

Diverse synthesis of natural product inspired fused and spiro-heterocyclic scaffolds *via* ring distortion and ring construction strategy

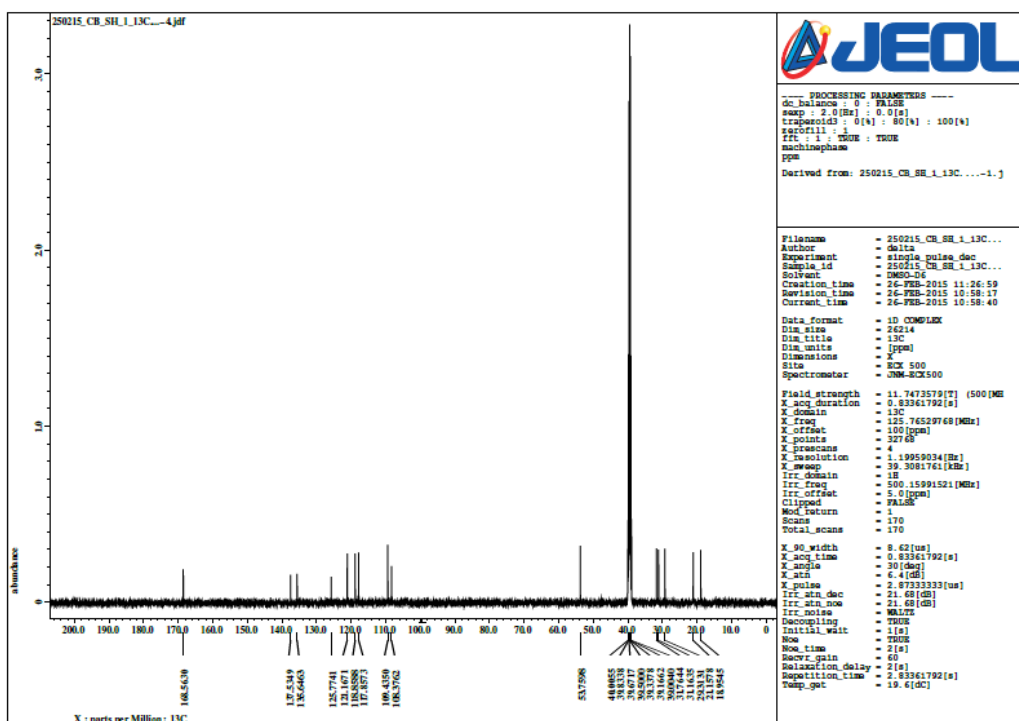
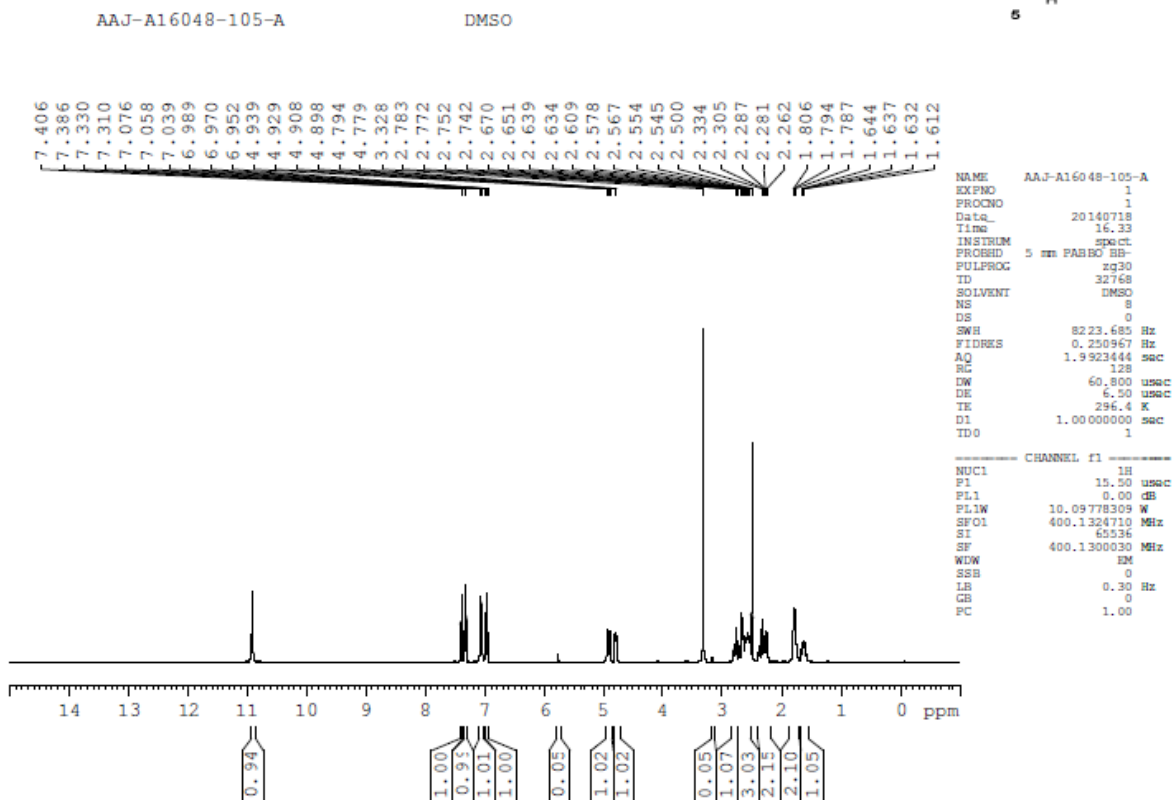
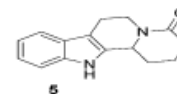
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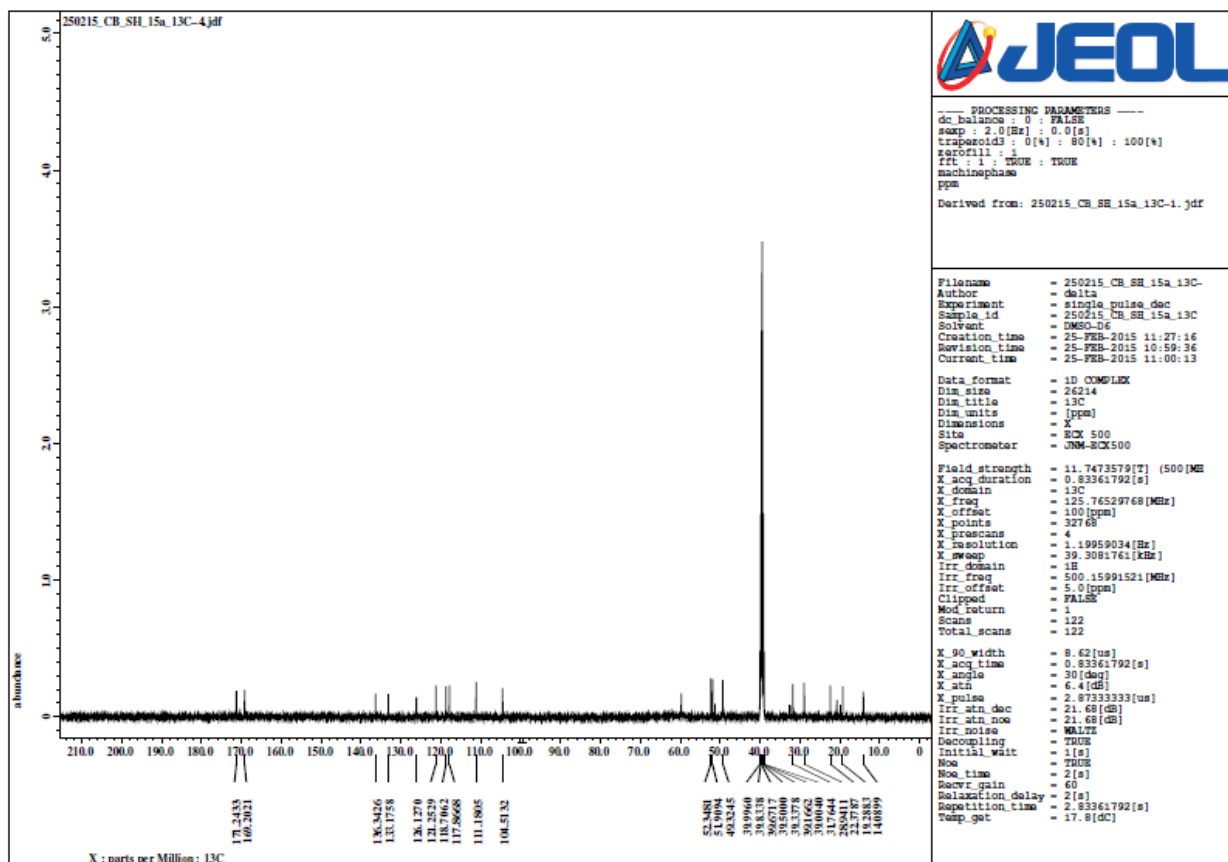
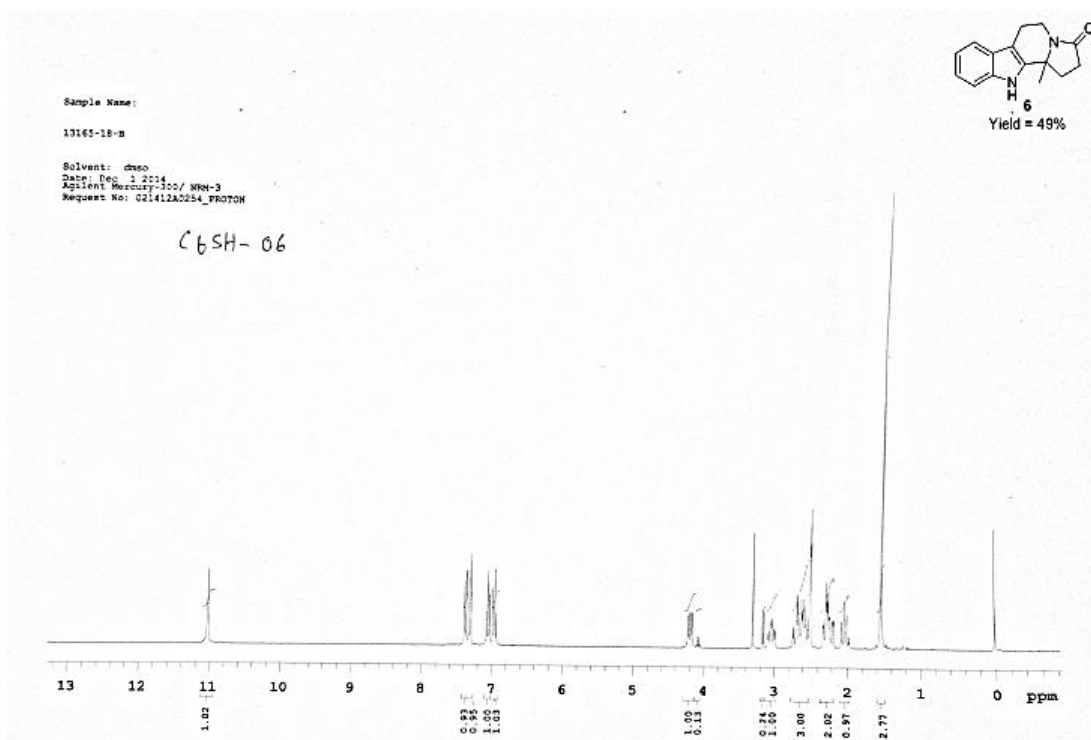
² Department of Life Science, Shiv Nadar University, Post Office Shiv Nadar University, Gautam Buddha Nagar, Uttar Pradesh 201314, India

