Appendix A

NMR Spectra

NMR Spectral Data.

2,4-D

300 MHz proton NMR, solvent $CDCl_3$. 7.43 ppm, 1 proton doublet, H3; 7.21 ppm 1 proton doublet of doublets H5; 6.84 ppm 2 proton doublet H6; 4.76 ppm 2 proton singlet CH_2. Consistent with expected spectrum of 2,4-D.

Alachlor

300 MHz proton NMR, solvent $CDCl_3$. 7.31 ppm, 1 proton multiplet, H4; 7.21 ppm 1 proton doublet of doublets H5; 4.96 ppm 2 proton singlet N-CH_2-O; 3.72 ppm 2 proton singlet CH_2Cl; 3.51 ppm 3 proton singlet OCH_3; 2.59 ppm, 4 proton multiplet 2 x $\underline{CH_2}$-CH_3; 2.59 ppm, 6 proton multiplet 2 x CH_2-$\underline{CH_3}$. Consistent with expected spectrum of alachlor.

Bensulide

300 MHz proton NMR, solvent CD_3OD. 7.85 ppm, 2 proton multiplet, H2, H6; 7.63 ppm 3 proton multiplet H3, H4, H5; 4.73 ppm 2 proton singlet 2 x 0-$\underline{CH}$-$(CH_3)_2$; 3.13 ppm 2 proton multiplet NH-CH_2; 2.90 ppm 2 proton multiplet CH_2-S; 12 proton triplet, 2 x 0-CH-($\underline{CH_3}$)$_2$. Consistent with expected spectrum of bensulide.

Chloridazon

300 MHz proton NMR, solvent CD_3OD. 7.77 ppm, 1 proton singlet H4, 5 proton multiplet at 7.42 ppm, consistent with the 4 protons on the benzene ring and the single proton on the pyridazine ring. Consistent with the expected spectrum of chloridazon.

Diazinon

300 MHz proton NMR, solvent $CDCl_3$. 6.77 ppm 1 proton singlet, ring; 4.35 ppm 4 proton multiplet 2 x CH_2; 2.55 ppm 3 proton singlet CH3; 3.23 ppm 1 proton singlet CH; 12 proton multiplets at approximately 1.4 ppm 4 x CH3. Consistent with the expected spectrum of chloridazon.

Flufenacet

300 MHz proton NMR, solvent $CDCl_3$. 7.24 ppm, 4 proton multiplet ring protons; 4.97 ppm, 1 proton multiplet CH; 4.75 ppm, 2 proton multiplet CH2; 1.10 ppm, 6 protons, 2 x CH_3. Consistent with the expected NMR spectrum for flufenacet.

Propyzamide

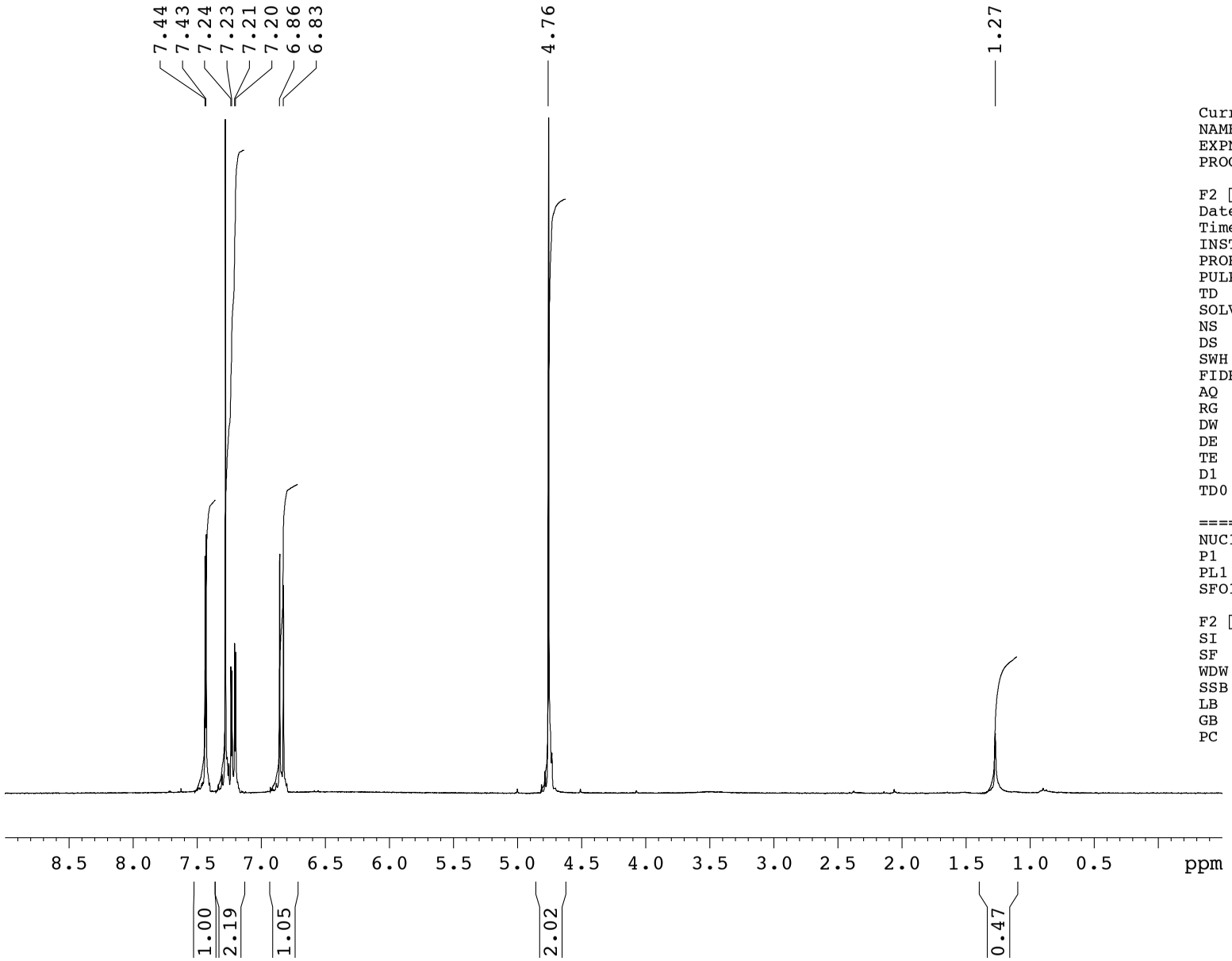
300 MHz proton NMR, solvent $CDCl_3$. 7.64 ppm, 2 proton multiplet, H2, H5; 7.54 ppm 1 proton multiplet H4; 6.13 ppm 1 proton singlet NH; 2.43 ppm 1 proton singlet CH; 1.80 ppm, 6 proton singlet 2 x $\underline{CH_3}$. Consistent with expected spectrum of propyzamide

