

**Synthesis of Novel Thiazol-2(3H)-imine Derivatives As Ergosterol Biosynthesis**

**Inhibitors, and Elucidation of Their Structures Using 2D NMR Technique**

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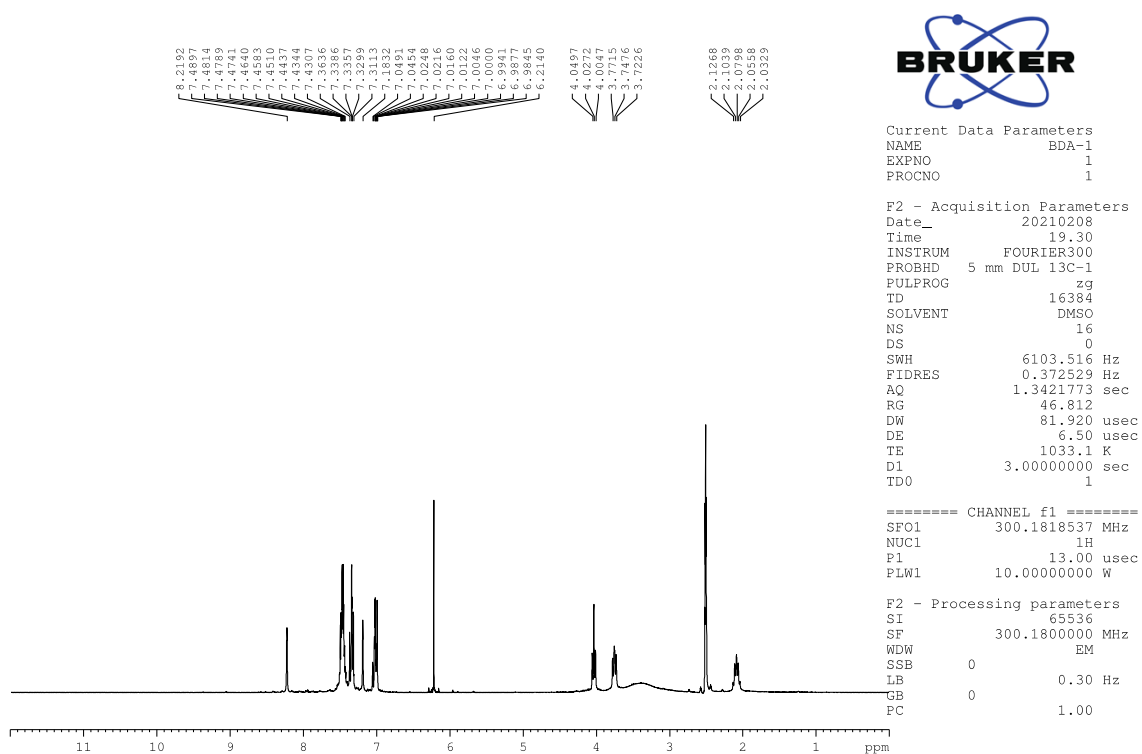
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University, 26470 Eskişehir, Turkey*

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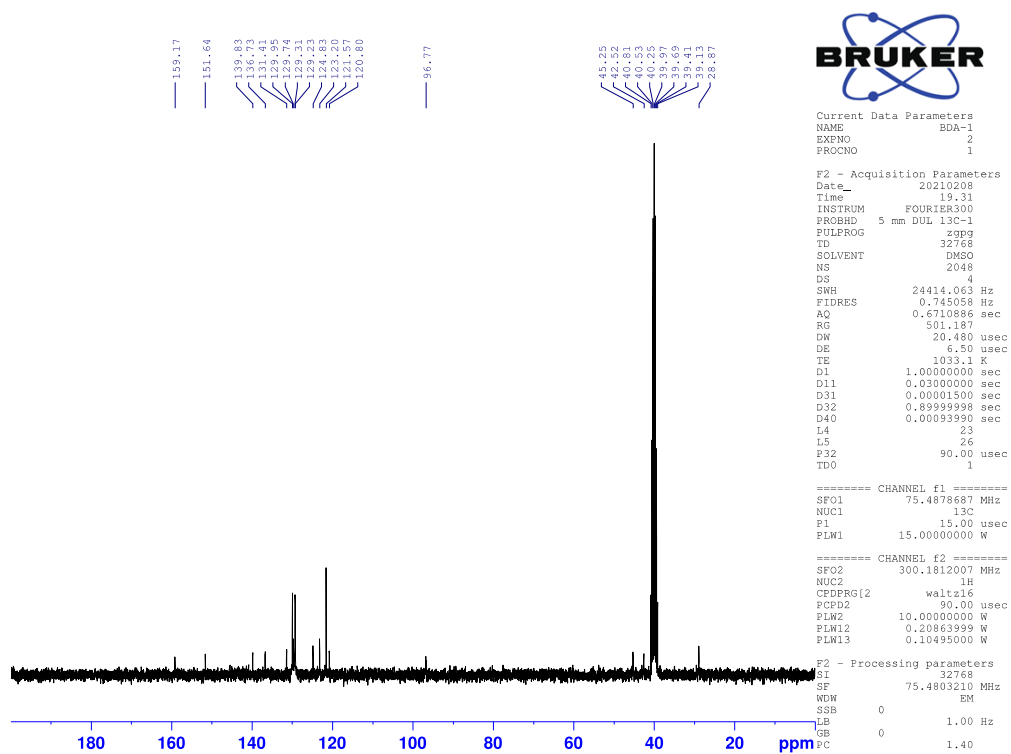
*E-mail address:* dosmaniye@anadolu.edu.tr (D.Osmaniye).

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**Figure S1.**  $^1\text{H}$ -NMR spectrum of compound **2a**



**Figure S2.**  $^{13}\text{C}$ -NMR spectrum of compound **2a**

Data File: C:\LabSolutions\Data\Analiz\derya\BDA-1\_44.lcd

Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Use Adduct
H	1	5	40	O	2	0	3	S	2	1	2	Ru	2	0	0	H
C	4	5	35	F	1	0	0	Cl	1	0	0	Pd	2	0	0	
N	3	0	5	P	3	0	0	Br	1	0	0	I	3	0	0	

Error Margin (ppm): 5

HC Ratio: unlimited

Max Isotopes: 3

MSn Iso RI (%): 10.00

DBE Range: 0.0 - 25.0

Apply N Rule: yes

Isotope RI (%): 1.00

MSn Logic Mode: AND

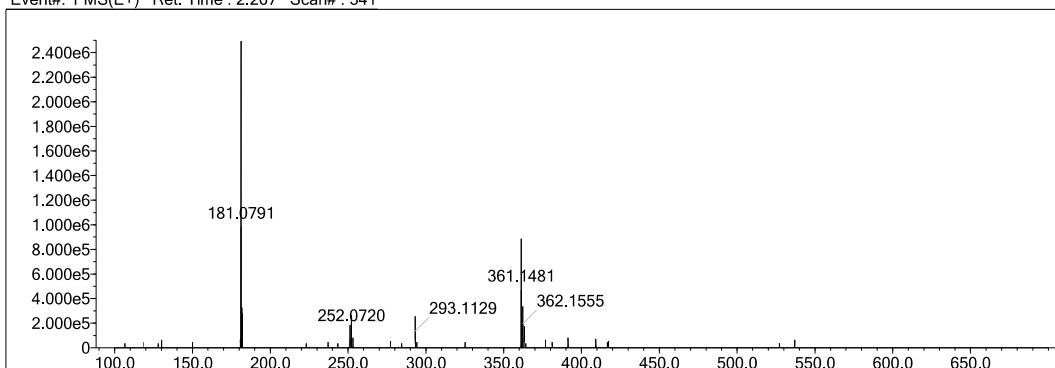
Electron Ions: both

Use MSn Info: yes

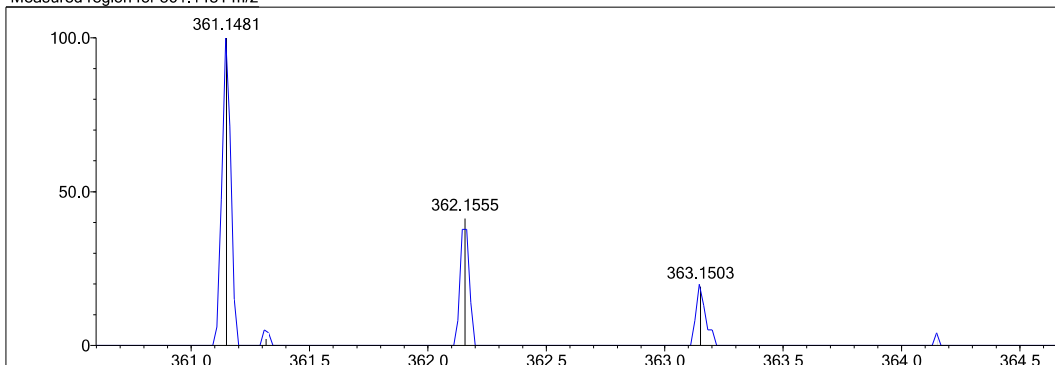
Isotope Res: 9000

Max Results: 150

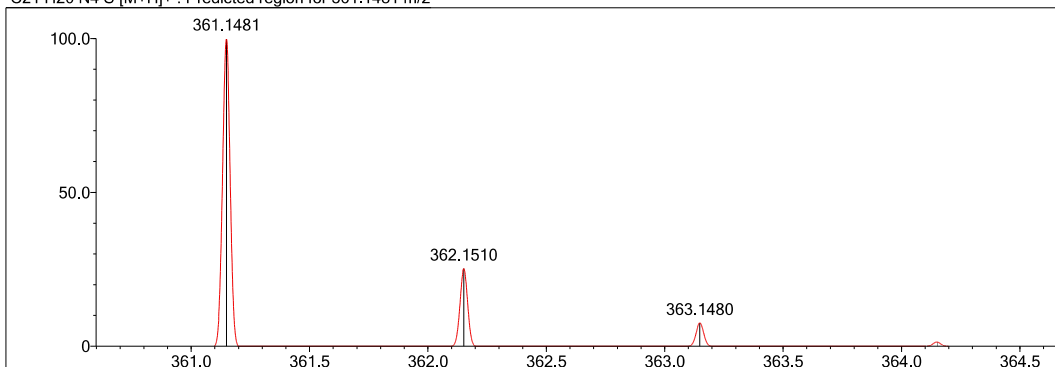
Event#: 1 MS(E+) Ret. Time : 2.267 Scan# : 341



Measured region for 361.1481 m/z



C21 H20 N4 S [M+H]+ : Predicted region for 361.1481 m/z



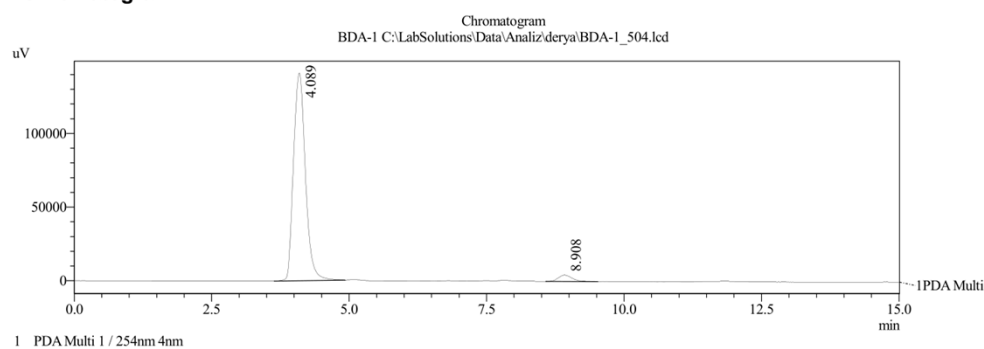
Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	55.29	C21 H20 N4 S	[M+H]+	361.1481	361.1481	-0.0	0.00	55.29	14.0

Figure S3. HRMS report of compound 2a

# ==== Shimadzu LCMSsolution Analysis Report ====

Acquired by : Admin  
 Sample Name : BDA-1  
 Sample ID :  
 Vial # : 67  
 Injection Volume : 0.5 uL  
 Data File Name : BDA-1\_504.lcd  
 Method File Name : isocratic\_serkan15DKBETÜL.lcm  
 Batch File Name : batch.lcb  
 Report File Name : DefaultLCMS.lcr  
 Data Acquired : 10.08.2023 09:31:09  
 Data Processed : 10.08.2023 11:35:30