[§] Equal contributor

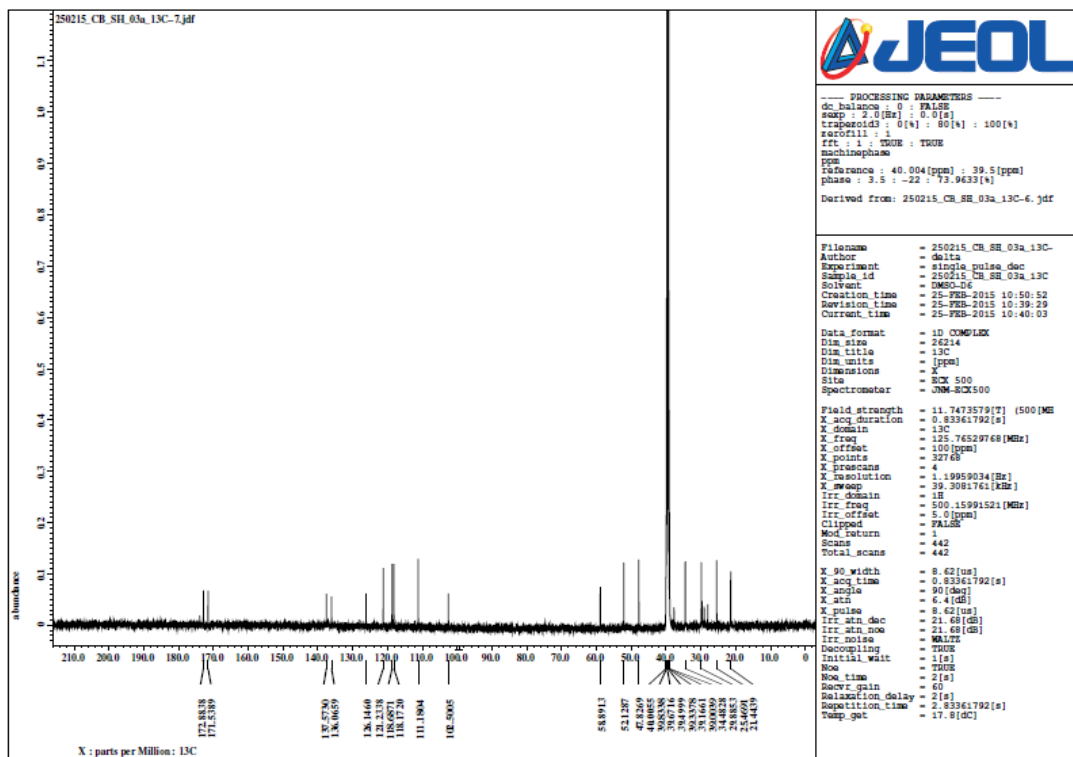
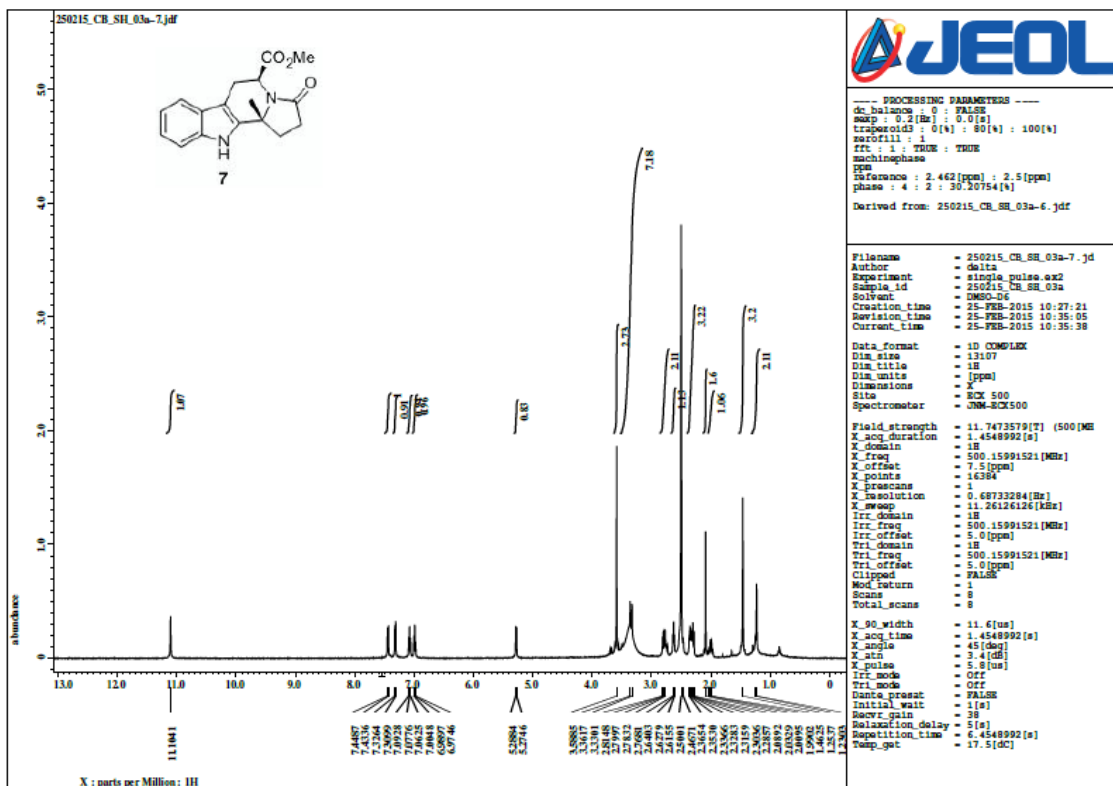
Compound 5



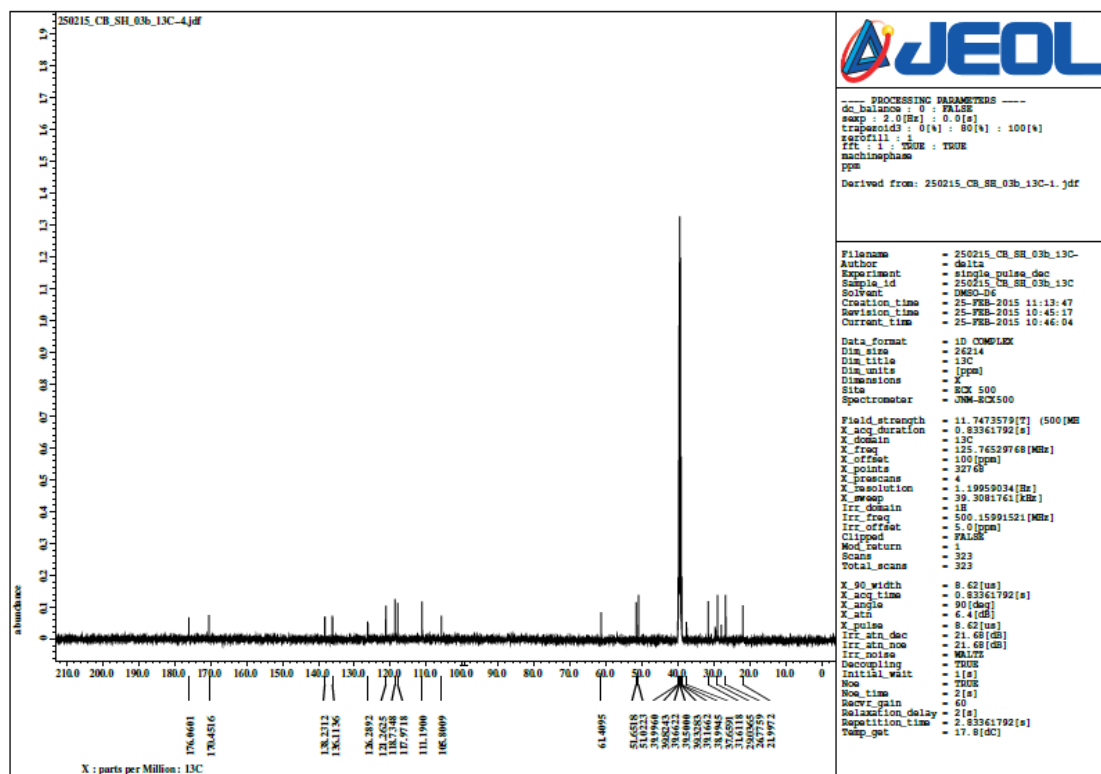
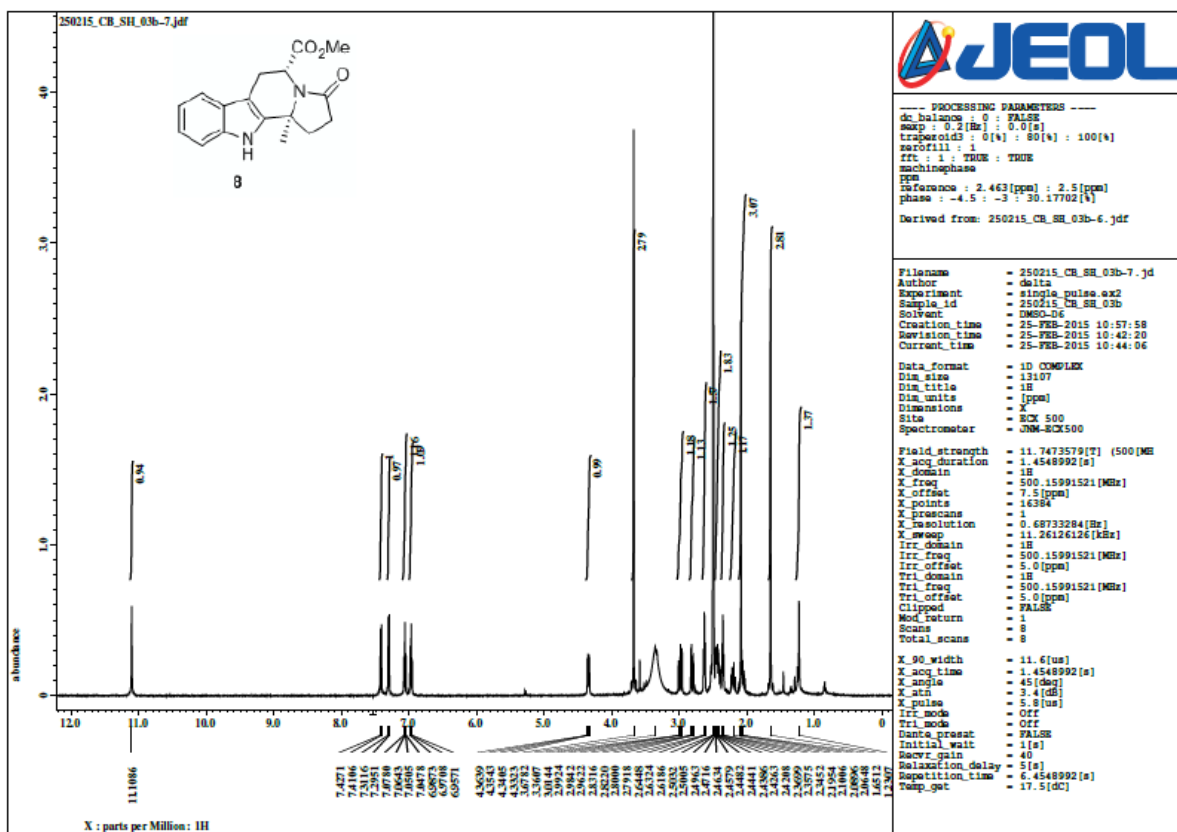
Compound 6



