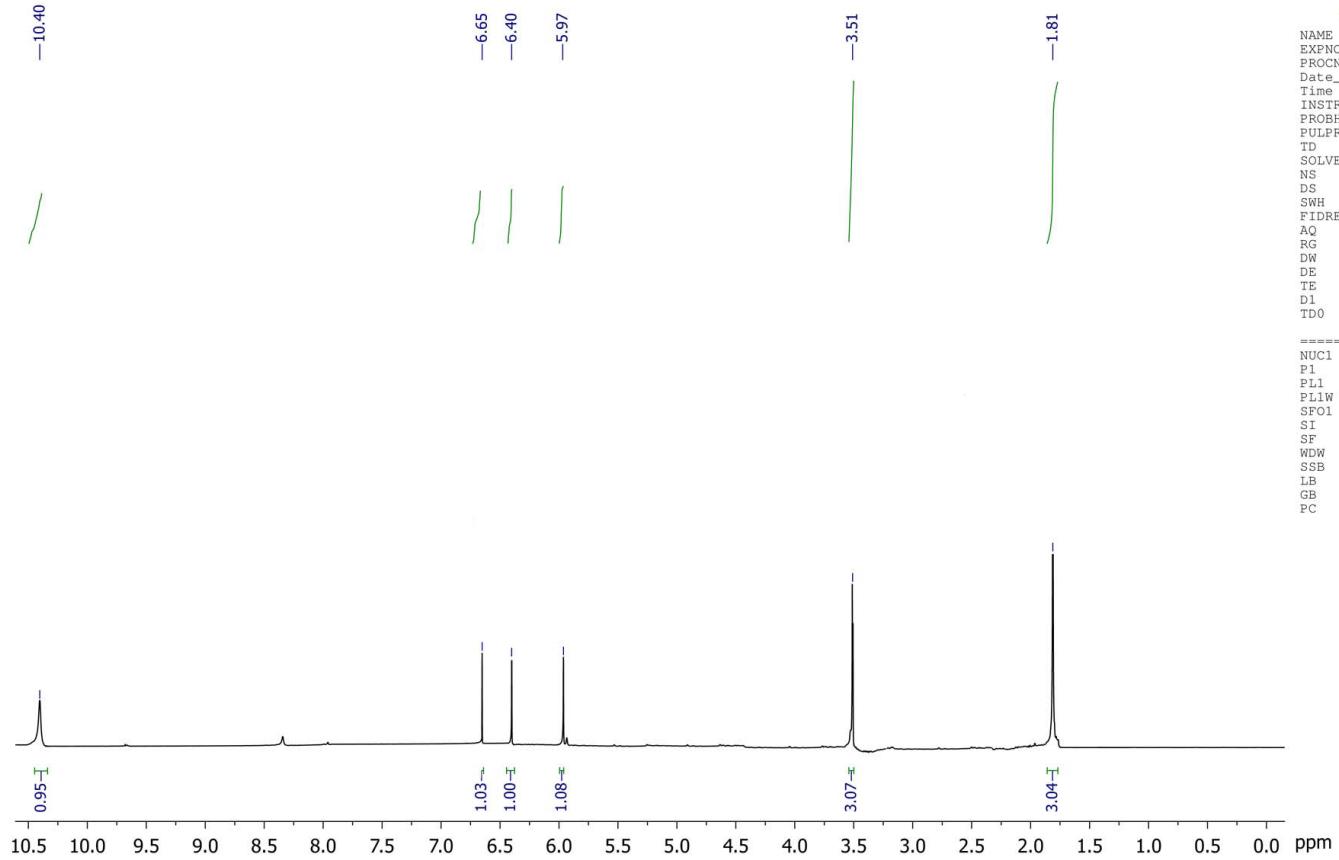
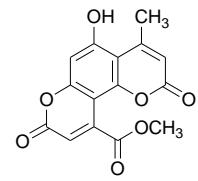


## Supporting Information

### **Preparation, characterization and catalytic application of nano- $\text{Fe}_3\text{O}_4@\text{SiO}_2@(\text{CH}_2)_3\text{OCO}_2\text{Na}$ as a novel basic magnetic nanocatalyst for the synthesis of new pyranocoumarin derivatives**

Hamideh Mohamadi Tanuraghaj and Mahnaz Farahi\*

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[farahimb@yu.ac.ir](mailto:farahimb@yu.ac.ir)

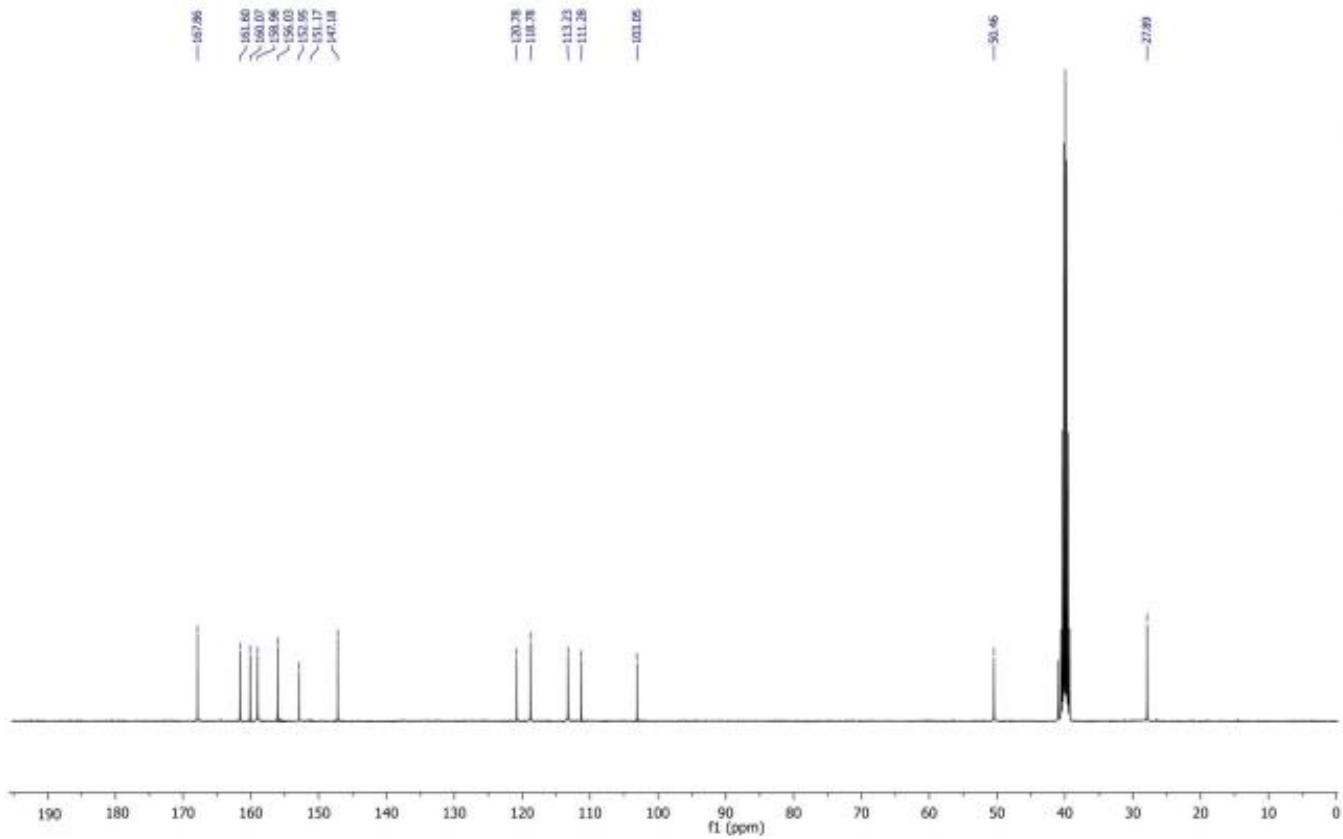
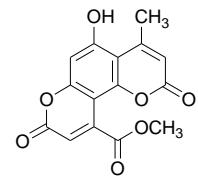


```

NAME Yasooj UN
EXPNO 919
PROCNO 1
Date_ 20170217
Time 9.42
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 40
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 40.3
DW 62,400 usec
DE 6.50 usec
TE 293.7 K
D1 4.0000000 sec
TDO0 1

===== CHANNEL f1 =====
NUC1 1H
P1 14.00 usec
PL1 -2.00 dB
PL1W 11.86359406 W
SF01 400.2236020 MHz
SI 32768
SF 400.2200000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

