APPENDIX

Figure 1. IR spectrum of (Z)-2-((E)-(3,4-dihyronaphthalen-1(2H)-ylidene)hydrazono)thiazolidin-4-one (3a')
Figure 2. $^1$H NMR spectrum of (Z)-2-((E)-(3,4-dihydronaphthalen-1(2H)-ylidene)hydrazono)thiazolidin-4-one (3a')
Figure 3. $^{13}$C NMR spectrum of (Z)-2-((E)-(3,4-dihydronaphthalen-1(2H)-ylidene)hydrazono)thiazolidin-4-one (3a')
Figure 4. Mass spectrum of (Z)-2-((E)-(3,4-dihyronaphthalen-1(2H)-ylidene)hydrazono)thiazolidin-4-one (3a')
Figure 5. IR spectrum of 2-{(E)-[3,4-Dihydro-2H-naphthalen-(1E)-ylidene]-hydrazono}-5-methylthiazolidin-4-one (3a'')
Figure 6. $^1$H NMR spectrum of 2-[(E)-[3,4-Dihydro-2H-naphthalen-(1E)-ylidene]-hydrazono]-5-methylthiazolidin-4-one (3a'')
Figure 7. $^{13}$C NMR spectrum of 2-{(E)-[3,4-Dihydro-2H-naphthalen-(1E)-ylidene]-hydrazono}-5-methylthiazolidin-4-one (3a'')
Figure 8. Mass spectrum of 2-\{(E)-[3,4-Dihydro-2H-naphthalen-(1E)-ylidene]-hydrazono\}-5-methylthiazolidin-4-one (3a'')
Figure 9. $^1$H NMR spectrum of (E)-4-(4-chlorophenyl)-2-(2-(3,4-dihydronaphthalen-1(2H)-ylidene)hydrazinyl)thiazole (4a')
Figure 10. $^1$H NMR spectrum of (E)-2-(2-(6-methoxy-3,4-dihyronaphthalen-1(2H)-ylidene)hydrazinyl)-4-(4-nitrophenyl)thiazole (4b'')
Figure 11. IR spectrum of 2-\{(E)-[3,4-Dihyronaphthalene-1(2H)-ylidene]hydrazono\}-perhydro-1,3-thiazin-4-one (5a)
Figure 12. $^1$H NMR spectrum of 2-{{(E)-[3,4-Dihyronaphthalene-1(2H)-ylidene]hydrazono}-perhydro-1,3-thiazin-4-one (5a)
Figure 13. $^{13}$C NMR spectrum of 2-{$\{E\}$-[3,4-Dihyronaphthalene-1(2H)-ylidene]hydrazono}-perhydro-1,3-thiazin-4-one (5a)
Figure 14. Mass spectrum of 2-[(E)-[3,4-Dihyronaphthalene-1(2H)-ylidene]hydrazono]-perhydro-1,3-thiazin-4-one (5a)
Figure 15. $^1$H NMR spectrum of (E)-ethyl 2-(2-(3,4-dihydronaphthalen-1(2H)-ylidene)hydrazinyl)thiazole-4-carboxylate (6a)
Figure 16. Mass spectrum of (E)-ethyl 2-(2-(3,4-dihydronaphthalen-1(2H)-ylidene)hydrazinyl)thiazole-4-carboxylate (6a)
Figure 17. IR spectrum of (Z)-2-((Z)-(6,7-dihydrobenzofuran-4(5H) ylidene)hydrazono)thiazolidin-4-one (9a)
Figure 18. $^1$H NMR spectrum of (Z)-2-((Z)-(6,7-dihydrobenzofuran-4(5H) ylidene)hydrazono)thiazolidin-4-one (9a)
Figure 19. $^{13}$C NMR spectrum of (Z)-2-((Z)-(6,7-dihydrobenzofuran-4(5H) ylidene)hydrazono)thiazolidin-4-one (9a)
Figure 20. Mass spectrum of (Z)-2-((Z)-(6,7-dihydrobenzofuran-4(5H) ylidene)hydrazono)thiazolidin-4-one (9a)
Figure 21. $^1$H NMR spectrum of (Z)-2-((Z)-(6,7-dihydrobenzofuran-4(5H)-ylidene)hydrazono)-5-methylthiazolidin-4-one (10a)
Figure 22. $^{13}$C NMR spectrum of (Z)-2-((Z)-(6,7-dihydrobenzofuran-4(5H)-ylidene)hydrazono)-5-methylthiazolidin-4-one (10a)