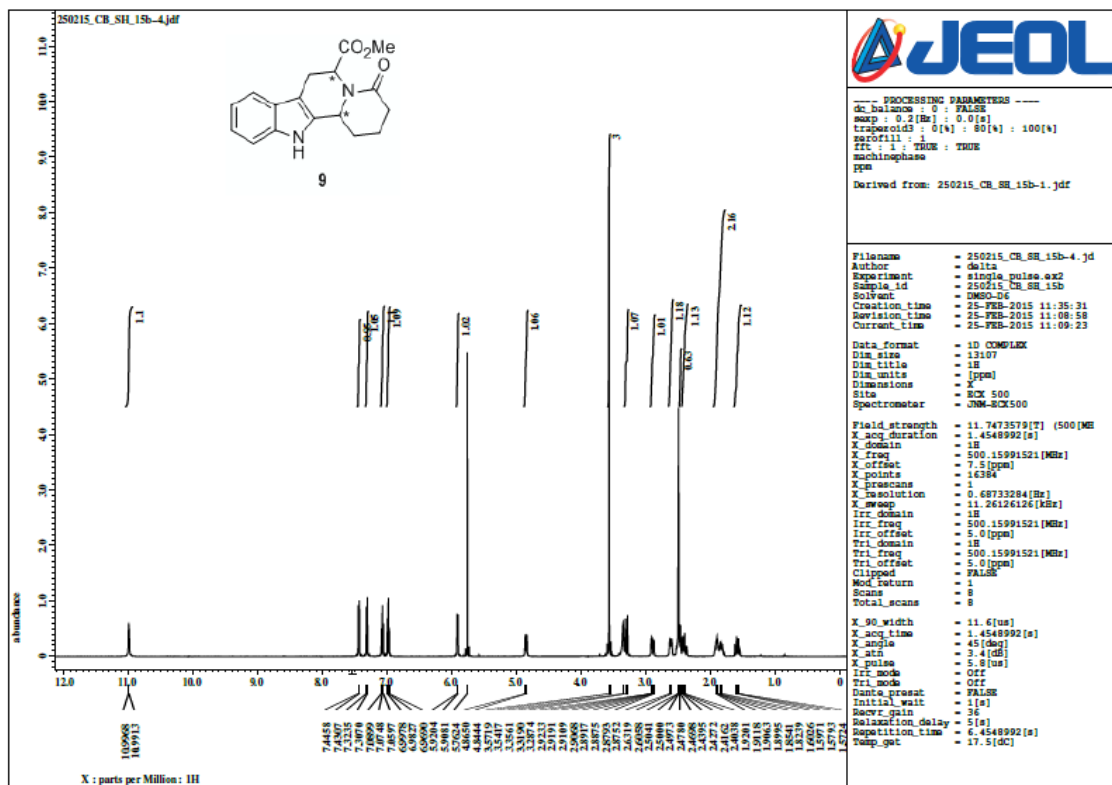
Compound 7



Compound 8



Compound 9



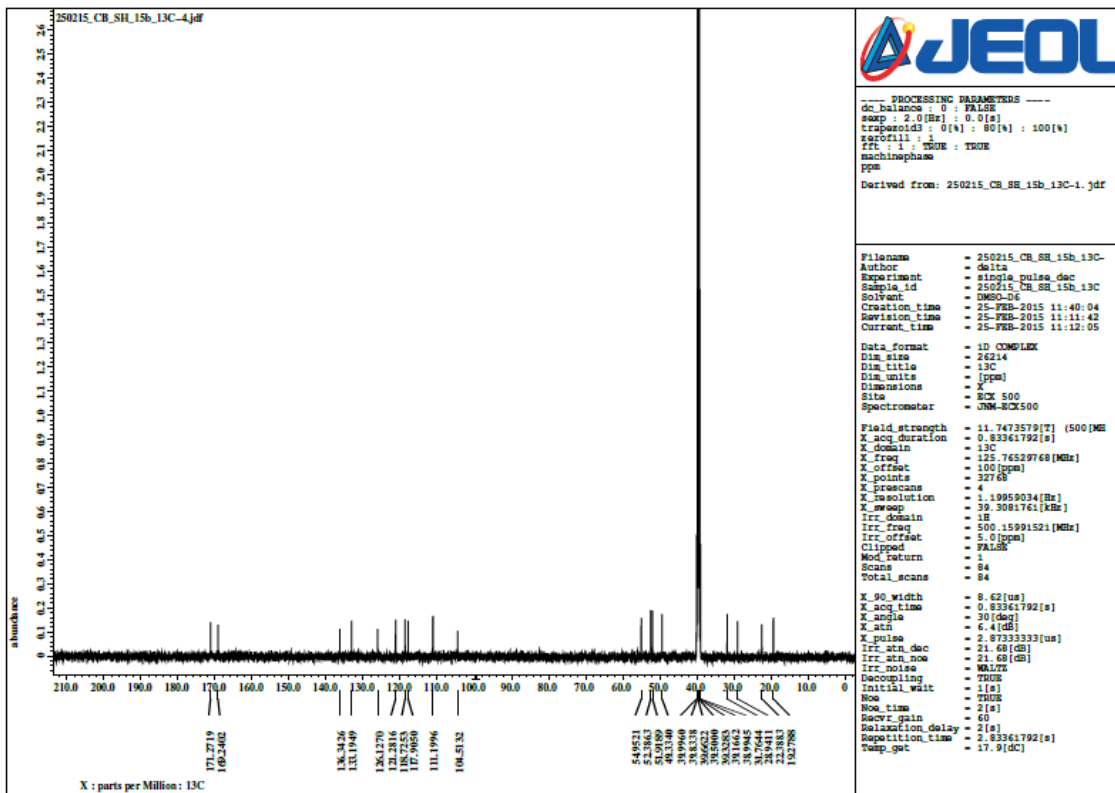
----- PROCESSING PARAMETERS -----
 dc balance : 0 : FALSE
 freq : 500.136 : 0.01
 trapazoid : 0 [%] : 80 [%] : 100 [%]
 zerofill : 1
 f1 : 1 : TRUE : TRUE
 machinophase
 ppm
 Derived from: 250215_CR_SR_15b-1.jdr

Filename = 250215_CR_SR_15b-4.jdr
 Author = delta
 Experiment = single_pulse_ax2
 Sample_id = 250215_CR_SR_15b
 Solvent = DMSO-d6
 Creation_time = 25-FEB-2015 11:35:31
 Revision_time = 25-FEB-2015 11:08:58
 Current_time = 25-FEB-2015 11:09:23

Data_format = 1D COMPLEX
 Dim_size = 1B
 Dim_title = 1B
 Dim_units = [ppm]
 Dimensions = 1
 Site = ECI 500
 Spectrometer = JNM-ECX500

Field_strength = 11.7473579 [T] (500 [MHz])
 X_acq_duration = 4.5448992 [s]
 X_domain = 1B
 X_freq = 500.15991521 [MHz]
 X_offset = 7.5 [ppm]
 X_points = 16384
 X_prescans = 1
 X_resolution = 0.68733284 [Hz]
 X_sweep = 11.26126126 [kHz]
 irr_domain = 1B
 irr_freq = 500.15991521 [MHz]
 irr_offset = 5.0 [ppm]
 Tri_domain = 1B
 Tri_freq = 500.15991521 [MHz]
 Tri_offset = 5.0 [ppm]
 Mod_return = FALSE
 Scans = 8
 Total_scans = 8

X_90_width = 11.6 [us]
 X_acq_time = 1.4548992 [s]
 X_angle = 45 [deg]
 X_atn = 3.4 [dB]
 X_pulse = 8 [us]
 irr_mode = Off
 Tri_mode = Off
 Dnspr_grat = FALSE
 Initial_wait = 1 [s]
 Recvr_gain = 16
 Relaxation_delay = 5 [s]
 Reposition_time = 1.4548992 [s]
 Temp_get = 17.5 [dC]



----- PROCESSING PARAMETERS -----
 dc balance : 0 : FALSE
 freq : 125.761792 : 0.01
 trapazoid : 0 [%] : 80 [%] : 100 [%]
 zerofill : 1
 f1 : 1 : TRUE : TRUE
 machinophase
 ppm
 Derived from: 250215_CR_SR_15b_13C-1.jdr

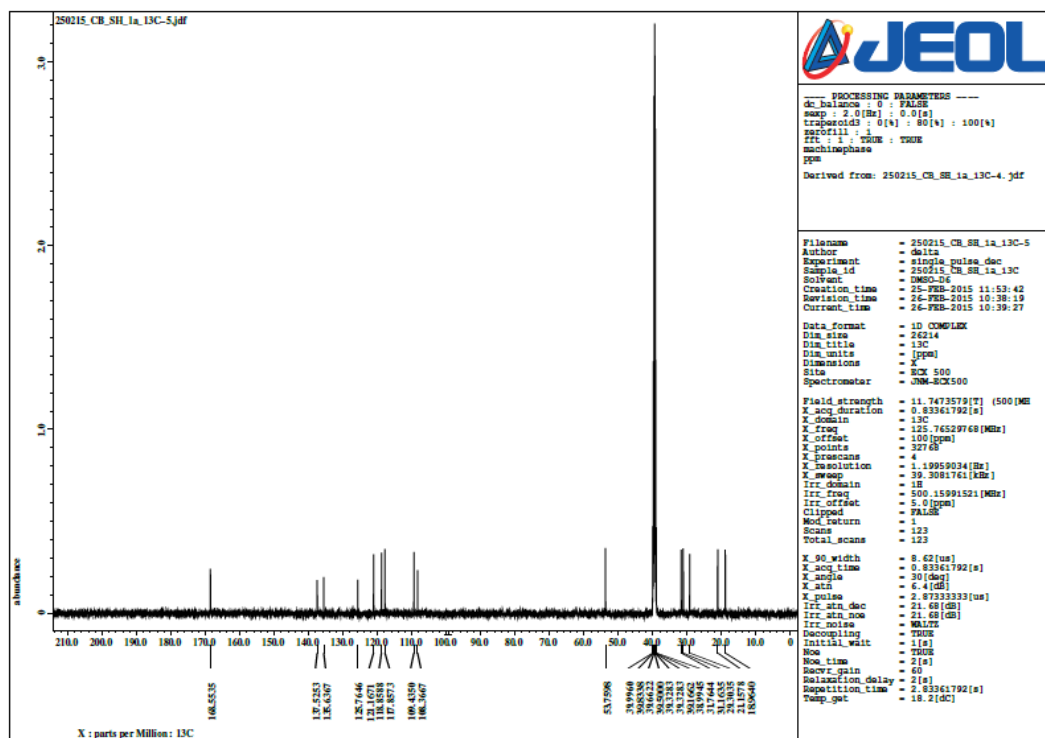
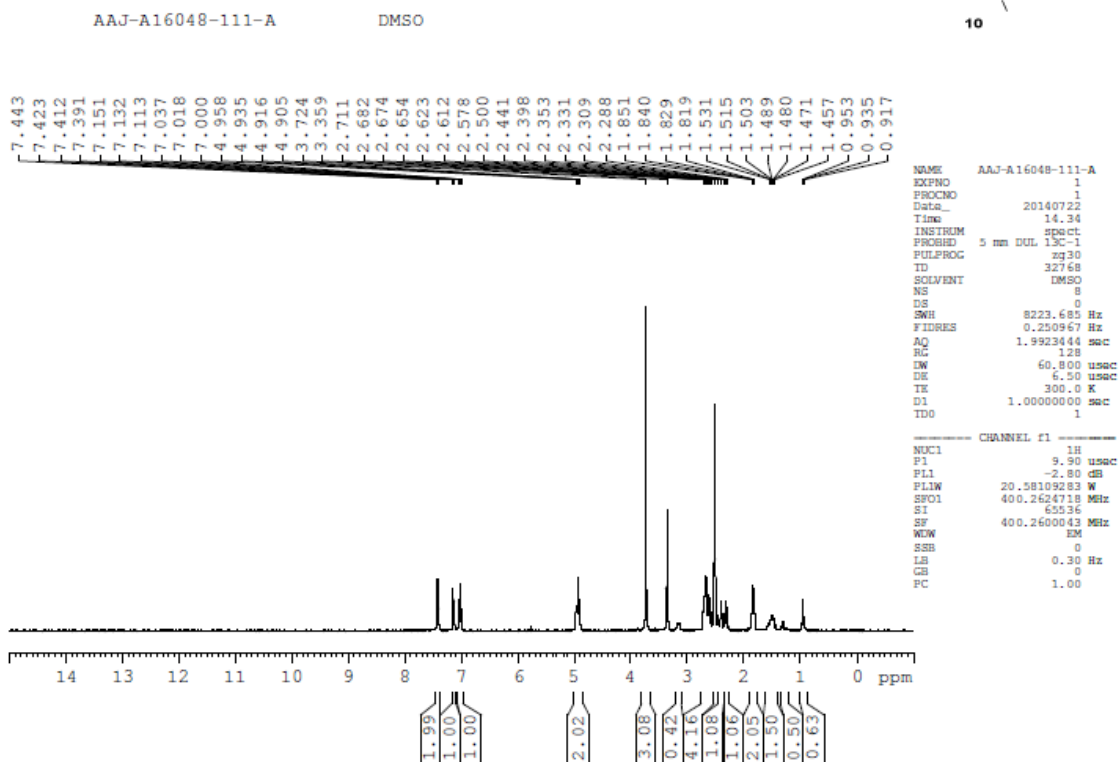
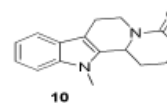
Filename = 250215_CR_SR_15b_13C-
 Author = delta
 Experiment = single_pulse_dec
 Sample_id = 250215_CR_SR_15b_13C
 Solvent = DMSO-d6
 Creation_time = 25-FEB-2015 11:40:04
 Revision_time = 25-FEB-2015 11:11:42
 Current_time = 25-FEB-2015 11:12:05