Pyrithiobac

300 MHz proton NMR, solvent CD_3OD. 7.62 ppm, 1 proton multiplet H4, 2 x 1 proton multiplet at 7.4 and 7.26 ppm, consistent with the H3 and H5 protons on the benzene ring; 5.74 ppm, 1 proton singlet

for the pyrimidine ring proton; 3.73 ppm 6 proton singlet 2 x CH_3. Consistent with expected spectrum of Pyrithiobac

2,4□D Pestanal



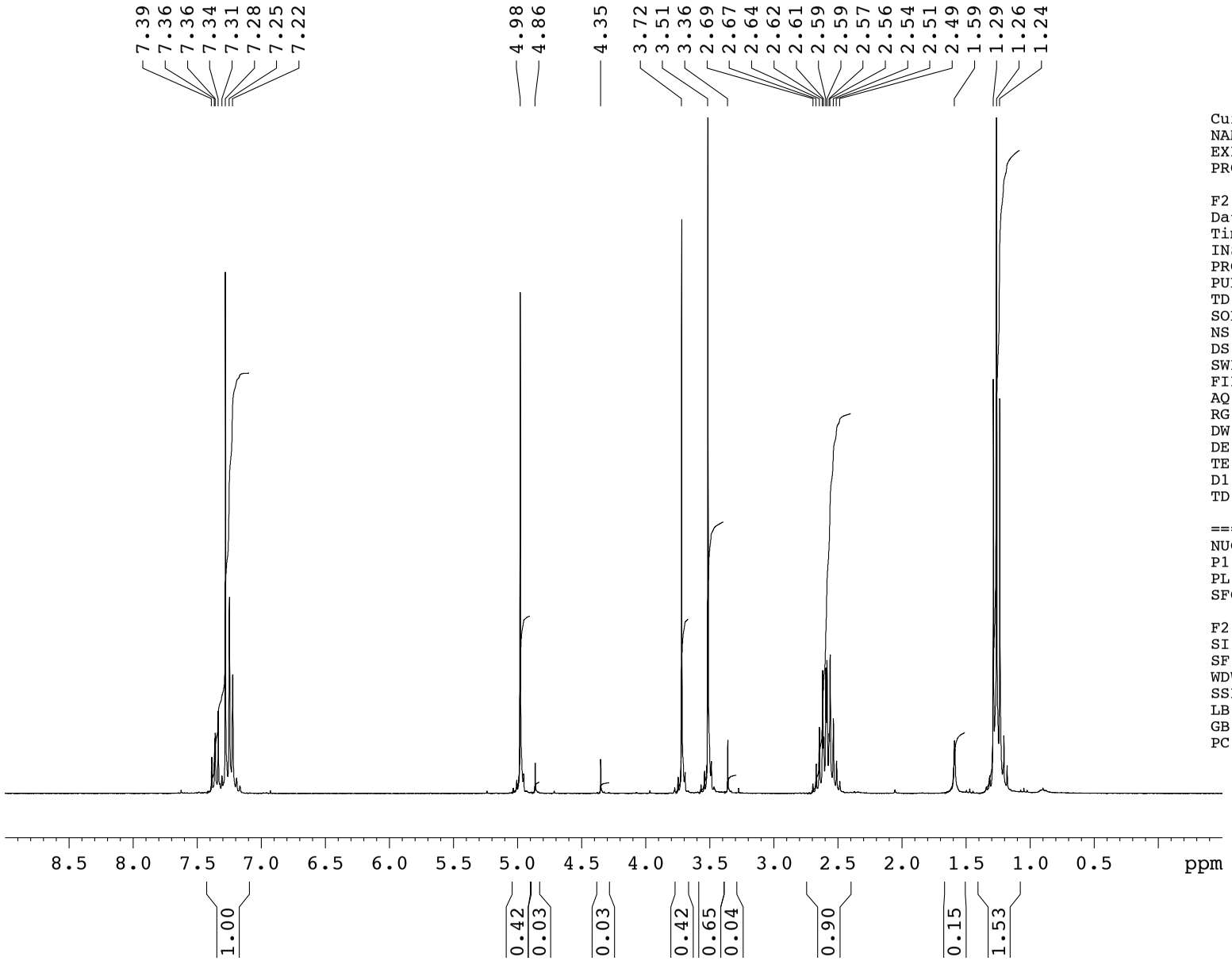
Current Data Parameters
NAME Aug05□2014□jpb
EXPNO 10
PROCNO 1

