# Efficient Synthesis of Promising Antidiabetic Triazinoindole Analogues *via* Solvent-Free Method: Investigating the Reaction of 1,3-Diketones and 2,5-Dihydro-3*H*-[1,2,4]triazino[5,6-*b*]indole-3-thione

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# SUPPLEMENTARY DATA

**General Procedures for the Synthesis of 3-Methyl-2-Aroylthiazolo[3',2':2,3][1,2,4]triazino[5,6-*b*]indole Derivatives**:

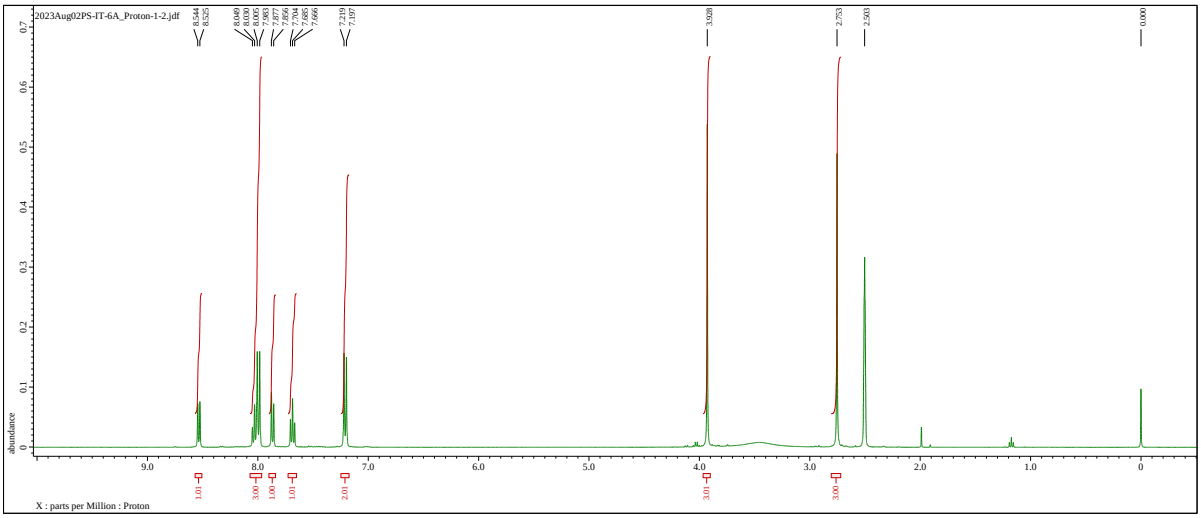
1,3-Diketones **19(a-j)** (1.0 mmol) and NBS (1.2 mmol) were thoroughly homogenized in a dry mortar until a thick paste was formed and then 2,5-dihydro-3*H*-[1,2,4]triazino[5,6-*b*]indole-3-thione **11** (1.0 mmol) was added. The reaction mixture was grinded for an additional 30-45 minutes under solvent-free conditions. The reaction progress was monitored by TLC with ethyl acetate-petroleum ether (30:70, *v/v*). After completion of the reaction, the reaction mixture was treated with distilled water and the resulting residue was filtered and recrystallized with ethanol. The solid obtained was dried to give pure compounds in high yields 77-94%. The products were characterized by IR, 1D & 2D NMR and HRMS spectrometry.

**Optimization of Reaction Conditions for the Synthesis of 3-Methyl-2-Aroylthiazolo[3',2':2,3][1,2,4]triazino[5,6-*b*]indole Derivatives**:

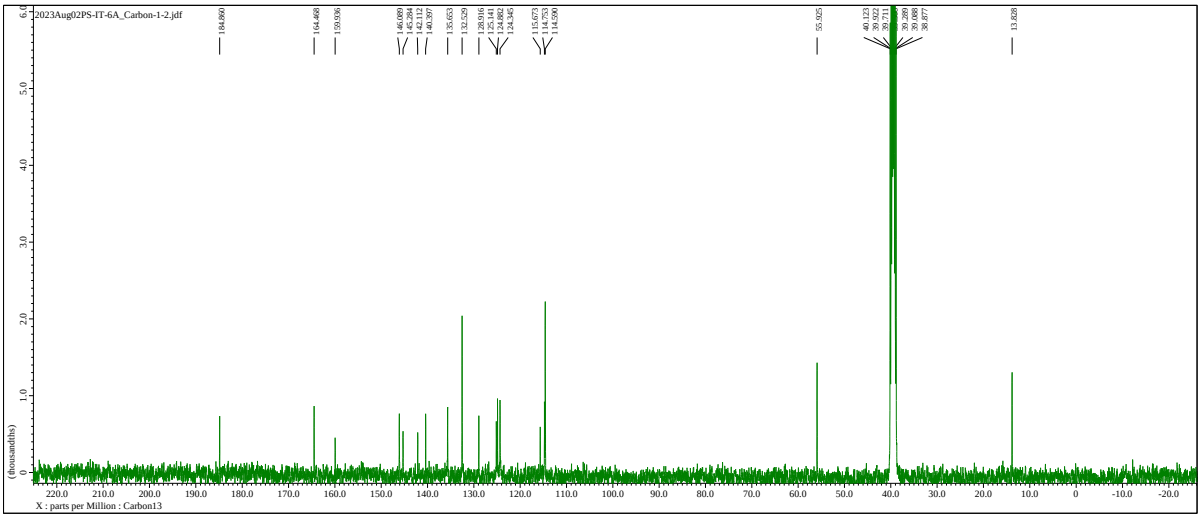
1. **Table 1, Entry 1-7: Solvent-Based Reactions under Visible Light**
   Reactions were performed using 20 mL of various solvents (EtOH, $H_2O$, DMF, DCM, EtOH/$H_2O$ mixtures) under visible-light irradiation (27 W CFL) for 12 hr. Products were isolated by filtration and recrystallized from ethanol.
2. **Table 1, Entry 8-11: Reactions under Refluxing Conditions**
   Reactions were conducted under reflux in 20 mL of different solvents (ethanol, water, DMF, and DMSO) for 4-5 hr. Products were purified by recrystallization from ethanol.
3. **Table 1, Entry 12: Solvent-Free Grinding at Room Temperature**
   Reagents were ground together for 30 minutes at room temperature under solvent-free conditions. This method provided a 94% yield in a shorter time.