Data_format = 1D COMPLEX
 Dim_size = 26214
 Dim_title = 13C
 Dim_units = [ppm]
 Dimensions = 1
 Site = ECI 500
 Spectrometer = JNM-ECX500

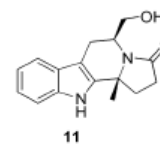
Field_strength = 11.7473579 [T] (500 [MHz])
 X_acq_duration = 0.83361792 [s]
 X_domain = 13C
 X_freq = 125.76529768 [MHz]
 X_offset = 100 [ppm]
 X_points = 32768
 X_prescans = 4
 X_resolution = 1.19959034 [Hz]
 X_sweep = 39.3081761 [kHz]
 irr_domain = 1B
 irr_freq = 500.15991521 [MHz]
 irr_offset = 5.0 [ppm]
 Mod_return = 1
 Scans = 84
 Total_scans = 84

X_90_width = 8.62 [us]
 X_acq_time = 0.83361792 [s]
 X_angle = 30 [deg]
 X_atn = 6.4 [dB]
 X_pulse = 2.87333333 [us]
 irr_atn_dec = 21.68 [dB]
 irr_atn_dec = 21.68 [dB]
 irr_noise = WALTZ
 Decoupling = TRUE
 Initial_wait = 1 [s]
 Recv_time = TRUE
 Recv_gain = 21 [dB]
 Recvr_gain = 60
 Relaxation_delay = 2 [s]
 Reposition_time = 0.83361792 [s]
 Temp_get = 17.9 [dC]

Compound 10

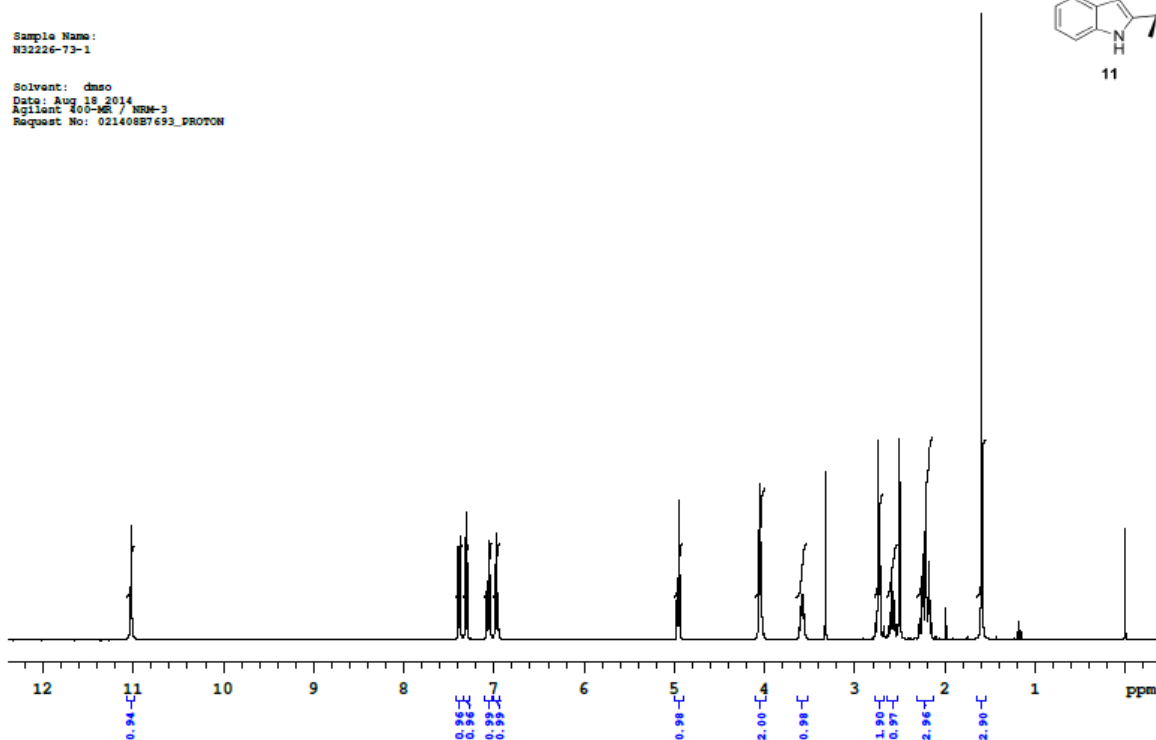


Compound 11



Sample Name:
N32226-73-1

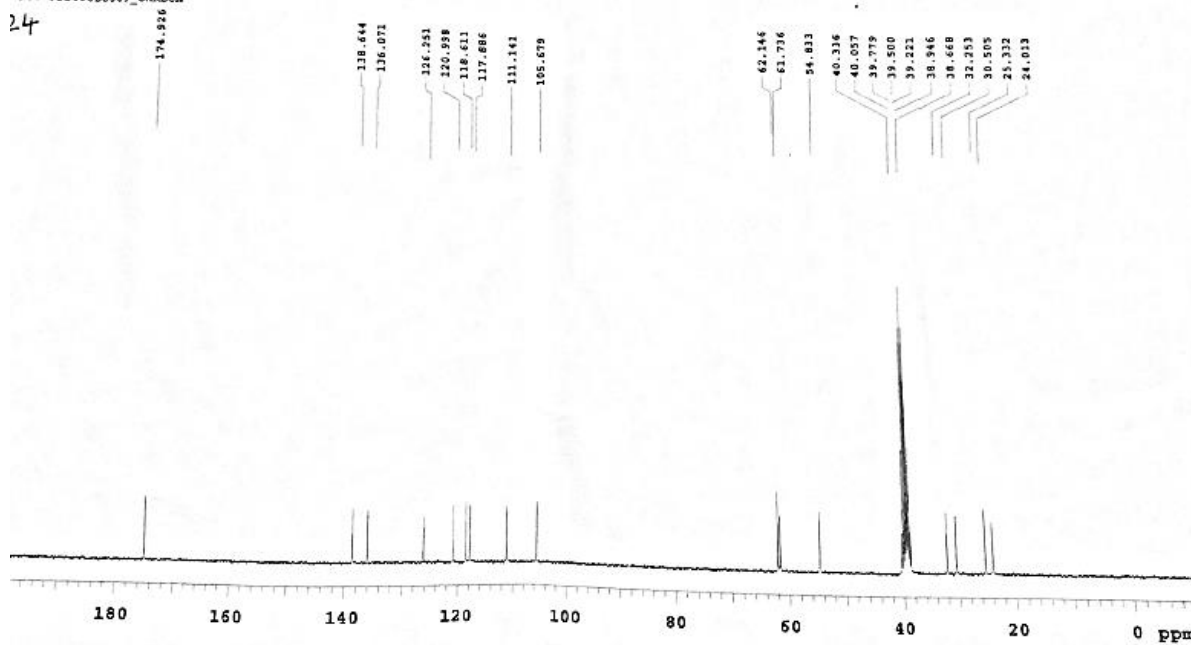
Solvent: dmsc
Date: Aug 18 2014
Agilent 400-MR / NMR-3
Request No: 02140887693_PROTON



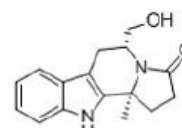
Name:
10-1

Solvent: dmsc
Date: Aug 20 2014
Agilent 300 / NMR-3
Request No: 02140888889_CARBON