```



**BRUKER**

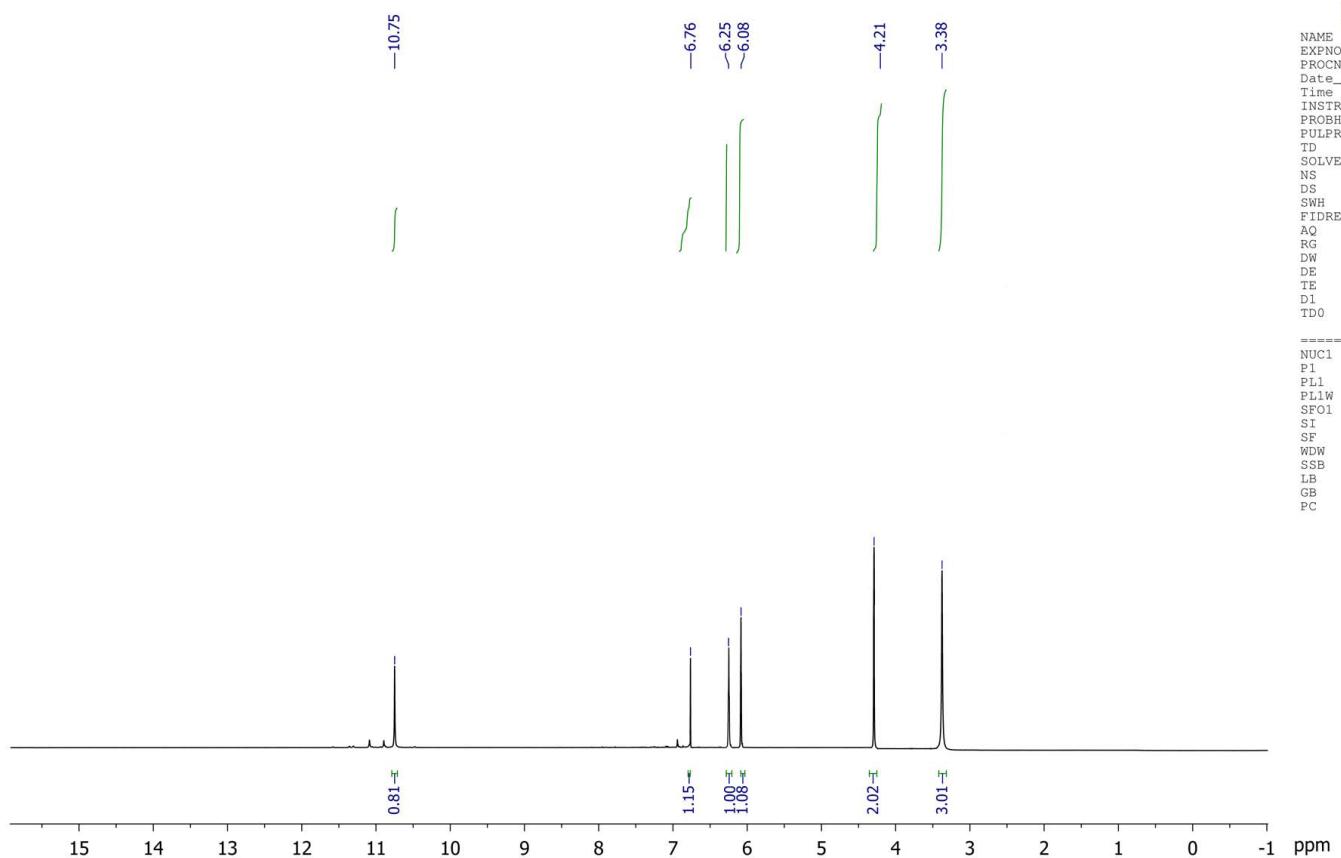
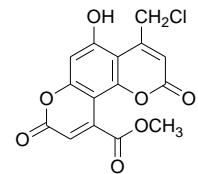
NAME Yaqoob\_1H  
 EXPNO 1000  
 PROBHD 1  
 Date\_ 20170629  
 Time 21:58  
 INSTRUM spect  
 PROBHD 5 mm PABBO BB-  
 PULPROG xpg30  
 TD 65536  
 SOLVENT CDCl3  
 MS 8192  
 DS 0  
 SWR 35714.385 Hz  
 FIDRES 0.544557 Hz  
 AQ 0.3175540 sec  
 RG 2050  
 DW 14.000 usec  
 DE 6.0 usec  
 TE 294.7 K  
 D1 1.0000000 sec  
 D11 0.0300000 sec  
 TQD 1

\*\*\*\*\* CHANNEL f1 \*\*\*\*\*

NUC1	13C
P1	9.00 usec
P1L	-0.90 dB
P1LW	42.22801935 W
SPO1	100.4479788 MHz

\*\*\*\*\* CHANNEL f2 \*\*\*\*\*

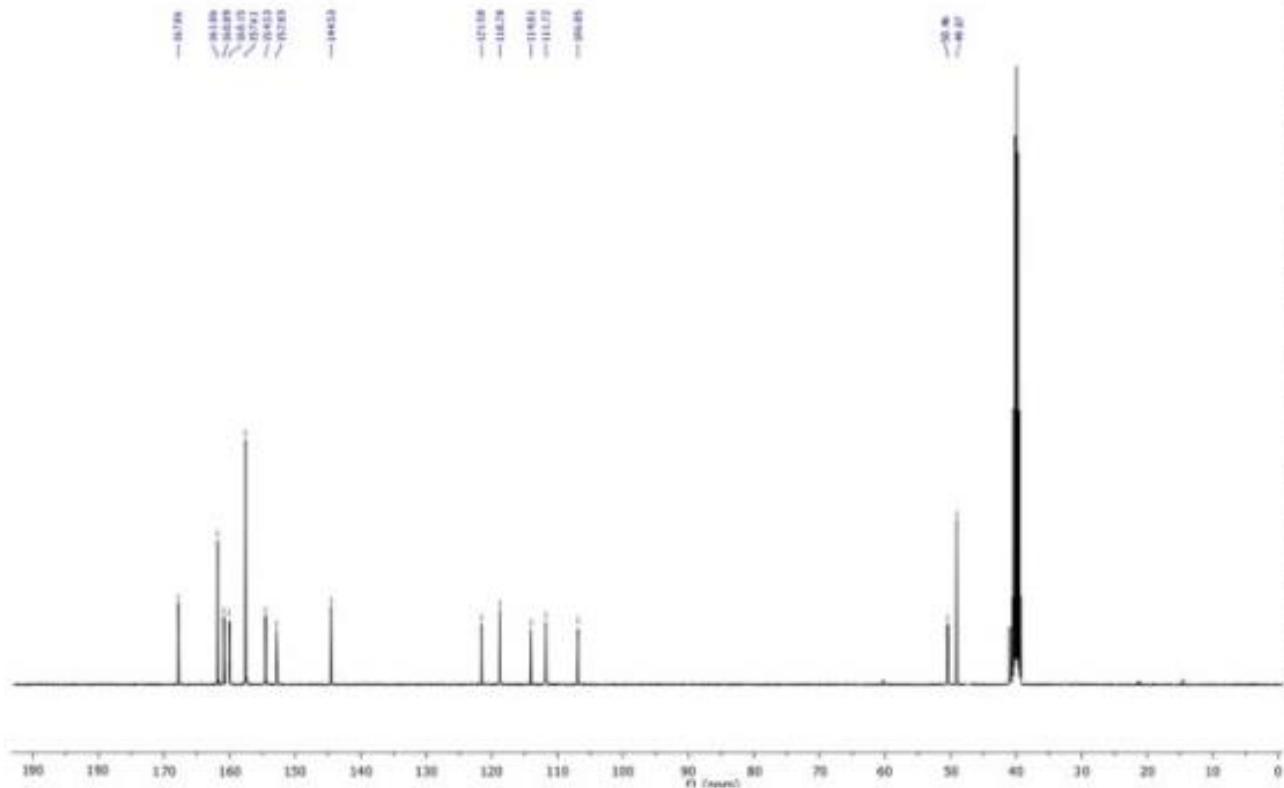
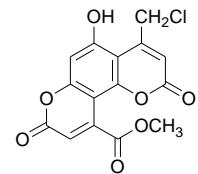
CPRFPG2	wait10
NUC2	1H
P1D2	90.00 usec
P1L2	-1.00 dB
P1L2	14.16 dB
P1L3	17.90 dB
P1L2N	11.86359406 W
P1L2N	0.28722108 W
P1L3N	0.12139934 W
SPO2	400.2216609 MHz
SI	32768
SF	100.6353930 MHz
WDW	EM
SSB	0
L1	1.00 Hz
GR	0
PC	1.40



```

NAME Yasooj UN
EXPNO 963
PROCNO 1
DATE 20170502
TIME 11.56
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 20
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 161
DW 62.400 usec
DE 6.50 usec
TE 293.9 K
D1 4.0000000 sec
TDO 1

===== CHANNEL f1 =====
NUC1 1H
P1 14.00 usec
PL1 -2.00 dB
PL1W 11.86359406 W
SF01 400.2236020 MHz
SI 32768
SF 400.2200000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
  
