Synthesis and Biological Evaluation of Novel Hybrid Compounds Bearing Pyrazine and 1,2,4-triazole Analogues as Potent Antitubercular Agents

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[*]Corresponding author: udayakumar@nitk.edu.in, udayaravi80@gmail.com

Supporting information

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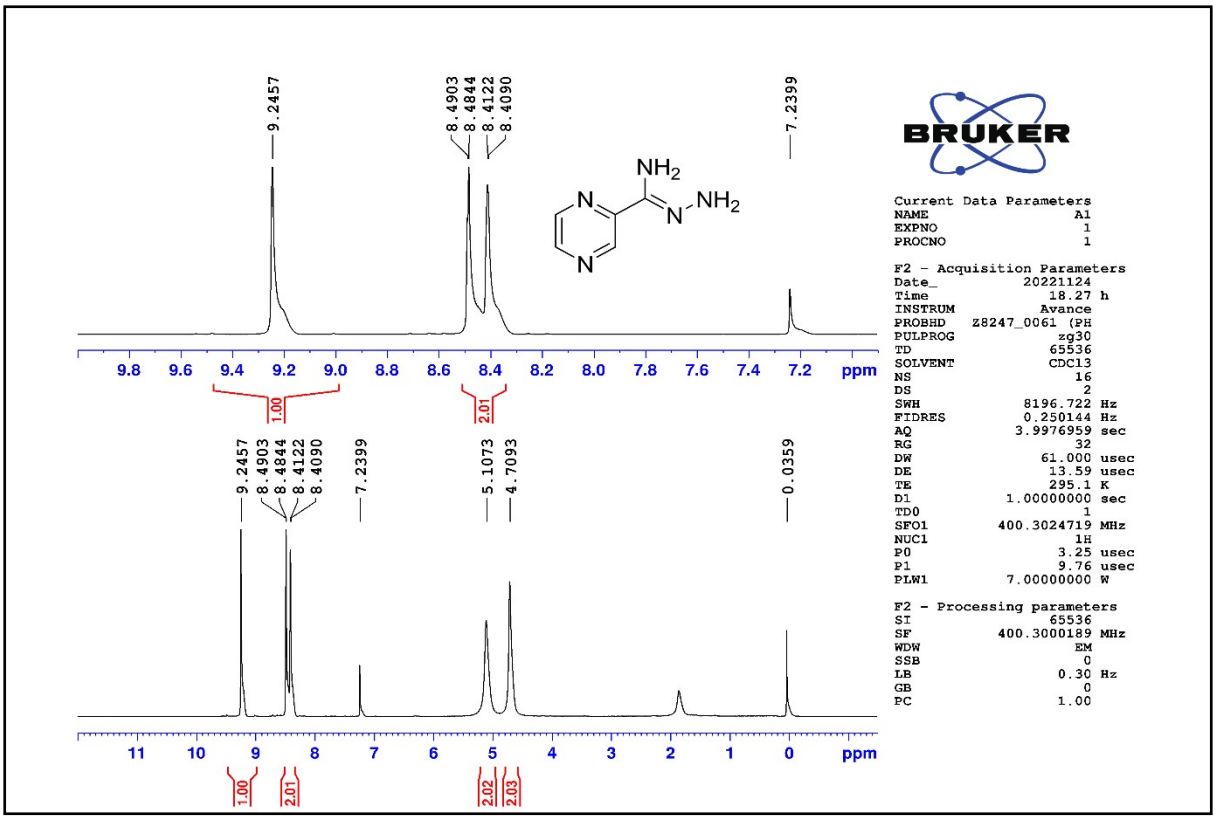


