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Asymmetric conjugate additions of 2-substituted benzofuran-3(2*H*)-ones with α, β-unsaturated ketone catalyzed by chiral copper complexes

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Supporting Information

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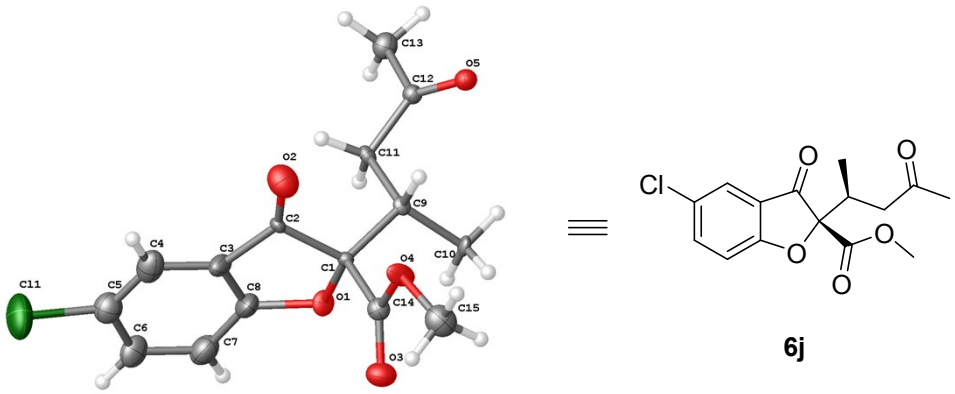
1、Crystal data and structure refinement for enantiopure 6j

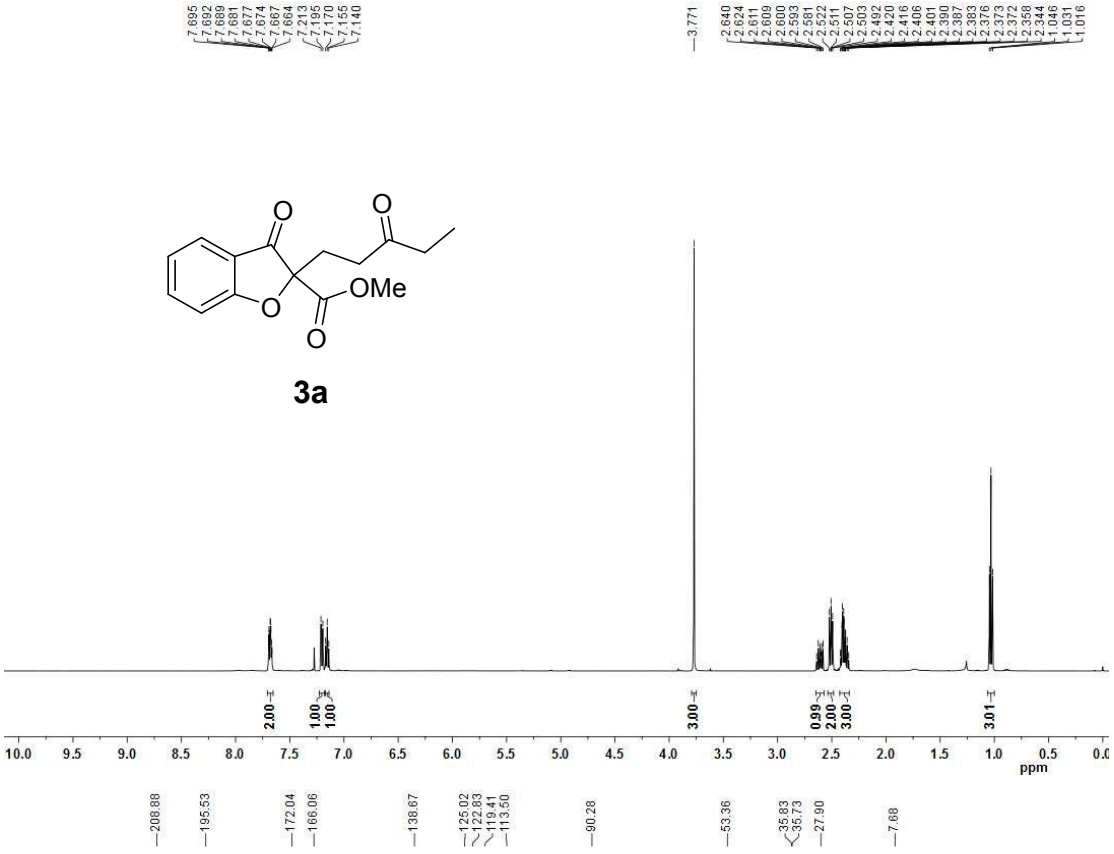
Crystals of enantiopure **6j** suitable for X-ray analysis were obtained from crystallization in a solution of dichloromethane/*n*-hexane.

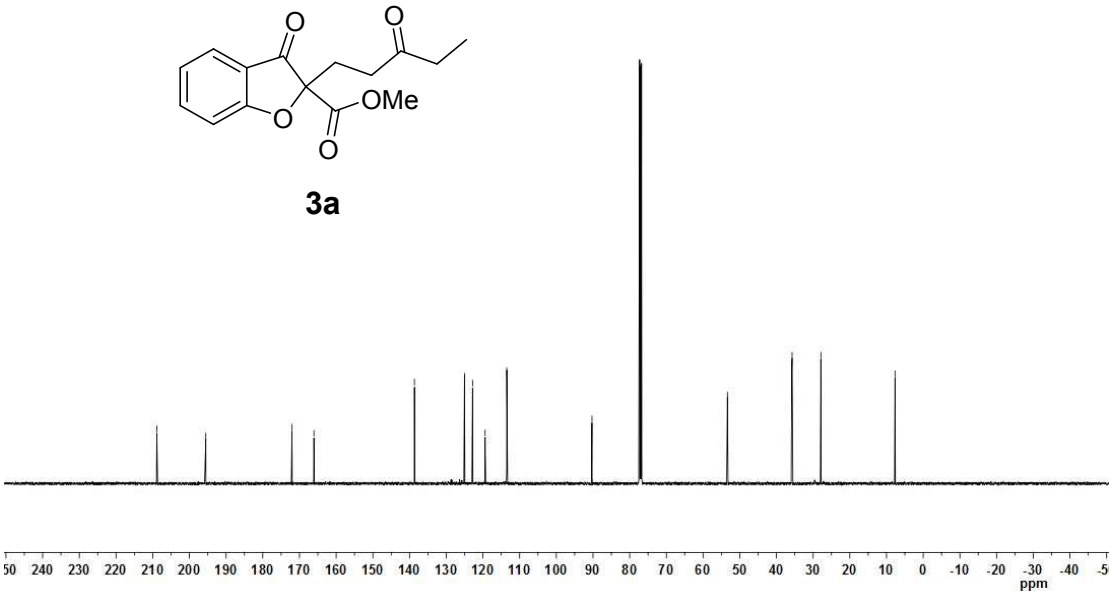


Identification code	mo_dm16873_0m	
Empirical formula	$C_{15}H_{15}ClO_5$	
Formula weight	310.72	
Temperature	130 K	
Wavelength	0.71073 Å	
Crystal system	Hexagonal	
Space group	P 65	
Unit cell dimensions	a = 15.8422(17) Å	□= 90°.
	b = 15.8422(17) Å	□= 90°.
	c = 11.1926(12) Å	□ = 120°.
Volume	2432.7(6) $Å^3$	
Z	6	
Density (calculated)	1.273 Mg/m^3	
Absorption coefficient	0.252 mm^{-1}	
F(000)	972	
Crystal size	0.05 x 0.05 x 0.05 mm^3	
Theta range for data collection	1.48 to 27.50°.	

Index ranges	-20<=h<=20, -20<=k<=20, -14<=l<=14
Reflections collected	20466
Independent reflections	3011 [R(int) = 0.0768]
Completeness to theta = 25.242°	100.0 %
Absorption correction	Semi-empirical from equivalents
Max. and min. transmission	0.7456 and 0.6540
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	3011 / 265 / 322
Goodness-of-fit on F^2	0.924
Final R indices [I>2sigma(I)]	R1 = 0.0535, wR2 = 0.1541
R indices (all data)	R1 = 0.0719, wR2 = 0.1733
Absolute structure parameter	0.03(4)
Extinction coefficient	n/a
Largest diff. peak and hole	0.232 and -0.291 e.$Å^{-3}$

2、^{1}H and ^{13}C NMR spectra of all products



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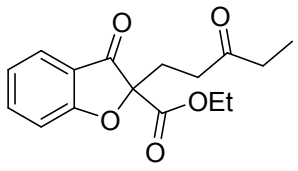
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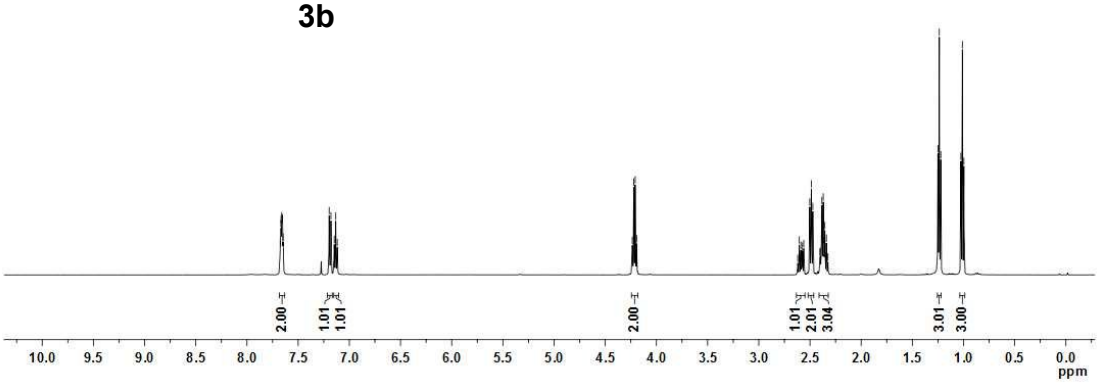
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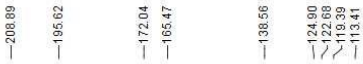
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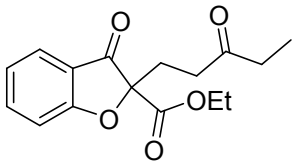
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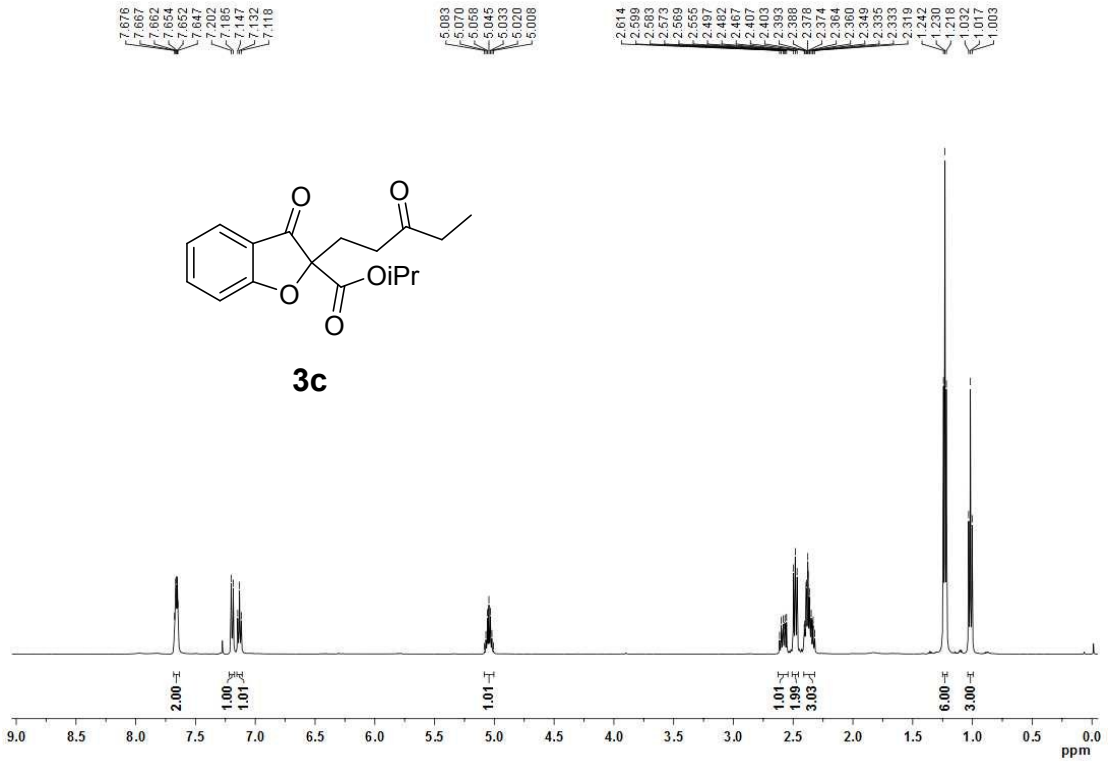
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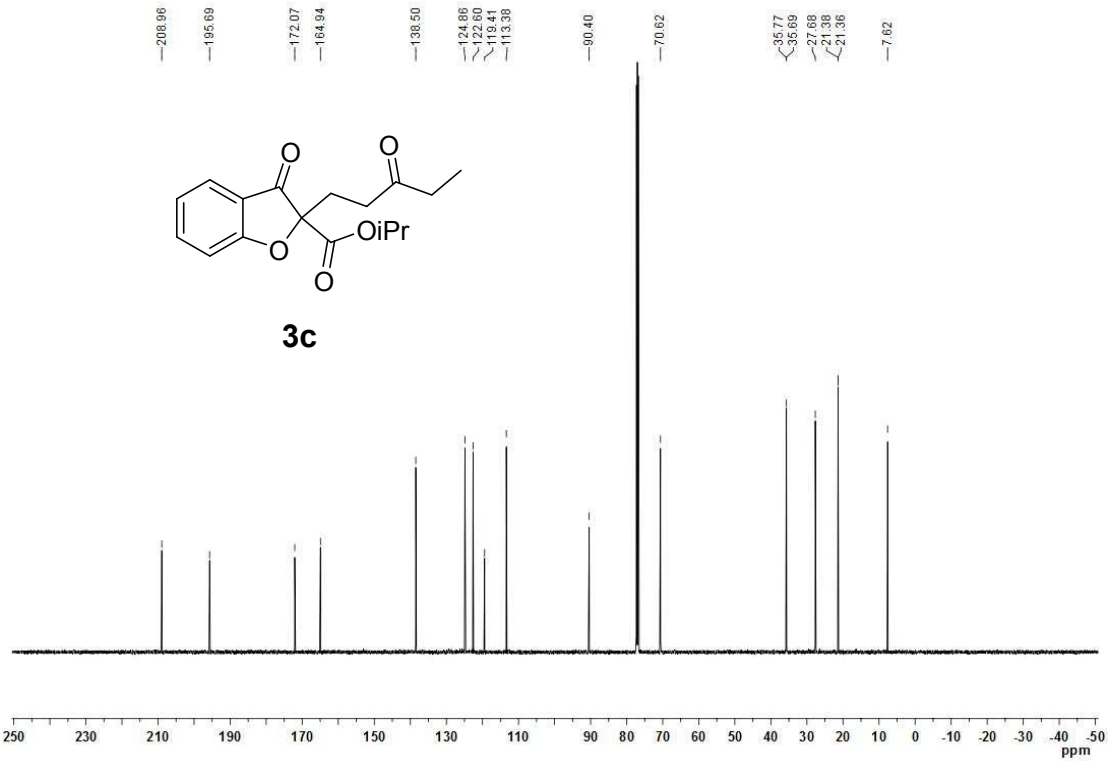
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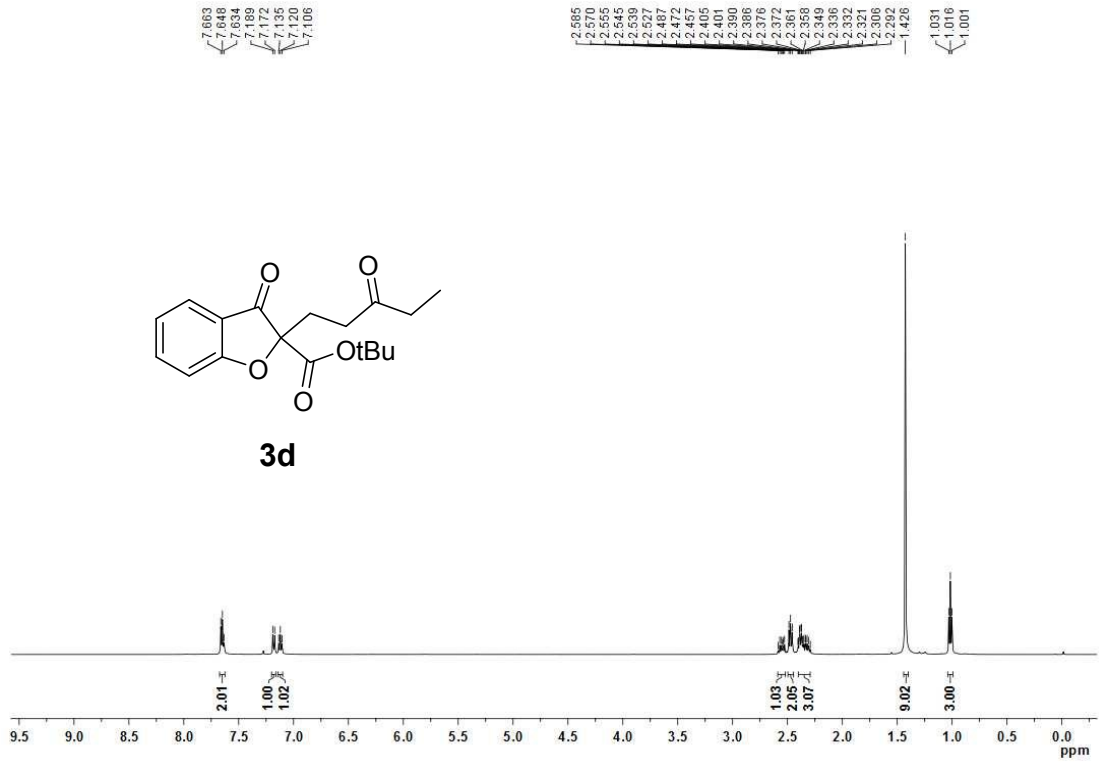
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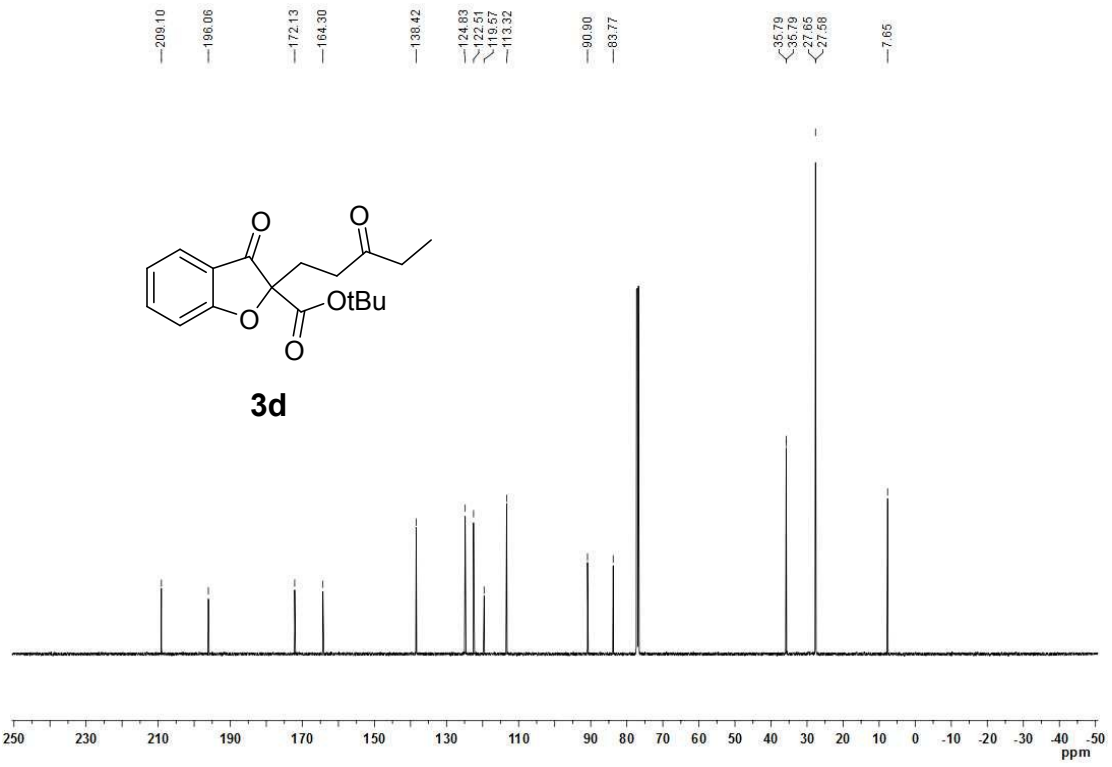
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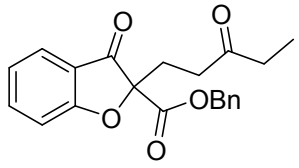

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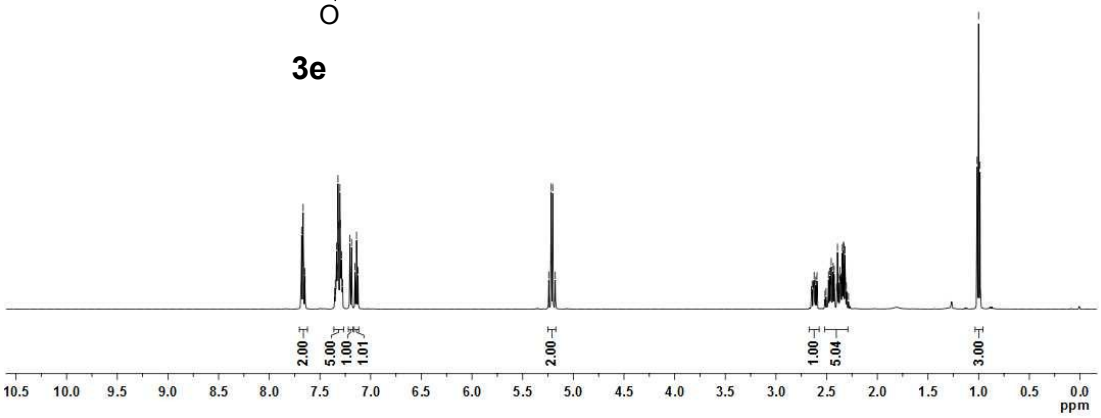

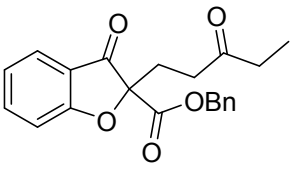

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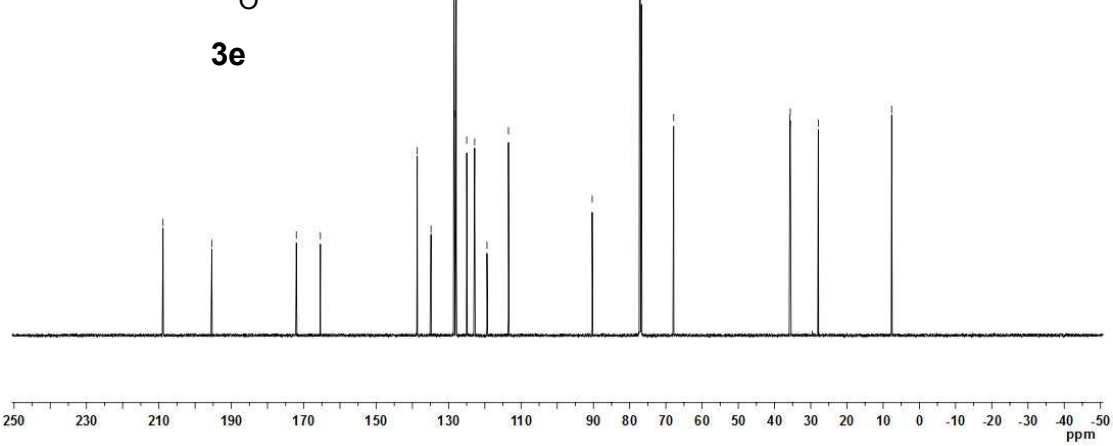