Figure 23. Mass spectrum of (Z)-2-((Z)-(6,7-dihydrobenzofuran-4(5H)-ylidene)hydrazono)-5-methylthiazolidin-4-one (10a)
Figure 24. $^1$H NMR spectrum of (Z)-4-(4-chlorophenyl)-2-(2-(6,7-dihydrobenzofuran-4(5H)-ylidene)hydrazinyl)thiazole (11a)
Figure 25. $^1$H NMR spectrum of (Z)-2-(2-(6,7-dihydrobenzofuran-4(5H)-ylidene)hydrazinyl)-4-(4-nitrophenyl)thiazole (11a')
Figure 26. $^1$H NMR spectrum of 2,3-dihydro-$1H$-carbazol-$4(9H)$-one (13)
Figure 27. $^{13}$C NMR spectrum of 2,3-dihydro-1$H$-carbazol-4(9$H$)-one (13)
Figure 28. Mass spectrum of 2,3-dihydro-1\(H\)-carbazol-4(9\(H\))-one (13)
Figure 29. $^1$H NMR spectrum of 9-Methyl-2,3-dihydro-1H-carbazol-4(9H)-one (14)
Figure 30. IR spectrum of (Z)-2-((E)-(2,3-dihydro-1H-carbazol-4(9H)-ylidene)hydrazono)thiazolidin-4-one (16a)
Figure 31. $^1$H NMR spectrum of (Z)-2-((E)-(2,3-dihydro-1H-carbazol-4(9H)-ylidene)hydrazono)thiazolidin-4-one (16a)
Figure 32. Mass spectrum of (Z)-2-((E)-(2,3-dihydro-1H-carbazol-4(9H)-ylidene)hydrazono)thiazolidin-4-one (16a)
Figure 33. $^1$H NMR spectrum of (Z)-2-((E)-(2,3-dihydro-1H-carbazol-4(9H)-ylidene)hydrazono)-5-methylthiazolidin-4-one (16b)
Figure 34. Mass spectrum of (Z)-2-((E)-(2,3-dihydro-1H-carbazol-4(9H)-ylidene)hydrazono)-5-methylthiazolidin-4-one (16b)
Figure 35. H NMR spectrum of (Z)-5-methyl-2-(E)-9-methyl-2,3-dihydro-1H-carbazol-4(9H)-ylidenehydrazonothiazolidin-4-one (16d)
Figure 36. $^{13}$C NMR spectrum of (Z)-5-methyl-2-((E)-(9-methyl-2,3-dihydro-1H-carbazol-4(9H)-ylidene)hydrazono)thiazolidin-4-one (16d)
Figure 37. Mass spectrum of \((Z)-5\text{-methyl-2-}((E)-(9\text{-methyl-2,3-dihydro-1H-carbazol-4(9H)-ylidene})hydrazono)\text{thiazolidin-4-one (16d)}}\)
Figure 38. $^1$H NMR spectrum of (E)-4-(4-chlorophenyl)-2-(2-(2,3-dihydro-1H-carbazol-4ylidene)hydrazinyl)thiazol (17b)
Figure 39. Mass spectrum of (E)-2-(2,3-dihydro-1H-carbazol-4(9H)-ylidene)hydrazinyl)-4-(4-nitrophenyl)thiazole (17c)
Figure 40. $^1$H NMR spectrum of (E)-ethyl 2-((2-(9-methyl-2,3-dihydro-1H-carbazol-4(9H)-ylidene)hydrazinyl)thiazole-4-carboxylate (18)
Figure 41. $^1$H NMR spectrum of (4E)-dimethyl 4-((2Z)-(5-(2-methoxy-2-oxoethylidene)-4-oxothiazolidin-2-ylidene)hydrazono)-9-methyl-2,3,4,9-tetrahydro-1H-4a,9a-ethenocarbazole-10,11-dicarboxylate (20)
Figure 42. Mass spectrum of (4E)-dimethyl 4-((2Z)-(5-(2-methoxy-2-oxoethylidene)-4-oxothiazolidin-2-ylidene)hydrazono)-9-methyl-2,3,4,9-tetrahydro-1H-4a,9a-ethenocarbazole-10,11-dicarboxylate (20)
Figure 43. $^1$H NMR spectrum of (3S,3aS)-3-Phenyl-3,3a,4,5-tetrahydro-2H-benzo[g]indazole-2-carboxamide (23a)
Figure 44. $^{13}$C NMR spectrum of (3S,3aS)-3-Phenyl-3a,4,5-tetrahydro-2H-benzo[g]indazole-2-carboxamide (23a)