Figure S1: [1]H-NMR spectrum of compound 2

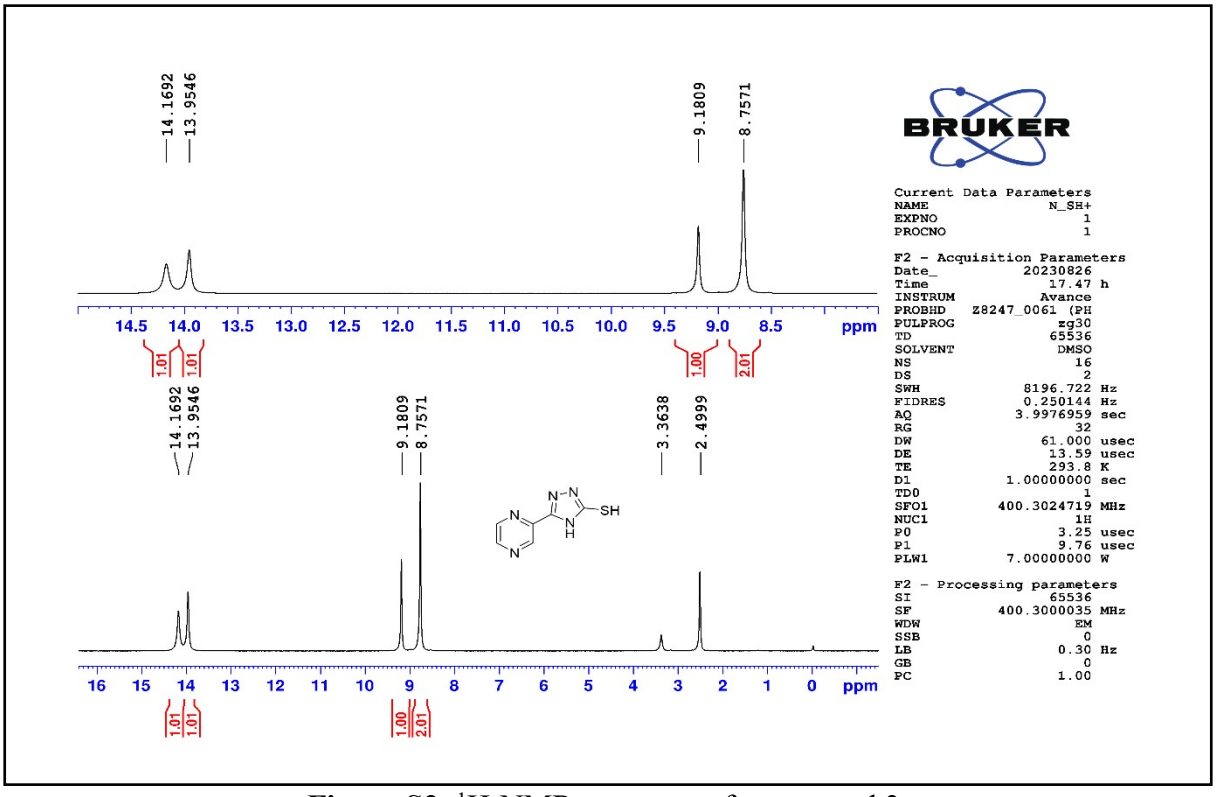


Figure S2: [1]H-NMR spectrum of compound 3

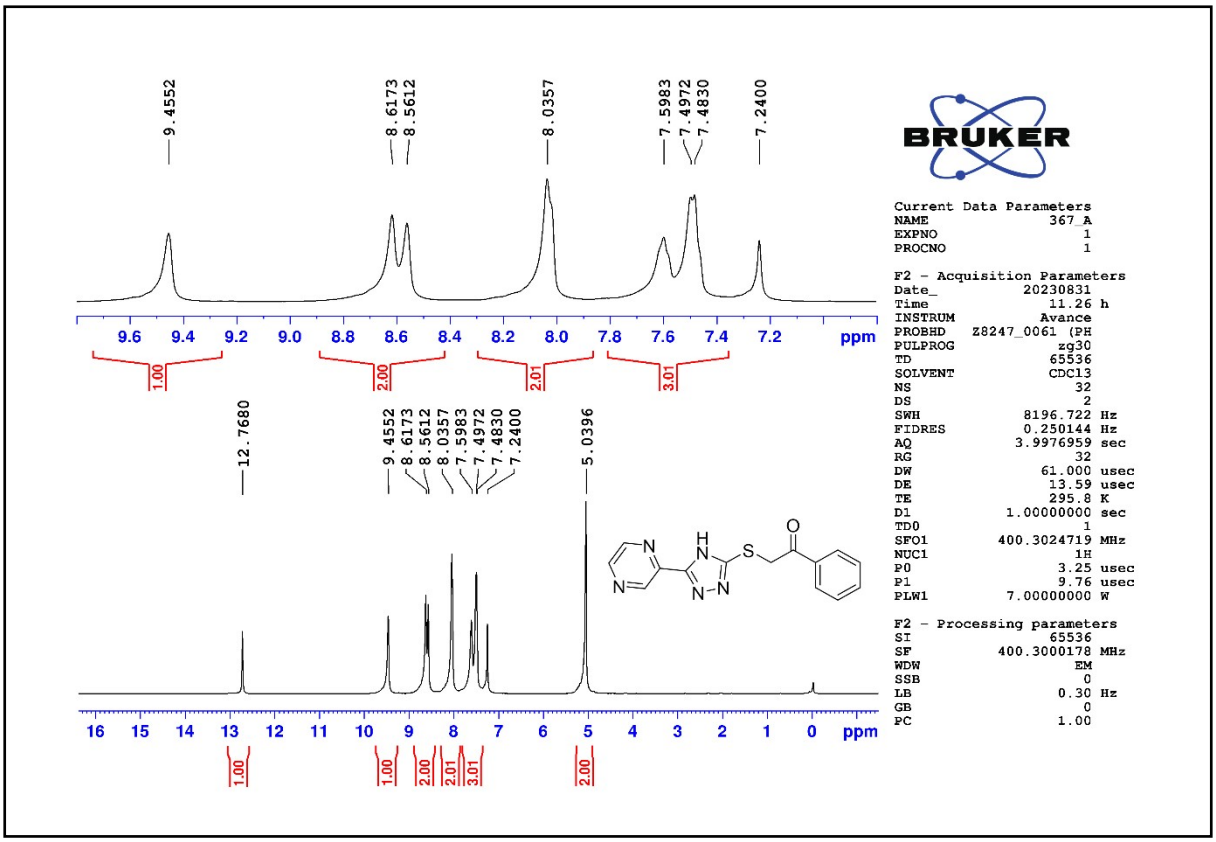


Figure S3: [1]H-NMR spectrum of compound T1

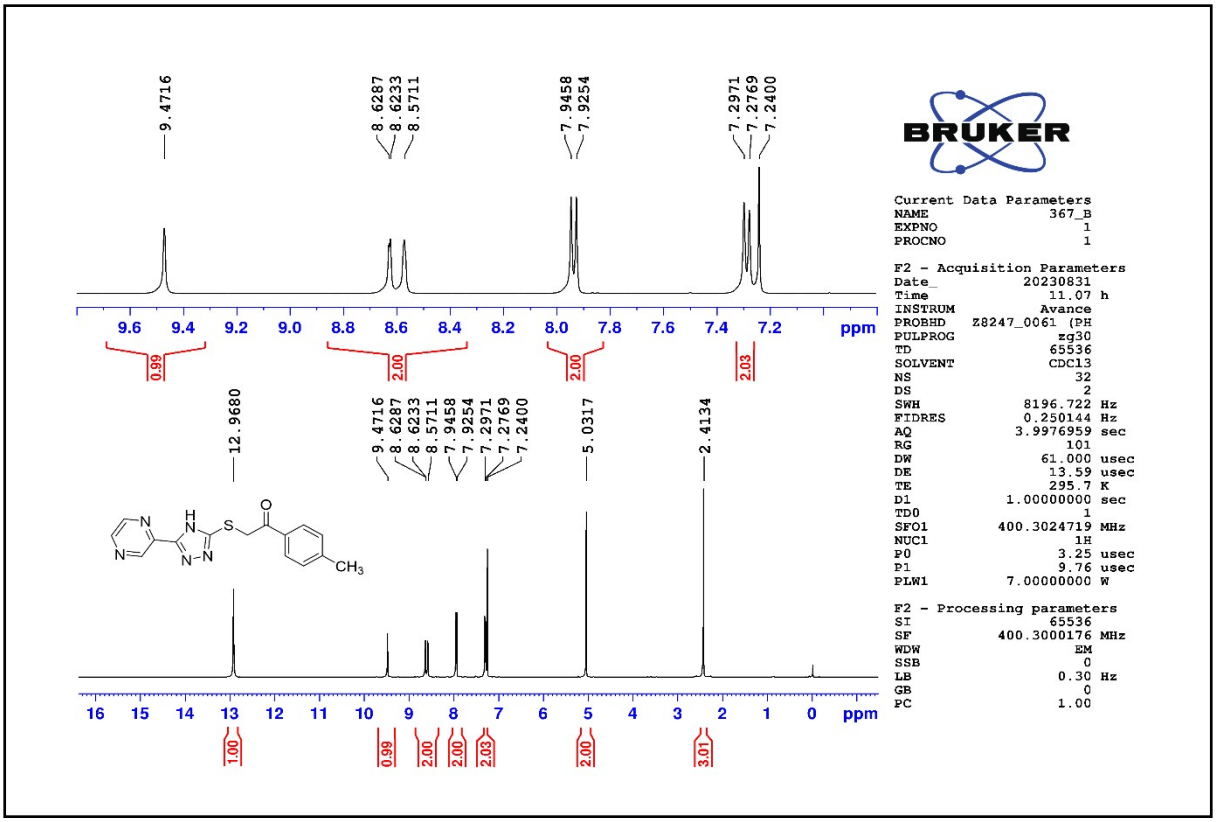


Figure S4: [1]H-NMR spectrum of compound T2

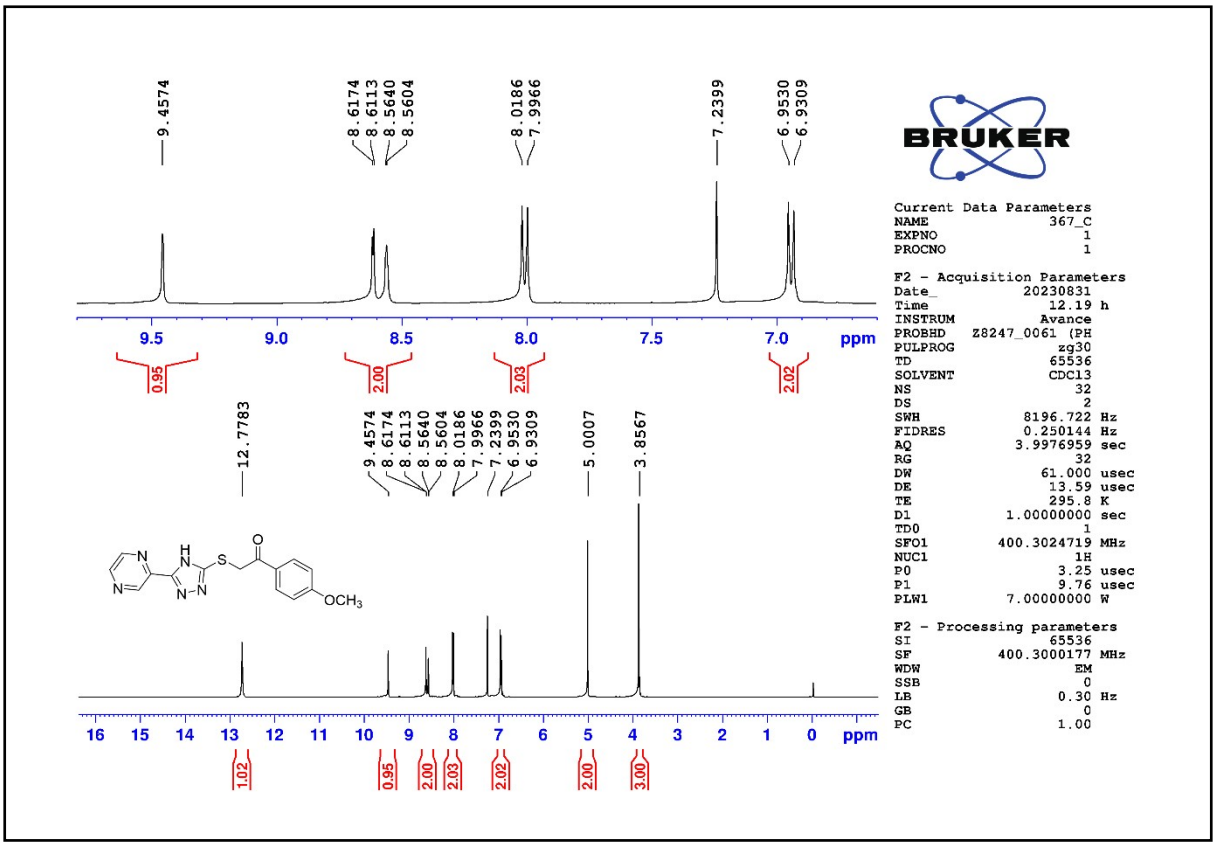


Figure S5: [1]H-NMR spectrum of compound T3

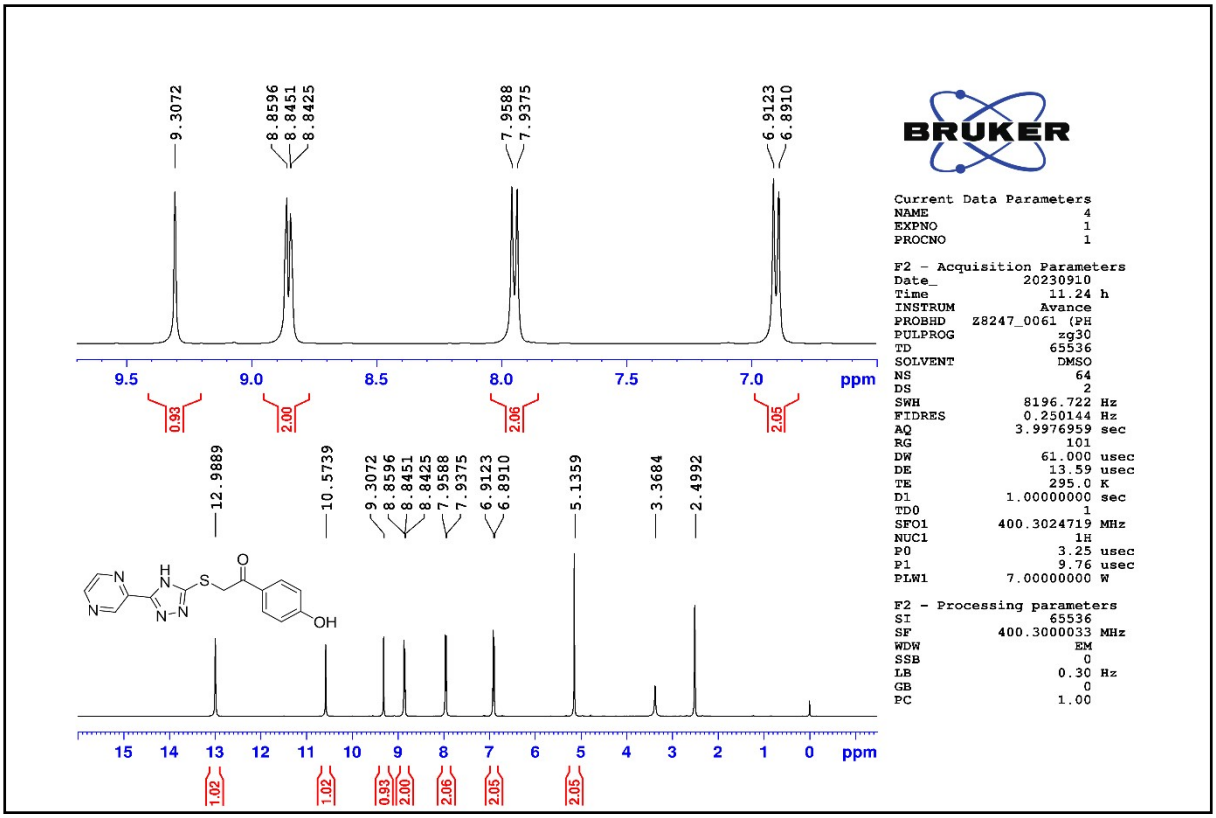


Figure S6: [1]H-NMR spectrum of compound T4

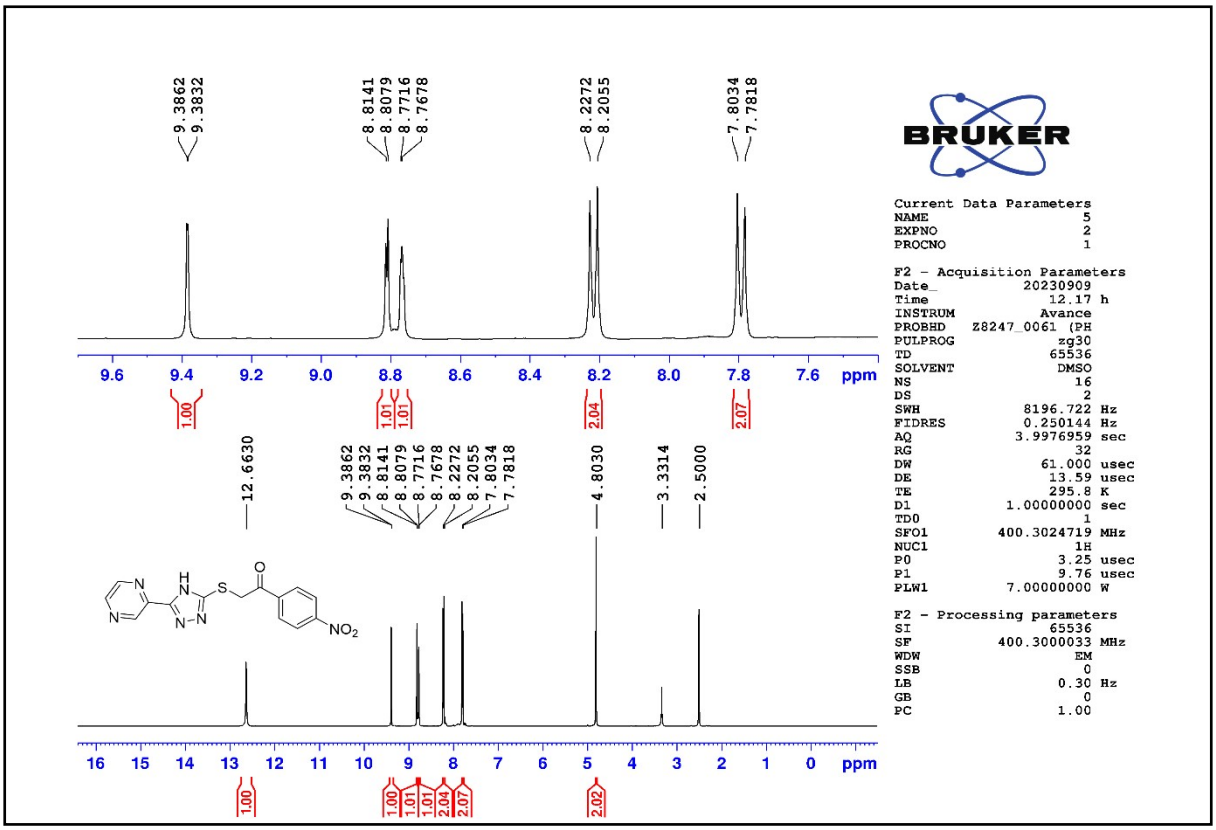


Figure S7: [1]H-NMR spectrum of compound T5

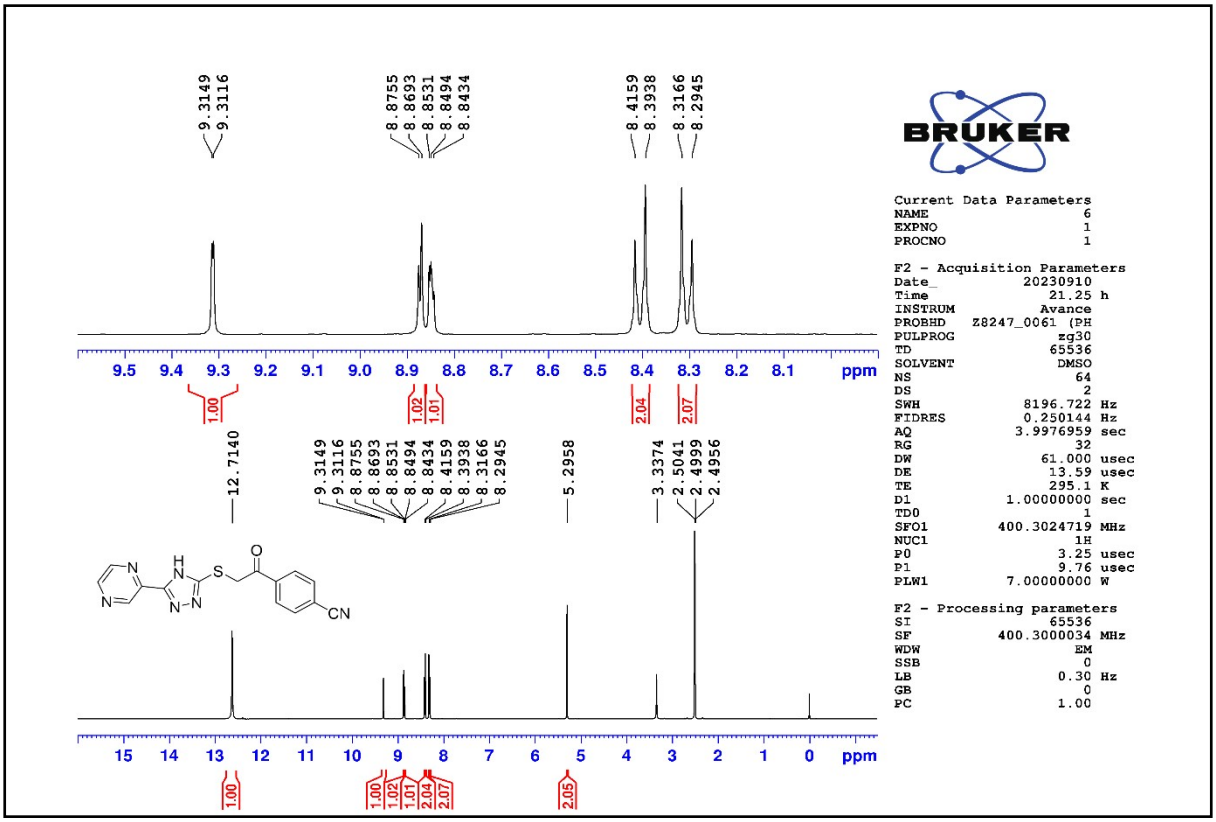


Figure S8: [1]H-NMR spectrum of compound T6

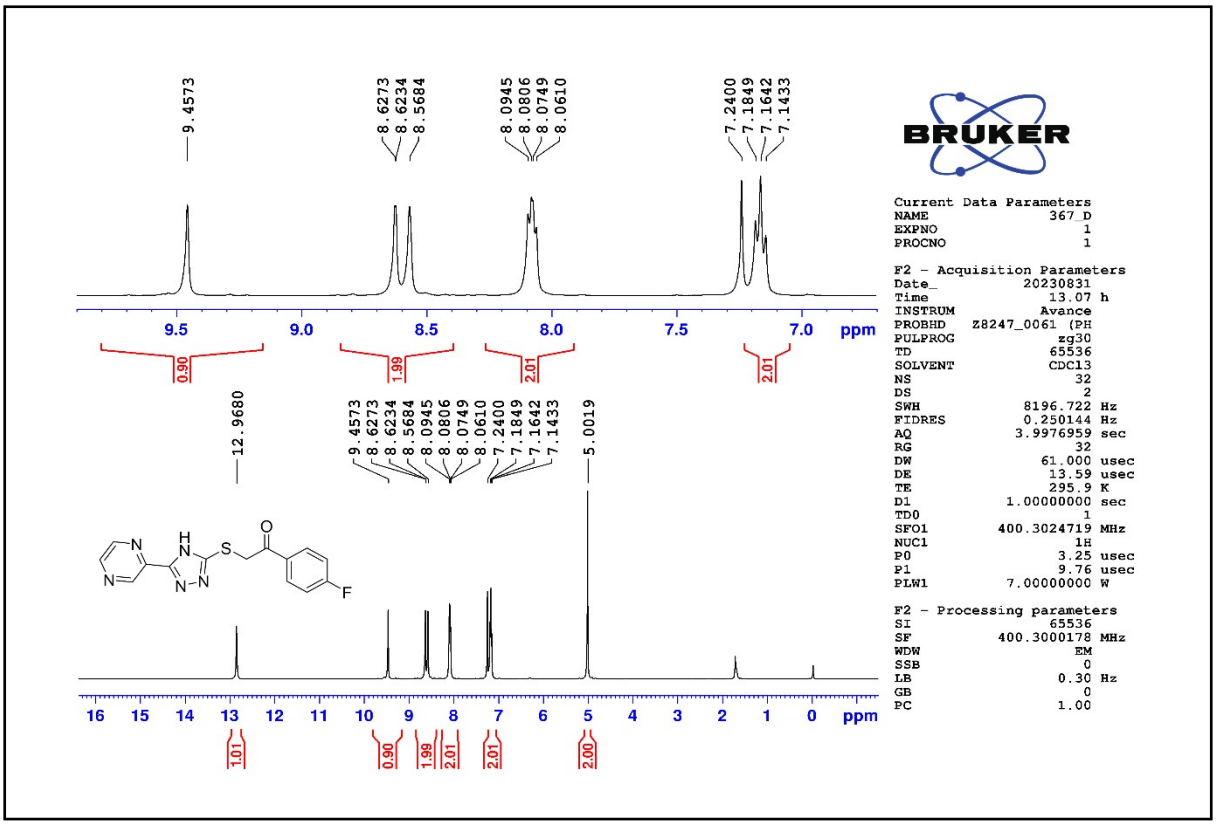
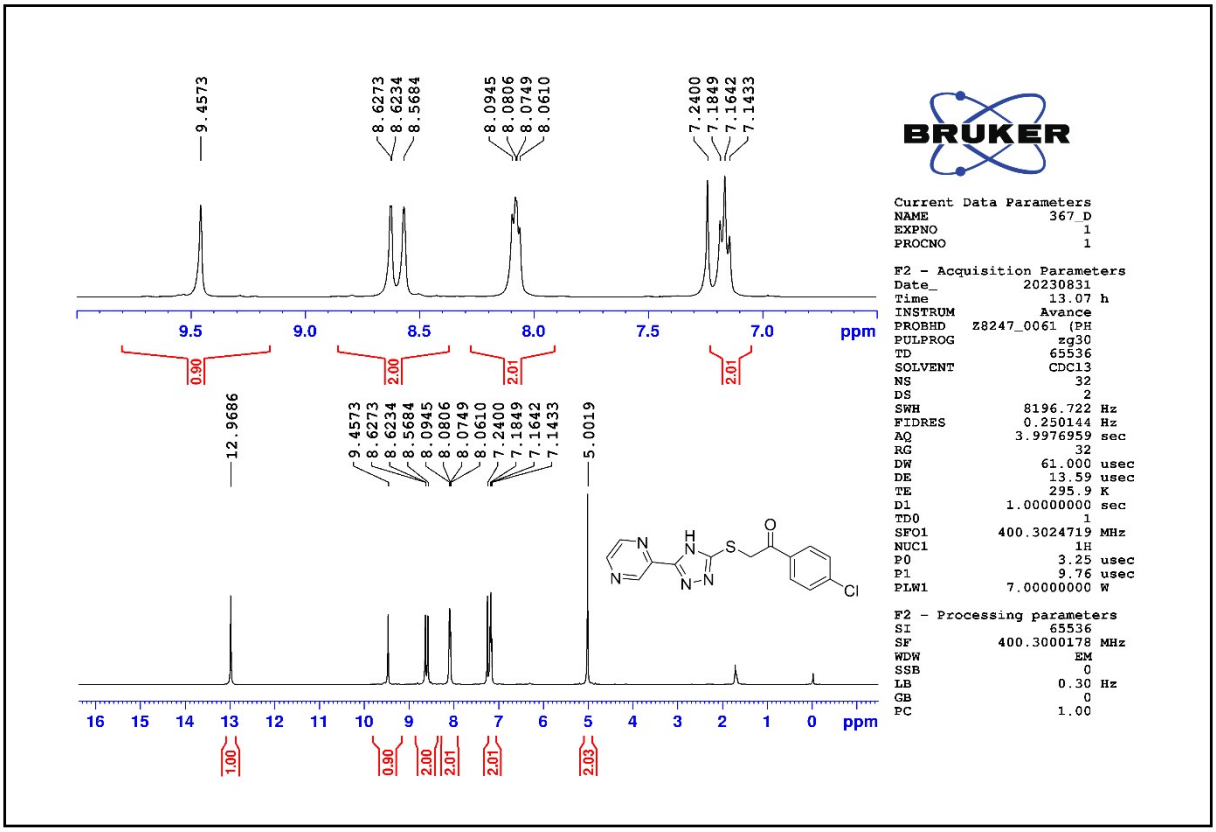


Figure S9: [1]H-NMR spectrum of compound T7



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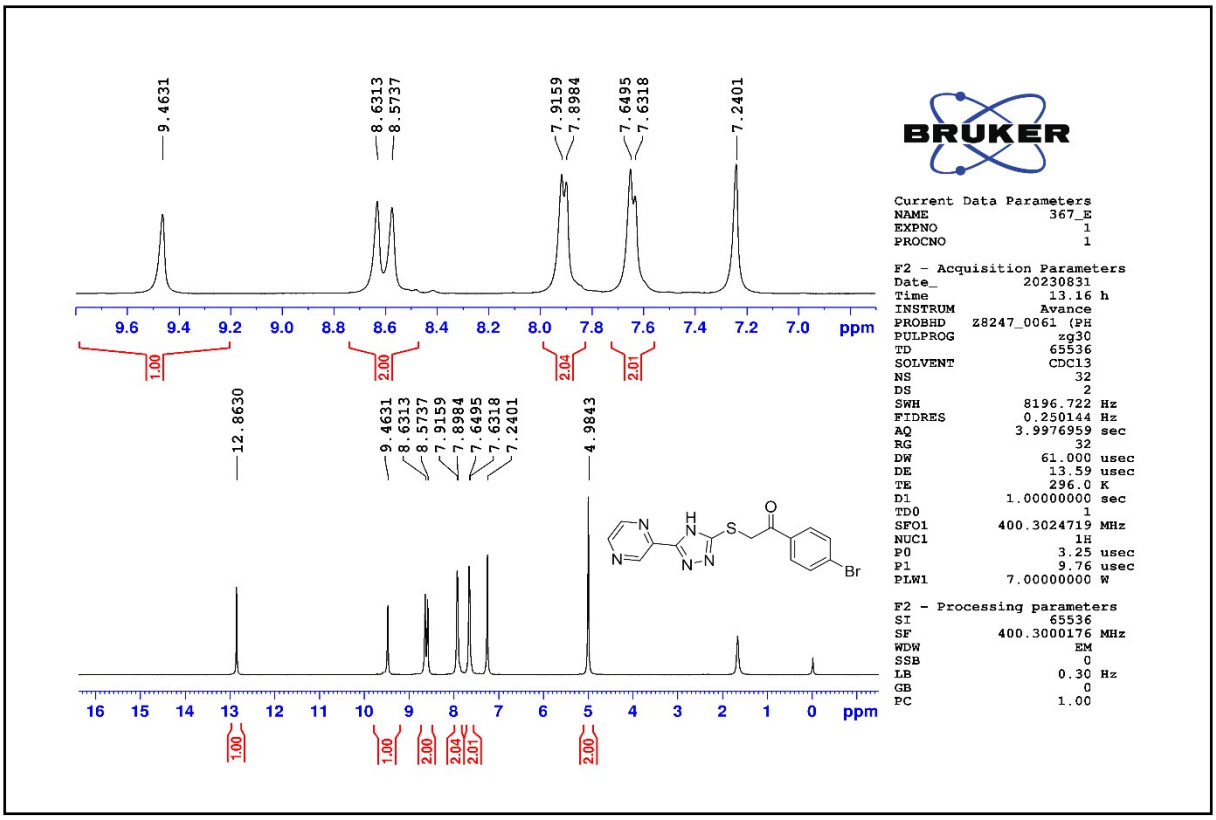