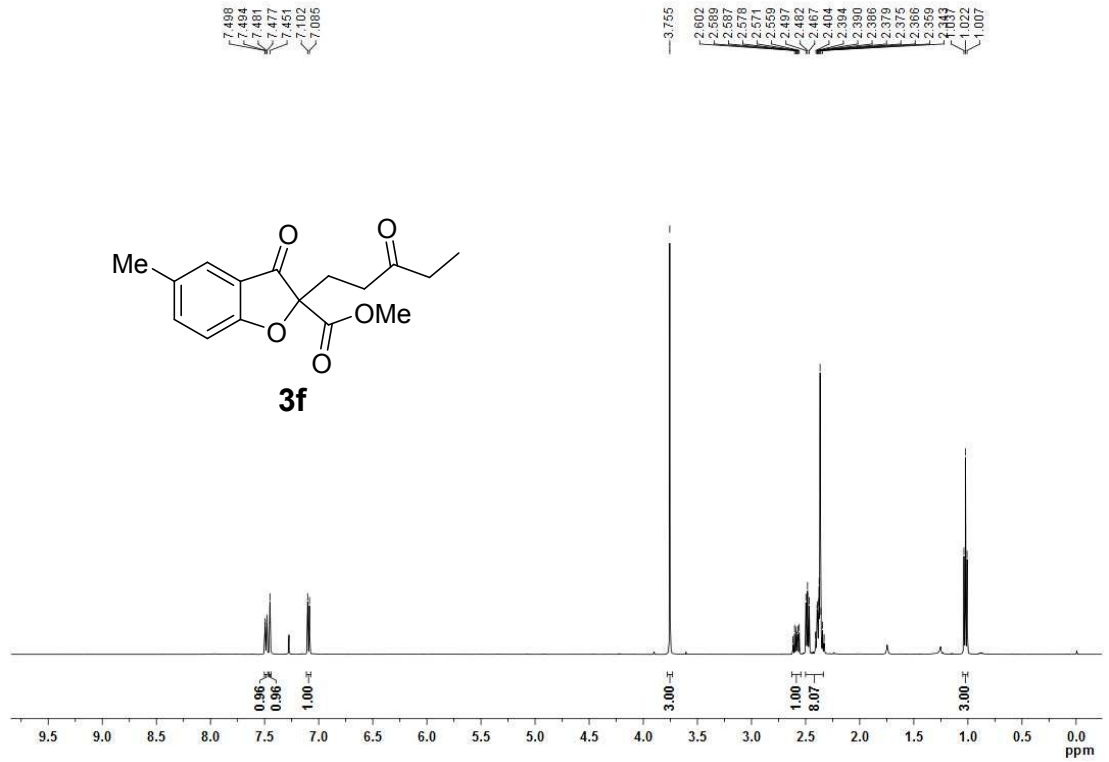
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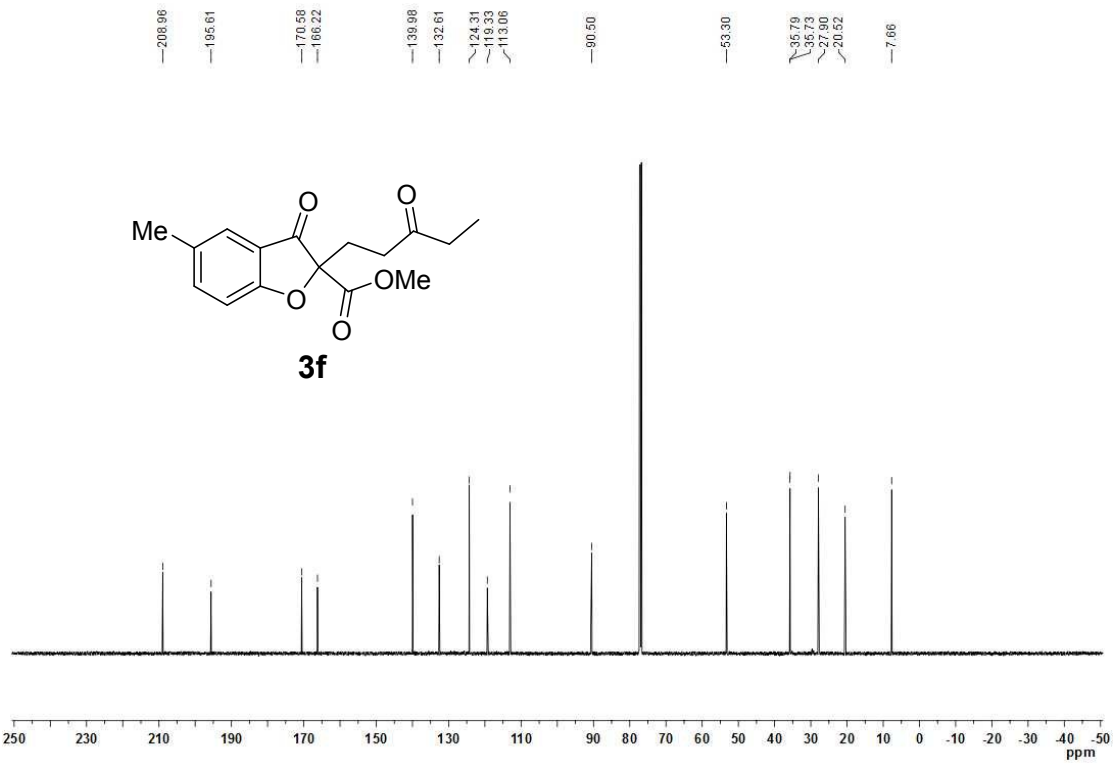
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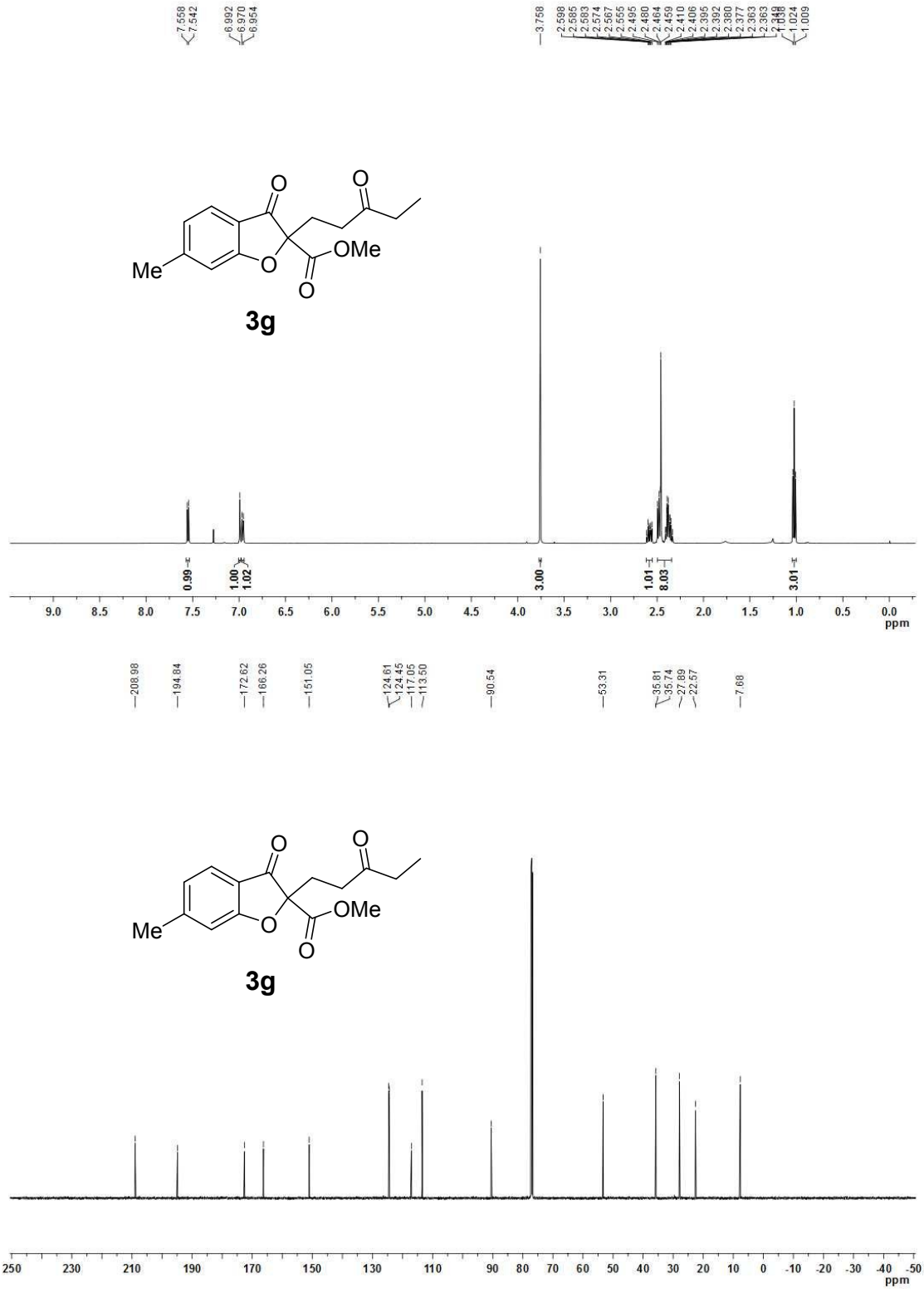
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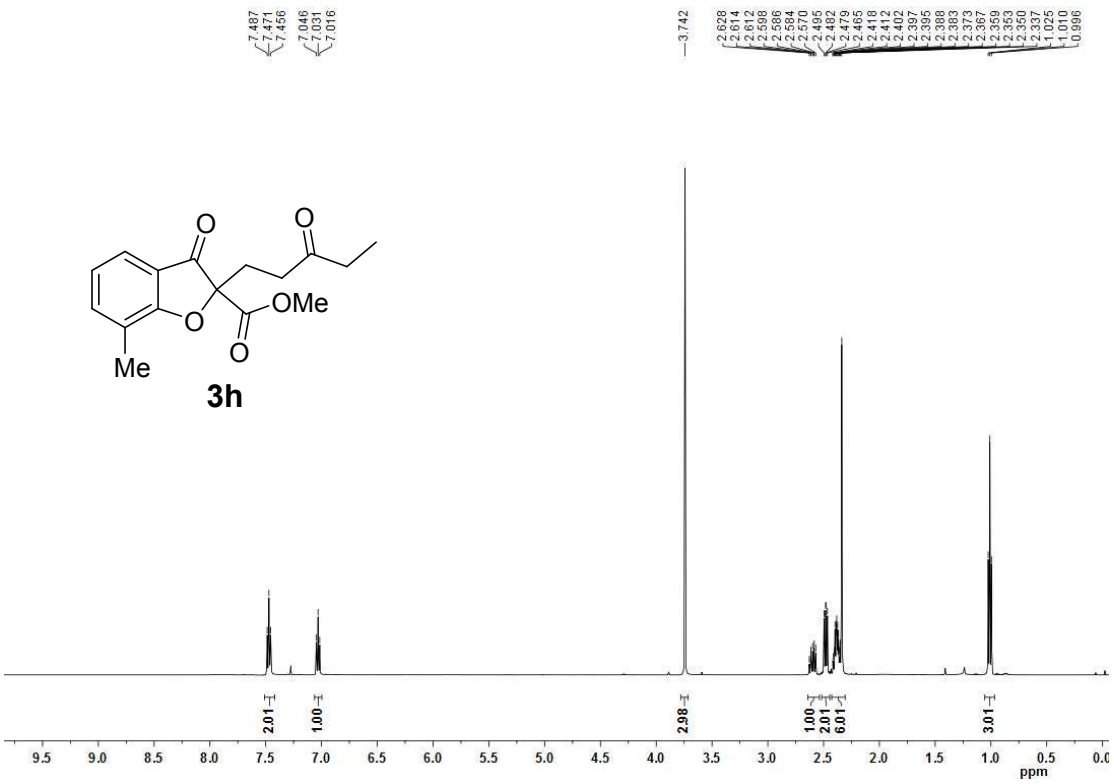
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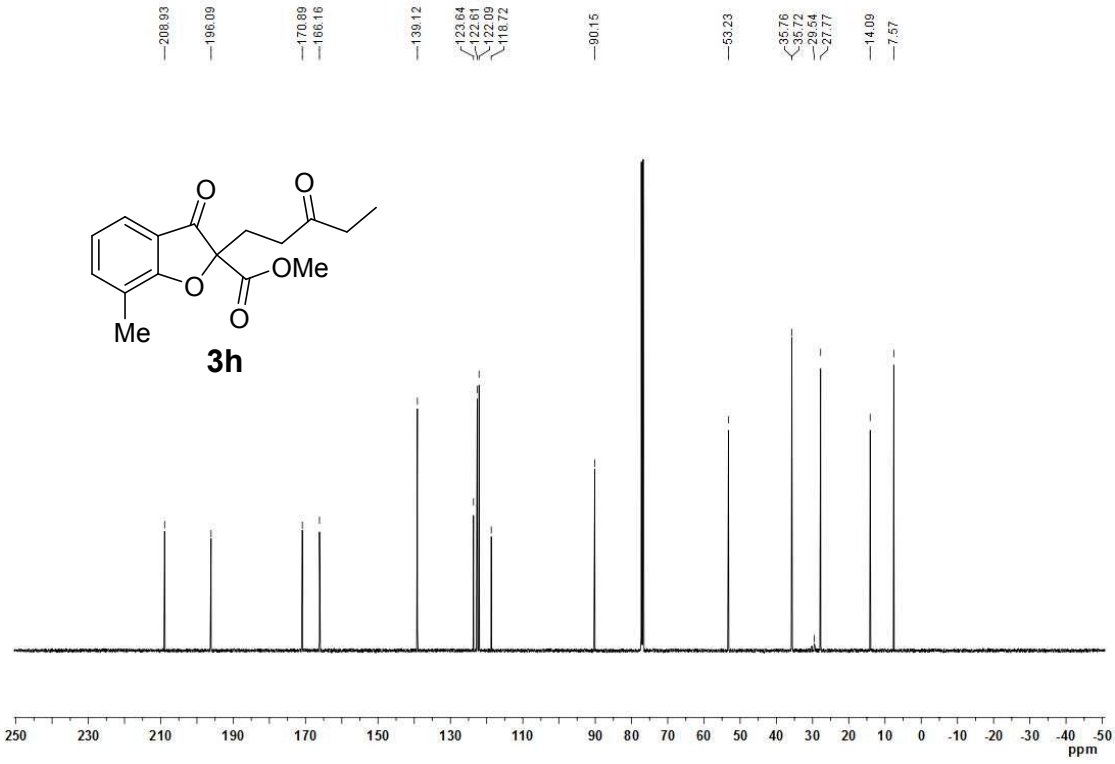
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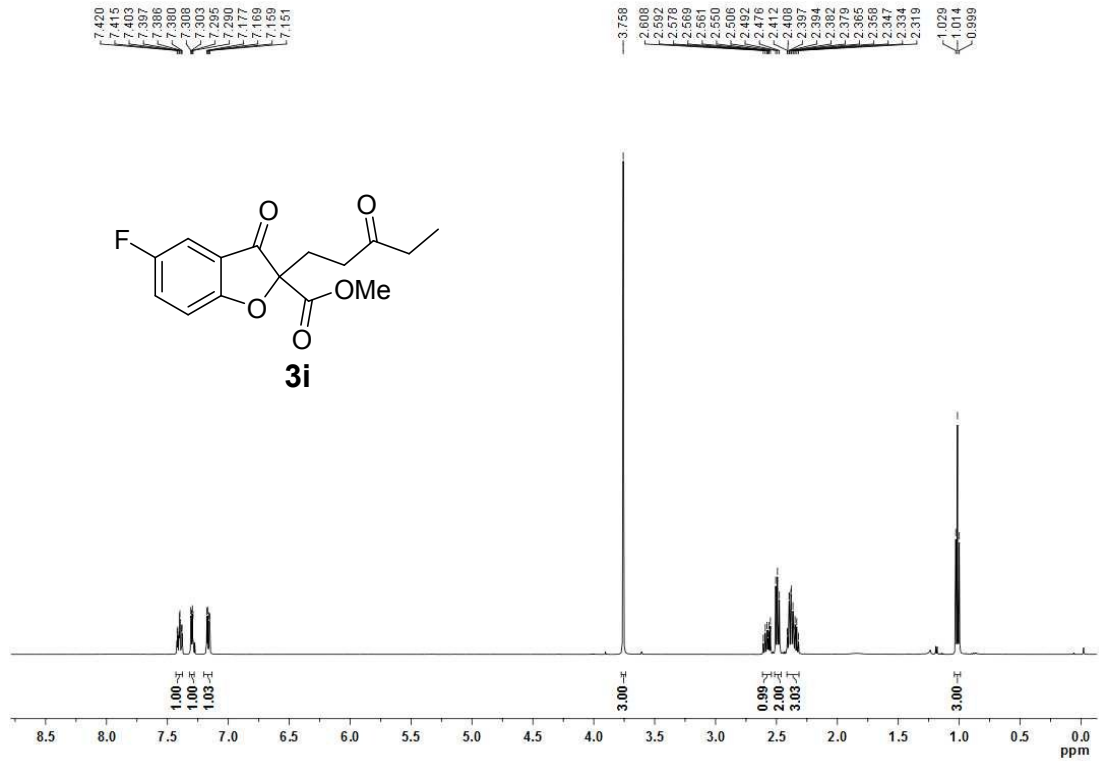
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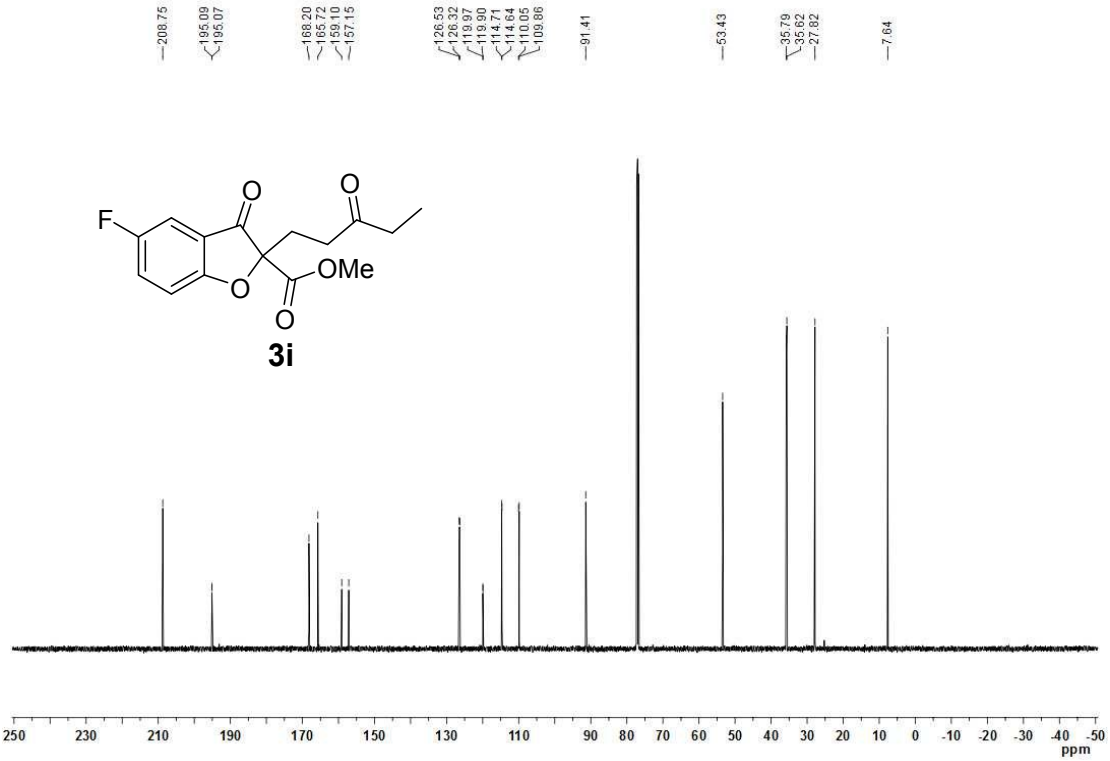
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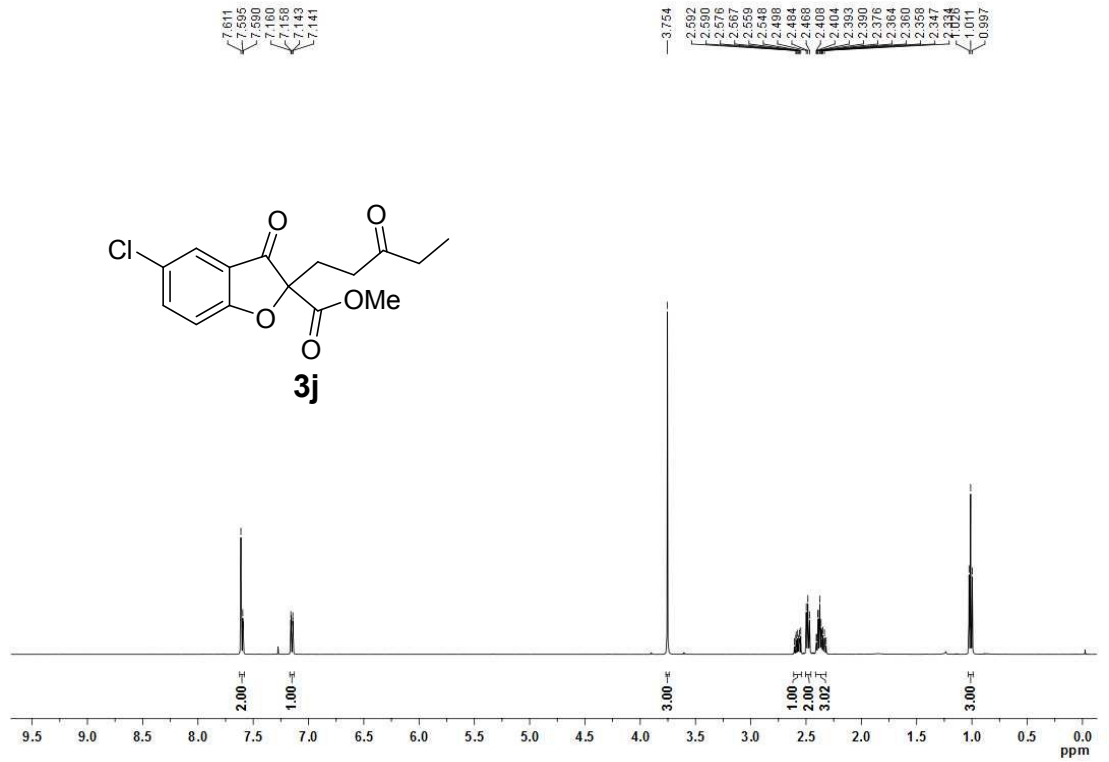
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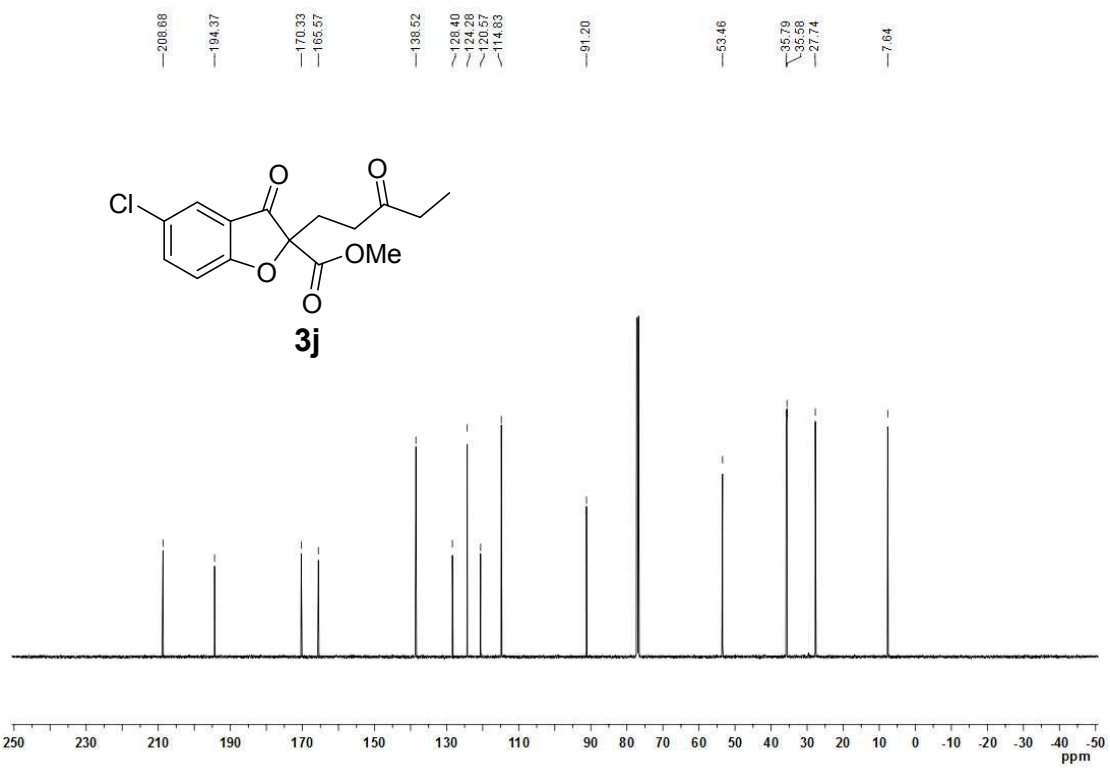
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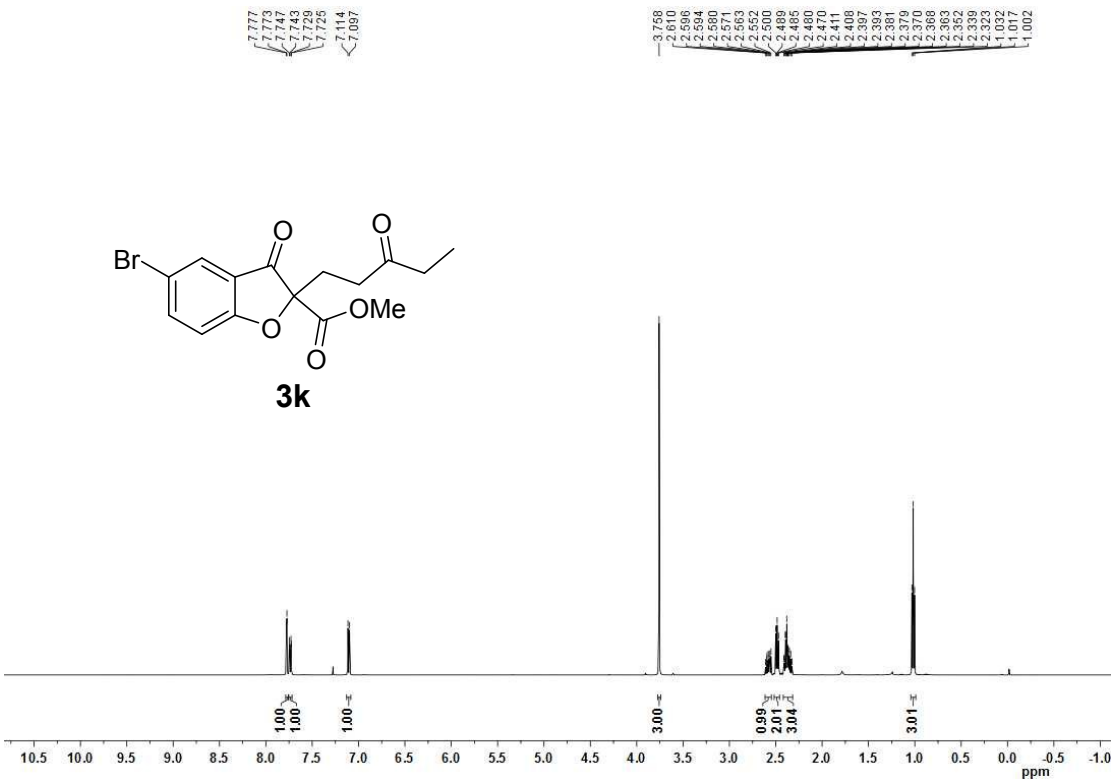
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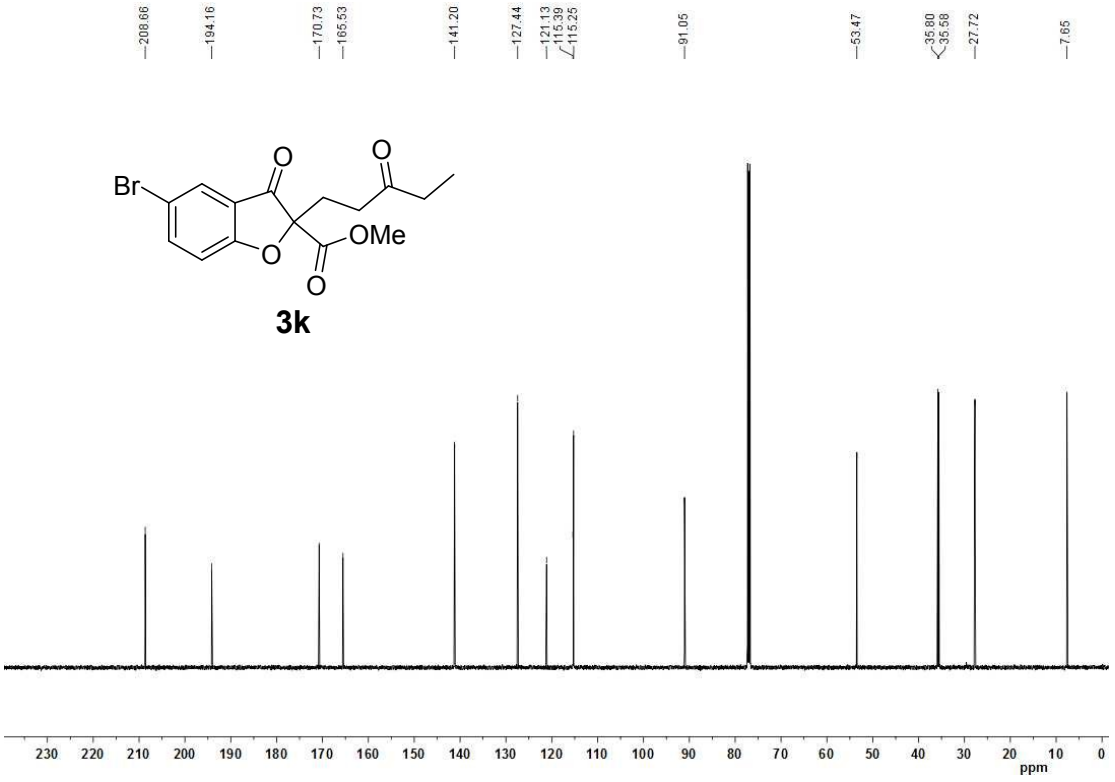
Br
O
O
O
OMe
O
3k
1.00
1.00
1.00
3.00
0.99
2.01
3.04
3.01
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
ppm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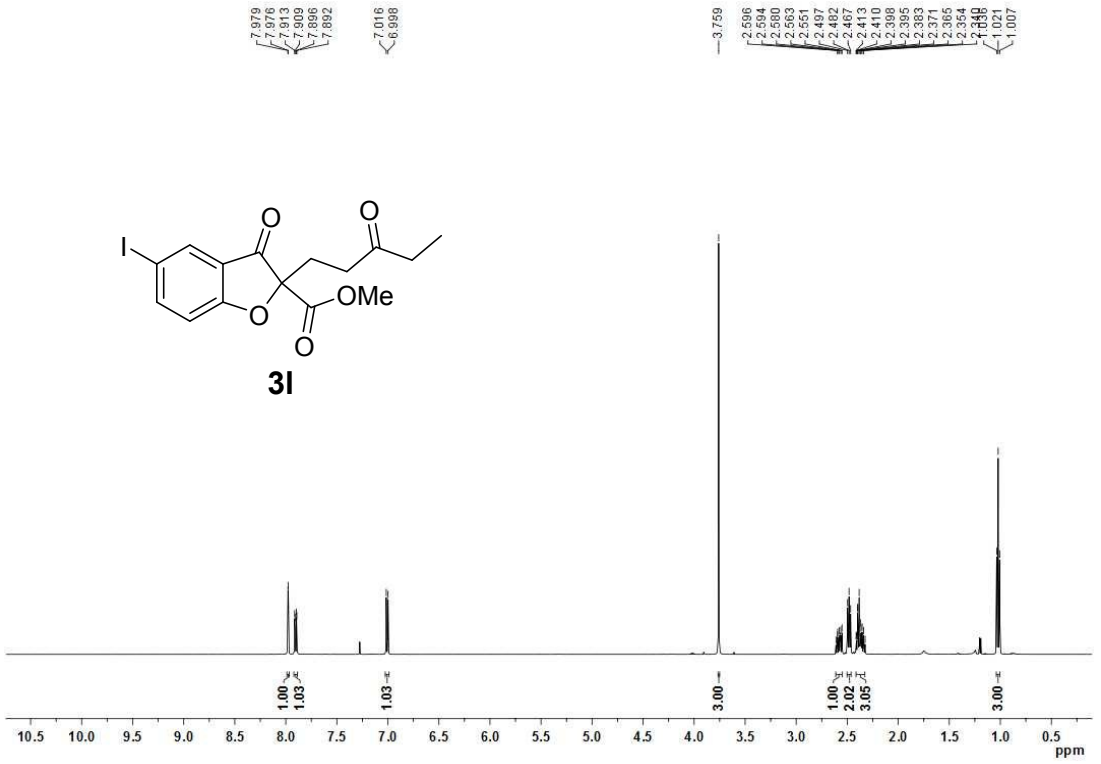
194.16
170.73
165.53
141.20
127.44
121.13
115.39
115.25
91.05
53.47
35.80
35.58
27.72
7.65
Br
O
O
O
OMe
O
3k
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
ppm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7.976
7.913
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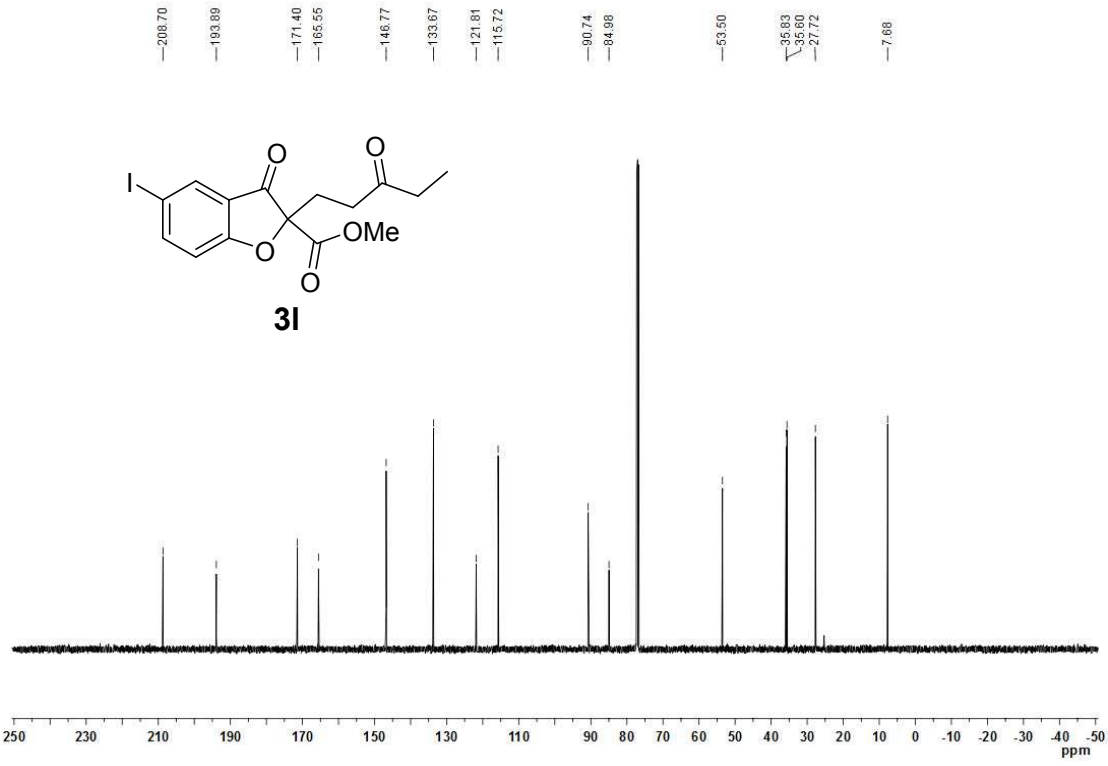
7.896
7.892
7.016
6.998
3.759
2.596
2.594
2.580
2.563
2.551
2.497
2.482
2.467
2.413
2.410
2.398
2.395
2.383
2.371
2.365
2.354
1.021
1.007
I
O
O
O
OMe
O
1.00
1.03
1.03
3.00
1.00
2.02
3.05
3.00
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm

3l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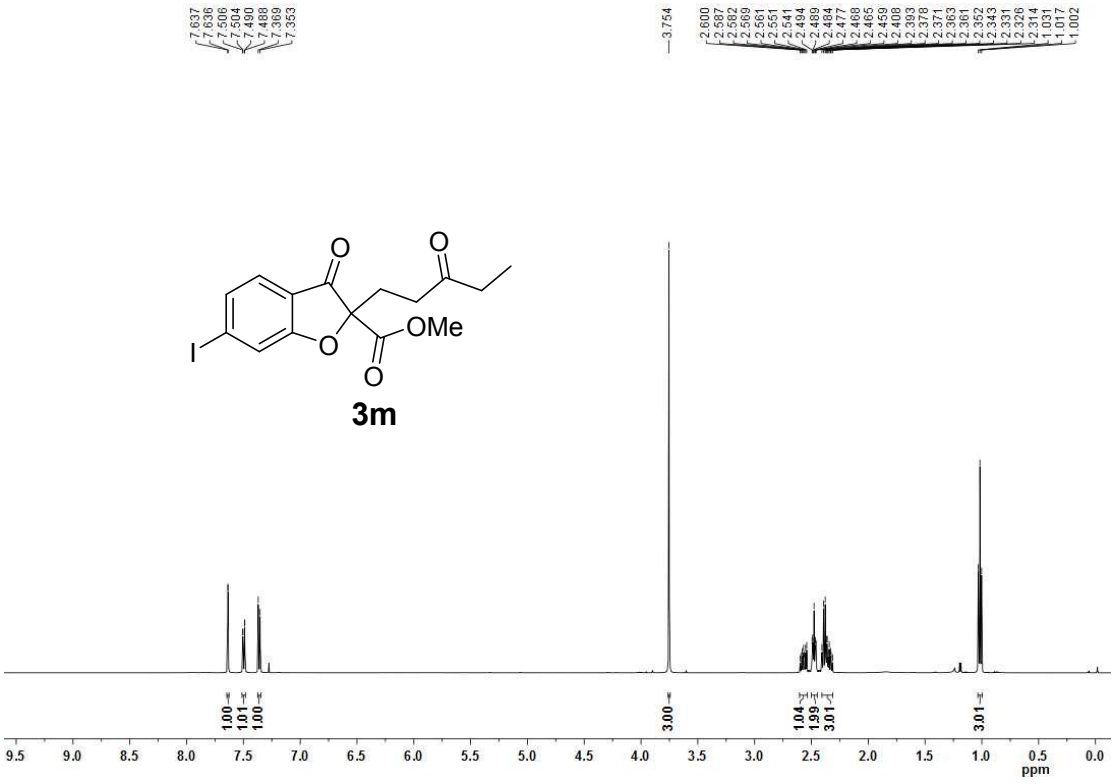
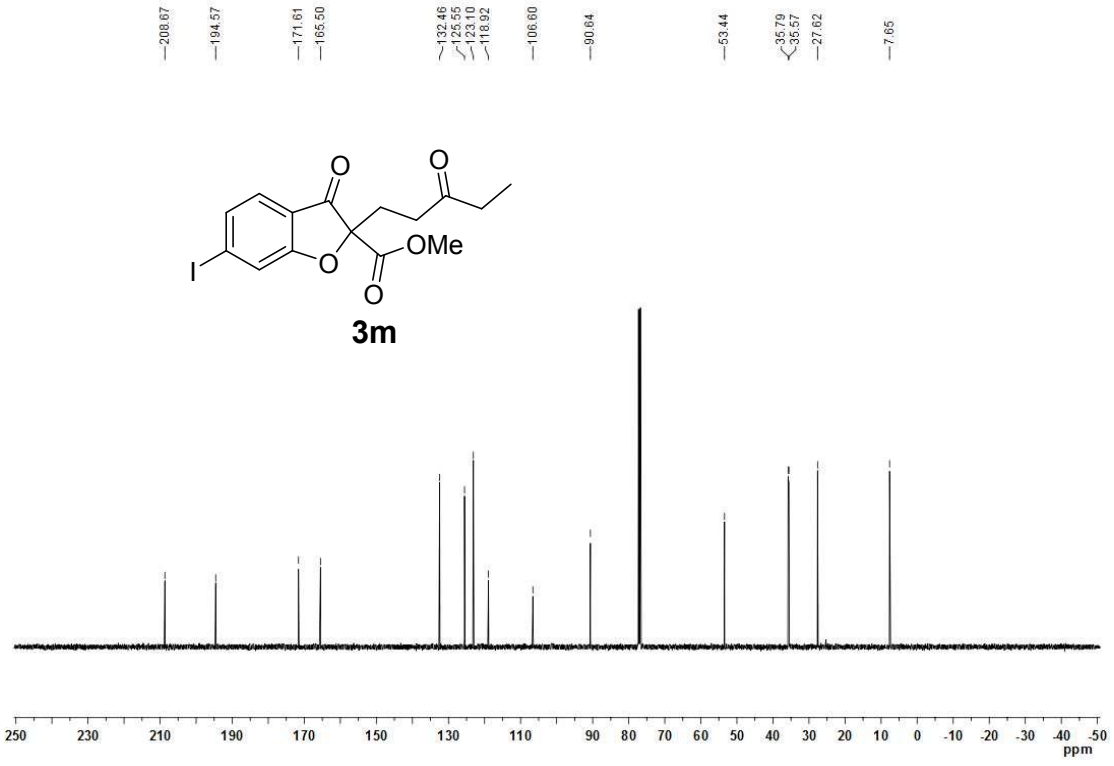
193.89
171.40
165.55
146.77
133.67
121.81
115.72
90.74
84.98
53.50
35.83
35.60
27.72
7.68
I
O
O
O
OMe
O
250
230
210
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
ppm

3l


7.637
7.636
7.506
7.504
7.490
7.488
7.369
7.353
3.754
2.600
2.587
2.582
2.569
2.561
2.551
2.541
2.494
2.489
2.484
2.477
2.468
2.465
2.459
2.408
2.393
2.378
2.371
2.363
2.361
2.352
2.343
2.331
2.326
2.314
1.031
1.017
1.002
O
O
O
OMe
O
I
3m
1.00
1.01
1.00
3.00
1.04
1.99
3.01
3.01
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
ppm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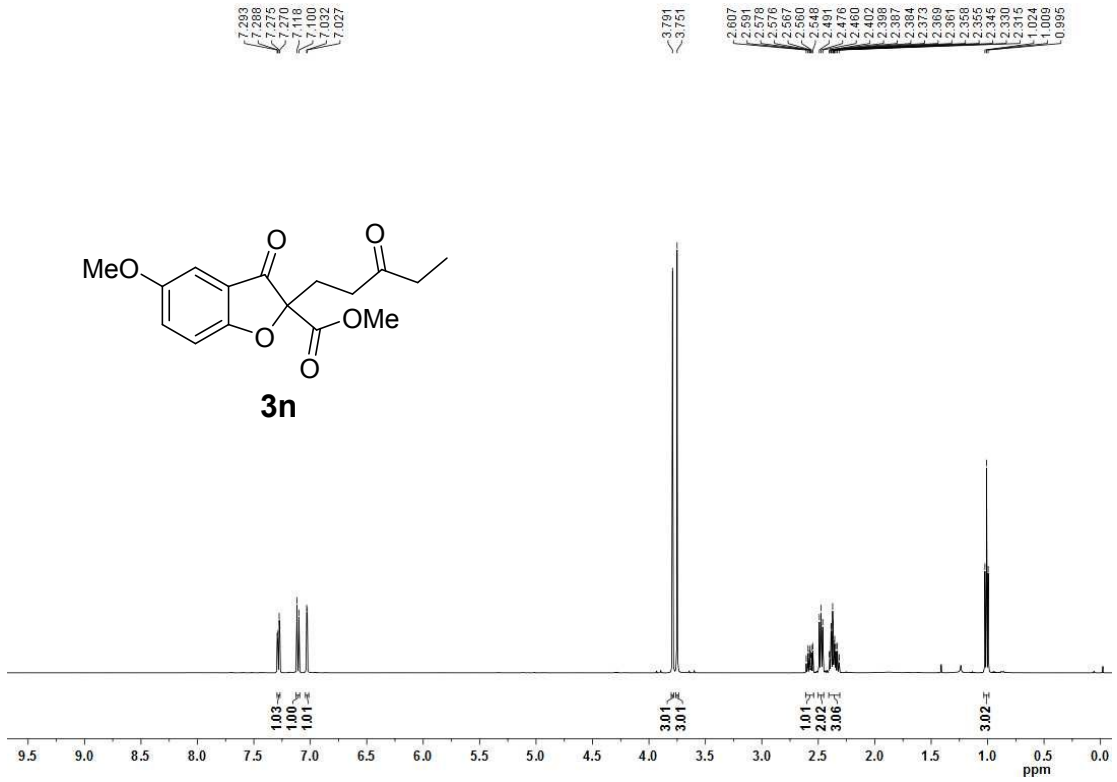
194.57
171.61
165.50
132.46
125.55
123.10
118.92
106.60
90.64
53.44
35.79
35.57
27.62
7.65
O
O
O
OMe
O
I
3m
250
230
210
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
ppm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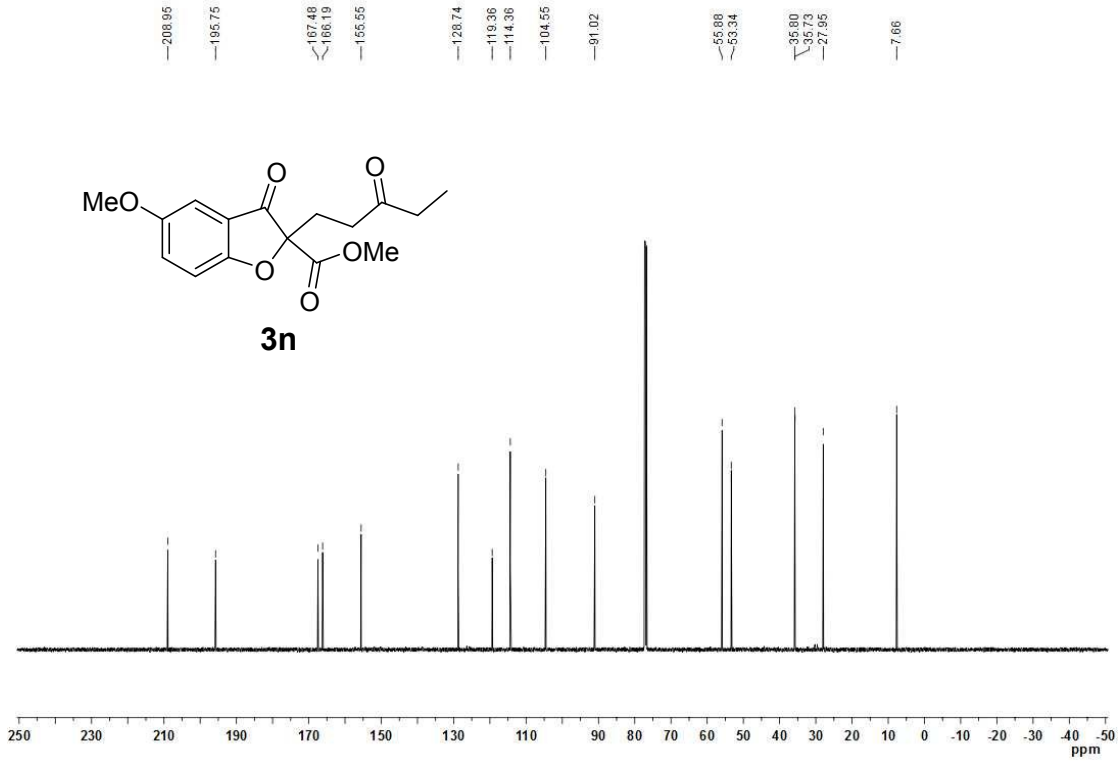
7.288
7.275
7.270
7.118
7.100
7.032
7.027
3.791
3.751
2.607
2.591
2.578
2.576
2.567
2.560
2.548
2.491
2.476
2.460
2.402
2.398
2.387
2.384
2.373
2.369
2.361
2.358
2.355
2.345
2.330
2.315
1.024
1.009
0.995
MeO
O
O
OMe
O
O
3n
1.03
1.00
1.01
3.01
3.01
1.01
2.02
3.06
3.02
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
ppm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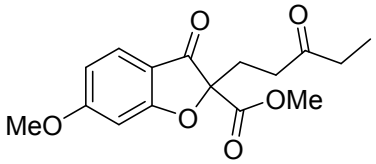
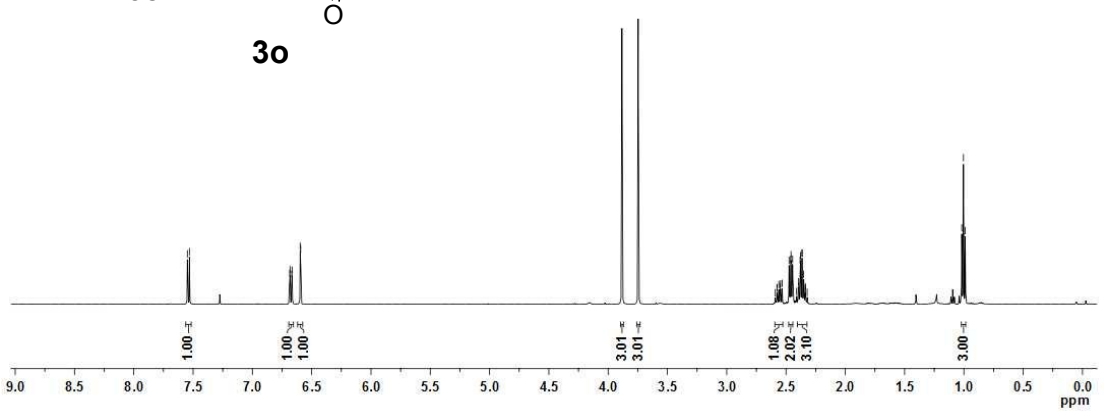
195.75
167.48
166.19
155.55
128.74
119.36
114.36
104.55
91.02
55.88
53.34
35.80
35.73
27.95
7.66
MeO
O
O
OMe
O
O
3n
250
230
210
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
ppm

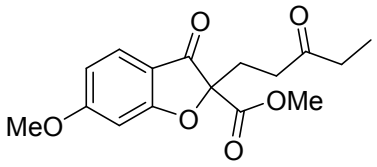

7.548
7.531
6.686
6.682
6.668
6.664
6.597
6.593
2.590
2.577
2.574
2.560
2.549
2.546
2.532
2.474
2.461
2.458
2.444
2.411
2.396
2.393
2.381
2.378
2.367
2.363
2.352
2.338
2.335
2.322
1.018
1.004
0.989


O
O
OMe
MeO
O
O

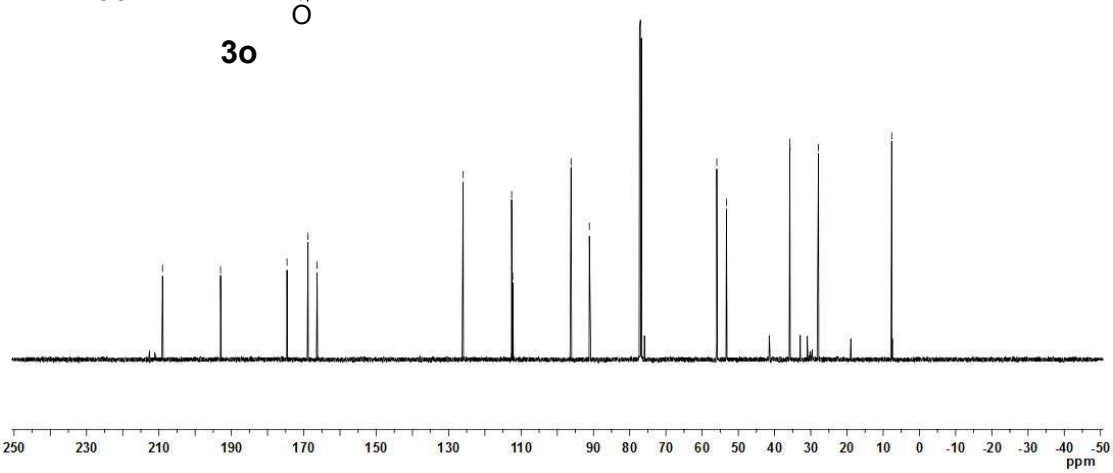
3o


1.00
1.00
1.00
3.01
3.01
1.08
2.02
3.10
3.00
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
ppm


209.00
192.98
174.64
168.83
166.32
126.00
112.61
112.31
96.20
91.14
55.96
53.28
35.78
35.72
27.87
7.65

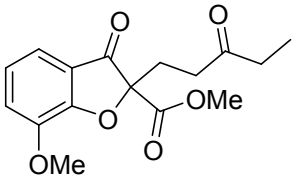

O
O
OMe
MeO
O
O

3o

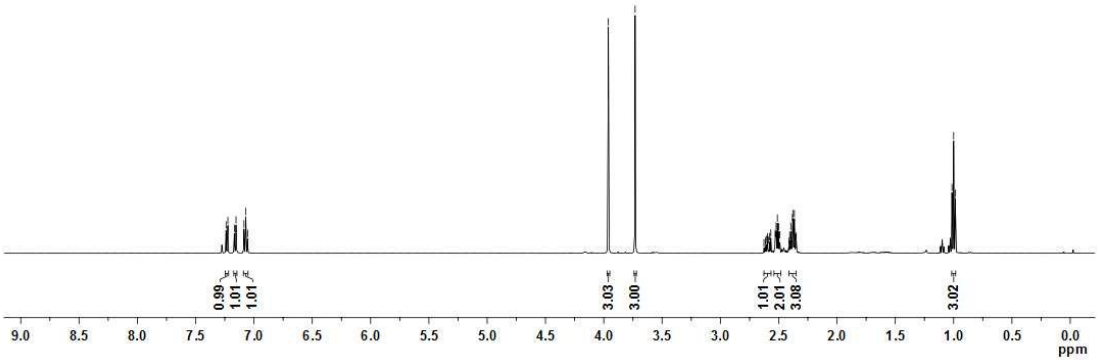

250
230
210
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
ppm


7.239
7.224
7.168
7.154
7.086
7.070
7.055

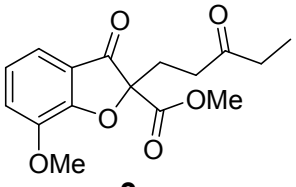

3.961
3.731
2.614
2.607
2.598
2.596
2.589
2.577
2.568
2.530
2.522
2.511
2.501
2.491
2.406
2.396
2.392
2.379
2.365
2.360
2.352
1.000
0.985


O
O
OMe
O
O
OMe

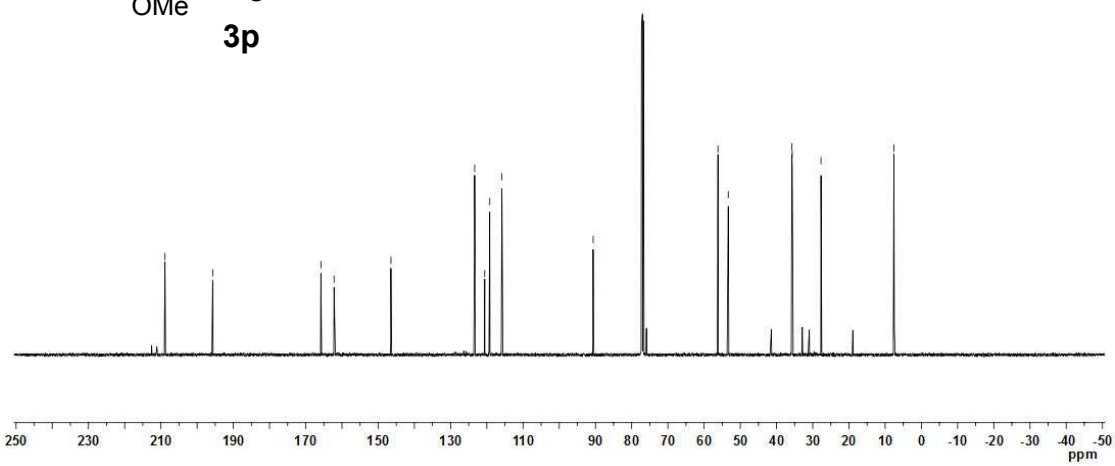
3p

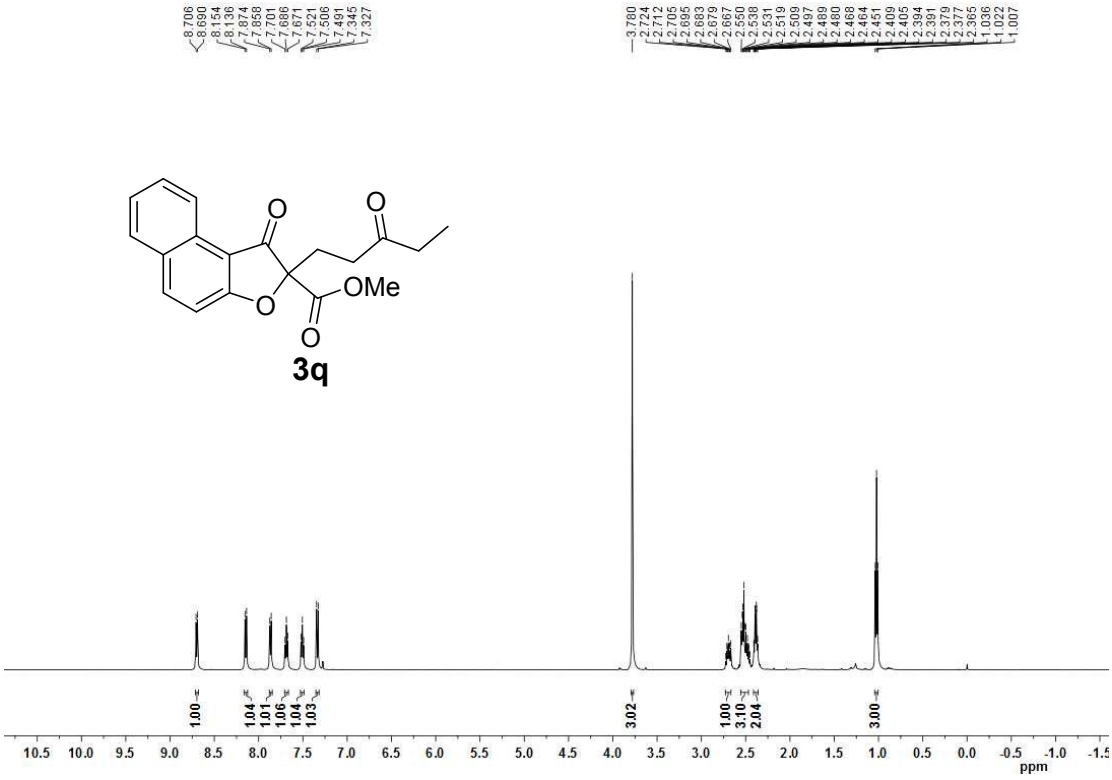

0.99
1.01
1.01
3.03
3.00
1.01
2.01
3.08
3.02
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
ppm


208.88
195.68
165.82
162.18
146.48
123.36
120.57
119.19
115.83
90.64
56.17
53.33
35.76
35.66
27.72
7.59


