Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary information and chemical compound information 2

Convenient and efficient synthesis of disubstituted piperazine derivatives by catalyst-free, atom-economical and tricomponent domino reactions

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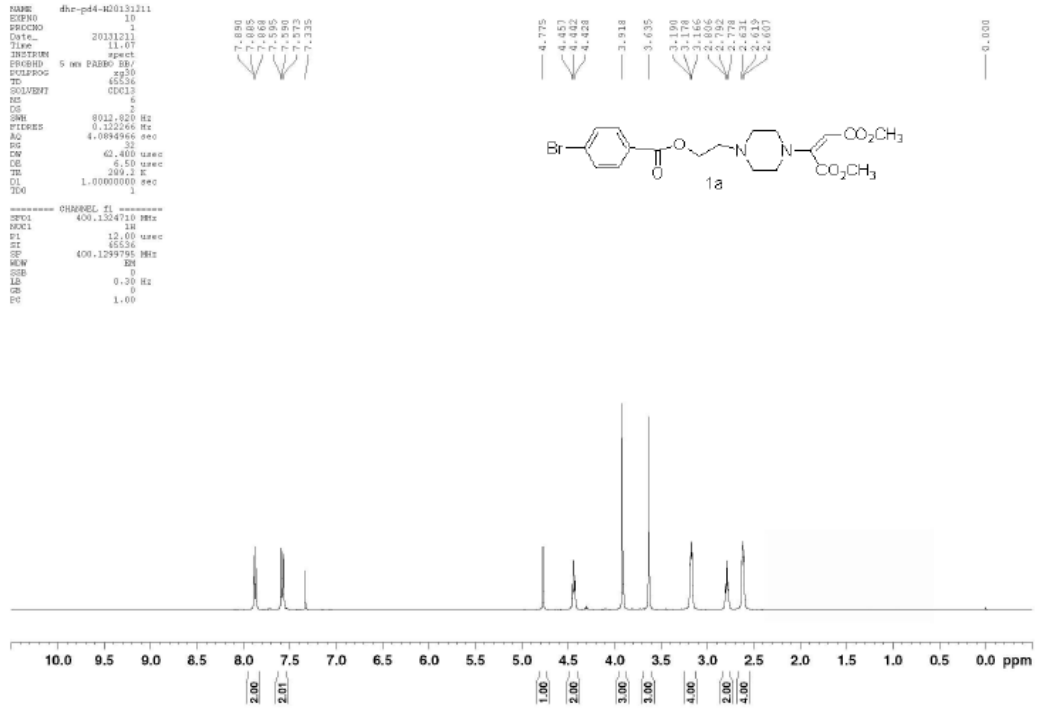
donghengshan@lzu.edu.cn.; xiezx@lzu.edu.cn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PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 6
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 32
DW 62.400 usec
DE 6.50 usec
TE 289.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 12.00 usec
SI 65536
SF 400.1299795 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.890
7.885
7.698
7.695
7.590
7.573
7.335
4.775
4.457
4.442
4.428
3.918
3.635
3.190
3.178
3.166
3.006
2.992
2.778
2.631
2.619
2.607
0.000
Br
O
O
N
N
CO2CH3
CO2CH3
1a
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
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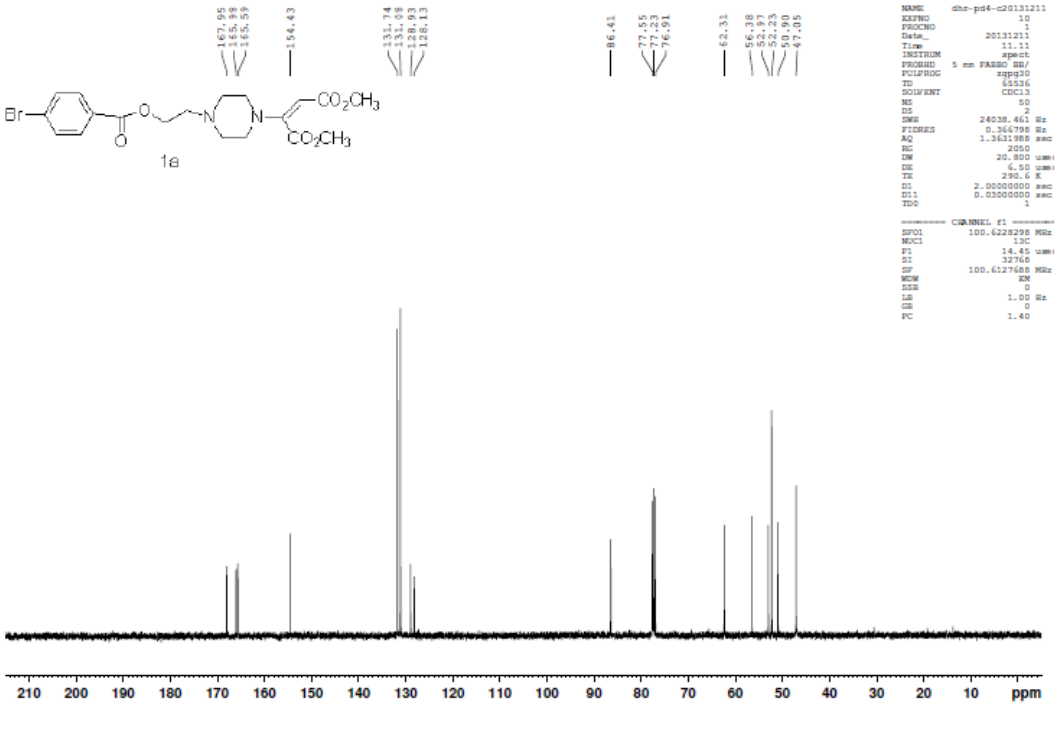
2.00
3.00
3.00
4.00
2.00
4.00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131.74
131.09
128.93
128.13
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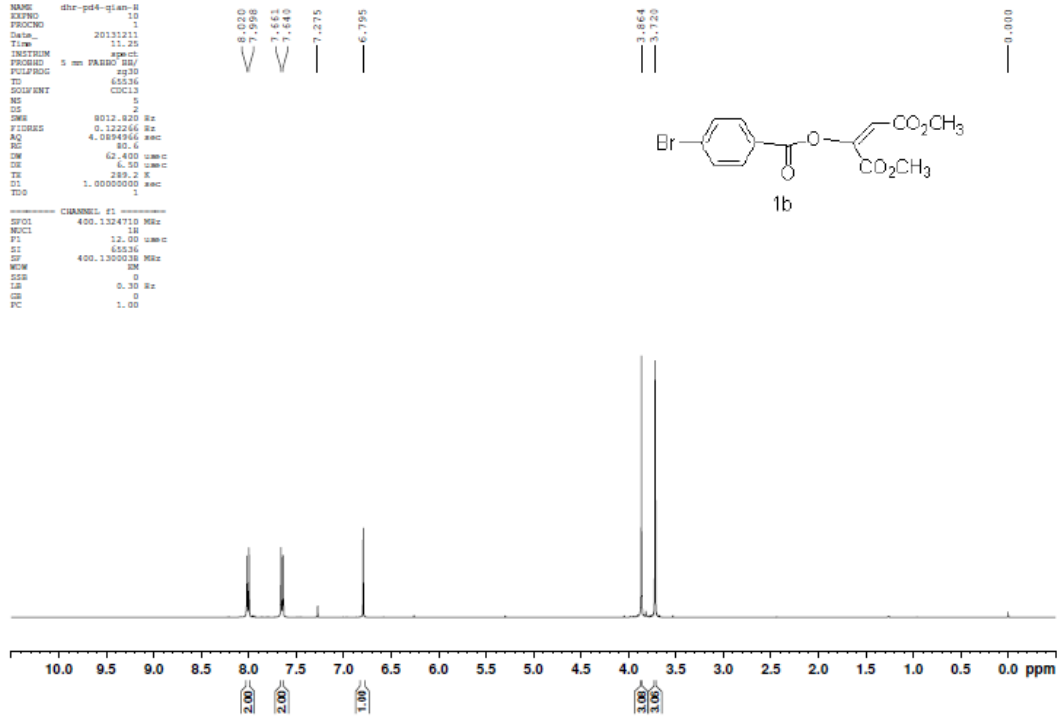
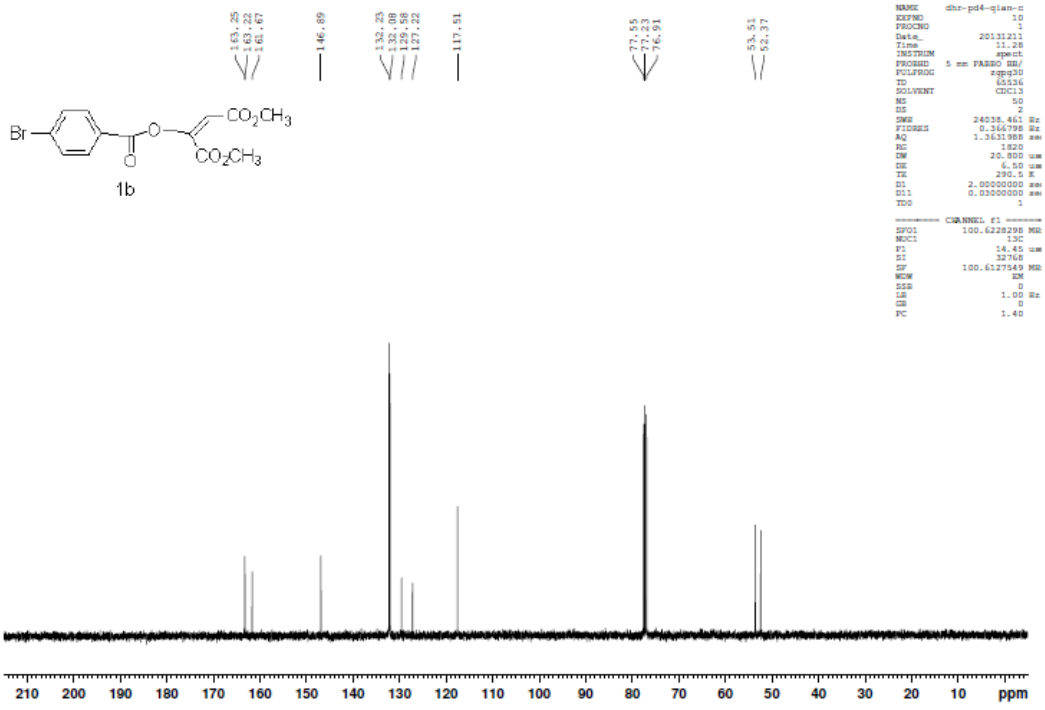
77.55
77.23
76.91
62.31
56.38
52.97
52.23
50.90
47.05
Br
O
O
N
N
CO2CH3
CO2CH3
1a
NAME dhr-pd4-c20131211
EXPNO 10
PROCNO 1
Date_ 20131211
Time 11.11
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 2050
DW 20.800 usec
DE 6.50 usec
TE 290.6 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 14.45 usec
SI 32768
SF 100.6127688 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


8.020
7.998
7.661
7.640
7.275
6.795
3.864
3.720
0.000
Br
O
O
CO_2CH_3
CO_2CH_3
1b
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
2.00
2.00
1.00
3.00
3.06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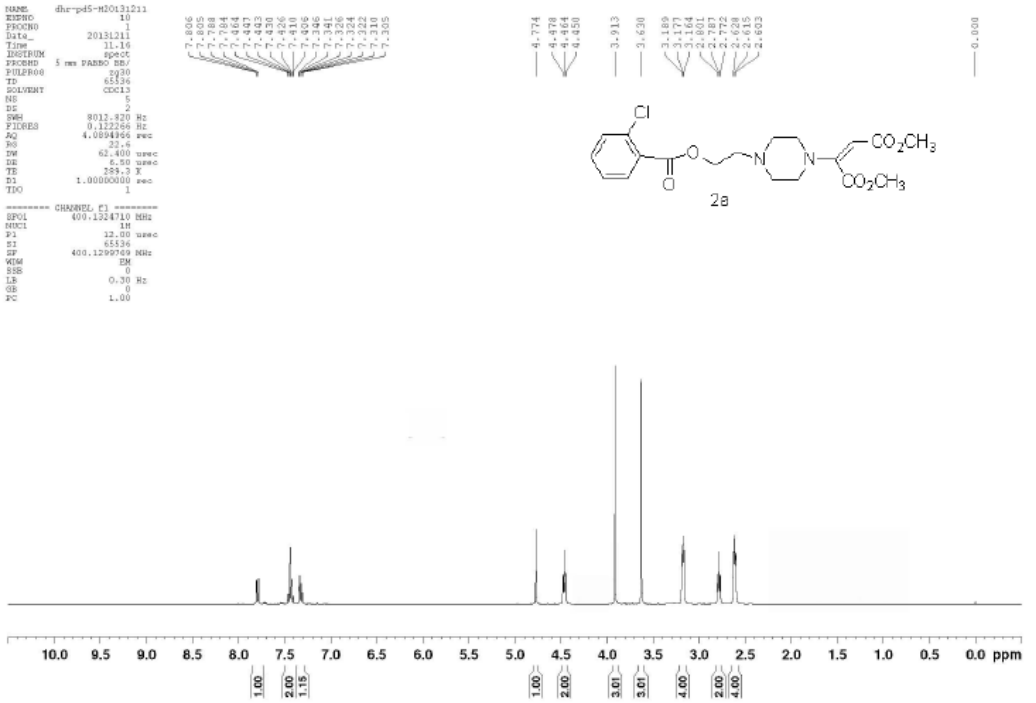
163.22
161.67
146.89
132.25
132.08
129.58
127.22
117.51
77.55
77.23
76.91
53.51
52.37
Br
O
O
CO_2CH_3
CO_2CH_3
1b
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894366 sec
RG 22.6
DW 62.400 usec
DE 6.50 usec
TE 284.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 12.00 usec
SI 65536
SF 400.1299709 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.806
7.805
7.788
7.784
7.464
7.463
7.443
7.430
7.426
7.410
7.406
7.346
7.341
7.326
7.324
7.322
7.310
7.305
4.774
4.478
4.464
4.450
3.913
3.630
3.189
3.177
3.164
2.801
2.787
2.672
2.628
2.615
2.603
0.000
Cl
O
O
N
N
CO2CH3
CO2CH3
2a
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
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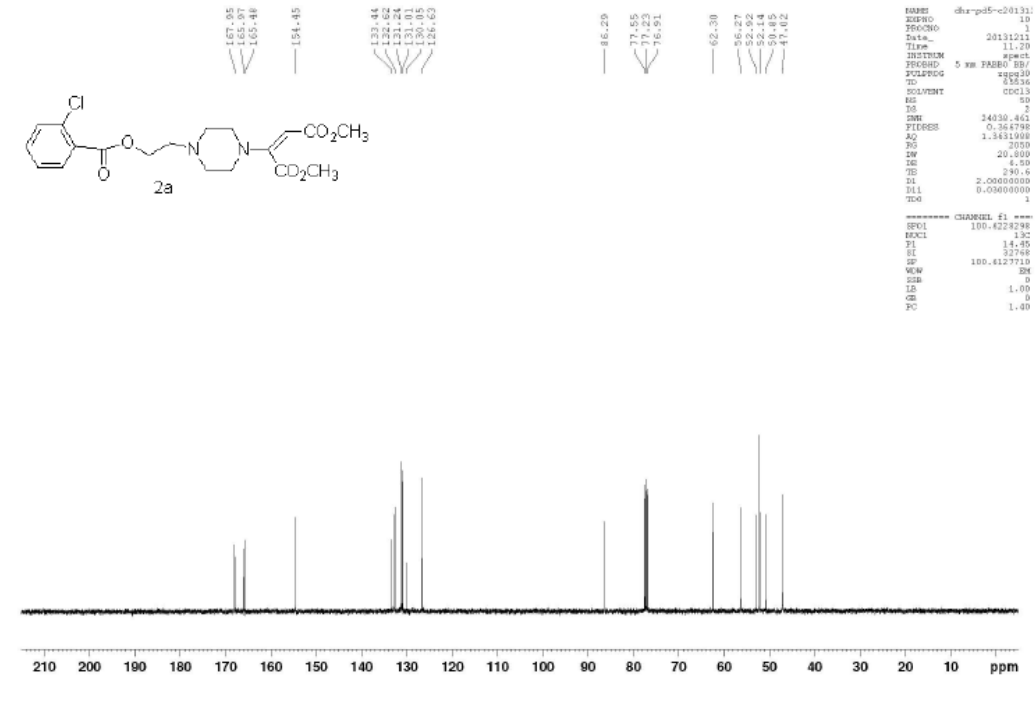
2.00
1.15
1.00
2.00
3.01
3.01
4.00
2.00
4.00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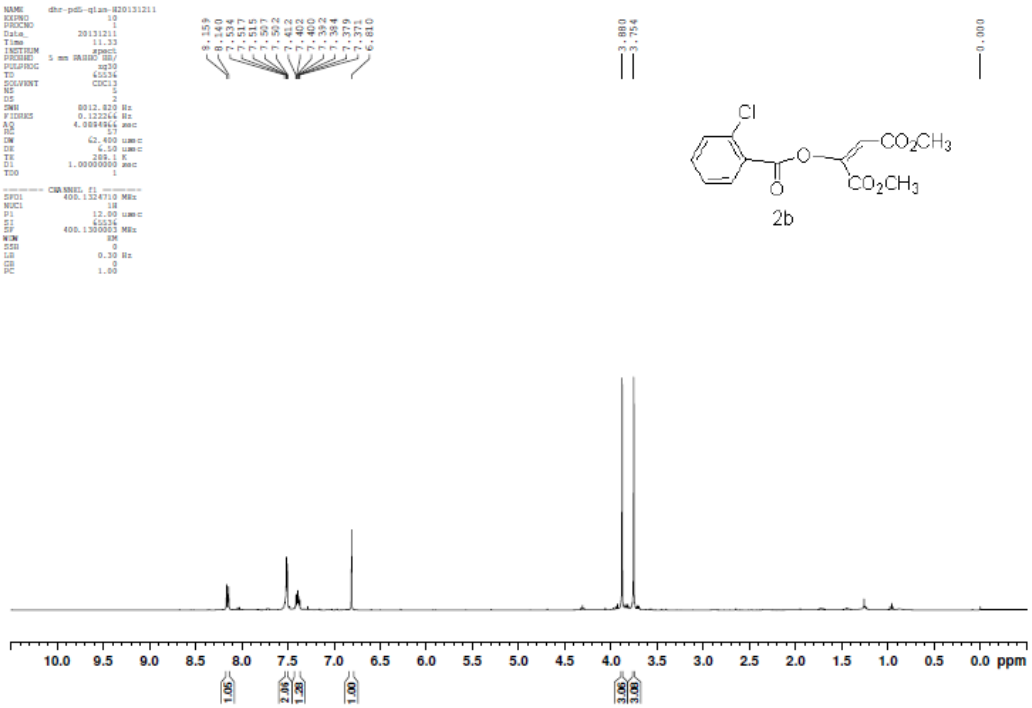
165.97
165.48
154.45
133.44
132.52
131.24
131.01
130.05
126.63
86.29
77.55
77.23
76.91
62.30
56.27
56.02
52.14
50.85
47.02
NAME dhr-pd5-c20131
EXPNO 10
PROCNO 1
Data_ 20131211
Time 11.20
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461
FIDRES 0.366798
AQ 1.3631908
RG 2050
DW 20.800
DE 6.50
TE 290.6
D1 2.00000000
D11 0.03000000
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298
NUC1 13C
P1 14.45
SI 32768
SF 100.6127710
WDW EM
SSB 0
LB 1.00
GB 0
PC 1.40
Cl
O
O
N
N
CO2CH3
CO2CH3
2a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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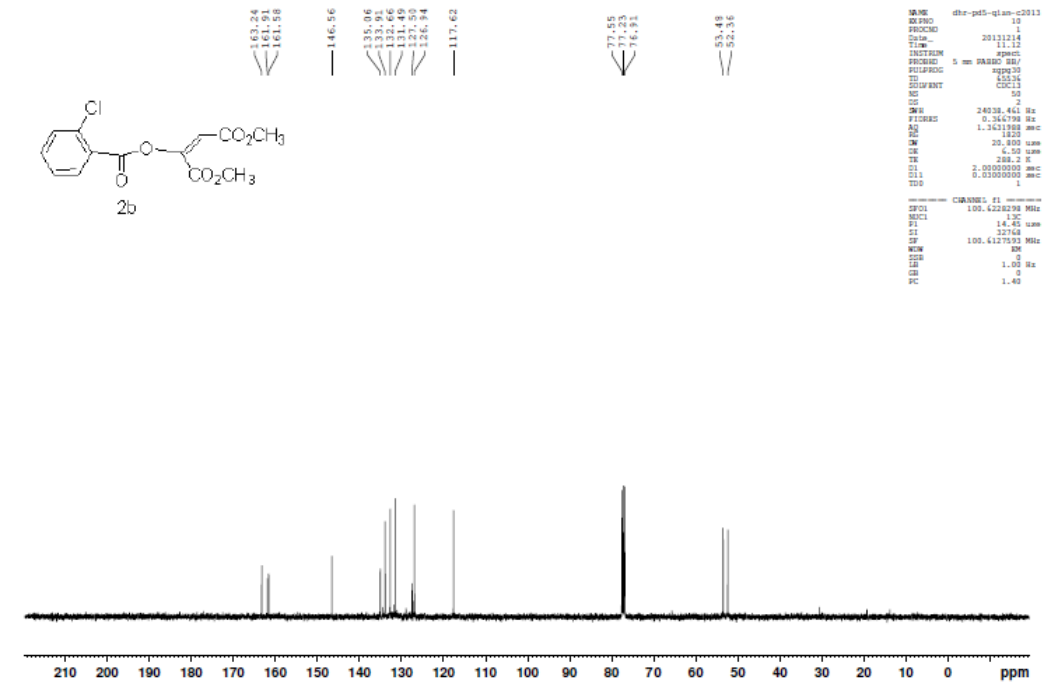
8.140
7.534
7.517
7.515
7.507
7.502
7.402
7.400
7.392
7.384
7.379
7.371
6.810
3.880
3.754
1.000
Cl
CO2CH3
O
O
CO2CH3
2b
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
1.05
2.06
1.28
1.00
3.06
3.00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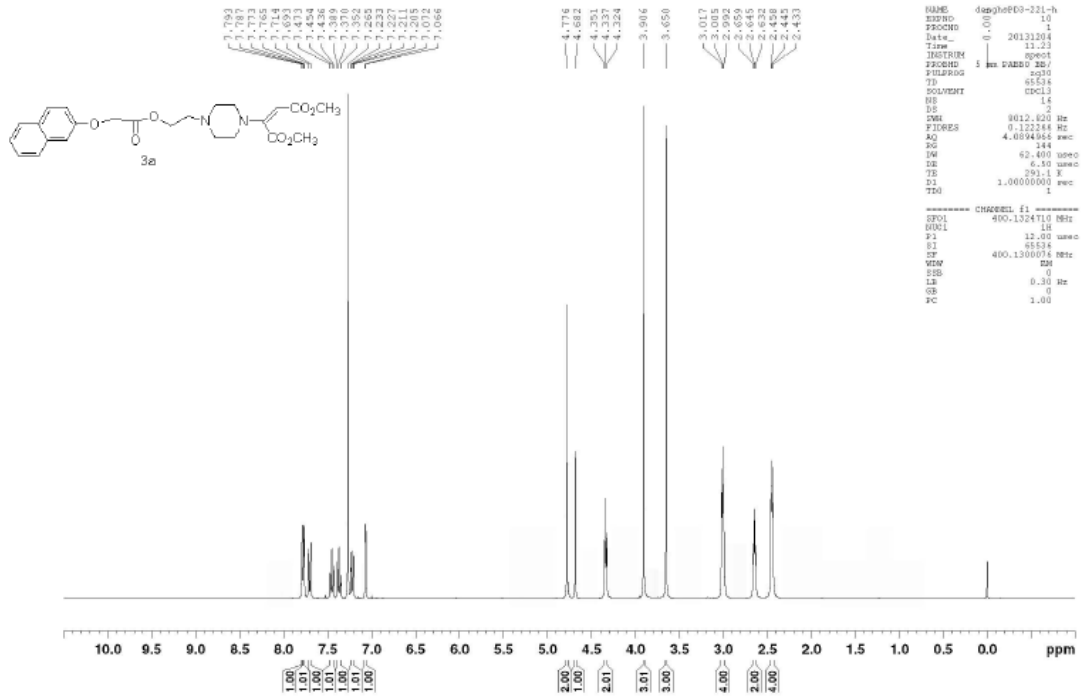
161.58
146.56
135.06
133.81
132.66
131.49
127.53
126.94
117.62
77.55
77.23
76.91
53.48
52.56
Cl
CO2CH3
O
O
CO2CH3
2b
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm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7.783
7.726
7.714
7.693
7.433
7.434
7.408
7.386
7.370
7.352
7.285
7.233
7.227
7.211
7.205
7.072
7.066
4.776
4.682
4.351
4.337
4.324
3.906
3.659
3.017
3.005
2.982
2.659
2.645
2.632
2.498
2.445
2.433
3a
CO2CH3
CO2CH3
NAME dengbe@PD3-221-h
EXPNO 10
PROCNO 1
Date_ 20131204
Time 11.23
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 144
DW 62.400 usec
DE 6.50 usec
TE 291.1 K
D1 1.00000000 sec
TD0 1
CHANNEL f1
SFO1 400.1324710 MHz
NUC1 1H
P1 12.00 usec
SI 65536
SF 400.1300076 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
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 ppm
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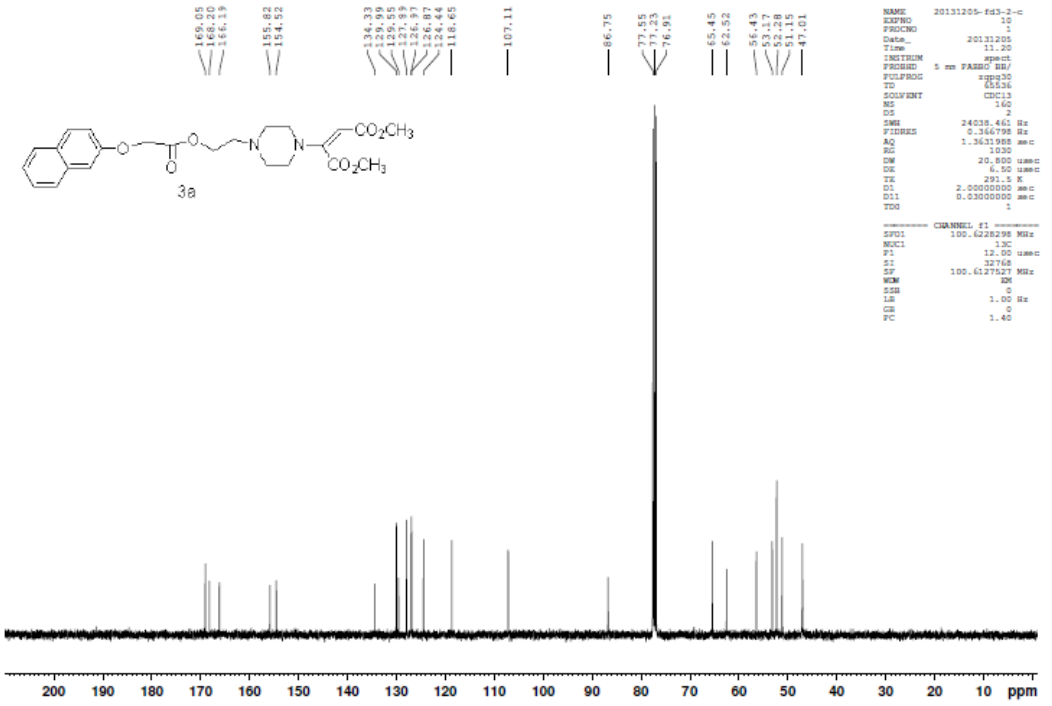
2.00 1.00 2.01 3.01 3.00 4.00 2.00 4.00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168.20
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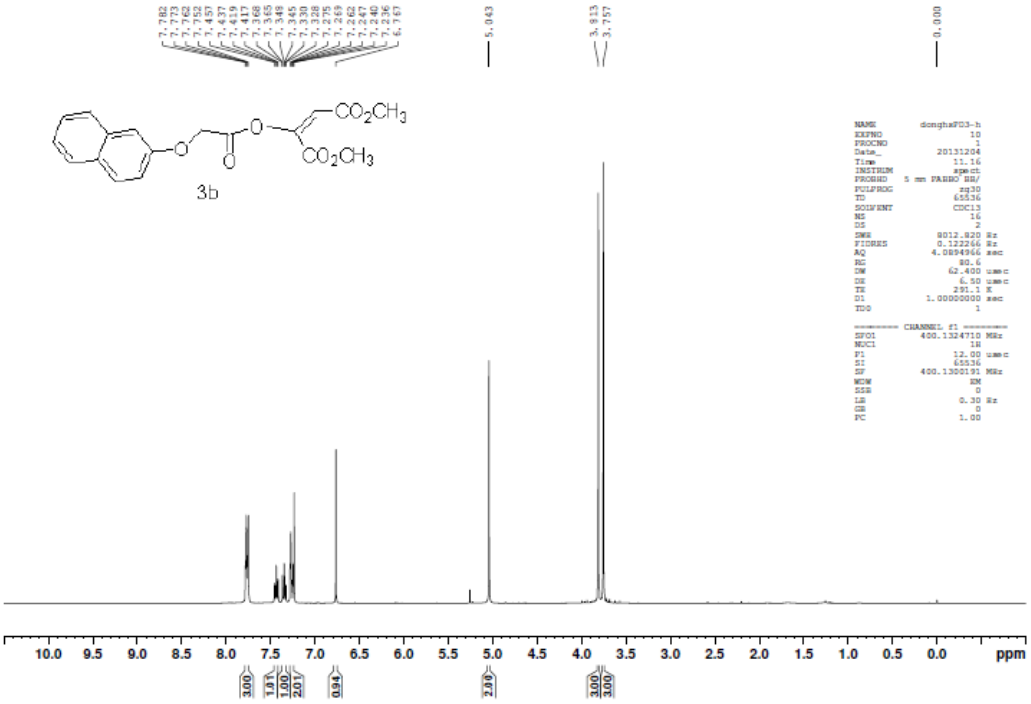
155.82
154.52
134.33
129.99
129.55
128.39
127.87
126.87
124.44
118.65
107.11
86.75
77.55
77.23
76.91
65.45
62.52
56.43
53.17
52.68
51.15
47.01
3a
CO2CH3
CO2CH3
NAME 20131205-fd3-2-c
EXPNO 10
PROCNO 1
Date_ 20131205
Time 11.20
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 160
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 1030
DW 20.800 usec
DE 6.50 usec
TE 291.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
CHANNEL f1
SFO1 100.6228298 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127527 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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7.773
7.762
7.752
7.450
7.437
7.419
7.417
7.368
7.365
7.348
7.345
7.330
7.328
7.275
7.269
7.262
7.257
7.240
7.236
6.767
5.043
3.813
3.757
0.000
3b
NAME donghaFD3-h
EXPNO 10
PROCNO 1
Date_ 20131204
Time 11.16
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 80.6
DW 62.400 usec
DE 6.50 usec
TE 291.1 K
D1 1.00000000 sec
TD0 1
CHANNEL f1
SFO1 400.1324710 MHz
NUC1 1H
P1 12.00 usec
SI 65536
SF 400.1300191 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
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 ppm
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1.00
2.07
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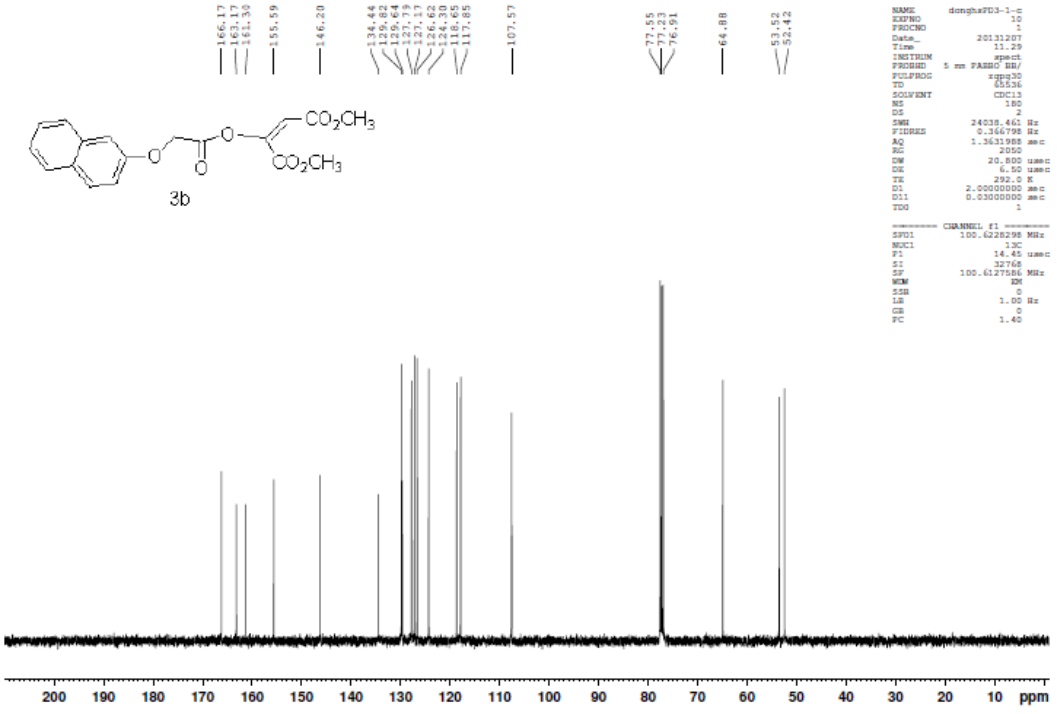
2.00
3.00
3.00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129.82
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127.79
127.17
126.62
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117.85
107.57
77.55
77.23
76.91
64.88
53.52
52.42
3b
NAME donghaFD3-1-c
EXPNO 10
PROCNO 1
Date_ 20131207
Time 11.29
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 180
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 2050
DW 20.800 usec
DE 6.50 usec
TE 292.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
CHANNEL f1
SFO1 100.6228298 MHz
NUC1 13C
P1 14.45 usec
SI 32768
SF 100.6127586 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
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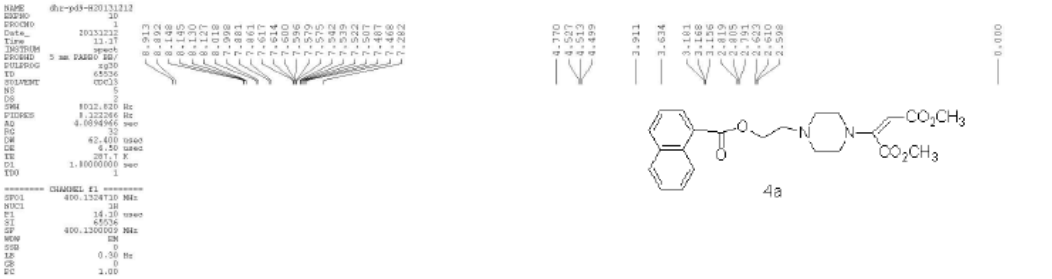
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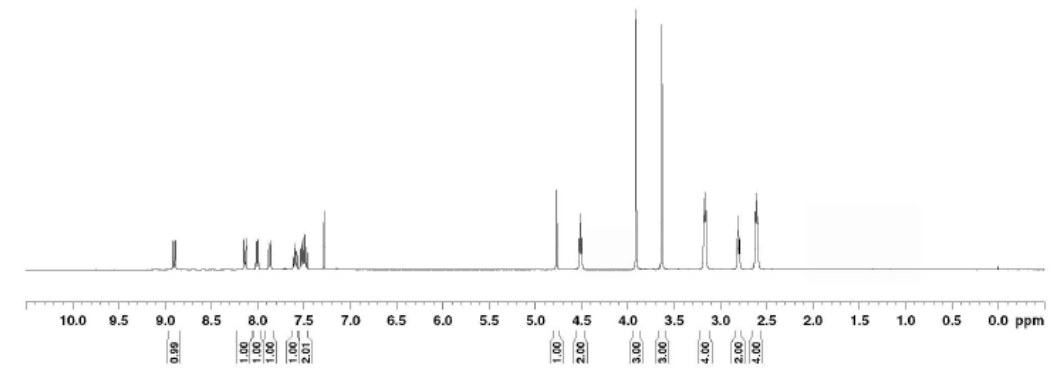
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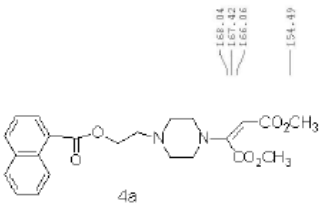
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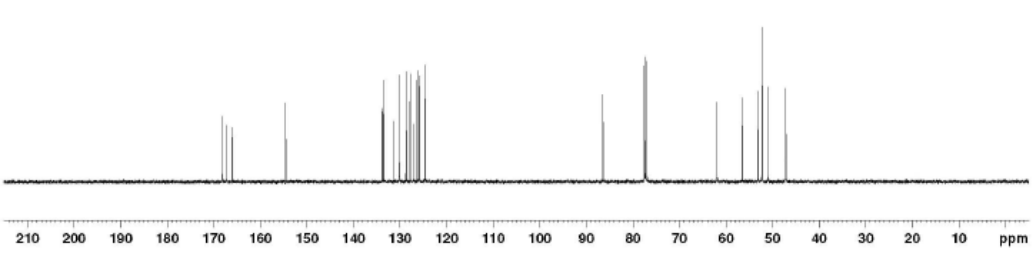
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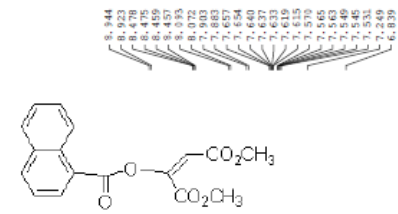

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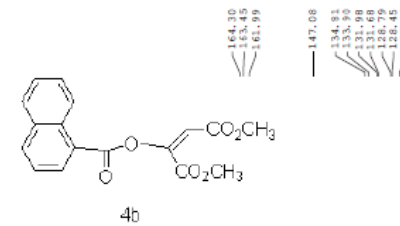