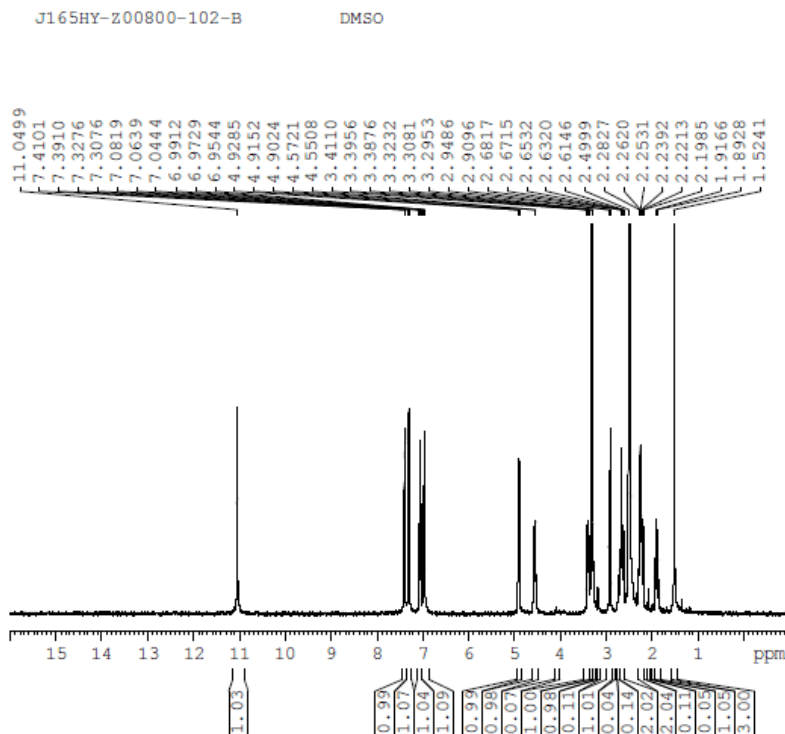
24



Compound 12



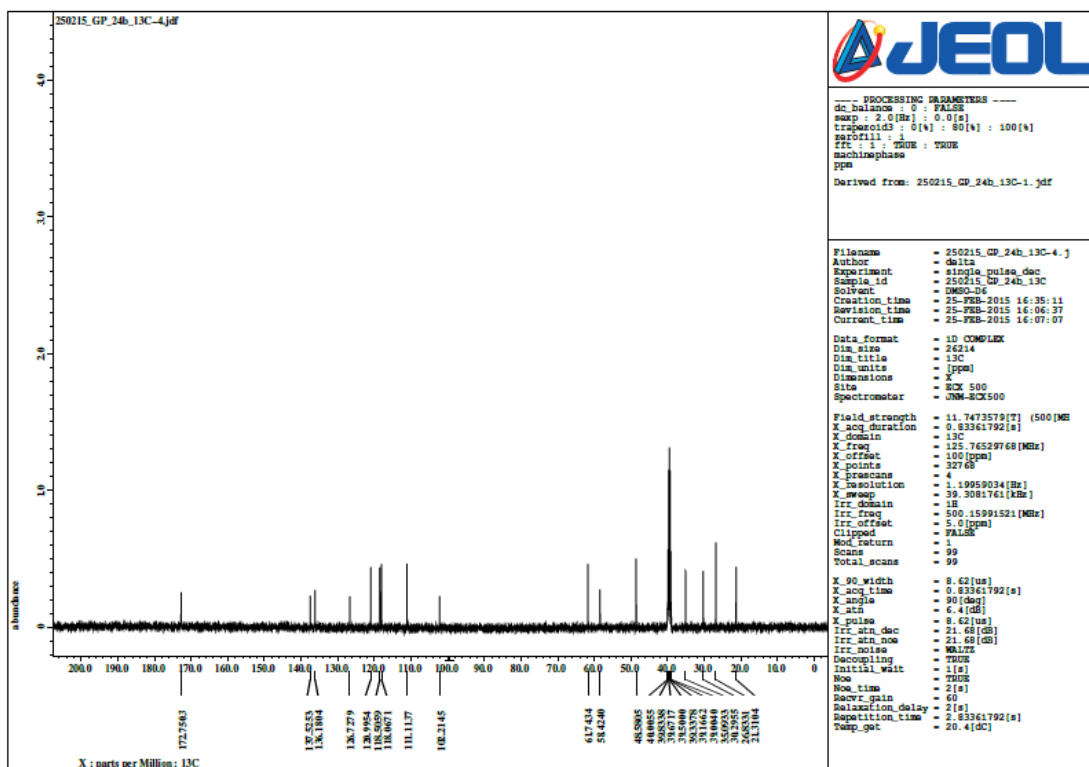
12



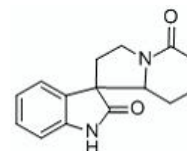
```

NAME J165HY-Z00800-102-B
EXPNO 1
PROCNO 1
DATE_ 20150316
Time 19.33
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 32768
SOLVENT DMSO
NS 8
DS 0
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 128
DW 60.800 usec
DE 6.50 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1

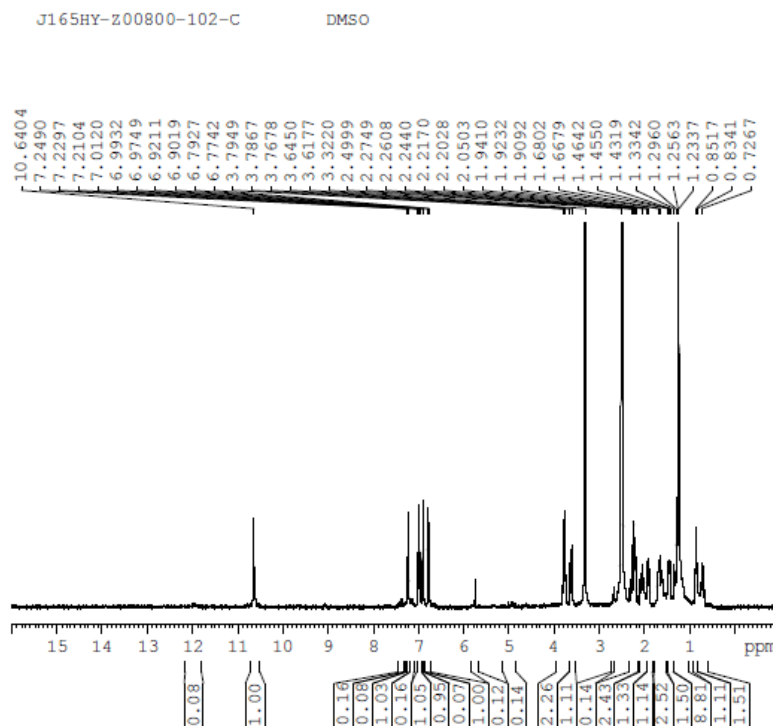
----- CHANNEL f1 -----
NUC1 1H
P1 15.50 usec
PL1 0.00 dB
PL1W 10.09778309 W
SFO1 400.1324710 MHz
SI 65536
SF 400.1300031 MHz
WDW EM
SB 0
LB 0.30 Hz
GB 0
FC 1.00
    
```



Compound 13



13

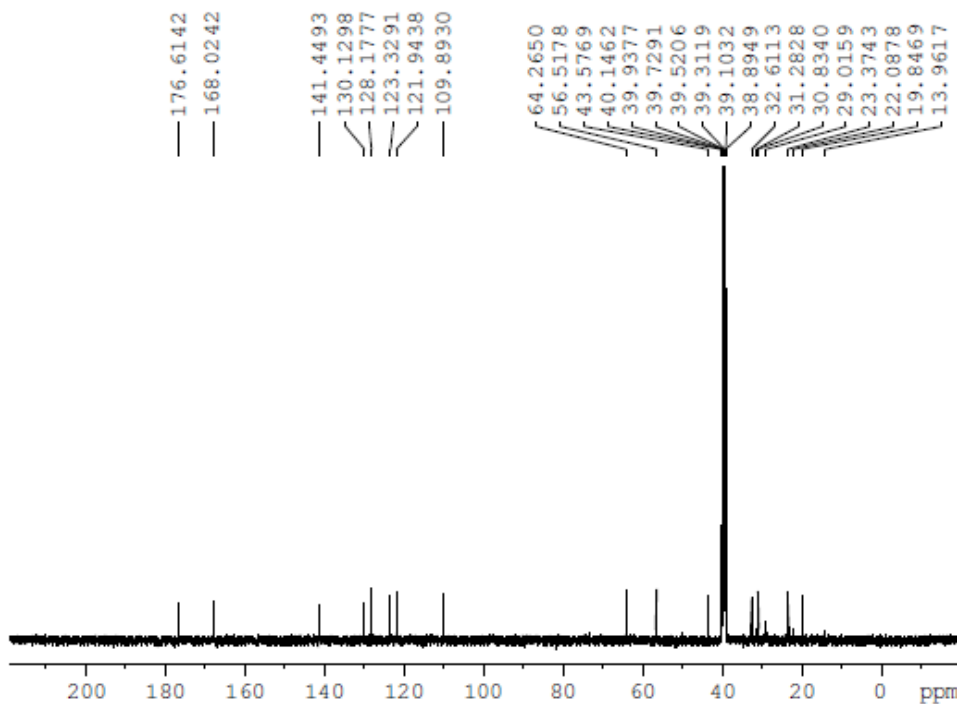


```

NAME J165HY-Z00800-102-C
EXPNO 1
PROCNO 1
Date_ 20150316
Time 19.32
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 32768
SOLVENT DMSO
NS 8
DS 0
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 128
DW 60.800 usec
DE 6.50 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1
    
```

```

----- CHANNEL f1 -----
NUC1 1H
P1 15.50 usec
PL1 0.00 dB
PL1W 10.09778309 W
SFO1 400.1324710 MHz
SI 65536
SF 400.1300030 MHz
WEM EM
SBB 0
LB 0.30 Hz
GB 0
PC 1.00
    
```



```

NAME J563-R00077-007-A
EXPNO 1
PROCNO 1
Date_ 20150319
Time 21.57
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 281
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 2050
DW 20.800 usec
DE 6.50 usec
TE 297.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
    
```

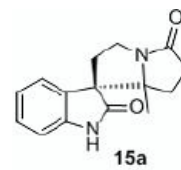
```

----- CHANNEL f1 -----
NUC1 13C
P1 7.50 usec
PL1 -3.00 dB
PL1W 71.16858673 W
SFO1 100.6228298 MHz
    
```

```

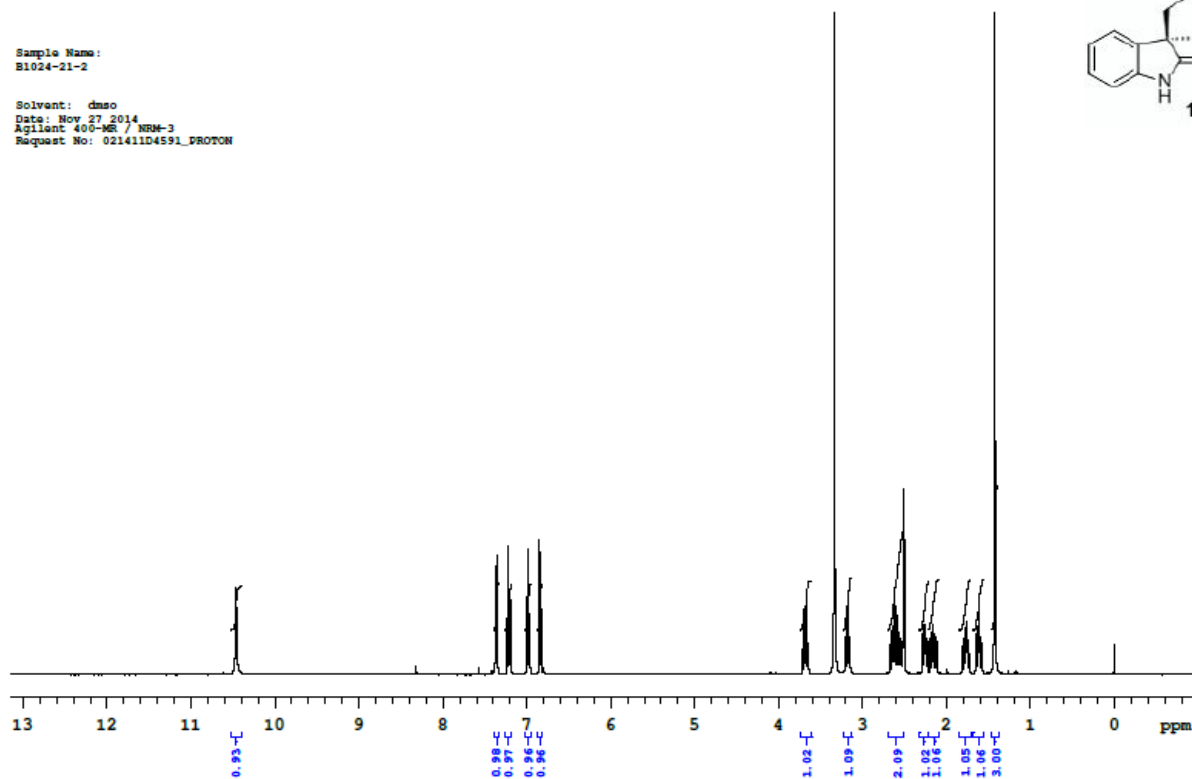
----- CHANNEL f2 -----
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 14.26 dB
    
```