## $^{1}$H NMR, $^{13}$C NMR, HSQC and HMBC Spectra of Final Compounds

### *2-(4-Methoxybenzoyl)-3-methylthiazolo[3',2':2,3][1,2,4]triazino[5,6-b]indole 12a*

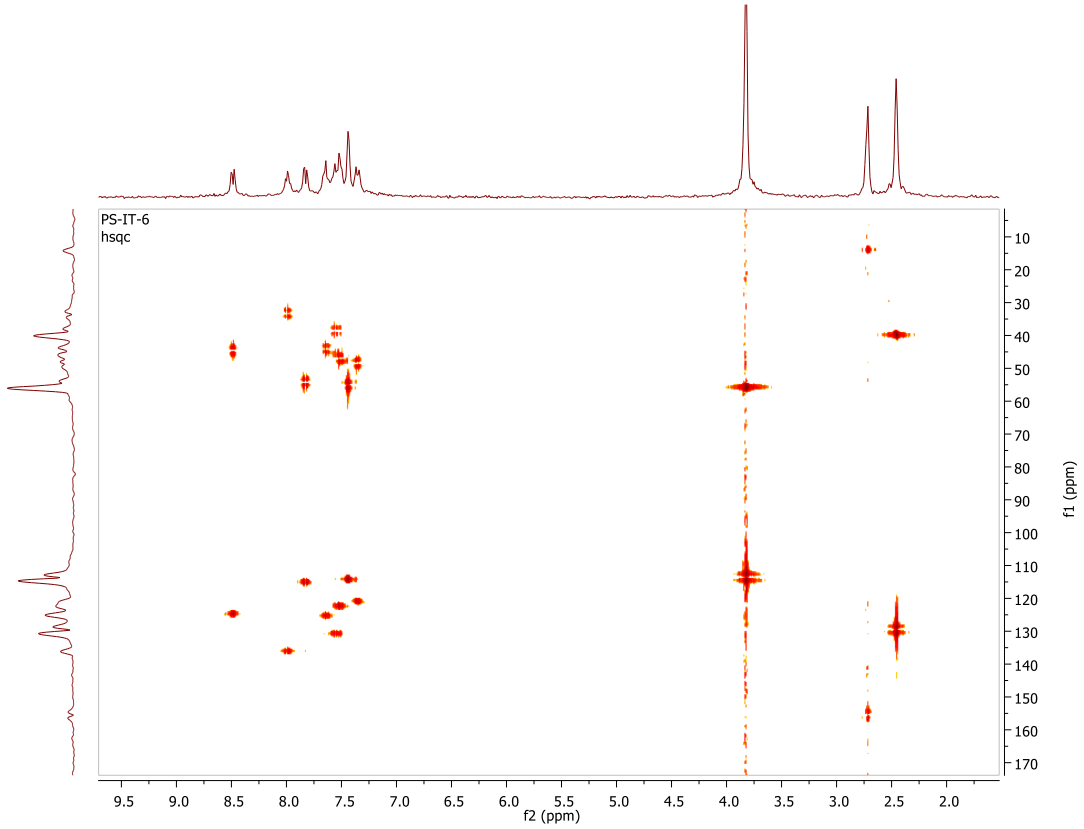



$^{1}$H NMR spectrum of **12a**

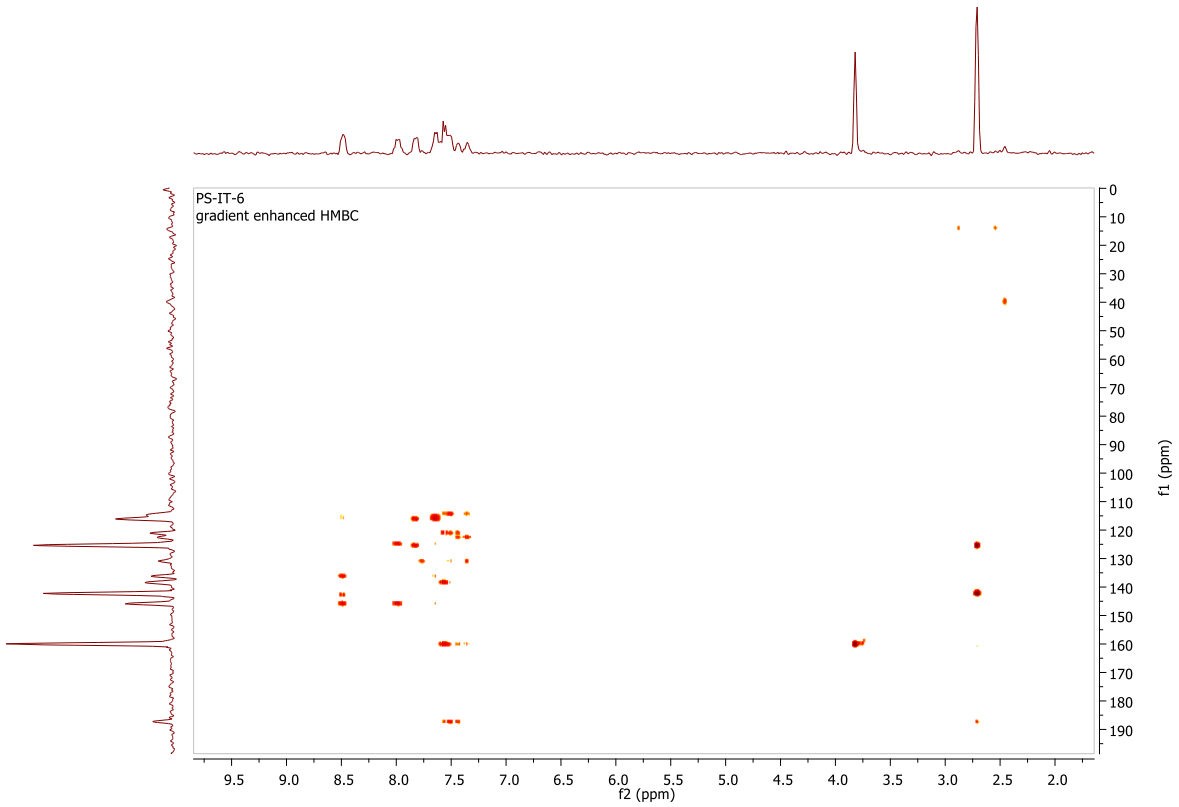



$^{13}$C NMR spectrum of **12a**

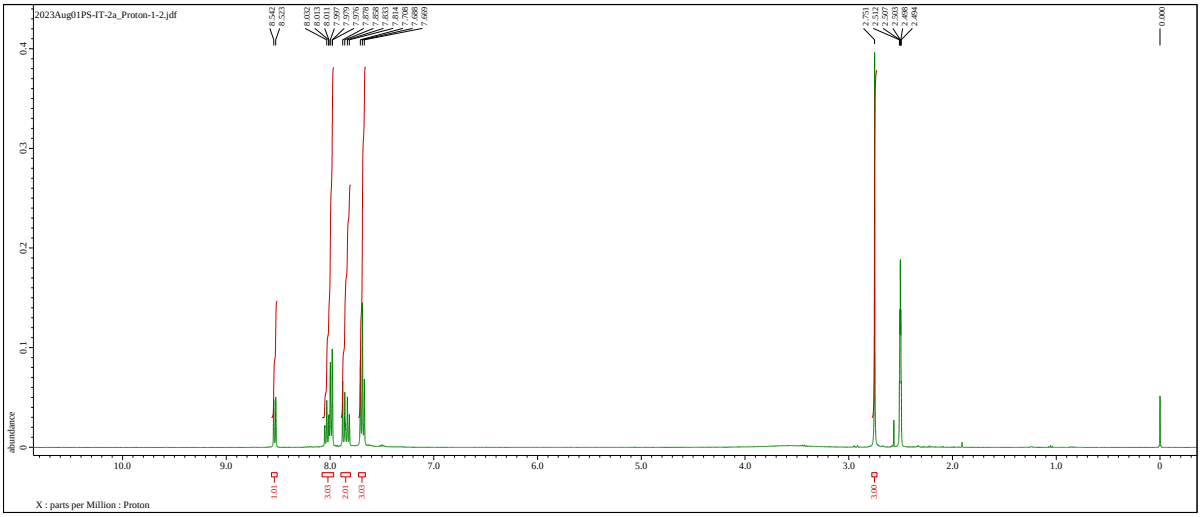
## $^{1}H$-$^{13}C$ HSQC (12a)