O
O
OMe
O
O
OMe

3p


250
230
210
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
ppm


8.706
8.690
8.154
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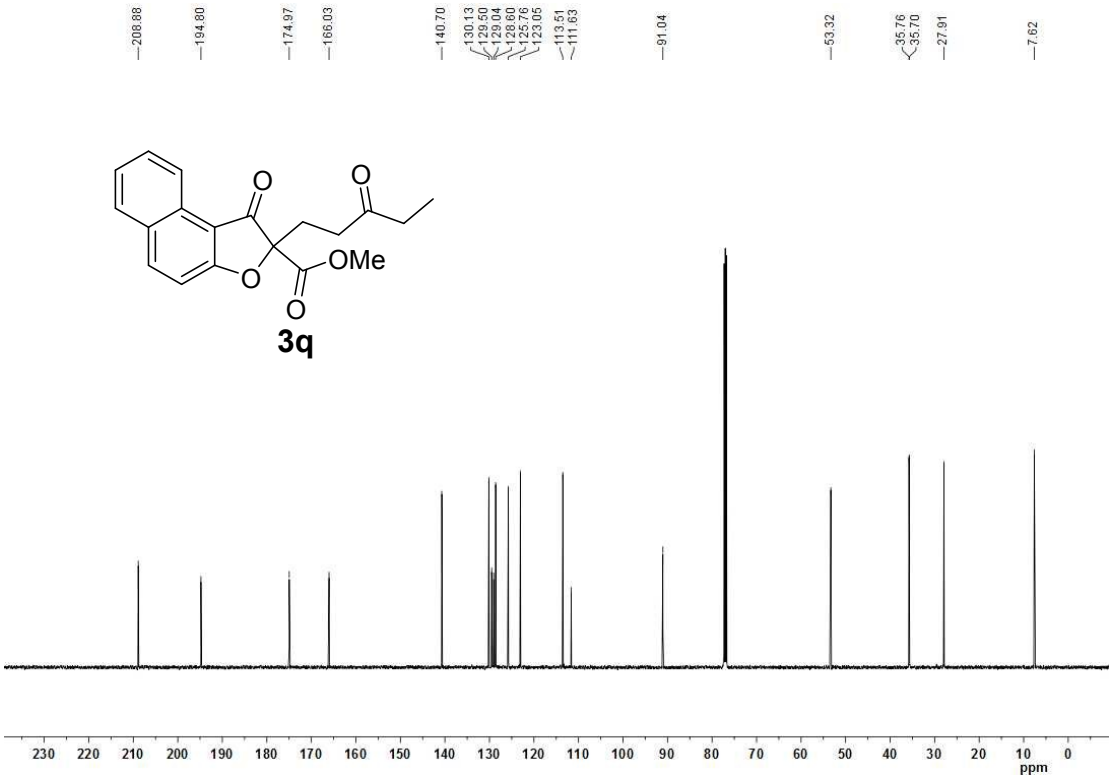
7.874
7.858
7.701
7.686
7.671
7.521
7.506
7.491
7.345
7.327
3.780
2.724
2.712
2.705
2.695
2.683
2.679
2.667
2.550
2.538
2.531
2.519
2.509
2.497
2.489
2.480
2.468
2.464
2.451
2.409
2.405
2.394
2.391
2.379
2.377
2.365
1.036
1.022
1.007
O
O
O
OMe
O
3q
1.00
1.04
1.01
1.06
1.04
1.03
3.02
1.00
3.10
2.04
3.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
ppm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194.80
174.97
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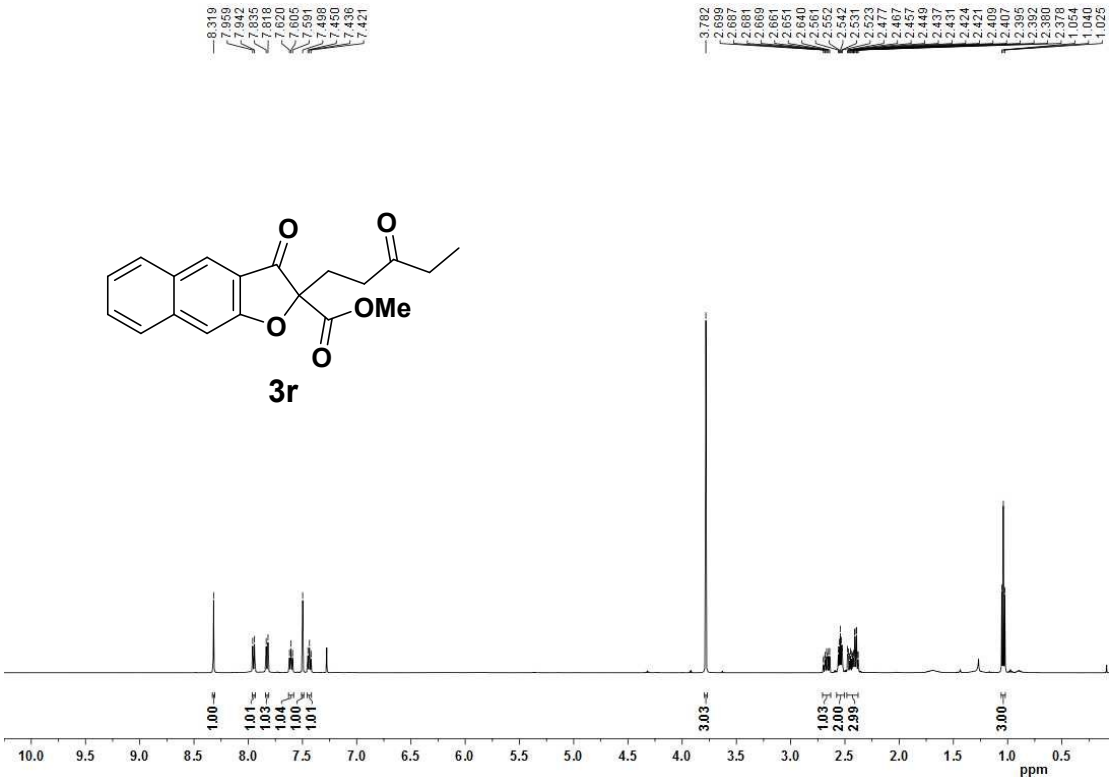
140.70
130.13
129.50
129.04
128.60
125.76
123.05
113.51
111.63
91.04
53.32
35.76
35.70
27.91
7.62
O
O
O
OMe
O
3q
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
ppm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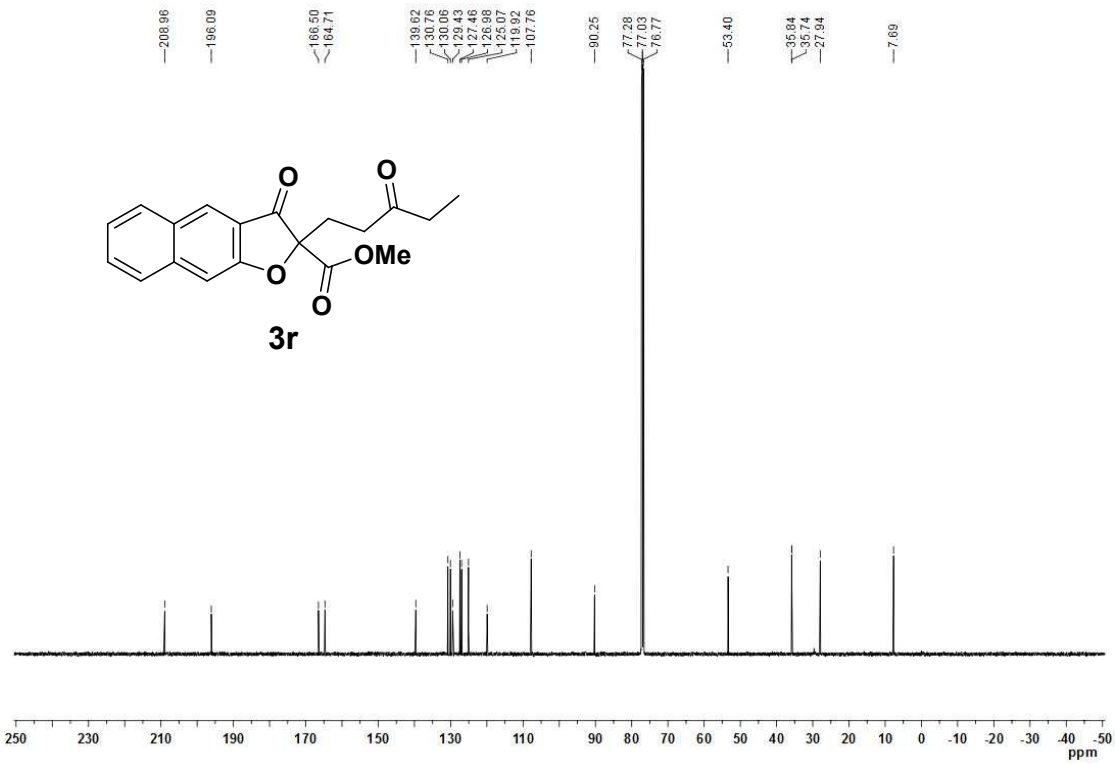
7.949
7.942
7.845
7.818
7.620
7.605
7.591
7.498
7.450
7.436
7.421
3.782
2.699
2.687
2.681
2.669
2.661
2.651
2.640
2.561
2.552
2.542
2.531
2.523
2.477
2.467
2.457
2.449
2.437
2.431
2.424
2.421
2.409
2.407
2.395
2.392
2.380
2.378
1.054
1.040
1.025
O
O
O
OMe
O
3r
1.00
1.01
1.03
1.04
1.00
1.01
3.03
1.03
2.00
2.99
3.00
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm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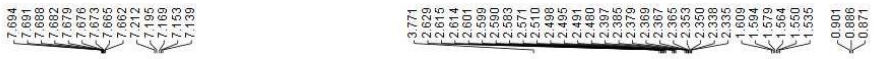
196.09
166.50
164.71
139.62
130.76
130.06
129.43
127.46
126.98
125.07
119.92
107.76
90.25
77.28
77.03
76.77
53.40
35.84
35.74
27.94
7.69
O
O
O
OMe
O
3r
250
230
210
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
ppm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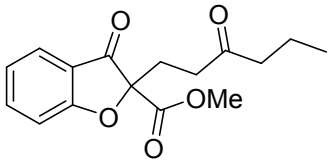
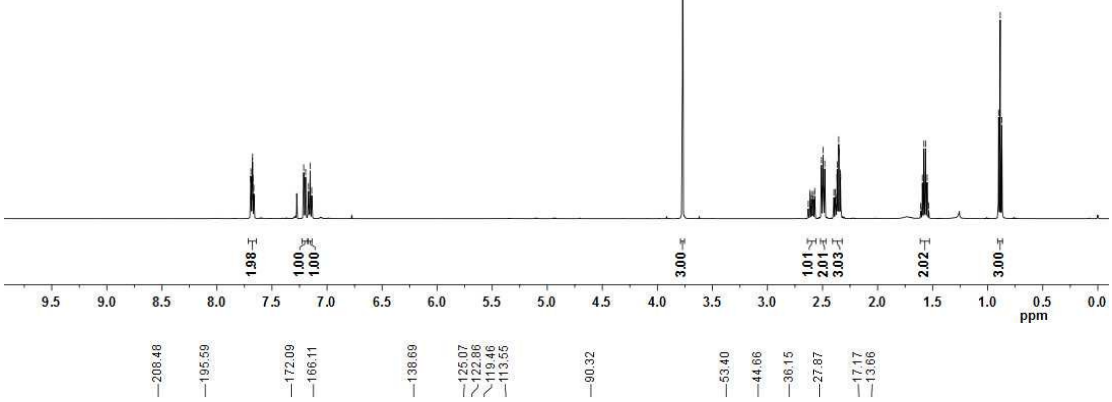
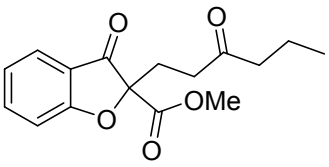
7.691
7.688
7.682
7.679
7.676
7.673
7.665
7.662
7.212
7.195
7.169
7.153
7.139
3.771
2.629
2.615
2.614
2.601
2.599
2.590
2.583
2.571
2.510
2.498
2.495
2.491
2.480
2.397
2.385
2.379
2.369
2.367
2.365
2.353
2.350
2.338
2.335
1.609
1.594
1.579
1.564
1.550
1.535
0.901
0.886
0.871


O
O
OMe
O
O

4b

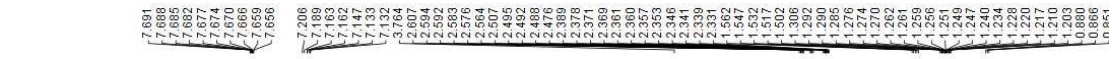

1.98
1.00
1.00
3.00
1.01
2.01
3.03
2.02
3.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
ppm

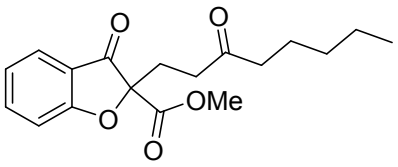
208.48
195.59
172.09
166.11
138.69
125.07
122.86
119.46
113.55
90.32
53.40
44.66
36.15
27.87
17.17
13.66


O
O
OMe
O
O

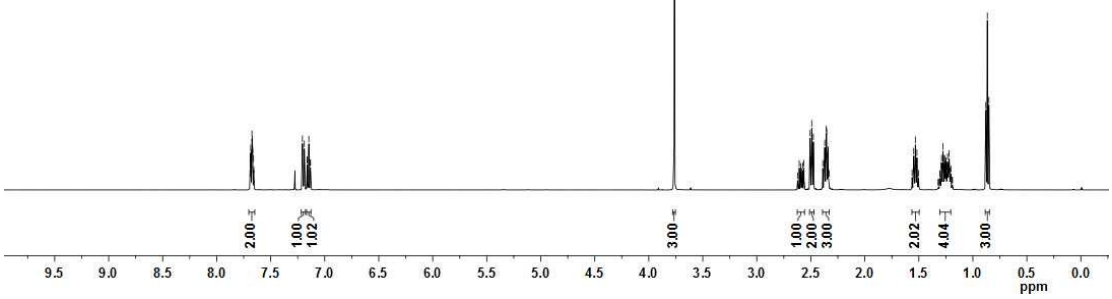
4b

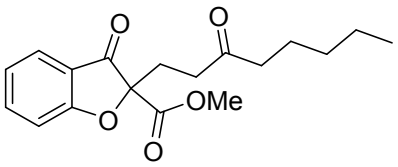
50 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20 -30 -40 -5
ppm



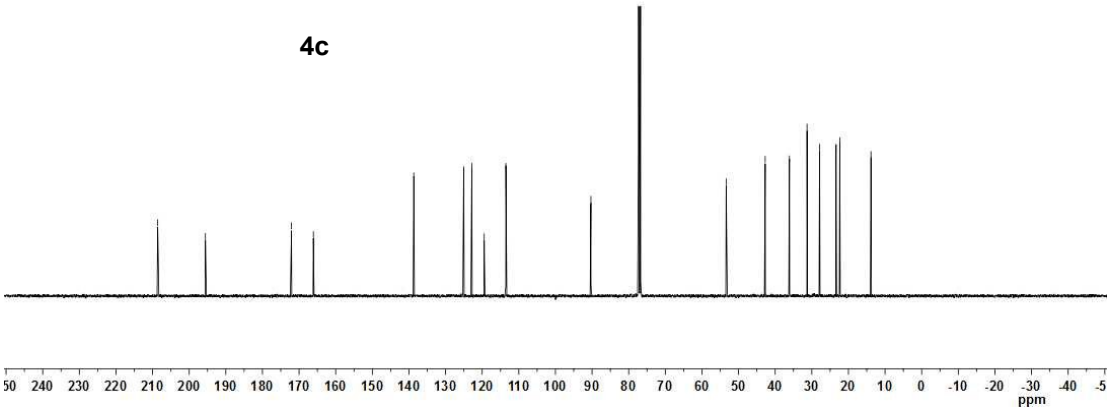


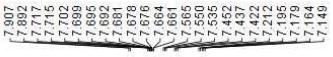
4c





4c

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7.717
7.715
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7.699
7.695
7.692
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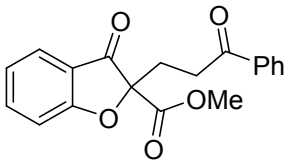
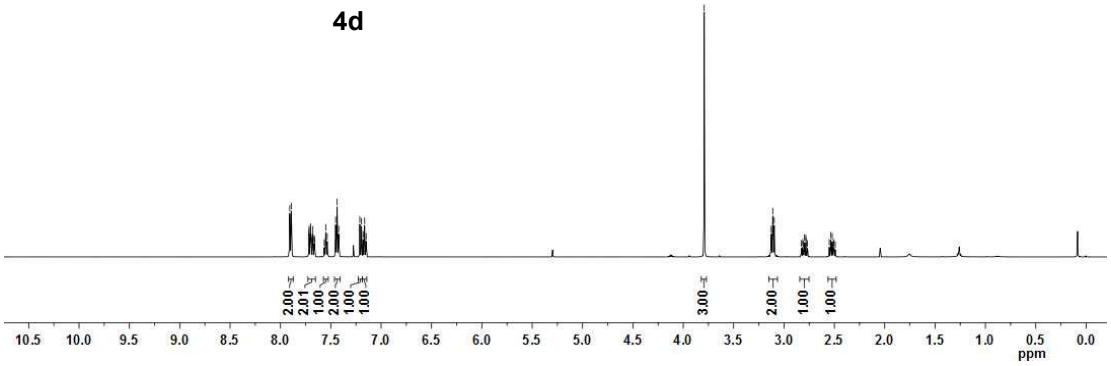
7.678
7.676
7.664
7.661
7.565
7.550
7.535
7.452
7.437
7.422
7.212
7.195
7.179
7.164
7.149


3.792
3.127
3.111
3.096
2.827
2.814
2.809
2.797
2.783
2.781
2.766
2.551
2.535
2.520
2.508
2.503
2.490


O
O
Ph
OMe
O
O

4d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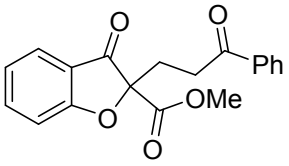
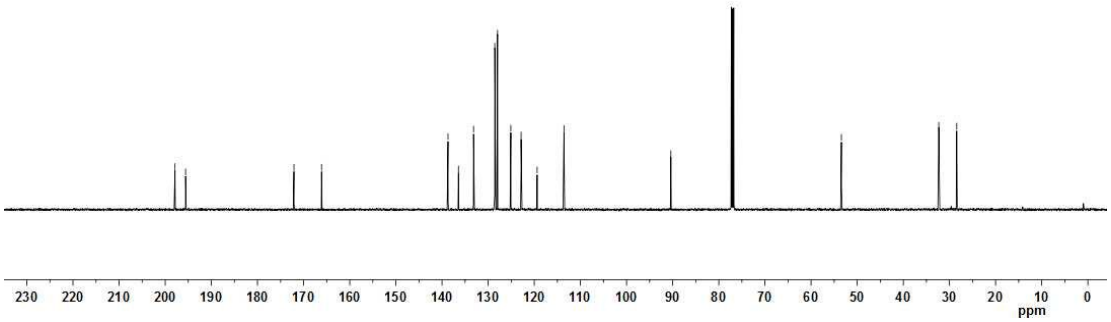
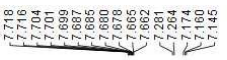
2.01
1.00
2.00
1.00
1.00
3.00
2.00
1.00
1.00
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
ppm


197.89
195.58
172.10
166.12
138.70
136.44
133.15
128.56
127.97
125.08
122.86
119.38
113.57
90.39
53.43
32.32
28.43


O
O
Ph
OMe
O
O

4d


230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm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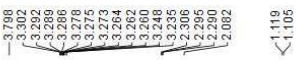
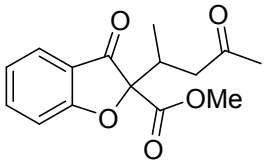
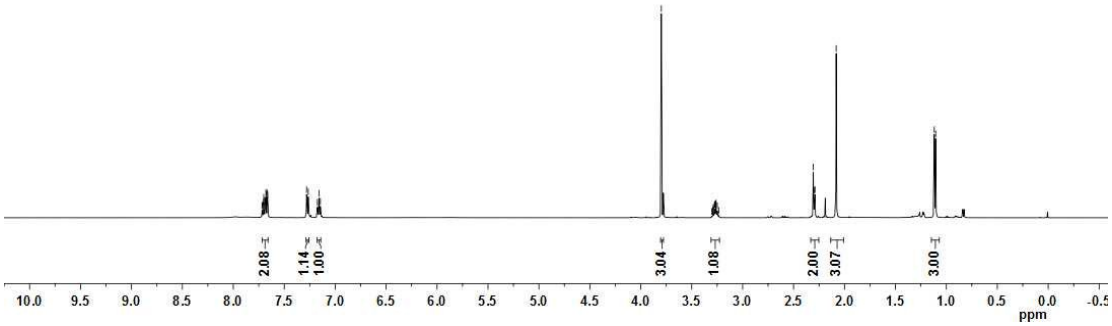
7.716
7.704
7.701
7.690
7.687
7.685
7.680
7.678
7.665
7.662
7.281
7.264
7.174
7.160
7.145

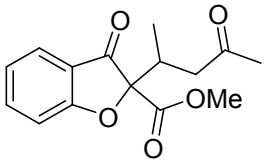

3.798
3.302
3.292
3.289
3.286
3.278
3.275
3.273
3.264
3.262
3.260
3.248
3.235
2.306
2.295
2.290
2.082
1.119
1.105


O
O
OMe
O
O

6a


2.08
1.14
1.00
3.04
1.08
2.00
3.07
3.00
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
ppm


205.65
195.16
172.31
165.61
138.73
124.71
122.73
120.03
113.43
94.11
53.33
43.61
34.21
30.07
14.62


O
O
OMe
O
O

6a

50 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20 -30 -40 -5
ppm


7.696
7.693
7.679
7.677
7.665
7.662
7.656
7.641
7.258
7.242
7.151
7.136
7.121


3.775
3.299
3.276
3.262
3.248
3.235
3.221
2.317
2.302
2.287
2.272
2.257
2.243
1.506
1.501
1.492
1.485
1.477
1.471
1.462
1.456
1.446
1.441
1.264
1.249
1.234
1.219
1.083
1.070
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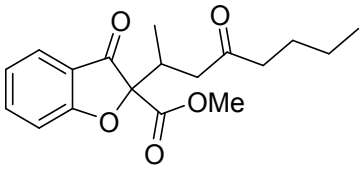
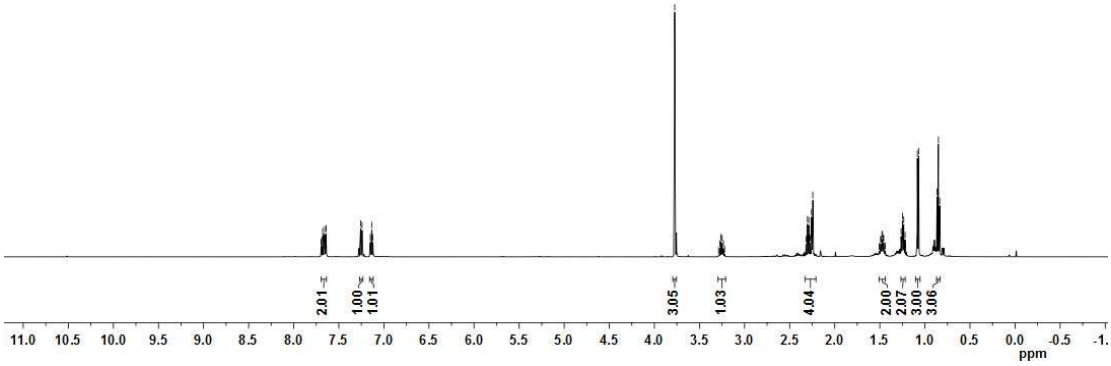
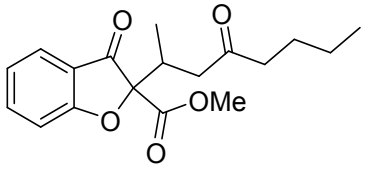
0.850
0.836


O
O
O
OMe
O

6b

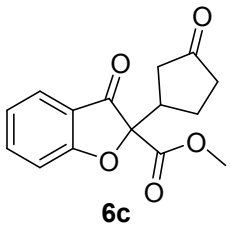

2.01
1.00
1.01
3.05
1.03
4.04
2.00
2.07
3.00
3.06
11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.
ppm


208.09
195.23
172.36
165.71
138.73
124.74
122.75
120.12
113.47
94.24
53.33
42.71
34.29
25.66
22.16
14.68
13.72

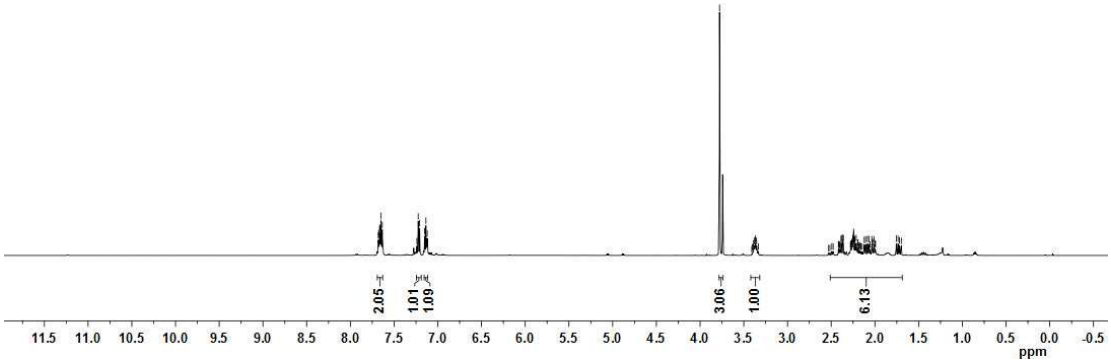

O
O
O
OMe
O

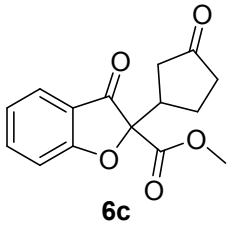
6b

240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
ppm

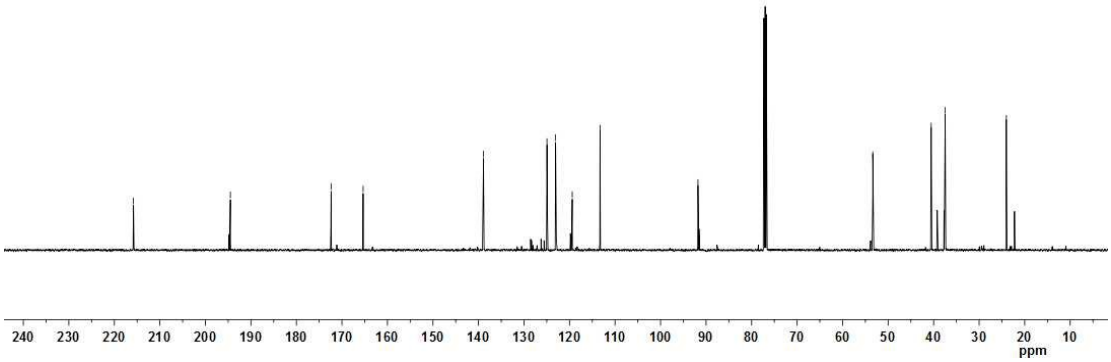


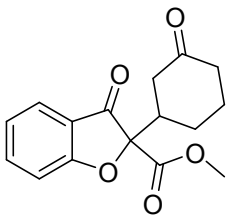
6c


2.05
1.01
1.09
3.06
1.00
6.13
11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
ppm

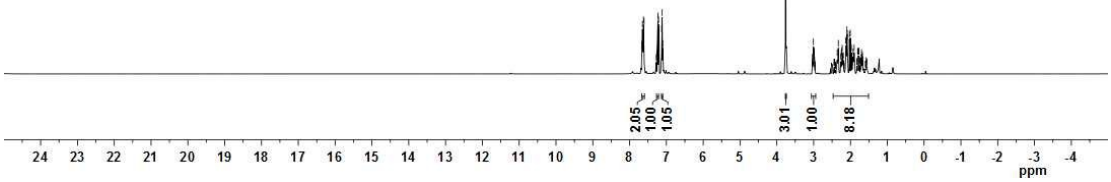


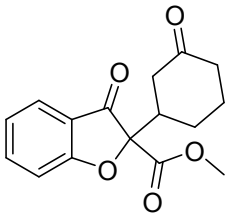
6c


240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10
ppm

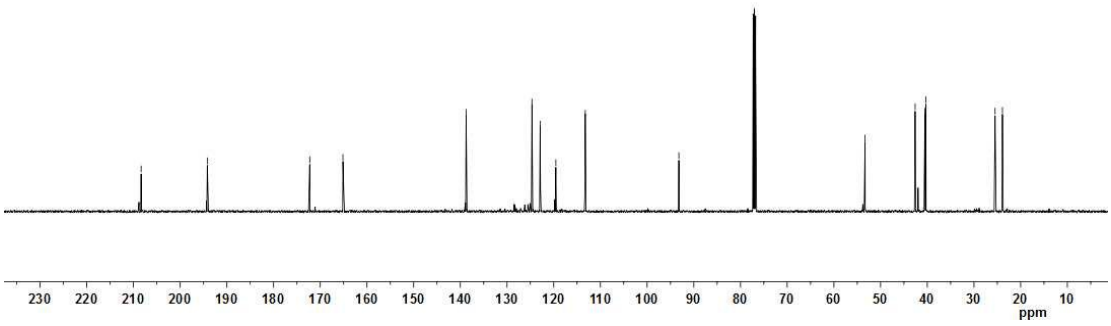


6d





6d

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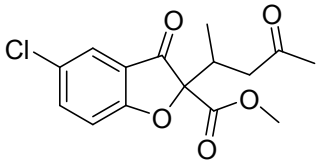
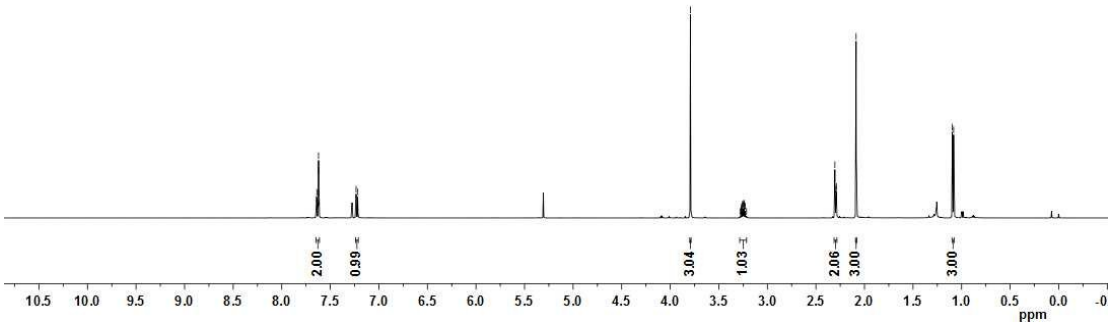
7.619
7.617
7.615
7.234
7.217
3.793
3.282
3.271
3.268
3.266
3.257
3.254
3.252
3.243
3.241
3.228
3.214
2.305
2.293
2.289
2.086
1.095
1.082


Cl
O
O
O
O
O

6j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0.99
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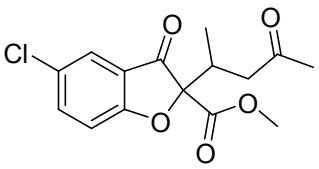
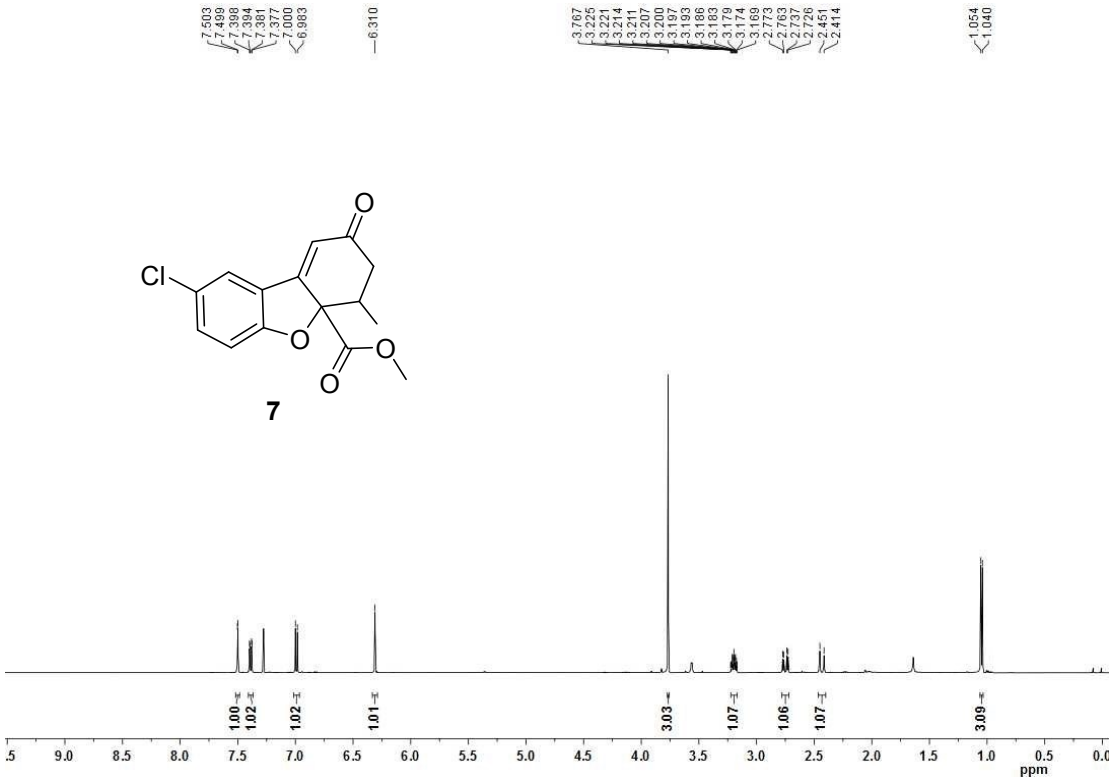
1.03
2.06
3.00
3.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0
ppm


205.51
194.15
170.69
165.26
138.67
128.48
124.10
121.31
114.87
95.15
53.54
43.65
34.30
30.19
14.66


