Supporting Information

Hepialiamides A–C: Aminated Fusaric Acid Derivatives and Related Metabolites with Anti-Inflammatory Activity from the Deep-Sea-Derived Fungus *Samsoniella hepiali* W7

Zheng-Biao Zou [1,2,†], Tai-Zong Wu [2,†], Long-He Yang[3], Xi-Wen He [3], Wen-Ya Liu [1], Kai Zhang [2], Chun-Lan Xie [2], Ming-Min Xie [2], Yong Zhang [2], Xian-Wen Yang [2,*] and Jun-Song Wang [1,*]

1 Center for Molecular Metabolism, School of Environmental and Biological Engineering, Nanjing University of Science and Technology, 200 Xiaolingwei Street, Nanjing 210094, China; zhengbiaozou@njust.edu.cn (Z.-B.Z.); wenyaliu2015@163.com (W.-Y.L.)

2 Key Laboratory of Marine Genetic Resources, Third Institute of Oceanography, Ministry of Natural Re-sources, 184 Daxue Road, Xiamen 361005, China; wutaizong@tio.org.cn (T.-Z.W.); z18252730063@163.com (K. Z.); xiechunlanxx@163.com (C.-L.X.); xiemingmin@tio.org.cn (M.-M.X.); zhangyong@tio.org.cn (Y. Z.)

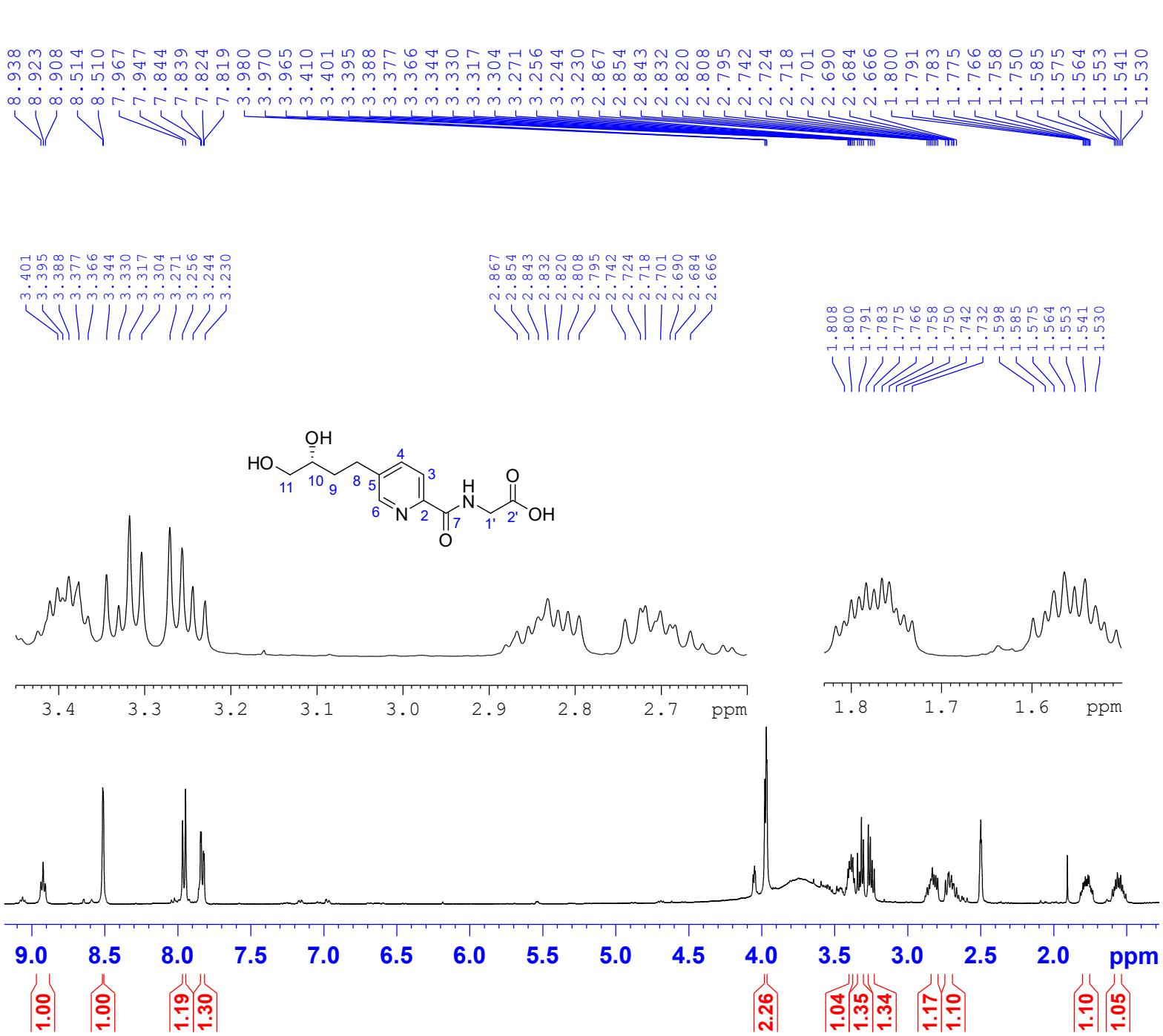
3 Technical Innovation Center for Utilization of Marine Biological Resources, Third Institute of Oceanogra-phy, Ministry of Natural Resources, 184 Daxue Road, Xiamen 361005, China; longheyang@tio.org.cn (L.-H.Y.);

* Correspondence: wang.junsong@gmail.com (J.W.); yangxianwen@tio.org.cn (X.-W.Y.); Tel.: +86-25- 8431-5512 (J.W.); Tel.: +86-592-2195319 (X.-W.Y.)

† These authors contributed equally to this work.

Content

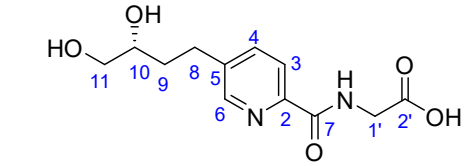
Figure S1. ^{1}H NMR spectrum of compound **1** in DMSO.

