Supplementary Material

Design, synthesis, antibacterial activity evaluation and molecular modeling studies of new sulfonamides containing sulfathiazole moiety

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Table 1. Minimal inhibitory concentration (MIC, μg/mL) of **SA1-SA12** against tested microorganisms.

Test organism: / **Compound**	***S. aureus*** **ATCC 25923**	***MRSA*** **ATCC 43300**	***S. aureus*** **NCTC 6571**	***S. aureus*** ***861****	***L.monocytogenes*** **NCTC 11994**	***E. coli*** **ATCC 11775**	***P.aeruginosa*** **NCTC 10332**	***C.albicans*** **ATCC 10231**
SA1	100	50	60	25	>200	>200	>200	200
SA2	12.5	12.5	25	6.25	>200	>200	>200	>200
SA3	12.5	25	25	6.25	>200	>200	>200	>200
SA4	12.5	25	25	6.25	>200	>200	>200	>200
SA5	50	100	100	50	>200	>200	>200	>200
SA6	100	100	50	25	>200	>200	>200	>200
SA7	0.25	1	12.5	0.5	>200	>200	>200	>200
SA8	12.5	50	100	25	>200	>200	>200	>200
SA9	25	100	100	50	>200	>200	>200	>200
SA10	100	100	200	50	>200	>200	>200	>200
SA11	0.5	6.25	12.5	2.5	>200	>200	>200	>200
SA12	6.25	2.5	6.25	2.5	>200	>200	>200	>200
ST	>200	>200	>200	150	>200	>200	>200	>200
SD	200	>200	>200	200	>200	>200	>200	>200

*****: clinical isolate, **ST**-Sulfathiazole, **SD**-Sulfadiazine

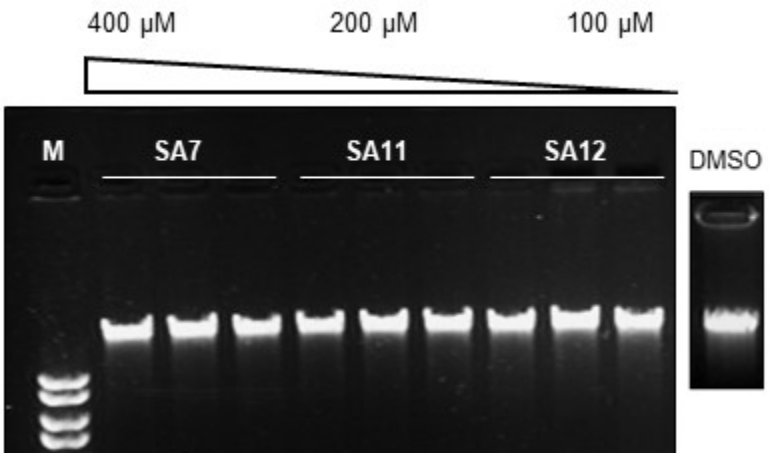


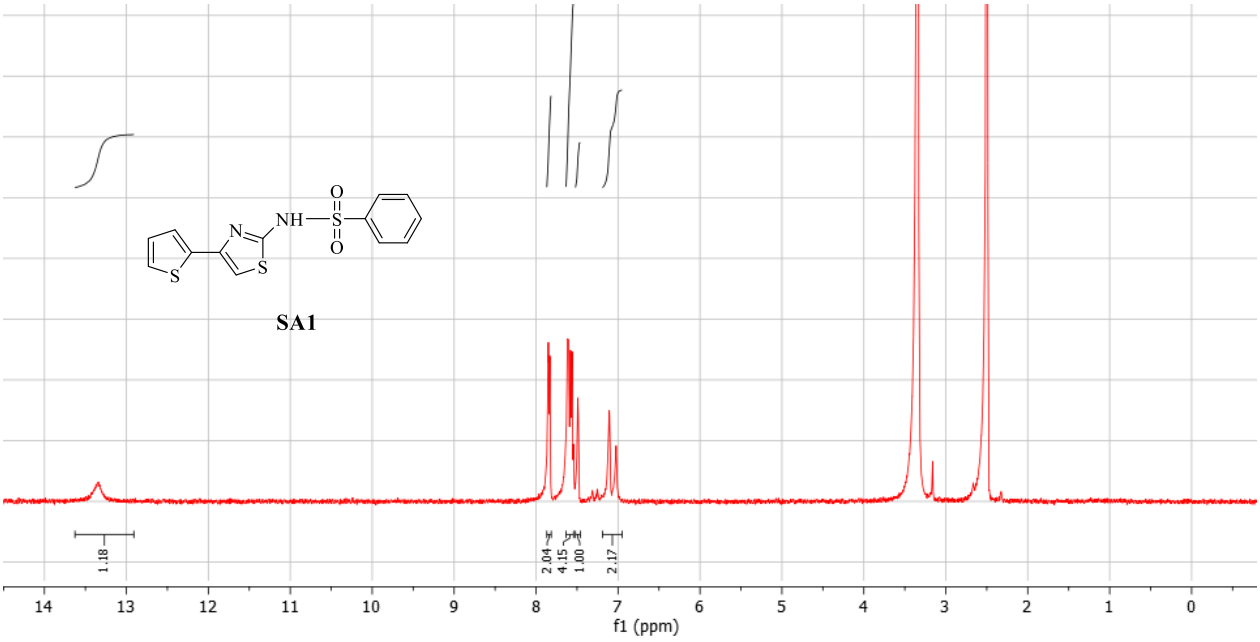
Figure 1. SA7, **SA11** and **SA12** interaction with lambda bacteriophage DNA (concentration of DNA 20 ng/µL, incubation at 37 °C for 1 h). Concentrations of compounds are 400, 200, and 100 µM. DMSO was used as a control. M is a 1kb ladder with the highest band of 10 kbp.

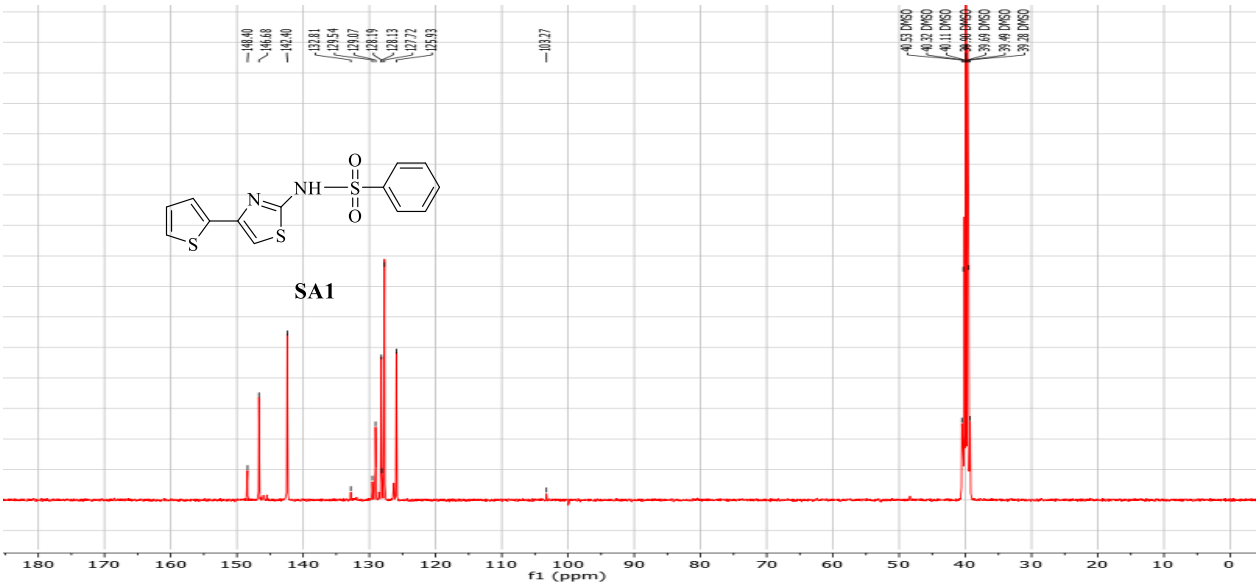
Table 2. Feature types, interaction partners and percentage occurrence of 3D pharmacophore features for **SA7**, **SA11** and **SA12** binding hypotheses over the course of MD simulations, as calculated by the dynophore method.