Cl
O
O
O
O
O

6j

230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
ppm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7.377
7.000
6.983
6.310
3.767
3.225
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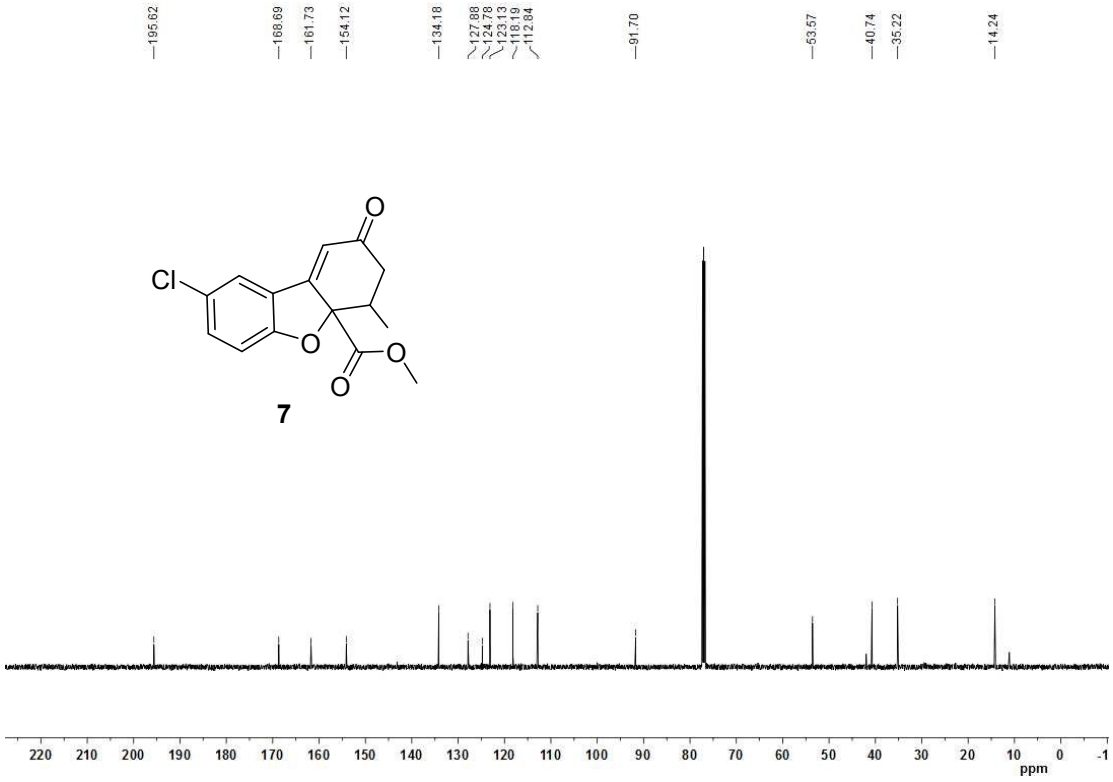
3.211
3.207
3.200
3.197
3.193
3.186
3.183
3.179
3.174
3.169
2.773
2.763
2.737
2.726
2.451
2.414
1.054
1.040
Cl
O
O
O
O
7
1.00
1.02
1.02
1.01
3.03
1.07
1.06
1.07
3.09
ppm


195.62
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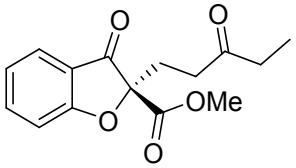
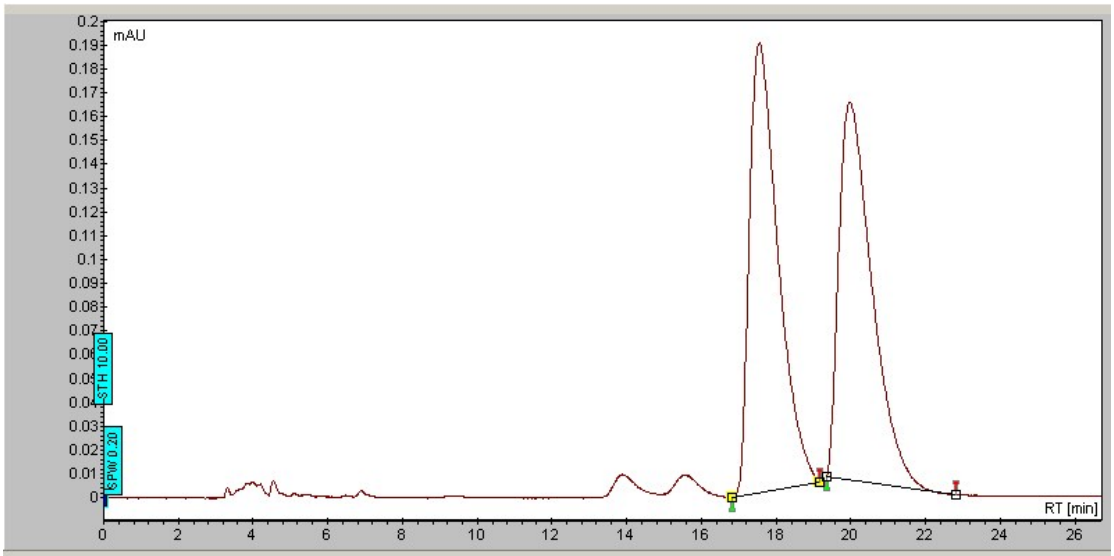
161.73
154.12
134.18
127.88
124.78
123.13
118.19
112.84
91.70
53.57
40.74
35.22
14.24
Cl
O
O
O
O
7
ppm

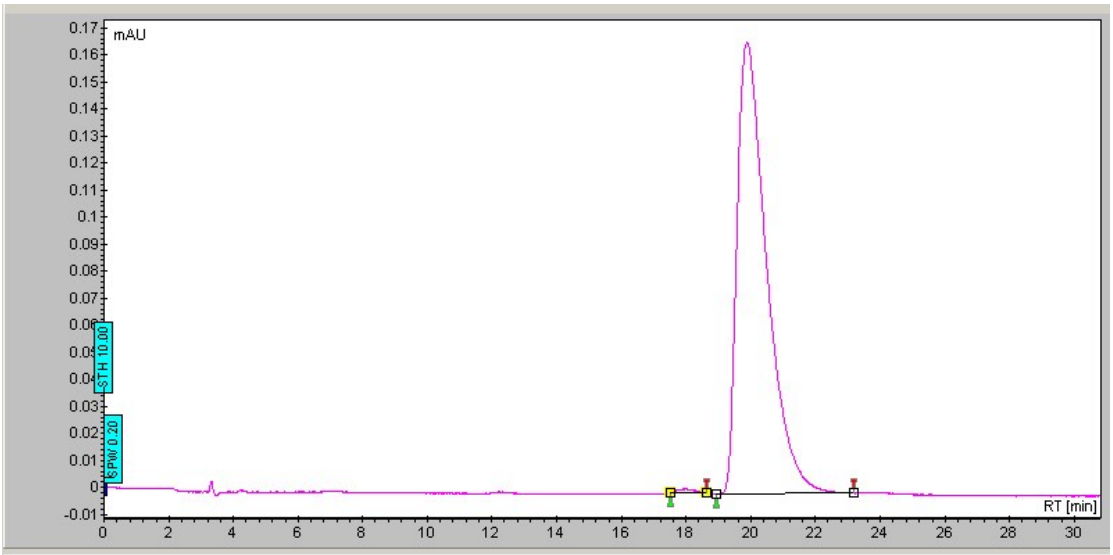
3、Chiral HPLC data of all products



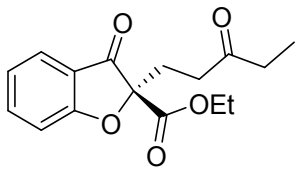
3a



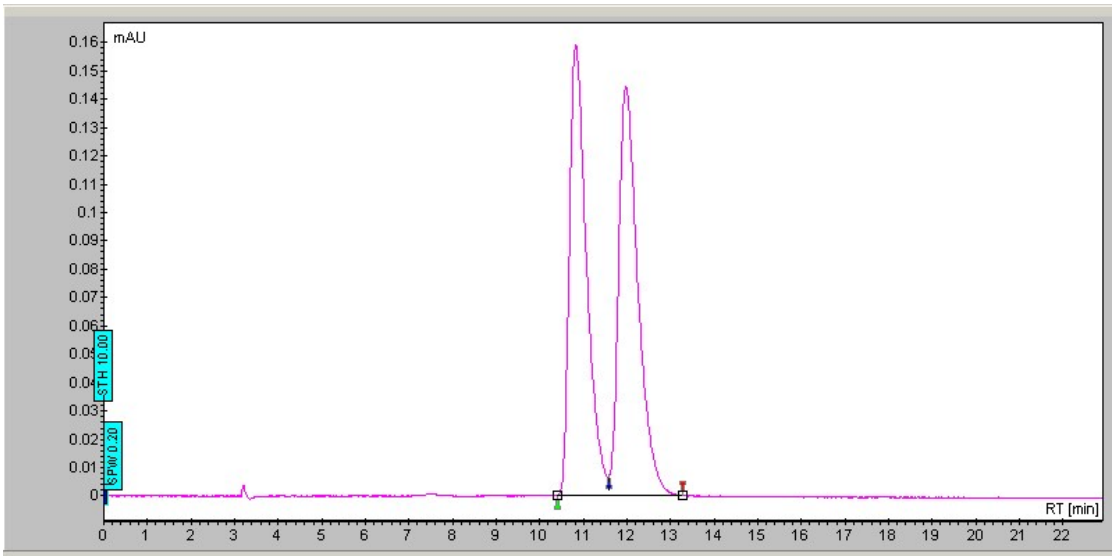
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	17.545	50.691
2	UNKNOWN	19.972	49.309
Total			100.000



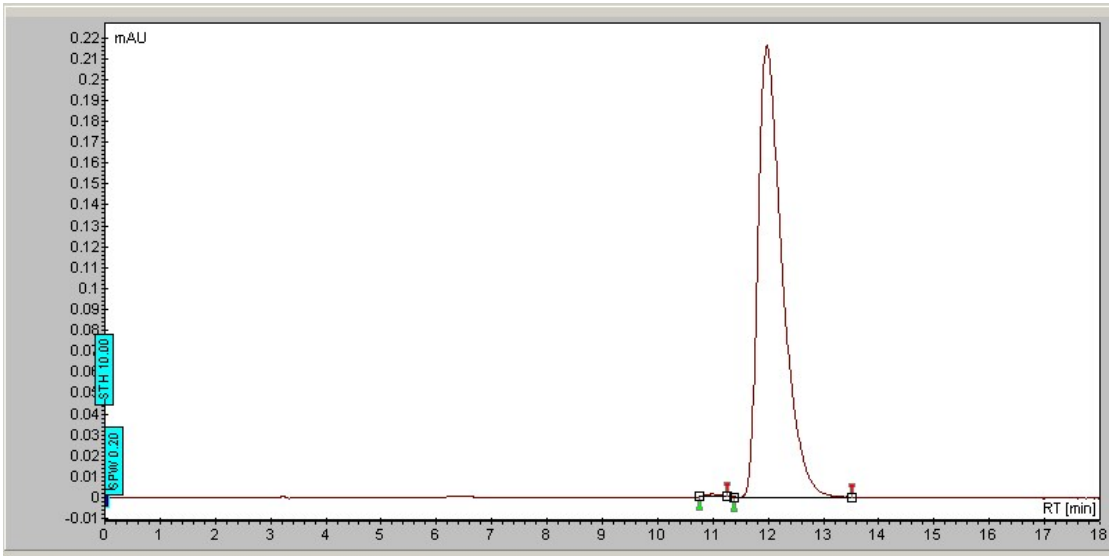
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	17.959	0.497
2	UNKNOWN	19.879	99.503
Total			100.000



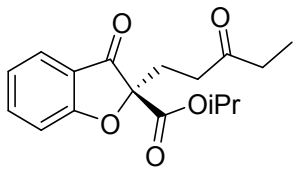
3b



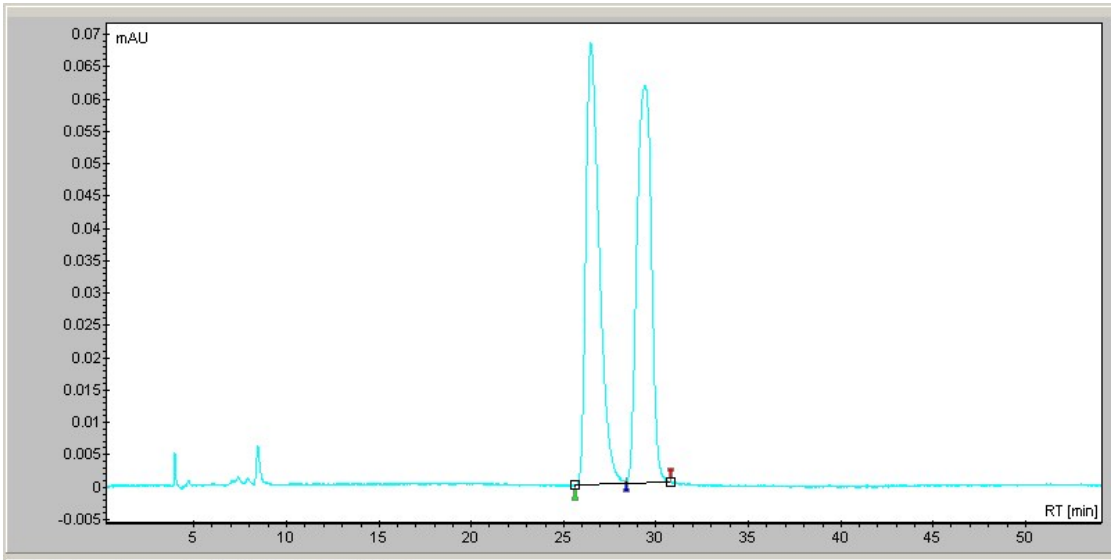
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	10.826	49.320
2	UNKNOWN	11.972	50.680
Total			100.000



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	10.986	0.309
2	UNKNOWN	11.972	99.691
Total			100.000



3c



#	Name	Time [Min]	Area % [%]
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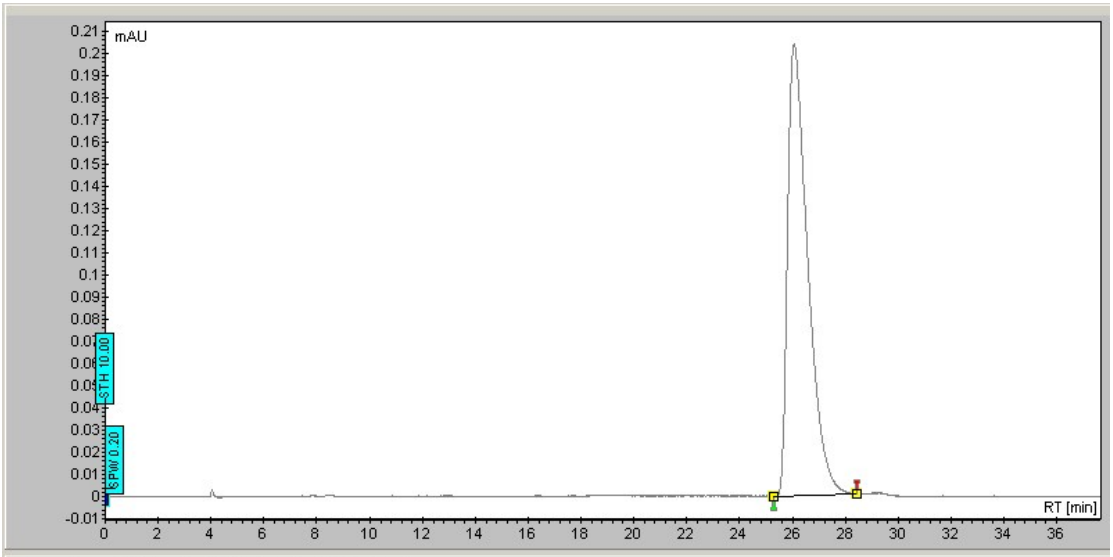
2	UNKNOWN	29.413	49.363
Total			100.000



#	Name	Time [Min]	Area % [%]
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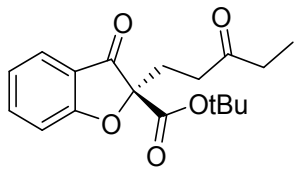
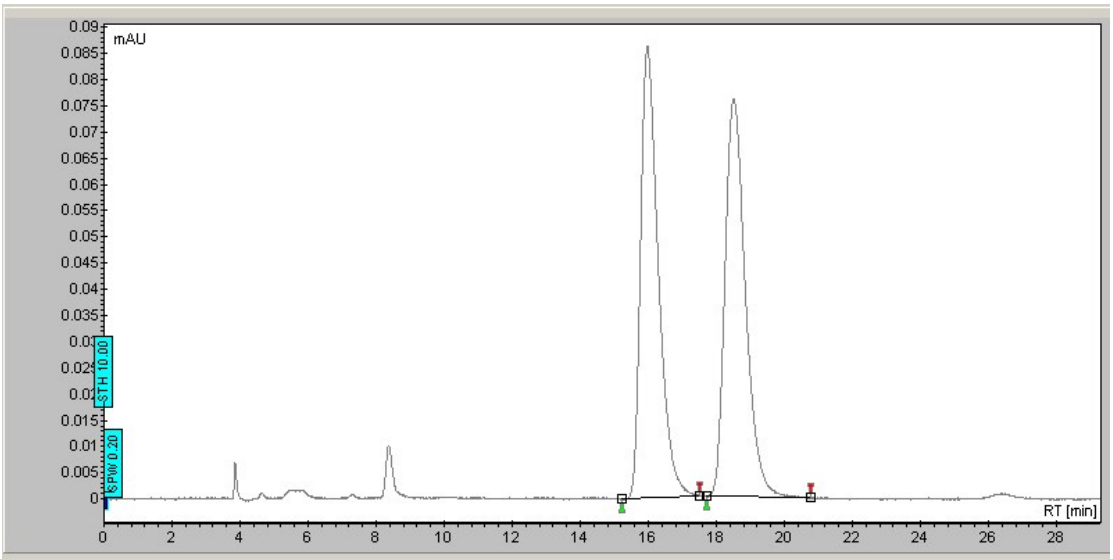
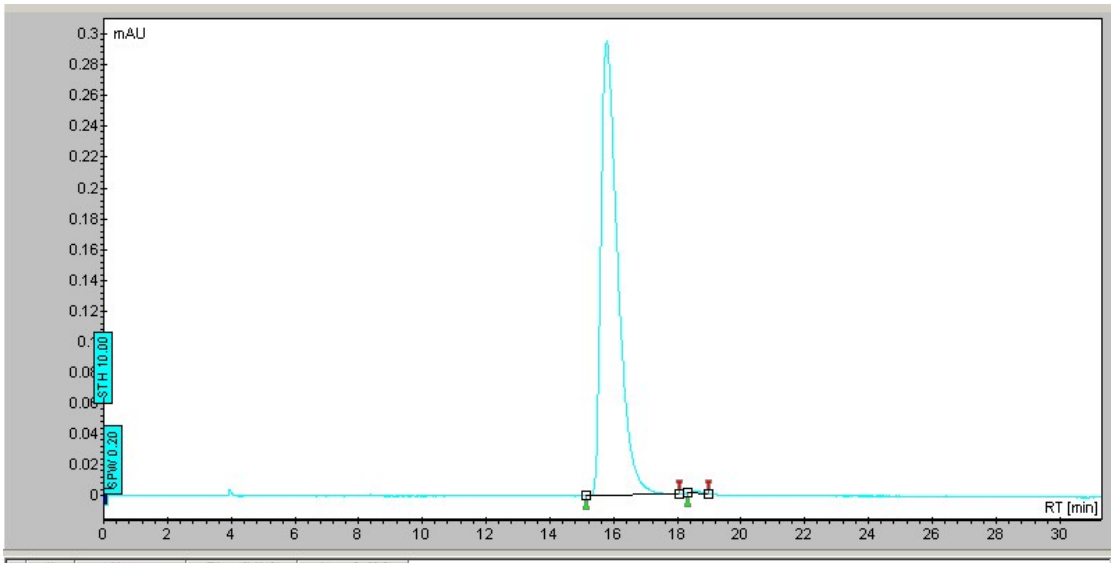
Total			100.000



3d



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	15.972	49.734
2	UNKNOWN	18.505	50.266
Total			100.000



#	Name	Time [Min]	Area % [%]
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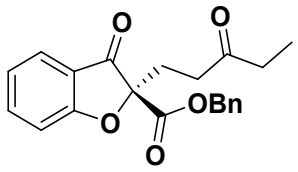
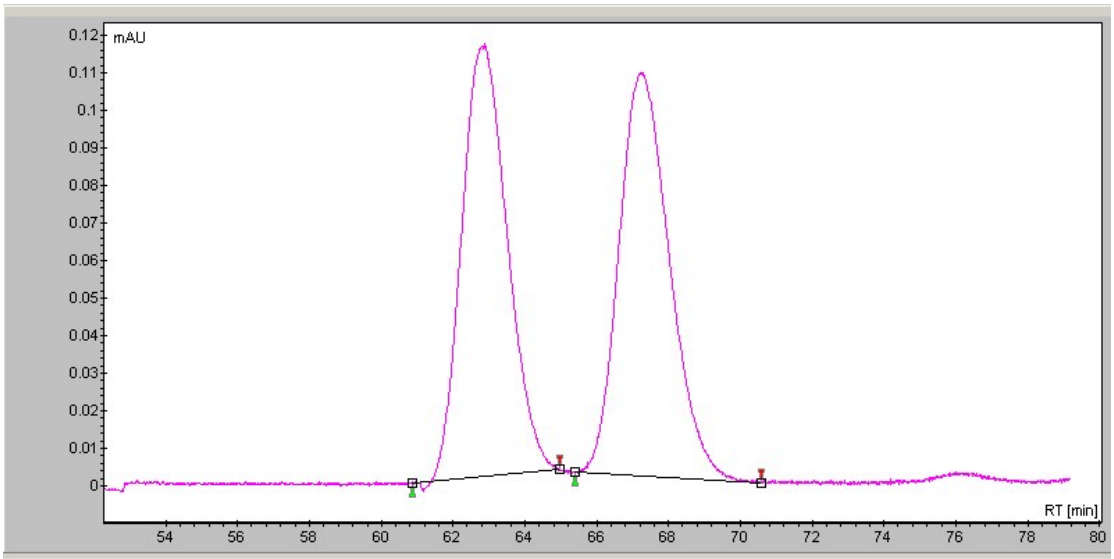
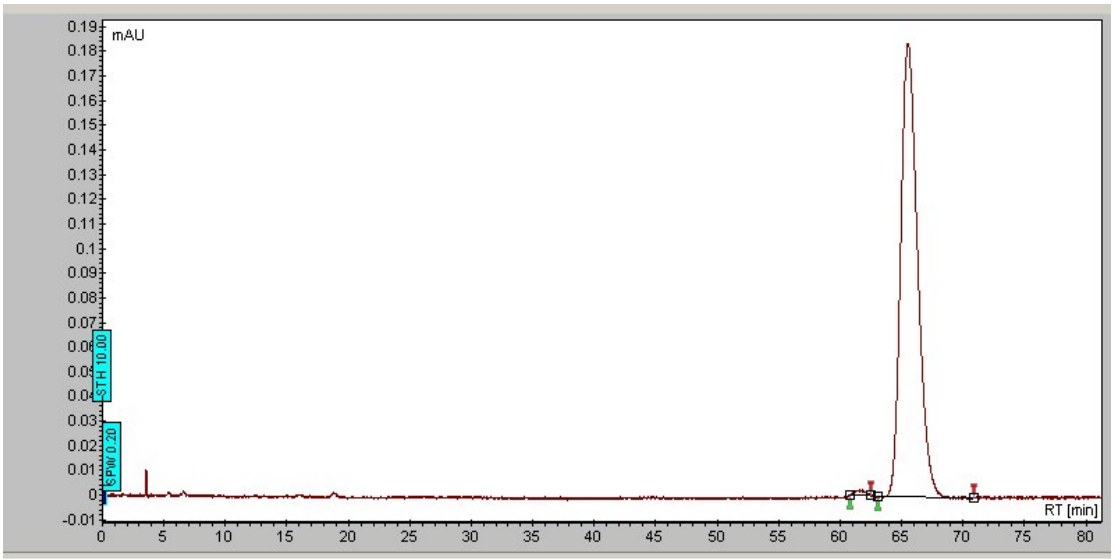
2	UNKNOWN	18.612	0.260
Total			100.000



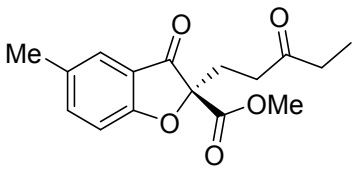
3e



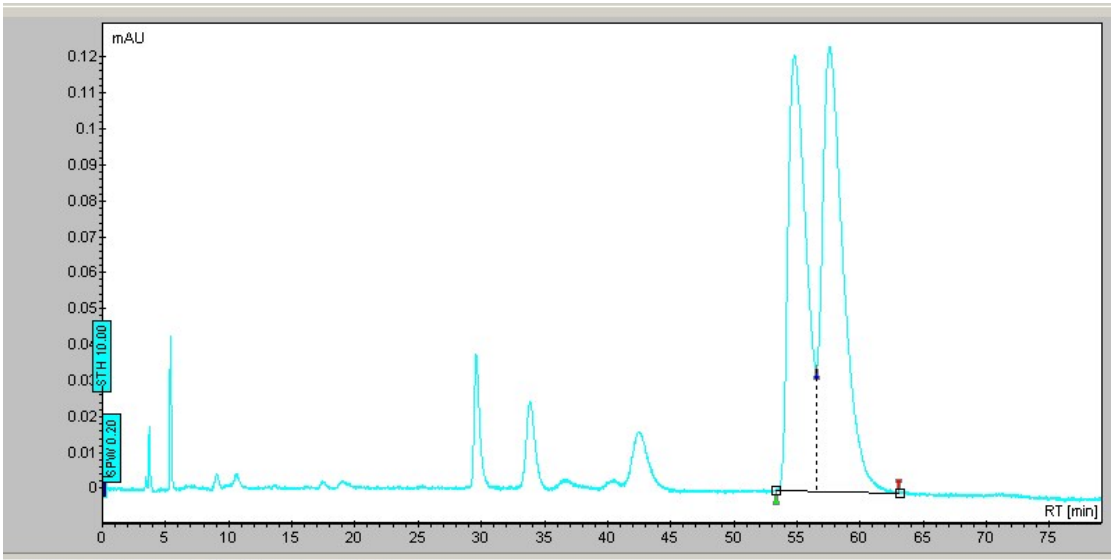
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	62.897	49.108
2	UNKNOWN	67.229	50.892
Total			100.000



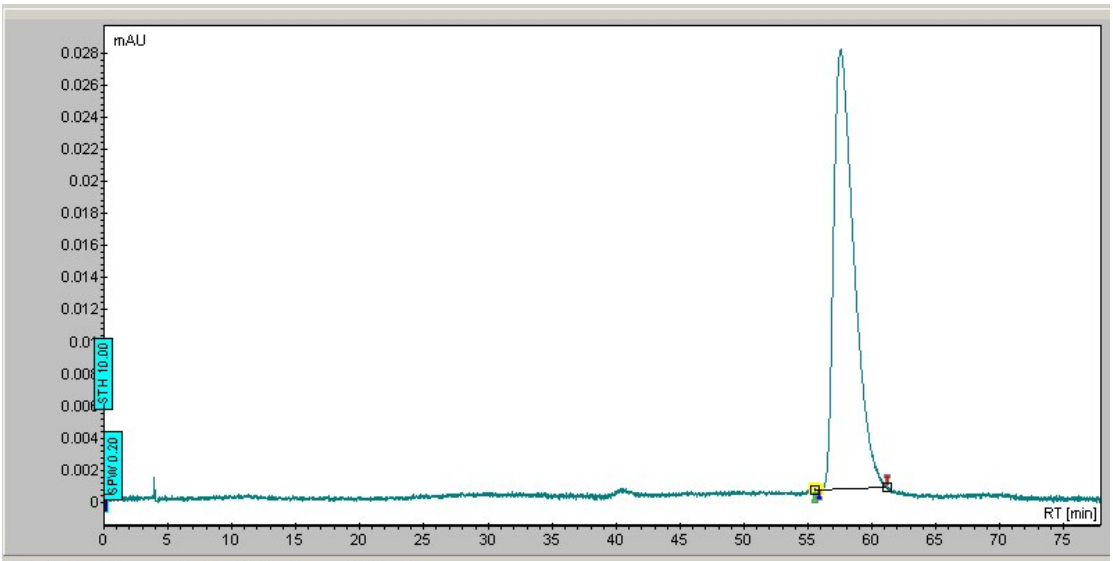
#	Name	Time [Min]	Area % [%]
2	UNKNOWN	61.578	0.628
1	UNKNOWN	65.523	99.372
Total			100.000



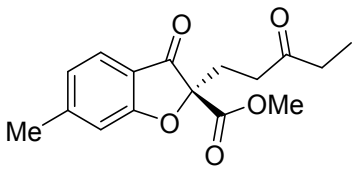
3f



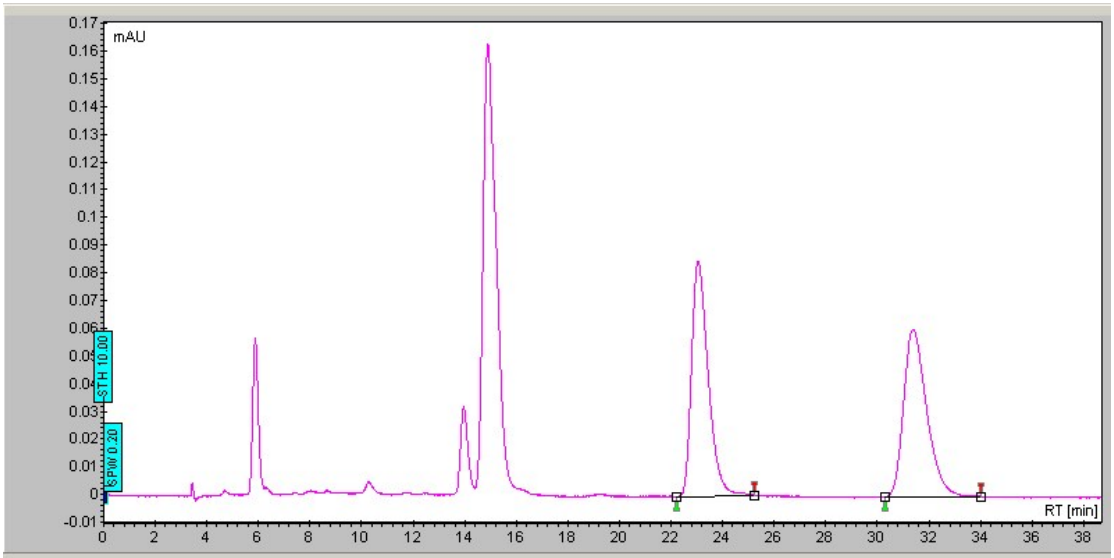
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	54.807	45.303
2	UNKNOWN	57.579	54.697
Total			100.000