Figure 45. 2D-COSY of (3S,3aS)-3-Phenyl-3a,4,5-tetrahydro-2H-benz[g]indazole-2-carboxamide (23a)
Figure 46. $^1$H NMR spectrum of (3R,3aS)-3-Phenyl-3a,4,5-tetrahydro-2H-benzo[g]indazole-2-carboxamide (24a)
Figure 47. $^{13}$C NMR spectrum of (3R, 3aS)-3-phenyl-3,3a,4,5-tetrahydro-2H-benzo[g]indazole-2-carboxamide (24a)
Figure 48. Mass spectrum of (3R,3aS)-3-Phenyl-3,3a,4,5-tetrahydro-2H-benzo[g]indazole-2-carboxamide (24a)
Figure 49. IR spectrum (3aR)-3-Phenyl-3,3a,4,5-tetrahydro-2H-benzo[g]indazole-2-carbothioamide (23b)
Figure 50. $^1$H NMR spectrum of (3aR)-3-Phenyl-3a,4,5-tetrahydro-2H-benzo[g]indazole-2-carbothioamide (23b)
Figure 51. $^{13}$C NMR spectrum of (3aR)-3-Phenyl-3,3a,4,5-tetrahydro-2H-benzo[g]indazole-2-carbothioamide (23b)
Figure 52. Mass spectrum of (3αR)-3-Phenyl-3,3a,4,5-tetrahydro-2H-benzo[g]indazole-2-carbothioamide (23b)
Figure 53. IR spectrum of 2-[(3S,3aS)-3-phenyl-3a,4,5-tetrahydro-2H-benzo[g]indazol-2-yl]thiazol-4(5H)-one (25a)
Figure 54. $^1$H NMR spectrum of 2-[(3S,3aS)-3-phenyl-3,3a,4,5-tetrahydro-2H-benzo[g]indazol-2-yl]thiazol-4(5H)-one (25a)
Figure 55. $^{13}$C NMR spectrum of 2-[(3S,3aS)-3-phenyl-3a,4,5-tetrahydro-2H-benzo[g]indazol-2-yl]thiazol-4(5H)-one (25a)
Figure 56. Mass spectrum of 2-[(3S,3aS)-3-phenyl-3a,4,5-tetrahydro-2H-benzo[g]indazol-2-yl]thiazol-4(5H)-one (25a)
Figure 57. $^1$H NMR spectrum of 5-Methyl-2-[(3S,3aS)-3-phenyl-3,3a,4,5-tetrahydro-2H-benzo[g]indazol-2-yl]thiazol-4(5H)-one (25b)
Figure 58. $^{13}$C NMR spectrum of 5-Methyl-2-[(3S,3aS)-3-phenyl-3a,4,5-tetrahydro-2H-benzo[g]indazol-2-yl]thiazol-4(5H)-one (25b)
Figure 59. Mass spectrum of 5-Methyl-2-[(3S,3aS)-3-phenyl-3a,4,5-tetrahydro-2H-benzo[g]indazol-2-yl]thiazol-4(5H)-one (25b)
Figure 60. $^1$H NMR spectrum of Cyclopenta-2,4-dien-1-yl(2-((E)-1-((E)-4-oxothiazolidin-2-ylidene)hydrazono)ethyl)cyclopenta-2,4-dien-1-yl)iron (29a)
Figure 61. $^{13}$C NMR spectrum of Cyclopenta-2,4-dien-1-yl(2-((E)-1-((E)-(4-oxothiazolidin-2-ylidene)hydrazono)ethyl)cyclopenta-2,4-dien-1-yl)iron (29a)
Figure 62. Mass spectrum of Cyclopenta-2,4-dien-1-yl(2-((E)-1-((E)-(4-oxothiazolidin-2-ylidene)hydrazono)ethyl)cyclopenta-2,4-dien-1-yl)iron (29a)
Figure 63. IR spectrum of Cyclopenta-2,4-dien-1-yl(2-\((E)-1-((E)-(5\text{-methyl-}4\text{-oxothiazolidin-2-ylidene})\text{hydrazono})\text{ethyl})\text{cyclopenta-2,4-dien-1-yl})\text{iron (29b)}}
Figure 64. $^1$H NMR spectrum of Cyclopenta-2,4-dien-1-yl(2-((E)-1-((E)-(5-methyl-4-oxothiazolidin-2-ylidene)hydrazono)ethyl)cyclopenta-2,4-dien-1-yl)iron (29b)
Figure 65. Mass spectrum of Cyclopenta-2,4-dien-1-yl(2-((E)-1-((E)-(5-methyl-4-oxothiazolidin-2-ylidene)hydrazono)ethyl)cyclopenta-2,4-dien-1-yl)iron (29b)