```



**BRUKER**

```

NAME      Tanny CM
EXPNO    1000
PROCNO   1
DATE_    20170628
TIME_    21:58
INSTRUM  spect
PROBHD  5 mm PABBO BB-
PULPROG  zgpg32
TD      4096
SWE     35714.288 Hz
FIDRES  0.544937 Hz
AQ      0.9175540 sec
RG      2010
DW      14.000 usec
DE      6.50 usec
TE      294.7 K
D1      1.0000000 sec
D11     0.0300000 sec
TDO      1

```

```

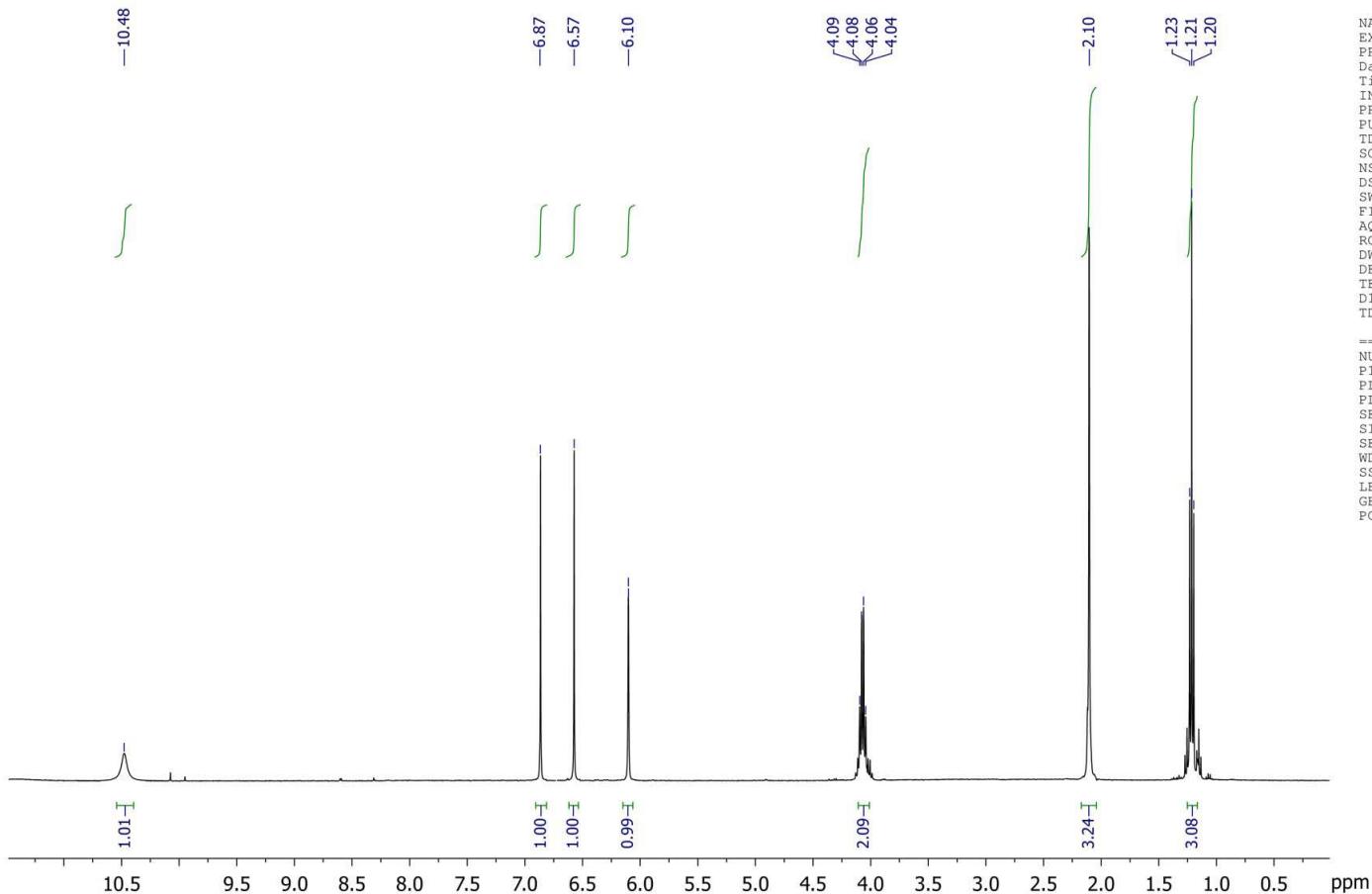
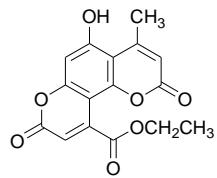
***** CHANNEL F1 *****
HDC1    13C
P1      9.00 usec
PL1    -0.90 dB
PL1W   42.0281695 Hz
SF1L   105.6479784 MHz

```

```

***** CHANNEL F2 *****
CPDPFD2  waltz16
HDC2    1H
PCPD2   90.00 usec
PL2    -2.00 dB
PL12   14.14 dB
PL13   17.90 dB
PL2W   11.85359454 Hz
PL12W   0.28722154 Hz
PL13W   0.12239934 Hz
SF2L   400.2216092 MHz
SI      32768
SF      100.6355990 MHz
WDW
SSB
LB      1.00 Hz
SB
PC      1.40

```

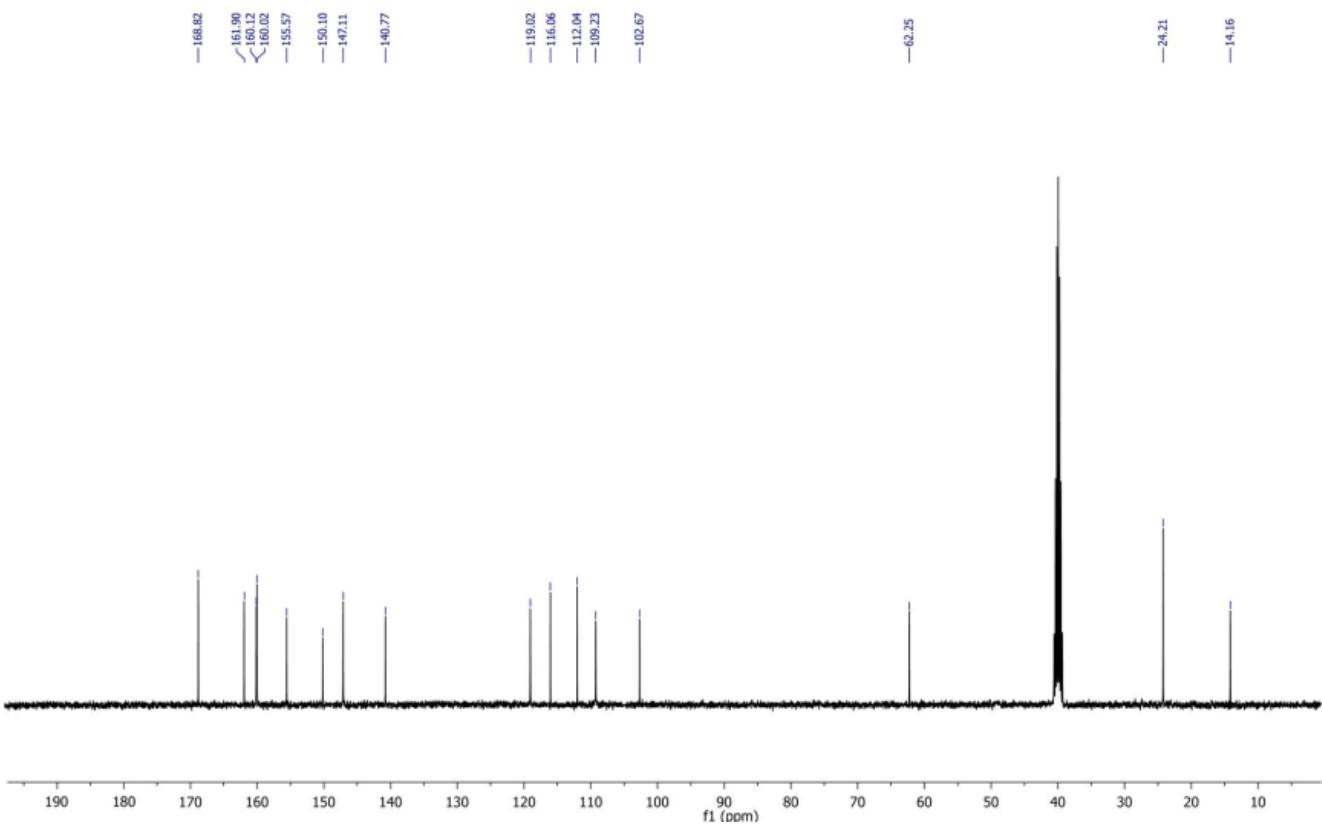
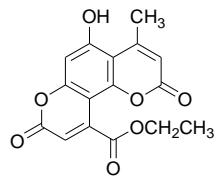