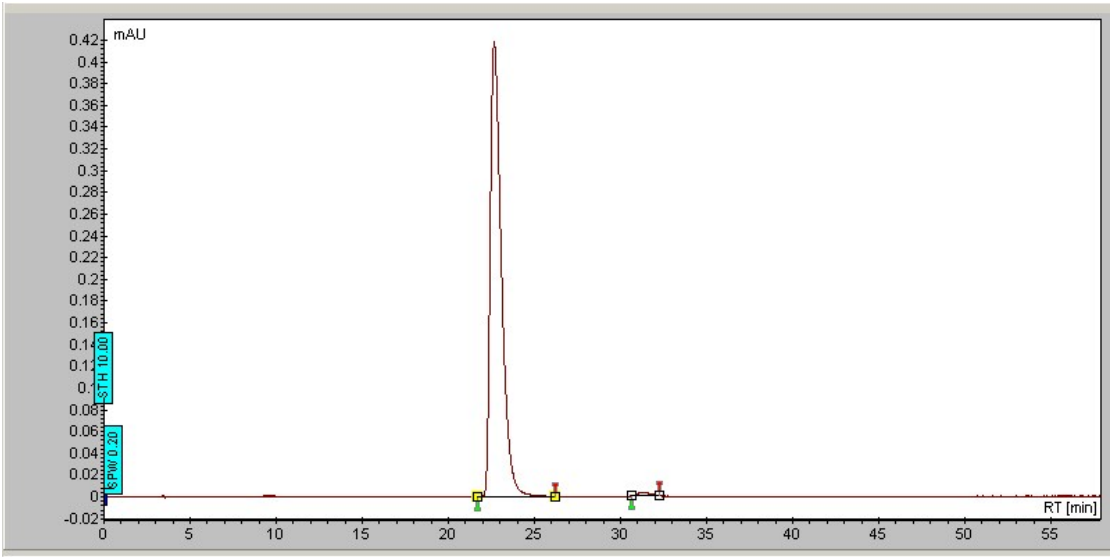
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	55.540	0.011
2	UNKNOWN	57.566	99.989
Total			100.000



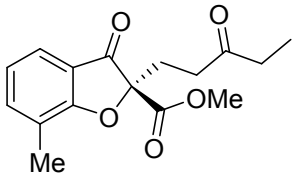
3g



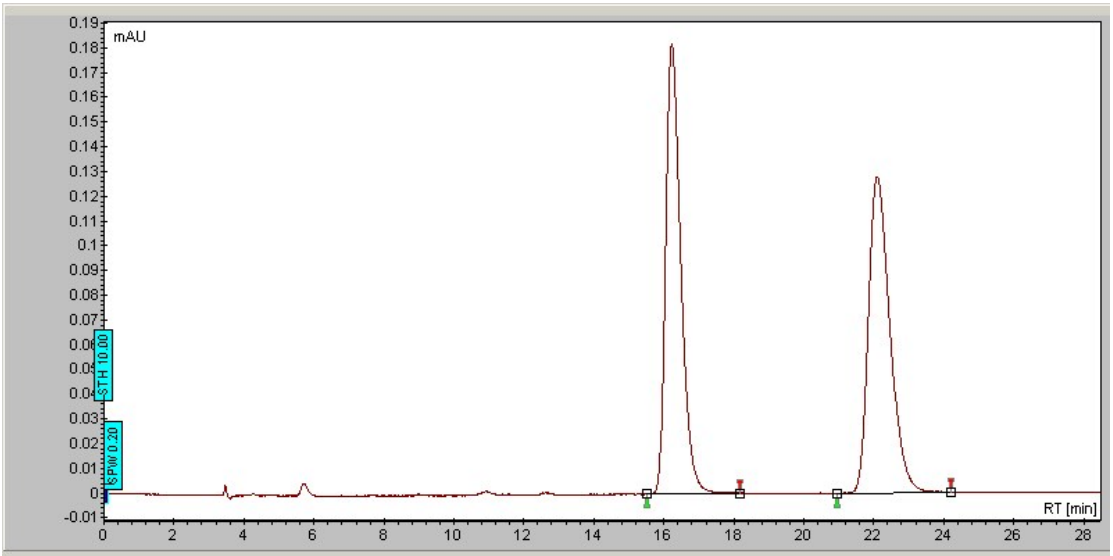
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	23.052	49.994
2	UNKNOWN	31.384	50.006
Total			100.000



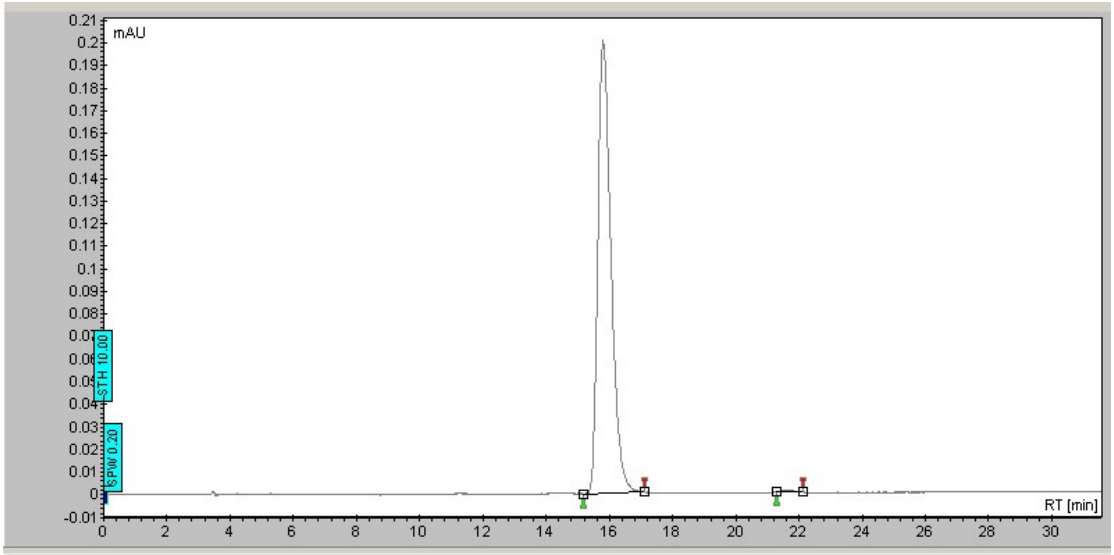
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	22.665	99.128
2	UNKNOWN	31.331	0.872
Total			100.000



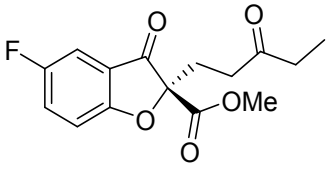
3h



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	16.225	50.111
2	UNKNOWN	22.105	49.889
Total			100.000



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	15.799	99.627
2	UNKNOWN	21.625	0.373
Total			100.000



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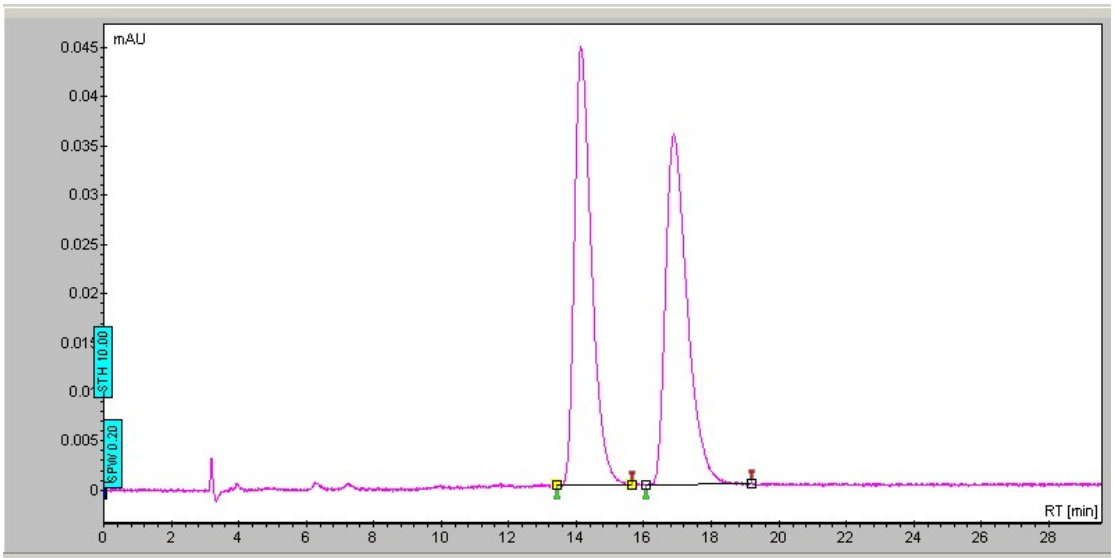
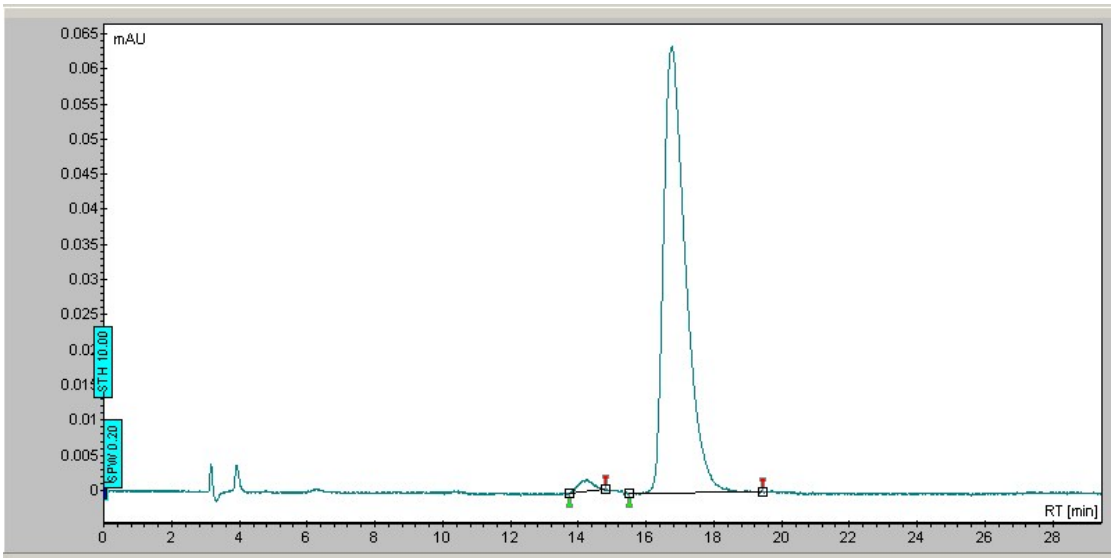
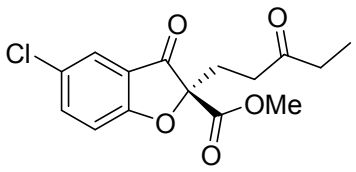


#	Name	Time [Min]	Area % [%]
1	UNKNOWN	14.146	49.949
2	UNKNOWN	16.892	50.051
Total			100.000



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	14.252	1.734
2	UNKNOWN	16.759	98.266
Total			100.000



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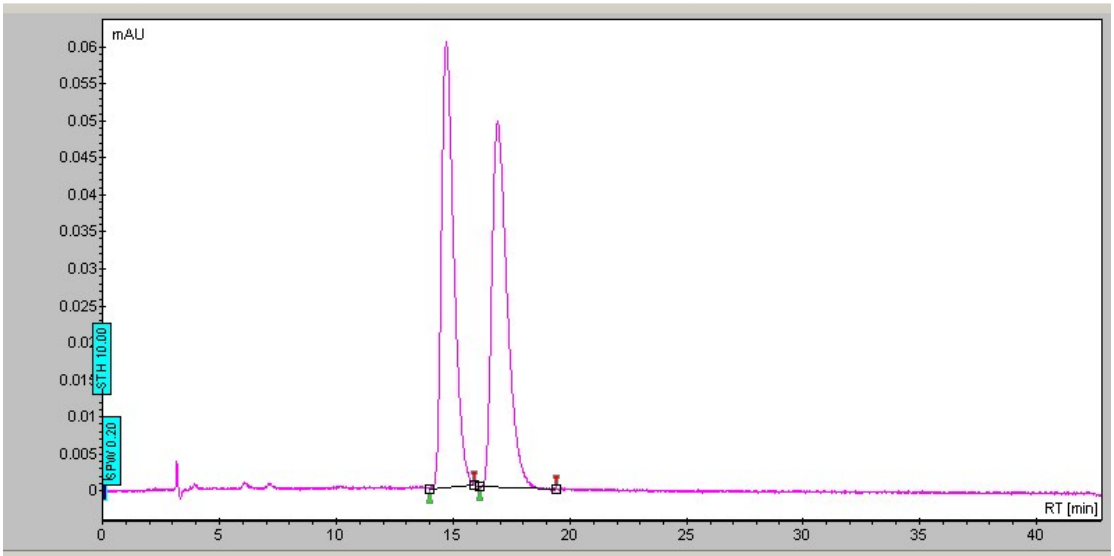
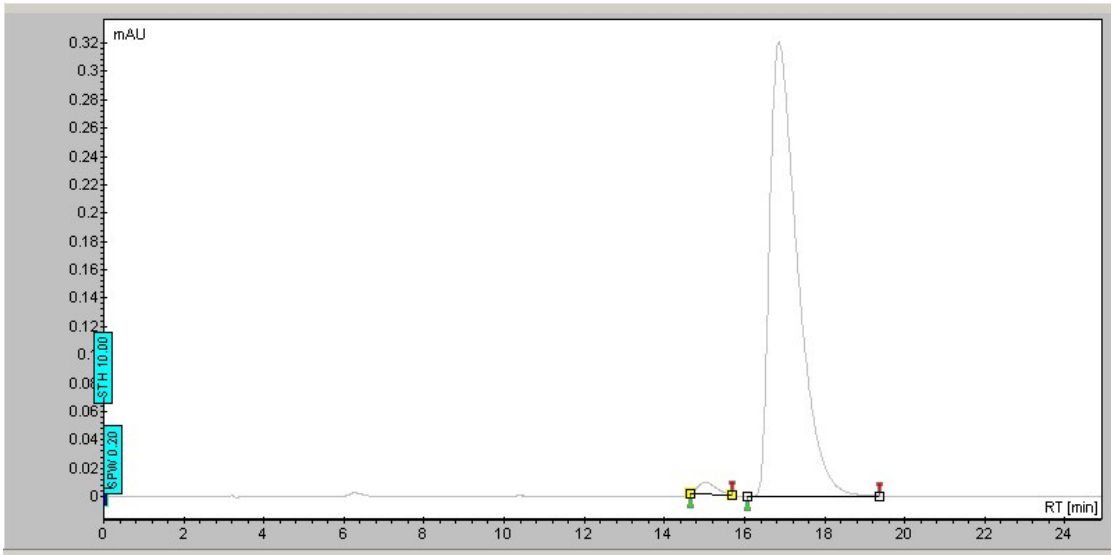
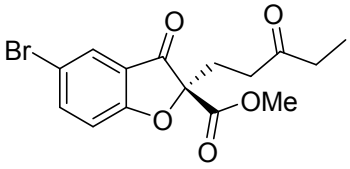


#	Name	Time [Min]	Area % [%]
1	UNKNOWN	14.719	49.595
2	UNKNOWN	16.919	50.405
Total			100.000



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	15.026	1.730
2	UNKNOWN	16.852	98.270
Total			100.000



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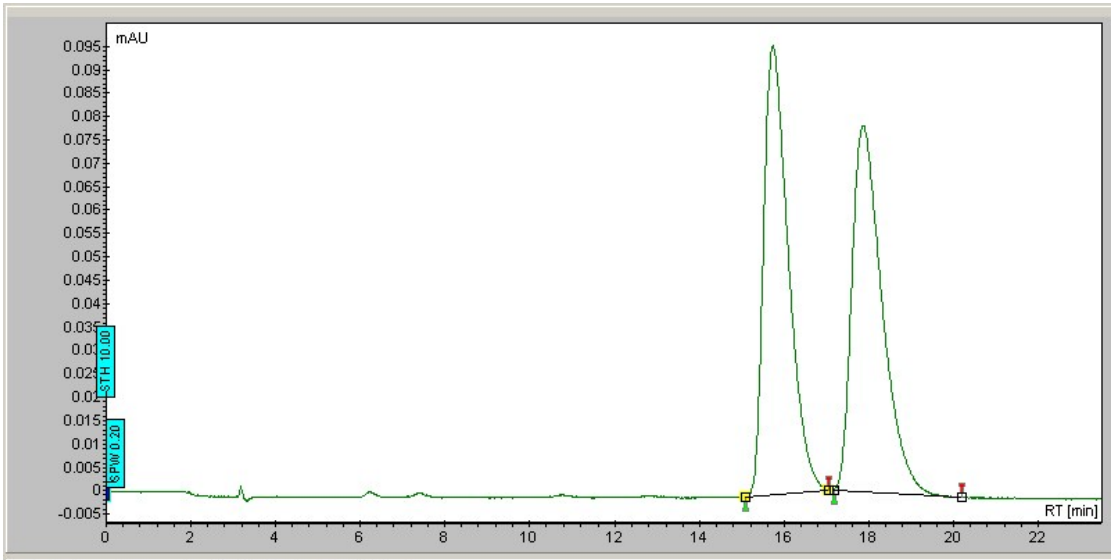
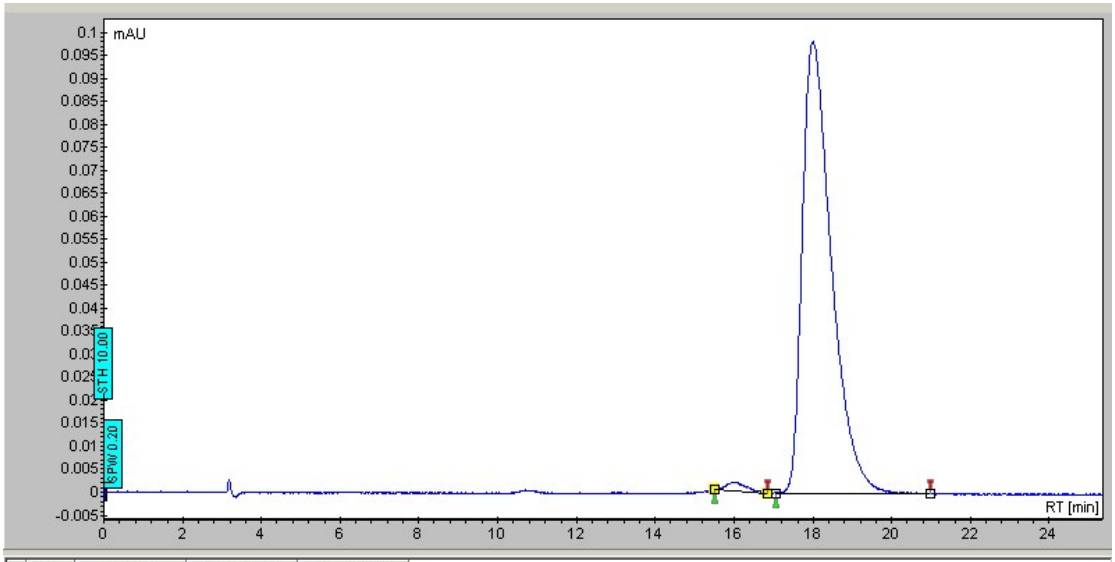
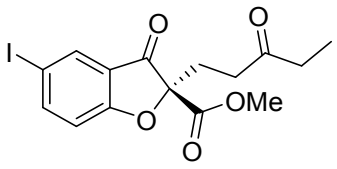


#	Name	Time [Min]	Area % [%]
1	UNKNOWN	15.732	50.093
2	UNKNOWN	17.865	49.907
Total			100.000



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	16.026	1.301
2	UNKNOWN	17.999	98.699
Total			100.000



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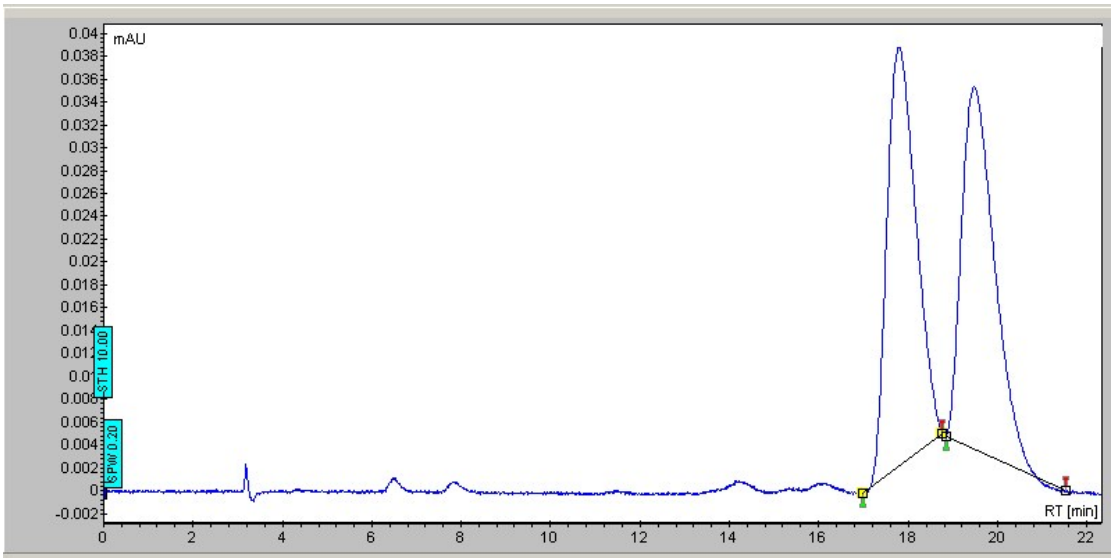
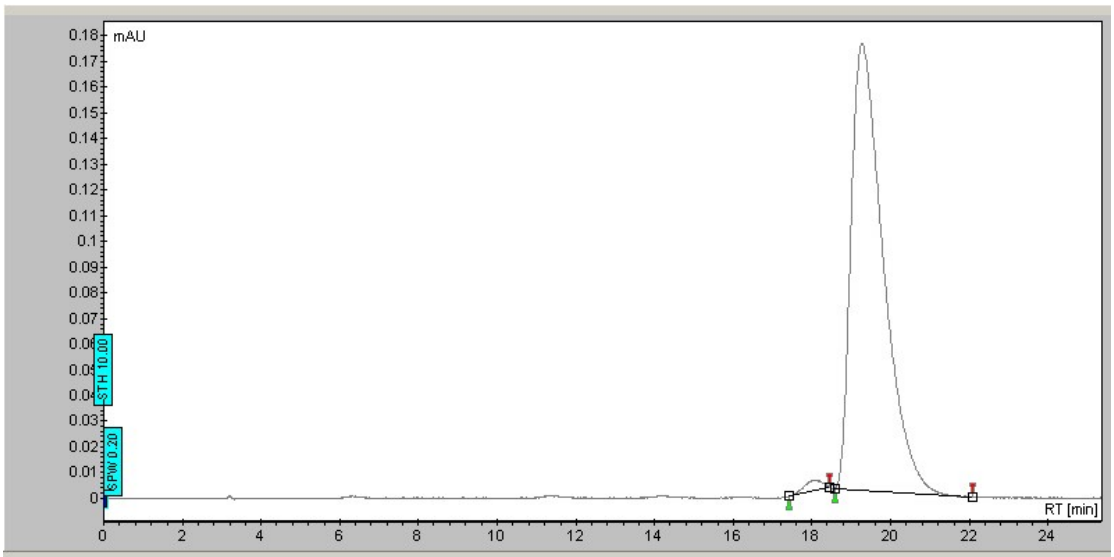
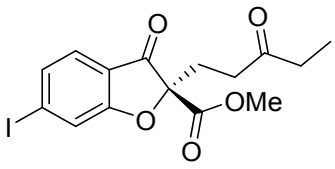


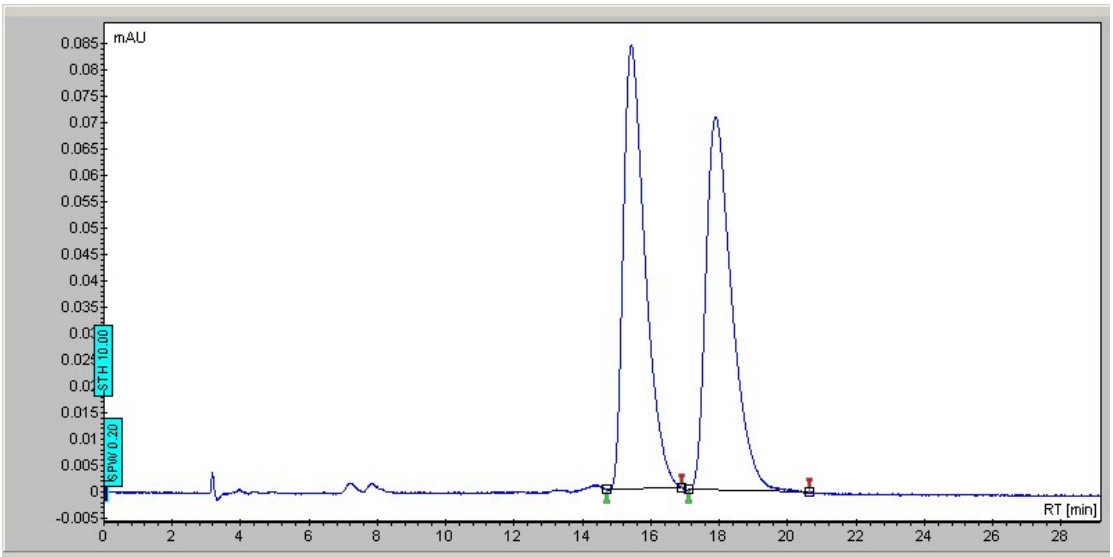
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	17.785	50.547
2	UNKNOWN	19.479	49.453
Total			100.000



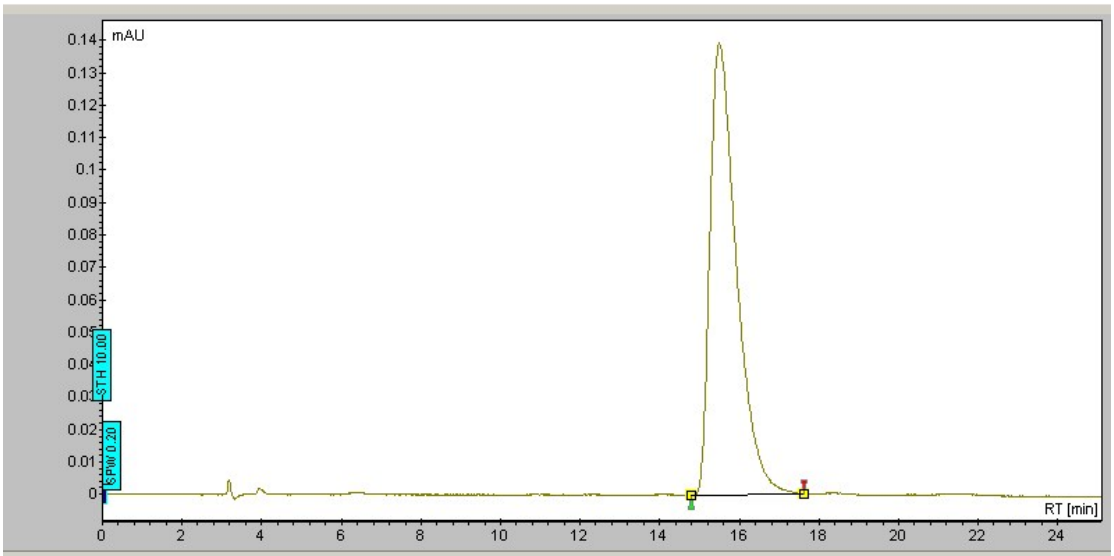
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	18.012	1.275
2	UNKNOWN	19.279	98.725
Total			100.000



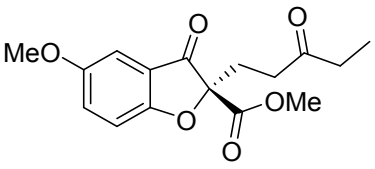
3m



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	15.426	50.007
2	UNKNOWN	17.892	49.993
Total			100.000



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	15.492	100.000
Total			100.000