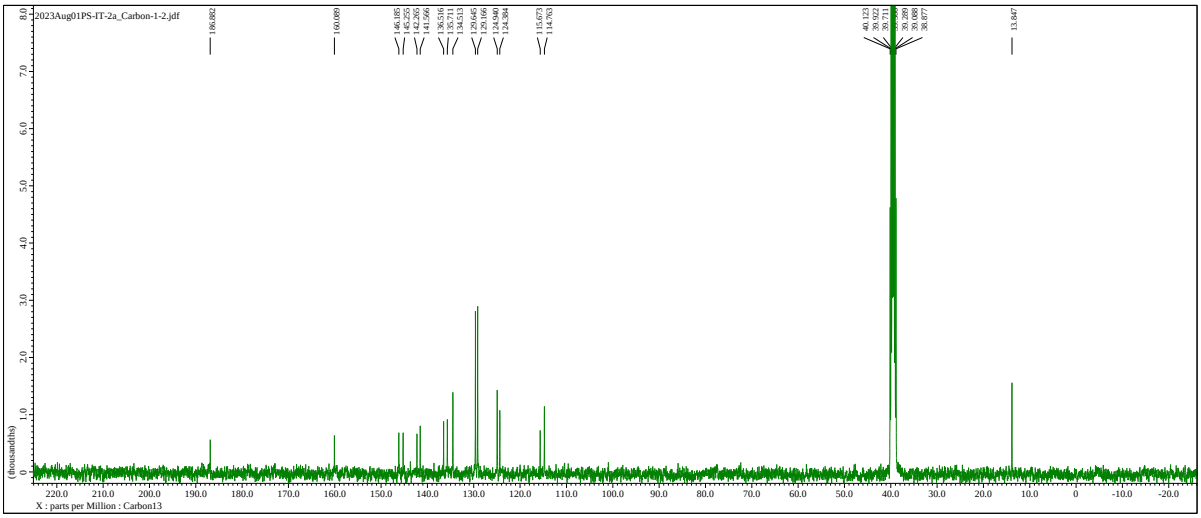

## $^{1}H$-$^{13}C$ HMBC (12a)



***2-Benzoyl-3-methylthiazolo[3',2':2,3][1,2,4]triazino[5,6-b]indole (12b)***

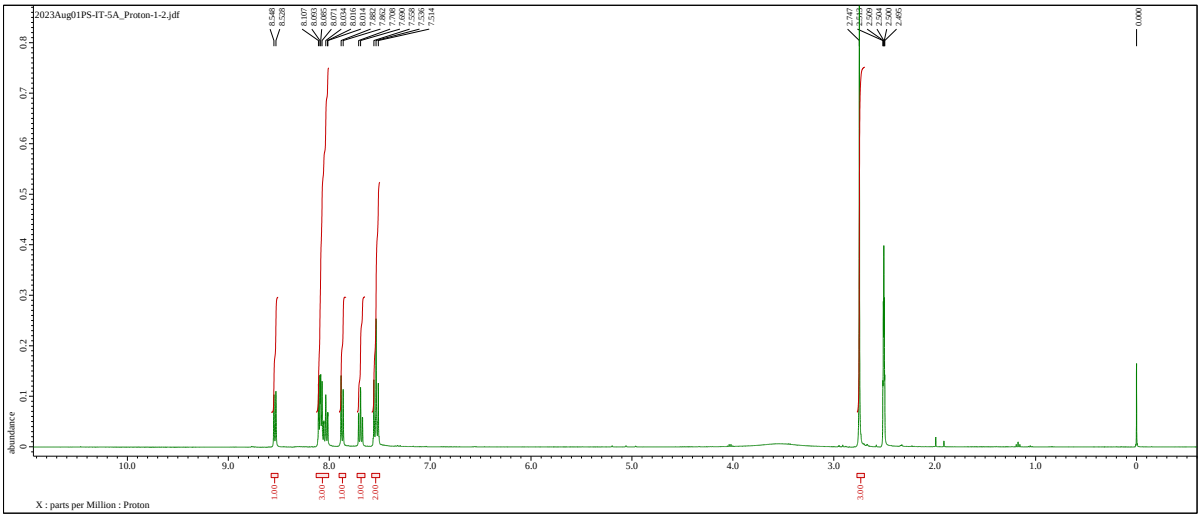



$^{1}$H NMR spectrum of **12b**

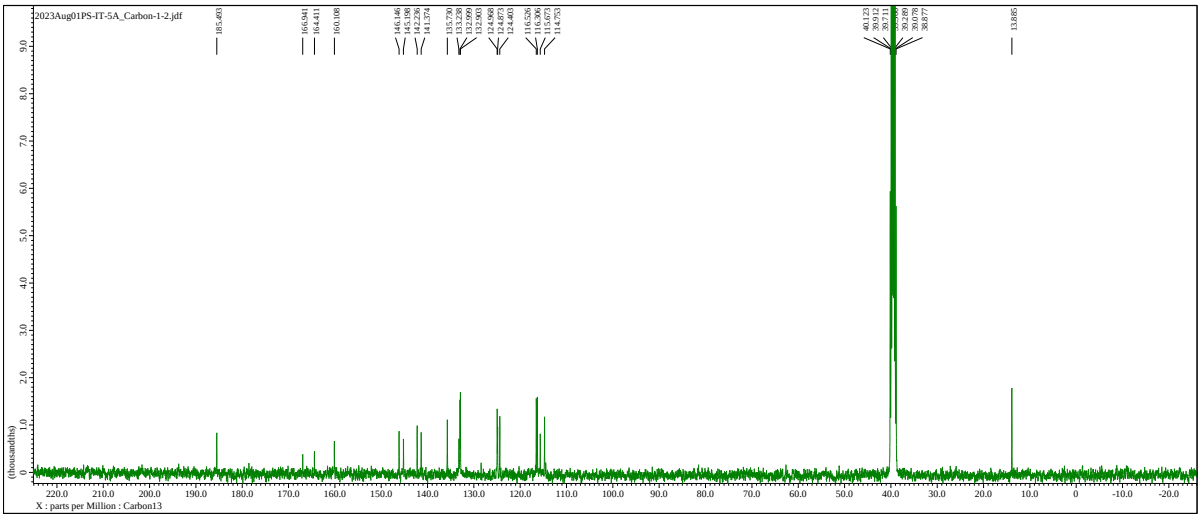



$^{13}$C NMR spectrum of **12b**