Figure S11: [1]H-NMR spectrum of compound T9

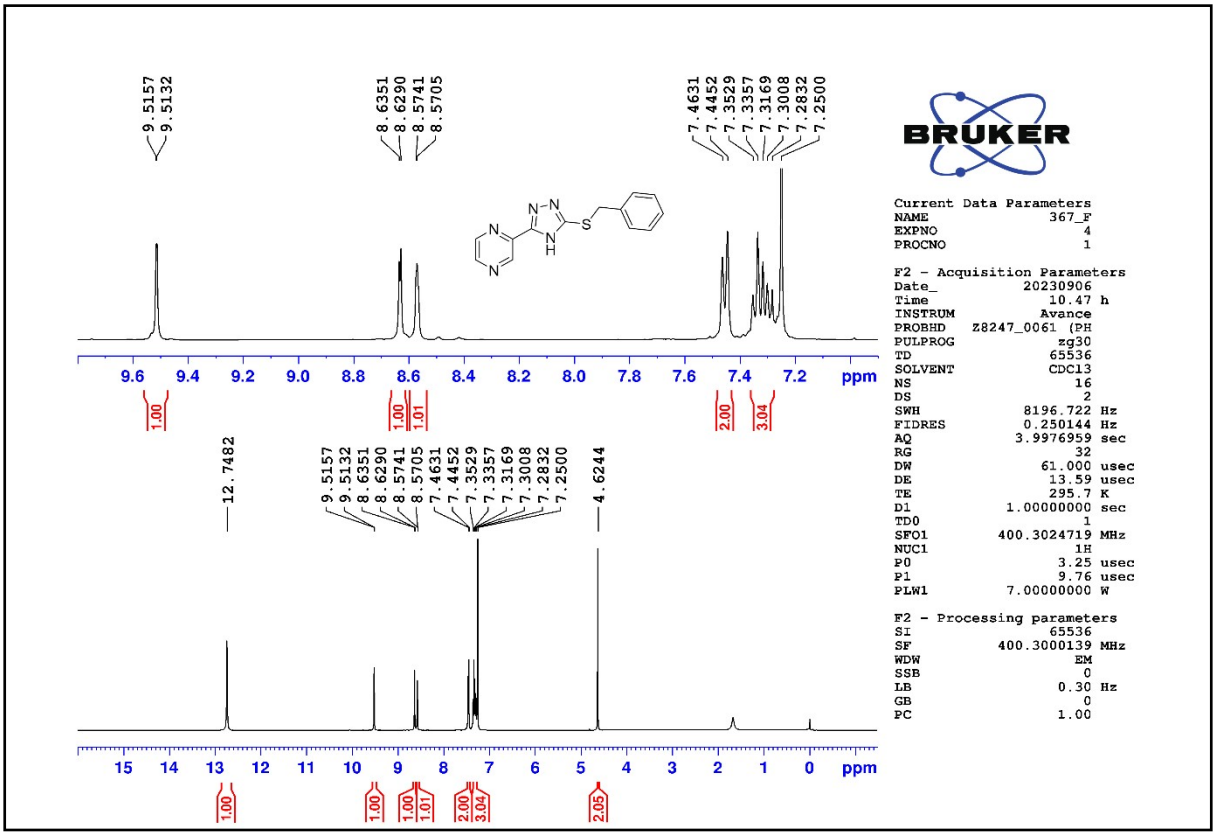


Figure S12: [1]H-NMR spectrum of compound T10

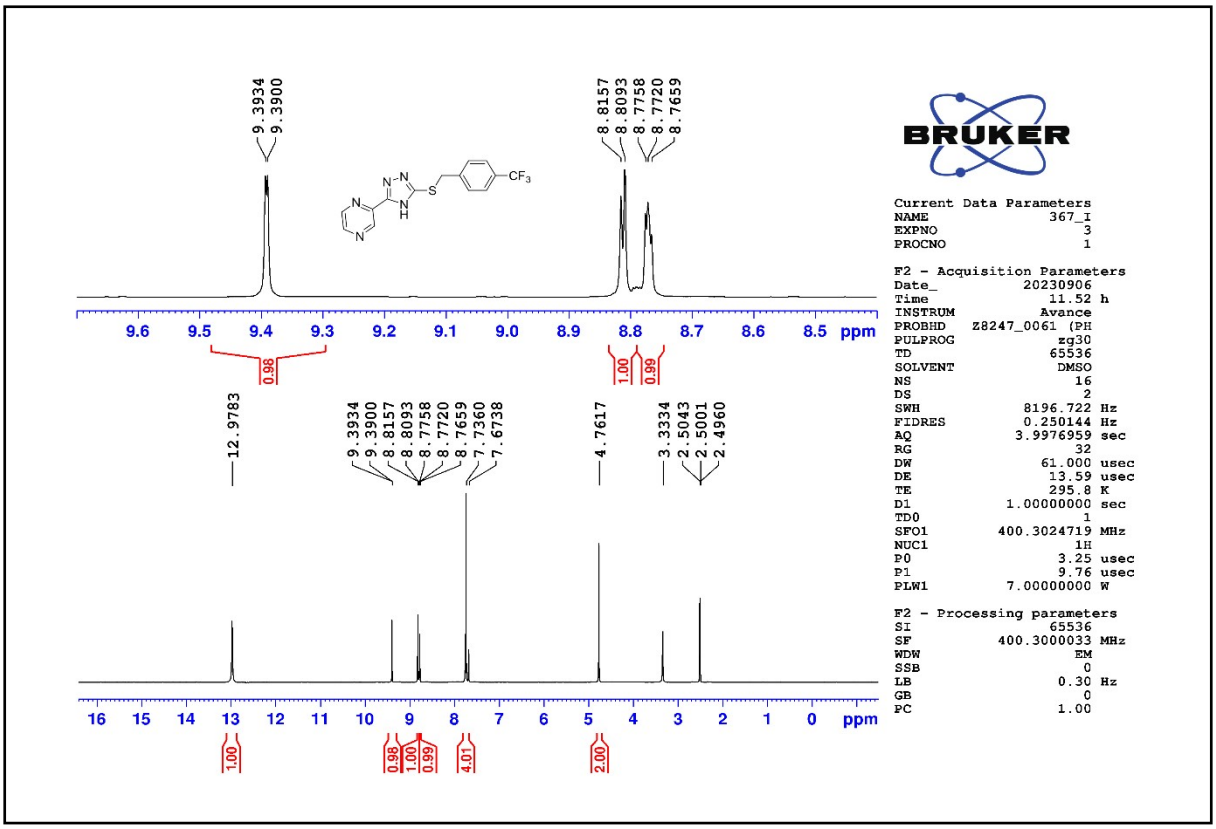


Figure S13: [1]H-NMR spectrum of compound T11

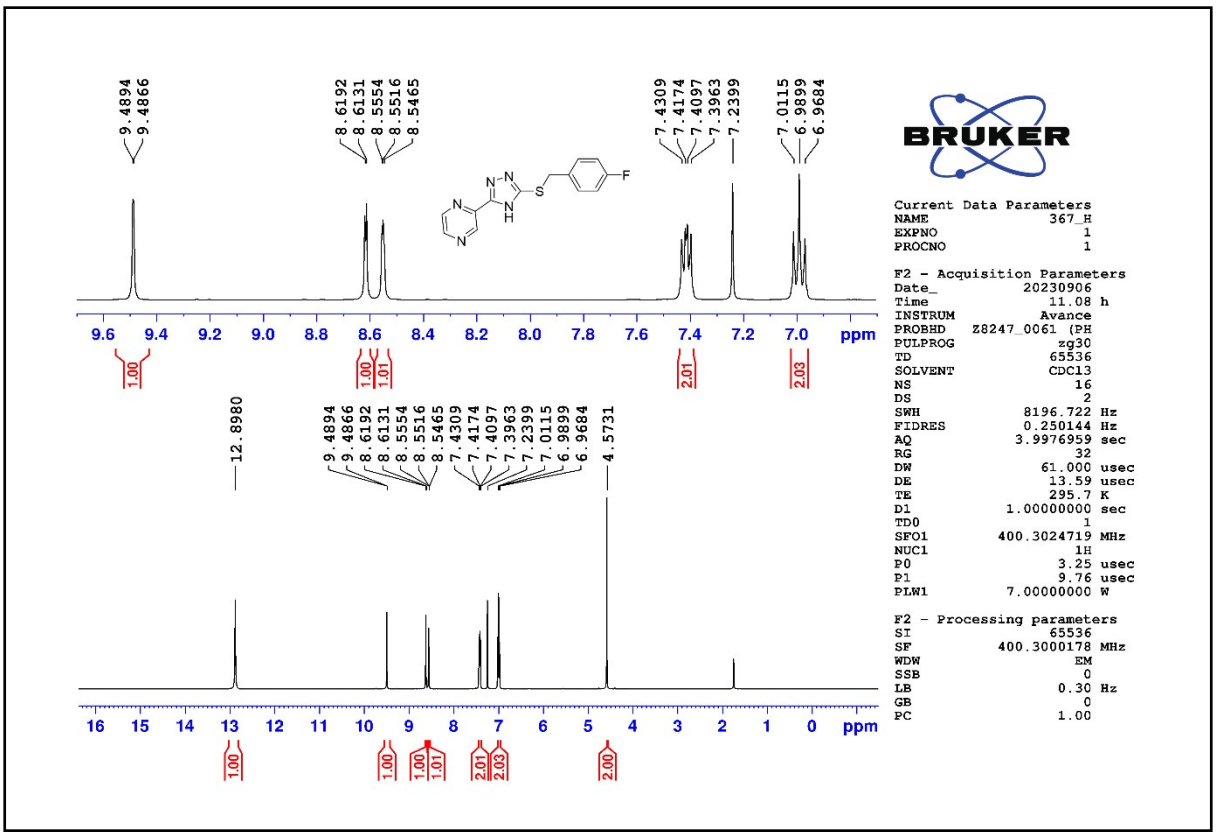


Figure S14: [1]H-NMR spectrum of compound T12

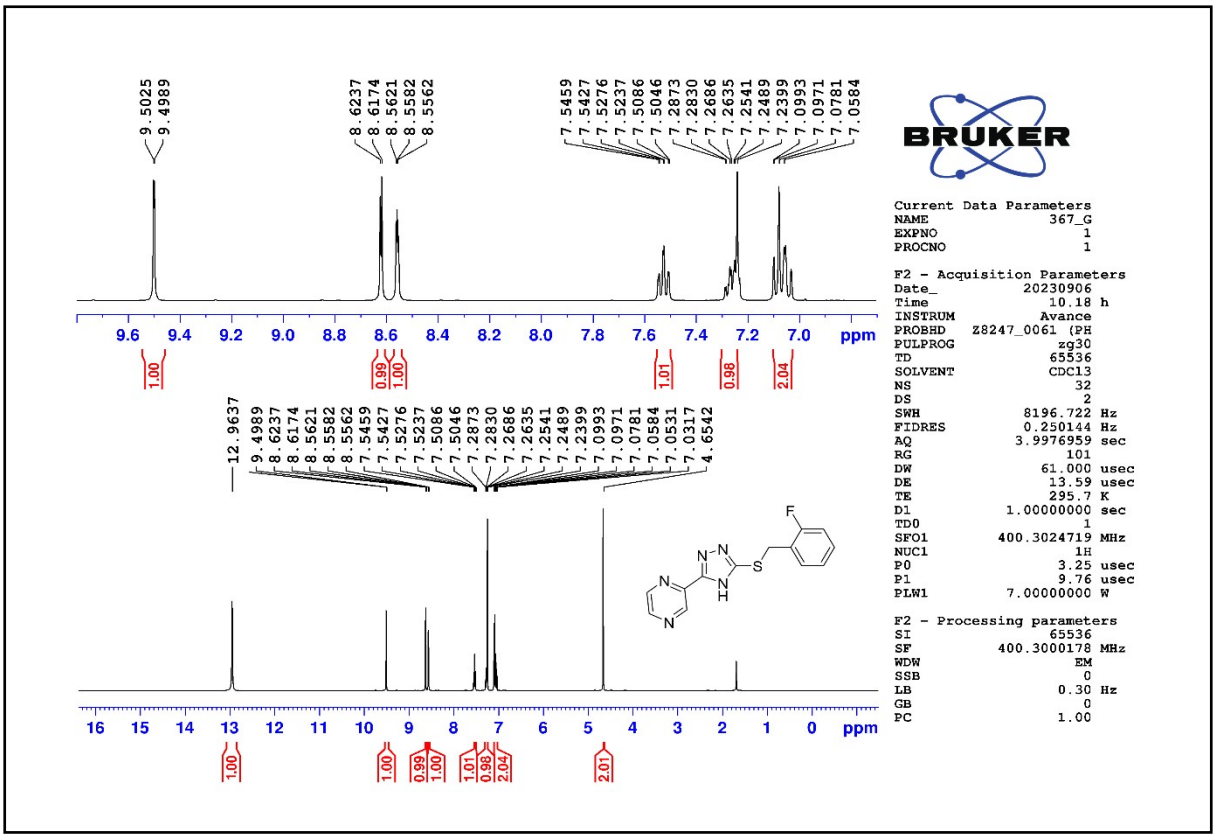


Figure S15: [1]H-NMR spectrum of compound T13

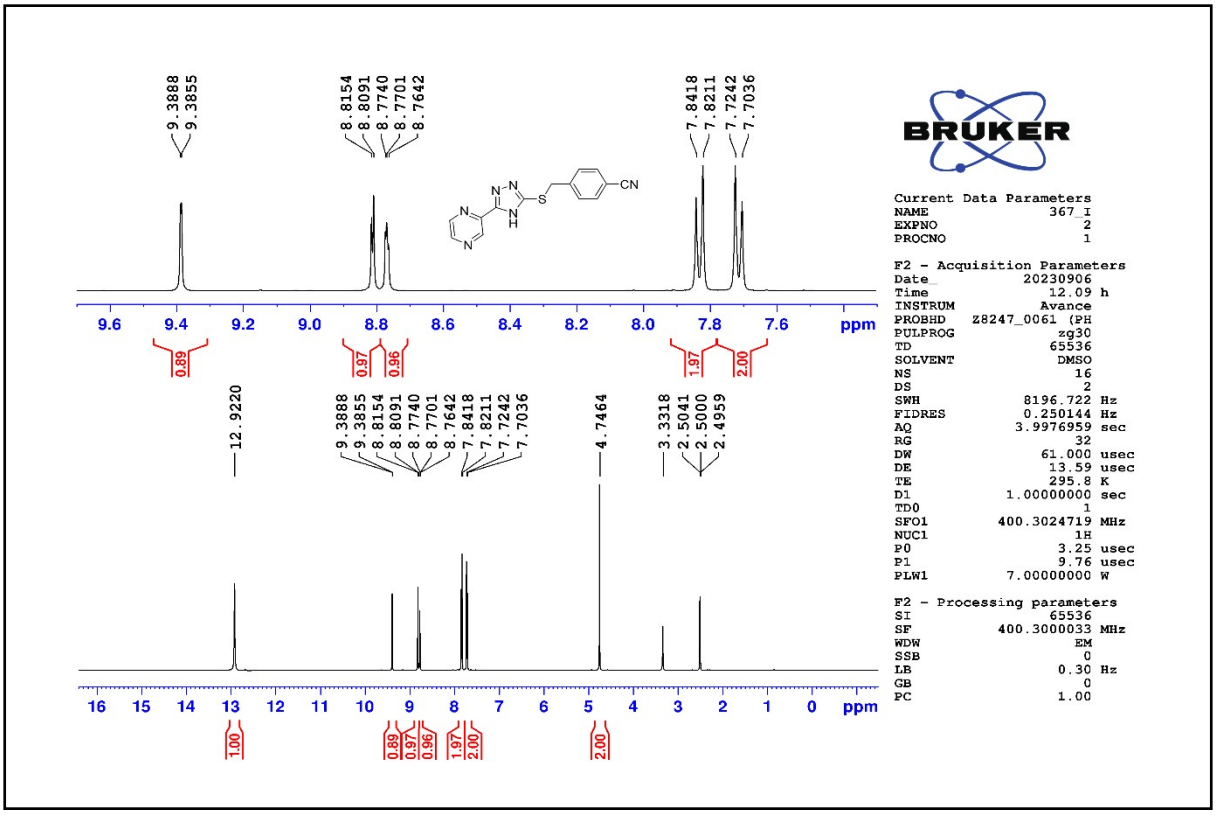


Figure S16: [1]H-NMR spectrum of compound T14

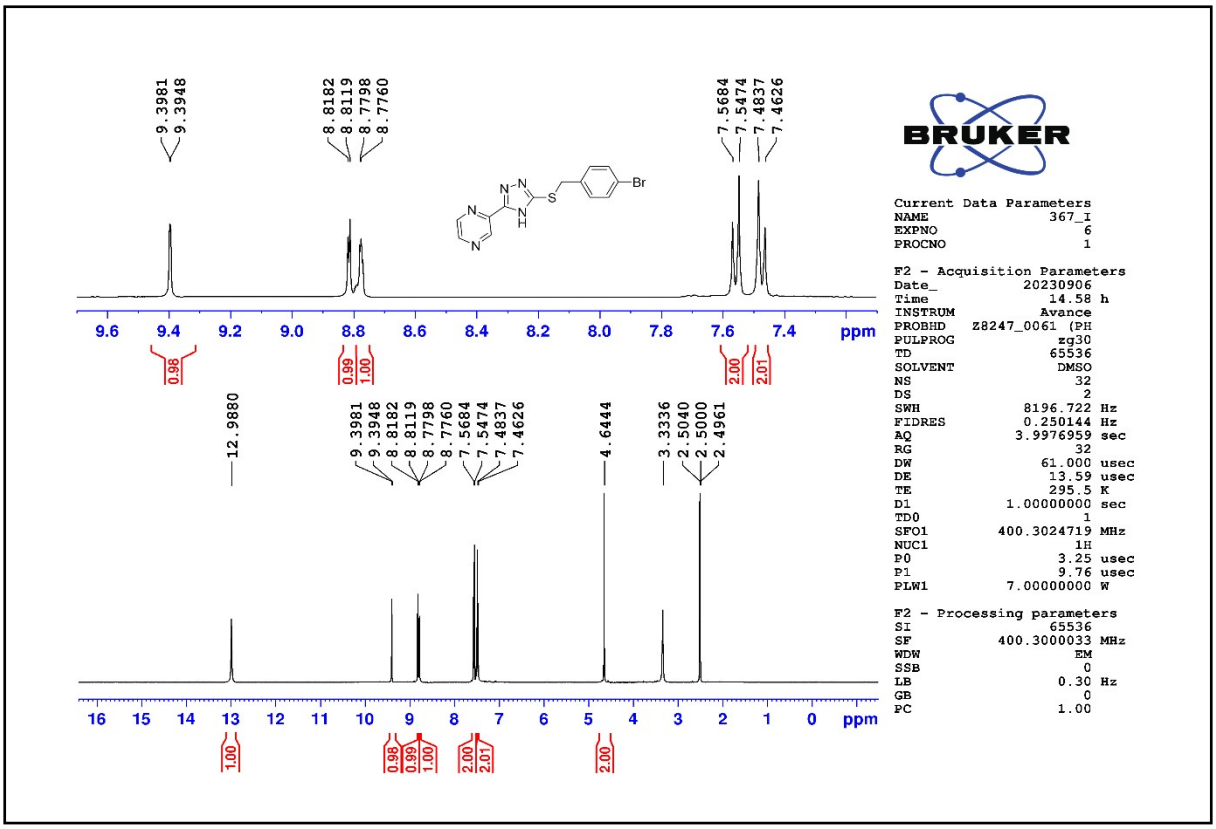


Figure S17: [1]H-NMR spectrum of compound T15

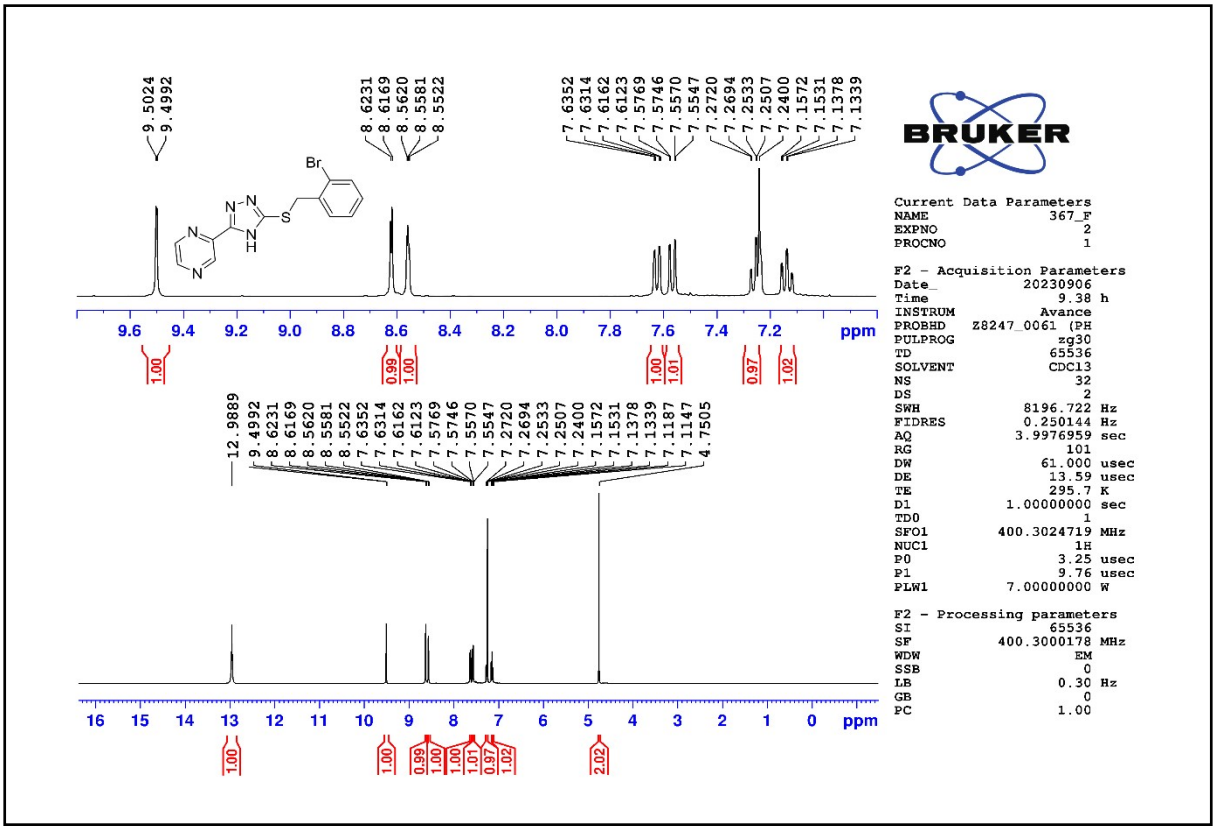


Figure S18: [1]H-NMR spectrum of compound T16

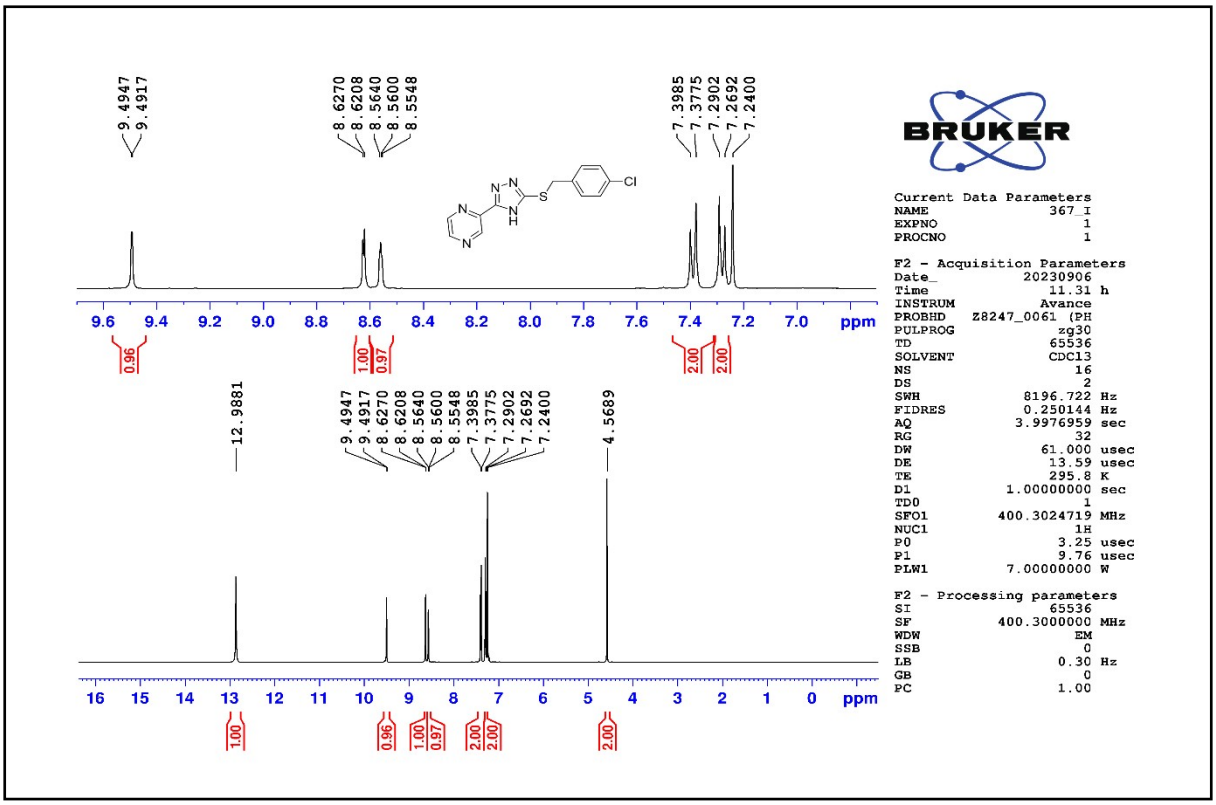


Figure S19: [1]H-NMR spectrum of compound T17

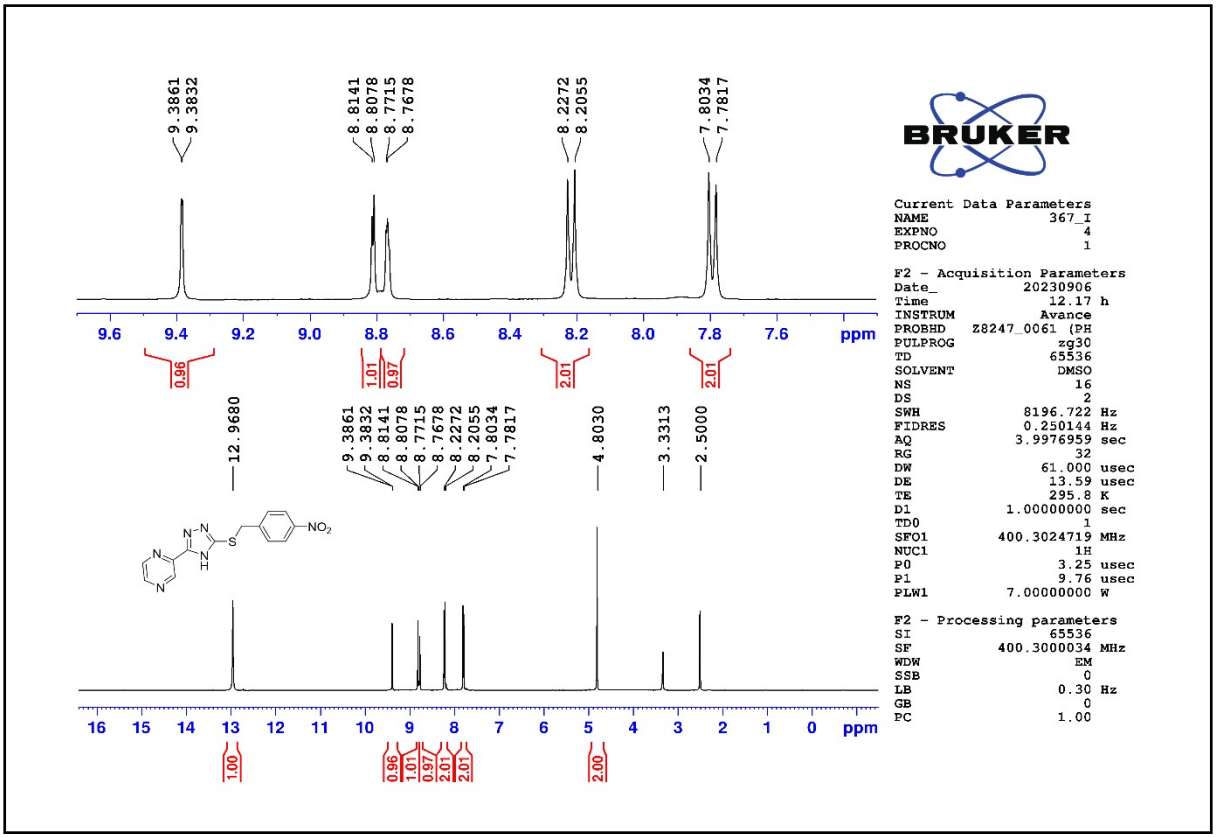


Figure S20: [1]H-NMR spectrum of compound T18

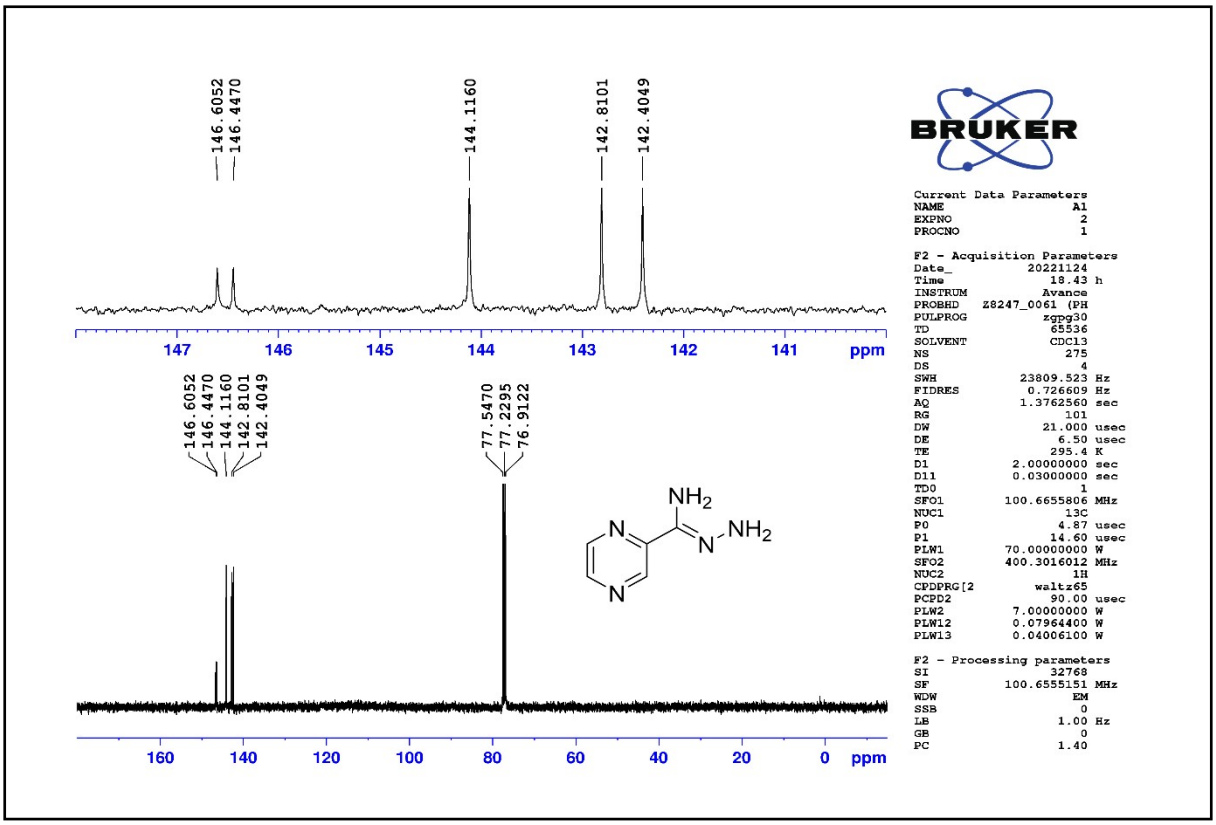


Figure S21: ^{13}C-NMR spectrum of 2

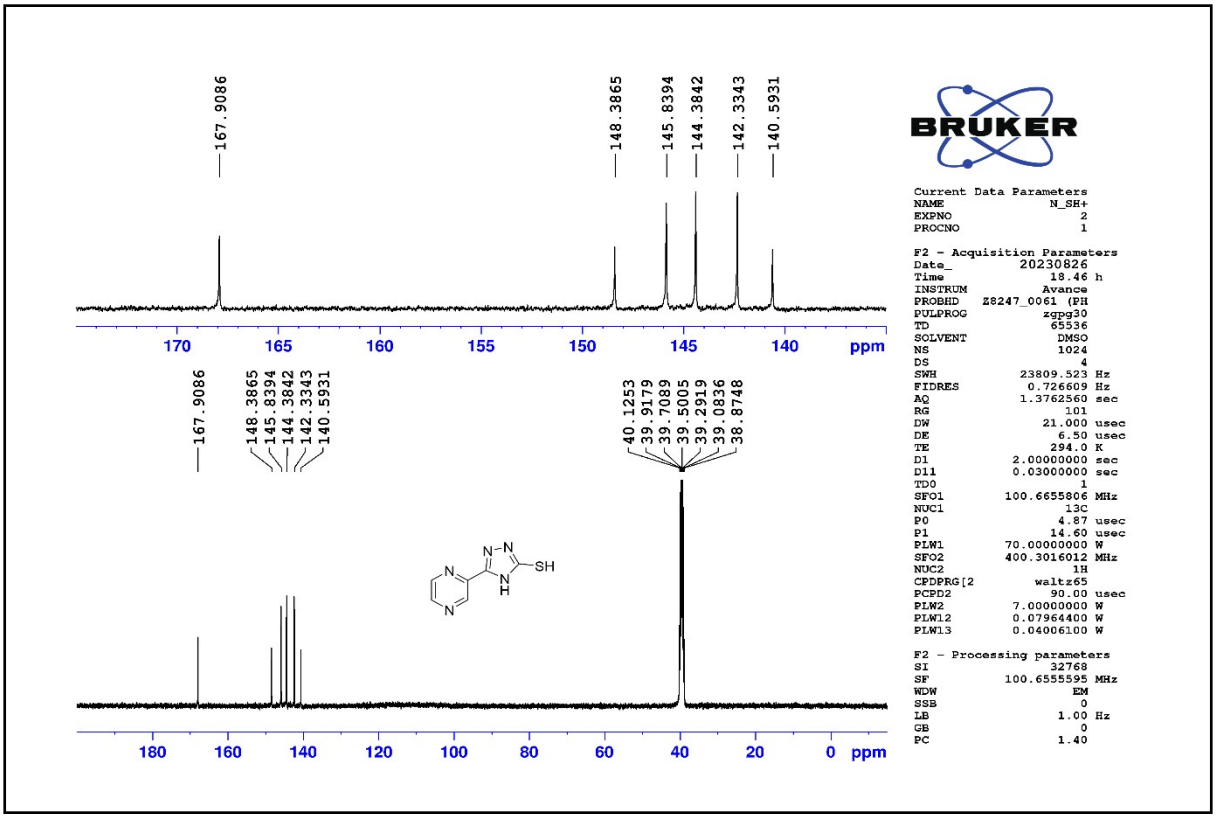


Figure S22: ^{13}C-NMR spectrum of 3

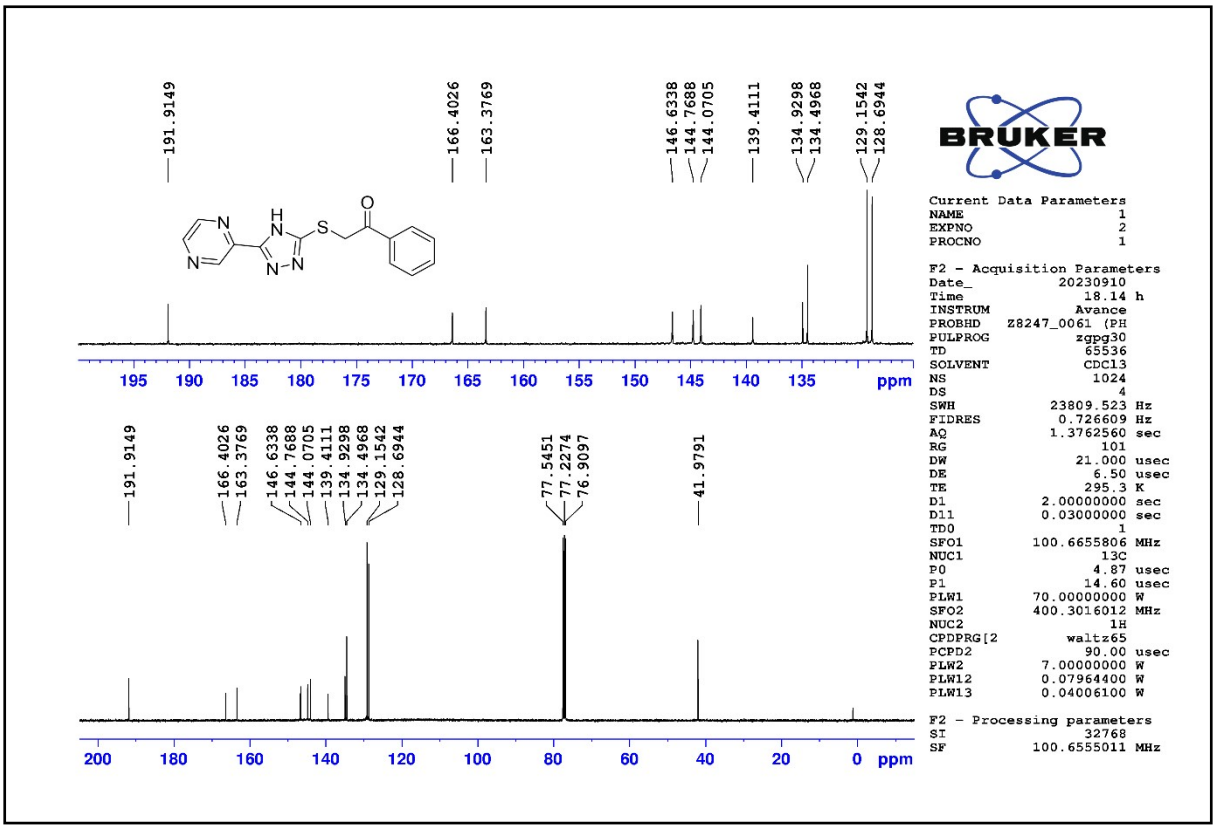


Figure S23: ^{13}C-NMR spectrum of T1

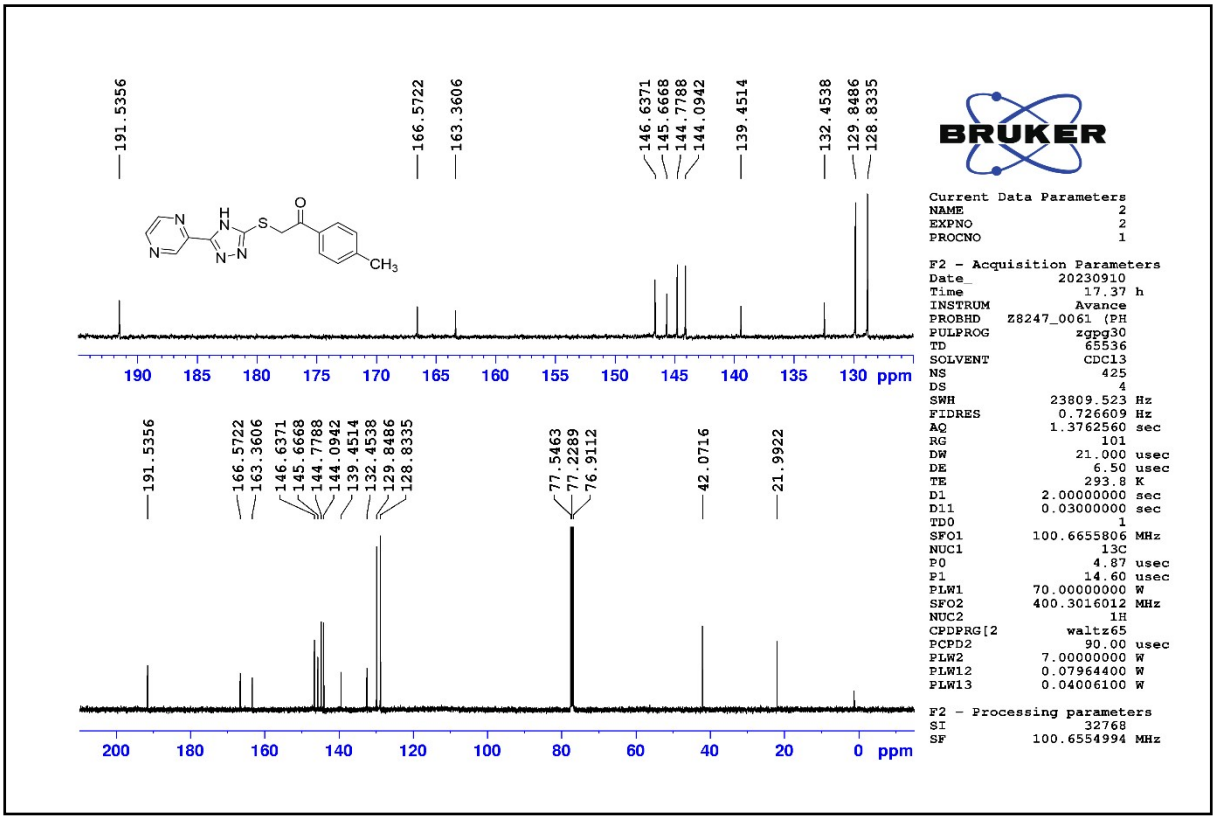


Figure S24: ^{13}C-NMR spectrum of T2