Ligand moiety	**Feature type**	**Interacting residues**			**% Occurrence**		
		SA7	**SA11**	**SA12**	**SA7**	**SA11**	**SA12**
R-substituent	Hydrophobic	F17, F172	I9, T13, F17, T51, M128, F172, A199	I9, F17, M128, F172, A199	100	83	83
	Halogen bond	N11, S50, V49, T51, Q105	N/A	N/A	7	N/A	N/A
	Aromatic	N/A	N/A	R52, K203	N/A	N/A	30
Phenyl	Hydrophobic	F17, R52, F172, K203	T13, F17, F172, K203	F17, F172, K203	83	63	90
	Aromatic	R52, K203	R52, K203, R219	F17, R52, K203	6	11	1
Sulfonyl oxygen	Hydrogen bond acceptor	R204	S50, R52, R204	R204, K207, R219	42	27	55
Sulfonyl oxygen	Hydrogen bond acceptor	R204, R219	R52, K203, R204, R219	R204, K207	46	26	2
Sulfonamide	Negative ionizable	R52, R204, K207, R219	R52, K203, R204, P216, R219	R204, K207, R219	25	76	77

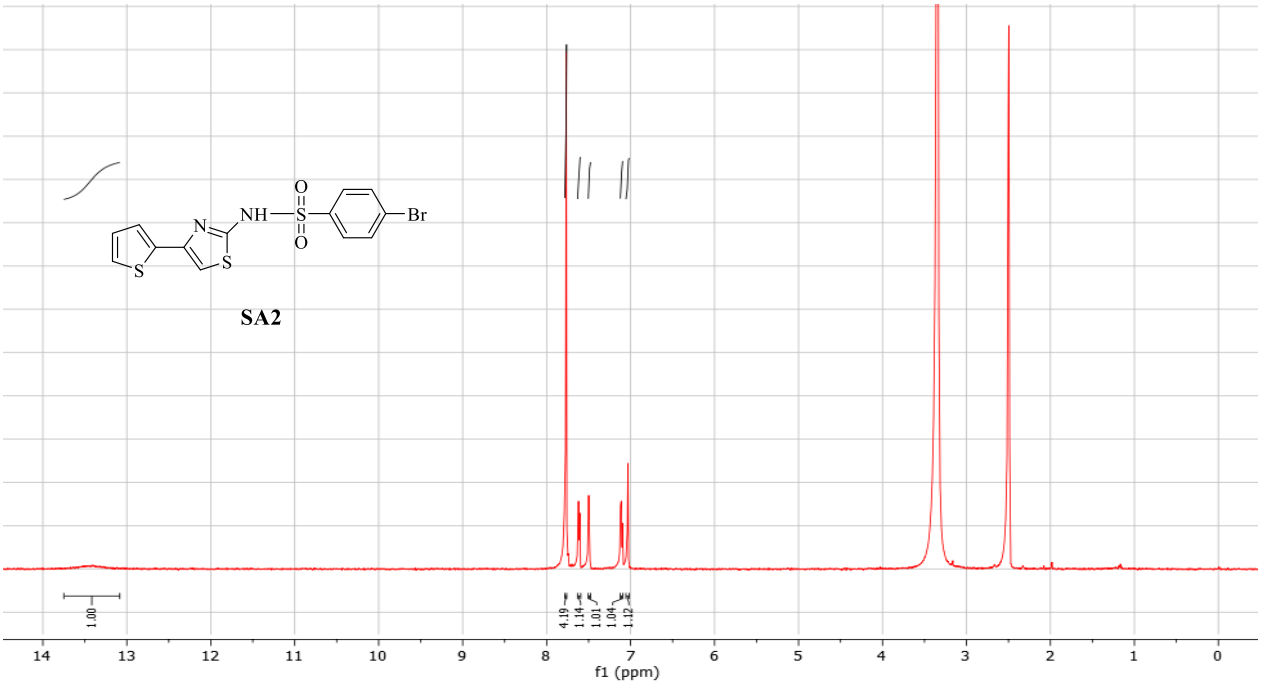
Sulfonamide nitrogen	Hydrogen bond acceptor	R52, R204, R219	R52, R219	K207, R219	12	32	64
Thiazole	Hydrophobic	F17, R52, R53	T13, F17	F17	18	43	68
	Aromatic	R52, R204	F17, R52, P216, R204	N/A	2	7	N/A
Thiazole nitrogen	Hydrogen bond acceptor	R52, R219	R52, R219	R219	5	23	56
Thiophene	Hydrophobic	F17, P53, A173, P216	T13, F17, R52, K203, P216	F17, T215, P216	14	15	10
	Aromatic	N/A	N11, F17, R52, P216, R219	N/A	N/A	6	N/A

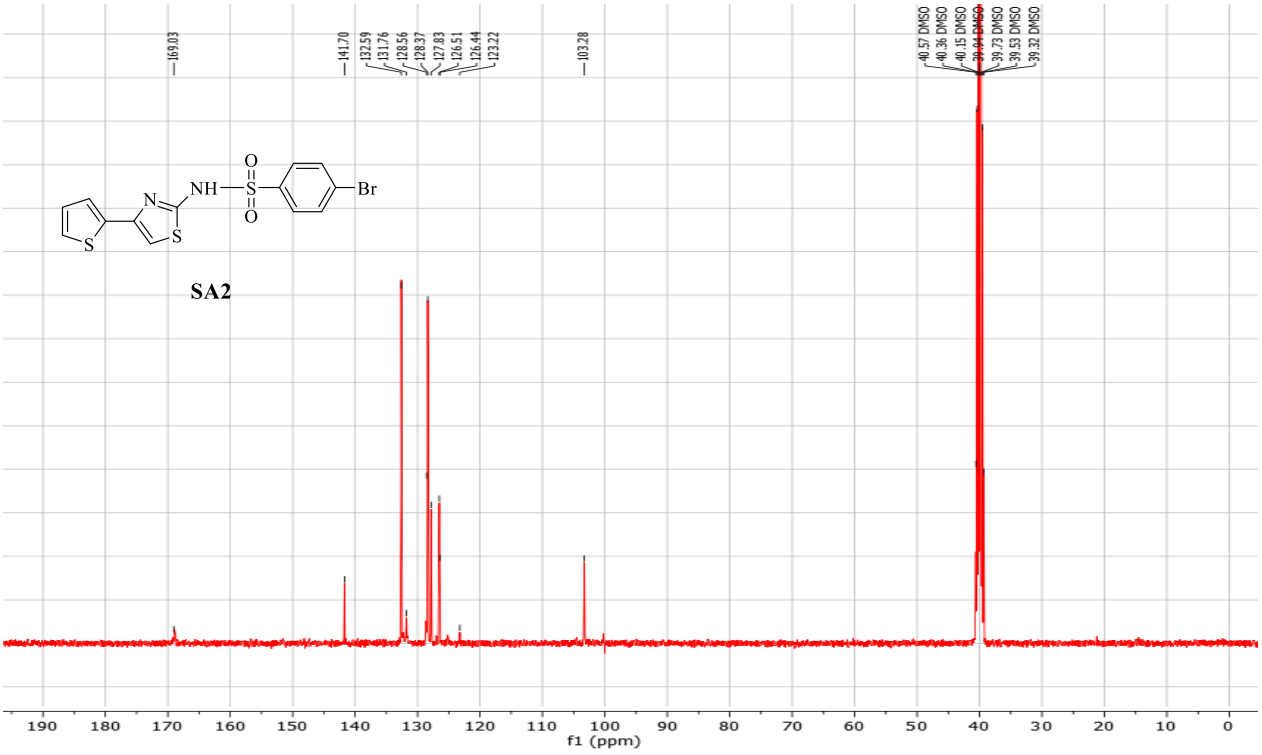
^{1}H NMR and ^{13}C NMR spectra of **SA1**.



