Supplementary Material

Diastereoselective synthesis of 2-vinylpyrrolidines and 2-vinylpiperidines by the palladium-catalysed cyclization of amino-allylic carbonates containing a chiral protecting group

Beata Olszewska, Aleksandra Jabłońska, and Anna Zawisza*

Department of Organic and Applied Chemistry, University of Łódź, Tamka 12, 91-403 Łódź, Poland
Email: azawisza@chemia.uni.lodz.pl

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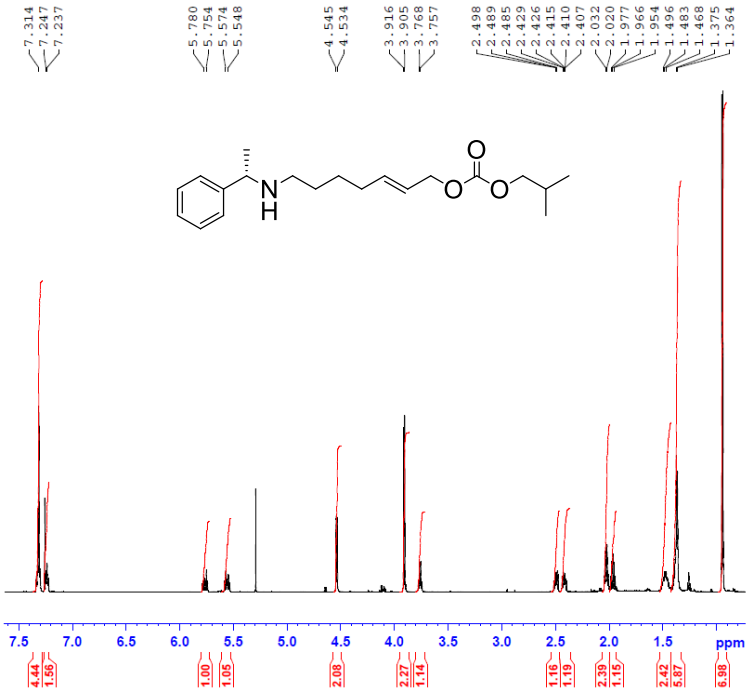
The ^{1}H and ^{13}C NMR of **5a**

^{1}H NMR (600MHz, CD_3Cl):

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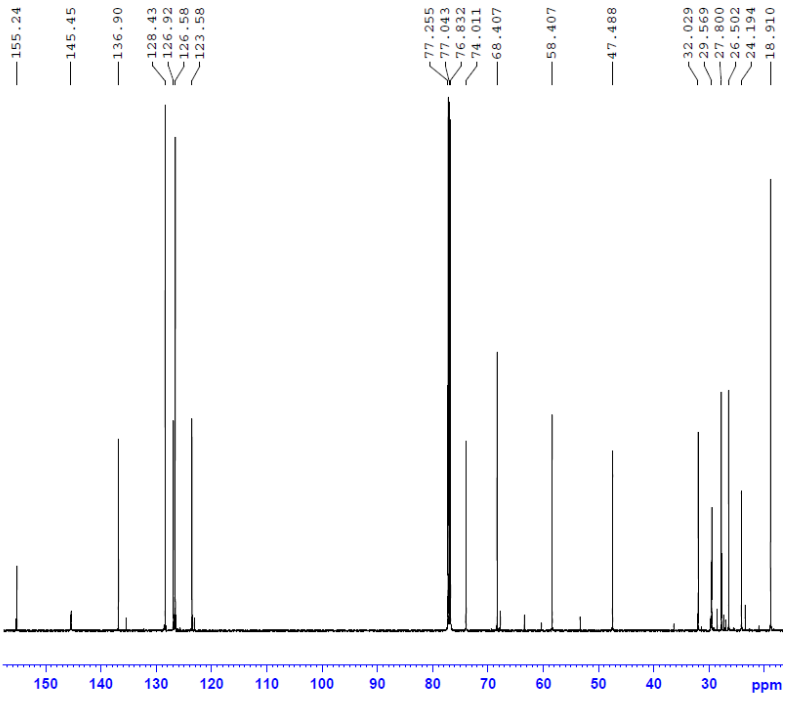
Current Data Parameters
NAME                  bo-42
EXPNO                     1
PROCNO                    1

F2 - Acquisition Parameters
Date_              20100423
Time                 13.21
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG               zg30
TD                   65536
SOLVENT              CDCl3
NS                      16
DS                       2
SWH              12335.526 Hz
FIDRES           0.188225 Hz
AQ               2.6564426 sec
RG                       4
DW                40.533 usec
DE                 8.50 usec
TE                 300.0 K
D1              1.00000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   1H
P1                  9.40 usec
PL1                -3.00 dB
PL1W          30.57242203 W
SFO1          600.2637069 MHz

F2 - Processing parameters
SI                   32768
SF            600.2600178 MHz
WDW                     no
SSB          0
LB           0 Hz
GB           0
PC                   1.00
```

^{13} C NMR (150MHz, CD_3Cl):

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Current Data Parameters
NAME                  bo-41
EXPNO                    11
PROCNO                    1

F2 - Acquisition Parameters
Date_              20100414
Time                 23.00
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgpg30
TD                   65536
SOLVENT              CDCl3
NS                    6000
DS                       4
SWH              36057.691 Hz
FIDRES           0.550197 Hz
AQ               0.9088159 sec
RG                    2050
DW                13.867 usec
DE                 8.50 usec
TE                 300.9 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                  13C
P1                 10.50 usec
PL1                0 dB
PL1W          91.93504333 W
SFO1          150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                   1H
PCPD2              90.00 usec
PL2                -3.00 dB
PL12               16.26 dB
PL13               18.00 dB
PL2W          30.57242203 W
PL12W          0.36251819 W
PL13W          0.24284537 W
SFO2          600.2624010 MHz

F2 - Processing parameters
SI                   32768
SF            150.9354970 MHz
WDW                     EM
SSB          0
LB                 1.00 Hz
GB           0
PC                   1.40
```
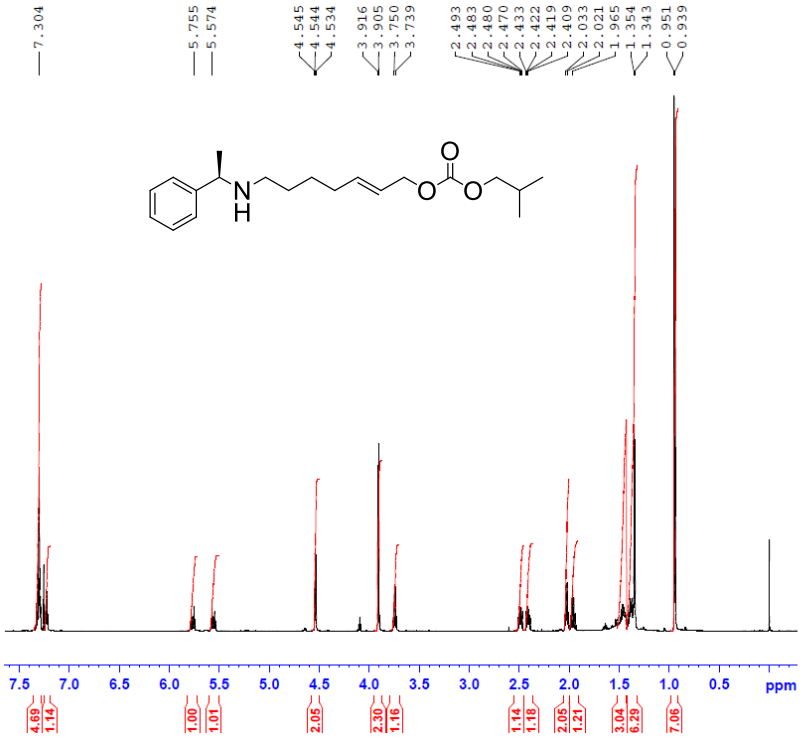

The ^{1}H and ^{13}C NMR of **5b**

^{1}H NMR (600MHz, CD_3Cl):



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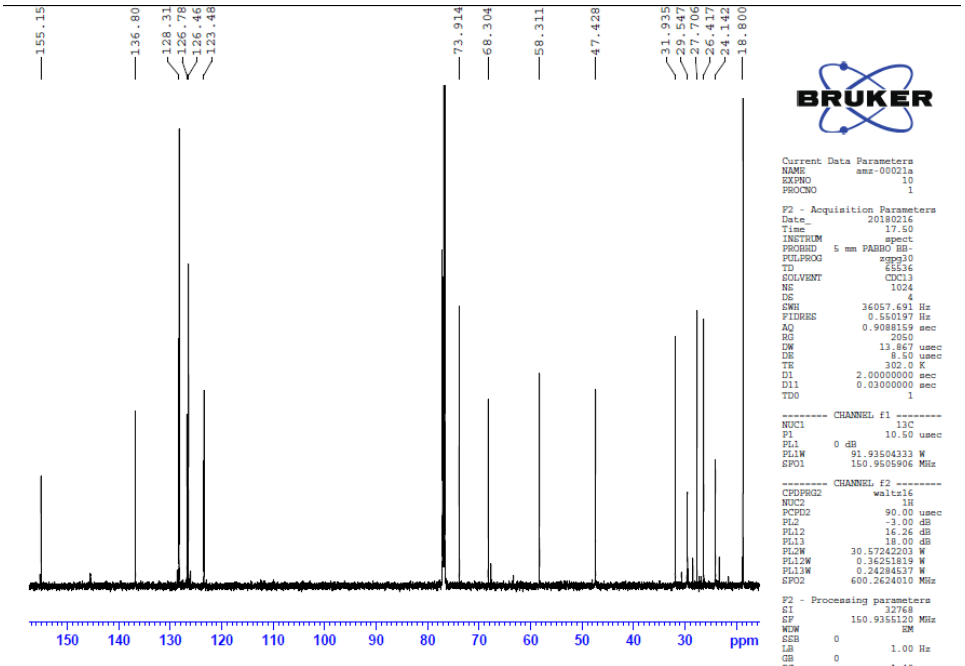
Current Data Parameters
NAME                  amz-00021
EXPNO                        10
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20180208
Time                      16.37
INSTRUM                   spect
PROBHD   5 mm PABBO BB-
PULPROG                   zg30
TD                       65536
SOLVENT                  CDCl3
NS                          16
DS                           2
SWH                  12335.526 Hz
FIDRES                0.188225 Hz
AQ                    2.6564426 sec
RG                          181
DW                     40.533 usec
DE                      8.50 usec
TE                     302.0 K
D1                    1.00000000 sec
TD0                           1

======== CHANNEL f1 ========
NUC1                         1H
P1                        9.40 usec
PL1                      -3.00 dB
PL1W                30.57242203 W
SFO1                600.2637069 MHz

F2 - Processing parameters
SI                        32768
SF                  600.2600191 MHz
WDW                          EM
SSB                 0
LB                        0.30 Hz
GB                  0
PC                        1.00
```

^{13} C NMR (150MHz, CD_3Cl):

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Current Data Parameters
NAME                 amz-00021a
EXPNO                        10
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20180216
Time                      17.50
INSTRUM                   spect
PROBHD   5 mm PABBO BB-
PULPROG                zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                        1024
DS                           4
SWH                  36057.691 Hz
FIDRES                0.550197 Hz
AQ                    0.9088159 sec
RG                        2050
DW                     13.867 usec
DE                      8.50 usec
TE                     302.0 K
D1                    2.00000000 sec
D11                   0.03000000 sec
TD0                           1

======== CHANNEL f1 ========
NUC1                        13C
P1                       10.50 usec
PL1                0 dB
PL1W                91.93504333 W
SFO1                150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                        1H
PCPD2                    90.00 usec
PL2                      -3.00 dB
PL12                     16.26 dB
PL13                     18.00 dB
PL2W                30.57242203 W
PL12W                0.36251819 W
PL13W                0.24284537 W
SFO2                600.2624010 MHz

F2 - Processing parameters
SI                        32768
SF                  150.9355120 MHz
WDW                          EM
SSB                 0
LB                        1.00 Hz
GB                  0
PC                        1.40
```
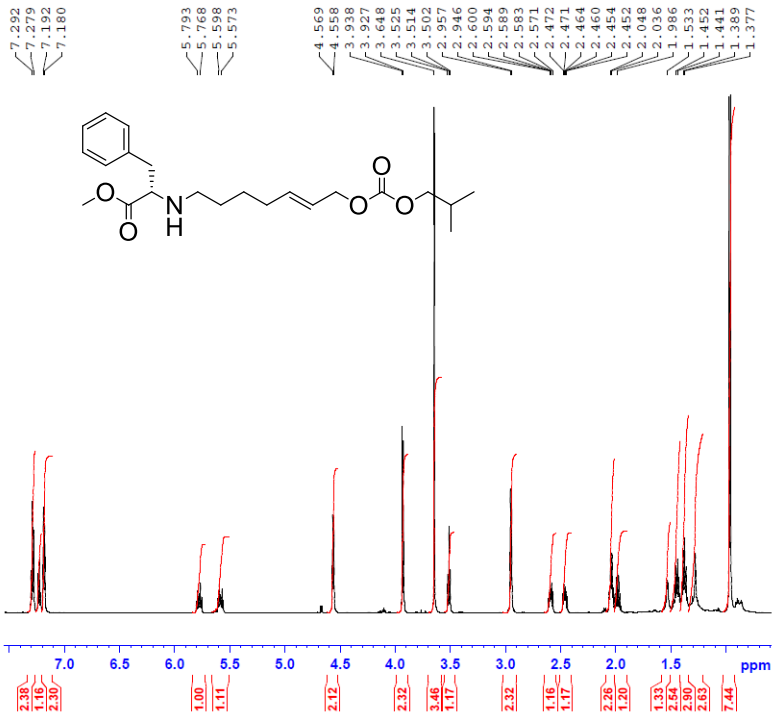

The ^{1}H and ^{13}C NMR of **5c**

^{1}H NMR (600MHz, CD_3Cl):

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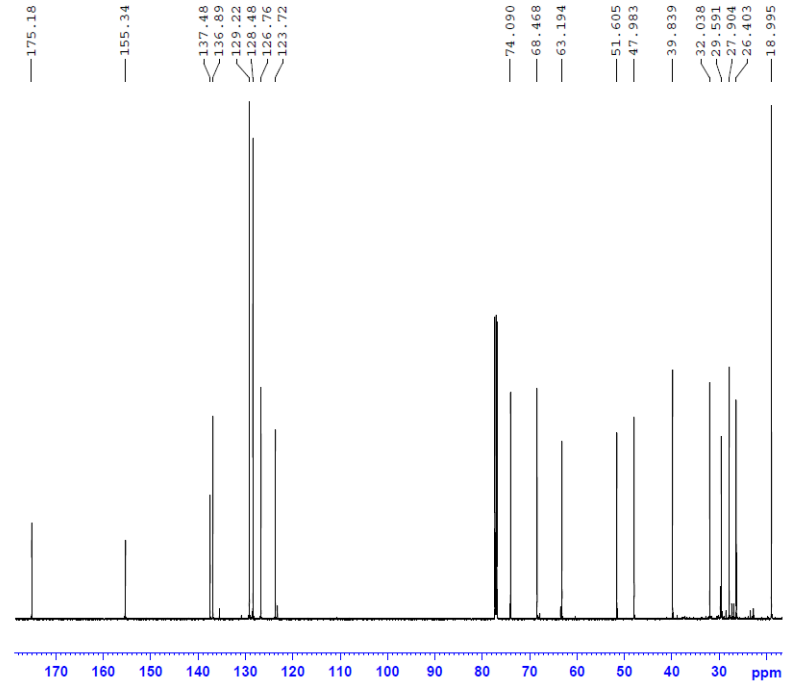
Current Data Parameters
NAME                  es-15
EXPNO                    10
PROCNO                    1