## <Chromatogram>



PeakTable					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.089	2134954	141214	96.545	97.016
2	8.908	76404	4343	3.455	2.984
Total		2211358	145557	100.000	100.000

C:\LabSolutions\Data\Analiz\derya\BDA-1\_504.lcd

**Figure S4.** HPLC report of compound **2a**

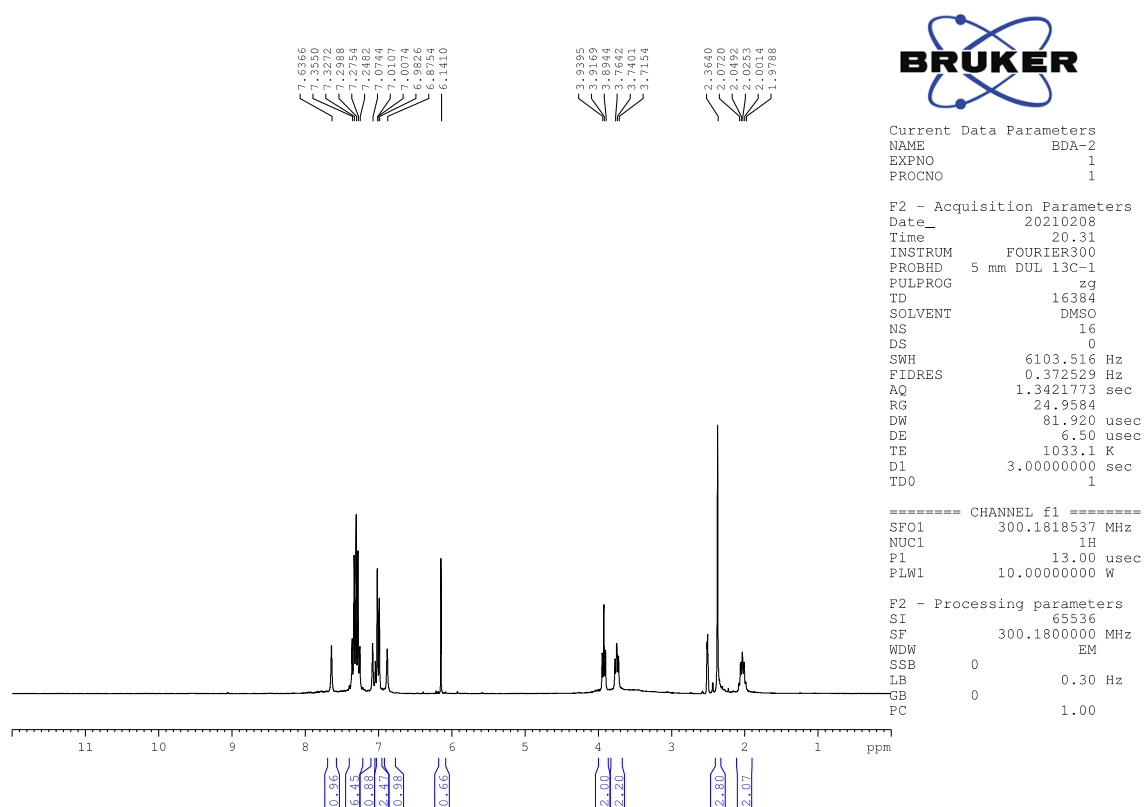


Figure S5.  $^1\text{H}$ -NMR spectrum of compound **2b**

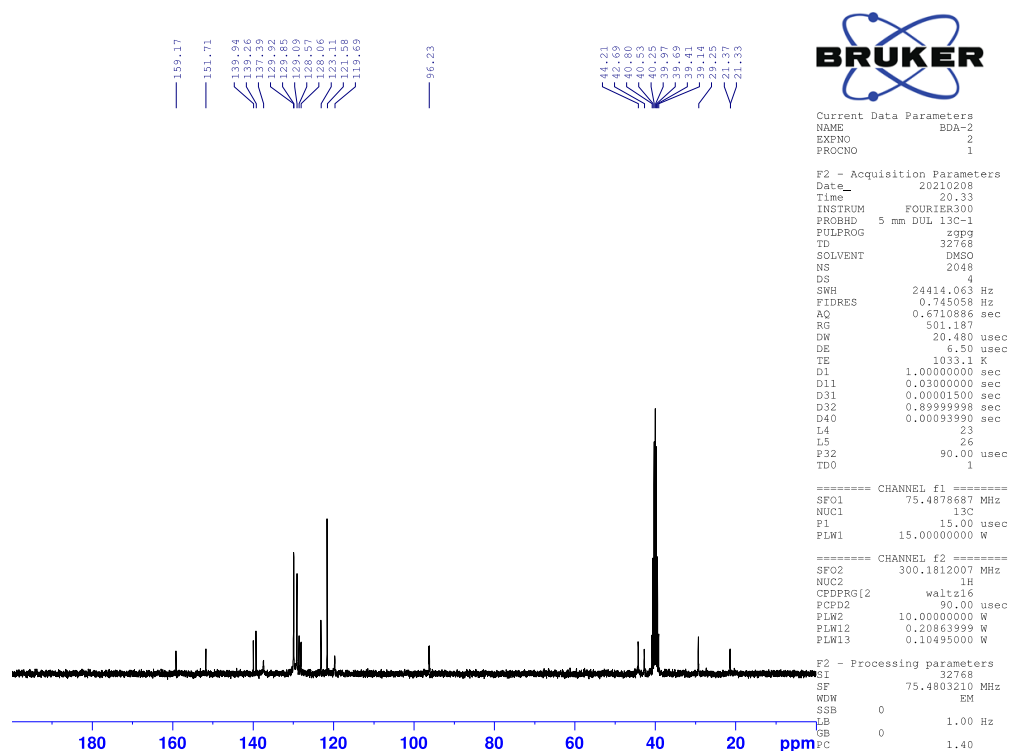


Figure S6.  $^{13}\text{C}$ -NMR spectrum of compound **2b**

Data File: C:\LabSolutions\Data\Analiz\derya\BDA-2\_45.lcd

Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Use Adduct
H	1	5	40	O	2	0	3	S	2	1	2	Ru	2	0	0	H
C	4	5	35	F	1	0	0	Cl	1	0	0	Pd	2	0	0	
N	3	0	5	P	3	0	0	Br	1	0	0	I	3	0	0	

Error Margin (ppm): 5

DBE Range: 0.0 - 25.0

Electron Ions: both

HC Ratio: unlimited

Apply N Rule: yes

Use MSn Info: yes

Max Isotopes: 3

Isotope RI (%): 1.00

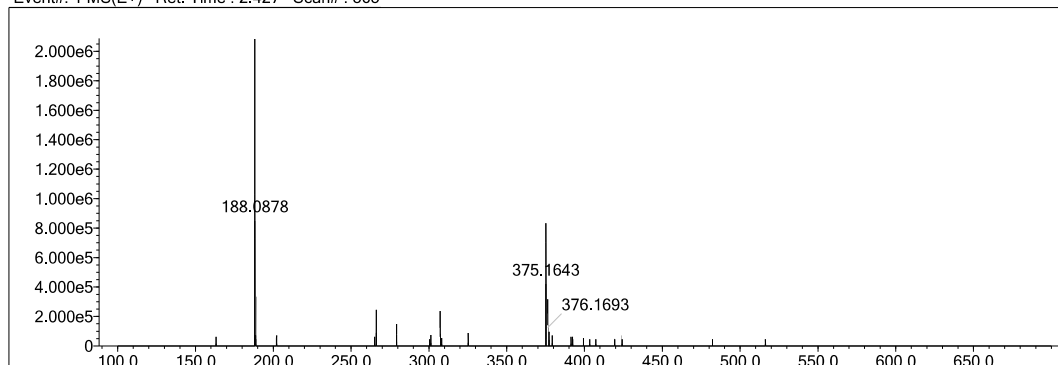
Isotope Res: 9000

MSn Iso RI (%): 10.00

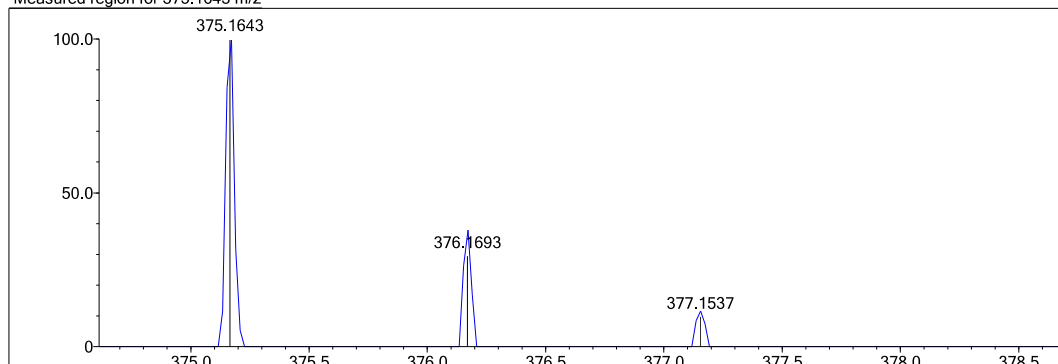
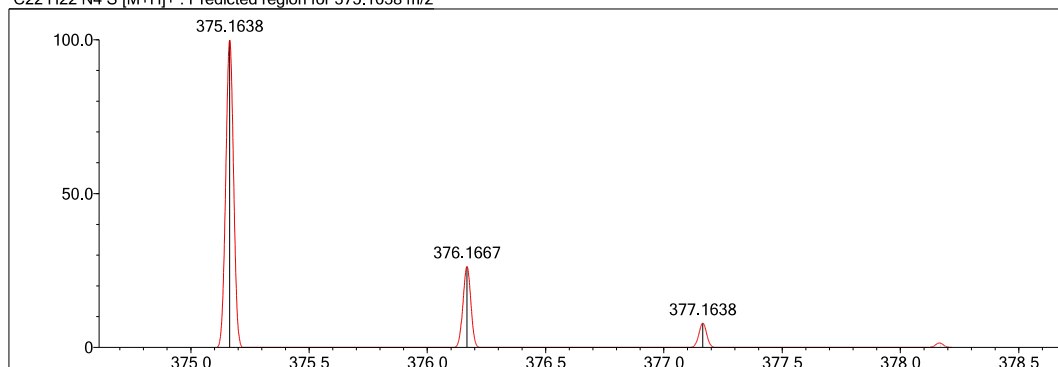
MSn Logic Mode: AND

Max Results: 150

Event#: 1 MS(E+) Ret. Time : 2.427 Scan# : 365



Measured region for 375.1643 m/z

C22 H22 N4 S [M+H]<sup>+</sup> : Predicted region for 375.1638 m/z

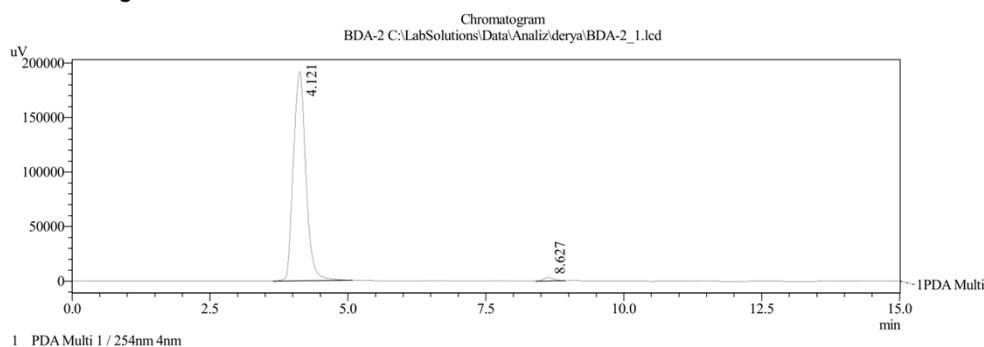
Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	44.31	C22 H22 N4 S	[M+H] <sup>+</sup>	375.1643	375.1638	0.5	1.33	44.68	14.0

Figure S7. HRMS report of compound **2b**

# ==== Shimadzu LCMSSolution Analysis Report ====

Acquired by : Admin  
 Sample Name : BDA-2  
 Sample ID :  
 Vial # : 68  
 Injection Volume : 0.5 uL  
 Data File Name : BDA-2\_1.lcd  
 Method File Name : isocratic\_serkan15DKBETÜL.lcm  
 Batch File Name : batch.lcb  
 Report File Name : DefaultLCMS.lcr  
 Data Acquired : 10.08.2023 09:46:37  
 Data Processed : 10.08.2023 11:43:17