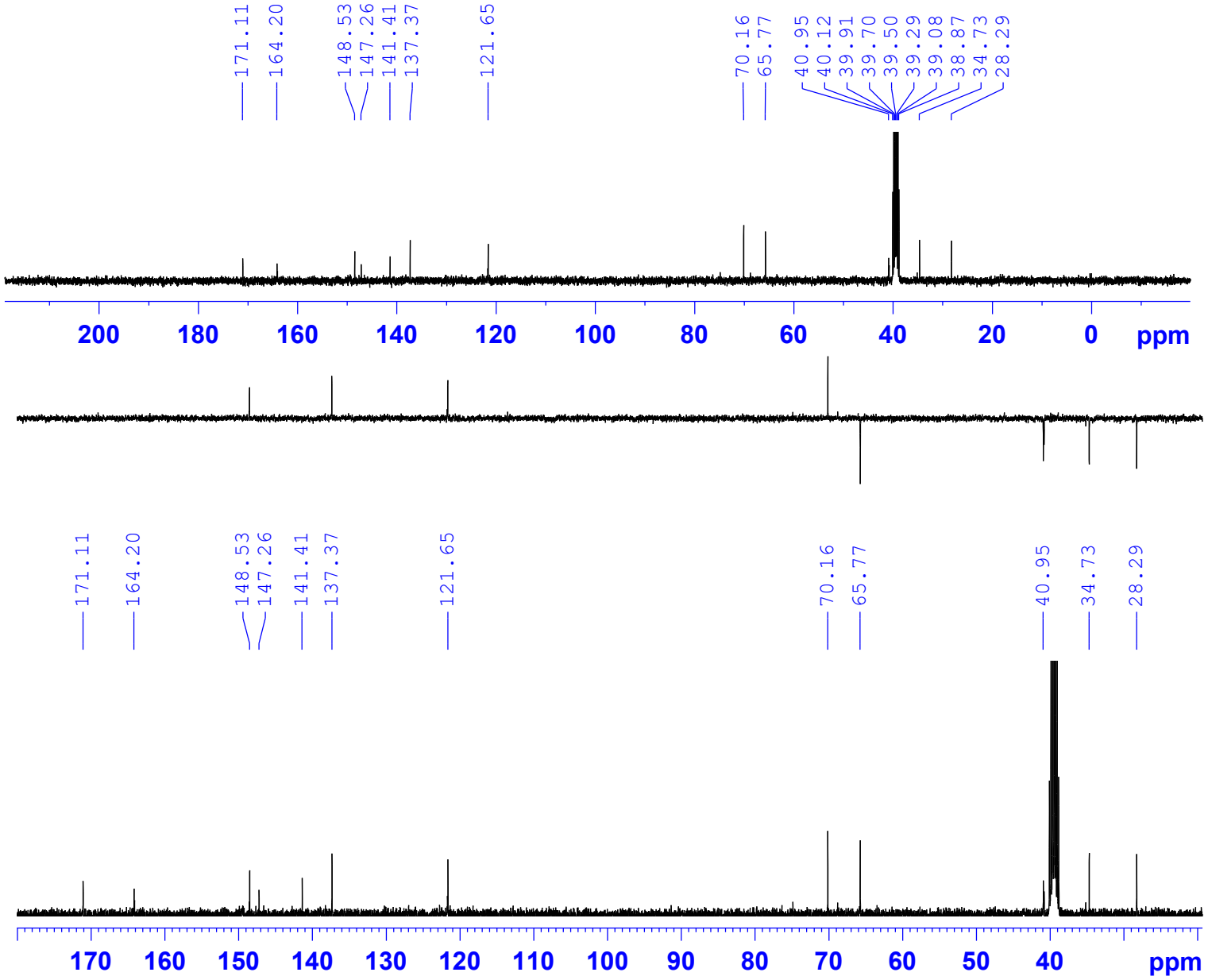


BRUKER

NAME	ZBC-10 DMSO 15mg
EXPNO	1
PROCNO	1
Date_	20200514
Time	21.41
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	DMSO
NS	37
DS	2
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	161
DW	62.400 usec
DE	6.50 usec
TE	296.9 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	13.90 usec
SI	32768
SF	400.1300031 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