**BRUKER**

NAME Yasooj UN  
 EXPNO 964  
 PROCN0 1  
 Date\_ 20170502  
 Time 12.02  
 INSTRUM spect  
 PROBHD 5 mm PABBO BB-  
 PULPROG zg30  
 TD 65536  
 SOLVENT DMSO  
 NS 20  
 DS 0  
 SWH 8012.820 Hz  
 FIDRES 0.122266 Hz  
 AQ 4.089496 sec  
 RG 161  
 DW 62,400 usec  
 DE 6,50 usec  
 TE 293.9 K  
 D1 4.0000000 sec  
 TDO 1

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

NUC1	1H
PI	14.00 usec
PL1	-2.00 dB
PL1W	11.86359406 W
SFO1	400.2236020 MHz
SI	32768
SF	400.2200000 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

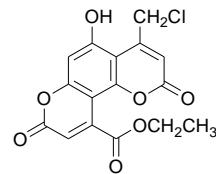
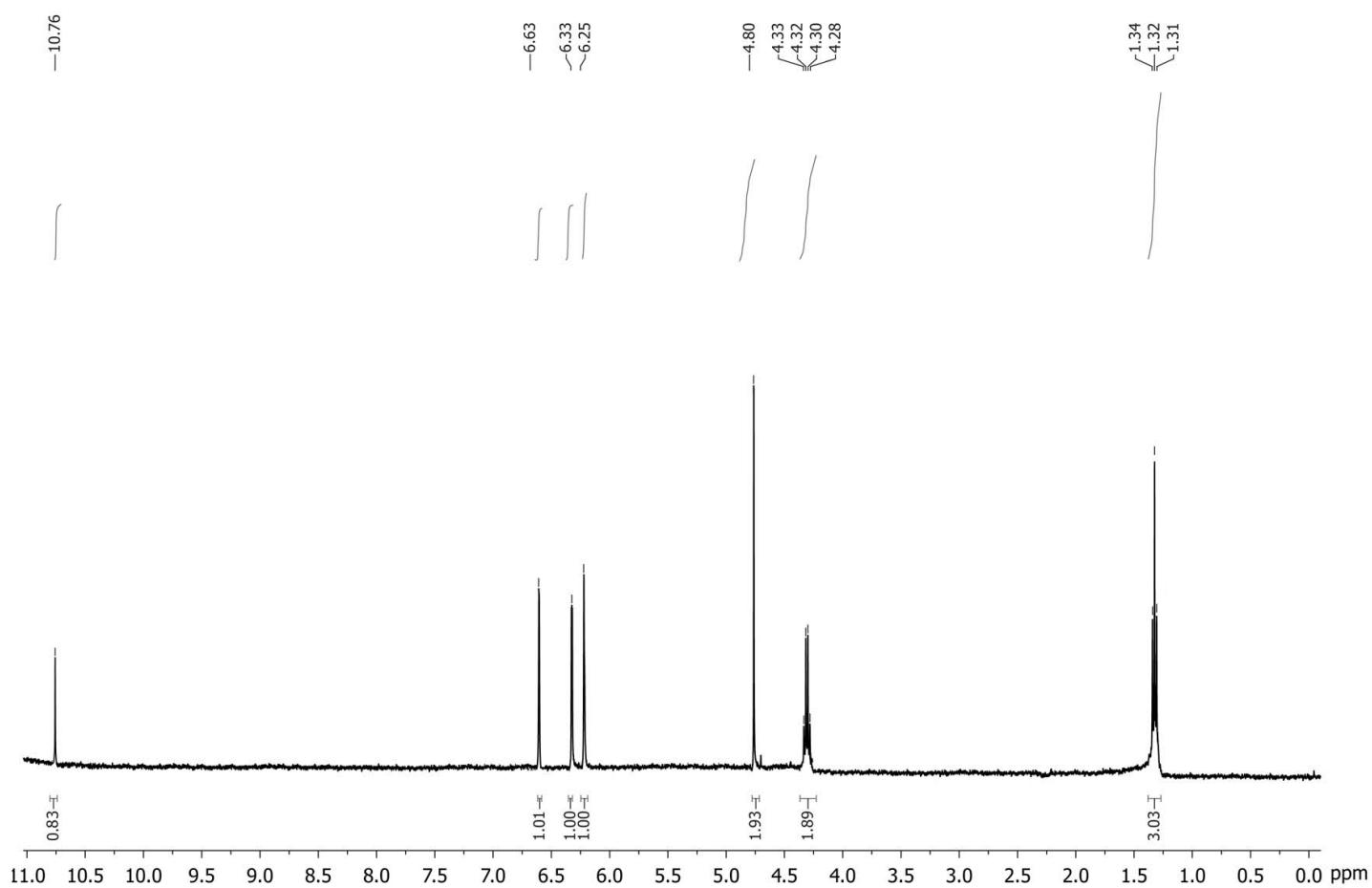


**BRUKER**

NAME Tehran UN  
 EXPNO 642  
 PROCNO 1  
 Date\_ 20170628  
 Time 13.58  
 INSTRUM spect  
 PROBHD 5 mm PABBO BB-  
 PULPROG zgpp3t0  
 TD 65536  
 SOLVENT DMSO  
 NS 200  
 DS 0  
 SWH 35714.285 Hz  
 FIDRES 0.544957 Hz  
 AQ 0.9175540 sec  
 RG 2050  
 DW 14.000 usec  
 DE 6.50 usec  
 TE 294.3 K  
 DI 1.0000000 sec  
 D11 0.03000000 sec  
 TDO 1

===== CHANNEL f1 =====  
 NUC1 13C  
 P1 9.00 usec  
 PLL -0.90 dB  
 PL1W 42.02801895 W  
 SF01 100.6479784 MHz