## <Chromatogram>



PeakTable					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.121	3031401	192104	98.717	98.478
2	8.627	39407	2969	1.283	1.522
Total		3070808	195073	100.000	100.000

C:\LabSolutions\Data\Analiz\derya\BDA-2\_1.lcd

**Figure S8. HPLC report of compound 2b**

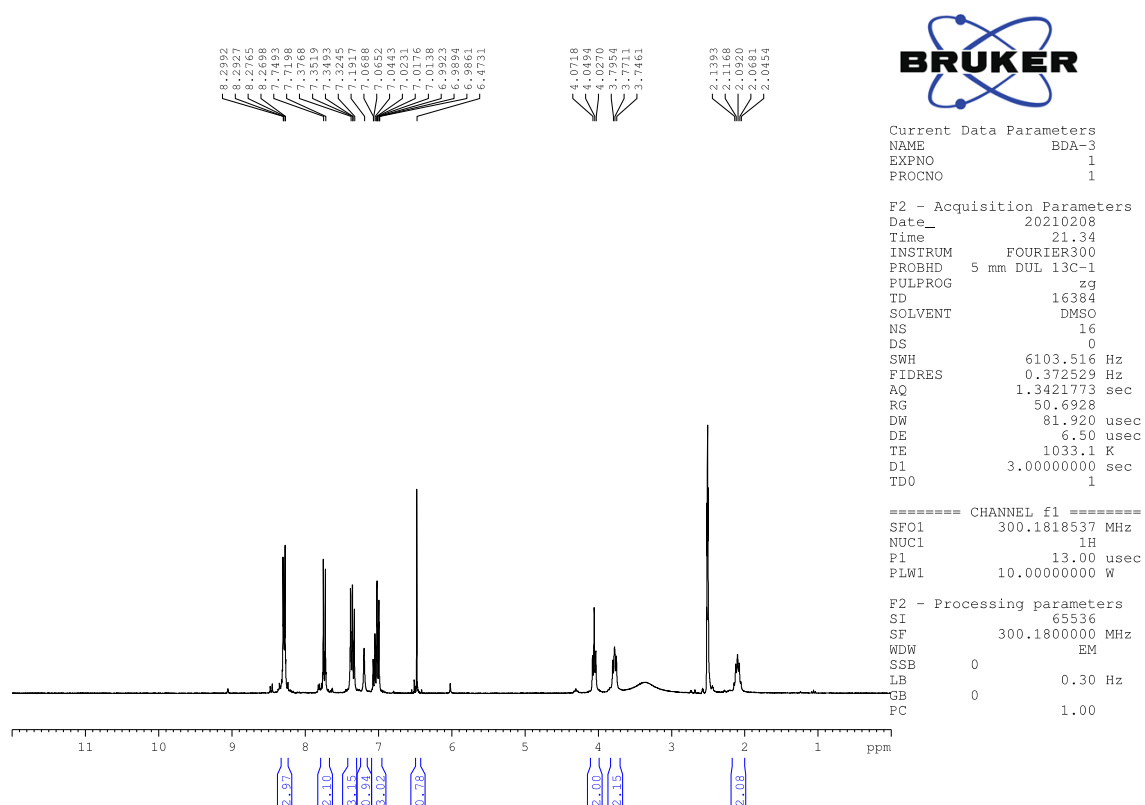


Figure S9.  $^1\text{H}$ -NMR spectrum of compound **2c**

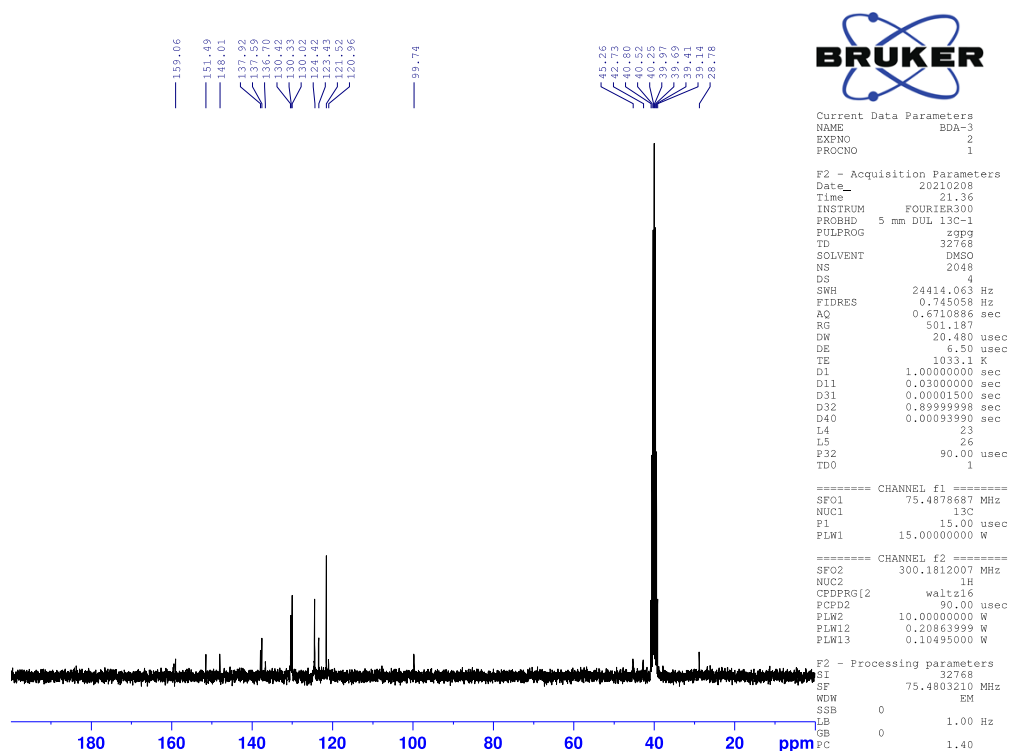


Figure S10.  $^{13}\text{C}$ -NMR spectrum of compound **2c**



Data File: C:\LabSolutions\Data\Analiz\derya\BDA-3\_46.lcd

Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Use Adduct
H	1	5	40	O	2	0	3	S	2	1	2	Ru	2	0	0	H
C	4	5	35	F	1	0	0	Cl	1	0	0	Pd	2	0	0	
N	3	0	5	P	3	0	0	Br	1	0	0	I	3	0	0	

Error Margin (ppm): 5

DBE Range: 0.0 - 25.0

Electron Ions: both

HC Ratio: unlimited

Apply N Rule: yes

Use MSn Info: yes

Max Isotopes: 3

Isotope RI (%): 1.00

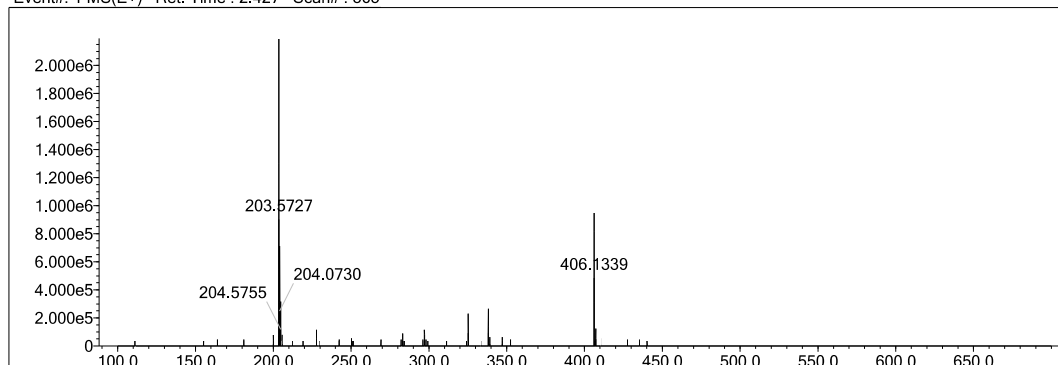
Isotope Res: 9000

MSn Iso RI (%): 10.00

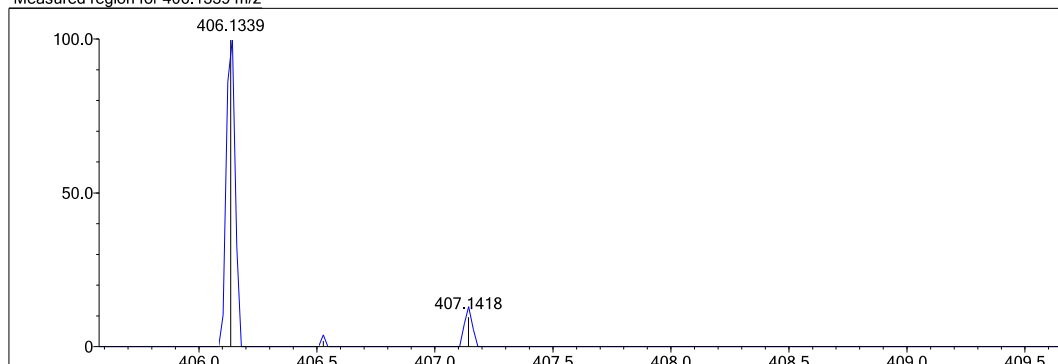
MSn Logic Mode: AND

Max Results: 150

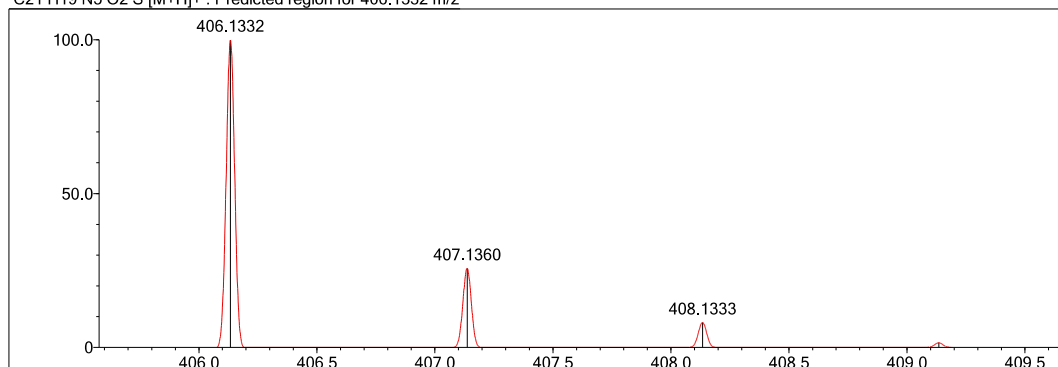
Event#: 1 MS(E+) Ret. Time : 2.427 Scan# : 365



Measured region for 406.1339 m/z



C21 H19 N5 O2 S [M+H]+ : Predicted region for 406.1332 m/z



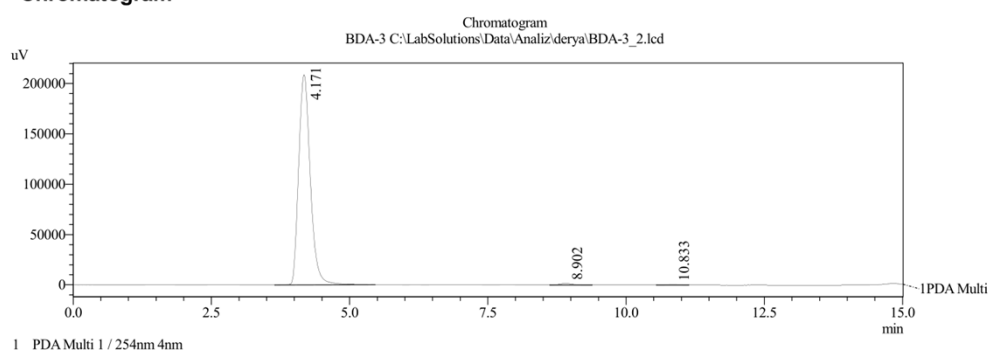
Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	0.00	C21 H19 N5 O2 S	[M+H] <sup>+</sup>	406.1339	406.1332	0.7	1.72	0.00	15.0

Figure S11. HRMS report of compound 2c

# ==== Shimadzu LCMSsolution Analysis Report ====

Acquired by : Admin  
 Sample Name : BDA-3  
 Sample ID :  
 Vial # : 69  
 Injection Volume : 0.5 uL  
 Data File Name : BDA-3\_2.lcd  
 Method File Name : isocratic\_serkan15DKBETÜL.lcm  
 Batch File Name : batch.lcb  
 Report File Name : DefaultLCMS.lcr  
 Data Acquired : 10.08.2023 10:02:06  
 Data Processed : 10.08.2023 11:43:57