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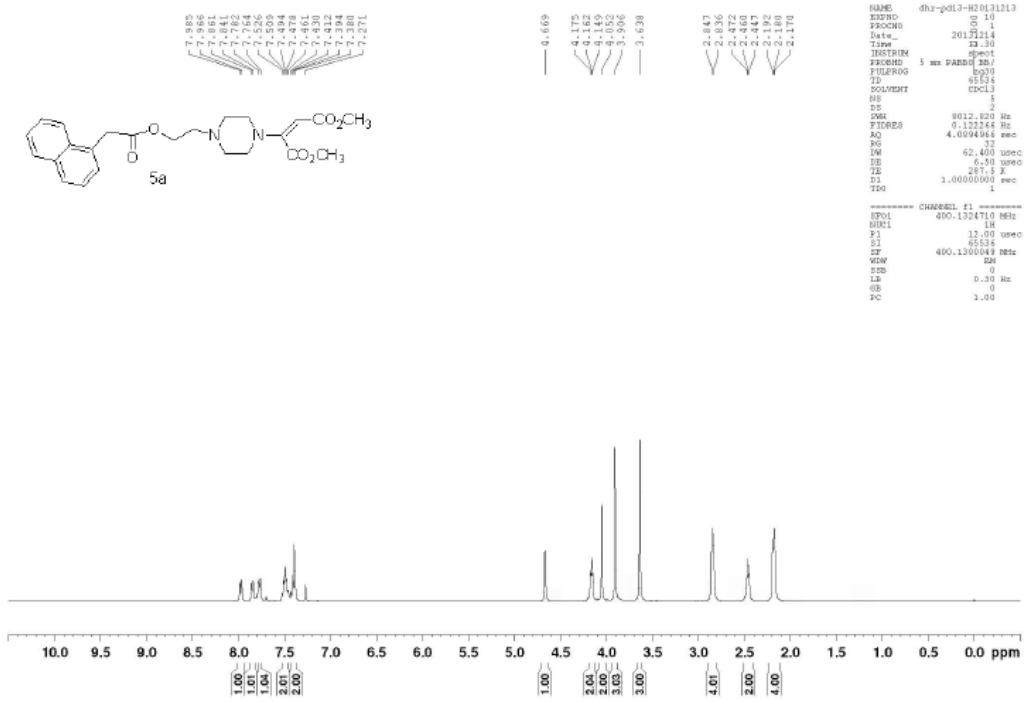
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7.861
7.841
7.782
7.764
7.526
7.509
7.484
7.461
7.430
7.412
7.394
7.380
7.271
4.669
4.175
4.162
4.149
4.052
3.906
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2.461
2.447
2.192
2.180
2.170
CO2CH3
CO2CH3
5a
NAME dhz-pd13-H201312l3
EXPNO 10
PROCNO 1
Date_ 20131214
Time 23.30
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 4
DS 2
SWH 9012.820 Hz
FIDRES 0.122244 Hz
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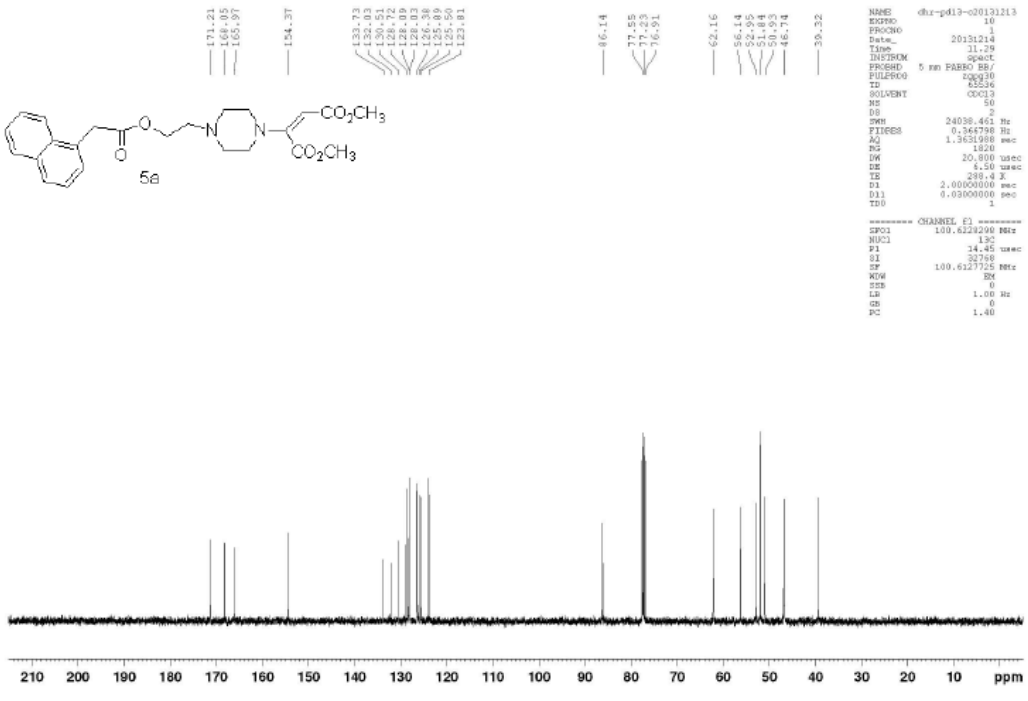
RG 32
DW 62.400 usec
DE 6.50 usec
TE 287.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 12.00 usec
PL1 65536
SF 400.1300049 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
1.00 1.01 1.04 2.01 2.00
1.00
2.04 2.00 3.03
3.00
4.01
2.00
4.00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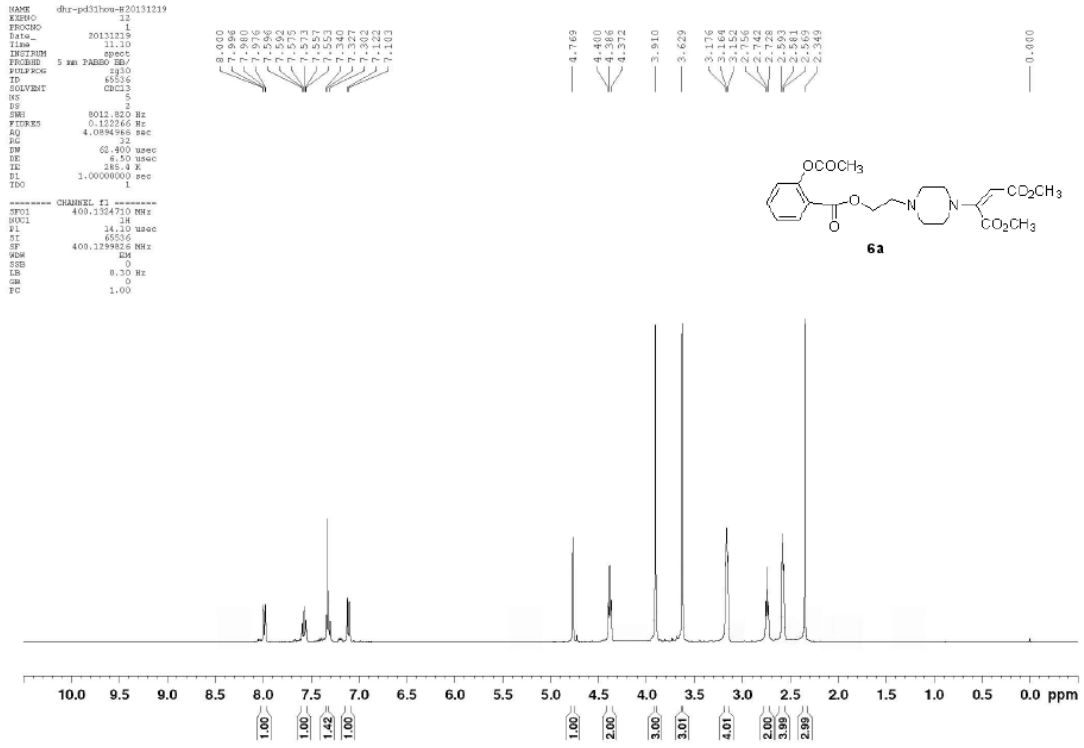
165.97
154.37
133.73
133.03
130.51
128.72
128.09
128.03
126.38
125.80
125.50
123.81
86.14
77.55
77.23
76.91
62.16
56.14
52.95
51.84
51.05
48.74
39.32
CO2CH3
CO2CH3
5a
NAME dhz-pd13-c20131213
EXPNO 10
PROCNO 1
Date_ 20131214
Time 21.29
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 1820
DW 20.800 usec
DE 6.50 usec
TE 298.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6232290 MHz
NUC1 13C
P1 14.45 usec
PL1 32768
SF 100.6127725 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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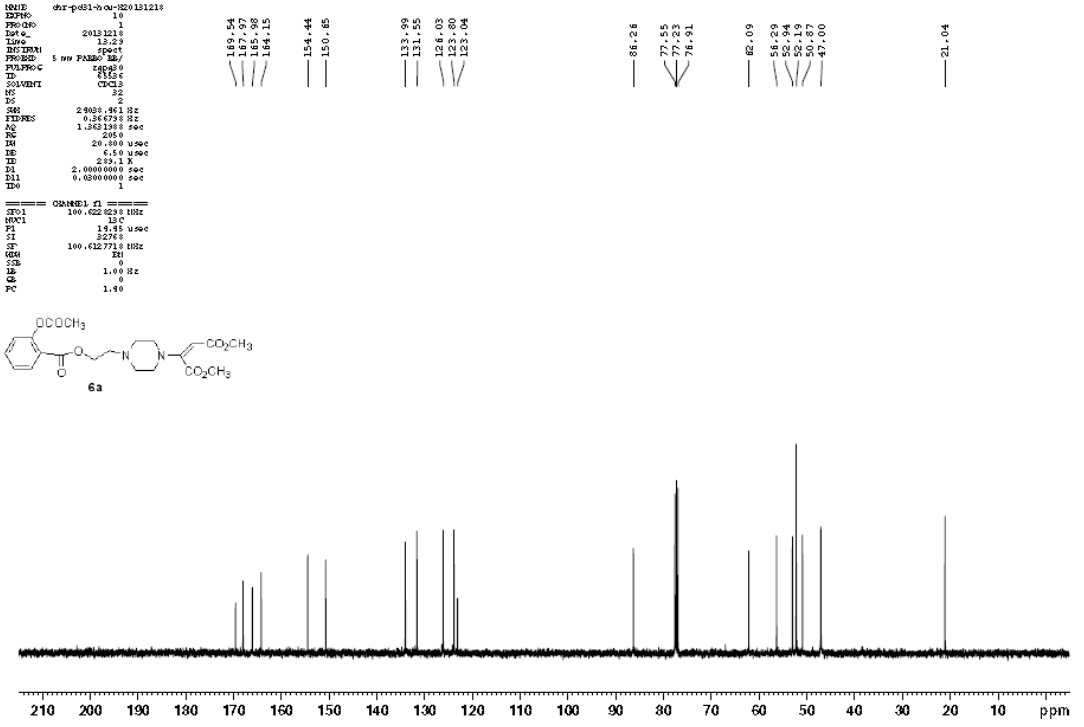
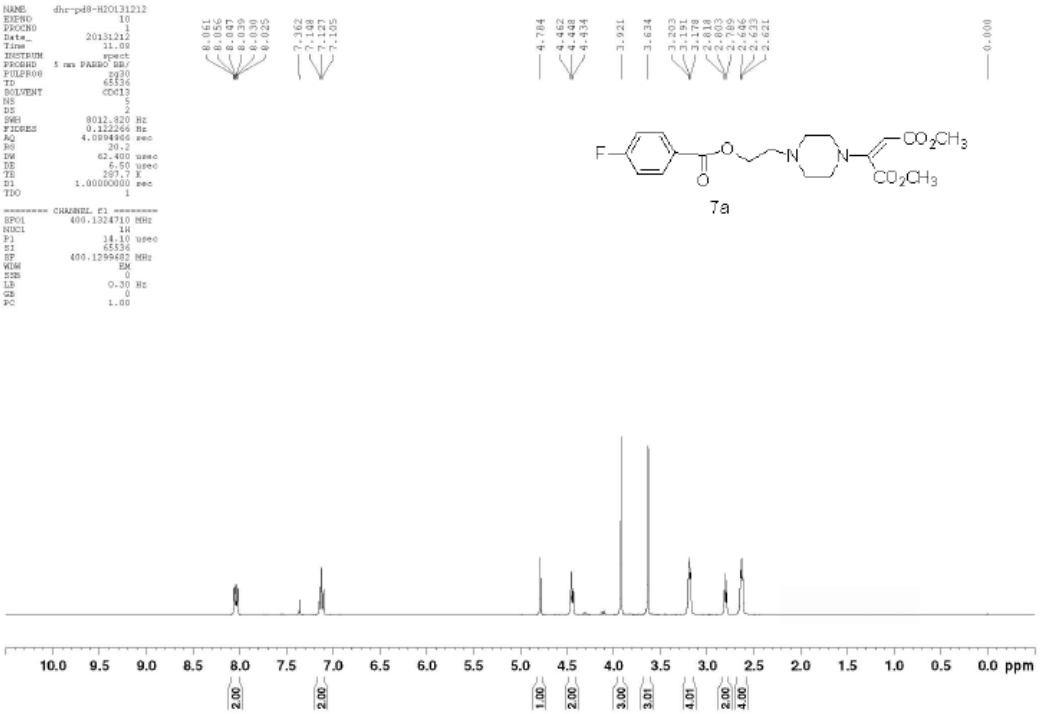
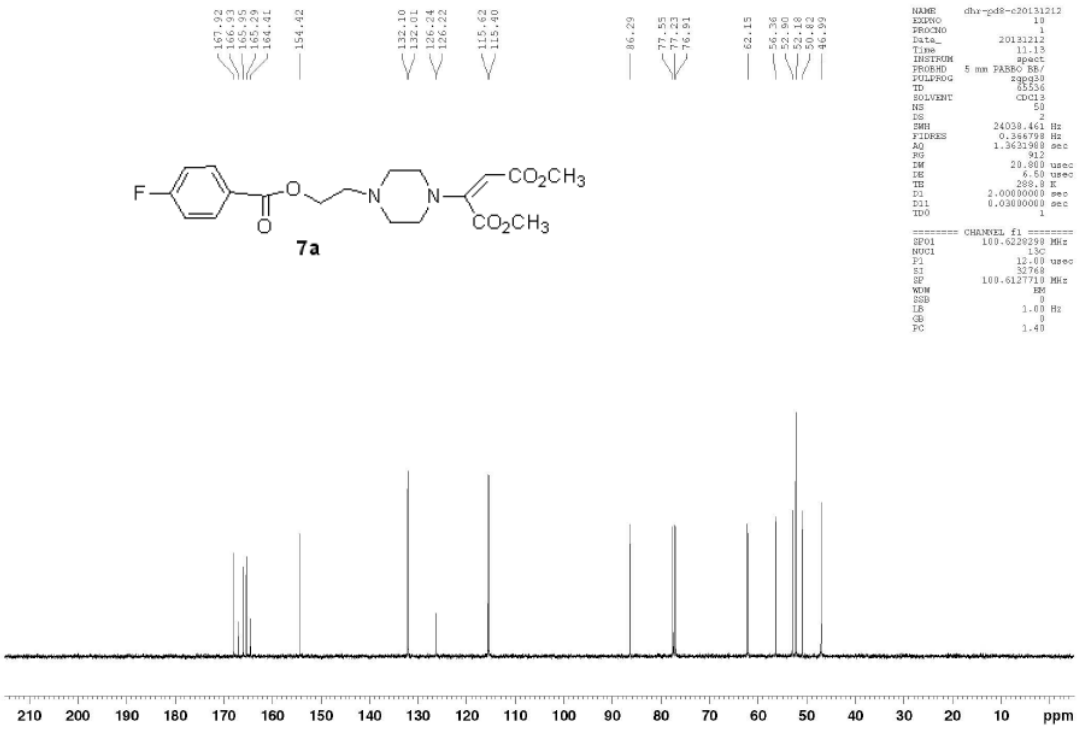
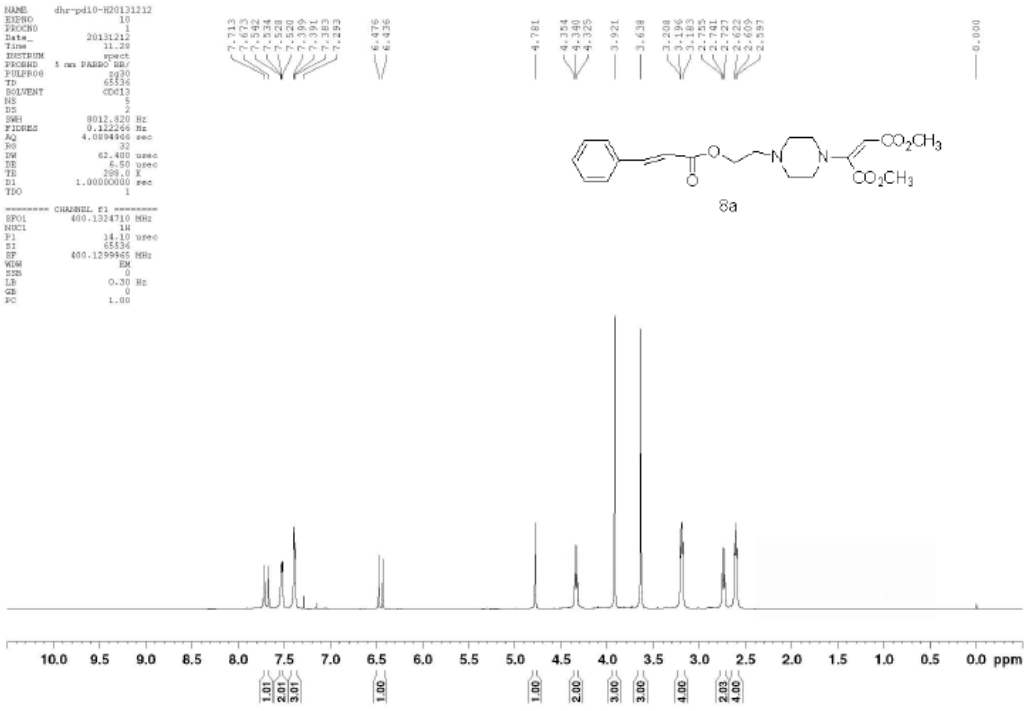
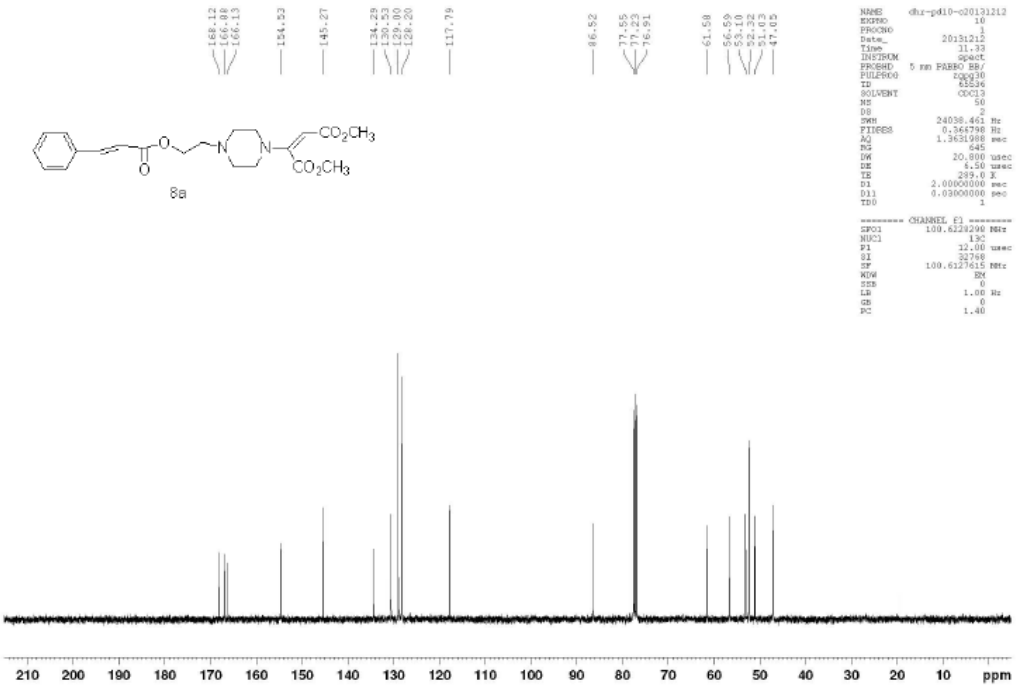
7.327
7.302
7.122
7.103
4.769
4.400
4.386
4.372
3.910
3.629
3.176
3.164
3.152
2.756
2.742
2.728
2.693
2.681
2.563
2.349
0.000
OCOCH3
CO2CH3
CO2CH3
6a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
1.00 1.00 1.42 1.00 1.00 2.00 3.00 3.01 4.01 2.00 3.99 2.99

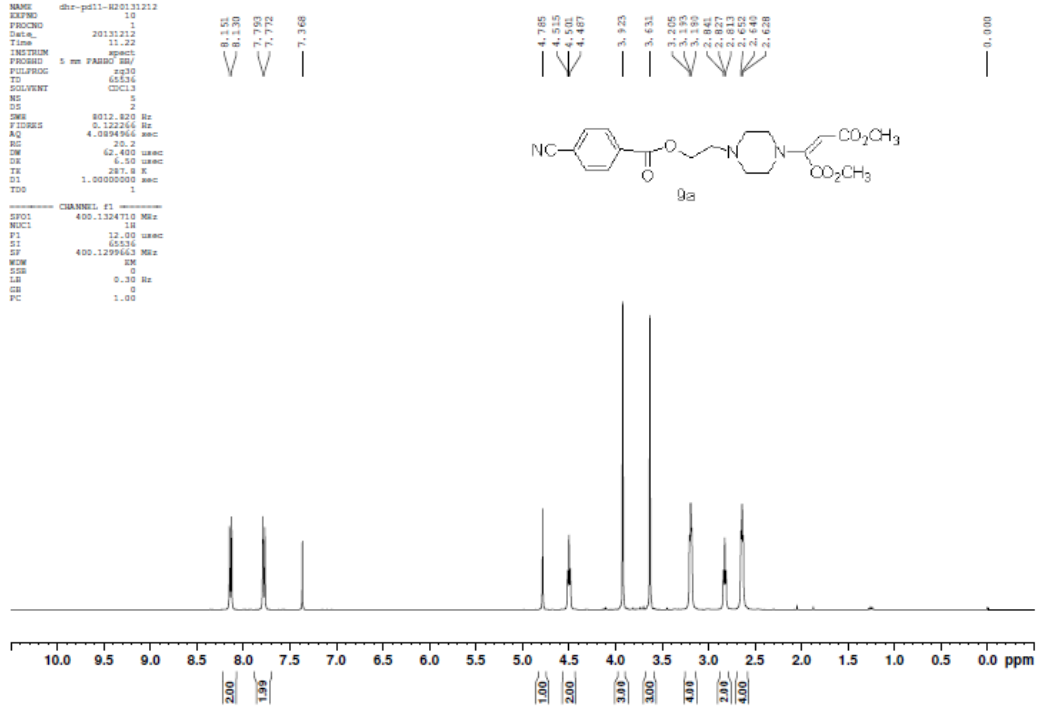

NAME dhr-pd31-how-H20131218
169.54
167.97
165.98
164.15
154.44
150.85
133.99
131.55
126.03
123.80
123.04
86.26
77.55
77.23
76.91
62.09
56.29
52.94
52.19
50.87
47.00
21.04
OCOCH3
CO2CH3
CO2CH3
6a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

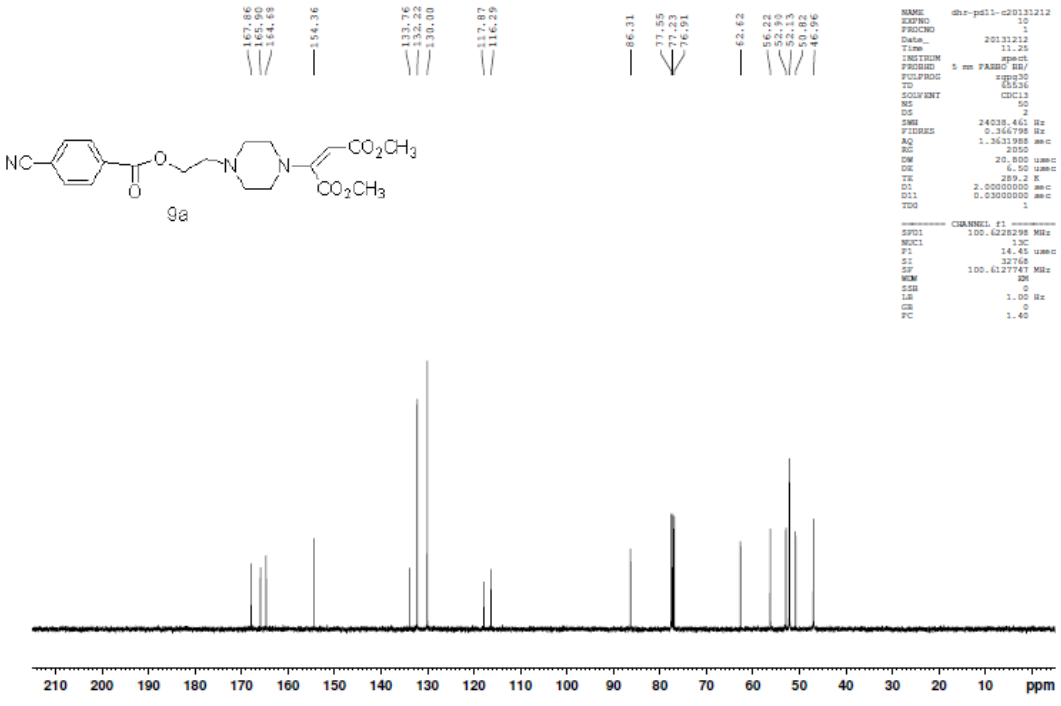

NAME dhr-pd8-H20131212
EXPNO 10
PROCNO 1
Date_ 20131212
Time 11.08
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 20.2
DW 62.400 usec
DE 6.50 usec
TE 297.7 K
D1 1.00000000 sec
TDO 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1299482 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
8.061
8.056
8.047
8.039
8.030
8.025
7.362
7.148
7.127
7.105
4.784
4.462
4.448
4.434
3.921
3.634
3.203
3.191
3.178
2.818
2.803
2.789
2.646
2.633
2.621
0.000
F
O
O
N
N
CO2CH3
CO2CH3
7a
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
2.00
2.00
1.00
2.00
3.00
3.01
4.01
2.00
4.00

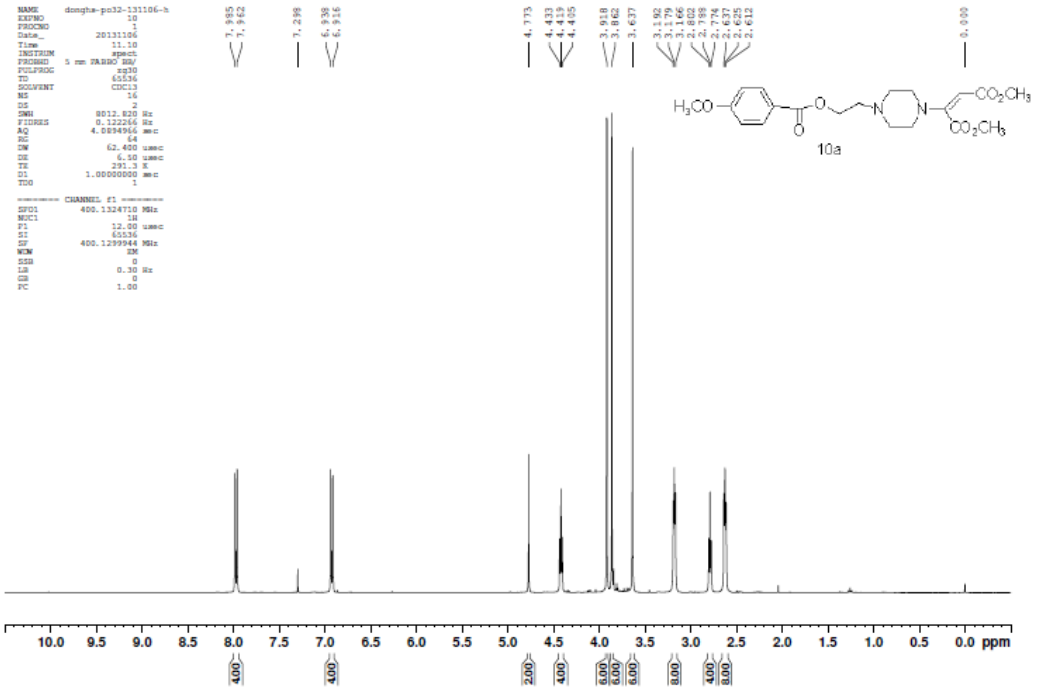

167.92
166.93
165.95
165.29
164.41
154.42
132.10
132.01
126.24
126.22
115.62
115.40
86.29
77.55
77.23
76.91
62.15
56.36
52.90
52.18
50.42
46.99
NAME dhr-pd8-c20131212
EXPNO 10
PROCNO 1
Date_ 20131212
Time 11.13
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631968 sec
RG 912
DW 20.800 usec
DE 6.50 usec
TE 280.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TDO 1
======== CHANNEL f1 ========
SFO1 100.6230298 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127710 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
F
O
O
N
N
CO2CH3
CO2CH3
7a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

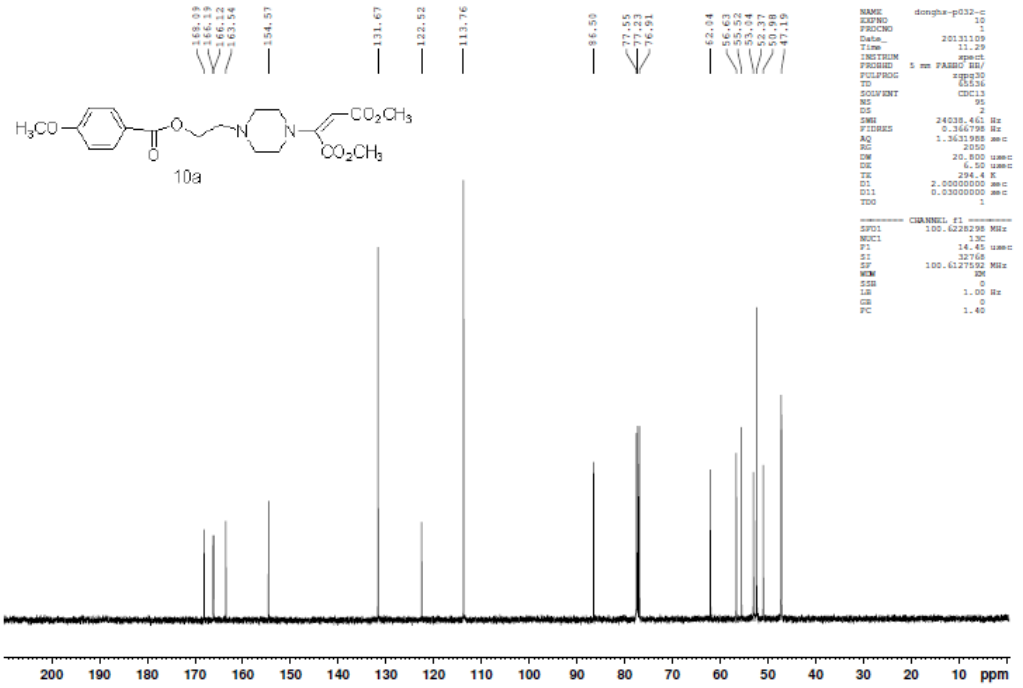

NAME dhr-pd10-H20131212
EXPNO 10
PROCNO 1
Date_ 20131212
Time 11.20
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPRO0 zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 8012.820 Hz
FIDRES 0.122296 Hz
AQ 4.0894966 sec
RG 32
DW 62.400 usec
DE 6.50 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1299965 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.713
7.673
7.542
7.534
7.524
7.520
7.399
7.391
7.383
7.293
6.476
6.436
4.781
4.354
4.340
4.325
3.921
3.638
3.208
3.196
3.183
3.035
2.741
2.727
2.622
2.609
2.597
0.000
8a
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
1.01
2.01
2.01
1.00
1.00
2.00
3.00
3.00
4.00
2.03
4.00

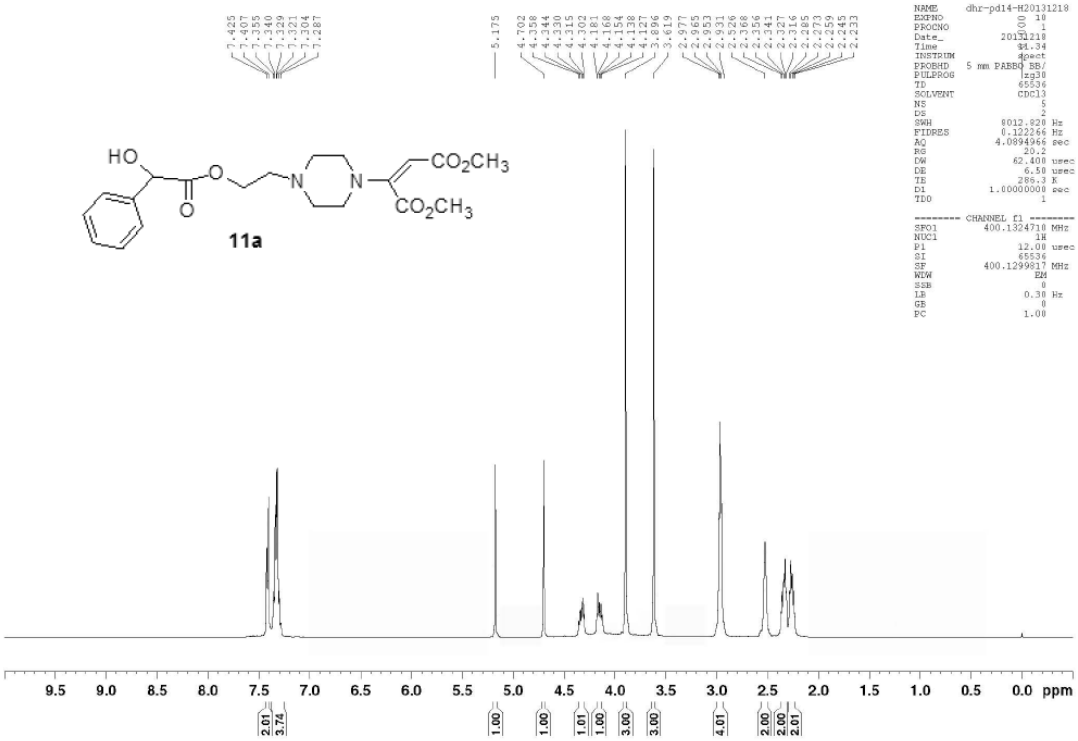

168.12
166.08
166.13
154.53
145.27
134.29
130.53
129.00
128.20
117.79
86.52
77.55
77.23
76.91
61.58
56.59
53.10
52.32
51.03
47.05
8a
NAME dhr-pd10-c20131212
EXPNO 10
PROCNO 1
Date_ 20131212
Time 11.33
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPRO0 zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 645
DW 20.800 usec
DE 6.50 usec
TE 289.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228296 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127615 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

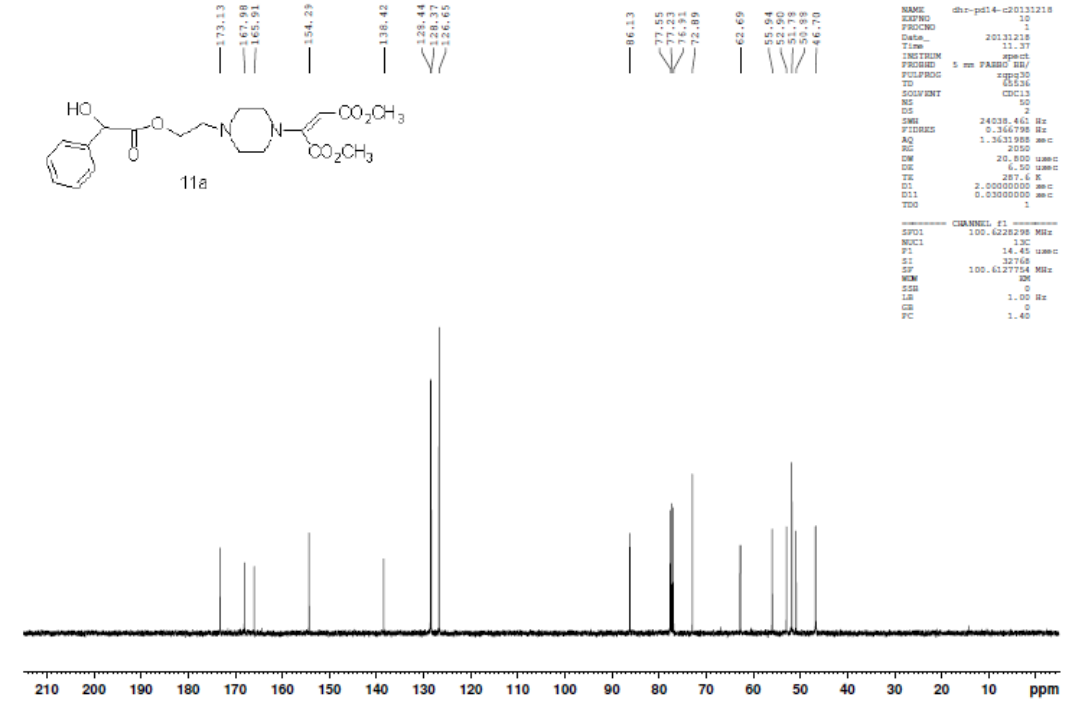

NAME dhr-pd11-H20131212
EXPNO 10
PROCNO 1
Date_ 20131212
Time 11.22
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 20.2
DW 62.400 usec
DE 6.50 usec
TE 287.8 K
D1 1.00000000 sec
TD0 1
CHANNEL f1
SFO1 400.1324710 MHz
NUC1 1H
P1 12.00 usec
SI 65536
SF 400.1299663 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
8.151
8.130
7.793
7.772
7.368
4.785
4.515
4.501
4.487
3.925
3.631
3.205
3.193
3.180
2.841
2.827
2.813
2.652
2.640
2.628
0.000
NC
O
O
N
N
CO2CH3
CO2CH3
9a
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
2.00
1.99
1.00
2.00
3.00
3.00
4.00
2.00
4.00

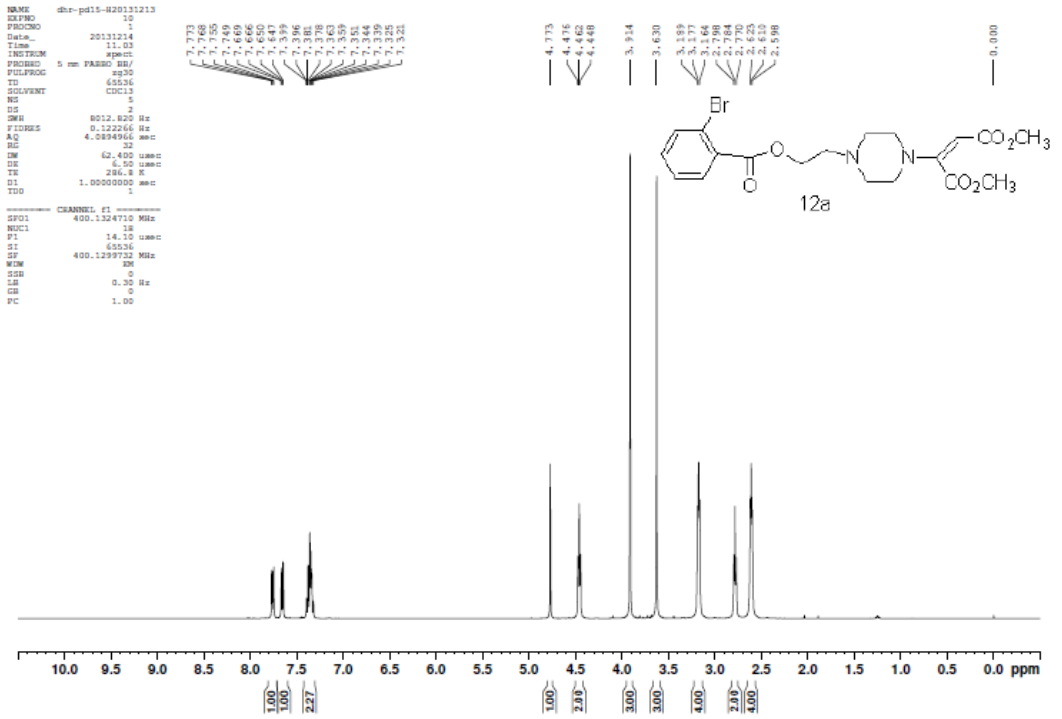

167.66
165.90
164.68
154.36
133.76
132.22
130.00
117.97
116.29
86.31
77.55
77.23
76.91
62.62
56.22
52.90
52.13
50.82
46.96
NC
O
O
N
N
CO2CH3
CO2CH3
9a
NAME dhr-pd11-c20131212
EXPNO 10
PROCNO 1
Date_ 20131212
Time 11.25
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 2050
DW 20.800 usec
DE 6.50 usec
TE 289.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
CHANNEL f1
SFO1 100.6228298 MHz
NUC1 13C
P1 14.45 usec
SI 32768
SF 100.6127747 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

