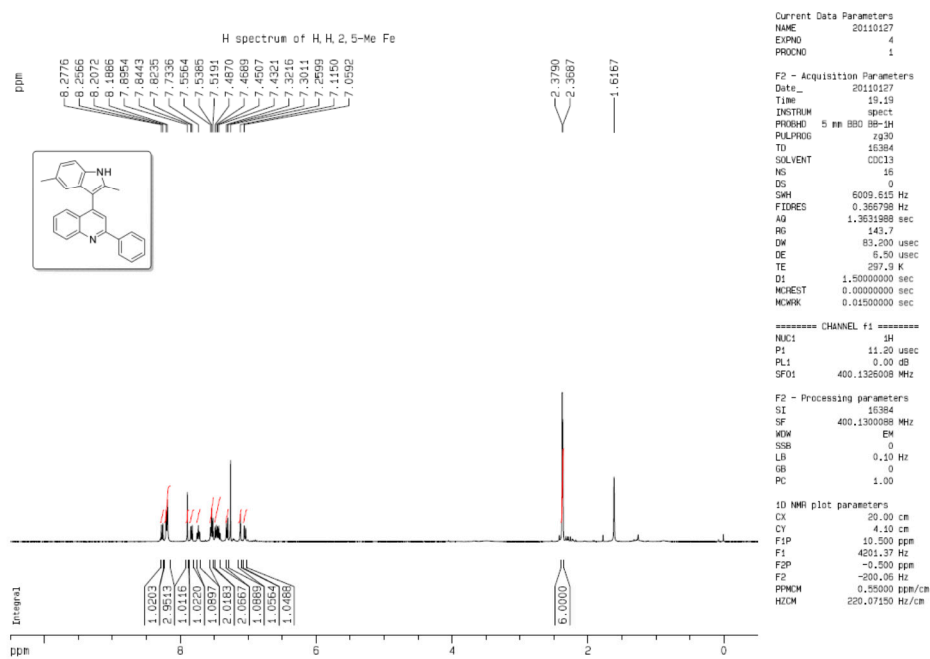


Figure S85. ^1H -NMR of 4-(2,5-Dimethyl-1*H*-indol-3-yl)-2-phenylquinoline (**4u**).

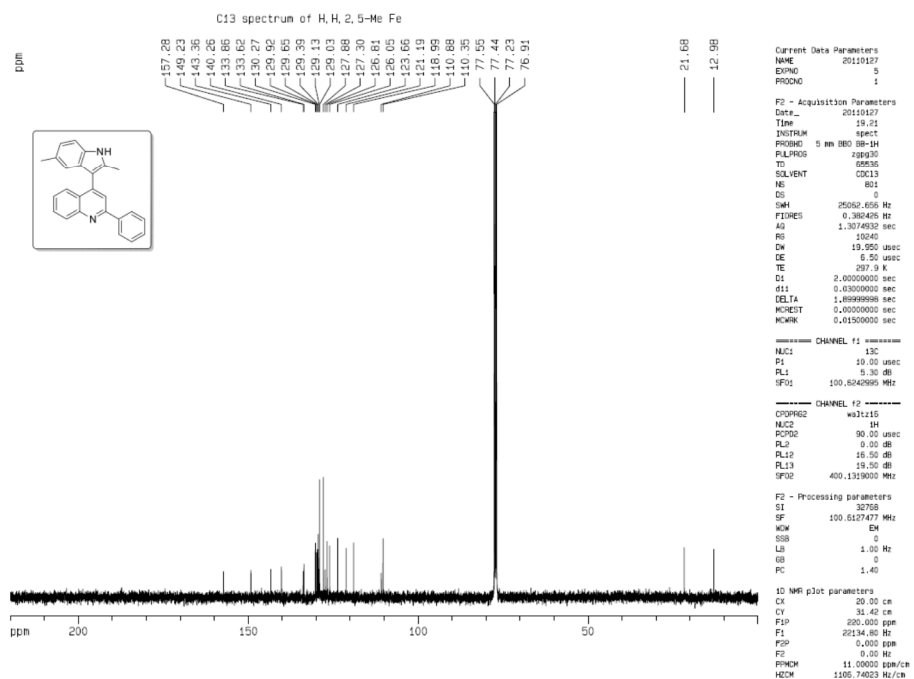


Figure S86. ^{13}C -NMR of 4-(2,5-Dimethyl-1H-indol-3-yl)-2-phenylquinoline (4u).