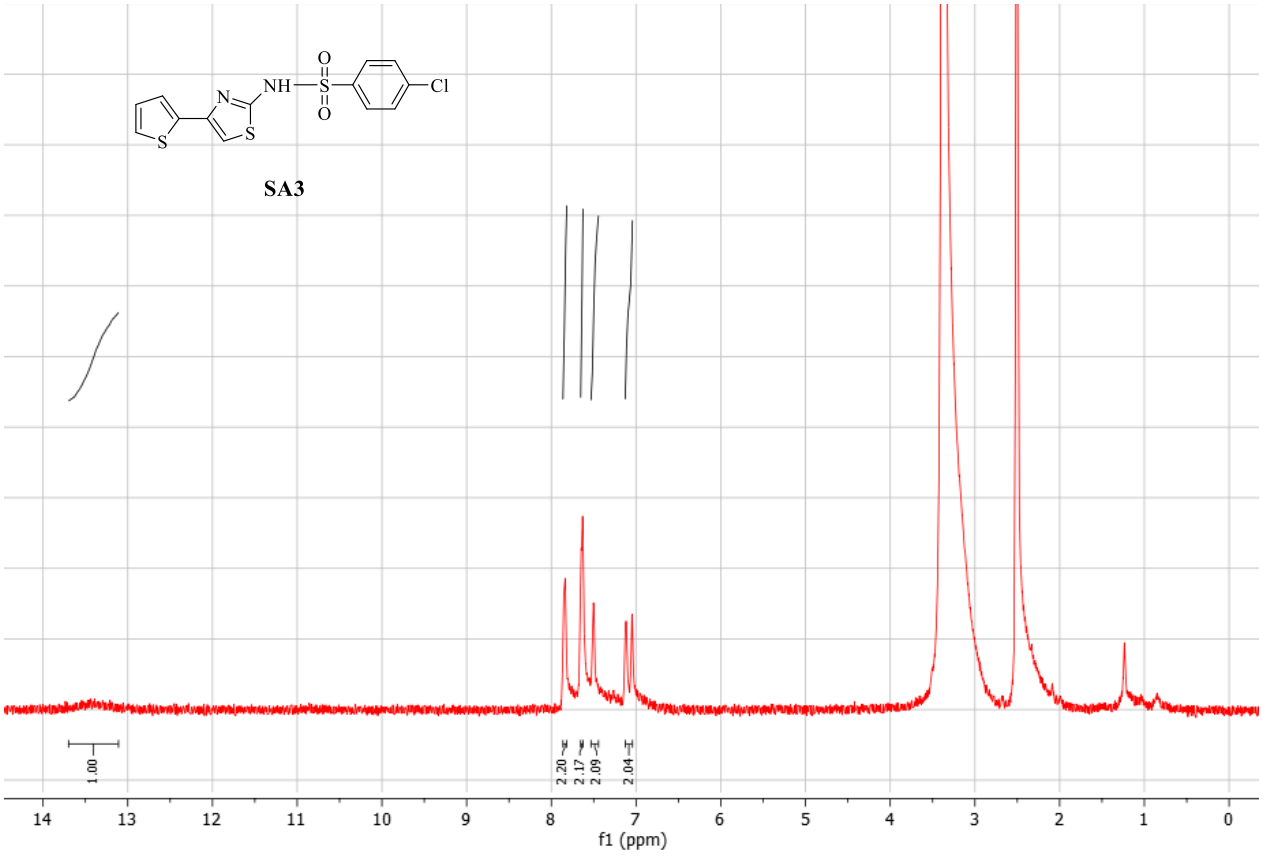


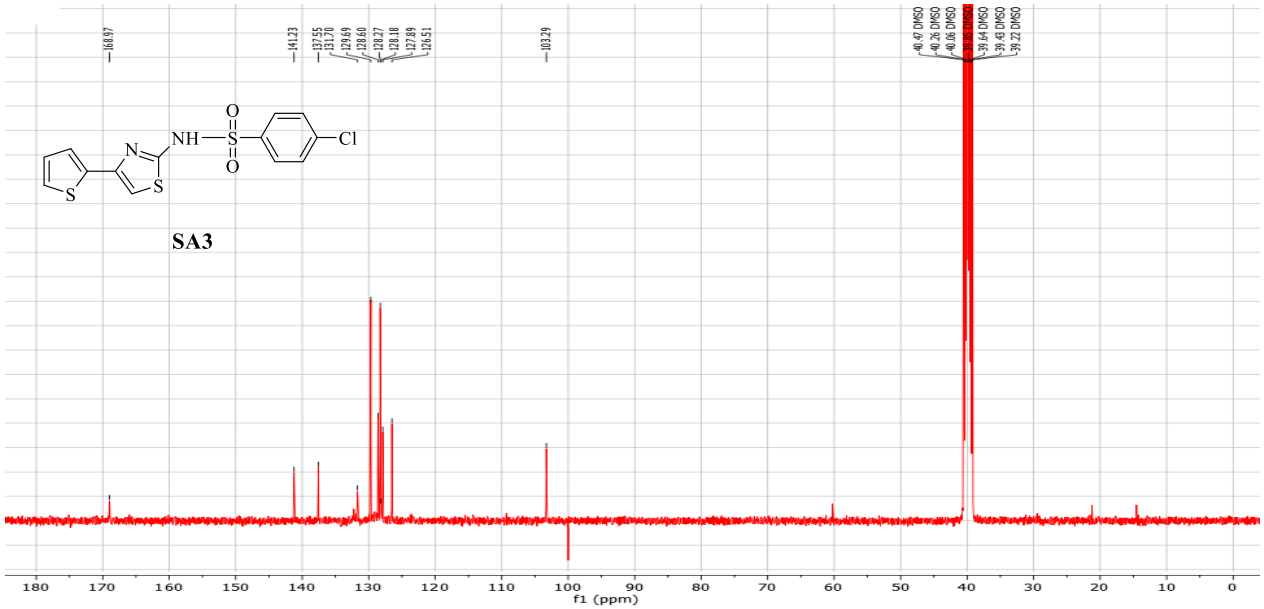
^{1}H NMR and ^{13}C NMR spectra of **SA2**.