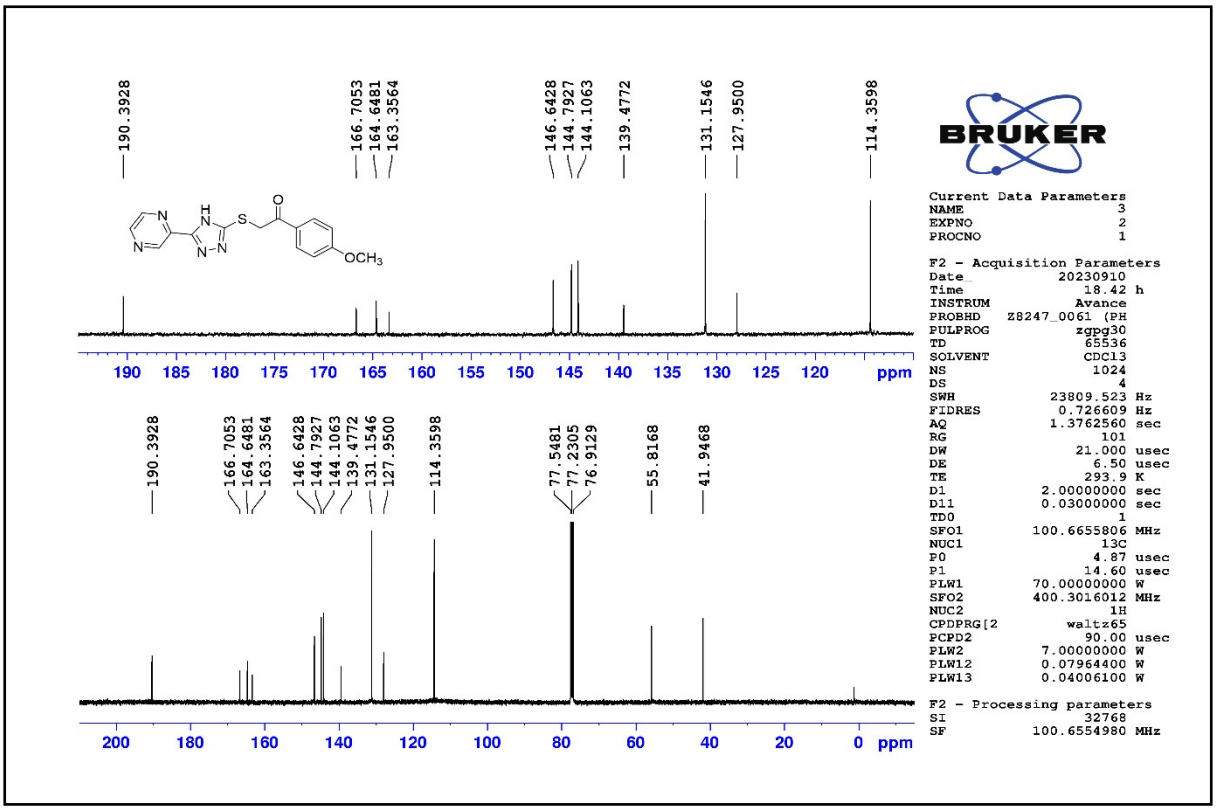


Figure S25: ^{13}C-NMR spectrum of T3

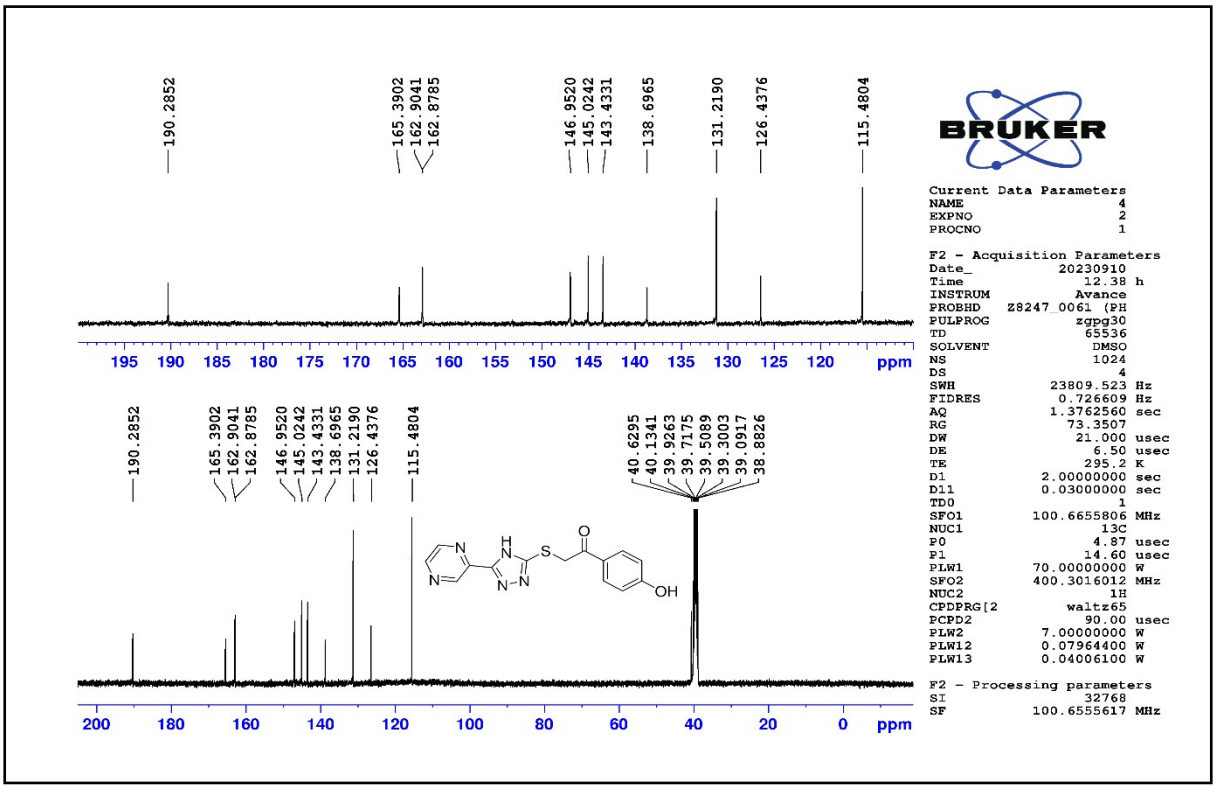


Figure S26: ^{13}C-NMR spectrum of T4

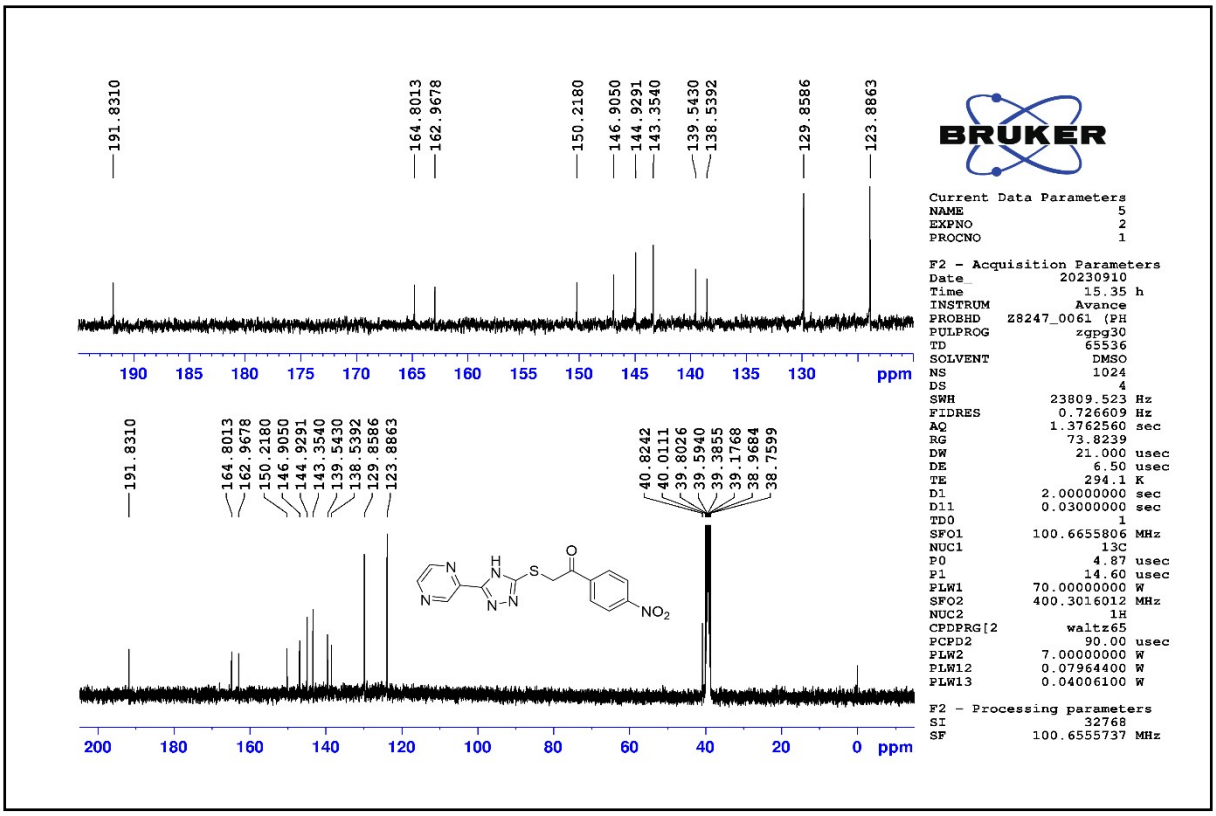


Figure S27: ^{13}C-NMR spectrum of T5

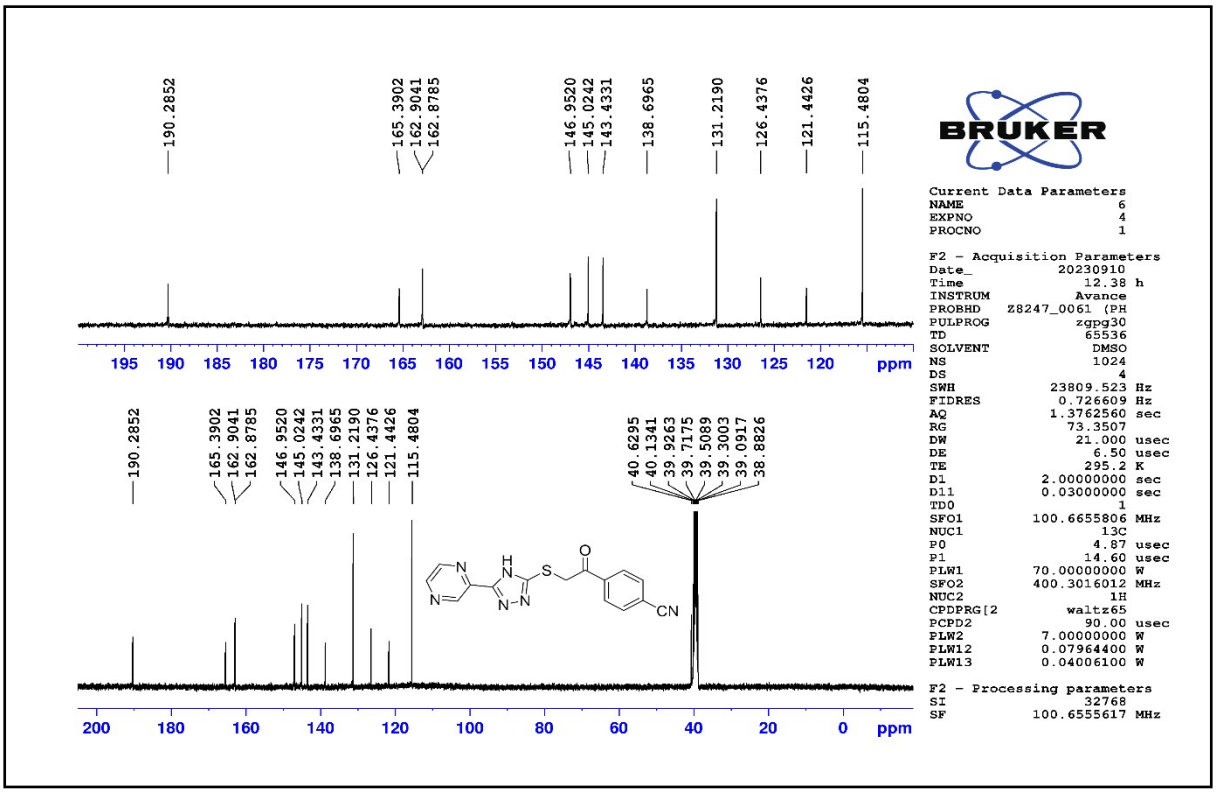


Figure S28: ^{13}C-NMR spectrum of T6

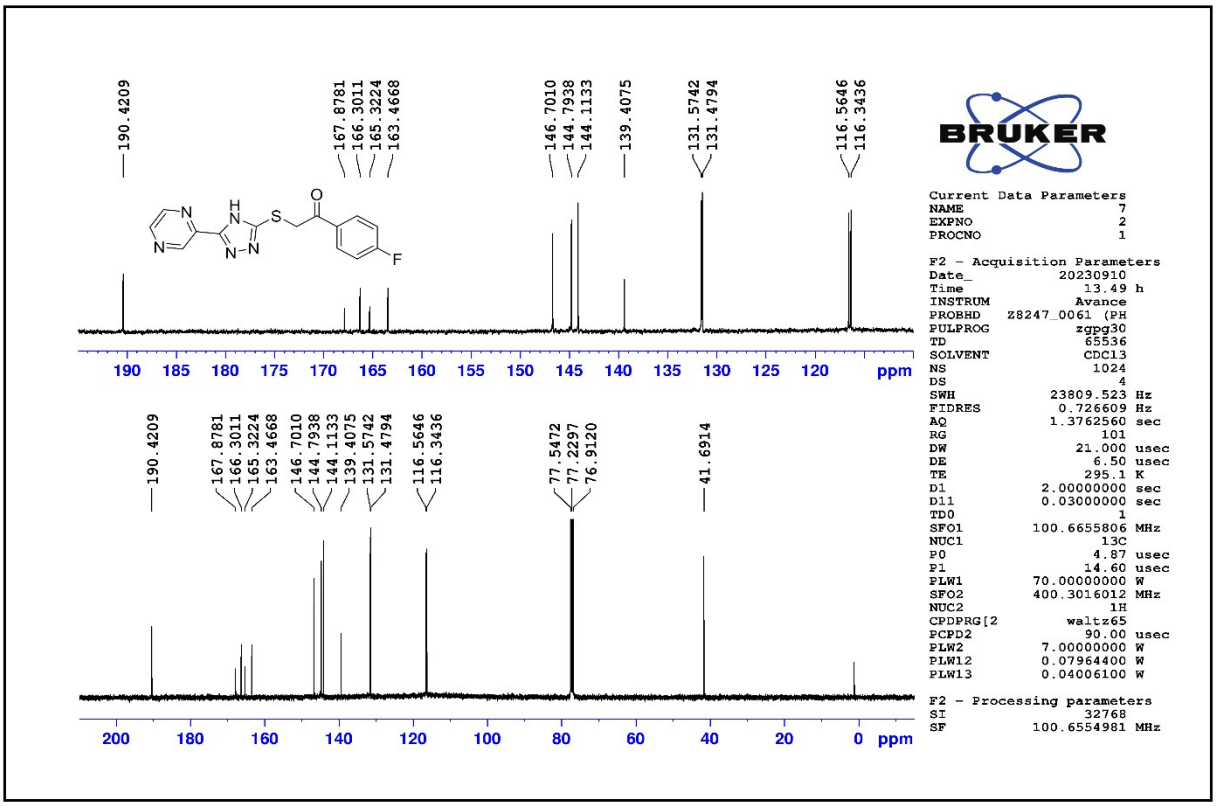


Figure S29: ^{13}C-NMR spectrum of T7

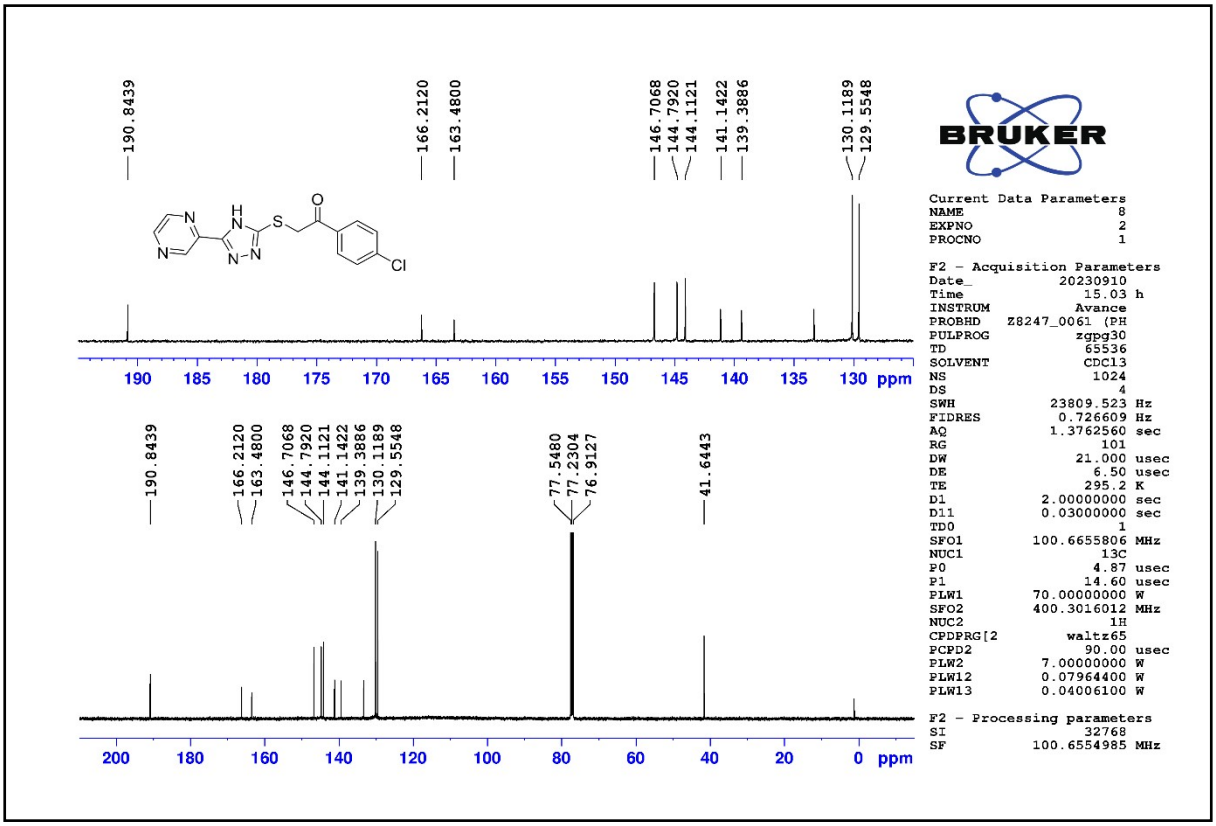


Figure S30: ^{13}C-NMR spectrum of T8

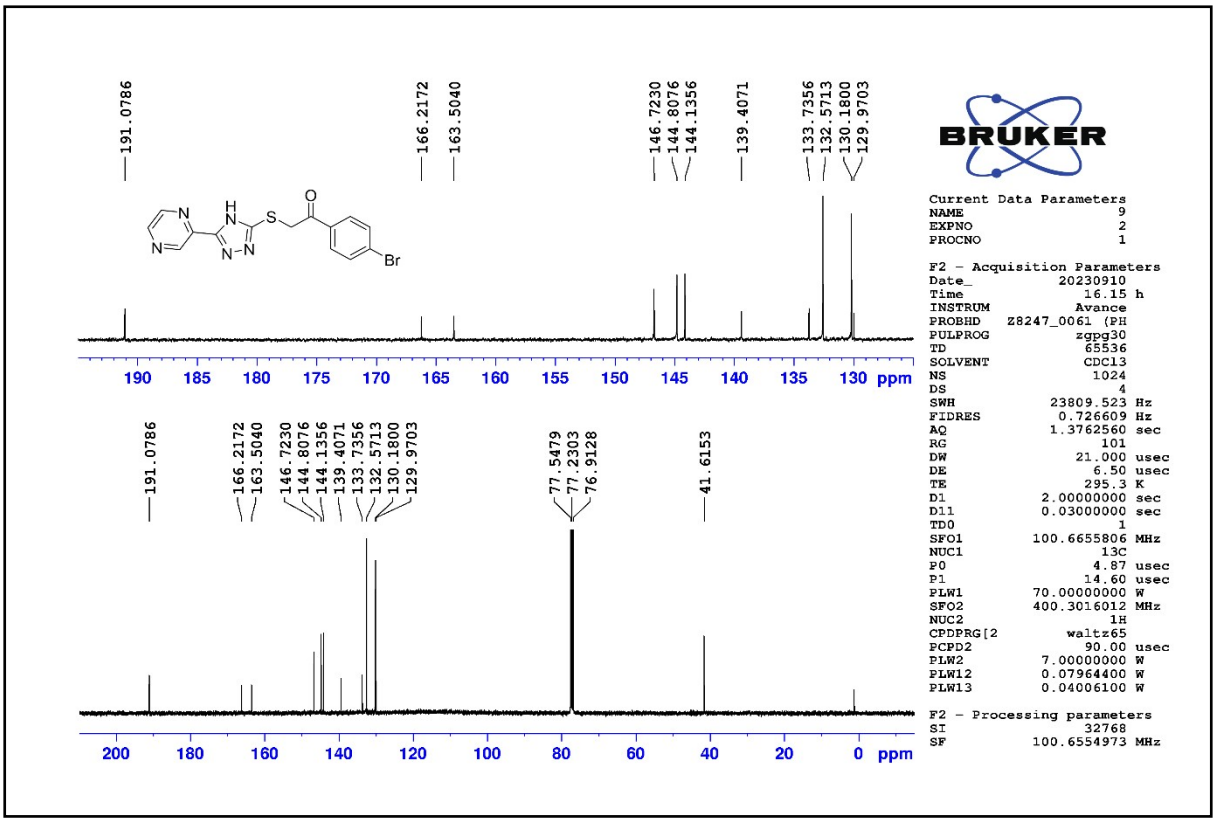


Figure S31: ^{13}C-NMR spectrum of T9

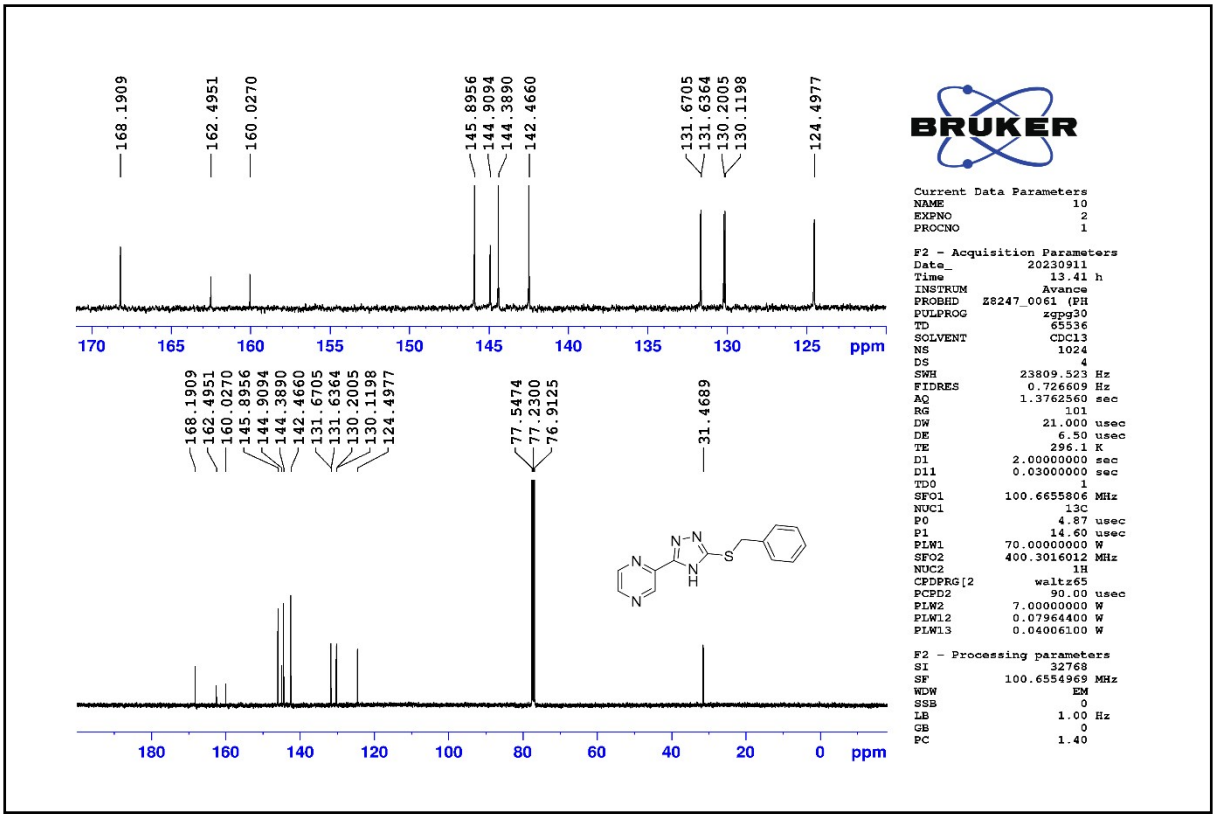


Figure S32: ^{13}C-NMR spectrum of T10

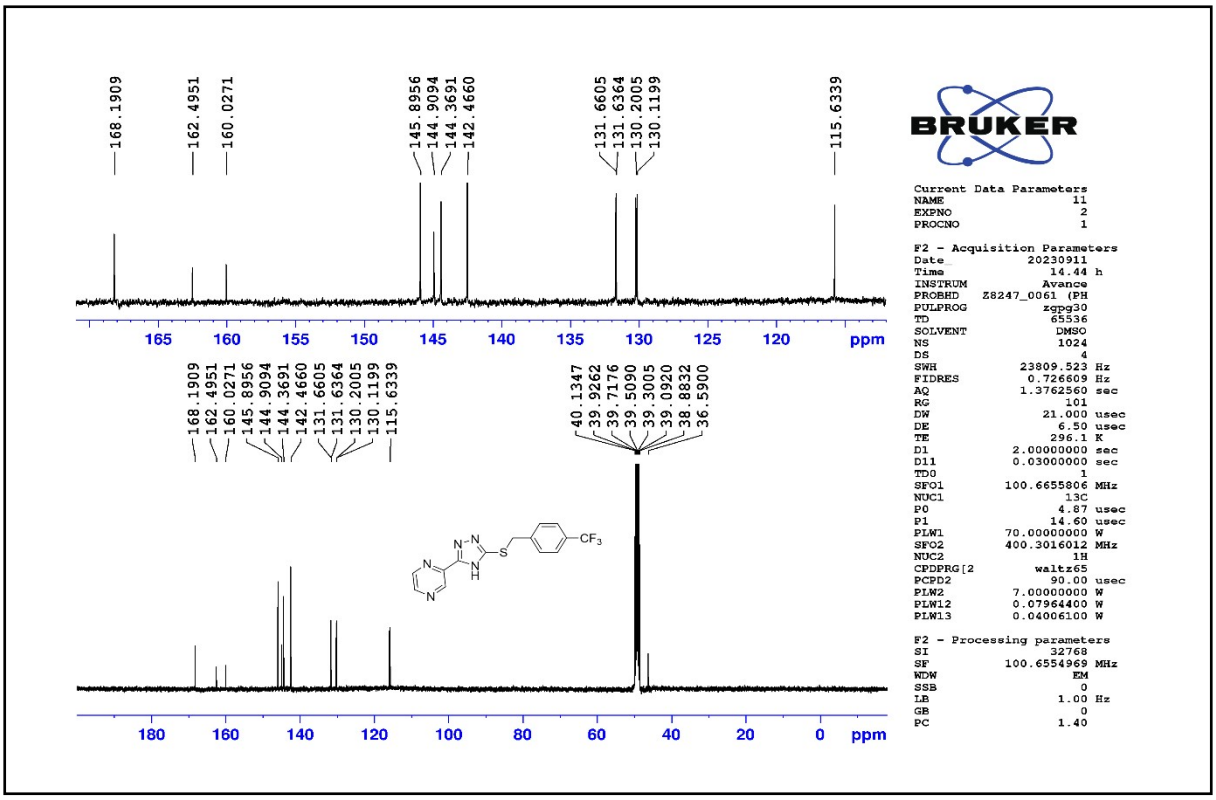


Figure S33: ^{13}C-NMR spectrum of T11

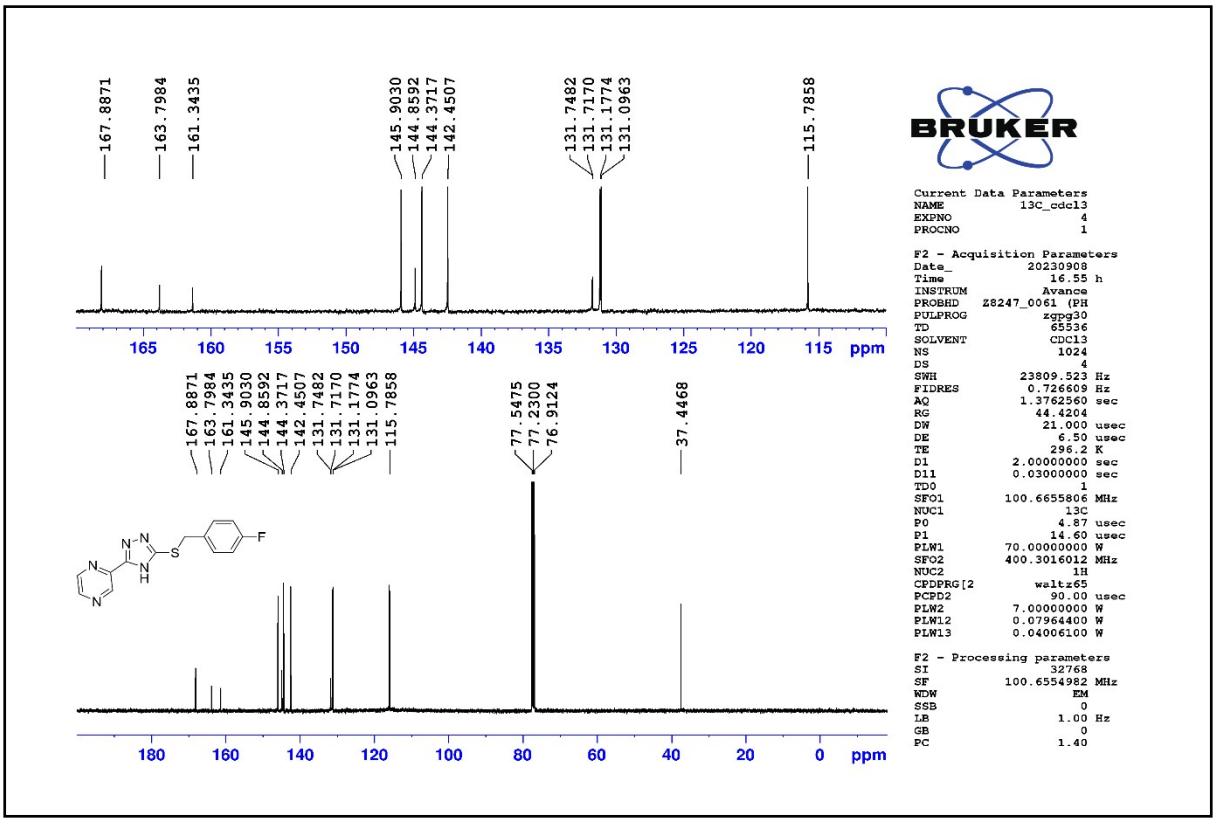


Figure S34: ^{13}C-NMR spectrum of T12

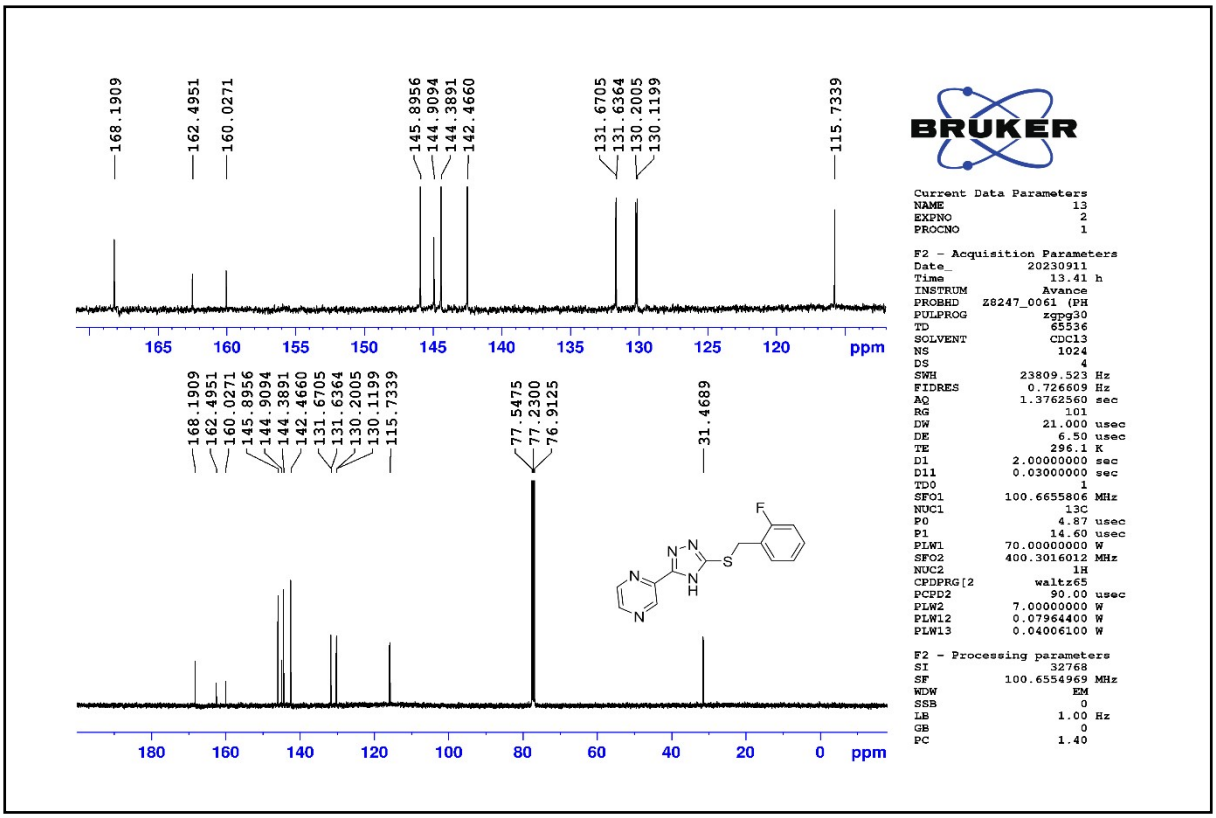


Figure S35: ^{13}C-NMR spectrum of T13

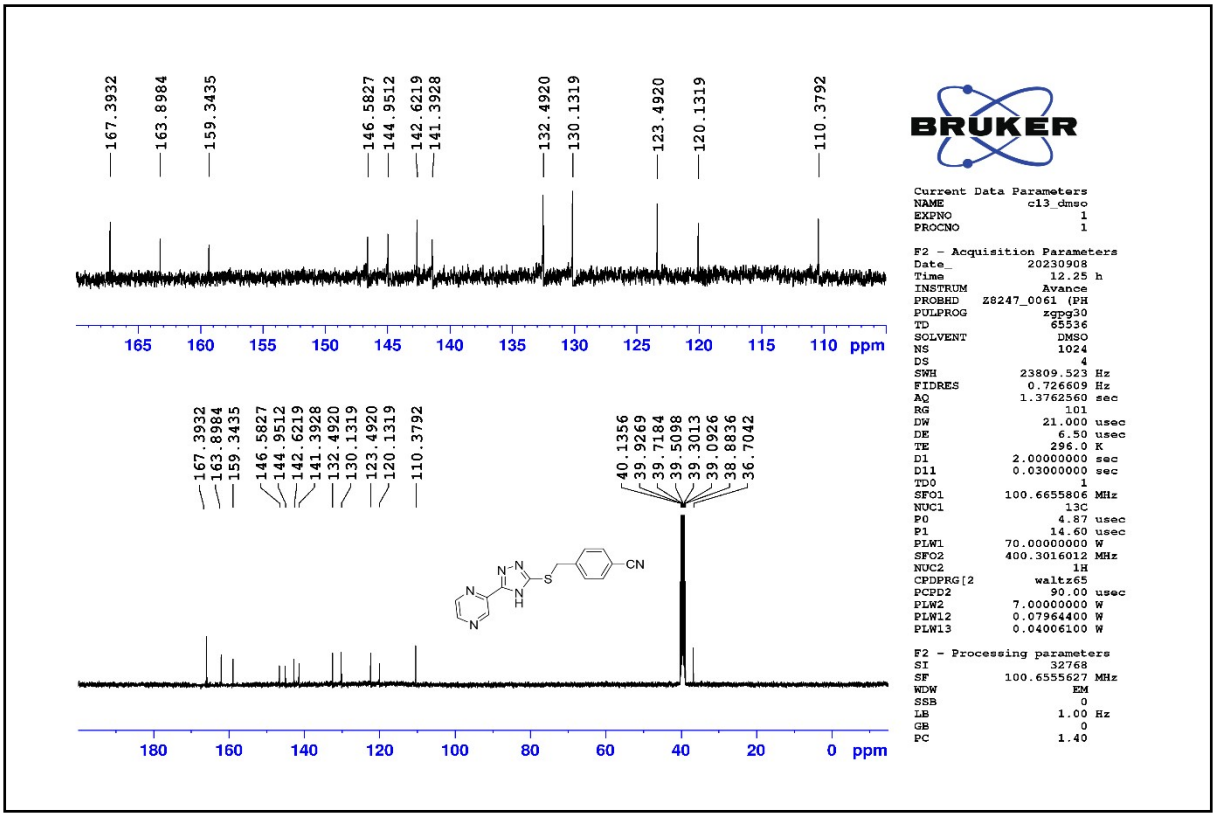


Figure S36: ^{13}C-NMR spectrum of T14

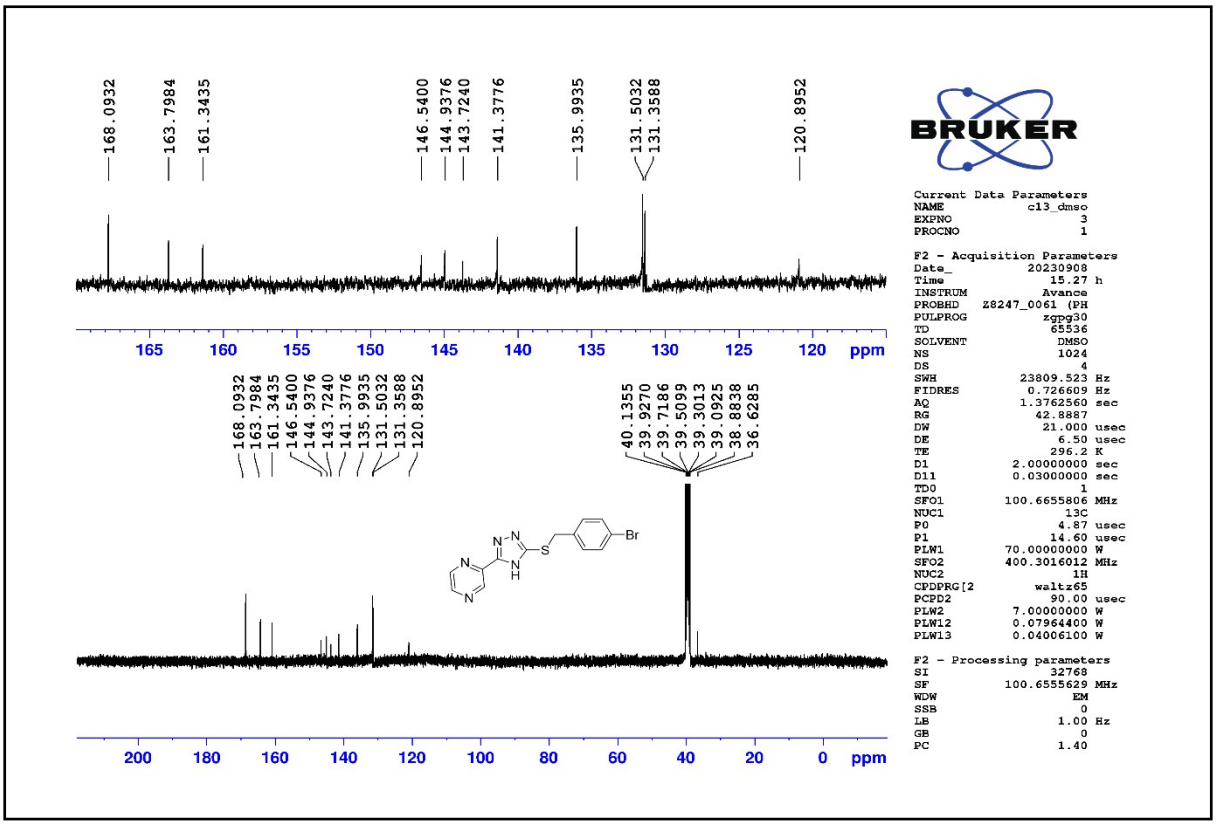


Figure S37: ^{13}C-NMR spectrum of T15

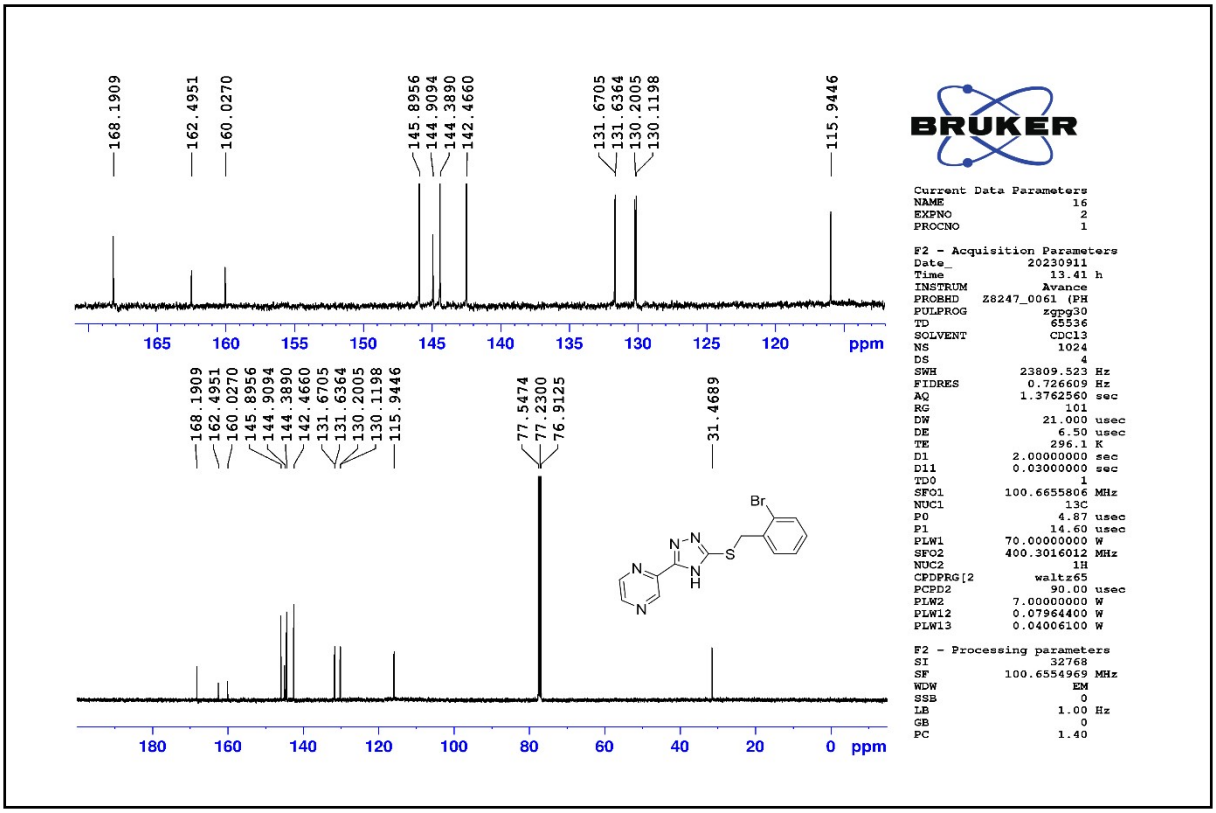


Figure S38: ^{13}C-NMR spectrum of T16

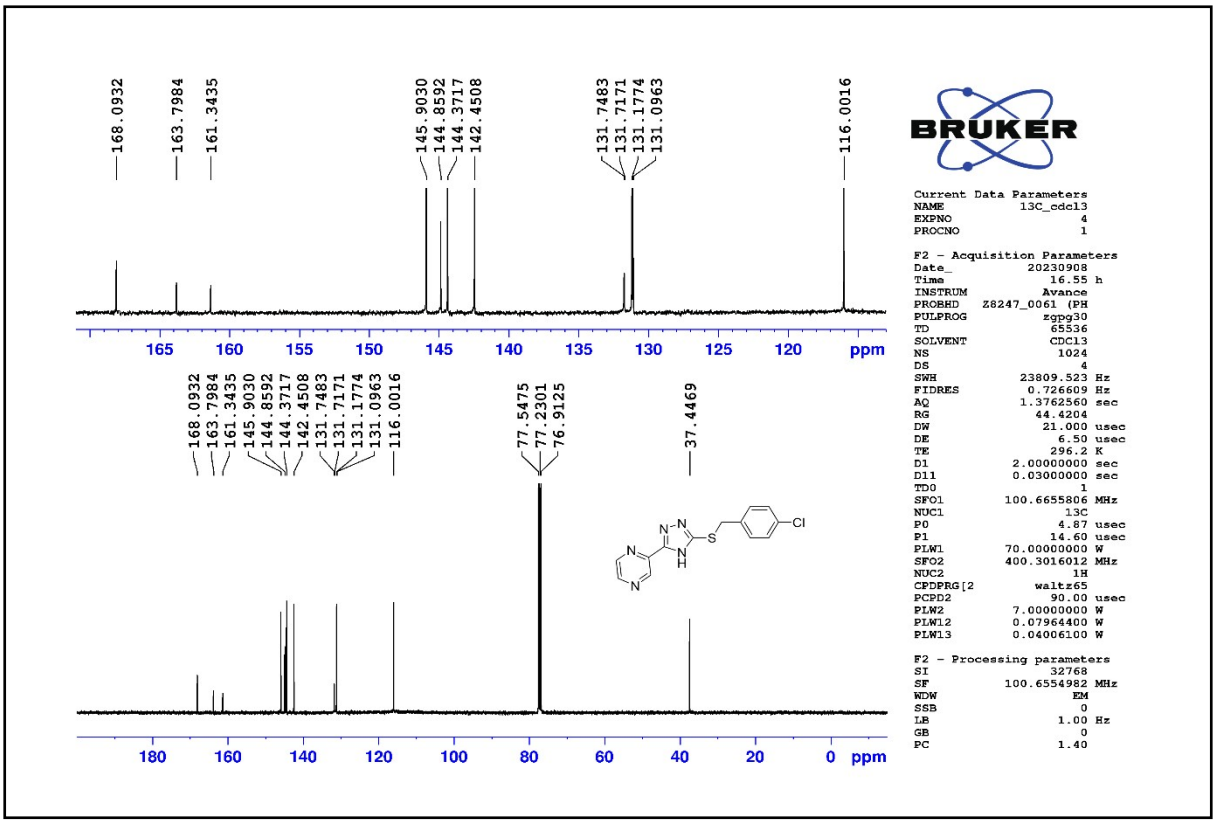