F2 - Acquisition Parameters
Date_               20150315
Time                    6.44
INSTRUM                spect
PROBHD     5 mm PABBO BB-
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH               12335.526 Hz
FIDRES            0.188225 Hz
AQ                2.6564426 sec
RG                      40.3
DW                 40.533 usec
DE                  8.50 usec
TE                   304.0 K
D1                1.00000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                     1H
P1                    9.40 usec
PL1                  -3.00 dB
PL1W           30.57242203 W
SFO1          600.2637069 MHz

F2 - Processing parameters
SI                    32768
SF             600.2600010 MHz
WDW                      no
SSB          0
LB           0 Hz
GB           0
PC                    1.00
```

^{13} C NMR (150MHz, CD_3Cl):




```
Current Data Parameters
NAME                  es-15
EXPNO                    11
PROCNO                    1

F2 - Acquisition Parameters
Date_               20150315
Time                    8.26
INSTRUM                spect
PROBHD     5 mm PABBO BB-
PULPROG             zgpg30
TD                    65536
SOLVENT               CDCl3
NS                     2048
DS                        4
SWH               36057.691 Hz
FIDRES            0.550197 Hz
AQ                0.9088159 sec
RG                      2050
DW                 13.867 usec
DE                  8.50 usec
TE                   304.0 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                       1

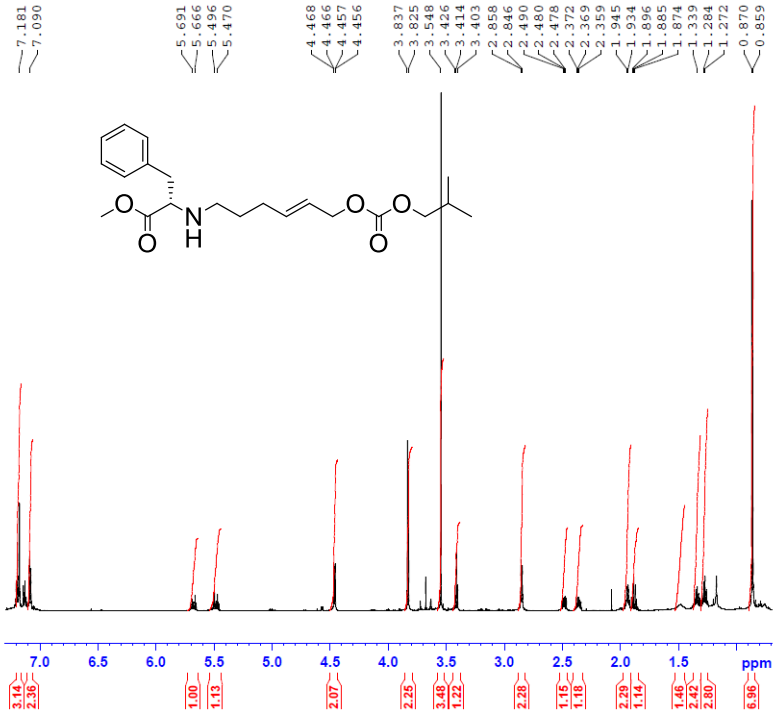
======== CHANNEL f1 ========
NUC1                    13C
P1                   10.50 usec
PL1        0 dB
PL1W           91.93504333 W
SFO1          150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2              waltz16
NUC2                    1H
PCPD2                90.00 usec
PL2                  -3.00 dB
PL12                 16.26 dB
PL13                 18.00 dB
PL2W           30.57242203 W
PL12W           0.36251819 W
PL13W           0.24284537 W
SFO2          600.2624010 MHz

F2 - Processing parameters
SI                    32768
SF            150.9354811 MHz
WDW                      EM
SSB          0
LB                    1.00 Hz
GB           0
PC                    1.40
```

The ^{1}H and ^{13}C NMR of **5d**

^{1}H NMR (600MHz, CD_3Cl):



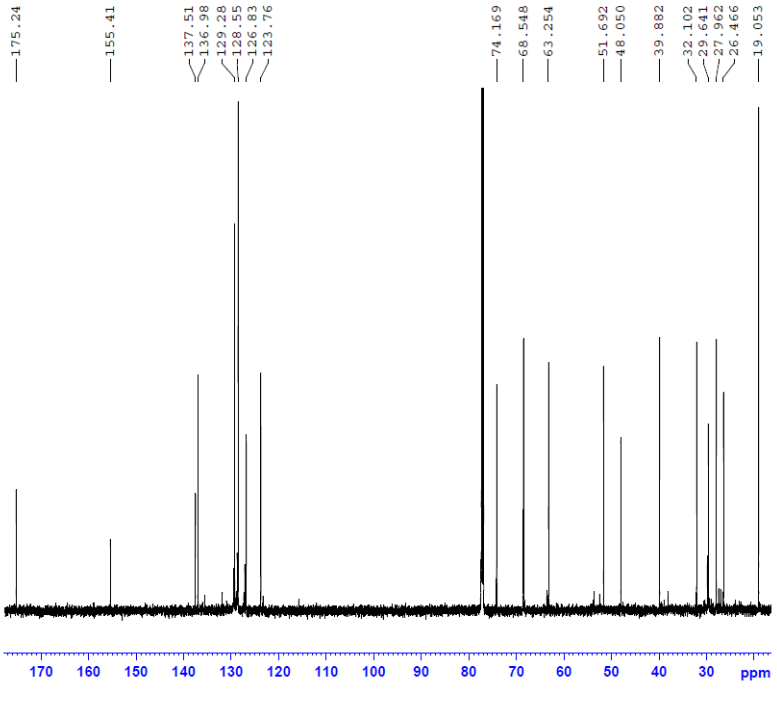

```
Current Data Parameters
NAME                  es-5
EXPNO                   10
PROCNO                   1

F2 - Acquisition Parameters
Date_              20150114
Time                   3.23
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG               zg30
TD                   65536
SOLVENT              CDCl3
NS                      16
DS                       2
SWH              12335.526 Hz
FIDRES            0.188225 Hz
AQ                2.6564426 sec
RG                     161
DW                40.533 usec
DE                 8.50 usec
TE                 303.0 K
D1              1.00000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                    1H
P1                   9.40 usec
PL1                 -3.00 dB
PL1W           30.57242203 W
SFO1           600.2637069 MHz

F2 - Processing parameters
SI                   32768
SF             600.2600681 MHz
WDW                     no
SSB                      0
LB                    0 Hz
GB                       0
PC                    1.00
```

^{13} C NMR (150MHz, CD_3Cl):

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Current Data Parameters
NAME                  es-5
EXPNO                   11
PROCNO                   1

F2 - Acquisition Parameters
Date_              20150114
Time                   4.14
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                    1024
DS                       4
SWH              36057.691 Hz
FIDRES            0.550197 Hz
AQ                0.9088159 sec
RG                    2050
DW                13.867 usec
DE                 8.50 usec
TE                 303.0 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   13C
P1                  10.50 usec
PL1       0 dB
PL1W           91.93504333 W
SFO1           150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                    1H
PCPD2                90.00 usec
PL2                 -3.00 dB
PL12                16.26 dB
PL13                18.00 dB
PL2W           30.57242203 W
PL12W           0.36251819 W
PL13W           0.24284537 W
SFO2           600.2624010 MHz

F2 - Processing parameters
SI                   32768
SF             150.9354736 MHz
WDW                     EM
SSB                      0
LB                    1.00 Hz
GB                       0
PC                    1.40
```
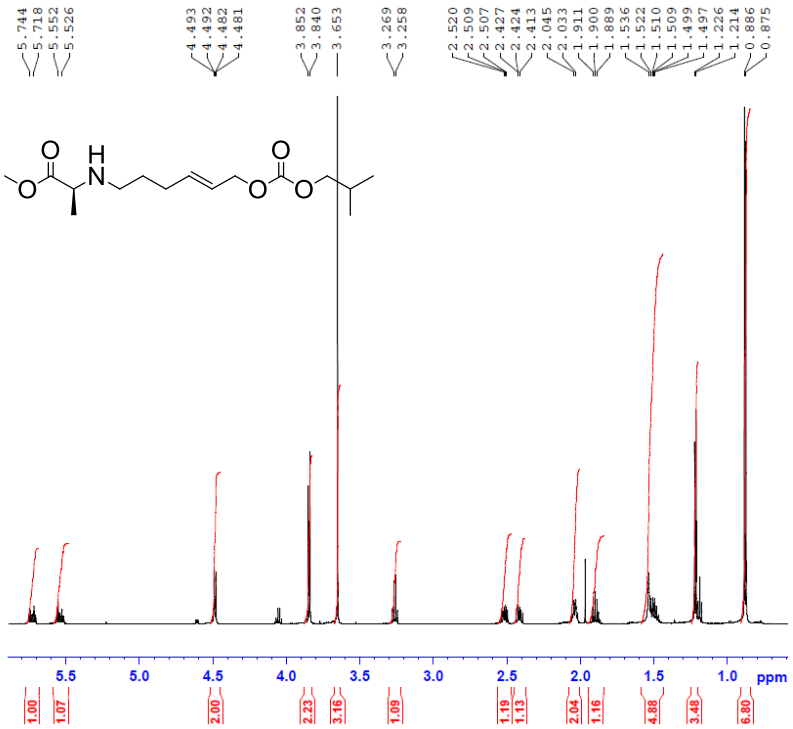

The ^{1}H and ^{13}C NMR of **5e**

^{1}H NMR (600MHz, CD_3Cl):



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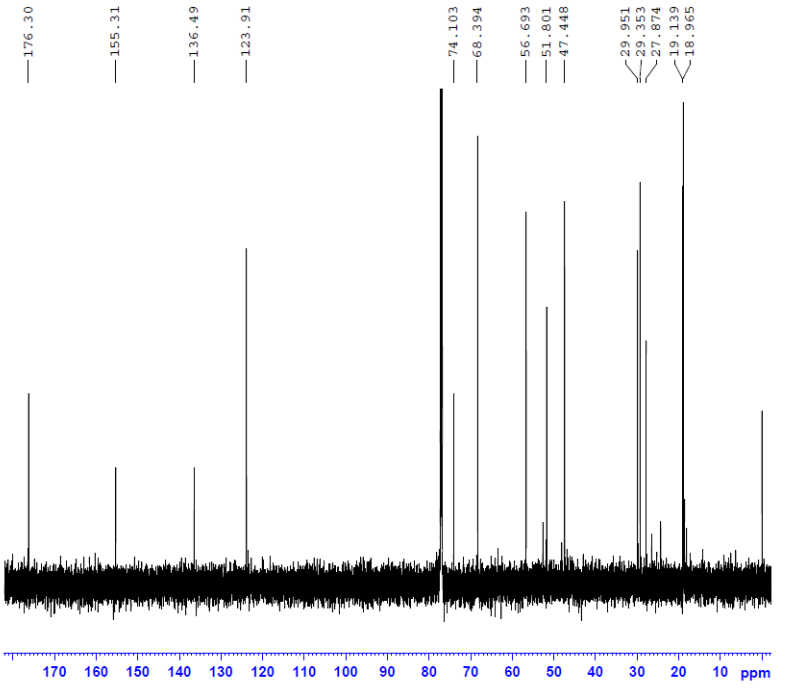
Current Data Parameters
NAME      bo-331-22.06.15
EXPNO                  10
PROCNO                  1

F2 - Acquisition Parameters
Date_           20150625
Time              10.38
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG           zg30
TD               65536
SOLVENT          CDCl3
NS                  16
DS                   2
SWH           12335.526 Hz
FIDRES         0.188225 Hz
AQ             2.6564426 sec
RG                 228
DW              40.533 usec
DE               8.50 usec
TE              304.1 K
D1           1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                1H
P1               9.40 usec
PL1             -3.00 dB
PL1W       30.57242203 W
SFO1      600.2637069 MHz

F2 - Processing parameters
SI                32768
SF         600.2600556 MHz
WDW                  no
SSB       0
LB        0 Hz
GB        0
PC                1.00
```

^{13} C NMR (150MHz, CD_3Cl):



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Current Data Parameters
NAME                 bo-313
EXPNO                    11
PROCNO                    1

F2 - Acquisition Parameters
Date_           20150206
Time              1.59
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG          zgpg30
TD               65536
SOLVENT          CDCl3
NS                2048
DS                   4
SWH           36057.691 Hz
FIDRES         0.550197 Hz
AQ             0.9088159 sec
RG                2050
DW              13.867 usec
DE               8.50 usec
TE              303.0 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                13C
P1              10.50 usec
PL1        0 dB
PL1W       91.93504333 W
SFO1      150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                1H
PCPD2           90.00 usec
PL2             -3.00 dB
PL12            16.26 dB
PL13            18.00 dB
PL2W       30.57242203 W
PL12W       0.36251819 W
PL13W       0.24284537 W
SFO2      600.2624010 MHz

F2 - Processing parameters
SI                32768
SF         150.9354858 MHz
WDW                  no
SSB       0
LB        0 Hz
GB        0
PC                1.40
```
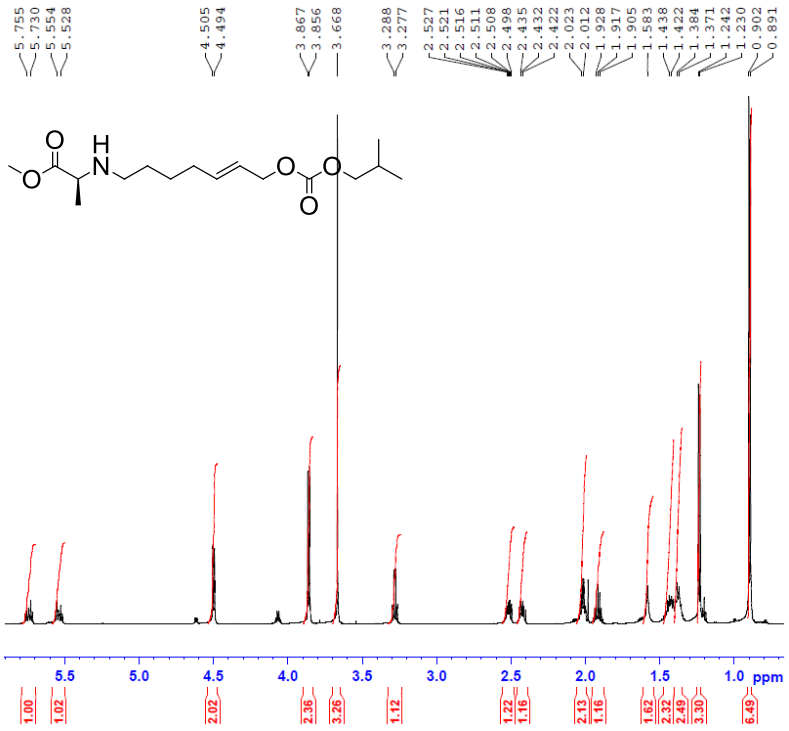