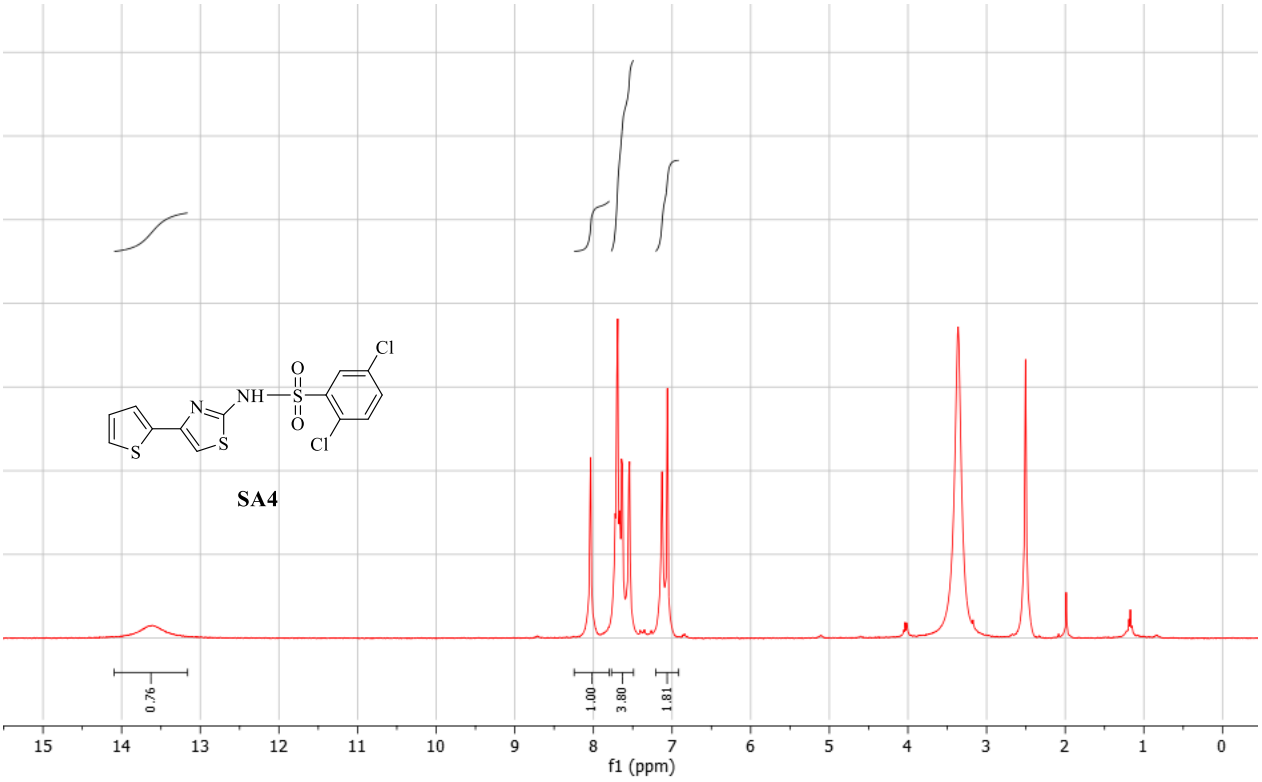


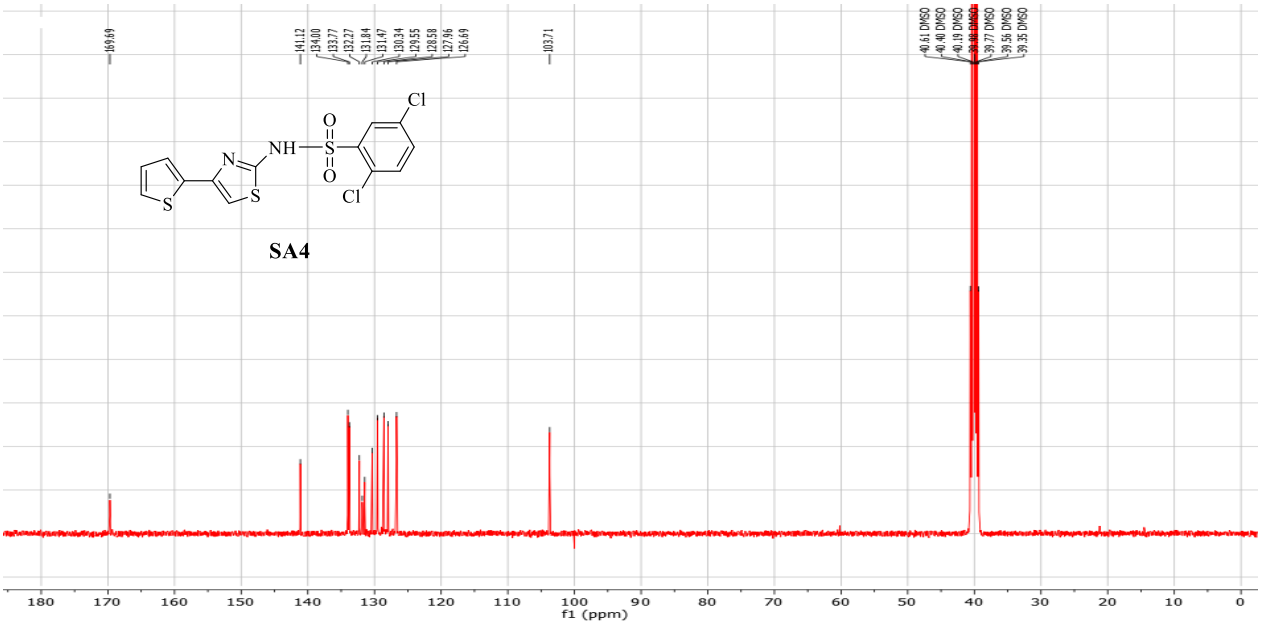
^{1}H NMR and ^{13}C NMR spectra of **SA3**.



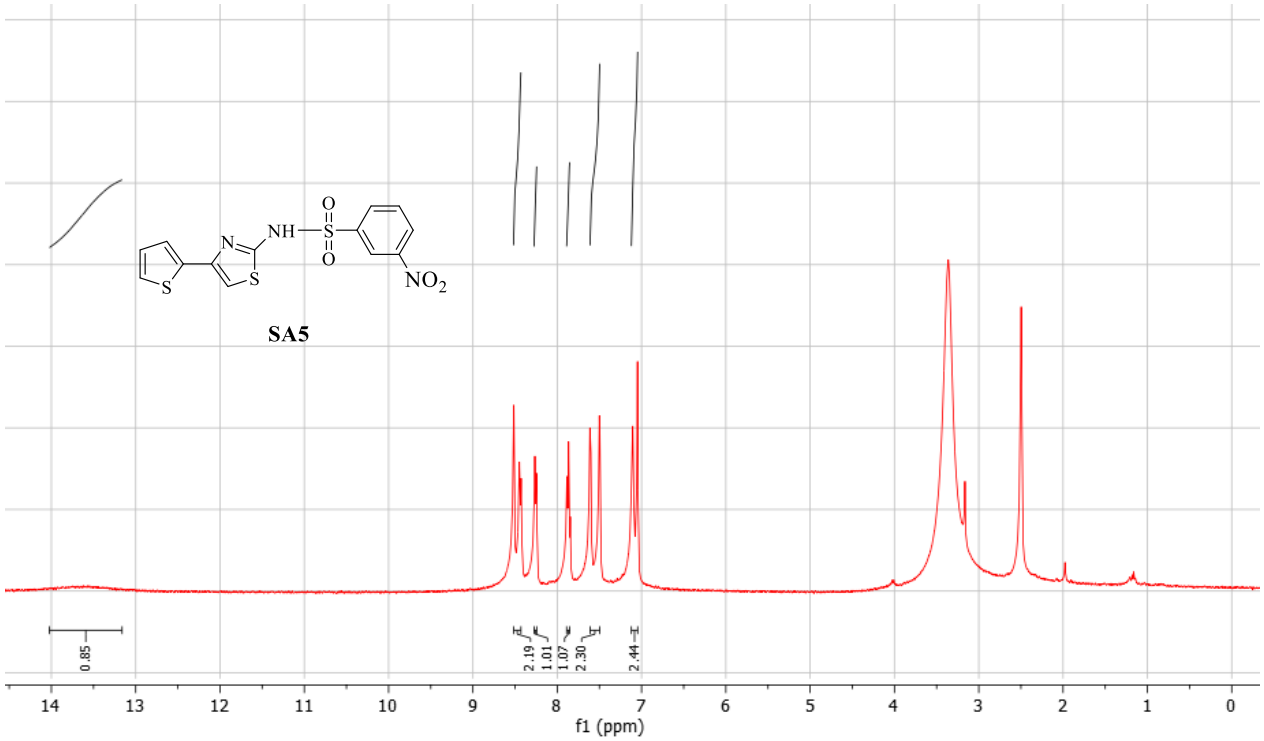


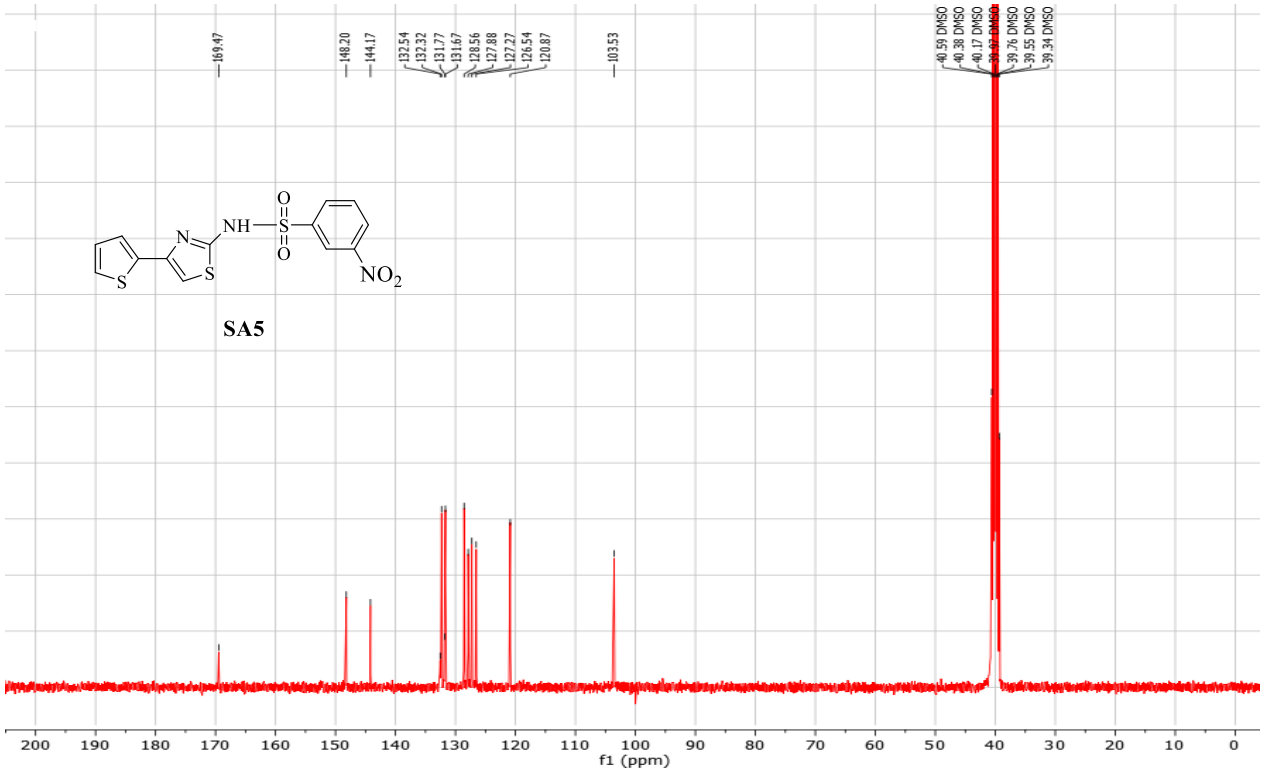
^{1}H NMR and ^{13}C NMR spectra of **SA4**.