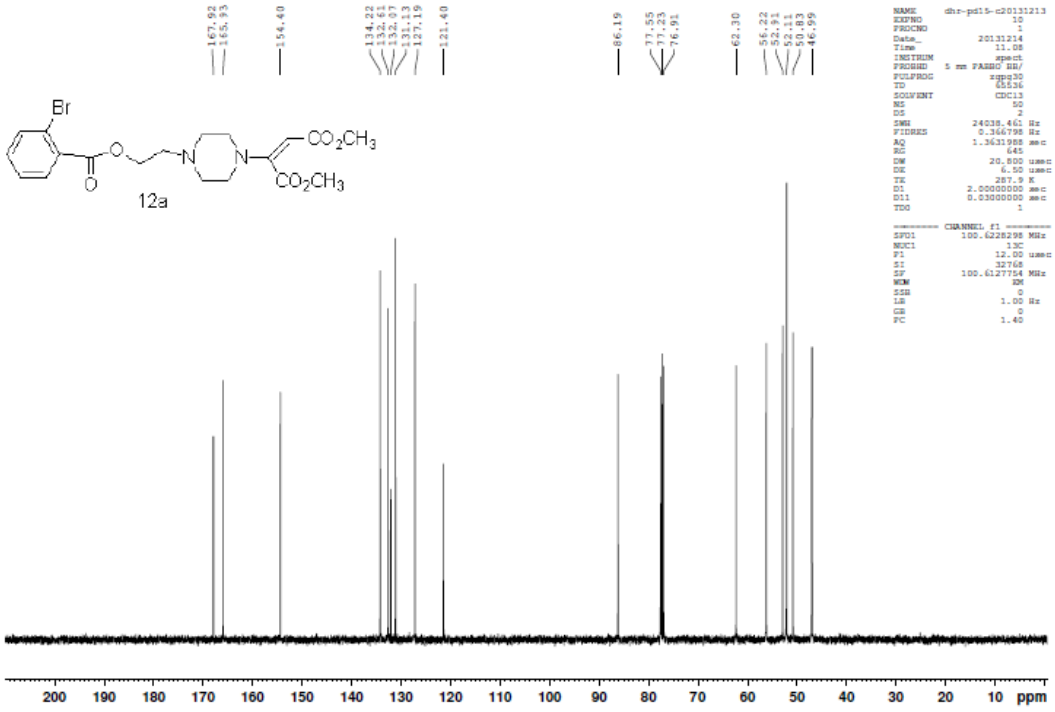

10a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm

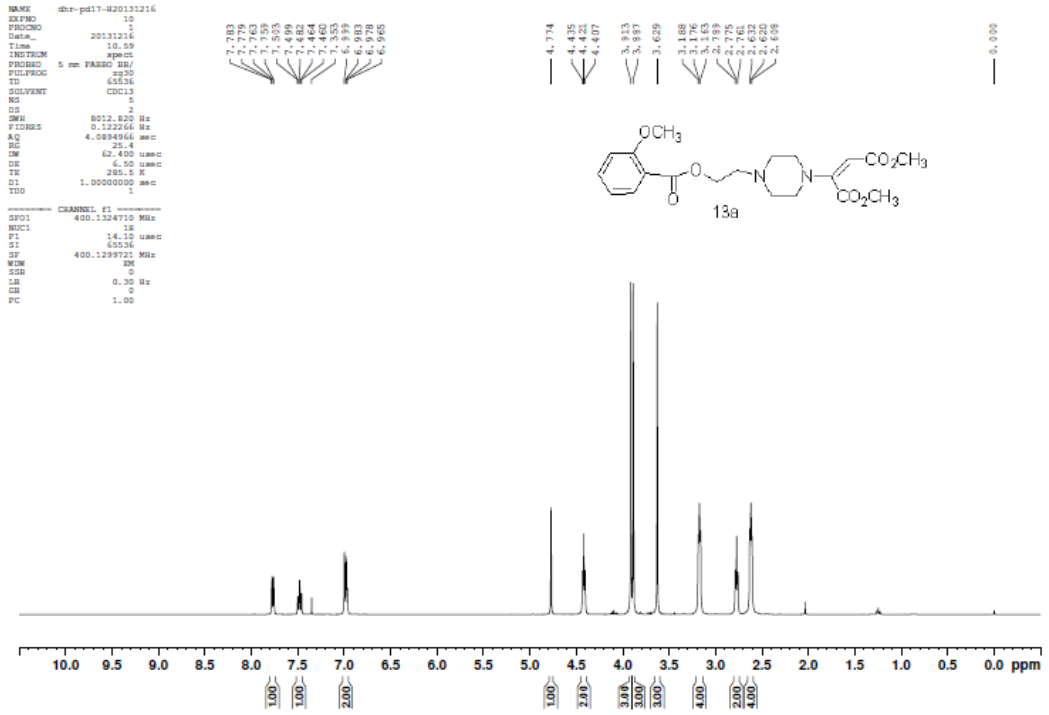

10a
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

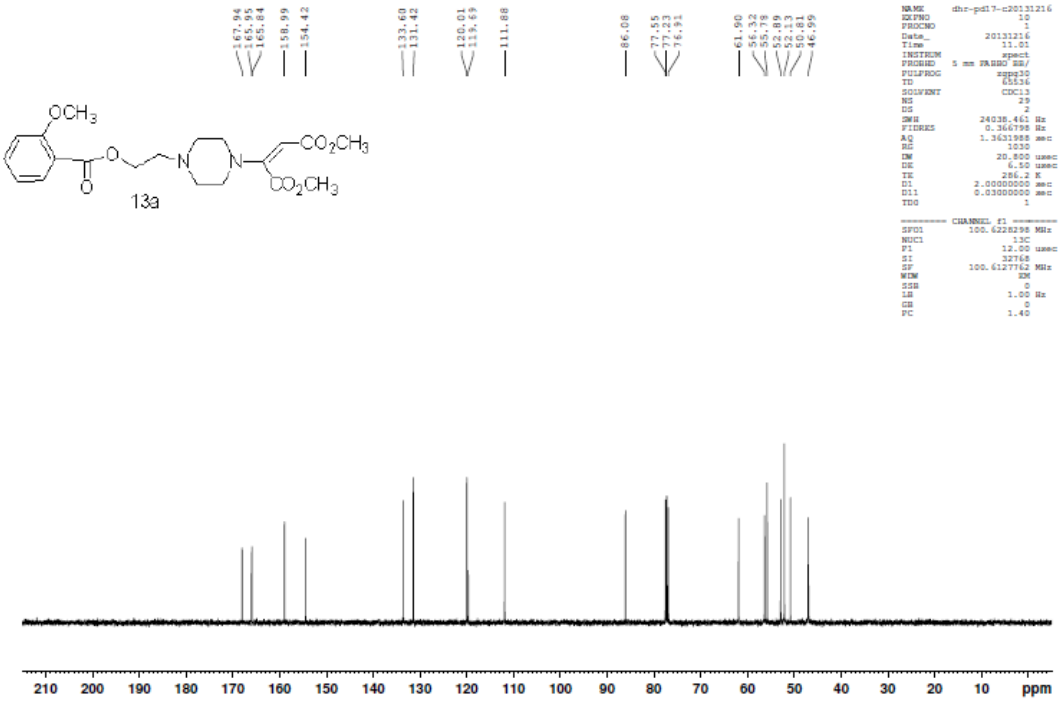

11a
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm

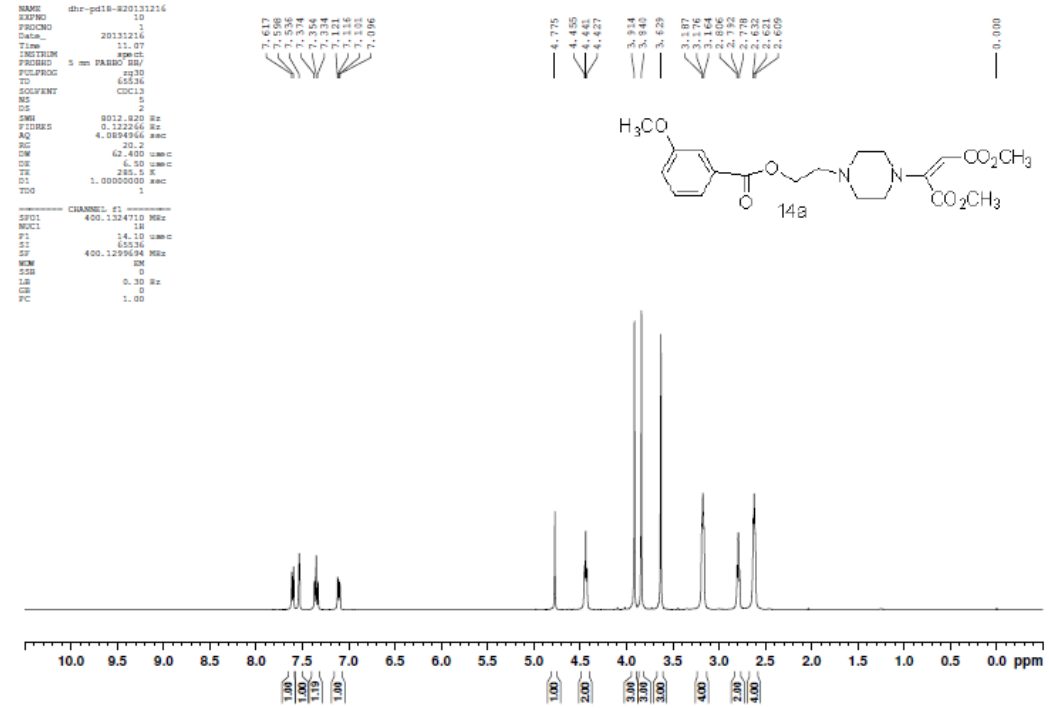

11a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

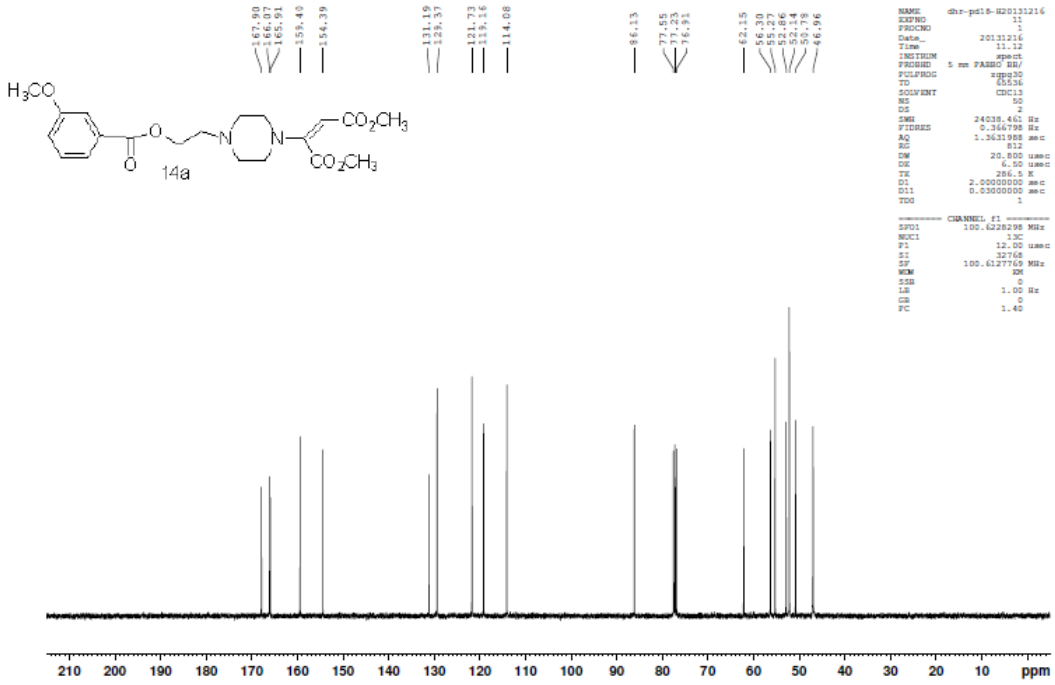

7.773
7.768
7.755
7.749
7.669
7.666
7.650
7.647
7.399
7.396
7.381
7.378
7.360
7.359
7.351
7.344
7.339
7.335
7.321
4.773
4.476
4.462
4.448
3.914
3.630
3.199
3.177
3.164
2.798
2.784
2.770
2.625
2.610
2.598
0.000
Br
O
O
N
N
CO2CH3
CO2CH3
12a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
1.00
1.00
2.27
1.00
2.10
3.00
3.00
4.00
2.10
4.00

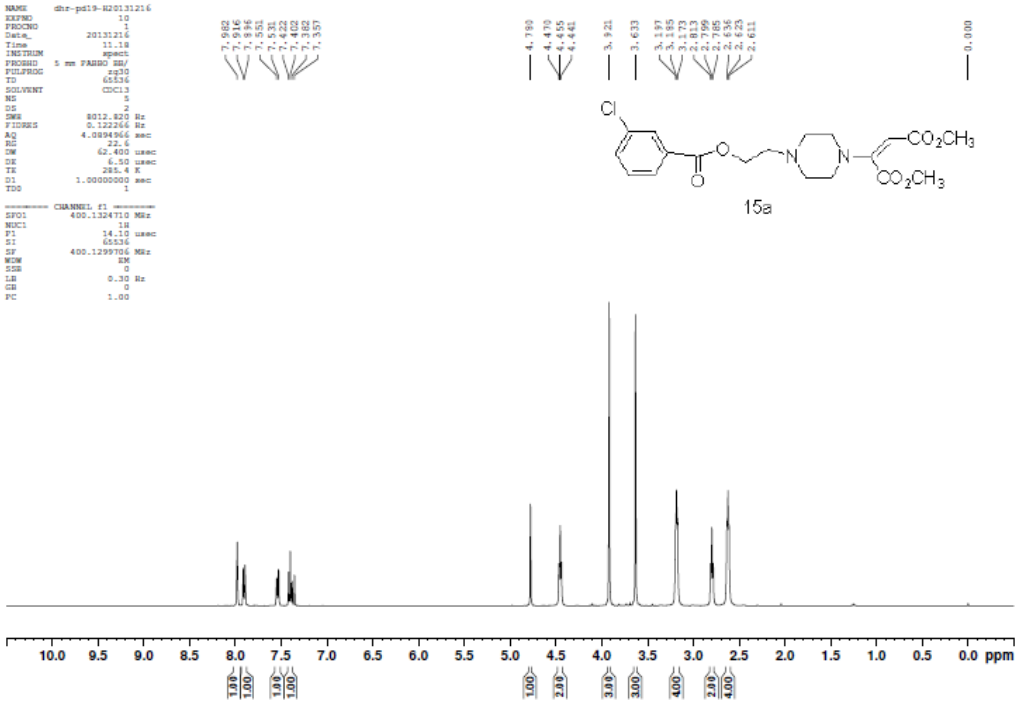

167.92
165.93
154.40
134.22
132.61
132.07
131.13
127.19
121.40
86.19
77.55
77.23
76.91
62.30
56.22
52.91
52.11
50.83
46.99
Br
O
O
N
N
CO2CH3
CO2CH3
12a
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

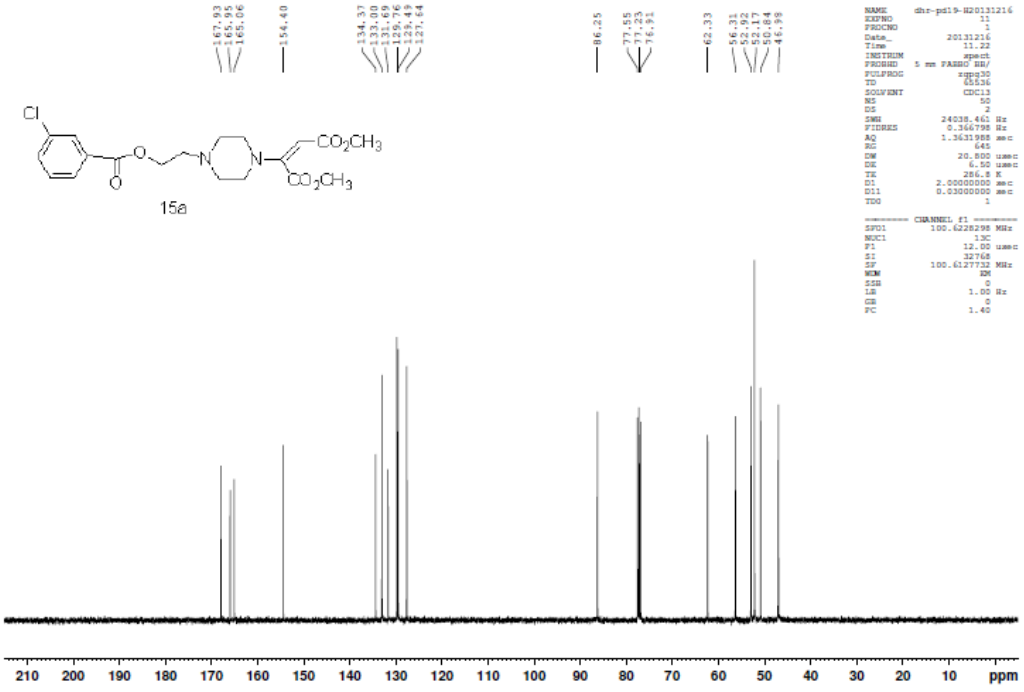

NAME dhr-pd17-H20131216
EXPNO 10
PROCNO 1
Date_ 20131216
Time 10.59
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 25.4
DW 62.400 usec
DE 6.50 usec
TE 285.5 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1299721 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.783
7.779
7.763
7.539
7.535
7.499
7.482
7.464
7.460
7.335
7.319
6.983
6.978
6.965
4.774
4.435
4.422
4.407
3.913
3.897
3.629
3.188
3.176
3.163
2.799
2.775
2.761
2.633
2.620
2.609
0.000
OCH3
CO2CH3
CO2CH3
13a
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
1.00
1.00
2.00
1.00
2.10
3.06
3.00
3.00
4.00
2.00
4.00

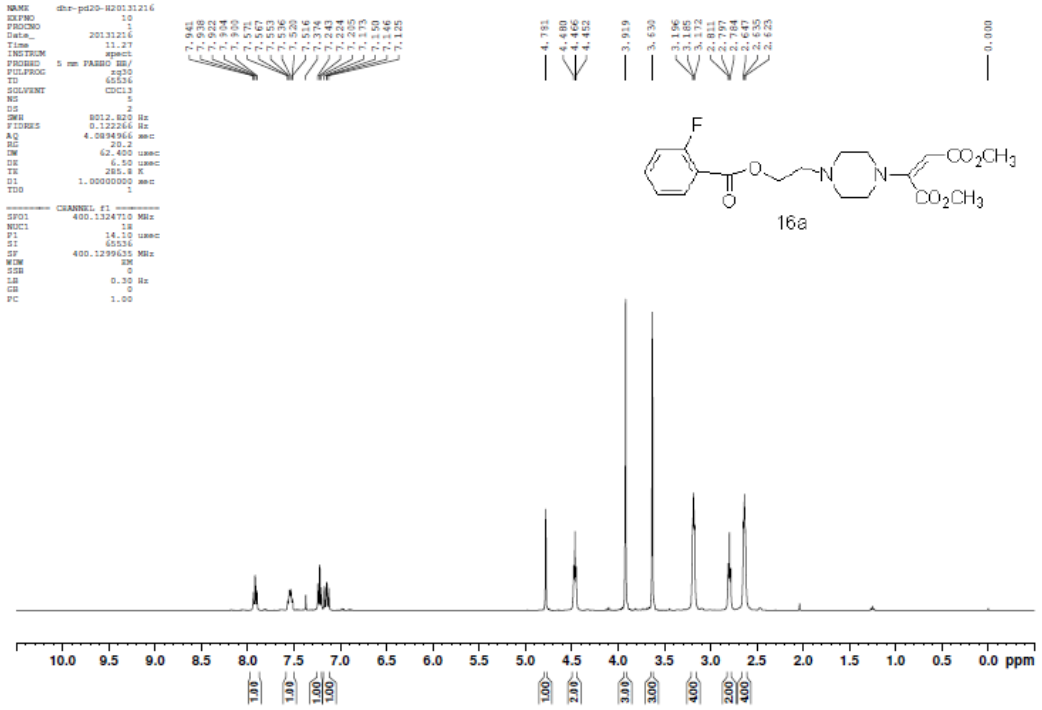

167.96
165.95
165.84
158.99
154.42
133.60
131.42
120.01
119.69
111.88
86.08
77.55
77.23
76.91
61.90
56.32
55.79
52.89
52.13
50.81
46.99
NAME dhr-pd17-c20131216
EXPNO 10
PROCNO 1
Date_ 20131216
Time 11.01
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 29
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 1030
DW 20.800 usec
DE 6.50 usec
TE 286.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127762 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
OCH3
CO2CH3
CO2CH3
13a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

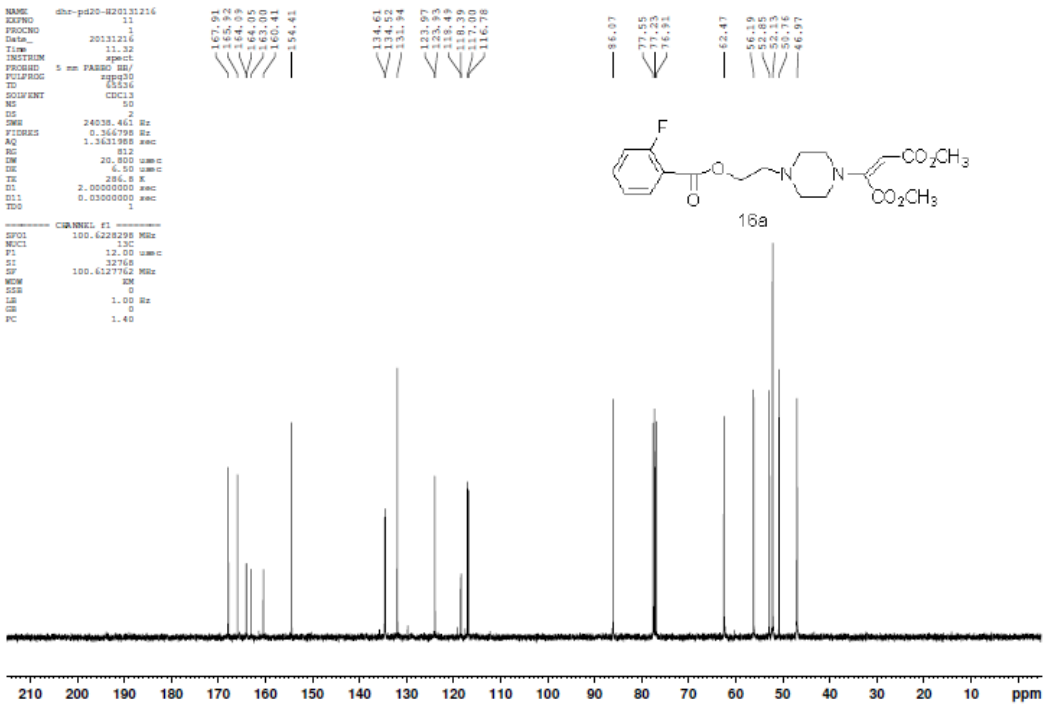

14a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm

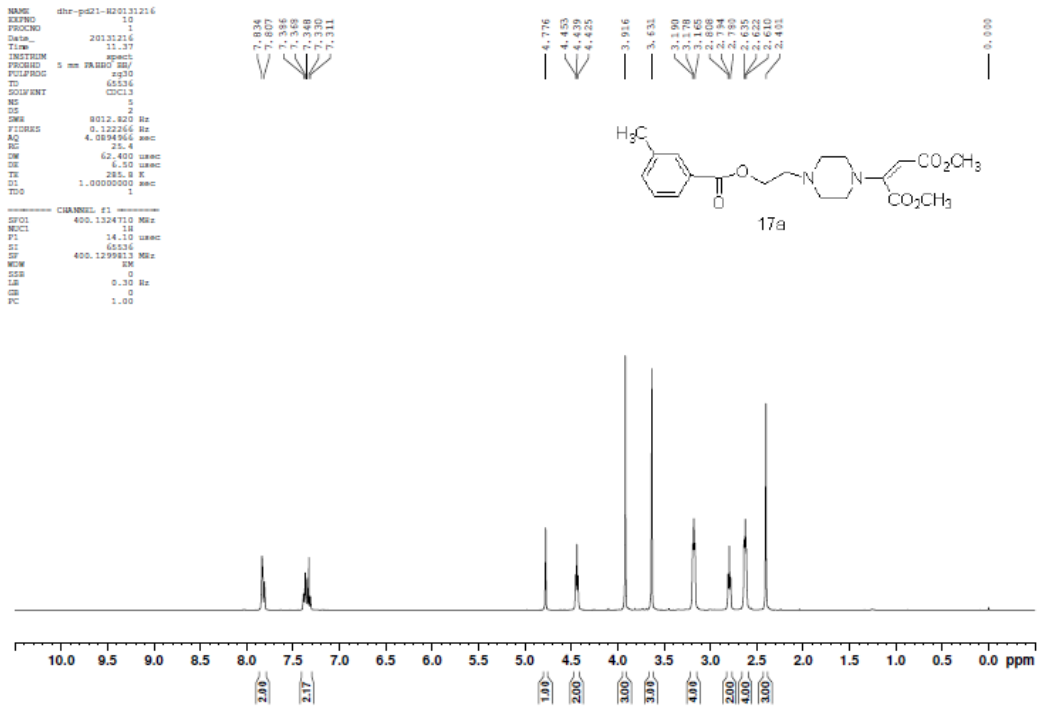

14a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

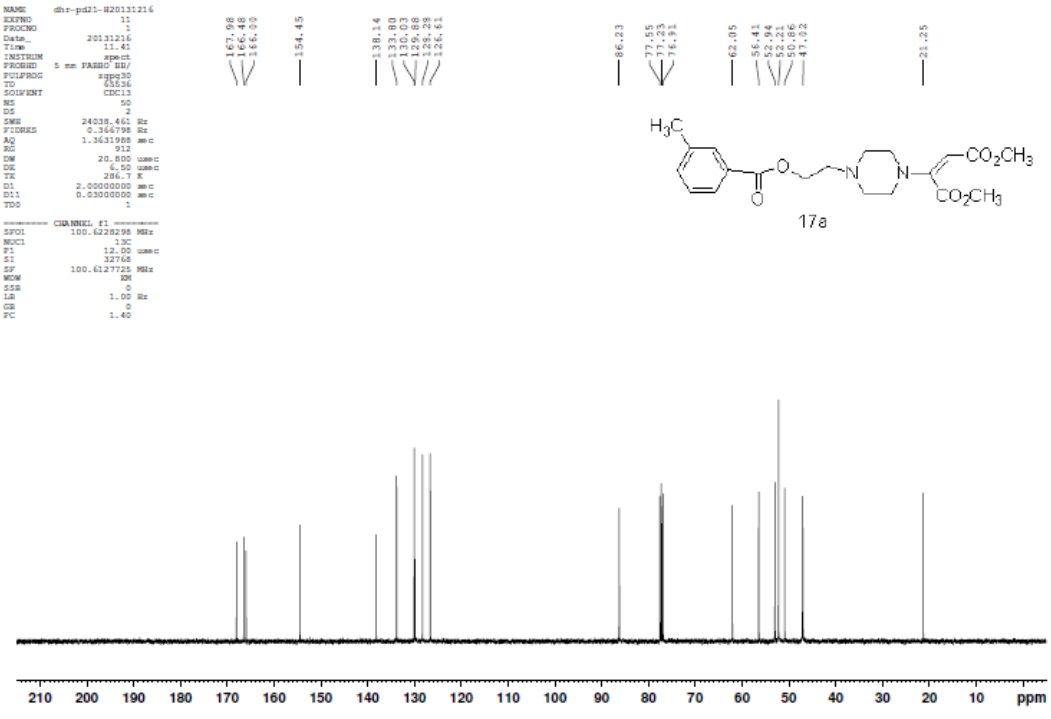

NAME dhr-pd19-H20131216
EXPNO 10
PROCNO 1
Date_ 20131216
Time 11.18
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 22.6
DW 62.400 usec
DE 6.50 usec
TE 285.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1299706 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.982
7.916
7.896
7.531
7.422
7.402
7.382
7.357
4.799
4.473
4.455
4.441
3.921
3.633
3.197
3.185
3.173
2.969
2.789
2.785
2.636
2.625
2.611
0.000
Cl
O
O
N
N
CO2CH3
CO2CH3
15a
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
1.00 1.00 1.00 1.00 1.00 2.00 3.00 3.00 4.00 2.00 4.00

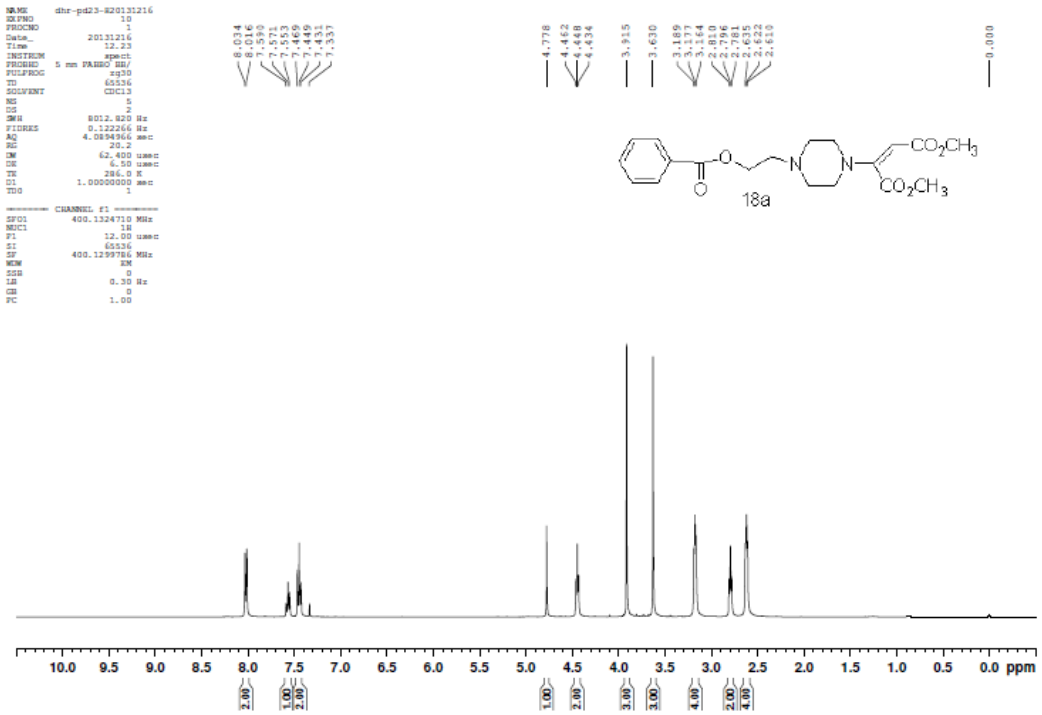

167.93
165.95
165.06
154.40
134.37
133.00
131.69
129.76
129.49
121.64
86.25
77.55
77.23
76.91
62.33
56.31
52.92
52.77
50.84
46.98
NAME dhr-pd19-H20131216
EXPNO 11
PROCNO 1
Date_ 20131216
Time 11.22
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 645
DW 20.800 usec
DE 6.50 usec
TE 286.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127732 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
Cl
O
O
N
N
CO2CH3
CO2CH3
15a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

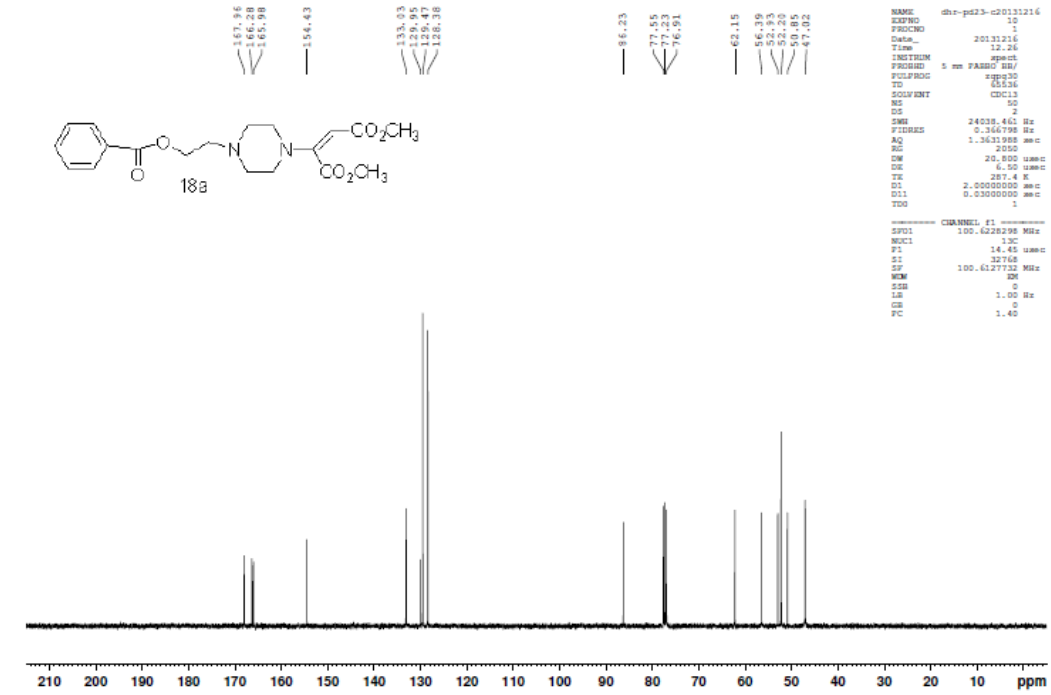

F
O
O
N
N
CO_2CH_3
CO_2CH_3
16a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm

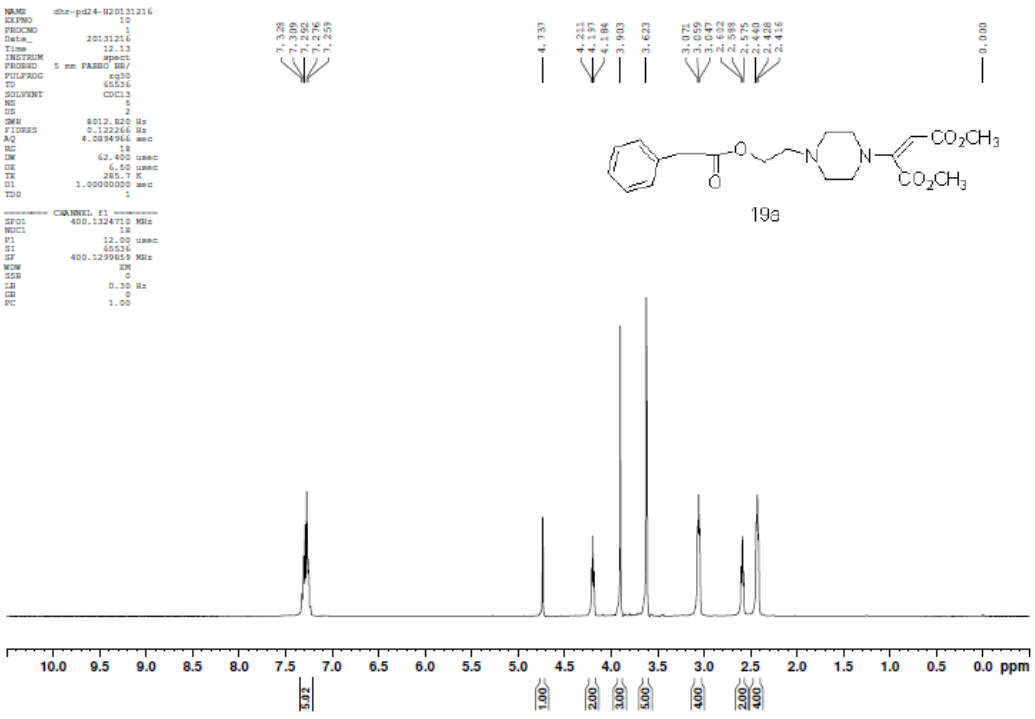

F
O
O
N
N
CO_2CH_3
CO_2CH_3
16a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