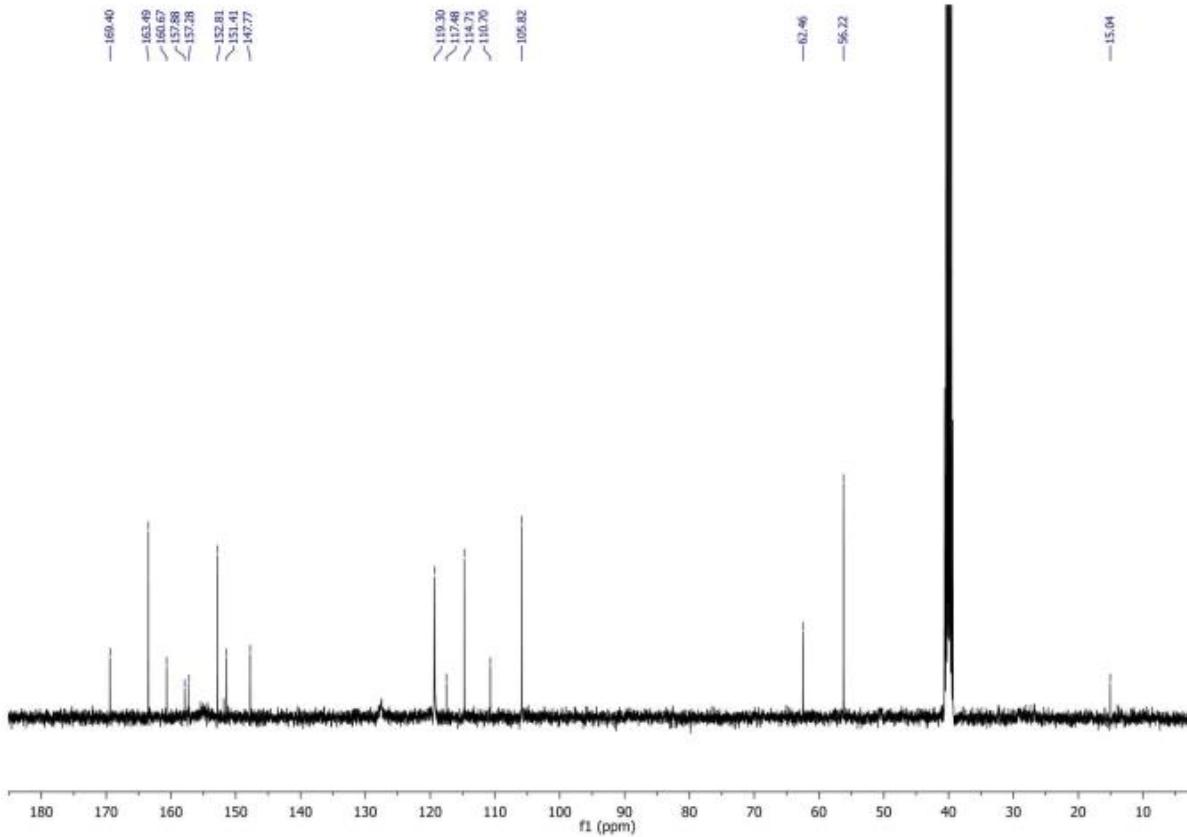
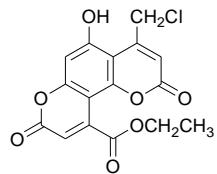
===== CHANNEL f2 =====  
 CPDPFRG2 waltz16  
 NUC2 1H  
 PCPD2 90.00 usec  
 PL2 -2.00 dB  
 PL12 14.48 dB  
 PL13 17.90 dB  
 PL2W 11.86359406 W  
 PL12W 0.26681873 W  
 PL13W 0.12139934 W  
 SF02 400.2216009 MHz  
 SI 32768  
 SF 100.6353990 MHz  
 WDW EM  
 SSB 0  
 LB 1.00 Hz  
 GB 0  
 FC 1.40



NAME Yasooj UN  
 EXPNO 964  
 PROCNO 1  
 Date 20170502  
 Time 12.02  
 INSTRUM spect  
 PROBHD 5 mm PABBO BB-  
 PULPROG zg30  
 TD 65536  
 SOLVENT DMSO  
 NS 20  
 DS 0  
 SWH 8012.820 Hz  
 FIDRES 0.122266 Hz  
 AQ 4.0894966 sec  
 RG 161  
 DW 62.400 usec  
 DE 6.50 usec  
 TE 293.9 K  
 D1 4.0000000 sec  
 TDO 1

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

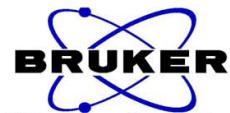
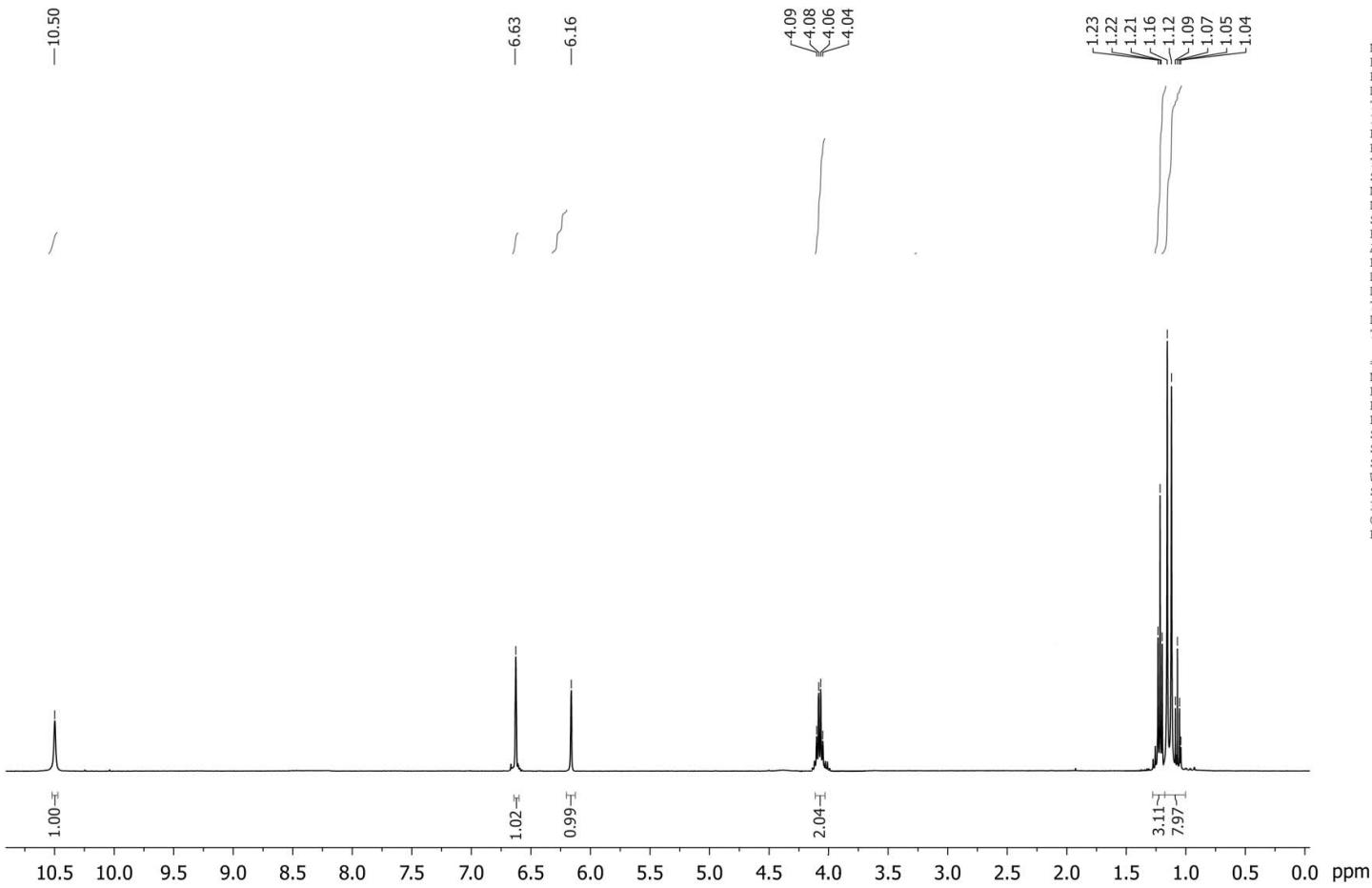
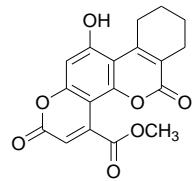
NUC1 1H  
 P1 14.00 usec  
 PL1 -2.00 dB  
 PL1W 11.86359406 W  
 SF01 400.2236020 MHz  
 SI 32768  
 SF 400.2200000 MHz  
 WDW EM  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 PC 1.00



NAME Yaddo UN  
 EXPNO 1002  
 PROBNO 1  
 Date 20170629  
 Time 12.47  
 INSTRUM spect  
 PROBHD S mm PARBO BB-  
 PULPROG zgpp30  
 TD 65536  
 SOLVENT DMSO  
 MS 900  
 DS 0  
 SWH 35714.286 Hz  
 FIDRES 0.94357 Hz  
 AQ 0.9175540 sec  
 RG 2050  
 DW 14.000 usec  
 DE 6.50 usec  
 TE 255.0 K  
 D1 1.0000000 sec  
 D11 0.0300000 sec  
 TD0 1