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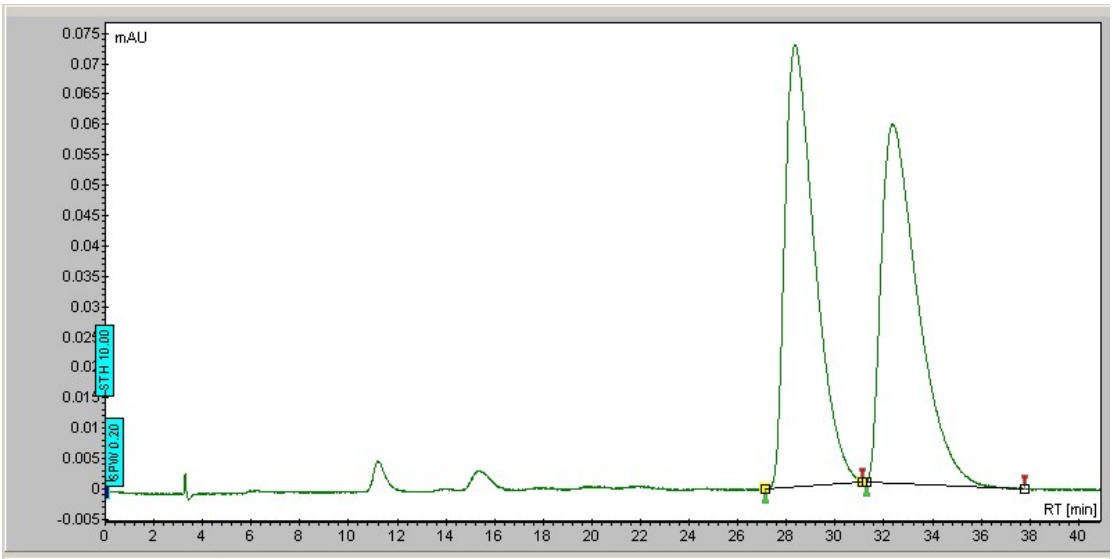
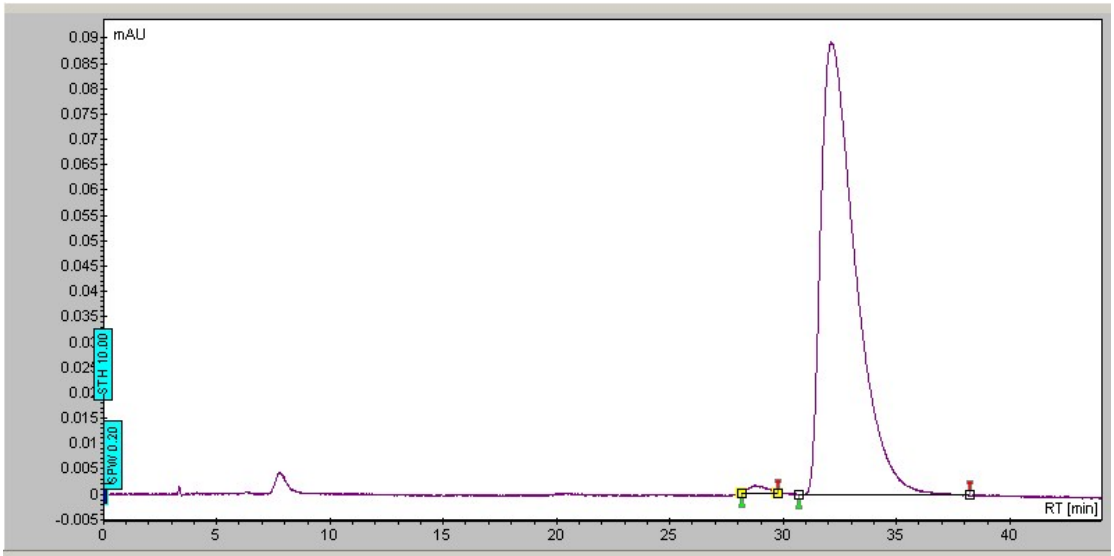
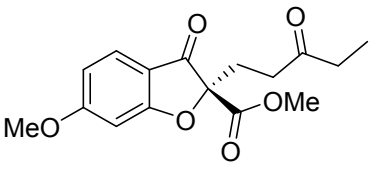


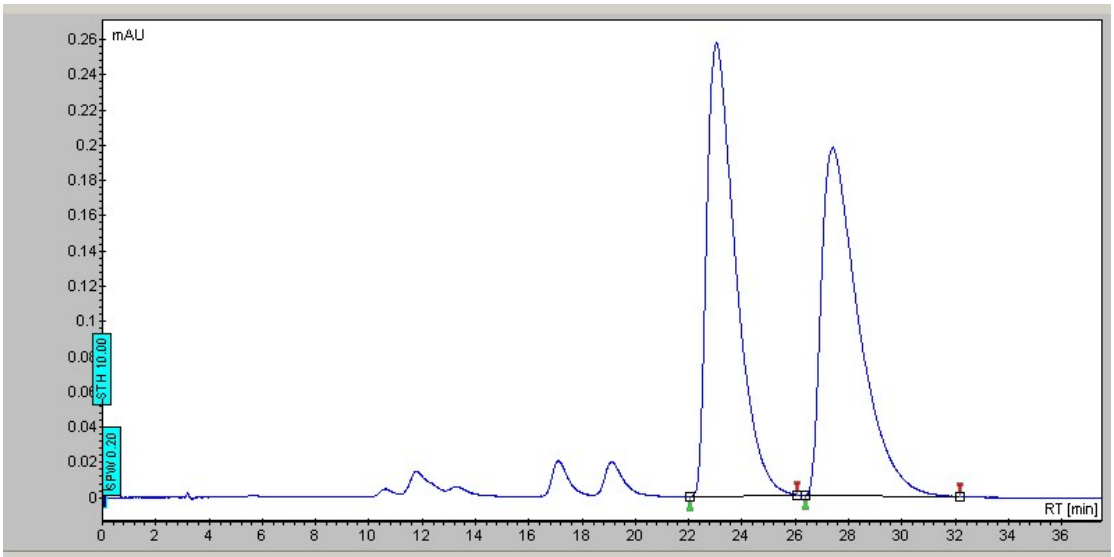
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	28.358	50.181
2	UNKNOWN	32.358	49.819
Total			100.000



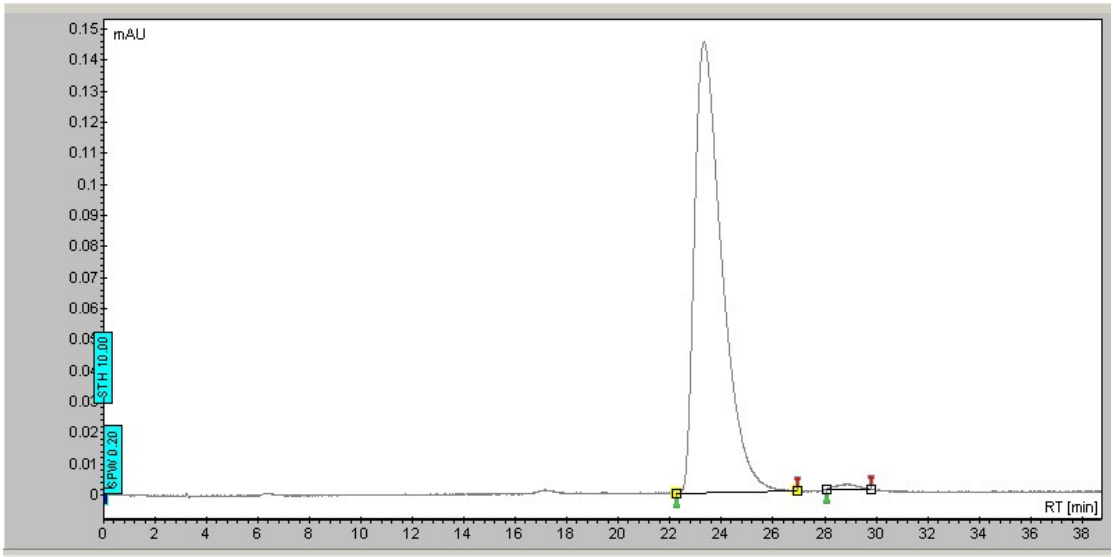
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	28.798	0.821
2	UNKNOWN	32.118	99.179
Total			100.000



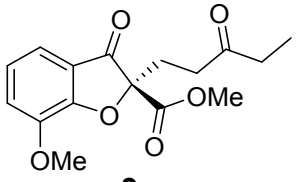
3o



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	23.038	50.071
2	UNKNOWN	27.398	49.929
Total			100.000



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	23.318	99.107
2	UNKNOWN	28.785	0.893
Total			100.000



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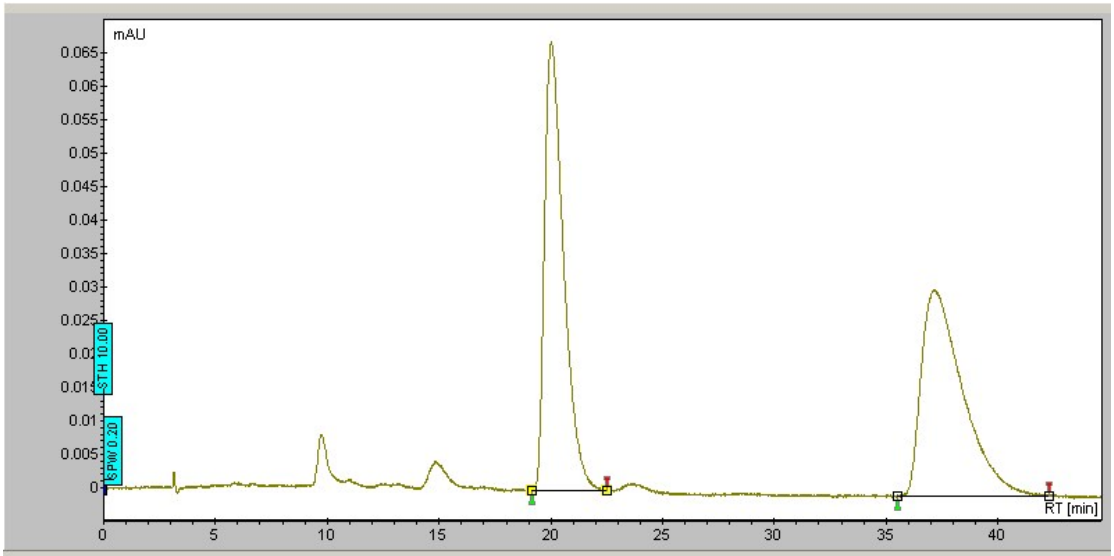
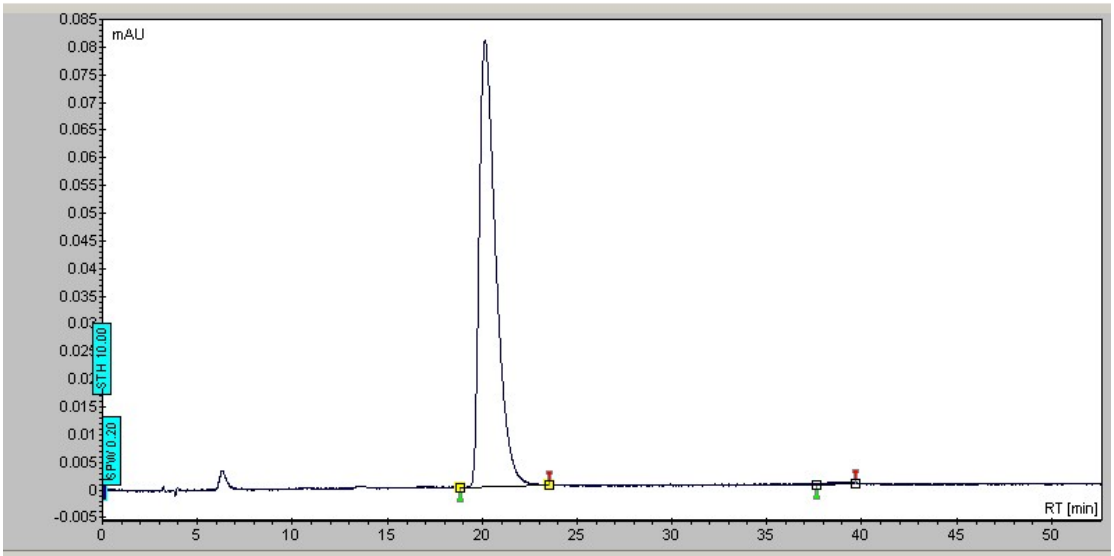
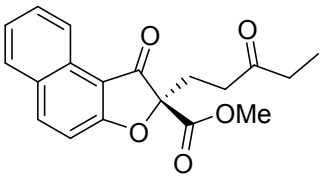


#	Name	Time [Min]	Area % [%]
1	UNKNOWN	20.012	49.978
2	UNKNOWN	37.157	50.022
Total			100.000



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	20.153	99.556
2	UNKNOWN	38.626	0.444
Total			100.000



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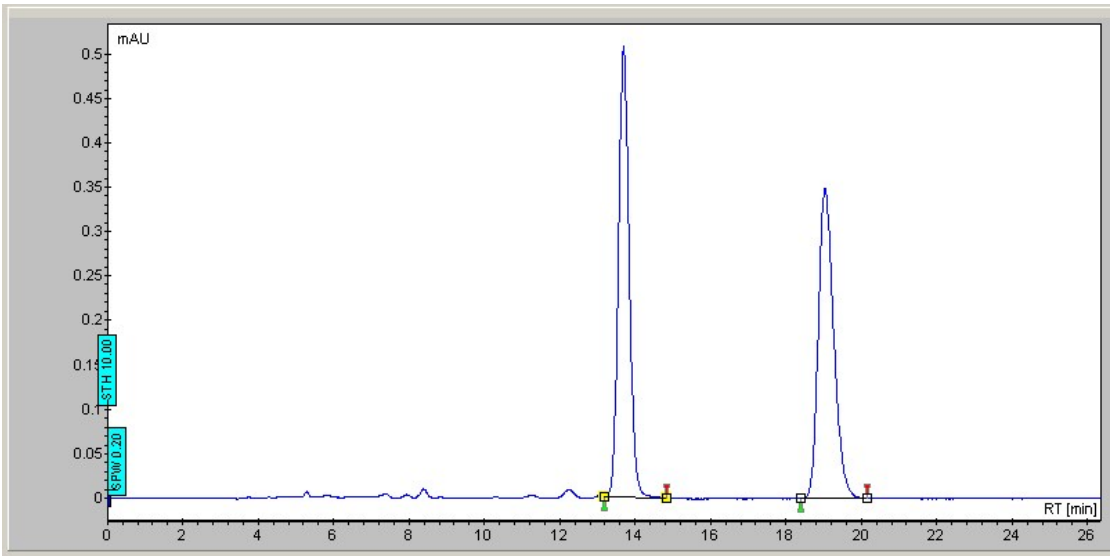
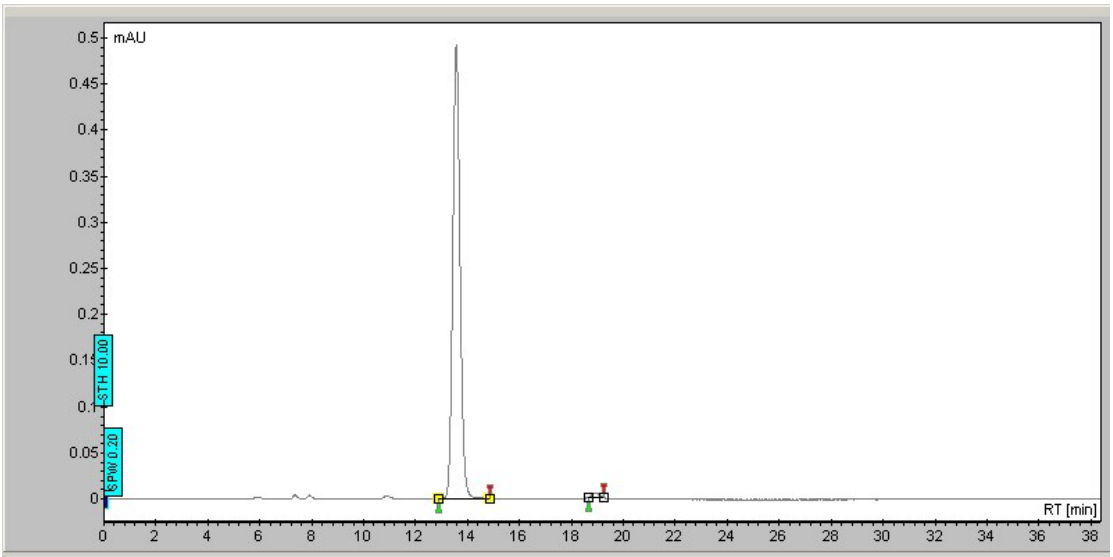
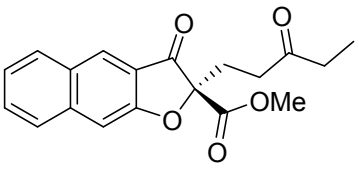


#	Name	Time [Min]	Area % [%]
1	UNKNOWN	13.692	50.139
2	UNKNOWN	19.039	49.861
Total			100.000



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	13.559	99.110
2	UNKNOWN	18.932	0.890
Total			100.000



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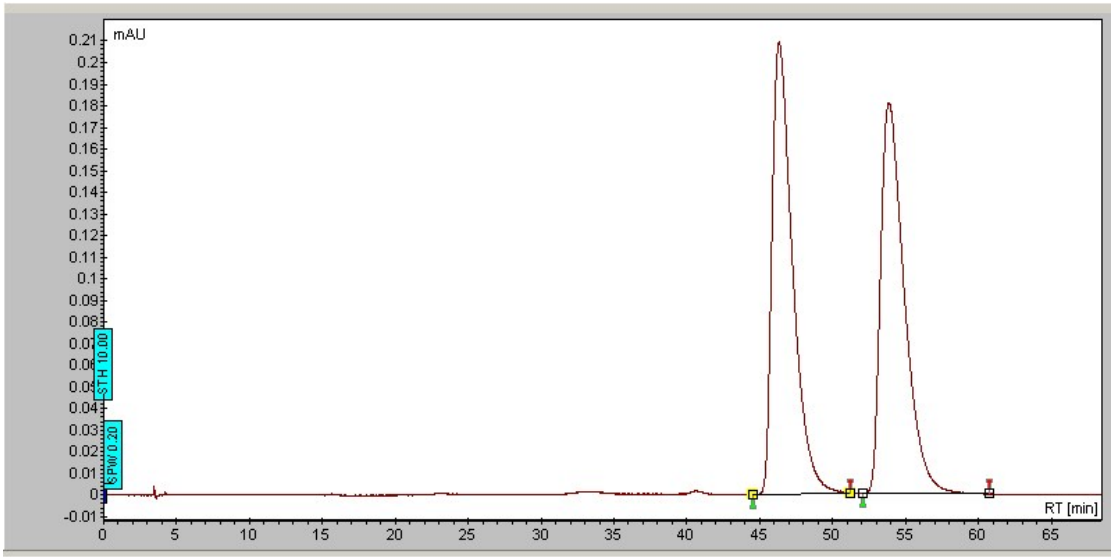
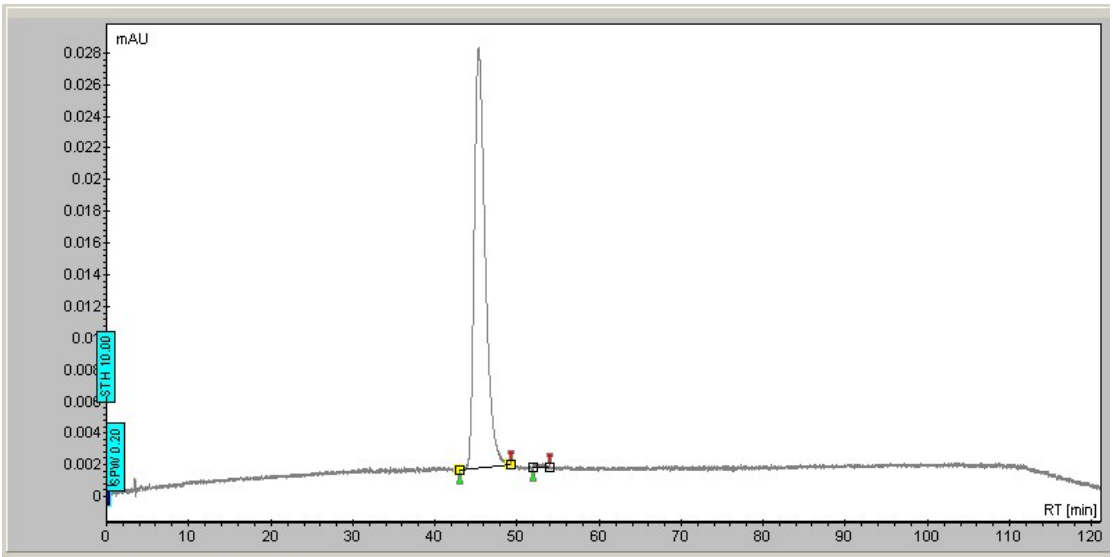
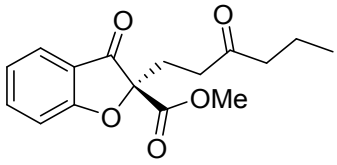


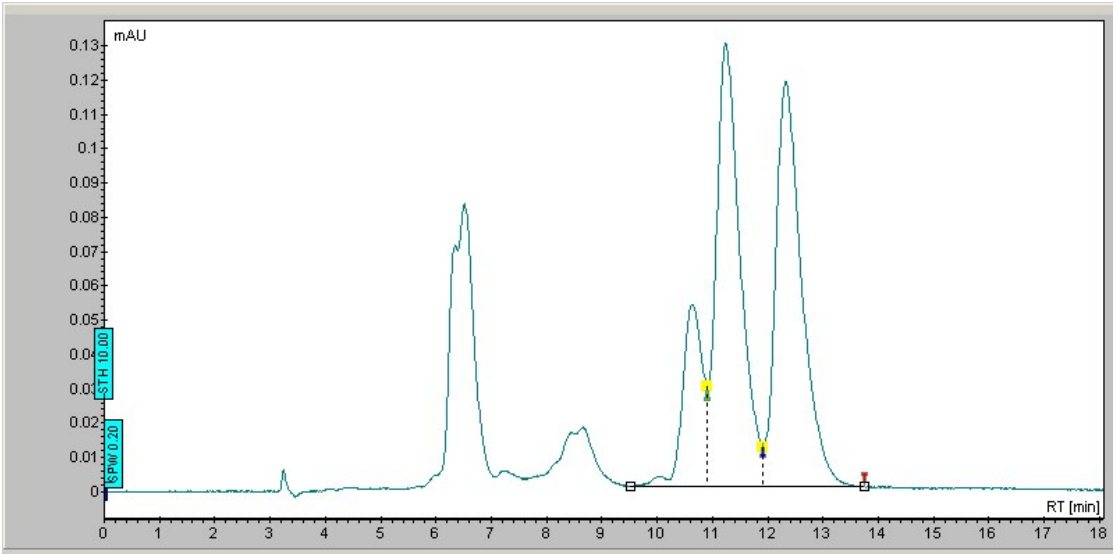
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	46.330	49.957
2	UNKNOWN	53.874	50.043
Total			100.000



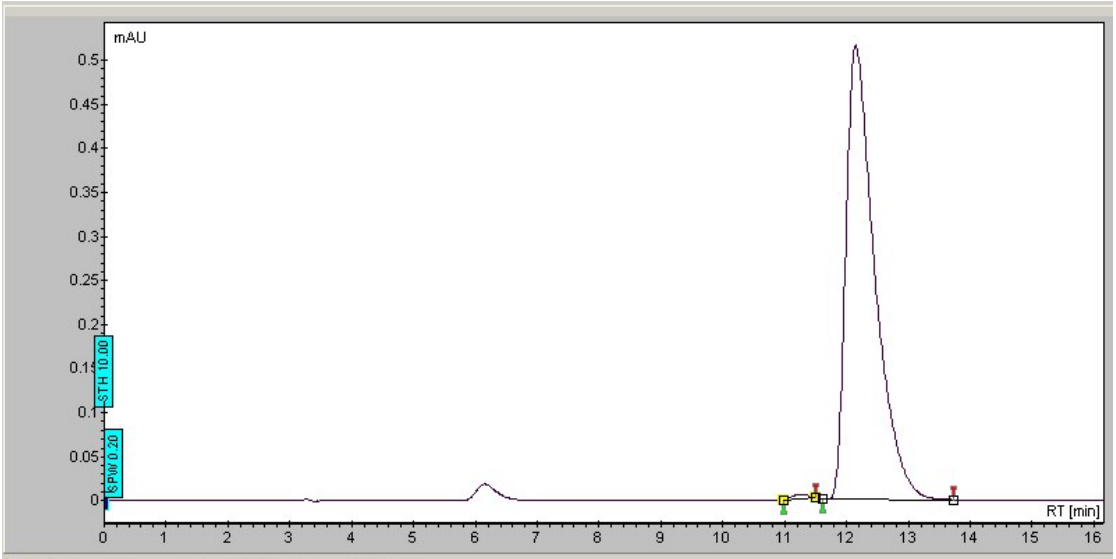
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	45.330	99.669
2	UNKNOWN	52.808	0.331
Total			100.000



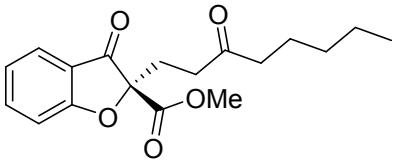
4b



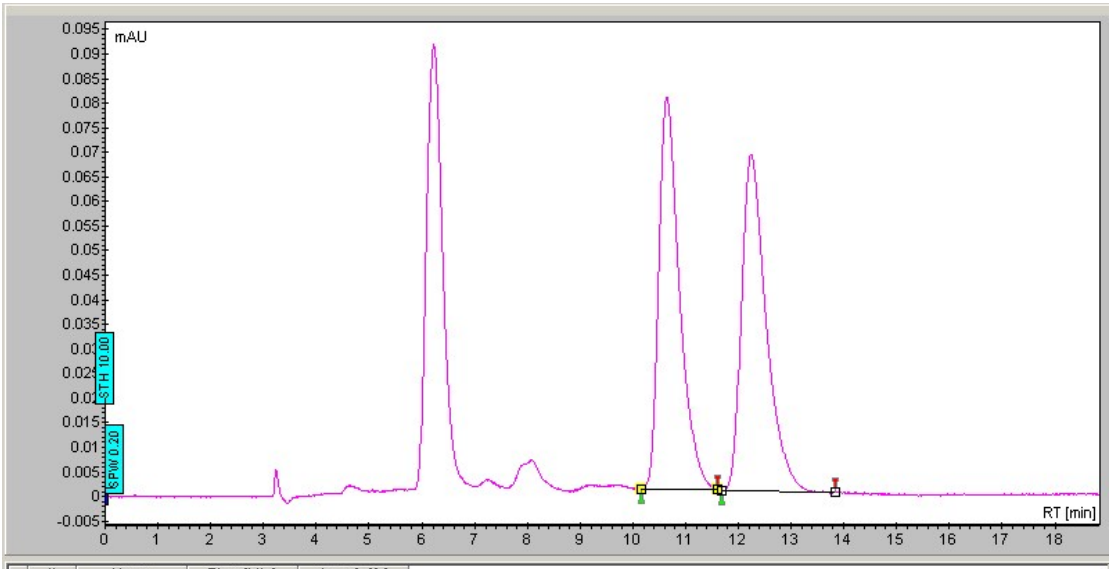
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	11.239	50.184
2	UNKNOWN	12.332	49.816
Total			100.000



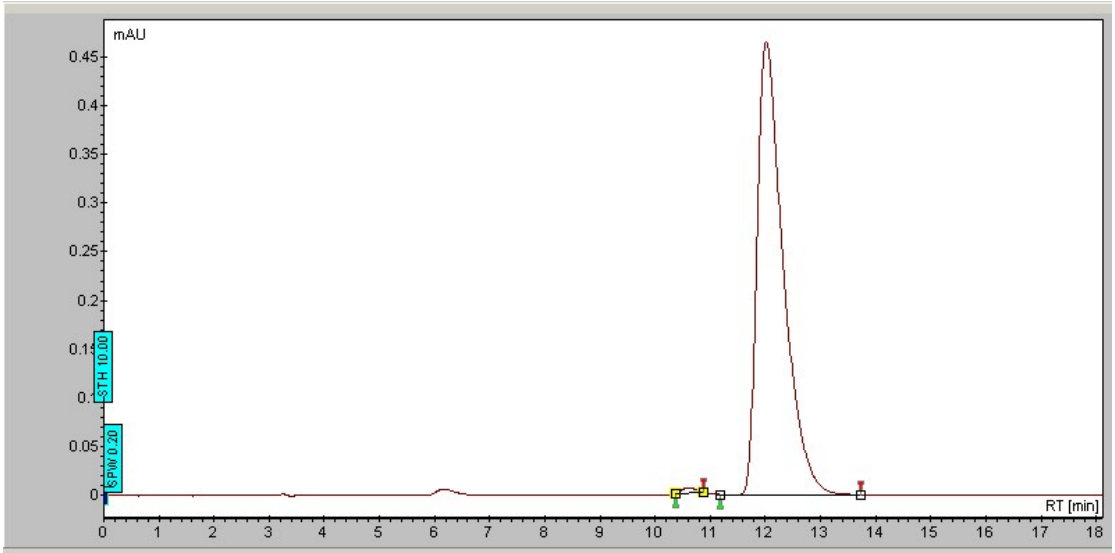
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	11.239	0.494
2	UNKNOWN	12.146	99.506
Total			100.000