F2 □ Acquisition Parameters
Date_ 20140806
Time 3.48
INSTRUM spect
PROBHD 5 mm QNP 1H/1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 64
DS 2
SWH 6172.839 Hz
FIDRES 0.094190 Hz
AQ 5.3084660 sec
RG 1290.2
DW 81.000 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 10.00 usec
PL1 □6.00 dB
SFO1 300.1318534 MHz

F2 □ Processing parameters
SI 32768
SF 300.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

Alachlor PESTANAL



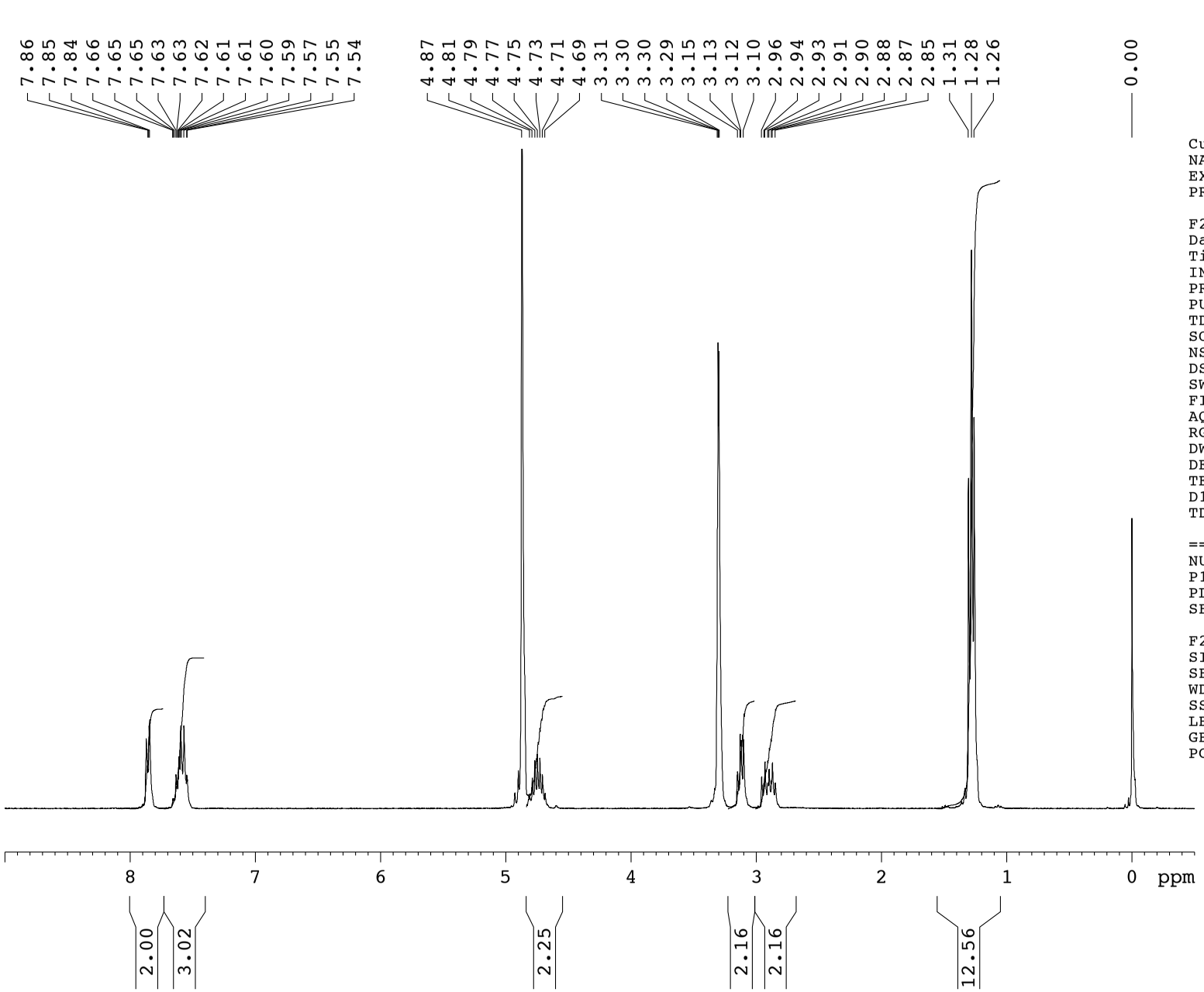
Current Data Parameters
NAME Aug05□2014□jpb
EXPNO 20
PROCNO 1