***2-(4-Fluorobenzoyl)-3-methylthiazolo[3',2':2,3][1,2,4]triazino[5,6-b]indole (12c)***

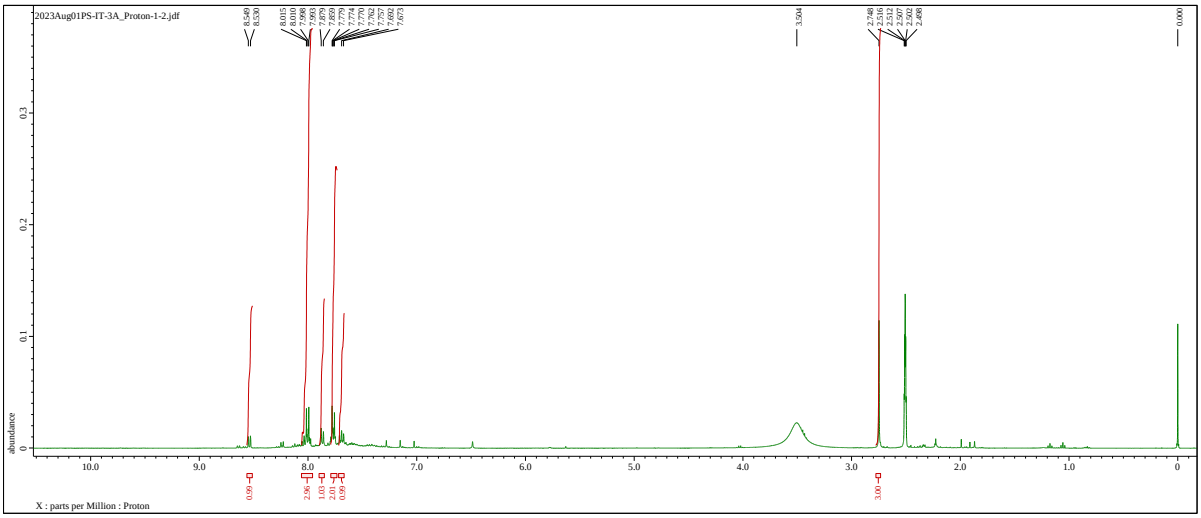



$^{1}$H NMR spectrum of **12c**

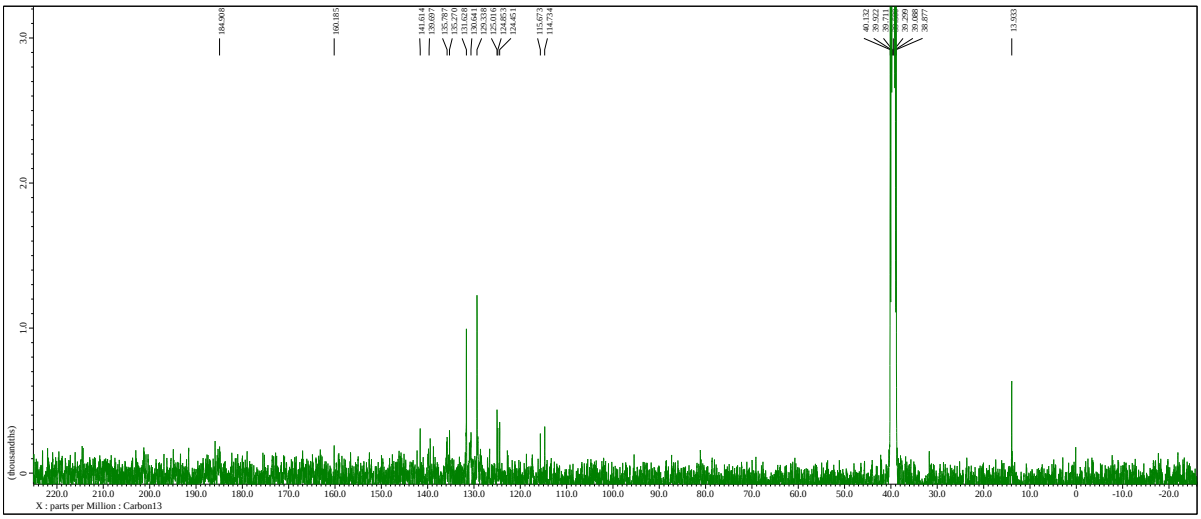



$^{13}$C NMR spectrum of **12c**

***2-(4-Chlorobenzoyl)-3-methylthiazolo[3',2':2,3][1,2,4]triazino[5,6-b]indole (12d)***

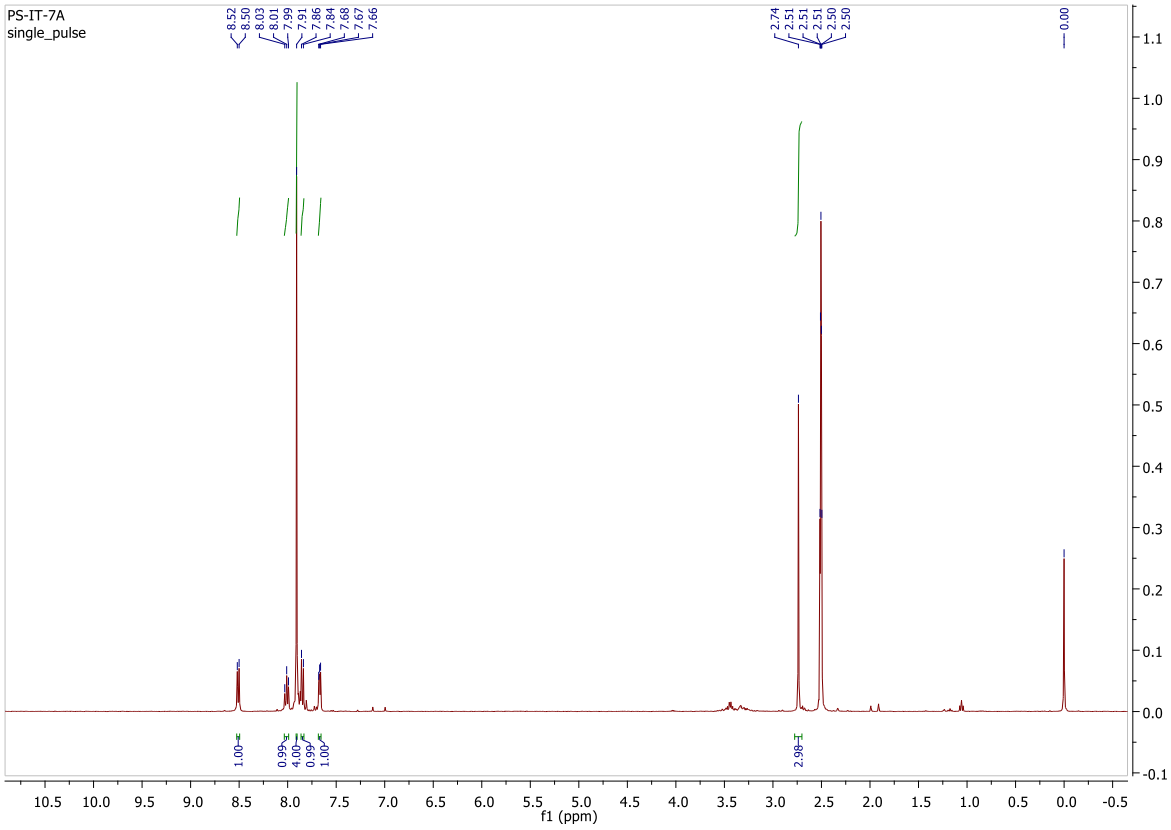



$^{1}$H NMR spectrum of **12d**