Compound 15a



Sample Name:
B1024-21-2

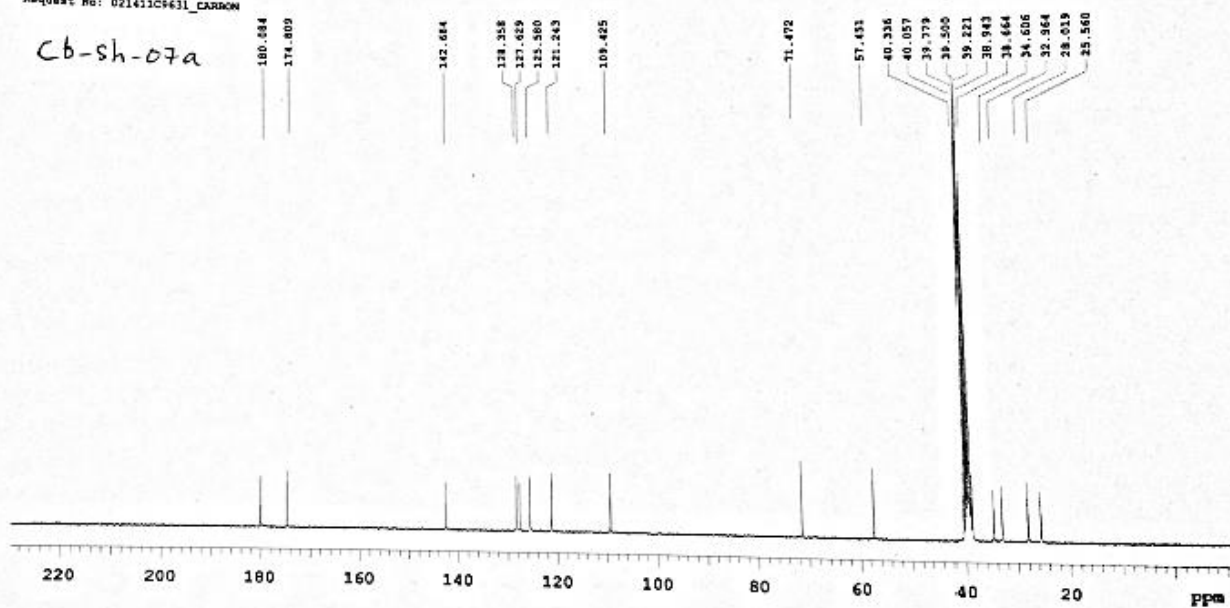
Solvent: dmsd
Date: Nov 27 2014
Agilent 400-MR / NMR-3
Request No: 021411D4591_PROTON



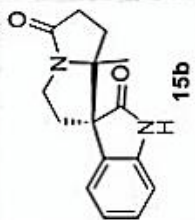
Sample Name:
B1024-21-2

Solvent: dmsd
Date: Nov 22 2014
Agilent Vn2x300 / NMR-3
Request No: 021411C9631_CARBON

Cb-sh-07a

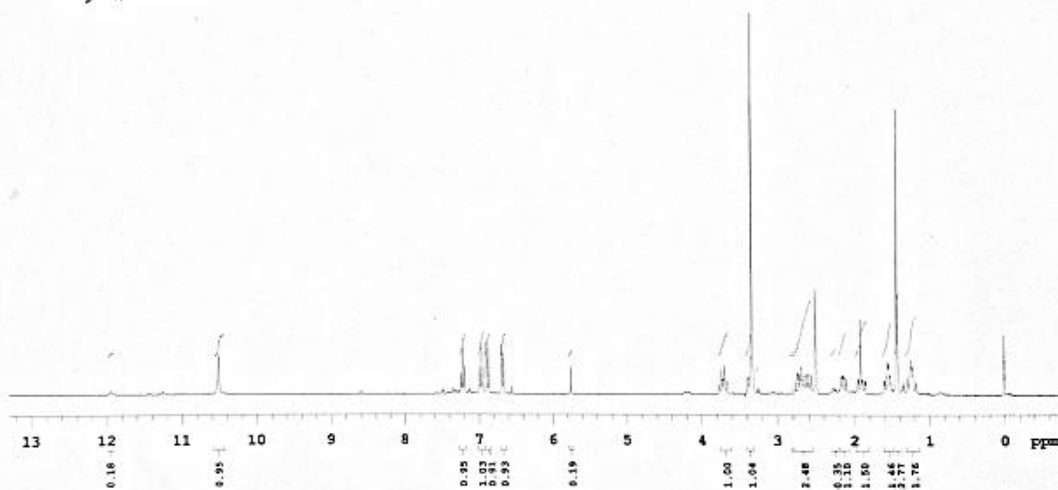


Compound 15b



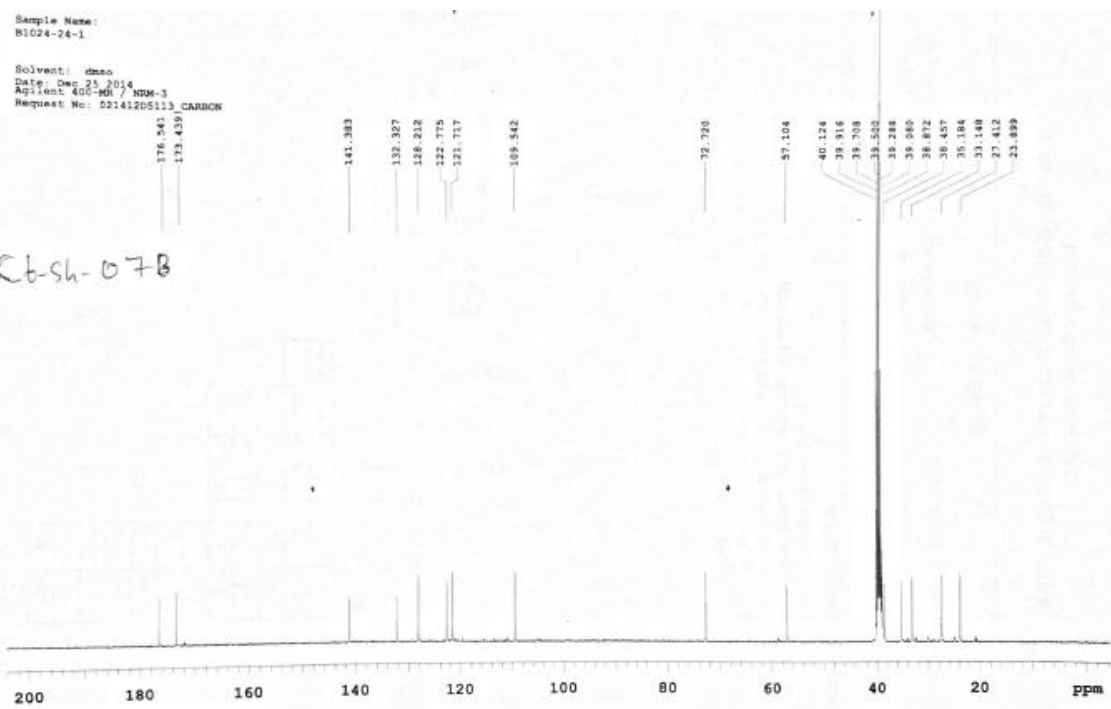
Sample Name: .
 11165-16-r
 Solvent: dmsc
 Date: Dec 1 2014
 Agilent Mercury-500/ NMR-3
 Request No: 021412A0249_PROTON

C₆H₄-07B

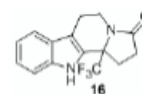


Sample Name:
 81024-24-1
 Solvent: dmsc
 Date: Dec 23 2014
 Agilent 400-MHz NMR-3
 Request No: 021412D5113_CARBON

C₆H₄-07B

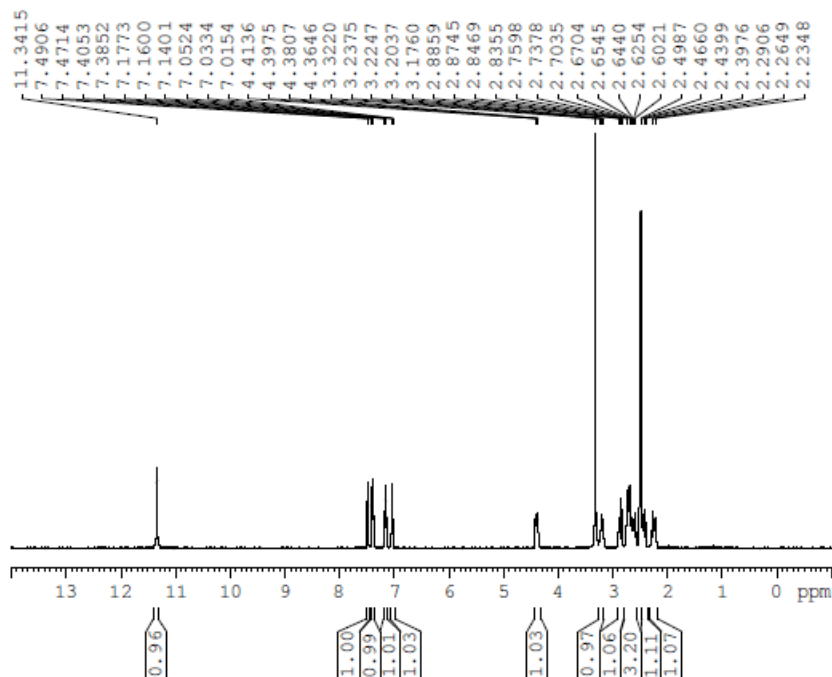


Compound 16



AAJ-A16048-125-A

DMSO



```

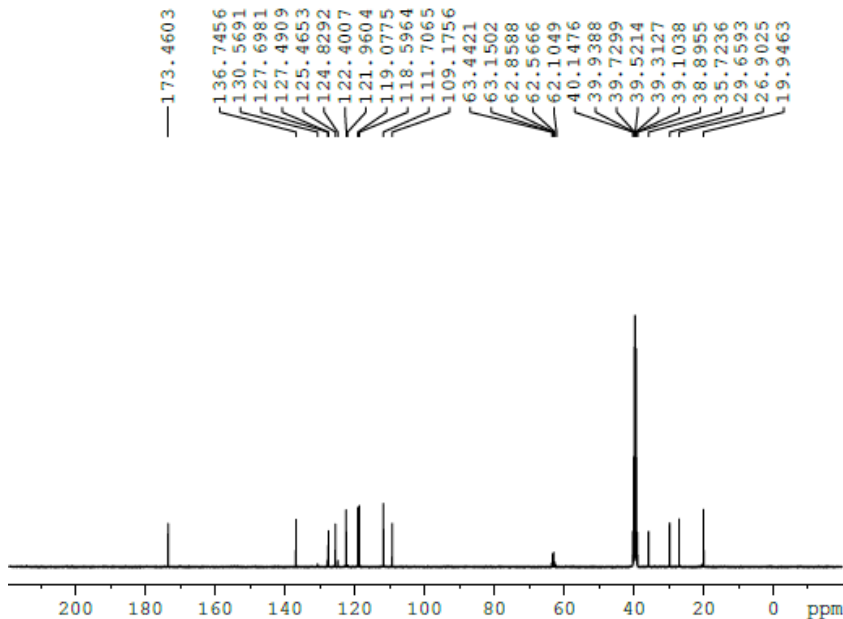
NAME      AAJ-A16048-125-A
EXPNO    1
PROCNO   1
Date_    20140814
Time     18.04
INSTRUM  spect
PROBHD   5 mm PABBO BB-
PULPROG  zgpg30
TD       32768
SOLVENT  DMSO
NS       8
DS       0
SWH      8223.685 Hz
FIDRES   0.250967 Hz
AQ       1.9923444 sec
RG       128
DW       60.800 usec
DE       6.50 usec
TE       296.4 K
D1       1.00000000 sec
TD0      1
    
```

```

----- CHANNEL f1 -----
NUC1     1H
P1       15.50 usec
PL1      0.00 dB
PL1W     10.09778309 W
SF01     400.1324710 MHz
SI       65536
SF       400.1300035 MHz
WM       BM
SXB      0
LB       0.30 Hz
GB       0
PC       1.00
    
```