The ^{1}H and ^{13}C NMR of **5f**

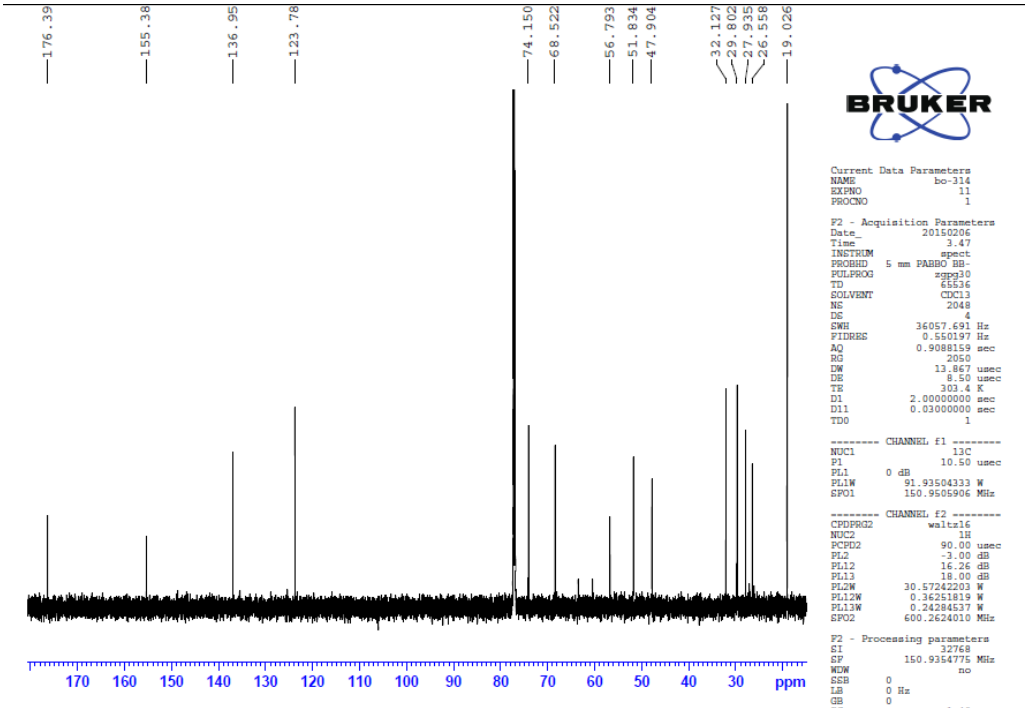
^{1}H NMR (600MHz, CD_3Cl):



BRUKER

```
Current Data Parameters
NAME      bo-330-22.06.15
EXPNO                   1
PROCNO                  1

F2 - Acquisition Parameters
Date_           20150625
Time               9.34
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                   16
DS                    2
SWH           12335.526 Hz
FIDRES        0.188225 Hz
AQ            2.6564426 sec
RG                   64
DW               40.533 usec
DE                8.50 usec
TE               304.0 K
D1            1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                9.40 usec
PL1               -3.00 dB
PL1W        30.57242203 W
SFO1       600.2637069 MHz

F2 - Processing parameters
SI                32768
SF          600.2600328 MHz
WDW                  no
SSB       0
LB        0 Hz
GB        0
PC                1.00
```

^{13} C NMR (150MHz, CD_3Cl):

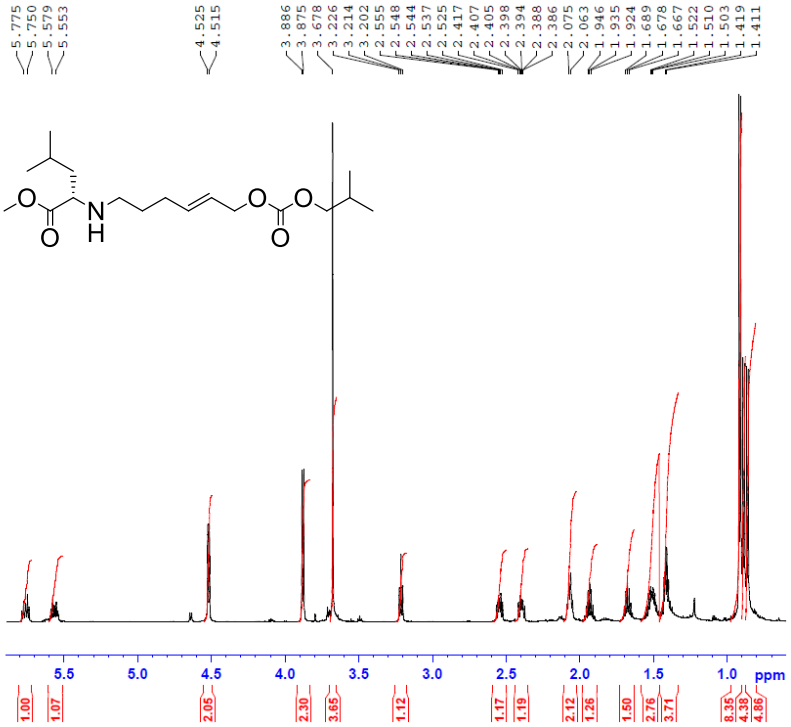


BRUKER

```
Current Data Parameters
NAME                bo-314
EXPNO                   11
PROCNO                   1

F2 - Acquisition Parameters
Date_           20150206
Time               3.47
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                 2048
DS                    4
SWH           36057.691 Hz
FIDRES        0.550197 Hz
AQ            0.9088159 sec
RG                 2050
DW               13.867 usec
DE                8.50 usec
TE               303.4 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                13C
P1               10.50 usec
PL1        0 dB
PL1W        91.93504333 W
SFO1       150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                 1H
PCPD2            90.00 usec
PL2               -3.00 dB
PL12              16.26 dB
PL13              18.00 dB
PL2W        30.57242203 W
PL12W        0.36251819 W
PL13W        0.24284537 W
SFO2       600.2624010 MHz

F2 - Processing parameters
SI                32768
SF          150.9354775 MHz
WDW                  no
SSB       0
LB        0 Hz
GB        0
PC                1.40
```

The ^{1}H and ^{13}C NMR of **5g**

^{1}H NMR (600MHz, CD_3Cl):



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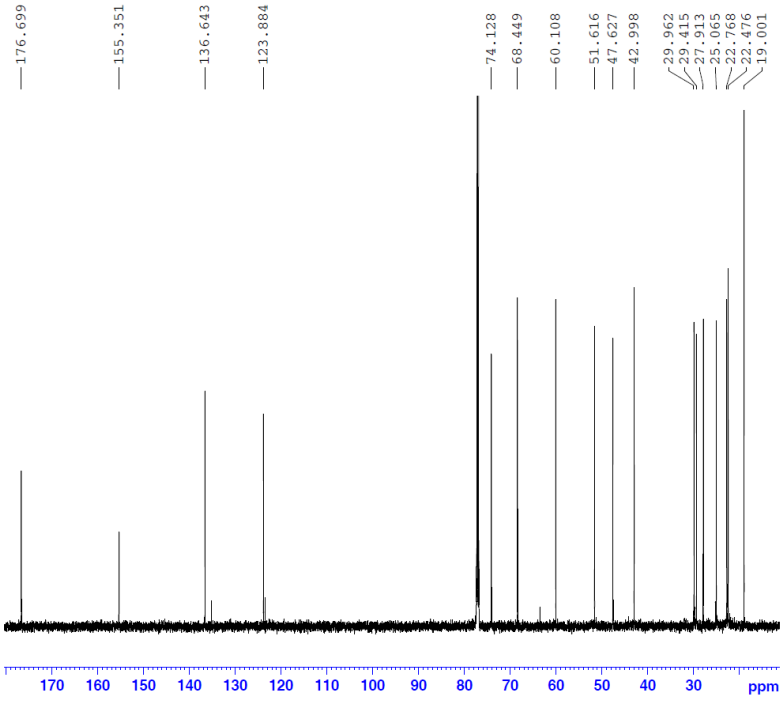
```
Current Data Parameters
NAME                  es-1
EXPNO                   10
PROCNO                   1

F2 - Acquisition Parameters
Date_           20150108
Time                5.22
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             12335.526 Hz
FIDRES          0.188225 Hz
AQ              2.6564426 sec
RG                   128
DW                40.533 usec
DE                 8.50 usec
TE                303.0 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.40 usec
PL1               -3.00 dB
PL1W         30.57242203 W
SFO1         600.2637069 MHz

F2 - Processing parameters
SI                 32768
SF          600.2600335 MHz
WDW                   no
SSB                    0
LB                  0 Hz
GB                     0
PC                  1.00
```

^{13} C NMR (150MHz, CD_3Cl):



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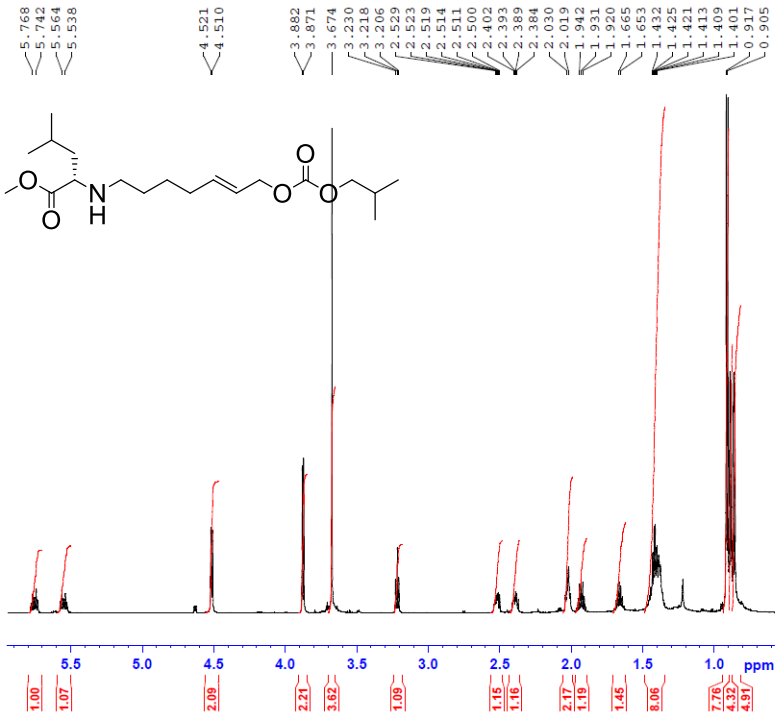
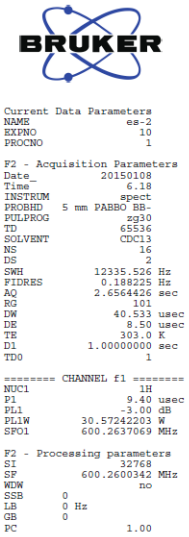
```
Current Data Parameters
NAME                  es-1
EXPNO                   11
PROCNO                   1

F2 - Acquisition Parameters
Date_           20150108
Time                6.13
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1024
DS                     4
SWH             36057.691 Hz
FIDRES          0.550197 Hz
AQ              0.9088159 sec
RG                  2050
DW                13.867 usec
DE                 8.50 usec
TE                303.0 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                10.50 usec
PL1        0 dB
PL1W         91.93504333 W
SFO1         150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2              90.00 usec
PL2                -3.00 dB
PL12               16.26 dB
PL13               18.00 dB
PL2W         30.57242203 W
PL12W         0.36281819 W
PL13W         0.24284537 W
SFO2         600.2624010 MHz

F2 - Processing parameters
SI                 32768
SF          150.9354796 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

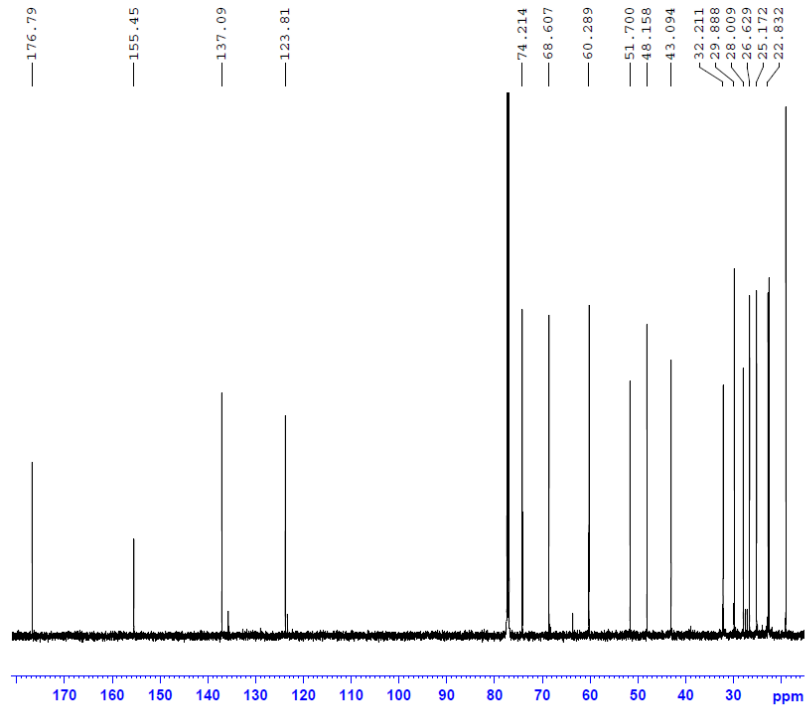
The ^{1}H and ^{13}C NMR of **5h**

^{1}H NMR (600MHz, CD_3Cl):





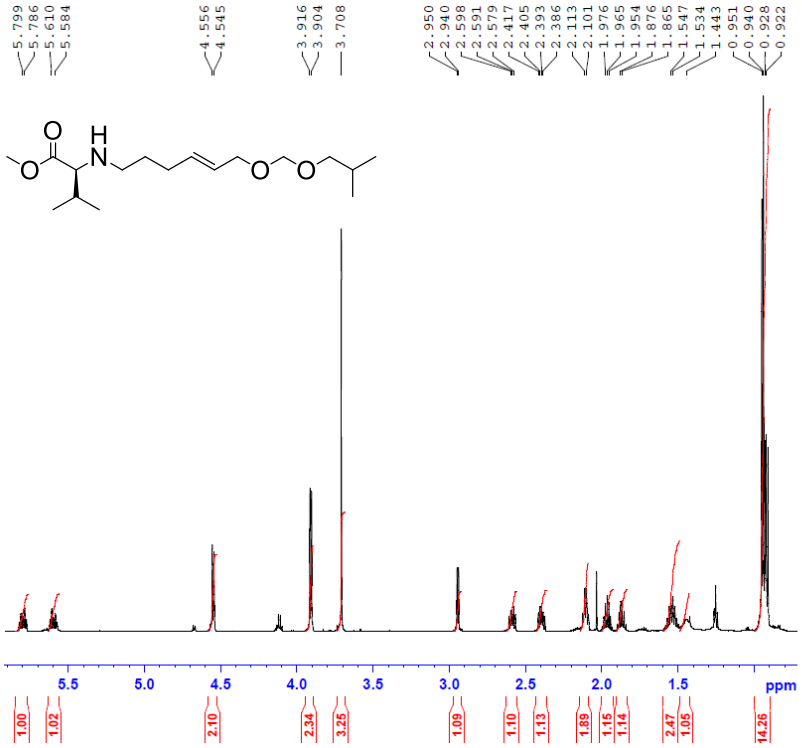
^{13} C NMR (150MHz, CD_3Cl):