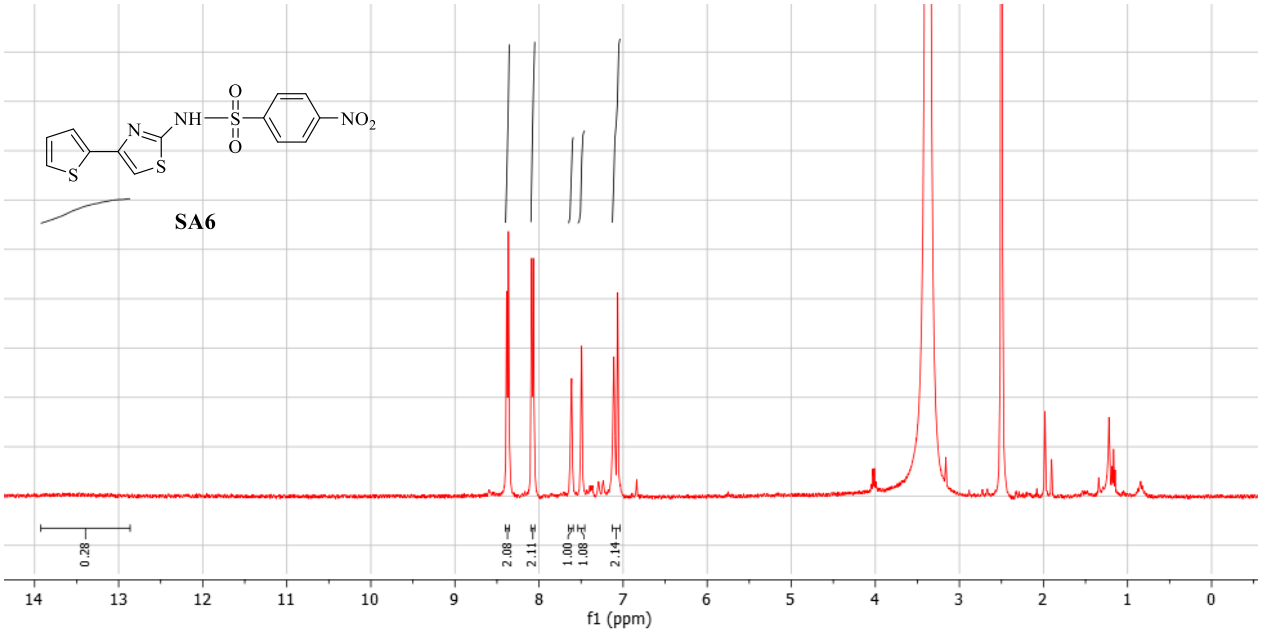


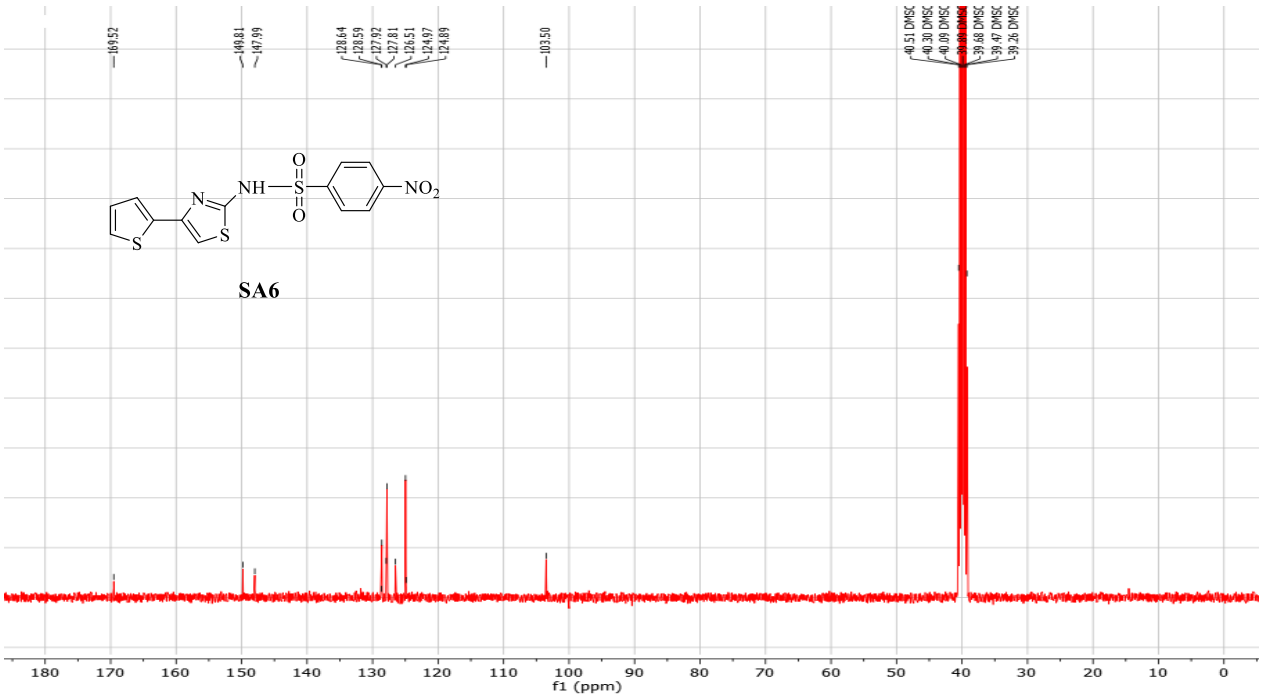
^{1}H NMR and ^{13}C NMR spectra of **SA5**.



