1,3-Dipolar cycloaddition of cycloimmonium salts and 4-(trimethylsilyl)-3-butyn-2-one to access new functionalized indolizines with potential cytostatic activity

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Supplementary information

Table S1. Results of the *in vitro* human cancer cell growth inhibition for selected compounds **10e**, **10e'**, **10g**, **10i**, **10k**, **10l**, **10m** and **17m**.

	Compound	**10e**	**10e'**	**10g**	**10i**	**10k**	**10l**	**10m**	**17m**
	NSC	826668	826669	833245	831789	835650	833244	835652	835648
Cell type	**Cell line**	**GI%[a, b] (10 μM)**							
Leukemia	CCRF-CEM	4	53	0	0	75	0	17	18
	HL-60(TB)	11	**91**	22	0	67	0	5	0
	K-562	5	81	14	0	81	18	16	37
	MOLT-4	8	72	18	0	77	0	33	40
	RPMI-8226	5	45	32	0	80	0	37	35
	SR	3	73	68	0	**93**	22	37	31
Non-Small Cell Lung Cancer	A549/ATCC	0	53	55	0	43	17	70	11
	EKVX	0	53	51	0	47	19	25	10
	HOP-62	0	48	65	9	41	60	26	0
	HOP-92	0	3	53	0	62	19	0	7
	NCI-H226	10	34	56	0	60	36	38	12
	NCI-H23	0	51	52	5	58	27	42	23
	NCI-H460	0	84	56	0	88	22	36	0
	NCI-H522	10	62	**98**	4	50	35	28	9
Colon Cancer	COLO 205	0	60	7	0	32	14	8	0
	HCC-2998	0	38	24	0	67	14	12	9
	HCT-116	5	82	80	0	**93**	27	55	31
	HCT-15	11	81	34	0	**90**	9	28	28
	HT29	0	84	28	0	67	19	43	43
	KM12	3	71	29	0	72	0	49	18
	SW-620	0	68	18	0	74	19	7	9
CNS Cancer	SF-268	0	39	77	3	51	26	21	6
	SF-295	0	**92**	69	0	64	45	0	0
	SF-539	2	65	76	0	67	34	68	7
	SNB-19	21	60	75	3	50	38	30	7
	SNB-75	35	**94**	**98**	3	17	55	0	0
	U251	3	66	68	0	64	28	73	12
Melanoma	LOX IMVI	3	66	45	7	**-40[c]**	18	43	6
	MALME-3M	11	56	28	9	46	23	**-6**	0
	M14	4	84	15	0	64	0	35	5
	MDA-MB-435	3	**-13**	51	0	72	27	19	0
	SK-MEL-2	0	62	29	0	28	0	0	0
	SK-MEL-28	0	42	27	0	**51**	20	12	0
	SK-MEL-5	3	63	76	0	**-36**	14	42	19
	UACC-257	0	33	21	0	68	0	14	6
	UACC-62	30	83	37	0	76	29	5	13
Ovarian Cancer	IGROV1	0	58	19	57	63	7	4	6
	OVCAR-3	0	72	56	0	42	7	0	5
	OVCAR-4	10	20	50	0	48	40	52	29
	OVCAR-8	0	49	20	0	54	0	50	6
	NCI/ADR-RES	0	82	65	0	82	33	31	0
	SK-OV-3	0	23	71	0	0	17	0	21
Renal Cancer	786-0	9	49	55	5	56	30	48	0
	A498	**-10**	62	14	35	15	0	3	9
	ACHN	0	49	44	0	71	33	50	0

	CAKI-1	16	66	61	7	65	38	45	0
	RXF 393	19	41	**92**	0	58	5	14	12
	SN12C	19	58	45	0	58	32	22	14
	UO-31	24	56	32	10	65	10	41	17
Prostate Cancer	PC-3	10	44	17	0	72	12	20	12
Breast Cancer	MCF7	17	85	65	5	74	23	36	31
	MDA-MB-231/ATCC	24	45	25	4	54	29	70	3
	HS 578T	9	41	57	5	46	26	37	7
	BT-549	0	47	75	0	84	7	22	6
	T-47D	18	62	51	0	79	16	25	70
	MDA-MB-468	18	**-3**	40	0	**97**	13	50	18

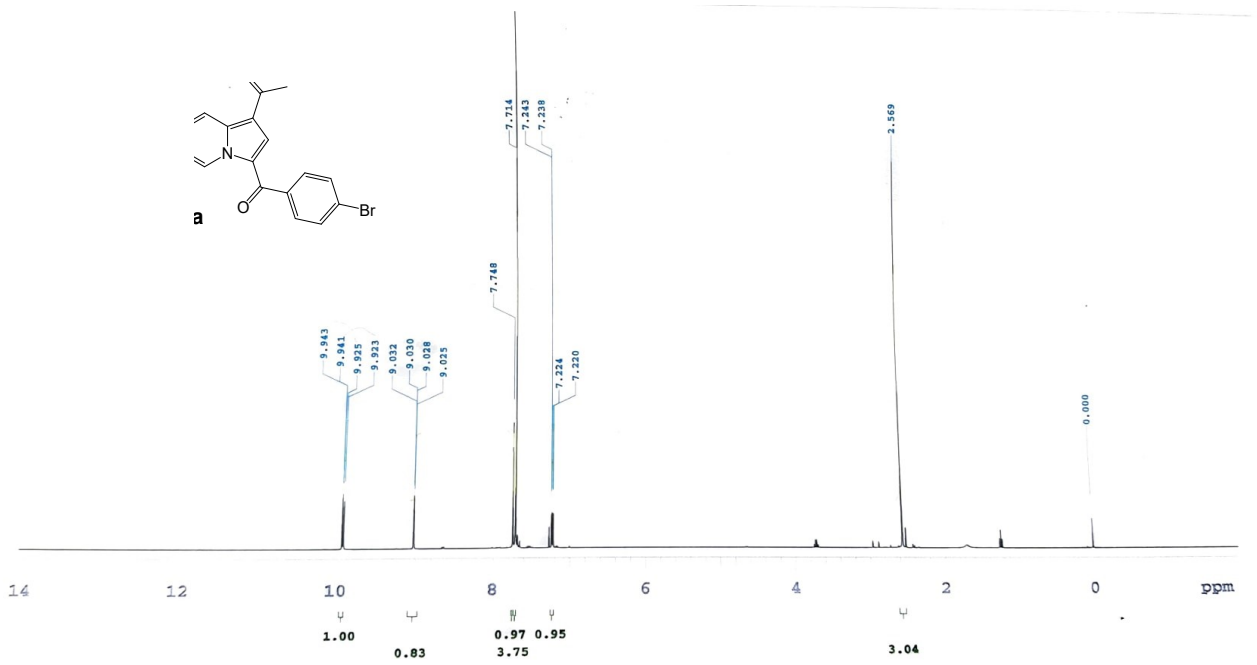
[a] Data obtained from NCI's *in vitro* 60-cell one dose screen at 10 μM concentration.

[b] GI% is the percentage of growth inhibition of tumor cells.

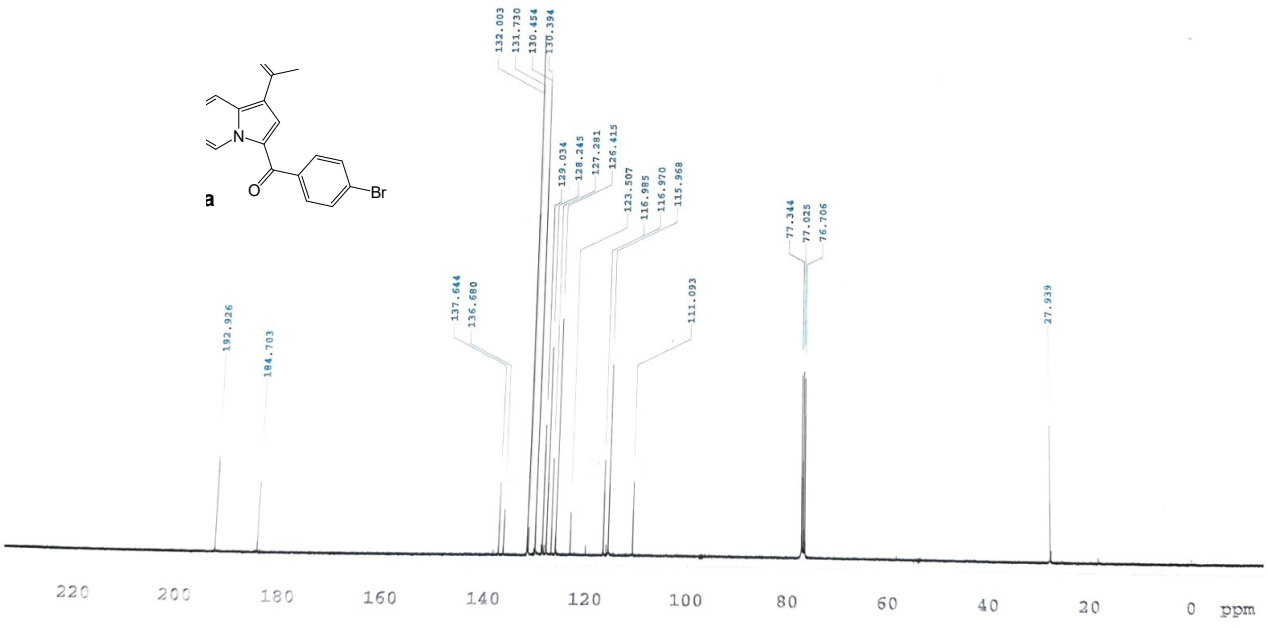
[c] A value of -x means x% cancer cells lethality of preexisting cells (cytotoxic effect).

NMR Spectra of compounds

^{1}H NMR (400 MHz, $CDCl_3$) **-10a**



^{13}C NMR (100 MHz, $CDCl_3$)



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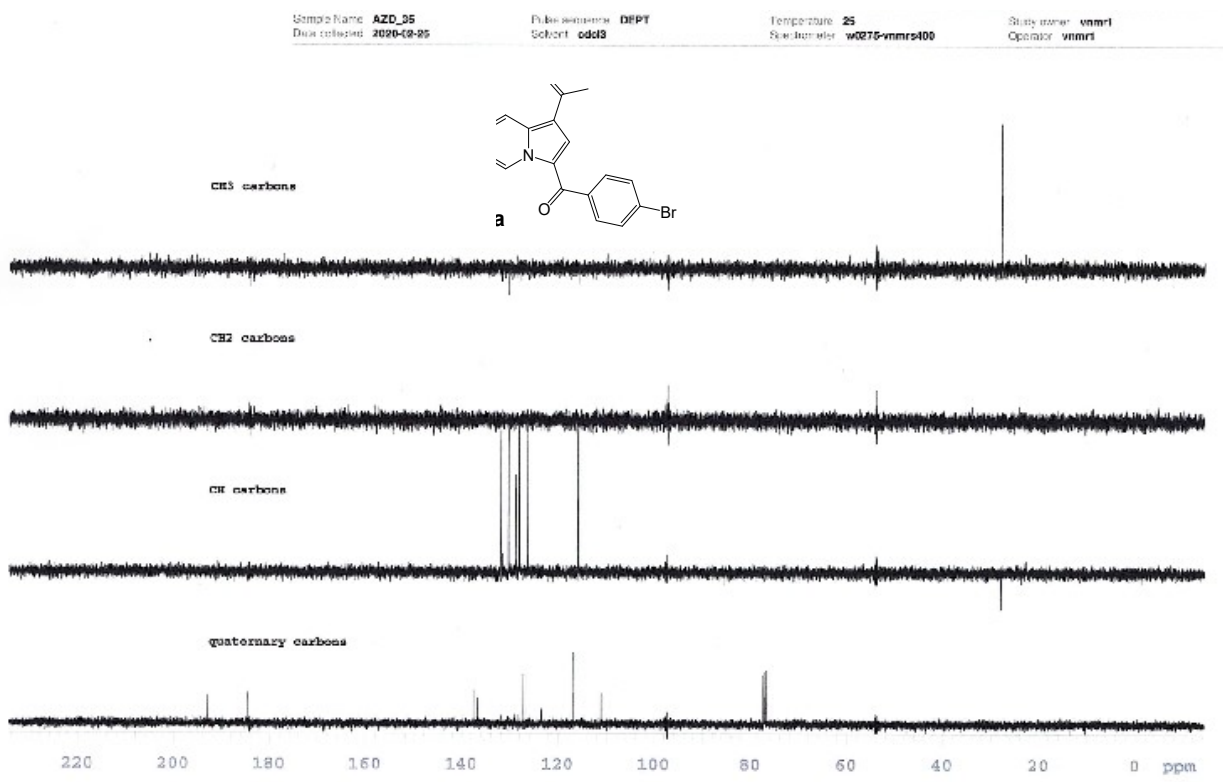
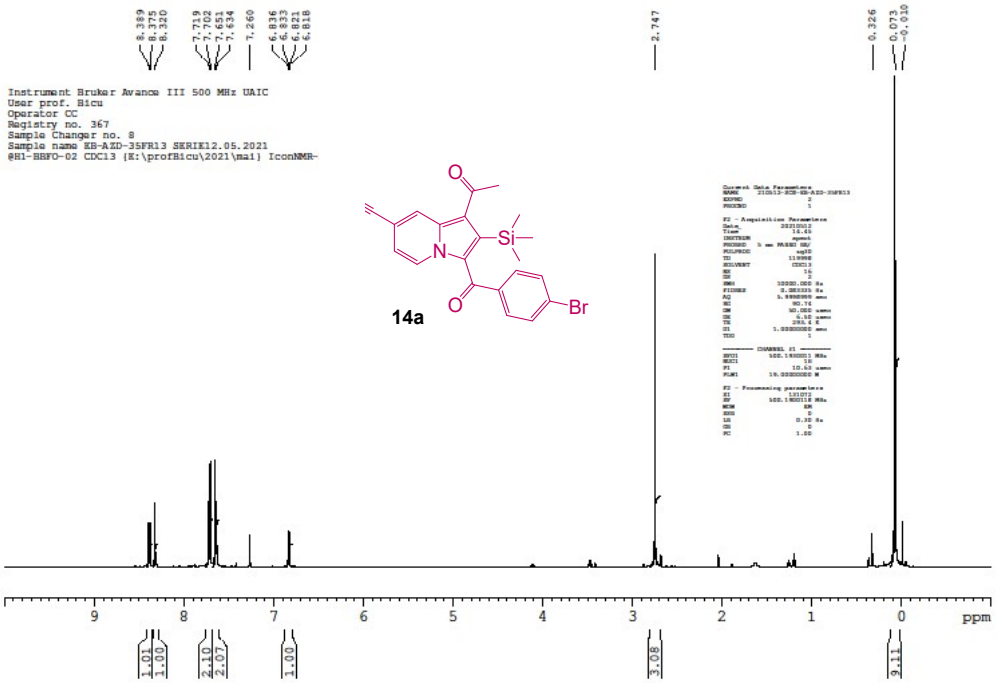
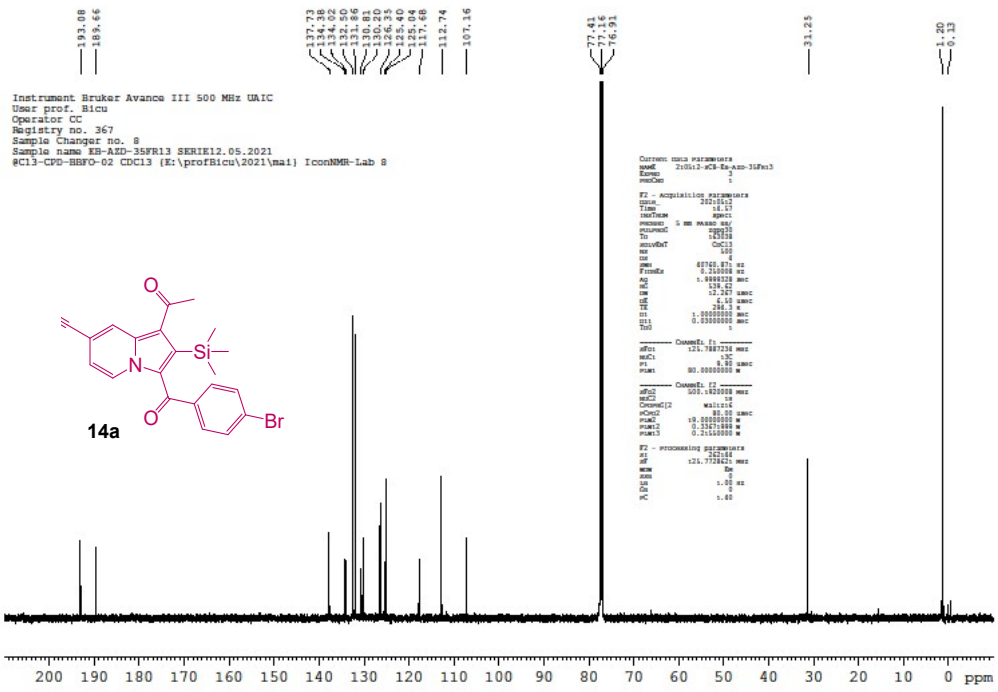


^{1}H NMR (500 MHz, $CDCl_3$) -**14a**



^{13}C NMR (125 MHz, $CDCl_3$)



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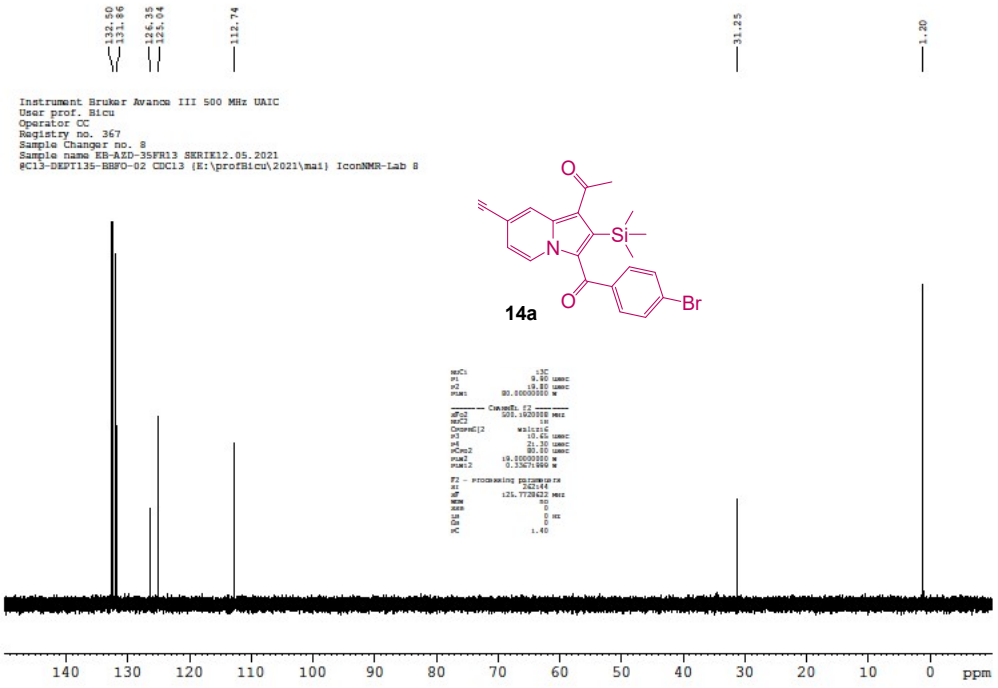

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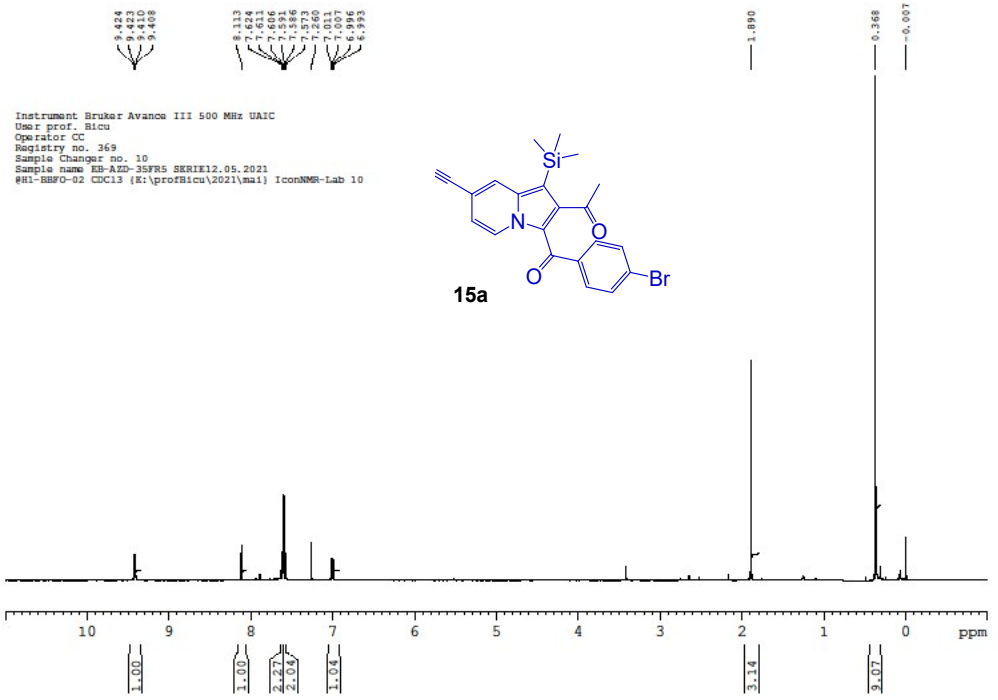
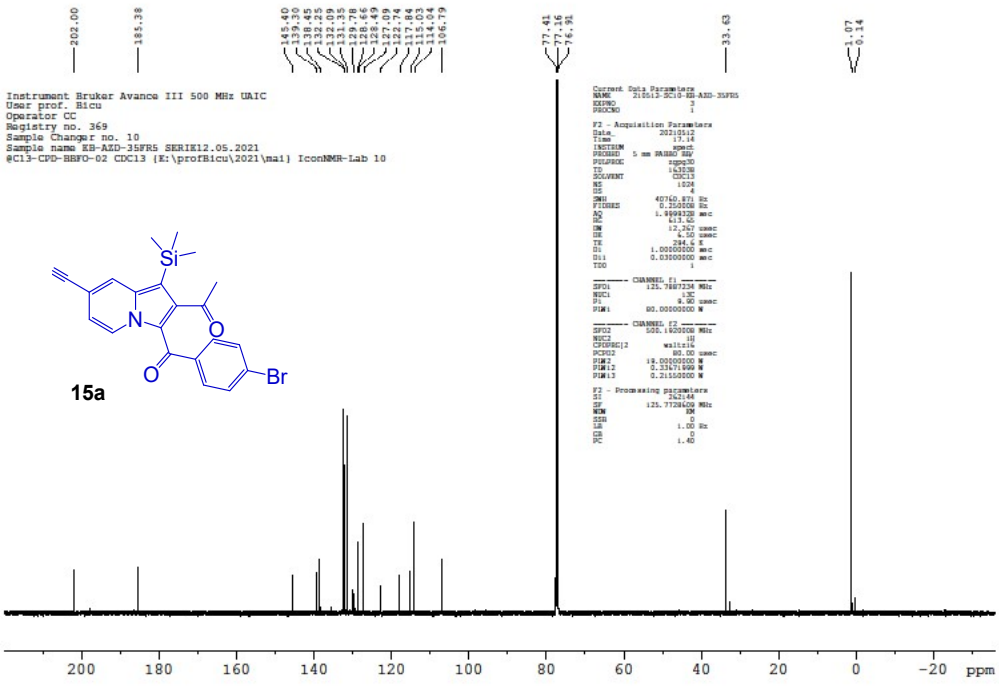


^{13}C NMR (125 MHz, $CDCl_3$)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77.16
76.91
33.63
1.07
0.14
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O
Br
15a
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100
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60
40
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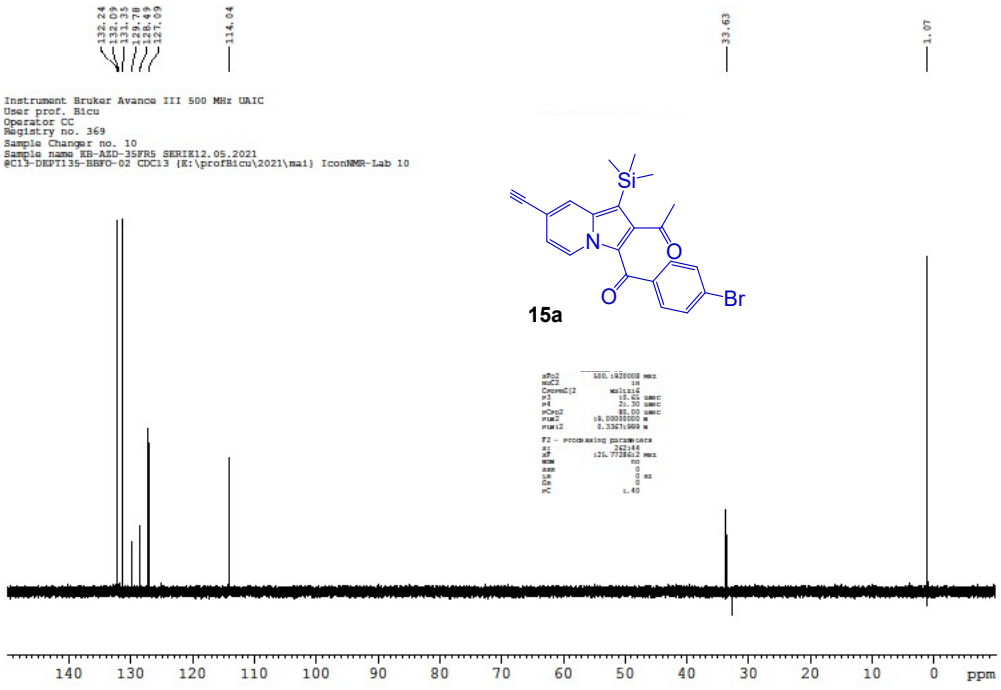
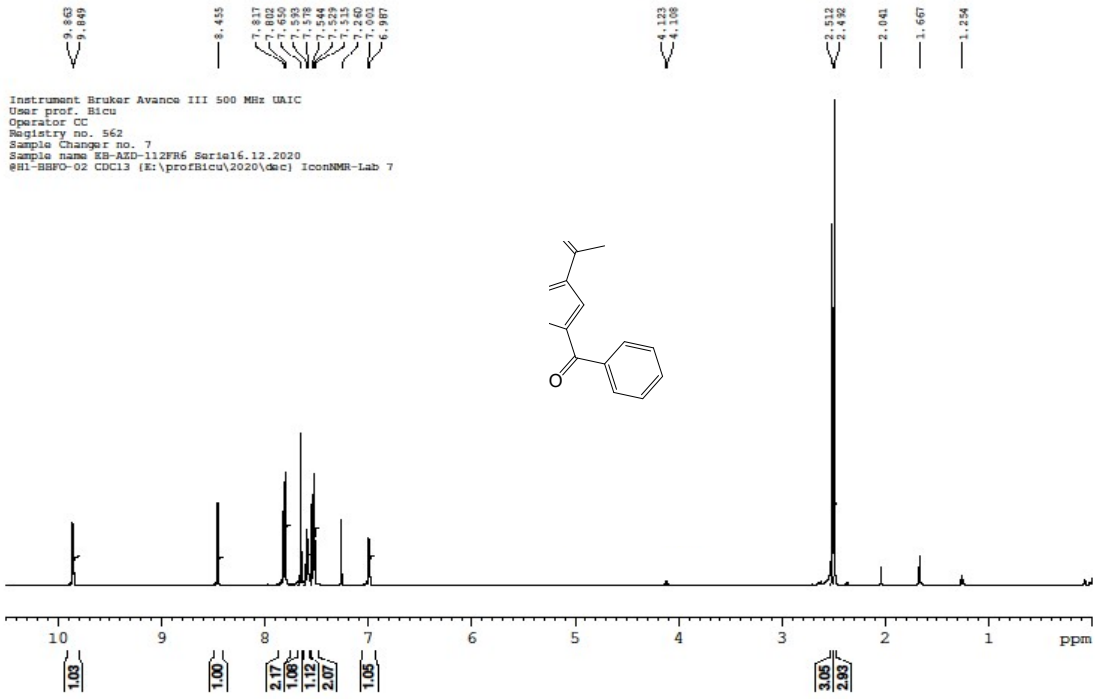
ppm

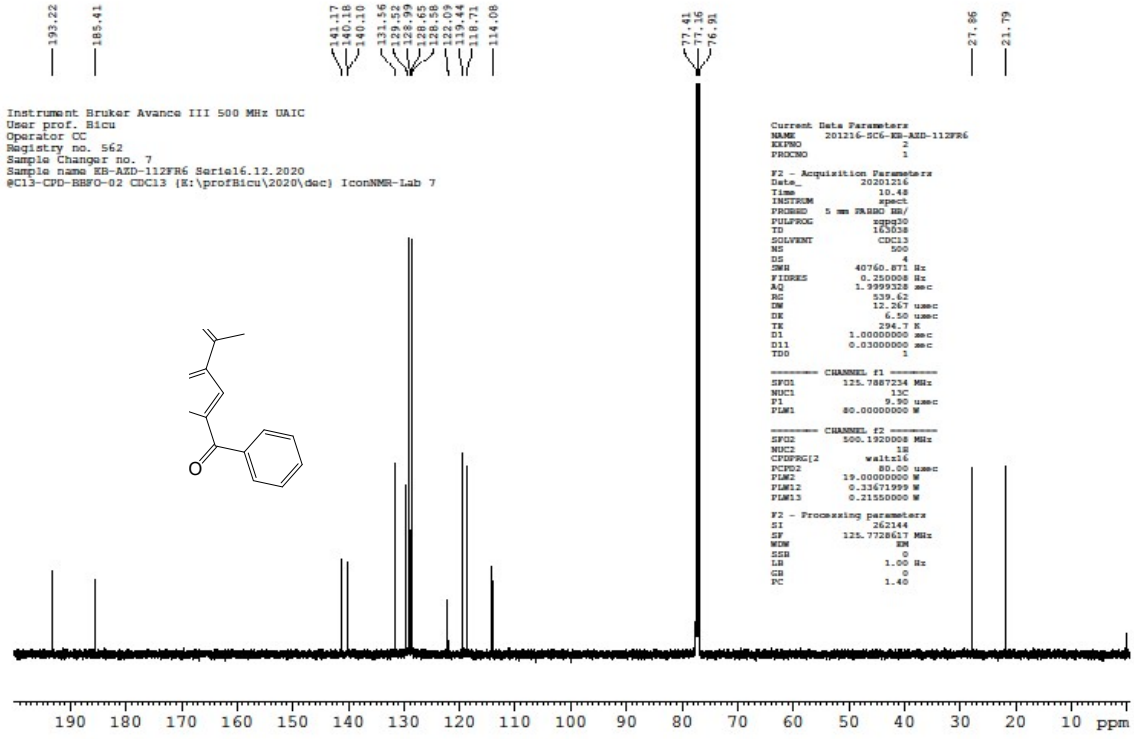
^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