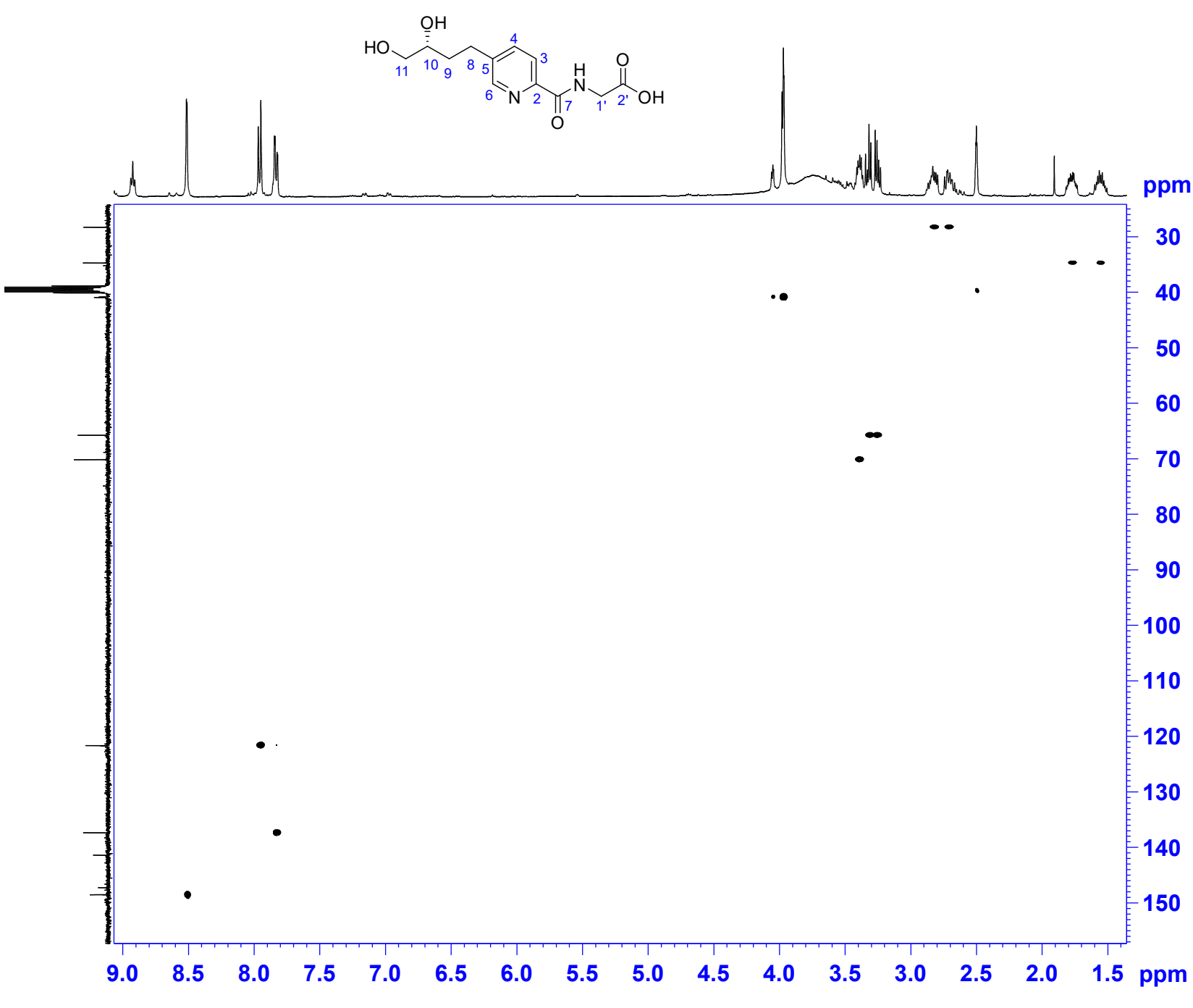
Figure S2. ^{13}C NMR spectrum of compound **1** in DMSO.





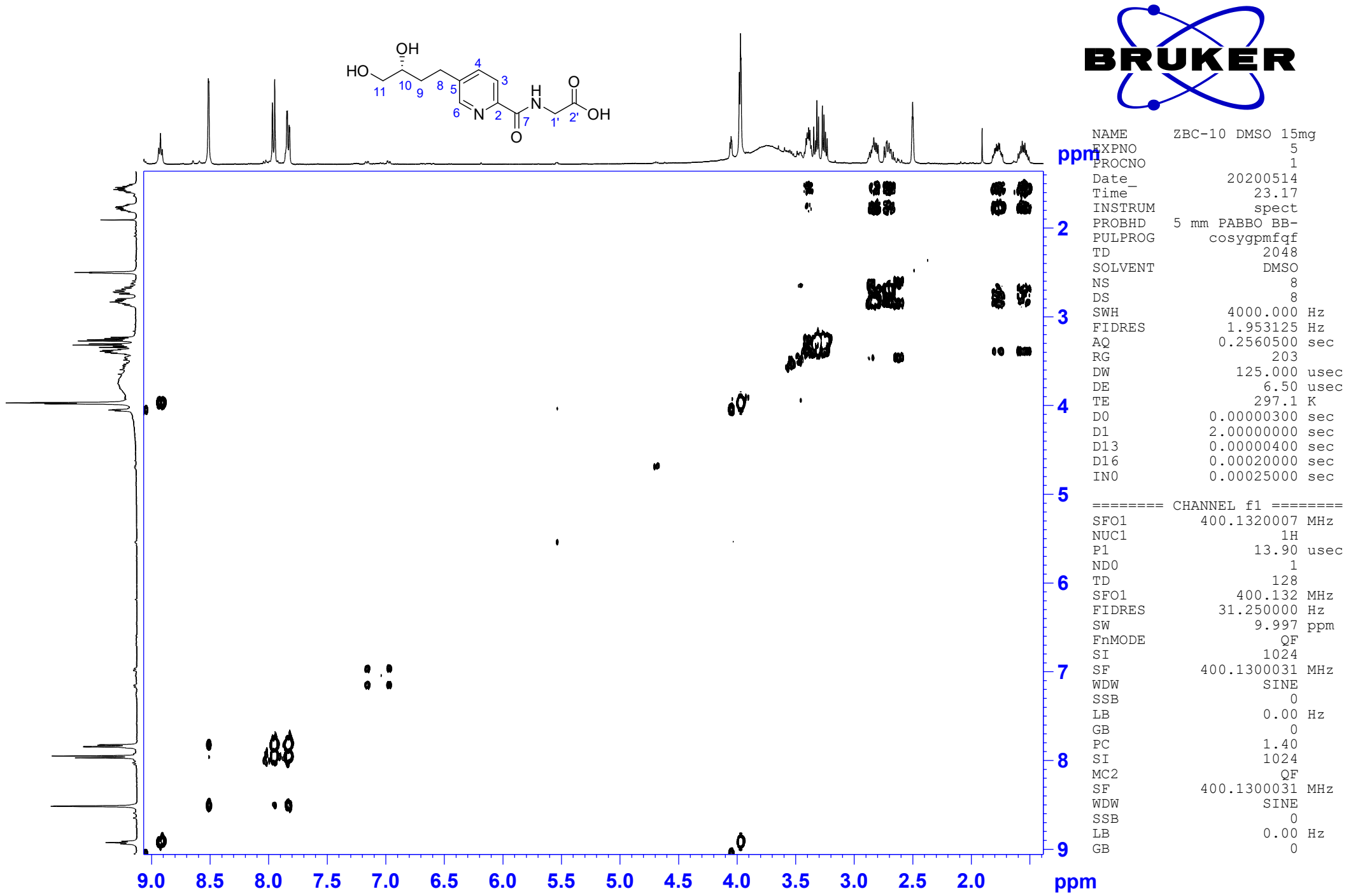

```
NAME        ZBC-10 DMSO 15mg
EXPNO                      2
PROCNO                     1
Date_               20200514
Time                   21.45
INSTRUM                spect
PROBHD    5 mm PABBO BB-
PULPROG                zgpg30
TD                     65536
SOLVENT                DMSO
NS                       175
DS                         4
SWH               24038.461 Hz
FIDRES             0.366798 Hz
AQ                 1.3631988 sec
RG                       203
DW                    20.800 usec
DE                     6.50 usec
TE                    297.4 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                        1

======== CHANNEL f1 ========
SFO1            100.6228293 MHz
NUC1                     13C
P1                    12.37 usec
SI                     32768
SF              100.6128129 MHz
WDW                       EM
SSB                        0
LB                     1.00 Hz
GB                         0
PC                     1.40
```