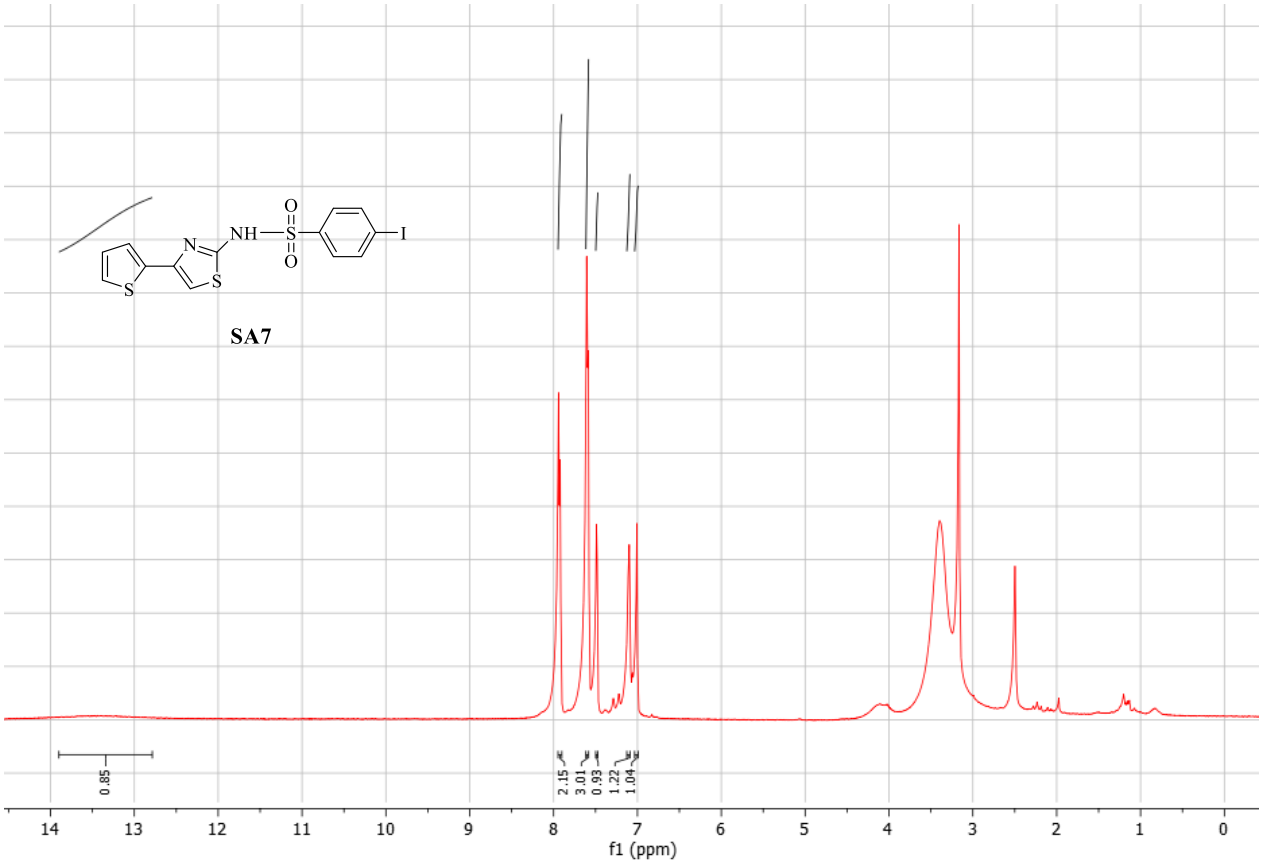


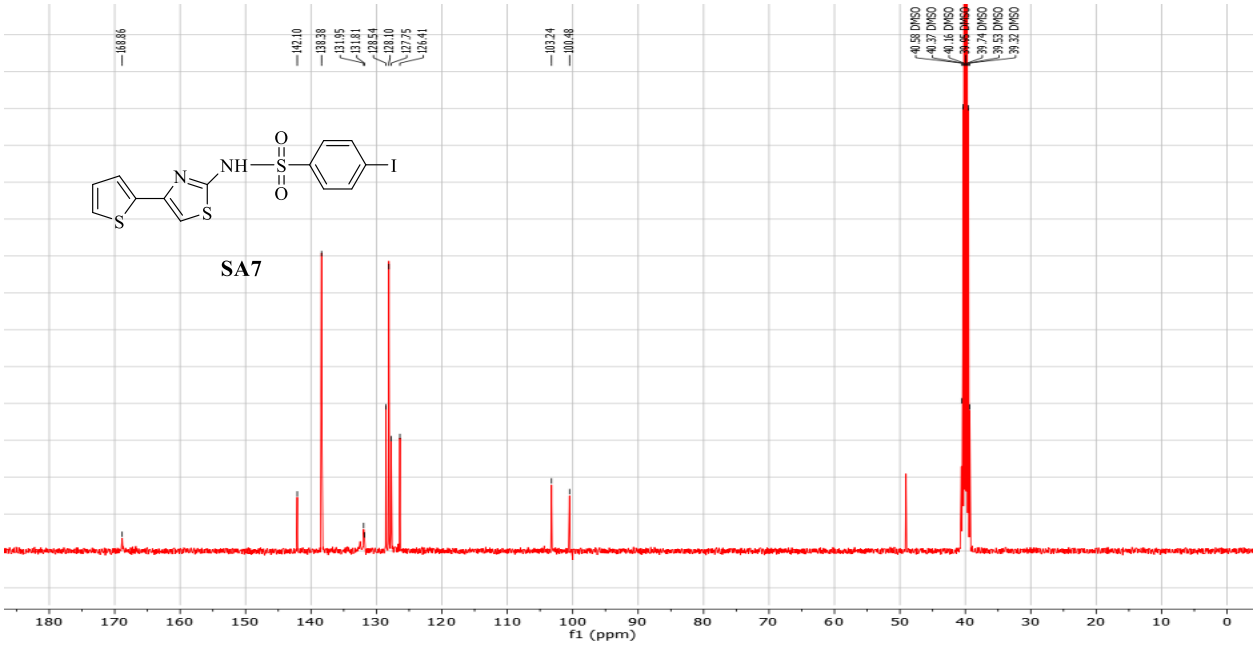
^{1}H NMR and ^{13}C NMR spectra of **SA6**.



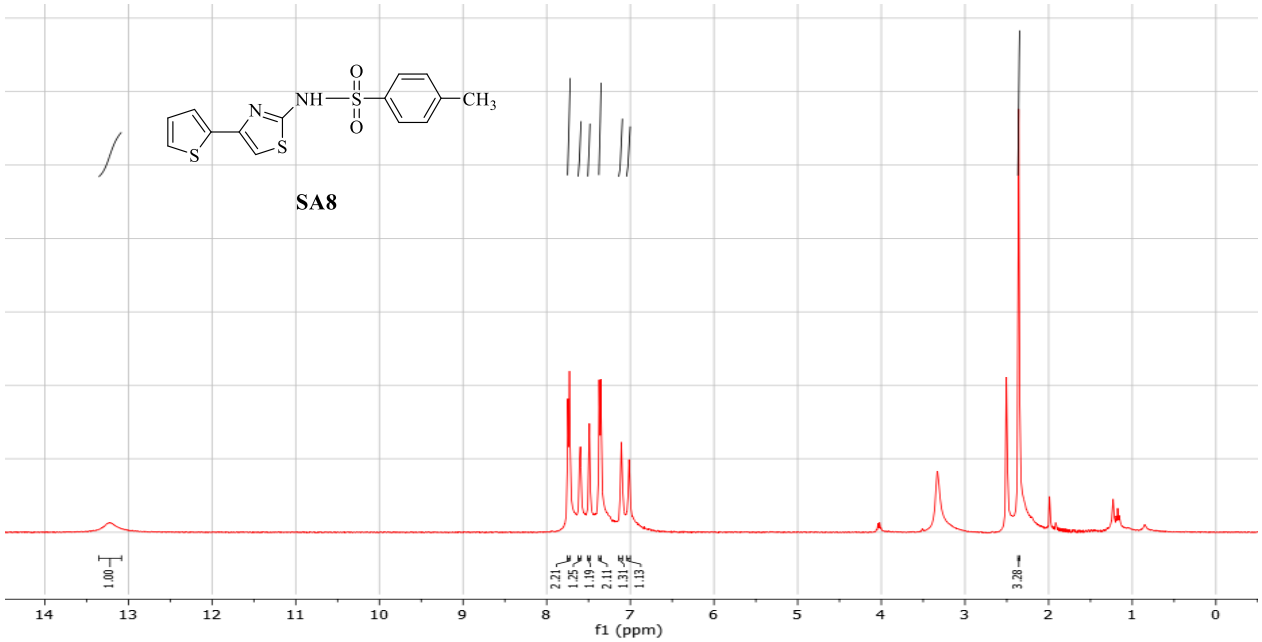


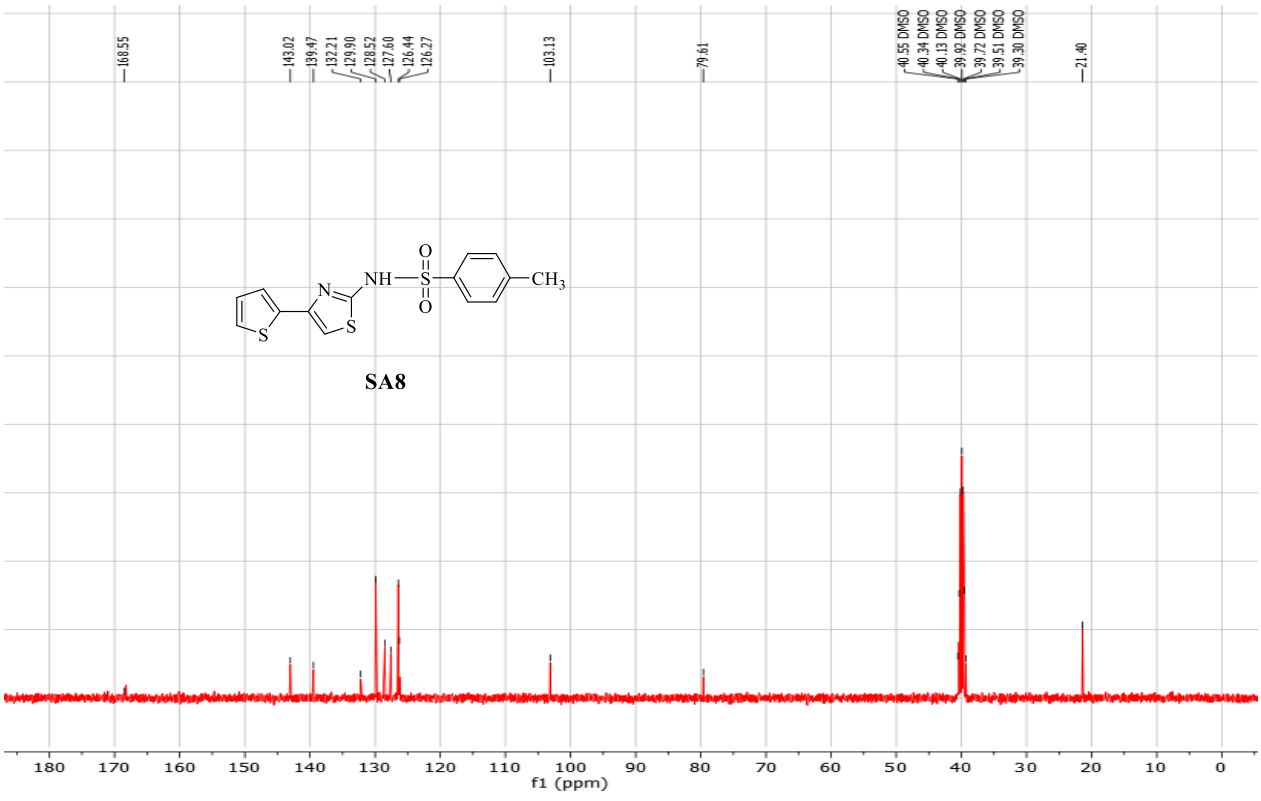
^{1}H NMR and ^{13}C NMR spectra of **SA7**.