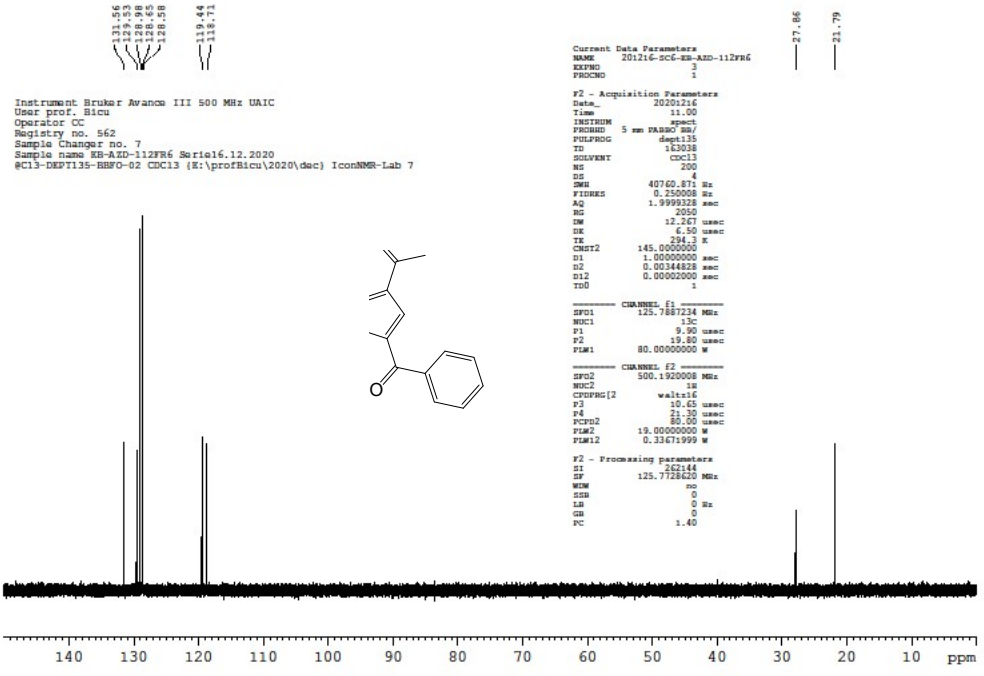
^{1}H NMR (500 MHz, $CDCl_3$)-**10b**



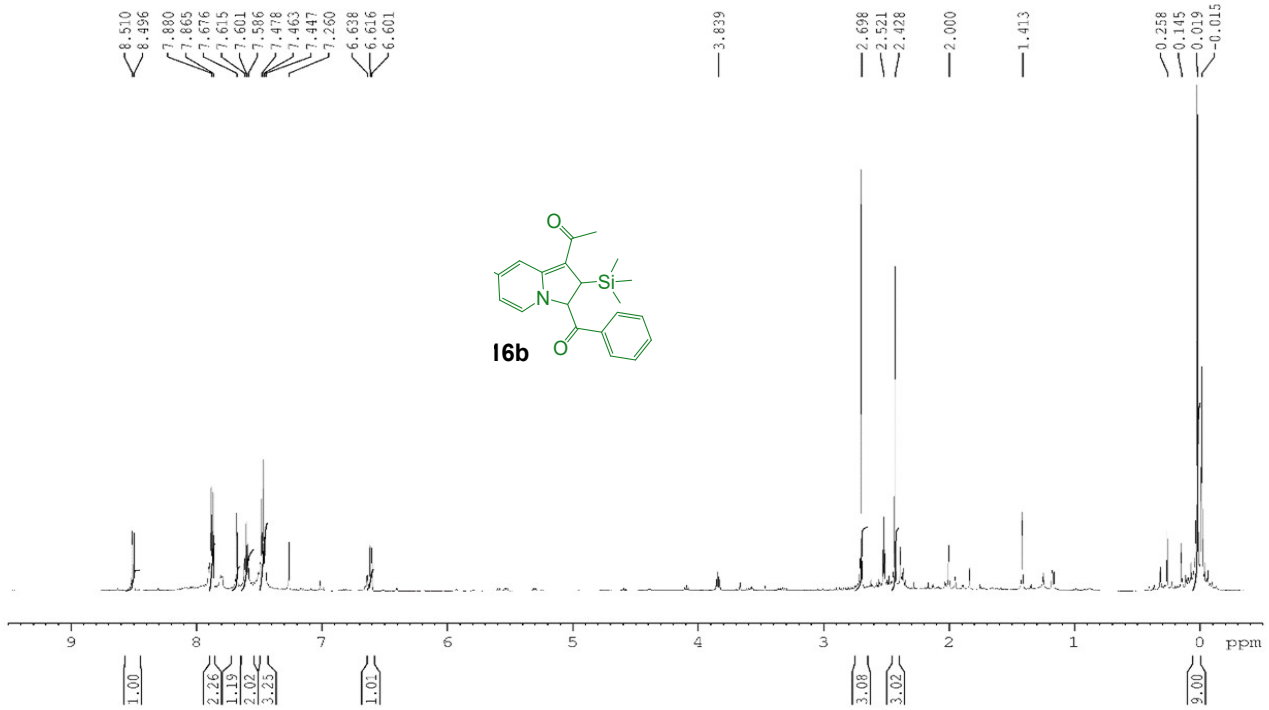
^{13}C NMR (125 MHz, $CDCl_3$)



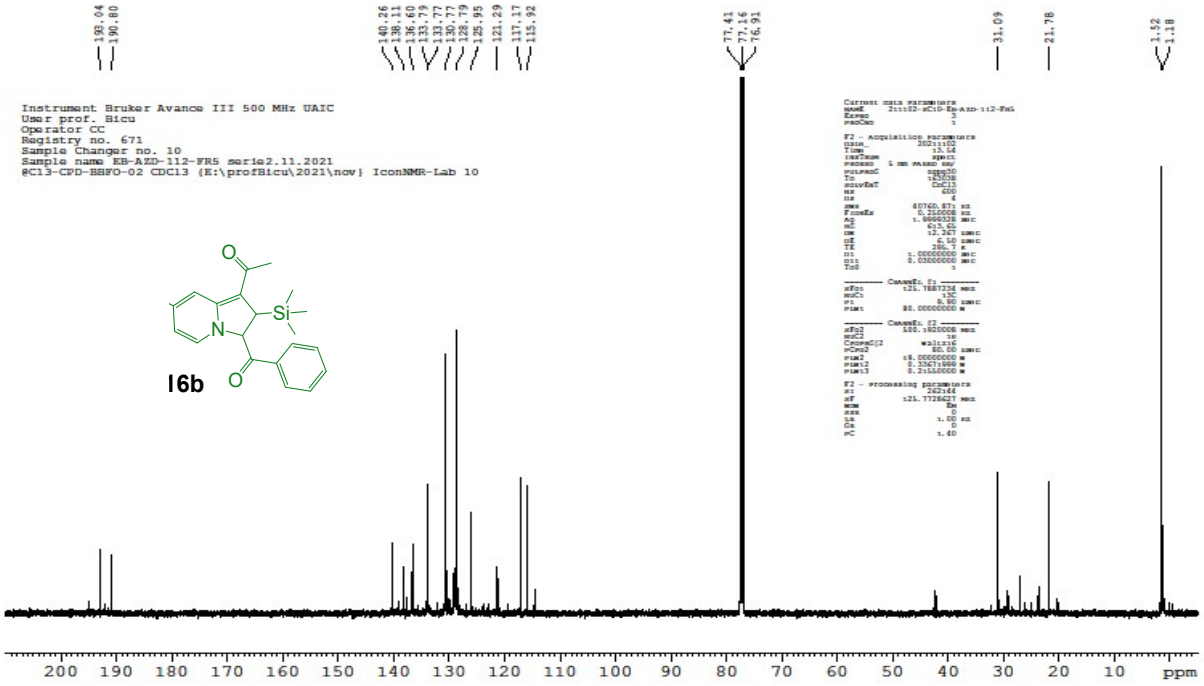
^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



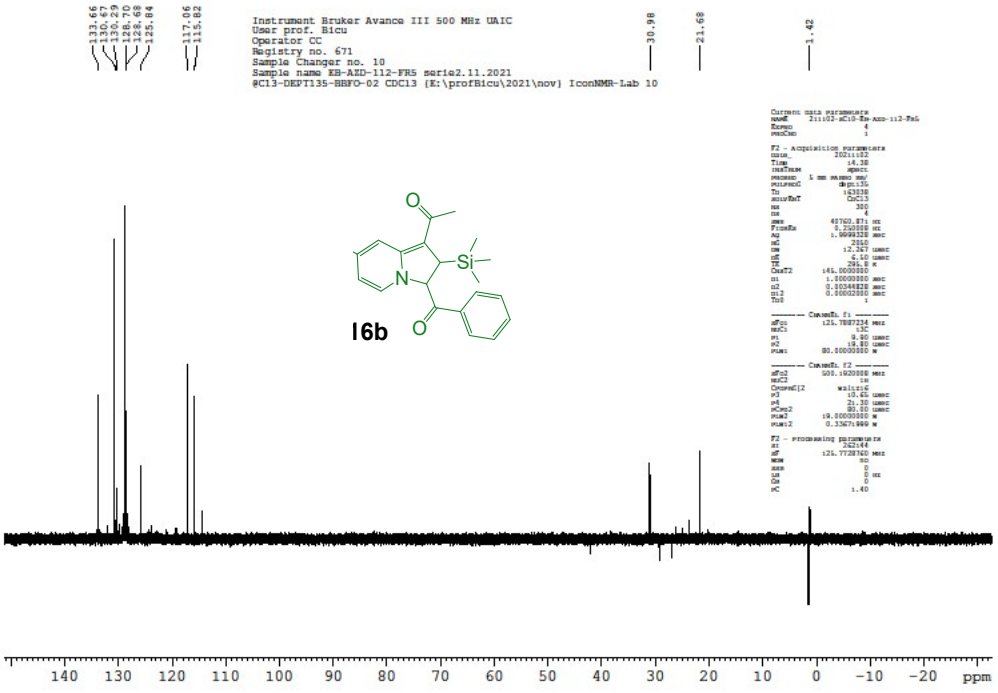
^{1}H NMR (500 MHz, $CDCl_3$) **-16b**



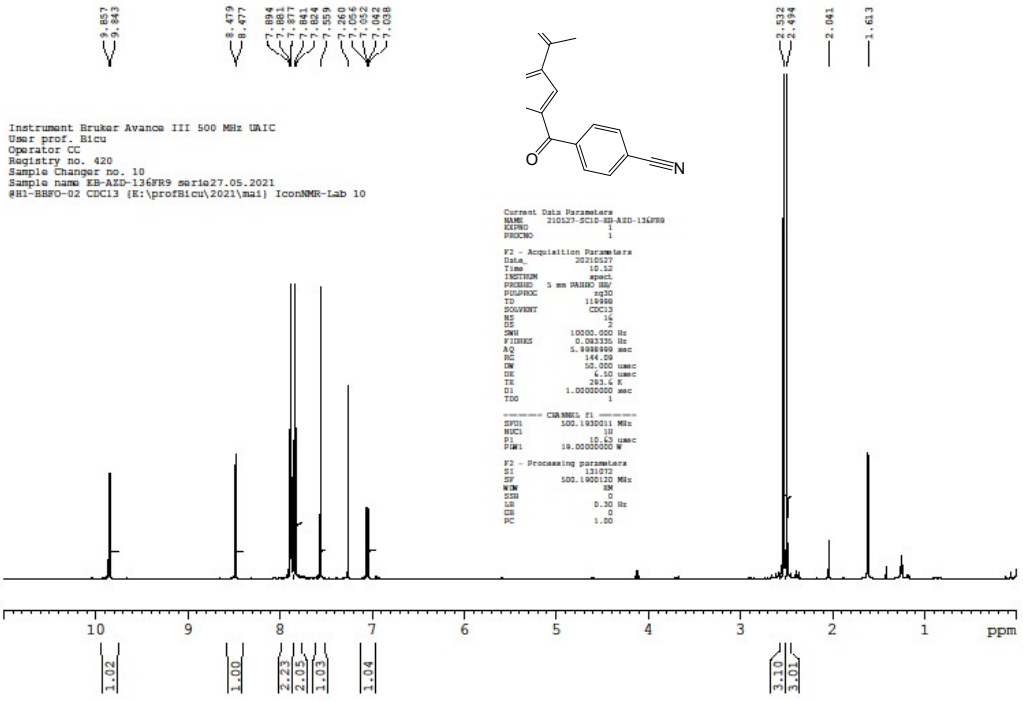
^{13}C NMR (125 MHz, $CDCl_3$)



^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



^{1}H NMR (500 MHz, $CDCl_3$) -**10c**



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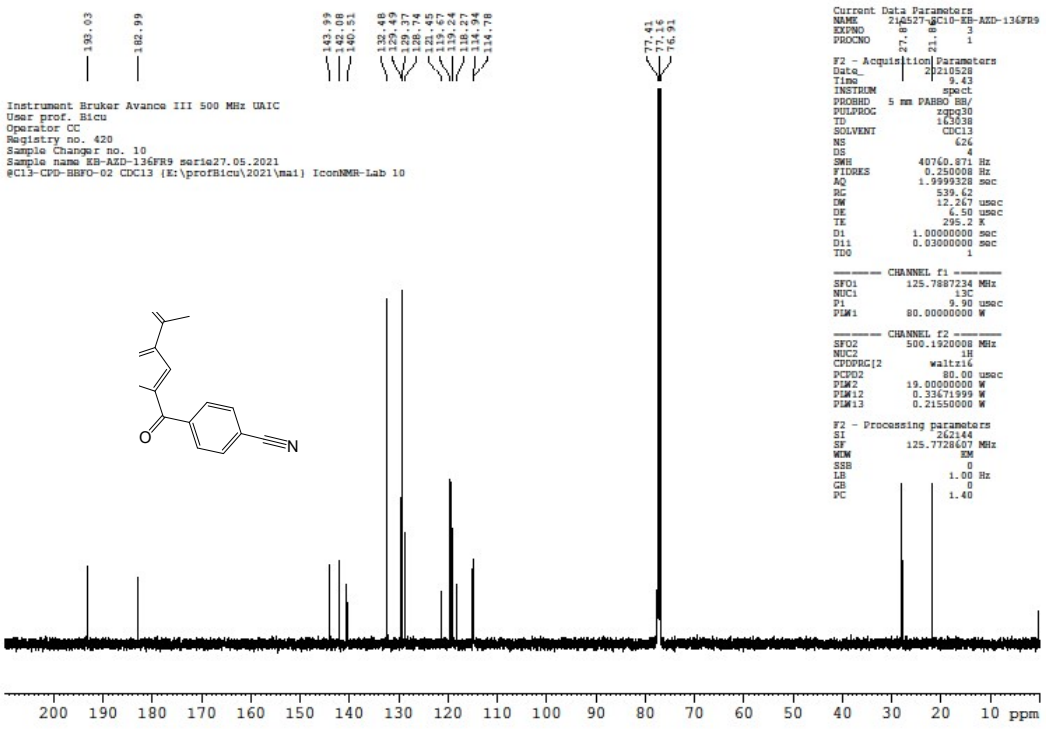

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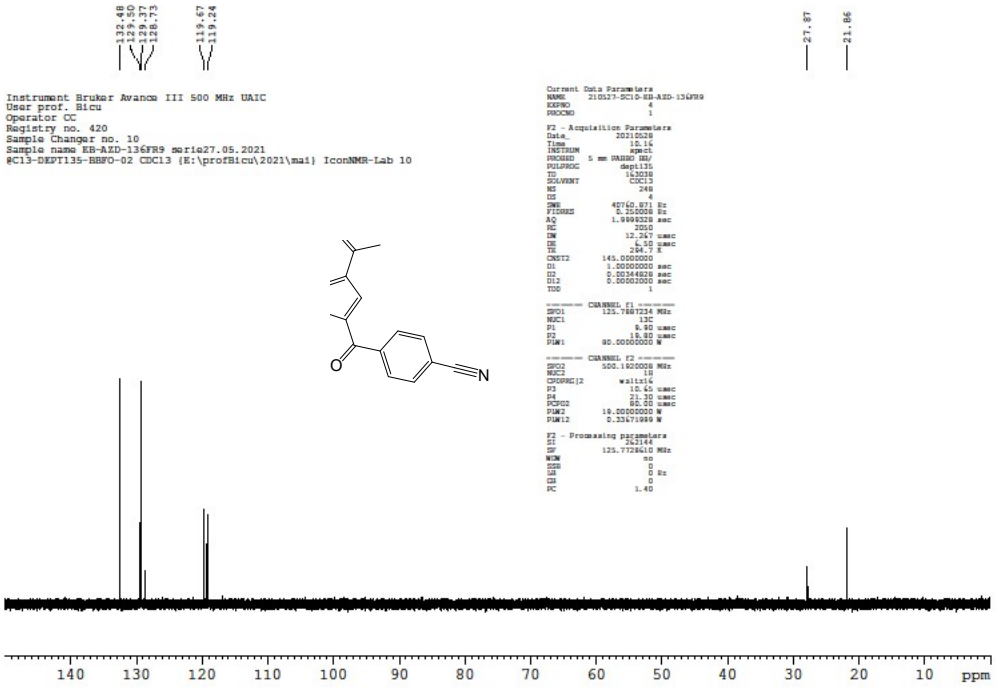
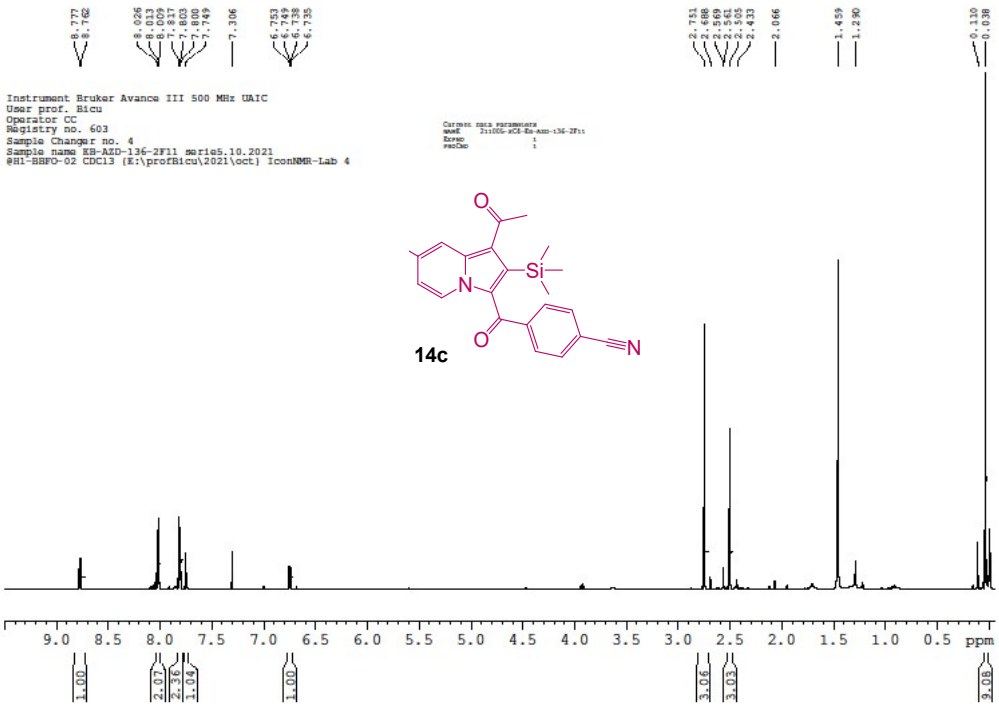
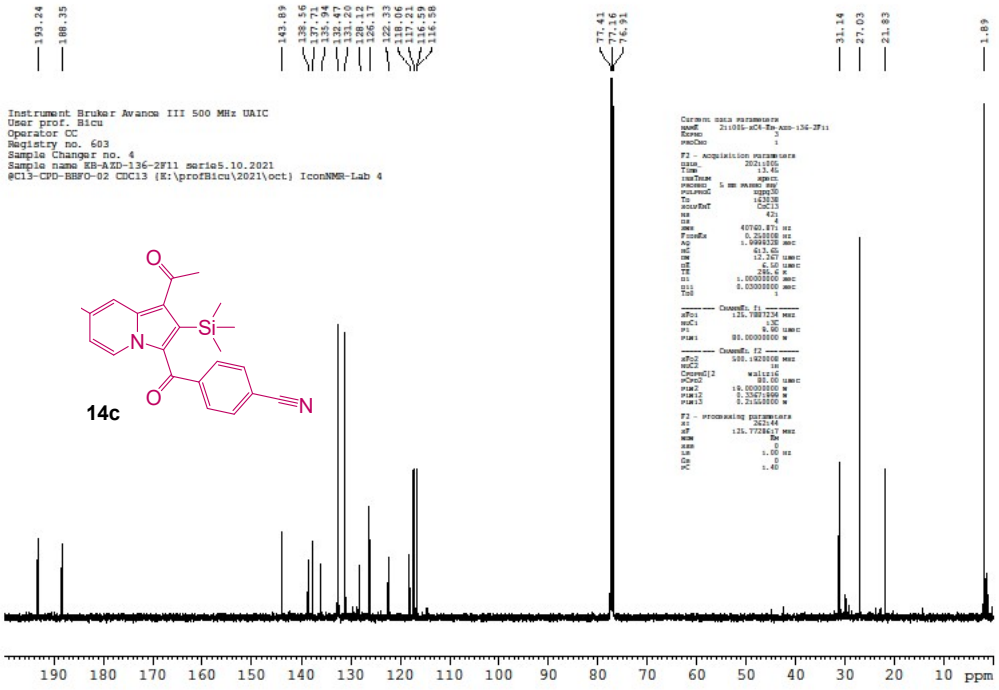


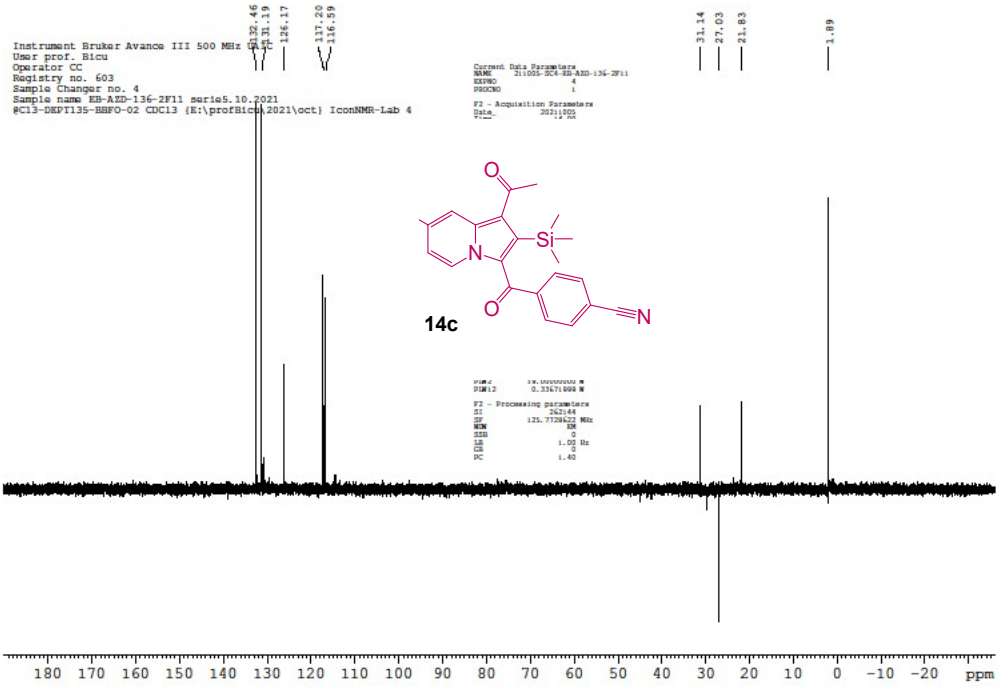
^{1}H NMR (500 MHz, $CDCl_3$) -**14c**



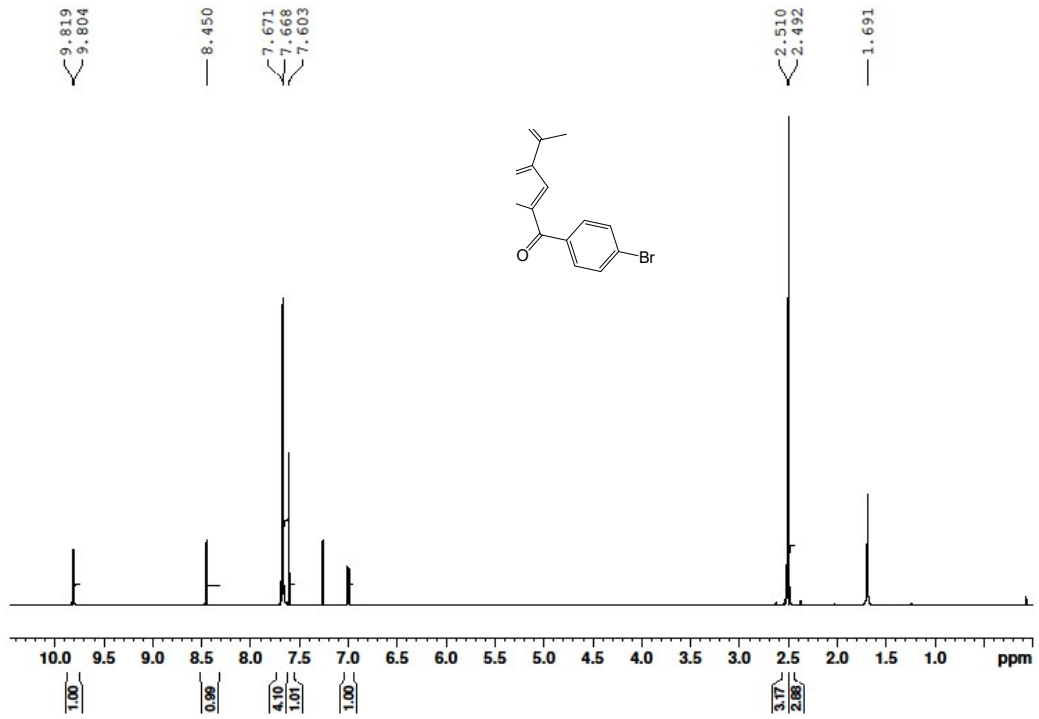
^{13}C NMR (125 MHz, $CDCl_3$)



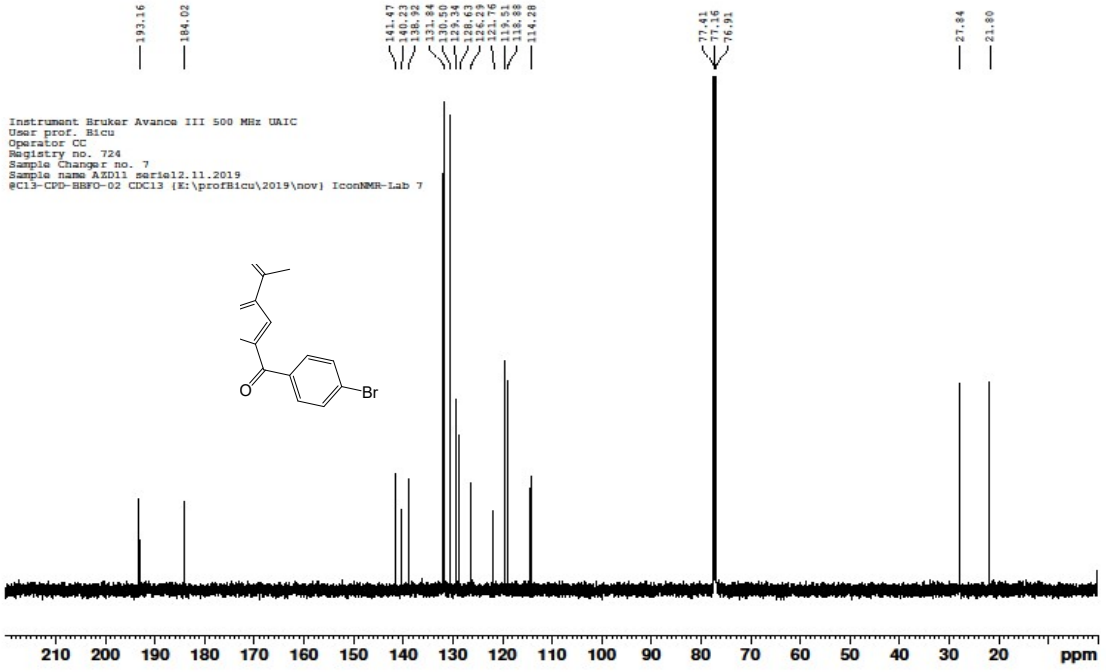
^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



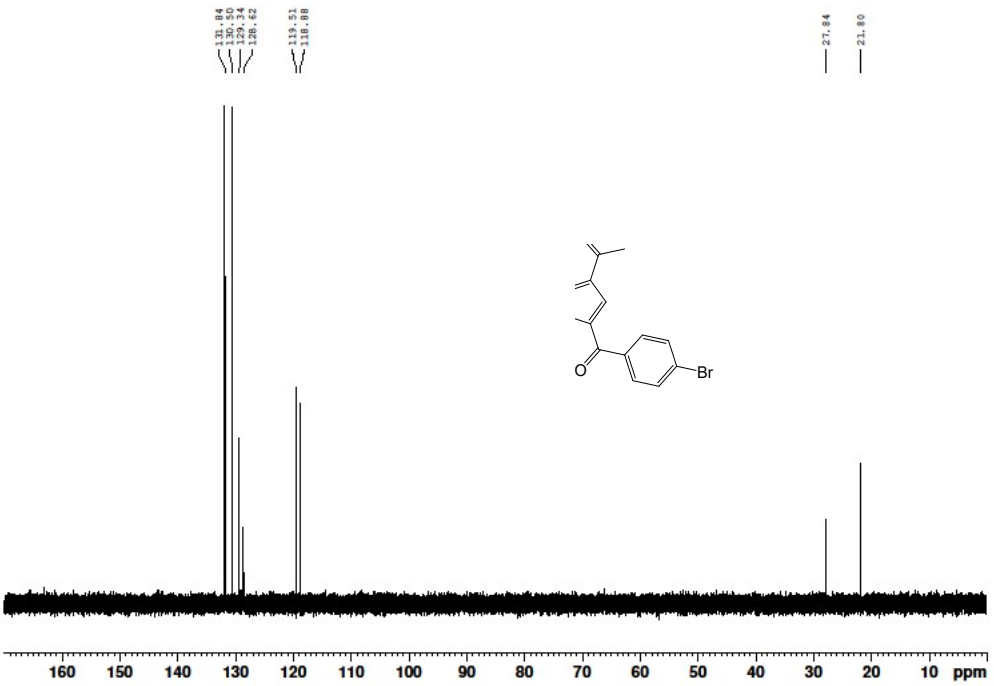
^{1}H NMR (500 MHz, $CDCl_3$) **-10d**



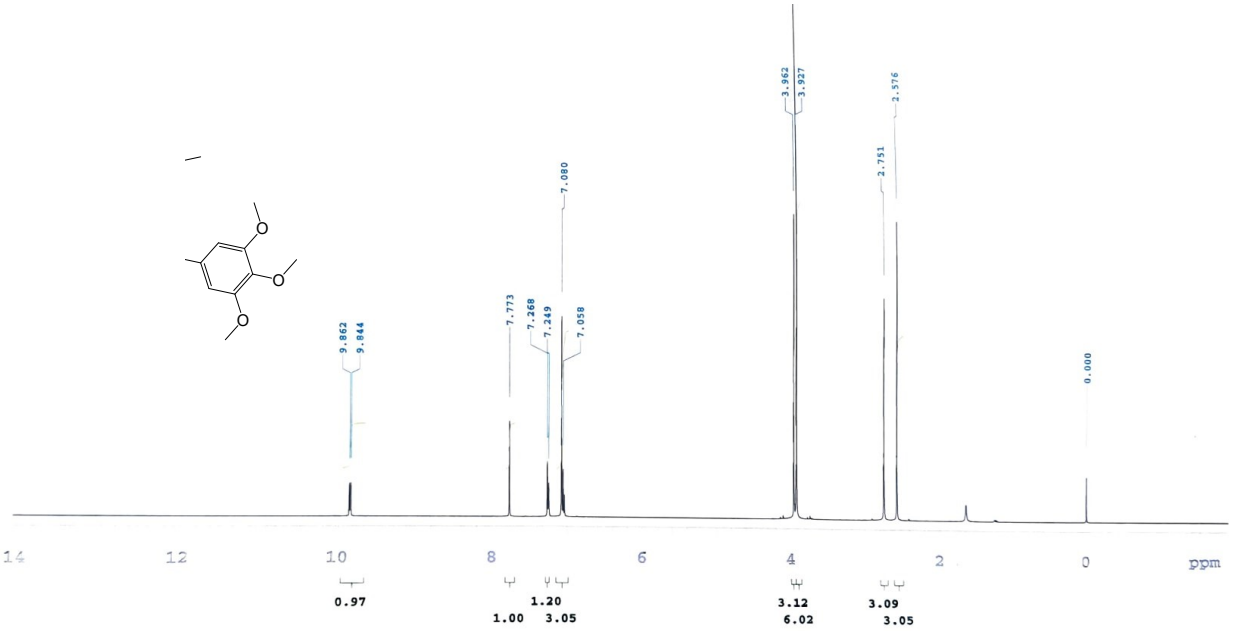
^{13}C NMR (125 MHz, $CDCl_3$)



^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



^{1}H NMR (400 MHz, $CDCl_3$) -**10e**



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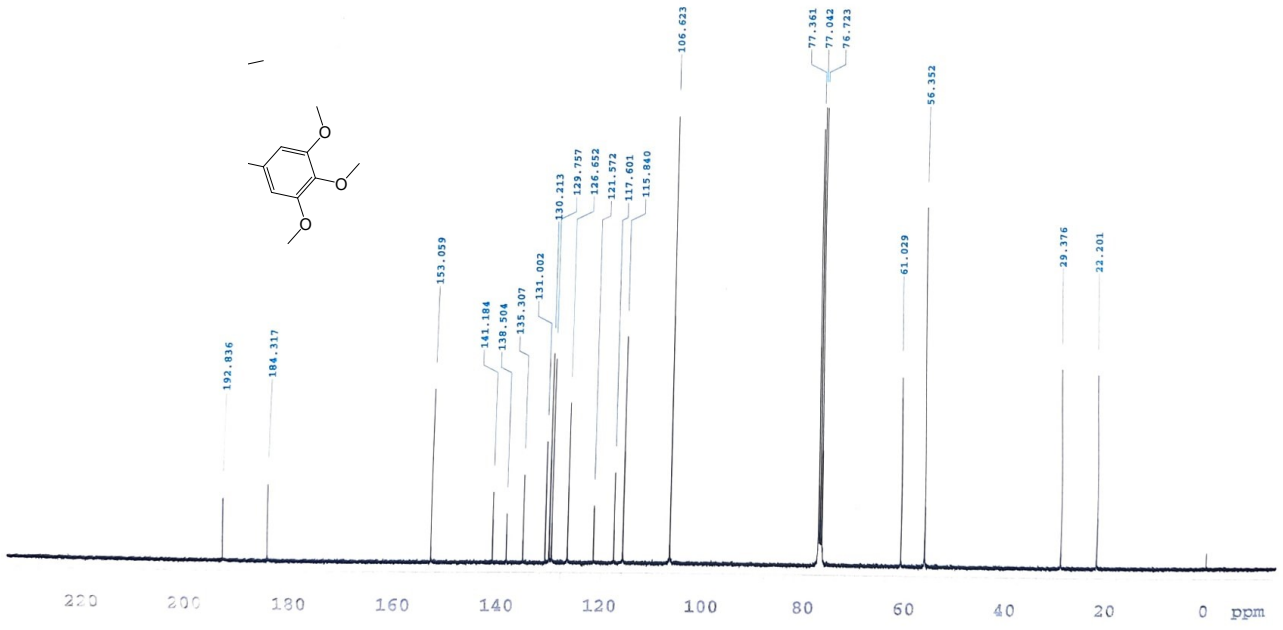