Figure S39: ^{13}C-NMR spectrum of T17

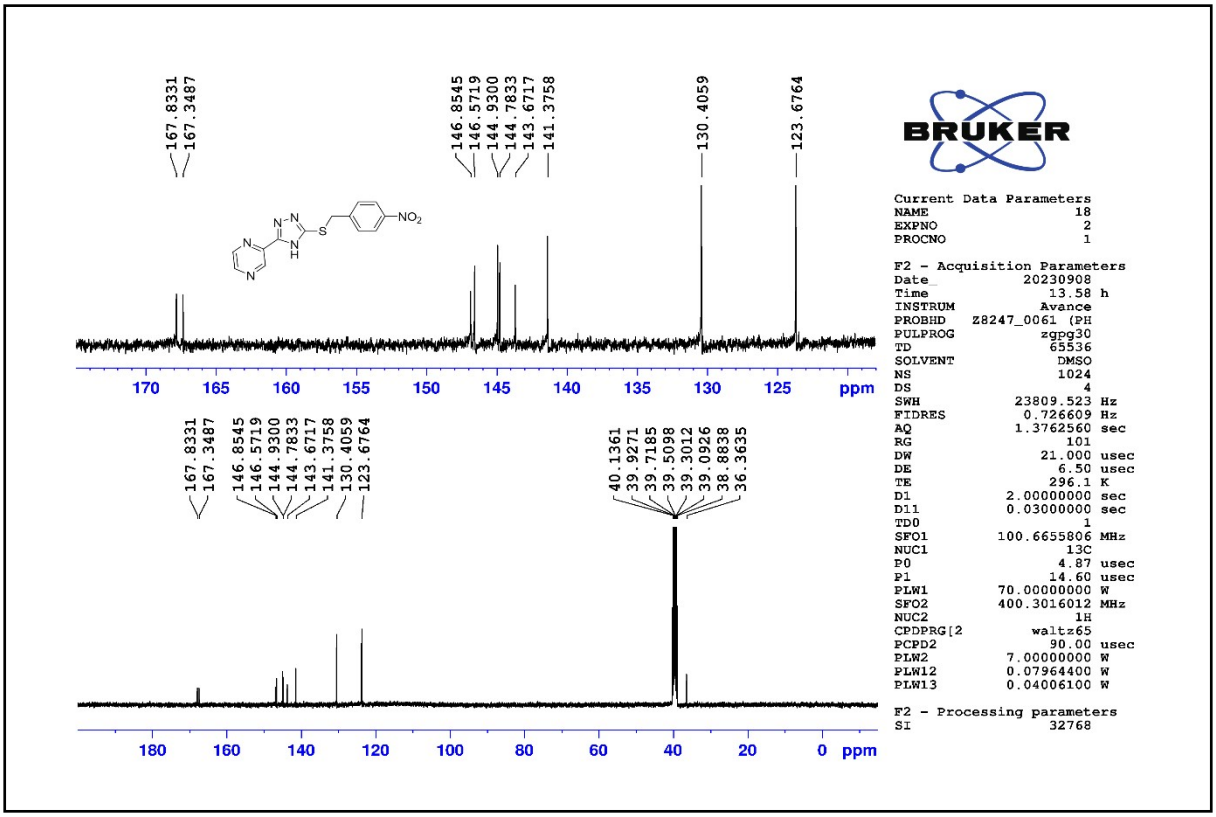


Figure S40: ^{13}C-NMR spectrum of T18

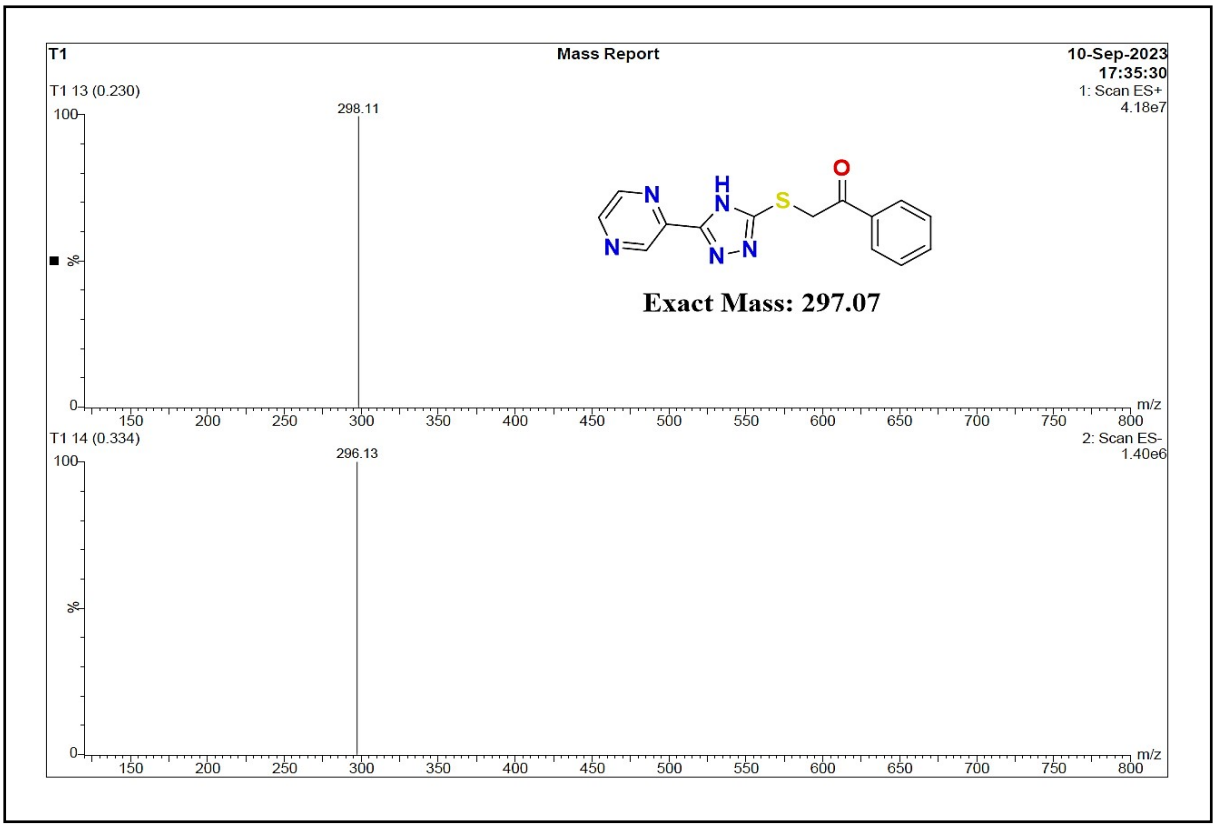


Figure S41: ESI-MS spectrum of compound T1

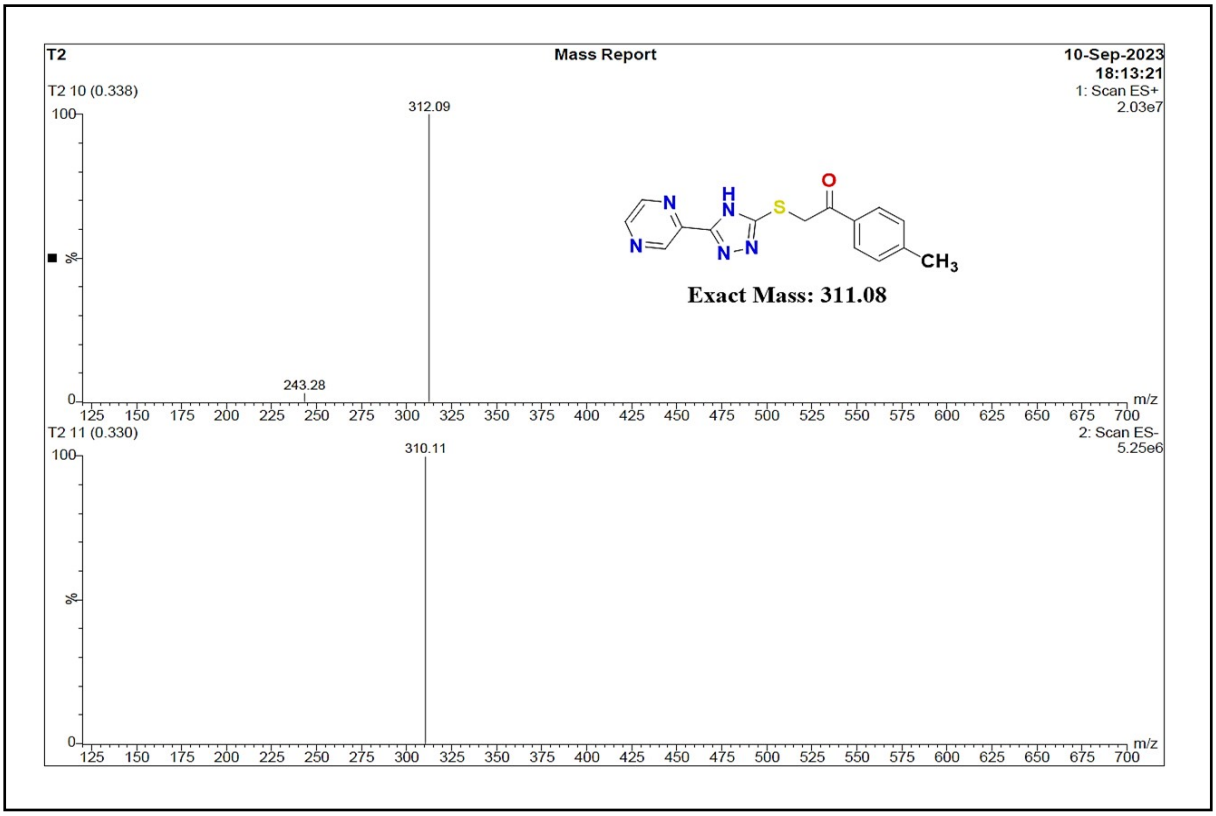


Figure S42: ESI-MS spectrum of compound T2

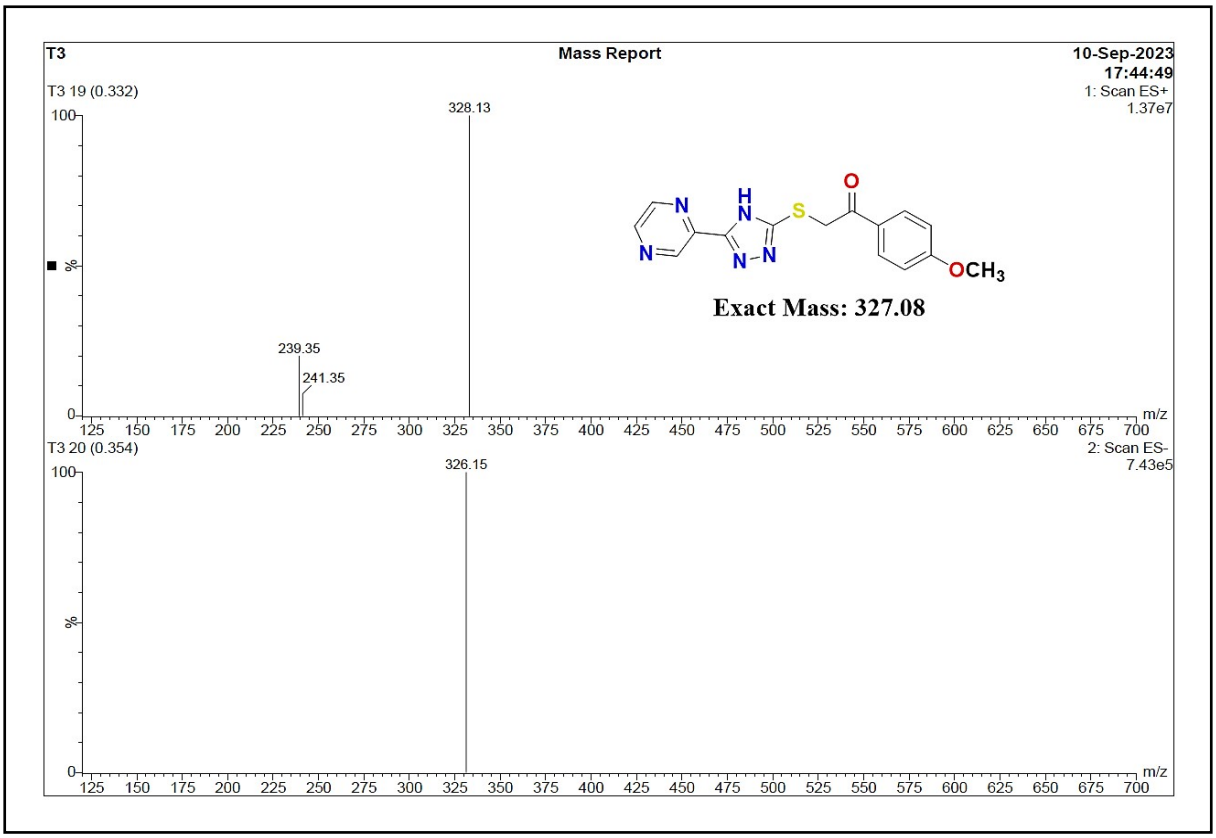


Figure S43: ESI-MS spectrum of compound T3

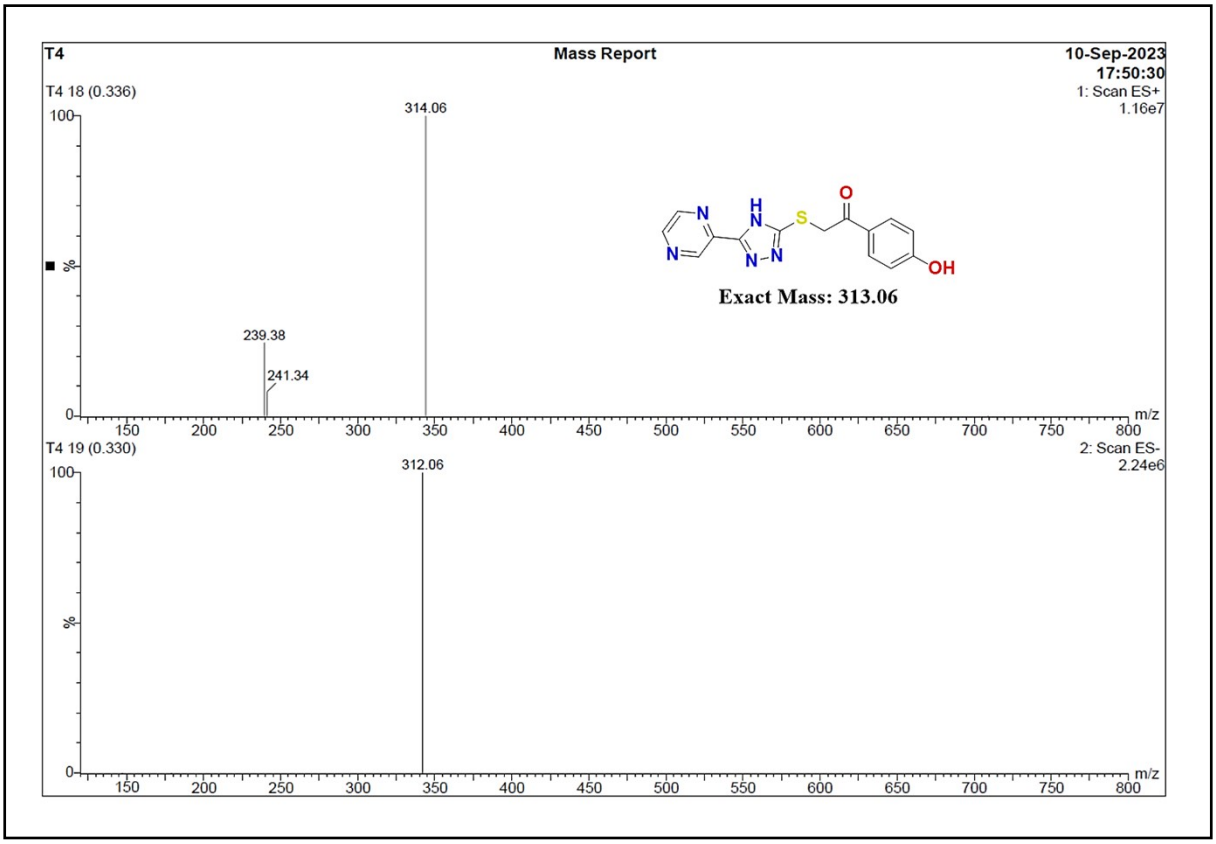


Figure S44: ESI-MS spectrum of compound T4

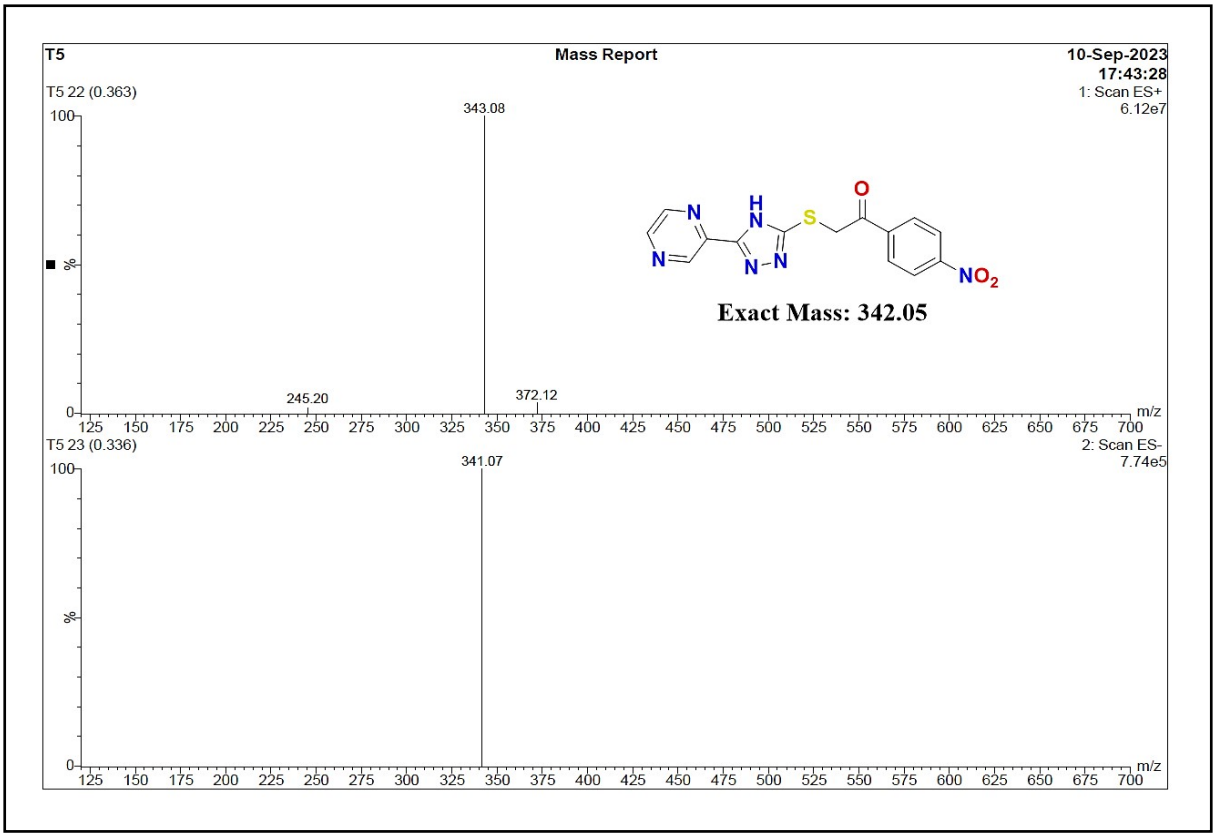


Figure S45: ESI-MS spectrum of compound T5

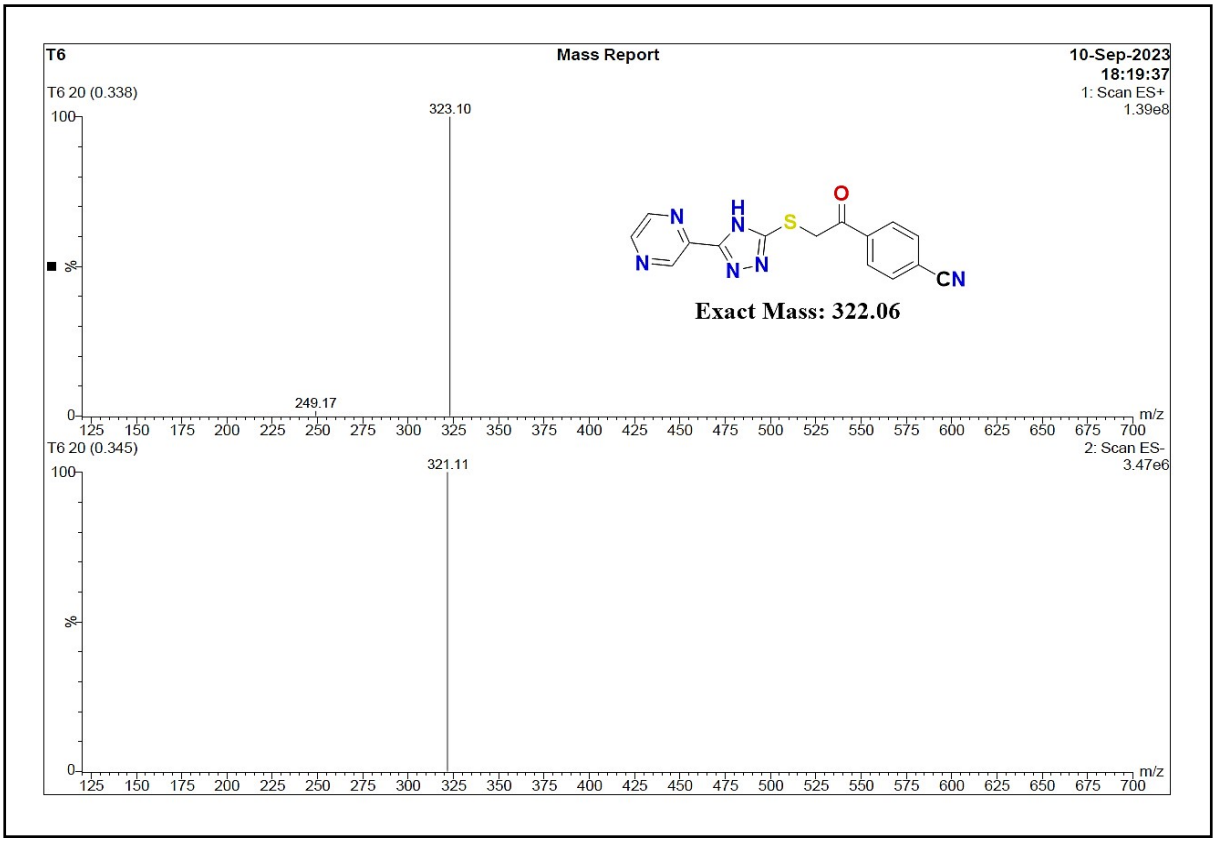


Figure S46: ESI-MS spectrum of compound T6

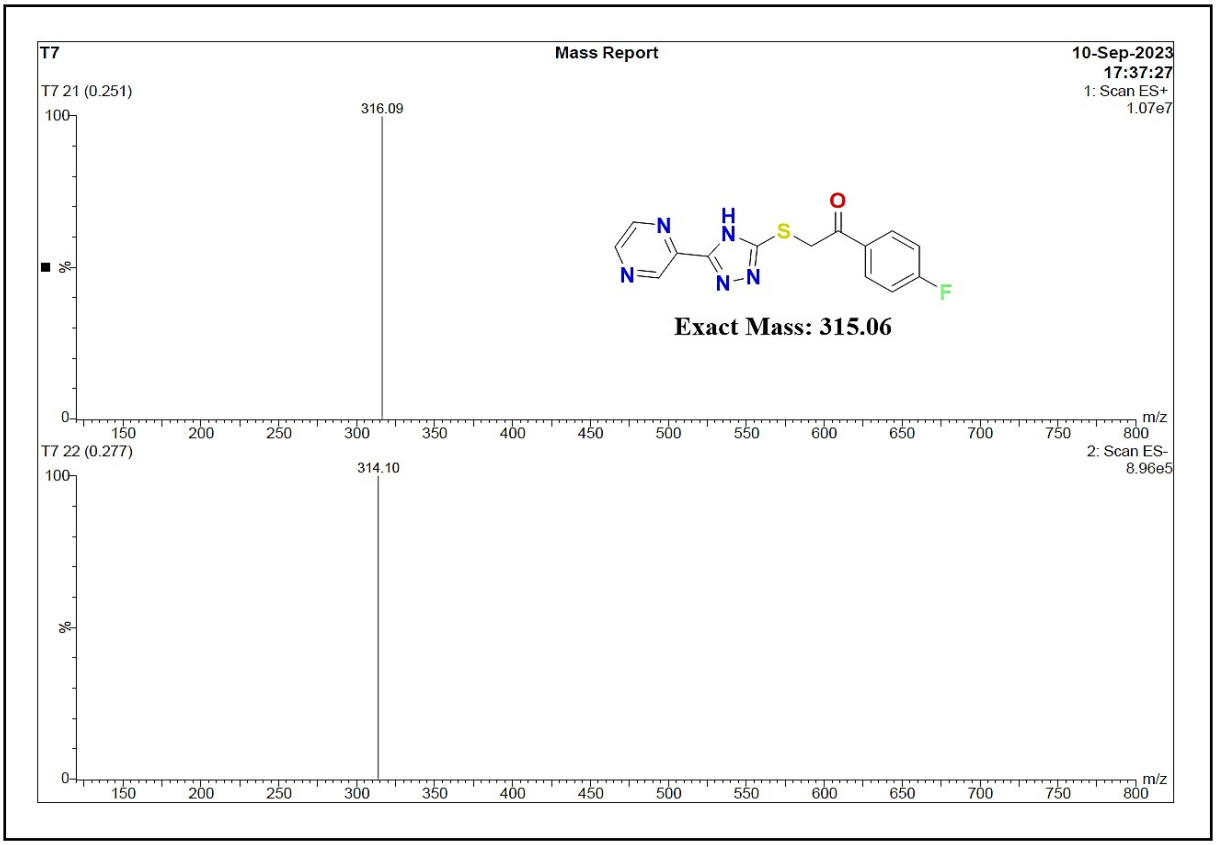


Figure S47: ESI-MS spectrum of compound T7

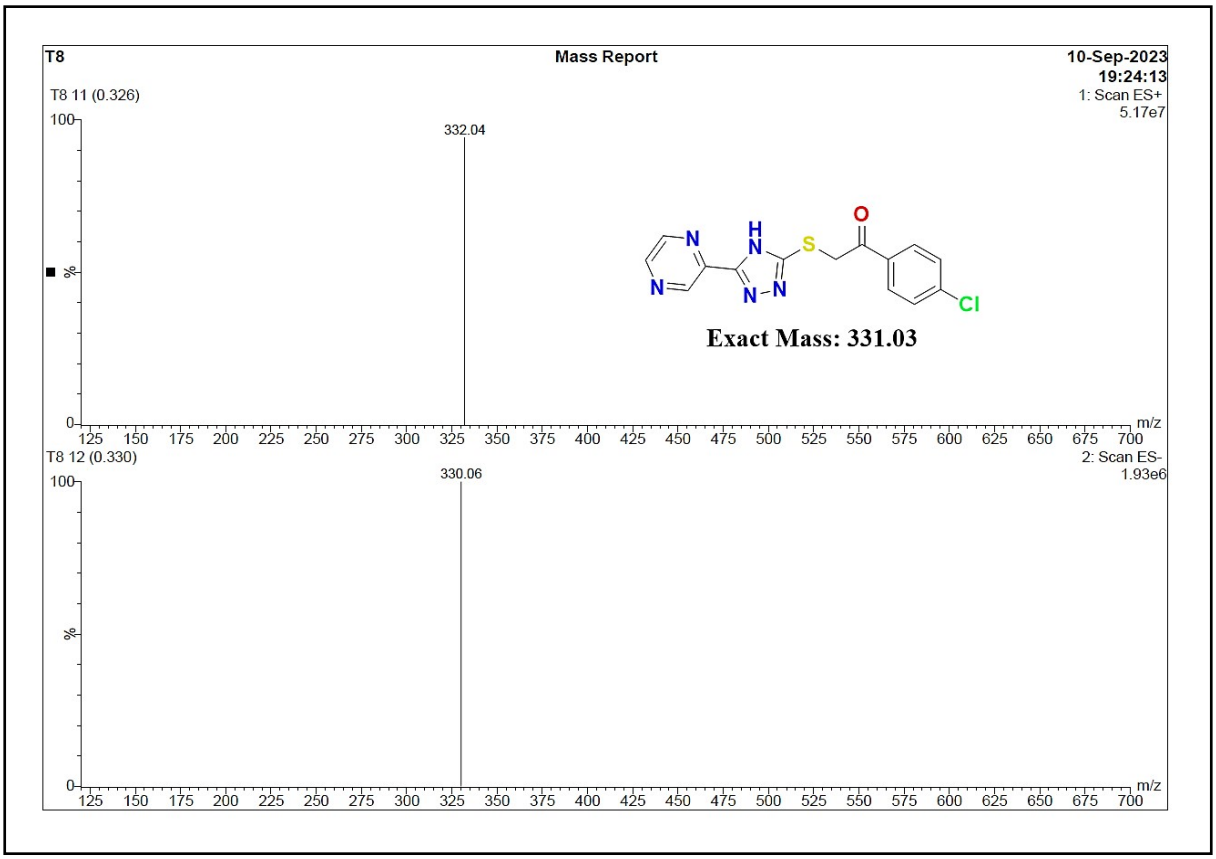


Figure S48: ESI-MS spectrum of compound T8

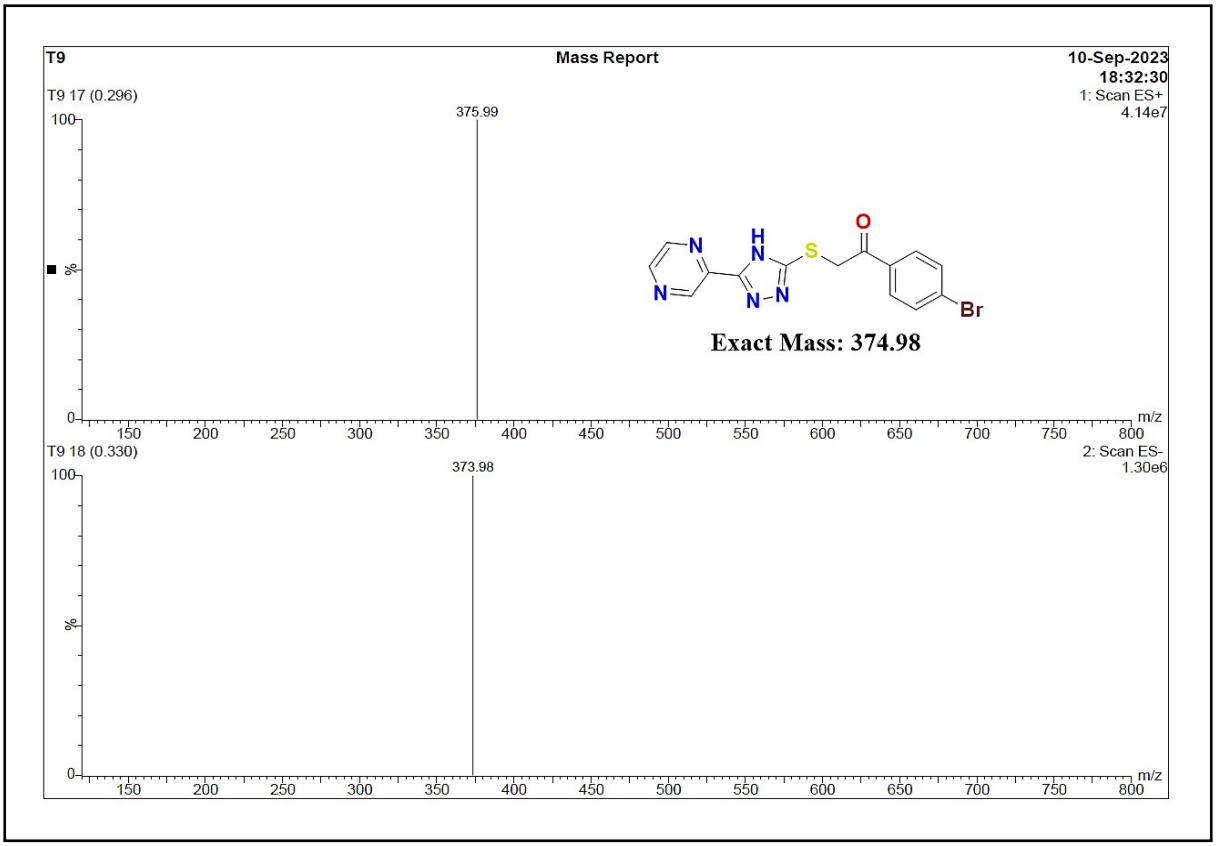


Figure S49: ESI-MS spectrum of compound T9

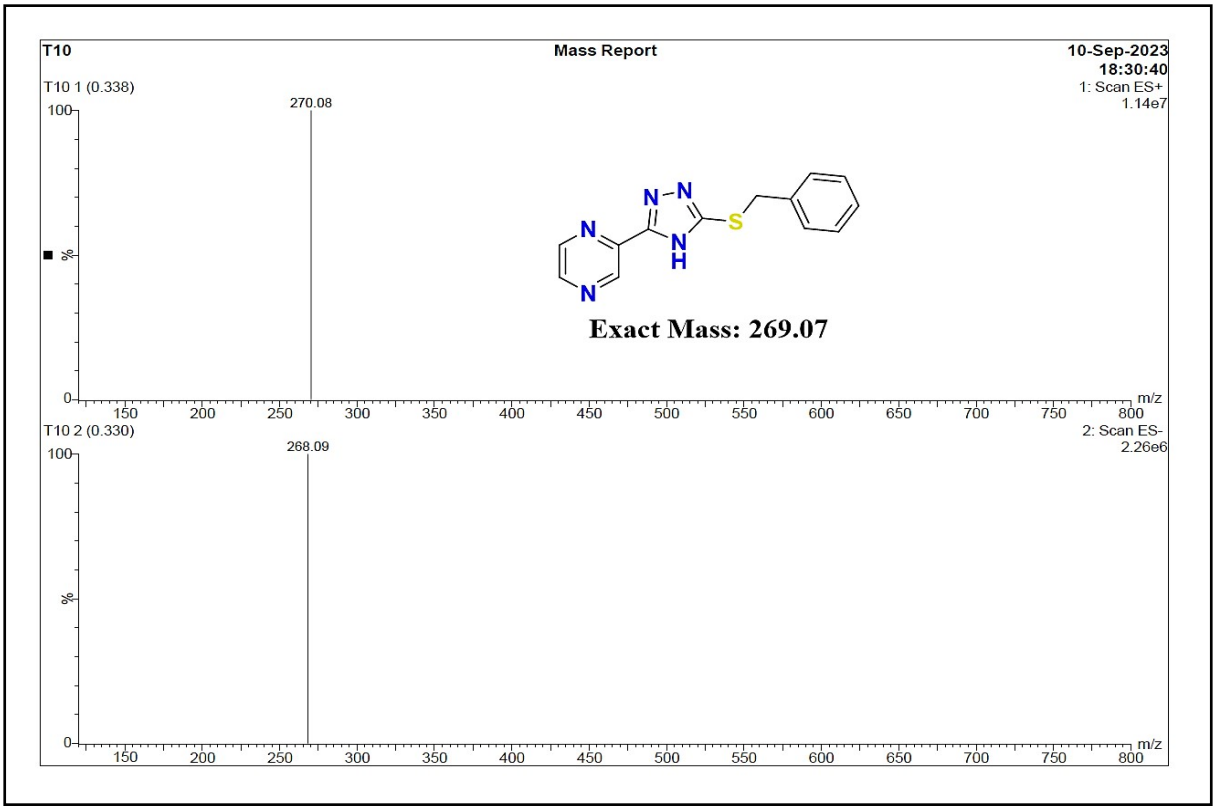


Figure S50: ESI-MS spectrum of compound T10

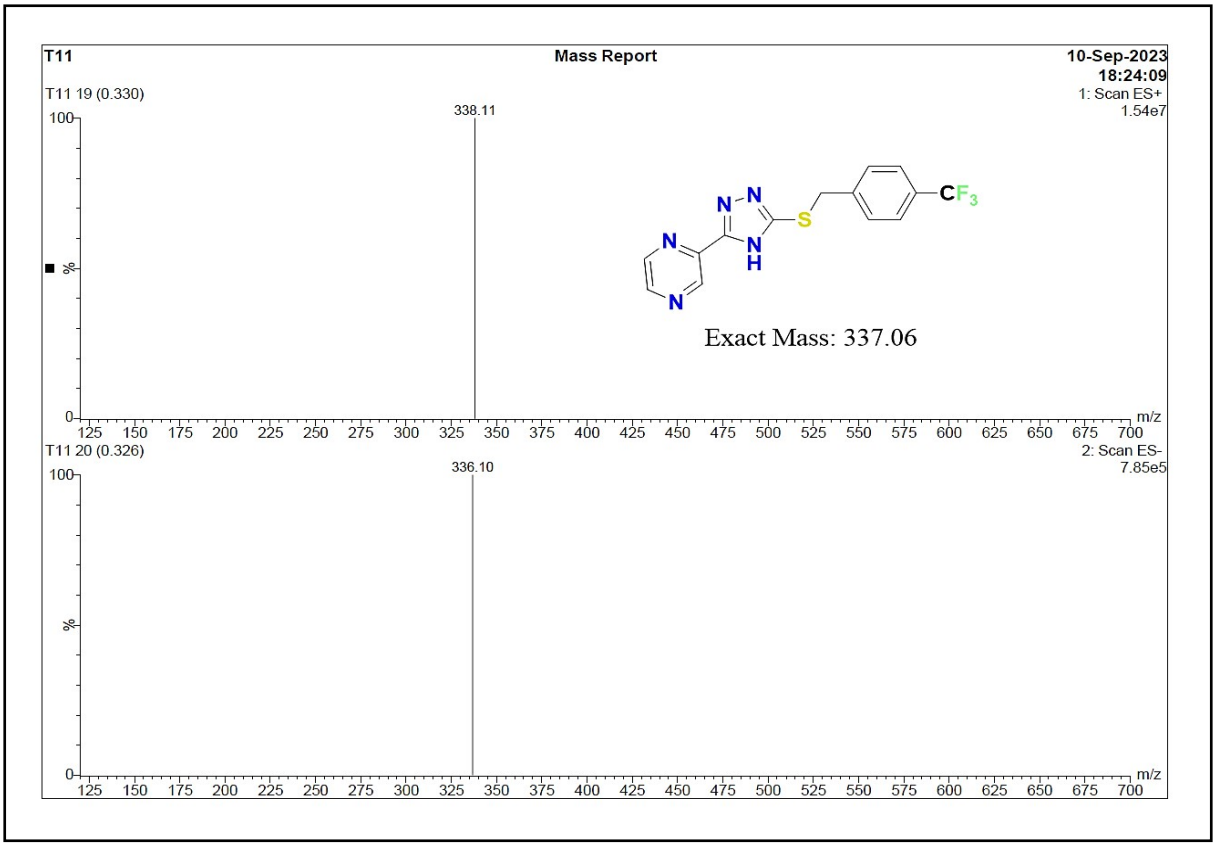


Figure S51: ESI-MS spectrum of compound T11

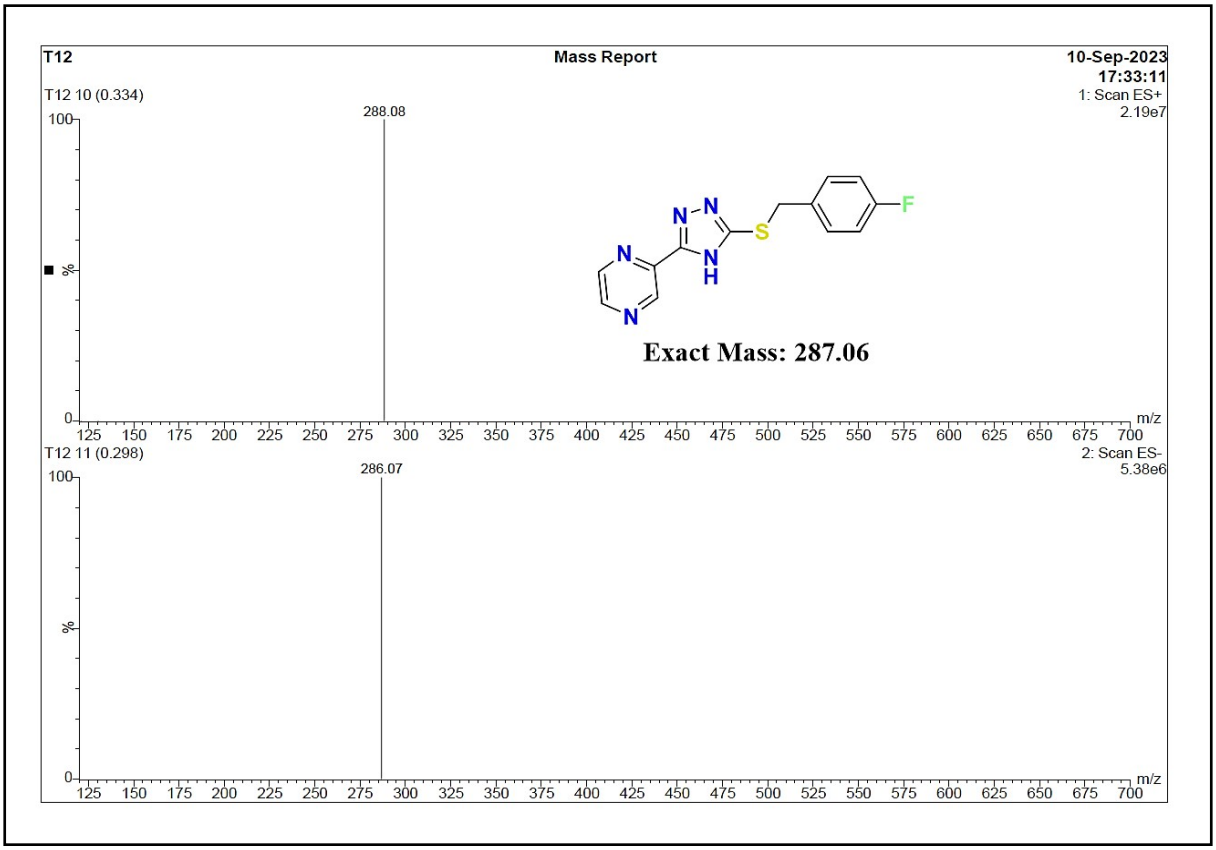


Figure S52: ESI-MS spectrum of compound T12

