Supporting Information

Facile syntheses of (+)-gabosines A, D, and E

Tony K. M. Shing* and Hau. M. Cheng

Department of Chemistry and Center of Novel Functional Molecules

The Chinese University of Hong Kong, Shatin, Hong Kong, China

tonyshing@cuhk.edu.hk

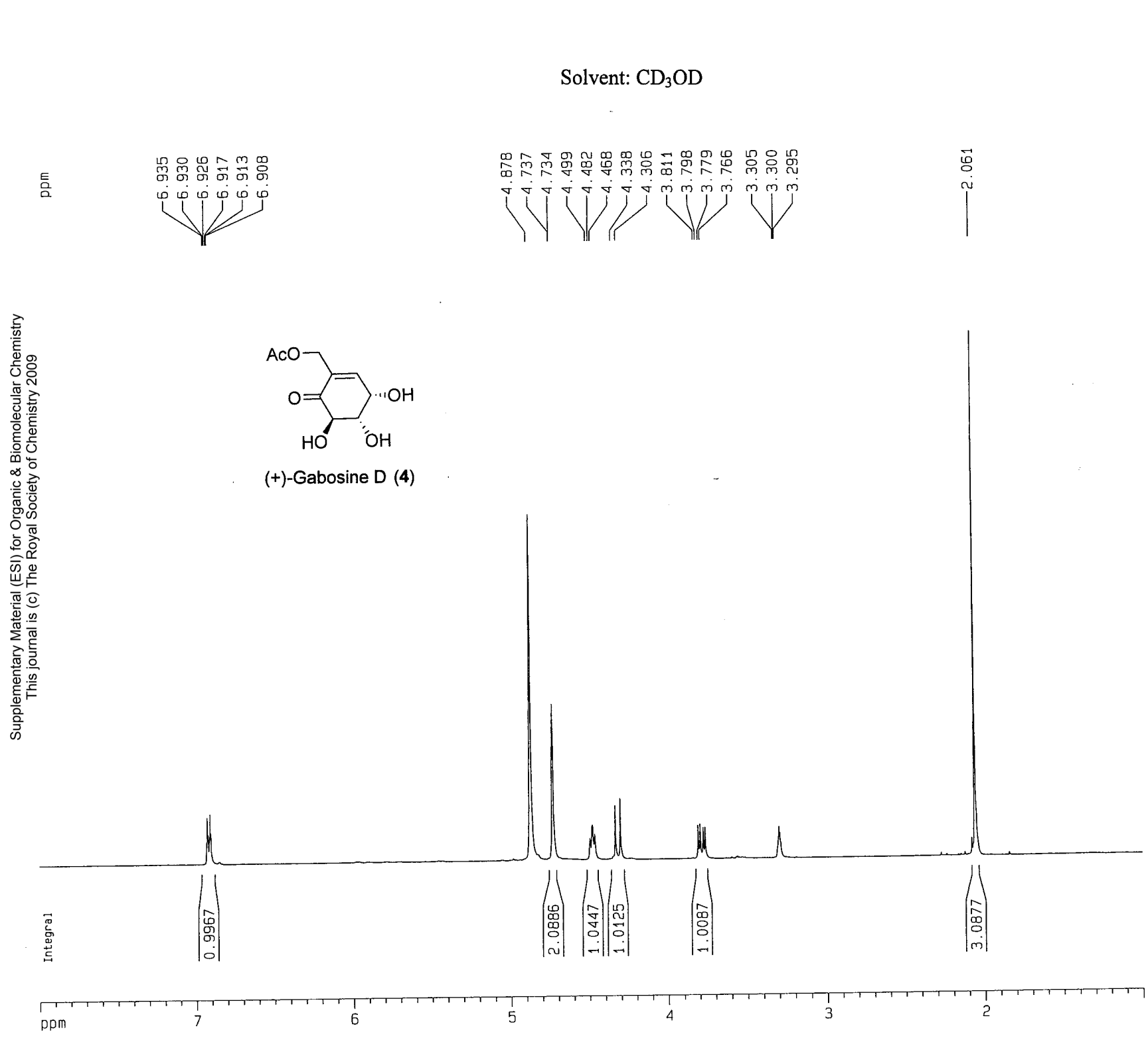
Received date (automatically inserted by publisher)

Appendices

General procedures

Melting points were measured in Celsius degrees and were uncorrected. Optical rotations were operating at 589nm. Infrared spectra (IR) were recorded as thin film on potassium bromide discs. Nuclear magnetic resonance (NMR) spectra were measured at 300.13 MHz (^{1}H) or at 75.47 MHz (^{13}C). All chemical shifts were recorded in ppm relative to tetramethylsilane (δ= 0.0). Spin-spin coupling constants (*J* value) recorded in Hz were measured directly from the spectra. All reactions were monitored by analytical thin-layer chromatography (TLC) on aluminium-precoated plates of silica gel with detection by spraying with 5% (w/v) dodecamolybdophosphoric acid in ethanol. Silica gel 60 (230–400 mesh) was used for flash chromatography. All reagents and solvents were general reagent grade unless otherwise stated. DMF was dried by magnesium sulfate and filtered. It was then freshly distilled under reduced pressure. THF was freshly distilled from Na/benzophenone ketyl under nitrogen. Dichloromethane was freshly distilled from P_2O_5 under nitrogen. Other reagents were purchased from commercial suppliers and were used without purification.

Solvent: CD_3OD



Current Data Parameters

NAME	GL145-h1
EXPNO	1
PROCNO	1

F2 - Acquisition Parameters

Date_	20070530
Time	21.18
INSTRUM	dpx300
PROBHD	5 mm BBO BB-1H
PULPROG	zg
TD	32768
SOLVENT	MeOD
NS	8
DS	0
SWH	5402.485 Hz
FIDRES	0.164871 Hz
AQ	3.0327284 sec
RG	228.1
DW	92.550 usec
DE	132.21 usec
TE	0.0 K
D1	1.00000000 sec
MCREST	0.00000000 sec
MCWRK	0.01500000 sec