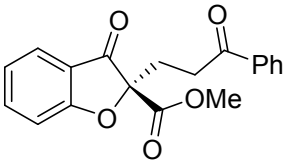
4c



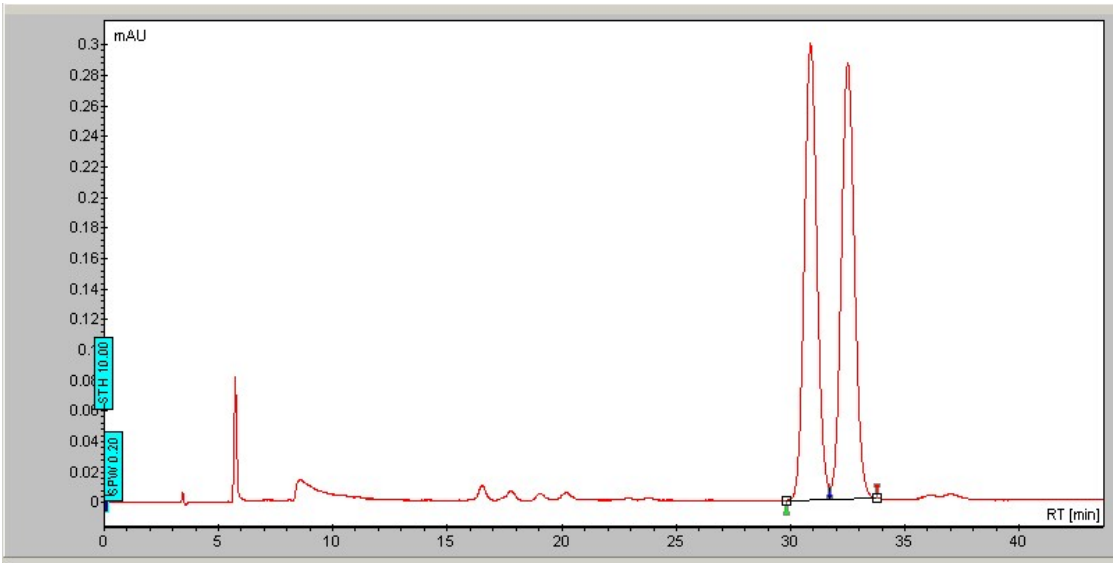
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	10.639	49.735
2	UNKNOWN	12.239	50.265
Total			100.000



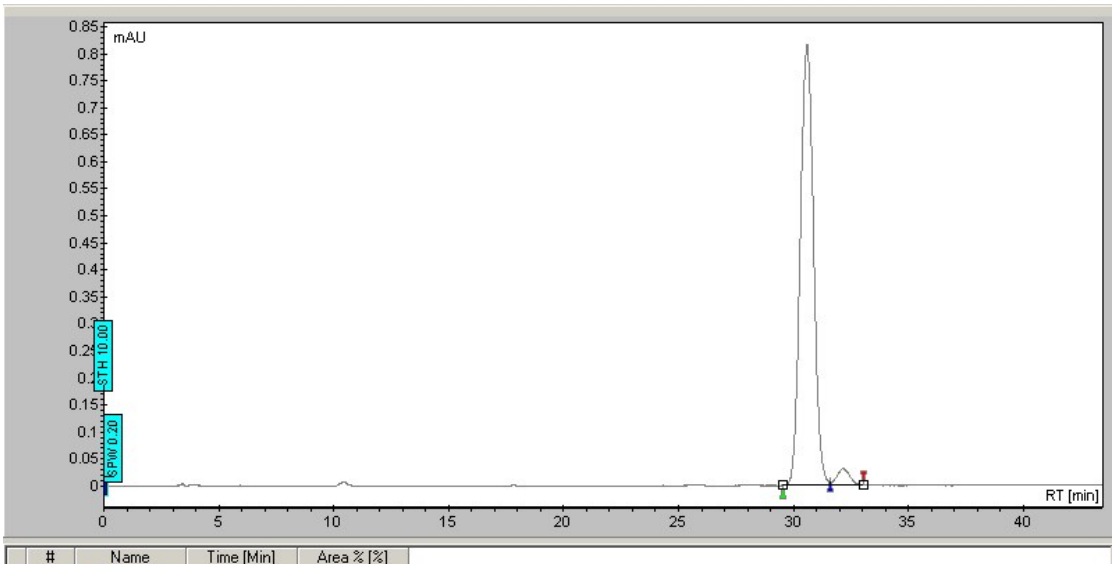
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	10.599	0.569
2	UNKNOWN	12.012	99.431
Total			100.000



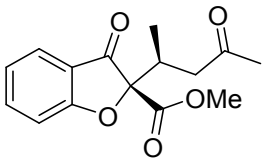
4d



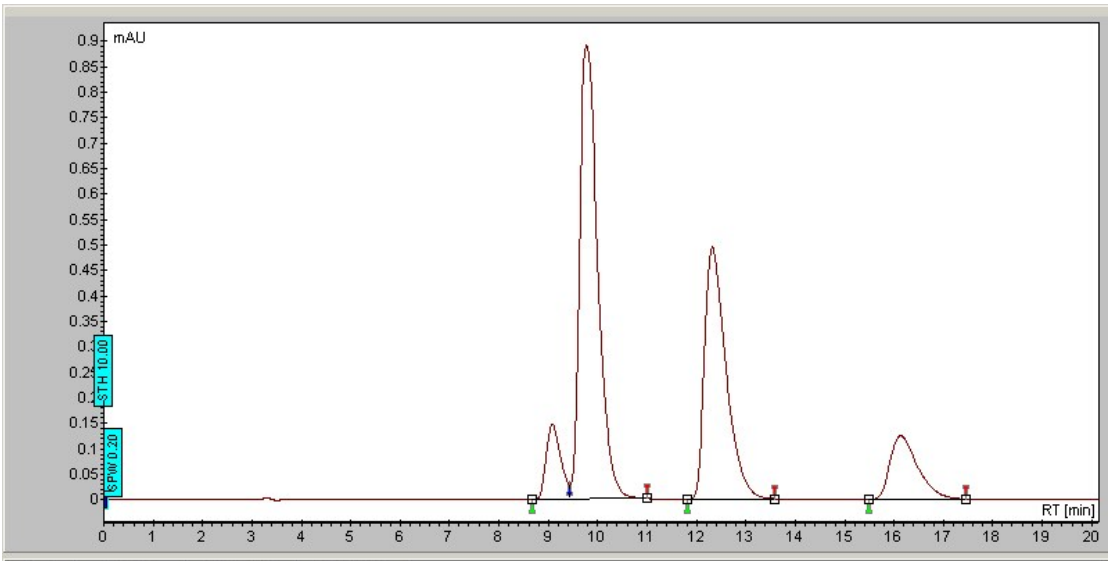
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	30.864	49.995
2	UNKNOWN	32.491	50.005
Total			100.000



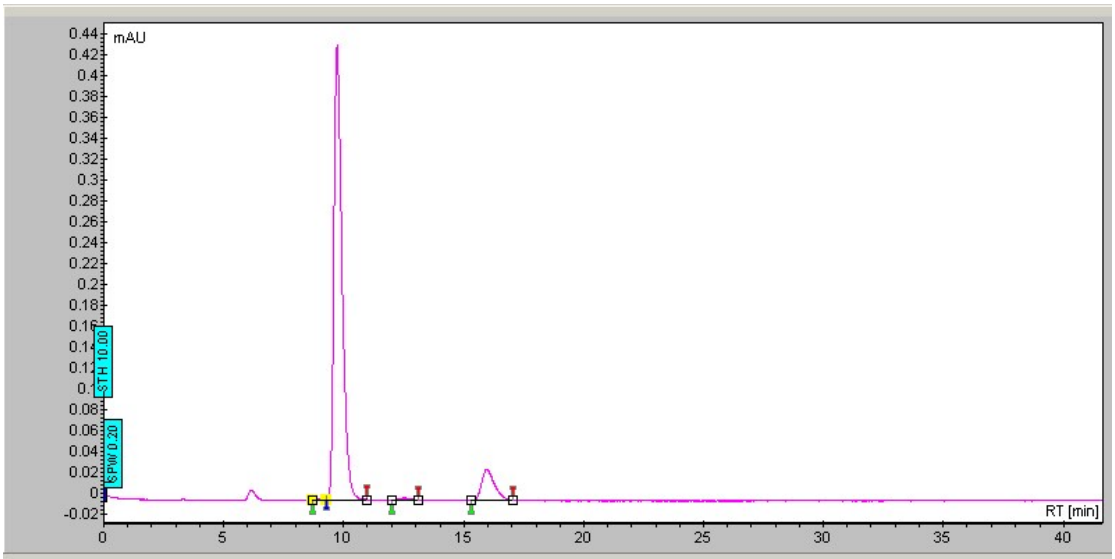
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	30.584	96.503
2	UNKNOWN	32.158	3.497
Total			100.000



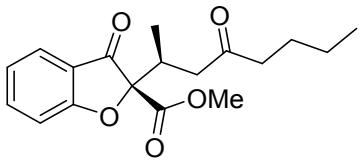
6a



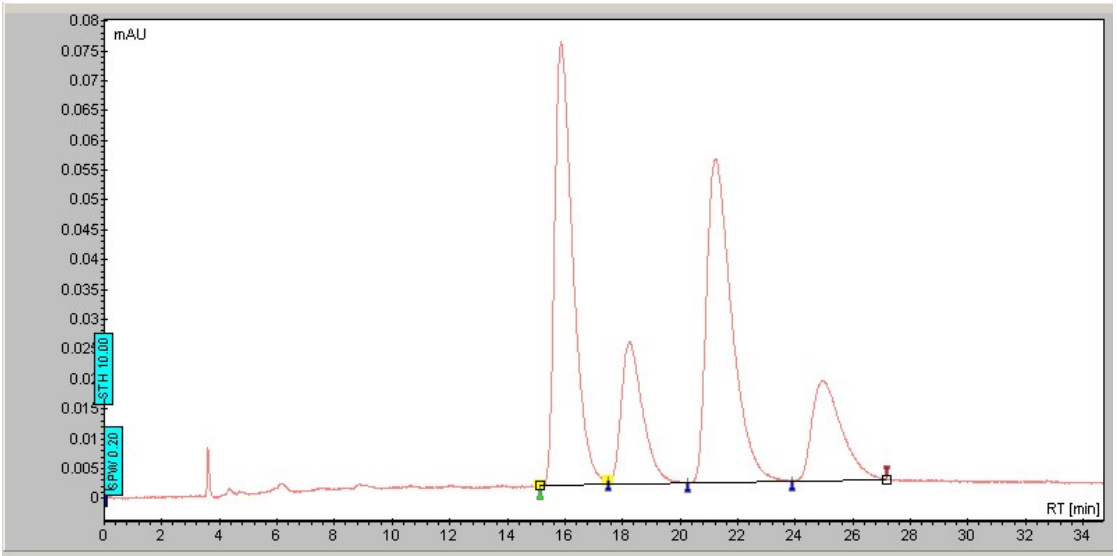
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	9.079	6.664
2	UNKNOWN	9.773	49.803
3	UNKNOWN	12.319	32.865
4	UNKNOWN	16.132	10.668
Total			100.000



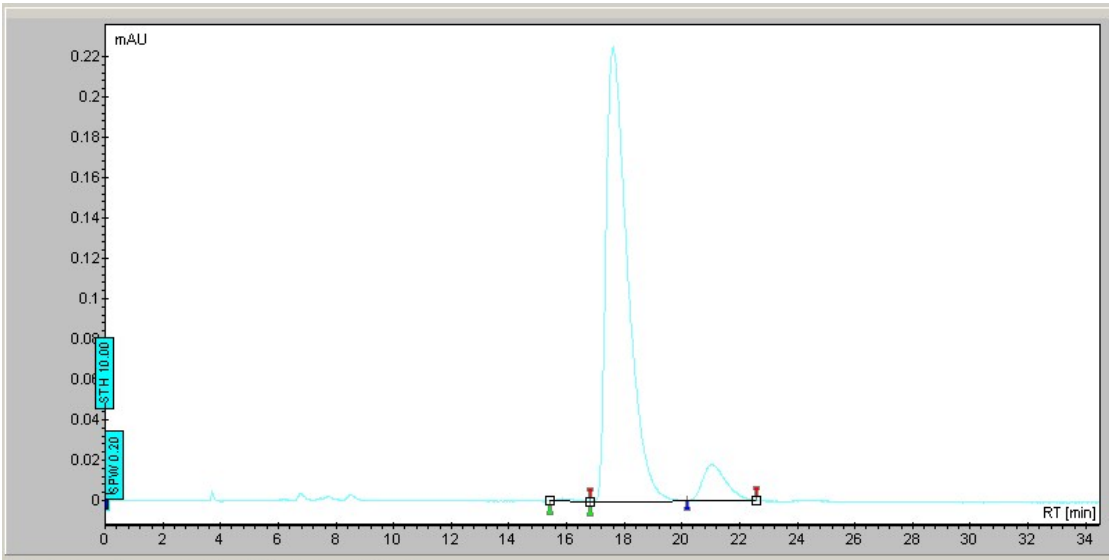
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	9.026	0.255
2	UNKNOWN	9.719	89.324
3	UNKNOWN	12.546	0.695
4	UNKNOWN	15.959	9.726
Total			100.000



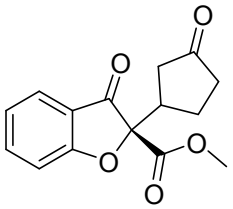
6b



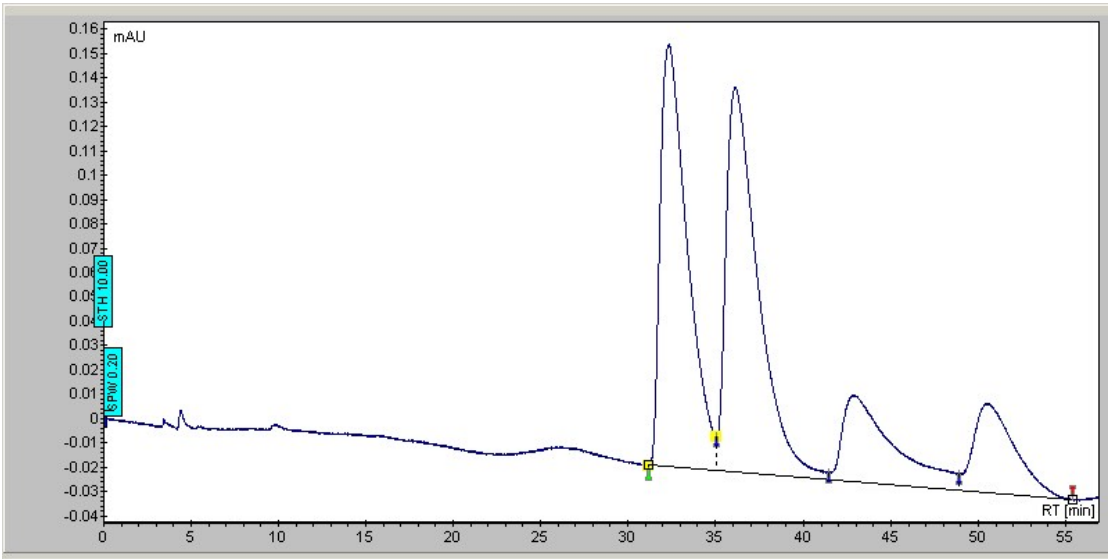
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	15.866	36.419
2	UNKNOWN	18.239	13.696
3	UNKNOWN	21.225	36.682
4	UNKNOWN	24.958	13.203
Total			100.000



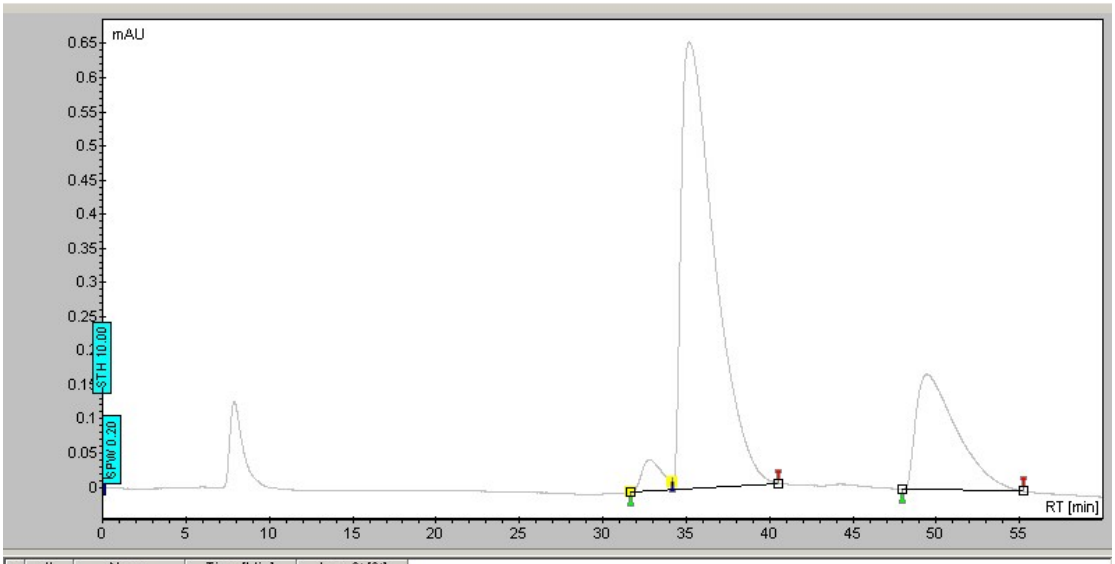
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	15.892	0.366
2	UNKNOWN	17.612	91.752
3	UNKNOWN	21.025	7.882
Total			100.000



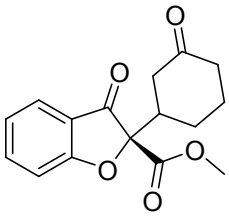
6c



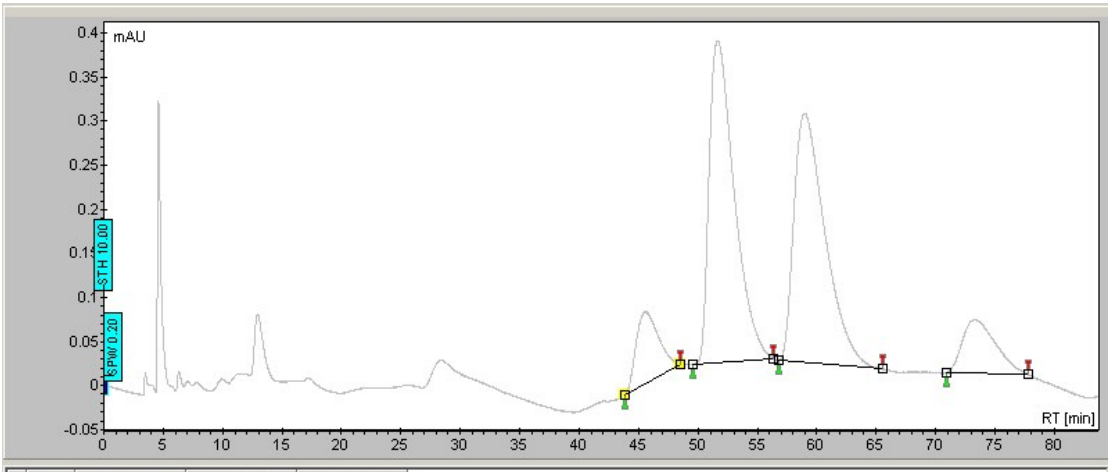
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	32.318	35.735
2	UNKNOWN	36.117	38.789
3	UNKNOWN	42.917	13.998
4	UNKNOWN	50.556	11.478
Total			100.000



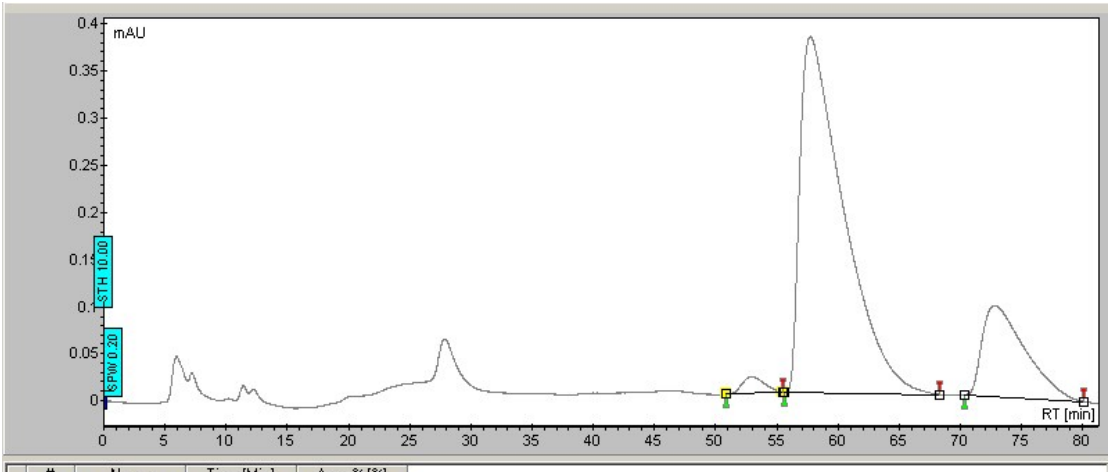
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	32.784	3.087
2	UNKNOWN	35.184	73.761
3	UNKNOWN	49.436	23.152
Total			100.000



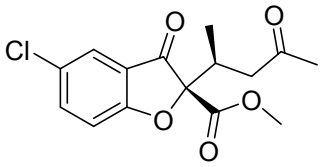
6d



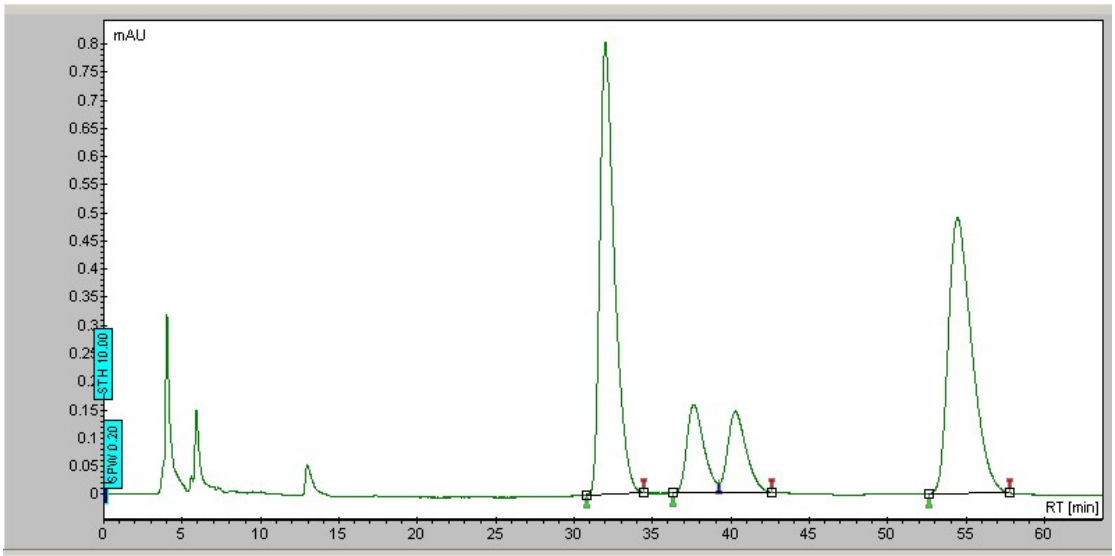
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	45.530	8.424
2	UNKNOWN	51.648	41.957
3	UNKNOWN	58.952	40.372
4	UNKNOWN	73.280	9.248
Total			100.000



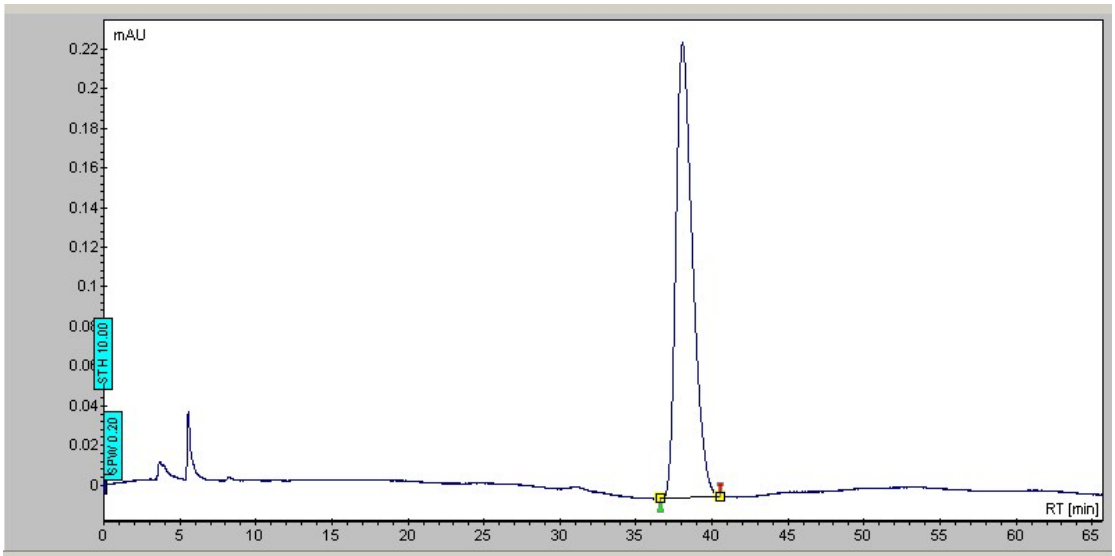
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	52.914	1.853
2	UNKNOWN	57.713	78.509
3	UNKNOWN	72.814	19.639
Total			100.000



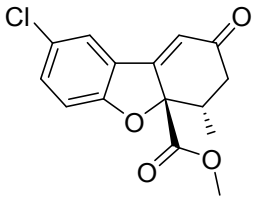
6j



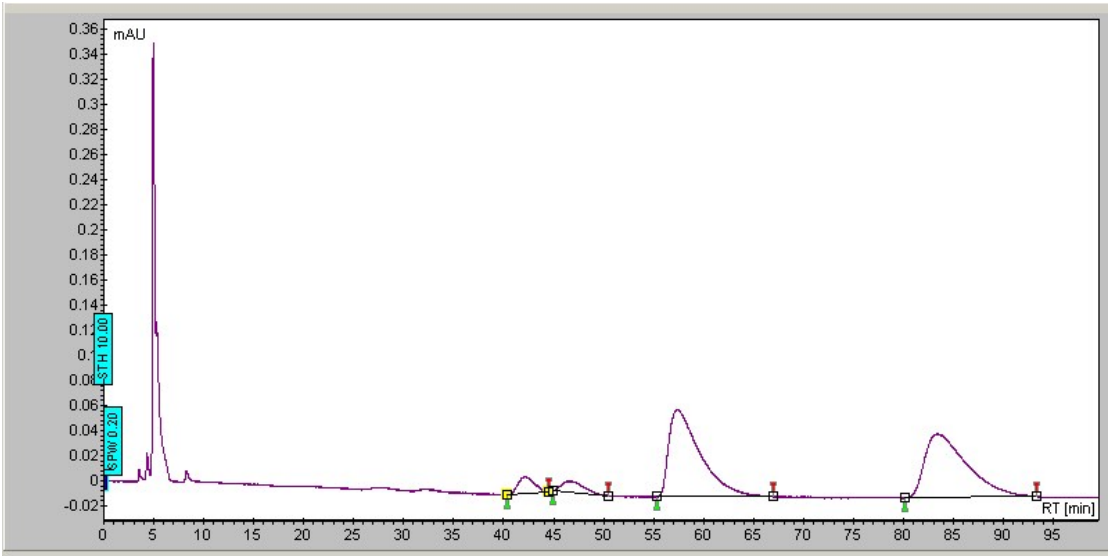
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	31.998	41.144
2	UNKNOWN	37.624	9.329
3	UNKNOWN	40.264	9.338
4	UNKNOWN	54.436	40.189
Total			100.000



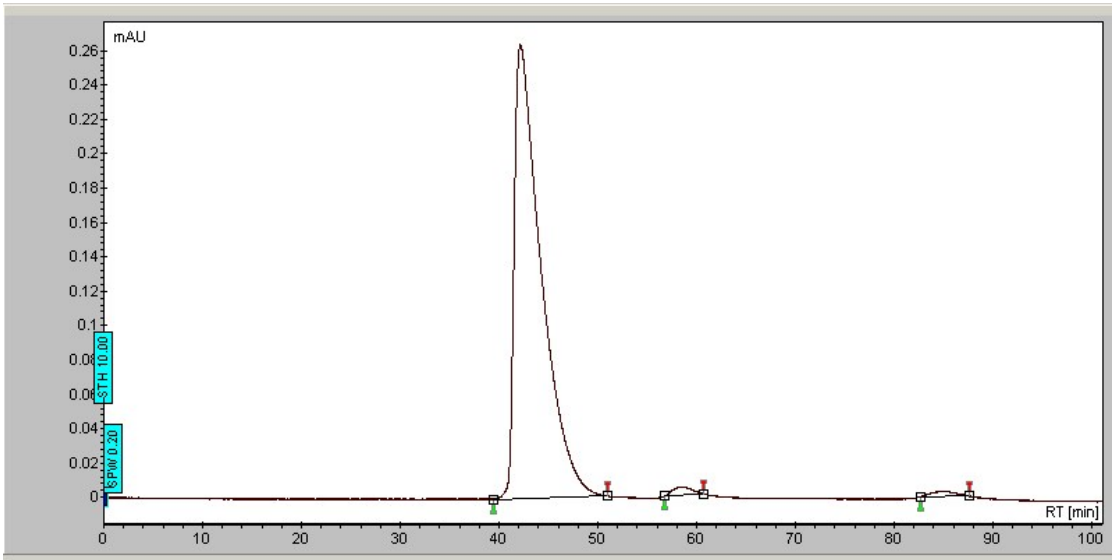
#	Name	Time [Min]	Area % [%]
1	UNKNOWN	38.053	100.000
Total			100.000



7



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	42.092	4.545
4	UNKNOWN	46.730	4.192
2	UNKNOWN	57.379	45.932
3	UNKNOWN	83.397	45.331
Total			100.000



#	Name	Time [Min]	Area % [%]
1	UNKNOWN	42.185	97.835
2	UNKNOWN	58.379	1.218
3	UNKNOWN	84.890	0.947
Total			100.000