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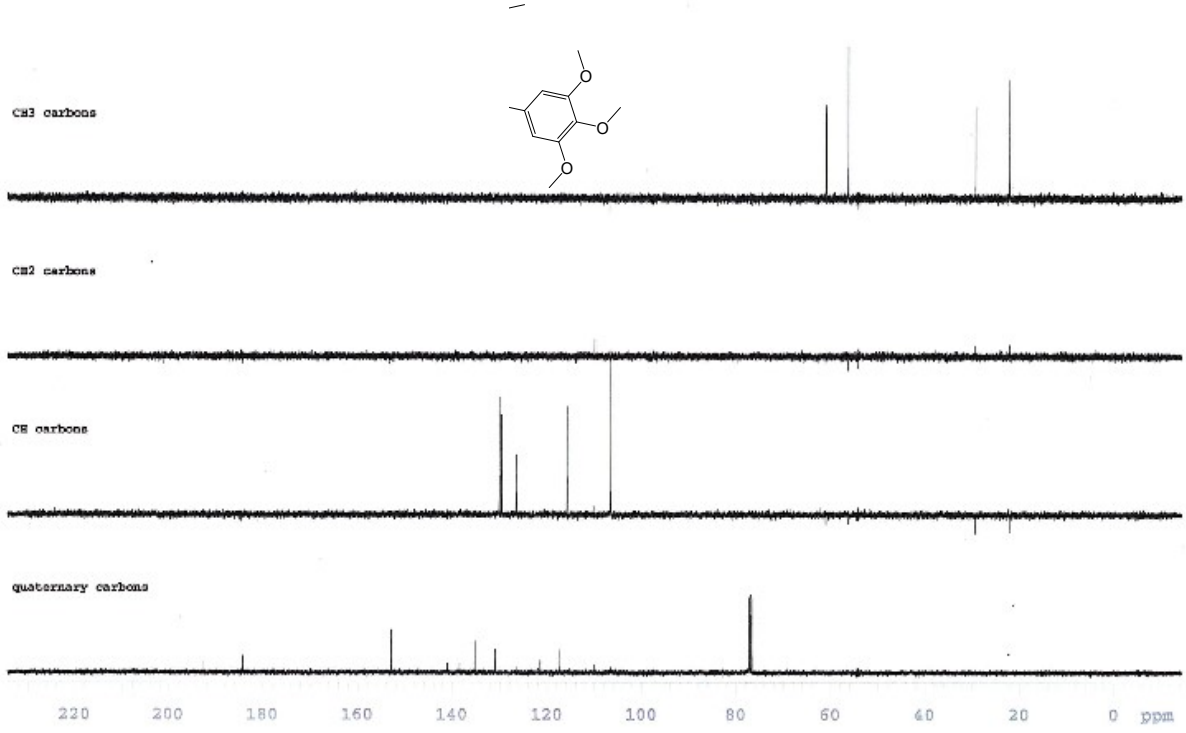

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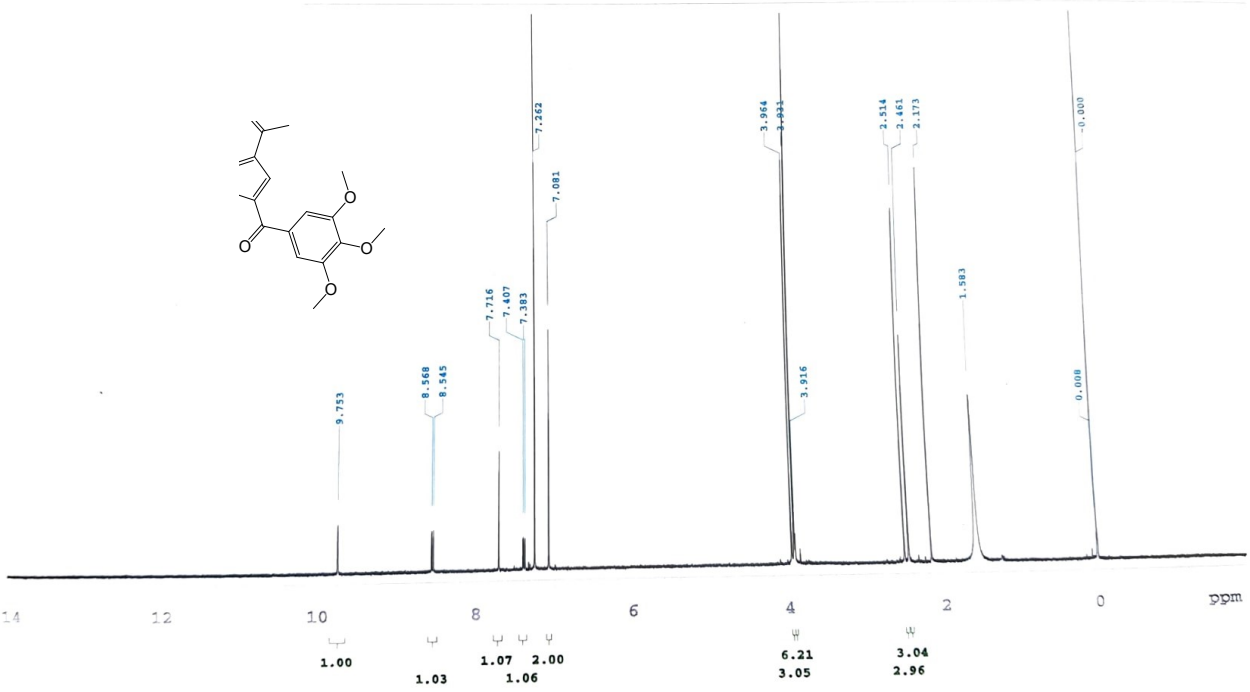

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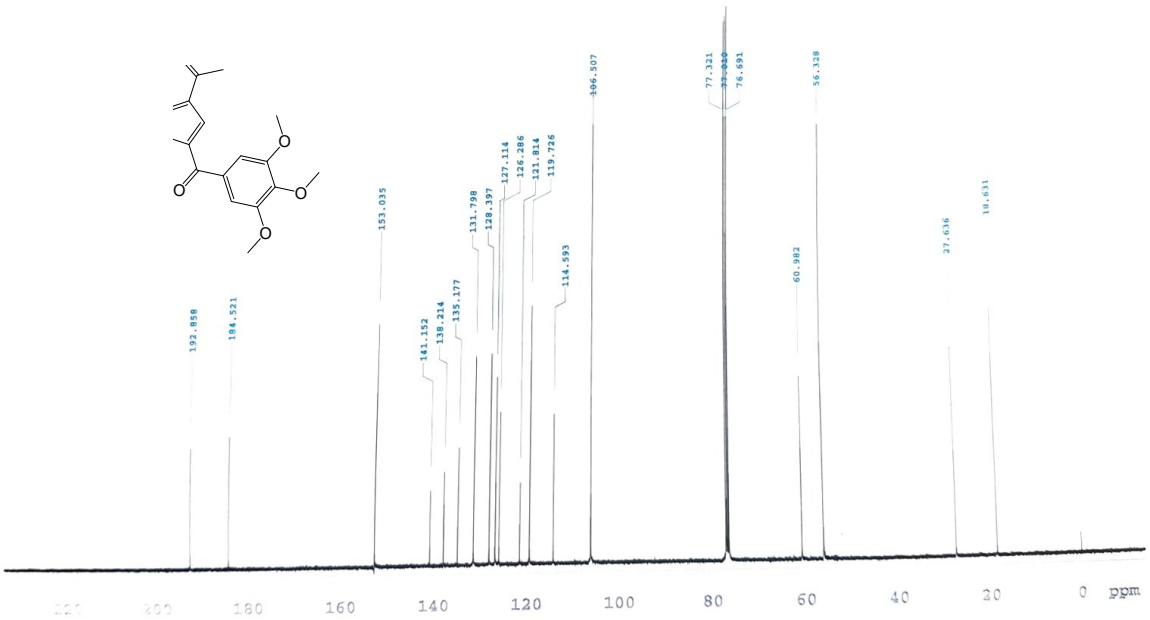

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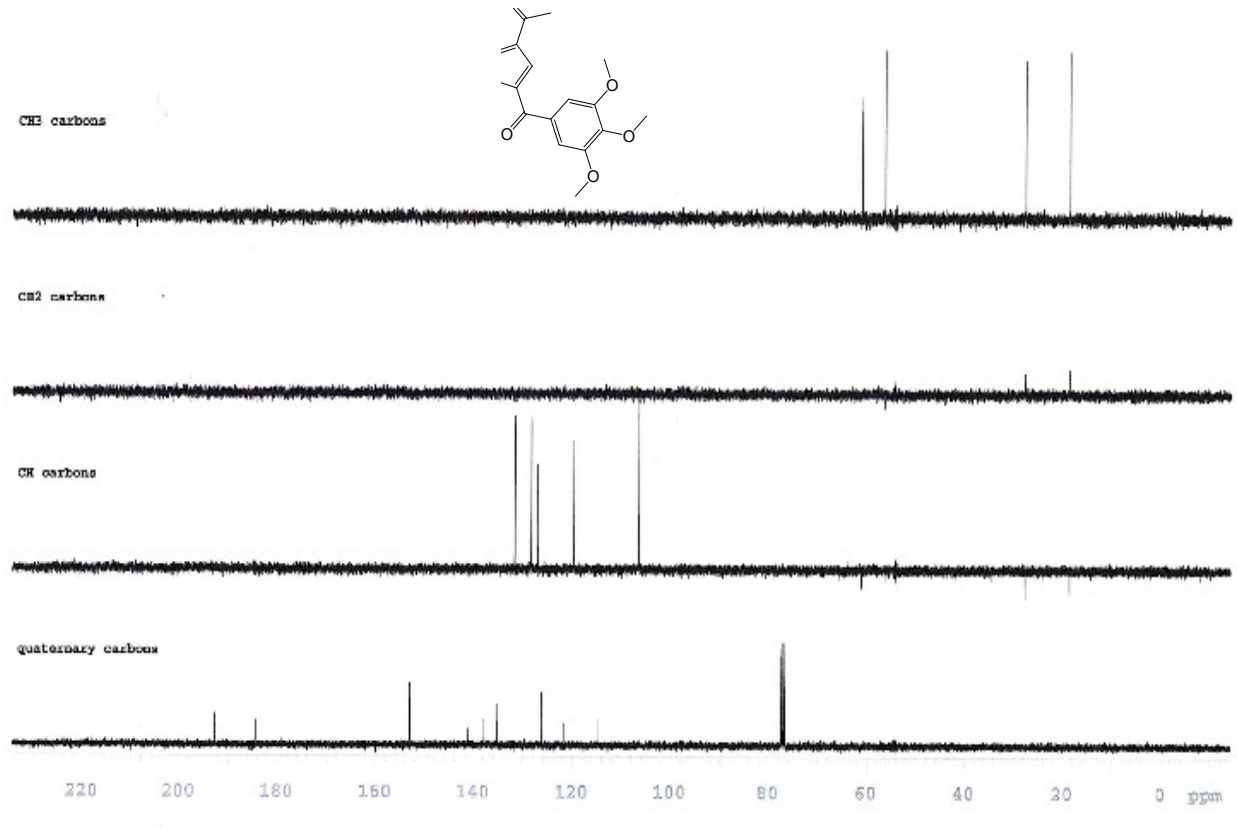
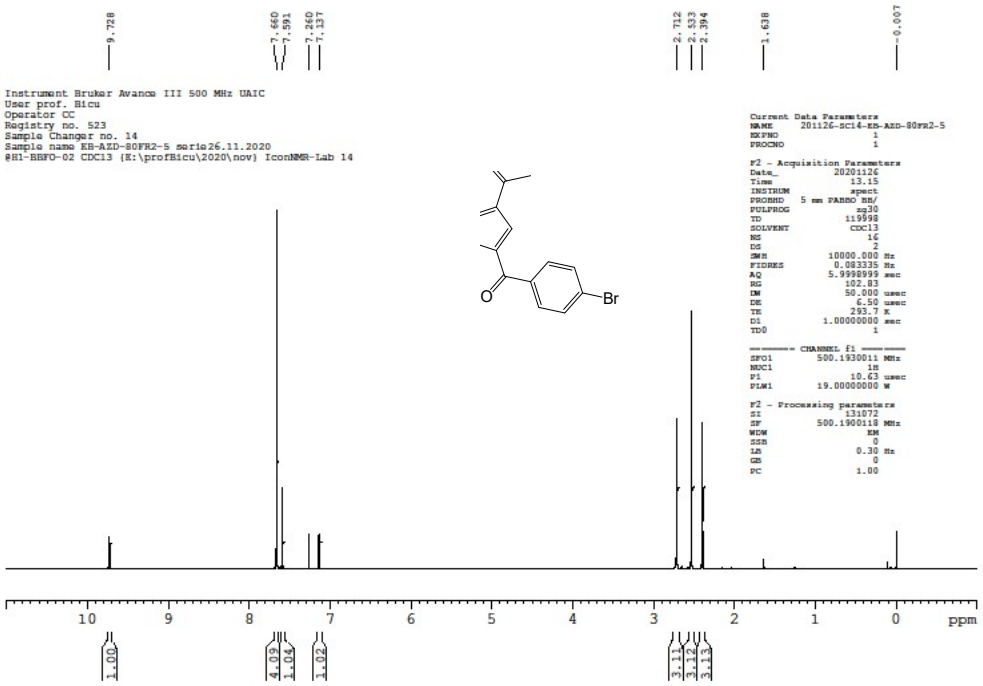
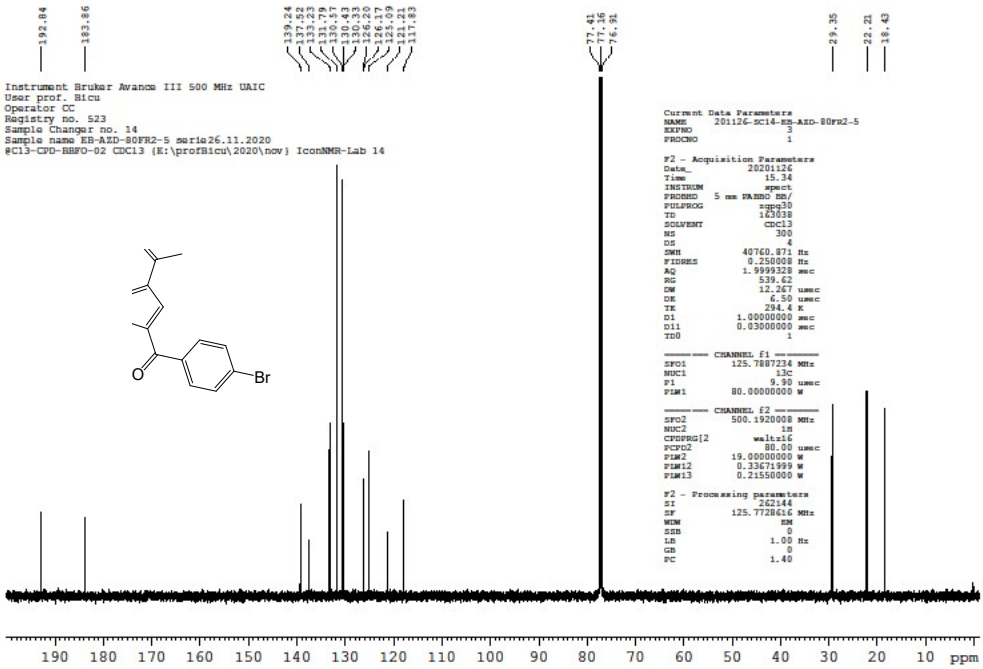


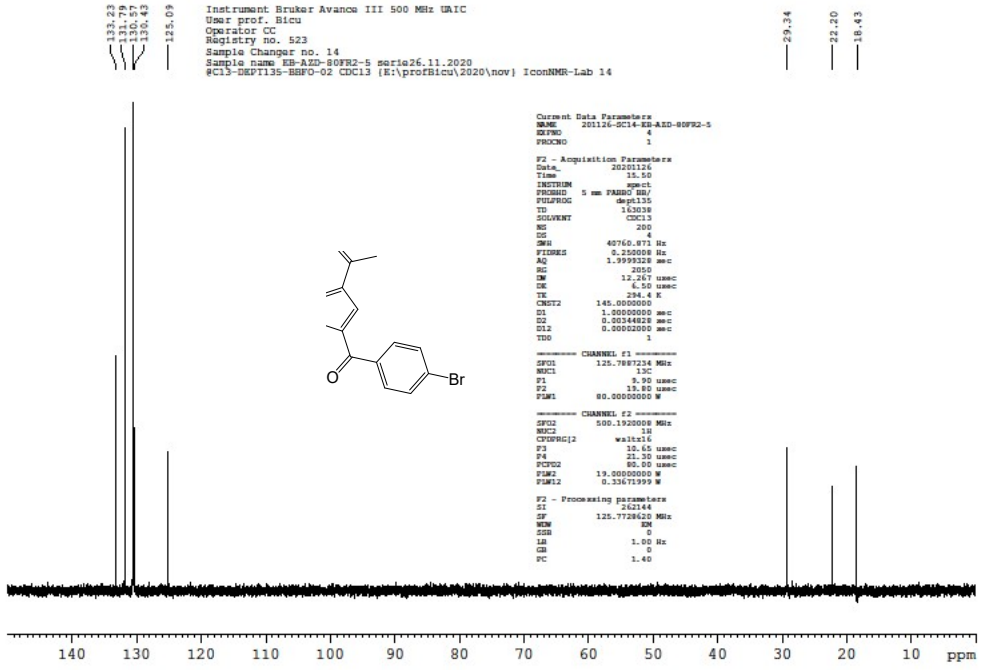
^{1}H NMR (500 MHz, $CDCl_3$) **-10f**



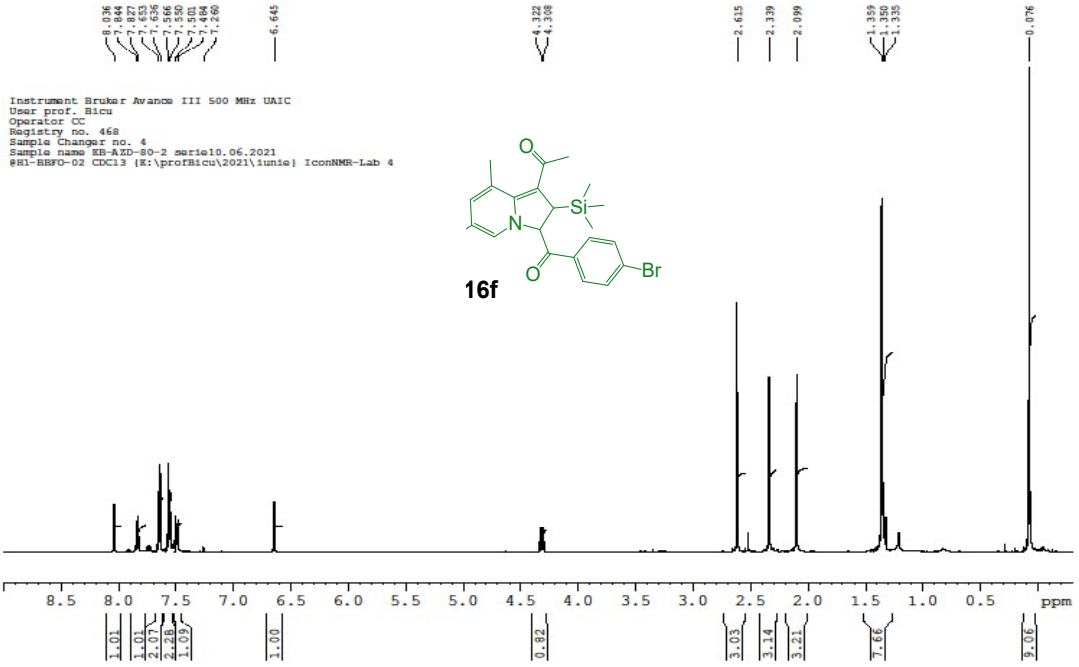
^{13}C NMR (125 MHz, $CDCl_3$)



^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



^{1}H NMR (500 MHz, $CDCl_3$) -**16f**



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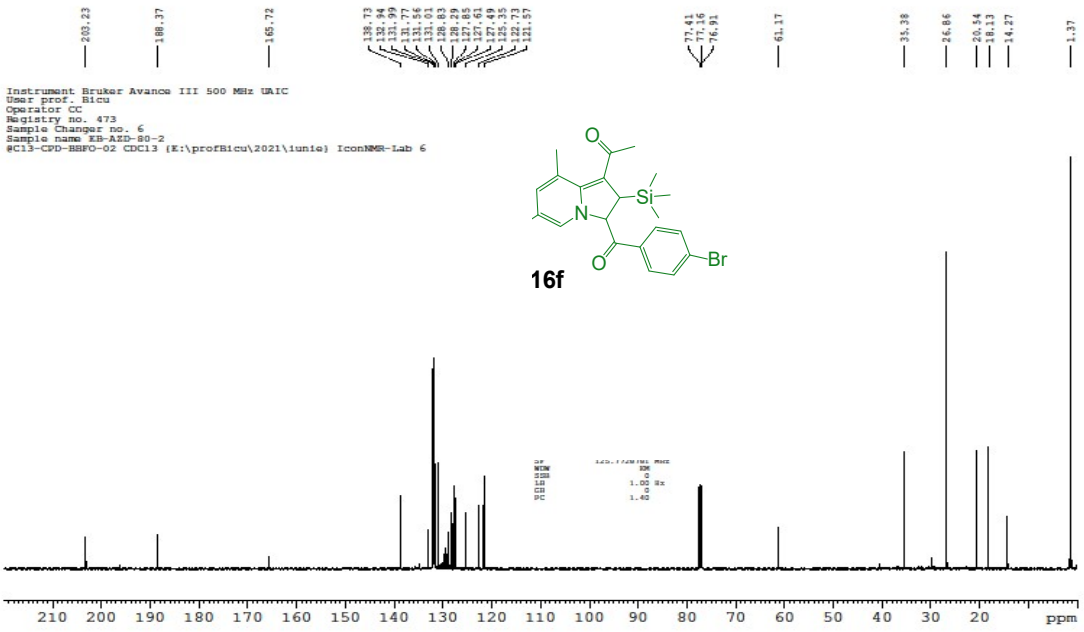

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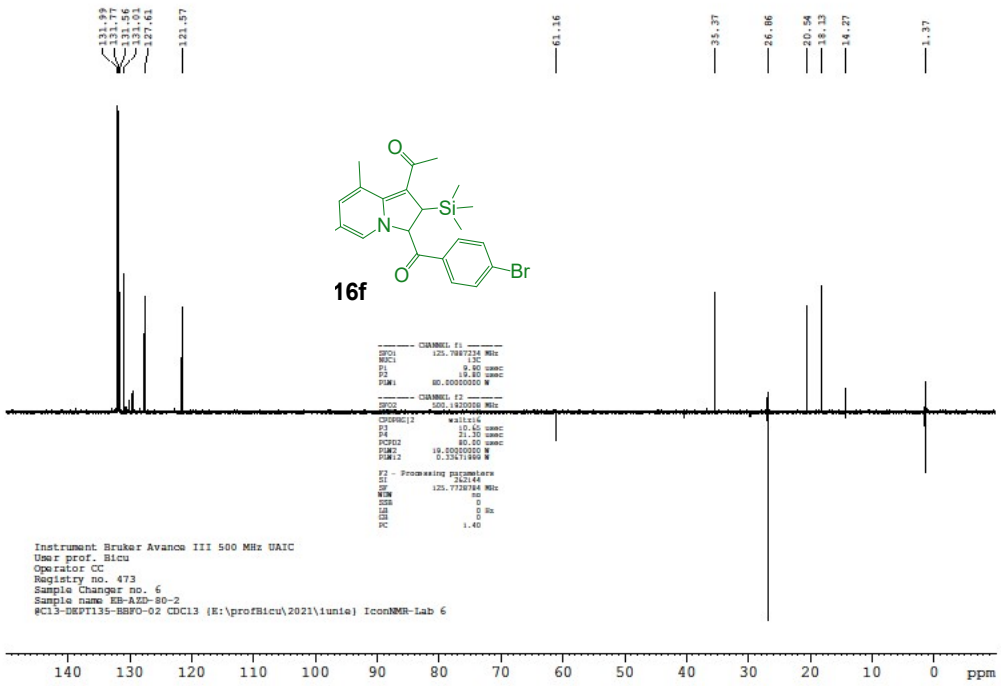

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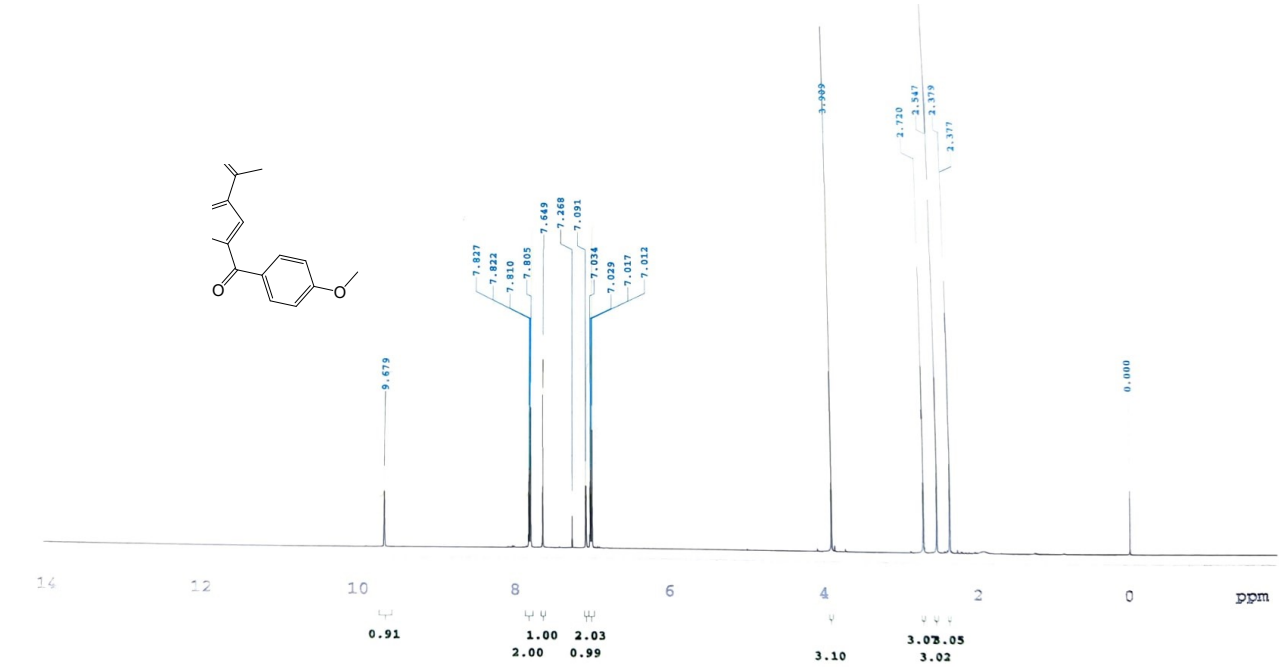
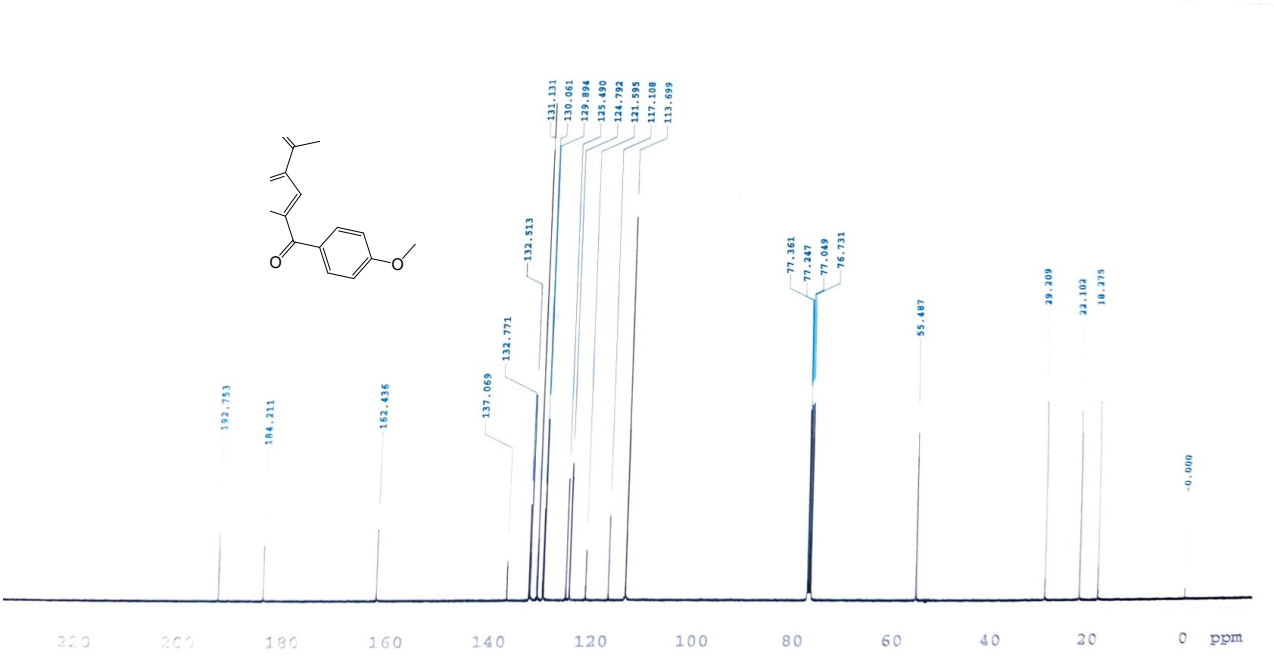
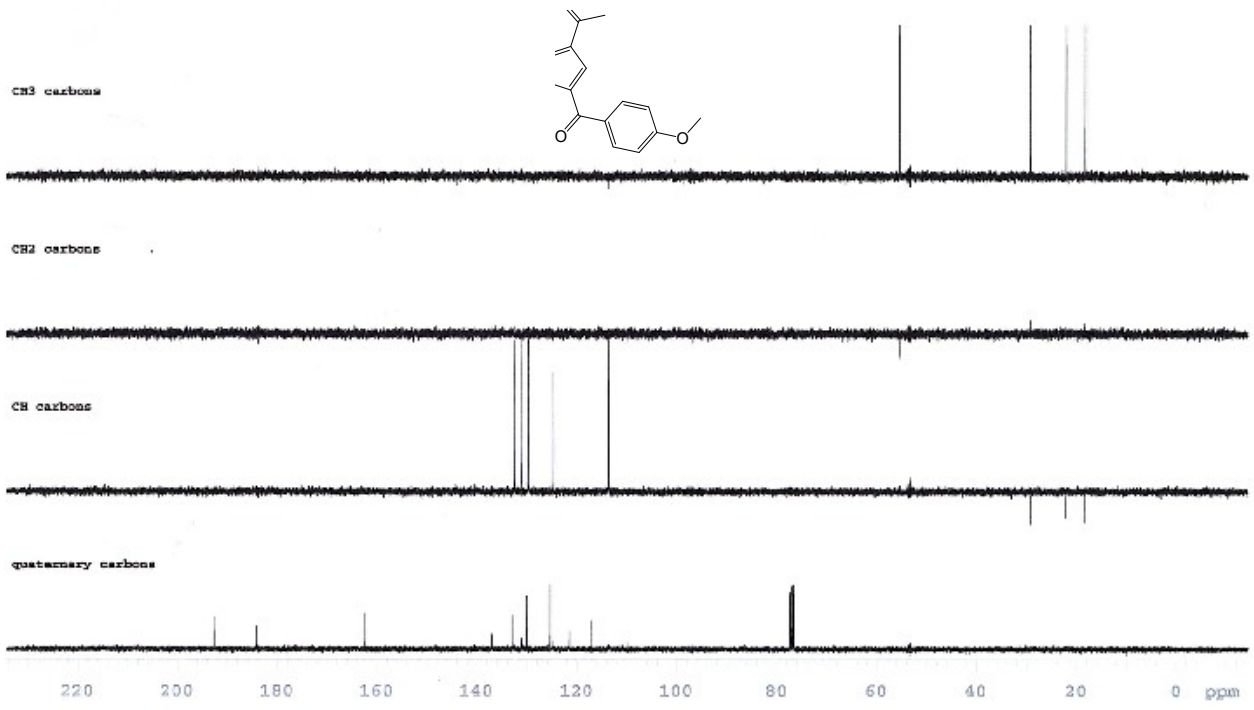