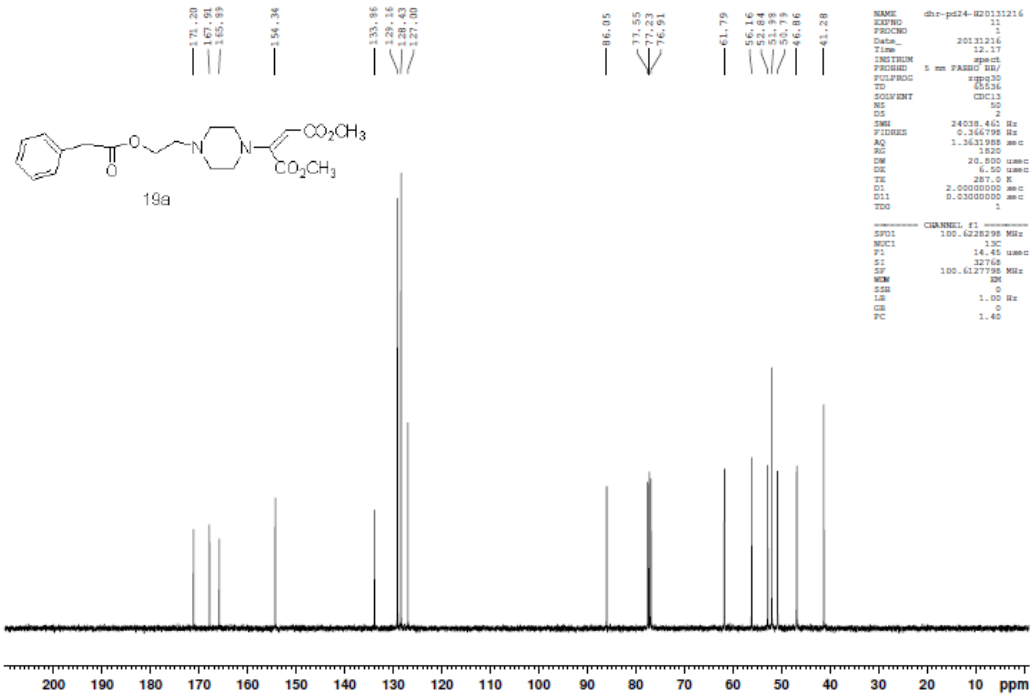

17a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm

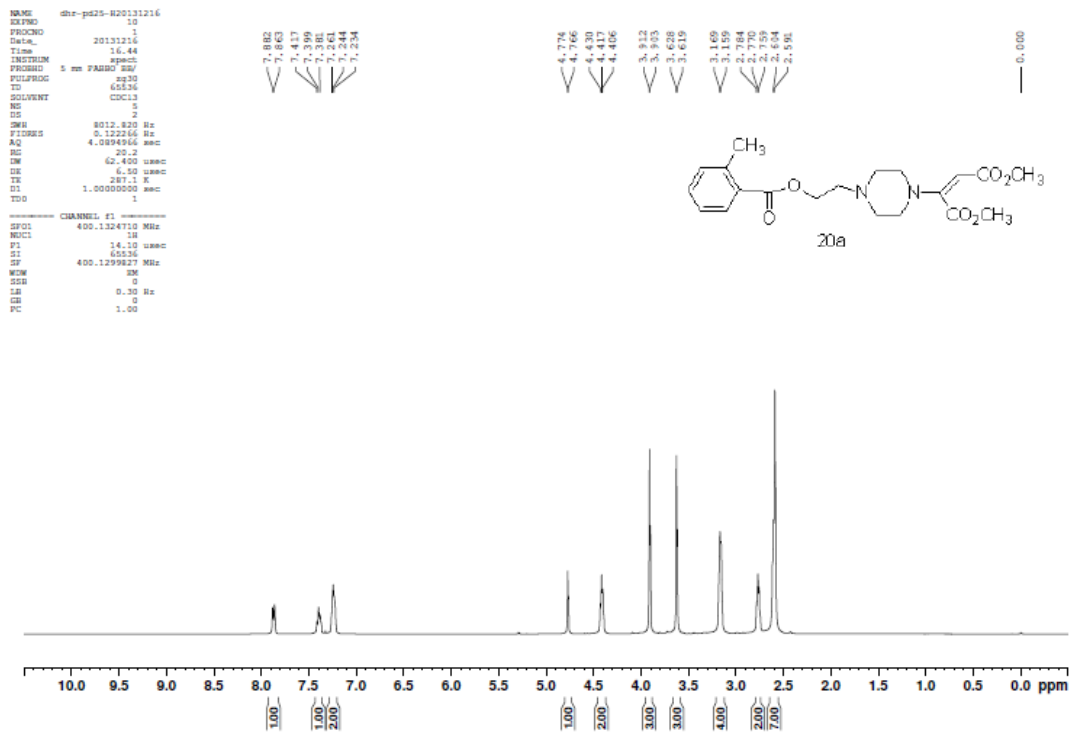

17a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

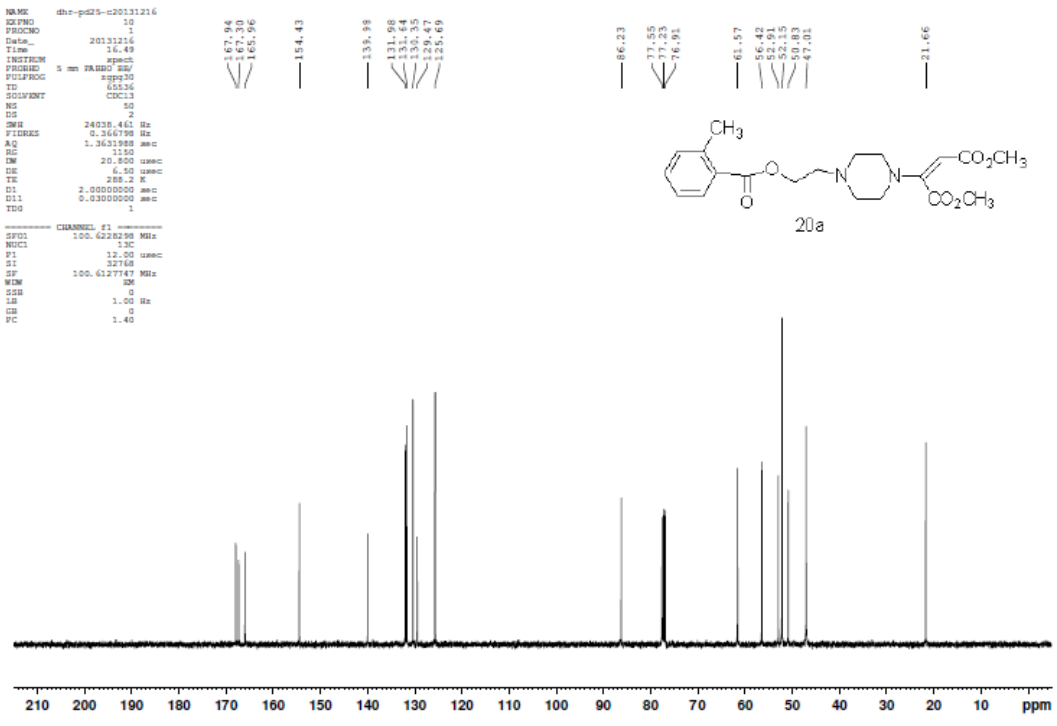

8.034
8.016
7.599
7.571
7.563
7.449
7.431
7.337
4.778
4.462
4.448
4.434
3.915
3.630
3.189
3.167
3.164
2.810
2.796
2.781
2.633
2.622
2.610
0.000
CO2CH3
CO2CH3
18a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
2.00 1.00 2.00 1.00 2.00 3.00 3.00 4.00 2.00 4.00

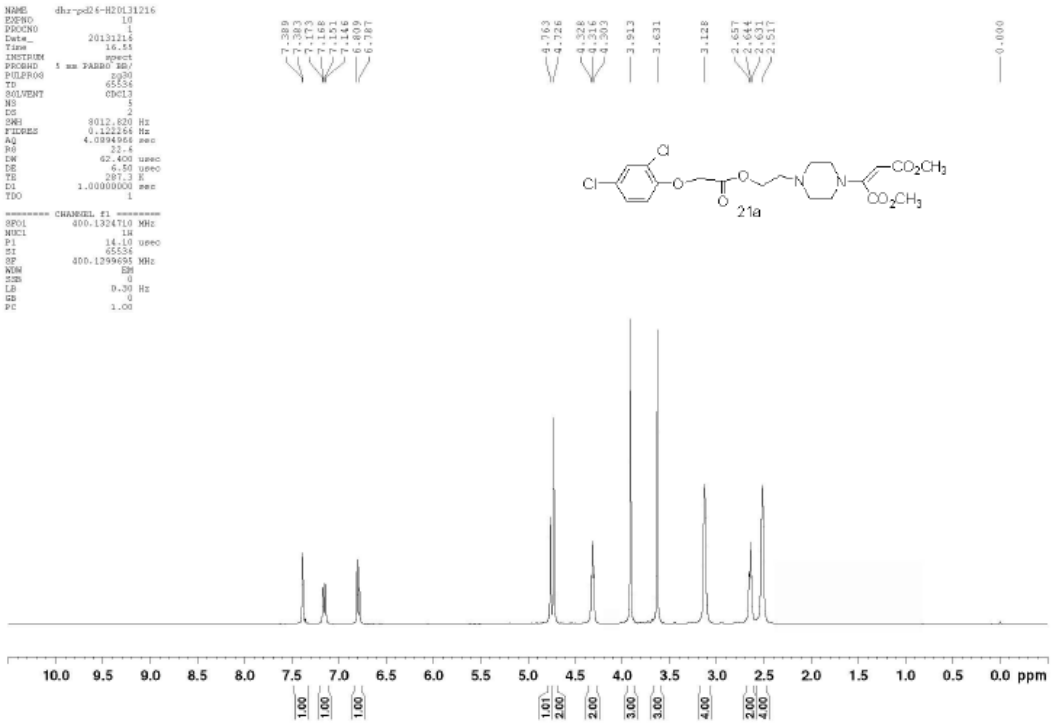

167.96
166.28
165.98
154.43
133.03
129.95
128.47
126.38
96.23
77.55
77.23
76.91
62.15
56.39
52.93
52.20
50.85
47.02
CO2CH3
CO2CH3
18a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

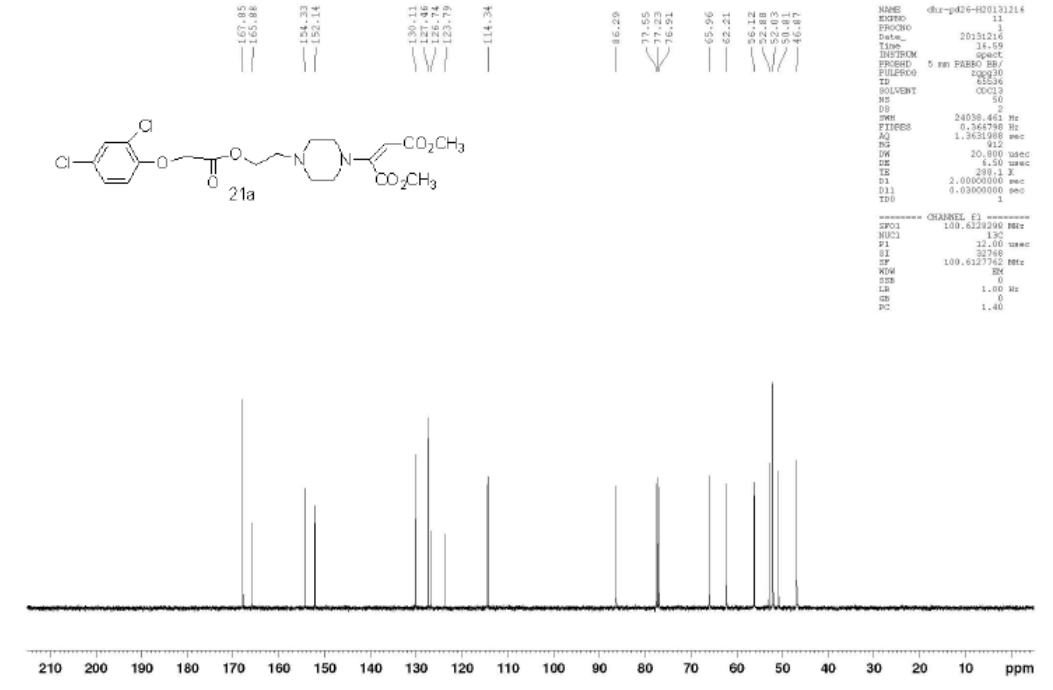

NAME dhr-pd24-H20131216
EXPNO 10
PROCNO 1
Date_ 20131216
Time 12.13
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 18
DW 62.400 usec
DE 6.50 usec
TE 285.7 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324710 MHz
NUC1 1H
P1 12.00 usec
SI 65536
SF 400.1299859 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.28
7.09
7.29
7.27
7.26
4.737
4.211
4.197
4.184
3.903
3.623
3.071
3.059
3.047
2.692
2.588
2.575
2.460
2.428
2.416
0.000
CO2CH3
CO2CH3
19a
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
5.82
1.00
2.00
3.00
5.00
4.00
2.00
4.00

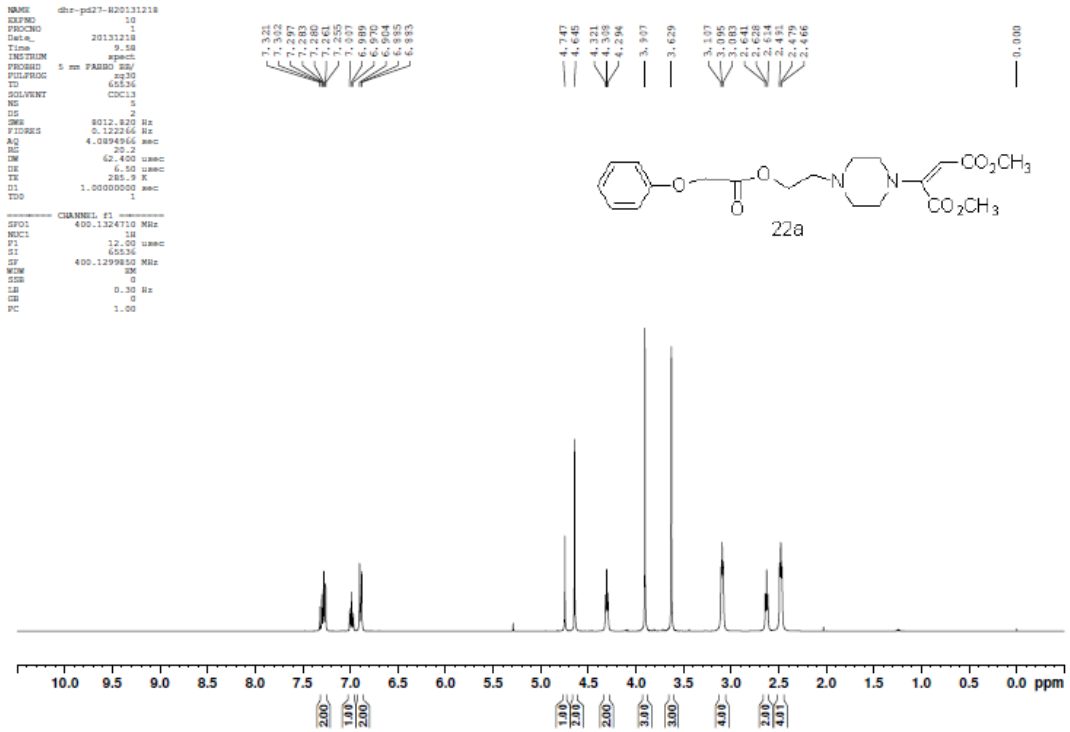

171.29
167.91
165.99
154.34
133.86
129.16
128.43
127.00
86.05
77.55
77.23
76.91
61.79
56.16
52.84
51.98
50.73
46.86
41.28
CO2CH3
CO2CH3
19a
NAME dhr-pd24-H20131216
EXPNO 11
PROCNO 1
Date_ 20131216
Time 12.17
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 1820
DW 20.800 usec
DE 6.50 usec
TE 287.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 14.45 usec
SI 32768
SF 100.6127798 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

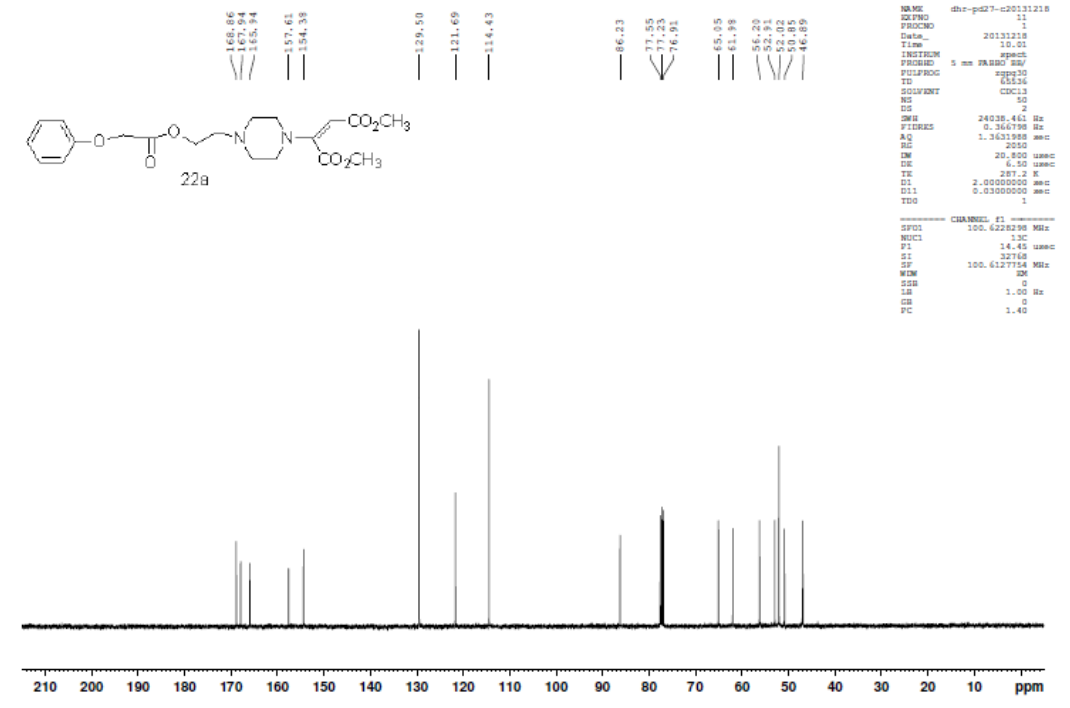

NAME dhr-pd25-H20131216
EXPNO 10
PROCNO 1
Date_ 20131216
Time 16.44
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 20.2
DW 62.400 usec
DE 6.50 usec
TE 287.1 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1299827 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.882
7.863
7.417
7.399
7.381
7.261
7.244
7.234
4.774
4.766
4.430
4.417
4.406
3.912
3.905
3.628
3.619
3.169
3.159
2.784
2.770
2.759
2.684
2.591
0.000
CH3
CO2CH3
CO2CH3
20a
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
1.00
1.00
1.00
2.00
1.00
2.00
3.00
3.00
4.00
2.00
7.00

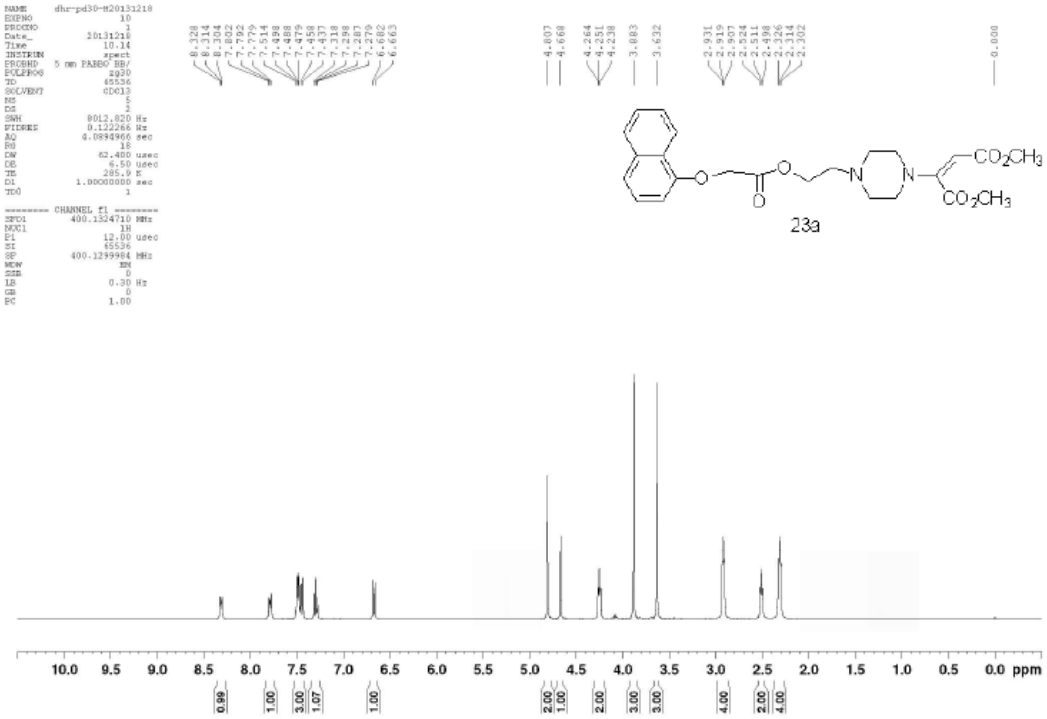

NAME dhr-pd25-c20131216
EXPNO 10
PROCNO 1
Date_ 20131216
Time 16.49
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 1150
DW 20.800 usec
DE 6.50 usec
TE 288.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127747 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
167.94
167.30
165.96
154.43
139.98
131.98
131.64
130.35
129.47
125.69
86.23
77.55
77.23
76.91
61.57
56.42
52.91
52.15
50.83
47.01
21.66
CH3
CO2CH3
CO2CH3
20a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

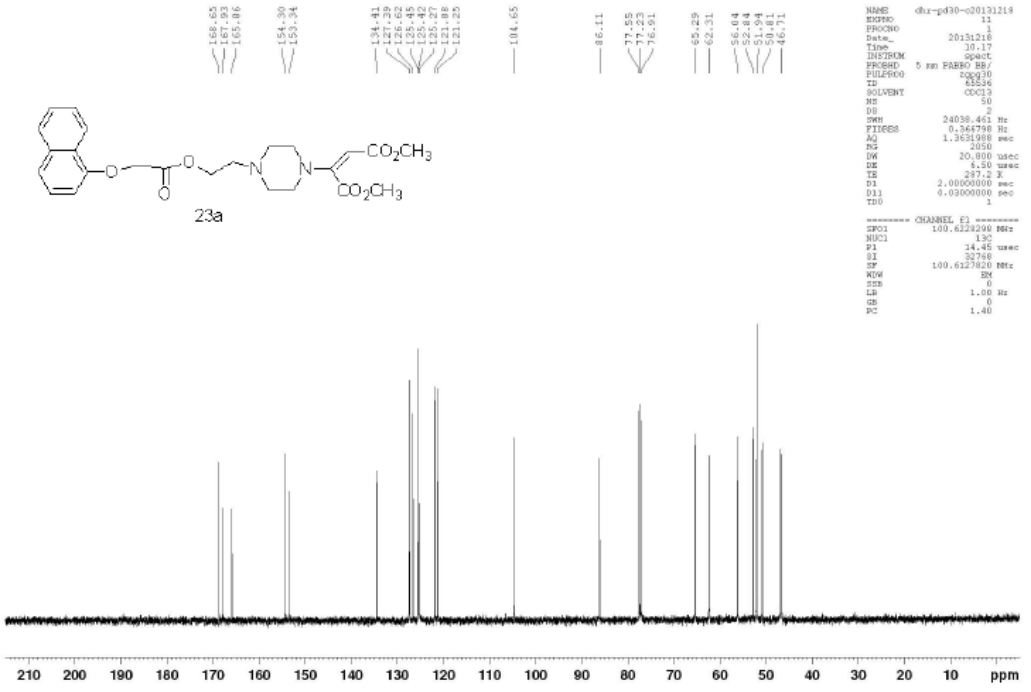

NAME dhz-pd26-H20131216
EXPNO 10
PROCNO 1
Date_ 20131216
Time 16.55
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 1
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 22.6
DW 62.400 usec
DE 6.50 usec
TE 287.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1299695 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.389
7.383
7.173
7.168
7.151
7.146
6.809
6.787
4.763
4.726
4.328
4.316
4.303
3.913
3.631
3.128
2.657
2.644
2.631
2.517
0.000
21a
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
1.00 1.00 1.00 1.01 2.00 2.00 3.00 3.00 4.00 2.00 4.00

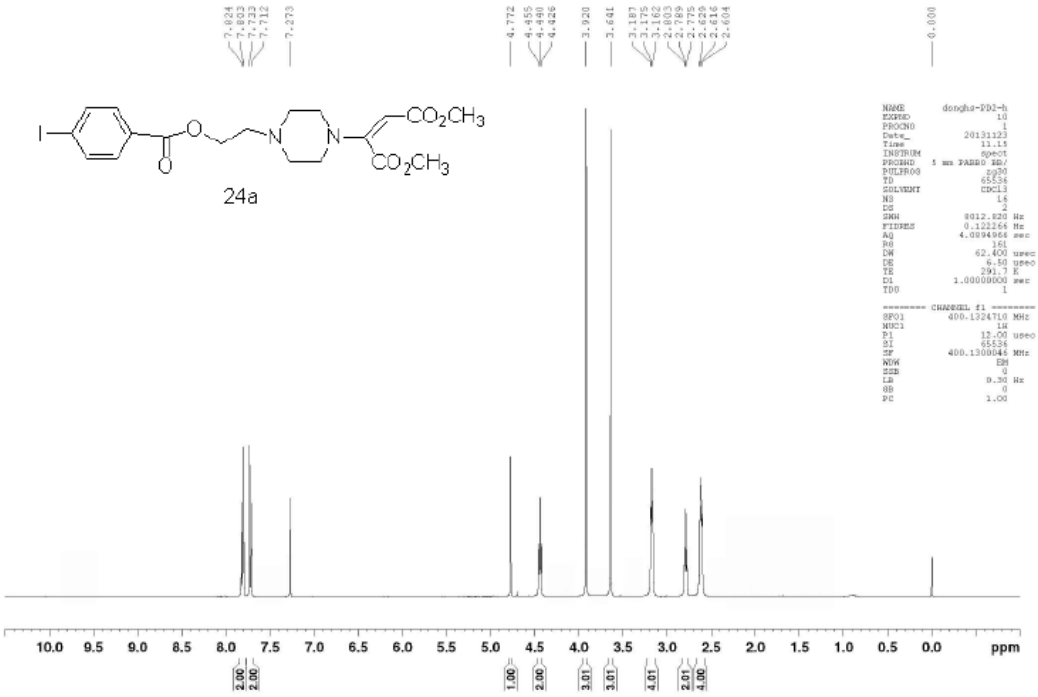

NAME dhz-pd26-H20131216
EXPNO 11
PROCNO 1
Date_ 20131216
Time 16.59
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 912
DW 20.800 usec
DE 6.50 usec
TE 298.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127762 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
167.85
165.88
154.33
152.14
130.11
127.46
126.74
123.79
114.34
86.29
77.55
77.23
76.91
65.96
62.21
56.12
52.88
52.03
50.81
46.87
21a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

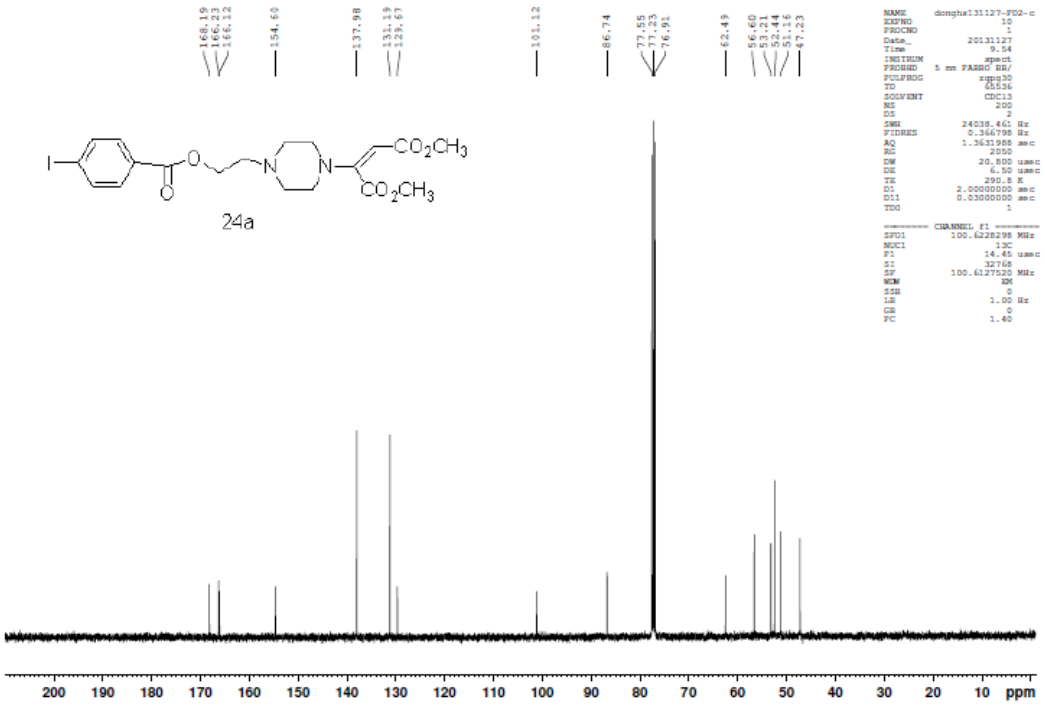

22a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm

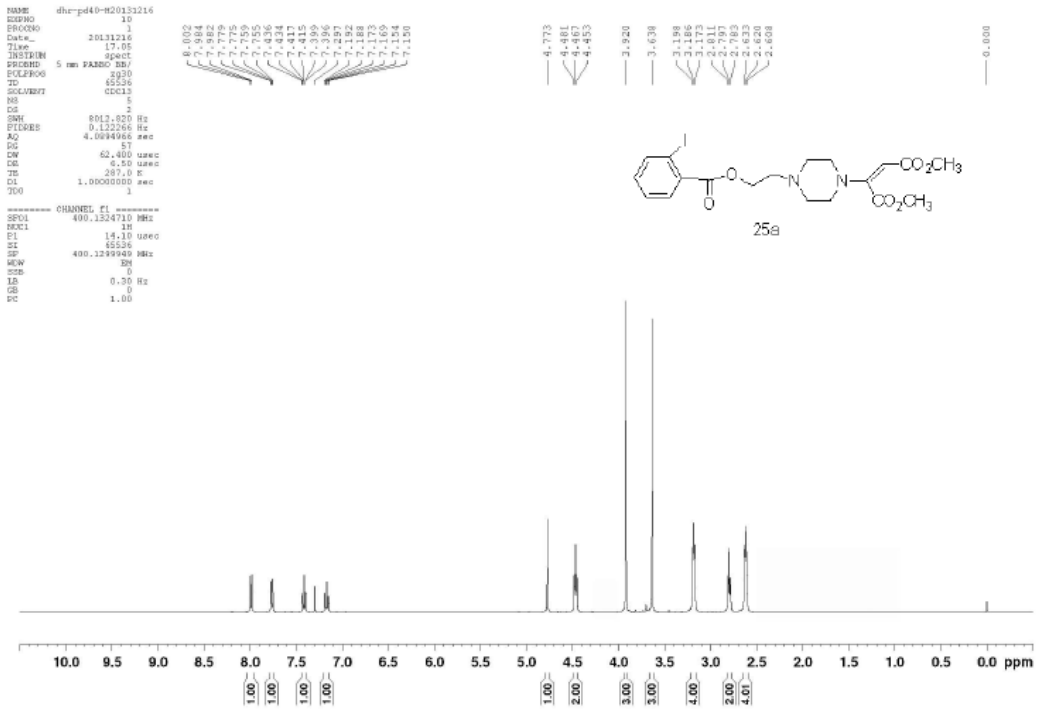

22a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

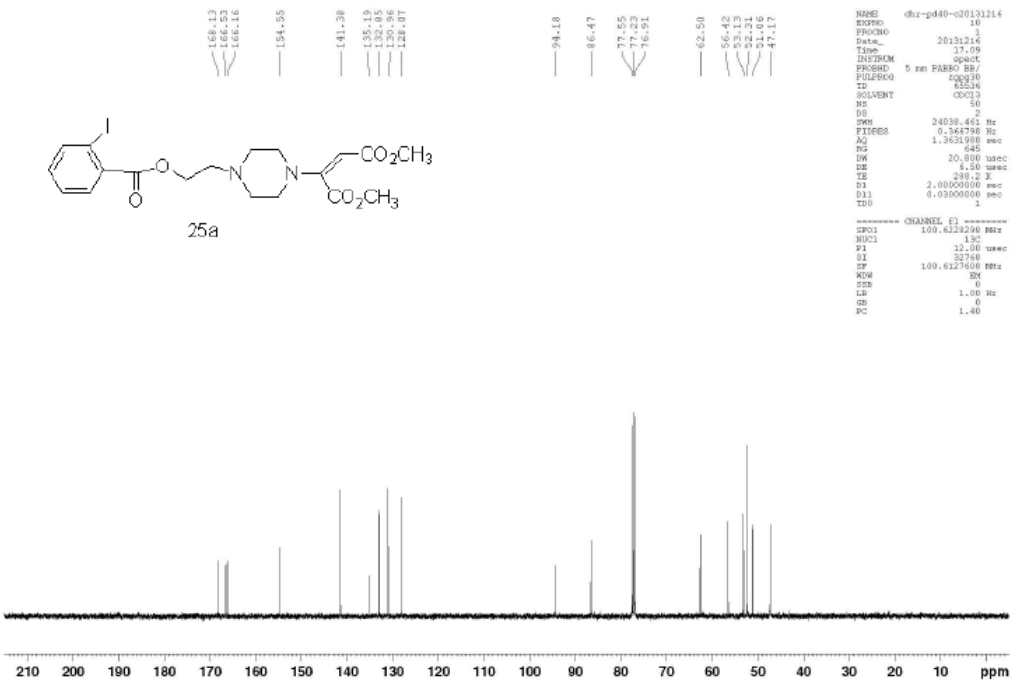

23a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm

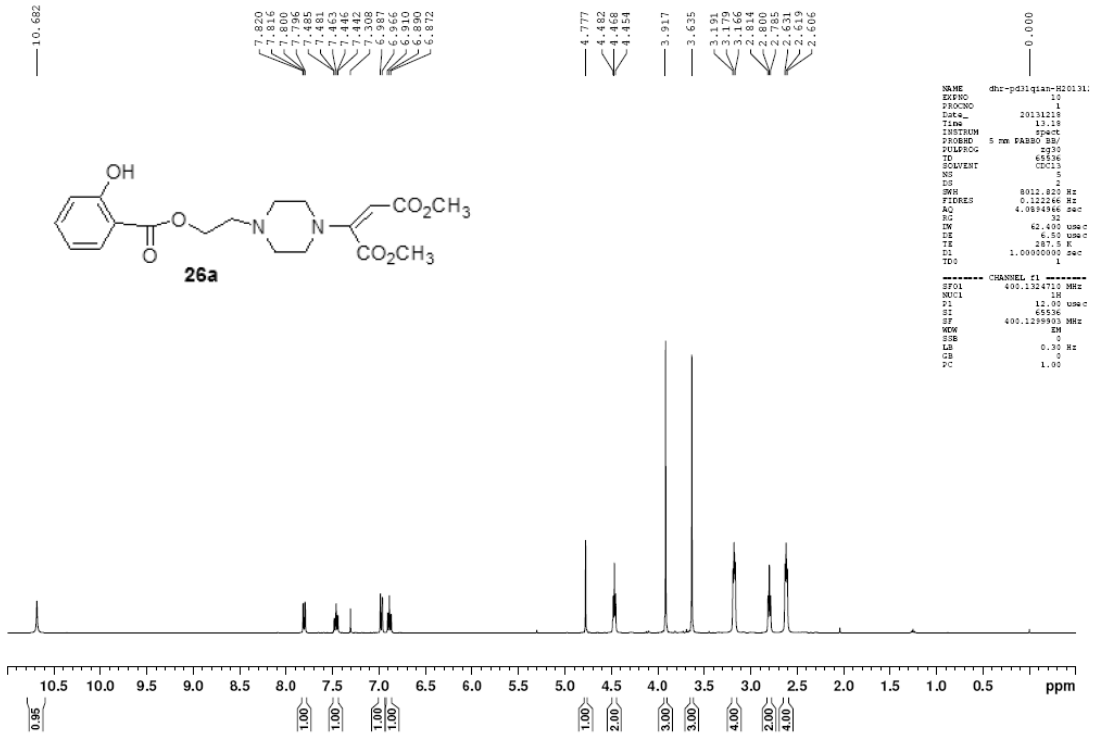

23a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

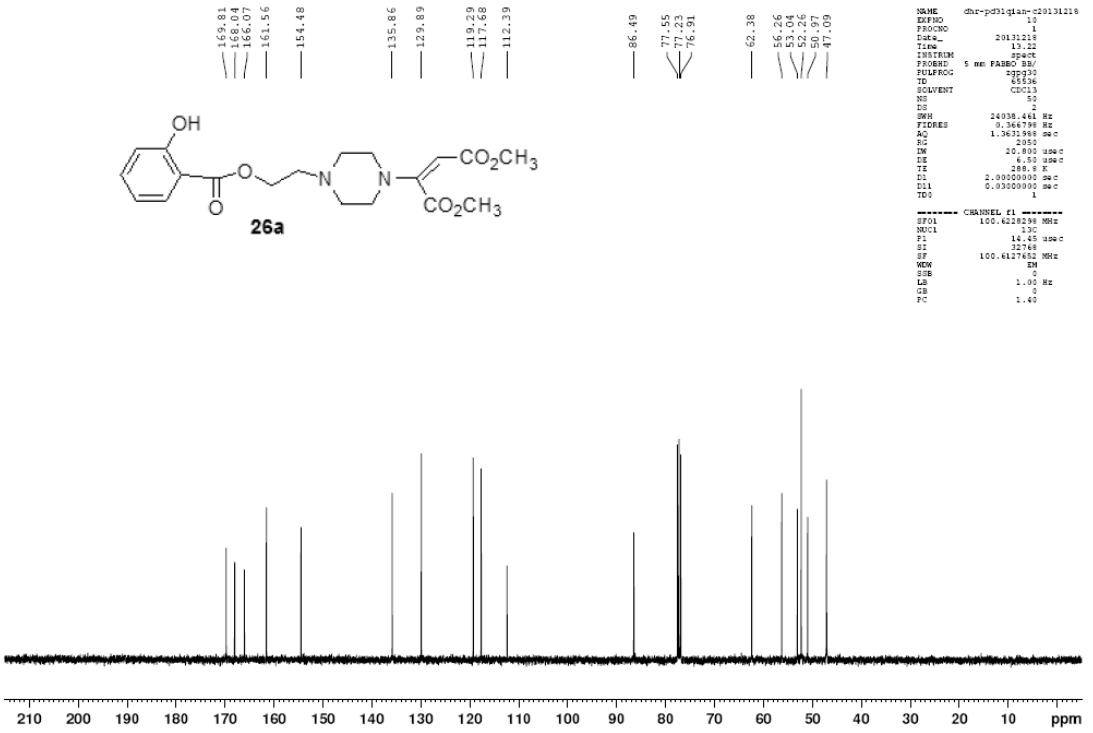

7.824
7.803
7.733
7.712
7.273
4.772
4.455
4.440
4.426
3.920
3.641
3.187
3.175
3.162
2.803
2.789
2.775
2.428
2.416
2.404
0.000
I
O
O
N
N
CO2CH3
CO2CH3
24a
NAME donghs-PD2-h
EXPNO 10
PROCNO 1
Date_ 20131123
Time 11.15
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 161
DW 62.400 usec
DE 6.50 usec
TE 291.7 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 12.00 usec
SI 65536
SF 400.1300048 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
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 ppm
2.00
2.00
1.00
2.00
3.01
3.01
4.01
2.01
4.00

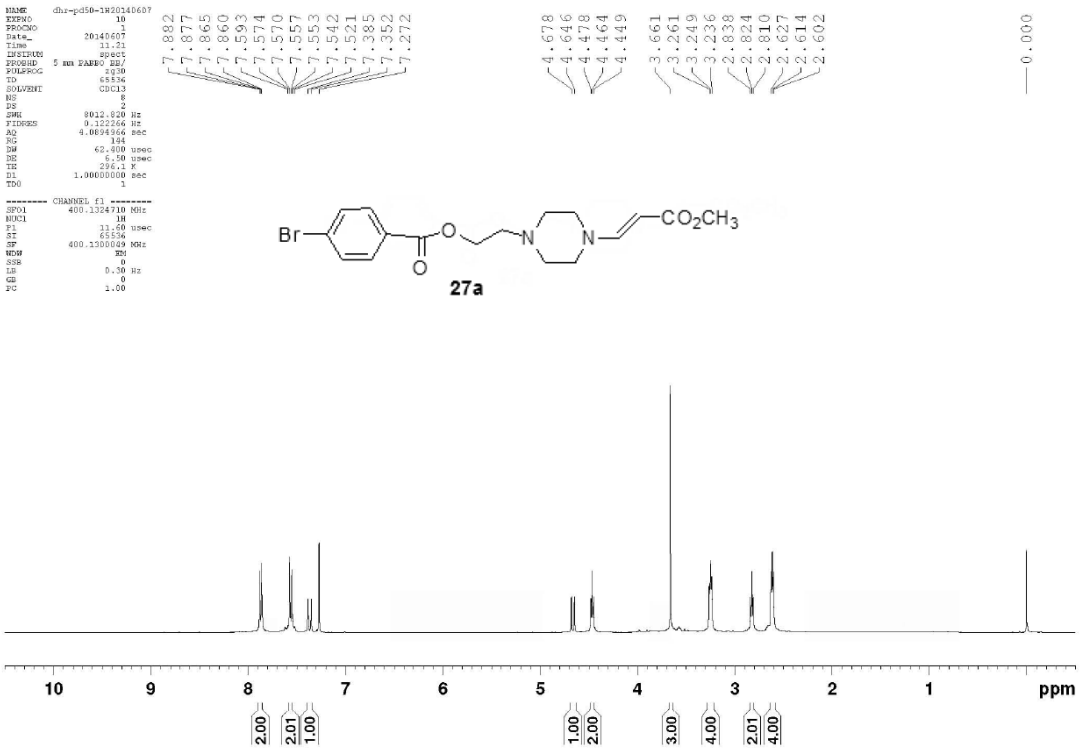

168.19
166.23
166.12
154.60
137.98
131.19
129.67
101.12
86.74
77.55
77.23
76.91
62.49
56.60
53.21
52.44
51.16
47.23
I
O
O
N
N
CO2CH3
CO2CH3
24a
NAME donghs131127-PD2-c
EXPNO 10
PROCNO 1
Date_ 20131127
Time 9.54
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 200
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 2050
DW 20.800 usec
DE 6.50 usec
TE 290.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 14.45 usec
SI 32768
SF 100.6127520 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