SNU-SS-52

DMSO



```

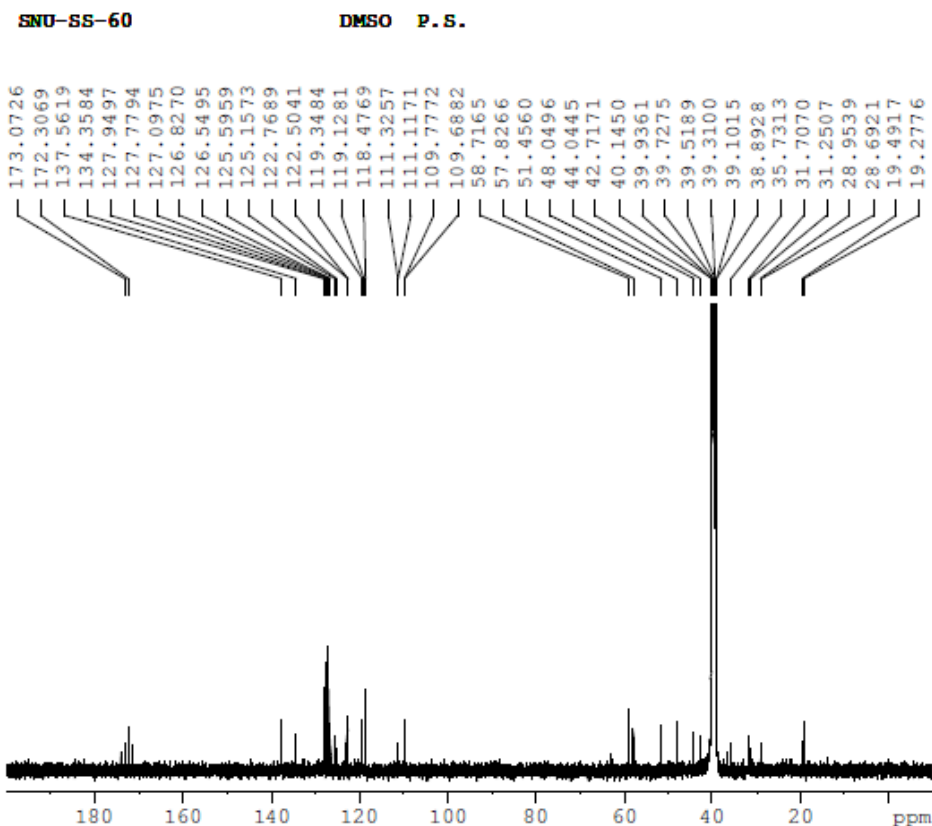
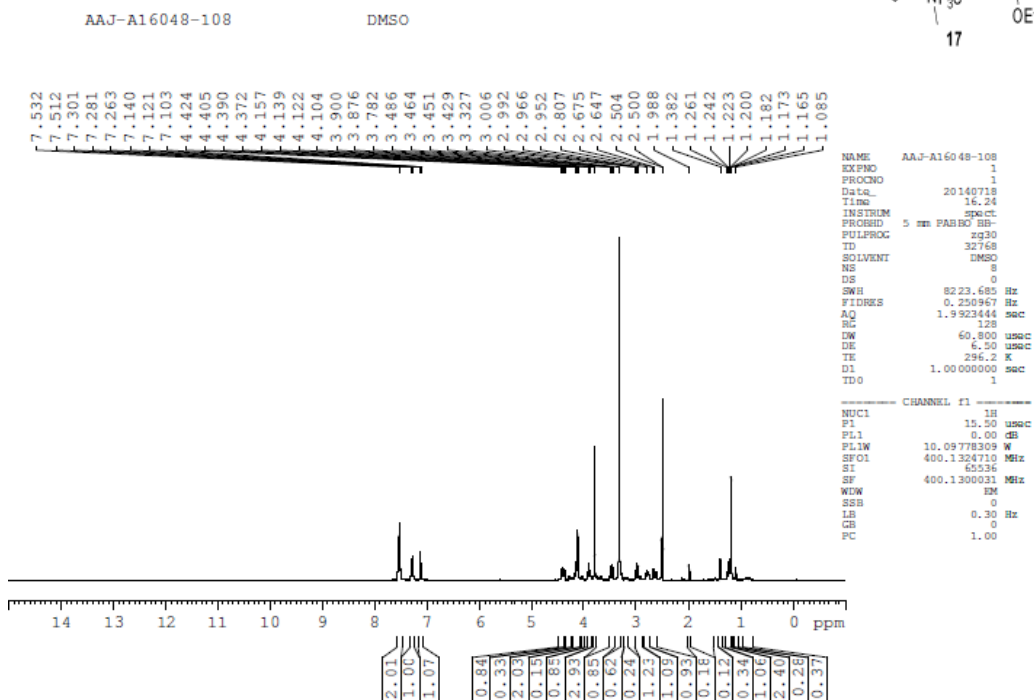
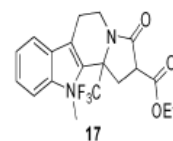
NAME      SNU-SS-52
EXPNO    2
PROCNO   1
Date_    20140819
Time     16.01
INSTRUM  spect
PROBHD   5 mm PABBO BB-
PULPROG  zgpg30
TD       65536
SOLVENT  DMSO
NS       1024
DS       4
SWH      24038.461 Hz
FIDRES   0.366798 Hz
AQ       1.3631988 sec
RG       2050
DW       20.800 usec
DE       6.50 usec
TE       298.5 K
D1       2.00000000 sec
D11      0.03000000 sec
TD0      1
    
```

```

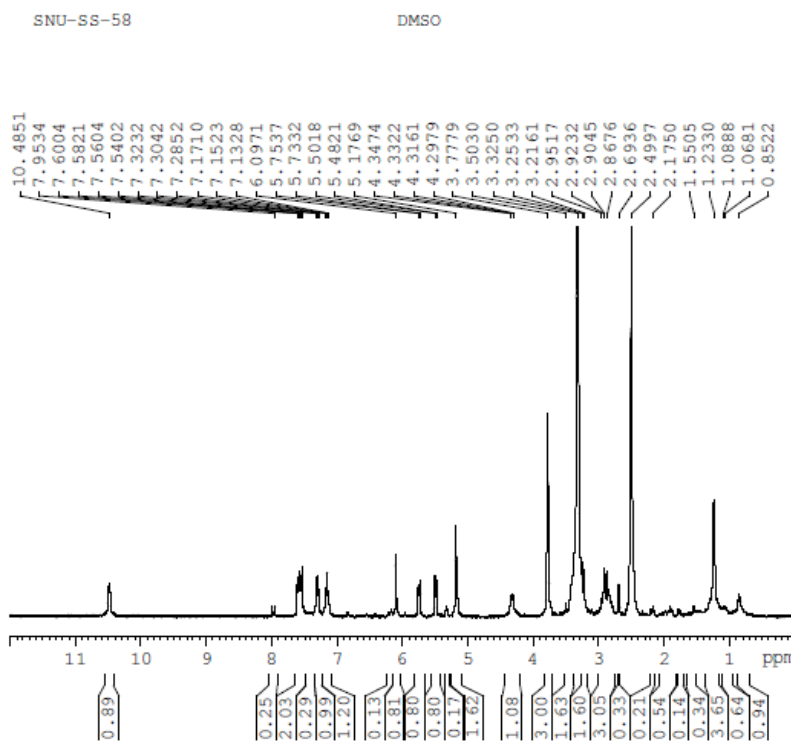
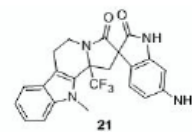
----- CHANNEL f1 -----
NUC1     13C
P1       7.50 usec
PL1      -3.00 dB
PL1W     71.16858673 W
SF01     100.6228298 MHz

----- CHANNEL f2 -----
CPDPRG2  waltz16
NUC2     1H
PCPD2    80.00 usec
PL2      0.00 dB
PL12     14.26 dB
    
```

Compound 17

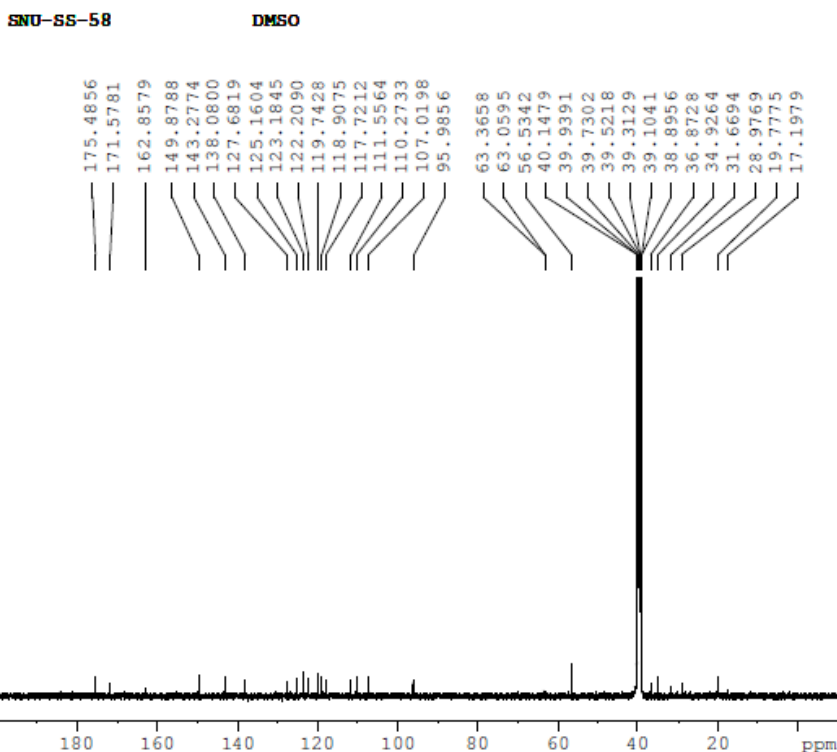


Compound 21



```

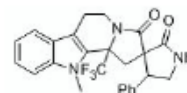
NAME SNU-SS-58
EXPNO 1
PROCNO 1
Date_ 20140813
Time 15.00
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 32768
SOLVENT DMSO
NS 8
DS 0
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 128
DW 60.800 usec
DE 6.50 usec
TE 296.4 K
D1 1.00000000 sec
TD0 1
----- CHANNEL f1 -----
NUC1 1H
P1 15.50 usec
PL1 0.00 dB
PL1W 10.09778309 W
SFO1 400.1324710 MHz
S1 65536
SF 400.1300034 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
    
```