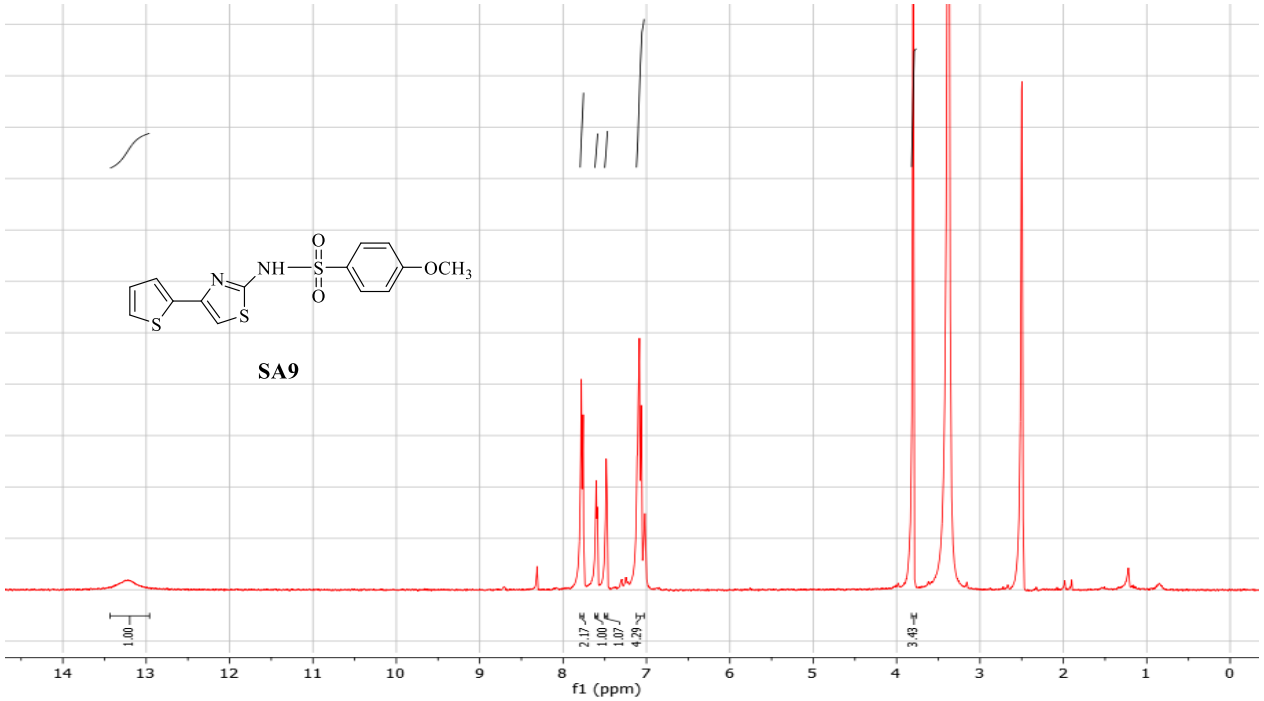


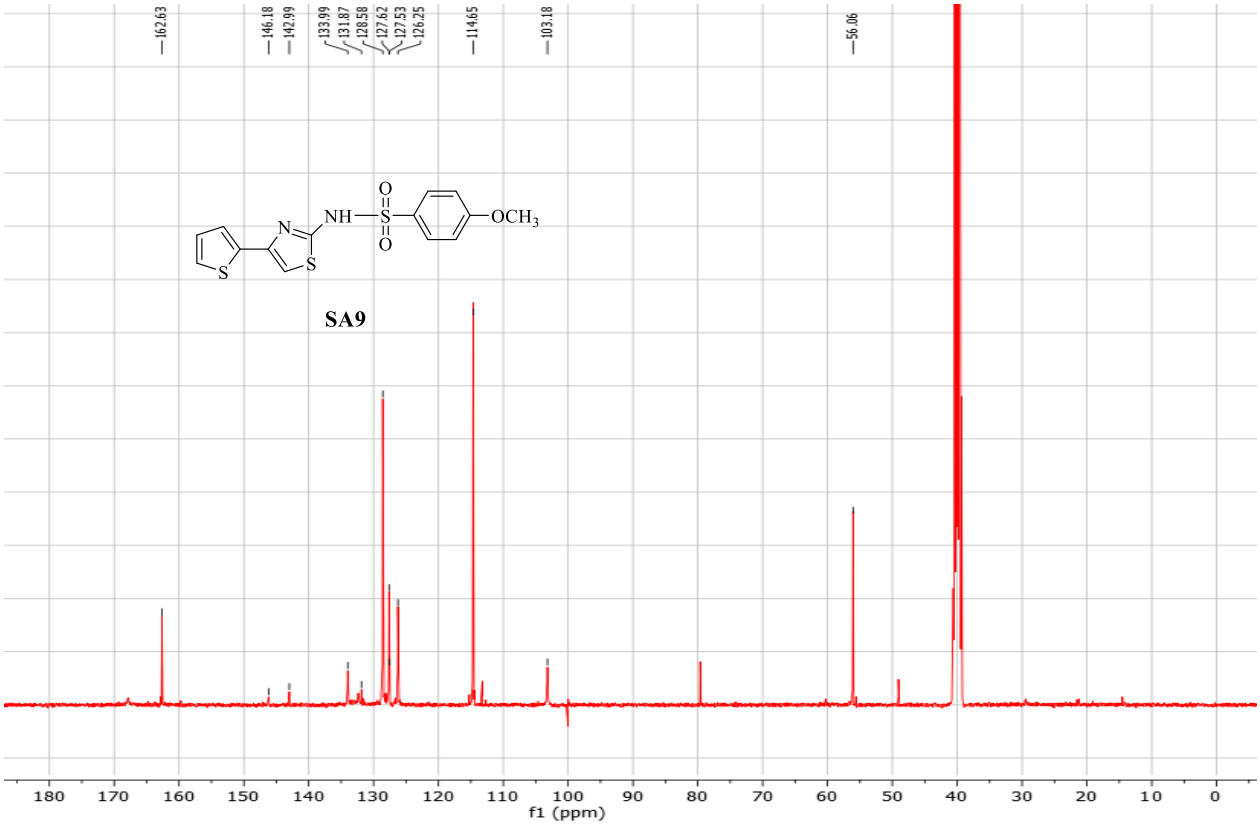
^{1}H NMR and ^{13}C NMR spectra of **SA8**.