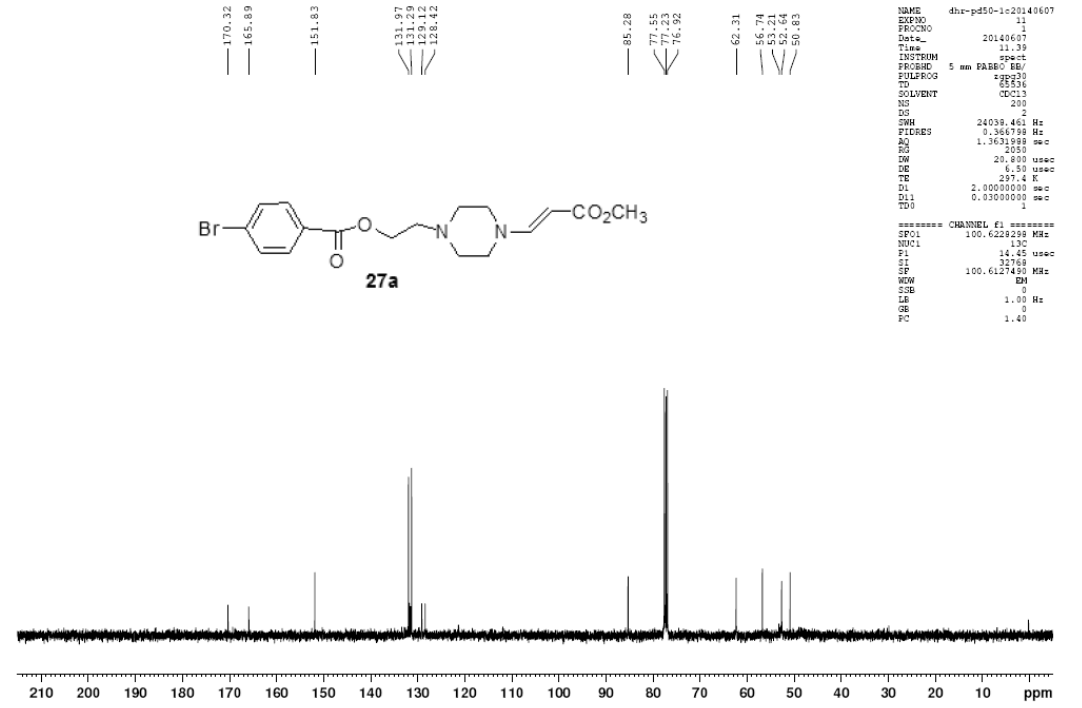

NAME dhr-pd40-m20131216
EXPNO 10
PROCNO 1
Date_ 20131216
Time 17.05
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 57
DW 62.400 usec
DE 6.50 usec
TE 287.0 K
D1 1.00000000 sec
P00 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1299949 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
8.002
7.984
7.982
7.779
7.775
7.759
7.755
7.436
7.434
7.417
7.415
7.399
7.396
7.192
7.188
7.173
7.169
7.154
7.150
4.773
4.481
4.463
4.455
2.920
3.638
3.198
3.166
3.133
2.811
2.797
2.783
2.633
2.608
2.588
0.000
I
O
O
N
N
CO2CH3
CO2CH3
25a
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
1.00 1.00 1.00 1.00 1.00 2.00 3.00 3.00 4.00 2.00 4.61

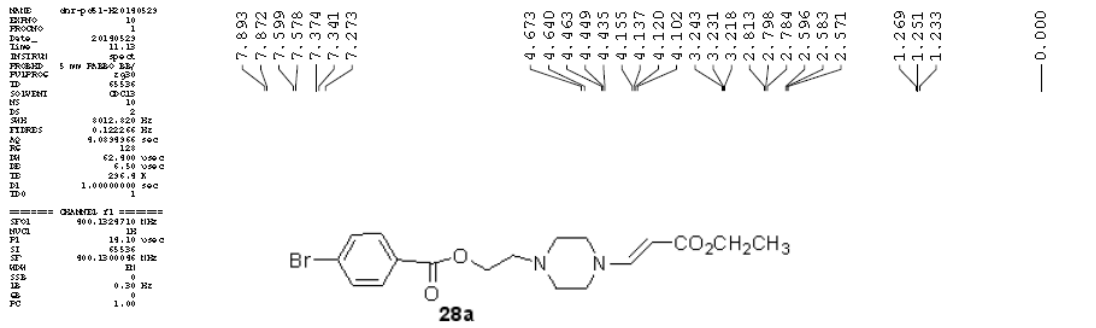

168.13
166.53
166.16
154.55
141.38
135.19
132.85
130.96
128.07
94.18
86.47
77.55
77.23
76.91
62.50
56.42
53.13
52.31
51.06
47.17
NAME dhr-pd40-c20131216
EXPNO 10
PROCNO 1
Date_ 20131216
Time 17.09
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 645
DW 20.800 usec
DE 6.50 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228290 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127600 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
I
O
O
N
N
CO2CH3
CO2CH3
25a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

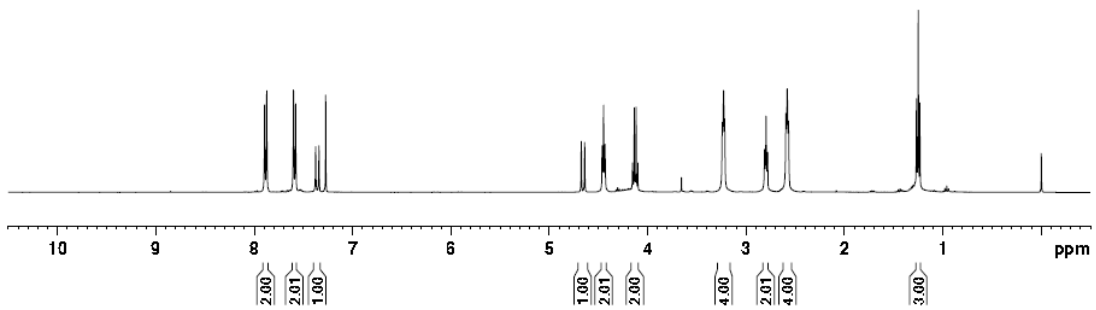

10.682
7.820
7.816
7.800
7.796
7.485
7.481
7.463
7.446
7.442
7.008
6.987
6.966
6.910
6.890
6.872
4.777
4.482
4.468
4.454
3.917
3.635
3.191
3.179
3.166
2.814
2.800
2.785
2.631
2.619
2.606
0.000
OH
O
N
N
CO2CH3
CO2CH3
26a
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
0.95
1.00
1.00
1.00
1.00
1.00
2.00
3.00
3.00
4.00
2.00
4.00

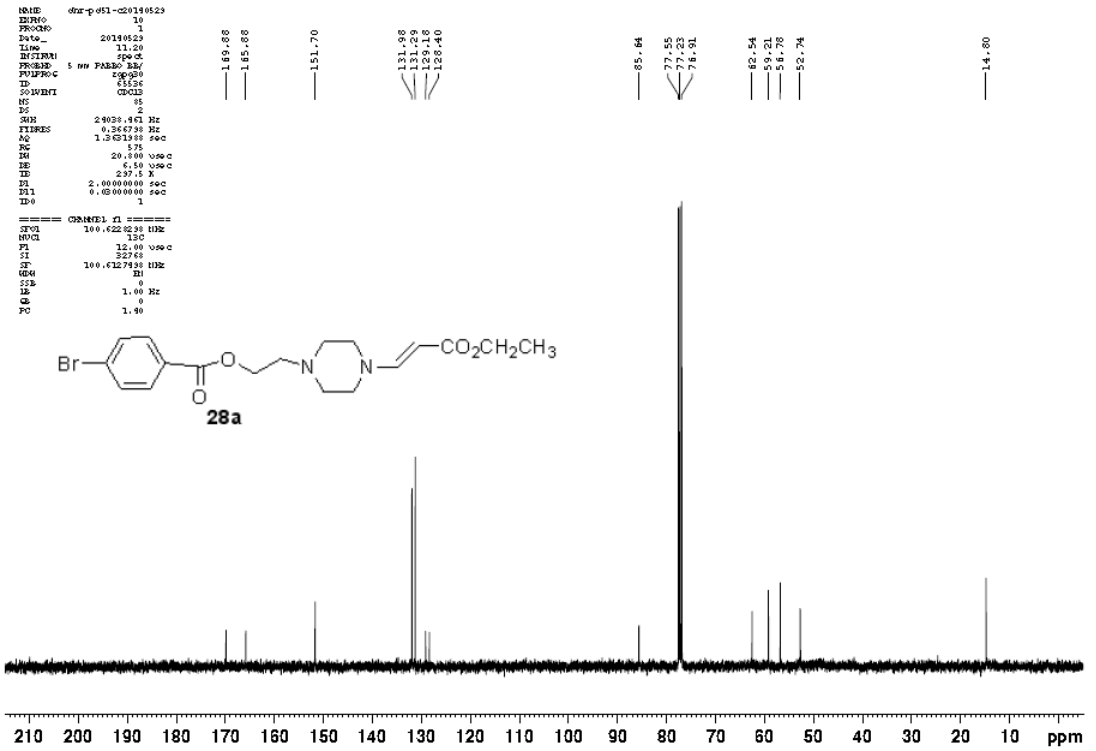

169.81
168.04
166.07
161.56
154.48
135.86
129.89
119.29
117.68
112.39
86.49
77.55
77.23
76.91
62.38
56.26
53.04
52.36
50.97
47.09
OH
O
N
N
CO2CH3
CO2CH3
26a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

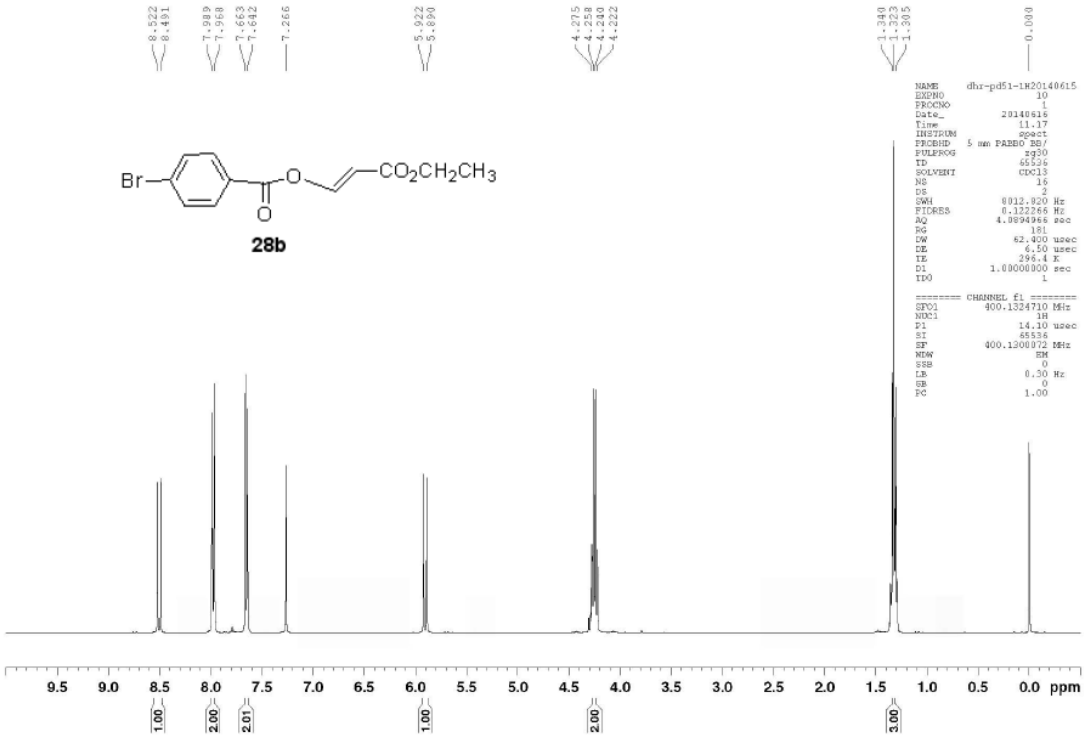

NAME dhr-pd50-1H20140607
EXPNO 10
PROCNO 1
Date_ 20140607
Time 11.21
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894366 sec
RG 144
DW 62.400 usec
DE 6.50 usec
TE 296.1 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 11.60 usec
SI 65536
SF 400.1300009 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.882
7.877
7.865
7.860
7.593
7.574
7.570
7.557
7.553
7.542
7.521
7.385
7.352
7.272
4.678
4.646
4.478
4.464
4.449
3.661
3.261
3.249
3.236
2.838
2.824
2.810
2.627
2.614
2.602
0.000
Br
O
O
N
N
CO2CH3
27a
10
9
8
7
6
5
4
3
2
1
ppm
2.00
2.01
1.00
1.00
2.00
3.00
4.00
2.01
4.00

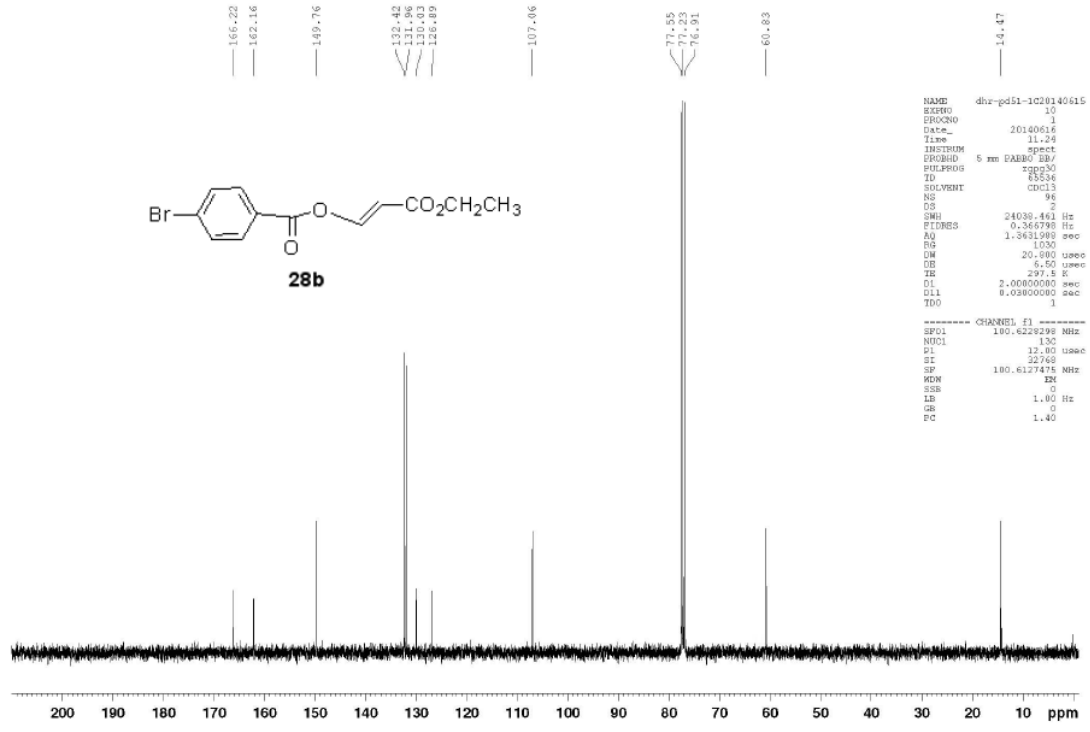

170.32
165.89
151.83
131.97
131.29
129.12
128.42
85.28
77.55
77.23
76.92
62.31
56.74
53.21
52.64
50.83
NAME dhr-pd50-1c20140607
EXPNO 11
PROCNO 1
Date_ 20140607
Time 11.39
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 200
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631998 sec
RG 2050
DW 20.800 usec
DE 6.50 usec
TE 297.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 14.45 usec
SI 32768
SF 100.6127490 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
Br
O
O
N
N
CO2CH3
27a
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

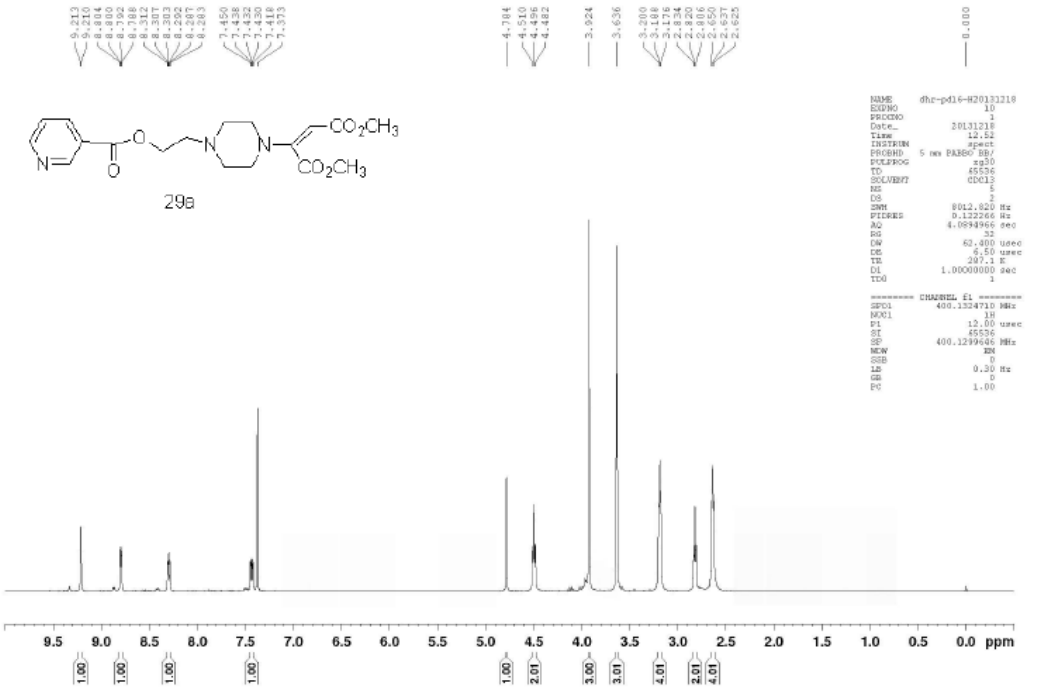

7.893
7.872
7.599
7.578
7.374
7.341
7.273
4.673
4.640
4.463
4.449
4.435
4.155
4.137
4.120
4.102
3.243
3.231
3.218
2.813
2.798
2.784
2.596
2.583
2.571
1.269
1.251
1.233
0.000
Br
O
O
N
N
CO2CH2CH3
28a

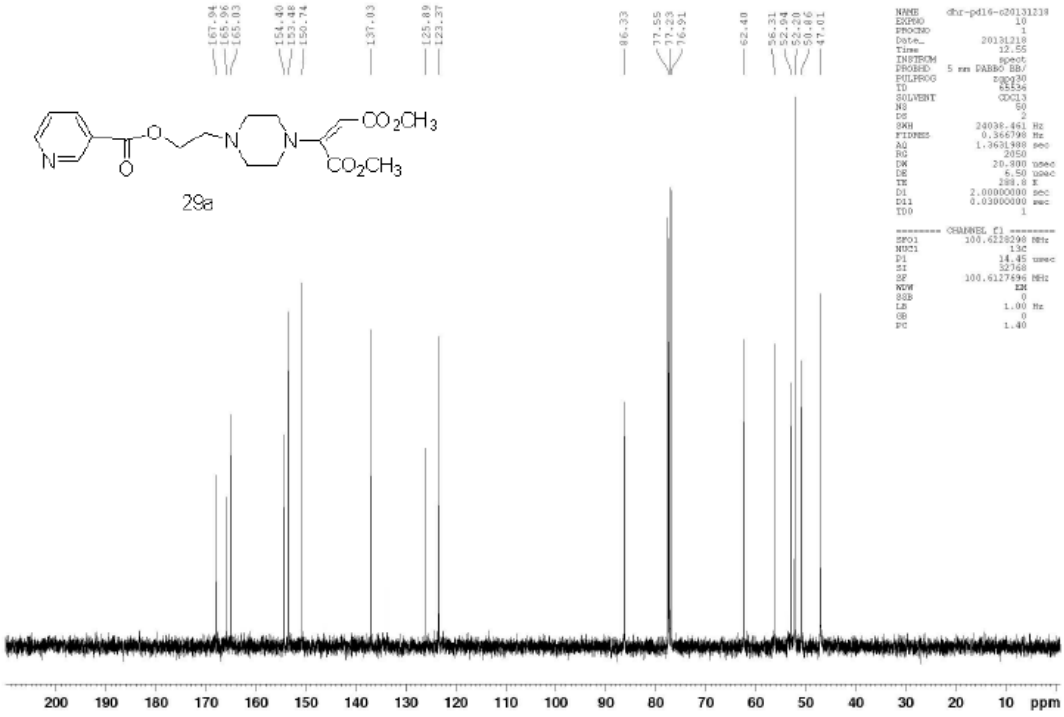

10
9
8
7
6
5
4
3
2
1
ppm
2.00
2.01
1.00
1.00
2.01
2.00
4.00
2.01
4.00
3.00

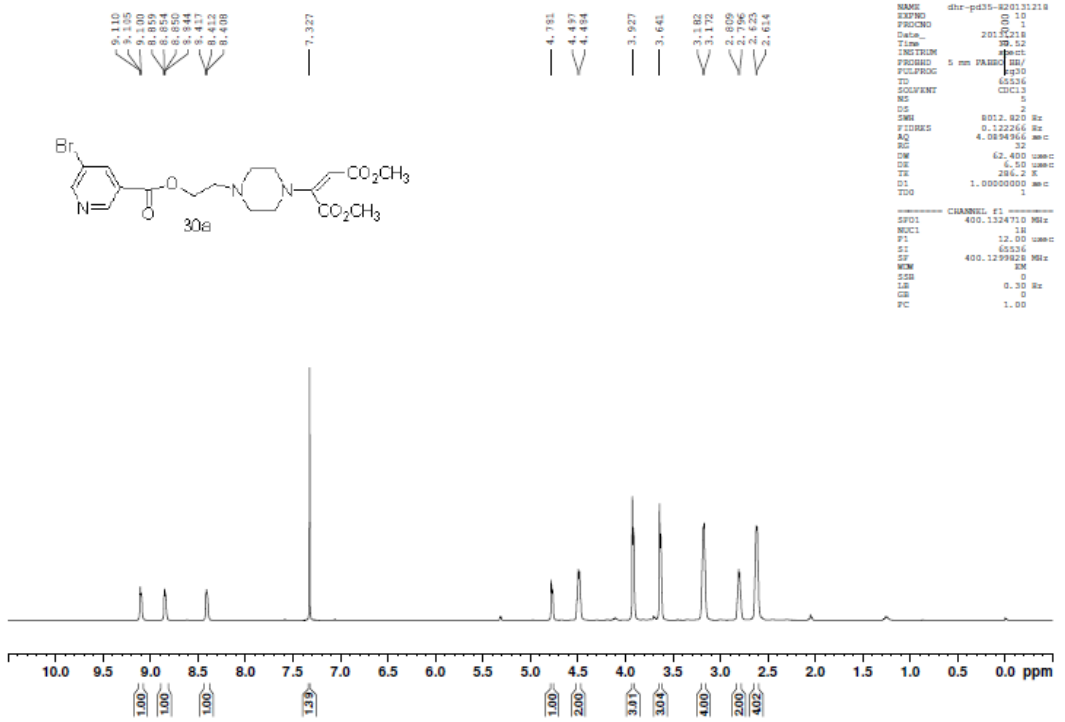

169.88
165.88
151.70
131.98
131.20
129.18
128.40
85.64
77.55
77.23
76.91
62.54
59.21
56.78
52.74
14.80
Br
O
O
N
N
CO2CH2CH3
28a
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

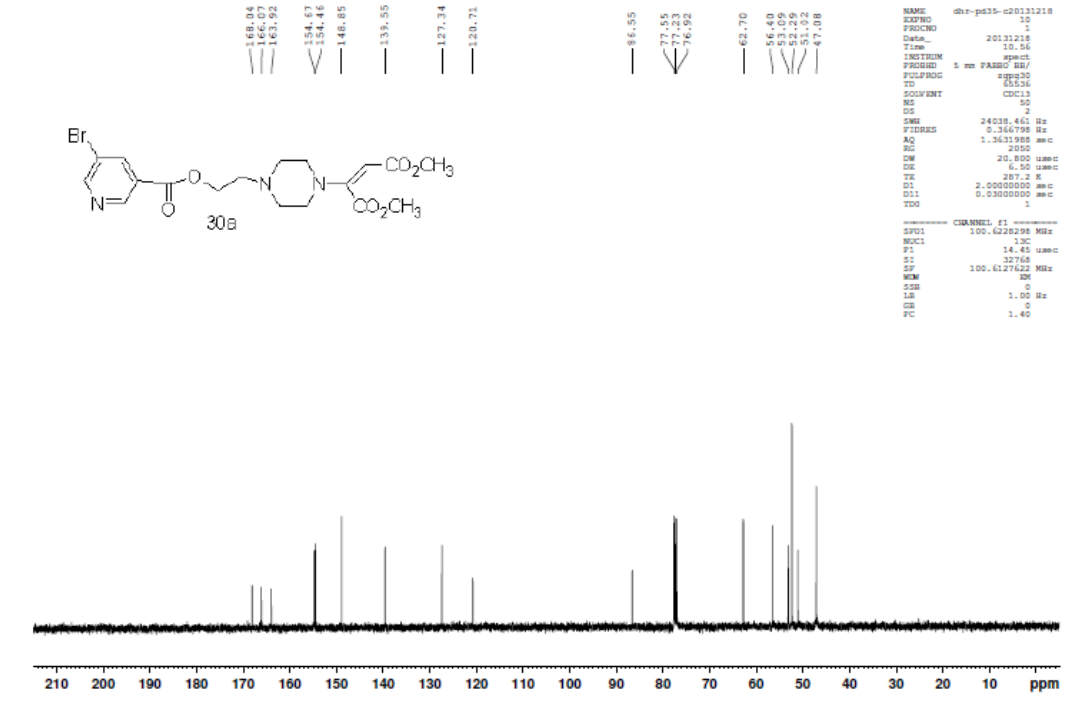

8.522
8.491
7.989
7.968
7.663
7.642
7.266
5.922
5.890
4.275
4.258
4.240
4.222
1.340
1.323
1.305
0.000
Br
O
O
CO2CH2CH3
28b
NAME dhr-pd51-1H20140615
EXPNO 10
PROCNO 1
Date_ 20140616
Time 11.17
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 181
DW 62.400 usec
DE 6.50 usec
TE 296.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1300072 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
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
1.00
2.00
2.01
1.00
2.00
3.00

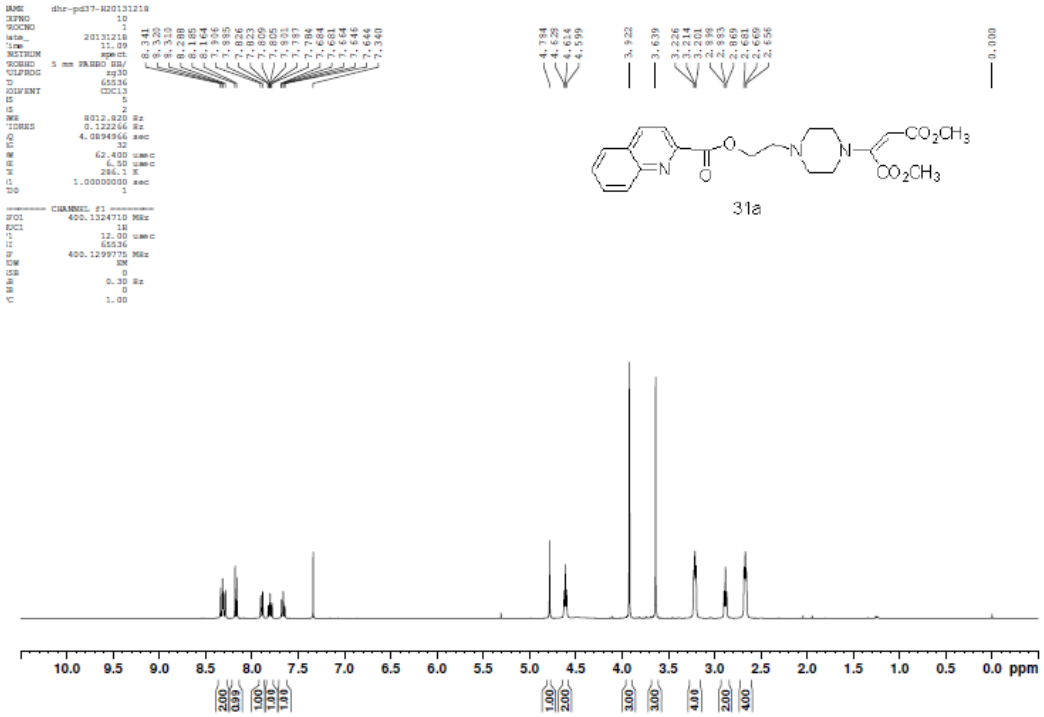

166.22
162.16
149.76
132.42
131.96
130.03
126.89
107.06
77.55
77.23
76.91
60.83
14.47
Br
O
O
CO2CH2CH3
28b
NAME dhr-pd51-1C20140615
EXPNO 10
PROCNO 1
Date_ 20140616
Time 11.24
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 96
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 1030
DW 20.800 usec
DE 6.50 usec
TE 297.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127475 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

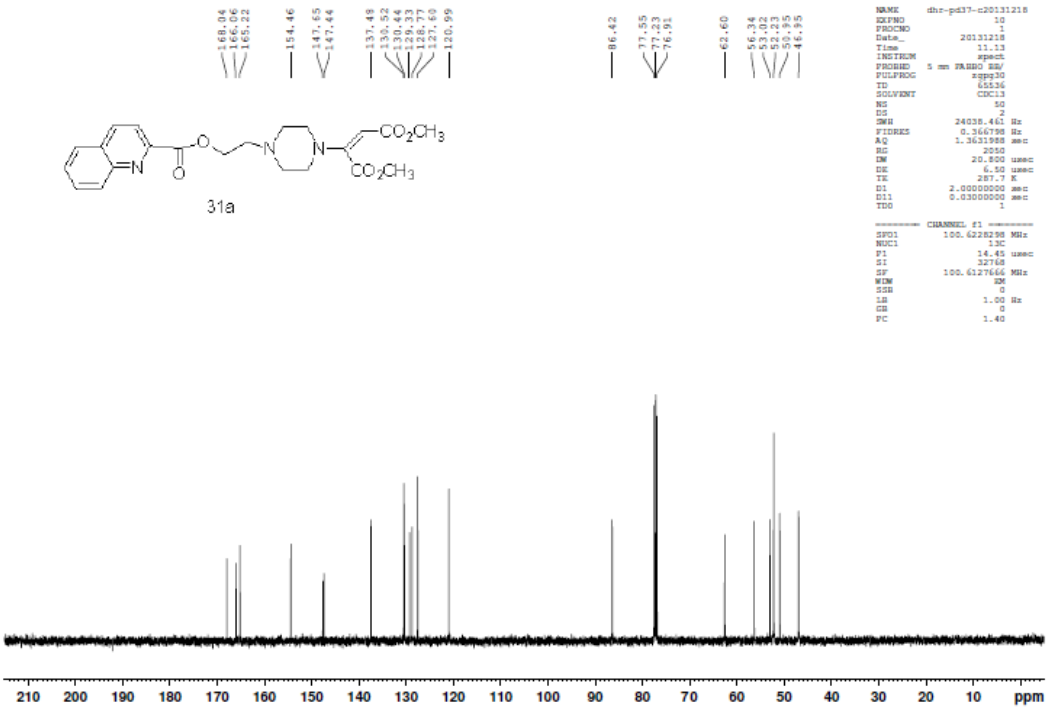

9.213
9.210
8.804
8.800
8.792
8.788
8.312
8.307
8.303
8.292
8.287
8.283
7.450
7.438
7.432
7.430
7.418
7.373
4.784
4.510
4.496
4.482
3.924
3.636
3.200
3.198
3.195
2.834
2.820
2.806
2.650
2.637
2.625
0.000
CO2CH3
CO2CH3
29a
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
1.00 1.00 1.00 1.00 1.00 2.01 3.00 3.01 4.01 2.01 4.01

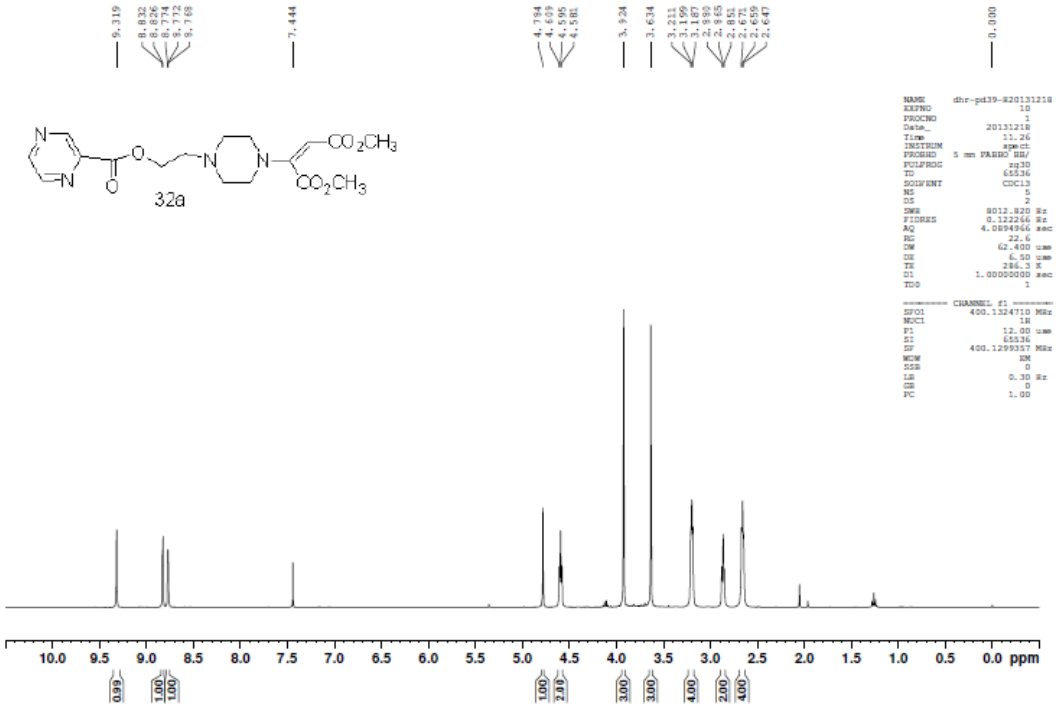

167.04
165.96
165.03
154.40
153.48
150.74
137.03
125.89
123.37
86.33
77.55
77.23
76.91
62.40
56.31
52.94
52.20
50.86
47.01
CO2CH3
CO2CH3
29a
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

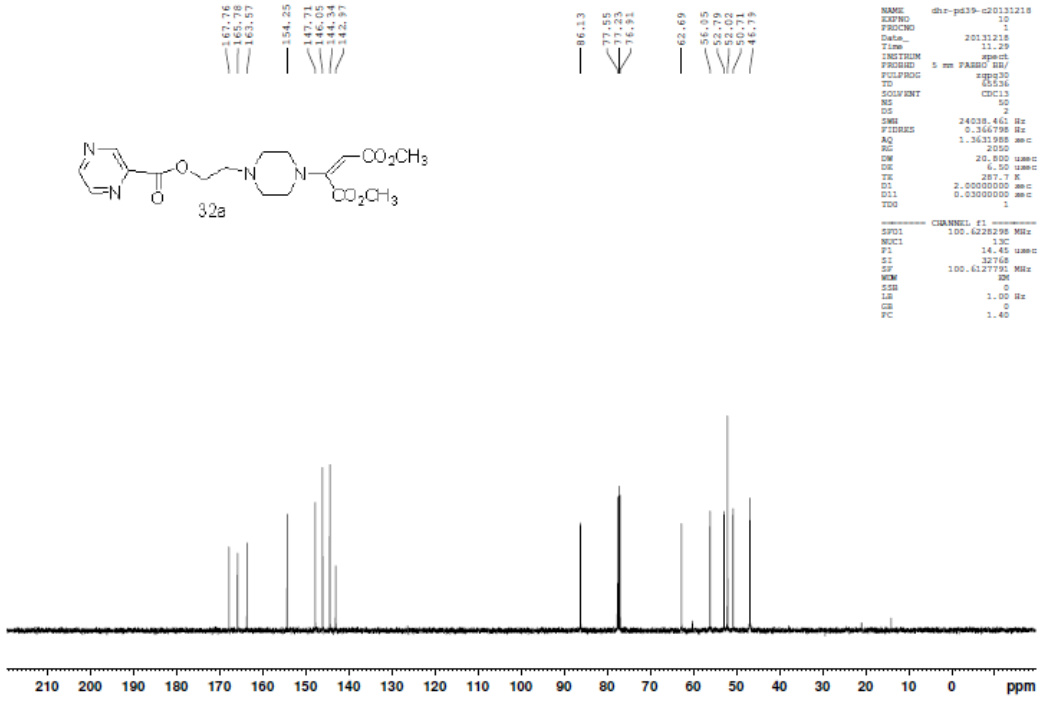

9.110
9.105
9.100
8.859
8.854
8.850
8.844
8.417
8.412
8.408
7.327
4.791
4.497
4.494
3.927
3.641
3.182
3.172
2.809
2.796
2.625
2.614
Br
N
O
O
N
N
CO2CH3
CO2CH3
30a
NAME dhr-pd35-s20131218
EXPNO 10
PROCNO 1
Date_ 20131218
Time 10.52
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 32
DW 62.400 usec
DE 6.50 usec
TE 286.2 K
D1 1.00000000 sec
TD0 1
CHANNEL f1
SFO1 400.1324710 MHz
NUC1 1H
P1 12.00 usec
SI 65536
SF 400.1299828 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
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 ppm
1.00 1.00 1.00 1.39 1.00 2.00 3.01 3.04 4.00 2.00 4.02