Figure S3. HSQC spectrum of compound **1** in DMSO.



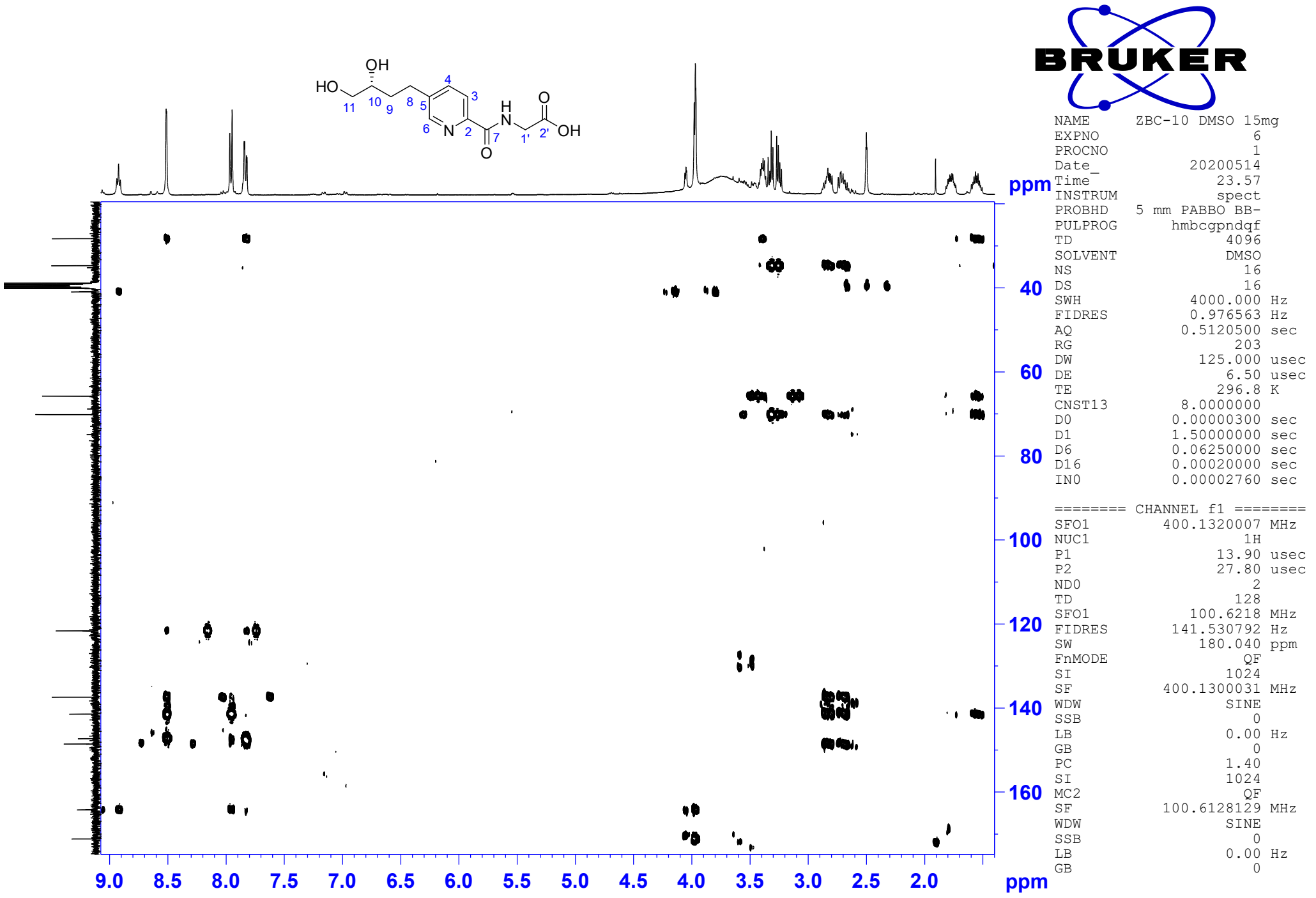

```
NAME       ZBC-10 DMSO 15mg
EXPNO                     4
PROCNO                    1
Date_              20200514
Time                  22.03
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG   hsqcetgpsisp2.2
TD                     1024
SOLVENT                DMSO
NS                        8
DS                       32
SWH               4000.000 Hz
FIDRES            3.906250 Hz
AQ                0.1280500 sec
RG                      203
DW                 125.000 usec
DE                   6.50 usec
TE                  297.2 K
CNST2           145.0000000
CNST17           -0.5000000
D0                0.00000300 sec
D1                2.00000000 sec
D4                0.00172414 sec
D11               0.03000000 sec
D16               0.00020000 sec
D24               0.00089000 sec
IN0               0.00002760 sec

======== CHANNEL f1 ========
SFO1            400.1320007 MHz
NUC1                    1H
P1                   13.90 usec
P2                   27.80 usec
P28                1000.00 usec
ND0                       2
TD                      256
SFO1             100.6218 MHz
FIDRES           70.765396 Hz
SW                180.040 ppm
FnMODE     Echo-Antiecho
SI                     1024
SF              400.1300031 MHz
WDW                   QSINE
SSB                       2
LB                 0.00 Hz
GB                        0
PC                     1.40
SI                     1024
MC2          echo-antiecho
SF              100.6128129 MHz
WDW                   QSINE
SSB                       2
LB                 0.00 Hz
GB                        0
```

Figure S4. ^{1}H– ^{1}H COSY spectrum of compound **1** in DMSO.