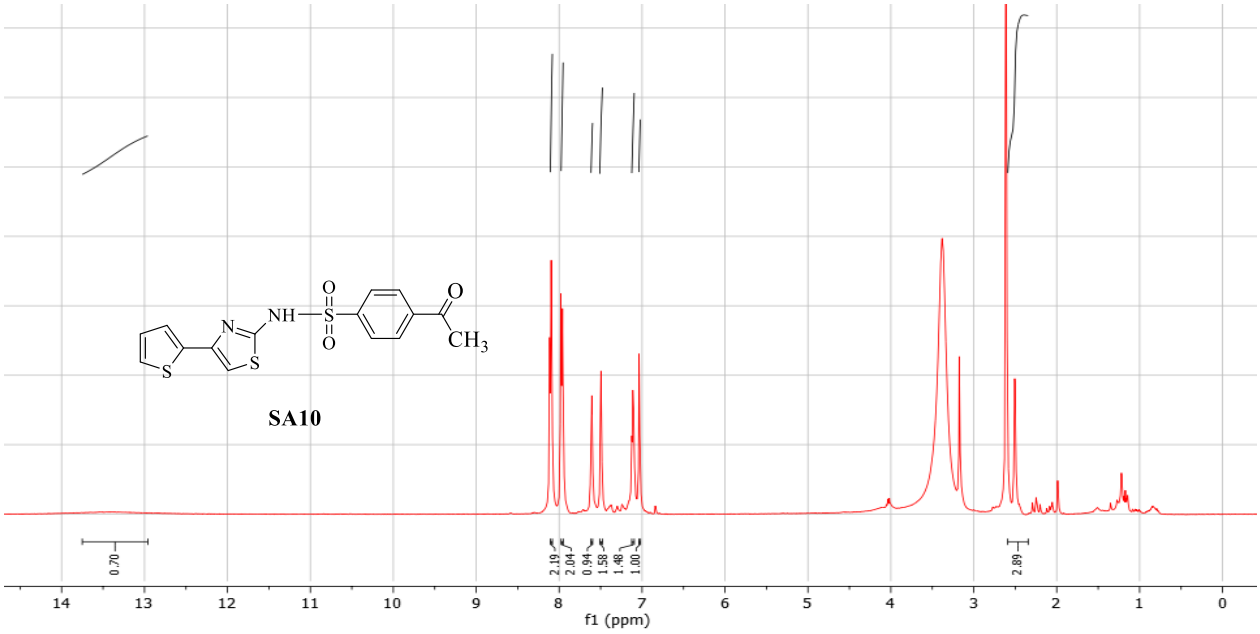


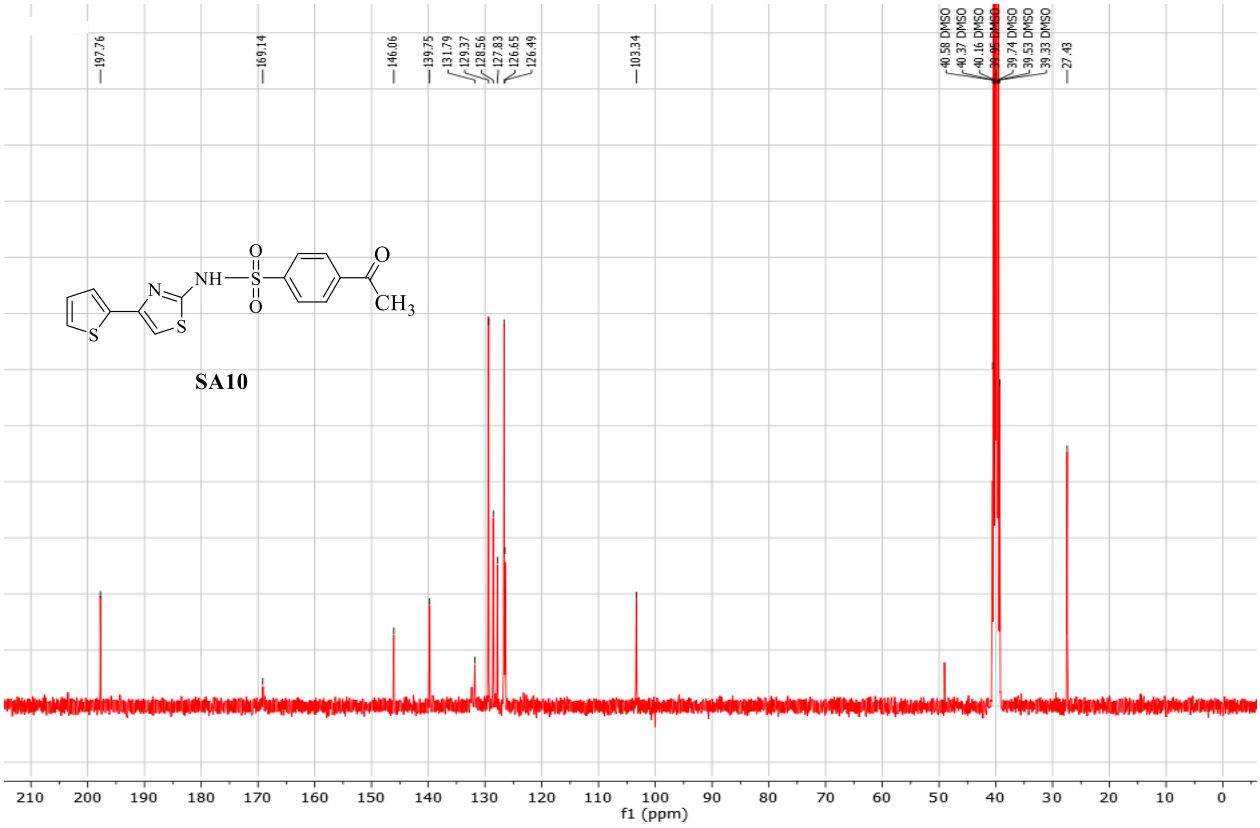
^{1}H NMR and ^{13}C NMR spectra of **SA9**.



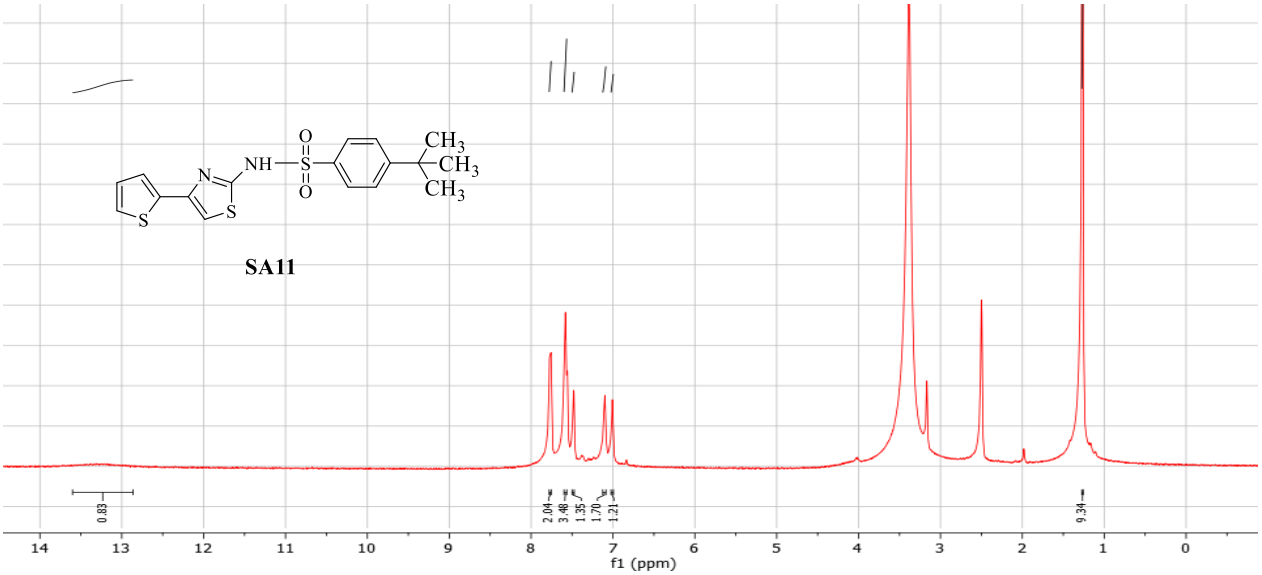


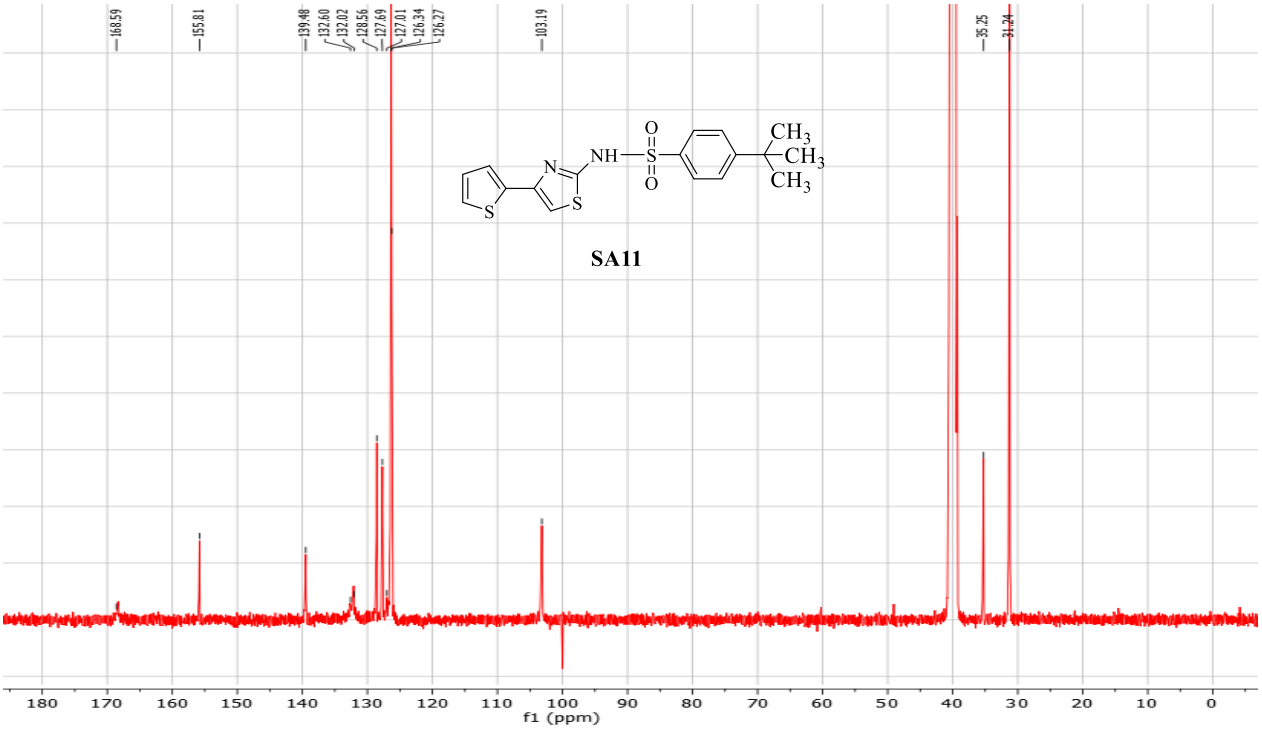
^{1}H NMR and ^{13}C NMR spectra of **SA10**.





^{1}H NMR and ^{13}C NMR spectra of **SA11**.





^{1}H NMR and ^{13}C NMR spectra of **SA12**.