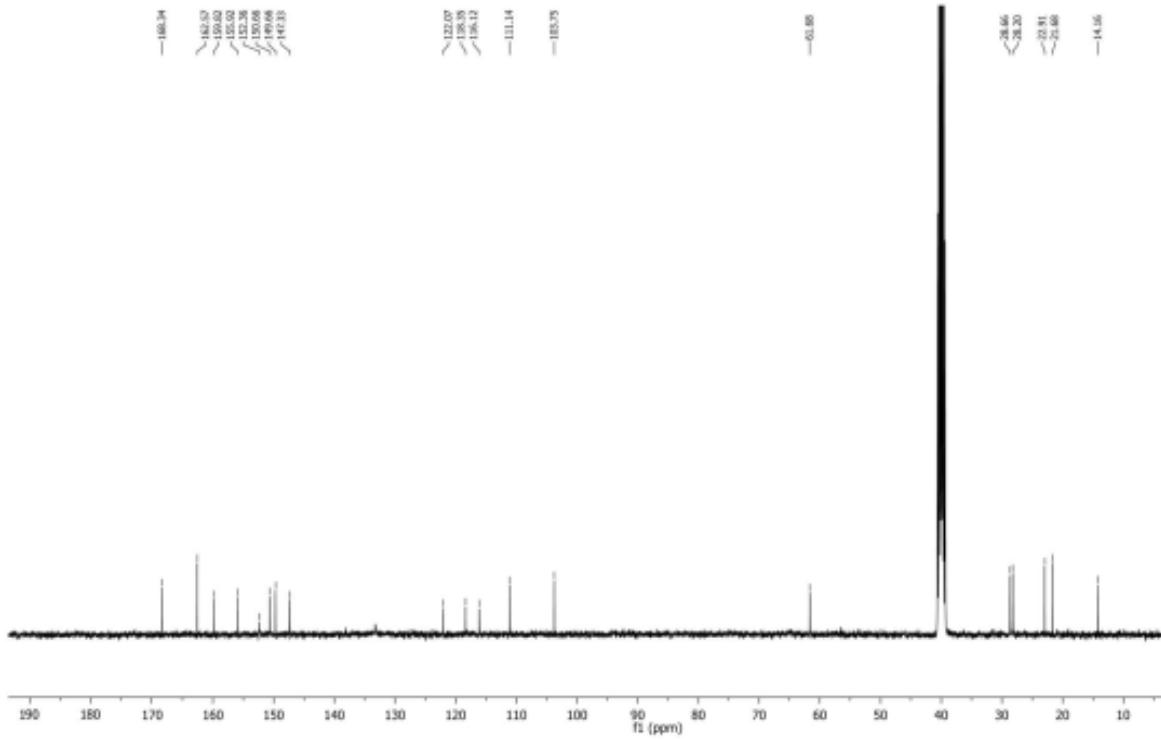
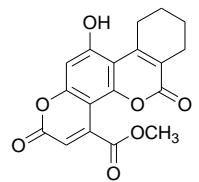
\*\*\*\*\* CHANNEL f1 \*\*\*\*\*  
 NUC1 13C  
 F1 9.00 usec  
 PLL -0.90 dB  
 PLLW 42.02801895 W  
 SF01 100.6479784 MHz

\*\*\*\*\* CHANNEL f2 \*\*\*\*\*  
 CPDPBG2 waltz16  
 NUC2 1H  
 PCPD2 90.00 usec  
 PL2 -2.00 dB  
 PLL2 14.16 dB  
 PLL3 17.90 dB  
 PLLW 11.86359406 W  
 PLL2W 0.28722104 W  
 PLL3W 0.12139934 W  
 SF02 400.2216009 MHz  
 SI 32768  
 SF 100.6353990 MHz  
 MDM 0  
 SSB 0  
 LB 1.00 Hz  
 GB 0  
 PC 1.40



NAME Yasooj UN  
EXPNO 891  
PROCNO 1  
Date\_ 20161226  
Time\_ 17.07  
INSTRUM spect  
PROBHD 5 mm PABBO BB-  
PULPROG zg30  
TD 65536  
SOLVENT DMSO  
NS 20  
DS 0  
SWH 8012.820 Hz  
FIDRES 0.122266 Hz  
AQ 4.0894966 sec  
RG 203  
DW 62.400 usec  
DE 6.50 usec  
TE 293.8 K  
D1 4.0000000 sec  
TD0 1

===== CHANNEL f1 =====  
NUC1 1H  
P1 14.00 usec  
PL1 -2.00 dB  
PL1W 11.86359406 W  
SF01 400.2236020 MHz  
SI 32768  
SF 400.2200000 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00



**BRUKER**

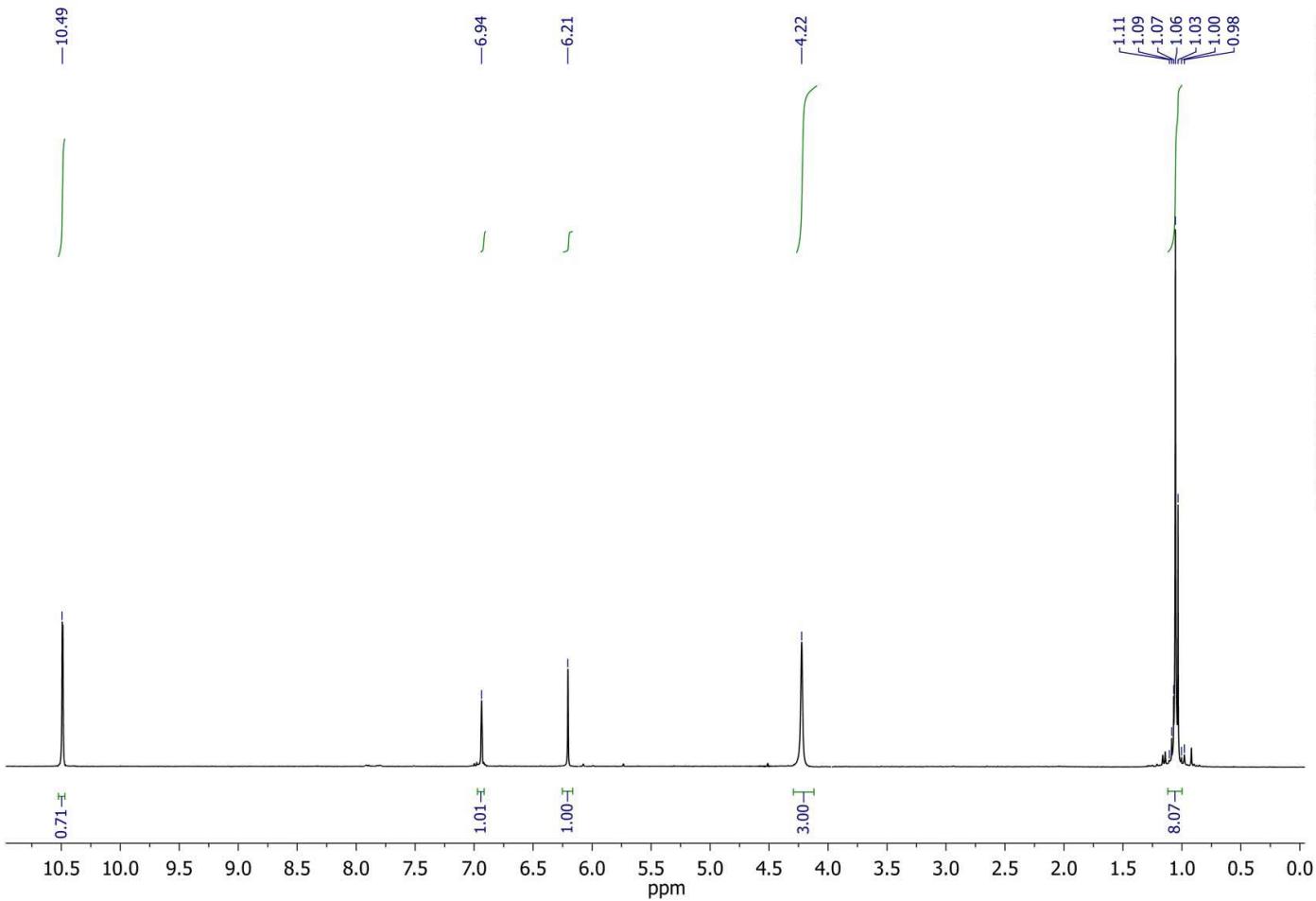
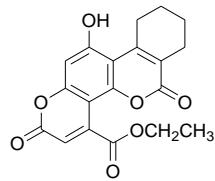
NAME T900\_1N  
EXPNO 900  
PROCNO 1  
DATE 20170105  
TIME 15:32  
INSTRUM ap401t  
PROBTD 5 mm PABBO BBP  
PULPROG zgpg3d  
TD 65536  
SOLVENT DMSO  
NS 8192  
DS 3  
SWH 35714.285 Hz  
FIDRES 0.544957 Hz  
AQ 0.9171568 sec  
RG 1  
DW 14.000 usec  
DE 6.98 usec  
TE 294.2 K  
D1 1.00980000 sec  
D11 0.03980000 sec  
DD 1