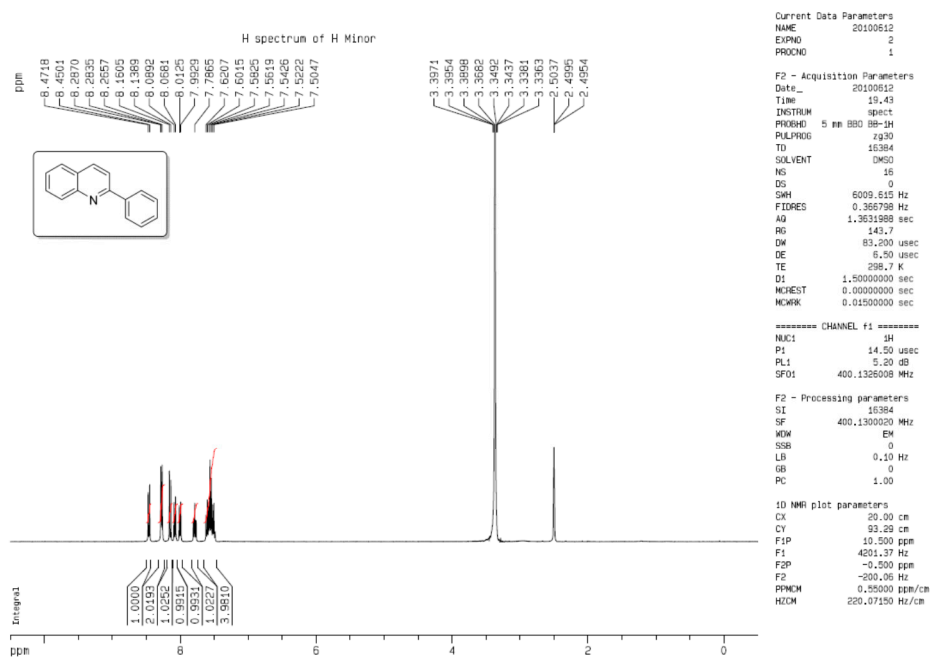


Figure S87. ^1H -NMR of 2-Phenylquinoline (5a).

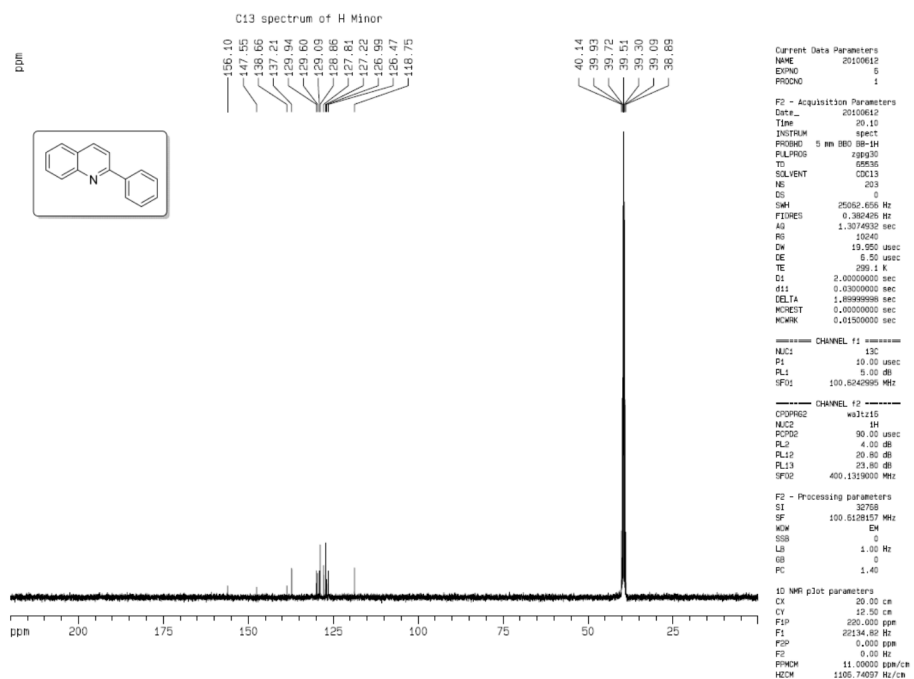


Figure S88. ^{13}C -NMR of 2-Phenylquinoline (5a).