======== CHANNEL f1 ========

NUC1	1H
P1	5.00 usec
PL1	-2.00 dB
SFO1	300.1318000 MHz

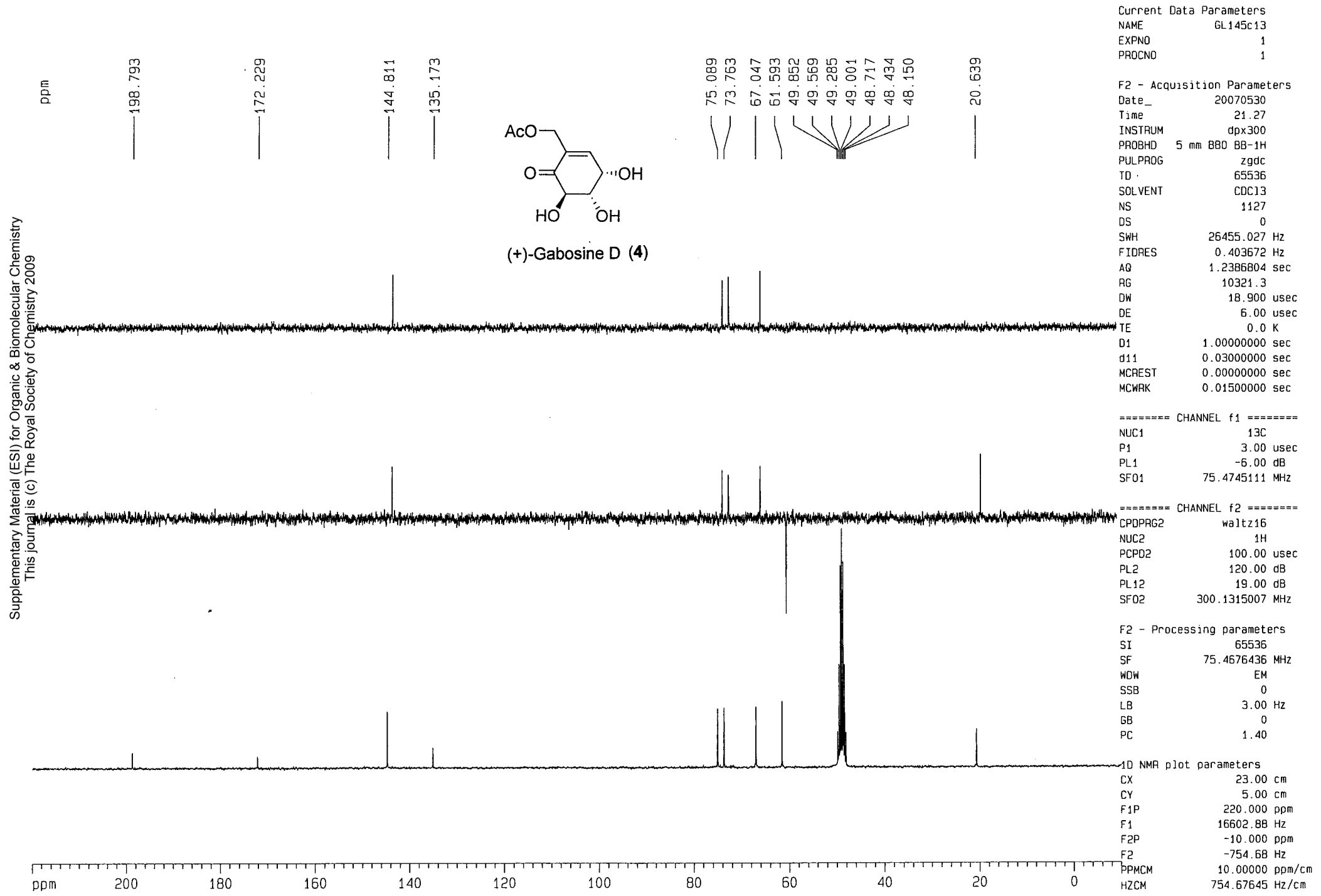
F2 - Processing parameters

SI	32768
SF	300.1300076 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

1D NMR plot parameters

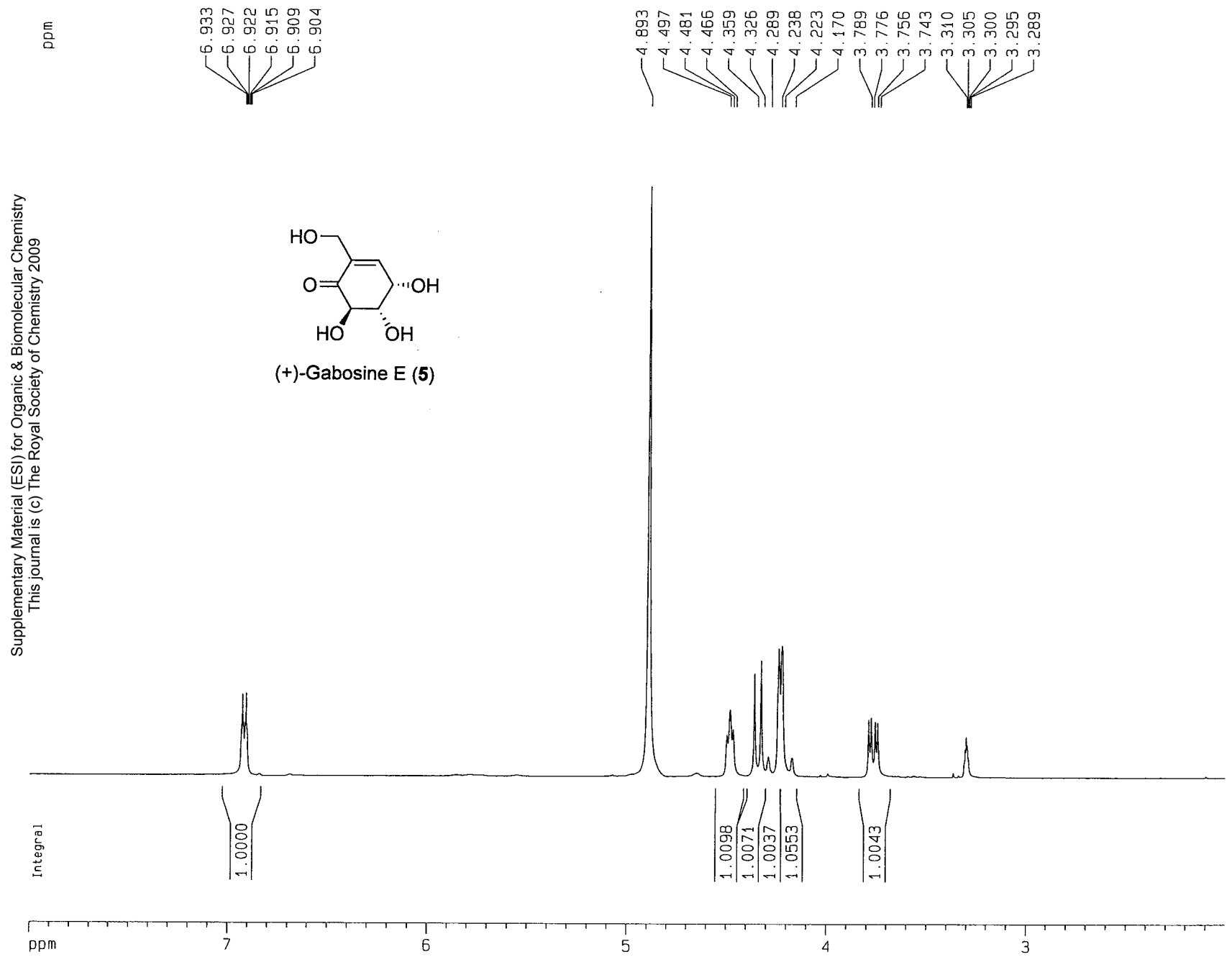
CX	22.00 cm
CY	10.38 cm
F1P	8.000 ppm
F1	2401.04 Hz
F2P	1.000 ppm
F2	300.13 Hz
PPMCM	0.31818 ppm/cm
HZCM	95.49591 Hz/cm

Solvent: CD_3OD




```
Current Data Parameters
NAME                  GL145c13
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameters
Date_                 20070530
Time                     21.27
INSTRUM                dpx300
PROBHD   5 mm BBO BB-1H
PULPROG                  zgdc
TD                       65536
SOLVENT                  CDCl3
NS                        1127
DS                           0
SWH                 26455.027 Hz
FIDRES               0.403672 Hz
AQ                   1.2386804 sec
RG                     10321.3
DW                    18.900 usec
DE                     6.00 usec
TE                       0.0 K
D1                   1.00000000 sec
d11                  0.03000000 sec
MCREST               0.00000000 sec
MCWRK                0.01500000 sec

======== CHANNEL f1 ========
NUC1                       13C
P1                    3.00 usec
PL1                    -6.00 dB
SFO1                75.4745111 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                100.00 usec
PL2                   120.00 dB
PL12                   19.00 dB
SFO2               300.1315007 MHz

F2 - Processing parameters
SI                        65536
SF                 75.4676436 MHz
WDW                          EM
SSB                           0
LB                     3.00 Hz
GB                            0
PC                         1.40

1D NMR plot parameters
CX                    23.00 cm
CY                     5.00 cm
F1P                  220.000 ppm
F1                 16602.88 Hz
F2P                  -10.000 ppm
F2                  -754.68 Hz
PPMCM                10.00000 ppm/cm
HZCM                754.67645 Hz/cm
```

Solvent: CD_3OD



Current Data Parameters

NAME	GL148-h1
EXPNO	1
PROCNO	1

F2 - Acquisition Parameters

Date_	20070606
Time	18.45
INSTRUM	dpx300
PROBHD	5 mm BBO BB-1H
PULPROG	zg
TD	32768
SOLVENT	MeOD
NS	8
DS	0
SWH	5402.485 Hz
FIDRES	0.164871 Hz
AQ	3.0327284 sec
RG	181
DW	92.550 usec
DE	132.21 usec
TE	0.0 K
D1	1.00000000 sec
MCREST	0.00000000 sec
MCWRK	0.01500000 sec