CHANNEL F1

NUCL 13C  
F1 13C  
P1 3.03 usec  
PL1 -7.02 dB  
PL1W 42.0281825 Hz  
SFQ1 130.6479794 MHz

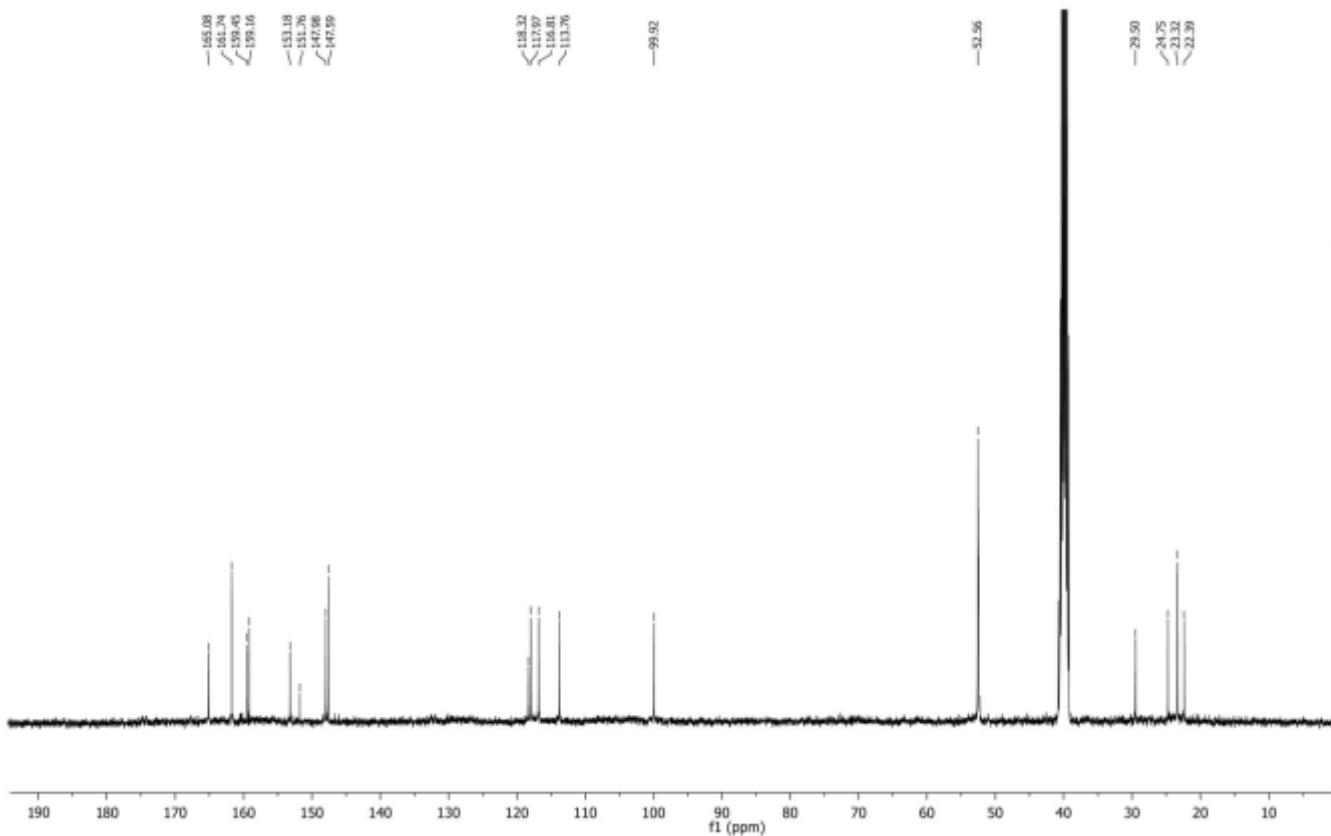
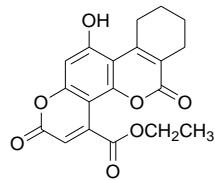
CHANNEL F2

NUCL 1H  
F2 1H  
PCPG2 96.03 usec  
PL2 -2.02 dB  
PL12 14.16 dB  
PL13 17.98 dB  
PL2W 11.89512104 Hz  
PL13W 8.12139934 Hz  
SFQ2 480.2216003 MHz  
SI 32768  
RF 180.6353993 MHz  
RWM 0.00  
SCA 0  
LB 1.00 Hz  
GD 0  
PC 1.00



NAME Yasooj UN  
 EXPNO 892  
 PROCN0 1  
 Date\_ 20161226  
 Time 17.15  
 INSTRUM spect  
 PROBHD 5 mm PABBO BB-  
 PULPROG zg30  
 TD 65536  
 SOLVENT DMSO  
 NS 20  
 DS 0  
 SWH 8012.820 Hz  
 FIDRES 0.122266 Hz  
 AQ 4.0894966 sec  
 RG 203  
 DW 62.400 usec  
 DE 6.50 usec  
 TE 293.8 K  
 D1 4.0000000 sec  
 TDO 1

===== CHANNEL f1 ======  
 NUC1 1H  
 P1 14.00 usec  
 PL1 -2.00 dB  
 PL1W 11.86359406 W  
 SF01 400.2236020 MHz  
 SI 32768  
 SF 400.2200000 MHz  
 WDW EM  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 PC 1.00



**BRUKER**

```

NAME Yaooj UN
EXPNO 920
PROCNO 1
Date_ 20170221
Time 18:20
INSTRUM spect
PROBHD 5 mm PABBO BB
PULPROG zg30
TD 65536
SOLVENT DMso
NS 8192
DS 0
SW0 35714.285 Hz
FIDRES 0.544957 Hz
AQ 0.9175540 sec
RG 2050
DM 14.000 usec
DE 6.50 usec
TE 292.9 K
D1 1.0000000 sec
D11 0.03000000 sec
TD0 1