## <Chromatogram>



PeakTable					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.171	3066285	208703	98.931	98.988
2	8.902	24136	1558	0.779	0.739
3	10.833	9007	576	0.291	0.273
Total		3099429	210837	100.000	100.000

C:\LabSolutions\Data\Analiz\derya\BDA-3\_2.lcd

**Figure S12.** HPLC report of compound **2c**

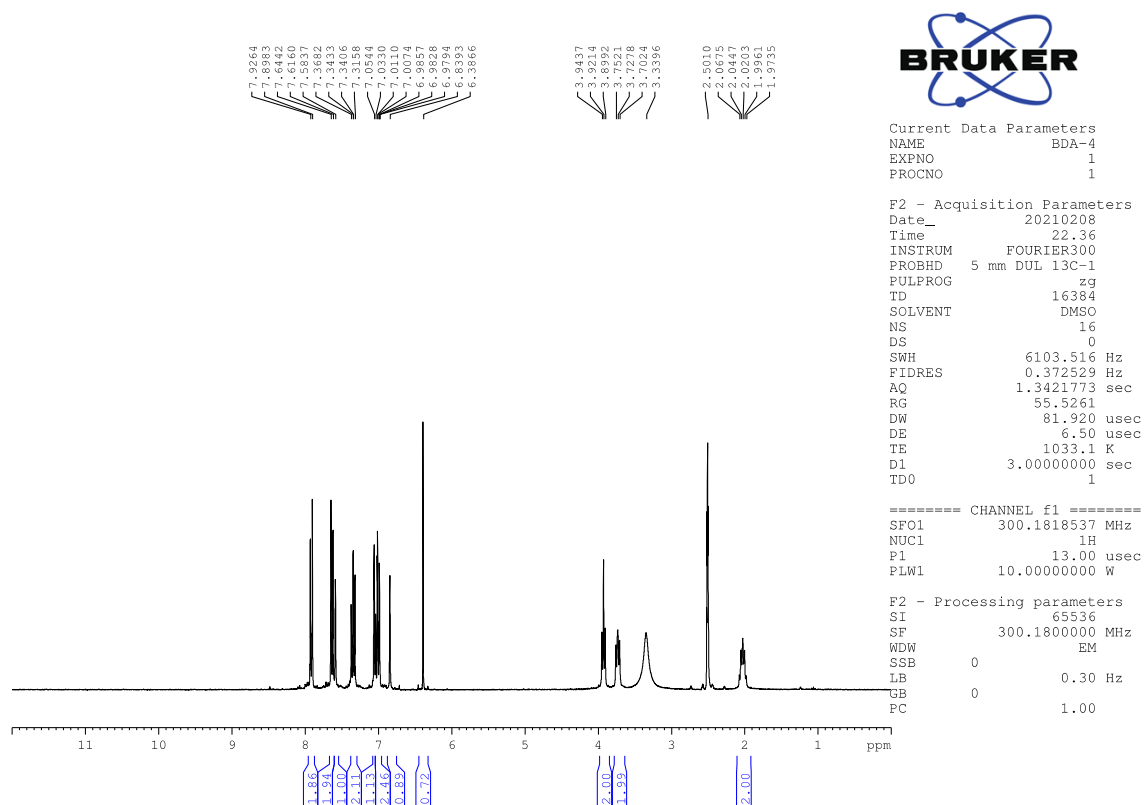


Figure S13.  $^1\text{H}$ -NMR spectrum of compound **2d**

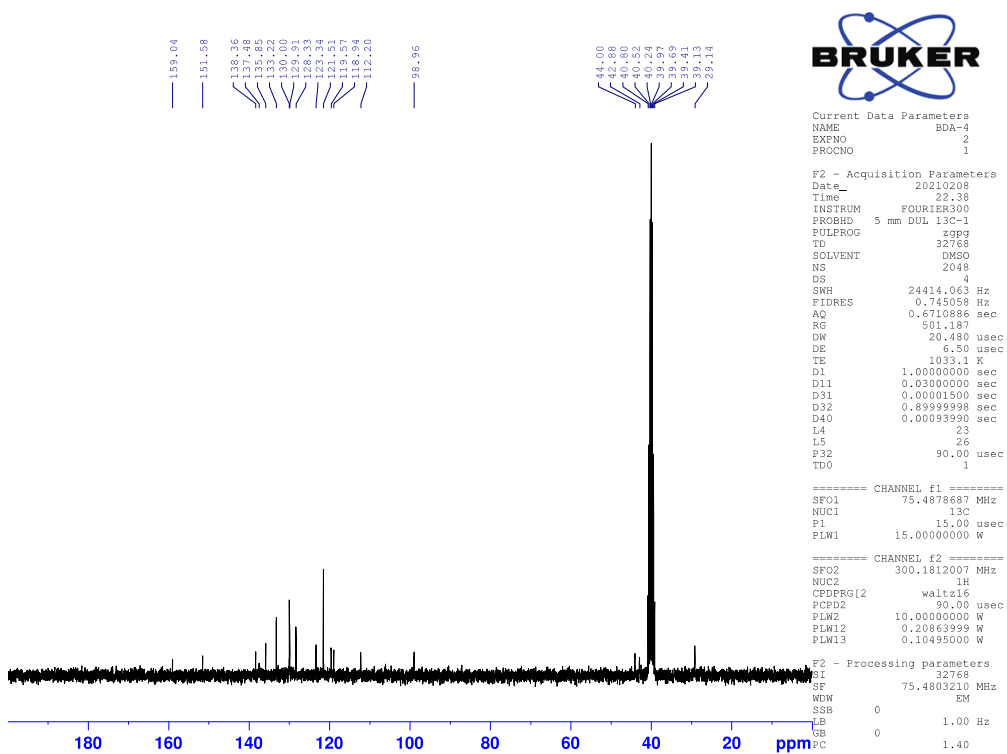


Figure S14.  $^{13}\text{C}$ -NMR spectrum of compound **2d**

Data File: C:\LabSolutions\Data\Analiz\derya\BDA-4\_47.lcd

Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Use Adduct
H	1	5	40	O	2	0	3	S	2	1	2	Ru	2	0	0	H
C	4	5	35	F	1	0	0	Cl	1	0	0	Pd	2	0	0	
N	3	0	5	P	3	0	0	Br	1	0	0	I	3	0	0	

Error Margin (ppm): 5

DBE Range: 0.0 - 25.0

Electron Ions: both

HC Ratio: unlimited

Apply N Rule: yes

Use MSn Info: yes

Max Isotopes: 3

Isotope RI (%): 1.00

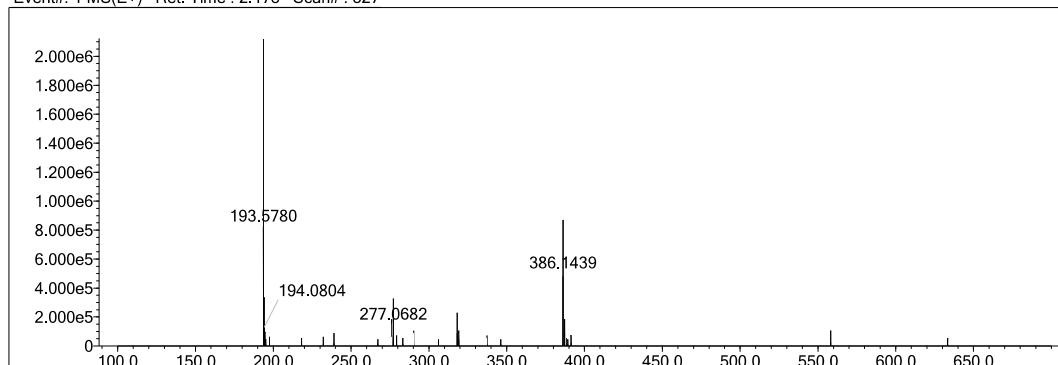
Isotope Res: 9000

MSn Iso RI (%): 10.00

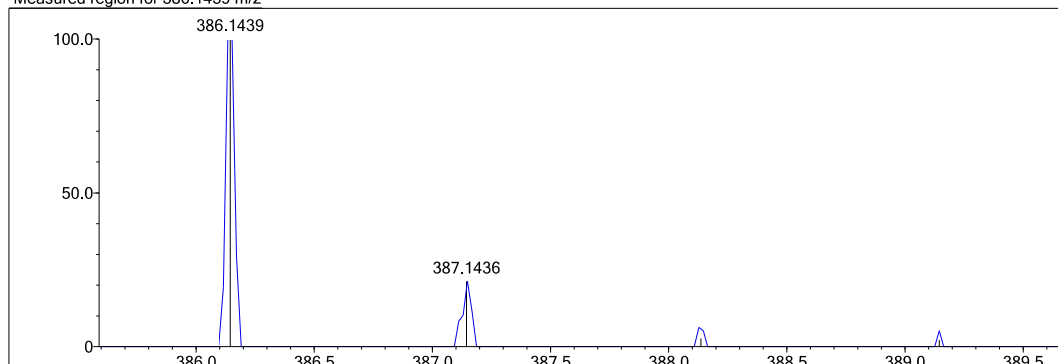
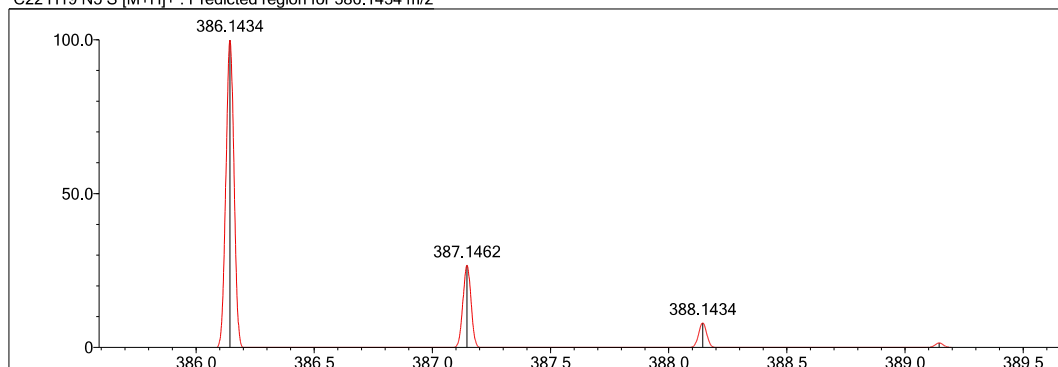
MSn Logic Mode: AND

Max Results: 150

Event#: 1 MS(E+) Ret. Time : 2.173 Scan# : 327



Measured region for 386.1439 m/z

C22 H19 N5 S [M+H]<sup>+</sup> : Predicted region for 386.1434 m/z

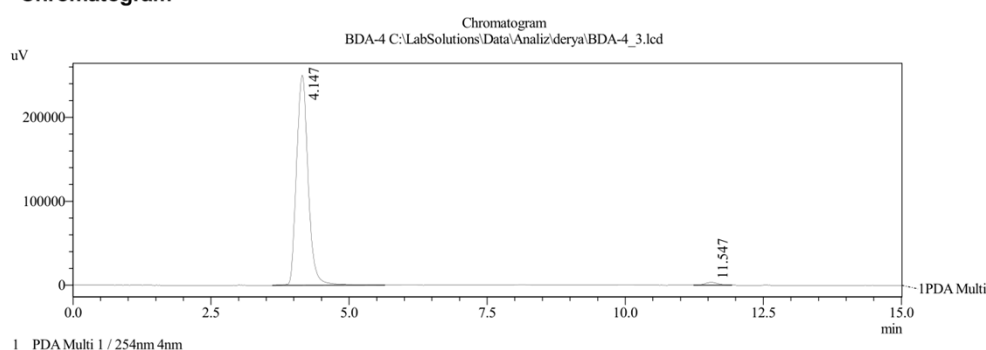
Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	60.01	C22 H19 N5 S	[M+H] <sup>+</sup>	386.1439	386.1434	0.5	1.29	60.45	16.0

Figure S15. HRMS report of compound **2d**

# ==== Shimadzu LCMSSolution Analysis Report ====

Acquired by : Admin  
 Sample Name : BDA-4  
 Sample ID :  
 Vial # : 70  
 Injection Volume : 0.5 uL  
 Data File Name : BDA-4\_3.lcd  
 Method File Name : isocratic\_serkan15DKBETÜL.lcm  
 Batch File Name : batch.lcb  
 Report File Name : DefaultLCMS.lcr  
 Data Acquired : 10.08.2023 10:17:35  
 Data Processed : 10.08.2023 11:44:50