F2 □ Acquisition Parameters
Date_ 20140806
Time 3.59
INSTRUM spect
PROBHD 5 mm QNP 1H/1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 64
DS 2
SWH 6172.839 Hz
FIDRES 0.094190 Hz
AQ 5.3084660 sec
RG 812.7
DW 81.000 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 10.00 usec
PL1 □6.00 dB
SFO1 300.1318534 MHz

F2 □ Processing parameters
SI 32768
SF 300.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

Bensulide PESTANAL



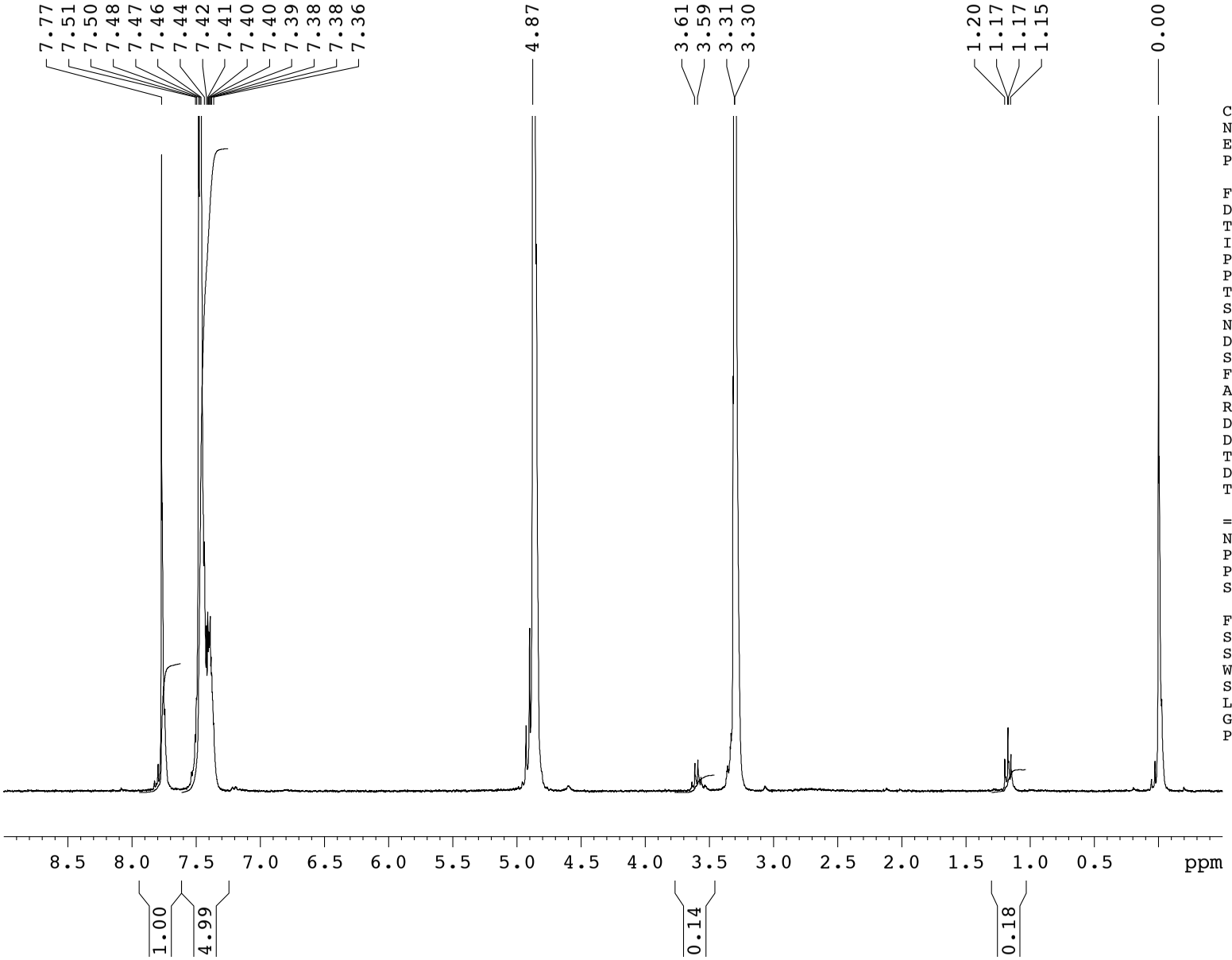
Current Data Parameters
NAME Aug05□2014□jpb
EXPNO 50
PROCNO 1