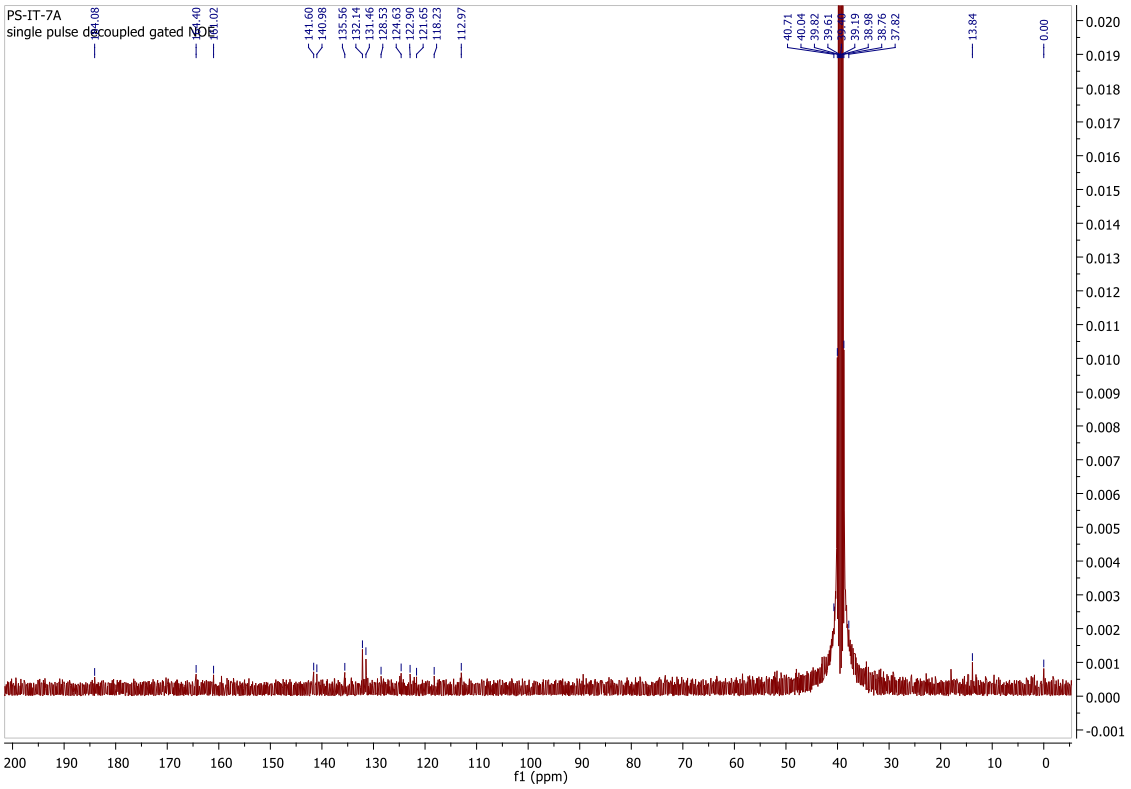



$^{13}$C NMR spectrum of **12d**

***2-(4-Bromobenzoyl)-3-methylthiazolo[3',2':2,3][1,2,4]triazino[5,6-b]indole (12e)***

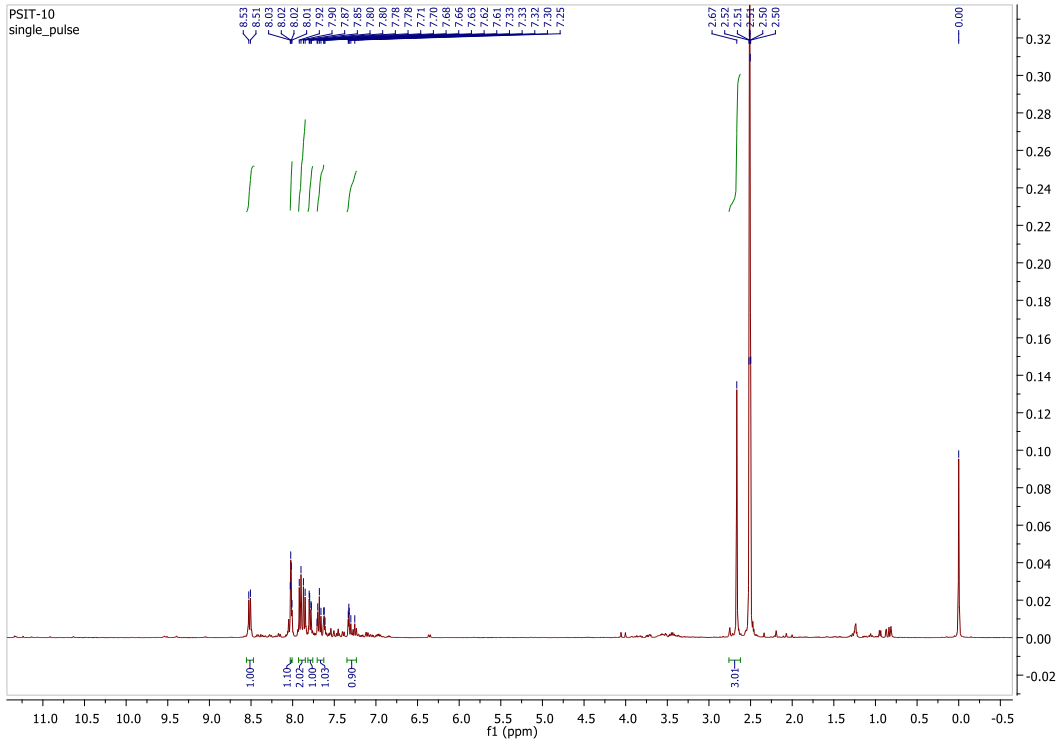



$^{1}$H NMR spectrum of **12e**

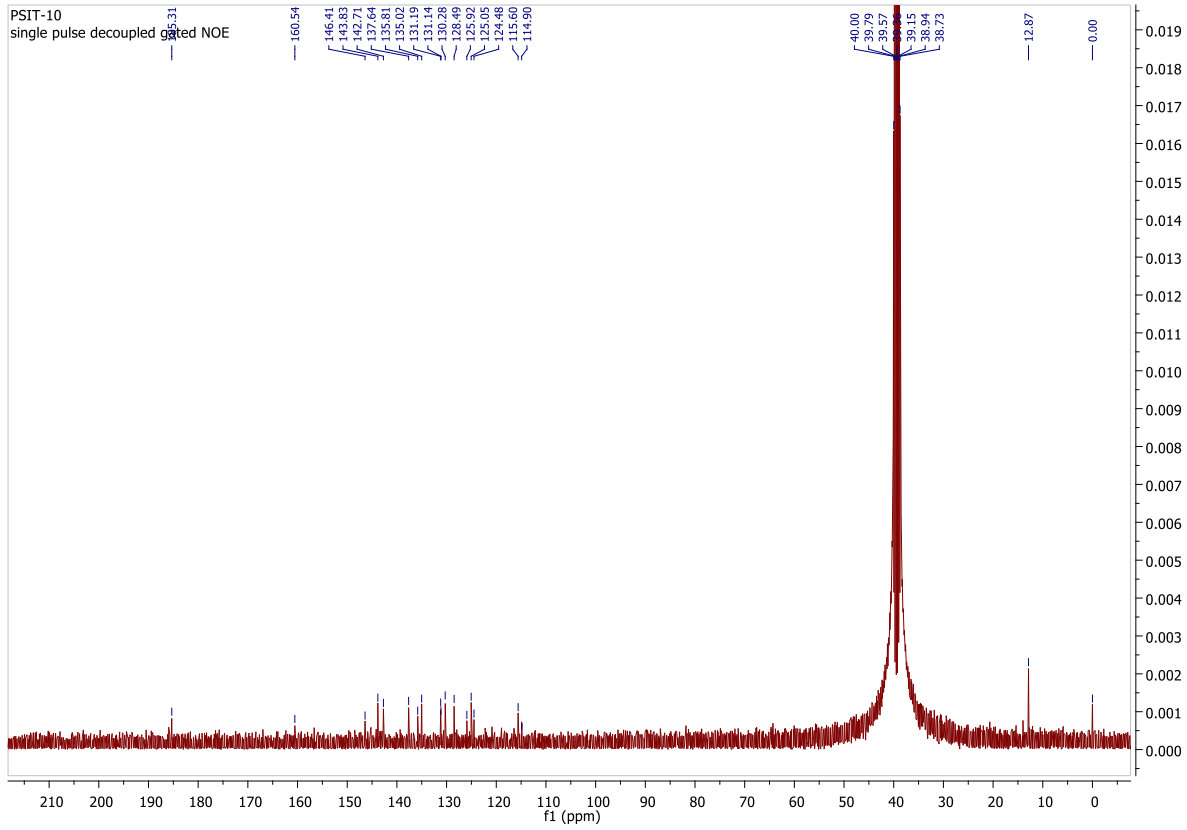



$^{13}$C NMR spectrum of **12e**