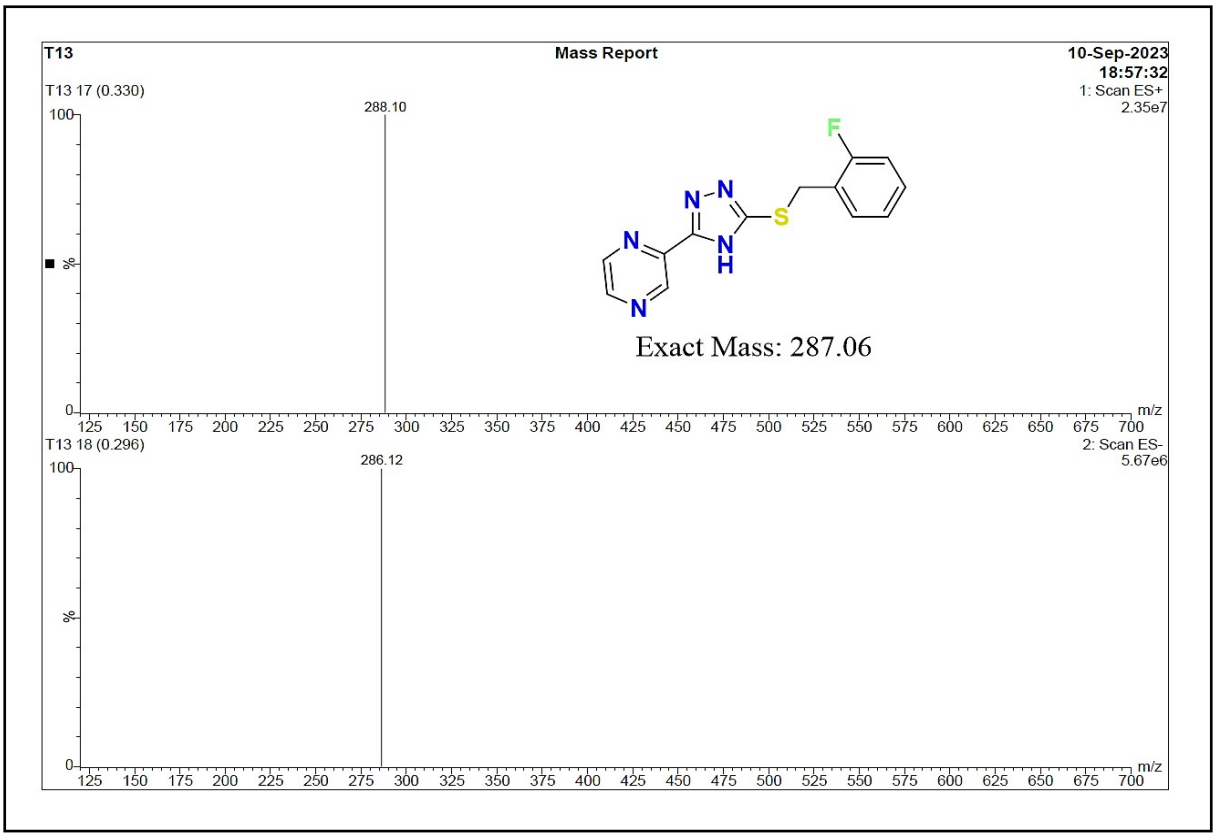


Figure S53: ESI-MS spectrum of compound T13

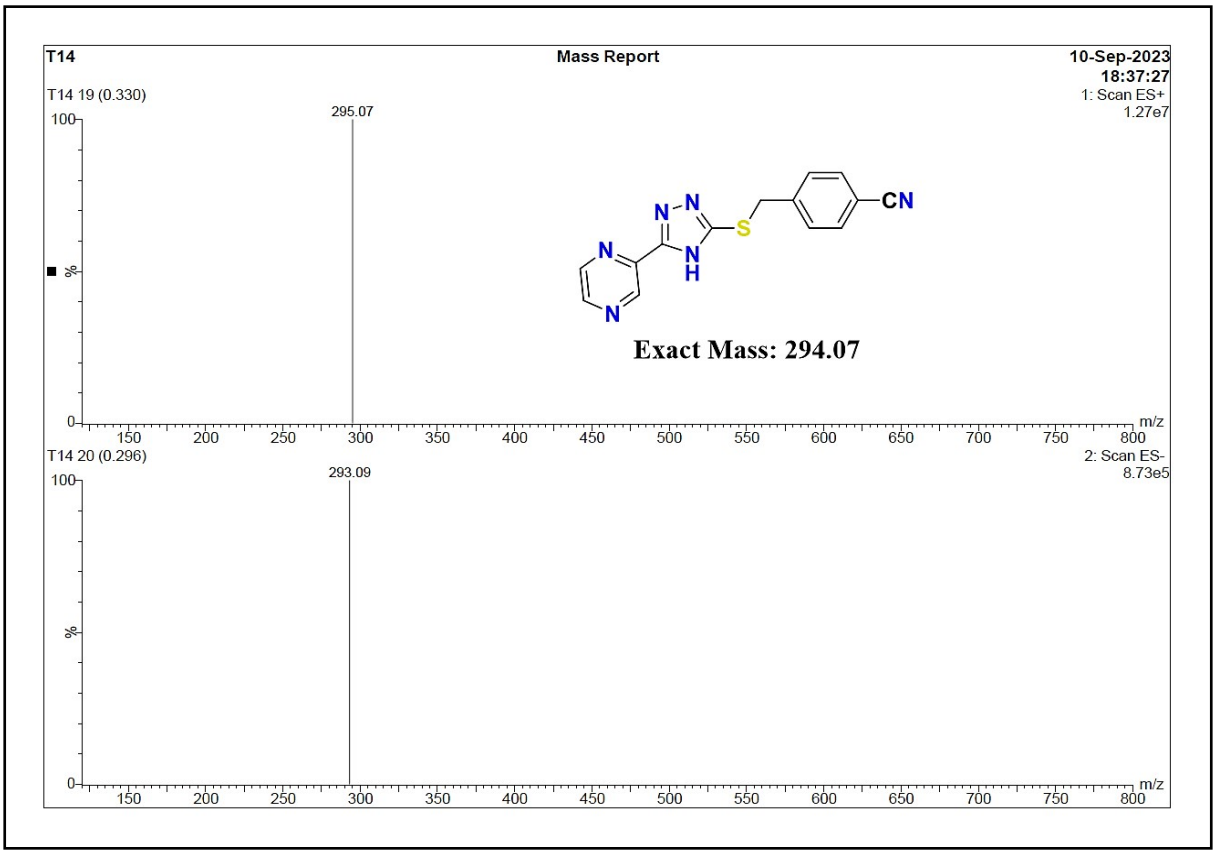


Figure S54: ESI-MS spectrum of compound T14

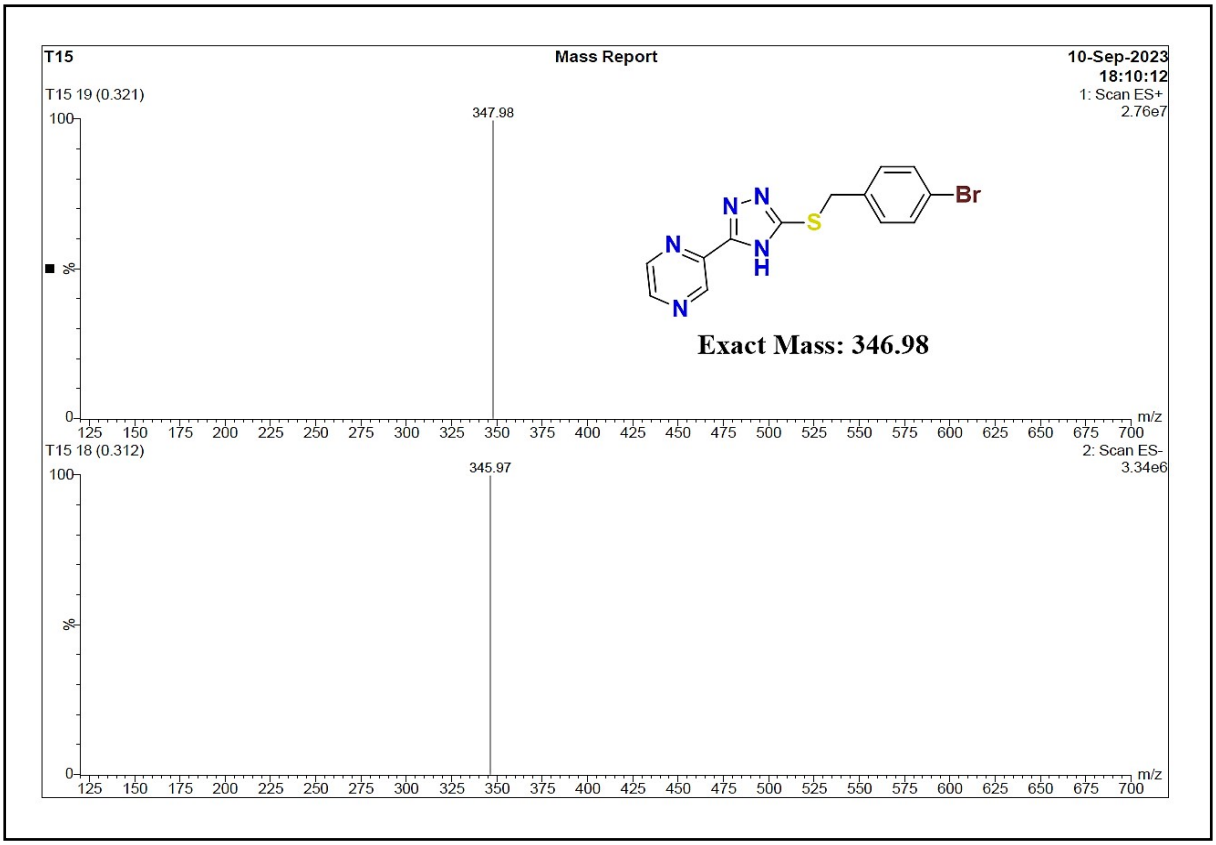


Figure S55: ESI-MS spectrum of compound T15

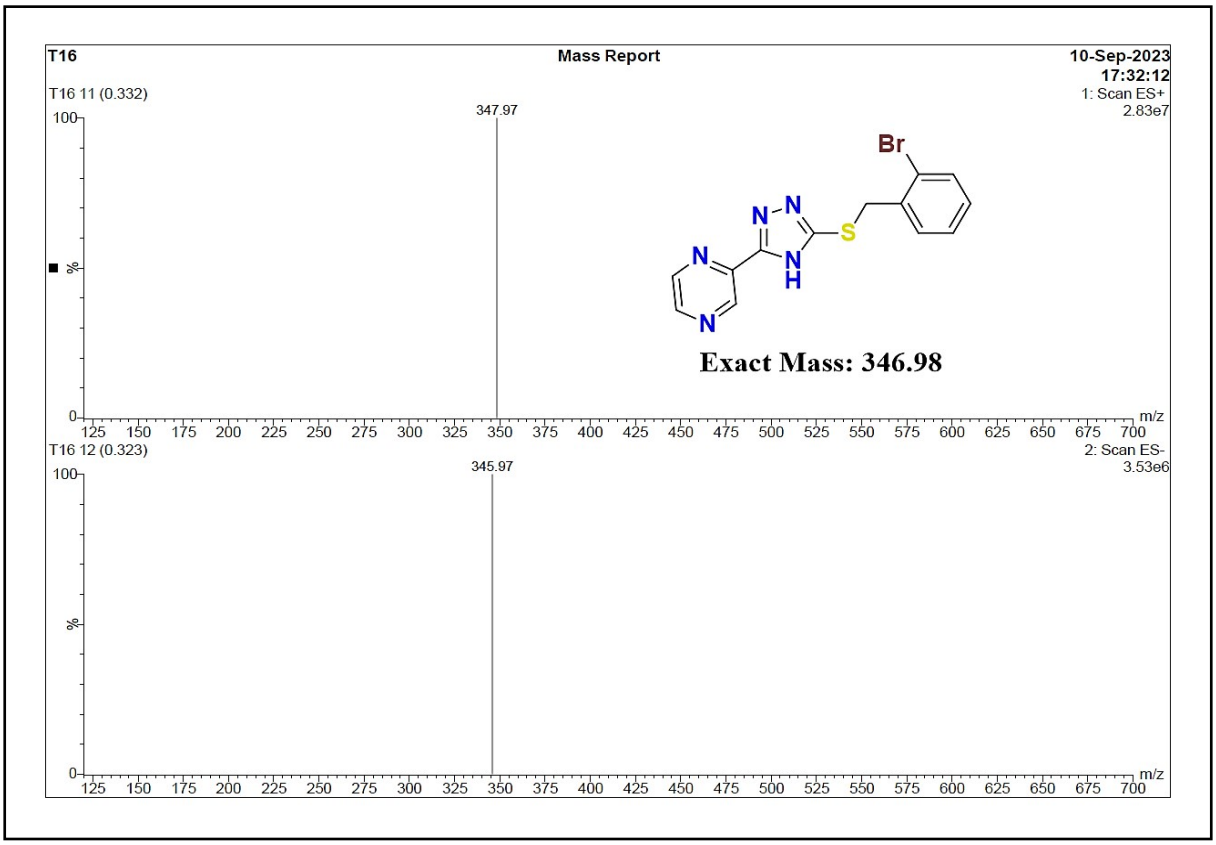


Figure S56: ESI-MS spectrum of compound T16

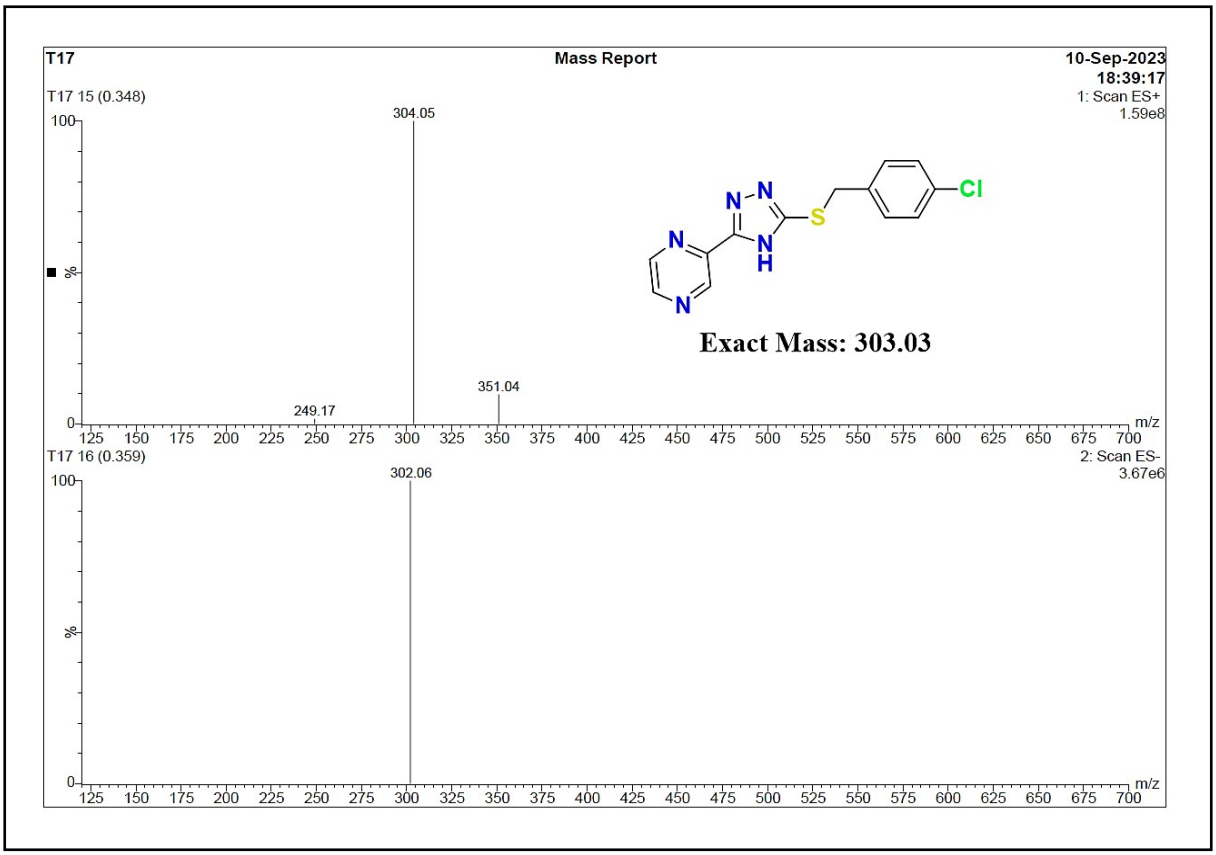


Figure S57: ESI-MS spectrum of compound T17

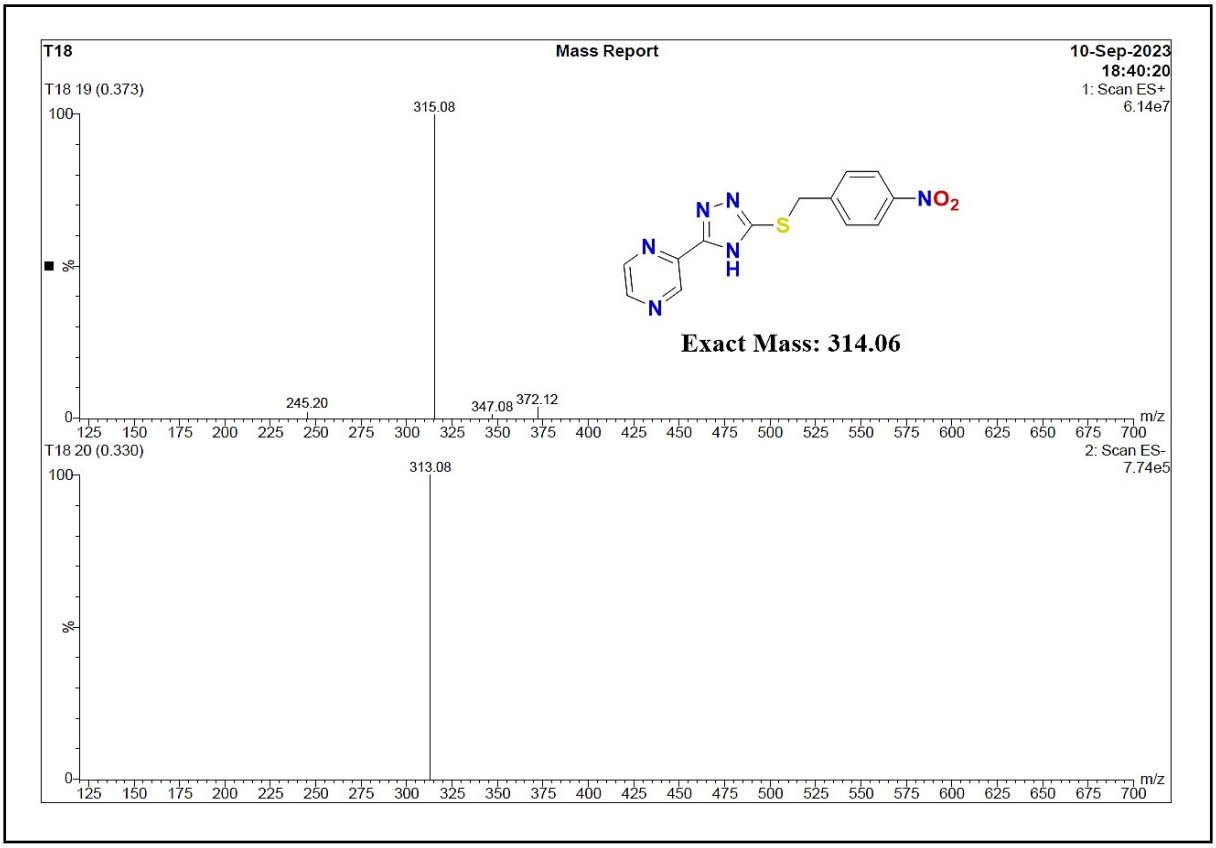


Figure S58: ESI-MS spectrum of compound T18

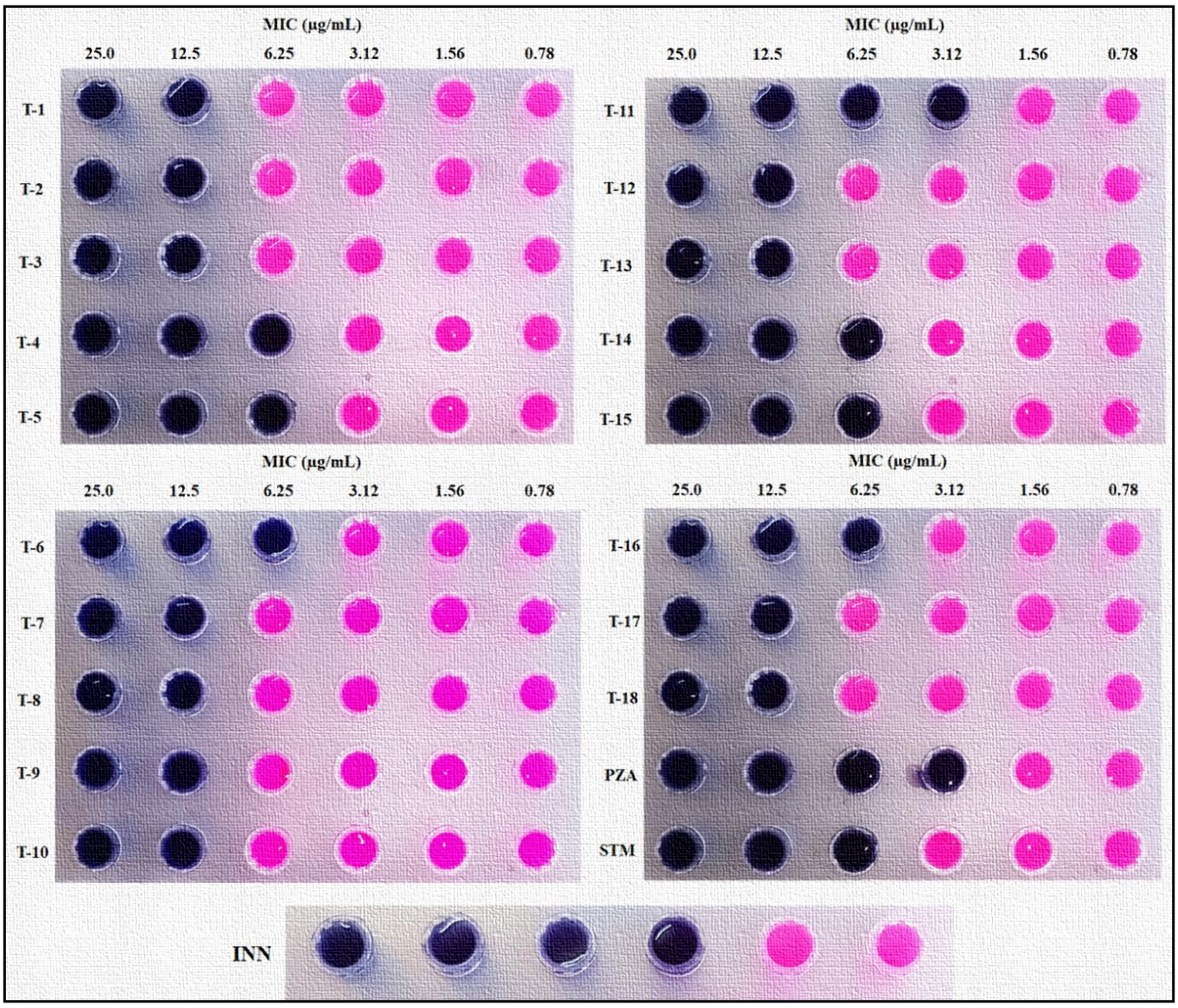
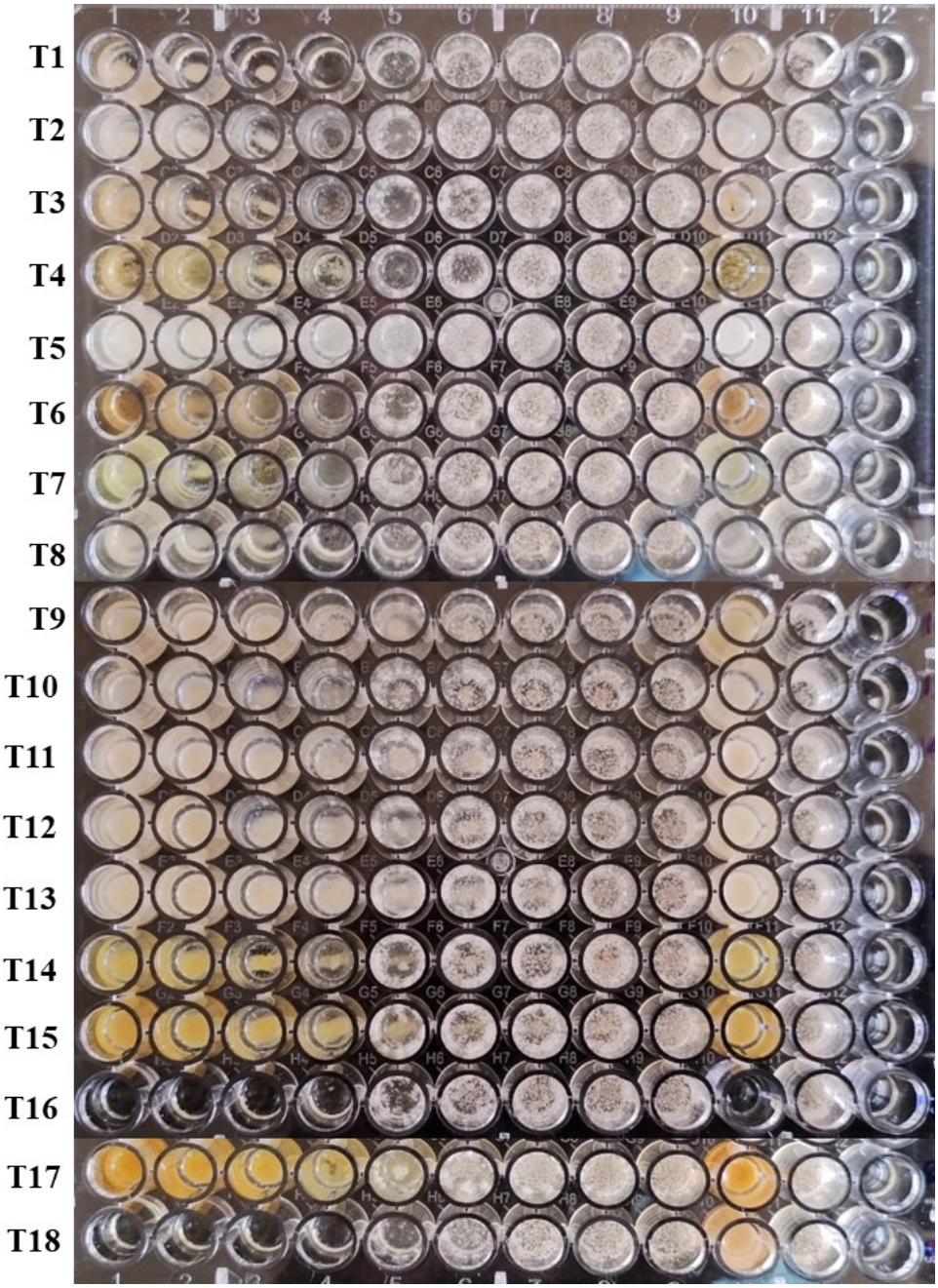
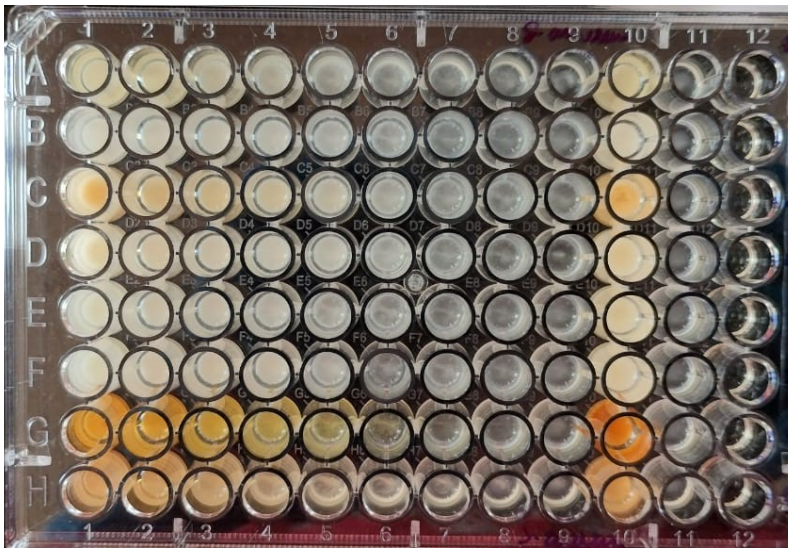


Figure S59: *In vitro* antitubercular activity assessment of target compounds (T1-T18)



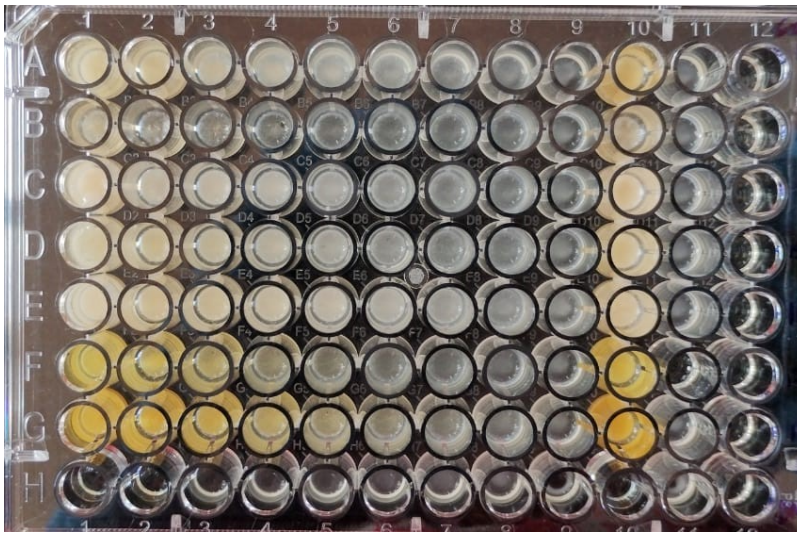
1) 5mg/ml, 2) 2.5mg/ml, 3) 1.25mg/ml, 4) 0.625mg/ml, 5) 0.3125mg/ml, 6) 0.15625mg/ml, 7) 0.078125, 8) 0.039063, 9) 0.01953mg/ml, 10) compound control, 11) culture control, 12) media control

Figure S60: *In vitro* antifungal activity assessment of target compounds against *A. niger*