## <Chromatogram>



PeakTable					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.147	3658634	250390	98.558	98.656
2	11.547	53520	3411	1.442	1.344
Total		3712155	253802	100.000	100.000

C:\LabSolutions\Data\Analiz\derya\BDA-4\_3.lcd

**Figure S16.** HPLC report of compound **2d**

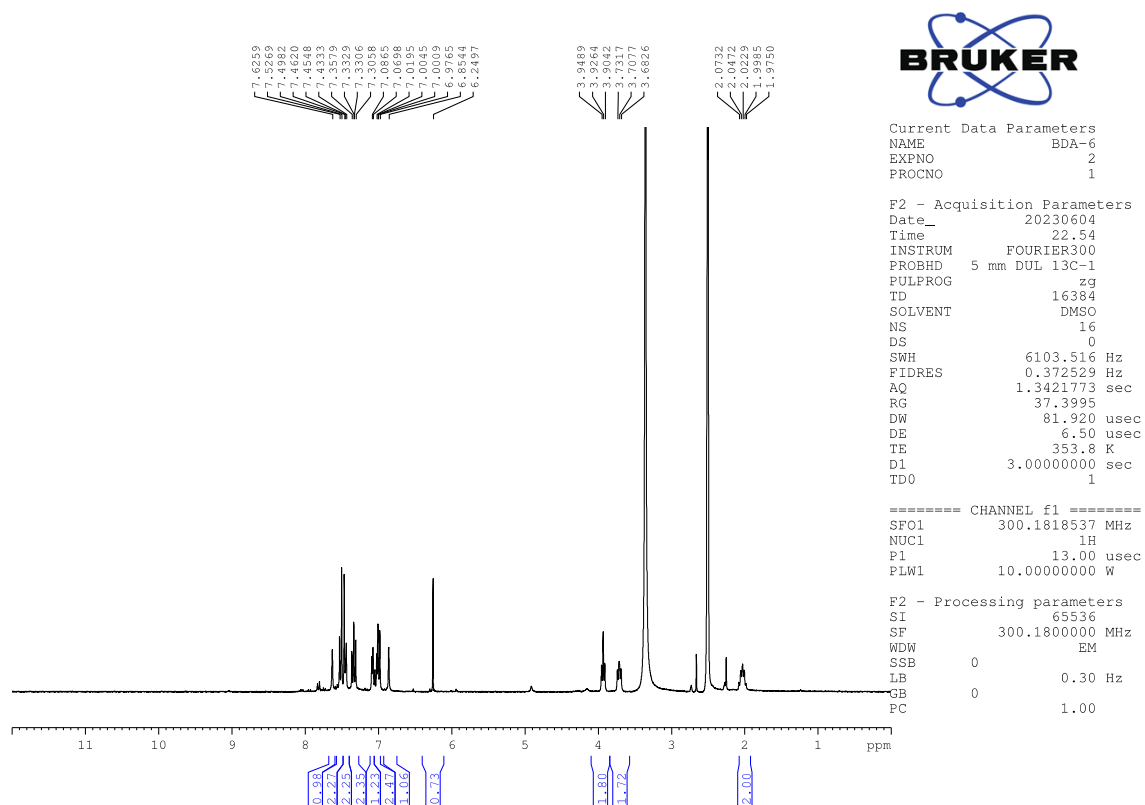


Figure S17.  $^1\text{H}$ -NMR spectrum of compound **2e**

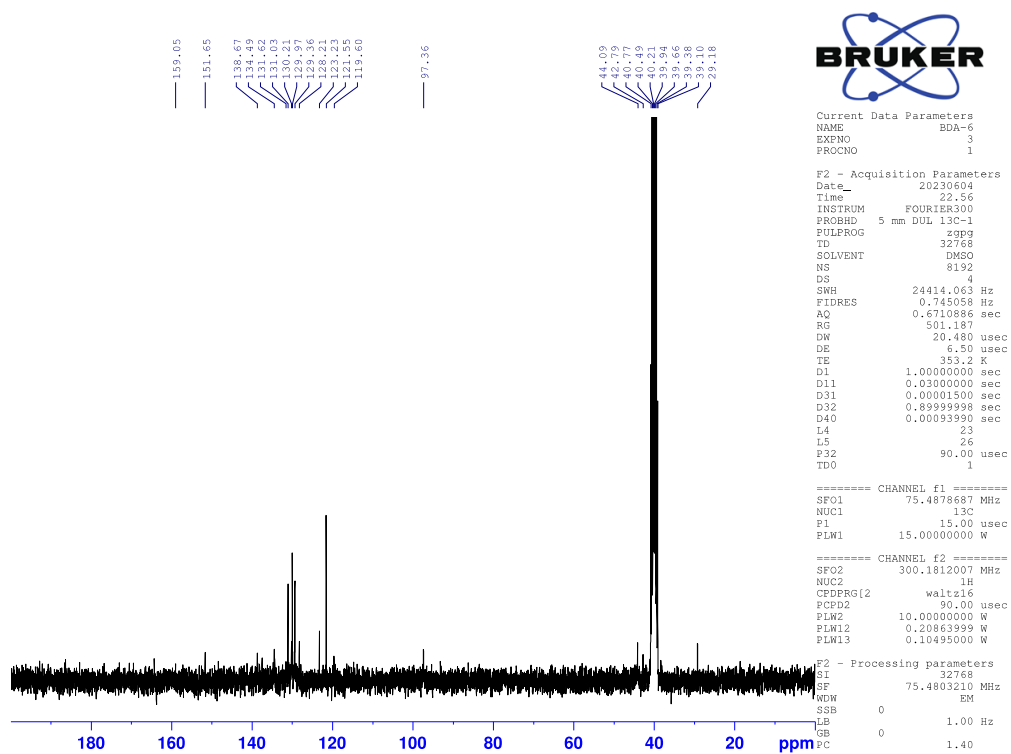


Figure S18.  $^{13}\text{C}$ -NMR spectrum of compound **2e**

Data File: C:\LabSolutions\Data\Analiz\derya\BDA-6\_48.lcd

Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Use Adduct
H	1	5	40	O	2	0	3	S	2	1	1	Ru	2	0	0	H
C	4	5	35	F	1	0	0	Cl	1	1	1	Pd	2	0	0	
N	3	0	5	P	3	0	0	Br	1	0	0	I	3	0	0	

Error Margin (ppm): 5

DBE Range: 0.0 - 25.0

Electron Ions: both

HC Ratio: unlimited

Apply N Rule: yes

Use MSn Info: yes

Max Isotopes: 3

Isotope RI (%): 1.00

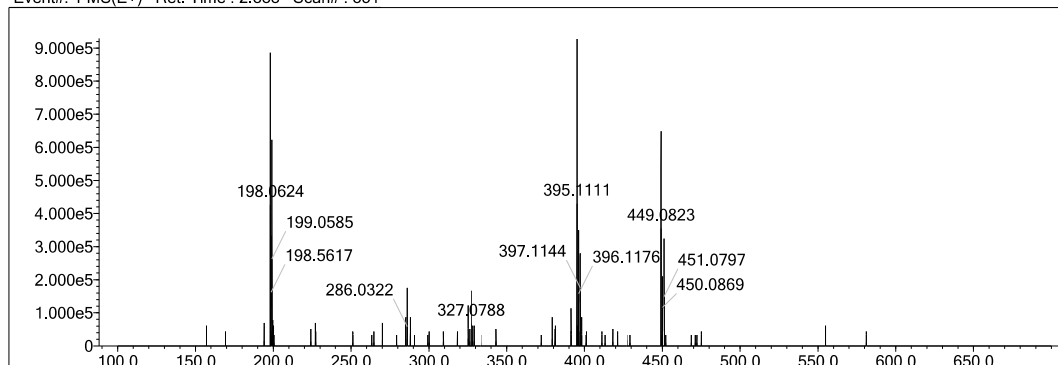
Isotope Res: 9000

MSn Iso RI (%): 10.00

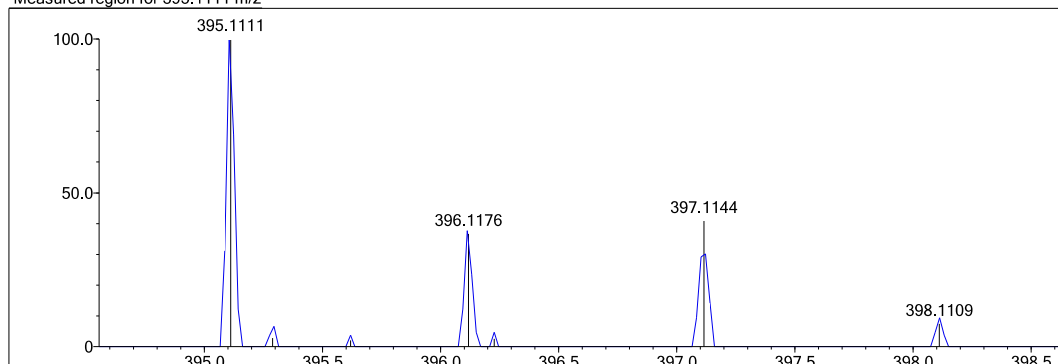
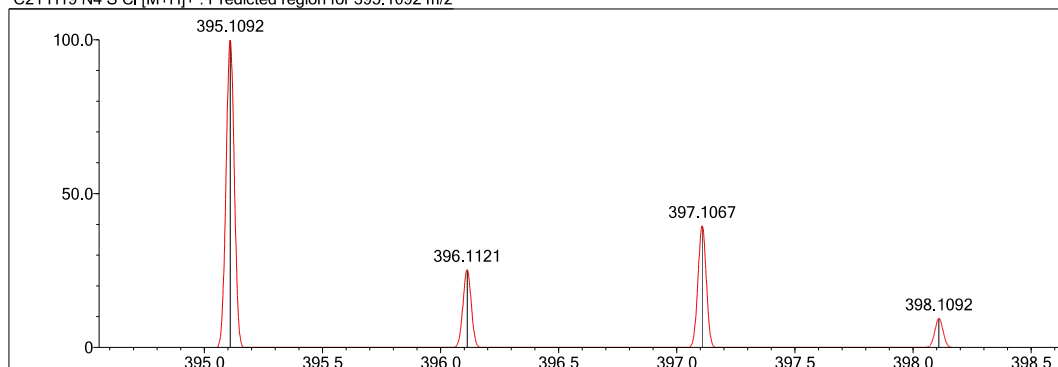
MSn Logic Mode: AND

Max Results: 150

Event#: 1 MS(E+) Ret. Time : 2.333 Scan# : 351



Measured region for 395.1111 m/z

C21 H19 N4 S Cl [M+H]<sup>+</sup> : Predicted region for 395.1092 m/z

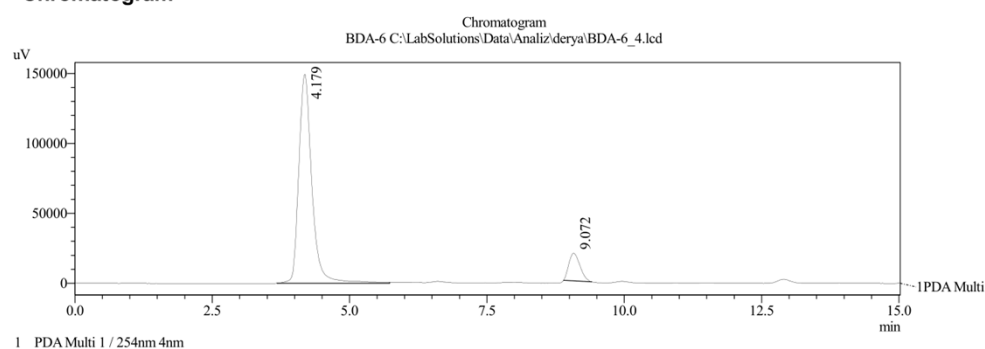
Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	52.48	C21 H19 N4 S Cl	[M+H] <sup>+</sup>	395.1111	395.1092	1.9	4.81	58.01	14.0

Figure S19. HRMS report of compound 2e

# ==== Shimadzu LCMSSolution Analysis Report ====

Acquired by : Admin  
 Sample Name : BDA-6  
 Sample ID :  
 Vial # : 71  
 Injection Volume : 0.5 uL  
 Data File Name : BDA-6\_4.lcd  
 Method File Name : isocratic\_serkan15DKBETÜL.lcm  
 Batch File Name : batch.lcb  
 Report File Name : DefaultLCMS.lcr  
 Data Acquired : 10.08.2023 10:33:04  
 Data Processed : 10.08.2023 11:48:05