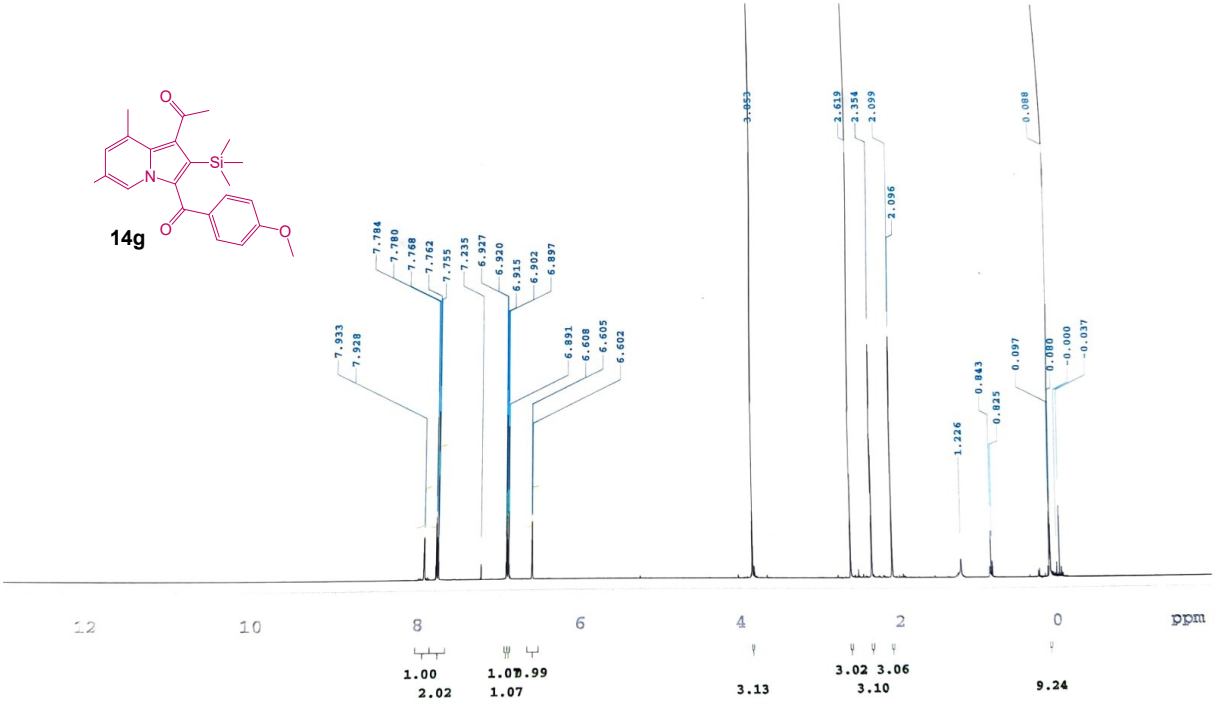
^{13}C NMR (100 MHz, $CDCl_3$)



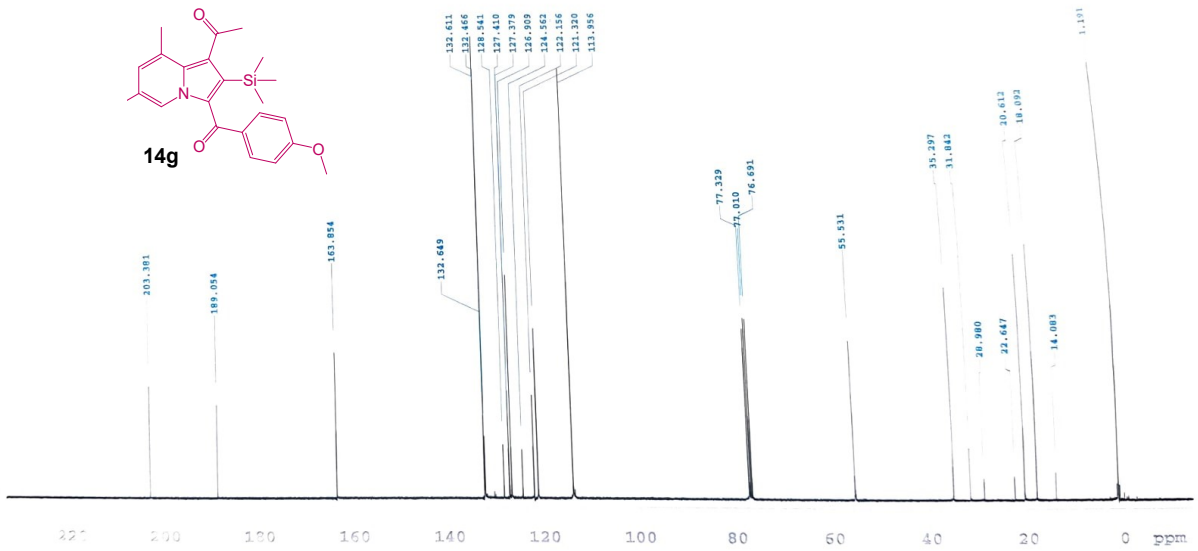
^{13}C-DEPT NMR (100 MHz, $CDCl_3$)



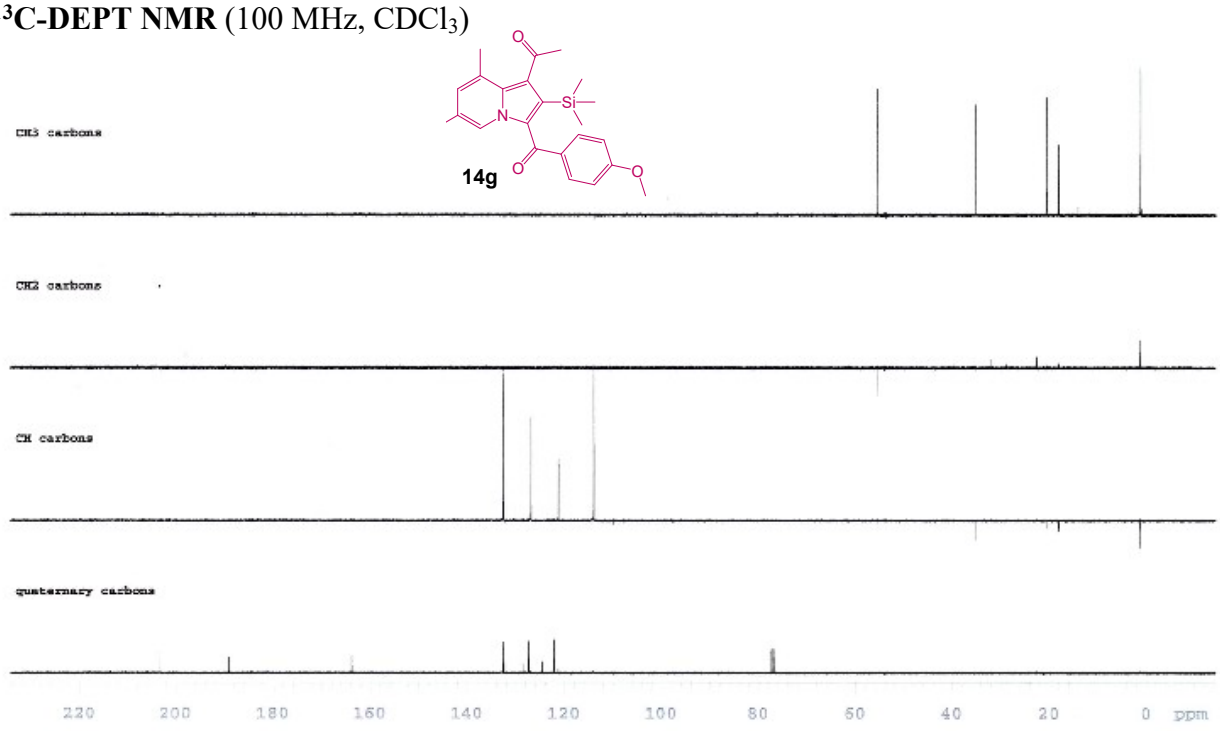
^{1}H NMR (400 MHz, $CDCl_3$) -**14g**



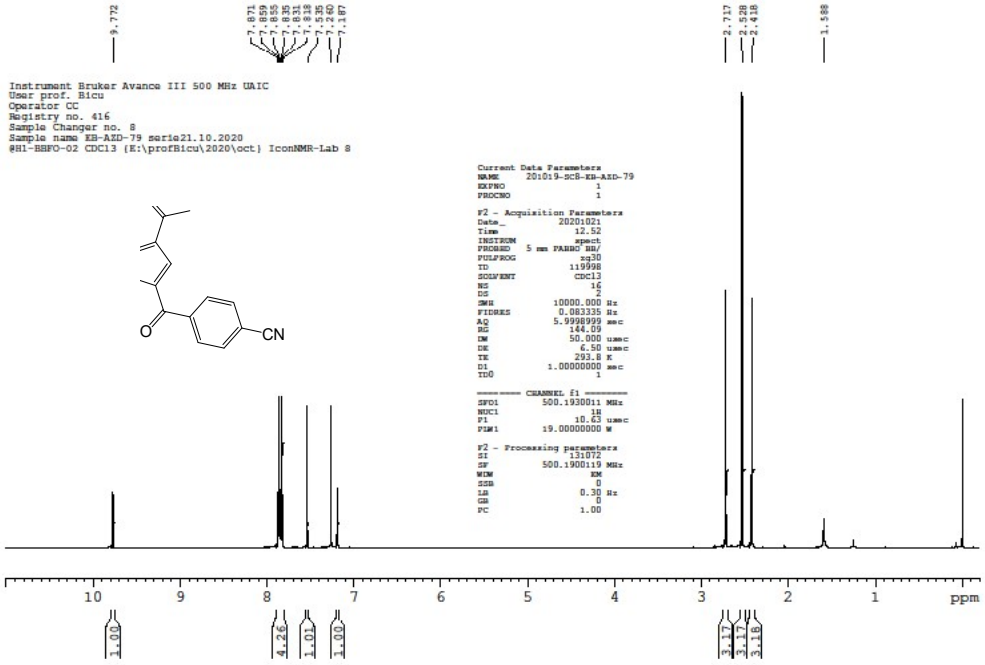
^{13}C NMR (100 MHz, $CDCl_3$)



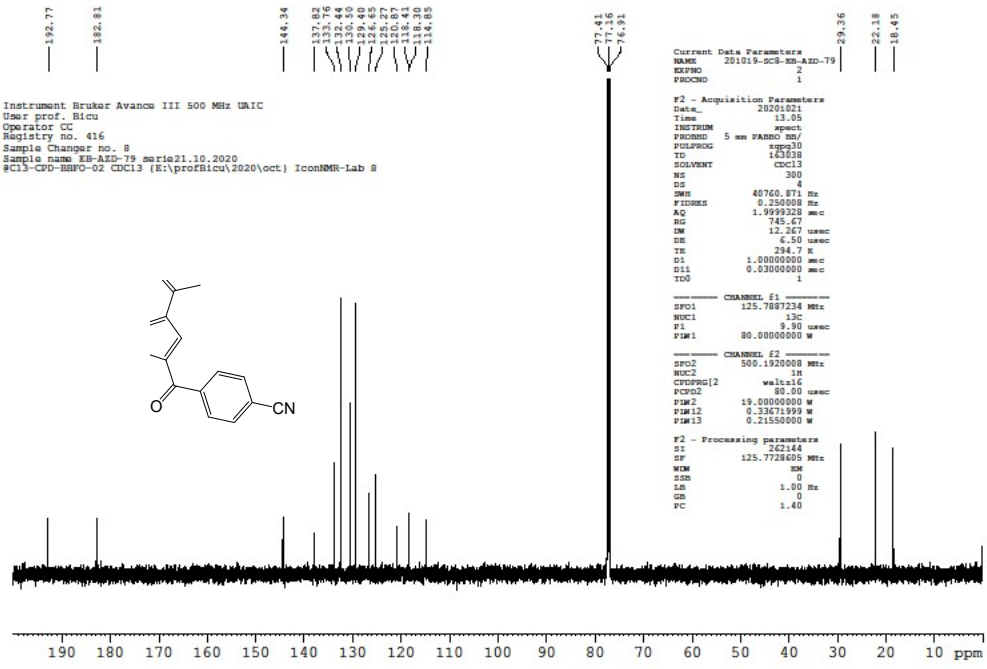
^{13}C-DEPT NMR (100 MHz, $CDCl_3$)



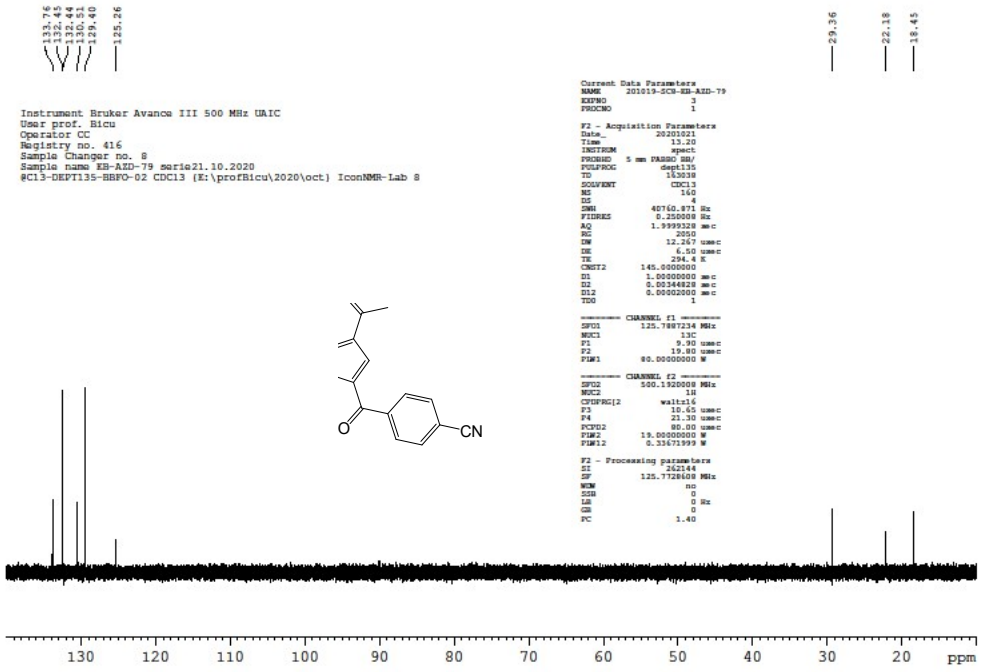
^{1}H NMR (500 MHz, $CDCl_3$) **-10h**



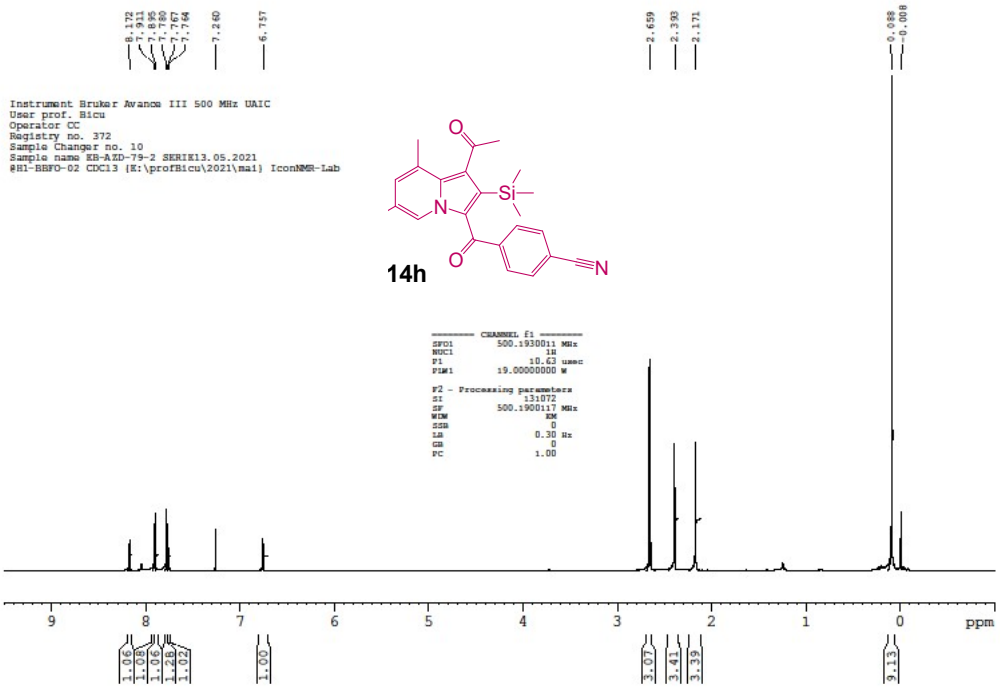
^{13}C NMR (125 MHz, $CDCl_3$)



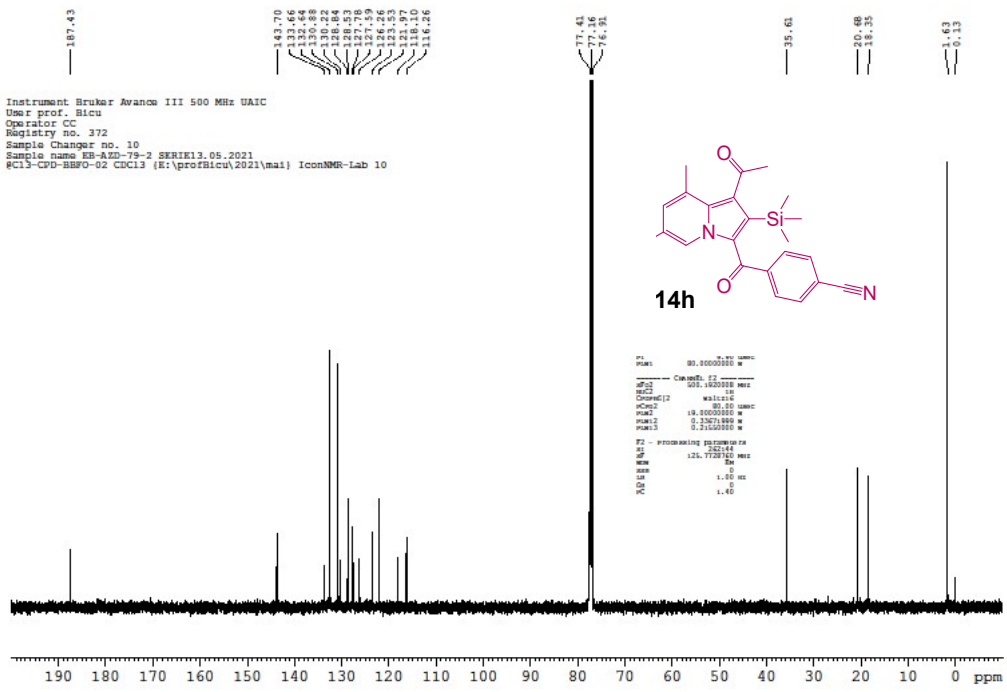
^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



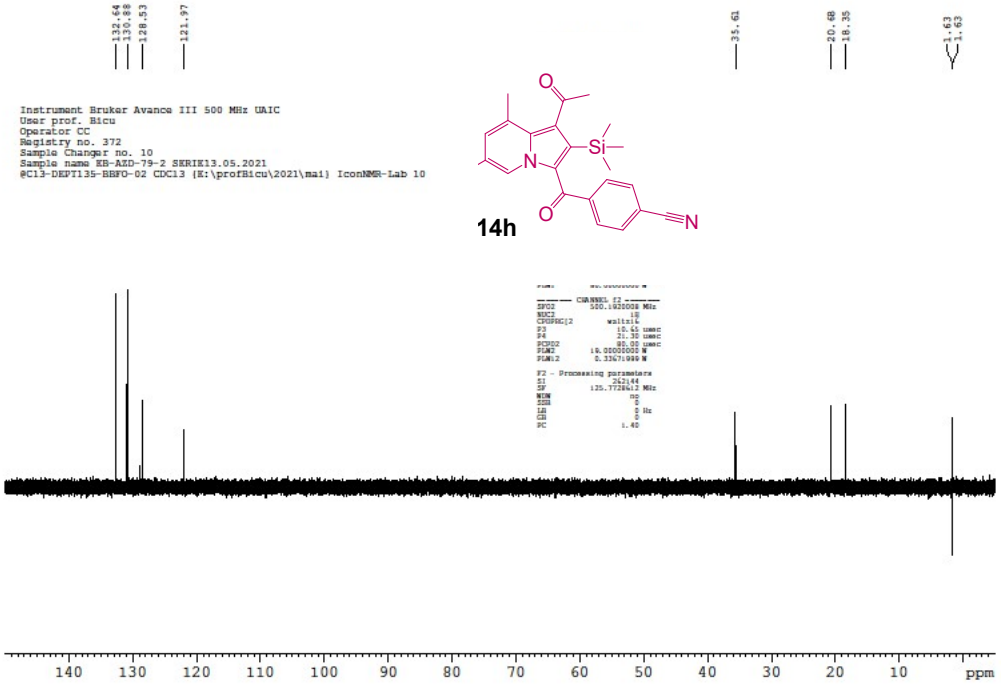
^{1}H NMR (500 MHz, $CDCl_3$) **-14h**



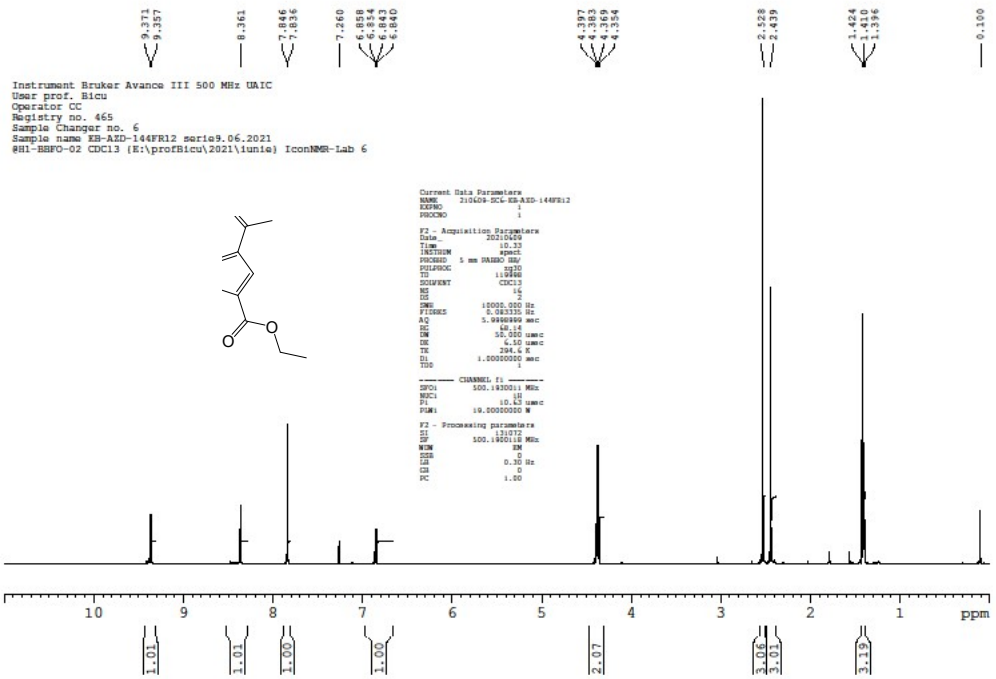
^{13}C NMR (125 MHz, $CDCl_3$)



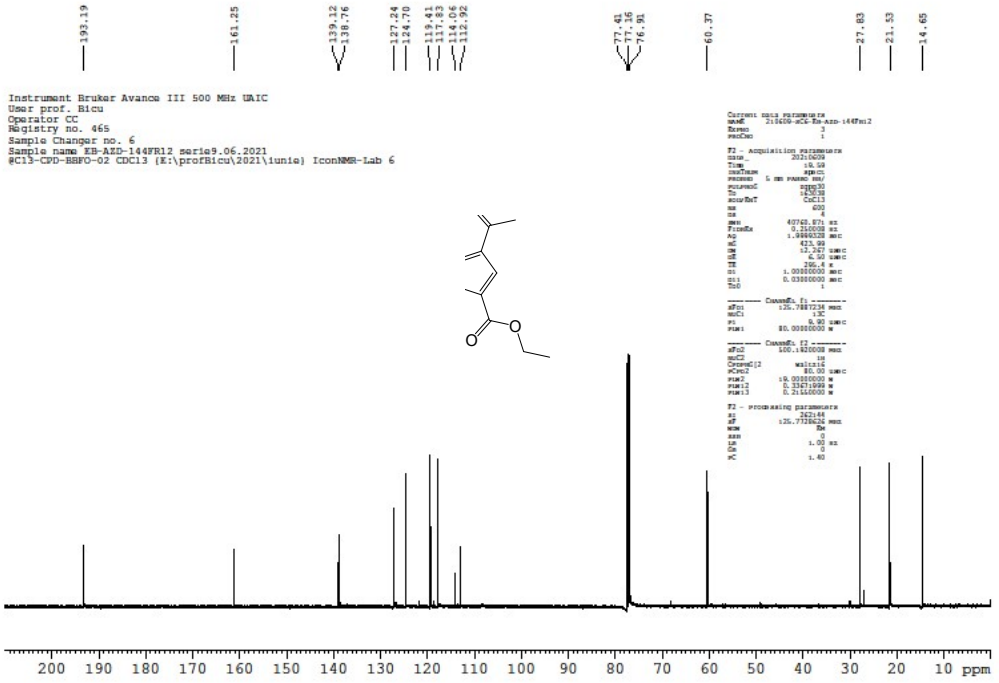
^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



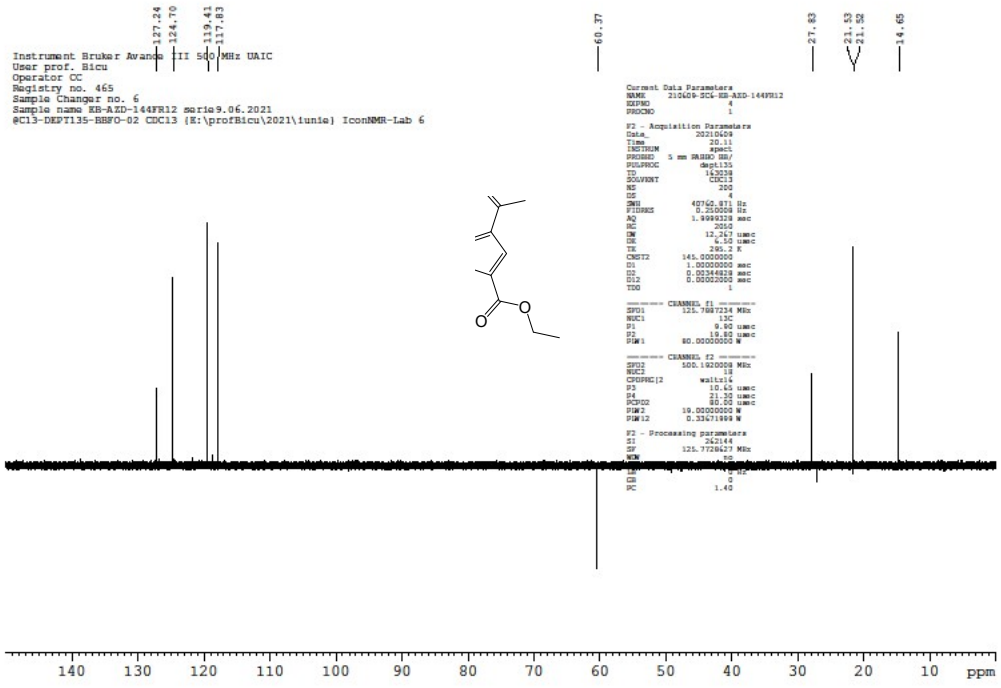
^{1}H NMR (500 MHz, $CDCl_3$) -**10i**



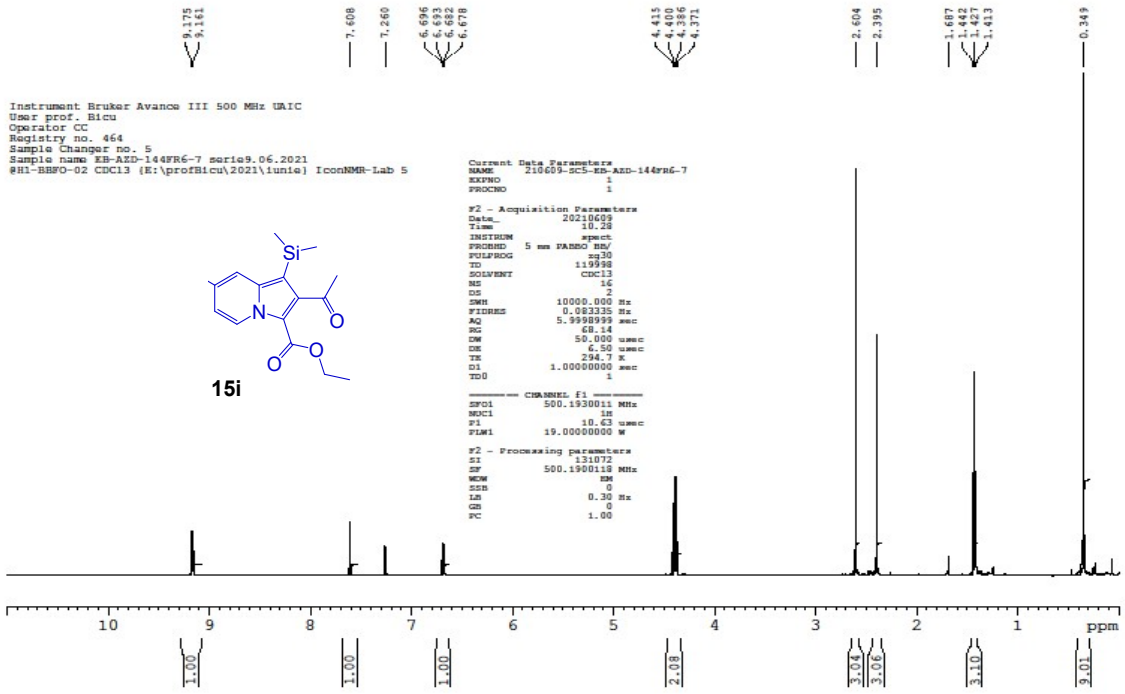
^{13}C NMR (125 MHz, $CDCl_3$)



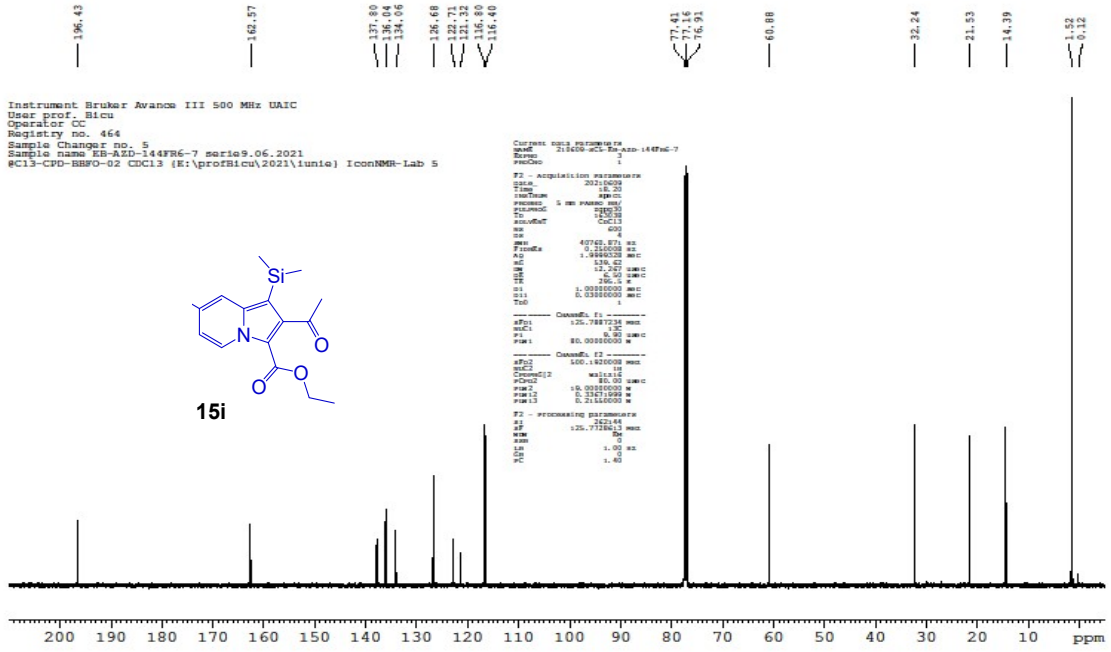
^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