Figure 66. $^1$H NMR spectrum of (E)-(2-{1-(2-{5-(4-chlorophenyl)thiazol-2-yl)hydrazono}ethyl)cyclopenta-2,4-dien-1-yl})(cyclopenta-2,4-dien-1-yl)iron (30b)
Figure 67. $^1$H NMR spectrum of 1-(4-chlorophenyl)-1,2,5,6-tetrahydrobenzo[f]quinazoline-3(4H)-thione (34)
Figure 68. $^1$H NMR spectrum of 12-(4-chlorophenyl)-9,12-dihydro-5H-benzo[f]thiazolo[2,3-b]quinazolin-10(6H)-one (35)
Figure 69. $^{13}$C NMR spectrum of 12-(4-chlorophenyl)-9,12-dihydro-5H-benzo[j]thiazolo[2,3-b]quinazolin-10(6H)-one (35)
Figure 70. Mass spectrum of 12-(4-chlorophenyl)-9,12-dihydro-5H-benzo[f]thiazolo[2,3-b]quinazolin-10(6H)-one (35)
Figure 71. $^1$H NMR spectrum of 12-(4-chlorophenyl)-9-methyl-9,12-dihydro-5H-benzo[f]thiazolo[2,3-b]quinazolin-10(6H)-one (39)
Figure 72. $^{13}$C NMR spectrum of 12-(4-chlorophenyl)-9-methyl-9,12-dihydro-5H-benzo[f]thiazolo[2,3-b]quinazolin-10(6H)-one (39)
Figure 73. Mass spectrum of 12-(4-chlorophenyl)-9-methyl-9,12-dihydro-5H-benzo[f]thiazolo[2,3-b]quinazolin-10(6H)-one (39)
Figure 74. $^1$H NMR spectrum of 12-(4-chlorophenyl)-6,9,10,12-tetrahydro-5H-benzo[f]thiazolo[2,3-b]quinazoline (37)
Figure 75. Mass spectrum of 12-(4-chlorophenyl)-6,9,10,12-tetrahydro-5H-benzo[f]thiazolo[2,3-b]quinazoline (37)
Figure 76. $^1$H NMR spectrum of 13-(4-chlorophenyl)-5,6,9,10,11,13-hexahydrobenzo[f][1,3]thiazino[2,3-b]quinazoline (44)
Figure 77. Mass spectrum of 13-(4-chlorophenyl)-5,6,9,10,11,13-hexahydrobenzo[f][1,3]thiazino[2,3-b]quinazoline (44)
Figure 78. $^1$H NMR spectrum of (Z)-12-(4-chlorophenyl)-9-(4-methylbenzylidene)-9,12-dihydro-5H-benzo[f]thiazolo[2,3-b]quinazolin-10(6H)-one (41b)
Figure 79. Mass spectrum of (Z)-12-(4-chlorophenyl)-9-(4-fluorobenzylidene)-9,12-dihydro-5H-benzo[f]thiazolo[2,3-b]quinazolin-10(6H)-one (41d)
Figure 80. IR spectrum of 13-(4-chlorophenyl)-5,6,9,10-tetrahydrobenzo[f][1,3]thiazino[2,3-b]quinazolin-11(13H)-one (42)
Figure 81. $^1$H NMR spectrum of 13-(4-chlorophenyl)-5,6,9,10-tetrahydrobenzo[f][1,3]thiazino[2,3-b]quinazolin-11(13H)-one (42)
Figure 82. $^{13}$C NMR spectrum of 13-(4-chlorophenyl)-5,6,9,10-tetrahydrobenzo[f][1,3]thiazino[2,3-b]quinazolin-11(13H)-one (42)
Figure 83. Mass spectrum of 13-(4-chlorophenyl)-5,6,9,10-tetrahydrobenzo[f][1,3]thiazino[2,3-b]quinazolin-11(13H)-one (42)
Figure 84. $^1$H NMR spectrum of (E)-1-(4-Chlorobenzylidene)-3,4-dihyronaphthalen-2(1H)-one (46a)
Figure 85. $^1$H NMR spectrum of 1-(4-Nitrophenyl)-5,6-dihydro-1H-naphtho[2,1-d][1,3]thiazin-3-amine (47b)
Figure 86. Mass spectrum of 1-(4-Nitrophenyl)-5,6-dihydro-1H-naphtho[2,1-d][1,3]thiazin-3-amine (47b)