```

```

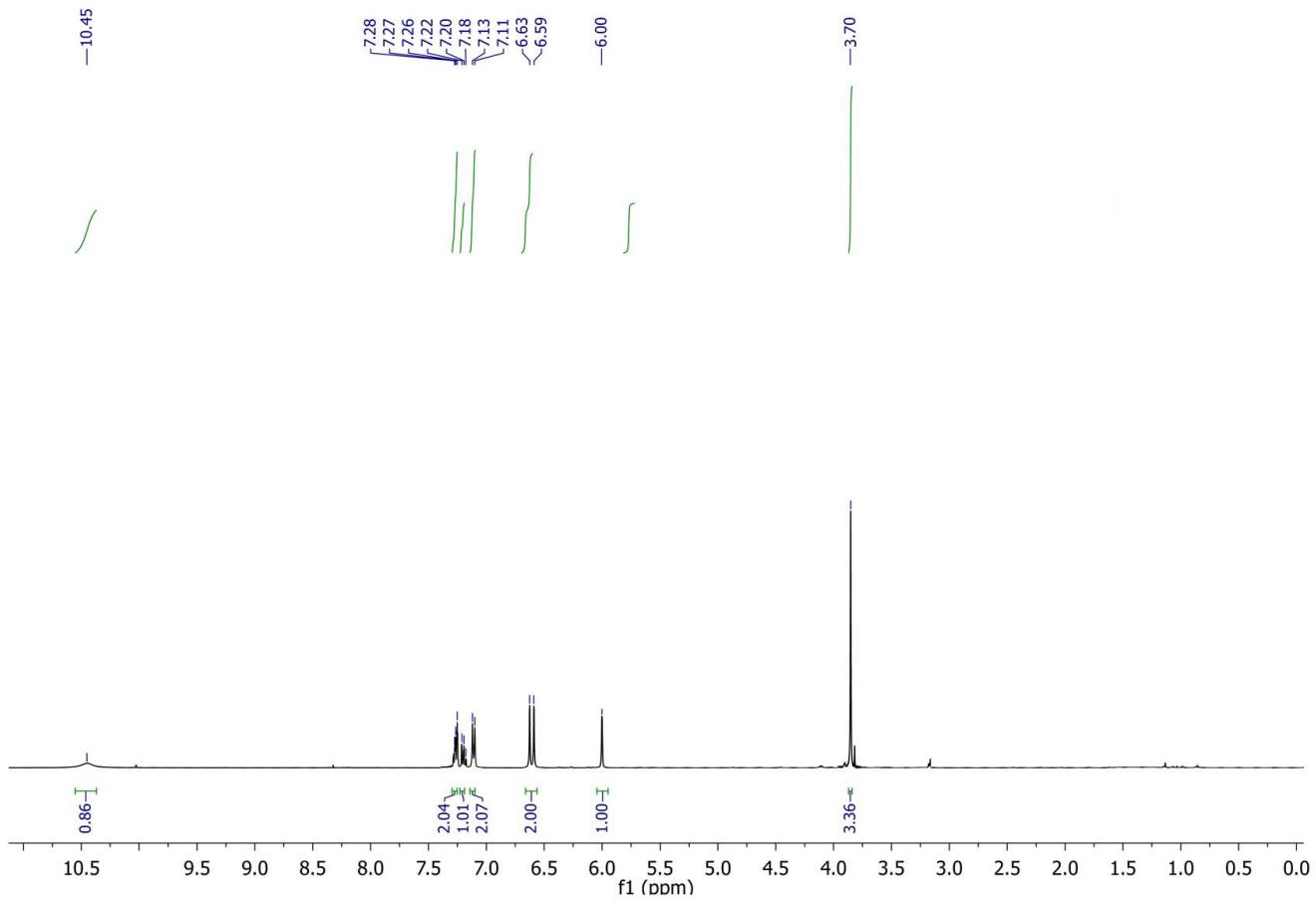
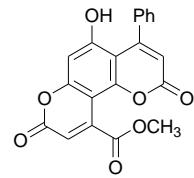
***** CHANNEL f1 *****
NUC1 13C
F1 9.00 usec
PL1 -0.90 dB
PL1W 42.02801895 W
SPO1 100.6479784 MHz

```

```

***** CHANNEL f2 *****
CPDPG2 waltz16
NUC2 1H
PCPD2 90.00 usec
PL2 -2.00 dB
PL2W 14.00 dB
PL3 17.90 dB
PL3W 11.84359406 W
PL2N 0.28732104 W
PL3N 0.12139934 W
SPO2 400.2216009 MHz
SI 32768
SF 100.6353990 MHz
MW 0
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

```



```

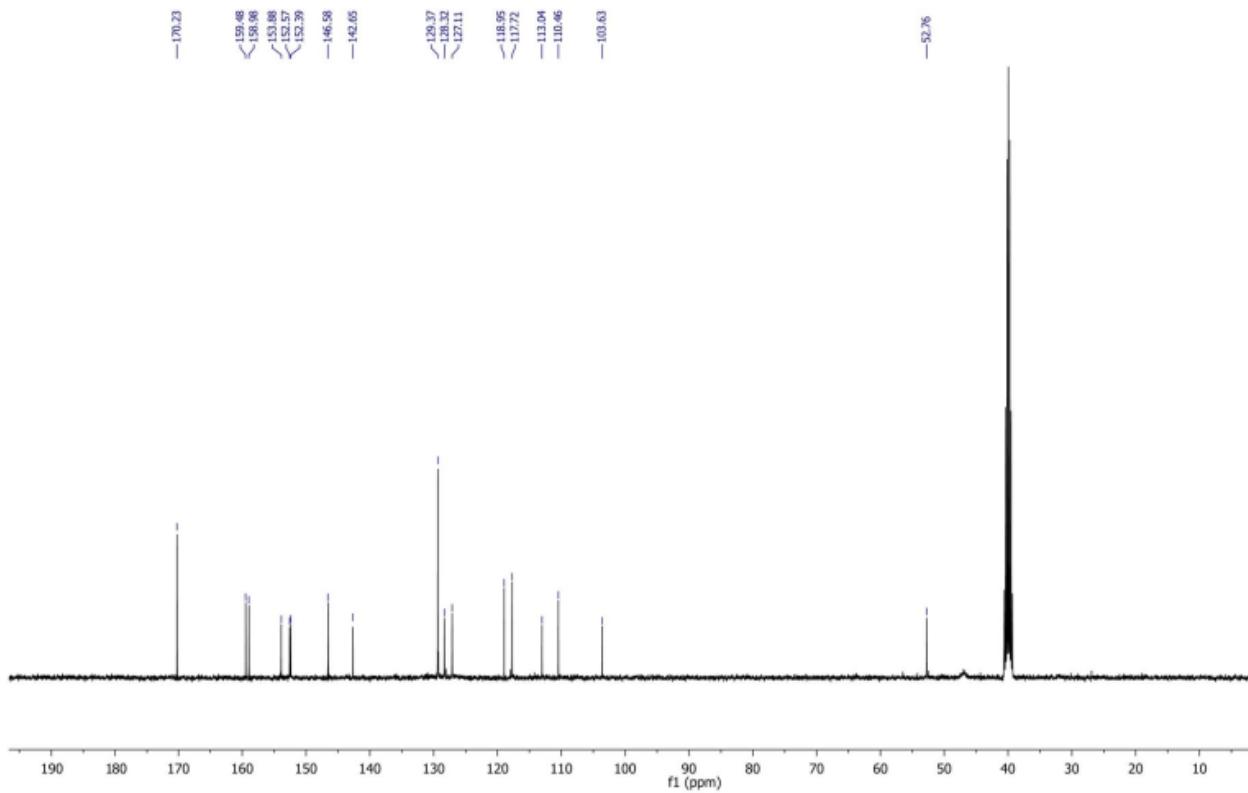
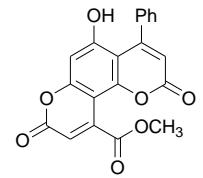
NAME Yasooj UN
EXPNO 898
PROCNO 1
Date_ 2017/226
Time_ 17.15
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 20
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 203
DW 62.400 usec
DE 6.50 usec
TE 293.8 K
D1 4.0000000 sec
TDO 1

```

```

===== CHANNEL f1 =====
NUC1 1H
P1 14.00 usec
PL1 -2.00 dB
PL1W 11.86359406 W
SFO1 400.2236020 MHz
SI 32768
SF 400.2200000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

```



**BRUKER**

```

NAME Yasoco UN
EXPNO 899
PROCNO 1
Date_ 20170105
Time 15.09
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgppg30
TD 65536
SOLVENT DMSO
NS 403
DS 0
SWH 35714.285 Hz
FIDRES 0.544957 Hz
AQ 0.9175540 sec
RG 2050
DM 14.000 usec
DE 6.500 usec
TB 234.5 K
T1 1.0000000 sec
D11 0.0300000 sec
TD0 1

```

```

***** CHANNEL f1 *****
NUC1 13C
P1 9.00 usec
PL1 -0.90 dB
PL1W 42.02801895 W
SF01 100.6479784 MHz

```

```

***** CHANNEL f2 *****
CPDPFG2 waltz16
NUC2 1H
PCPD2 90.00 usec
PL2 -2.00 dB
PL1Z 14.16 dB
PL13 11.79 dB
PL2W 11.86359409 W
PL12W 0.28722104 W
PL13W 0.12139934 W
SFQ2 400.2216009 MHz
SI 32768
SF 100.6353990 MHz
WDW EM
SSB 0
LB 1.00 Hz
GS 0
PC 1.40

```