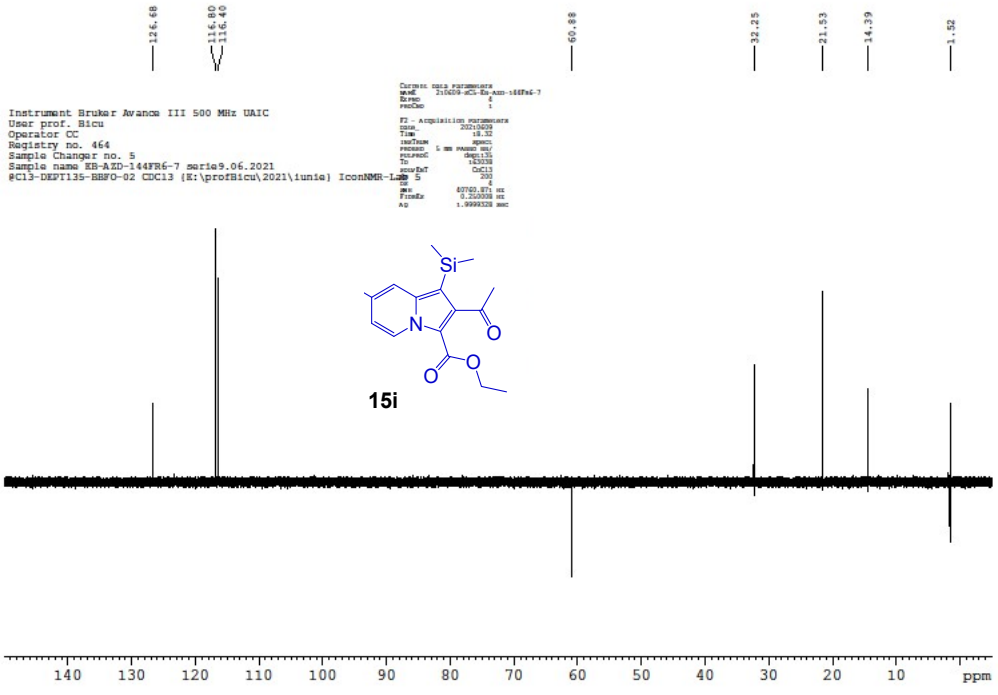
^{1}H NMR (500 MHz, $CDCl_3$) -**15i**



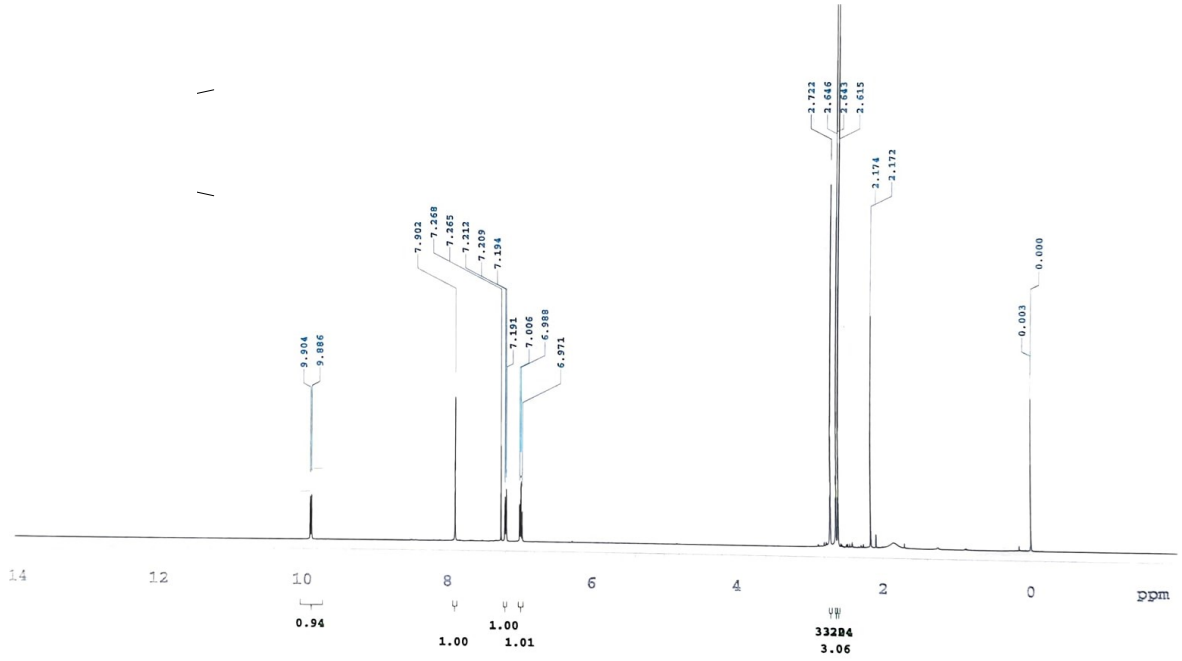
^{13}C NMR (125 MHz, $CDCl_3$)



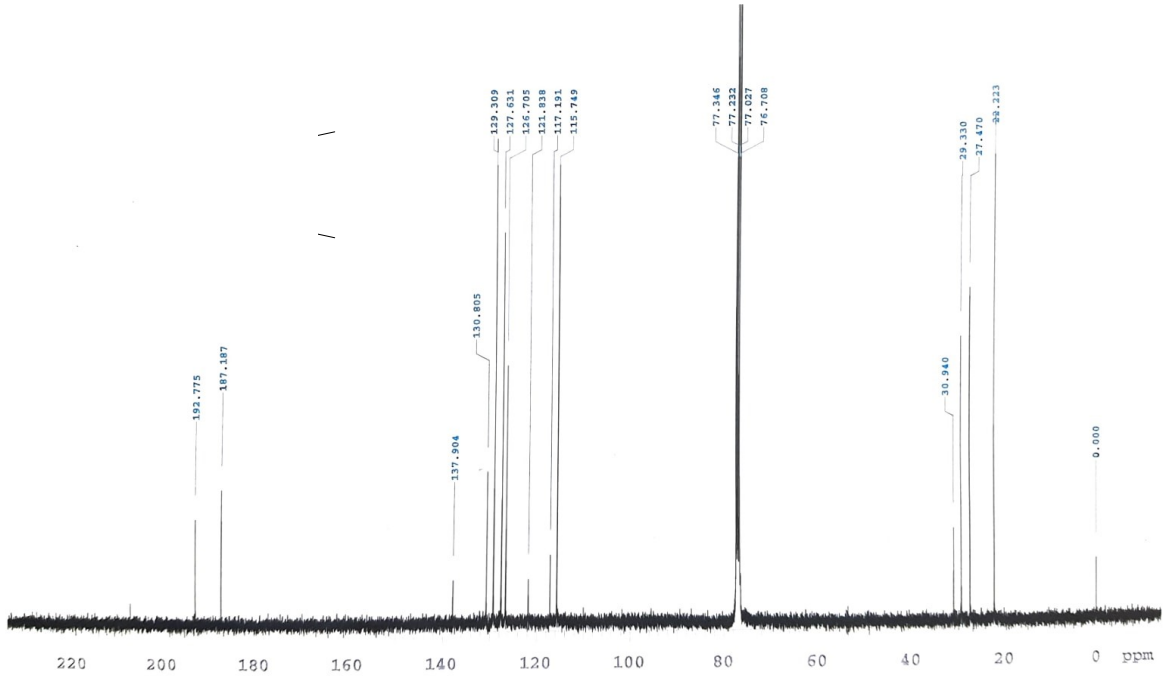
^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



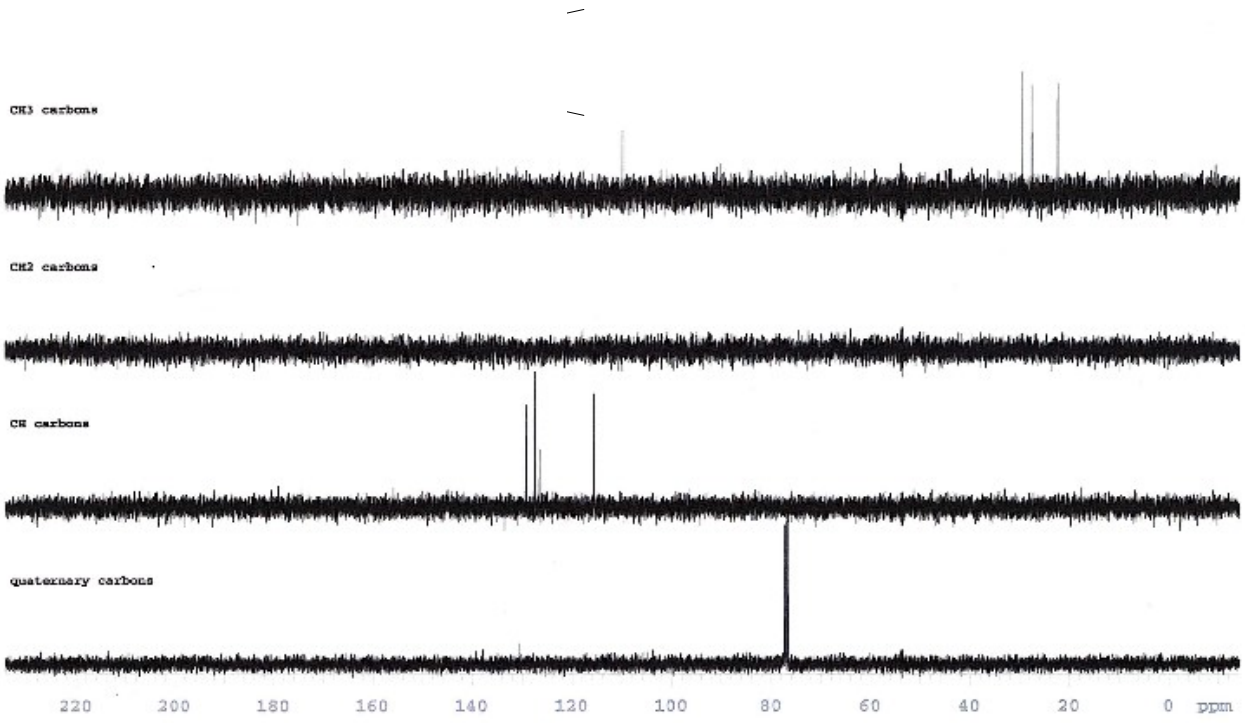
^{1}H NMR (400 MHz, $CDCl_3$) -**10j**



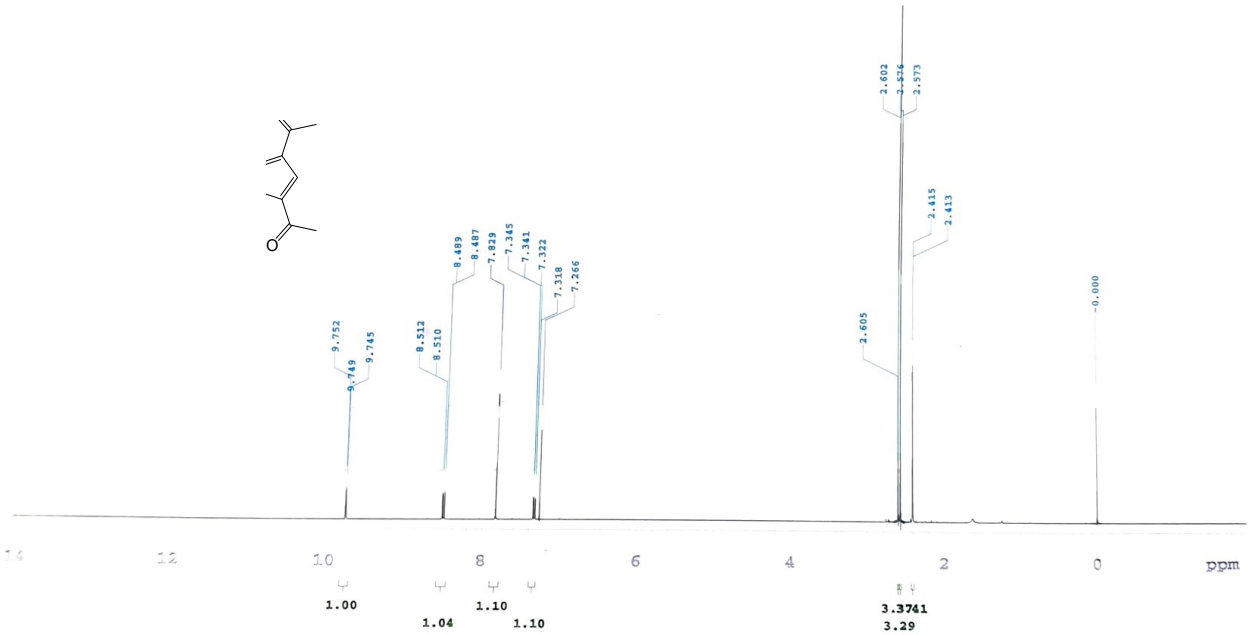
^{13}C NMR (100 MHz, $CDCl_3$)



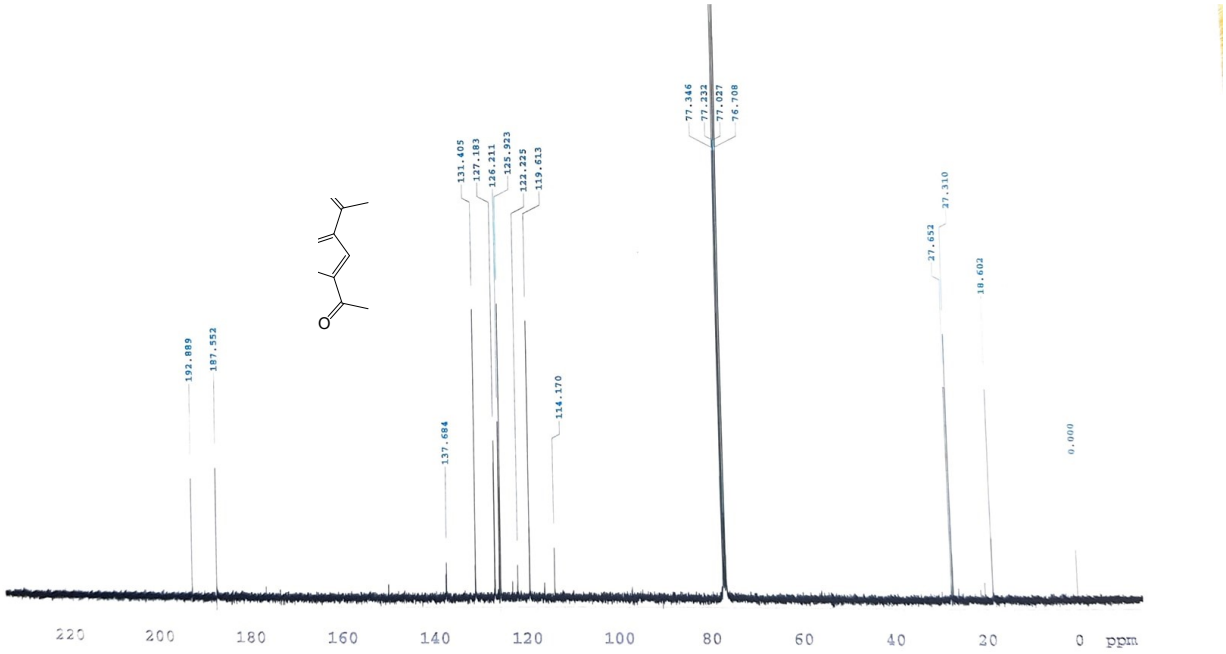
^{13}C-DEPT NMR (100 MHz, $CDCl_3$)



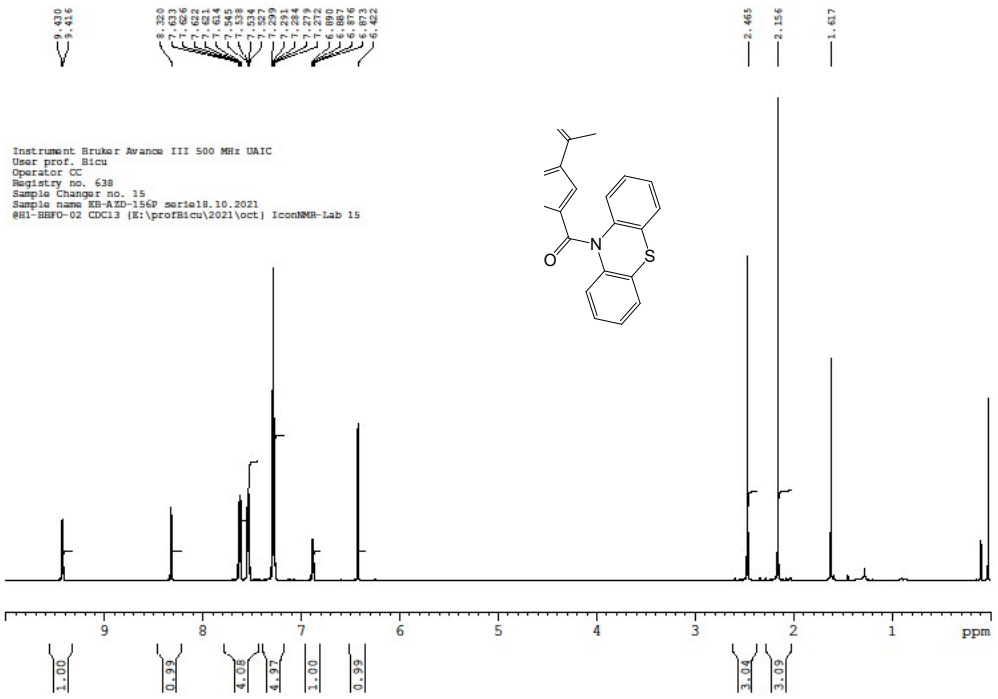
^{1}H NMR (400 MHz, $CDCl_3$) -**10j'**



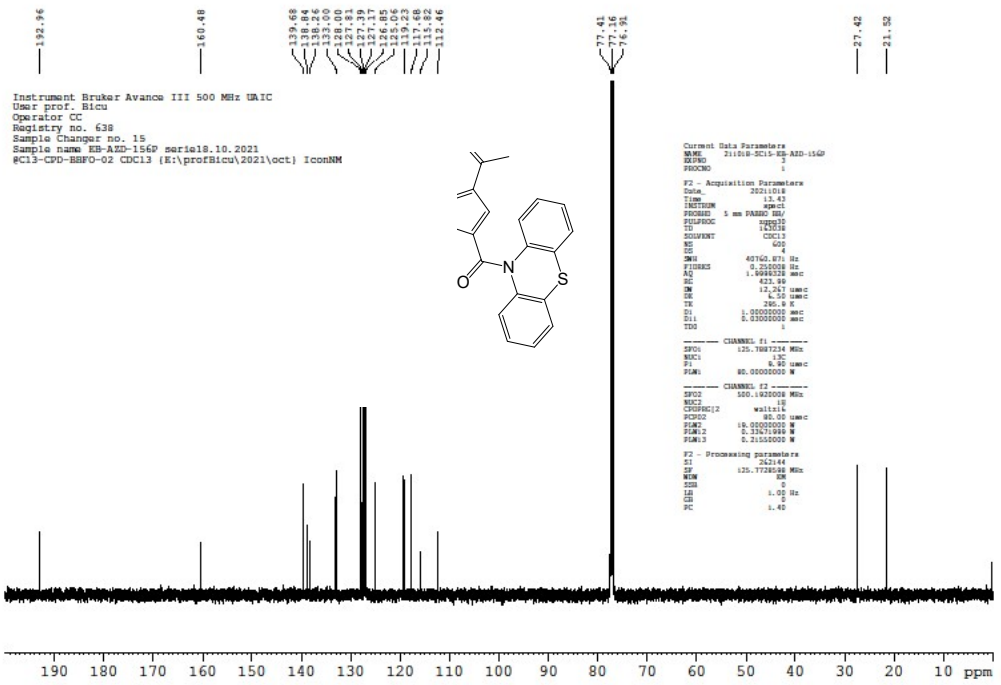
^{13}C NMR (100 MHz, $CDCl_3$)



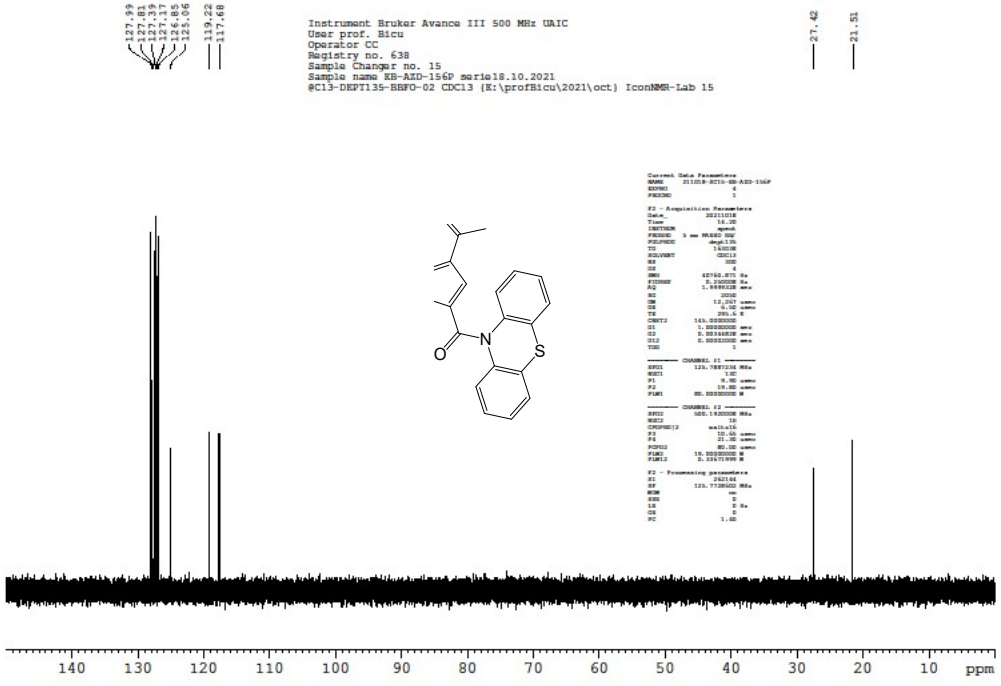
^{1}H NMR (500 MHz, $CDCl_3$) -**10k**



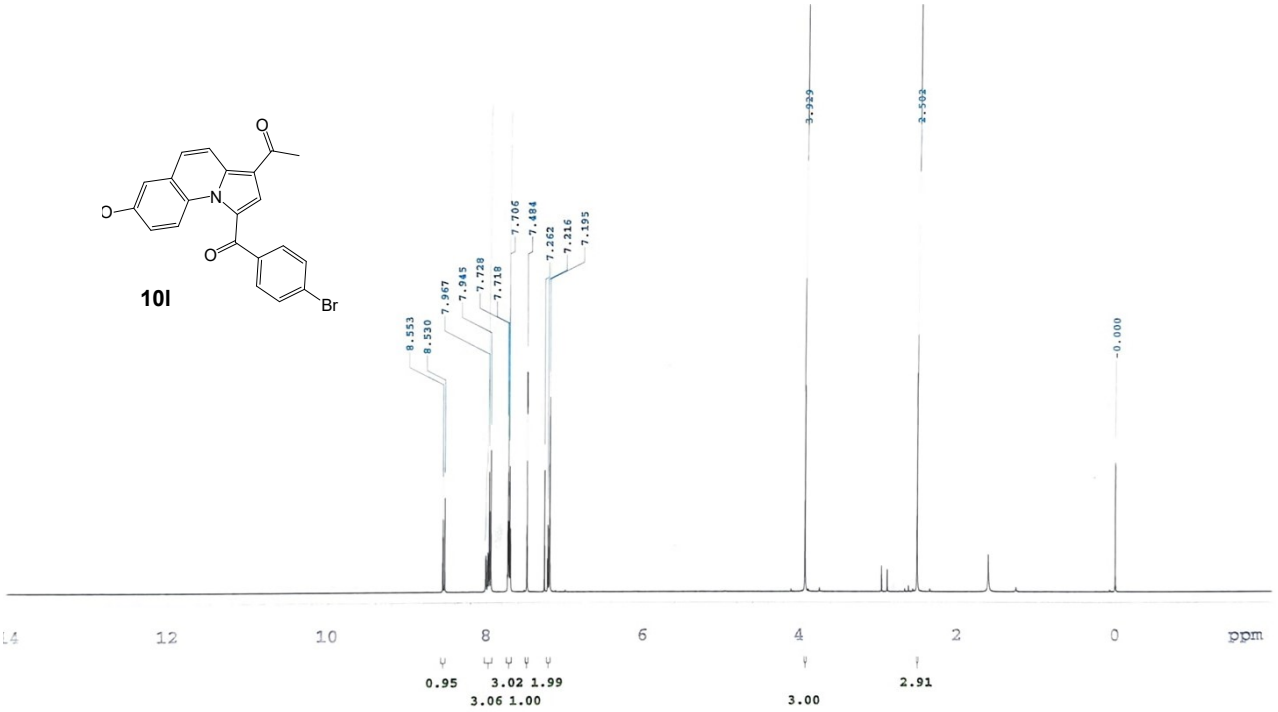
^{13}C NMR (125 MHz, $CDCl_3$)



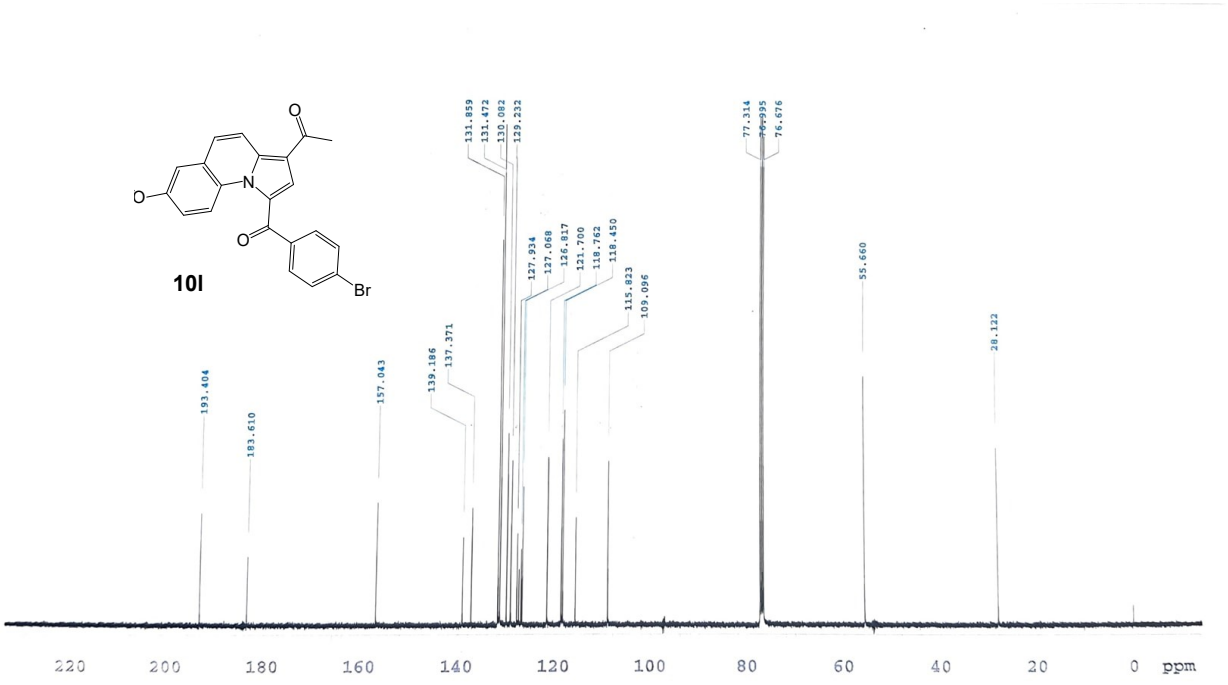
^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



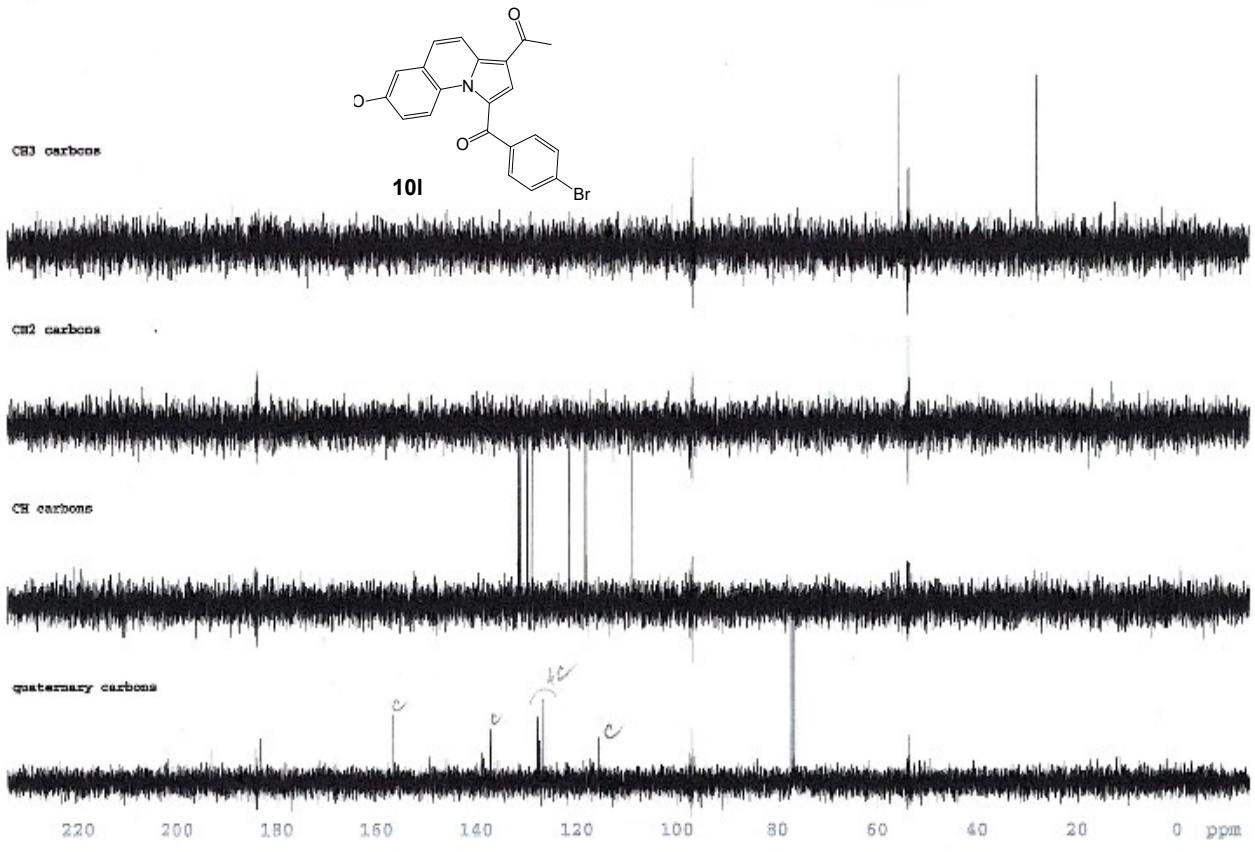
^{1}H NMR (400 MHz, $CDCl_3$) -**10l**



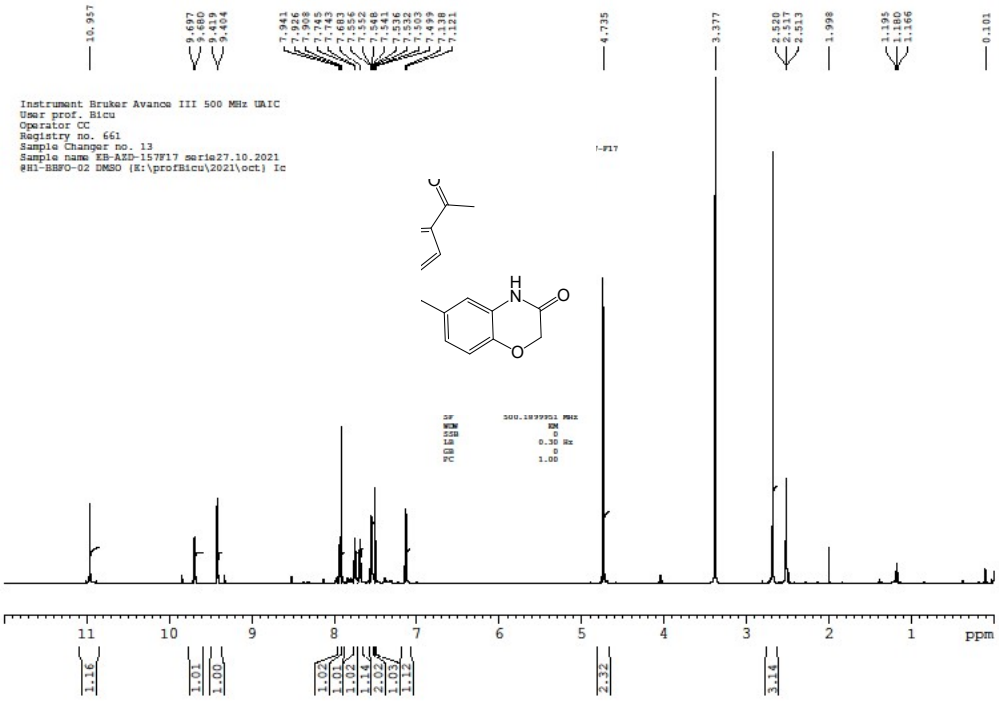
^{13}C NMR (100 MHz, $CDCl_3$)



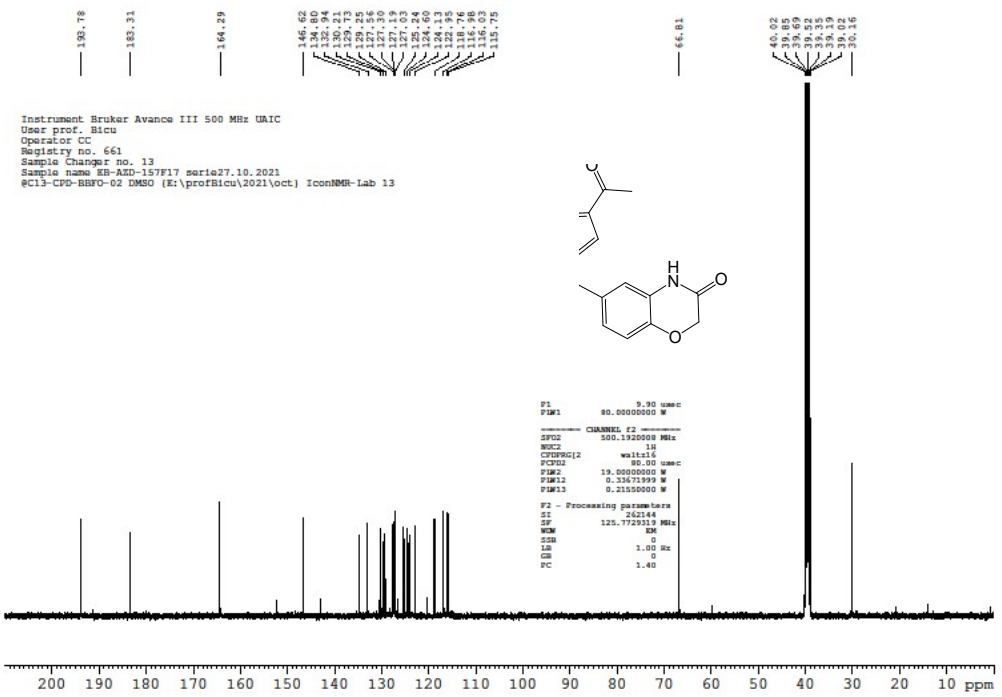
^{13}C-DEPT NMR (100 MHz, $CDCl_3$)