```
Current Data Parameters
NAME                  es-2
EXPNO                   11
PROCNO                   1

F2 - Acquisition Parameters
Date_              20150108
Time_                 7.09
INSTRUM              spect
PROBHD   5 mm PABBO BB-
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                    1024
DS                       4
SWH              36057.691 Hz
FIDRES           0.550197 Hz
AQ               0.9088159 sec
RG                    2050
DW                13.867 usec
DE                 8.50 usec
TE                 303.0 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   13C
P1                 10.50 usec
PL1        0 dB
PL1W         91.93504333 W
SFO1        150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                    1H
PCPD2              90.00 usec
PL2                -3.00 dB
PL12               16.26 dB
PL13               18.00 dB
PL2W         30.57242203 W
PL12W         0.36251819 W
PL13W         0.24284537 W
SFO2        600.2624010 MHz

F2 - Processing parameters
SI                   32768
SF             150.9354645 MHz
WDW                     EM
SSB                      0
LB                 1.00 Hz
GB                       0
PC                 1.40
```

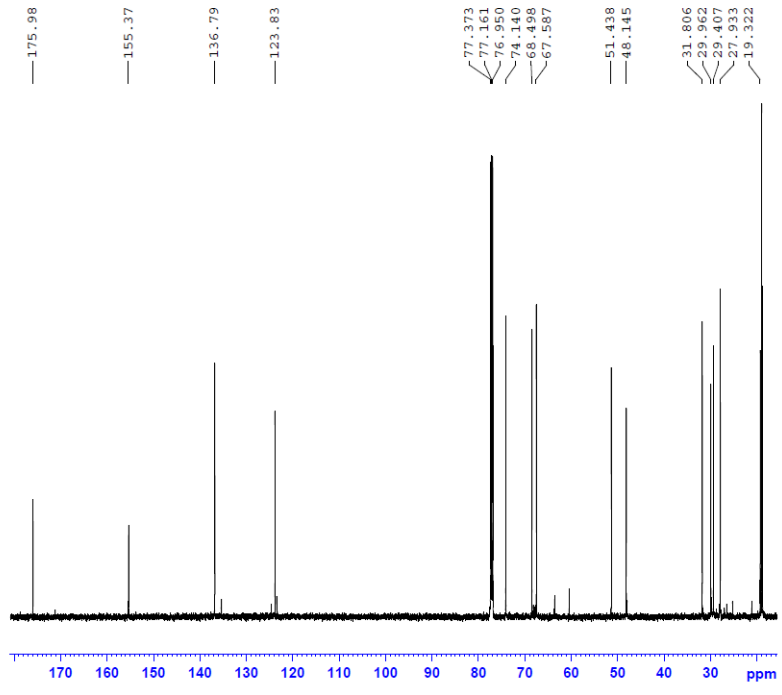
The ^{1}H and ^{13}C NMR of **5i**

^{1}H NMR (600MHz, CD_3Cl):




```
Current Data Parameters
NAME      bo-344-17.03.16
EXPNO                  10
PROCNO                  1

F2 - Acquisition Parameters
Date_            20160321
Time                22.42
INSTRUM             spect
PROBHD   5 mm TBI 1H/31
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH            12335.526 Hz
FIDRES          0.188225 Hz
AQ             2.6564426 sec
RG                    32
DW               40.533 usec
DE                8.50 usec
TE                302.8 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                  9.95 usec
PL1                 1.00 dB
PL1W         12.17109966 W
SFO1        600.2637069 MHz

F2 - Processing parameters
SI                 32768
SF          600.2600121 MHz
WDW                   no
SSB                    0
LB                     0 Hz
GB                     0
PC                  1.00
```

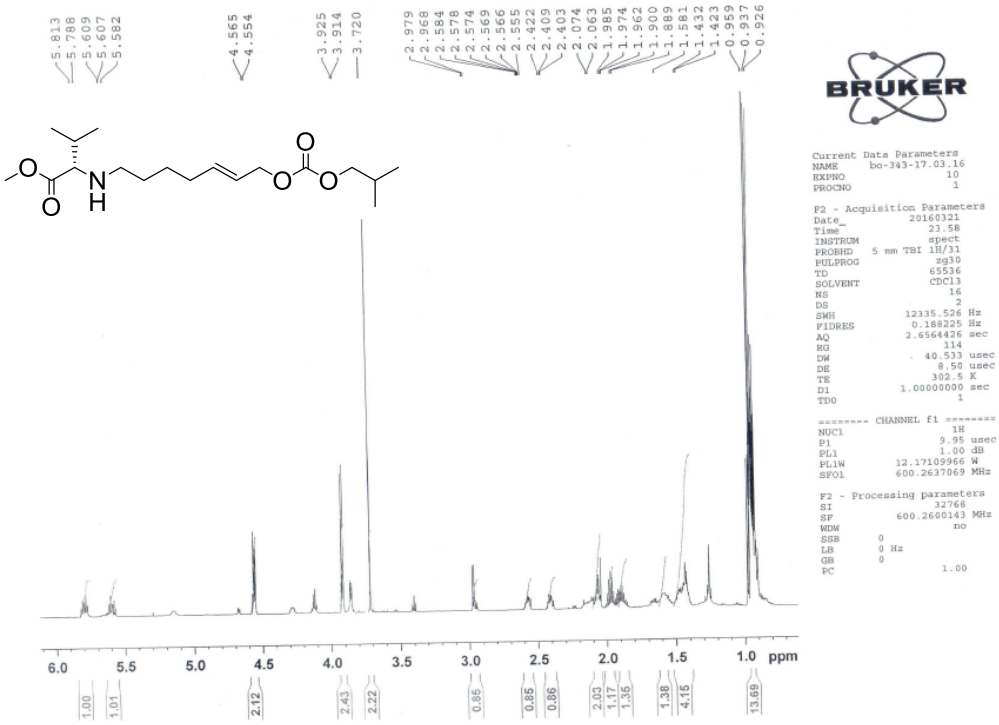
^{13} C NMR (150MHz, CD_3Cl):




```
Current Data Parameters
NAME      bo-344-17.03.16
EXPNO                  11
PROCNO                  1

F2 - Acquisition Parameters
Date_            20160321
Time                23.34
INSTRUM             spect
PROBHD   5 mm TBI 1H/31
PULPROG          zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1024
DS                     4
SWH            36057.691 Hz
FIDRES          0.550197 Hz
AQ             0.9088159 sec
RG                  2050
DW               13.867 usec
DE                8.50 usec
TE                303.1 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                 17.00 usec
PL1                -2.40 dB
PL1W        159.76480103 W
SFO1         150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2              95.00 usec
PL2                 1.00 dB
PL12               20.21 dB
PL13               22.00 dB
PL2W         12.17109966 W
PL12W         0.14599229 W
PL13W         0.09667849 W
SFO2        600.2624010 MHz

F2 - Processing parameters
SI                 32768
SF          150.9354756 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

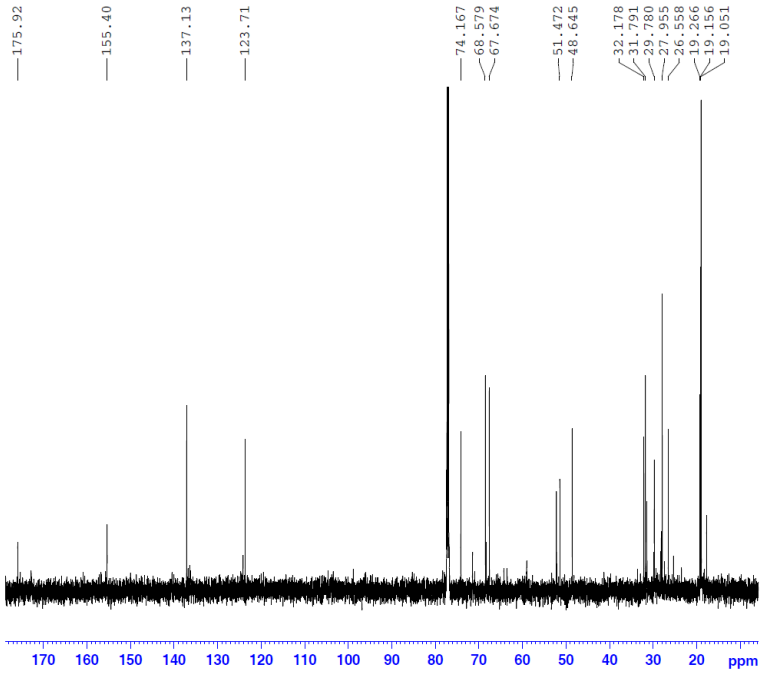
The ^{1}H and ^{13}C NMR of **5j**

^{1}H NMR (600MHz, CD_3Cl):




```
Current Data Parameters
NAME      bo-343-17.03.16
EXPNO                  10
PROCNO                  1

F2 - Acquisition Parameters
Date_            20160321
Time                23.58
INSTRUM             spect
PROBHD   5 mm TBI 1H/31
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH           12335.526 Hz
FIDRES         0.188225 Hz
AQ            2.6564426 sec
RG                   114
DW              40.533 usec
DE                8.50 usec
TE                302.5 K
D1            1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                   1H
P1                  9.95 usec
PL1                 1.00 dB
PL1W          12.17109966 W
SFO1          600.2637069 MHz

F2 - Processing parameters
SI                 32768
SF            600.2600143 MHz
WDW                   no
SSB                    0
LB                 0 Hz
GB                     0
PC                  1.00
```

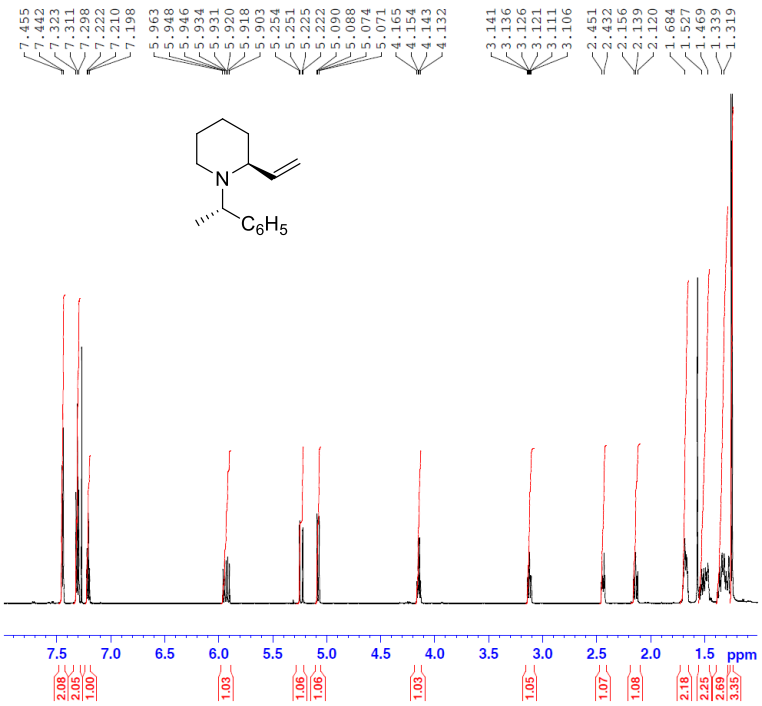
^{13} C NMR (150MHz, CD_3Cl):




```
Current Data Parameters
NAME      bo-343-17.03.16
EXPNO                  11
PROCNO                  1

F2 - Acquisition Parameters
Date_            20160322
Time                 0.49
INSTRUM             spect
PROBHD   5 mm TBI 1H/31
PULPROG          zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1024
DS                     4
SWH           36057.691 Hz
FIDRES         0.550197 Hz
AQ            0.9088159 sec
RG                  2050
DW              13.867 usec
DE                8.50 usec
TE                302.9 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  13C
P1                 17.00 usec
PL1                -2.40 dB
PL1W       159.76480103 W
SFO1        150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2              95.00 usec
PL2                 1.00 dB
PL12               20.21 dB
PL13               22.00 dB
PL2W          12.17109966 W
PL12W          0.14599229 W
PL13W          0.09667849 W
SFO2          600.2624010 MHz

F2 - Processing parameters
SI                 32768
SF            150.9354744 MHz
WDW                   EM
SSB                    0
LB                 1.00 Hz
GB                     0
PC                  1.40
```

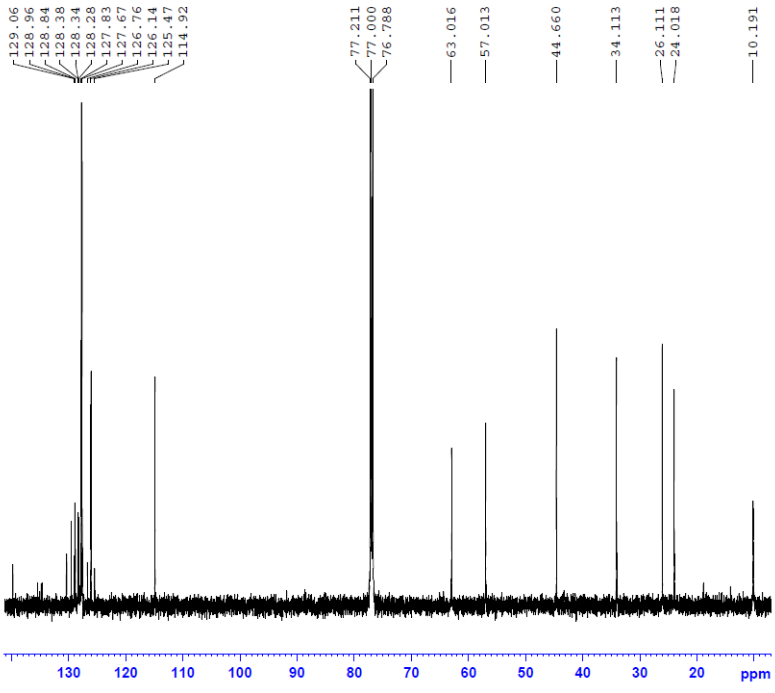
The ^{1}H and ^{13}C NMR of **7a**

^{1}H NMR (600MHz, CD_3Cl):




```
Current Data Parameters
NAME                 amz-00041c
EXPNO                        10
PROCNO                        1

F2 - Acquisition Parameters
Date_                 20180213
Time                     13.28
INSTRUM                  spect
PROBHD     5 mm PABBO BB-
PULPROG                  zg30
TD                      65536
SOLVENT                  CDCl3
NS                          16
DS                           2
SWH                 12335.526 Hz
FIDRES                0.188225 Hz
AQ                    2.65644426 sec
RG                         362
DW                    40.533 usec
DE                     8.50 usec
TE                     302.0 K
D1                    1.00000000 sec
TD0                           1

======== CHANNEL f1 ========
NUC1                         1H
P1                        9.40 usec
PL1                      -3.00 dB
PL1W                30.57242203 W
SFO1               600.2637069 MHz

F2 - Processing parameters
SI                        32768
SF                 600.2600101 MHz
WDW                          no
SSB                 0
LB                  0 Hz
GB                  0
PC                           1.00
```