## <Chromatogram>

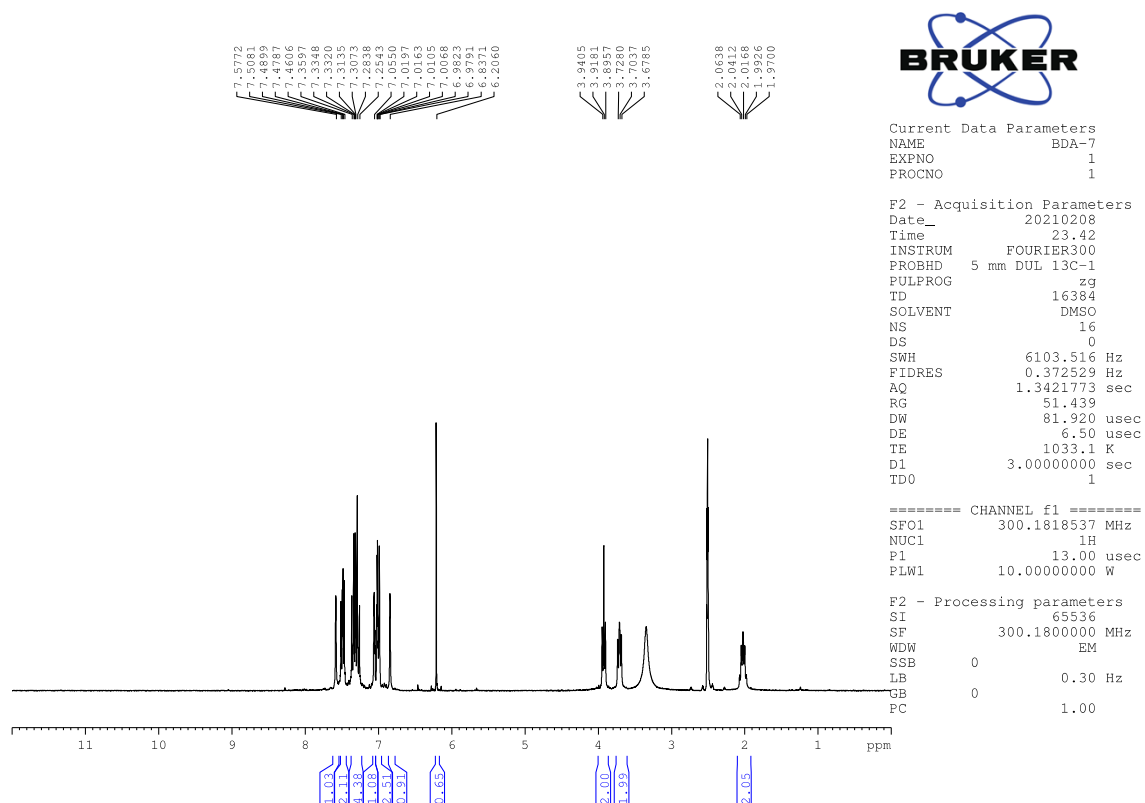


PeakTable					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.179	2487913	149461	90.001	88.384
2	9.072	276397	19644	9.999	11.616
Total		2764309	169105	100.000	100.000

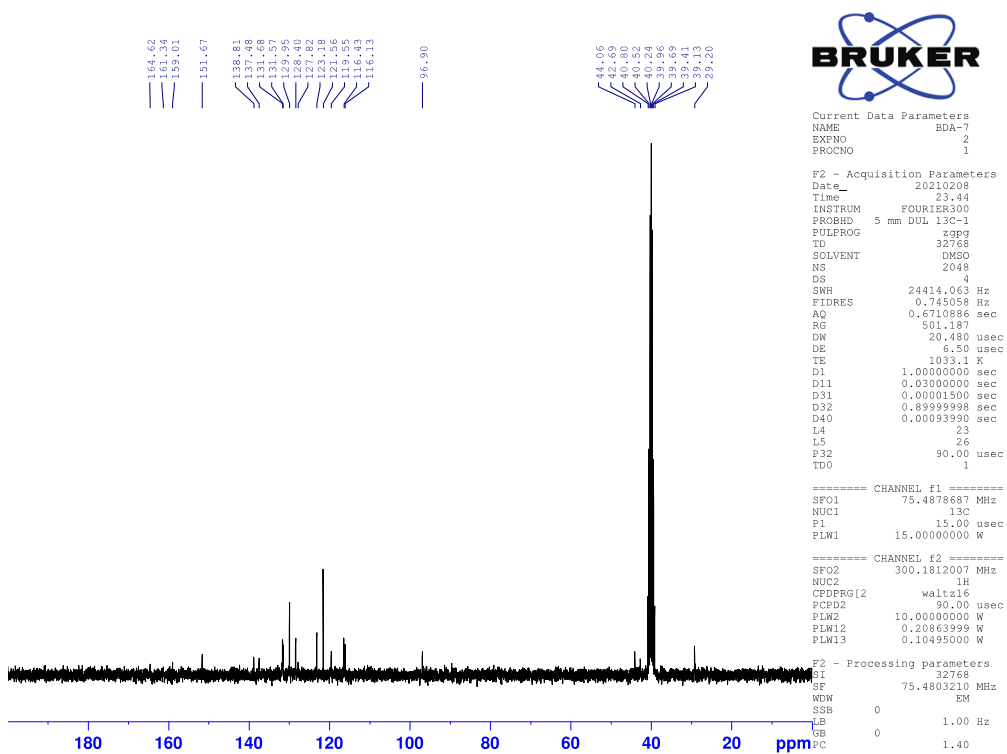
C:\LabSolutions\Data\Analiz\derya\BDA-6\_4.lcd

**Figure S20.** HPLC report of compound **2e**





**Figure S21.**  $^1\text{H}$ -NMR spectrum of compound **2f**



Data File: C:\LabSolutions\Data\Analiz\derya\BDA-7\_49.lcd

Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Use Adduct
H	1	5	40	O	2	0	3	S	2	1	1	Ru	2	0	0	H
C	4	5	35	F	1	1	1	Cl	1	0	0	Pd	2	0	0	
N	3	0	5	P	3	0	0	Br	1	0	0	I	3	0	0	

Error Margin (ppm): 5

DBE Range: 0.0 - 25.0

Electron Ions: both

HC Ratio: unlimited

Apply N Rule: yes

Use MSn Info: yes

Max Isotopes: 3

Isotope RI (%): 1.00

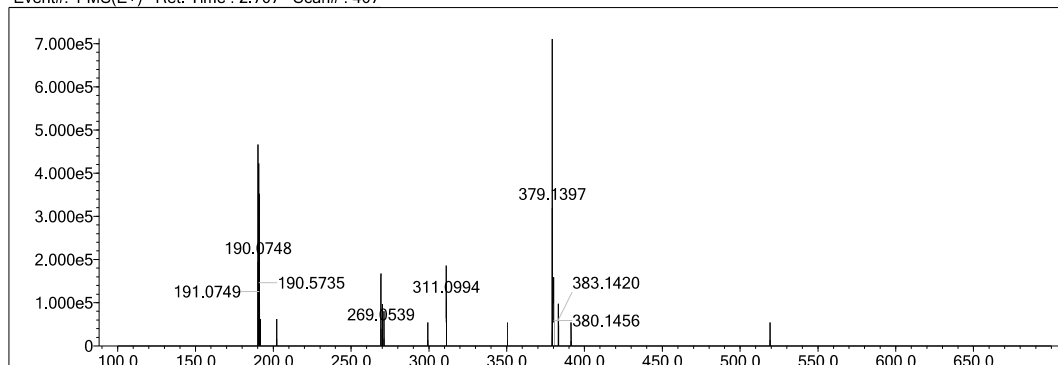
Isotope Res: 9000

MSn Iso RI (%): 10.00

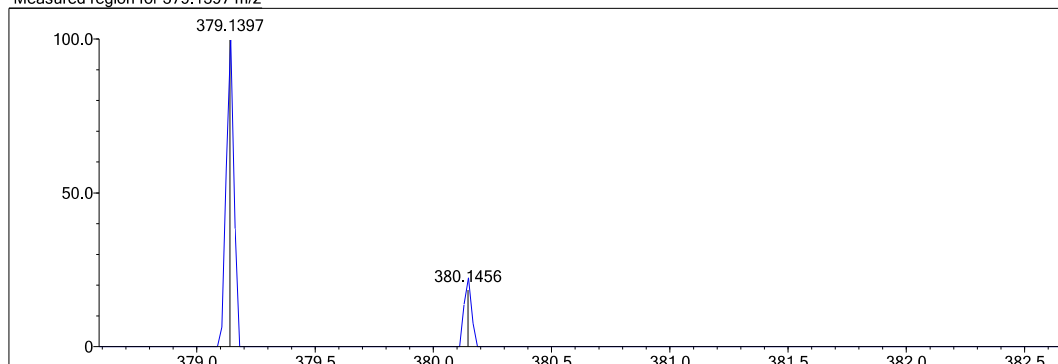
MSn Logic Mode: AND

Max Results: 150

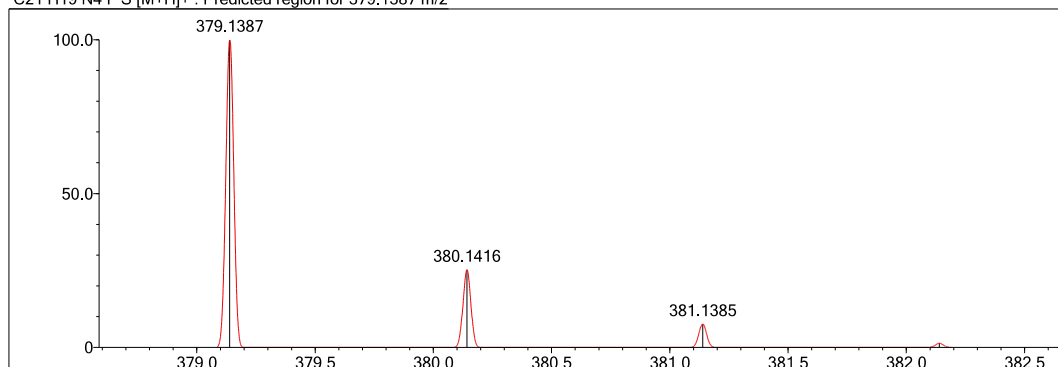
Event#: 1 MS(E+) Ret. Time : 2.707 Scan# : 407



Measured region for 379.1397 m/z



C21 H19 N4 F S [M+H]+ : Predicted region for 379.1387 m/z



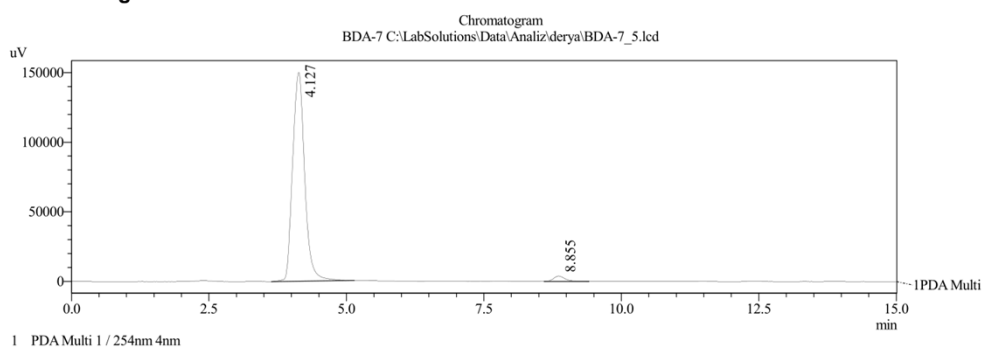
Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	0.00	C21 H19 N4 F S	[M+H]+	379.1397	379.1387	1.0	2.64	0.00	14.0

Figure S23. HRMS report of compound 2f

# ==== Shimadzu LCMSSolution Analysis Report ====

Acquired by : Admin  
 Sample Name : BDA-7  
 Sample ID :  
 Vial # : 72  
 Injection Volume : 0.5 uL  
 Data File Name : BDA-7\_5.lcd  
 Method File Name : isocratic\_serkan15DKBETÜL.lcm  
 Batch File Name : batch.lcb  
 Report File Name : DefaultLCMS.lcr  
 Data Acquired : 10.08.2023 10:48:34  
 Data Processed : 10.08.2023 11:48:48