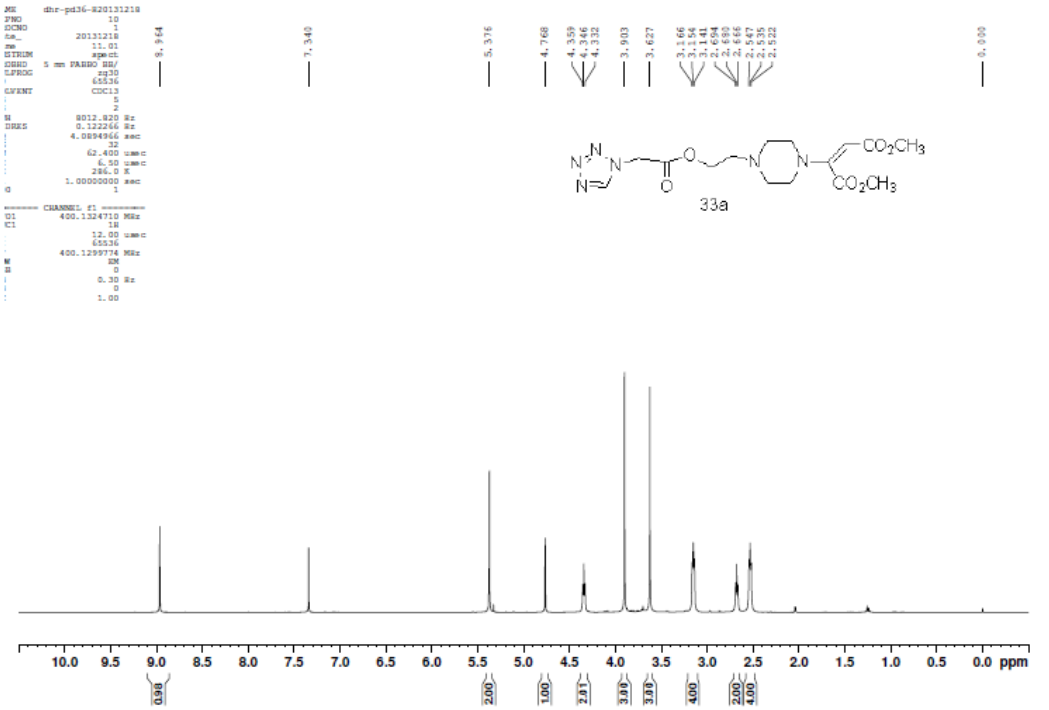

168.04
166.07
163.92
154.67
154.46
148.85
139.55
127.34
120.71
96.55
77.55
77.23
76.92
62.70
56.40
53.09
52.29
51.02
47.08
Br
N
O
O
N
N
CO2CH3
CO2CH3
30a
NAME dhr-pd35-c20131218
EXPNO 10
PROCNO 1
Date_ 20131218
Time 10.56
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 2050
DW 20.800 usec
DE 6.50 usec
TE 287.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
CHANNEL f1
SFO1 100.6228298 MHz
NUC1 13C
P1 14.45 usec
SI 32768
SF 100.6127622 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

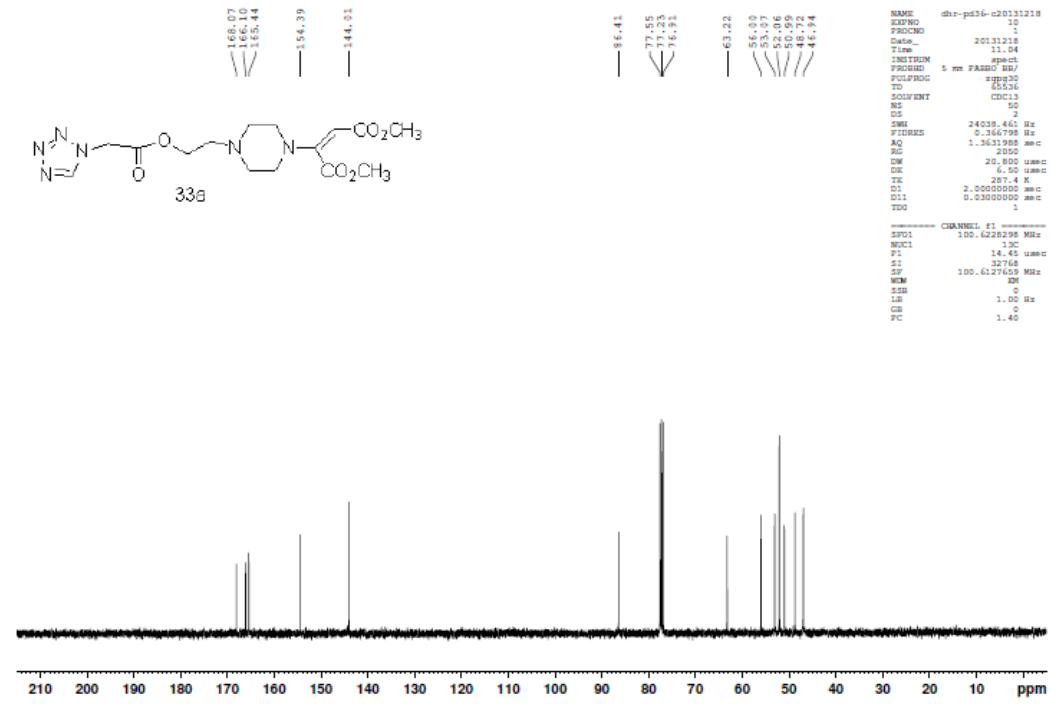

8.341
8.320
8.310
8.288
8.185
8.164
7.956
7.935
7.826
7.823
7.809
7.805
7.801
7.797
7.784
7.684
7.681
7.664
7.646
7.644
7.340
4.784
4.628
4.614
4.599
3.922
3.639
3.226
3.214
3.201
3.188
2.955
2.869
2.681
2.669
2.656
0.000
CO2CH3
CO2CH3
31a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
2.00
0.99
1.00
1.00
1.00
1.00
1.00
2.00
3.00
3.00
4.00
2.00
4.00

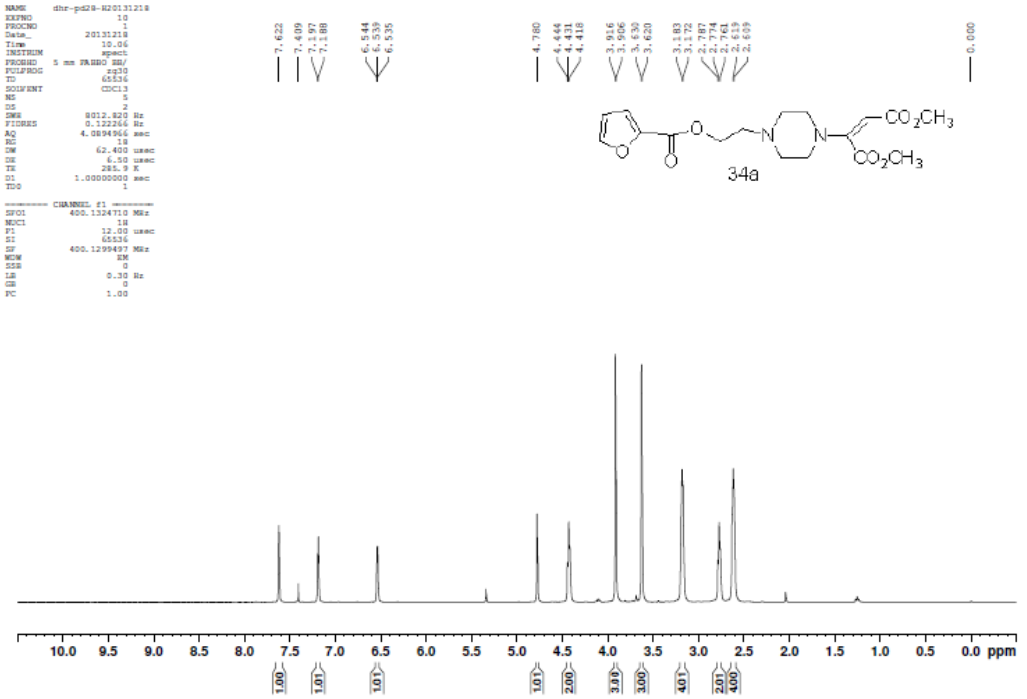

168.04
166.06
165.22
154.46
147.65
147.44
131.48
130.52
130.44
129.33
128.37
123.60
120.99
86.42
77.55
77.23
76.91
62.60
56.34
53.02
52.23
50.45
46.95
CO2CH3
CO2CH3
31a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

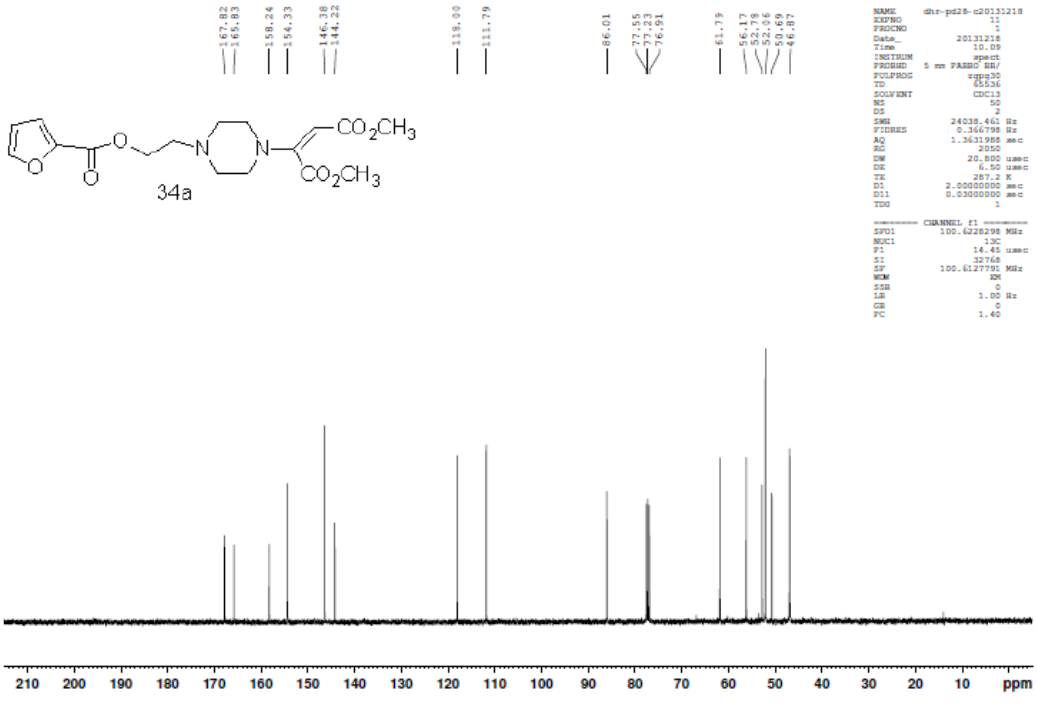

9.319
8.832
8.826
8.774
8.772
8.768
7.444
4.794
4.609
4.595
4.581
3.924
3.634
3.211
3.199
3.187
2.990
2.965
2.851
2.671
2.659
2.647
0.000
32a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
0.99
1.00
1.00
1.00
2.00
3.00
3.00
4.00
2.00
4.00

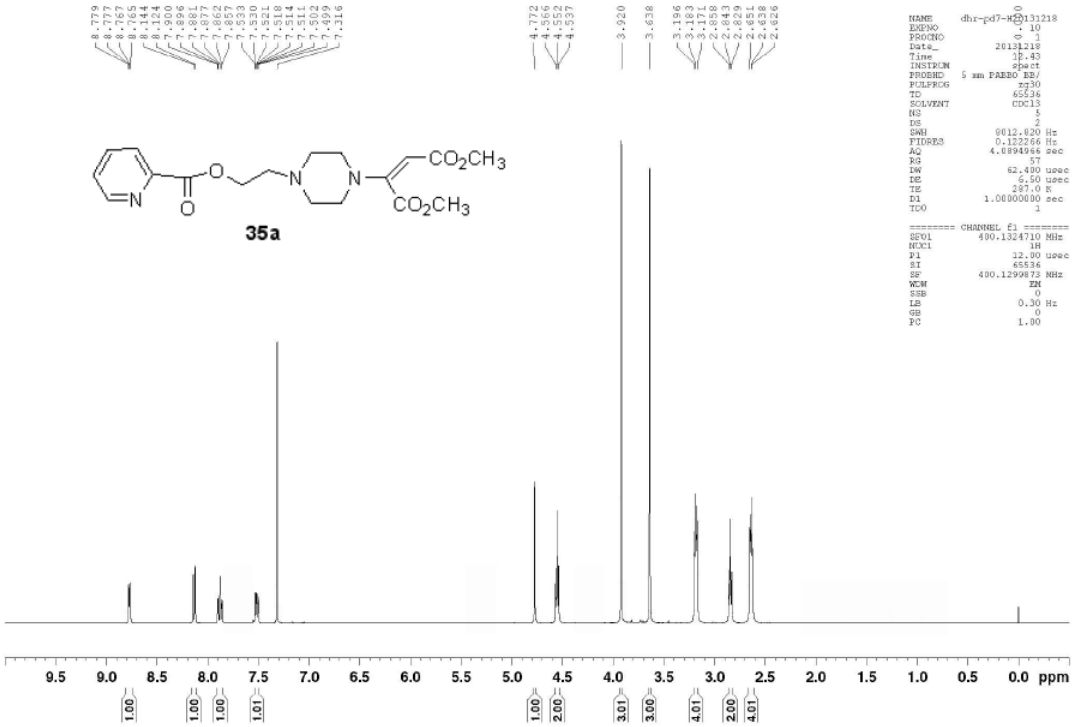

167.76
165.78
163.57
154.25
147.71
146.85
144.94
142.97
86.13
77.55
77.23
76.91
62.69
56.05
52.79
52.02
50.71
46.79
32a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

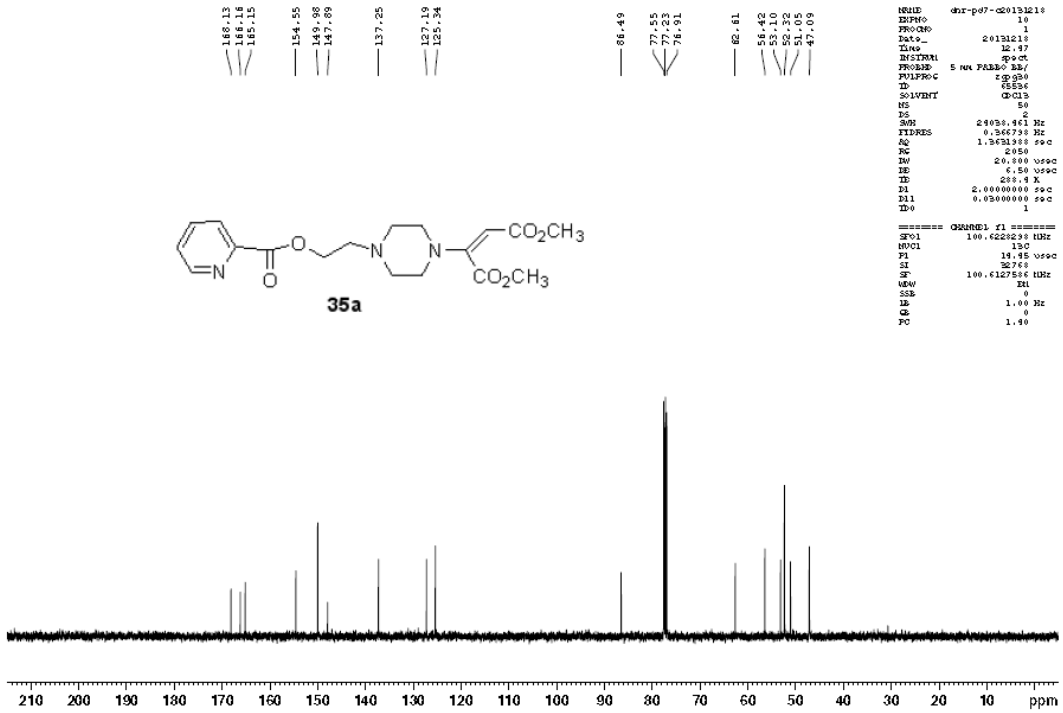

8.964
7.349
5.376
4.768
4.359
4.346
4.332
3.903
3.627
3.166
3.154
3.141
2.694
2.689
2.686
2.547
2.535
2.522
0.000
33a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
0.90
2.00
1.00
2.01
3.00
3.00
4.00
2.00
4.00

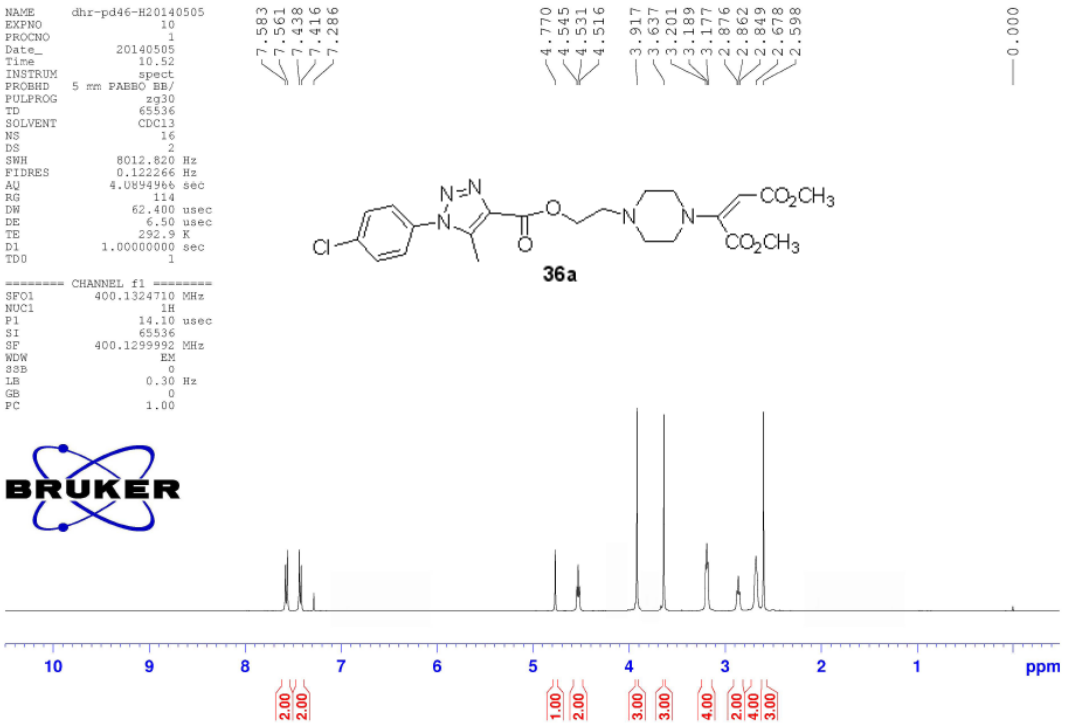

168.07
166.10
165.44
154.39
144.01
96.41
77.55
77.23
76.91
63.22
56.00
53.37
52.06
50.99
48.72
46.94
33a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

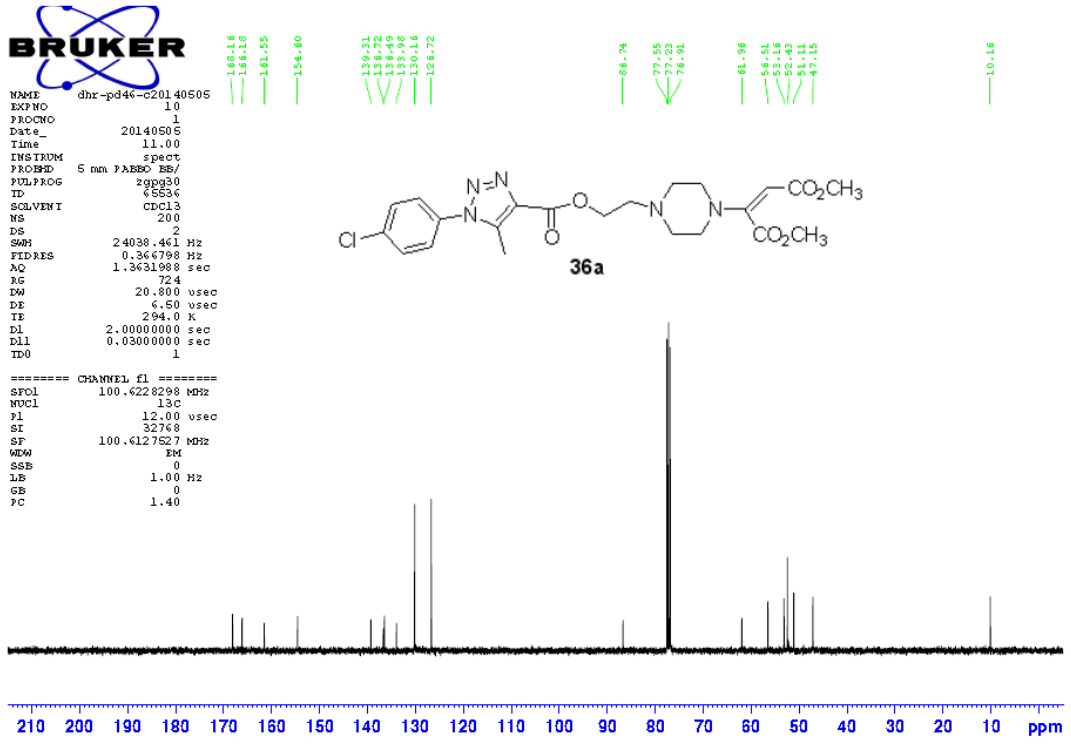

7.622
7.409
7.197
7.188
6.544
6.539
6.535
4.780
4.444
4.431
4.418
3.916
3.696
3.638
3.620
3.183
3.172
2.787
2.774
2.761
2.653
2.639
0.000
CO2CH3
CO2CH3
34a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
1.00 1.01 1.01 1.01 2.00 3.00 3.00 4.01 2.01 4.00

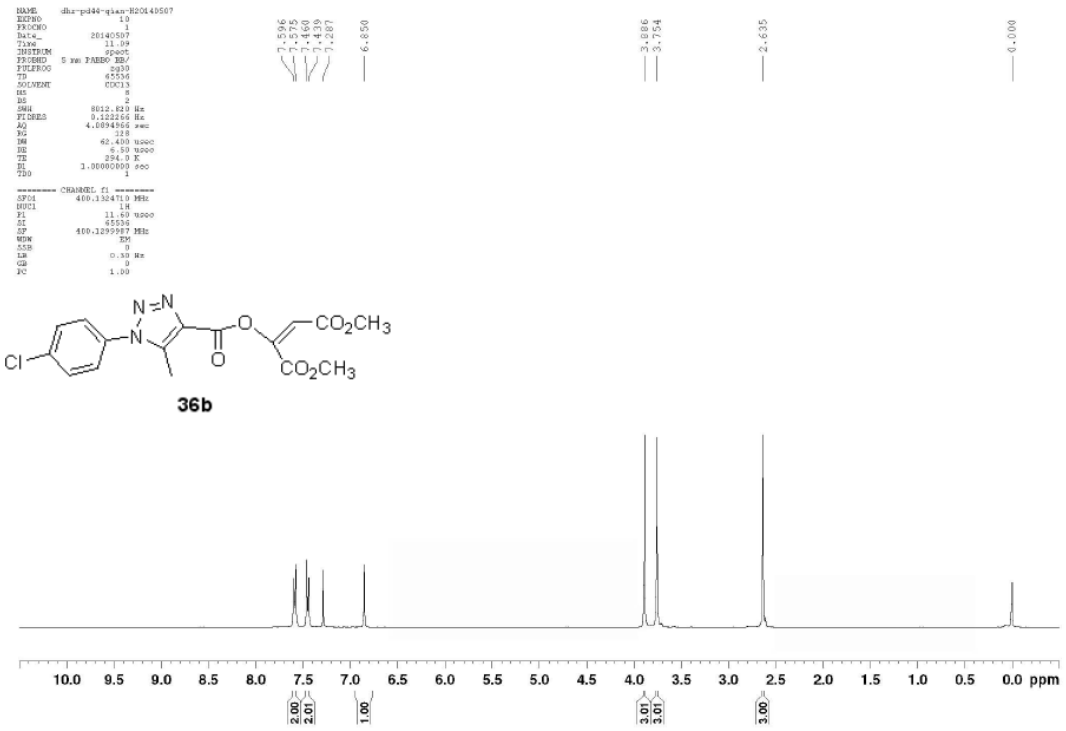

167.82
165.83
158.24
154.33
146.38
144.22
119.00
111.79
86.01
77.55
77.23
76.91
61.79
56.17
52.78
52.56
50.69
46.87
CO2CH3
CO2CH3
34a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


8.779
8.777
8.765
8.144
8.124
7.900
7.896
7.881
7.867
7.857
7.533
7.521
7.518
7.514
7.502
7.499
7.316
4.772
4.566
4.552
4.537
3.920
3.638
3.196
3.183
3.171
2.858
2.843
2.829
2.644
2.626
CO2CH3
CO2CH3
35a
NAME dhr-pd7-m20131218
EXPNO 10
PROCNO 1
Date_ 20131218
Time 12.43
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 57
DW 62.400 usec
DE 6.50 usec
TE 287.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SF01 400.1324710 MHz
NUC1 1H
P1 12.90 usec
SI 65536
SF 400.1299873 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
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
1.00
1.00
1.00
1.01
1.00
2.00
3.01
3.00
4.01
2.00
4.01

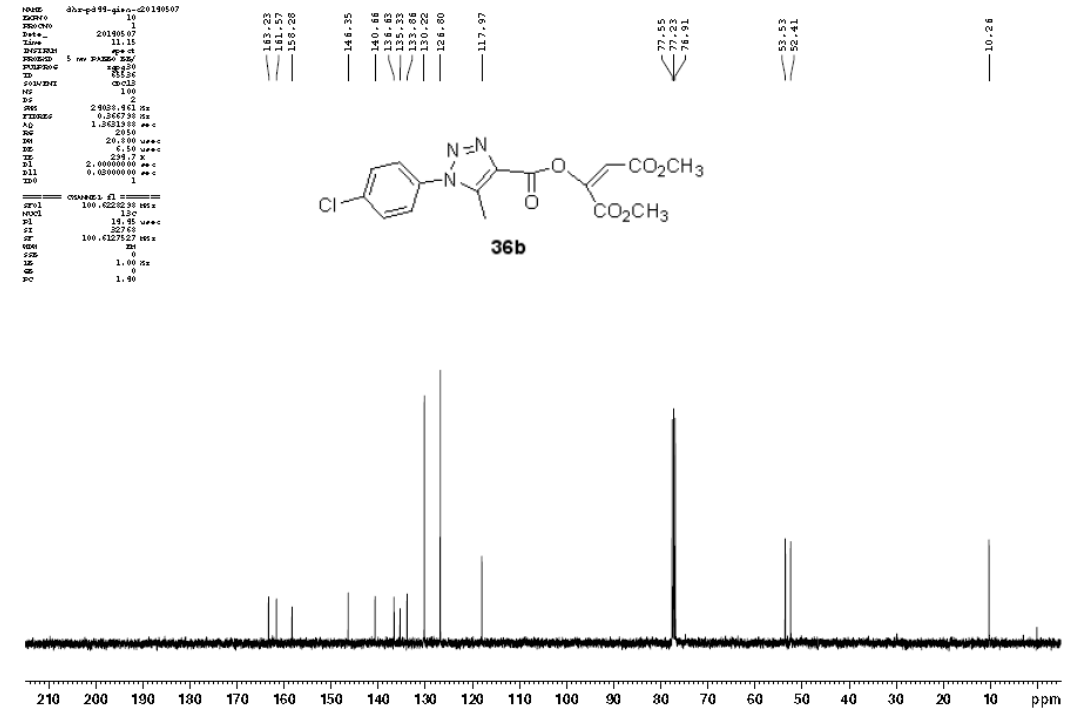

168.13
166.16
165.15
154.55
149.98
147.89
137.25
127.19
125.34
86.49
77.55
77.23
76.91
62.61
56.42
53.10
52.32
51.05
47.09
CO2CH3
CO2CH3
35a
NAME dhr-pd7-c20131218
EXPNO 10
PROCNO 1
Date_ 20131218
Time 12.47
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366738 Hz
AQ 1.3631988 sec
RG 2050
DW 20.800 usec
DE 6.50 usec
TE 288.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SF01 100.6228298 MHz
NUC1 13C
P1 19.45 usec
SI 32768
SF 100.6127586 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


NAME dhr-pd46-H20140505
EXPNO 10
PROCNO 1
Date_ 20140505
Time 10.52
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 114
DW 62.400 usec
DE 6.50 usec
TE 292.9 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1299992 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.583
7.561
7.438
7.416
7.286
4.770
4.545
4.531
4.516
3.917
3.637
3.201
3.189
3.177
2.876
2.862
2.849
2.678
2.598
0.000
Cl
CO2CH3
CO2CH3
36a
BRUKER
10
9
8
7
6
5
4
3
2
1
ppm
2.00
2.00
1.00
2.00
3.00
3.00
4.00
2.00
4.00
3.00

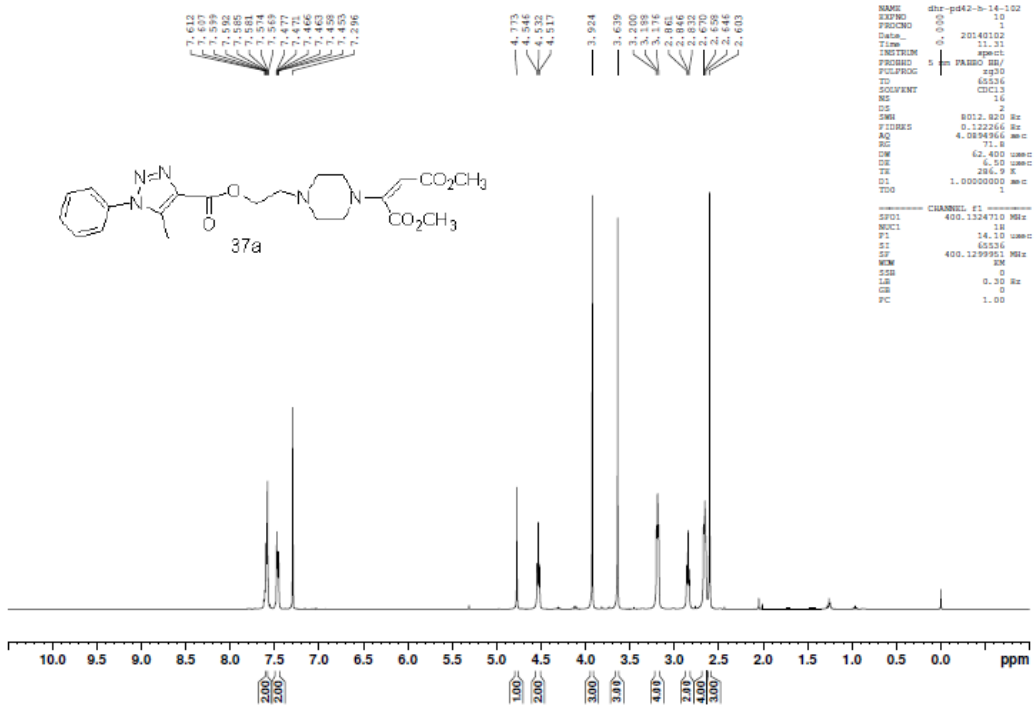

BRUKER
NAME dhr-pd46-c20140505
EXPNO 10
PROCNO 1
Date_ 20140505
Time 11.00
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 200
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 724
DW 20.800 usec
DE 6.50 usec
TE 294.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127527 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
168.16
166.18
161.55
154.60
139.31
136.72
135.49
133.98
130.16
126.72
86.74
77.55
77.23
76.91
61.96
56.51
53.18
52.43
51.11
47.15
10.16
Cl
CO2CH3
CO2CH3
36a
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

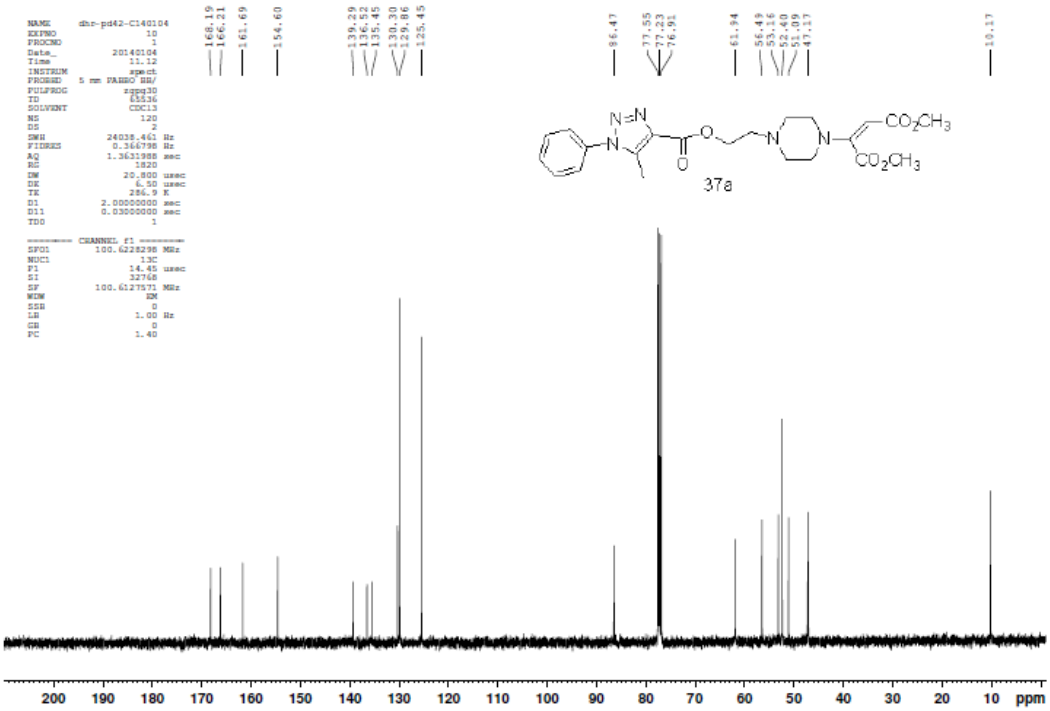

7.596
7.575
7.460
7.439
7.287
6.850
3.886
3.754
2.635
0.000
Cl
N
N
O
O
O
CO2CH3
CO2CH3
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
2.00
2.01
1.00
3.01
3.01
3.00

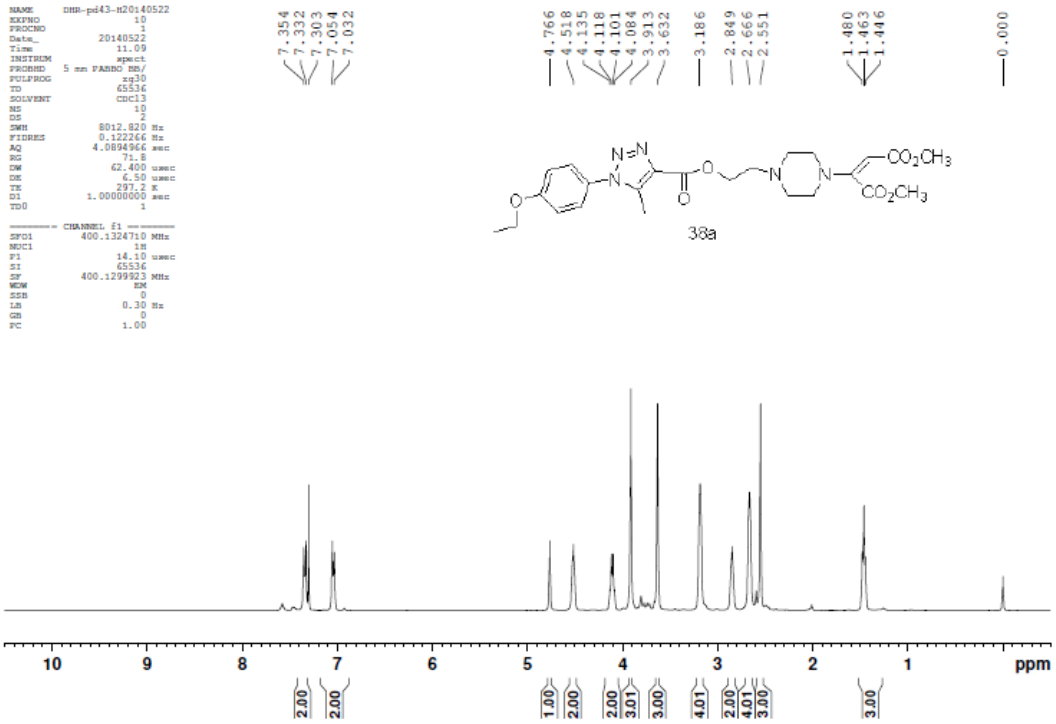
36b

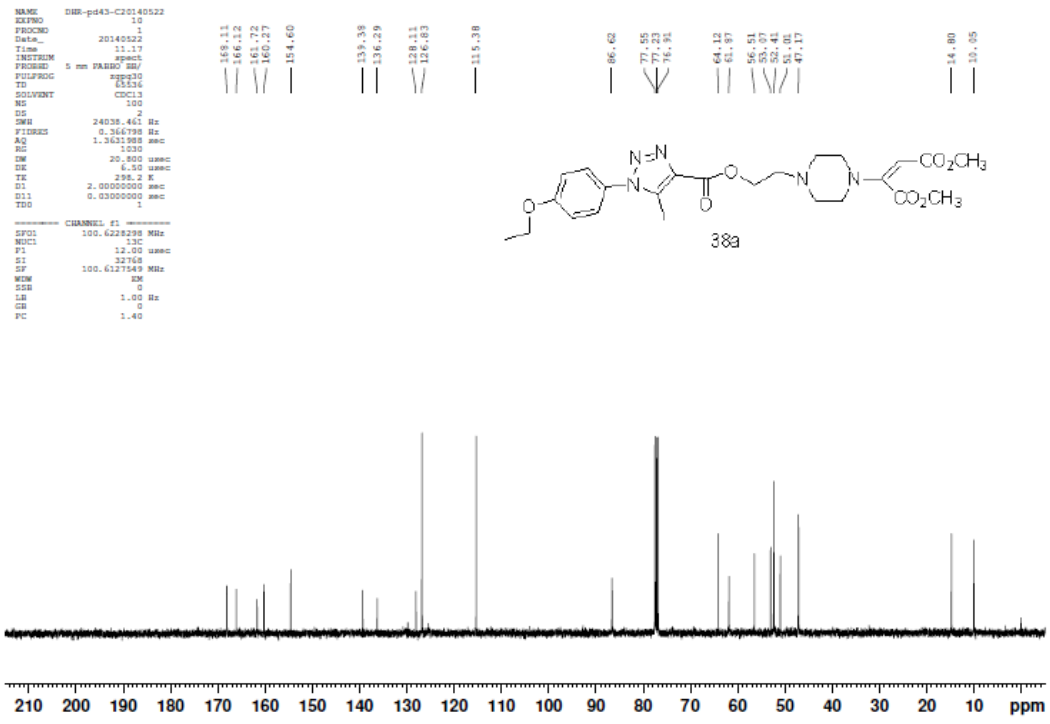

163.23
161.57
150.28
146.35
140.68
136.85
135.33
133.68
133.02
130.82
126.80
117.97
77.55
77.23
76.91
53.53
52.41
10.26
Cl
N
N
O
O
O
CO2CH3
CO2CH3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

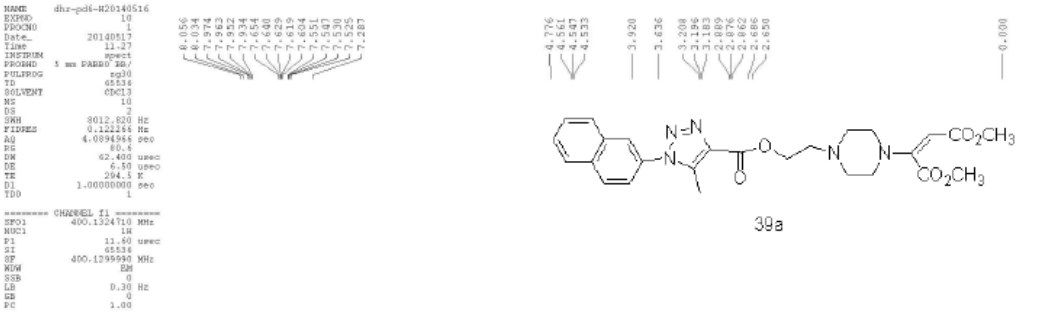
36b

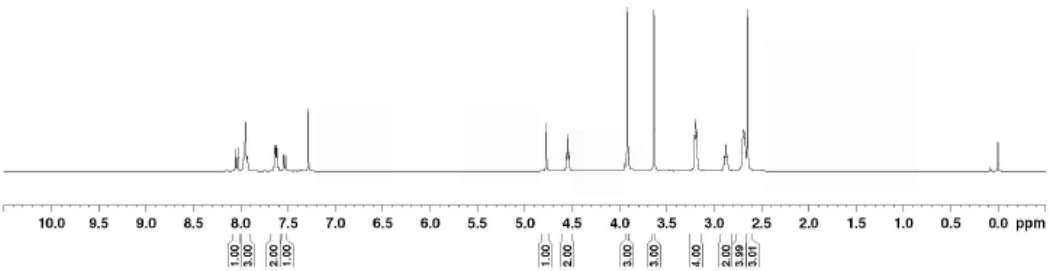

7.612
7.607
7.599
7.582
7.581
7.574
7.569
7.477
7.472
7.466
7.463
7.458
7.453
7.296
4.773
4.546
4.532
4.517
3.924
3.639
3.200
3.188
3.178
2.865
2.846
2.832
2.670
2.658
2.646
2.603
CO2CH3
CO2CH3
37a
NAME dhr-pd42-h-14-102
EXPNO 10
PROCNO 1
Date_ 20140102
Time 11.31
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 71.8
DW 62.400 usec
DE 6.50 usec
TE 286.9 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1299951 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
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 ppm
2.00 2.00 1.00 2.00 3.00 3.00 4.08 2.08 4.00 3.00