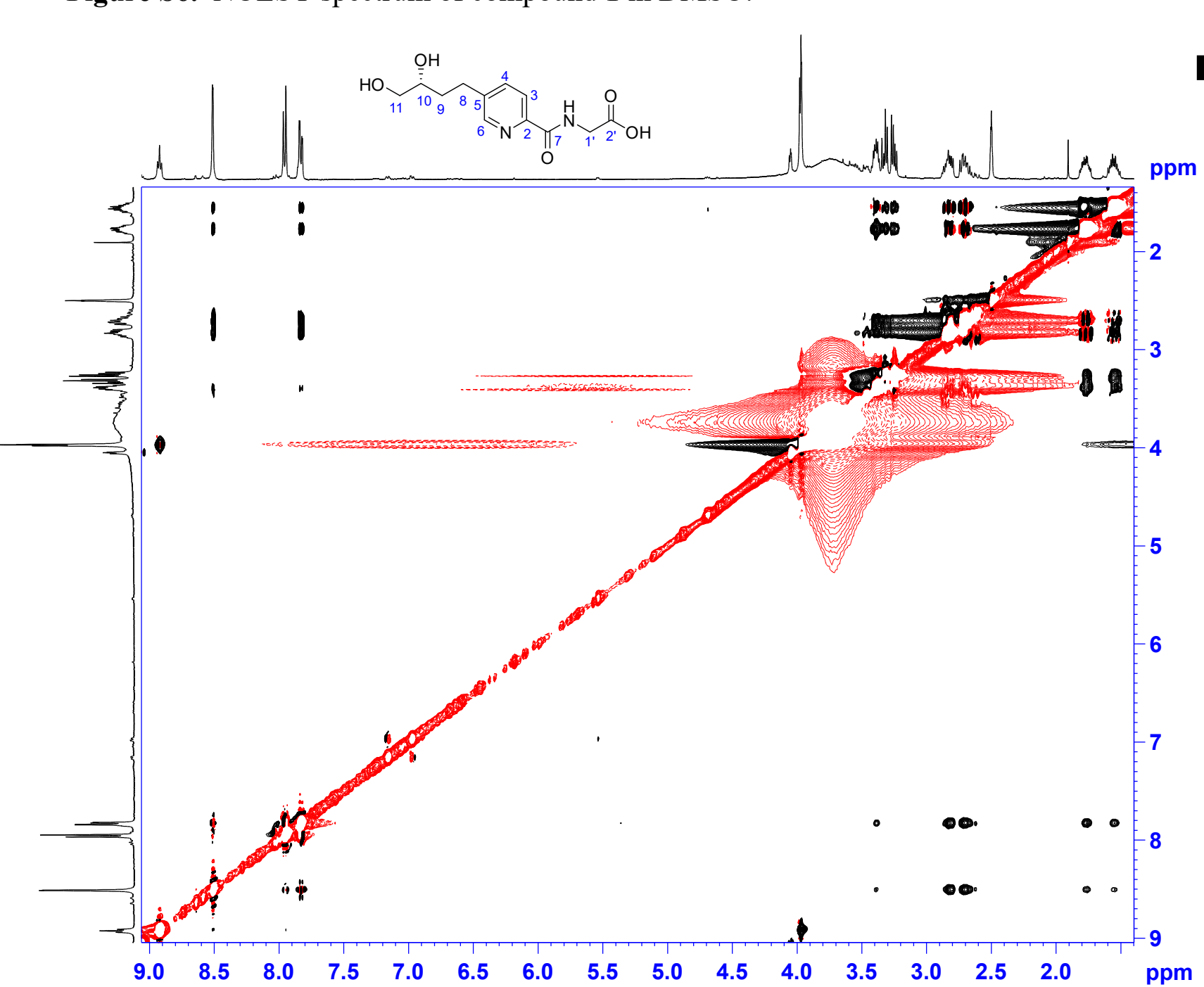

```
NAME        ZBC-10 DMSO 15mg
EXPNO                      5
PROCNO                     1
Date_               20200514
Time                   23.17
INSTRUM                spect
PROBHD     5 mm PABBO BB-
PULPROG         cosygpmfqf
TD                      2048
SOLVENT                 DMSO
NS                         8
DS                         8
SWH                4000.000 Hz
FIDRES             1.953125 Hz
AQ                 0.2560500 sec
RG                       203
DW                 125.000 usec
DE                   6.50 usec
TE                   297.1 K
D0                 0.00000300 sec
D1                 2.00000000 sec
D13                0.00000400 sec
D16                0.00020000 sec
IN0                0.00025000 sec

======== CHANNEL f1 ========
SFO1           400.1320007 MHz
NUC1                     1H
P1                  13.90 usec
ND0                      1
TD                     128
SFO1               400.132 MHz
FIDRES           31.250000 Hz
SW                   9.997 ppm
FnMODE                  QF
SI                    1024
SF             400.1300031 MHz
WDW                   SINE
SSB                      0
LB                    0.00 Hz
GB                       0
PC                    1.40
SI                    1024
MC2                     QF
SF             400.1300031 MHz
WDW                   SINE
SSB                      0
LB                    0.00 Hz
GB                       0
```