F2 □ Acquisition Parameters
Date_ 20140806
Time 4.34
INSTRUM spect
PROBHD 5 mm QNP 1H/1
PULPROG zg30
TD 65536
SOLVENT MeOD
NS 64
DS 2
SWH 6172.839 Hz
FIDRES 0.094190 Hz
AQ 5.3084660 sec
RG 724.1
DW 81.000 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 10.00 usec
PL1 □6.00 dB
SFO1 300.1318534 MHz

F2 □ Processing parameters
SI 32768
SF 300.1300063 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

Chloridazon PESTANAL



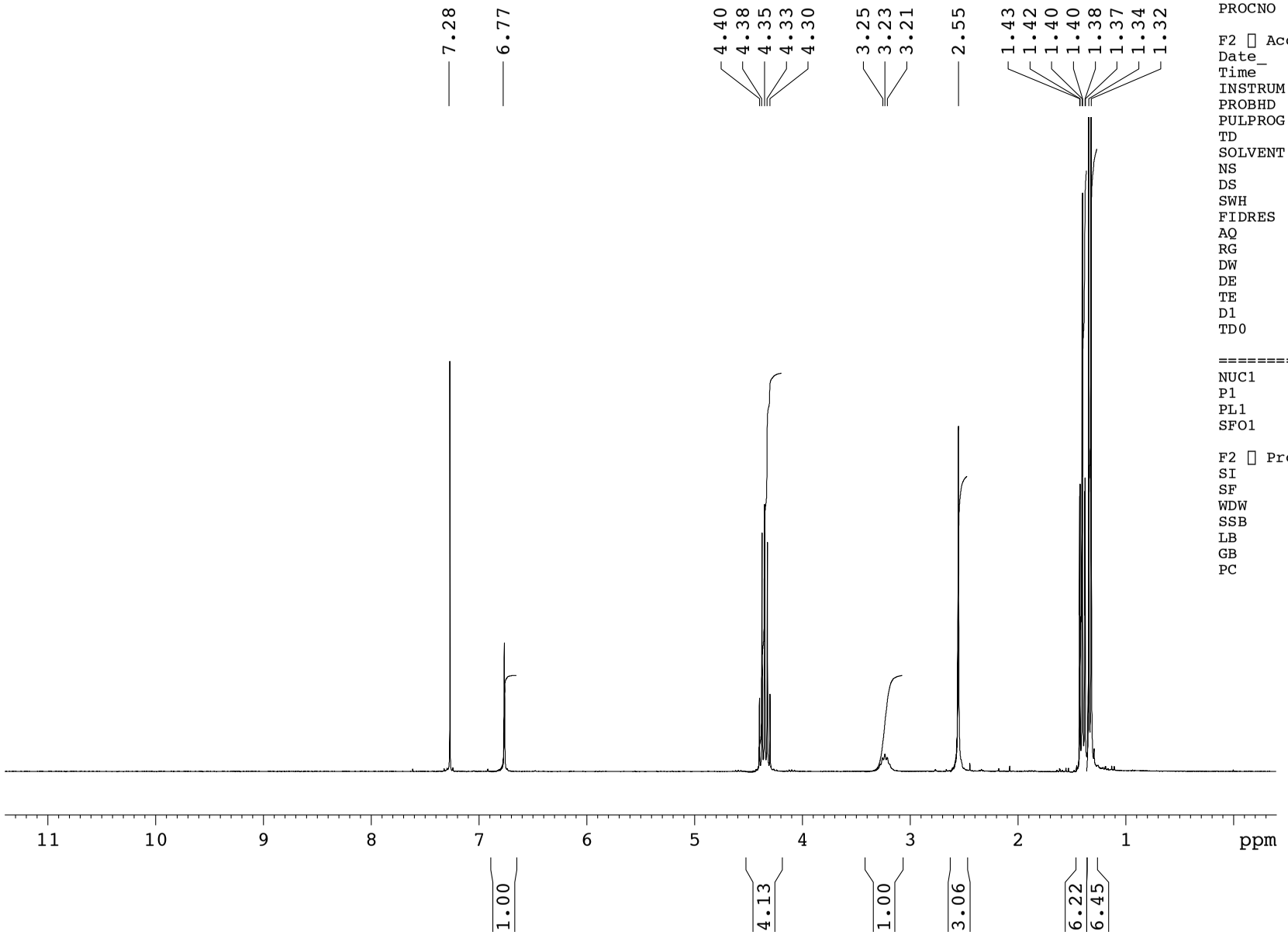
Current Data Parameters
NAME Aug05□2014□jpb
EXPNO 60
PROCNO 1