1) 5mg/ml, 2) 2.5mg/ml, 3) 1.25mg/ml, 4) 0.625mg/ml, 5) 0.3125mg/ml, 6) 0.15625mg/ml, 7) 0.078125, 8) 0.039063, 9) 0.01953mg/ml, 10) compound control, 11) culture control, 12) media control A) T1, B) T2, C) T3, D) T4, E) T5, F) T6, G) T7, H) T8

Figure S61: *In vitro* antibacterial activity assessment of target compounds against *S. aureus*

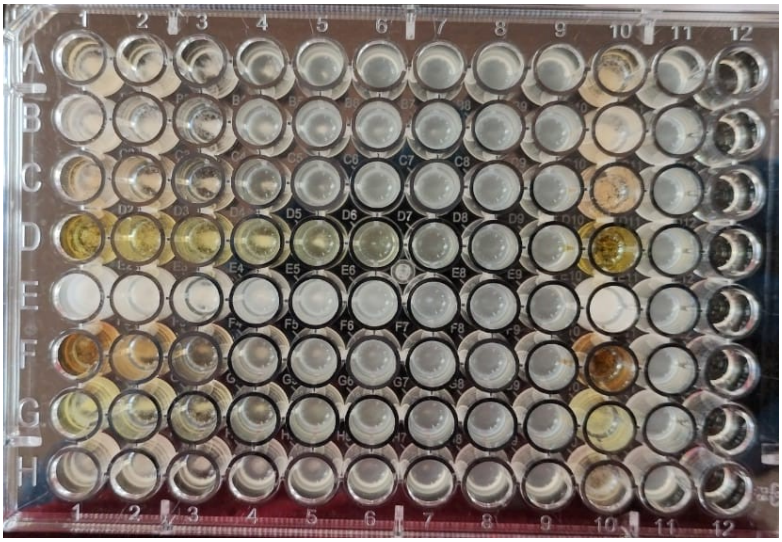


1) 5mg/ml, 2) 2.5mg/ml, 3) 1.25mg/ml, 4) 0.625mg/ml, 5) 0.3125mg/ml, 6) 0.15625mg/ml, 7) 0.078125, 8) 0.039063, 9) 0.01953mg/ml, 10) compound control, 11) culture control, 12) media control A) T9, B) T10, C) T11, D) T12, E) T13, F) T14, G) T15, H) DMSO

Figure S62: *In vitro* antibacterial activity assessment of target compounds against *S. aureus*

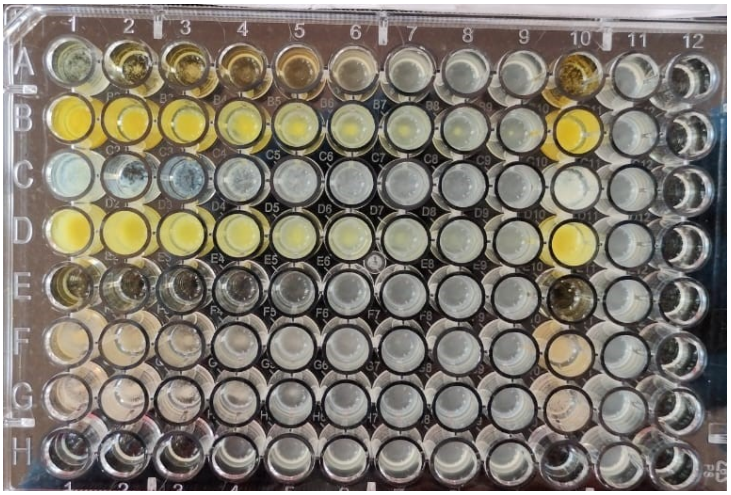
1) 5mg/ml, 2) 2.5mg/ml, 3) 1.25mg/ml, 4) 0.625mg/ml, 5) 0.3125mg/ml, 6) 0.15625mg/ml, 7) 0.078125, 8) 0.039063, 9) 0.01953mg/ml, 10) compound control, 11) culture control, 12) media control A) T16, B) T17, C) T18

Figure S63: *In vitro* antibacterial activity assessment of target compounds against *S. aureus*



1) 5mg/ml, 2) 2.5mg/ml, 3) 1.25mg/ml, 4) 0.625mg/ml, 5) 0.3125mg/ml, 6) 0.15625mg/ml, 7) 0.078125, 8) 0.039063, 9) 0.01953mg/ml, 10) compound control, 11) culture control, 12) media control A) T1, B) T2, C) T3, D) T4, E) T5, F) T6, G) T7, H) T8