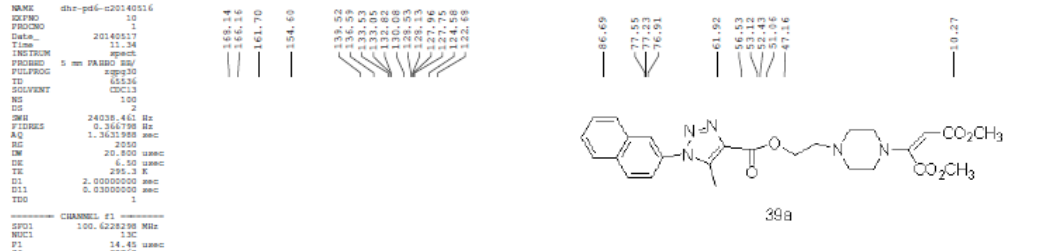

168.19
166.21
161.69
154.60
139.29
136.52
135.45
130.30
129.86
125.45
86.47
77.55
77.23
76.91
61.94
56.49
53.46
52.60
51.09
47.17
10.17
CO2CH3
CO2CH3
37a
NAME dhr-pd42-C140104
EXPNO 10
PROCNO 1
Date_ 20140104
Time 11.12
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 120
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 1820
DW 20.800 usec
DE 6.50 usec
TE 286.9 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 14.45 usec
SI 32768
SF 100.6127571 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

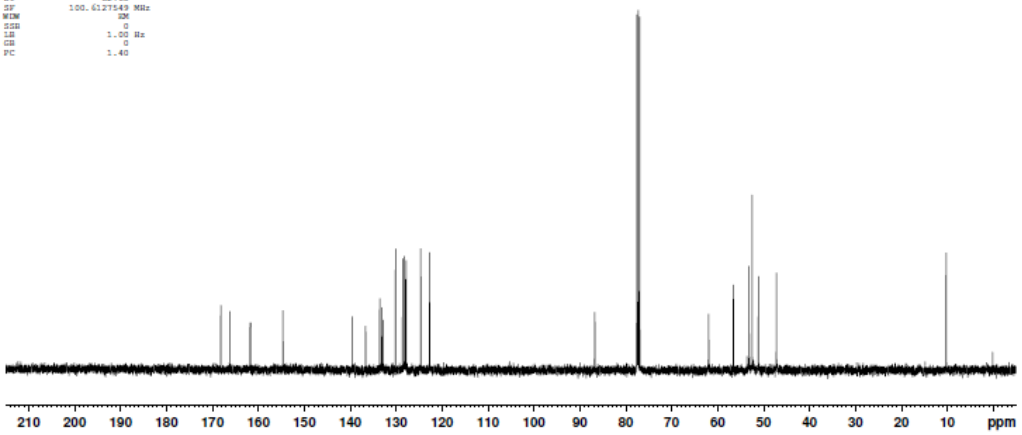

NAME DHR-pd43-H20140522
EXPNO 10
PROCNO 1
Date_ 20140522
Time 11.09
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 10
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 71.8
DW 62.400 usec
DE 6.50 usec
TE 297.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1299923 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.354
7.332
7.303
7.054
7.032
4.766
4.518
4.135
4.118
4.101
4.084
3.913
3.632
3.186
2.849
2.666
2.551
1.480
1.463
1.446
0.000
38a
10
9
8
7
6
5
4
3
2
1
ppm
2.00
2.00
1.00
2.00
2.00
3.01
3.00
4.01
2.00
4.01
3.00
3.00

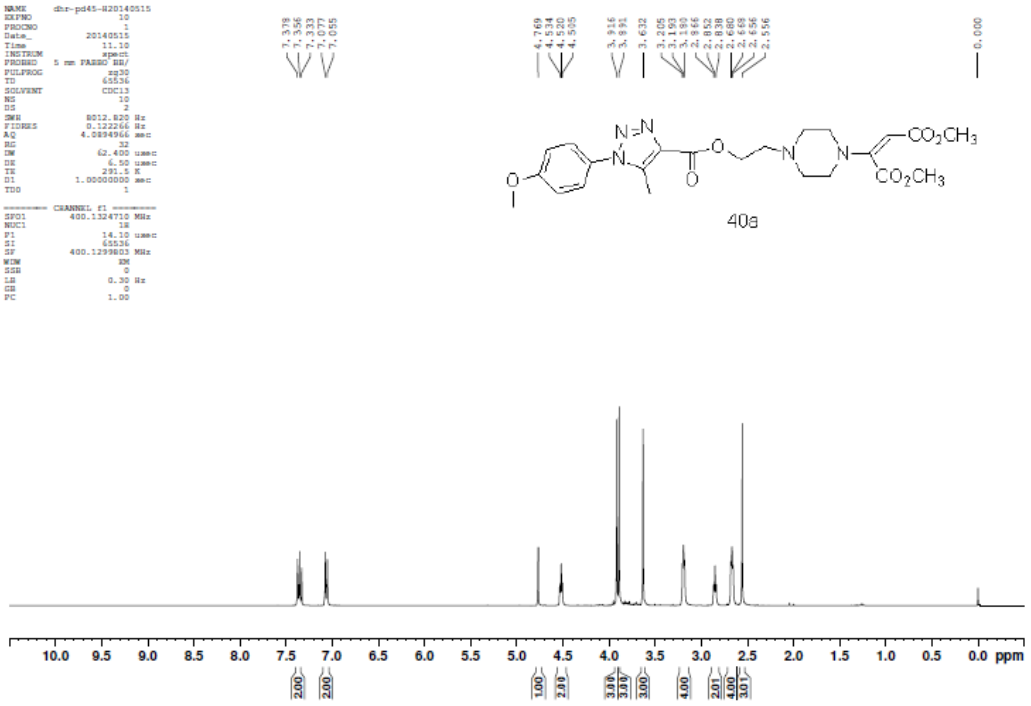

NAME DHR-pd43-C20140522
EXPNO 10
PROCNO 1
Date_ 20140522
Time 11.17
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 100
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 1030
DW 20.800 usec
DE 6.50 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127549 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
168.11
166.12
161.72
160.27
154.60
139.38
136.29
128.11
126.83
115.38
86.62
77.55
77.23
76.91
64.12
61.97
56.51
53.07
52.41
51.01
47.17
14.80
10.05
38a
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

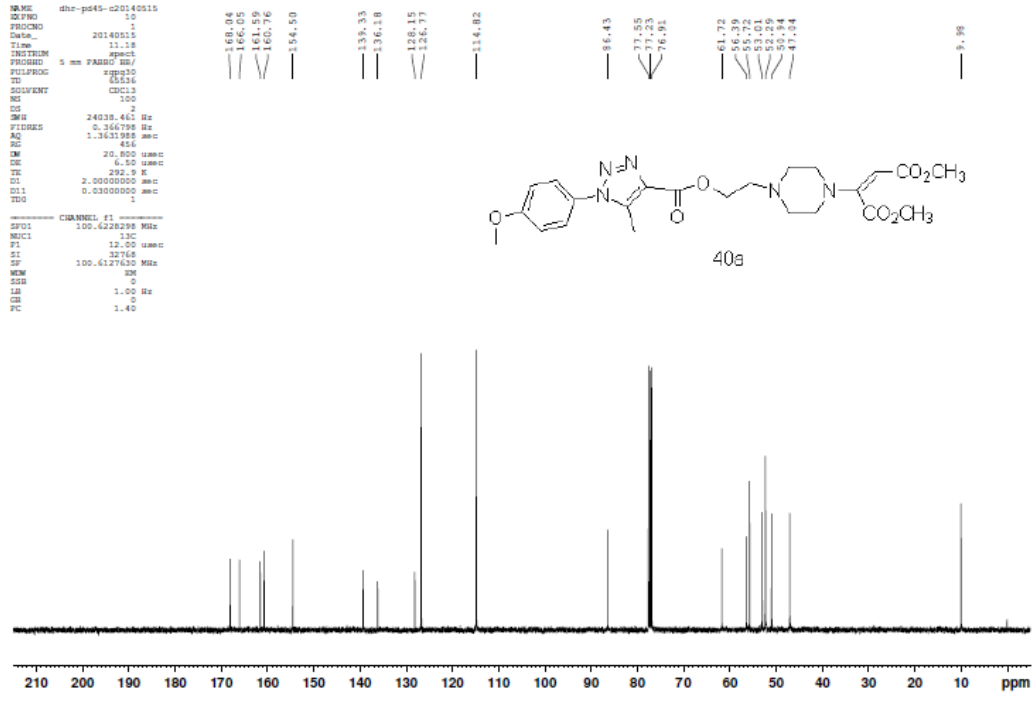

39a

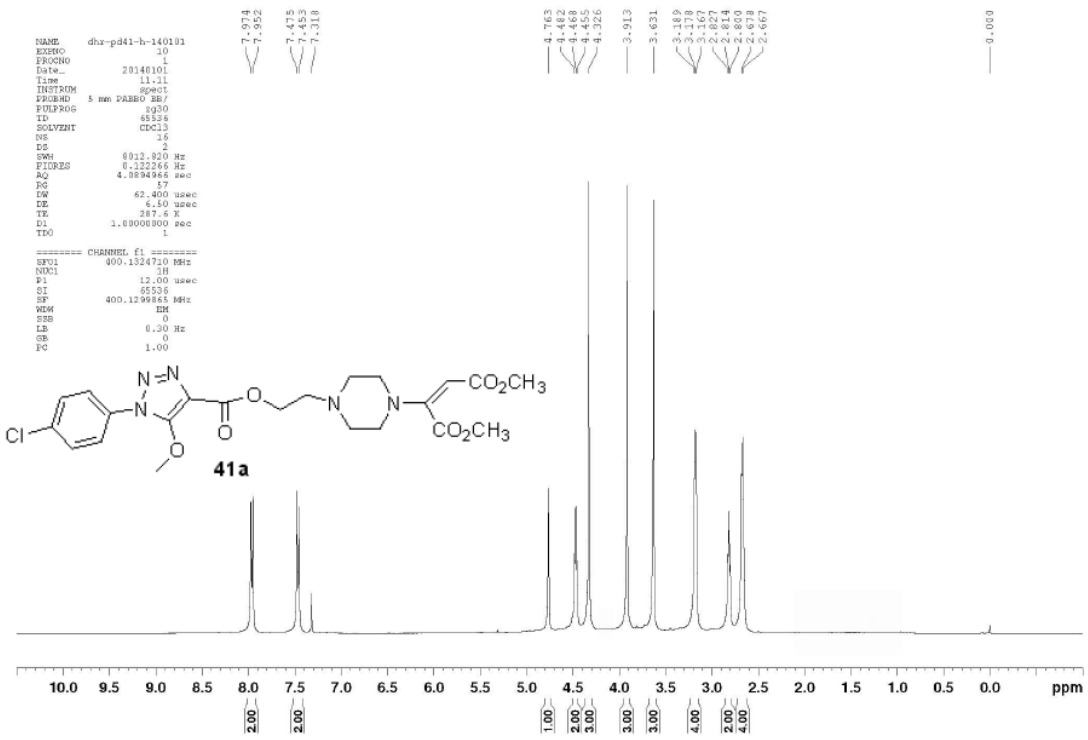

10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm

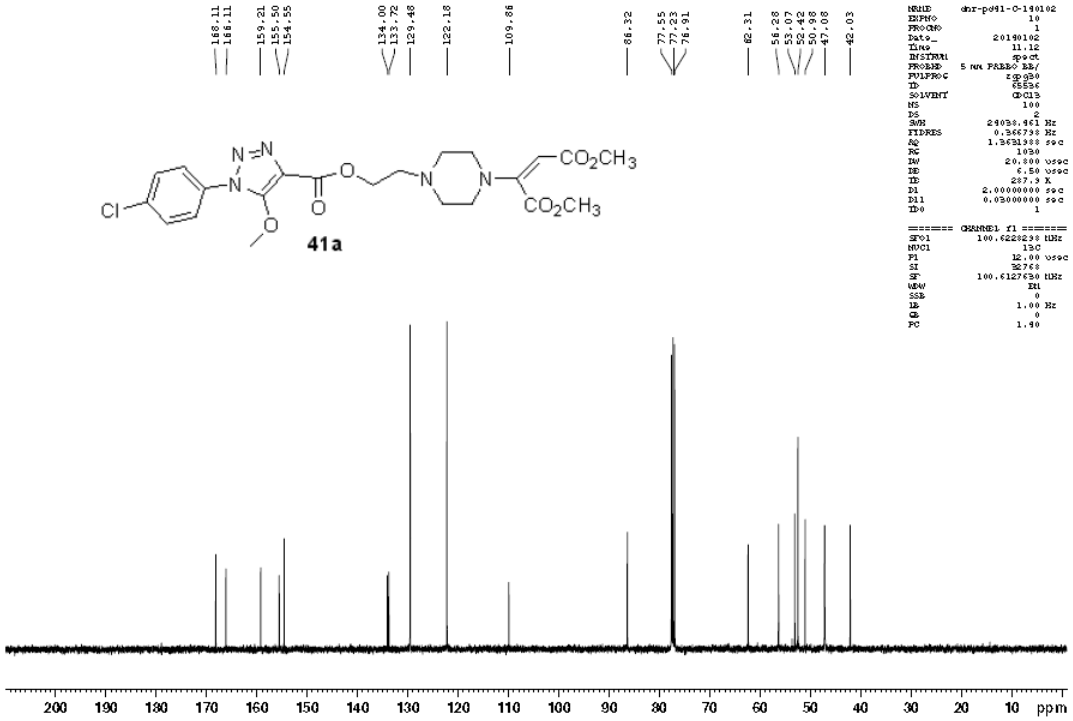

39a

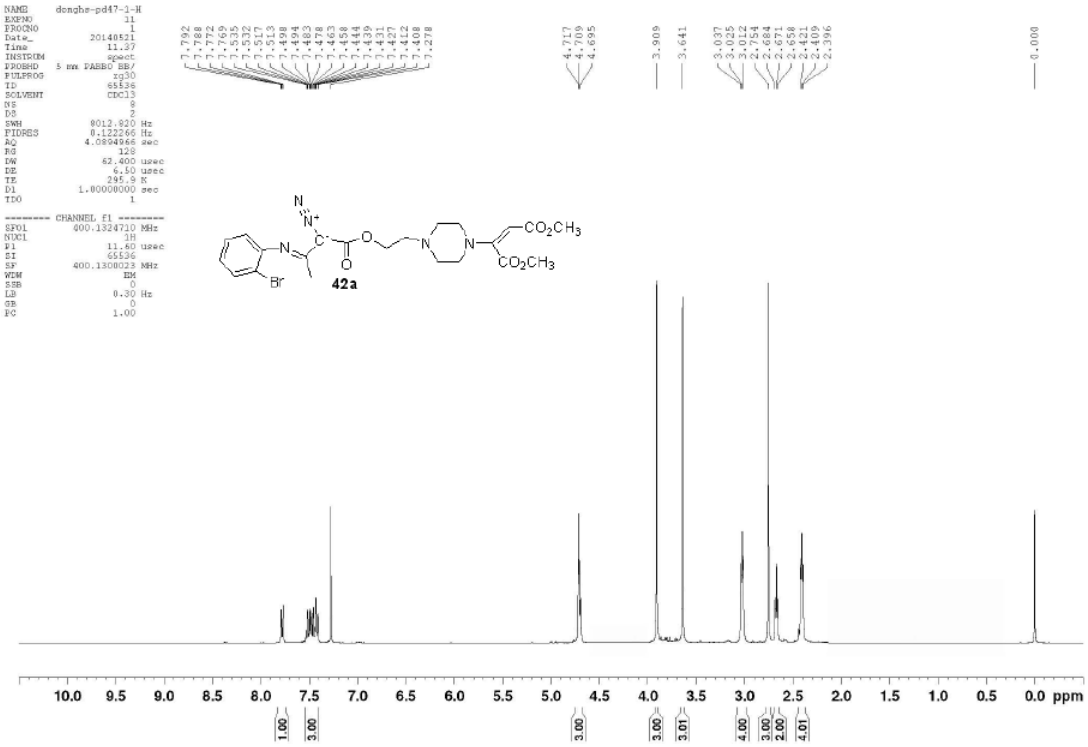

210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

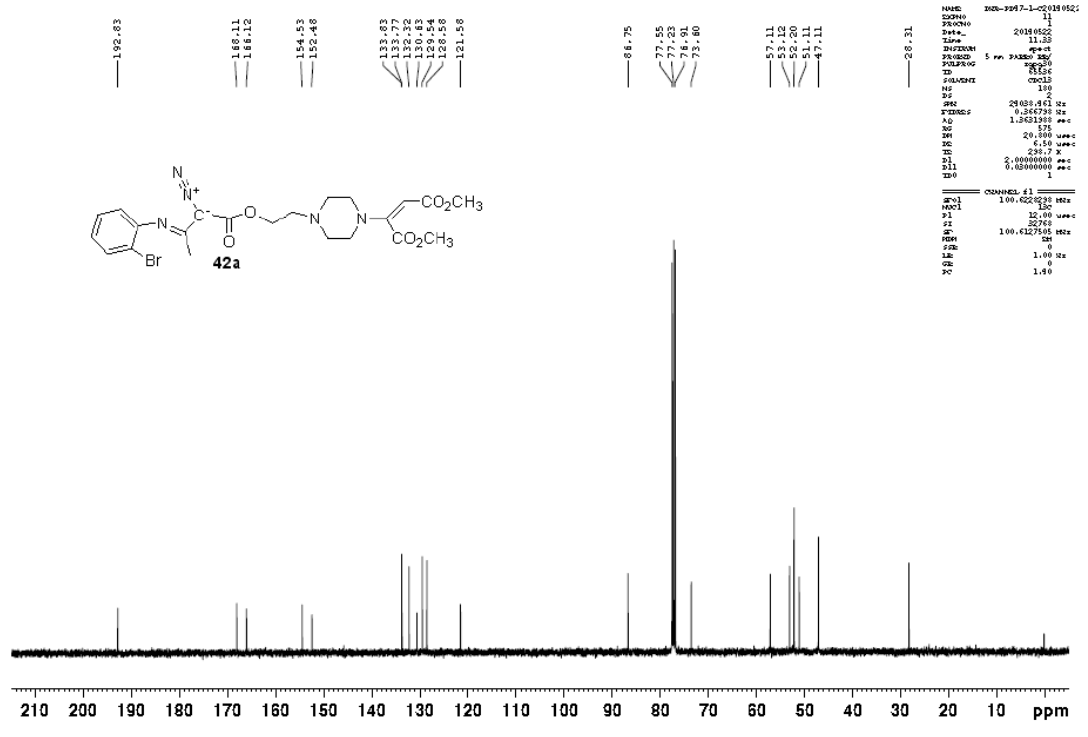

NAME dhr-pd45-H20140515
EXPNO 10
PROCNO 1
Date_ 20140515
Time 11.10
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 10
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 32
DW 62.400 usec
DE 6.50 usec
TE 291.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1299803 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.378
7.356
7.333
7.077
7.055
4.769
4.534
4.520
4.505
3.916
3.891
3.632
3.205
3.193
3.180
2.866
2.853
2.838
2.680
2.668
2.656
2.556
0.000
CO2CH3
CO2CH3
40a
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
2.00
2.00
1.00
2.06
3.06
3.07
3.00
4.00
2.01
4.00
3.01

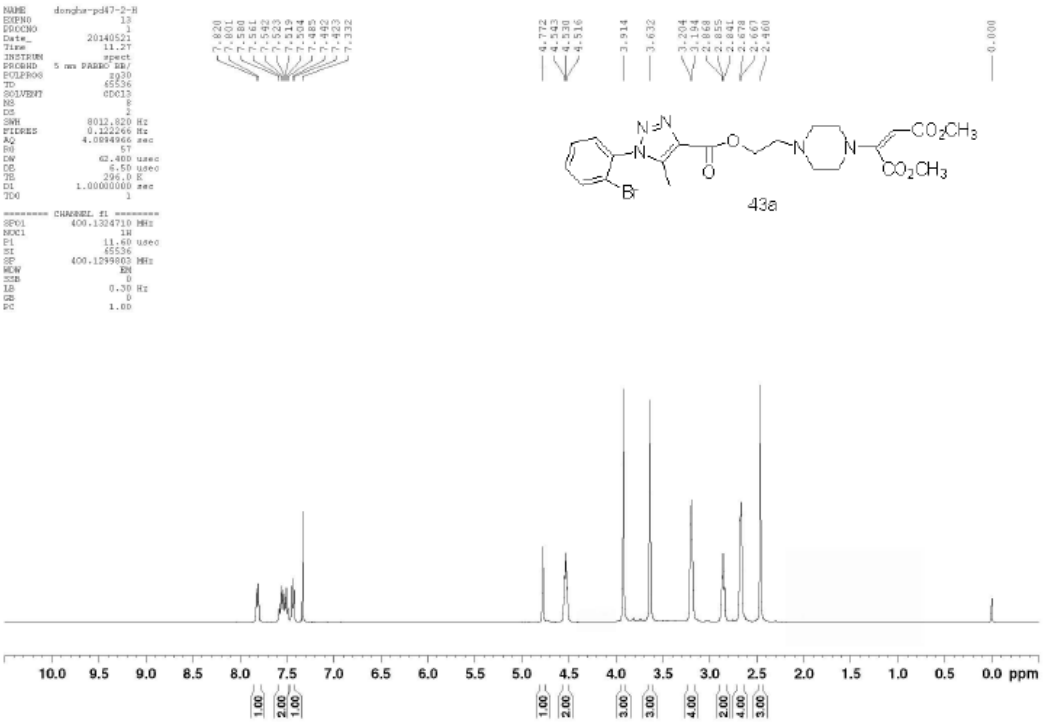

NAME dhr-pd45-c20140515
EXPNO 10
PROCNO 1
Date_ 20140515
Time 11.18
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 100
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 456
DW 20.800 usec
DE 6.50 usec
TE 292.9 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127630 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
168.04
166.05
161.59
160.76
154.50
139.33
136.18
126.15
125.77
114.82
86.43
77.55
77.23
76.91
61.72
56.39
55.72
53.01
52.20
50.94
47.04
9.98
CO2CH3
CO2CH3
40a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

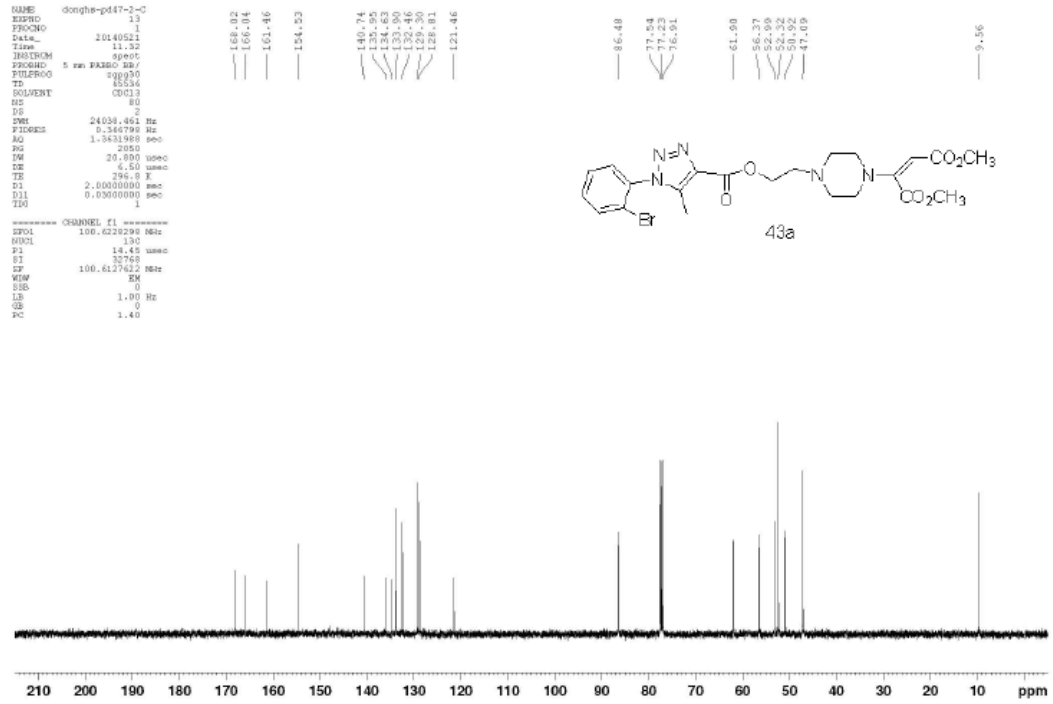

NAME dhr-pd41-h-140101
EXPNO 10
PROCNO 1
Date_ 20140101
Time 11.11
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 57
DW 62.400 usec
DE 6.50 usec
TE 287.6 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 12.00 usec
SI 65536
SF 400.1299865 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.974
7.952
7.475
7.453
7.318
4.763
4.482
4.468
4.455
4.326
3.913
3.631
3.189
3.178
3.167
2.827
2.814
2.800
2.678
2.667
0.000
CO2CH3
CO2CH3
Cl
O
41a
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
2.00
2.00
1.00
2.00
3.00
3.00
3.00
4.00
2.00
4.00

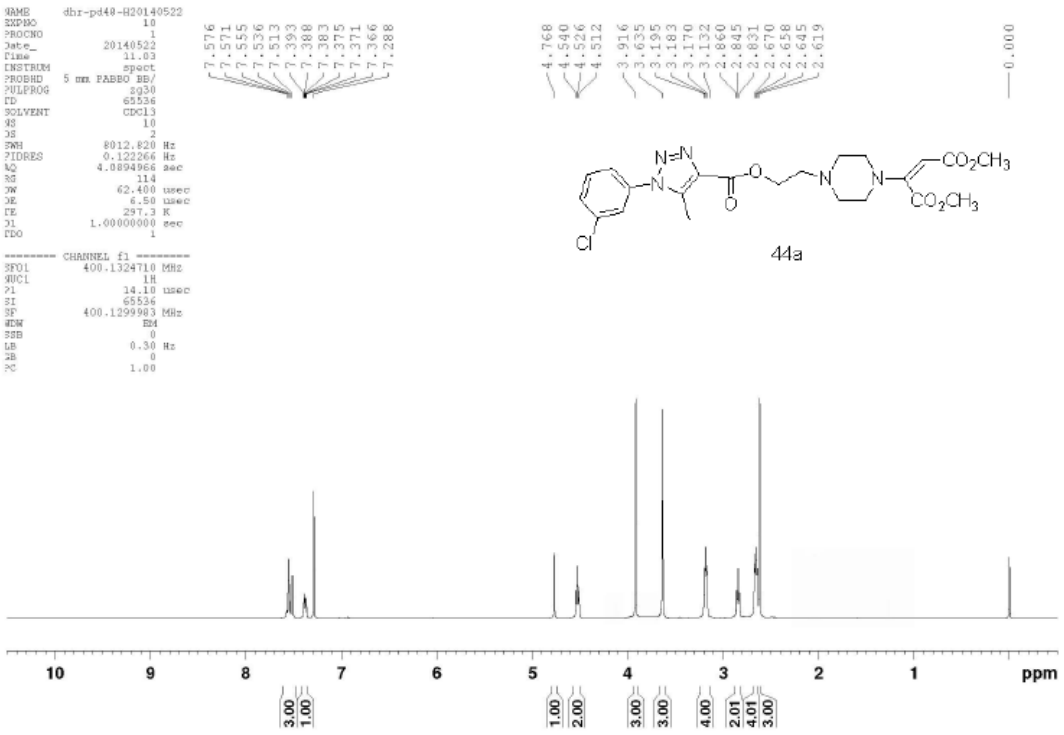

168.11
168.11
159.21
155.50
154.55
134.00
133.72
129.46
122.18
109.86
86.32
77.55
77.23
76.91
62.31
56.08
53.47
53.42
50.98
47.08
42.03
NAME dhr-pd41-C-140102
EXPNO 10
PROCNO 1
Date_ 20140102
Time 11.12
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 100
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 1030
DW 20.800 usec
DE 6.50 usec
TE 287.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127630 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
CO2CH3
CO2CH3
Cl
O
41a
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

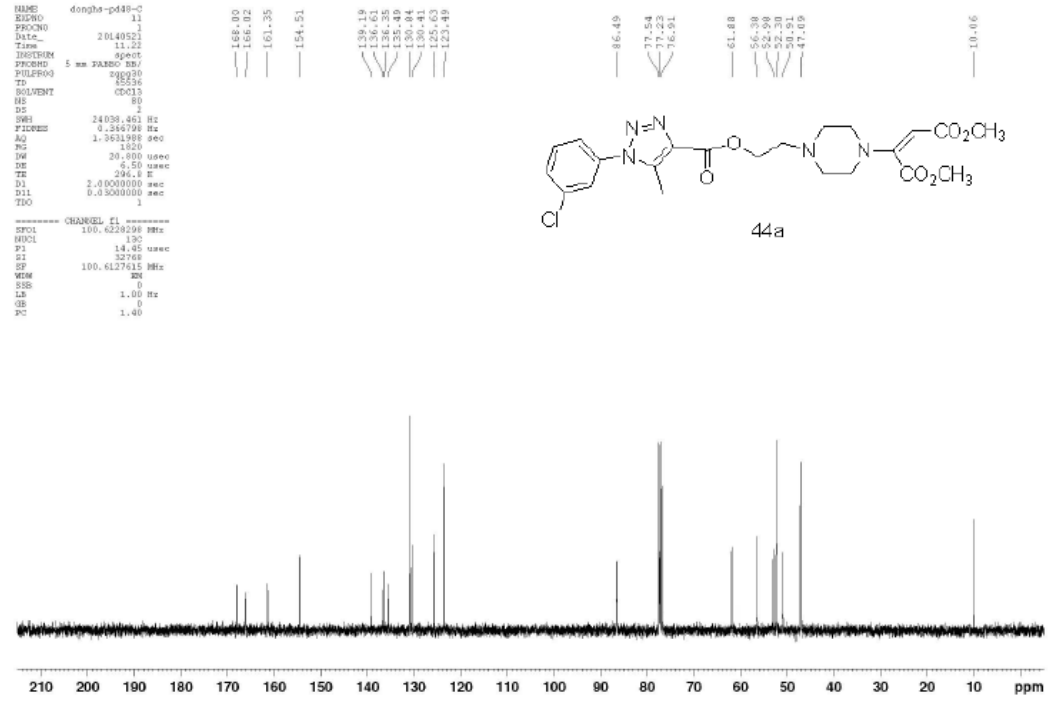

42a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm

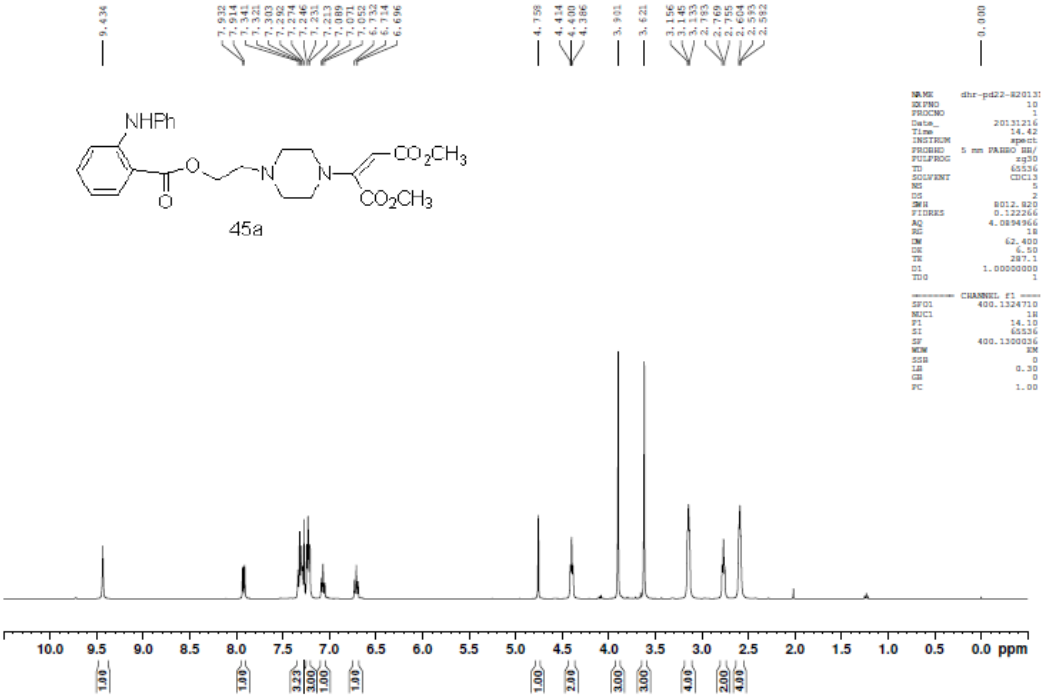

42a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

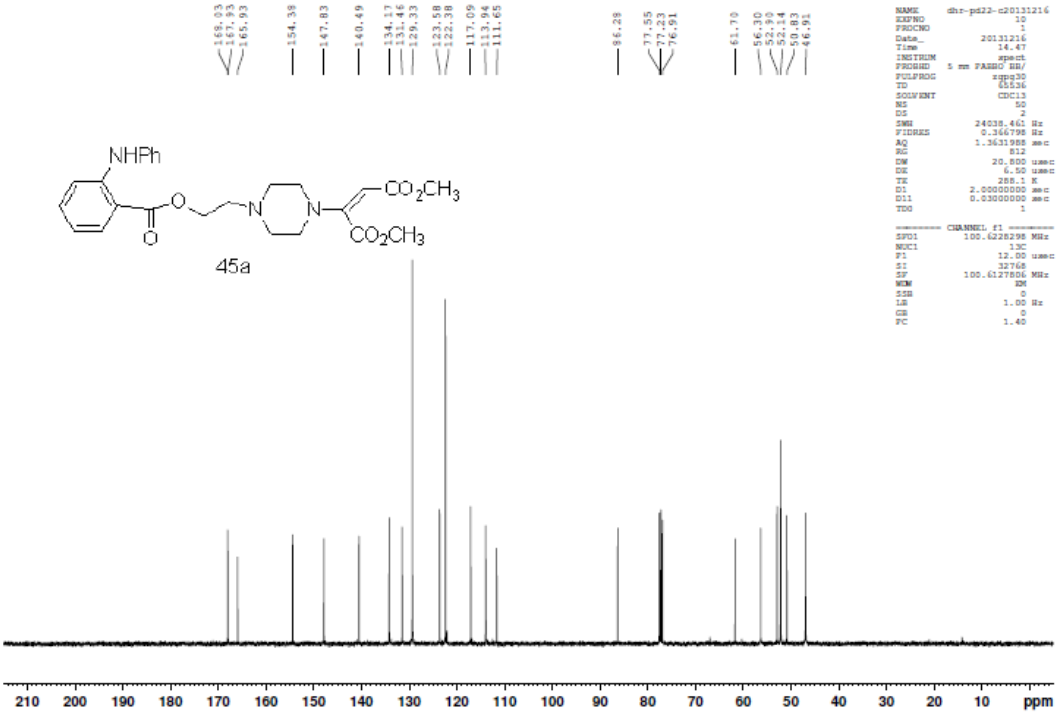

NAME donghe-pd47-2-H
EXPNO 13
PROCNO 1
Date_ 20140521
Time 11.27
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 57
DW 62.400 usec
DE 6.50 usec
TE 296.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 11.60 usec
SI 65536
SF 400.1299803 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.820
7.801
7.580
7.561
7.532
7.513
7.504
7.485
7.482
7.463
7.332
4.772
4.543
4.530
4.516
3.914
3.632
3.204
3.194
3.068
2.855
2.841
2.678
2.667
2.460
0.000
CO2CH3
CO2CH3
Br
43a
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
1.00
2.00
1.00
1.00
2.00
3.00
3.00
4.00
2.00
4.00
3.00

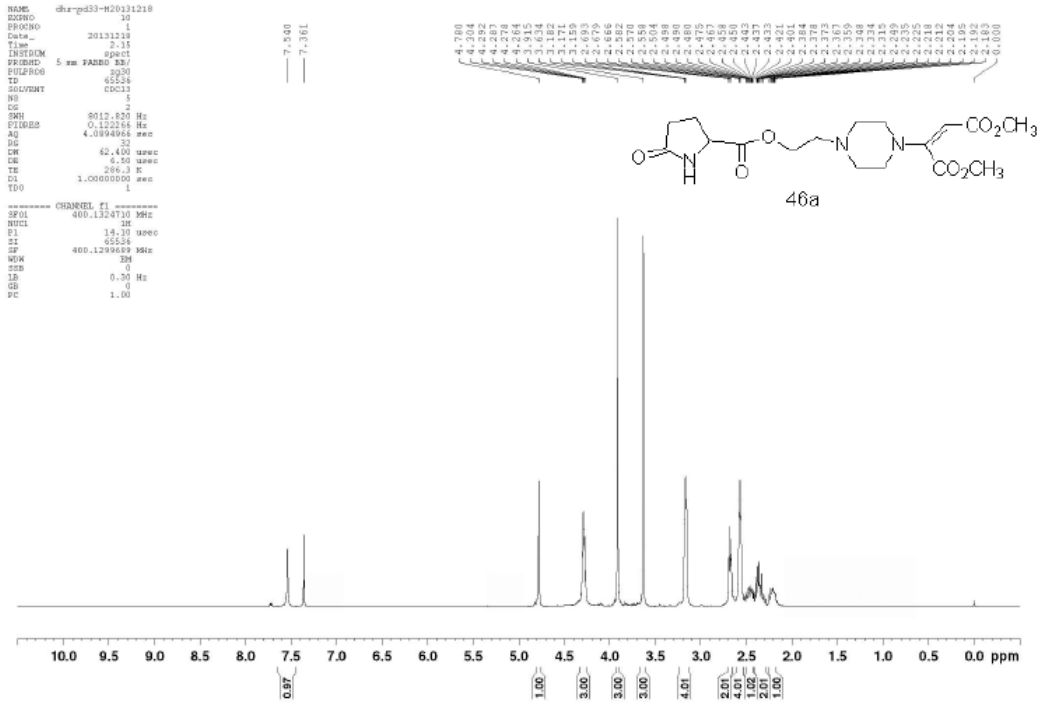

NAME donghe-pd47-2-C
EXPNO 13
PROCNO 1
Date_ 20140521
Time 11.52
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 80
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 2050
DW 20.800 usec
DE 6.50 usec
TE 296.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 14.45 usec
SI 32768
SF 100.6127622 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
168.02
166.04
161.46
154.53
140.74
135.95
134.63
133.90
132.46
129.30
128.81
121.46
86.48
77.54
77.23
76.91
61.90
56.37
52.69
52.32
50.92
47.09
9.56
CO2CH3
CO2CH3
Br
43a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