F2 □ Acquisition Parameters
Date_ 20140806
Time 4.45
INSTRUM spect
PROBHD 5 mm QNP 1H/1
PULPROG zg30
TD 65536
SOLVENT MeOD
NS 64
DS 2
SWH 6172.839 Hz
FIDRES 0.094190 Hz
AQ 5.3084660 sec
RG 812.7
DW 81.000 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 10.00 usec
PL1 □6.00 dB
SFO1 300.1318534 MHz

F2 □ Processing parameters
SI 32768
SF 300.1300062 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

Diazinon□O□Analog



Current Data Parameters

NAME	Diazinon□O□analog
EXPNO	20
PROCNO	1

F2 □ Acquisition Parameters

Date_	20141212
Time	12.15
INSTRUM	spect
PROBHD	5 mm QNP 1H/1
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	6172.839 Hz
FIDRES	0.094190 Hz
AQ	5.3084660 sec
RG	512
DW	81.000 usec
DE	6.00 usec
TE	300.0 K
D1	1.00000000 sec
TD0	1

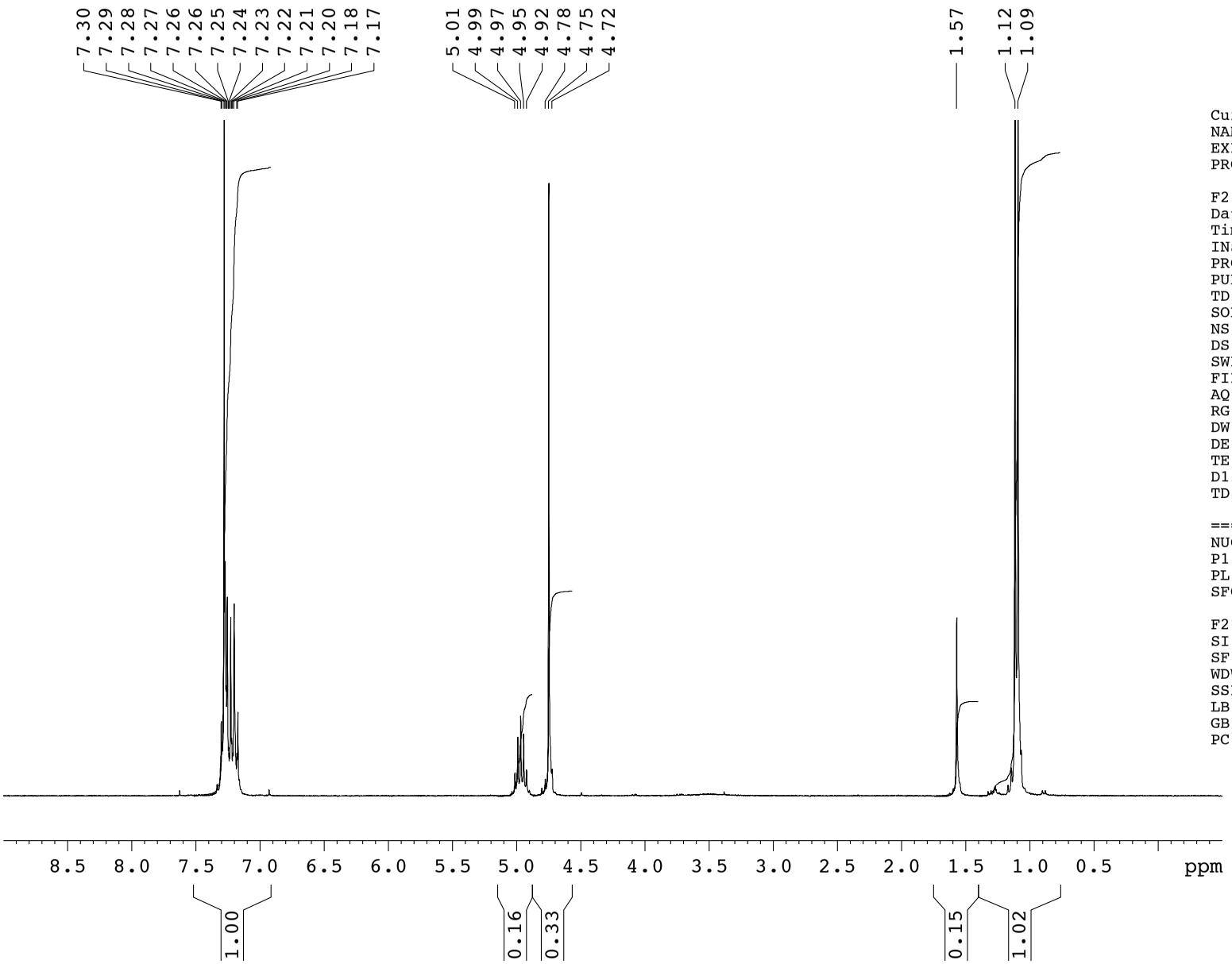
======== CHANNEL f1 ========

NUC1	1H
P1	10.00 usec
PL1	□6.00 dB
SFO1	300.1318534 MHz

F2 □ Processing parameters

SI	32768