***2-(2,4-Dichlorobenzoyl)-3-methylthiazolo[3',2':2,3][1,2,4]triazino[5,6-b]indole 12f***

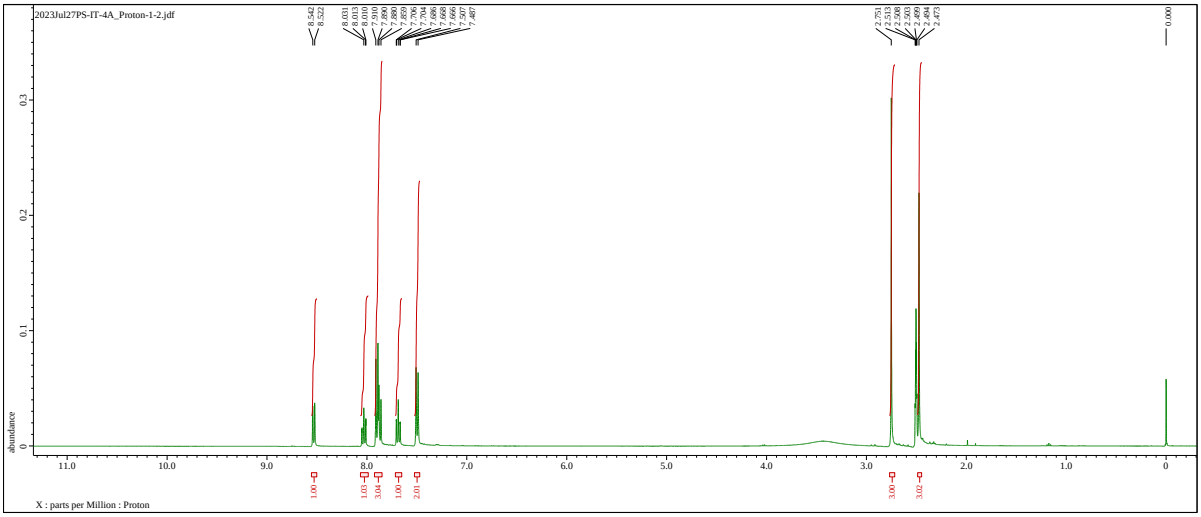



$^{1}$H NMR spectrum of **12f**

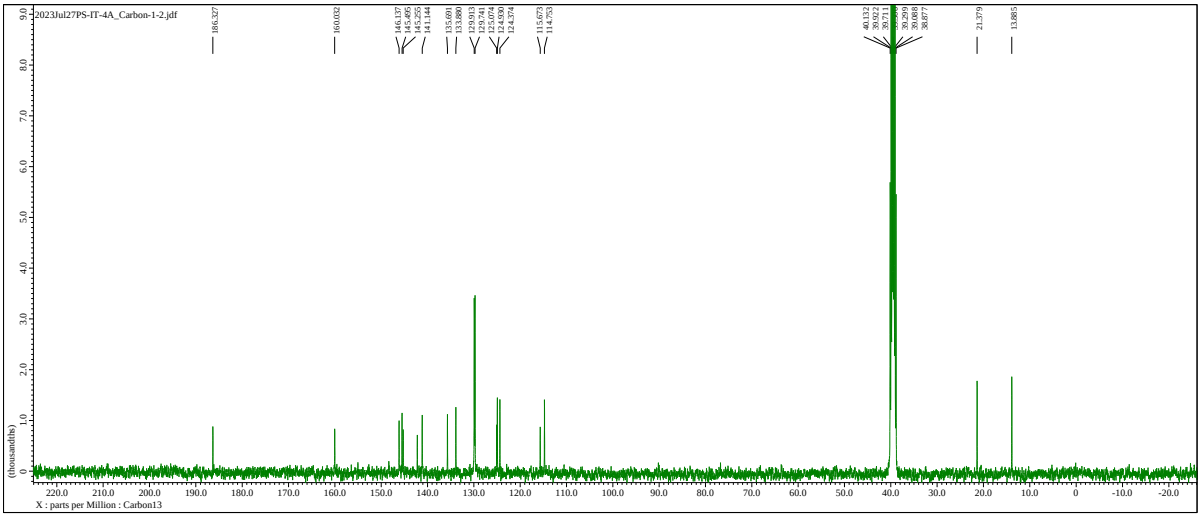



$^{13}$C NMR spectrum of **12f**

***3-Methyl-2-(4-methylbenzoyl)thiazolo[3',2':2,3][1,2,4]triazino[5,6-b]indole (12g)***

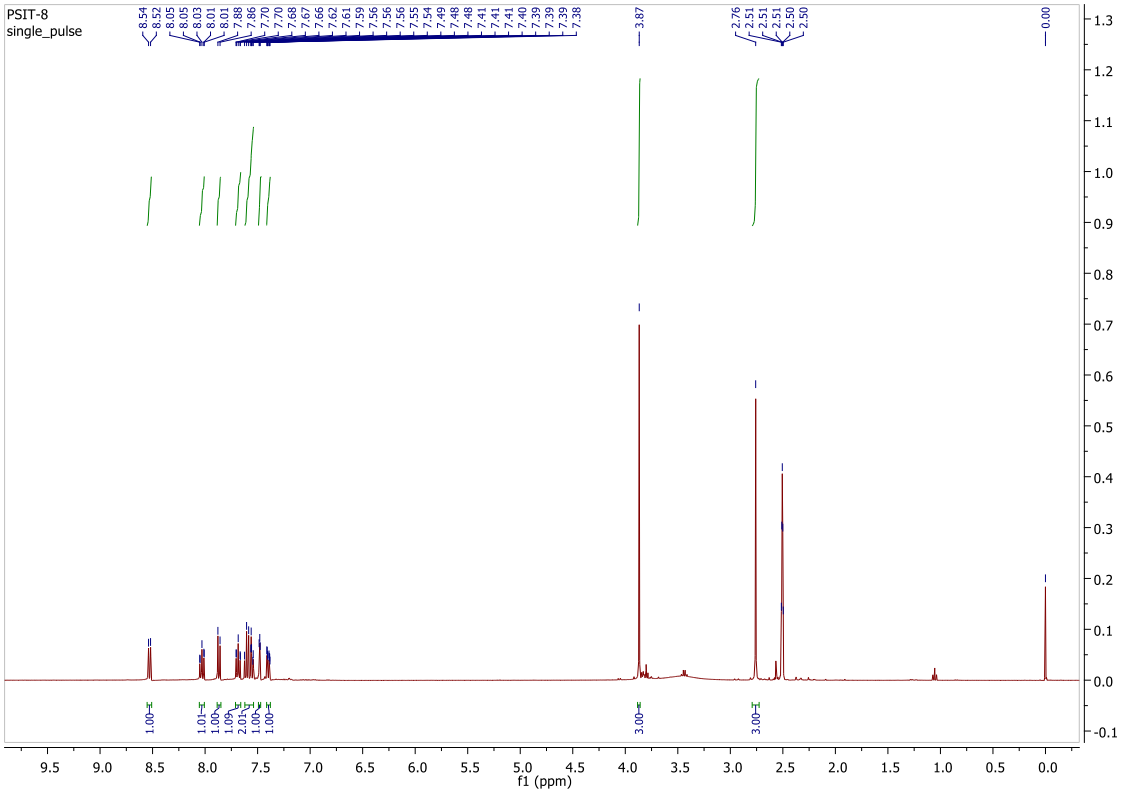



$^{1}$H NMR spectrum of **12g**

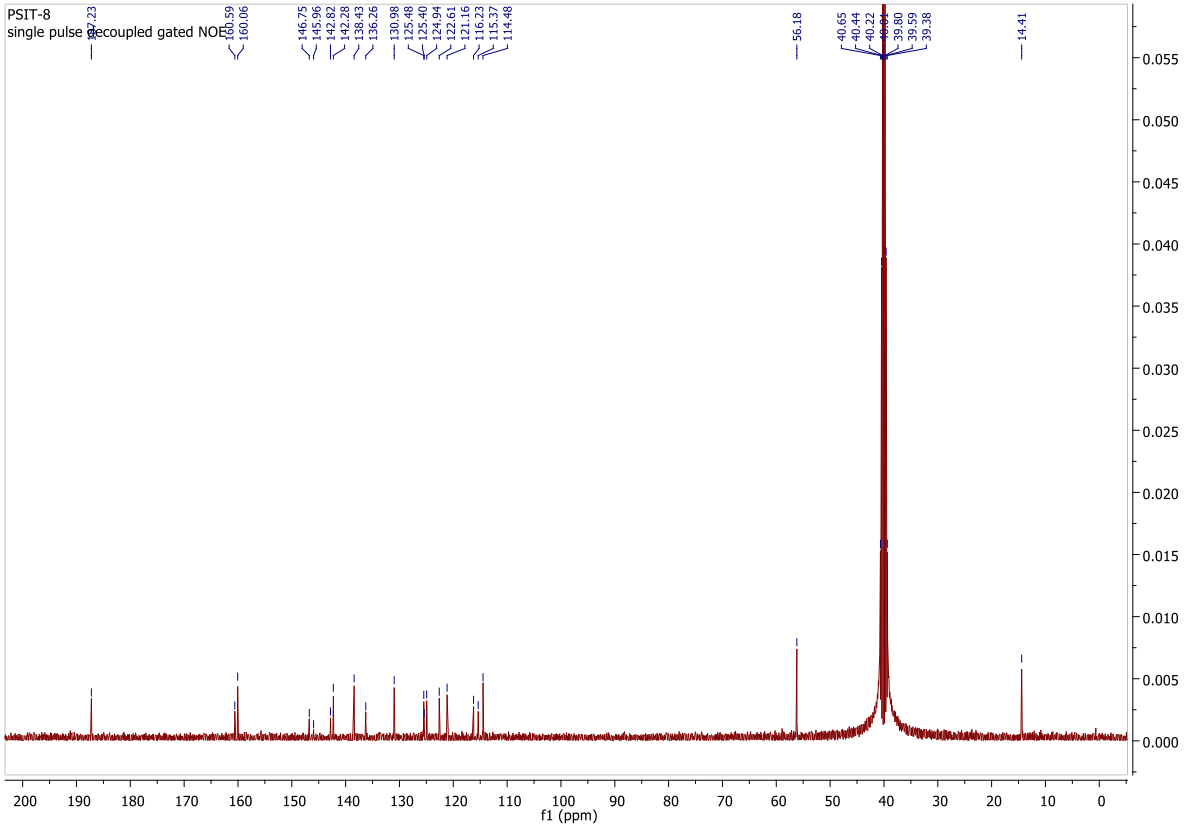



$^{13}$C NMR spectrum of **12g**

***2-(3-Methoxybenzoyl)-3-methylthiazolo[3',2':2,3][1,2,4]triazino[5,6-b]indole (12h)***

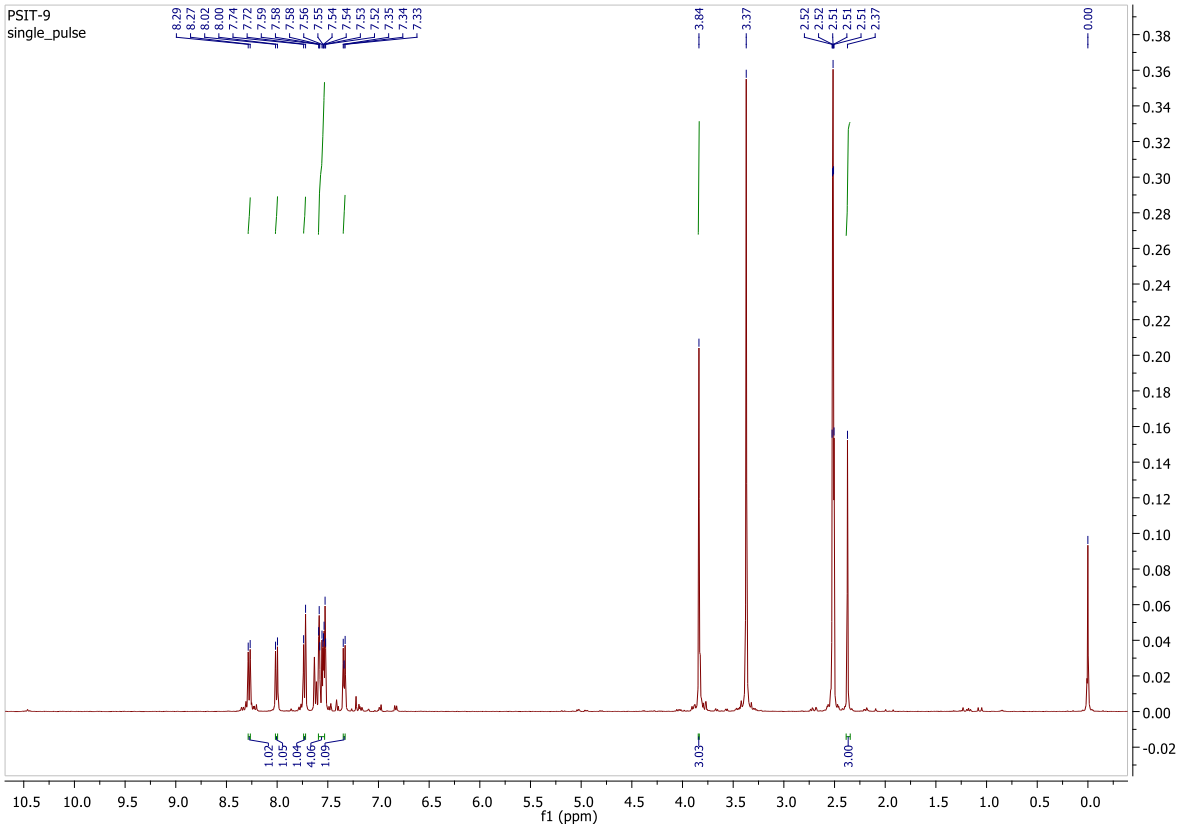



$^{1}$H NMR spectrum of **12h**

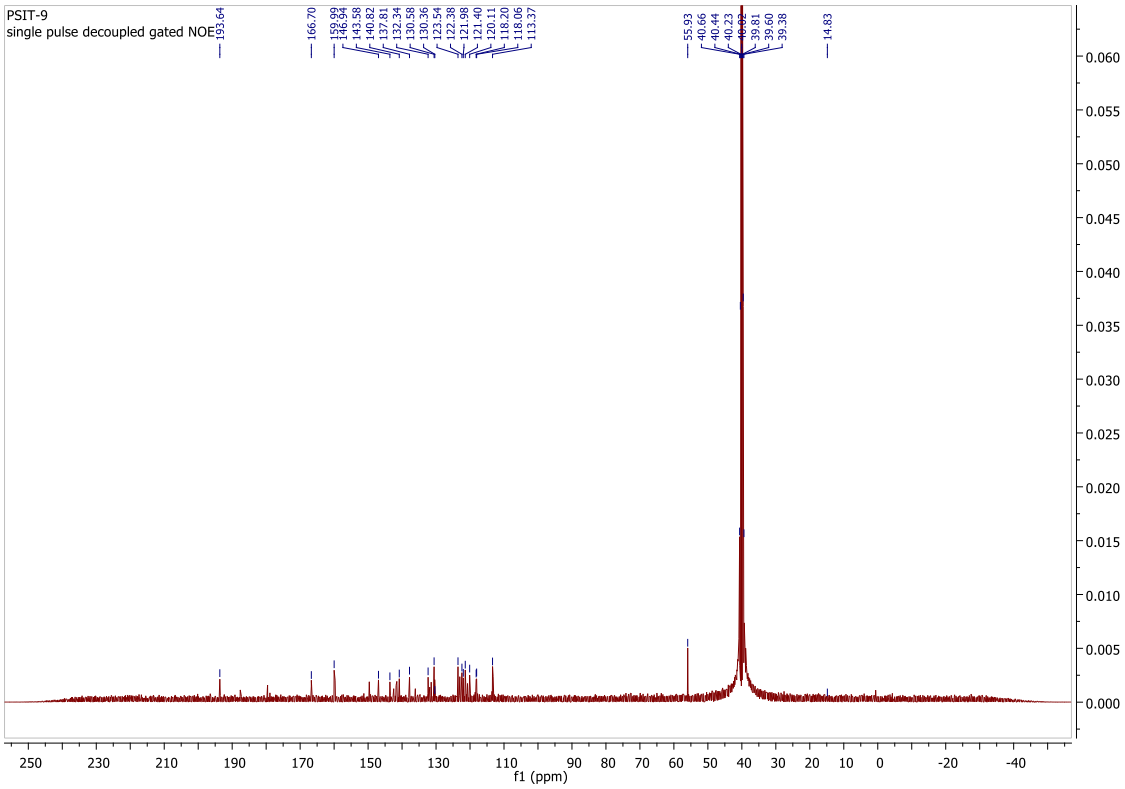



$^{13}$C NMR spectrum of **12h**