## <Chromatogram>



PeakTable					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.127	2295836	150088	97.709	97.573
2	8.855	53840	3734	2.291	2.427
Total		2349676	153822	100.000	100.000

C:\LabSolutions\Data\Analiz\derya\BDA-7\_5.lcd

**Figure S24.** HPLC report of compound **2f**

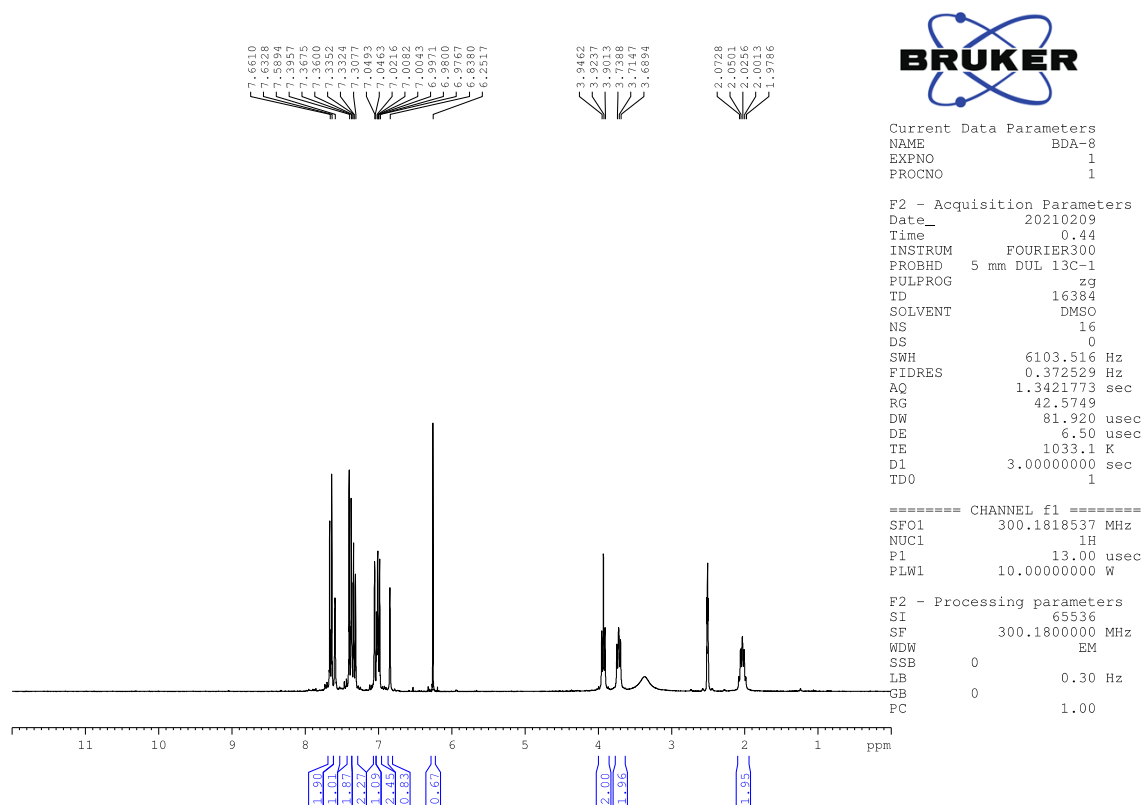


Figure S25.  $^1\text{H}$ -NMR spectrum of compound **2g**

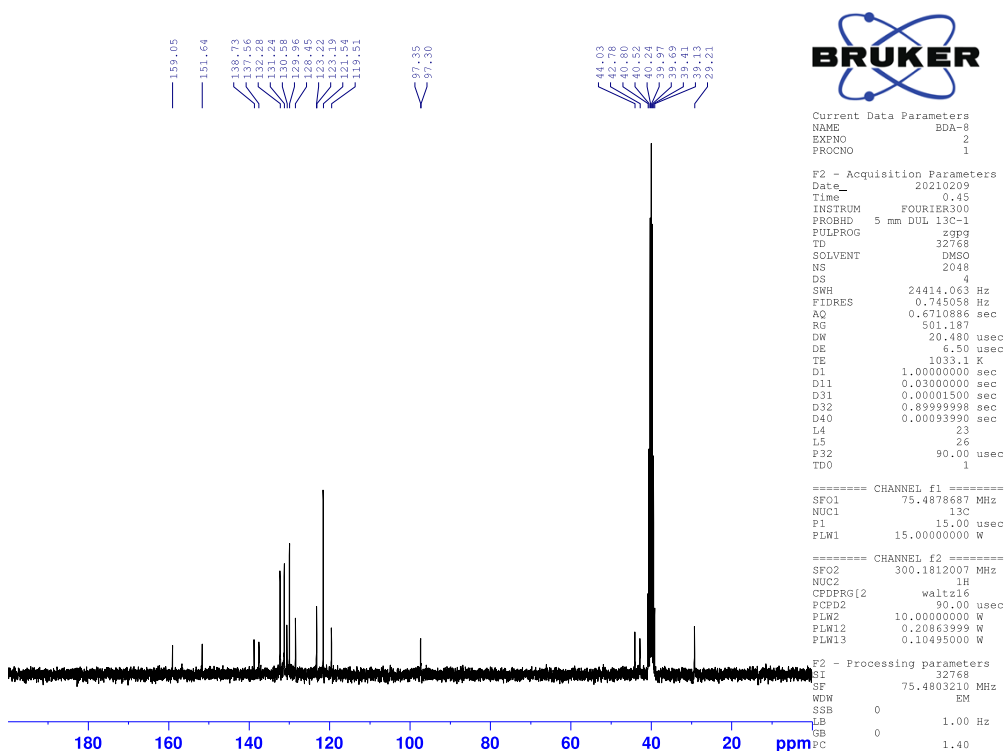


Figure S26.  $^{13}\text{C}$ -NMR spectrum of compound **2g**

Data File: C:\LabSolutions\Data\Analiz\derya\BDA-8\_50.lcd

Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Use Adduct
H	1	5	40	O	2	0	3	S	2	1	1	Ru	2	0	0	H
C	4	5	35	F	1	0	0	Cl	1	0	0	Pd	2	0	0	
N	3	0	5	P	3	0	0	Br	1	1	1	I	3	0	0	

Error Margin (ppm): 5

DBE Range: 0.0 - 25.0

Electron Ions: both

HC Ratio: unlimited

Apply N Rule: yes

Use MSn Info: yes

Max Isotopes: 3

Isotope RI (%): 1.00

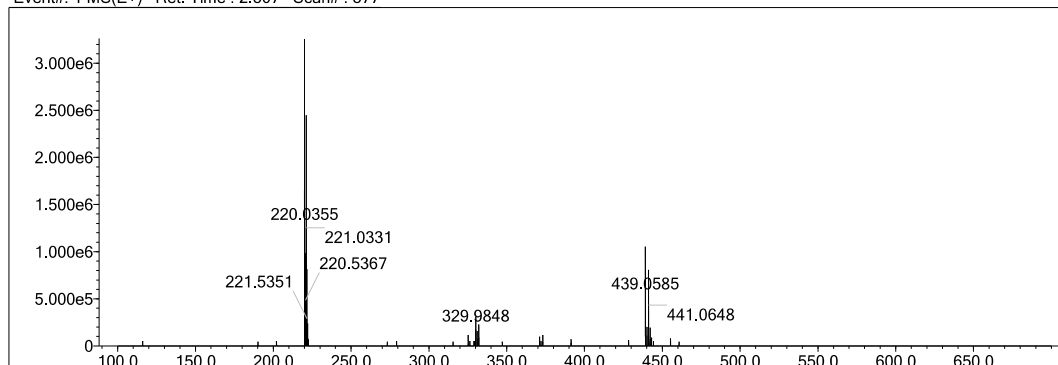
Isotope Res: 9000

MSn Iso RI (%): 10.00

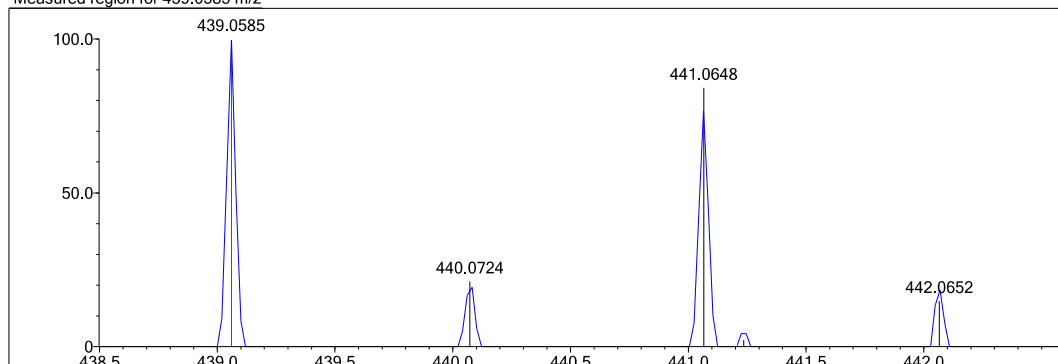
MSn Logic Mode: AND

Max Results: 150

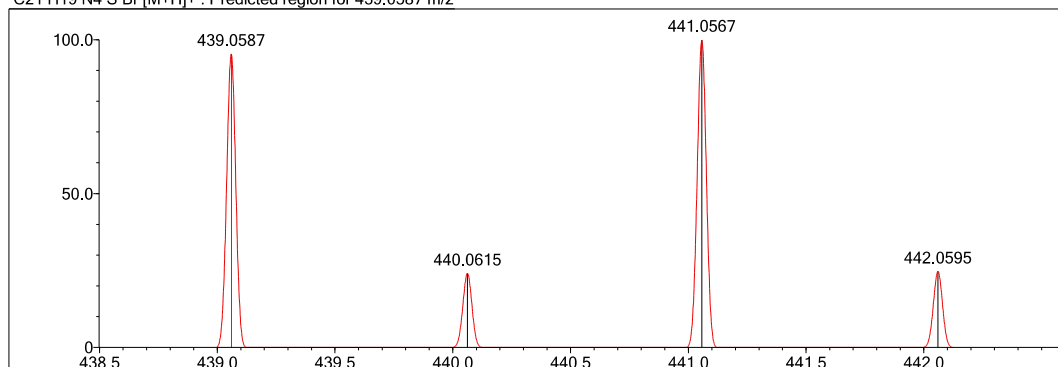
Event#: 1 MS(E+) Ret. Time : 2.507 Scan# : 377



Measured region for 439.0585 m/z



C21 H19 N4 S Br [M+H]+ : Predicted region for 439.0587 m/z



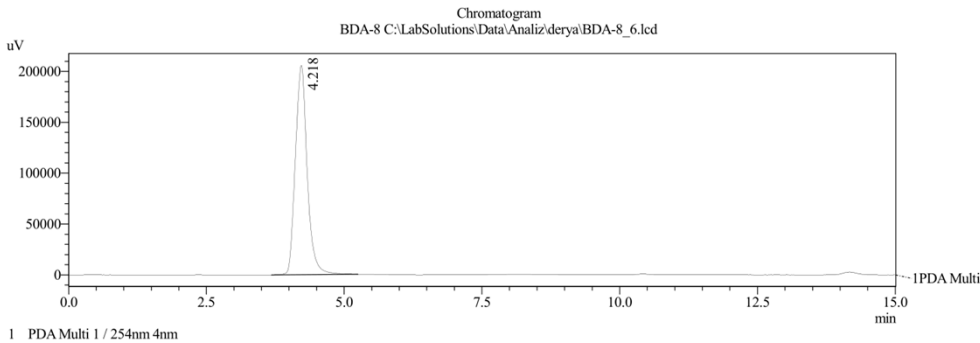
Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	26.78	C21 H19 N4 S Br	[M+H] <sup>+</sup>	439.0585	439.0587	-0.2	-0.46	26.78	14.0

Figure S27. HRMS report of compound 2g

==== Shimadzu LCMSsolution Analysis Report ====

Acquired by : Admin  
Sample Name : BDA-8  
Sample ID :  
Vial # : 73  
Injection Volume : 0.5 uL  
Data File Name : BDA-8\_6.lcd  
Method File Name : isocratic\_serkan15DKBETÜL.lcm  
Batch File Name : batch.lcb  
Report File Name : DefaultLCMS.lcr  
Data Acquired : 10.08.2023 11:04:03  
Data Processed : 10.08.2023 11:49:28

<Chromatogram>



PDA Ch1 254nm 4nm

PeakTable					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.218	3074897	205830	100.000	100.000
Total		3074897	205830	100.000	100.000