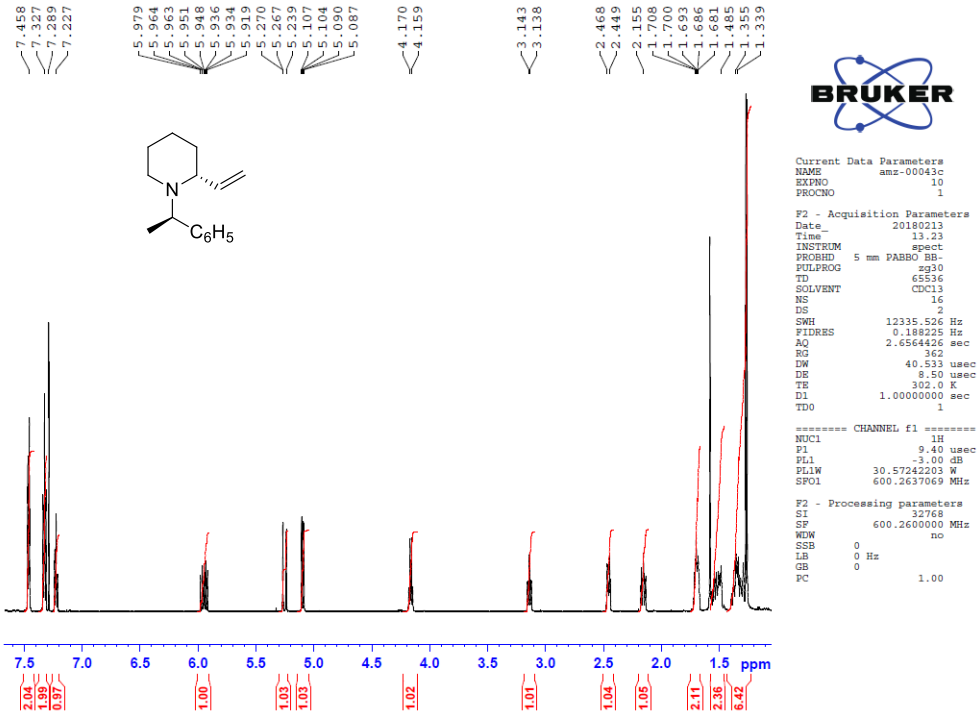
^{13} C NMR (150MHz, CD_3Cl):



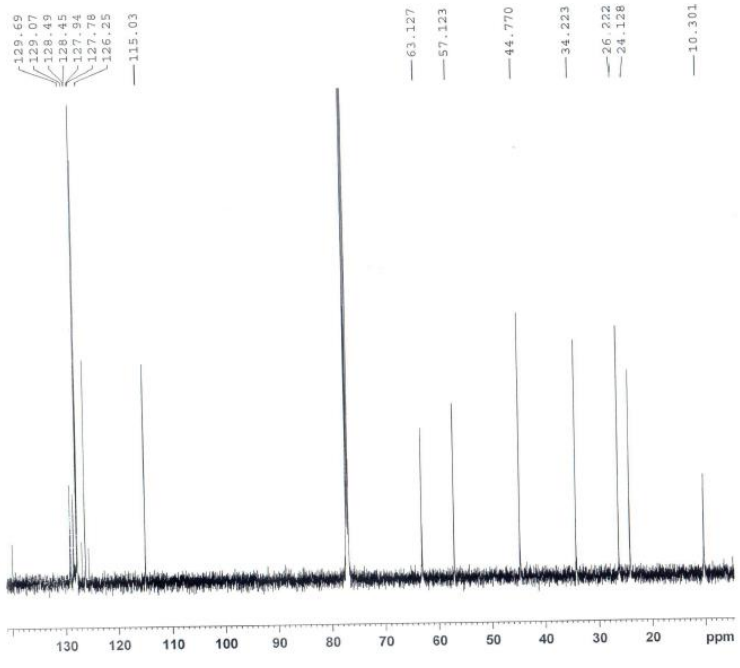

```
Current Data Parameters
NAME                      bo-44
EXPNO                        11
PROCNO                        1

F2 - Acquisition Parameters
Date_                 20100427
Time                     19.46
INSTRUM                  spect
PROBHD     5 mm PABBO BB-
PULPROG                 zgpg30
TD                      65536
SOLVENT                  CDCl3
NS                        2500
DS                           4
SWH                 36057.691 Hz
FIDRES                0.550197 Hz
AQ                    0.9088159 sec
RG                        2050
DW                    13.867 usec
DE                     8.50 usec
TE                     301.7 K
D1                    2.00000000 sec
D11                   0.03000000 sec
TD0                           1

======== CHANNEL f1 ========
NUC1                         13C
P1                       10.50 usec
PL1                   0 dB
PL1W                91.93504333 W
SFO1               150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2                 waltz16
NUC2                         1H
PCPD2                    90.00 usec
PL2                      -3.00 dB
PL12                     16.26 dB
PL13                     18.00 dB
PL2W                30.57242203 W
PL12W                0.36251819 W
PL13W                0.24284537 W
SFO2               600.2624010 MHz

F2 - Processing parameters
SI                        32768
SF                 150.9354982 MHz
WDW                          EM
SSB                 0
LB                       1.00 Hz
GB                  0
PC                           1.40
```

The ^{1}H and ^{13}C NMR of 6**b**

^{1}H NMR (600MHz, CD_3Cl):

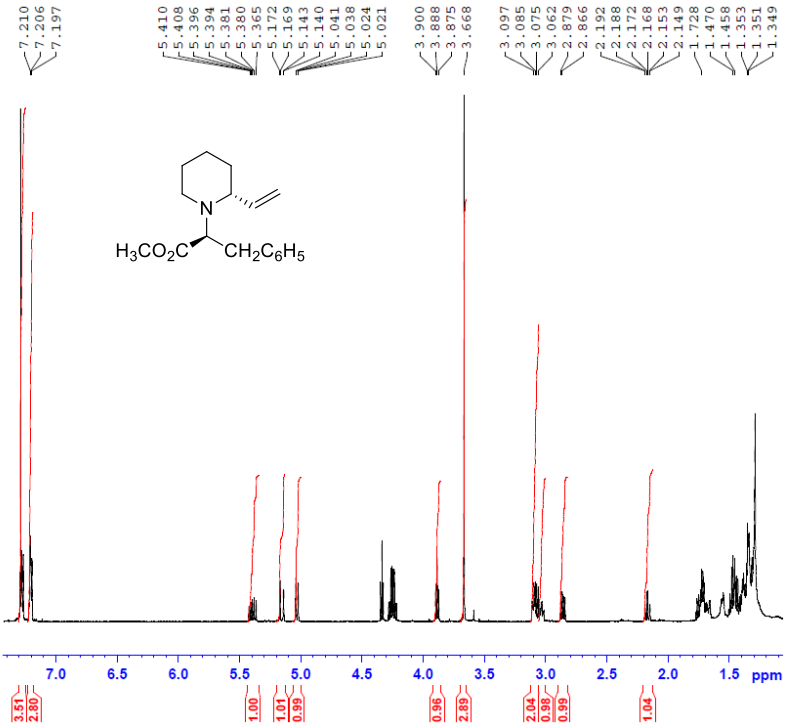


^{13} C NMR (150MHz, CD_3Cl):



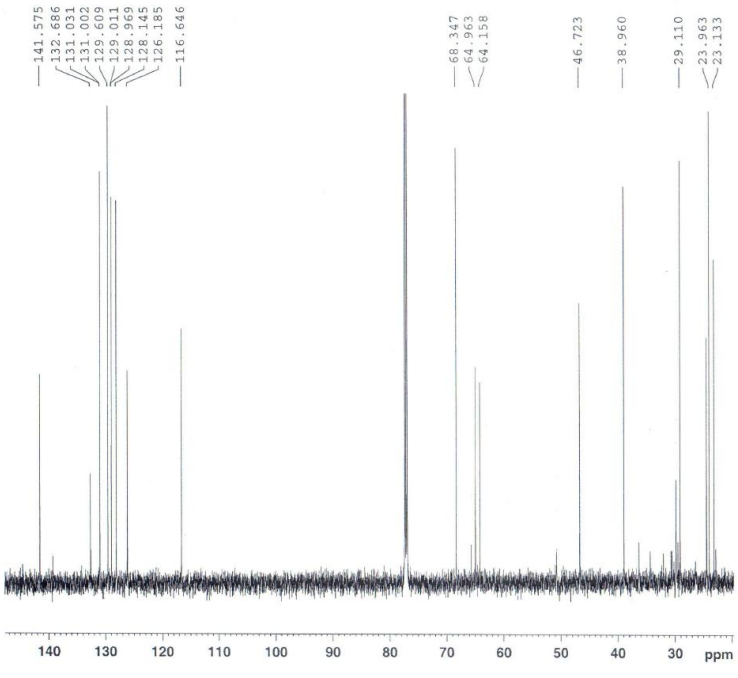
The ^{1}H and ^{13}C NMR of **6c**

^{1}H NMR (600MHz, CD_3Cl):




```
Current Data Parameters
NAME                  es-17-1
EXPNO                       1
PROCNO                      1

F2 - Acquisition Parameters
Date_              20150326
Time                  14.14
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG               zg30
TD                   65536
SOLVENT              CDCl3
NS                      16
DS                       2
SWH               12335.526 Hz
FIDRES            0.188225 Hz
AQ                2.6564426 sec
RG                     362
DW                  40.533 usec
DE                   8.50 usec
TE                  303.8 K
D1              1.00000000 sec
TD0                         1

======== CHANNEL f1 ========
NUC1                    1H
P1                   9.40 usec
PL1                 -3.00 dB
PL1W           30.57242203 W
SFO1           600.2637069 MHz

F2 - Processing parameters
SI                      32768
SF             600.2600000 MHz
WDW                        no
SSB          0
LB           0 Hz
GB           0
PC                      1.00
```

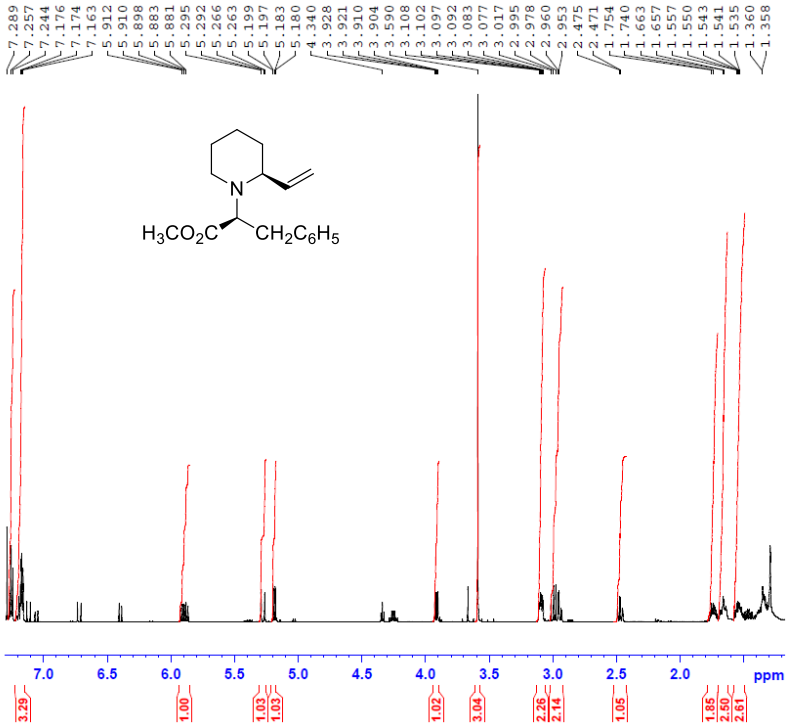
^{13} C NMR (150MHz, CD_3Cl):




```
Current Data Parameters
NAME                 es-17-1C
EXPNO                       1
PROCNO                      1

F2 - Acquisition Parameters
Date_              20150505
Time                  13.35
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG             zgpg
TD                   65536
SOLVENT              CDCl3
NS                    1024
DS                       2
SWH               36057.691 Hz
FIDRES            0.550197 Hz
AQ                0.9088159 sec
RG                     2050
DW                  13.867 usec
DE                   8.50 usec
TE                  304.0 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                         1

======== CHANNEL f1 ========
NUC1                   13C
P1                   9.00 usec
PL1                  0 dB
PL1W           91.93504333 W
SFO1          150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                    1H
PCPD2               90.00 usec
PL2                  -3.00 dB
PL12                 16.26 dB
PL13                 18.00 dB
PL2W           30.57242203 W
PL12W           0.36251819 W
PL13W           0.24284537 W
SFO2          600.2624010 MHz

F2 - Processing parameters
SI                      32768
SF            150.9354719 MHz
WDW                        EM
SSB          0
LB                   1.00 Hz
GB           0
PC                      1.40
```