Figure S64: *In vitro* antibacterial activity assessment of target compounds against *S.* Typhi



1) 5mg/ml, 2) 2.5mg/ml, 3) 1.25mg/ml, 4) 0.625mg/ml, 5) 0.3125mg/ml, 6) 0.15625mg/ml, 7) 0.078125, 8) 0.039063, 9) 0.01953mg/ml, 10) compound control, 11) culture control, 12) media control A) T9, B) T10, C) T11, D) T12, E) T13, F) T14, G) T15, H) DMSO

Figure S65: *In vitro* antibacterial activity assessment of target compounds against *S.* Typhi

1) 5mg/ml, 2) 2.5mg/ml, 3) 1.25mg/ml, 4) 0.625mg/ml, 5) 0.3125mg/ml, 6) 0.15625mg/ml, 7) 0.078125, 8) 0.039063, 9) 0.01953mg/ml, 10) compound control, 11) culture control, 12) media control A) T16, B) T17, C) T18

Figure S66: *In vitro* antibacterial activity assessment of target compounds against *S.* Typhi

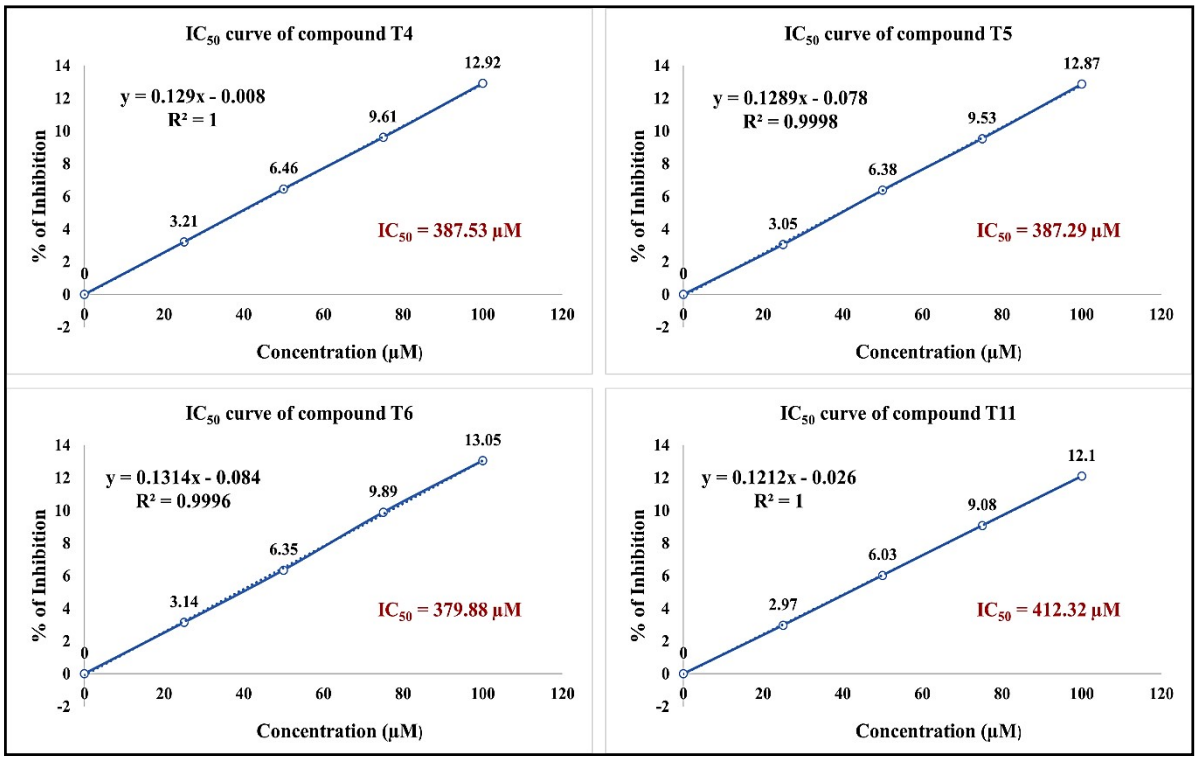


Figure S67: Graphical illustration of IC_{50} value of the compound T4. T5, T6, & T11 were determined through an MTT assay against the Vero cell line

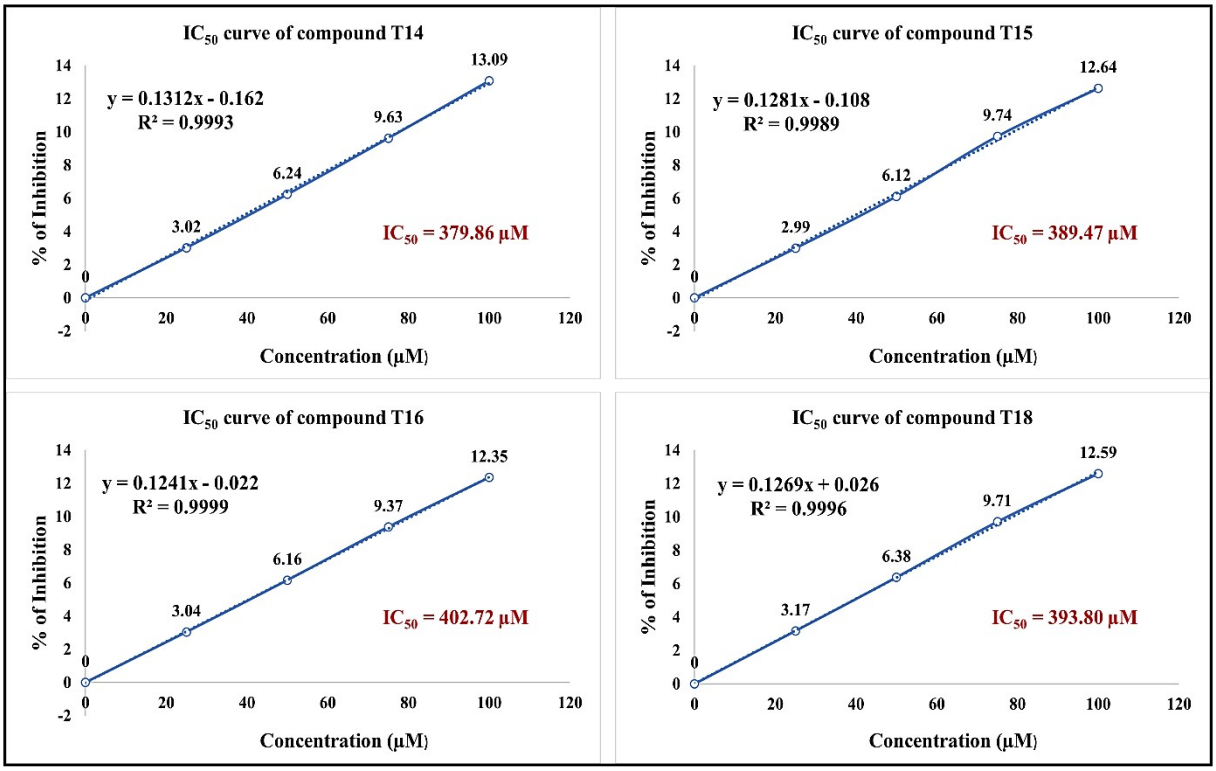


Figure S68: Graphical illustration of IC_{50} value of the compound T14. T15, T16, & T18 were determined through an MTT assay against the Vero cell line