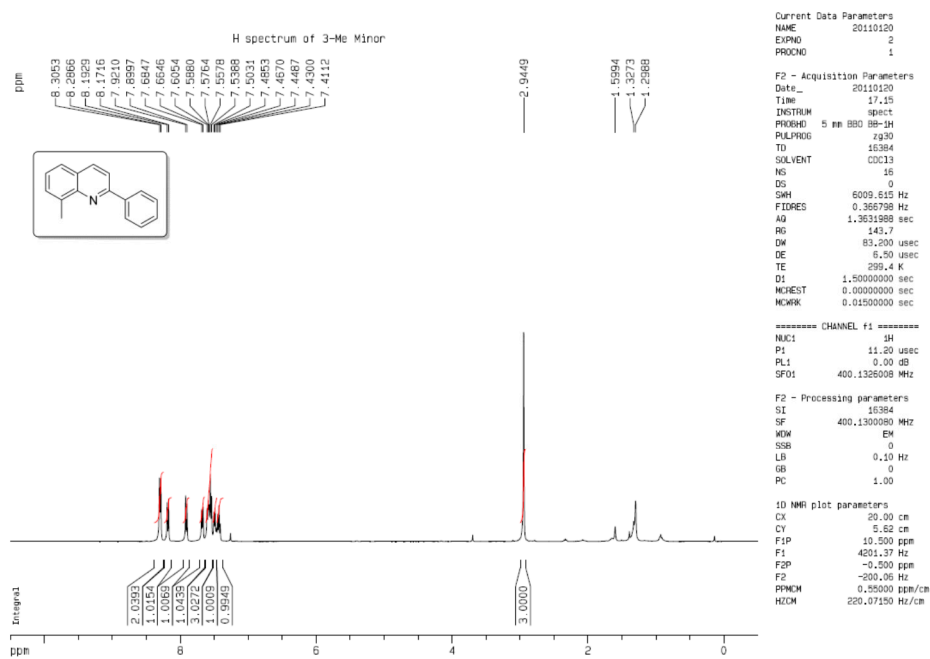


Figure S89. ^1H -NMR of 8-Methyl-2-phenylquinoline (5v).

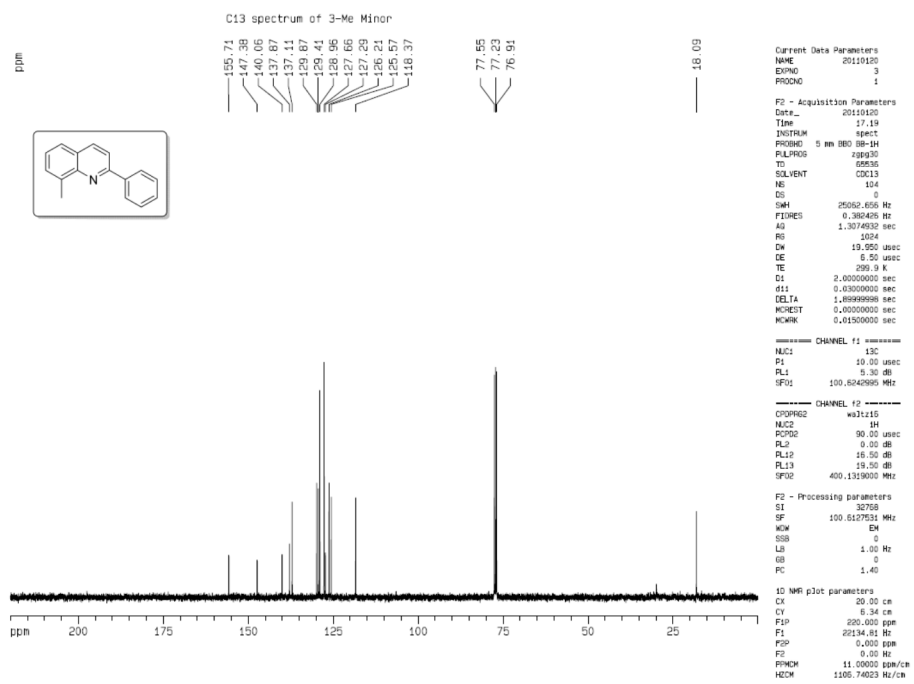


Figure S90. ^{13}C -NMR of 8-Methyl-2-phenylquinoline (**5v**).