SF	300.1300037 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

Flufenacet PESTANAL



BRUKER

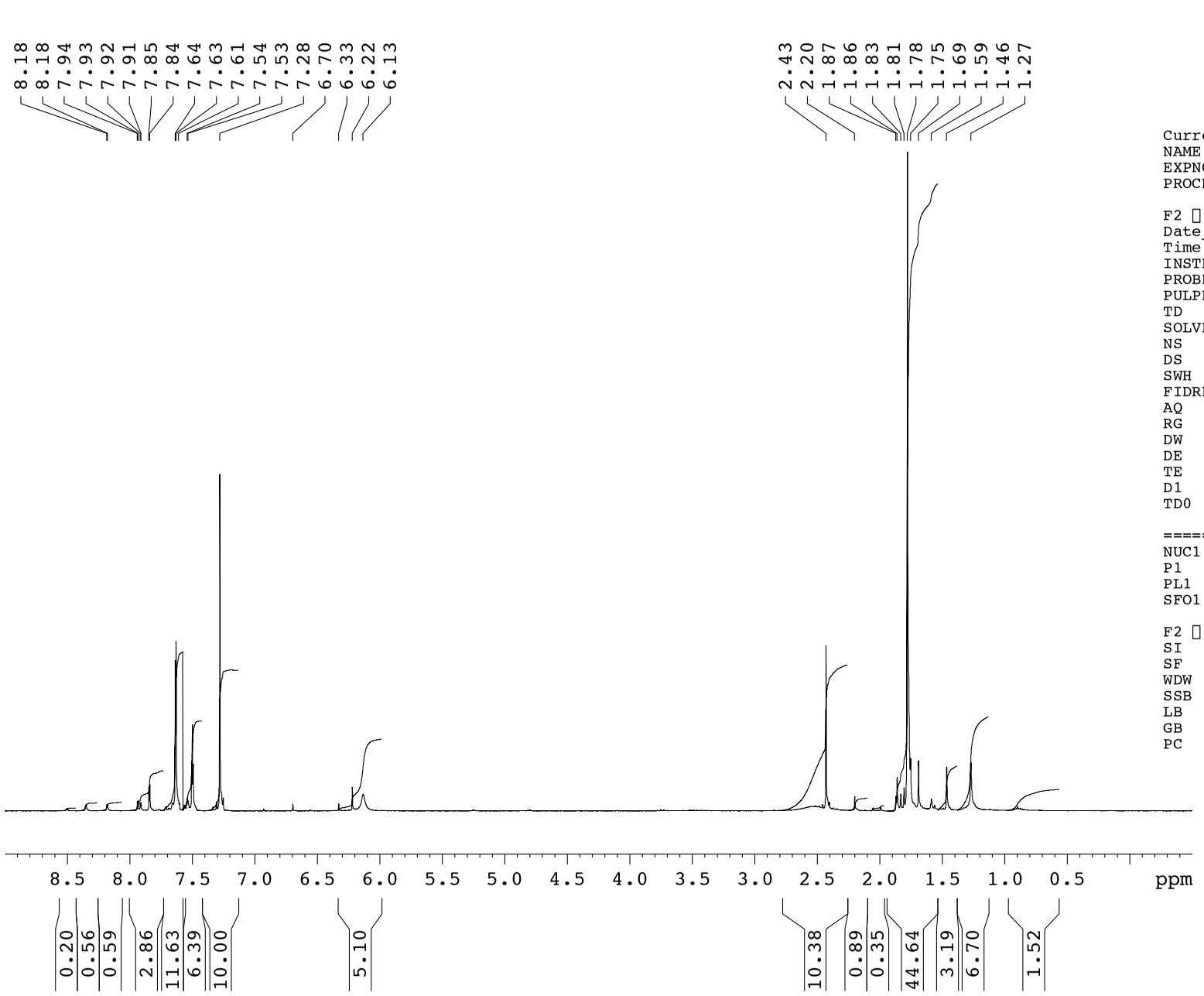
```
Current Data Parameters
NAME      Aug05□2014□jpb
EXPNO                 30
PROCNO                 1

F2 □ Acquisition Parameters
Date_           20140806
Time                4.12
INSTRUM            spect
PROBHD   5 mm QNP  1H/1
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    64
DS                     2
SWH             6172.839 Hz
FIDRES          0.094190 Hz
AQ              5.3084660 sec
RG                 1149.4
DW                81.000 usec
DE                 6.00 usec
TE                300.0 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                10.00 usec
PL1               □6.00 dB
SFO1         300.1318534 MHz

F2 □ Processing parameters
SI                 32768
SF           300.1300000 MHz
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                1.00
```

