Supporting Information for

Lignans from the Tuber-barks of *Colocasia antiquorum* var. *esculenta* and Their Anti-melanogenic Activity

KI HYUN KIM,[†] EUNJUNG MOON,[‡] SUN YEOU KIM,[‡] AND KANG RO LEE*,[†]

[†]Natural Products Laboratory, School of Pharmacy, Sungkyunkwan University, Suwon 440-746, Korea, and [‡]East-West Medical Science Integrated Research Center, Graduate School of East-West Medical Science, Kyung Hee University; Yongin 449-701, Korea

*To whom correspondence should be addressed: School of Pharmacy, Sungkyunkwan University, Suwon 440-746, Korea. Tel: +82-31-290-7710. Fax: +82-31-290-7730. E-mail: krlee@skku.ac.kr.

Supporting Information Contents:

Figure 1. The structures of known compounds (**9-12**)

Figure 2. The ^{1}H NMR (CD_3OD, 500 MHz) data of **1**

Figure 3. The ^{13}C NMR (CD_3OD, 125 MHz) data of **1**

Figure 4. ^{1}H-^{1}H COSY data of **1**

Figure 5. HSQC data of **1**

Figure 6. HMBC data of **1**

Figure 7. The ^{1}H NMR (CD_3OD, 500 MHz) data of **2**

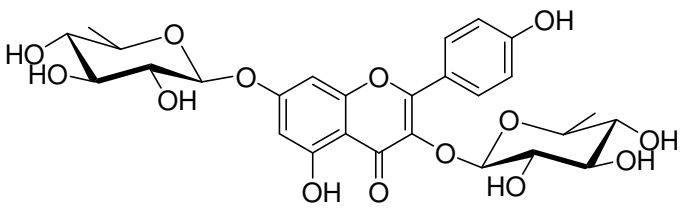
Figure 8. The ^{13}C NMR (CD_3OD, 125 MHz) data of **2**

Figure 9. ^{1}H-^{1}H COSY data of **2**

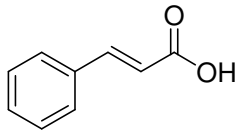
Figure 10. HSQC data of **2**

Figure 11. HMBC data of **2**

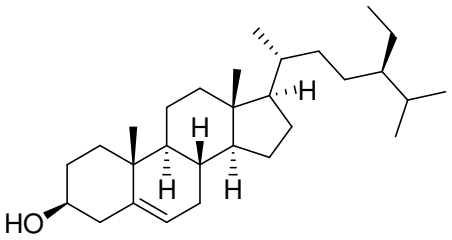
Figure 1. The structures of known compounds (**9-12**)



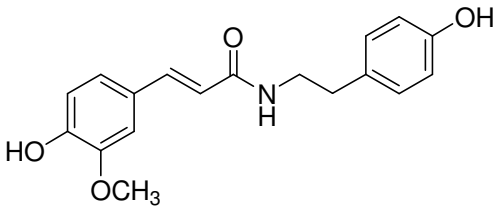
9



10



11



12

Figure 2. The ^{1}H NMR (CD_3OD, 500 MHz) data of **1**

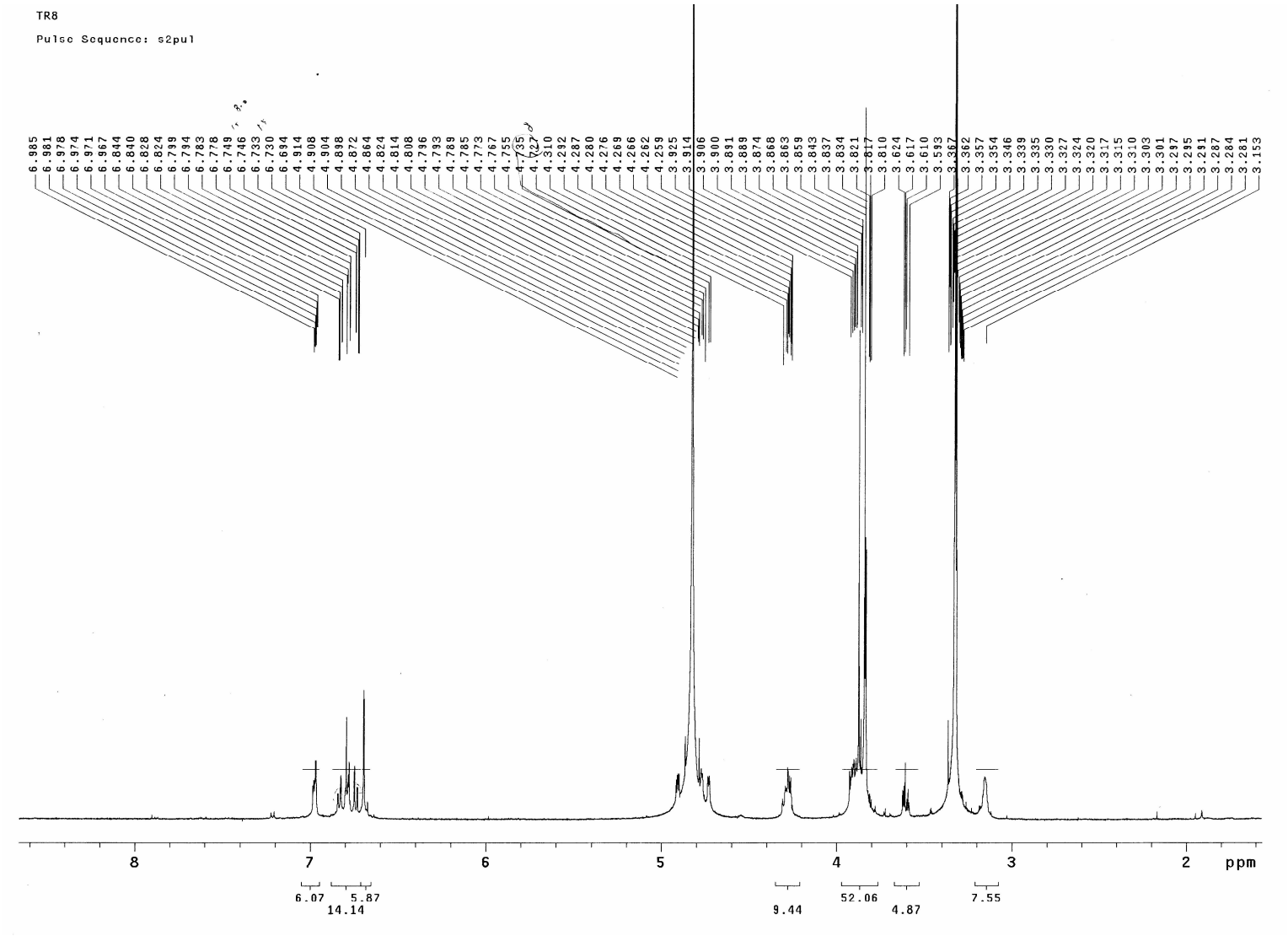


Figure 3. The ^{13}C NMR (CD_3OD, 125 MHz) data of **1**

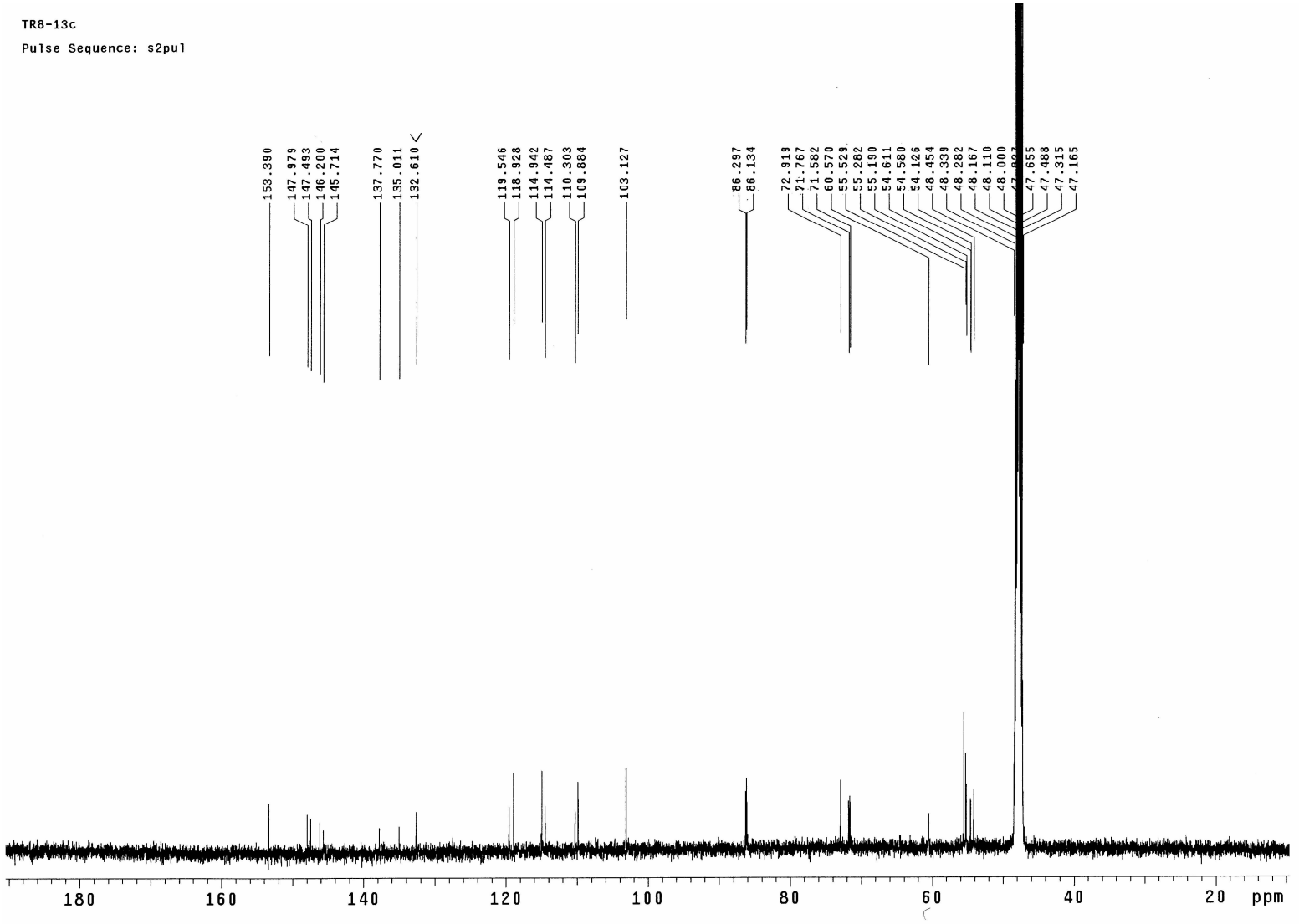
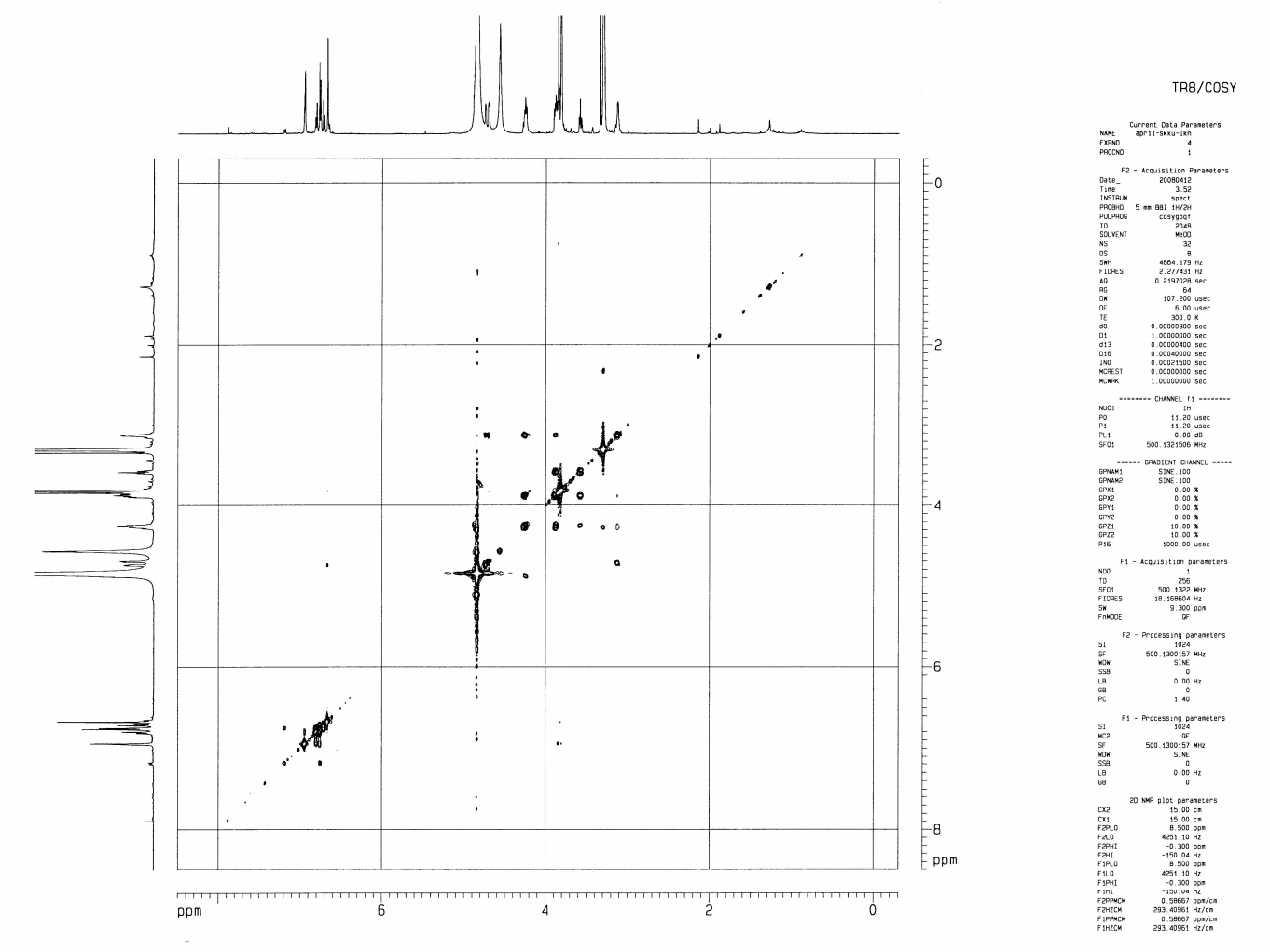


Figure 4. ^{1}H-^{1}H COSY data of **1**



TR8/COSY

Current Data Parameters
NAME apr11-skku-1kh
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters
Date_ 20080412
Time 3.52
INSTRUM spect
PROBHD 5 mm BBI 1H/2H
PULPROG cosygpqf
TD 2048
SOLVENT MeOD
NS 32
DS 8
SWH 4664.179 Hz
FIDRES 2.277431 Hz
AQ 0.2197028 sec
RG 64
DW 107.200 usec
DE 6.00 usec
TE 300.0 K
D0 0.00000300 sec
D1 1.00000000 sec
D13 0.00000400 sec
D16 0.00040000 sec
IN0 0.00021500 sec
MCREST 0.00000000 sec
MCWRK 1.00000000 sec

======== CHANNEL f1 ========
NUC1 1H
P0 11.20 usec
P1 11.20 usec
PL1 0.00 dB
SFO1 500.1321506 MHz

====== GRADIENT CHANNEL =====
GPNAM1 SINE.100
GPNAM2 SINE.100
GPX1 0.00 %
GPX2 0.00 %
GPY1 0.00 %
GPY2 0.00 %
GPZ1 10.00 %
GPZ2 10.00 %
P16 1000.00 usec

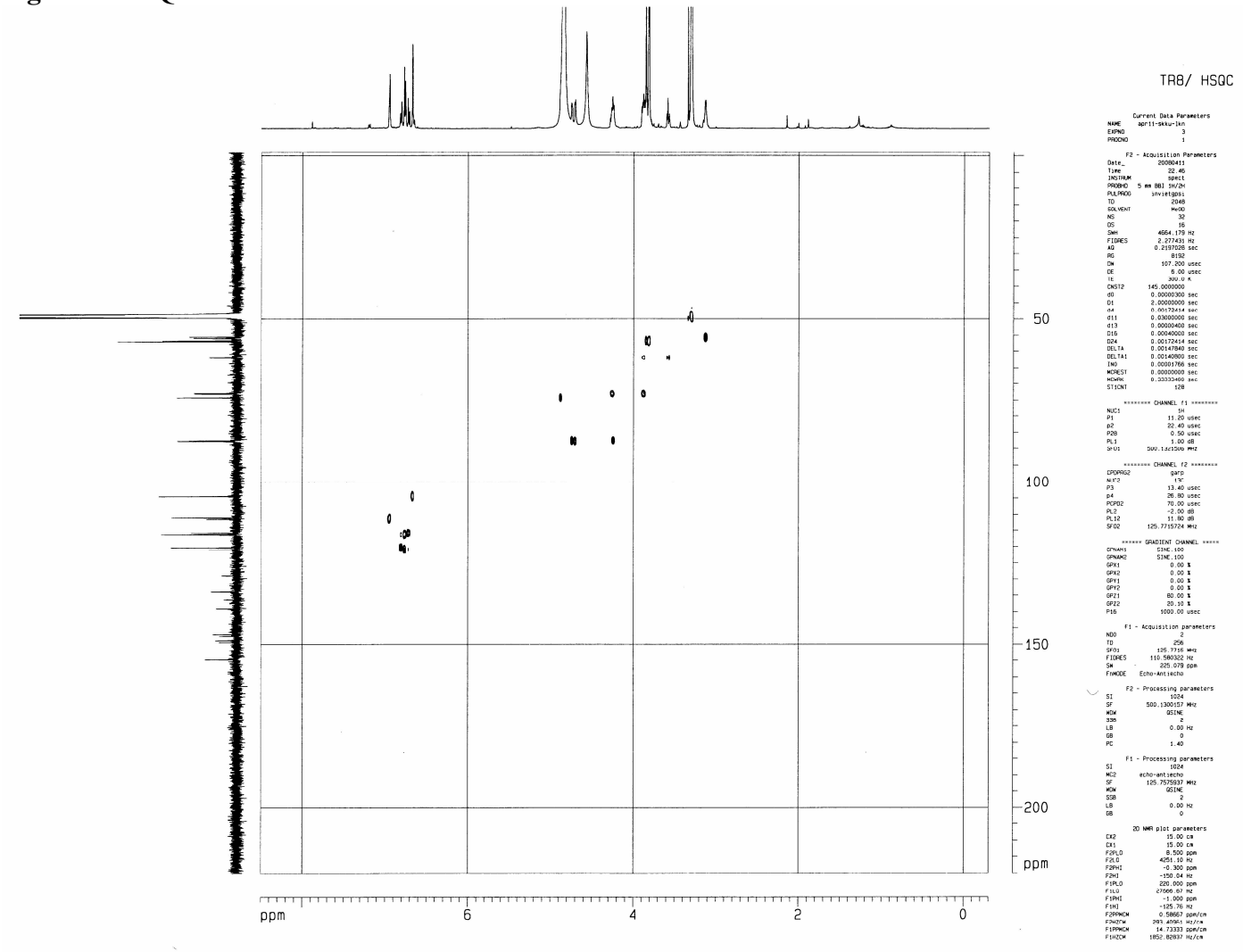
F1 - Acquisition parameters
ND0 1
TD 256
SFO1 500.1320 MHz
FIDRES 18.168604 Hz
SW 9.300 ppm
FnMODE QF

F2 - Processing parameters
SI 1024
SF 500.1300157 MHz
WDW SINE
SSB 0
LB 0.00 Hz
GB 0
PC 1.40

F1 - Processing parameters
SI 1024
MC2 QF
SF 500.1300157 MHz
WDW SINE
SSB 0
LB 0.00 Hz
GB 0

2D NMR plot parameters
CX2 15.00 cm
CX1 15.00 cm
F2PLO 8.500 ppm
F2LO 4251.10 Hz
F2PHI -0.300 ppm
F2HI -150.04 Hz
F1PLO 8.500 ppm
F1LO 4251.10 Hz
F1PHI -0.300 ppm
F1HI -150.04 Hz
F2PPMCM 0.58667 ppm/cm
F2HZCM 293.40961 Hz/cm
F1PPMCM 0.58667 ppm/cm
F1HZCM 293.40961 Hz/cm

Figure 5. HSQC data of **1**



TR8/ HSQC

Current Data Parameters
NAME aprit-saku-jkn
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20080411
Time 22.46
INSTRUM spect
PROBHD 5 mm BBI 1H/2H
PULPROG invietgpsi
TD 2048
SOLVENT MeOD
NS 32
DS 16
SWH 4954.179 Hz
FIDRES 2.277431 Hz
AQ 0.2197028 sec
RG 8192
DW 107.200 usec
DE 6.00 usec
TE 300.0 K
CNST2 145.0000000
d0 0.00000300 sec
D1 2.00000000 sec
d4 0.00179414 sec
d11 0.03000000 sec
d13 0.00000400 sec
D16 0.00040000 sec
D24 0.00172414 sec
DELTA 0.00147840 sec
DELTA1 0.00140800 sec
IN0 0.00001766 sec
MCREST 0.00000000 sec
MCWRK 0.03333400 sec
STSIGNT 128

======== CHANNEL f1 ========
NUC1 1H
P1 11.20 usec
p2 22.40 usec
P28 0.50 usec
PL1 1.00 dB
SFO1 500.1315245 MHz

======== CHANNEL f2 ========
CPDPRG2 garp
NUC2 13C
P3 13.40 usec
p4 26.80 usec
PCPD2 70.00 usec
PL2 -2.00 dB
PL12 11.80 dB
SFO2 125.7715724 MHz

====== GRADIENT CHANNEL =====
GPNAM1 SINE.100
GPNAM2 SINE.100
GPX1 0.00 %
GPX2 0.00 %
GPY1 0.00 %
GPY2 0.00 %
GPZ1 80.00 %
GPZ2 20.10 %
P16 1000.00 usec

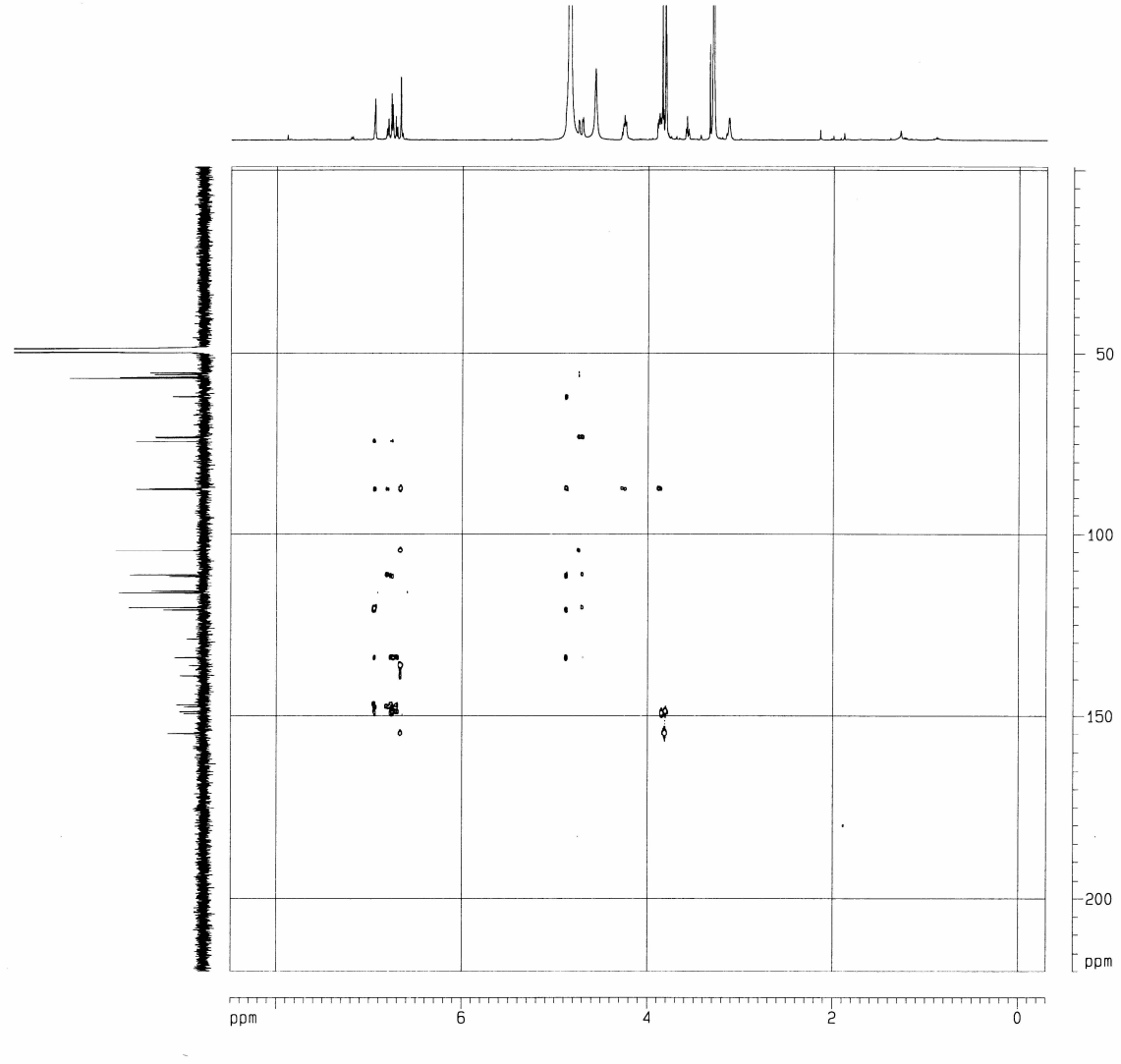
F1 - Acquisition parameters
ND0 2
TD 256
SFO1 125.7716 MHz
FIDRES 110.580322 Hz
SW 225.079 ppm
FnMODE Echo-Antiecho

F2 - Processing parameters
SI 1024
SF 500.1300157 MHz
WDW QSINE
SSB 2
LB 0.00 Hz
GB 0
PC 1.40

F1 - Processing parameters
SI 1024
MC2 echo-antiecho
SF 125.7575937 MHz
WDW QSINE
SSB 2
LB 0.00 Hz
GB 0

2D NMR plot parameters
CX2 15.00 cm
CX1 15.00 cm
F2PLO 8.500 ppm
F2LO 4251.10 Hz
F2PHI -0.300 ppm
F2HI -150.04 Hz
F1PLO 220.000 ppm
F1LO 27566.67 Hz
F1PHI -1.000 ppm
F1HI -125.76 Hz
F2PPMCM 0.58667 ppm/cm
F2HZCM 293.40961 Hz/cm
F1PPMCM 14.73333 ppm/cm
F1HZCM 1852.82837 Hz/cm

Figure 6. HMBC data of **1**



TR8/HMBC

Current Data Parameters

NAME	apr11-skku-1kn
EXPNO	2
PROCNO	1

F2 - Acquisition Parameters

Date_	20080411
Time	17.31
INSTRUM	spect
PROBHD	5 mm BBI 1H/2H
PULPROG	inv4gplp3rndqf
TD	2048
SOLVENT	MeOD
NS	32
DS	16
SWH	4664.179 Hz
FIDRES	2.277431 Hz
AQ	0.2197028 sec
RG	161944
DW	107.200 usec
DE	6.00 usec
TE	300.0 K
CNST2	145.0000000
d0	0.00000300 sec
D1	2.00000000 sec
d2	0.00344828 sec
D6	0.06500000 sec
d13	0.00000400 sec
D16	0.00040000 sec
IN0	0.00001767 sec
MCREST	0.00000000 sec
MCWRK	2.00000000 sec

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

NUC1	1H
P1	11.20 usec
p2	22.40 usec
PL1	0.00 dB
SFO1	500.1321506 MHz

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

NUC2	13C
P3	13.70 usec
PL2	-3.00 dB
SFO2	125.7715724 MHz

====== GRADIENT CHANNEL =====

GPNAM1	SINE.100
GPNAM2	SINE.100
GPNAM3	SINE.100
GPX1	0.00 %
GPX2	0.00 %
GPX3	0.00 %
GPY1	0.00 %
GPY2	0.00 %
GPY3	0.00 %
GPZ1	50.00 %
GPZ2	30.00 %
GPZ3	40.10 %
P16	1000.00 usec

F1 - Acquisition parameters

ND0	2
TD	256
SFO1	125.7715 MHz
FIDRES	110.502121 Hz
SW	224.820 ppm
FnMODE	QF

F2 - Processing parameters

SI	1024
SF	500.1300157 MHz
WDW	SINE
SSB	0
LB	0.00 Hz
GB	0
PC	1.00

F1 - Processing parameters

SI	1024
WDW	QF
SF	125.7575937 MHz
WDW	SINE
SSB	0
LB	0.00 Hz
GB	0

2D NMR plot parameters

CX2	15.00 cm
CX1	15.00 cm
F2PLO	8.500 ppm
F2LO	4251.10 Hz
F2PHI	-0.300 ppm
F2HI	-150.04 Hz
F1PLO	220.000 ppm
F1LO	27666.67 Hz
F1PHI	-1.000 ppm
F1HI	-125.76 Hz
F2PPMCM	0.58667 ppm/cm
F2HZCM	293.40961 Hz/cm
F1PPMCM	14.73333 ppm/cm
F1HZCM	1852.82837 Hz/cm

Figure 7. The ^{1}H NMR (CD_3OD, 500 MHz) data of **2**

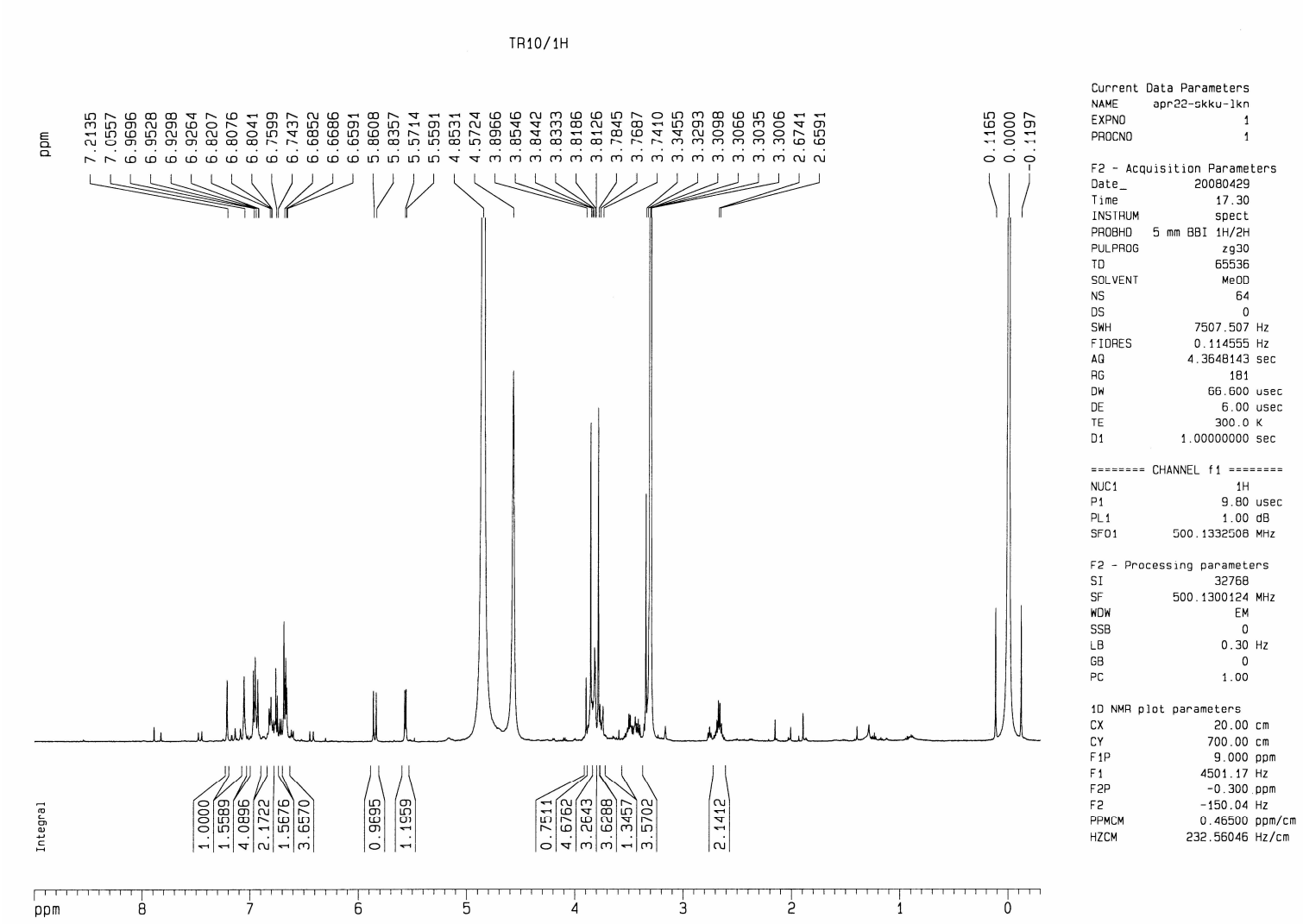


Figure 8. The ^{13}C NMR (CD_3OD, 125 MHz) data of **2**

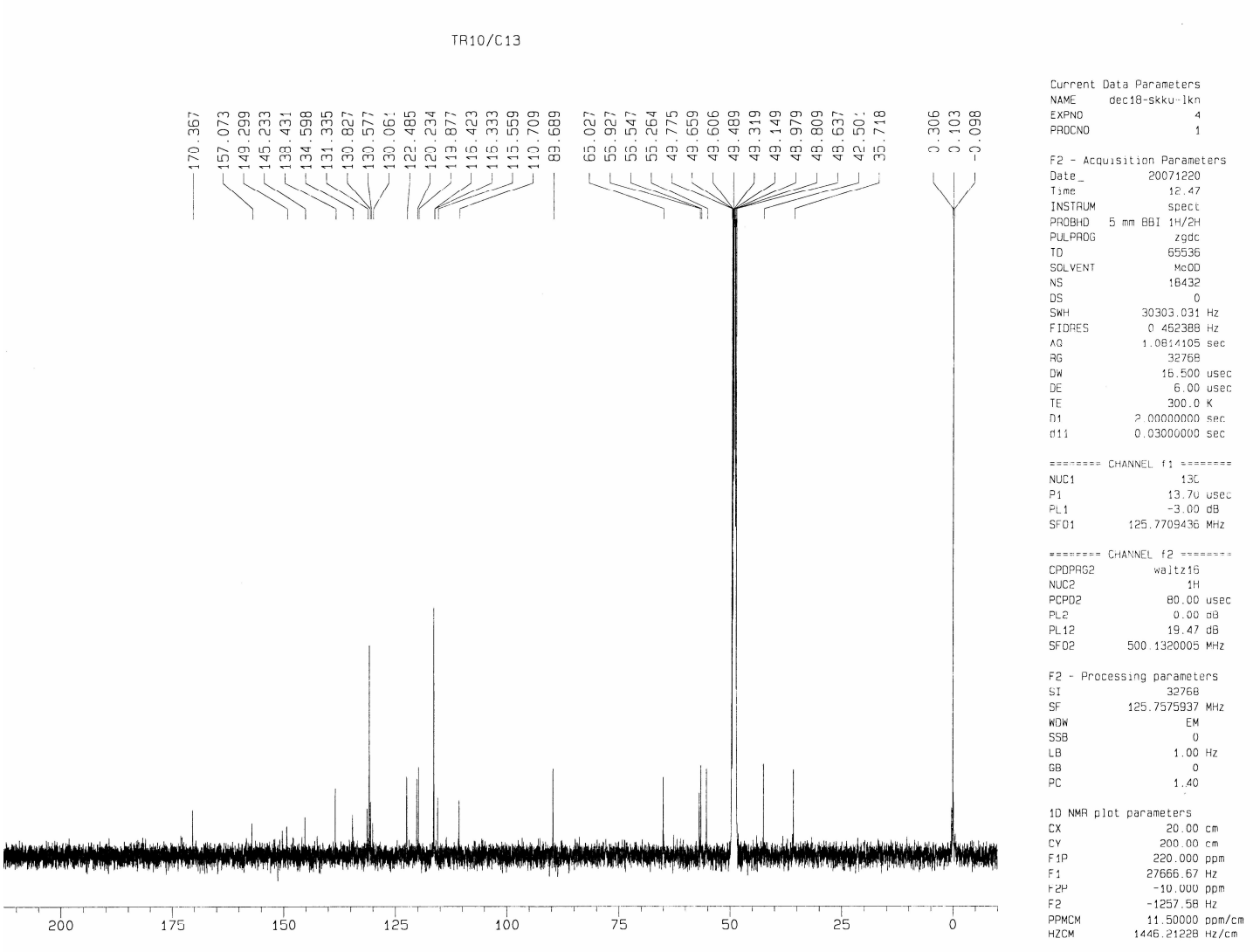
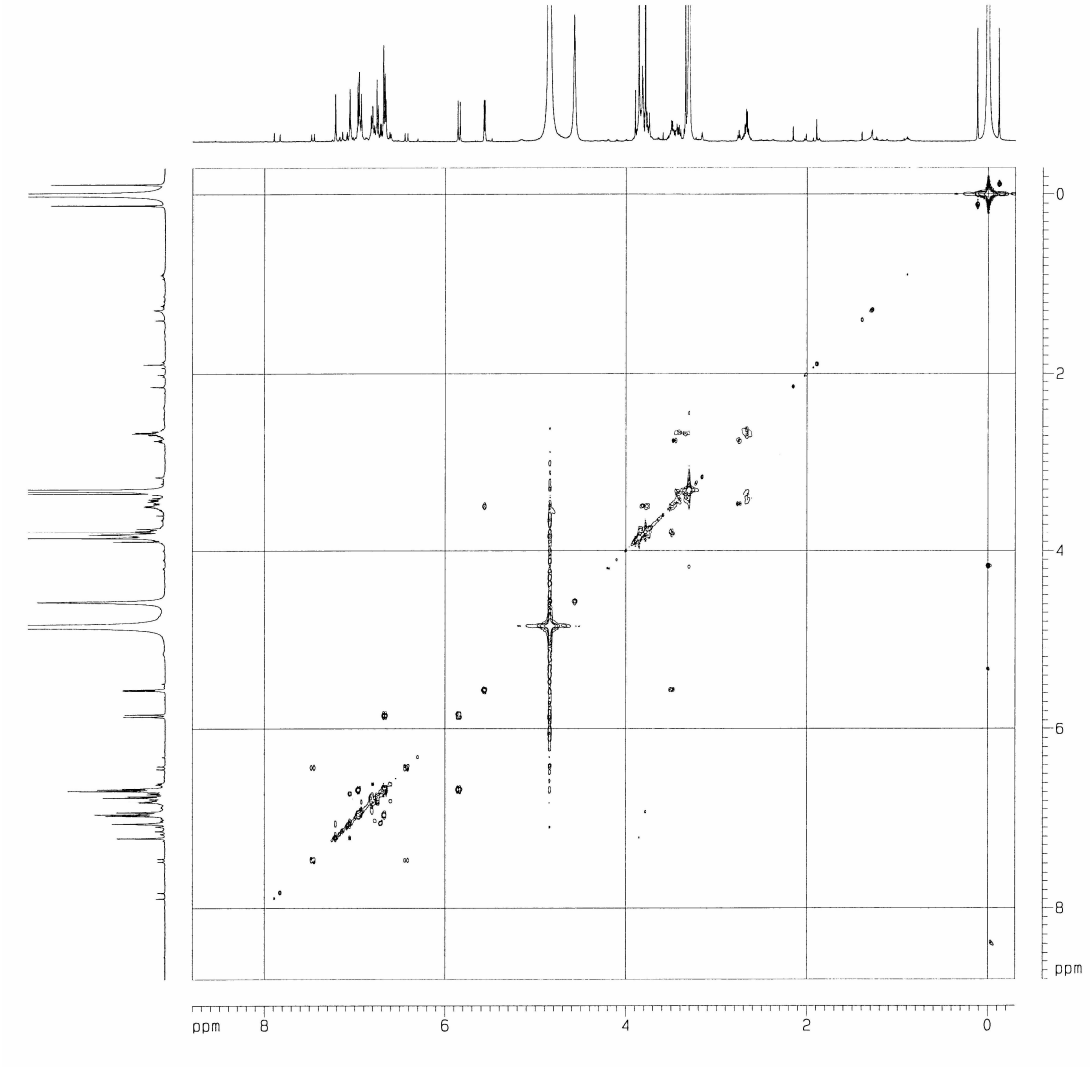


Figure 9. ^{1}H-^{1}H COSY data of **2**



TR10/COSY

Current Data Parameters
NAME decl8-skku-1kh
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20071217
Time 21.40
INSTRUM spect
PROBHD 5 mm BBI 1H/2H
PULPROG cosygpqf
TD 2048
SOLVENT MeOD
NS 32
DS 8
SWH 4734.849 Hz
FIDRES 2.311938 Hz
AQ 0.2164244 sec
RG 64
DW 105.600 usec
DE 6.00 usec
TE 300.0 K
D0 0.00000300 sec
D1 1.00000000 sec
D13 0.00000400 sec
D16 0.00040000 sec
IN0 0.00021048 sec
MCREST 0.00000000 sec
MCWRK 1.00000000 sec

-------- CHANNEL f1 --------
NUC1 1H
PO 11.40 usec
P1 11.40 usec
PL1 0.00 dB
SFO1 500.1321006 MHz

====== GRADIENT CHANNEL =====
GPNAM1 SINE.100
GPNAM2 SINE.100
GPX1 0.00 %
GPX2 0.00 %
GPY1 0.00 %
GPY2 0.00 %
GPZ1 10.00 %
GPZ2 10.00 %
P16 1000.00 usec

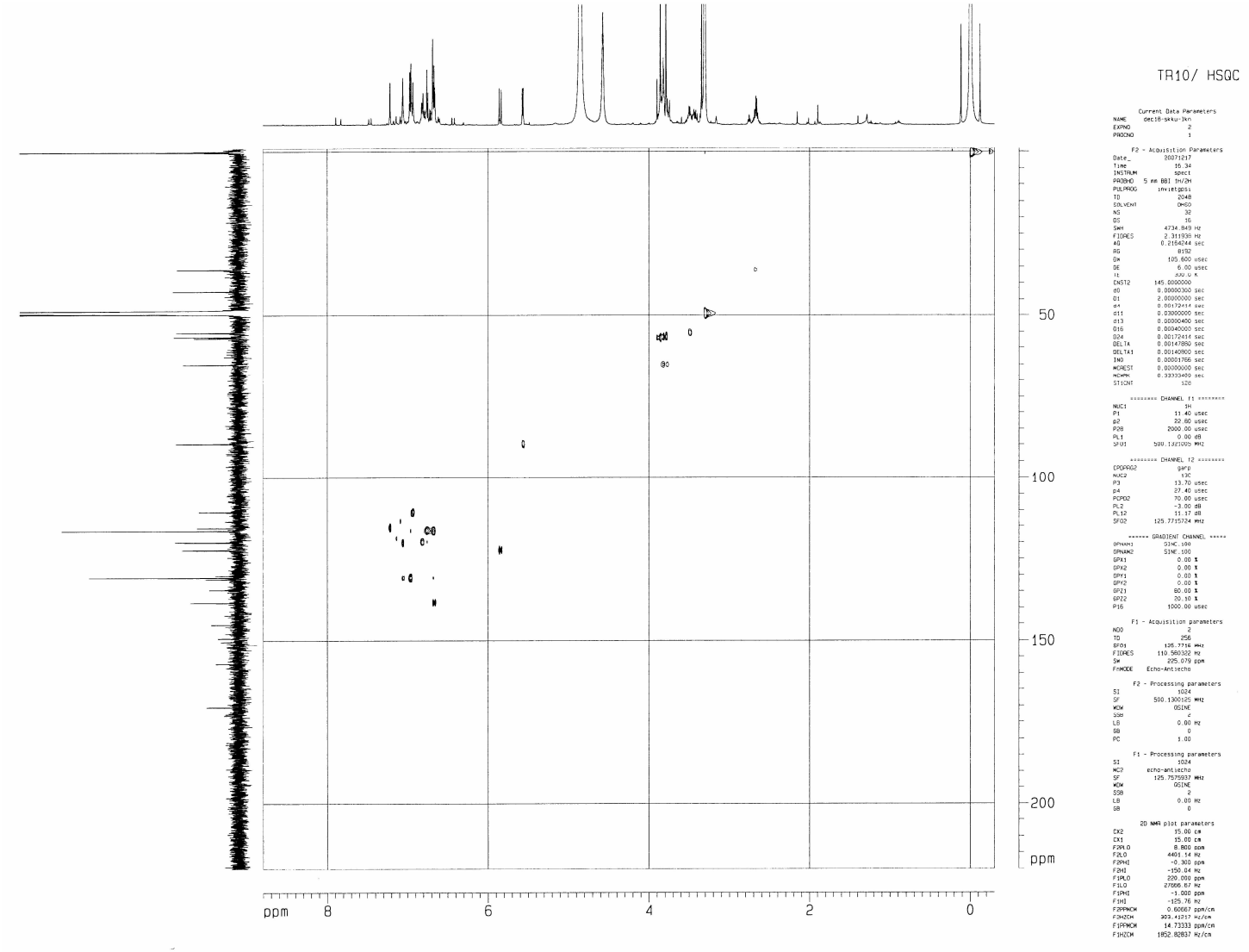
F1 - Acquisition parameters
ND0 1
TD 256
SFO1 500.1321 MHz
FIDRES 18.559212 Hz
SW 9.500 ppm
FnMODE QF

F2 - Processing parameters
SI 1024
SF 500.1300125 MHz
WDW SINE
SSB 0
LB 0.00 Hz
GB 0
PC 1.40

F1 - Processing parameters
SI 1024
MC2 QF
SF 500.1300125 MHz
WDW SINE
SSB 0
LB 0.00 Hz
GB 0

2D NMR plot parameters
CX2 15.00 cm
CX1 15.00 cm
F2PLO 8.800 ppm
F2LO 4401.14 Hz
F2PHI -0.300 ppm
F2HI -150.04 Hz
F1PLO 8.800 ppm
F1LO 4401.14 Hz
F1PHI -0.300 ppm
F1HI -150.04 Hz
F2PPMCM 0.60667 ppm/cm
F2HZCM 303.41217 Hz/cm
F1PPMCM 0.60667 ppm/cm
F1HZCM 303.41217 Hz/cm

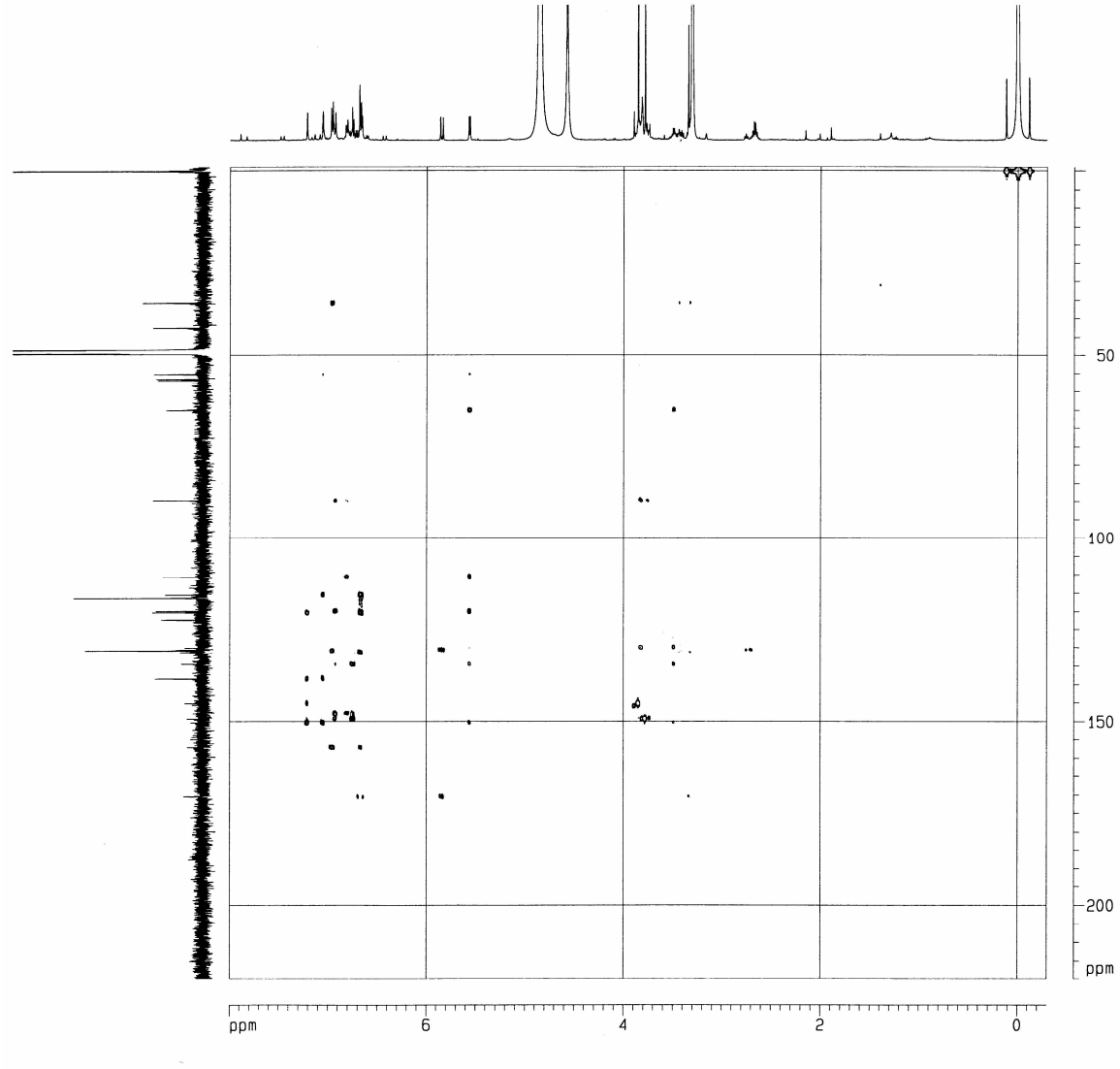
Figure 10. HSQC data of **2**



TR10/ HSQC

```
      Current Data Parameters
NAME          dec18-sksu-1kn
EXPNO                      2
PROCNO                     1

      F2 - Acquisition Parameters
Date_              20071217
Time                  16.34
INSTRUM               spect
PROBHD   5 mm BBI 1H/2H
PULPROG          invietgpsi
TD                      2048
SOLVENT                 CHCl3
NS                        32
DS                        16
SWH                 4734.849 Hz
FIDRES              2.311938 Hz
AQ                  0.2164244 sec
RG                       8192
DW                    105.600 usec
DE                      6.00 usec
TE                     300.0 K
CNST2              145.0000000
d0                   0.00000300 sec
d1                   2.00000000 sec
d4                   0.00172414 sec
d11                  0.03000000 sec
d13                  0.00000400 sec
d16                  0.00040000 sec
d24                  0.00172414 sec
DELTA                0.00147850 sec
DELTA1               0.00140900 sec
IN0                  0.00001766 sec
MCREST               0.00000000 sec
MCWRK                0.33333499 sec
ST1CNT                    128

      ======== CHANNEL f1 ========
NUC1                      1H
P1                     11.40 usec
p2                     22.80 usec
P28                  2000.00 usec
PL1                     0.00 dB
SFO1          500.1321005 MHz

      ======== CHANNEL f2 ========
CPDPRG2                 garp
NUC2                     13C
P3                     13.70 usec
p4                     27.40 usec
PCPD2                  70.00 usec
PL2                    -3.00 dB
PL12                   11.17 dB
SFO2          125.7715724 MHz

      ====== GRADIENT CHANNEL =====
GPNAM1                 SINE.100
GPNAM2                 SINE.100
GPX1                    0.00 %
GPX2                    0.00 %
GPY1                    0.00 %
GPY2                    0.00 %
GPZ1                   80.00 %
GPZ2                   20.10 %
P16                  1000.00 usec

      F1 - Acquisition parameters
ND0                       2
TD                      256
SFO1          125.7716 MHz
FIDRES             110.560302 Hz
SW                 225.079 ppm
FnMODE     Echo-Antiecho

      F2 - Processing parameters
SI                      1024
SF            500.1300125 MHz
WDW                     QSINE
SSB                         2
LB                      0.00 Hz
GB                          0
PC                      1.00

      F1 - Processing parameters
SI                      1024
MC2          echo-antiecho
SF            125.7575937 MHz
WDW                     QSINE
SSB                         2
LB                      0.00 Hz
GB                          0

      2D NMR plot parameters
CX2                    15.00 cm
CY1                    15.00 cm
F2PPM                   8.800 ppm
F2LO                 4401.14 Hz
F2PPM1                 -0.300 ppm
F2H1                 -150.04 Hz
F1PPM                 220.000 ppm
F1LO                 27666.67 Hz
F1PPM1                 -1.000 ppm
F1H1                 -125.76 Hz
F2PPMCM              0.60667 ppm/cm
F2HZCM             303.41217 Hz/cm
F1PPMCM             14.73333 ppm/cm
F1HZCM            1852.82837 Hz/cm
```

Figure 11. HMBC data of **2**



TR10/HMBC

```
Current Data Parameters
NAME        apr22-skku-lkn
EXPNO                    2
PROCNO                   1

F2 - Acquisition Parameters
Date_          20080429
Time              17.30
INSTRUM             spect
PROBHD   5 mm BBI 1H/2H
PULPROG  inv4gplplrndqf
TD                  20a8
SOLVENT             MeOD
NS                    32
DS                    16
SWH           4595.598 Hz
FIDRES        2.243940 Hz
AQ            0.2229812 sec
RG                 16384
DW              108.800 usec
DE                6.00 usec
TE                300.0 K
CNST2         145.0000000
d0             0.00000300 sec
D1             2.00000000 sec
d2             0.00344828 sec
D6             0.06500000 sec
d13            0.00000400 sec
D16            0.00040000 sec
IN0            0.00001767 sec
MCREST         0.00000000 sec
MCWRK          2.00000000 sec

======== CHANNEL f1 ========
NUC1                 1H
P1                11.30 usec
p2                22.60 usec
PL1               0.00 dB
SFO1        500.1320005 MHz

======== CHANNEL f2 ========
NUC2                 13C
P3                13.70 usec
PL2               -3.00 dB
SFO2        125.7715724 MHz

====== GRADIENT CHANNEL =====
GPNAM1           SINE.100
GPNAM2           SINE.100
GPNAM3           SINE.100
GPX1              0.00 %
GPX2              0.00 %
GPX3              0.00 %
GPY1              0.00 %
GPY2              0.00 %
GPY3              0.00 %
GPZ1             50.00 %
GPZ2             30.00 %
GPZ3             40.10 %
P16            1000.00 usec

F1 - Acquisition parameters
NDO                   2
TD                  256
SFO1        125.7715 MHz
FIDRES      110.502121 Hz
SW            224.920 ppm
FnMODE              QF

F2 - Processing parameters
SI                 1024
SF          500.1300124 MHz
WDW                SINE
SSB                   0
LB             0.00 Hz
GB                    0
PC                 1.00

F1 - Processing parameters
SI                 1024
WDW2                QF
SF          125.7575937 MHz
WDW                SINE
SSB                   0
LB             0.00 Hz
GB                    0

2D NMR plot parameters
CX2               15.00 cm
CY1               15.00 cm
F2PLO              8.000 ppm
F2LO             4001.04 Hz
F2PHI             -0.300 ppm
F2HI            -150.04 Hz
F1PLO            220.000 ppm
F1LO            27666.67 Hz
F1PHI             -1.000 ppm
F1HI            -125.76 Hz
F2PPMCM         0.55333 ppm/cm
F2HZCM        276.73862 Hz/cm
F1PPMCM        14./////// ppm/cm
F1HZCM        1952.82837 Hz/cm
```