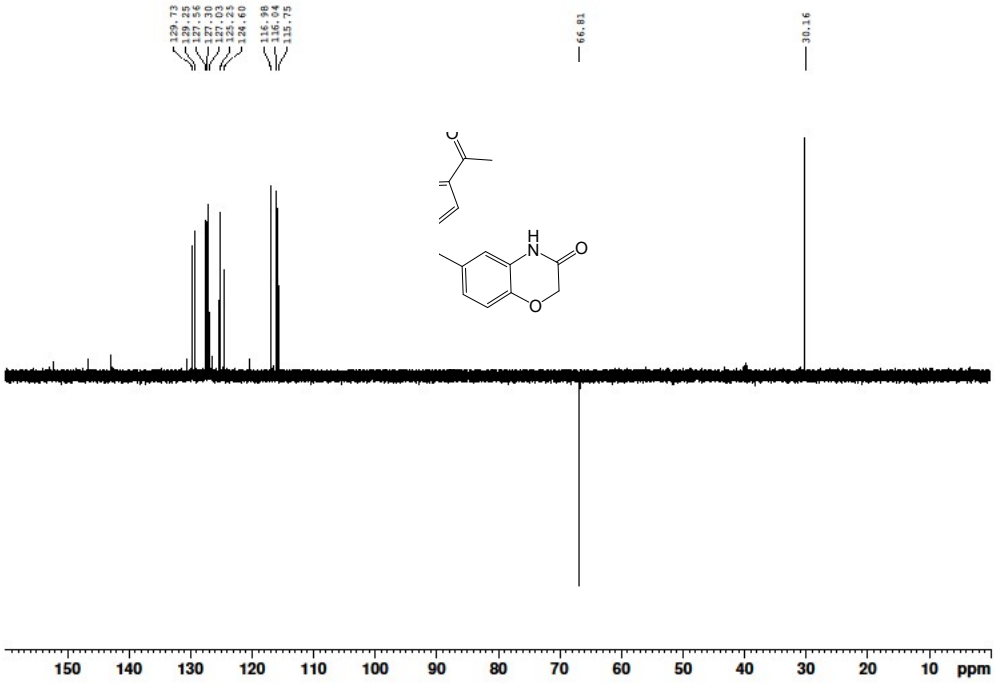
^{1}H NMR (500 MHz, DMSO-d_6) -**10m**



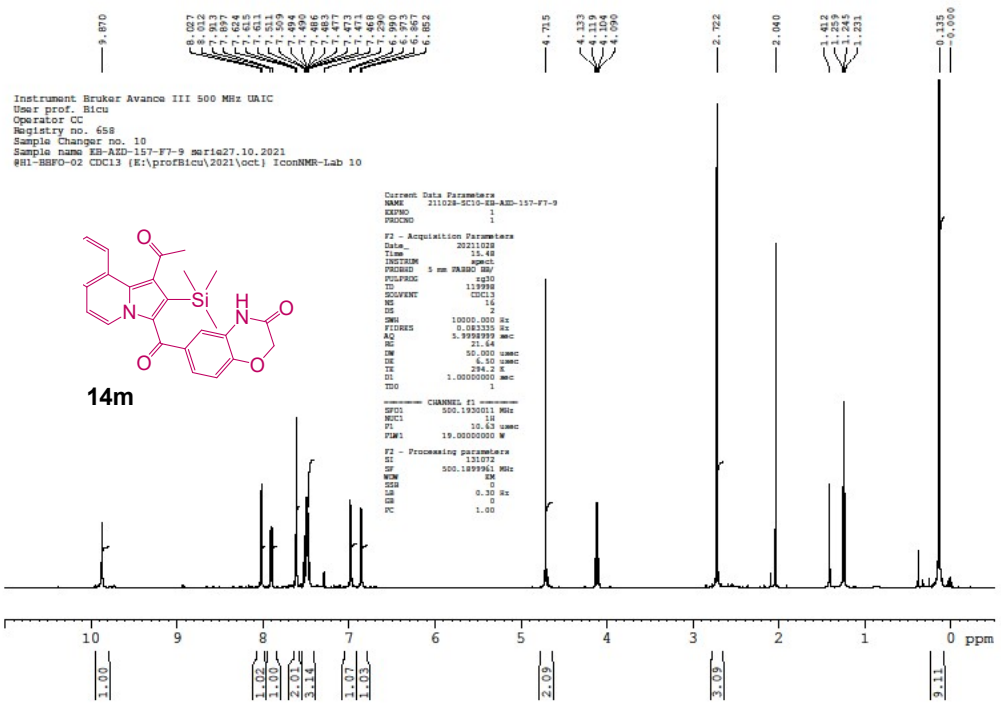
^{13}C NMR (125 MHz, DMSO-d_6)



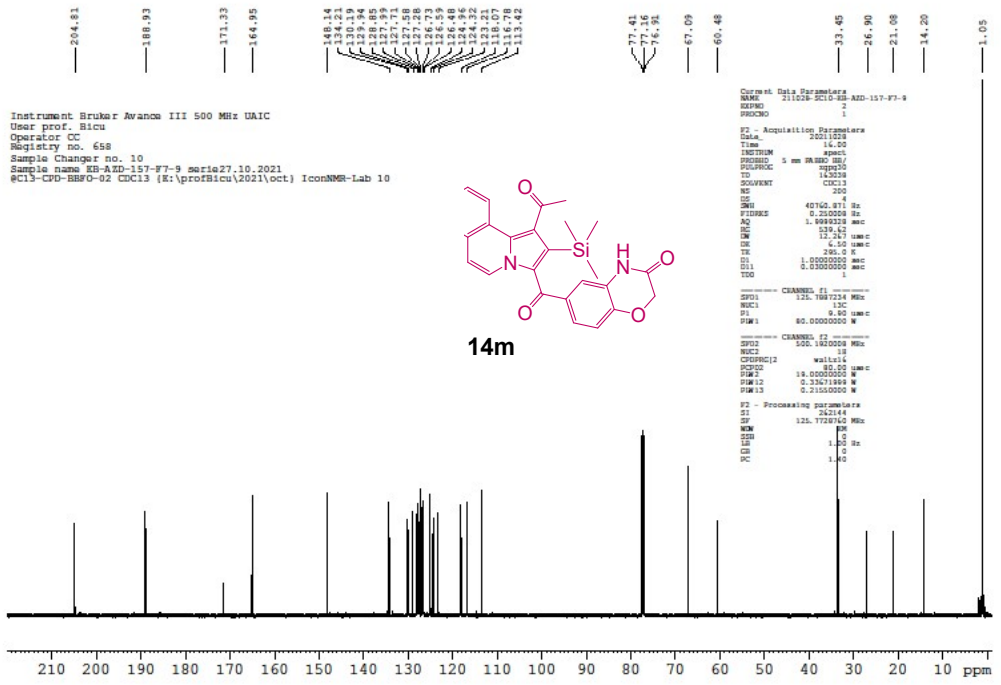
^{13}C-DEPT NMR (125 MHz, DMSO-d_6)


129.73
129.25
127.56
127.30
127.03
125.25
124.60
116.98
116.04
115.75
66.81
30.16
H
N
O
O
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

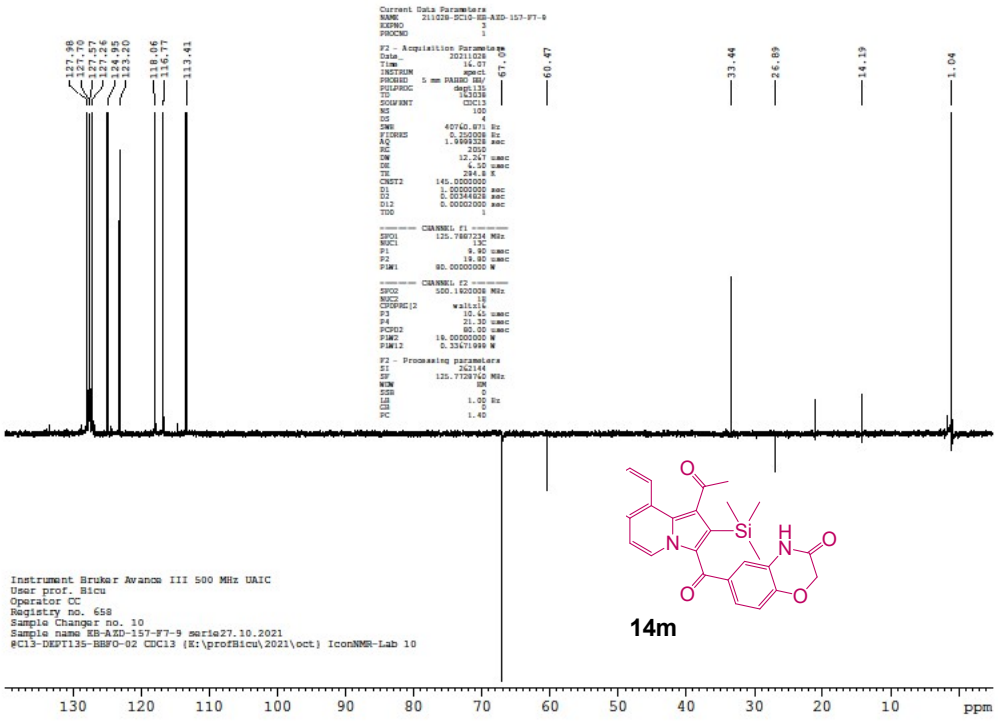
^{1}H NMR (500 MHz, $CDCl_3$) -**14m**



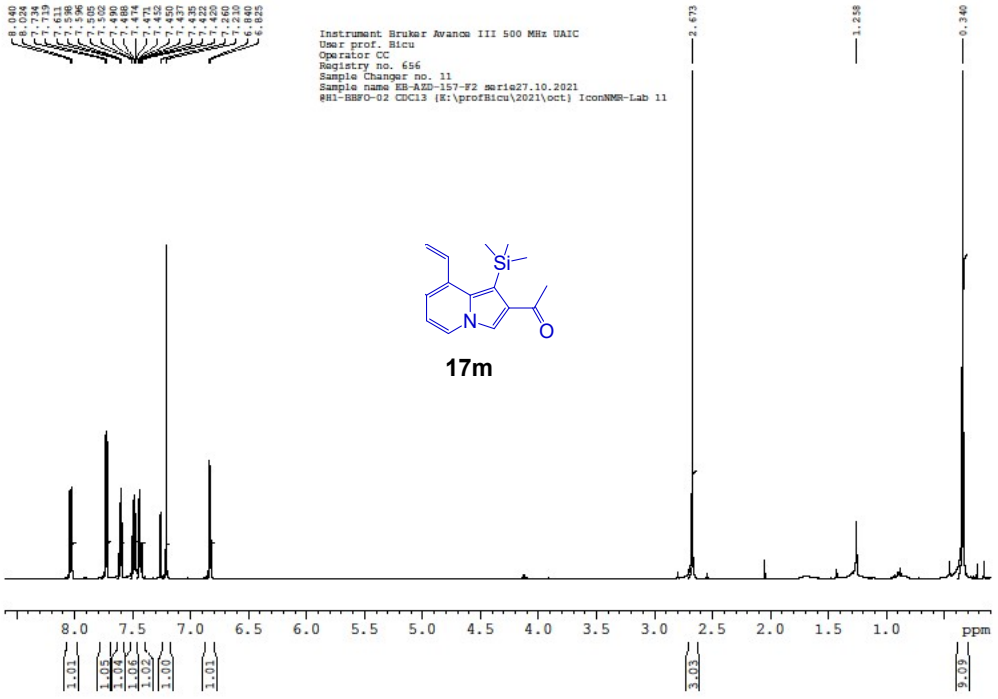
^{13}C NMR (125 MHz, $CDCl_3$)



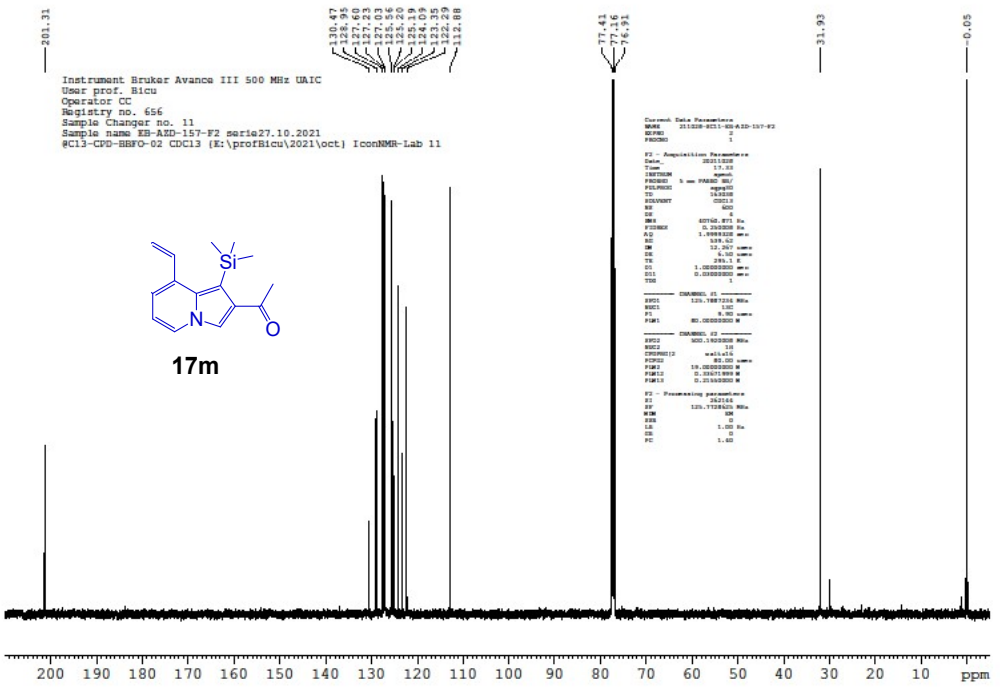
^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



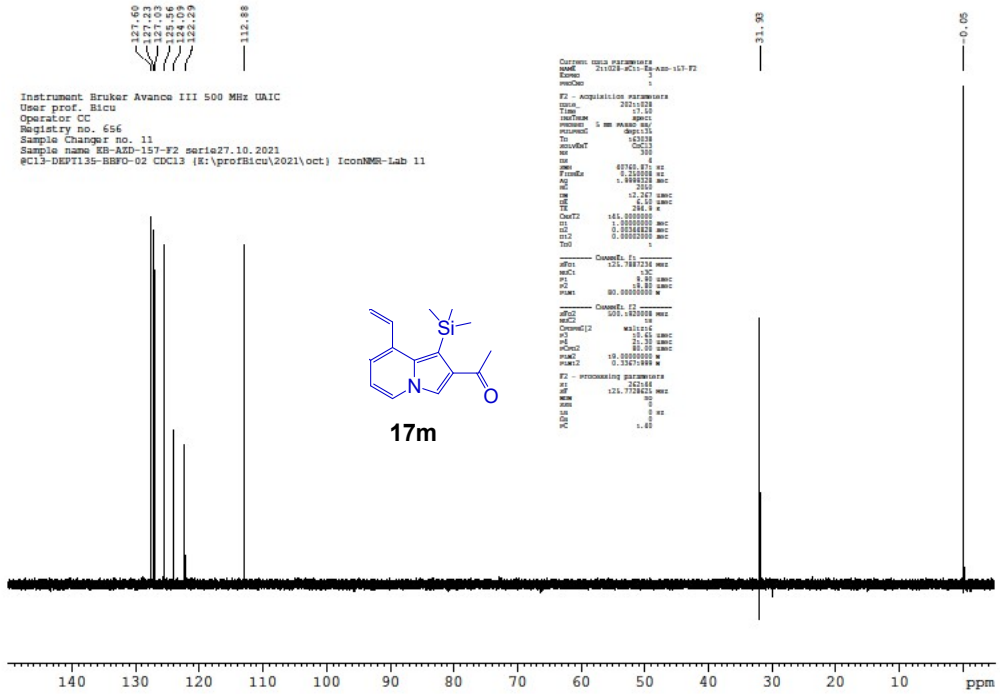
^{1}H NMR (500 MHz, $CDCl_3$) **-17m**



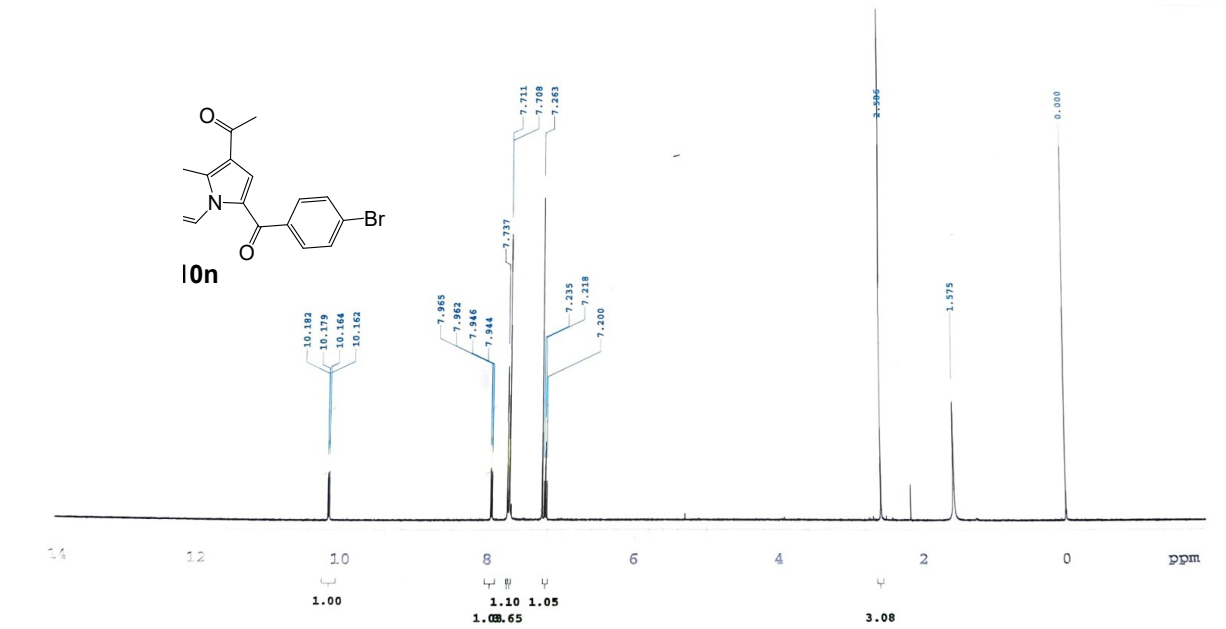
^{13}C NMR (125 MHz, $CDCl_3$)



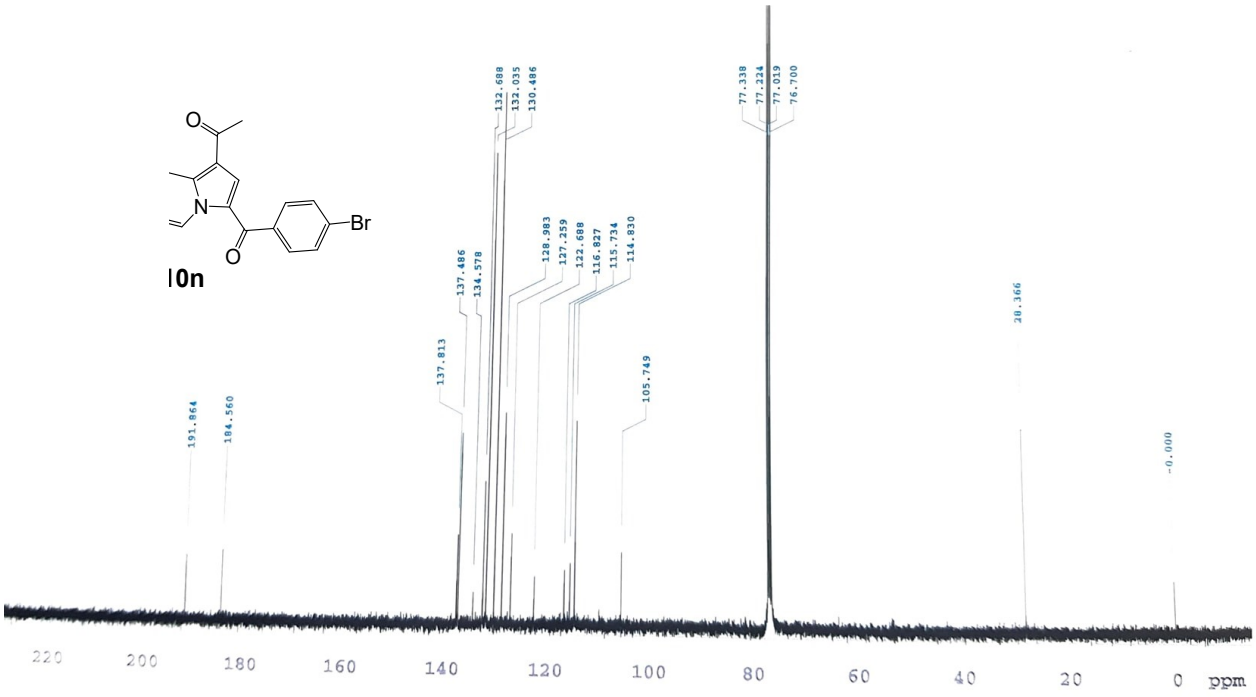
^{13}C-DEPT NMR (125 MHz, $CDCl_3$)



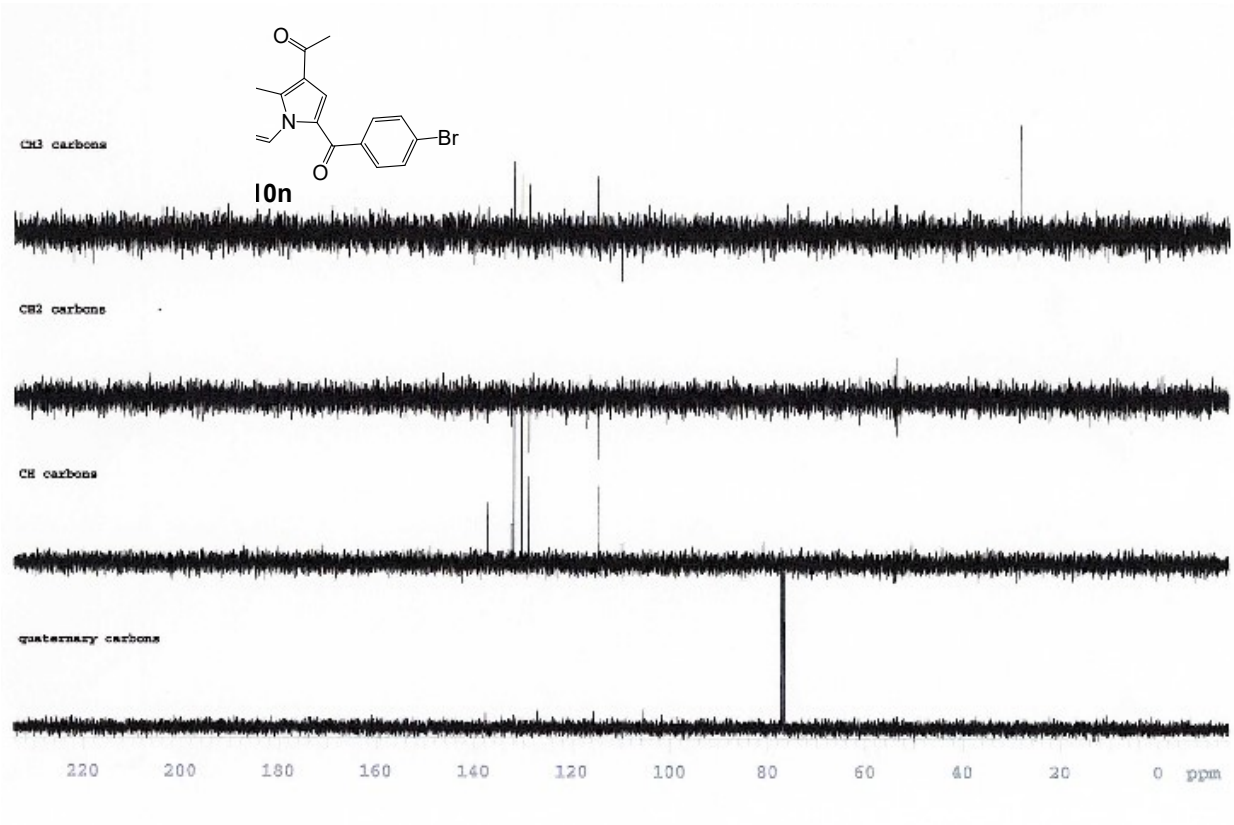
^{1}H NMR (400 MHz, $CDCl_3$) -**10n**



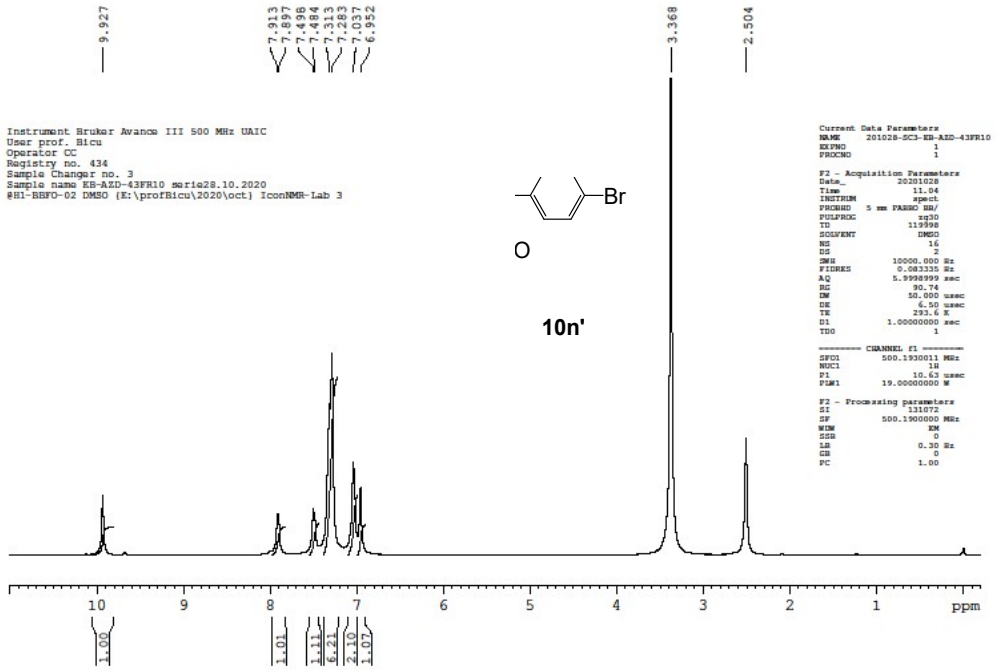
^{13}C NMR (100 MHz, $CDCl_3$)



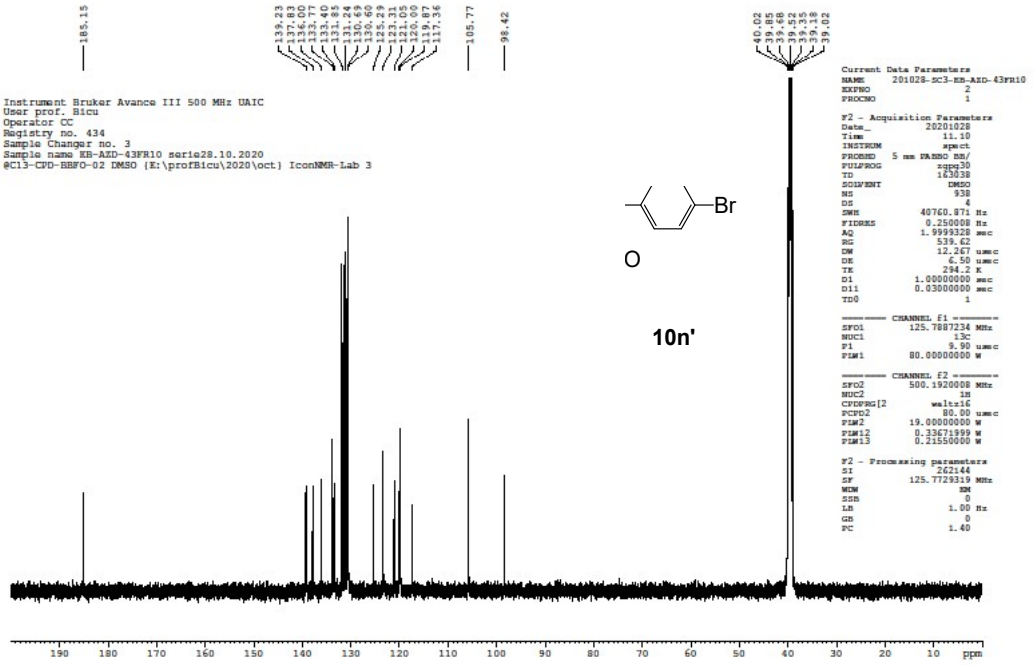
^{13}C-DEPT NMR (100 MHz, $CDCl_3$)



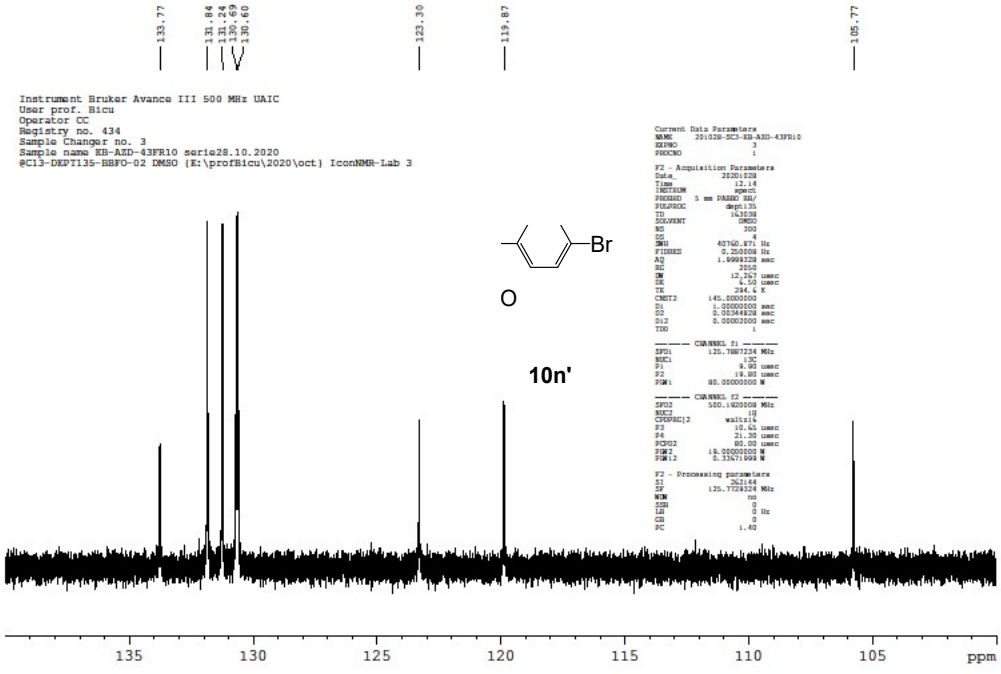
^{1}H NMR (500 MHz, DMSO-d_6) -**10n'**



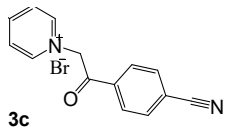
^{13}C NMR (125 MHz, DMSO-d_6)



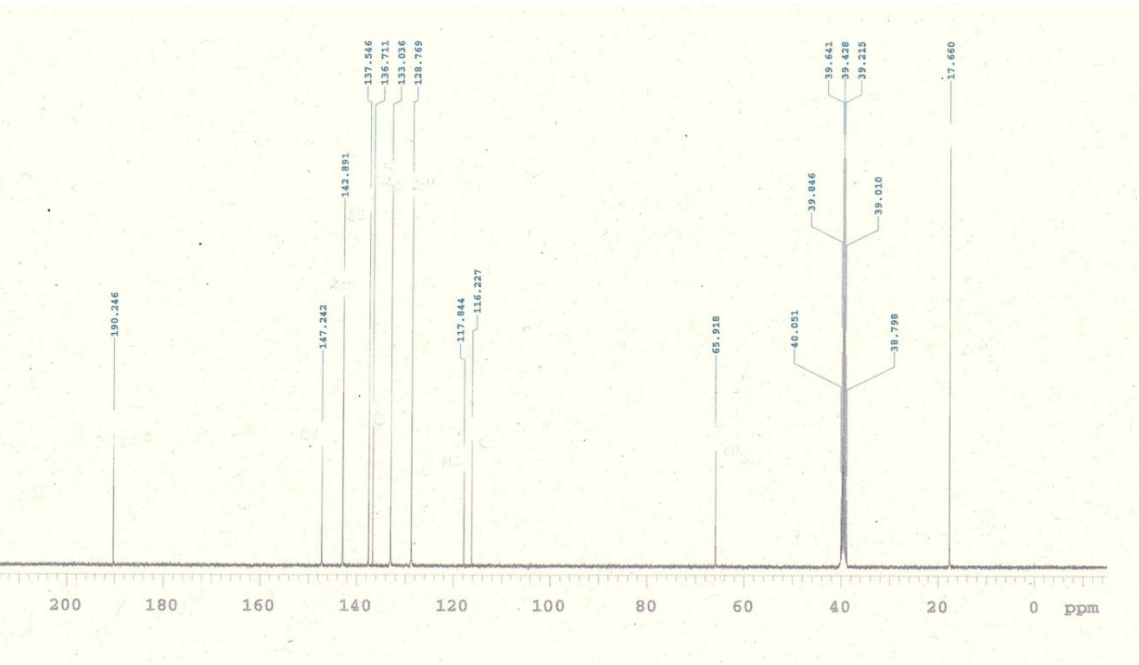
^{13}C-DEPT NMR (125 MHz, DMSO-d_6)