Figure S5. HMBC spectrum of compound **1** in DMSO.




```
NAME          ZBC-10 DMSO 15mg
EXPNO                        6
PROCNO                       1
Date_                 20200514
Time                     23.57
INSTRUM                  spect
PROBHD       5 mm PABBO BB-
PULPROG          hmbcgpndqf
TD                        4096
SOLVENT                   DMSO
NS                          16
DS                          16
SWH                 4000.000 Hz
FIDRES                0.976563 Hz
AQ                    0.5120500 sec
RG                          203
DW                    125.000 usec
DE                      6.50 usec
TE                     296.8 K
CNST13                8.0000000
D0                    0.00000300 sec
D1                    1.50000000 sec
D6                    0.06250000 sec
D16                   0.00020000 sec
IN0                   0.00002760 sec

======== CHANNEL f1 ========
SFO1               400.1320007 MHz
NUC1                       1H
P1                      13.90 usec
P2                      27.80 usec
ND0                         2
TD                        128
SFO1                100.6218 MHz
FIDRES              141.530792 Hz
SW                    180.040 ppm
FnMODE                     QF
SI                        1024
SF                 400.1300031 MHz
WDW                      SINE
SSB                         0
LB                       0.00 Hz
GB                          0
PC                       1.40
SI                        1024
MC2                        QF
SF                 100.6128129 MHz
WDW                      SINE
SSB                         0
LB                       0.00 Hz
GB                          0
```

Figure S6. NOESY spectrum of compound **1** in DMSO.



BRUKER

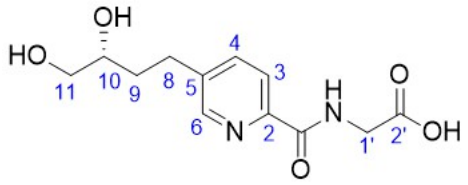
NAME	ZBC-10 DMSO 15mg
EXPNO	7
PROCNO	1
Date_	20200515
Time	1.11
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	noesygpphpp
TD	2048
SOLVENT	DMSO
NS	32
DS	32
SWH	4000.000 Hz
FIDRES	1.953125 Hz
AQ	0.2560500 sec
RG	203
DW	125.000 usec
DE	6.50 usec
TE	296.8 K
D0	0.00010730 sec
D1	2.00000000 sec
D8	0.30000001 sec
D11	0.03000000 sec
D12	0.00002000 sec
D16	0.00020000 sec
IN0	0.00025000 sec
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	13.90 usec
P2	27.80 usec
P17	2500.00 usec
ND0	1
TD	256
SFO1	400.132 MHz
FIDRES	15.625000 Hz
SW	9.997 ppm
FnMODE	States-TPPI
SI	1024
SF	400.1300031 MHz
WDW	QSINE
SSB	2
LB	0.00 Hz
GB	0
PC	1.00
SI	1024
MC2	States-TPPI
SF	400.1300031 MHz
WDW	QSINE
SSB	2
LB	0.00 Hz
GB	0

Figure S7. HRESIMS spectrum of compound **1**.

Elemental Composition Report

Single Mass Analysis

Tolerance = 40.0 mDa / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

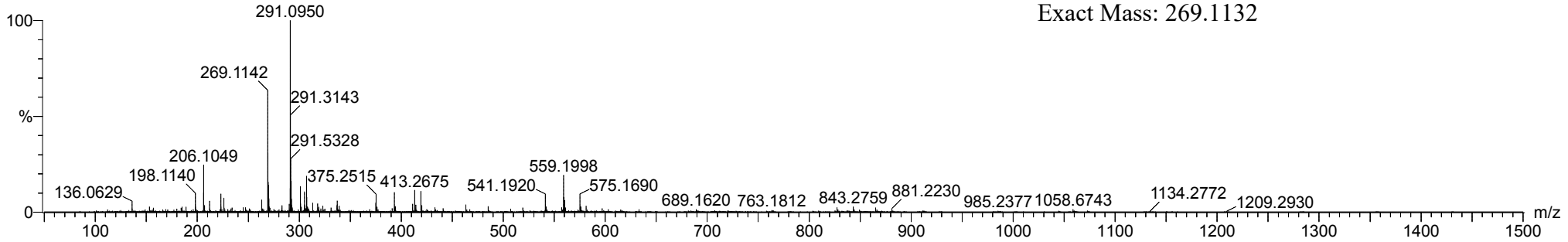


Chemical Formula: $C_{12}H_{17}N_2O_5^+$
Exact Mass: 269.1132

Monoisotopic Mass, Even Electron Ions
61 formula(e) evaluated with 4 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:
C: 0-13 H: 0-50 N: 0-5 O: 0-5