======== CHANNEL f1 ========

NUC1	1H
P1	5.00 usec
PL1	-2.00 dB
SFO1	300.1318000 MHz

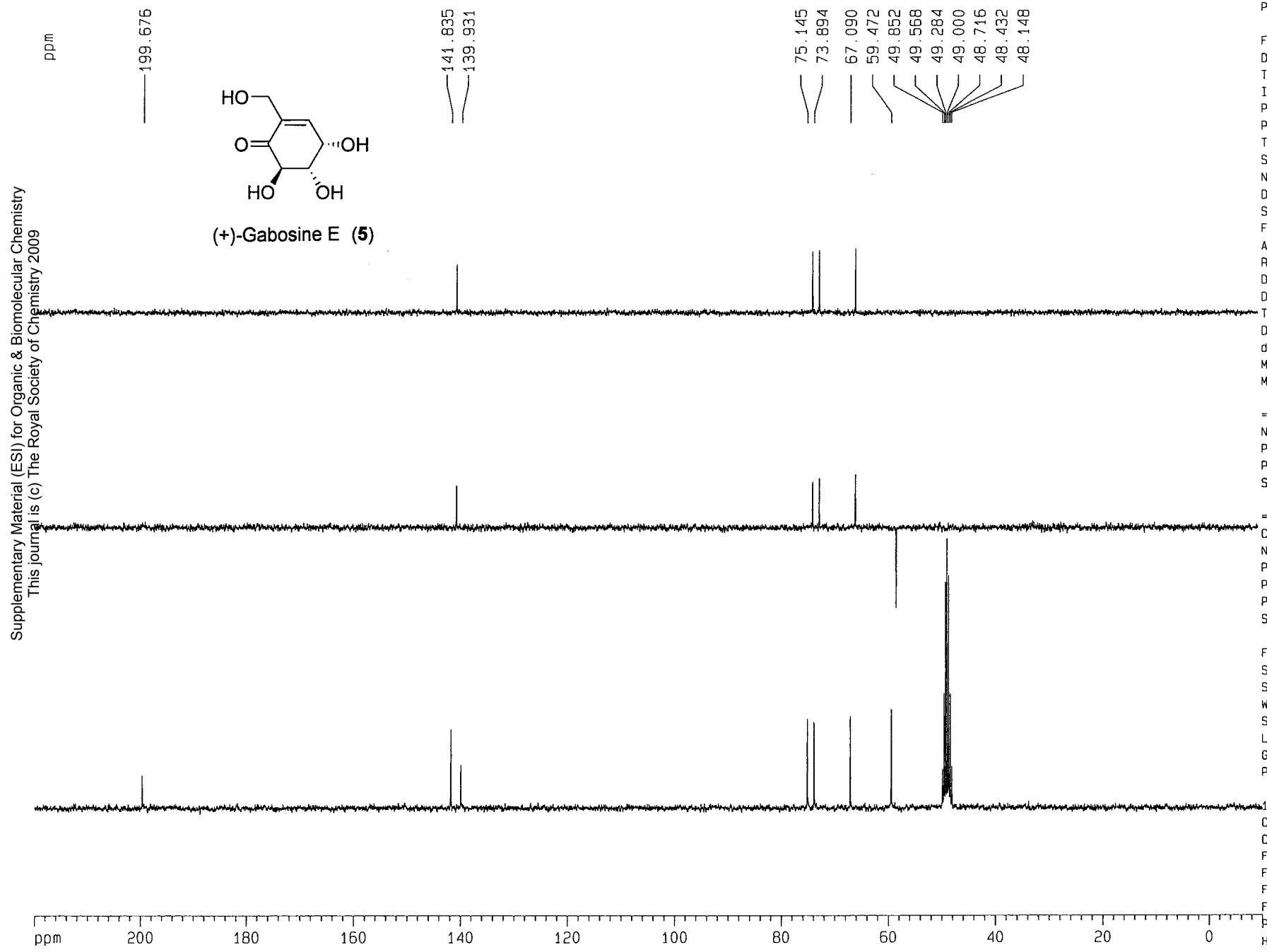
F2 - Processing parameters

SI	32768
SF	300.1300076 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

1D NMR plot parameters

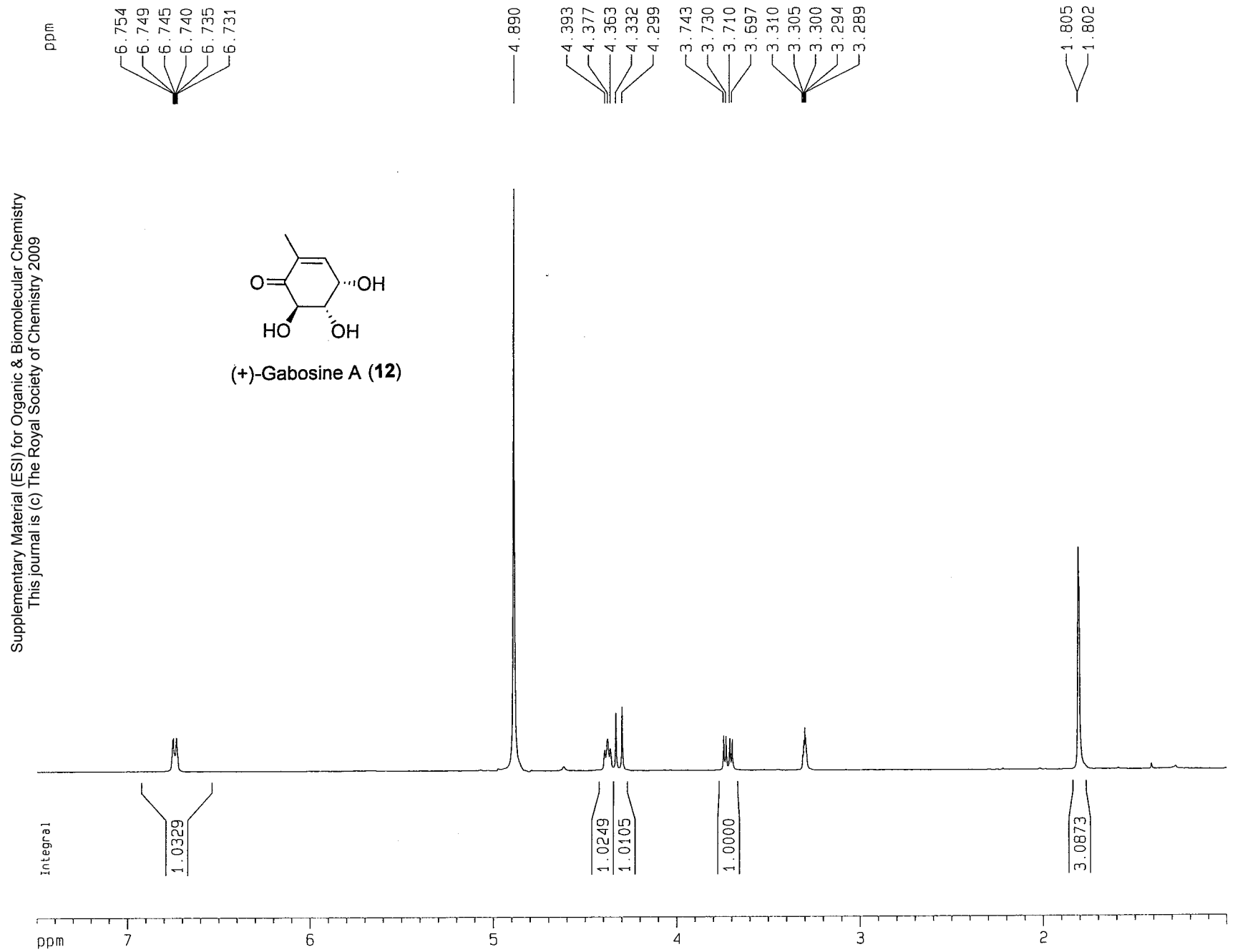
CX	22.00 cm
CY	10.76 cm
F1P	8.000 ppm
F1	2401.04 Hz
F2P	2.000 ppm
F2	600.26 Hz
PPMCM	0.27273 ppm/cm
HZCM	81.85364 Hz/cm

Solvent: CD_3OD




```
Current Data Parameters
NAME                  GL14B-c13
EXPNO                         1
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20070606
Time                      18.52
INSTRUM                 dpx300
PROBHD   5 mm BBO BB-1H
PULPROG                   zgdc
TD                       65536
SOLVENT                  CDCl3
NS                         140
DS                           0
SWH                 26455.027 Hz
FIDRES              0.403672 Hz
AQ                  1.2386804 sec
RG                       5792.6
DW                     18.900 usec
DE                      6.00 usec
TE                        0.0 K
D1                  1.00000000 sec
d11                 0.03000000 sec
MCREST              0.00000000 sec
MCWRK               0.01500000 sec

======== CHANNEL f1 ========
NUC1                        13C
P1                     3.00 usec
PL1                    -6.00 dB
SFO1                75.4745111 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                        1H
PCPD2                100.00 usec
PL2                    120.00 dB
PL12                    19.00 dB
SFO2               300.1315007 MHz

F2 - Processing parameters
SI                       65536
SF                  75.4676448 MHz
WDW                         EM
SSB                          0
LB                      2.50 Hz
GB                           0
PC                        1.40

1D NMR plot parameters
CX                      23.00 cm
CY                       5.00 cm
F1P                    220.000 ppm
F1                   16602.88 Hz
F2P                    -10.000 ppm
F2                    -754.68 Hz
PPMCM                10.00000 ppm/cm
HZCM                754.67645 Hz/cm
```

Solvent: CD_3OD



Current Data Parameters

NAME	GL154-h1
EXPNO	1
PROCNO	1

F2 - Acquisition Parameters

Date_	20070709
Time	10.17
INSTRUM	dpx300
PROBHD	5 mm BBO BB-1H
PULPROG	zg
TD	32768
SOLVENT	MeOD
NS	8
DS	0
SWH	5402.485 Hz
FIDRES	0.164871 Hz
AQ	3.0327284 sec
RG	228.1
DW	92.550 usec
DE	132.21 usec
TE	0.0 K
D1	1.00000000 sec
MCREST	0.00000000 sec
MCWRK	0.01500000 sec

======== CHANNEL f1 ========

NUC1	1H
P1	5.00 usec
PL1	-2.00 dB
SFO1	300.1318000 MHz

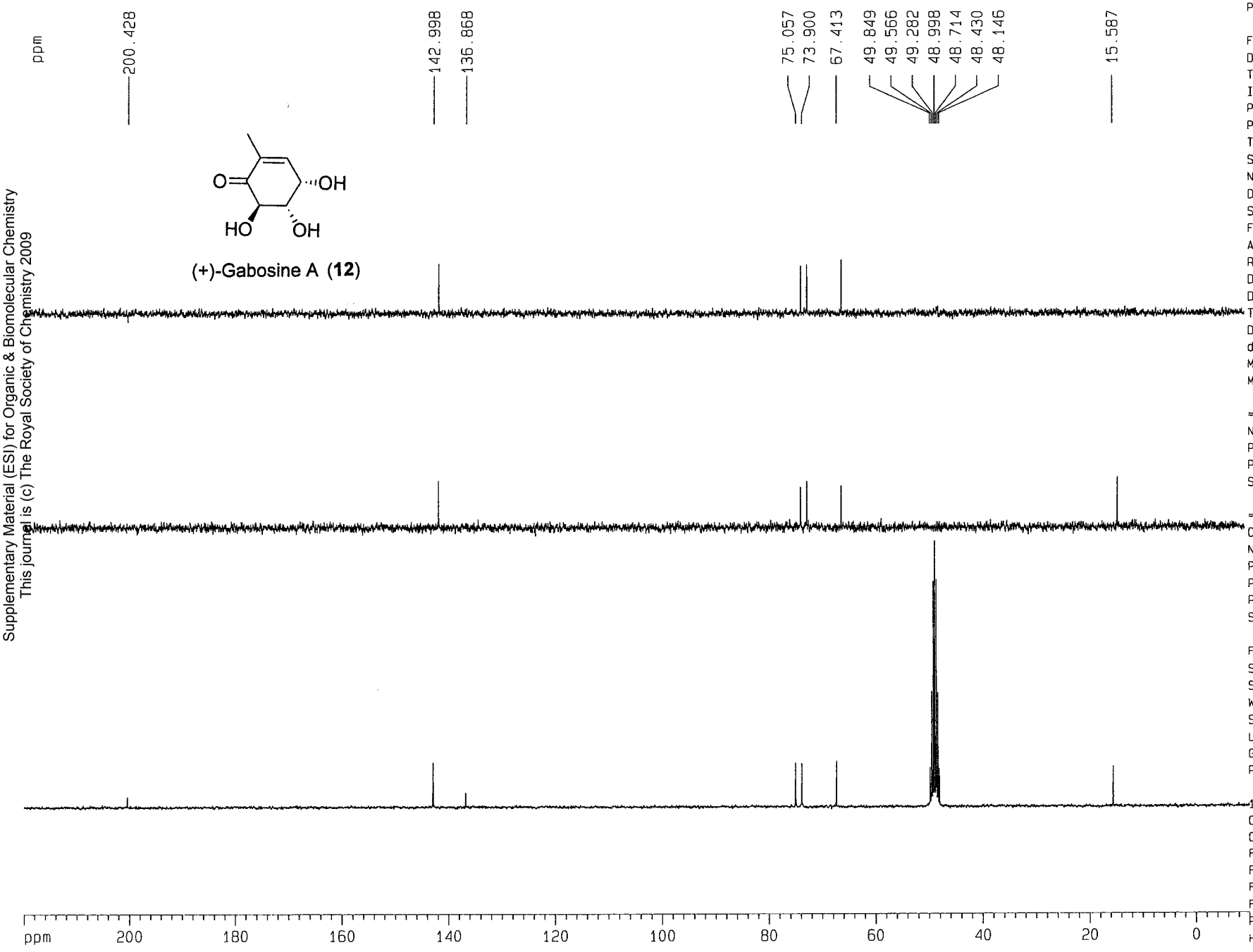
F2 - Processing parameters

SI	32768
SF	300.1300078 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

1D NMR plot parameters

CX	22.00 cm
CY	10.66 cm
F1P	7.500 ppm
F1	2250.98 Hz
F2P	1.000 ppm
F2	300.13 Hz
PPMCM	0.29545 ppm/cm
HZCM	88.67478 Hz/cm

Solvent: CD_3OD



Current Data Parameters

NAME	GL154-c13
EXPNO	1
PROCNO	1

F2 - Acquisition Parameters

Date_	20070709
Time	10.22
INSTRUM	dpx300
PROBHD	5 mm BBO BB-1H
PULPROG	zgdc
TD	65536
SOLVENT	CDCl3
NS	341
DS	0
SWH	26455.027 Hz
FIDRES	0.403672 Hz
AQ	1.2386804 sec
RG	10321.3
DW	18.900 usec
DE	6.00 usec
TE	0.0 K
D1	1.00000000 sec
d11	0.03000000 sec
MCREST	0.00000000 sec
MCWRK	0.01500000 sec

======== CHANNEL f1 ========

NUC1	13C
P1	3.00 usec
PL1	-6.00 dB
SF01	75.4745111 MHz

======== CHANNEL f2 ========

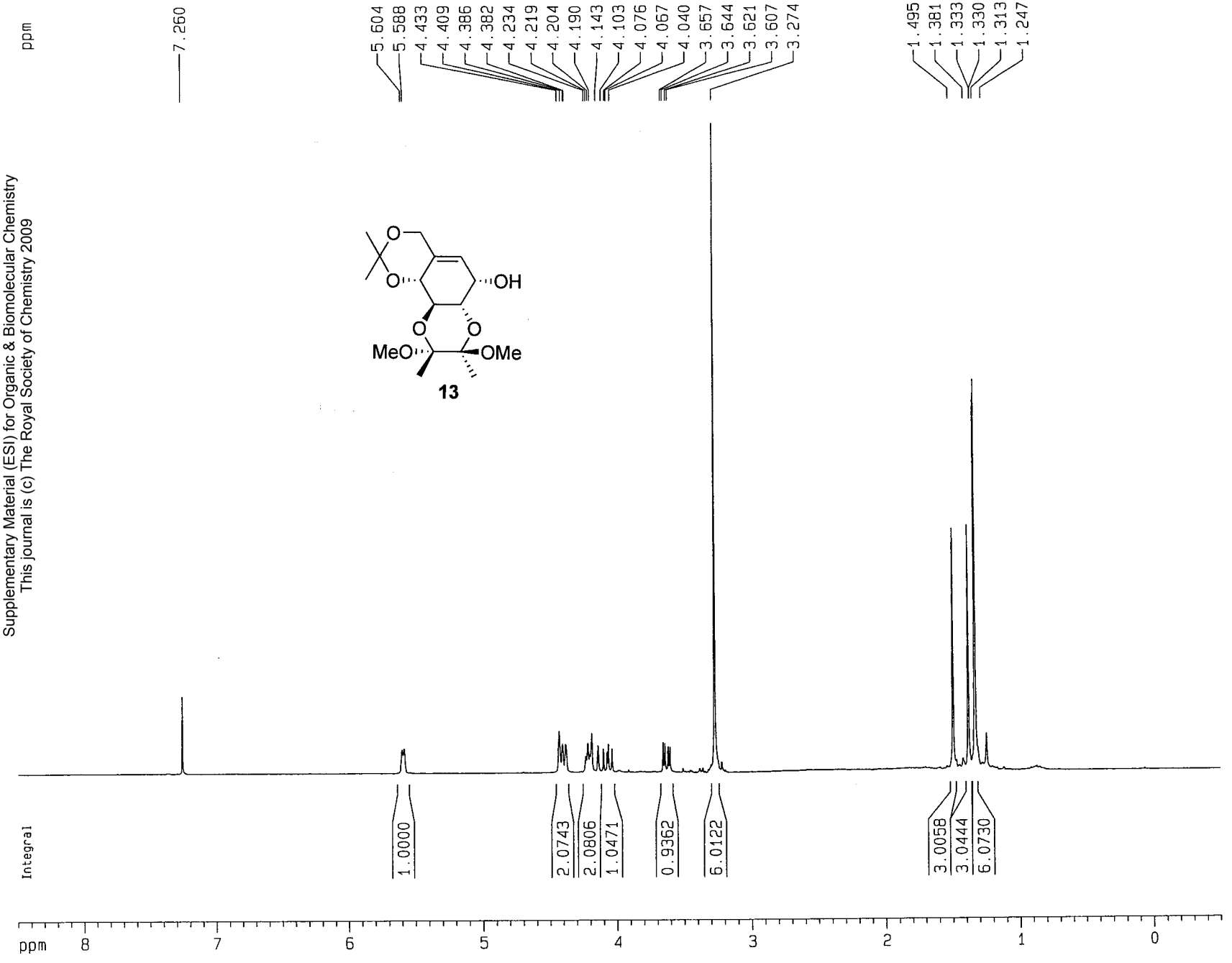
CPDPRG2	waltz16
NUC2	1H
PCPD2	100.00 usec
PL2	120.00 dB
PL12	19.00 dB
SF02	300.1315007 MHz

F2 - Processing parameters

SI	65536
SF	75.4676435 MHz
WDW	EM
SSB	0
LB	2.50 Hz
GB	0
PC	1.40

1D NMR plot parameters

CX	23.00 cm
CY	5.00 cm
F1P	220.000 ppm
F1	16602.88 Hz
F2P	-10.000 ppm
F2	-754.68 Hz
PPMCM	10.00000 ppm/cm
HZCM	754.67645 Hz/cm



Current Data Parameters

NAME	GL44data
EXPNO	1
PROCNO	2

F2 - Acquisition Parameters

Date_	20050521
Time	13.29
INSTRUM	dpx300
PROBHD	5 mm BBO BB-1H
PULPROG	zg
TD	32768
SOLVENT	CDCl3
NS	8
DS	0
SWH	8992.806 Hz
FIDRES	0.274439 Hz
AQ	1.8219508 sec
RG	181
DW	55.600 usec
DE	79.43 usec
TE	296.2 K
D1	1.00000000 sec
MCREST	0.00000000 sec
MCWRK	0.01500000 sec

======== CHANNEL f1 ========

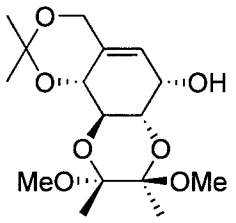
NUC1	1H
P1	5.00 usec
PL1	-2.00 dB
SFO1	300.1312000 MHz

F2 - Processing parameters

SI	32768
SF	300.1300063 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

1D NMR plot parameters

CX	22.00 cm
CY	11.81 cm
F1P	8.500 ppm
F1	2551.10 Hz
F2P	-0.500 ppm
F2	-150.07 Hz
PPMCM	0.40909 ppm/cm
HZCM	122.78046 Hz/cm



13

ppm

136.766
119.644
100.081
99.662
99.391
77.924
77.501
77.077
70.289
68.290
67.278
65.553
63.197
48.575
48.433
28.310
20.834
18.247
18.082

Current Data Parameters

NAME	GL44c13
EXPNO	1
PROCNO	2

F2 - Acquisition Parameters

Date_	20050520
Time	11.31
INSTRUM	dpx300
PROBHD	5 mm BBO BB-1H
PULPROG	zgdc
TD	65536
SOLVENT	CDCl3
NS	882
DS	0
SWH	26455.027 Hz
FIDRES	0.403672 Hz
AQ	1.2386804 sec
RG	2896.3
DW	18.900 usec
DE	6.00 usec
TE	297.2 K
D1	1.00000000 sec
d11	0.03000000 sec
MCREST	0.00000000 sec
MCWRK	0.01500000 sec

======== CHANNEL f1 ========

NUC1	13C
P1	3.00 usec
PL1	-6.00 dB
SFO1	75.4745111 MHz

======== CHANNEL f2 ========

CPDPRG2	waltz16
NUC2	1H
PCPD2	100.00 usec
PL2	120.00 dB
PL12	19.00 dB
SFO2	300.1315007 MHz

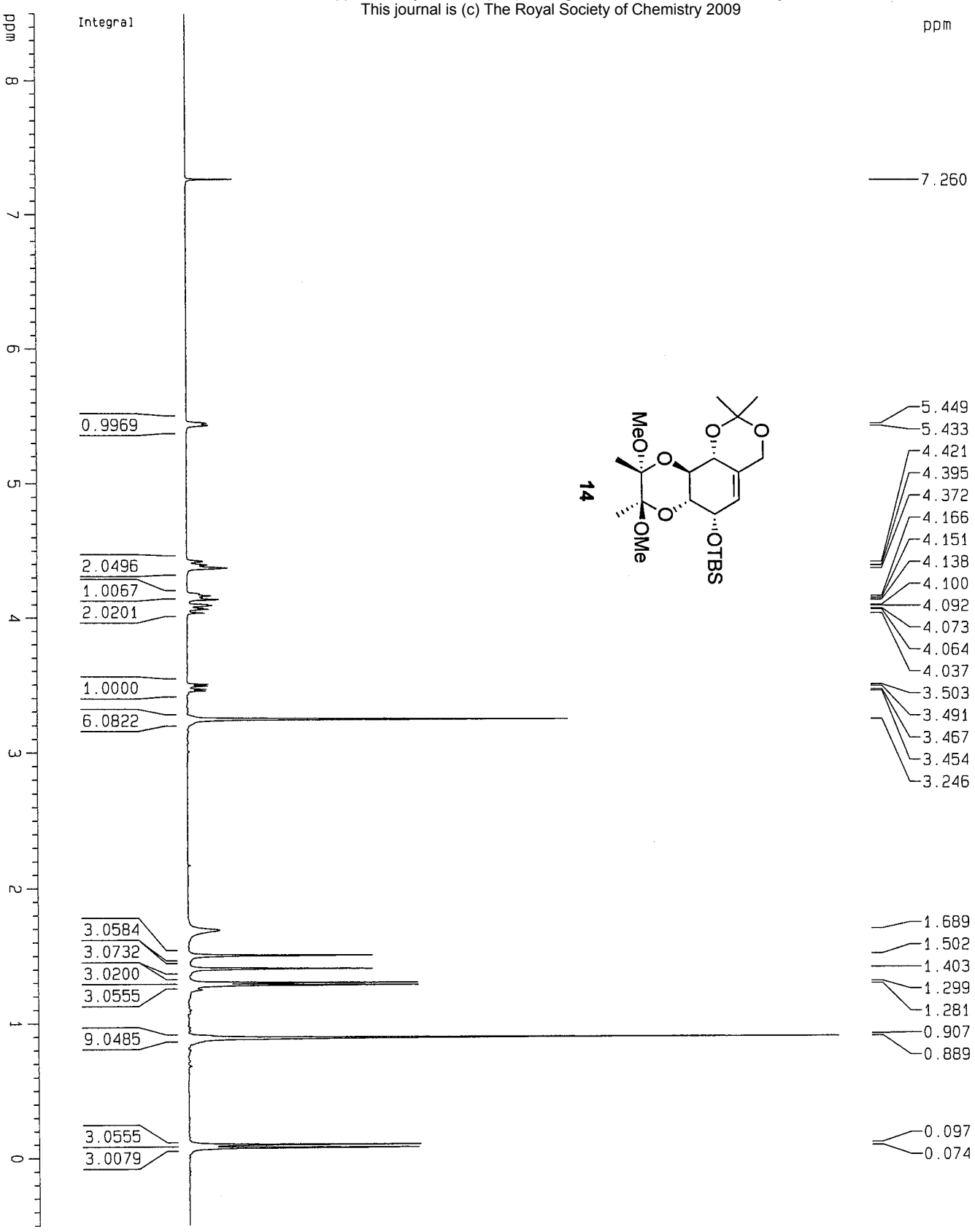
F2 - Processing parameters

SI	65536
SF	75.4677141 MHz
WDW	EM
SSB	0
LB	3.00 Hz
GB	0
PC	1.40

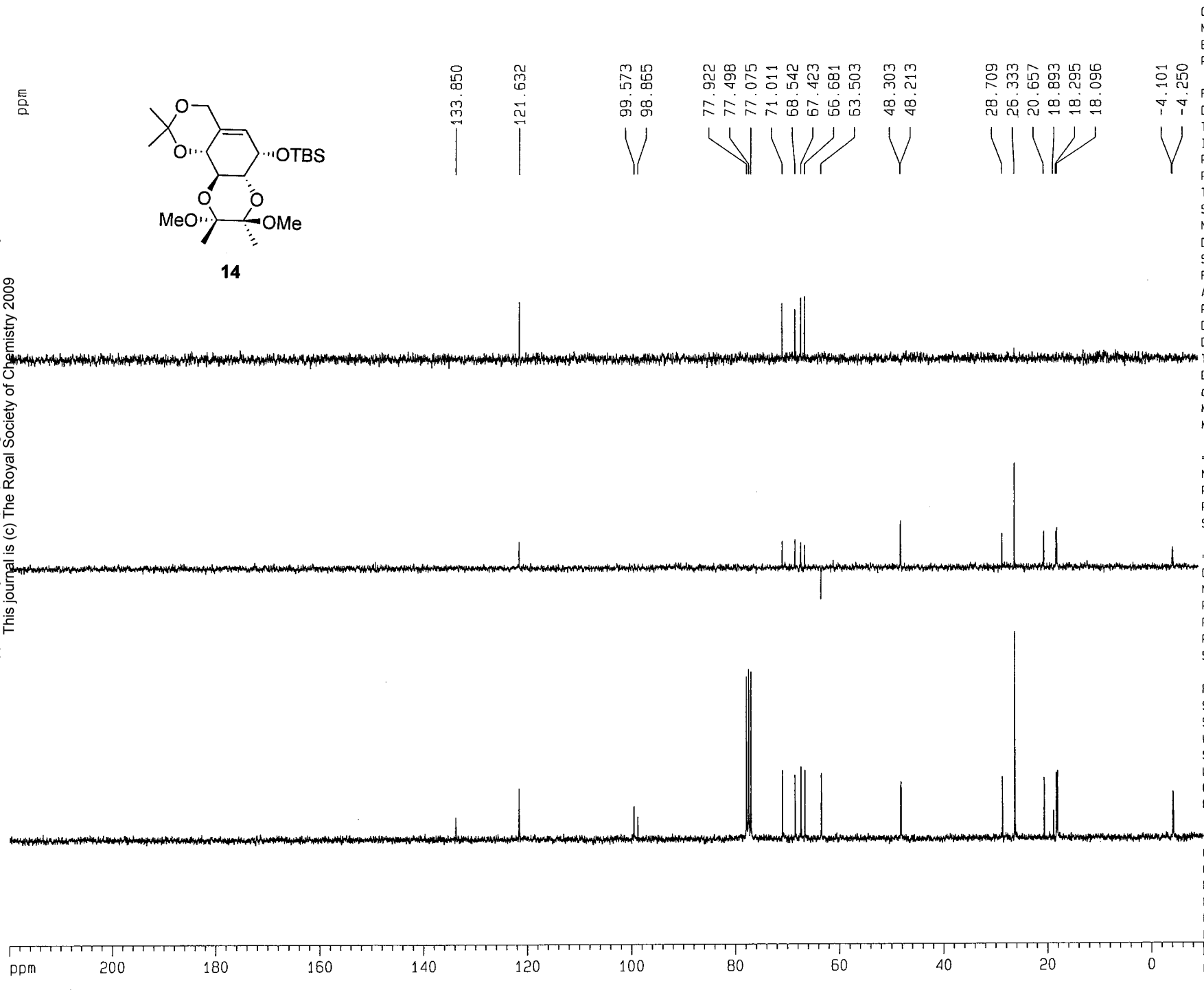
1D NMR plot parameters

CX	23.00 cm
CY	4.00 cm
F1P	220.000 ppm
F1	16602.90 Hz
F2P	-10.000 ppm
F2	-754.68 Hz
PPMCM	10.00000 ppm/cm
HZCM	754.67712 Hz/cm

ppm 200 180 160 140 120 100 80 60 40 20 0




```
Current Data Parameters
NAME                  GL141-h1
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameters
Date_              20070521
Time_                  11.14
INSTRUM                dpx300
PROBHD  5 mm BBO BB-1H
PULPROG                  zg
TD                     32768
SOLVENT                CDCl3
NS                           8
DS                           0
SWH                4803.074 Hz
FIDRES             0.146578 Hz
AQ                 3.4111989 sec
RG                         128
DW                 104.100 usec
DE                  148.71 usec
TE                      0.0 K
D1                 1.00000000 sec
MCREST             0.00000000 sec
MCWRK              0.01500000 sec

======== CHANNEL f1 ========
NUC1                       1H
P1                   5.00 usec
PL1                  -2.00 dB
SFO1           300.1318000 MHz

F2 - Processing parameters
SI                       32768
SF                 300.1300060 MHz
WDW                         EM
SSB                          0
LB                    0.50 Hz
GB                           0
PC                    1.00

1D NMR plot parameters
CX                   22.00 cm
CY                   11.64 cm
F1P                  8.500 ppm
F1                 2551.10 Hz
F2P                 -0.500 ppm
F2                 -150.07 Hz
PPMCM              0.40909 ppm/cm
HZCM               122.78046 Hz/cm
```



Current Data Parameters

NAME	GL141-c13
EXPNO	1
PROCNO	1

F2 - Acquisition Parameters

Date_	20070521
Time	11.21
INSTRUM	dpx300
PROBHD	5 mm BBO BB-1H
PULPROG	zgdc
TD	65536
SOLVENT	CDCl3
NS	335
DS	0
SWH	26455.027 Hz
FIDRES	0.403672 Hz
AQ	1.2386804 sec
RG	5792.6
DW	18.900 usec
DE	6.00 usec
TE	0.0 K
D1	1.00000000 sec
d11	0.03000000 sec
MCREST	0.00000000 sec
MCWRK	0.01500000 sec

======== CHANNEL f1 ========

NUC1	13C
P1	3.00 usec
PL1	-6.00 dB
SFO1	75.4745111 MHz

======== CHANNEL f2 ========

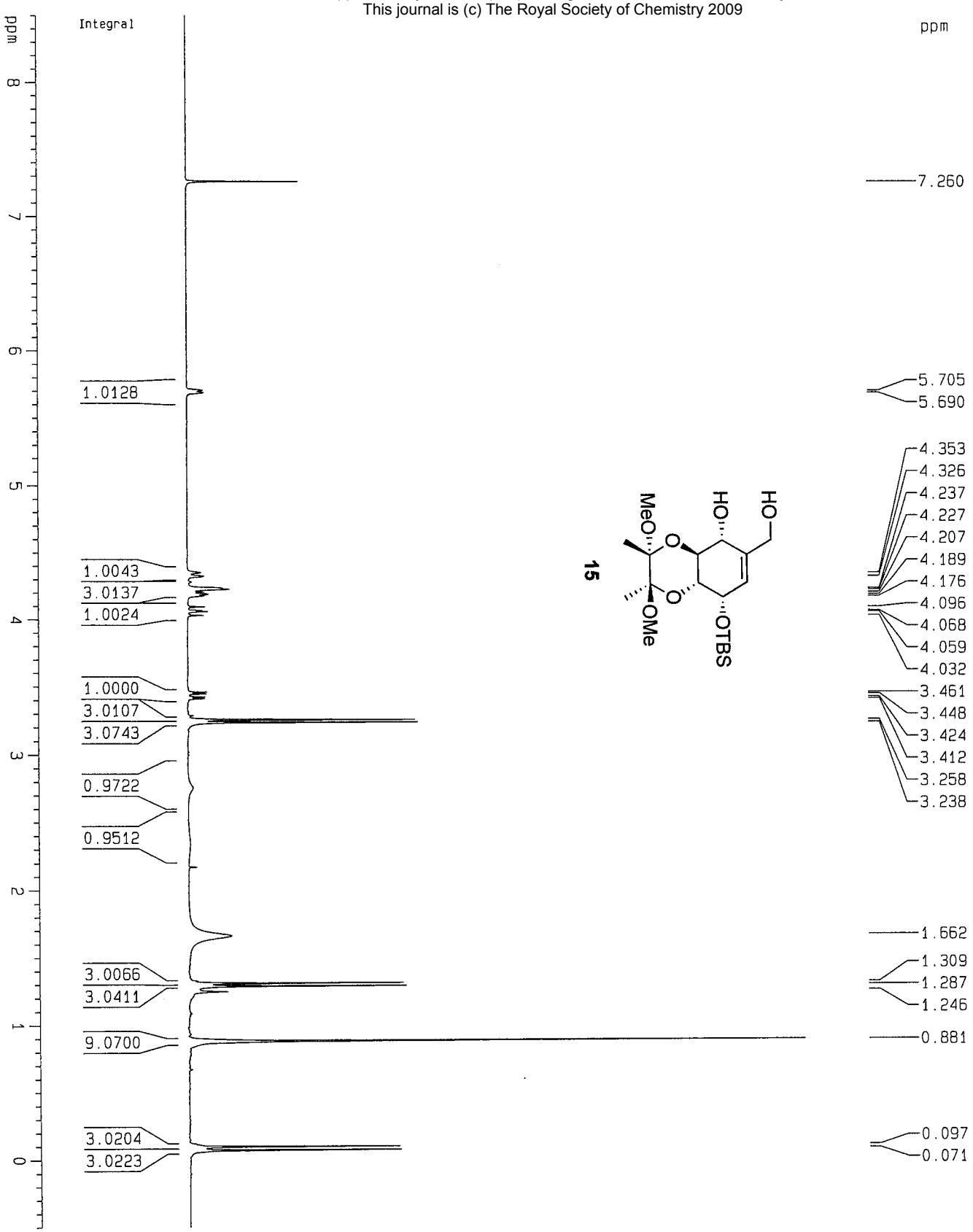
CPDPRG2	waltz16
NUC2	1H
PCPD2	100.00 usec
PL2	120.00 dB
PL12	19.00 dB
SFO2	300.1315007 MHz

F2 - Processing parameters

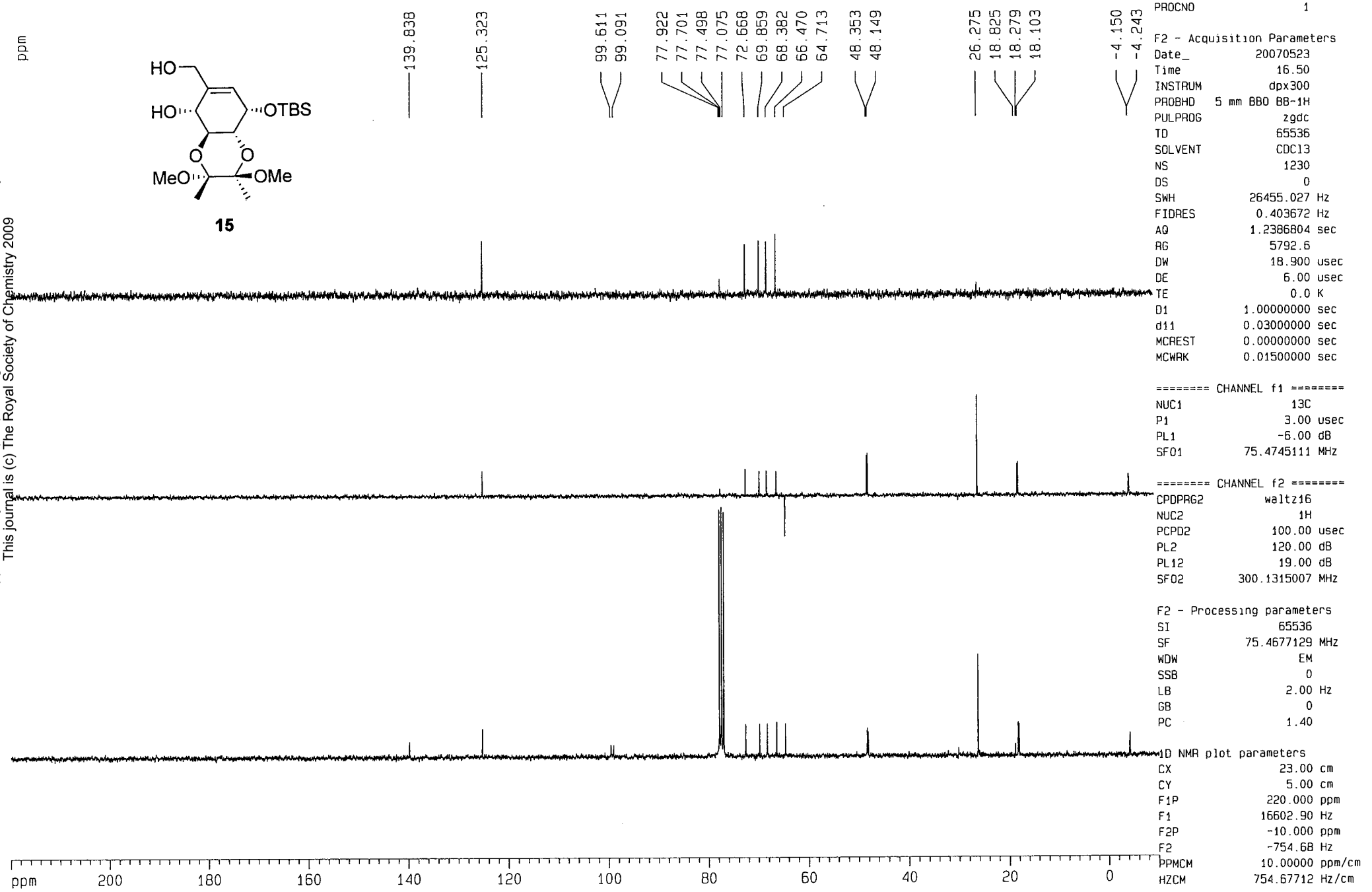
SI	65536
SF	75.4677129 MHz
WDW	EM
SSB	0
LB	2.00 Hz
GB	0
PC	1.40

1D NMR plot parameters

CX	23.00 cm
CY	4.00 cm
F1P	220.000 ppm
F1	16602.90 Hz
F2P	-10.000 ppm
F2	-754.68 Hz
PPMCM	10.00000 ppm/cm
HZCM	754.67712 Hz/cm




```
Current Data Parameters
NAME                  GL142-h1
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameters
Date_              20070523
Time                   16.02
INSTRUM                dpx300
PROBHD  5 mm BBO BB-1H
PULPROG                   zg
TD                     32768
SOLVENT                CDCl3
NS                        16
DS                         0
SWH                4803.074 Hz
FIDRES             0.146578 Hz
AQ                 3.4111989 sec
RG                       362
DW                 104.100 usec
DE                  148.71 usec
TE                      0.0 K
D1                 1.00000000 sec
MCREST             0.00000000 sec
MCWRK              0.01500000 sec

======== CHANNEL f1 ========
NUC1                       1H
P1                   5.00 usec
PL1                  -2.00 dB
SFO1           300.1318000 MHz

F2 - Processing parameters
SI                       32768
SF                 300.1300063 MHz
WDW                         EM
SSB                          0
LB                    0.50 Hz
GB                           0
PC                        1.00

1D NMR plot parameters
CX                    22.00 cm
CY                    11.09 cm
F1P                   8.500 ppm
F1                  2551.10 Hz
F2P                  -0.500 ppm
F2                  -150.07 Hz
PPMCM              0.40909 ppm/cm
HZCM             122.78046 Hz/cm
```



Current Data Parameters
NAME GL142-c13
EXPNO 1
PROCNO 1

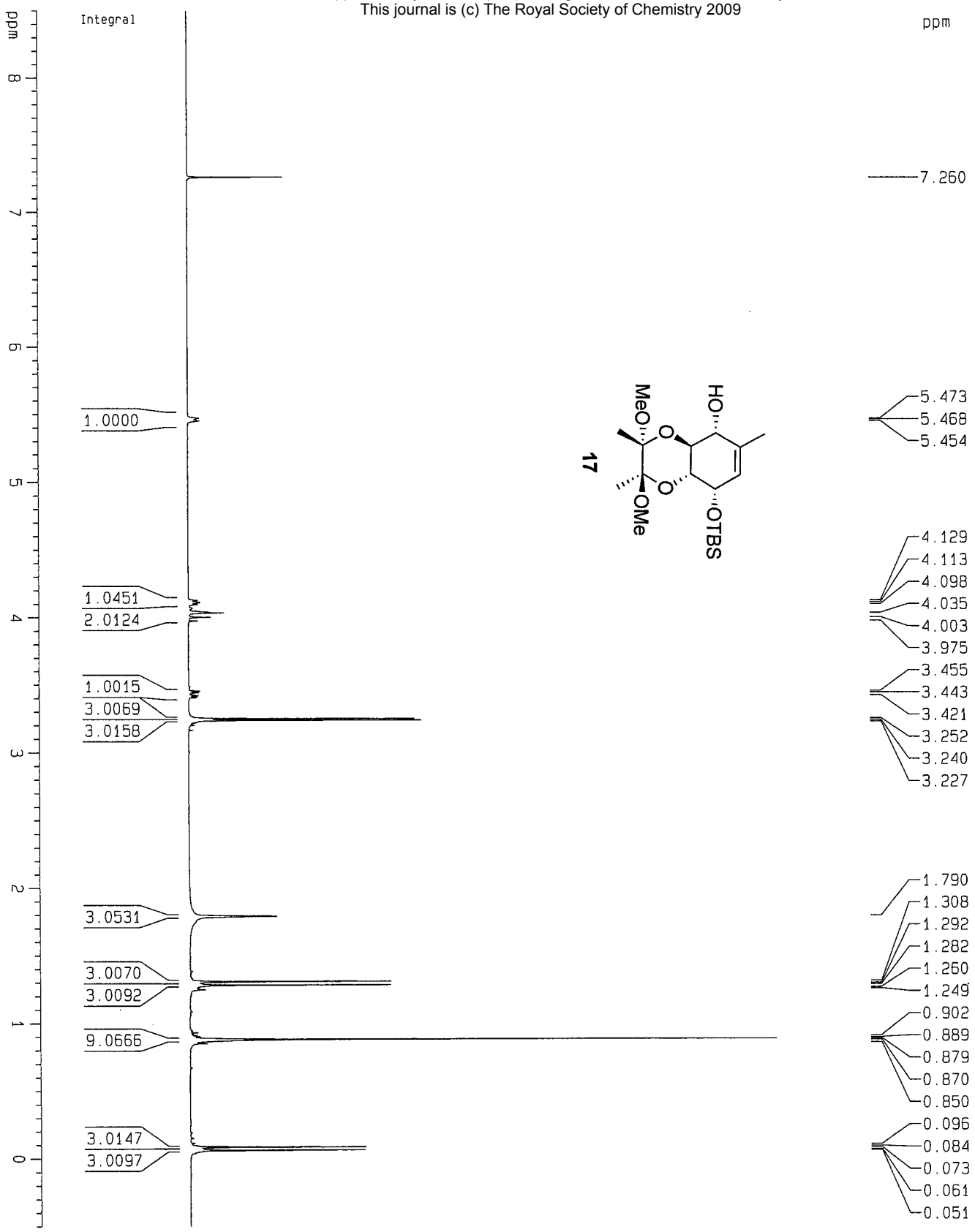
F2 - Acquisition Parameters
Date_ 20070523
Time 16.50
INSTRUM dpx300
PROBHD 5 mm BBO BB-1H
PULPROG zgdc
TD 65536
SOLVENT CDCl3
NS 1230
DS 0
SWH 26455.027 Hz
FIDRES 0.403672 Hz
AQ 1.2386804 sec
RG 5792.6
DW 18.900 usec
DE 6.00 usec
TE 0.0 K
D1 1.00000000 sec
d11 0.03000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

======== CHANNEL f1 ========
NUC1 13C
P1 3.00 usec
PL1 -6.00 dB
SFO1 75.4745111 MHz

======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 120.00 dB
PL12 19.00 dB
SFO2 300.1315007 MHz

F2 - Processing parameters
SI 65536
SF 75.4677129 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 1.40

1D NMR plot parameters
CX 23.00 cm
CY 5.00 cm
F1P 220.000 ppm
F1 16602.90 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.00000 ppm/cm
HZCM 754.67712 Hz/cm



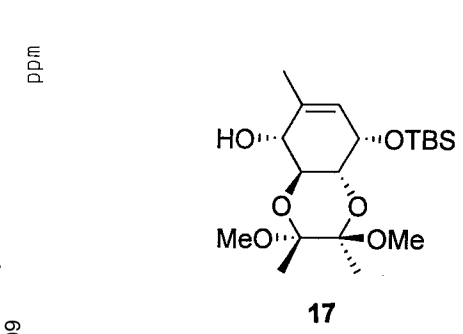
Current Data Parameters
NAME GL1521-h1
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20070608
Time 18.12
INSTRUM dpx300
PROBHD 5 mm BBO BB-1H
PULPROG zg
TD 32768
SOLVENT CDCl3
NS 32
DS 0
SWH 5402.485 Hz
FIDRES 0.164871 Hz
AQ 3.0327284 sec
RG 362
DW 92.550 usec
DE 132.21 usec
TE 0.0 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

========== CHANNEL f1 ==========
NUC1 1H
P1 5.00 usec
PL1 -2.00 dB
SFO1 300.1318000 MHz

F2 - Processing parameters
SI 32768
SF 300.1300064 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

1D NMR plot parameters
CX 22.00 cm
CY 10.62 cm
F1P 8.500 ppm
F1 2551.10 Hz
F2P -0.500 ppm
F2 -150.07 Hz
PPMCM 0.40909 ppm/cm
HZCM 122.78046 Hz/cm



17

Current Data Parameters

NAME	GL152-c13
EXPNO	1
PROCNO	1

F2 - Acquisition Parameters

Date_	20070604
Time	19.09
INSTRUM	dpx300
PROBHD	5 mm BBO BB-1H
PULPROG	zgdc
TD	65536
SOLVENT	CDCl3
NS	880
DS	0
SWH	26455.027 Hz
FIDRES	0.403672 Hz
AQ	1.2386804 sec
RG	2580.3
DW	18.900 usec
DE	6.00 usec
TE	0.0 K
D1	1.00000000 sec
d11	0.03000000 sec
MCREST	0.00000000 sec
MCWRK	0.01500000 sec

======== CHANNEL f1 ========

NUC1	13C
P1	3.00 usec
PL1	-6.00 dB
SFO1	75.4745111 MHz

======== CHANNEL f2 ========

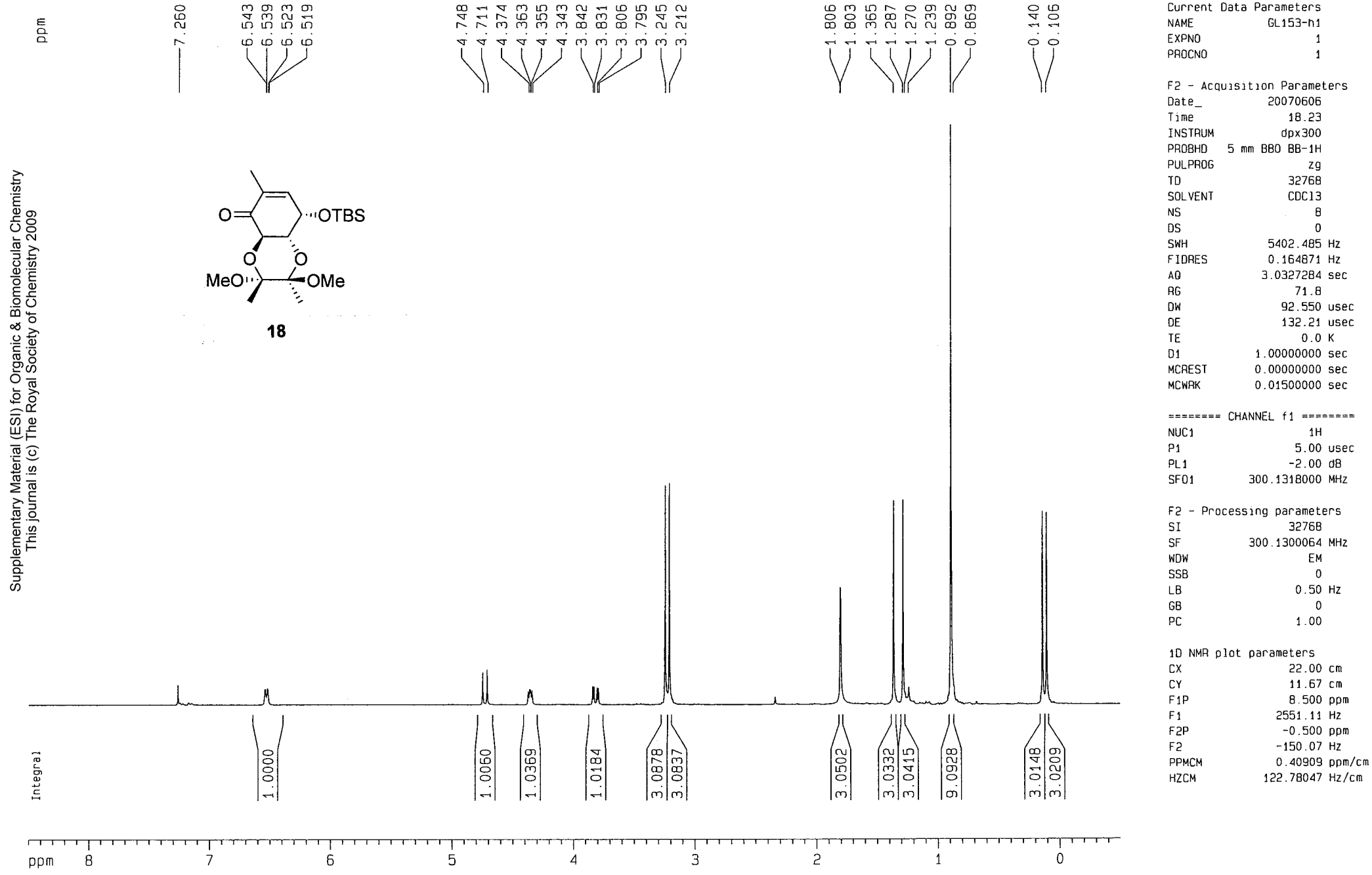
CPDPRG2	waltz16
NUC2	1H
PCPD2	100.00 usec
PL2	120.00 dB
PL12	19.00 dB
SFO2	300.1315007 MHz

F2 - Processing parameters

SI	65536
SF	75.4677125 MHz
WDW	EM
SSB	0
LB	2.50 Hz
GB	0
PC	1.40

1D NMR plot parameters

CX	23.00 cm
CY	3.50 cm
F1P	220.000 ppm
F1	16602.90 Hz
F2P	-10.000 ppm
F2	-754.68 Hz
PPMCM	10.00000 ppm/cm
HZCM	754.67712 Hz/cm



Current Data Parameters

NAME	GL153-h1
EXPNO	1
PROCNO	1

F2 - Acquisition Parameters

Date_	20070606
Time	18.23
INSTRUM	dpx300
PROBHD	5 mm BBO BB-1H
PULPROG	zg
TD	32768
SOLVENT	CDCl3
NS	8
DS	0
SWH	5402.485 Hz
FIDRES	0.164871 Hz
AQ	3.0327284 sec
RG	71.8
DW	92.550 usec
DE	132.21 usec
TE	0.0 K
D1	1.00000000 sec
MCREST	0.00000000 sec
MCWRK	0.01500000 sec

======== CHANNEL f1 ========

NUC1	1H
P1	5.00 usec
PL1	-2.00 dB
SFO1	300.1318000 MHz

F2 - Processing parameters

SI	32768
SF	300.1300064 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

1D NMR plot parameters

CX	22.00 cm
CY	11.67 cm
F1P	8.500 ppm
F1	2551.11 Hz
F2P	-0.500 ppm
F2	-150.07 Hz
PPMCM	0.40909 ppm/cm
HZCM	122.78047 Hz/cm