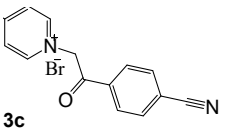
^{1}H NMR (400 MHz, DMSO-d_6) -**13c**



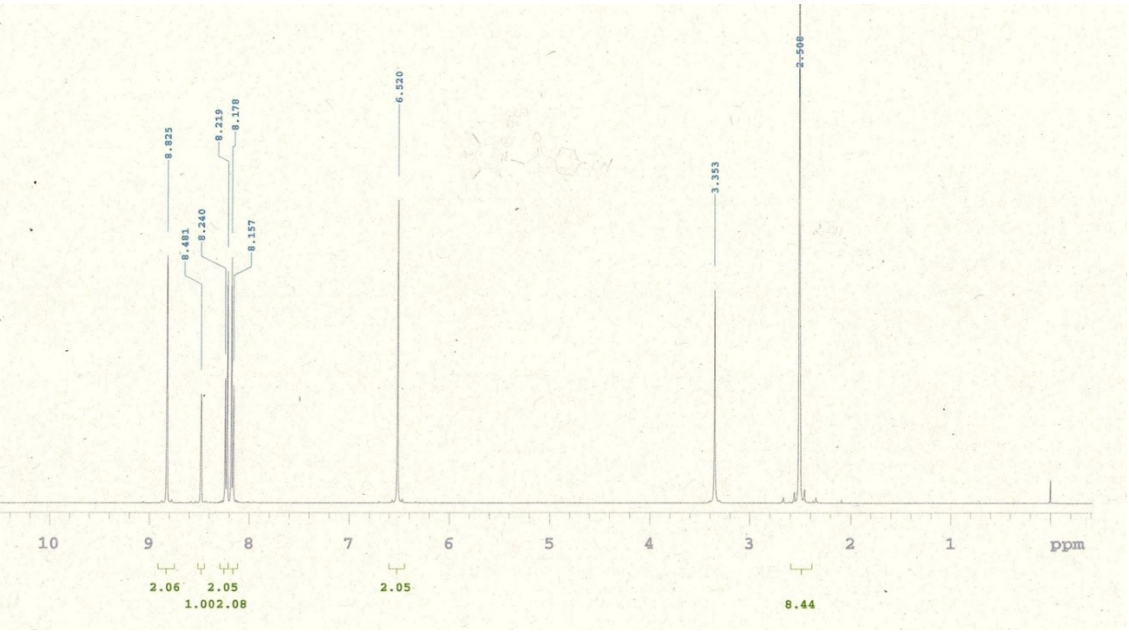
3c

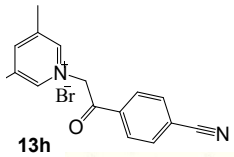


^{13}C NMR (100 MHz, DMSO-d_6)

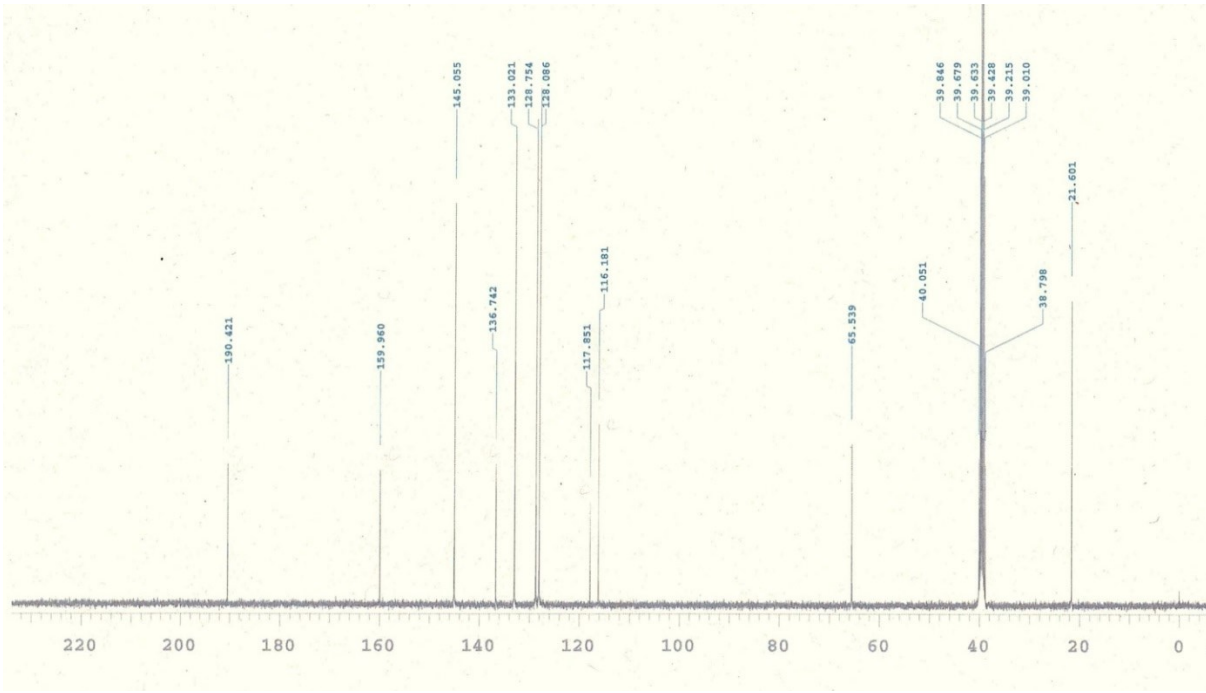


3c


8.825
8.481
8.240
8.219
8.178
8.157
6.520
3.353
2.500
10
9
8
7
6
5
4
3
2
1
ppm
2.06
2.05
1.002.08
2.05
8.44

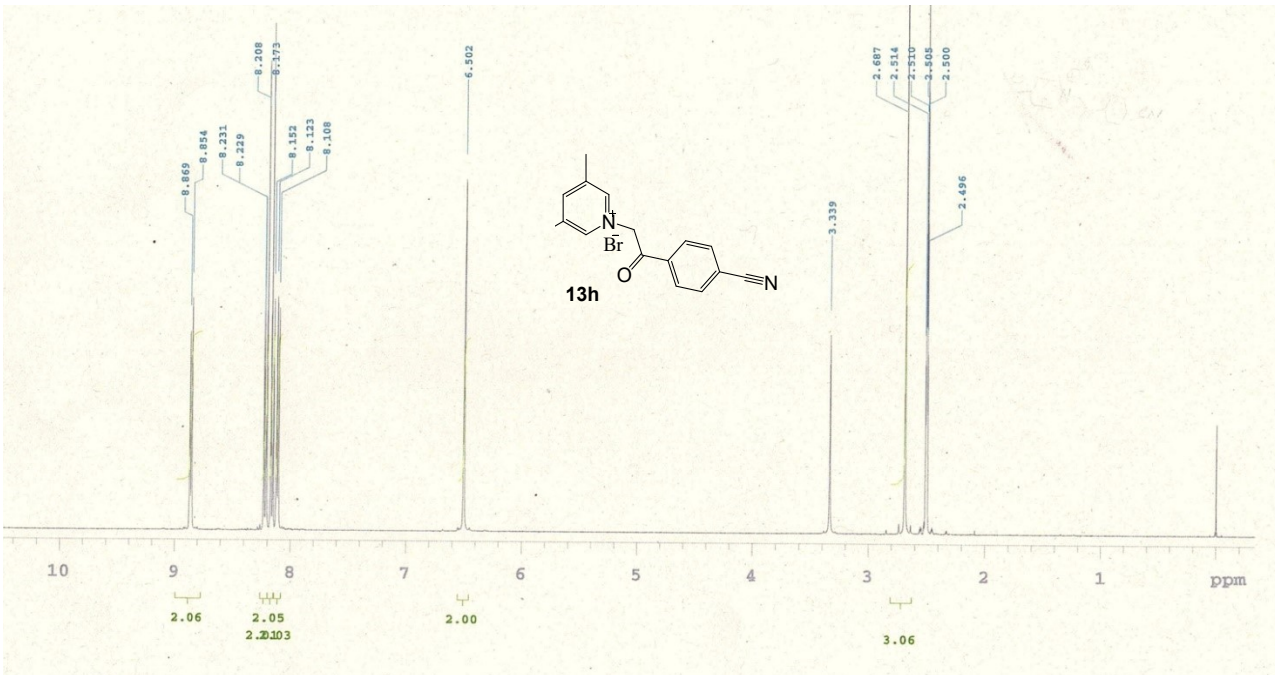


13h

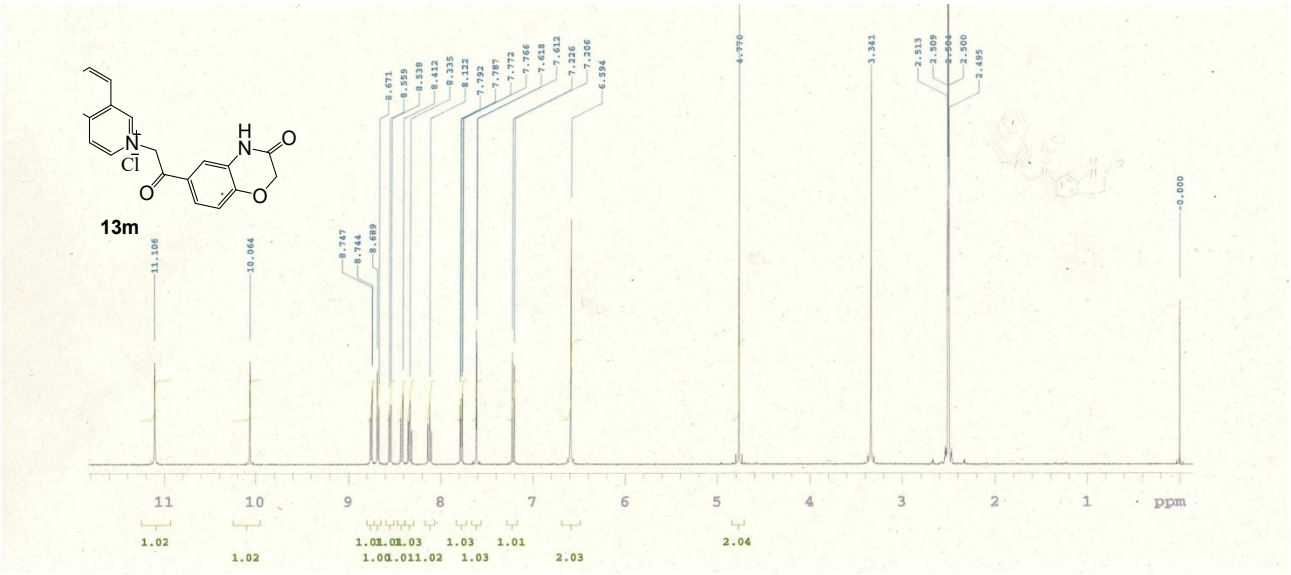


^{1}H NMR (400 MHz, DMSO-d_6) -**13h**

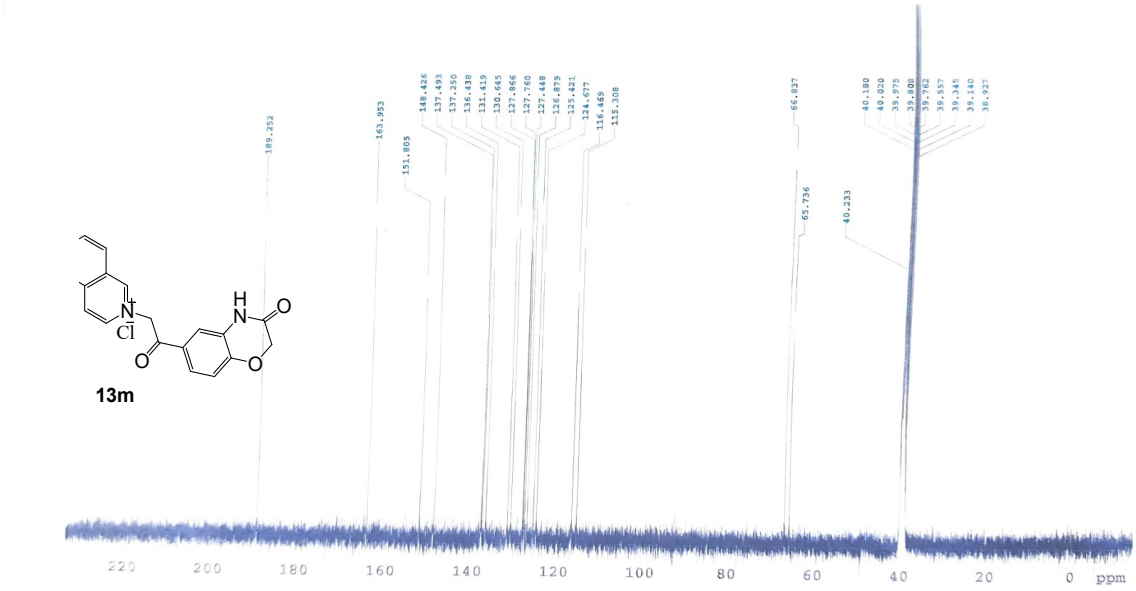
^{13}C NMR (100 MHz, DMSO-d_6)


8.869
8.854
8.231
8.229
8.208
8.173
8.152
8.123
8.108
6.502
3.339
2.687
2.514
2.510
2.505
2.500
2.496
13h
10
9
8
7
6
5
4
3
2
1
ppm
2.06
2.05
2.00
3.06

^{1}H NMR (400 MHz, DMSO-d_6) -**13m**



^{13}C NMR (100 MHz, DMSO-d_6)



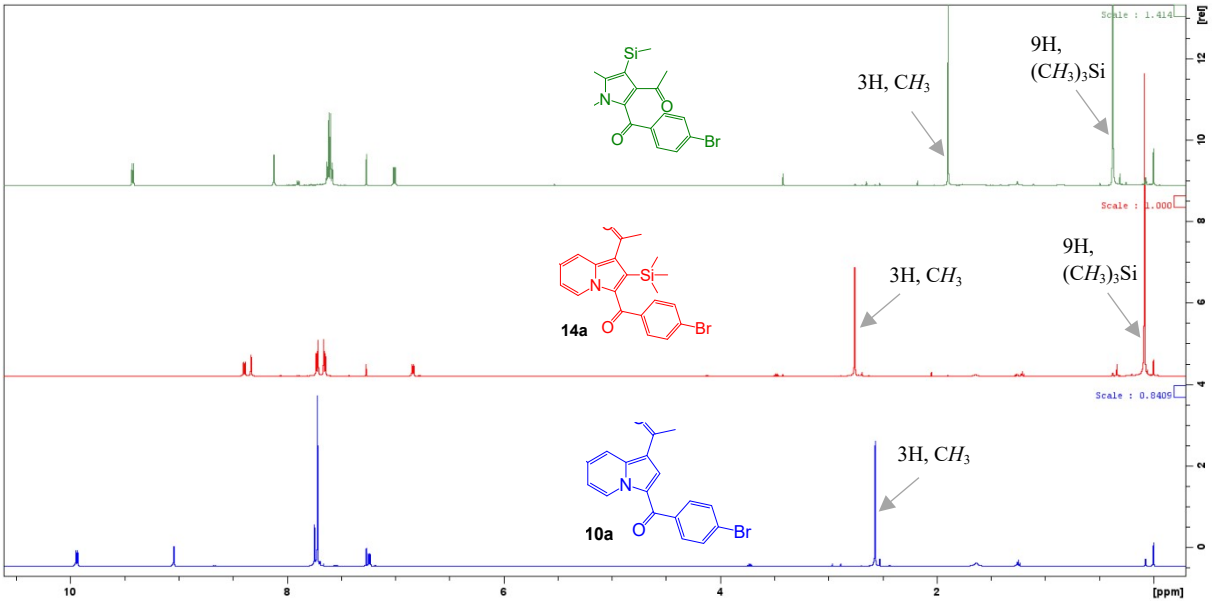
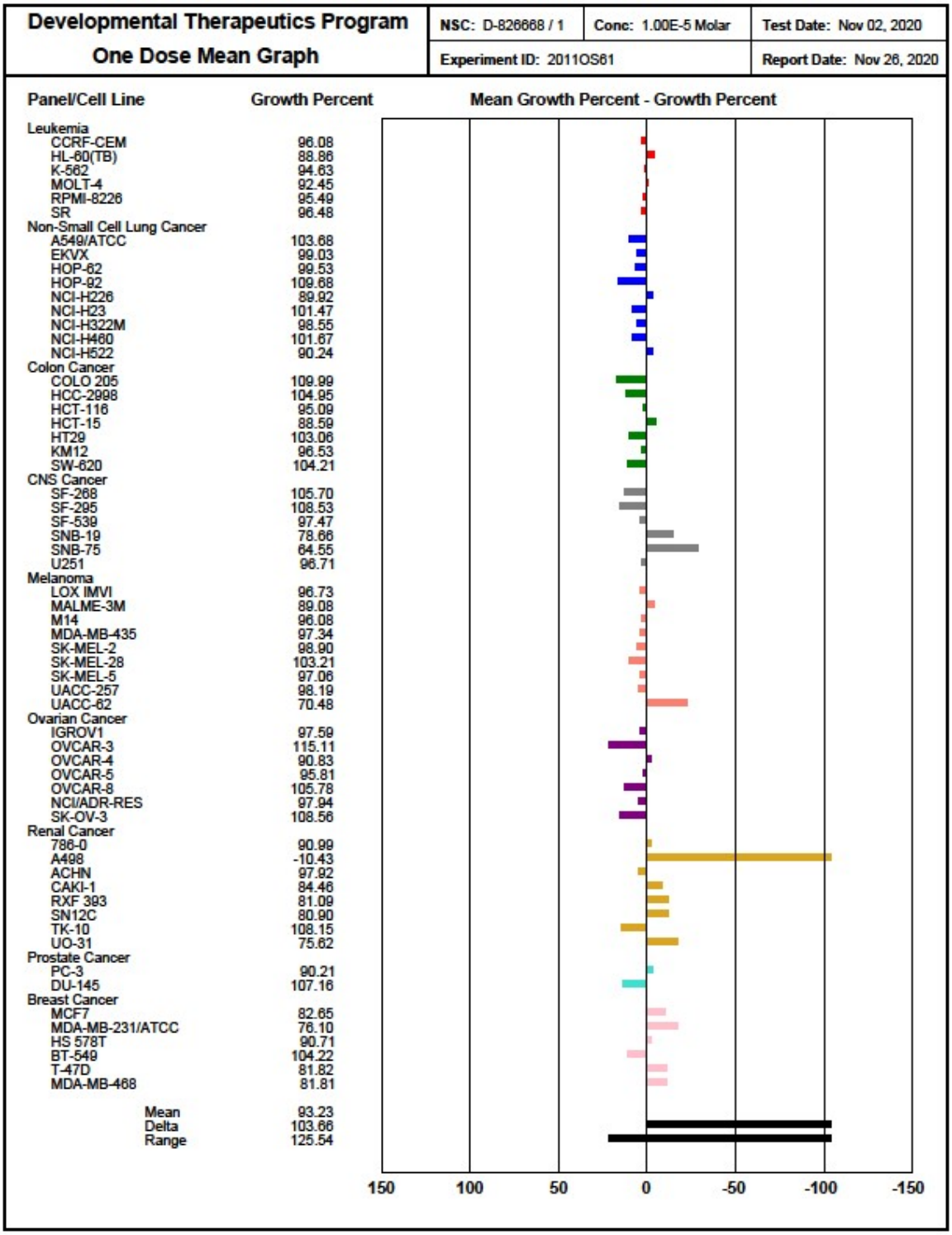


Figure S1. Superimposition of ^{1}H NMR spectra ($CDCl_3$) of compounds **10a**, **14a** and **15a**

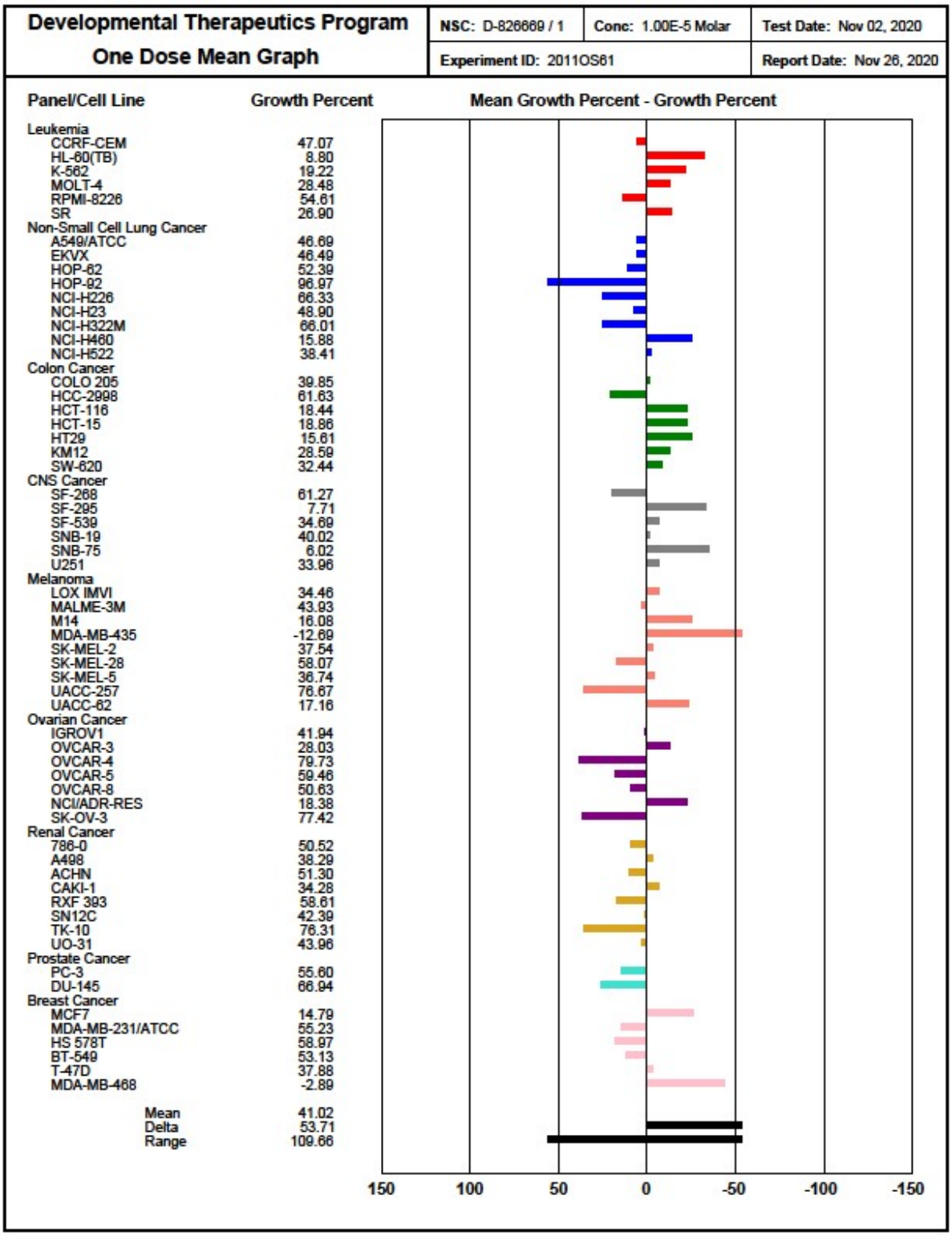
By superimposing the ^{1}H NMR spectra of compounds **10a**, **14a** and **15a** (Figure S1), some characteristics are highlighted also in the aliphatic zone: the characteristic signal of the 9 protons from the trimethylsilyl $(CH_3)_3Si$ group (for structures **14a** and **15a**) and of the 3 protons of the acetyl function, highlighting the fact that in compound **15a**, which contains the acetyl group in position 2, the chemical shift is approximately 1.9 ppm, while in the derivatives with the acetyl group in position 1 (in compounds **10a** and **14a**) the signal is deshielded (δ ~ 2.5 ppm), as a result of the formation of a hydrogen bond (O---Hindoliz-8).

One-dose full graphs obtained on NCI-60 cancer cell lines panel

Compound 10e



Compound 10e'



Compound 10g

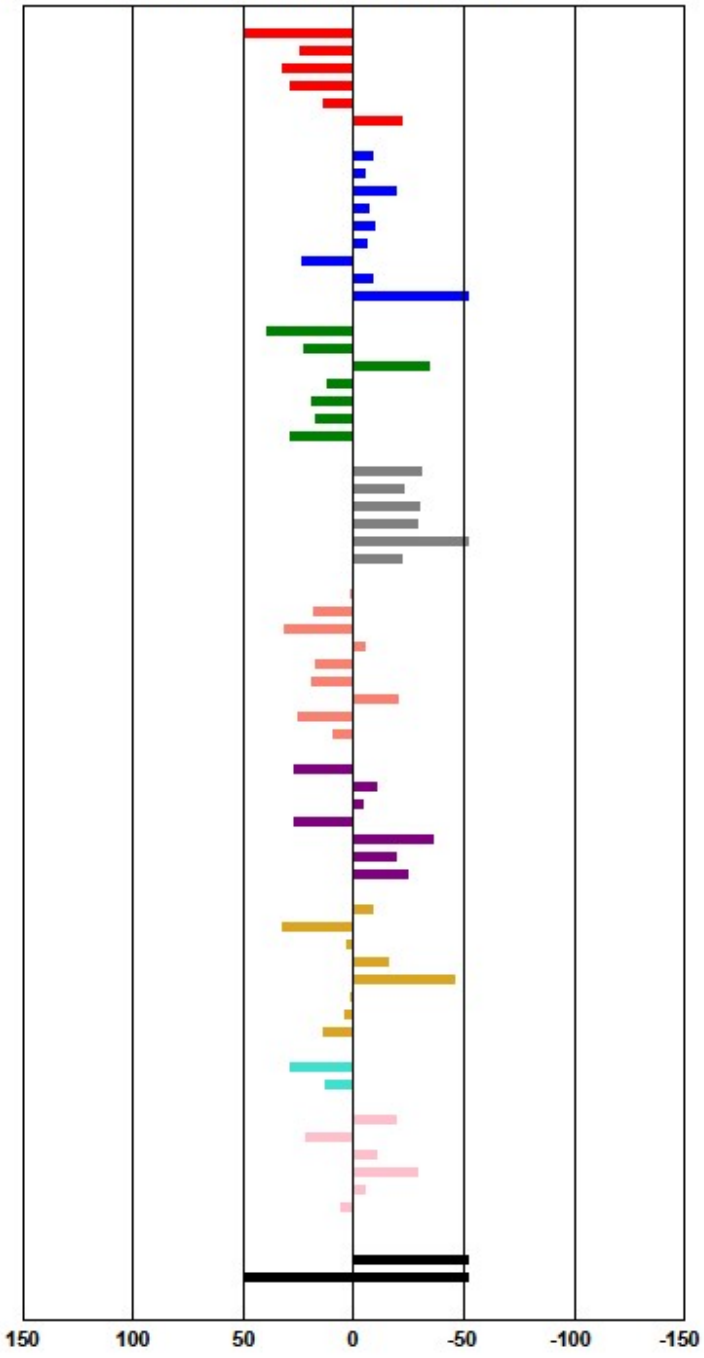
Developmental Therapeutics Program

One Dose Mean Graph

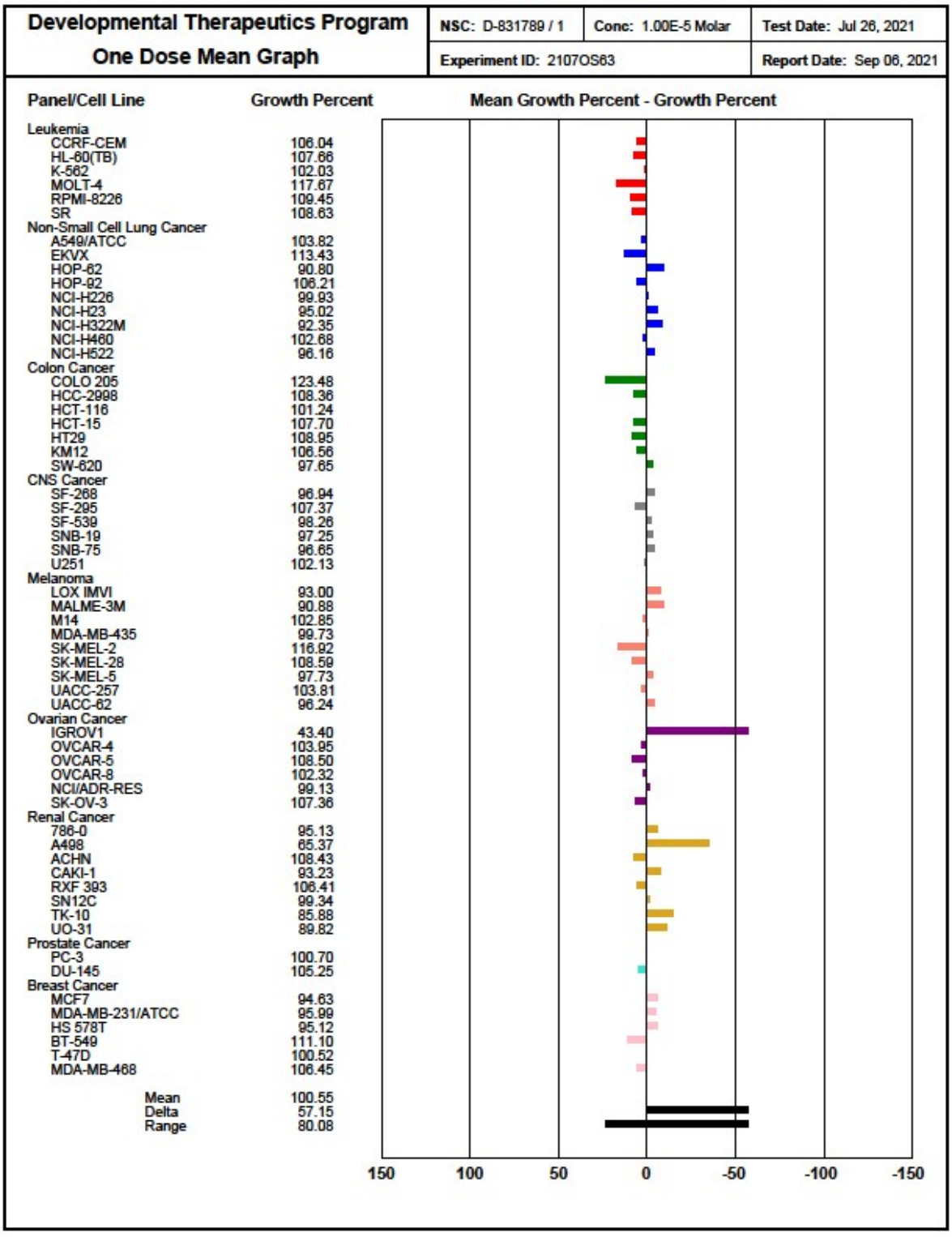
NSC: D-833245 / 1	Conc: 1.00E-5 Molar	Test Date: Dec 13, 2021
Experiment ID: 2112OS29		Report Date: Feb 17, 2022

Panel/Cell Line	Growth Percent
Leukemia	
CCRF-CEM	103.50
HL-60(TB)	78.04
K-562	86.37
MOLT-4	82.34
RPMI-8226	67.69
SR	31.78
Non-Small Cell Lung Cancer	
A549/ATCC	45.35
EKVX	49.36
HOP-62	34.49
HOP-92	46.85
NCI-H226	44.39
NCI-H23	47.70
NCI-H322M	76.85
NCI-H460	45.43
NCI-H522	2.30
Colon Cancer	
COLO 205	92.71
HCC-2998	76.09
HCT-116	19.64
HCT-15	65.87
HT29	72.46
KM12	71.16
SW-620	82.19
CNS Cancer	
SF-268	23.46
SF-295	31.01
SF-539	23.79
SNB-19	24.77
SNB-75	2.27
U251	32.38
Melanoma	
LOX IMVI	54.85
MALME-3M	72.14
M14	84.91
MDA-MB-435	49.11
SK-MEL-2	70.95
SK-MEL-28	72.89
SK-MEL-5	33.61
UACC-257	79.20
UACC-62	63.37
Ovarian Cancer	
IGROV1	80.83
OVCAR-3	43.93
OVCAR-4	49.85
OVCAR-5	80.49
OVCAR-8	18.36
NCI/ADR-RES	35.03
SK-OV-3	29.13
Renal Cancer	
786-0	45.44
A498	86.06
ACHN	56.64
CAKI-1	38.56
RXF 393	8.06
SN12C	55.02
TK-10	57.38
UO-31	67.55
Prostate Cancer	
PC-3	82.94
DU-145	66.89
Breast Cancer	
MCF7	35.23
MDA-MB-231/ATCC	75.33
HS 578T	43.40
BT-549	25.40
T-47D	48.56
MDA-MB-468	59.62
Mean	53.85
Delta	51.58
Range	101.23