***2-(2-Methoxybenzoyl)-3-methylthiazolo[3',2':2,3][1,2,4]triazino[5,6-b]indole (12i)***

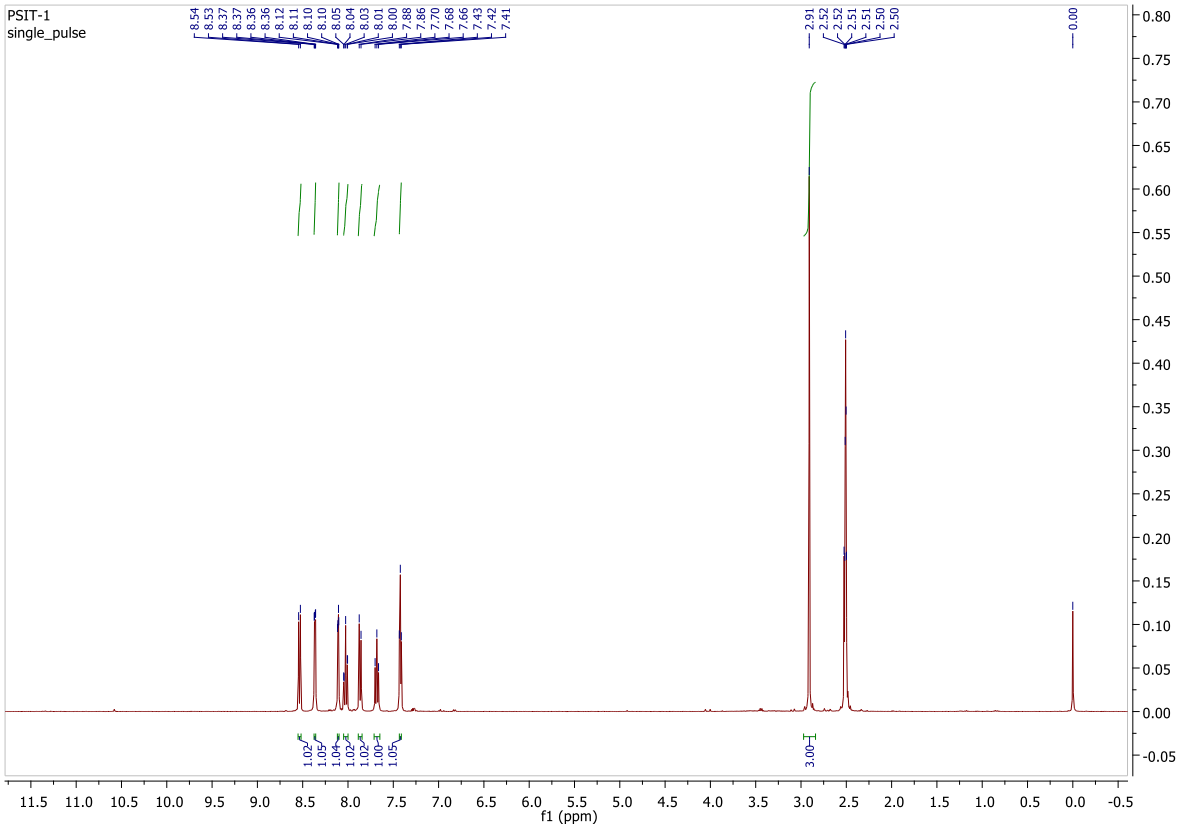



$^{1}$H NMR spectrum of **12i**

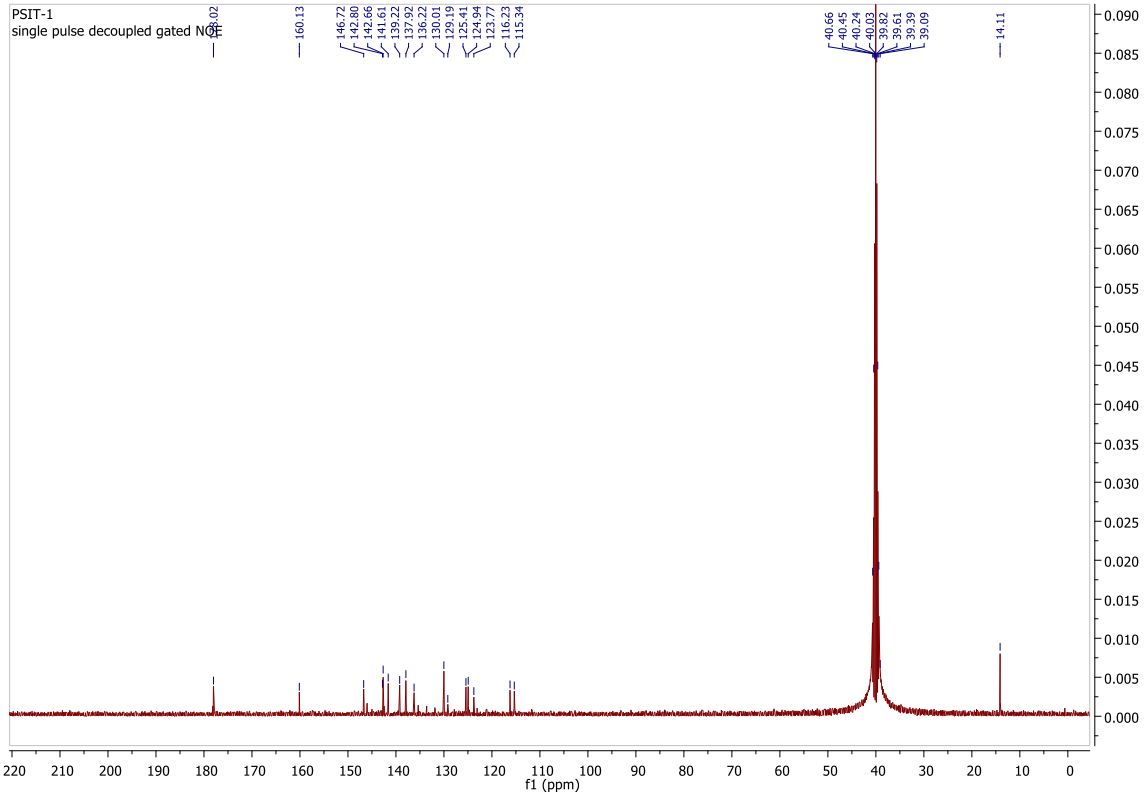



$^{13}$C NMR spectrum of **12i**

***3-Methyl-2-((2-thiophen)oyl)thiazolo[3',2':2,3][1,2,4]triazino[5,6-b]indole (12j)***




$^{1}$H NMR spectrum of **12j**




$^{13}$C NMR spectrum of **12j**