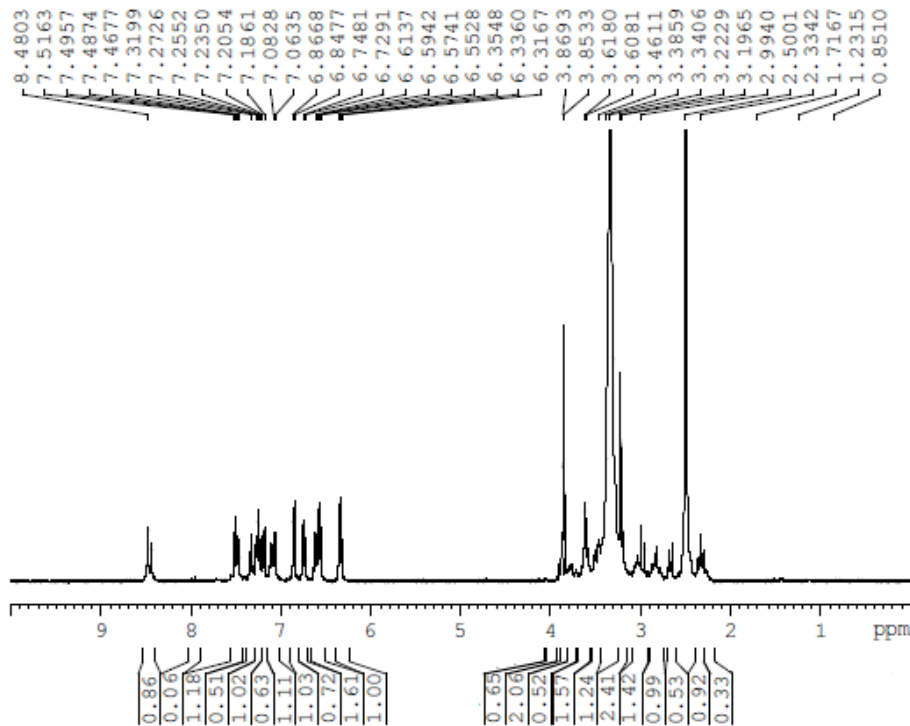
```

Current Data Parameters
NAME SNU-SS-58
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20140813
Time 15.00
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 32768
SOLVENT DMSO
NS 8
DS 0
SWH 24038.461 Hz
FIDRES 0.300788 Hz
AQ 1.321365 sec
RG 128
DW 60.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.20000000 sec
TD0 1
----- CHANNEL f1 -----
NUC1 13C
P1 15.00 usec
PL1 0.00 dB
PL1W 71.14884173 W
SFO1 100.628363 MHz
SF 100.628363 MHz
----- CHANNEL f2 -----
NUC1 13C
P1 80.00 usec
PL1 0.00 dB
PL1W 14.20 dB
SFO1 125.761 MHz
SF 125.761 MHz
F2 - Processing parameters
SI 32768
SF 400.1314000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
    
```


Compound 22



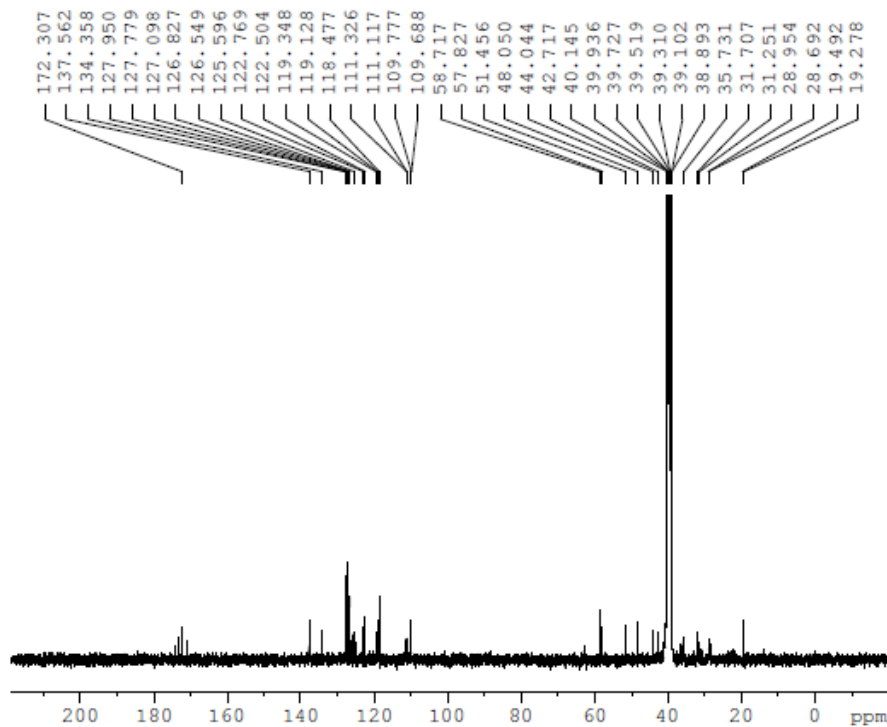
22



```

NAME          SNU-SS-60
EXPNO         1
PROCNO        1
Date_         20140813
Time          15.02
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zg30
TD            32768
SOLVENT       DMSO
NS            8
DS            0
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9923444 sec
RG            128
DC            60.800 usec
DE            6.50 usec
TE            296.3 K
D1            1.00000000 sec
TD0           1

----- CHANNEL f1 -----
NUC1          1H
P1            15.50 usec
PL1           0.00 dB
PL1W          10.09778309 W
SFO1          400.1324710 MHz
SI            65536
SF            400.1300033 MHz
WDW           EM
SSB           0
LB            0.30 Hz
GB            0
PC            1.00
    
```



```

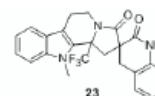
Current Data Parameters
NAME          SNU-SS-60
EXPNO         2
PROCNO        1

F2 - Acquisition Parameters
Date_         20140827
Time          18.12
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       DMSO
NS            4
DS            4
SWH           24231.461 Hz
FIDRES        0.2314436 Hz
AQ            1.3631088 sec
RG            256
DC            20.000 usec
DE            4.50 usec
TE            294.0 K
D1            1.00000000 sec
TD0           1

----- CHANNEL f1 -----
NUC1          13C
P1            1.50 usec
PL1           -3.00 dB
PL1W          71.0491813 W
SFO1          100.628288 MHz

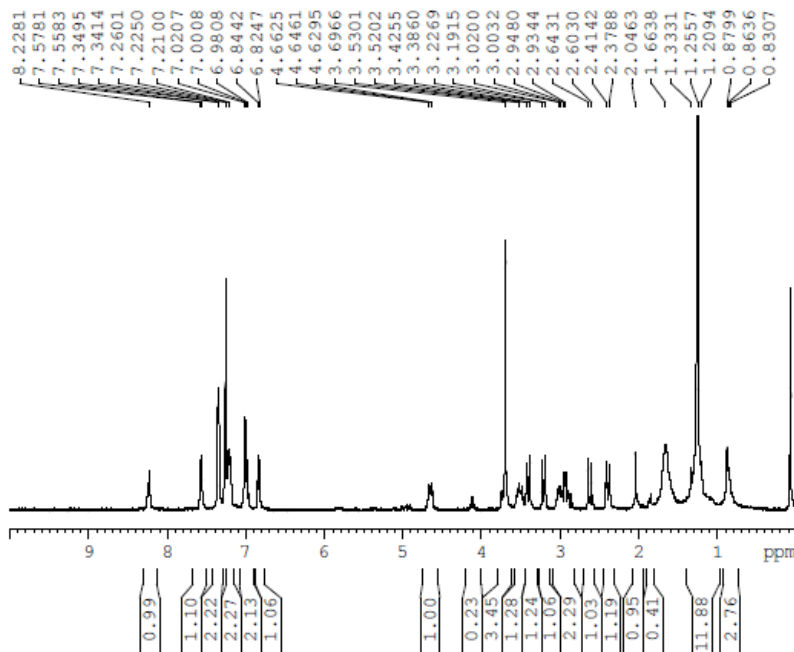
----- CHANNEL f2 -----
CONTCNT      65536
NUC2          13C
P2            15.00 usec
PL2           0.00 dB
PL2W          14.26 dB
SFO2          10.09778309 W
SI            65536
SF            100.628288 MHz
WDW           EM
SSB           0
LB            1.00 Hz
GB            0
PC            1.00
    
```

Compound 23



SNU-SS-59

CDCl3



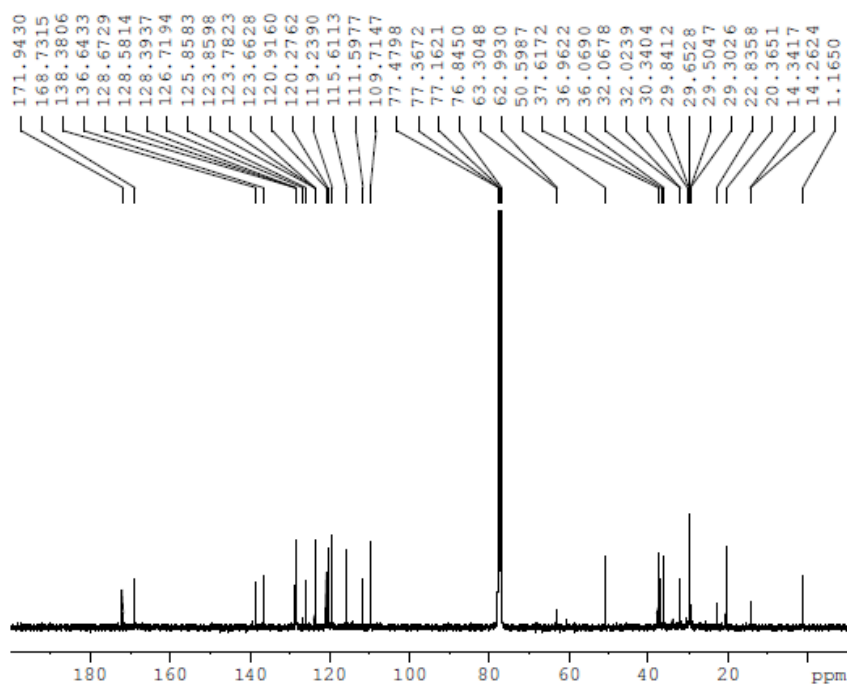
```

NAME      SNU-SS-59
EXPNO     1
PROCNO    1
Date_     20140812
Time      18.26
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         8
DS         0
SWH       8223.685 Hz
FIDRES    0.250967 Hz
AQ         1.9923444 sec
RC         128
DQ         60.800 usec
DE         6.50 usec
TE         296.7 K
D1         1.00000000 sec
TDO        1

----- CHANNEL f1 -----
NUC1       1H
P1         15.50 usec
PL1        0.00 dB
PL1W       10.09778309 W
SFO1       400.1324710 MHz
SI         65536
SF         400.1300097 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
    
```

SNU-SS-59

CDCl3



```

Current Data Parameters
NAME      SNU-SS-59
EXPNO     1
PROCNO    1
Date_     20140812
Time      18.26
INSTRUM   spect
PROBHD    5 mm QNP 1H/1
PULPROG   zgpg30
TD         65536
SOLVENT   CDCl3
NS         8192
DS         4
SWH       24036.461 Hz
FIDRES    0.264788 Hz
AQ         1.243888 sec
RC         2500
DQ         20.800 usec
DE         6.50 usec
TE         296.7 K
D1         1.00000000 sec
TDO        0.00000000 sec

----- CHANNEL f1 -----
NUC1       13C
P1         90.00 usec
PL1        0.00 dB
PL1W       57.37432718 W
SFO1       100.6261210 MHz

----- CHANNEL f2 -----
NUC2       1H
P2         80.00 usec
PL2        2.00 dB
PL2W       19.00 dB
SFO2       400.1300097 MHz

F2 - Processing parameters
SI         65536
SF         400.1300097 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
    
```