Propyzamid PESTANAL



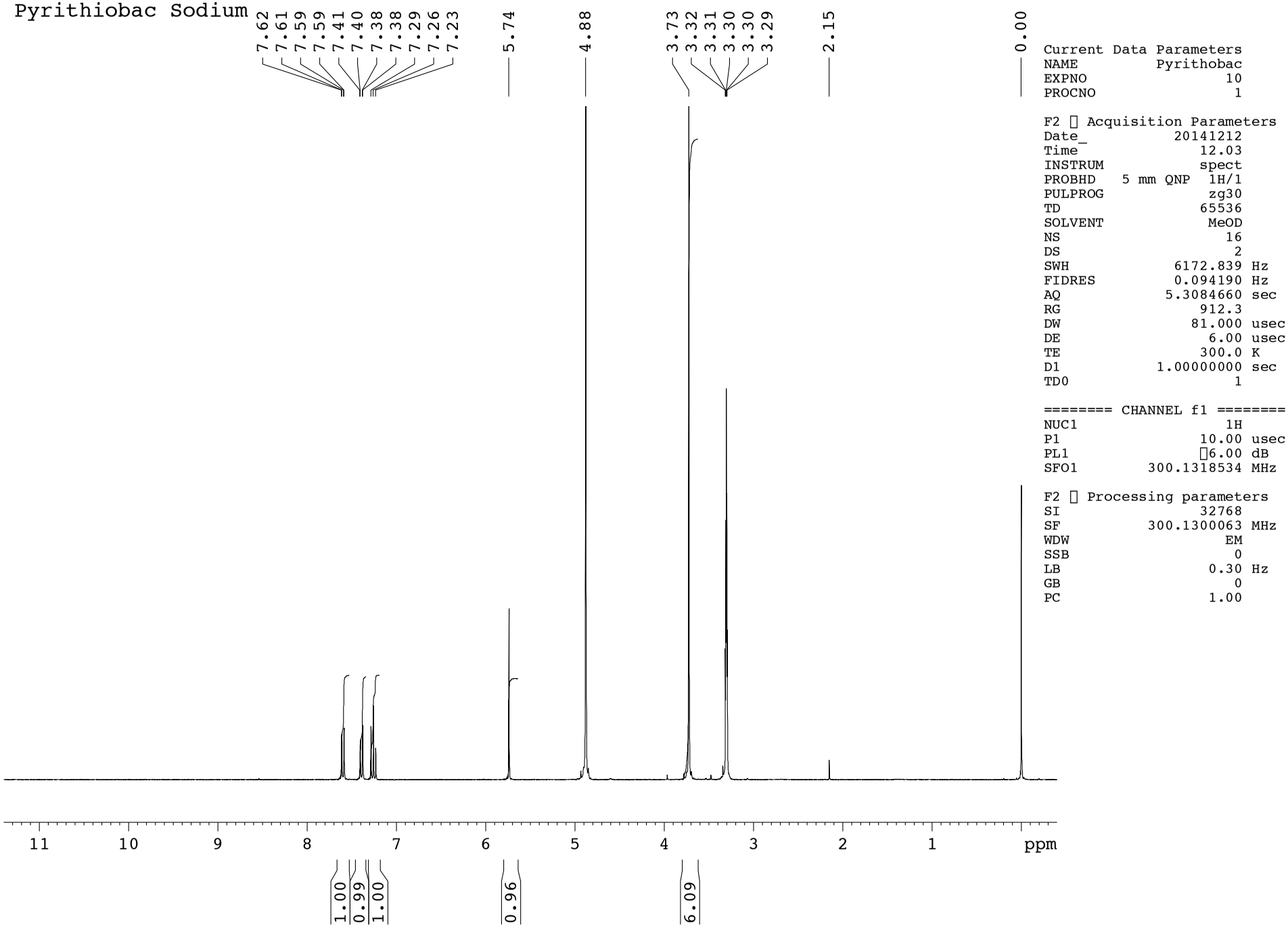
Current Data Parameters
NAME Aug05□2014□jpb
EXPNO 40
PROCNO 1

F2 □ Acquisition Parameters
Date_ 20140806
Time 4.23
INSTRUM spect
PROBHD 5 mm QNP 1H/1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 64
DS 2
SWH 6172.839 Hz
FIDRES 0.094190 Hz
AQ 5.3084660 sec
RG 1024
DW 81.000 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 10.00 usec
PL1 □6.00 dB
SFO1 300.1318534 MHz

F2 □ Processing parameters
SI 32768
SF 300.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

Pyrithiobac Sodium



Current Data Parameters
NAME Pyrithobac
EXPNO 10
PROCNO 1

F2 □ Acquisition Parameters
Date_ 20141212
Time 12.03
INSTRUM spect
PROBHD 5 mm QNP 1H/1
PULPROG zg30
TD 65536
SOLVENT MeOD
NS 16
DS 2
SWH 6172.839 Hz
FIDRES 0.094190 Hz
AQ 5.3084660 sec
RG 912.3
DW 81.000 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 10.00 usec
PL1 □6.00 dB
SFO1 300.1318534 MHz

F2 □ Processing parameters
SI 32768
SF 300.1300063 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00