C:\LabSolutions\Data\Analiz\derya\BDA-8\_6.lcd

Figure S28. HPLC report of compound 2g

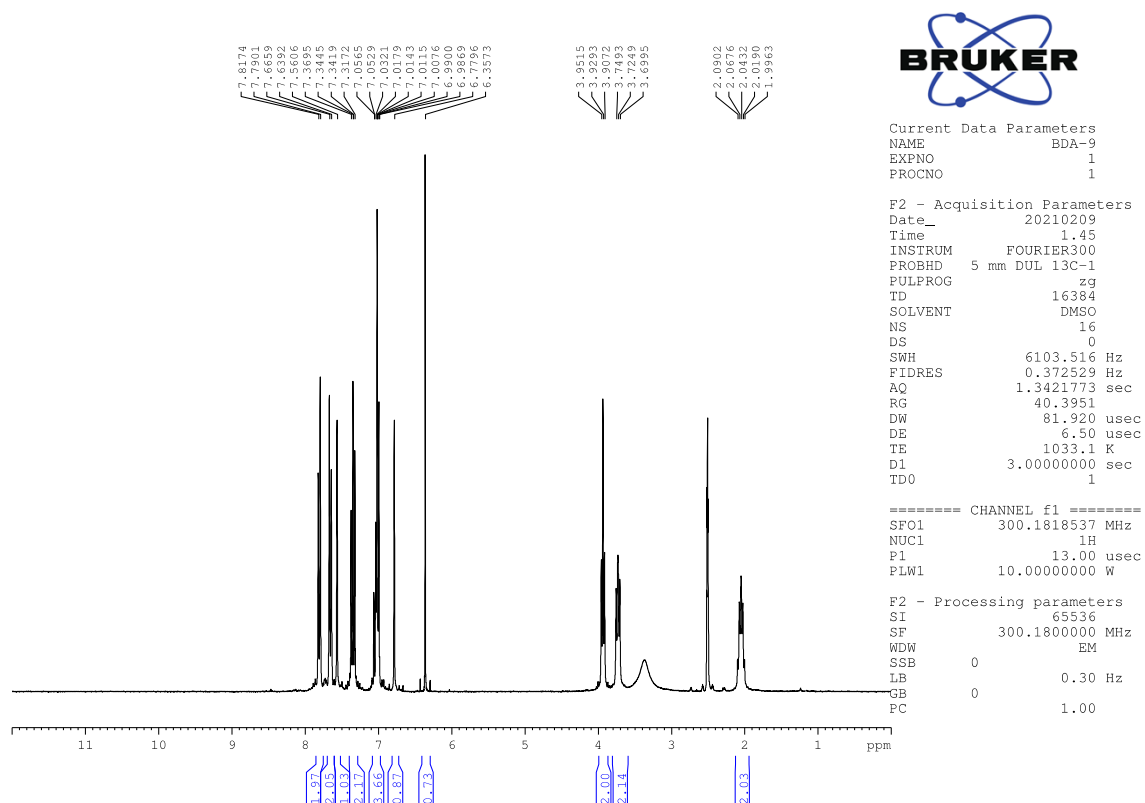


Figure S29.  $^1\text{H}$ -NMR spectrum of compound **2h**

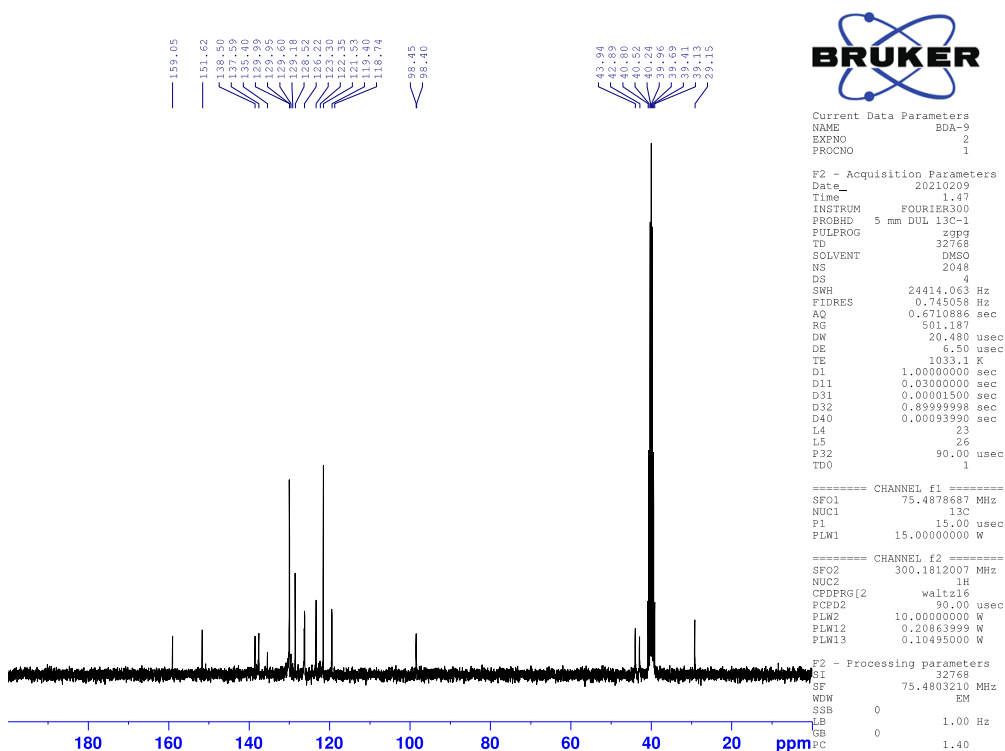


Figure S30.  $^{13}\text{C}$ -NMR spectrum of compound **2h**

Data File: C:\LabSolutions\Data\Analiz\derya\BDA-9\_51.lcd

Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Elmt	Val.	Min	Max	Use Adduct
H	1	5	40	O	2	0	3	S	2	1	1	Ru	2	0	0	H
C	4	5	35	F	1	3	3	Cl	1	0	0	Pd	2	0	0	
N	3	0	5	P	3	0	0	Br	1	0	0	I	3	0	0	

Error Margin (ppm): 5

DBE Range: 0.0 - 25.0

Electron Ions: both

HC Ratio: unlimited

Apply N Rule: yes

Use MSn Info: yes

Max Isotopes: 3

Isotope RI (%): 1.00

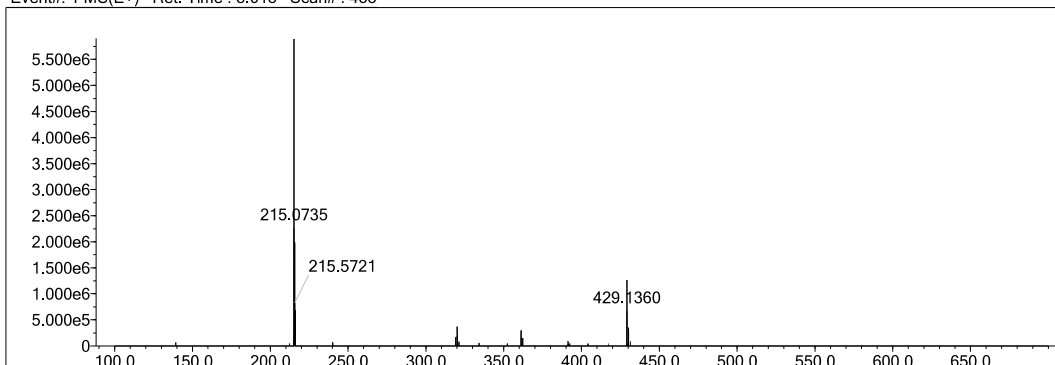
Isotope Res: 9000

MSn Iso RI (%): 10.00

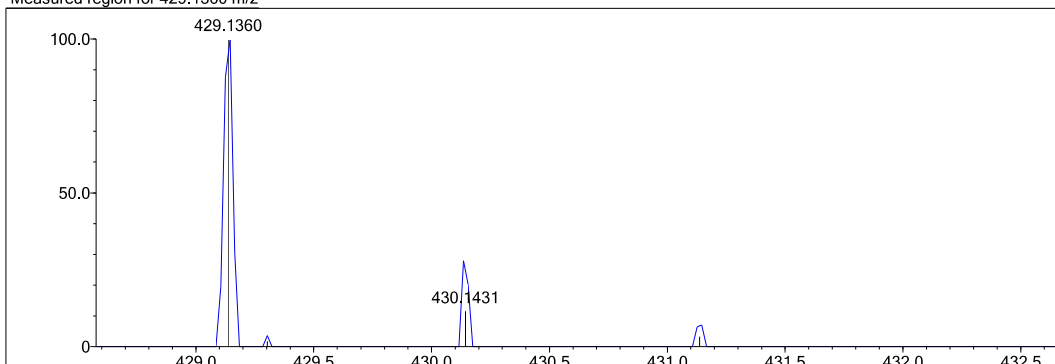
MSn Logic Mode: AND

Max Results: 150

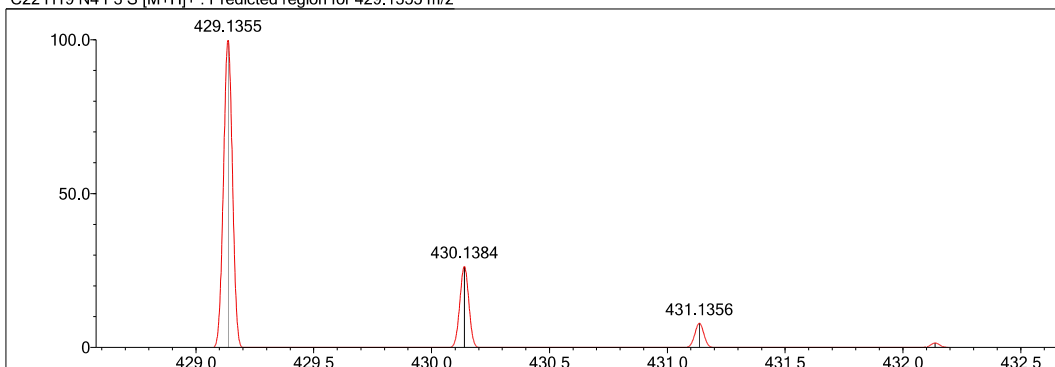
Event#: 1 MS(E+) Ret. Time : 3.013 Scan# : 453



Measured region for 429.1360 m/z



C22 H19 N4 F3 S [M+H]+ : Predicted region for 429.1355 m/z



Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	80.23	C22 H19 N4 F3 S	[M+H]+	429.1360	429.1355	0.5	1.17	80.57	14.0

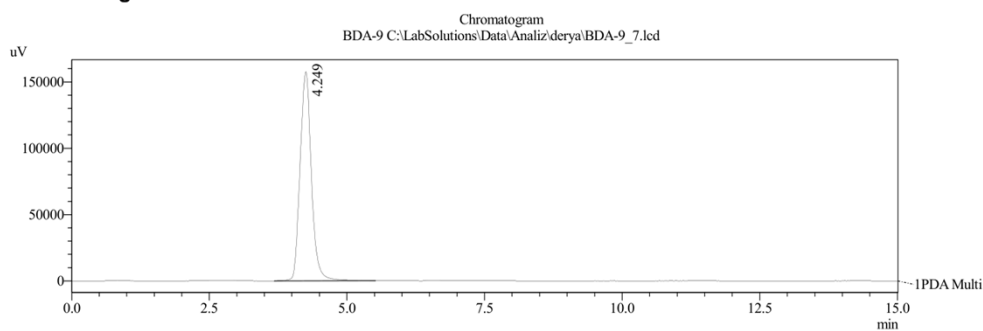
Figure S31. HRMS report of compound 2h



# ==== Shimadzu LCMSsolution Analysis Report ====

Acquired by : Admin  
 Sample Name : BDA-9  
 Sample ID :  
 Vial # : 74  
 Injection Volume : 0.5 uL  
 Data File Name : BDA-9\_7.lcd  
 Method File Name : isocratic\_serkan15DKBETÜL.lcm  
 Batch File Name : batch.lcb  
 Report File Name : DefaultLCMS.lcr  
 Data Acquired : 10.08.2023 11:19:32  
 Data Processed : 10.08.2023 11:50:10

## <Chromatogram>



PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.249	2258640	157774	100.000	100.000
Total		2258640	157774	100.000	100.000

C:\LabSolutions\Data\Analiz\derya\BDA-9\_7.lcd

**Figure S32.** HPLC report of compound **2h**