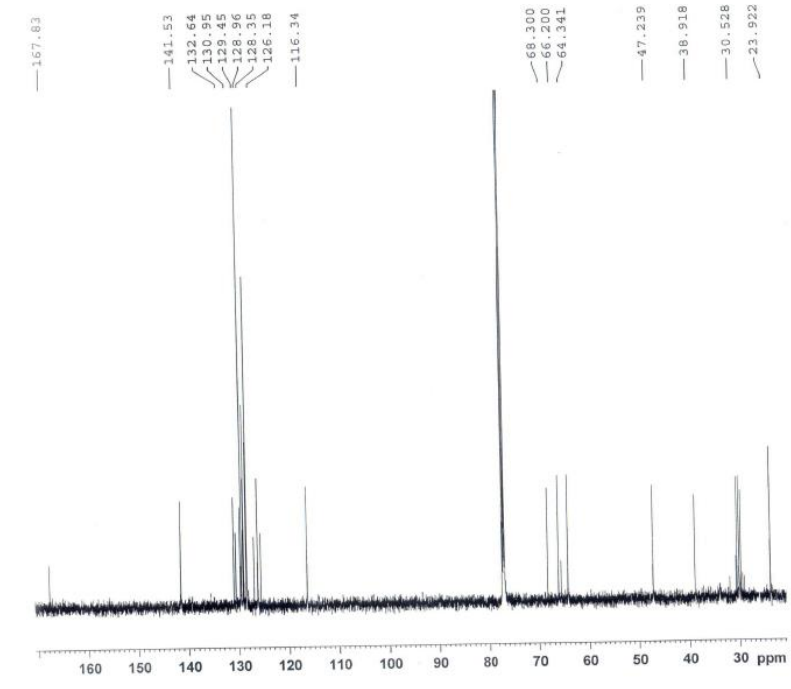
The ^{1}H and ^{13}C NMR of **7c**

^{1}H NMR (600MHz, CD_3Cl):




```
Current Data Parameters
NAME                  es-17-2
EXPNO                       1
PROCNO                      1

F2 - Acquisition Parameters
Date_              20150326
Time                  14.19
INSTRUM                spect
PROBHD   5 mm PABBO BB-
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH               12335.526 Hz
FIDRES            0.188225 Hz
AQ                2.6564426 sec
RG                      144
DW                 40.533 usec
DE                  8.50 usec
TE                  303.8 K
D1                1.00000000 sec
TD0                         1

======== CHANNEL f1 ========
NUC1                      1H
P1                     9.40 usec
PL1                   -3.00 dB
PL1W           30.57242203 W
SFO1           600.2637069 MHz

F2 - Processing parameters
SI                        32768
SF               600.2600000 MHz
WDW                          no
SSB          0
LB           0 Hz
GB           0
PC                        1.00
```

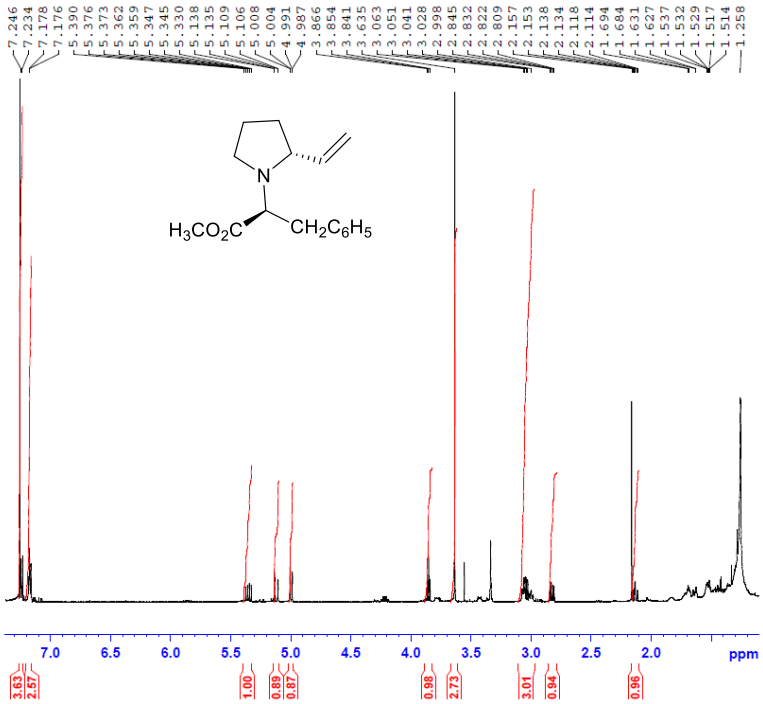
^{13} C NMR (150MHz, CD_3Cl):




```
Current Data Parameters
NAME                  es-17-2
EXPNO                      10
PROCNO                      1

F2 - Acquisition Parameters
Date_              20150505
Time                  18.51
INSTRUM                spect
PROBHD   5 mm PABBO BB-
PULPROG             zgpg30
TD                    65536
SOLVENT               CDCl3
NS                     1024
DS                        4
SWH               36057.691 Hz
FIDRES            0.550197 Hz
AQ                0.9088159 sec
RG                     2050
DW                 13.867 usec
DE                  8.50 usec
TE                  304.0 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                         1

======== CHANNEL f1 ========
NUC1                      13C
P1                    10.50 usec
PL1                0 dB
PL1W           91.93504333 W
SFO1           150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                 90.00 usec
PL2                   -3.00 dB
PL12                  16.26 dB
PL13                  18.00 dB
PL2W           30.57242203 W
PL12W          0.36251819 W
PL13W          0.24284537 W
SFO2           600.2624010 MHz

F2 - Processing parameters
SI                        32768
SF               150.9354789 MHz
WDW                          EM
SSB          0
LB                     1.00 Hz
GB           0
PC                        1.40
```

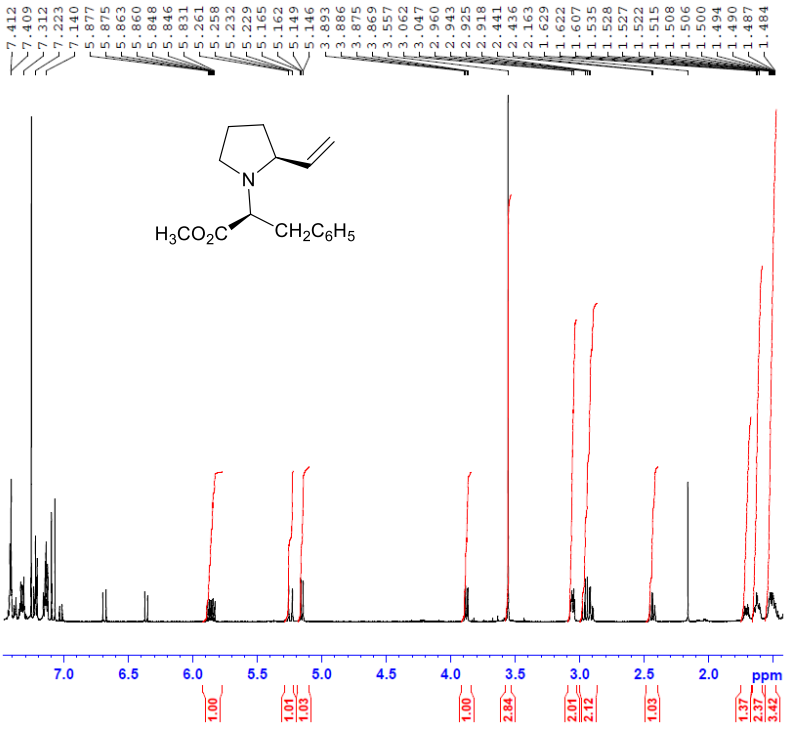
The ^{1}H and ^{13}C NMR of **6d** and **7d**

^{1}H NMR (600MHz, CD_3Cl) of **6d**:



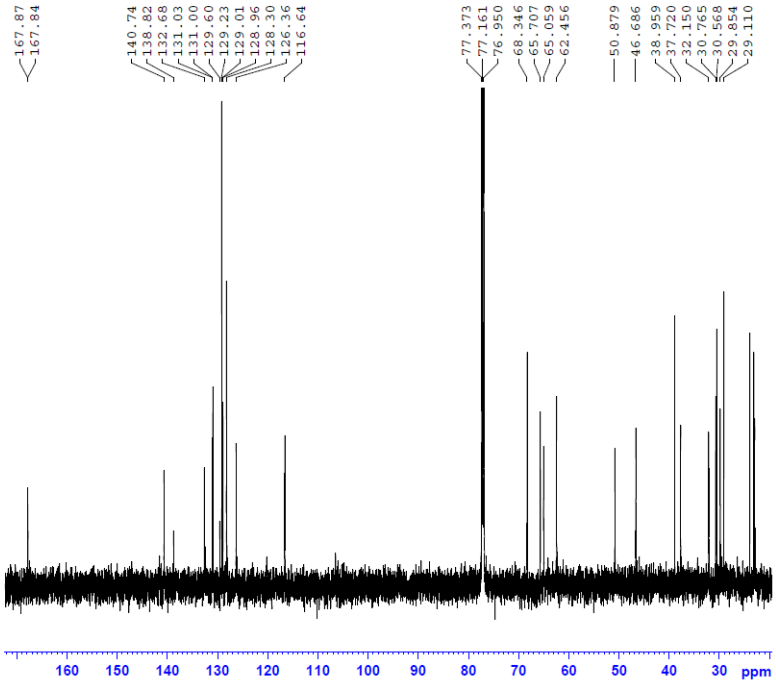

```
Current Data Parameters
NAME                  es-14-1
EXPNO                       1
PROCNO                      1

F2 - Acquisition Parameters
Date_               20150305
Time                   13.53
INSTRUM                spect
PROBHD   5 mm PABBO BB-
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH               12335.526 Hz
FIDRES             0.188225 Hz
AQ                2.6564426 sec
RG                      406
DW                 40.533 usec
DE                  8.50 usec
TE                  304.0 K
D1              1.00000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                      1H
P1                     9.40 usec
PL1                   -3.00 dB
PL1W           30.57242203 W
SFO1          600.2637069 MHz

F2 - Processing parameters
SI                    32768
SF            600.2600195 MHz
WDW                      no
SSB          0
LB           0 Hz
GB           0
PC                     1.00
```

^{1}H NMR (600MHz, CD_3Cl) of **7d**:




```
Current Data Parameters
NAME                  es-14-2
EXPNO                       1
PROCNO                      1

F2 - Acquisition Parameters
Date_               20150305
Time                   13.57
INSTRUM                spect
PROBHD   5 mm PABBO BB-
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH               12335.526 Hz
FIDRES             0.188225 Hz
AQ                2.6564426 sec
RG                      406
DW                 40.533 usec
DE                  8.50 usec
TE                  304.0 K
D1              1.00000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                      1H
P1                     9.40 usec
PL1                   -3.00 dB
PL1W           30.57242203 W
SFO1          600.2637069 MHz

F2 - Processing parameters
SI                    32768
SF            600.2600201 MHz
WDW                      no
SSB          0
LB           0 Hz
GB           0
PC                     1.00
```

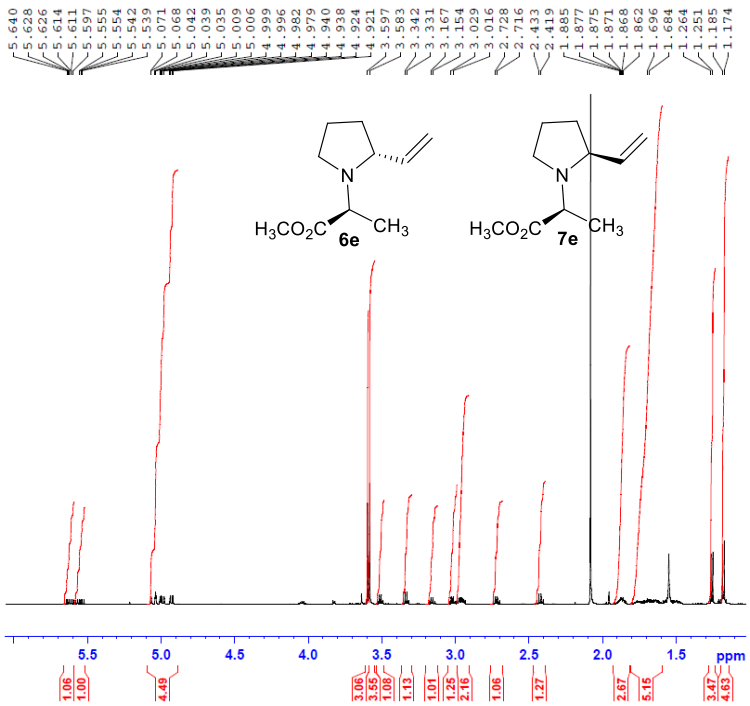
^{13} C NMR (150MHz, CD_3Cl) of **6d** and **7d**:

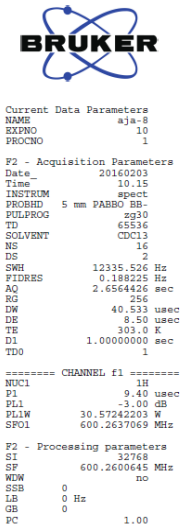


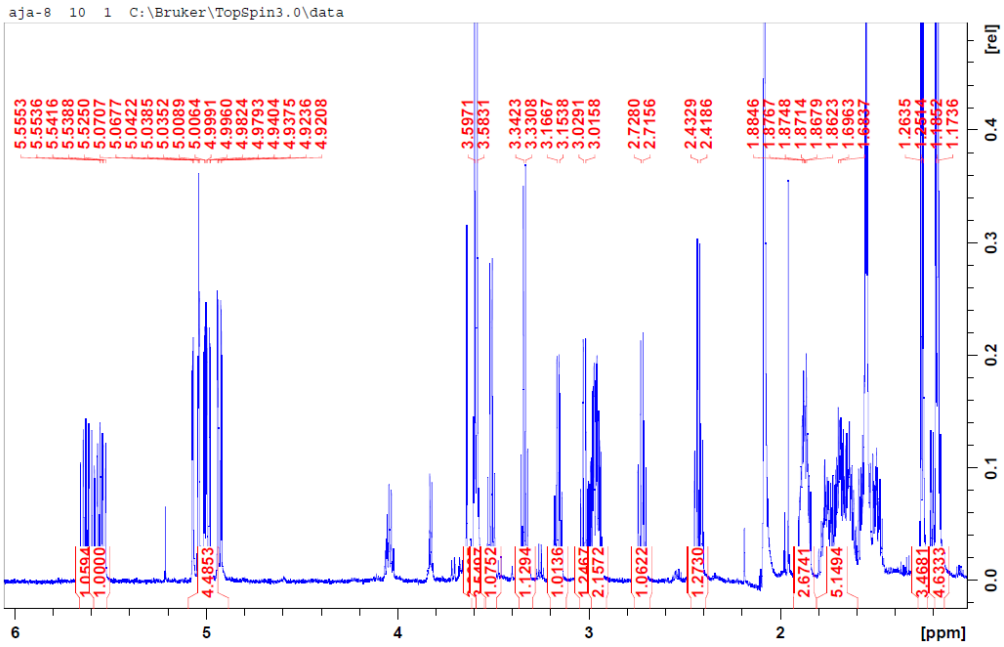

```
Current Data Parameters
NAME                  es-19-2
EXPNO                      11
PROCNO                      1

F2 - Acquisition Parameters
Date_              20150423
Time               20.56
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG            zgpg30
TD                 65536
SOLVENT            CDCl3
NS                 1024
DS                 4
SWH                36057.691 Hz
FIDRES             0.550197 Hz
AQ                 0.9088159 sec
RG                 2050
DW                 13.867 usec
DE                 8.50 usec
TE                 304.0 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                1

======== CHANNEL f1 ========
NUC1               13C
P1                 10.50 usec
PL1       0 dB
PL1W               91.93504333 W
SFO1               150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2               1H
PCPD2              90.00 usec
PL2                -3.00 dB
PL12               16.26 dB
PL13               18.00 dB
PL2W               30.57242203 W
PL12W              0.36251819 W
PL13W              0.24284537 W
SFO2               600.2624010 MHz

F2 - Processing parameters
SI                 32768
SF                 150.9354720 MHz
WDW                EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

The ^{1}H and ^{13}C NMR of **6e** and **7e**

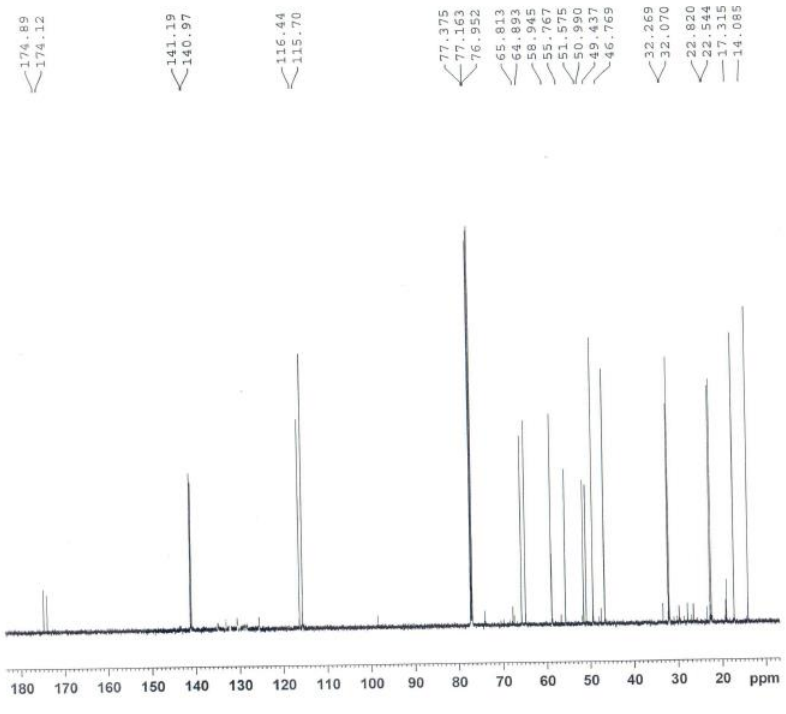
^{1}H NMR (600MHz, CD_3Cl):







^{13} C NMR (150MHz, CD_3Cl) of **6e** and **7e**:

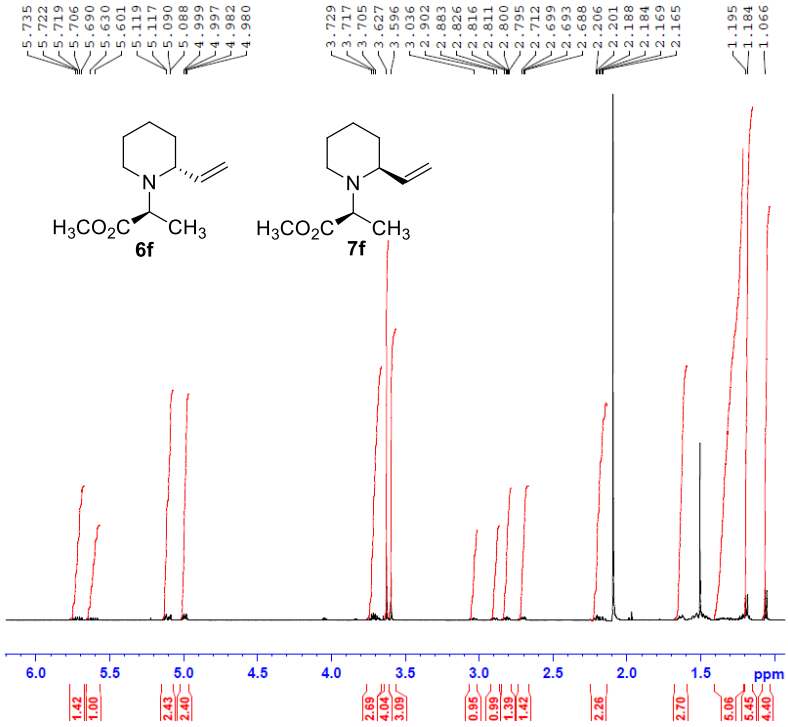


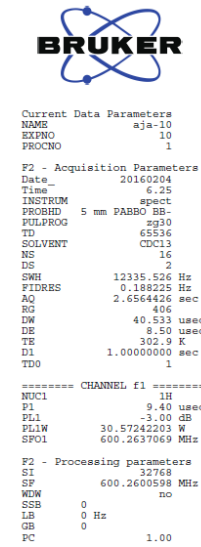
BRUKER

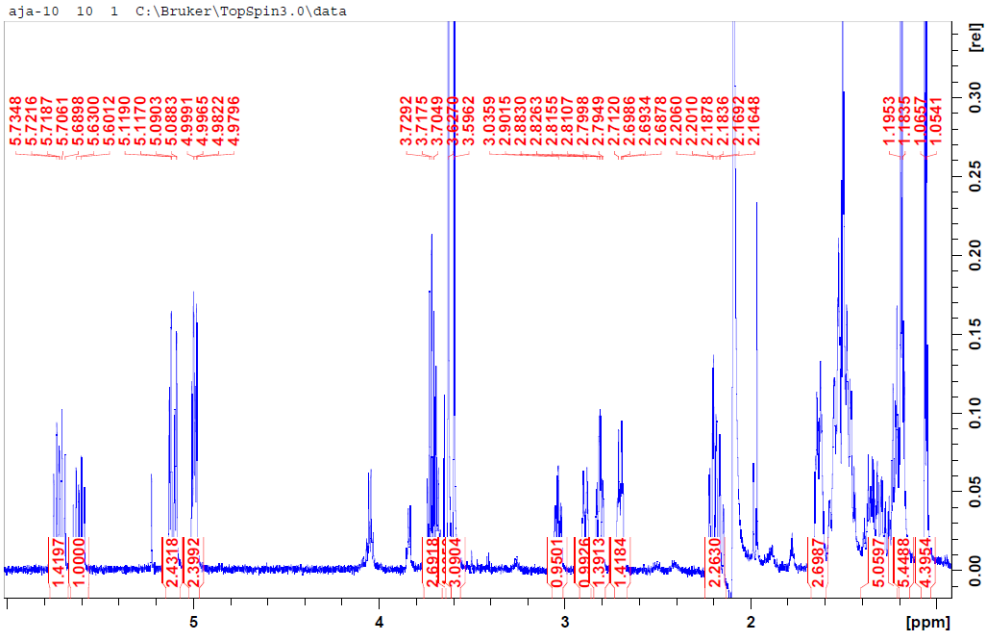
```
Current Data Parameters
NAME                  aja-2a
EXPNO                      4
PROCNO                     1

F2 - Acquisition Parameters
Date_              20151120
Time                  12.38
INSTRUM               spect
PROBHD   5 mm PABBO BB-
PULPROG               zgpg
TD                   65536
SOLVENT              CDCl3
NS                    1256
DS                       4
SWH               36057.691 Hz
FIDRES            0.550197 Hz
AQ                0.9088159 sec
RG                     2050
DW                  13.867 usec
DE                   8.50 usec
TE                  303.5 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                        1

======== CHANNEL f1 ========
NUC1                     13C
P1                    9.00 usec
PL1          0 dB
PL1W         91.93504333 W
SFO1         150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2              waltz16
NUC2                     1H
PCPD2                90.00 usec
PL2                  -3.00 dB
PL12                 16.26 dB
PL13                 18.00 dB
PL2W         30.57242203 W
PL12W         0.36251819 W
PL13W         0.24284537 W
SFO2         600.2624010 MHz

F2 - Processing parameters
SI                       32768
SF            150.9354761 MHz
WDW                         EM
SSB          0
LB                    1.00 Hz
GB           0
PC                    1.40
```

The ^{1}H and ^{13}C NMR of **6f** and **7f**

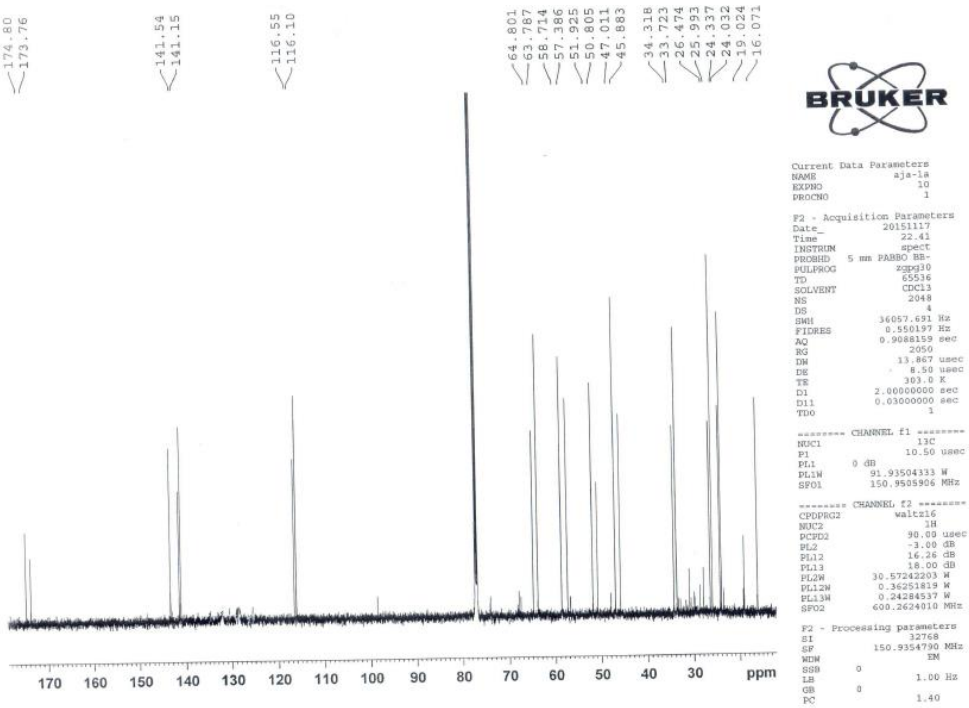
^{1}H NMR (600MHz, CD_3Cl):





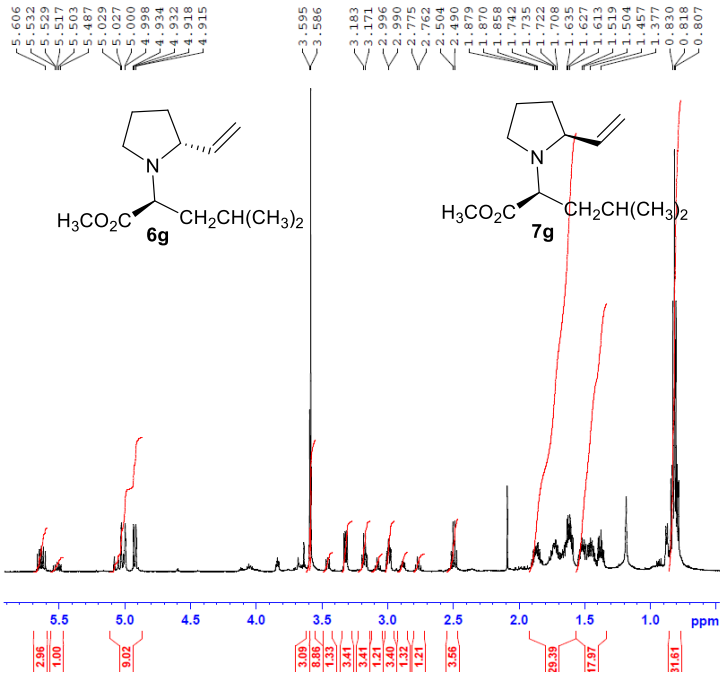


^{13} C NMR (150MHz, CD_3Cl) of **6f** and **7f**:



The ^{1}H and ^{13}C NMR of **6g** and **7g**

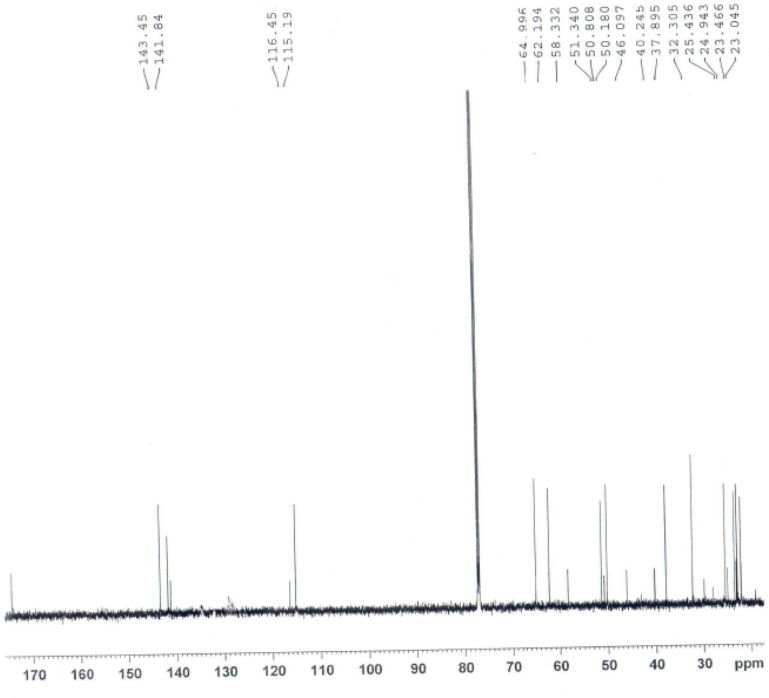
^{1}H NMR (600MHz, CD_3Cl):



BRUKER

```
Current Data Parameters
NAME                  aj-5
EXPNO                   10
PROCNO                   1

F2 - Acquisition Parameters
Date_           20160113
Time                2.58
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH            12335.526 Hz
FIDRES         0.188225 Hz
AQ             2.6564426 sec
RG                   228
DW                40.533 usec
DE                 8.50 usec
TE                303.0 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.40 usec
PL1                -3.00 dB
PL1W         30.57242203 W
SFO1         600.2637069 MHz