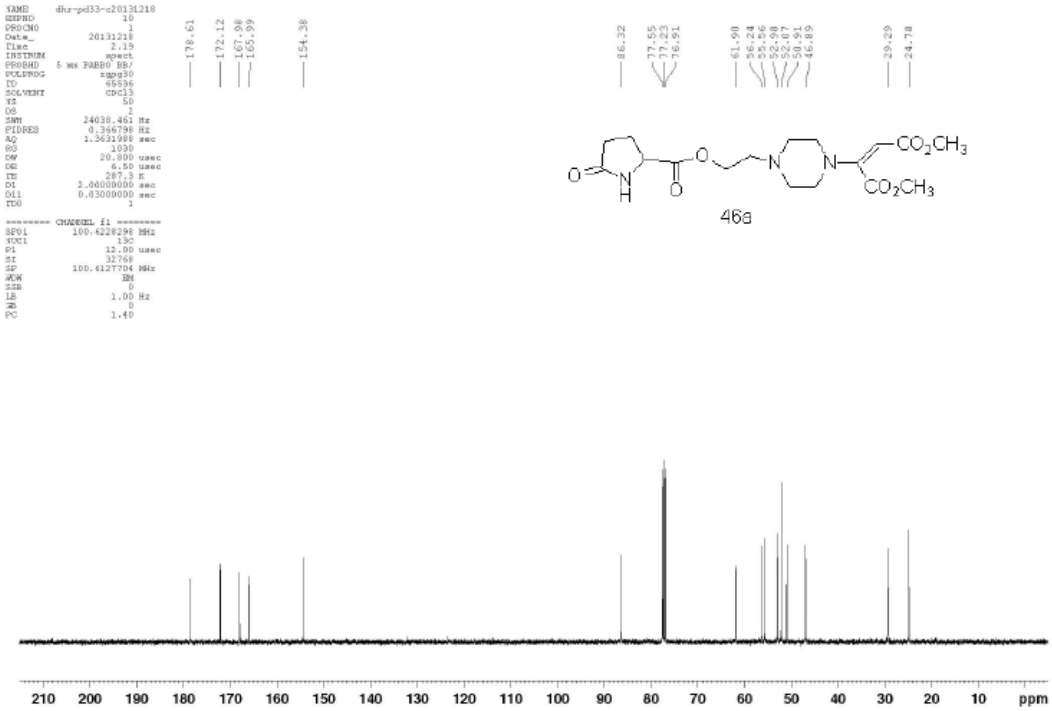

NAME dbr-pd48-H20140522
EXPNO 10
PROCNO 1
Date_ 20140522
Time 11.03
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 10
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 114
DW 62.400 usec
DE 6.50 usec
TE 297.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.10 usec
SI 65536
SF 400.1299983 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.576
7.571
7.555
7.536
7.513
7.393
7.388
7.383
7.375
7.371
7.366
7.288
4.768
4.540
4.526
4.512
3.916
3.635
3.195
3.183
3.170
3.132
2.860
2.845
2.831
2.670
2.658
2.645
2.619
0.000
44a
10
9
8
7
6
5
4
3
2
1
ppm
3.00
1.00
1.00
2.00
3.00
3.00
4.00
2.01
4.01
3.00

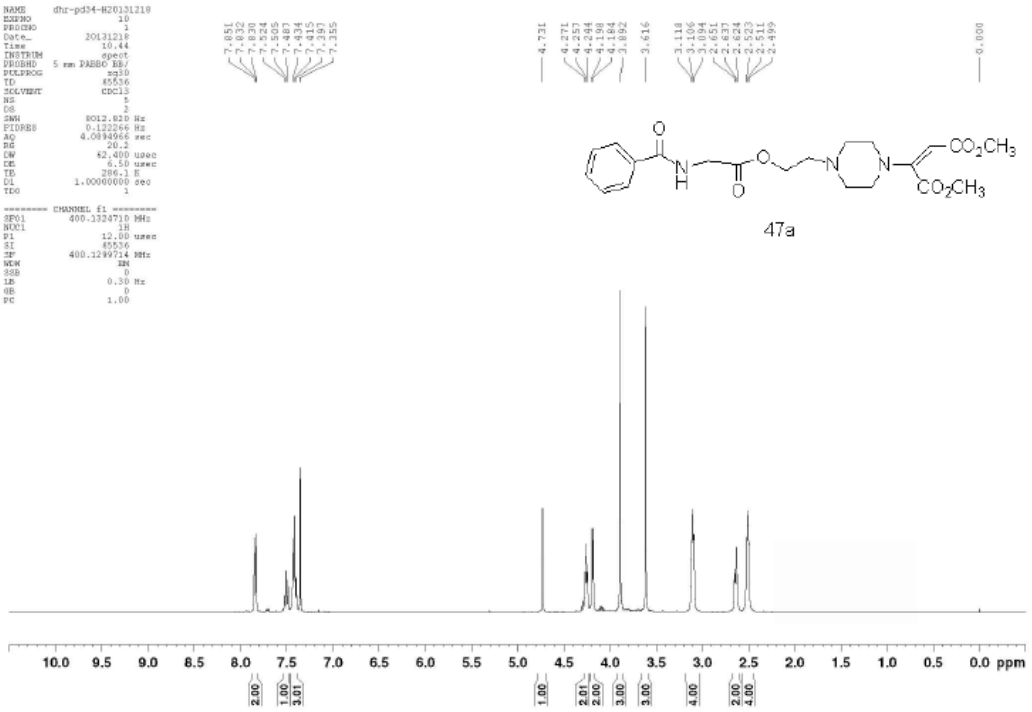

NAME dongha-pd48-C
EXPNO 11
PROCNO 1
Date_ 20140521
Time 11.22
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 80
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 1820
DW 20.800 usec
DE 6.50 usec
TE 296.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 14.45 usec
SI 32768
SF 100.6127615 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
168.00
166.02
161.35
154.51
139.19
136.61
136.35
135.49
130.84
130.41
125.63
123.49
86.49
77.54
77.23
76.91
61.88
56.38
52.99
52.30
50.91
47.69
10.46
44a
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

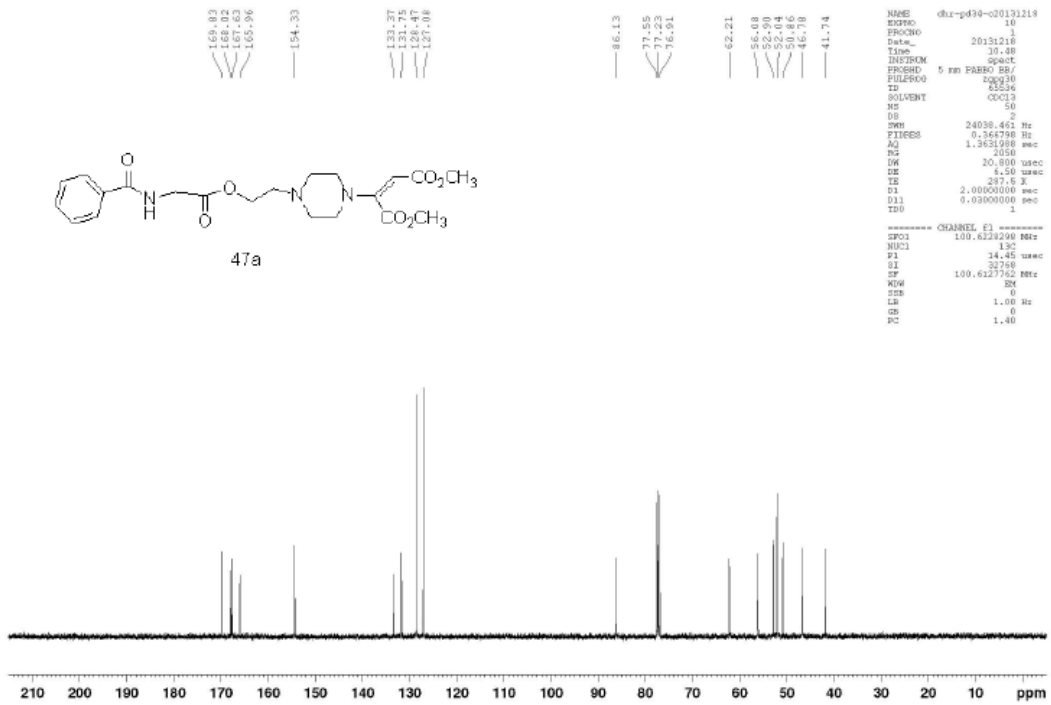

9.434
7.932
7.914
7.341
7.321
7.303
7.292
7.274
7.246
7.231
7.213
7.089
7.071
6.752
6.732
6.714
6.696
4.758
4.414
4.400
4.386
3.901
3.621
3.156
3.145
3.133
2.793
2.769
2.755
2.604
2.593
2.582
0.000
NHPh
CO2CH3
CO2CH3
45a
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
1.00 1.00 3.23 3.00 1.00 1.00 1.00 2.00 3.00 3.00 4.00 2.00 4.00

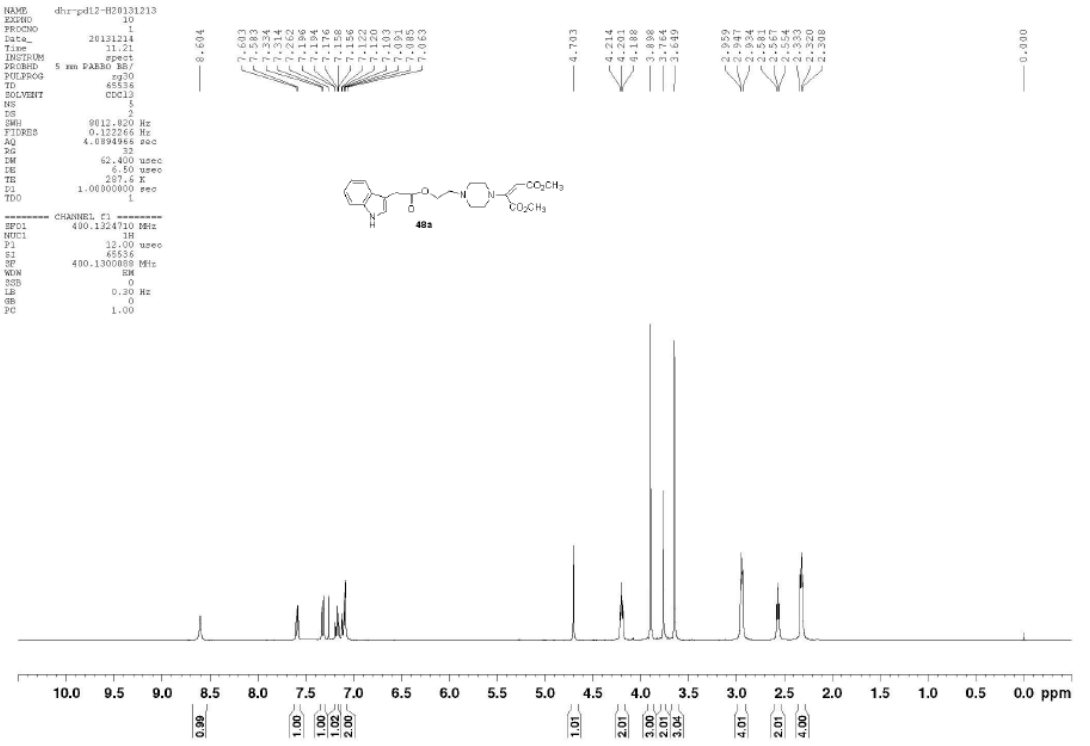

169.93
167.83
165.93
154.38
147.83
140.49
134.17
131.46
129.33
123.58
122.38
117.09
113.94
111.65
86.28
77.55
77.23
76.91
61.70
56.30
52.90
52.14
50.83
46.91
NHPh
CO2CH3
CO2CH3
45a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

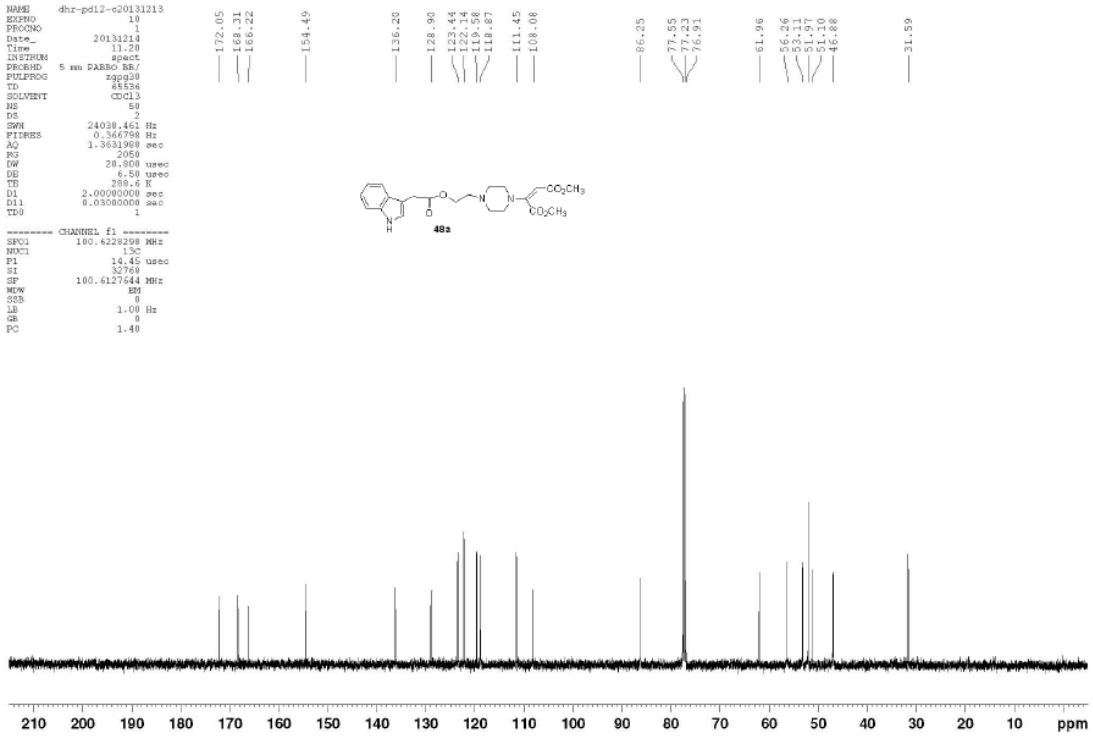

NAME dhz-pd33-H20131218
EXPNO 10
PROCNO 1
Date_ 20131218
Time 2.15
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 8012.820 Hz
FIDRES 0.122166 Hz
AQ 4.0894966 sec
RG 32
DW 62.400 usec
DE 6.50 usec
TE 286.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SF01 400.1324710 MHz
NUCL 1H
P1 14.20 usec
SI 65536
SF 400.1299689 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.540
7.361
4.700 4.304 4.292 4.287 4.278 4.265 4.254 3.634 3.182 3.171 3.159 3.149 2.679 2.666 2.582 2.570 2.558 2.504 2.498 2.490 2.480 2.475 2.467 2.458 2.450 2.443 2.437 2.423 2.411 2.401 2.384 2.378 2.373 2.367 2.359 2.348 2.334 2.315 2.289 2.235 2.225 2.218 2.212 2.204 2.195 2.192 2.183 0.000
46a
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
0.97 1.00 3.00 3.00 5.00 4.61 2.01 4.01 1.02 2.01 1.00

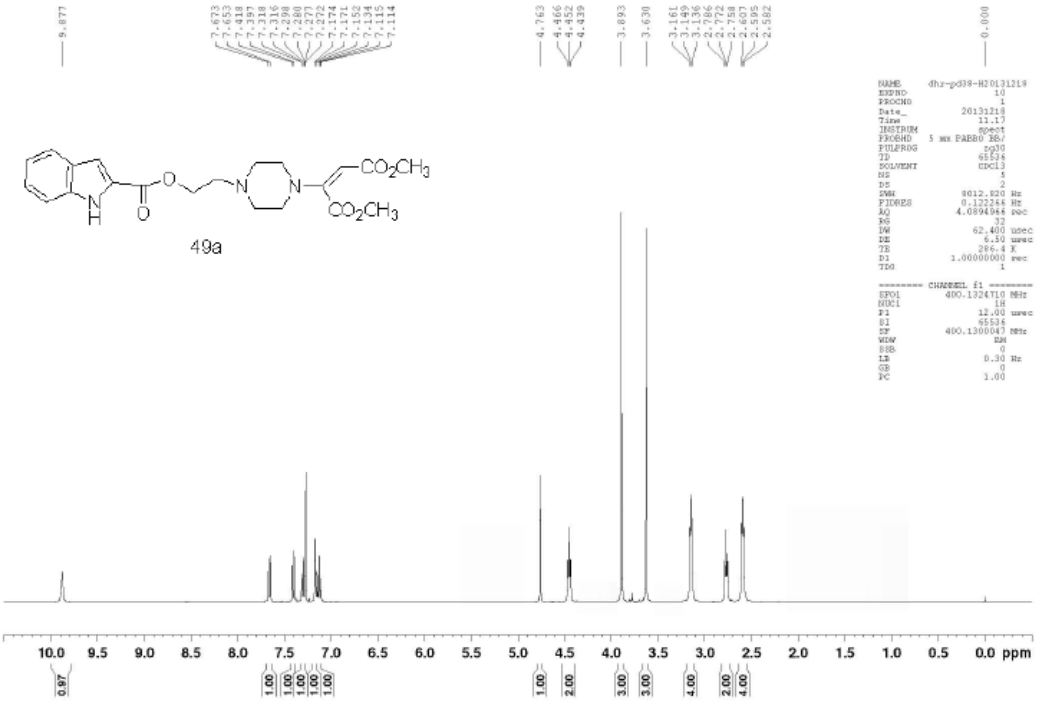

NAME dhz-pd33-c20131218
EXPNO 10
PROCNO 1
Date_ 20131218
Time 2.19
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366796 Hz
AQ 1.3631988 sec
RG 1030
DW 20.800 usec
DE 6.50 usec
TE 287.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SF01 100.6228296 MHz
NUC1 13C
P1 12.00 usec
SI 32768
SF 100.6127704 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
178.61
172.12
167.98
165.99
154.38
86.32
77.55
77.23
76.91
61.90
56.24
55.56
52.98
52.07
50.91
46.89
29.29
24.78
46a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


47a
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

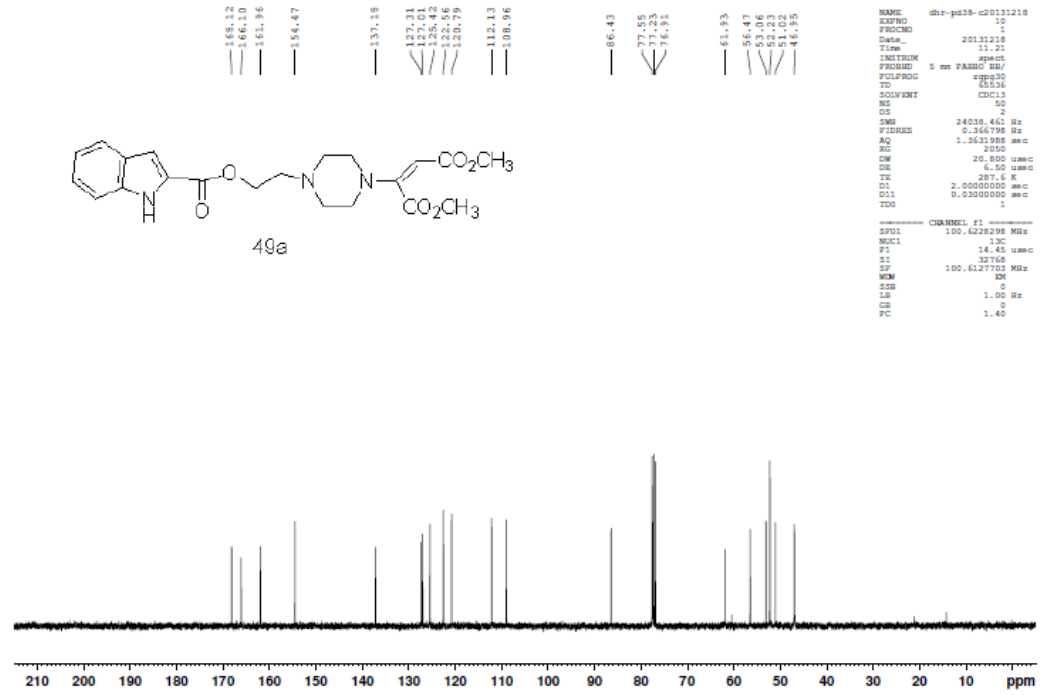

47a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


NAME dhr-pd12-H20131213
EXPNO 10
PROCNO 1
Date_ 20131214
Time 11.21
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 5
DS 2
SWH 9012.820 Hz
FIDRES 0.122266 Hz
AQ 4.6894966 sec
RG 32
DW 62.400 usec
DE 6.50 usec
TE 287.6 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 12.00 usec
SI 65536
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
8.604
7.603
7.583
7.334
7.214
7.196
7.194
7.176
7.158
7.156
7.122
7.120
7.103
7.091
7.085
7.063
4.703
4.214
4.201
4.188
3.898
3.764
3.649
2.959
2.947
2.934
2.581
2.567
2.554
2.333
2.320
2.308
0.000
48a
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
0.99 1.00 1.00 1.02 2.00 1.01 2.01 3.00 2.01 3.04 4.01 2.01 4.00

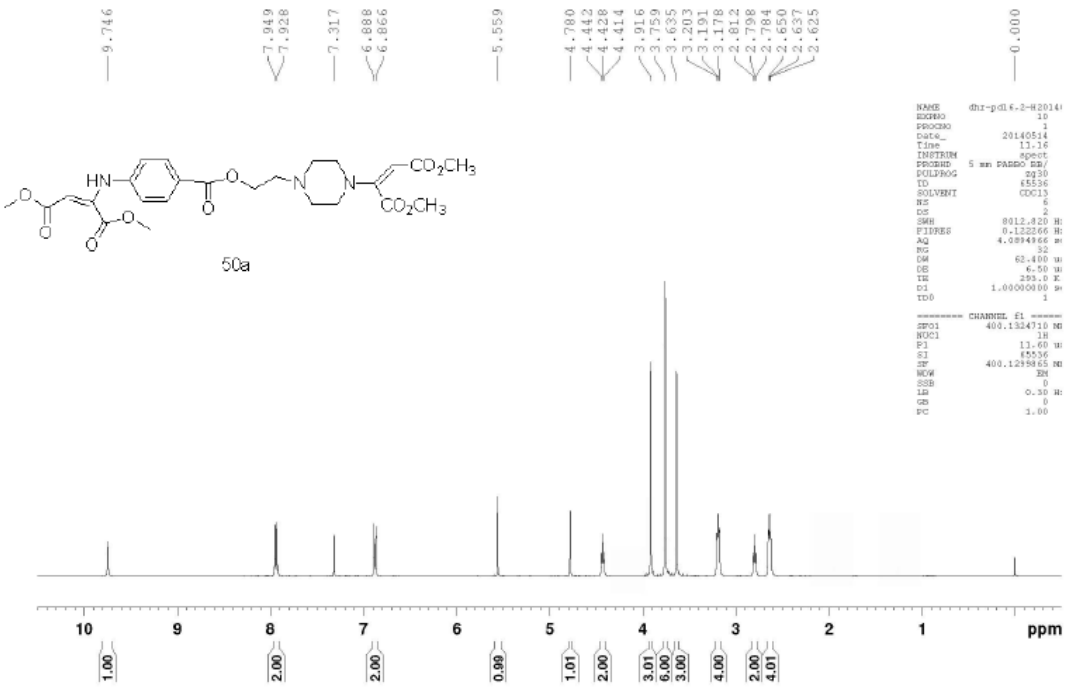

NAME dhr-pd12-c20131213
EXPNO 10
PROCNO 1
Date_ 20131214
Time 11.20
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 2050
DW 20.800 usec
DE 6.50 usec
TE 288.6 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 14.45 usec
SI 32768
SF 100.6127544 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
172.05
168.31
166.22
154.49
136.20
128.90
123.44
122.14
119.58
118.87
111.45
108.08
86.25
77.55
77.23
76.91
61.96
56.26
53.11
51.67
51.10
46.88
31.59
48a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

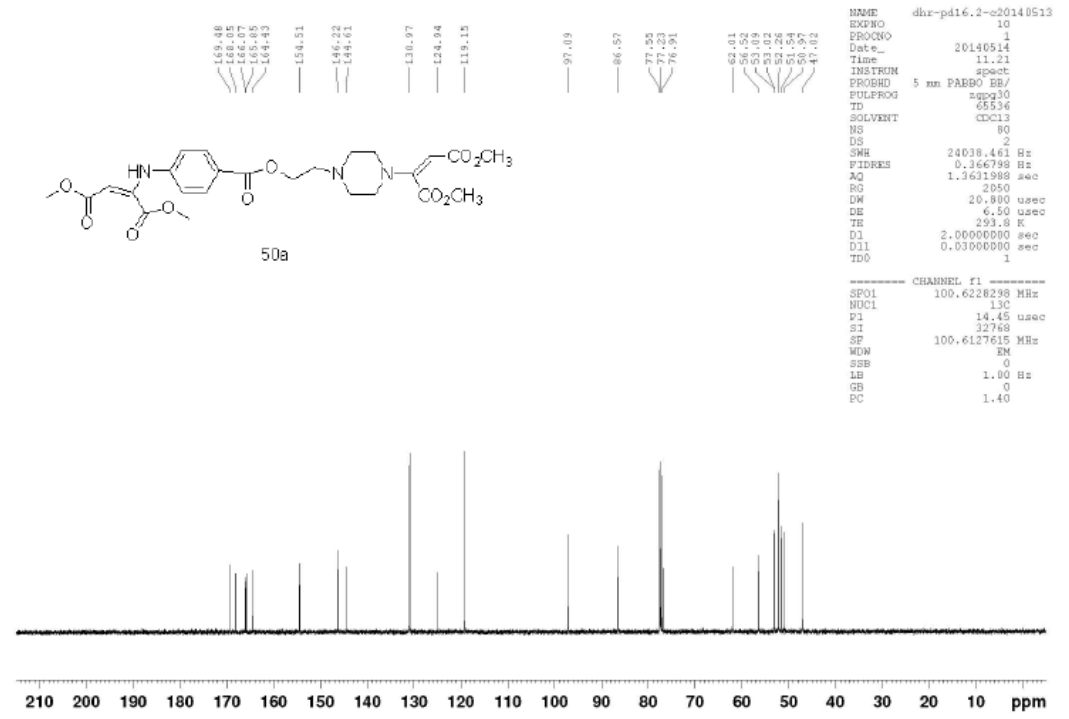

9.677
7.673
7.653
7.418
7.397
7.318
7.316
7.298
7.280
7.277
7.272
7.174
7.171
7.152
7.134
7.114
4.763
4.466
4.452
4.439
3.893
3.630
3.161
3.149
3.136
2.786
2.772
2.758
2.607
2.595
2.582
0.000
CO2CH3
CO2CH3
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
0.97
1.00
1.00
1.00
1.00
1.00
1.00
2.00
3.00
3.00
4.00
2.00
4.00

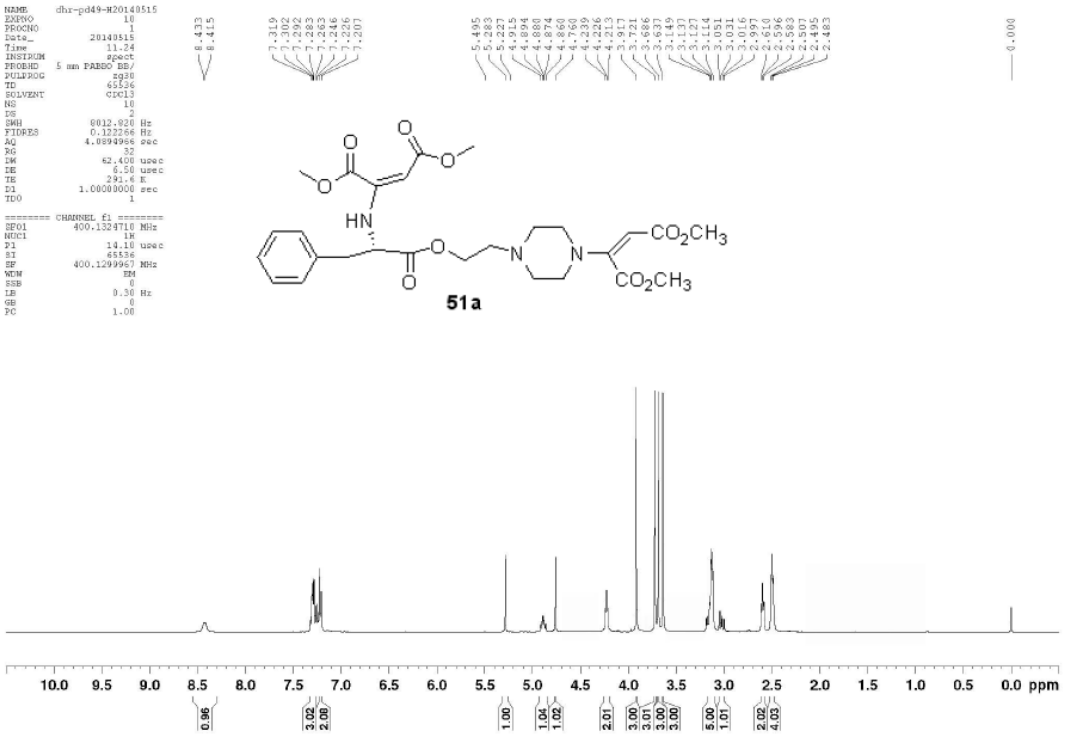
49a

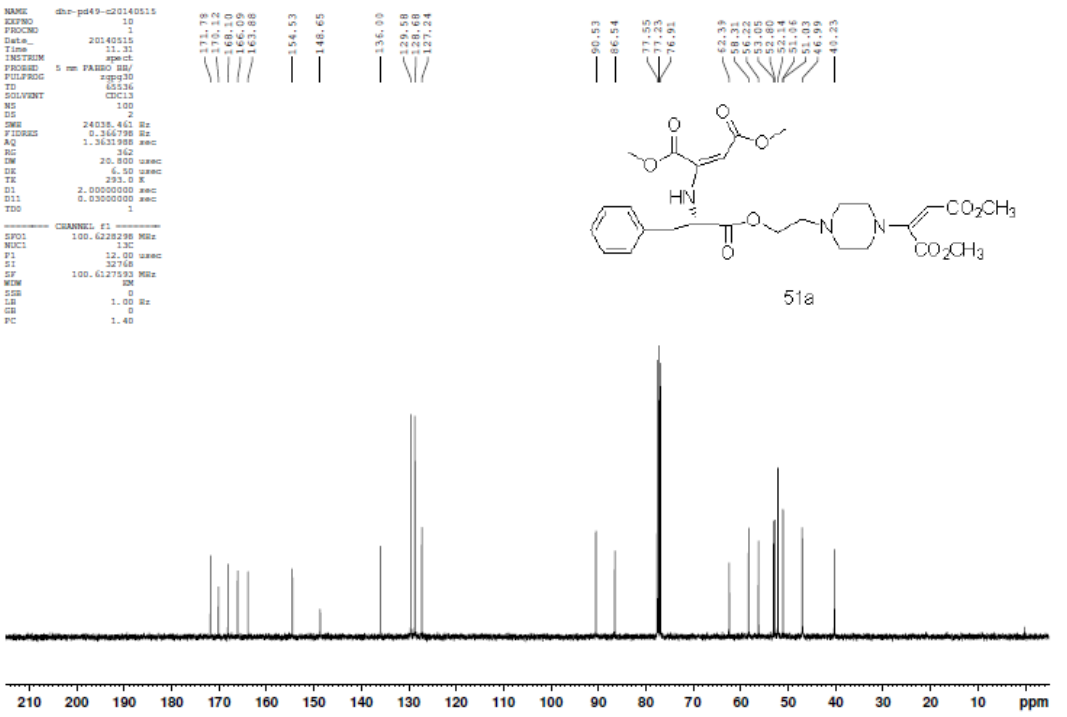

168.12
166.10
151.96
134.47
137.18
127.31
127.01
125.42
122.56
120.79
112.13
108.96
86.43
77.55
77.23
76.91
61.93
56.47
53.06
52.27
51.02
46.95
CO2CH3
CO2CH3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

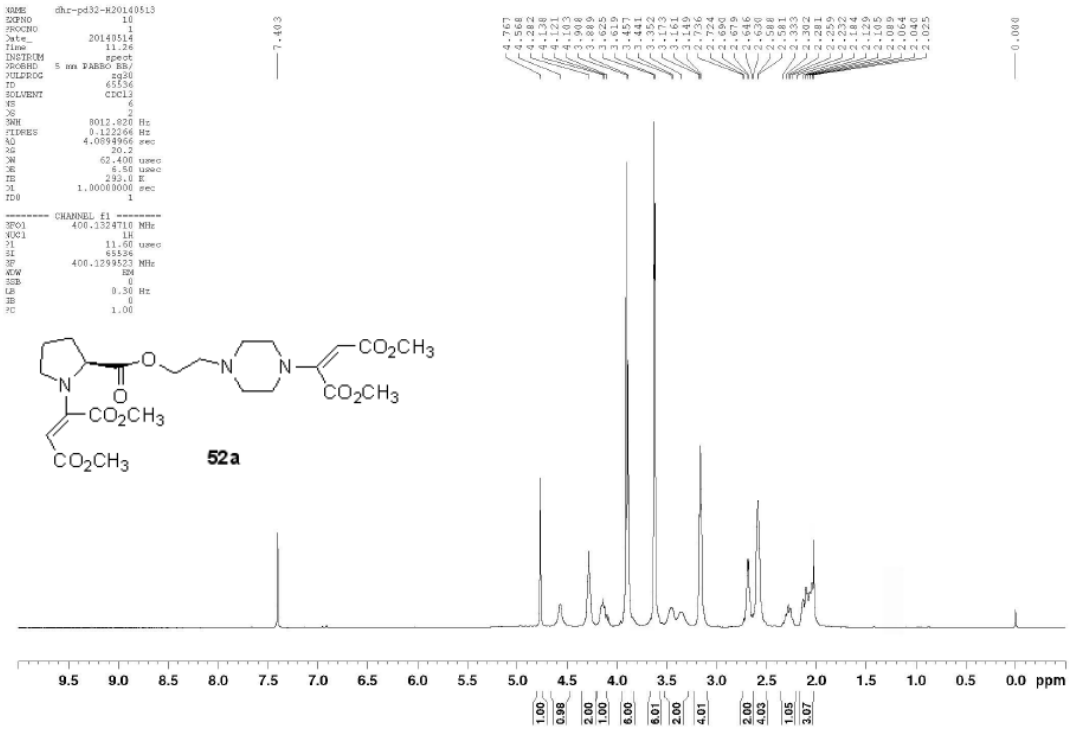
49a

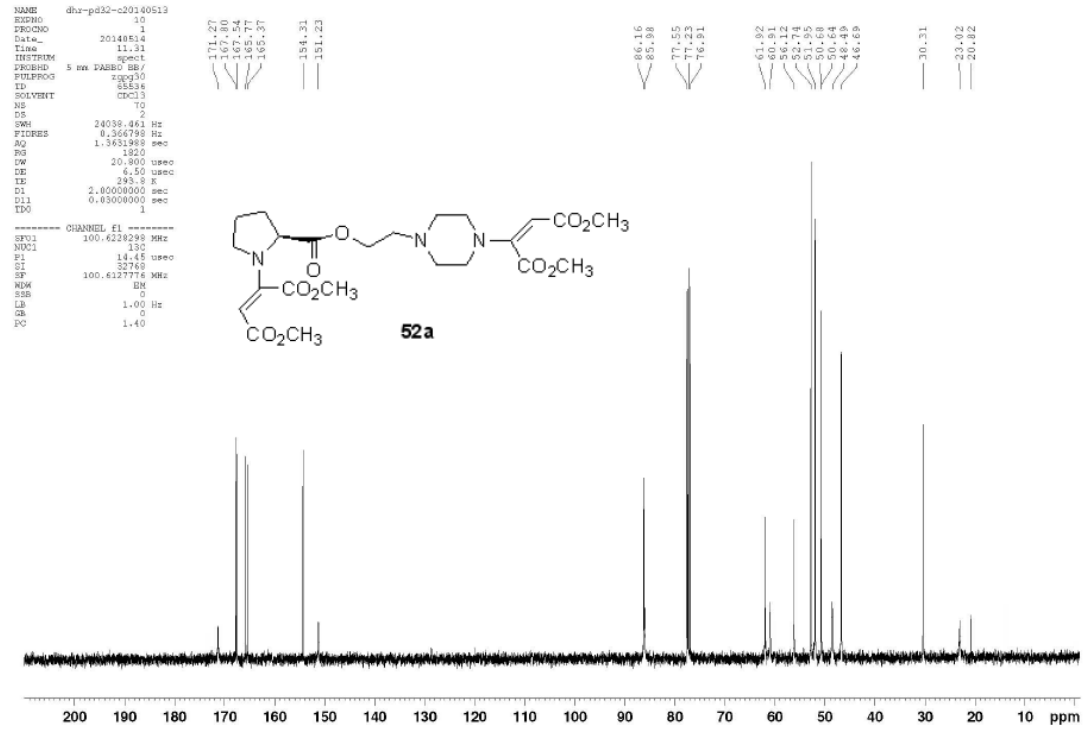

9.746
7.949
7.928
7.317
6.888
6.866
5.559
4.780
4.442
4.428
4.414
3.916
3.759
3.635
3.203
3.191
3.178
2.812
2.798
2.784
2.650
2.637
2.625
0.000
HN
O
O
O
O
O
O
N
N
CO2CH3
CO2CH3
50a
10
9
8
7
6
5
4
3
2
1
ppm
1.00
2.00
2.00
0.99
1.01
2.00
3.01
6.00
3.00
4.00
2.00
4.01


169.48
168.05
166.87
166.85
164.43
154.51
146.22
144.61
130.97
124.94
119.15
97.09
86.57
77.55
77.23
76.91
62.01
56.52
53.09
53.02
52.26
51.54
51.02
47.02
HN
O
O
O
O
O
O
N
N
CO2CH3
CO2CH3
50a
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm


51a
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


51a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


NAME dhz-pd32-H20140513
EXPNO 10
PROCNO 1
Date_ 20140514
Time 11.26
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 6
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 20.2
DW 62.400 usec
DE 6.50 usec
TE 293.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 11.60 usec
SI 65536
SF 400.1299523 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.403
4.767
4.568
4.282
4.138
4.121
4.103
3.908
3.665
3.619
3.457
3.441
3.352
3.163
3.151
3.149
2.736
2.724
2.694
2.679
2.636
2.600
2.581
2.333
2.302
2.281
2.259
2.232
2.184
2.129
2.105
2.089
2.064
2.046
2.025
0.000
52a
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
1.00 0.98 2.00 1.00 6.00 6.01 2.00 4.01 2.00 4.03 1.05 3.07


NAME dhz-pd32-c20140513
EXPNO 10
PROCNO 1
Date_ 20140514
Time 11.31
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 70
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 1820
DW 20.800 usec
DE 6.50 usec
TE 293.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228298 MHz
NUC1 13C
P1 14.45 usec
SI 32768
SF 100.6127774 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
171.27
167.80
167.54
165.77
165.37
154.31
151.23
86.16
85.98
77.55
77.23
76.91
61.92
60.91
56.12
52.74
51.95
50.68
50.64
48.49
46.89
30.31
23.02
20.82
52a
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm