

## SUPPORTING INFORMATION AVAILABLE

### **C-Methylated Flavonoids from *Cleistocalyx operculatus* and their Inhibitory Effects on Novel Influenza A (H1N1) Neuraminidase**

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## Figure Legends

**Figure S1.1.**  $^1\text{H}$  NMR (500 MHz,  $\text{CDCl}_3$ ) of new compound **1**.

**Figure S1.2.**  $^{13}\text{C}$  NMR (125 MHz,  $\text{CDCl}_3$ ) of new compound **1**.

**Figure S1.3.** HSQC spectrum of new compound **1**.

**Figure S1.4.** HMBC spectrum of new compound **1**.

**Figure S2.1.**  $^1\text{H}$  NMR (500 MHz,  $\text{CD}_3\text{OD}$ ) of new compound **2**.

**Figure S2.2.**  $^{13}\text{C}$  NMR (125 MHz,  $\text{CD}_3\text{OD}$ ) of new compound **2**.

**Figure S2.3.** HSQC spectrum of new compound **2**.

**Figure S2.4.** HMBC spectrum of new compound **2**.

**Figure S3.1.**  $^1\text{H}$  NMR (500 MHz,  $\text{CDCl}_3$ ) of new compound **3**.

**Figure S3.2.**  $^{13}\text{C}$  NMR (125 MHz,  $\text{CDCl}_3$ ) of new compound **3**.

**Figure S3.3.** HSQC spectrum of new compound **3**.

**Figure S3.4.** HMBC spectrum of new compound **3**.

**Figure S4.1.**  $^1\text{H}$  NMR (500 MHz,  $\text{CD}_3\text{COCD}_3$ ) of new compound **4**.

**Figure S4.2.**  $^{13}\text{C}$  NMR (125 MHz,  $\text{CD}_3\text{COCD}_3$ ) of new compound **4**.

**Figure S4.3.** HSQC spectrum of new compound **4**.

**Figure S4.4.** HMBC spectrum of new compound **4**.

**Figure S5.** The antiviral effects of a representative compound **4** on influenza A/PR/8/34 in

the immunofluorescence assay. (A) Mock-inoculated MDCK cells show no positive

fluorescence reactions in the cells. (B) Virus-infected MDCK cells without compound **4**. There are many positive cells (green). (C-D) Virus-infected MDCK cells with oseltamivir (4.88 and 1.22  $\mu\text{M}$ ). (E-F) Virus-infected MDCK cells with compound **4** (15.92 and 3.18  $\mu\text{M}$ ). There is a remarkably lower number of positive cells.

**Figure S6.** (A–B) Inhibition of NAs from influenza A (H1N1 and H9N2) by oseltamivir in the presence or absence of compound **4**.

Figure S1.1.

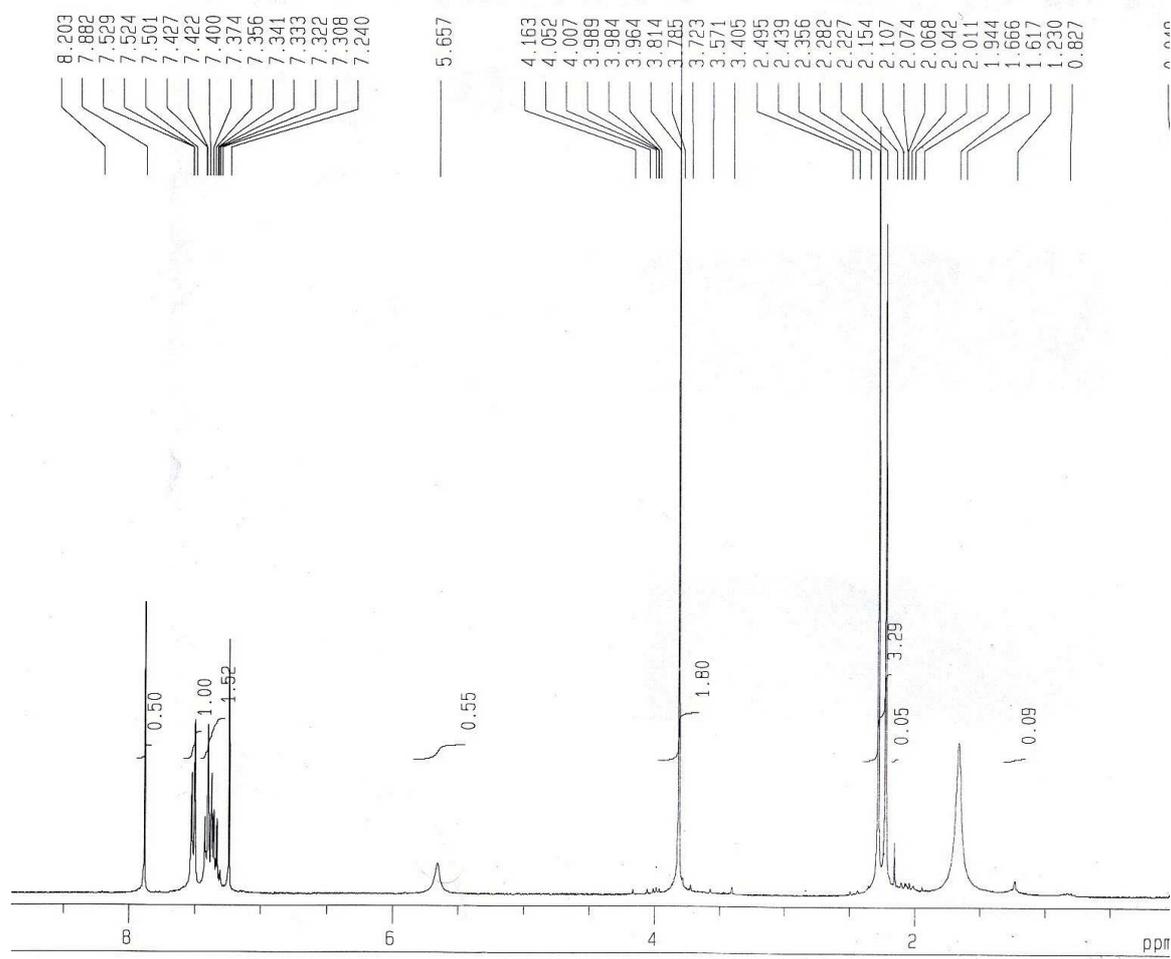
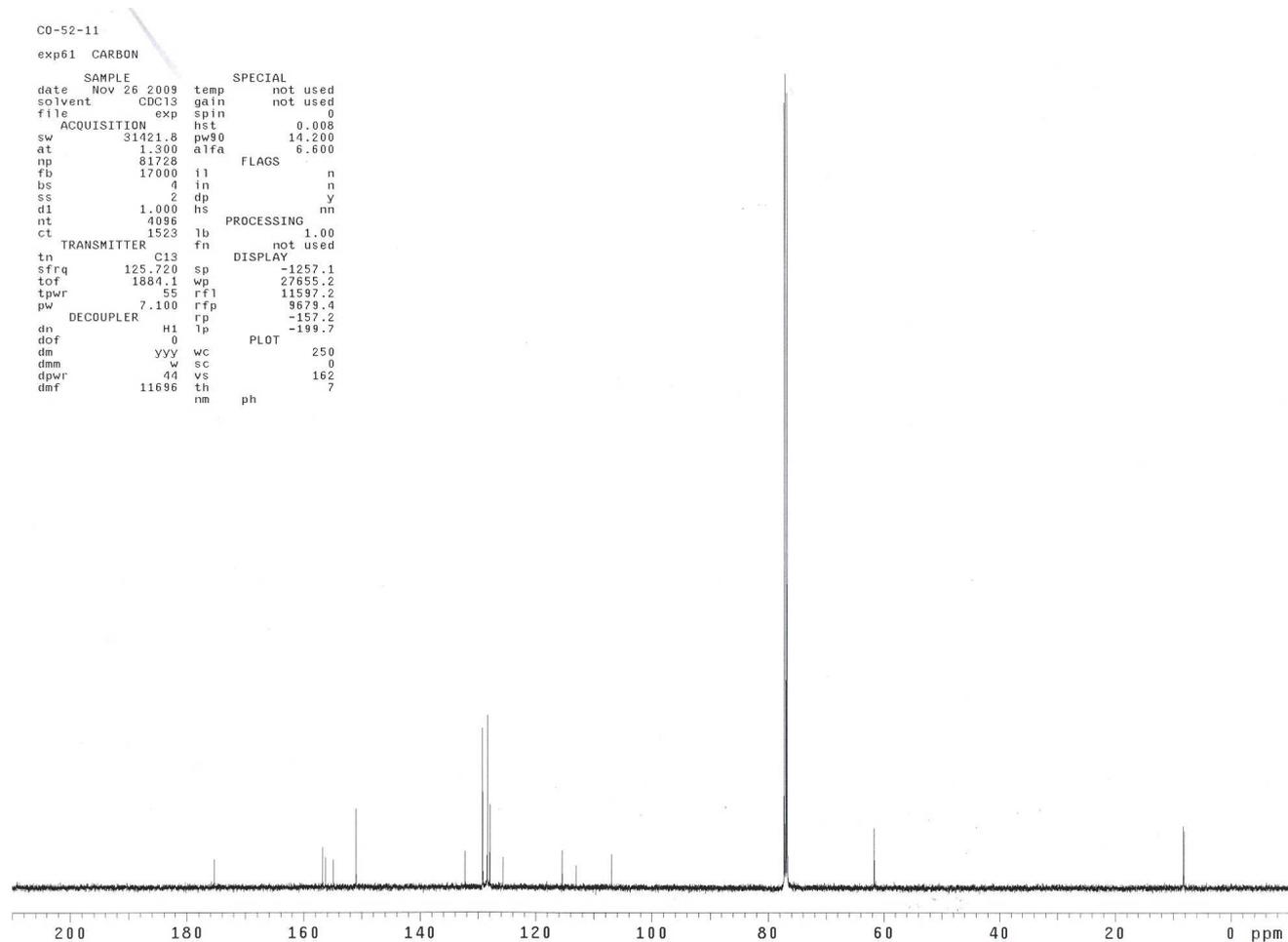


Figure S1.2.



**Figure S1.3.**

C0-52-11  
Data Collected on:  
Kjui500-inova500  
Archive directory:  
/export/home/vnmr1/vnmrsys/data  
Sample directory:  
File: gHSQC  
Pulse Sequence: gHSQC  
Solvent: CDCl3  
User: 1-14-87  
Relax. delay 1.000 sec  
Acq. time 0.150 sec  
Width 7998.4 Hz  
ZD Width 21567.5 Hz  
64 repetitions  
2 x 200 increments  
OBSERVE H1, 499.9244519 MHz  
DECOUPLE C13, 125.7155231 MHz  
Power 41 dB  
on during acquisition  
off during delay  
w40\_sw modulated  
DATA PROCESSING  
Gauss apodization 0.059 sec  
F1 DATA PROCESSING  
Gauss apodization 0.011 sec  
F1 size 2048 x 2048  
Total time 2 min

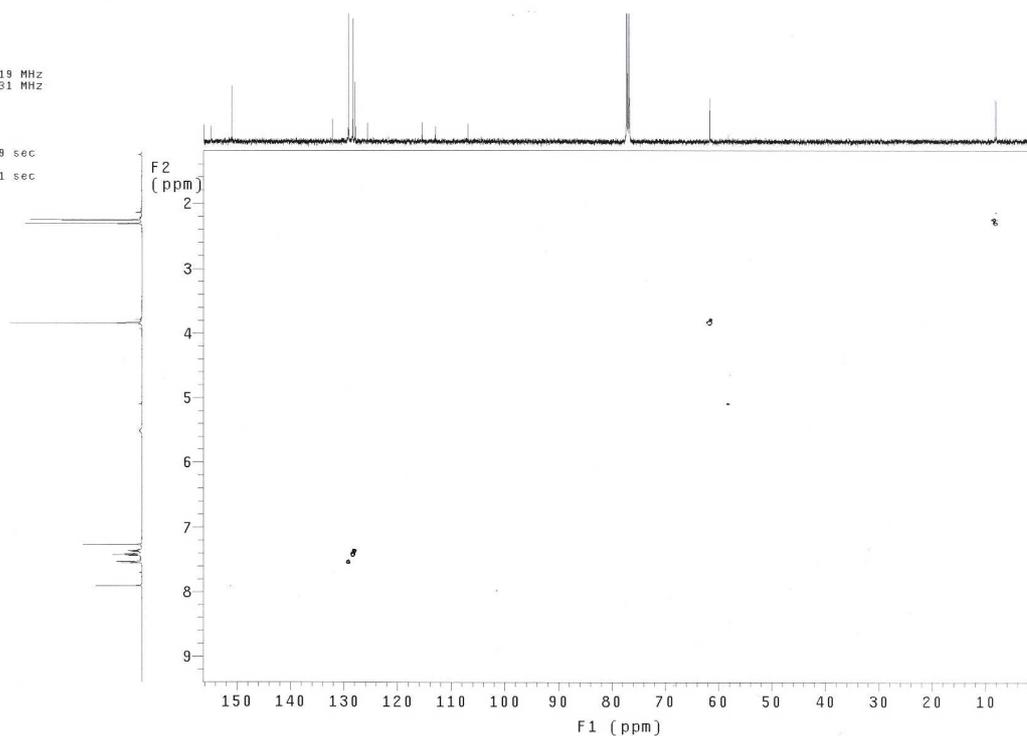




Figure S2.1.

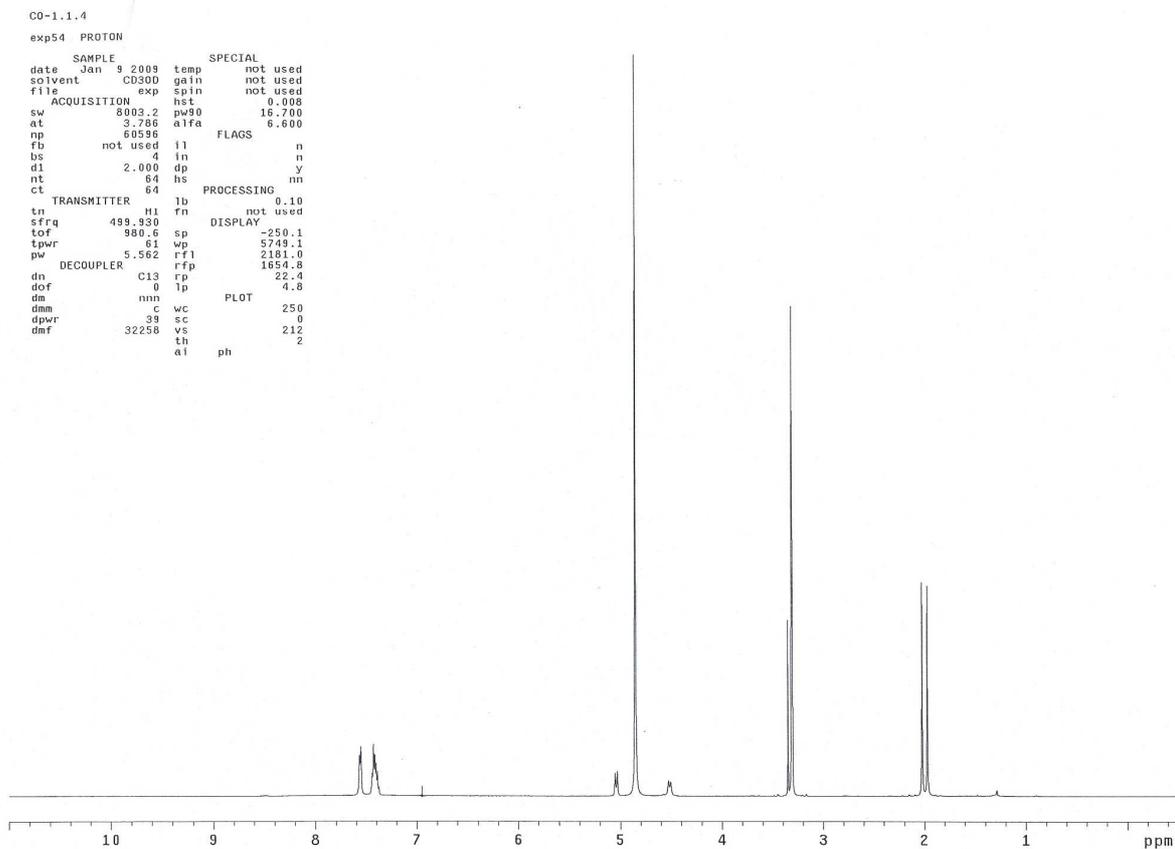
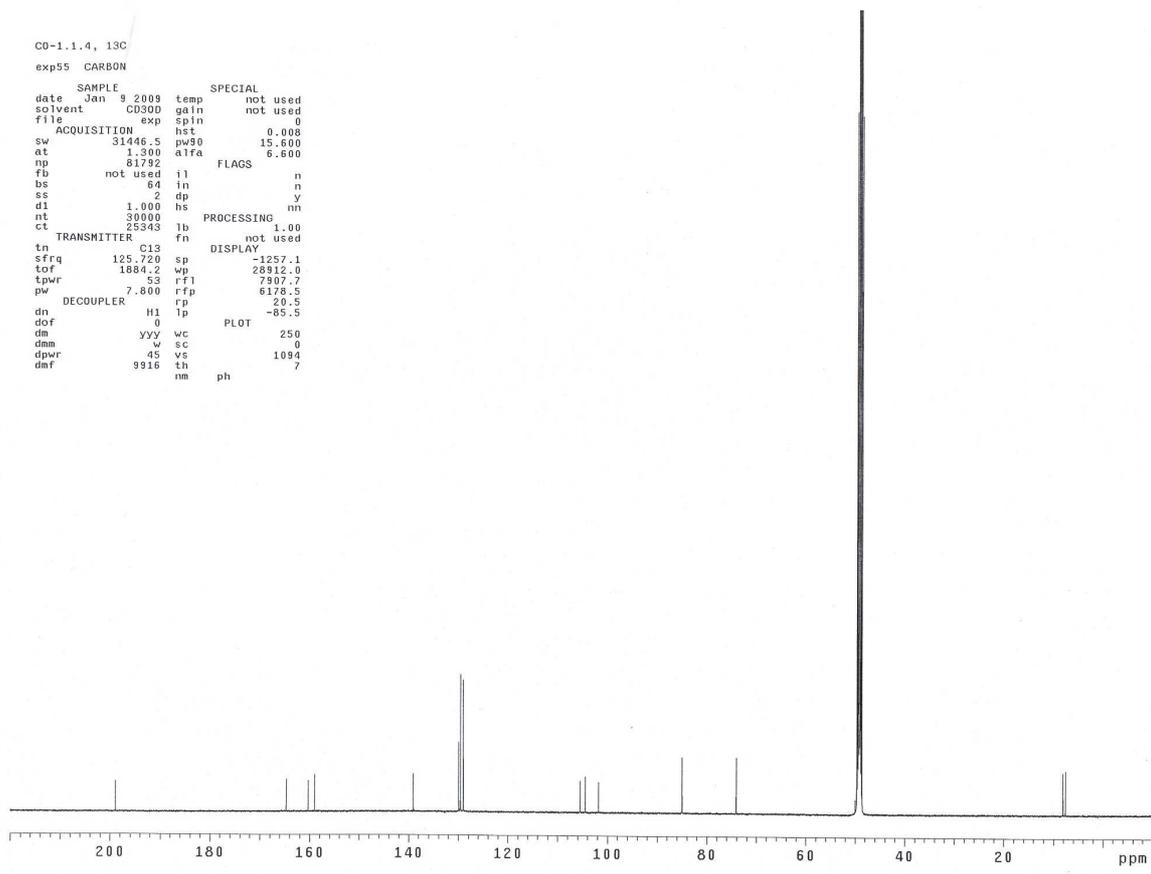
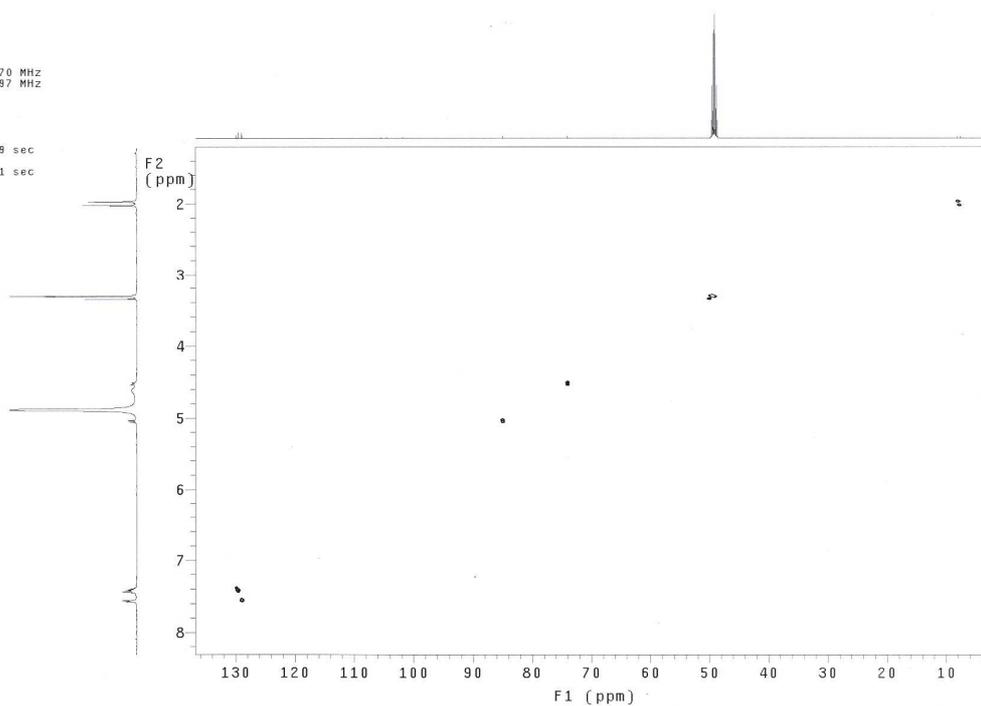


Figure S2.2.



**Figure S2.3.**

CO-1.1.4  
Data Collected on:  
kjui500-inova500  
Archive directory:  
/export/home/vnmr1/vnmrsys/data  
Sample directory:  
File: gHSQC  
Pulse Sequence: gHSQC  
Solvent: CD300  
User: 1-10-87  
Relax. delay 1.000 sec  
Acq. time 0.150 sec  
Width 6498.8 Hz  
2D Width 21367.5 Hz  
64 repetitions  
2 x 128 increments  
OBSERVE H1, 499.9264170 MHz  
DECOUPLE C13, 125.7180197 MHz  
Power 41 dB  
on during acquisition  
off during delay  
W40\_sw modulated  
DATA PROCESSING  
Gauss apodization 0.069 sec  
F1 DATA PROCESSING  
Gauss apodization 0.011 sec  
F1 size 2048 x 2048  
Total time 3 min



**Figure S2.4.**

C0-1.1.4  
Data Collected on:  
Kjui500-inova500  
Archive directory:  
/export/home/vnmr1/vnmrsys/data  
Sample directory:  
File: gHMBC  
Pulse Sequence: gHMBC  
Solvent: CD3OD  
User: i-14-87  
Relax. delay 1.000 sec  
Acq. time 9.150 sec  
Width 6498.8 Hz  
2D Width 30165.9 Hz  
64 repetitions  
400 increments  
OBSERVE H1, 499.9264170 MHz  
DATA PROCESSING  
Sine bell 0.075 sec  
F1 DATA PROCESSING  
Sine bell 0.007 sec  
FT size 2048 x 2048  
Total time 3 min

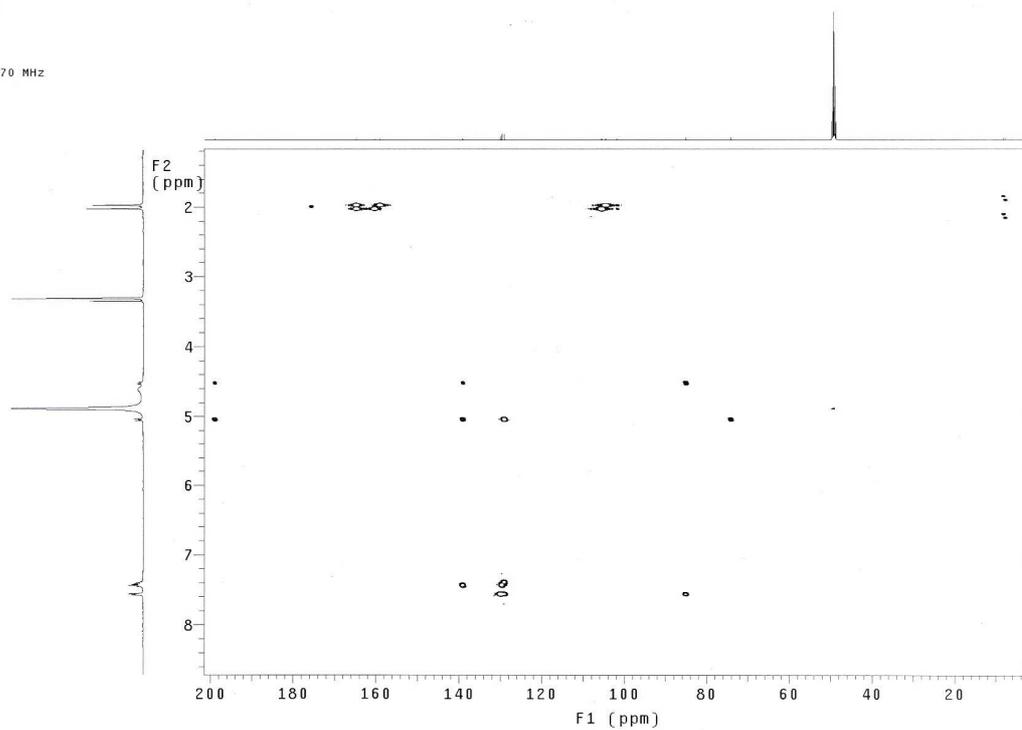


Figure S3.1.

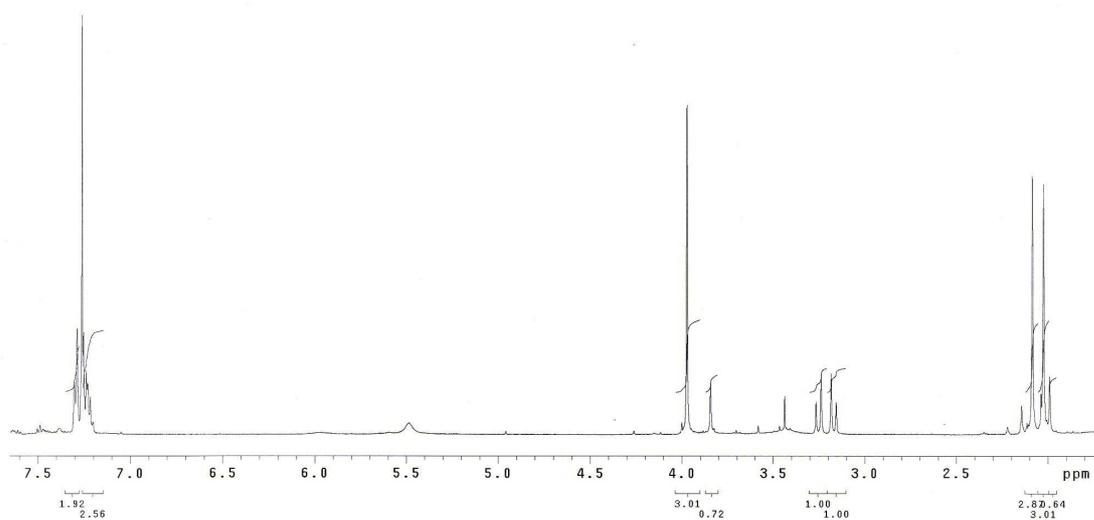
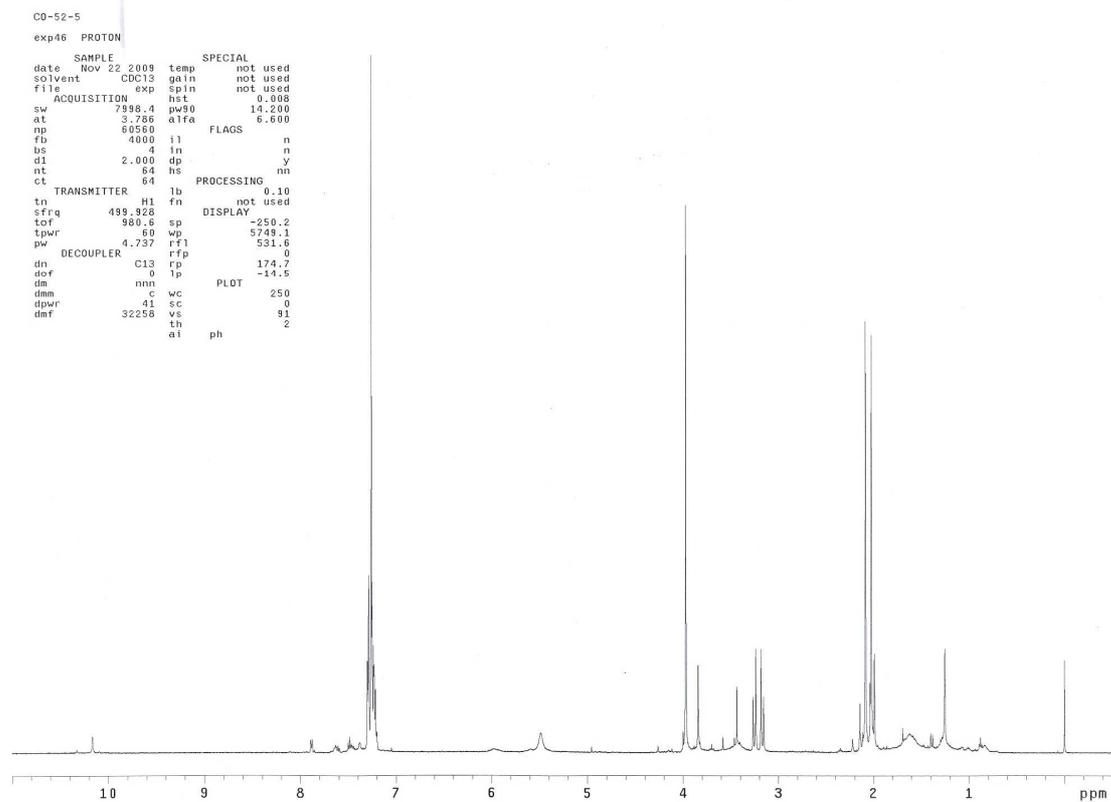
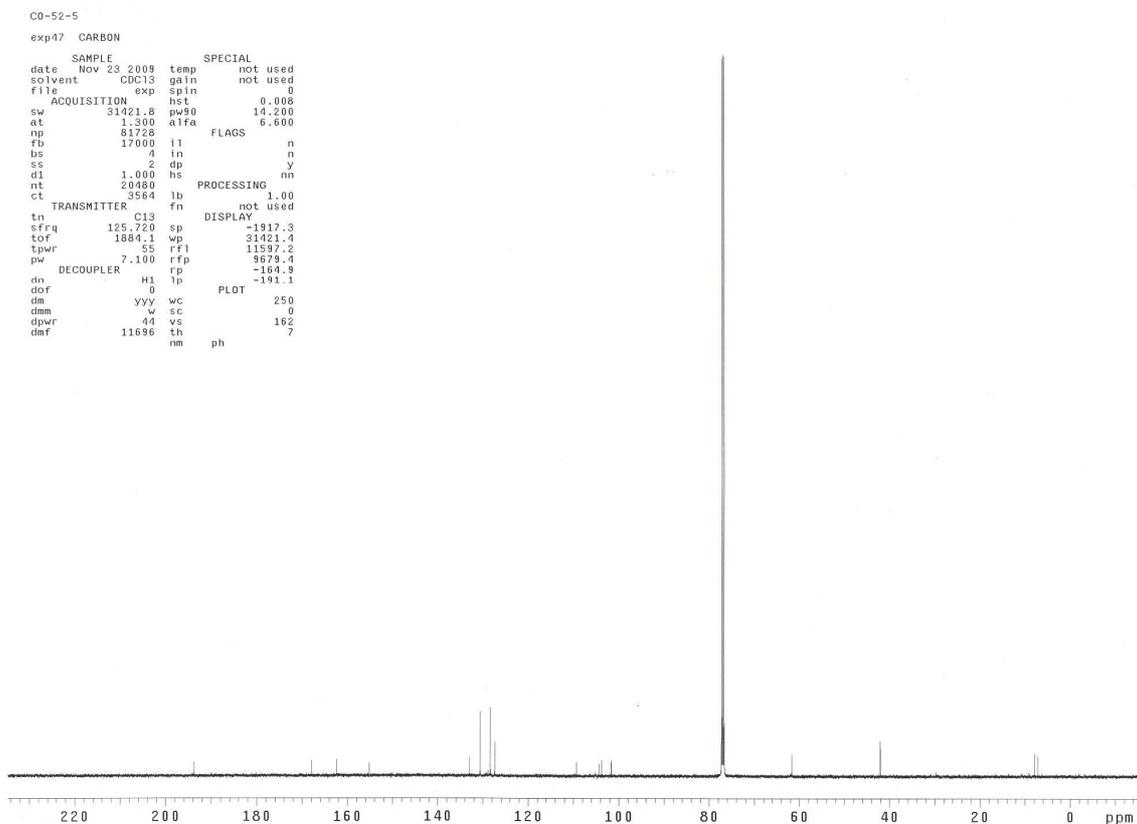
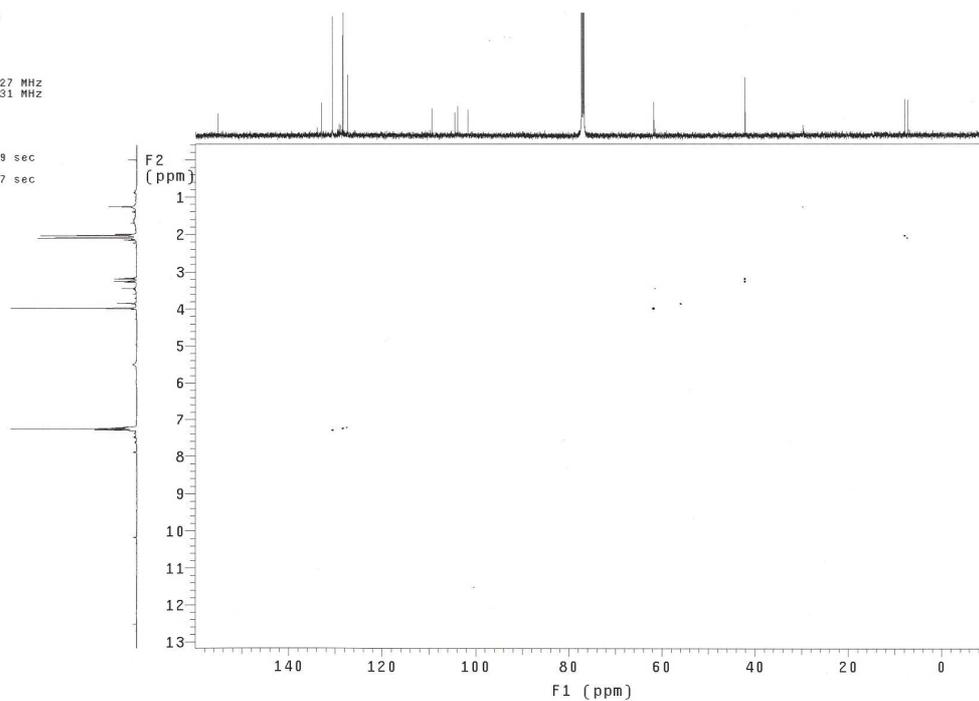


Figure S3.2.



**Figure S3.3.**

00-5-2-5  
Data Collected on:  
NMR500K3-inova500  
Archive directory:  
/export/home/vnmr1/vnmrsys/data  
Sample directory:  
File: gHSQC  
Pulse Sequence: gHSQC  
Solvent: CDCl3  
Temp. 25.0 C / 298.1 K  
User: 1-14-87  
Relax. delay 1.000 sec  
Acq. time 0.150 sec  
Width 6792.9 Hz  
2D Width 21367.5 Hz  
32 repetitions  
2 x 200 increments  
OBSERVE H1, 499.9244527 MHz  
DECOUPLE C13, 125.7155231 MHz  
Power 50 dB  
on during acquisition  
off during delay  
W40\_triple modulated  
DATA PROCESSING  
Gauss apodization 0.069 sec  
F1 DATA PROCESSING  
Gauss apodization 0.017 sec  
F1 size 2048 x #096  
Total time 3 min



**Figure S3.4.**

CO-5-2-5

Data Collected on:  
NMR500KJ-1nova500  
Archive directory:  
/export/home/vnmr1/vnmrsys/data  
Sample directory:

File: gHMBC

Pulse Sequence: gHMBC  
Solvent: CDCl3  
Temp: 25.0 C / 298.1 K  
User: 1-14-87

Relax. delay 1.000 sec  
Acq. time 0.150 sec  
Width 6792.9 Hz  
ZD Width 30165.9 Hz  
64 repetitions  
400 increments  
OBSERVE F1, 499.9244527 MHz  
DATA PROCESSING  
Sine bell 0.075 sec  
F1 DATA PROCESSING  
Sine bell 0.027 sec  
FT size 2048 x 8192  
Total time 3 min

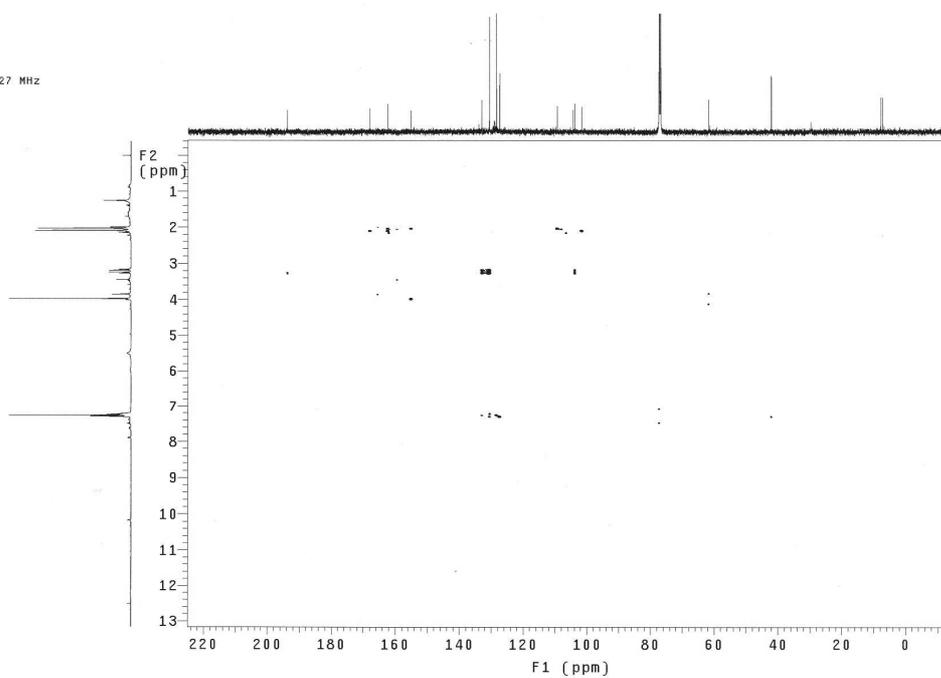


Figure S4.1.

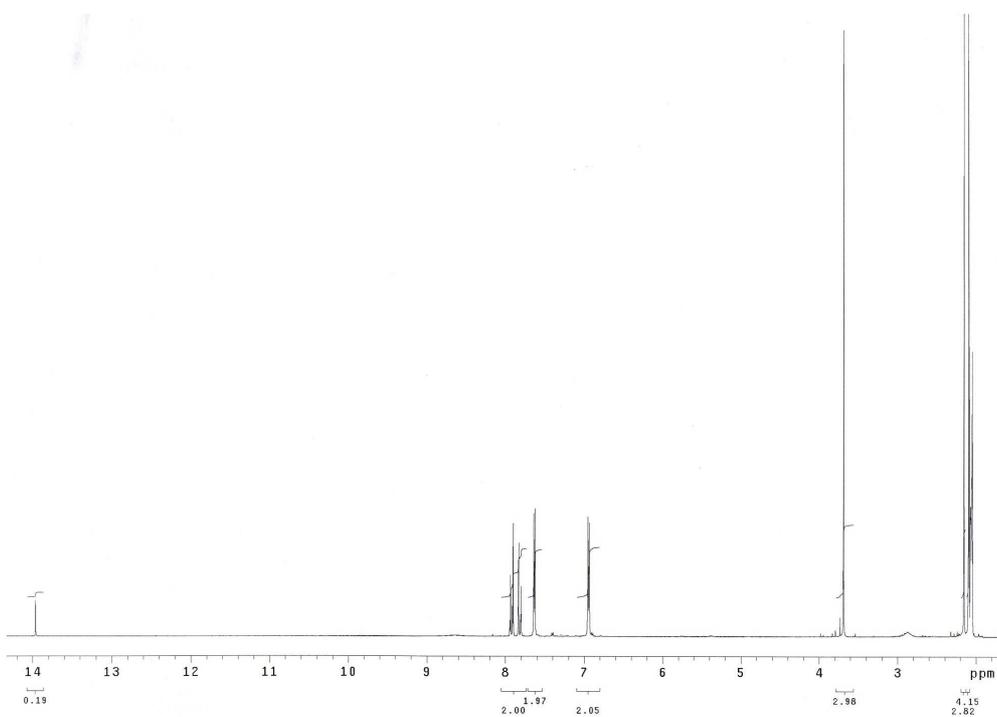
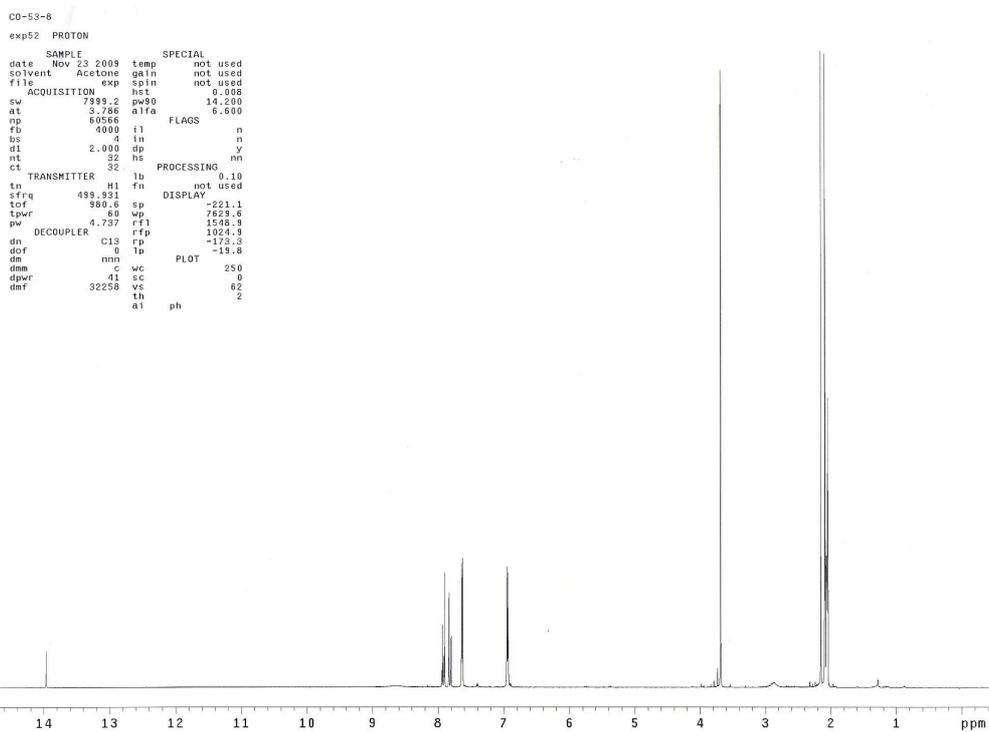
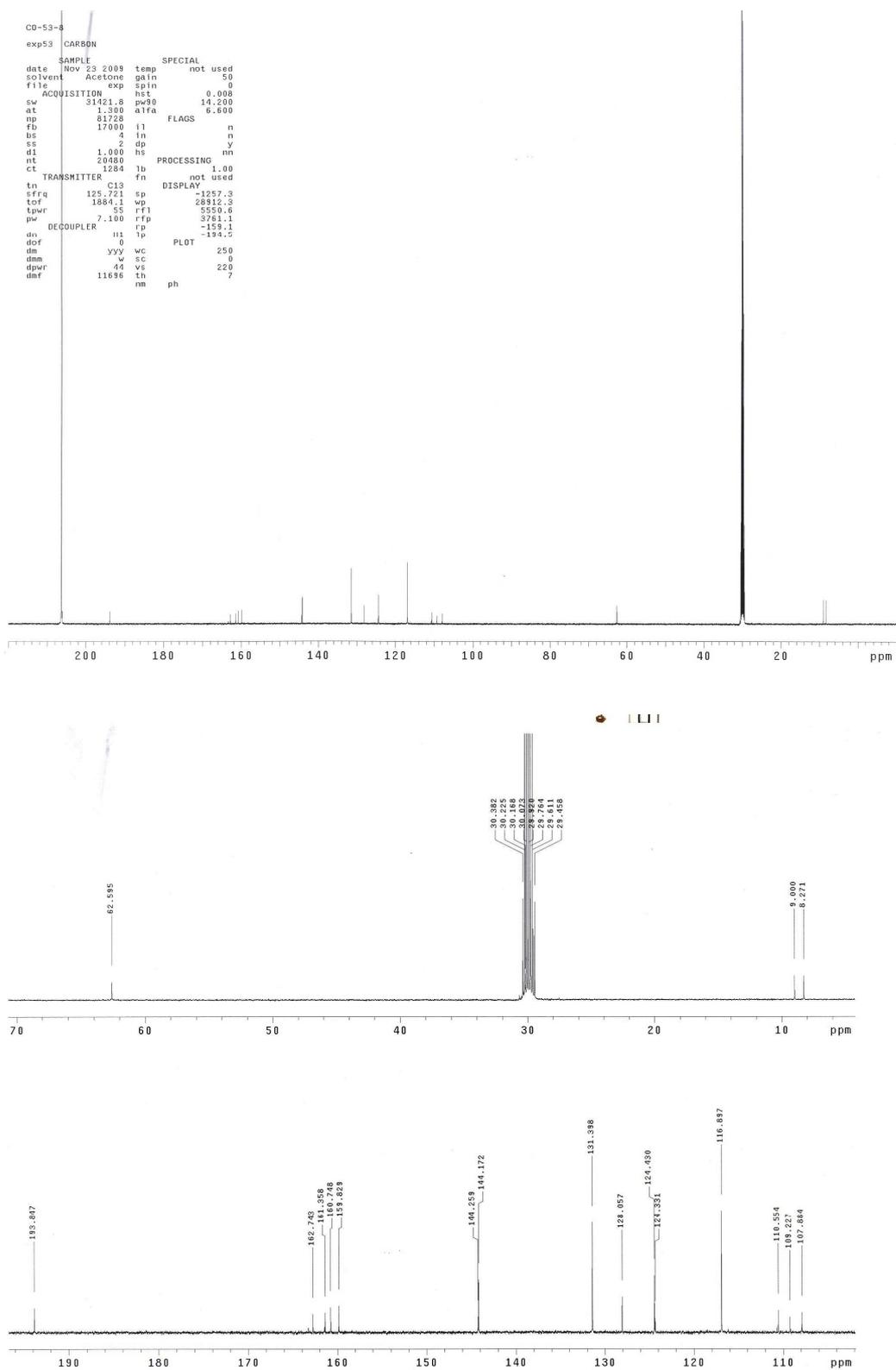


Figure S4.2.



**Figure S4.3.**

CO-5.3.8

Data Collected on:  
Kjui500-inova500  
Archive directory:  
/export/home/vmmr1/vmmr1sys/data  
Sample directory:

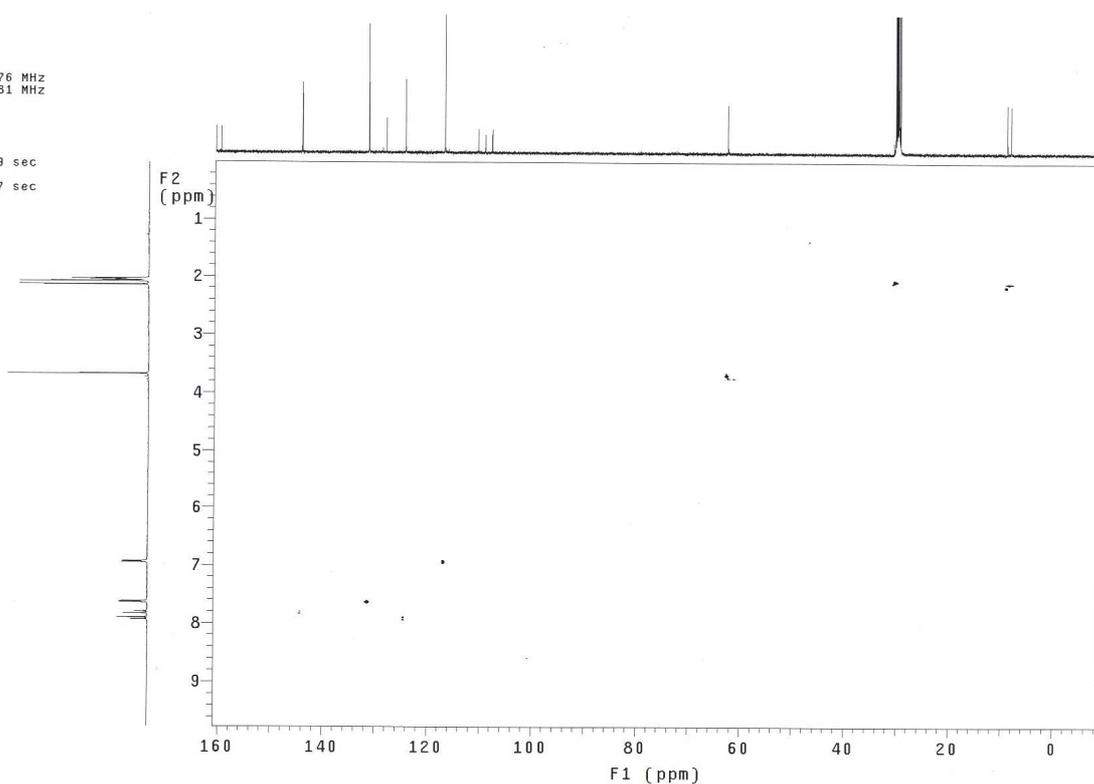
File: gHSQC

Pulse Sequence: gHSQC

Solvent: Acetone

User: 1-14-87

Relax. delay 1.000 sec  
Acq. time 0.150 sec  
Width 4881.6 Hz  
2D Width 21367.5 Hz  
16 repetitions  
2 x 200 increments  
OBSERVE H1, 499.9270476 MHz  
DECOUPLE C13, 125.7161781 MHz  
Power 50 dB  
on during acquisition  
off during delay  
W40\_triple modulated  
DATA PROCESSING  
Gauss apodization 0.069 sec  
F1 DATA PROCESSING  
Gauss apodization 0.017 sec  
FT size 2048 x 4096  
Total time 3 min



**Figure S4.4.**

CO-5.3.8

Data Collected on:  
kju1500-inova500  
Archive directory:  
/export/home/vnmr1/vnmrsys/data  
Sample directory:

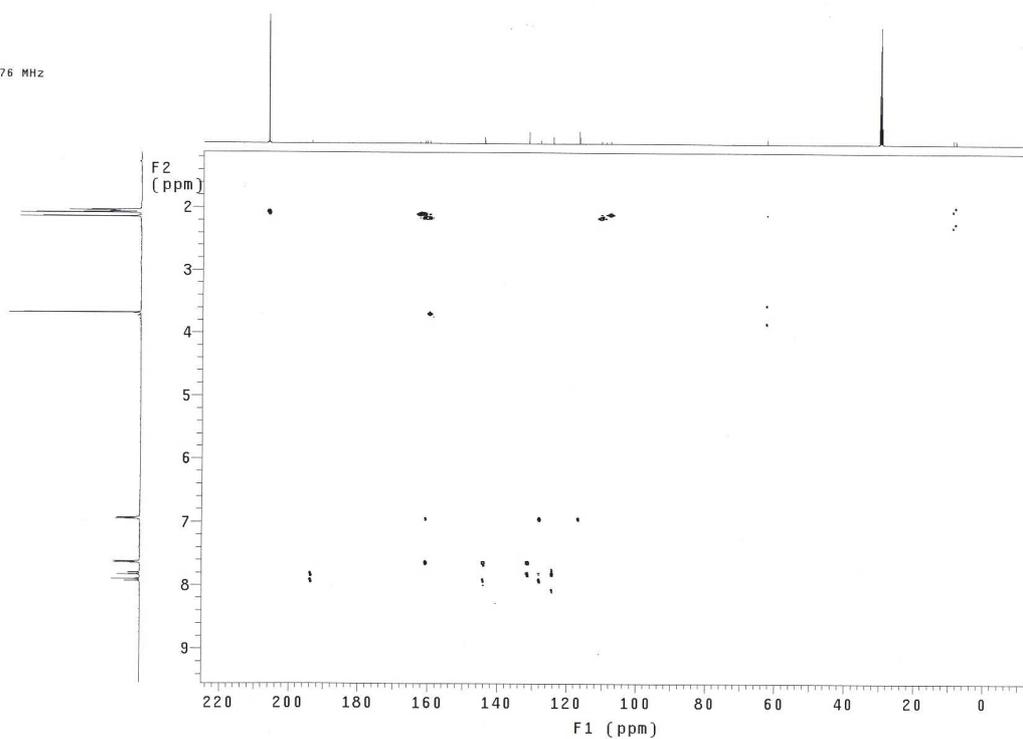
File: gHMBC

Pulse Sequence: gHMBC

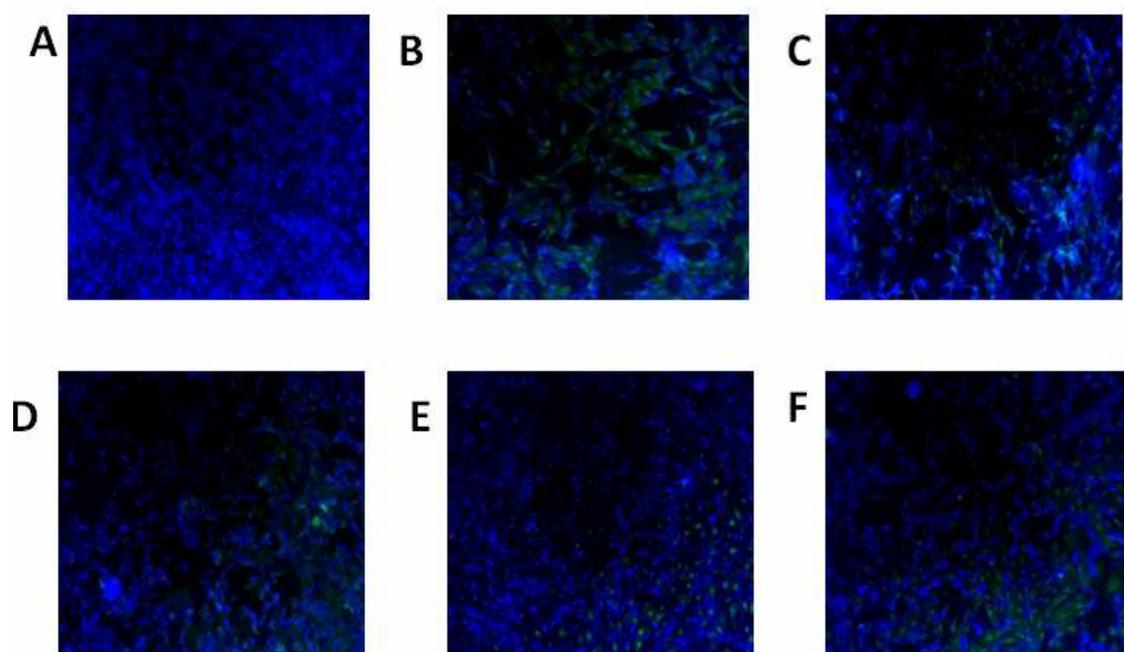
Solvent: Acetone

User: 1-14-87

Relax. delay 1.000 sec  
Acq. time 0.150 sec  
Width 4881.8 Hz  
2D Width 30165.9 Hz  
32 repetitions  
400 increments  
OBSERVE H1, 499.9270476 MHz  
DATA PROCESSING  
Sine bell 0.075 sec  
F1 DATA PROCESSING  
Sine bell 0.027 sec  
FT size 2048 x 8192  
Total time 3 min



**Figure S5.**



**Figure S6.**