F2 - Processing parameters
SI                 32768
SF           600.2600594 MHz
WDW                   no
SSB       0
LB        0 Hz
GB        0
PC                 1.00
```

^{13} C NMR (150MHz, CD_3Cl):



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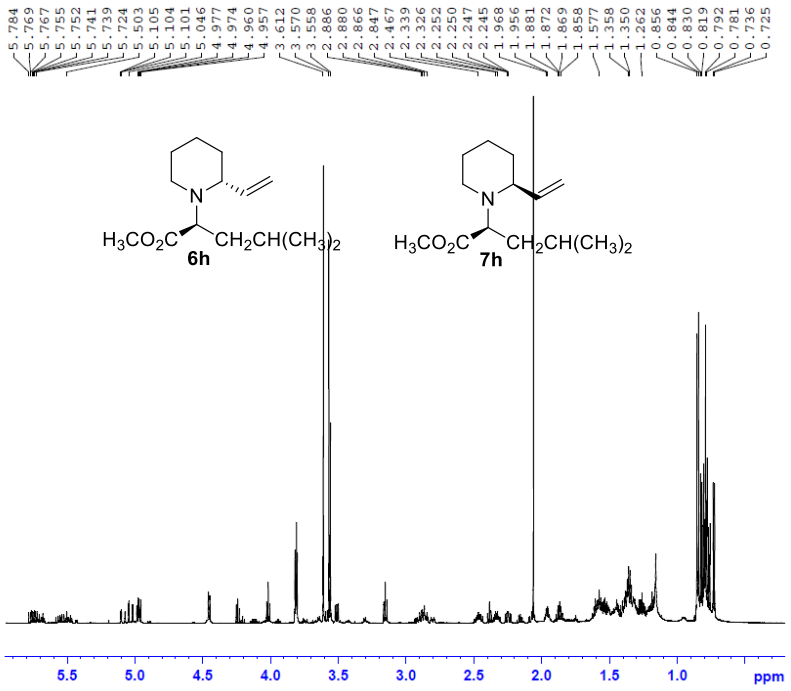
```
Current Data Parameters
NAME                  aj-5
EXPNO                   11
PROCNO                   1

F2 - Acquisition Parameters
Date_           20160113
Time                3.49
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1024
DS                     4
SWH            36057.691 Hz
FIDRES         0.550197 Hz
AQ             0.9088159 sec
RG                  2050
DW                13.867 usec
DE                 8.50 usec
TE                303.0 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                10.50 usec
PL1        0 dB
PL1W         91.93504333 W
SFO1         150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2             90.00 usec
PL2                -3.00 dB
PL12               16.26 dB
PL13               18.00 dB
PL2W         30.57242203 W
PL12W         0.36251819 W
PL13W         0.24284537 W
SFO2         600.2624010 MHz

F2 - Processing parameters
SI                 32768
SF           150.9354728 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

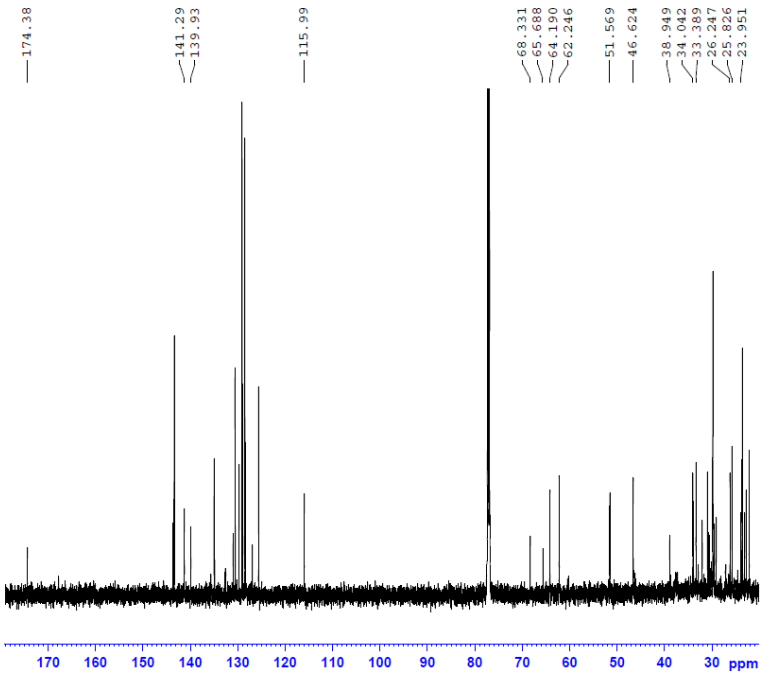
The ^{1}H and ^{13}C NMR of **6h** and **7h**

^{1}H NMR (600MHz, CD_3Cl):



```
Current Data Parameters
NAME                  es-22
EXPNO                    10
PROCNO                    1

F2 - Acquisition Parameters
Date_              20150423
Time                  21.05
INSTRUM                spect
PROBHD    5 mm PABBO BB-
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH               12335.526 Hz
FIDRES                0.188225 Hz
AQ                2.6564426 sec
RG                      181
DW                   40.533 usec
DE                    8.50 usec
TE                   303.9 K
D1                1.00000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                      1H
P1                     9.40 usec
PL1                   -3.00 dB
PL1W            30.57242203 W
SFO1           600.2637069 MHz

F2 - Processing parameters
SI                    32768
SF               600.2600759 MHz
WDW                      no
SSB          0
LB           0 Hz
GB           0
PC                      1.00
```

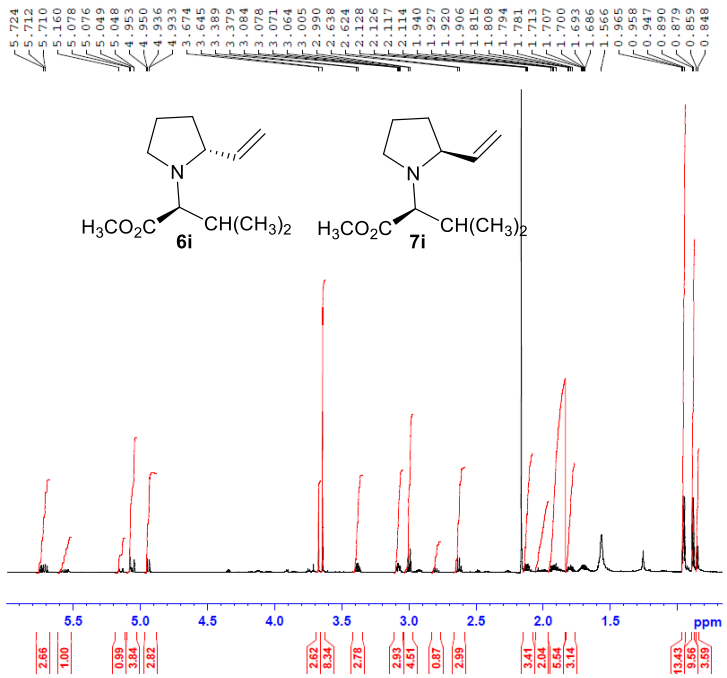
^{13} C NMR (150MHz, CD_3Cl):

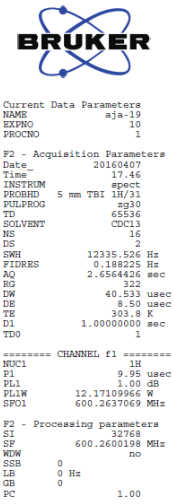


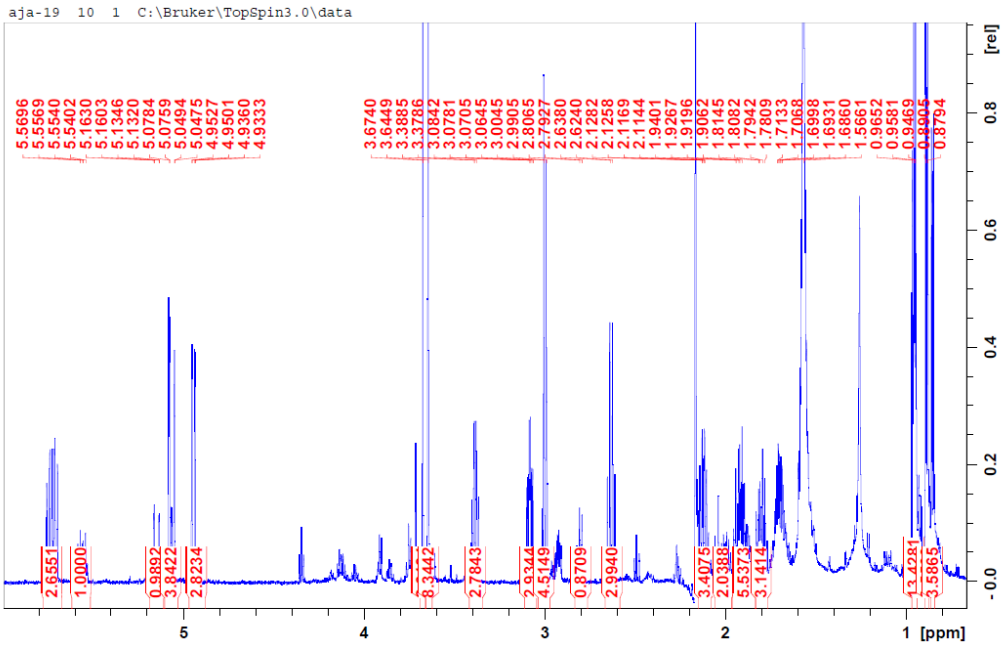
```
Current Data Parameters
NAME                es-24-2
EXPNO                    11
PROCNO                    1

F2 - Acquisition Parameters
Date_              20150514
Time                  20.35
INSTRUM                spect
PROBHD    5 mm PABBO BB-
PULPROG             zgpg30
TD                    65536
SOLVENT               CDCl3
NS                     2048
DS                        4
SWH               36057.691 Hz
FIDRES                0.550197 Hz
AQ                0.9088159 sec
RG                      2050
DW                   13.867 usec
DE                    8.50 usec
TE                   304.5 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                     13C
P1                    10.50 usec
PL1          0 dB
PL1W            91.93504333 W
SFO1           150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                      1H
PCPD2                 90.00 usec
PL2                   -3.00 dB
PL12                  16.26 dB
PL13                  18.00 dB
PL2W            30.57242203 W
PL12W            0.36251819 W
PL13W            0.24284537 W
SFO2           600.2624010 MHz

F2 - Processing parameters
SI                    32768
SF               150.9354737 MHz
WDW                      EM
SSB          0
LB                    1.00 Hz
GB           0
PC                      1.40
```

The ^{1}H and ^{13}C NMR of **6i** and **7i**

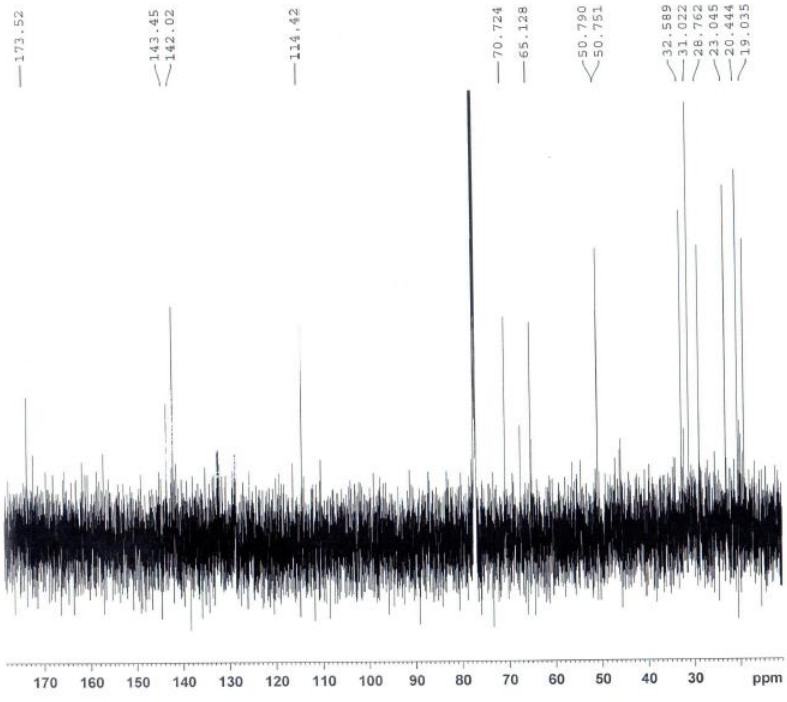
^{1}H NMR (600MHz, CD_3Cl):







^{13} C NMR (150MHz, CD_3Cl) of **6i** and **7i**:



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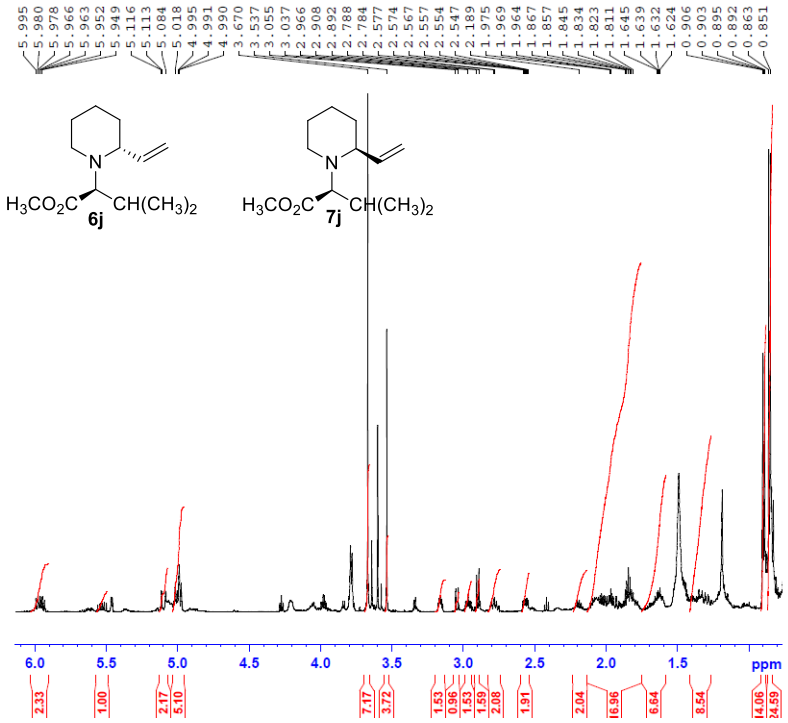
```
Current Data Parameters
NAME                  aja-19
EXPNO                     11
PROCNO                     1

F2 - Acquisition Parameters
Date_              20160407
Time                  18.38
INSTRUM               spect
PROBHD   5 mm TBI 1H/31
PULPROG               zgpg30
TD                     65536
SOLVENT               CDCl3
NS                      1024
DS                         4
SWH               36057.691 Hz
FIDRES                0.550197 Hz
AQ                0.9088159 sec
RG                      2050
DW                   13.867 usec
DE                    8.50 usec
TE                   304.3 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                        1

======== CHANNEL f1 ========
NUC1                     13C
P1                    17.00 usec
PL1                   -2.40 dB
PL1W          159.76480103 W
SFO1          150.9505906 MHz

======== CHANNEL f2 ========
CPDPRG2              waltz16
NUC2                     1H
PCPD2                 95.00 usec
PL2                    1.00 dB
PL12                  20.21 dB
PL13                  22.00 dB
PL2W          12.17109966 W
PL12W          0.14599229 W
PL13W          0.09667849 W
SFO2          600.2624010 MHz

F2 - Processing parameters
SI                     32768
SF            150.9354738 MHz
WDW                       EM
SSB                    0
LB                    1.00 Hz
GB                     0
PC                    1.40
```

The ^{1}H NMR of **6j** and **7j**

^{1}H NMR (600MHz, CD_3Cl):



The ^{1}H NMR of **8**