Mean Growth Percent - Growth Percent



Compound 10i



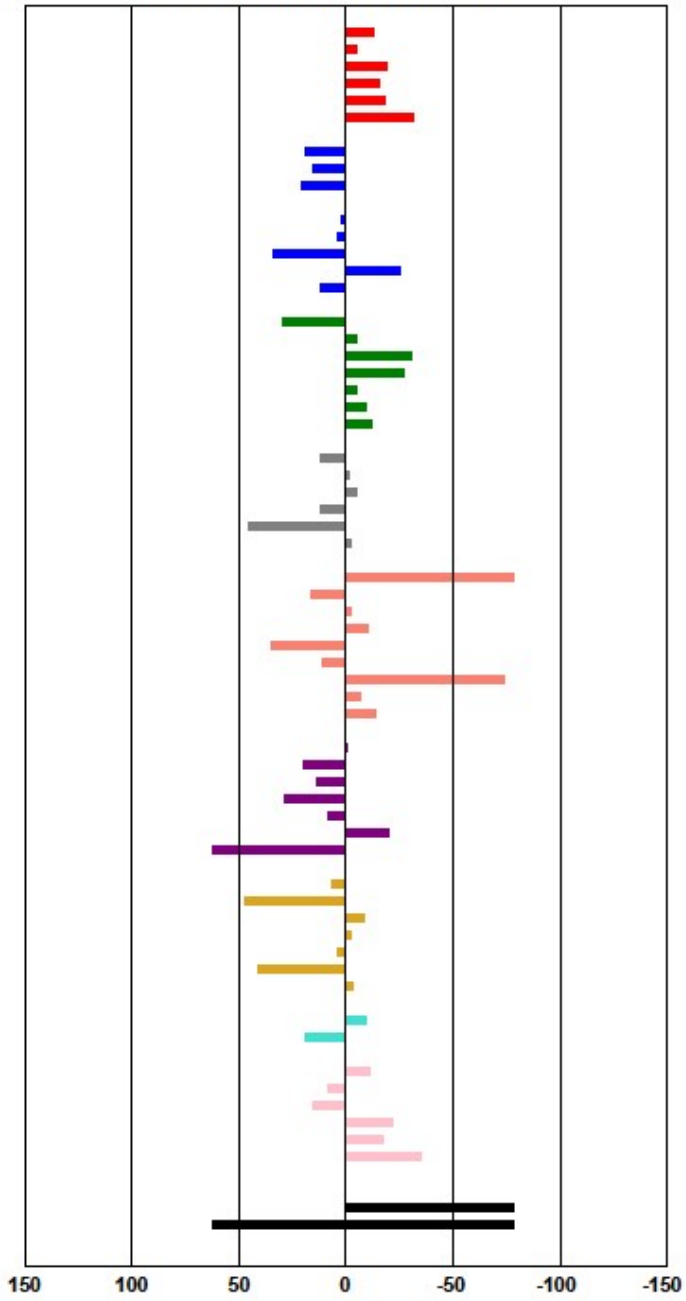
Compound 10k

Developmental Therapeutics Program

One Dose Mean Graph

NSC: D-835650 / 1	Conc: 1.00E-5 Molar	Test Date: Mar 07, 2022
Experiment ID: 2203OS82		Report Date: Mar 28, 2022

Panel/Cell Line	Growth Percent
Leukemia	
CCRF-CEM	24.81
HL-60(TB)	33.30
K-562	18.66
MOLT-4	22.63
RPMI-8226	19.81
SR	6.72
Non-Small Cell Lung Cancer	
A549/ATCC	56.88
EKVX	53.09
HOP-62	58.60
HOP-92	38.06
NCI-H226	40.17
NCI-H23	41.97
NCI-H322M	72.21
NCI-H460	12.33
NCI-H522	49.61
Colon Cancer	
COLO 205	67.66
HCC-2998	32.71
HCT-116	7.08
HCT-15	10.54
HT29	32.70
KM12	28.27
SW-620	25.60
CNS Cancer	
SF-268	49.42
SF-295	36.46
SF-539	32.75
SNB-19	49.79
SNB-75	83.08
U251	36.10
Melanoma	
LOX IMVI	-39.98
MALME-3M	53.92
M14	36.05
MDA-MB-435	27.99
SK-MEL-2	72.48
SK-MEL-28	48.69
SK-MEL-5	-36.26
UACC-257	31.61
UACC-62	23.83
Ovarian Cancer	
IGROV1	37.07
OVCAR-3	58.02
OVCAR-4	51.71
OVCAR-5	66.77
OVCAR-8	45.86
NCI/ADR-RES	18.36
SK-OV-3	99.85
Renal Cancer	
786-0	44.48
A498	85.39
ACHN	29.13
CAKI-1	35.27
SN12C	42.31
TK-10	78.91
UO-31	35.10
Prostate Cancer	
PC-3	28.27
DU-145	56.65
Breast Cancer	
MCF7	26.49
MDA-MB-231/ATCC	46.37
HS 578T	53.68
BT-549	15.99
T-47D	20.83
MDA-MB-468	3.44
Mean	37.95
Delta	77.93
Range	139.83



Compound 10l

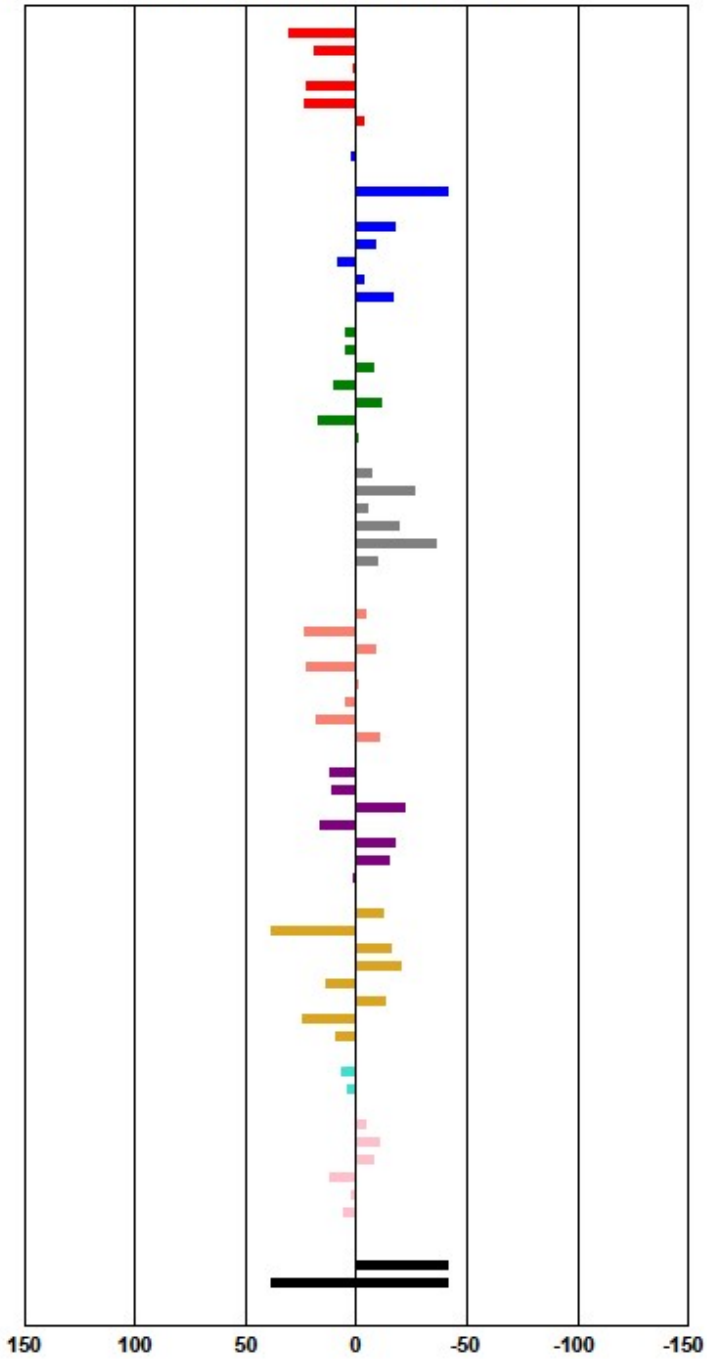
Developmental Therapeutics Program

One Dose Mean Graph

NSC: D-833244 / 1	Conc: 1.00E-5 Molar	Test Date: Dec 13, 2021
Experiment ID: 2112OS29		Report Date: Feb 17, 2022

Panel/Cell Line	Growth Percent
Leukemia	
CCRF-CEM	111.66
HL-60(TB)	99.82
K-562	82.30
MOLT-4	103.86
RPMI-8226	104.13
SR	77.65
Non-Small Cell Lung Cancer	
A549/ATCC	82.92
EKVX	81.28
HOP-62	40.19
HOP-92	81.96
NCI-H226	64.25
NCI-H23	72.52
NCI-H322M	89.23
NCI-H460	78.30
NCI-H522	64.54
Colon Cancer	
COLO 205	86.02
HCC-2998	86.07
HCT-116	73.34
HCT-15	91.29
HT29	70.53
KM12	98.15
SW-620	80.75
CNS Cancer	
SF-268	74.25
SF-295	55.39
SF-539	76.00
SNB-19	62.00
SNB-75	45.27
U251	71.65
Melanoma	
LOX IMVI	81.87
MALME-3M	77.10
M14	104.32
MDA-MB-435	72.56
SK-MEL-2	103.37
SK-MEL-28	80.41
SK-MEL-5	86.00
UACC-257	99.57
UACC-62	71.14
Ovarian Cancer	
IGROV1	92.65
OVCAR-3	92.55
OVCAR-4	59.71
OVCAR-5	97.67
OVCAR-8	63.84
NCI/ADR-RES	66.85
SK-OV-3	82.83
Renal Cancer	
786-0	69.62
A498	119.19
ACHN	66.07
CAKI-1	61.70
RXF 393	94.88
SN12C	68.15
TK-10	105.81
UO-31	90.07
Prostate Cancer	
PC-3	87.75
DU-145	85.07
Breast Cancer	
MCF7	76.96
MDA-MB-231/ATCC	70.99
HS 578T	73.60
BT-549	93.30
T-47D	83.74
MDA-MB-468	87.20
Mean	81.20
Delta	41.01
Range	79.00

Mean Growth Percent - Growth Percent



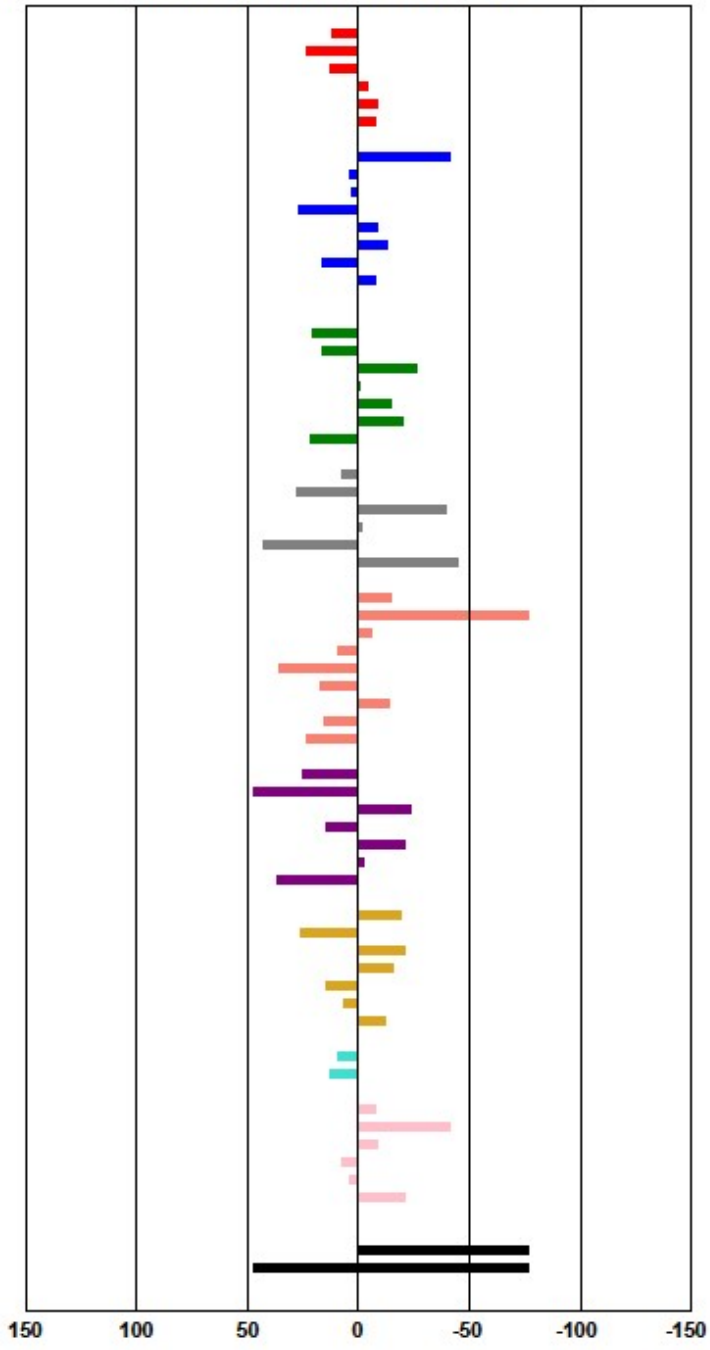
Compound 10m

Developmental Therapeutics Program

One Dose Mean Graph

NSC: D-835652 / 1	Conc: 1.00E-5 Molar	Test Date: Mar 07, 2022
Experiment ID: 2203OS82		Report Date: Mar 28, 2022

Panel/Cell Line	Growth Percent
Leukemia	
CCRF-CEM	82.92
HL-60(TB)	94.70
K-562	84.13
MOLT-4	66.84
RPMI-8226	62.68
SR	63.23
Non-Small Cell Lung Cancer	
A549/ATCC	29.75
EKVX	75.01
HOP-62	74.13
HOP-92	97.70
NCI-H226	62.31
NCI-H23	58.28
NCI-H322M	87.83
NCI-H460	63.78
NCI-H522	71.59
Colon Cancer	
COLO 205	91.91
HCC-2998	87.75
HCT-116	45.03
HCT-15	71.10
HT29	56.47
KM12	51.46
SW-620	93.14
CNS Cancer	
SF-268	78.98
SF-295	98.94
SF-539	31.87
SNB-19	69.59
SNB-75	114.08
U251	26.46
Melanoma	
LOX IMVI	56.50
MALME-3M	-5.58
M14	65.11
MDA-MB-435	80.54
SK-MEL-2	106.77
SK-MEL-28	88.40
SK-MEL-5	57.61
UACC-257	86.15
UACC-62	94.73
Ovarian Cancer	
IGROV1	96.16
OVCAR-3	118.35
OVCAR-4	47.86
OVCAR-5	85.66
OVCAR-8	50.29
NCI/ADR-RES	68.99
SK-OV-3	108.00
Renal Cancer	
786-0	51.72
A498	97.29
ACHN	50.00
CAKI-1	55.37
SN12C	86.07
TK-10	78.17
UO-31	59.01
Prostate Cancer	
PC-3	80.31
DU-145	84.07
Breast Cancer	
MCF7	64.01
MDA-MB-231/ATCC	29.93
HS 578T	63.06
BT-549	78.32
T-47D	75.31
MDA-MB-468	50.03
Mean	71.18
Delta	76.76
Range	123.93



Compound 17m

Developmental Therapeutics Program

One Dose Mean Graph

NSC: D-835648 / 1	Conc: 1.00E-5 Molar	Test Date: Mar 07, 2022
Experiment ID: 2203OS82		Report Date: Mar 28, 2022

Panel/Cell Line	Growth Percent
Leukemia	
CCRF-CEM	82.29
HL-60(TB)	100.93
K-562	63.43
MOLT-4	60.06
RPMI-8226	65.15
SR	68.82
Non-Small Cell Lung Cancer	
A549/ATCC	88.66
EKVX	90.15
HOP-62	106.33
HOP-92	93.06
NCI-H226	88.17
NCI-H23	77.21
NCI-H322M	109.57
NCI-H460	102.08
NCI-H522	91.33
Colon Cancer	
COLO 205	115.29
HCC-2998	90.53
HCT-116	69.42
HCT-15	72.36
HT29	56.05
KM12	81.65
SW-620	91.06
CNS Cancer	
SF-268	94.22
SF-295	98.24
SF-539	93.34
SNB-19	92.57
SNB-75	105.64
U251	87.54
Melanoma	
LOX IMVI	93.97
MALME-3M	105.38
M14	95.29
MDA-MB-435	103.15
SK-MEL-2	99.69
SK-MEL-28	106.08
SK-MEL-5	81.18
UACC-257	93.65
UACC-62	86.65
Ovarian Cancer	
IGROV1	93.68
OVCAR-3	94.75
OVCAR-4	70.88
OVCAR-5	93.68
OVCAR-8	100.42
NCI/ADR-RES	78.70
SK-OV-3	115.00
Renal Cancer	
786-0	90.70
A498	147.32
ACHN	106.50
CAKI-1	87.56
SN12C	86.12
TK-10	128.98
UO-31	83.47
Prostate Cancer	
PC-3	88.42
DU-145	99.63
Breast Cancer	
MCF7	69.25
MDA-MB-231/ATCC	97.13
HS 578T	93.21
BT-549	94.61
T-47D	30.47
MDA-MB-468	82.45
Mean	90.39
Delta	59.92
Range	116.85

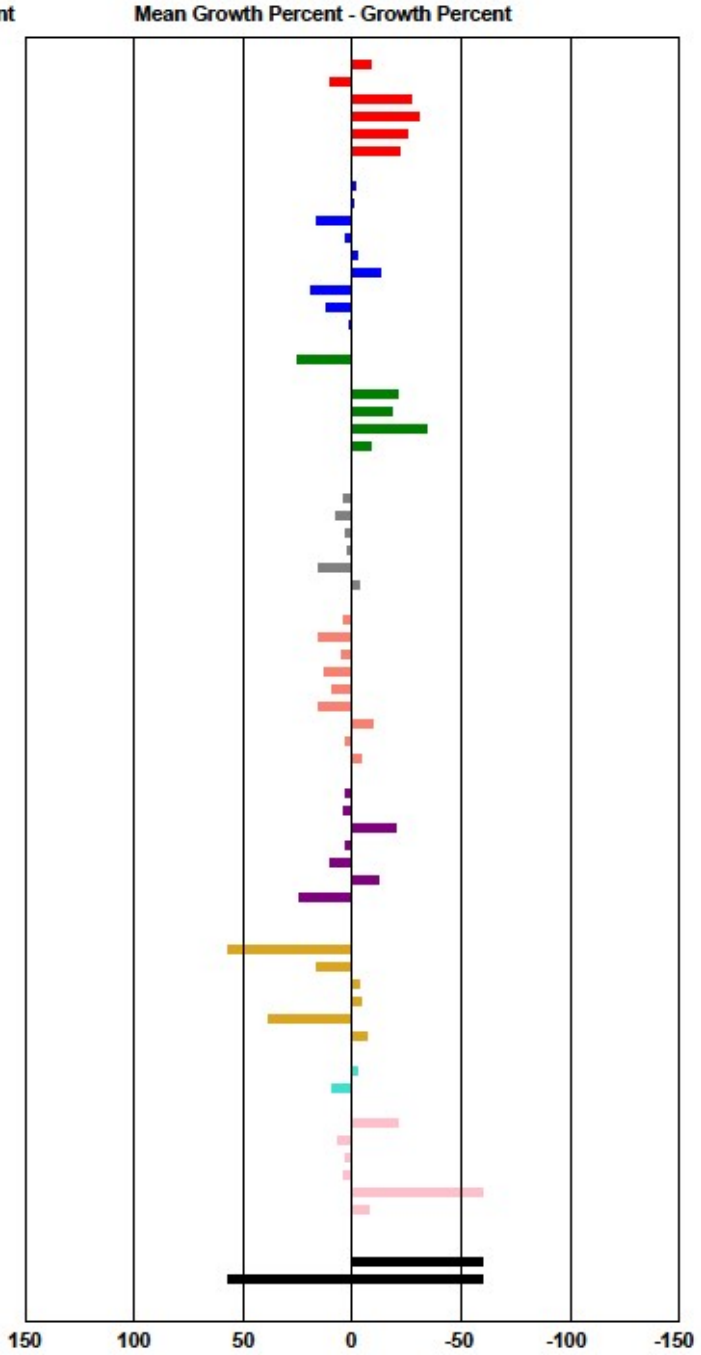


Table S2. Bond distances (Å) and angles (°).

Compound 14a.

	molecule		
	A	B	C
Br1-C4	1.894(7)	1.897(7)	1.901(7)
Si1-C9	1.892(7)	1.893(7)	1.887(7)
Si1-C10	1.865(6)	1.877(6)	1.848(8)
Si1-C11	1.848(7)	1.844(7)	1.871(7)
Si1-C12	1.857(8)	1.864(7)	1.837(8)
O1-C7	1.215(8)	1.229(8)	1.226(8)
O2-C15	1.219(8)	1.222(8)	1.222(8)
N1-C8	1.376(8)	1.389(8)	1.387(8)
N1-C14	1.415(8)	1.402(8)	1.404(8)
N1-C20	1.405(9)	1.380(8)	1.385(9)
N2-C21	1.151(9)	1.142(8)	1.138(9)
C1-C2	1.386(9)	1.395(9)	1.392(10)
C1-C6	1.381(10)	1.369(10)	1.380(10)
C1-C7	1.500(9)	1.473(9)	1.479(9)
C2-C3	1.383(10)	1.381(10	1.383(10)
C3-C4	1.387(10)	1.359(10)	1.384(10)
C4-C5	1.388(9)	1.389(10)	1.364(10)
C5-C6	1.385(10)	1.382(10)	1.393(10)
C7-C8	1.502(9)	1.510(9)	1.480(9)
C8-C9	1.393(9)	1.374(9)	1.388(9)
C9-C13	1.432(9)	1.447(8)	1.435(9)
C13-C14	1.384(9)	1.397(9)	1.398(9)
C13-C15	1.470(10)	1.467(9)	1.474(10)
C14-C17	1.417(9)	1.406(8)	1.421(9)
C15-C16	1.504(9)	1.496(8)	1.501(10)
C17-C18	1.391(10)	1.342(9)	1.358(10)

C18-C19	1.415(10)	1.431(9)	1.436(9)
C18-C21	1.439(10)	1.461(10)	1.444(10)
C19-C20	1.327(9)	1.350(9)	1.340(9)
C10-Si1-C9	110.2(3)	108.2(3)	110.8(3)
C11-Si1-C9	112.6(3)	112.5(3)	109.2(3)
C11-Si1-C10	107.3(3)	107.6(3)	106.3(4)
C11-Si1-C12	112.1(4)	112.6(4)	108.4(4)
C12-Si1-C9	110.0(3)	110.4(3)	112.1(3)
C12-Si1-C10	104.3(3)	105.2(3)	109.9(4)
C8-N1-C14	109.0(6)	108.1(6)	109.5(6)
C8-N1-C20	129.8(6)	129.4(6)	129.0(6)
C20-N1-C14	121.1(6)	122.5(5)	121.5(6)
C2-C1-C7	119.6(7)	119.7(7)	120.1(7)
C6-C1-C2	119.7(7)	118.0(7)	119.3(7)
C6-C1-C7	120.7(7)	122.3(7)	120.5(7)
C3-C2-C1	121.2(7)	120.8(7)	119.9(8)
C2-C3-C4	118.0(7)	119.7(7)	119.6(8)
C3-C4-Br1	119.4(6)	120.3(6)	119.1(6)
C3-C4-C5	121.9(7)	121.3(7)	121.3(7)
C5-C4-Br1	118.7(6)	118.4(6)	119.6(6)
C6-C5-C4	118.7(7)	118.0(7)	118.9(7)
C1-C6-C5	120.5(7)	122.3(7)	120.8(8)
O1-C7-C1	122.2(7)	122.8(6)	121.2(6)
O1-C7-C8	120.0(7)	117.7(7)	119.1(6)
C1-C7-C8	117.8(7)	119.5(6)	119.6(6)
N1-C8-C7	121.9(6)	119.0(6)	120.9(6)
N1-C8-C9	109.3(6)	110.4(6)	109.2(6)
C9-C8-C7	128.8(6)	130.6(6)	129.9(7)
C8-C9-Si1	125.9(5)	127.0(5)	125.9(5)
C8-C9-C13	105.9(6)	105.8(6)	105.9(6)

C13-C9-Si1	127.2(6)	126.1(5)	127.2(6)
C9-C13-C15	122.6(6)	122.8(6)	123.6(7)
C14-C13-C9	109.3(6)	108.2(6)	109.4(7)
C14-C13-C15	127.9(6)	129.0(6)	126.8(6)
N1-C14-C17	117.5(7)	116.6(6)	117.1(6)
C13-C14-N1	106.4(6)	107.4(5)	106.1(6)
C13-C14-C17	136.0(7)	135.9(6)	136.8(7)
O2-C15-C13	119.1(7)	119.0(6)	119.4(7)
O2-C15-C16	120.0(7)	119.7(7)	120.6(7)
C13-C15-C16	120.8(6)	121.3(6)	120.0(7)
C18-C17-C14	119.2(7)	120.6(6)	120.1(7)
C17-C18-C19	121.3(7)	121.7(6)	121.5(7)
C17-C18-C21	119.7(7)	121.7(6)	121.1(7)
C19-C18-C21	119.0(7)	116.7(6)	117.4(7)
C20-C19-C18	119.8(7)	118.3(7)	118.1(7)
C19-C20-N1	120.8(7)	120.1(6)	121.7(7)
N2-C21-C18	179.9(11)	176.9(9)	177.4(9

Compound 15a.

Br1-C4 1.897(3)

Si1-C12 1.883(3)

Si1-C13 1.853(3)

Si1-C14 1.859(3)

Si1-C15 1.870(3)

O1-C7 1.218(3)

O2-C10 1.206(3)

N1-C8 1.385(3)

N1-C16 1.403(3)

N1-C20 1.383(3)

N2-C21 1.146(4)

C1-C2 1.391(4)

C1-C6 1.379(4)

C1-C7 1.499(4)

C2-C3 1.390(4

C3-C4 1.367(5)

C4-C5 1.376(5)

C5-C6 1.390(4)

C7-C8 1.461(4)

C8-C9 1.404(4)

C9-C10 1.504(4)

C9-C12 1.410(3)

C10-C11 1.492(4)

C12-C16 1.390(4)

C16-C17 1.416(3)

C17-C18 1.360(4)

C18-C19 1.422(4)

C18-C21 1.437(4)

C19-C20 1.345(4)

C13-Si1-C12 109.65(13)

C13-Si1-C14 111.30(16)

C13-Si1-C15 107.50(15)

C14-Si1-C12 108.48(14)

C14-Si1-C15 108.95(16)

C15-Si1-C12 110.97(14)

C8-N1-C16 108.7(2)

C20-N1-C8 129.2(2)

C20-N1-C16 121.9(2)

C2-C1-C7 117.8(3)

C6-C1-C2 119.3(3)

C6-C1-C7 122.9(3)

C3-C2-C1 120.1(3)

C4-C3-C2	119.3(3)
C3-C4-Br1	118.1(2)
C3-C4-C5	121.8(3)
C5-C4-Br1	120.1(3)
C4-C5-C6	118.6(3)
C1-C6-C5	120.9(3)
O1-C7-C1	120.4(3)
O1-C7-C8	121.8(3)
C8-C7-C1	117.8(3)
N1-C8-C7	121.2(2)
N1-C8-C9	106.3(2)
C9-C8-C7	132.5(2)
C8-C9-C10	127.4(2)
C8-C9-C12	110.2(2)
C12-C9-C10	122.4(2)
O2-C10-C9	118.5(3)
O2-C10-C11	122.2(3)
C11-C10-C9	119.2(3)
C9-C12-Si1	126.8(2)
C16-C12-Si1	127.77(18)
C16-C12-C9	105.5(2)
N1-C16-C17	116.9(2)
C12-C16-N1	109.4(2)
C12-C16-C17	133.7(2)
C18-C17-C16	120.8(3)
C17-C18-C19	120.4(2)
C17-C18-C21	119.7(3)
C19-C18-C21	119.8(3)
C20-C19-C18	119.6(3)
C19-C20-N1	120.4(3)
N2-C21-C18	178.4(4)

Compound 10n'

Br1-C4 1.892(6)

Br2-C15 1.891(6)

O1-C11 1.229(6)

N1-C9 1.410(6)

N1-C10 1.398(6)

N1-C18 1.358(6)

N2-C22 1.140(8)

C1-C2 1.391(7)

C1-C6 1.392(7)

C1-C7 1.471(7)

C2-C3 1.385(7)

C3-C4 1.381(7)

C4-C5 1.366(7)

C5-C6 1.370(7)

C7-C8 1.399(7)

C7-C10 1.393(7)

C8-C9 1.380(7)

C9-C21 1.405(7)

C10-C11 1.463(7)

C11-C12 1.483(7)

C12-C13 1.383(7)

C12-C17 1.384(7)

C13-C14 1.376(7)

C14-C15 1.376(7)

C15-C16 1.384(7)

C16-C17 1.379(7)

C18-C19 1.360(7)

C19-C20 1.425(8)

C19-C22 1.439(9)

C20-C21	1.353(8)

C10-N1-C9	108.9(5)
C18-N1-C9	121.7(5)
C18-N1-C10	129.3(5)
C2-C1-C6	117.9(5)
C2-C1-C7	121.0(5)
C6-C1-C7	121.1(5)
C3-C2-C1	120.6(6)
C4-C3-C2	119.6(6)
C3-C4-Br1	120.1(5)
C5-C4-Br1	119.3(5)
C5-C4-C3	120.6(6)
C4-C5-C6	119.7(5)
C5-C6-C1	121.6(5)
C8-C7-C1	123.6(5)
C10-C7-C1	127.1(5)
C10-C7-C8	108.4(5)
C9-C8-C7	108.8(5)
C8-C9-N1	106.9(5)
C8-C9-C21	135.5(6)
C21-C9-N1	117.5(6)
N1-C10-C11	119.8(5)
C7-C10-N1	106.9(5)
C7-C10-C11	133.2(6)
O1-C11-C10	120.3(5)
O1-C11-C12	119.8(5)
C10-C11-C12	119.9(5)
C13-C12-C11	123.5(5)
C13-C12-C17	118.8(5)
C17-C12-C11	117.4(5)

C14-C13-C12	120.8(5)
C15-C14-C13	119.5(5)
C14-C15-Br2	119.8(5)
C14-C15-C16	121.0(6)
C16-C15-Br2	119.1(4)
C17-C16-C15	118.7(5)
C16-C17-C12	121.2(5)
N1-C18-C19	119.6(6)
C18-C19-C20	120.8(6)
C18-C19-C22	116.8(6)
C20-C19-C22	122.3(6)
C21-C20-C19	118.9(6)
C20-C21-C9	121.3(6)
N2-C22-C19	178.6(8)

Pictures of dipolarophiles

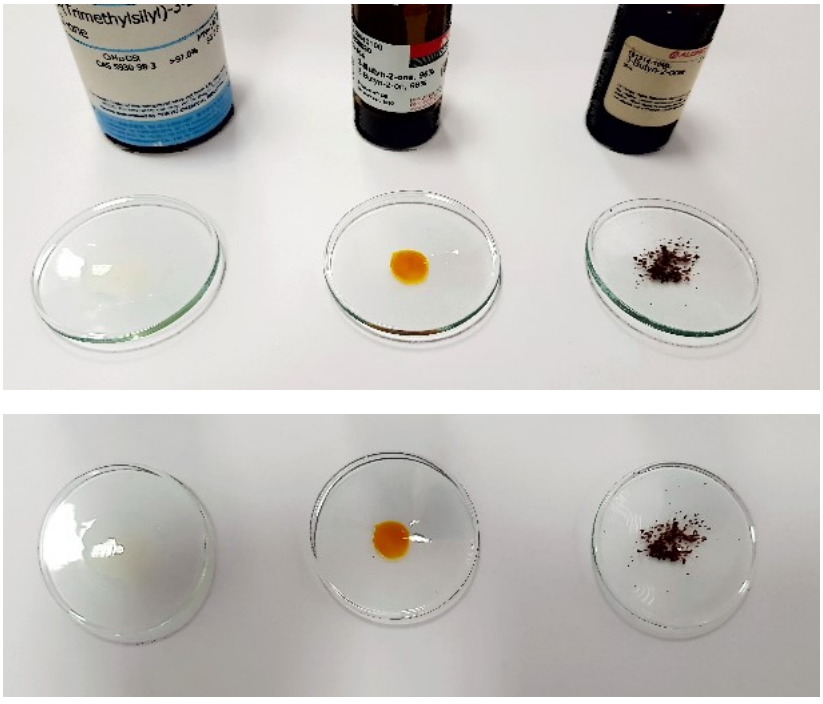


Figure S2. Picture of commercial dipolarophiles: 4-(trimethylsilyl)-3-butyn-2-one **1** (left) and 3-butyn-2-one (fresh batch (middle) and old batch (right)).