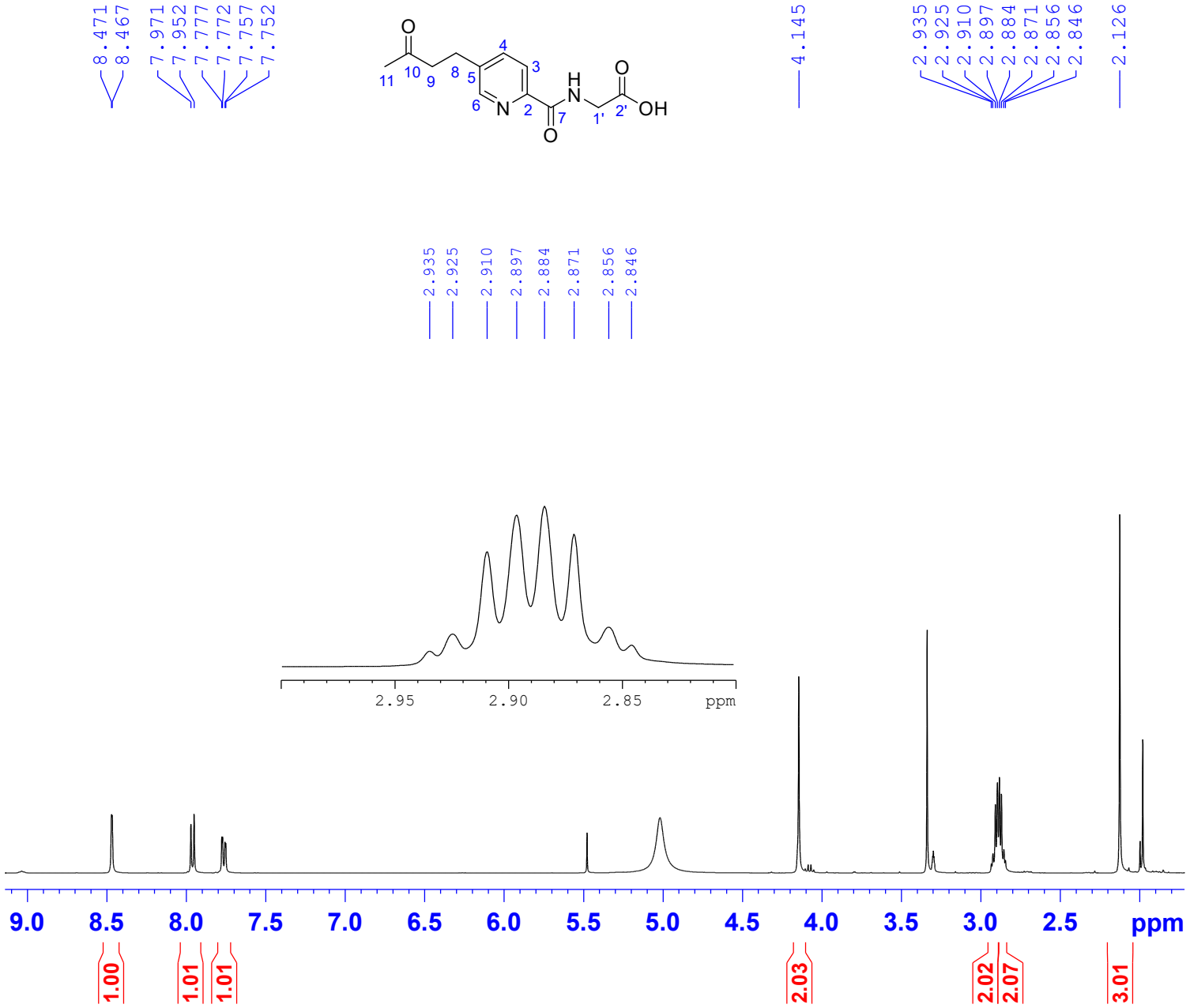
ZBC-10 101 (0.400) Cm (70:203)
1: TOF MS ES+

3.47e+007



Minimum:				-1.5				
Maximum:		40.0	10.0	50.0				
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
269.1142	269.1137	0.5	1.9	5.5	2594.2	0.563	56.97	C12 H17 N2 O5
	269.1501	-35.9	-133.4	4.5	2595.0	1.349	25.96	C13 H21 N2 O4
	269.1250	-10.8	-40.1	5.5	2595.9	2.253	10.51	C11 H17 N4 O4
	269.0886	25.6	95.1	6.5	2596.4	2.724	6.56	C10 H13 N4 O5

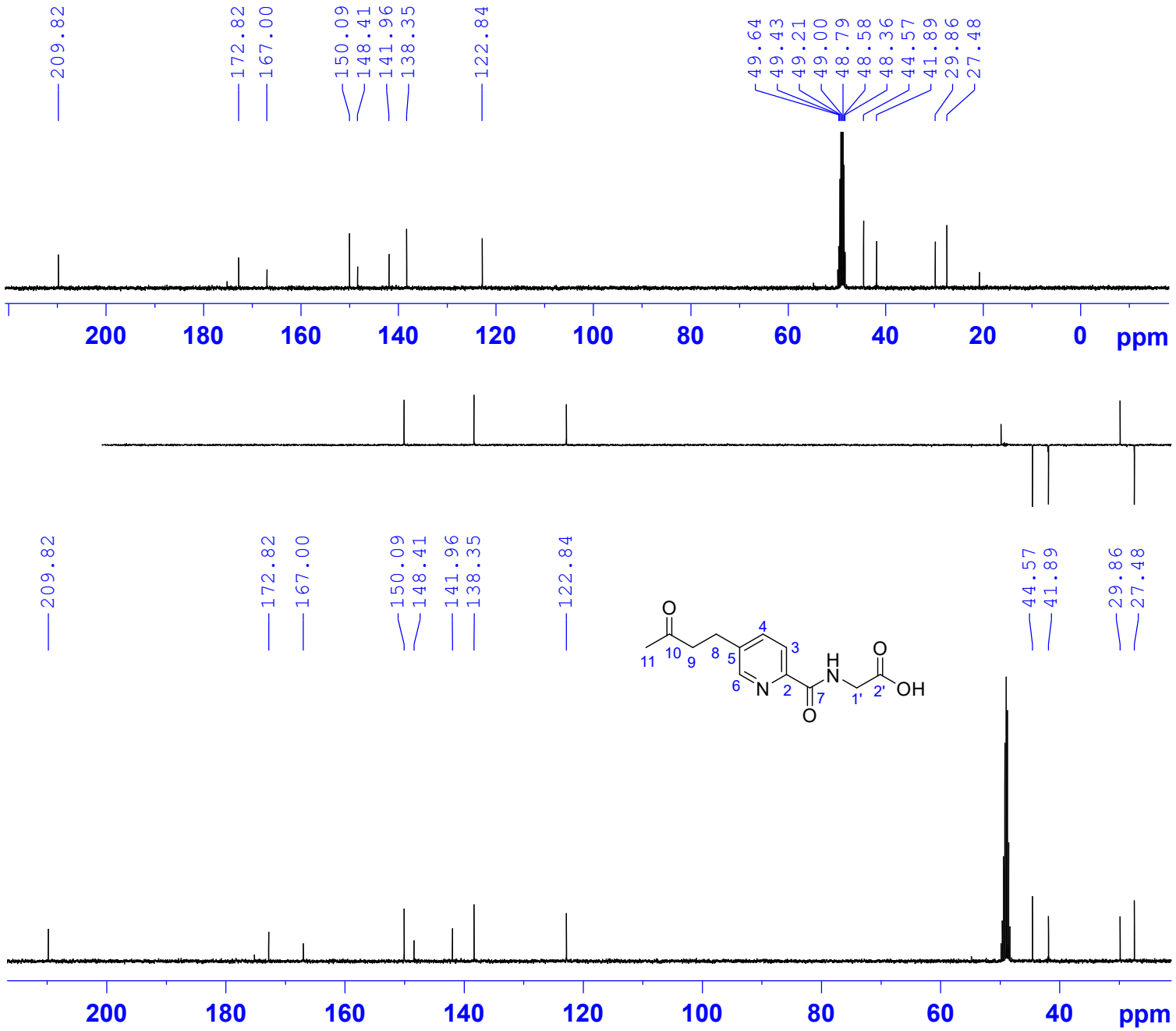
Figure S8. ^{1}H NMR spectrum of compound **2** in CD_3OD.

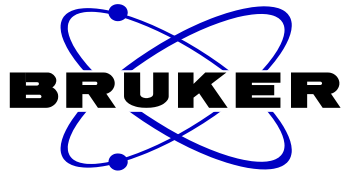


BRUKER

NAME	ZBC-2 M 62mg
EXPNO	1
PROCNO	1
Date_	20200323
Time	22.39
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	MeOD
NS	128
DS	2
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	64
DW	62.400 usec
DE	6.50 usec
TE	294.4 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	13.90 usec
SI	32768
SF	400.1300115 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

Figure S9. ^{13}C NMR spectrum of compound **2** in CD_3OD.

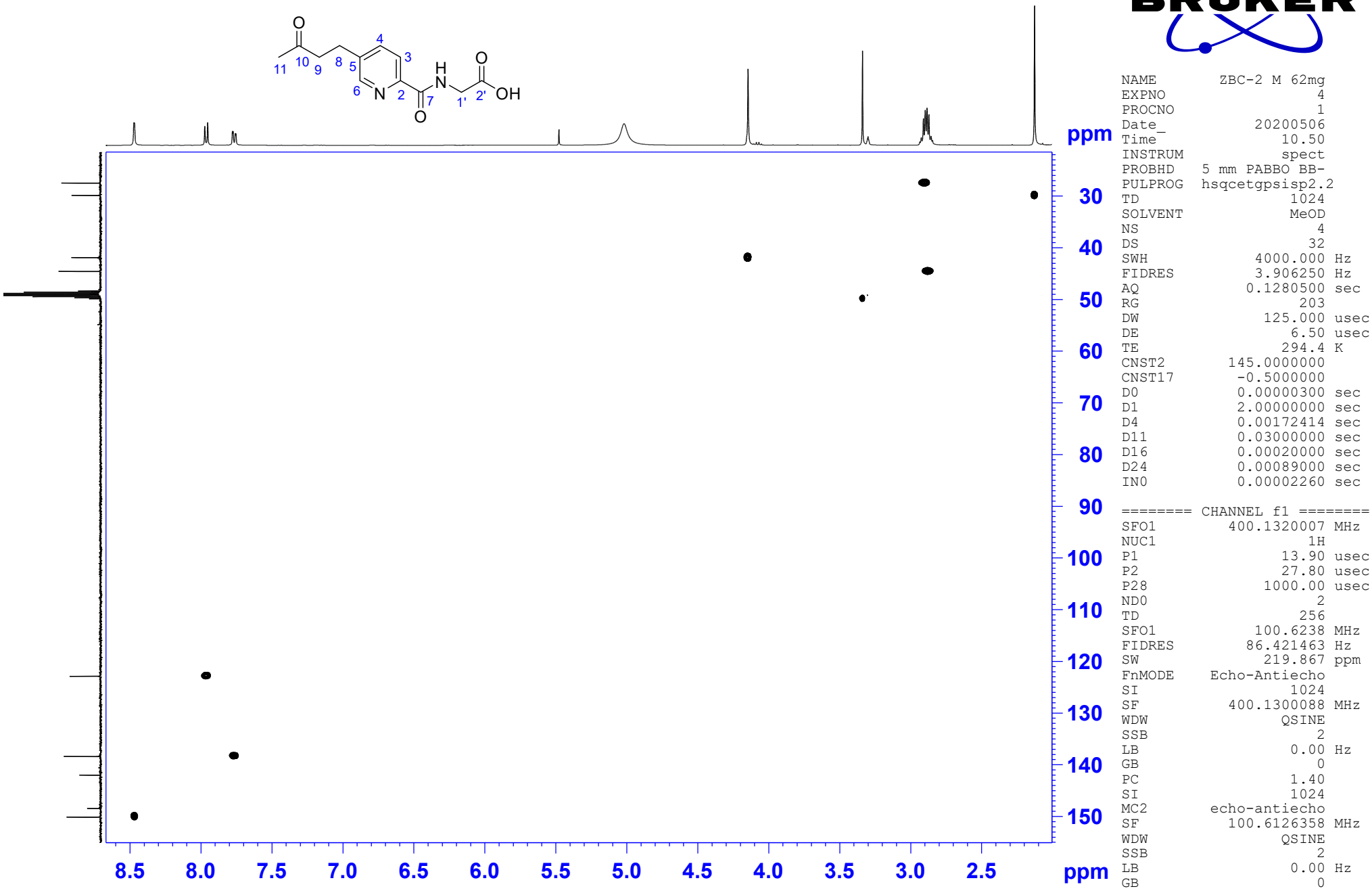




NAME	ZBC-2 M 62mg
EXPNO	2
PROCNO	1
Date_	20200323
Time	22.56
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	MeOD
NS	36
DS	4
SWH	24038.461 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	20.800 usec
DE	6.50 usec
TE	294.4 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1

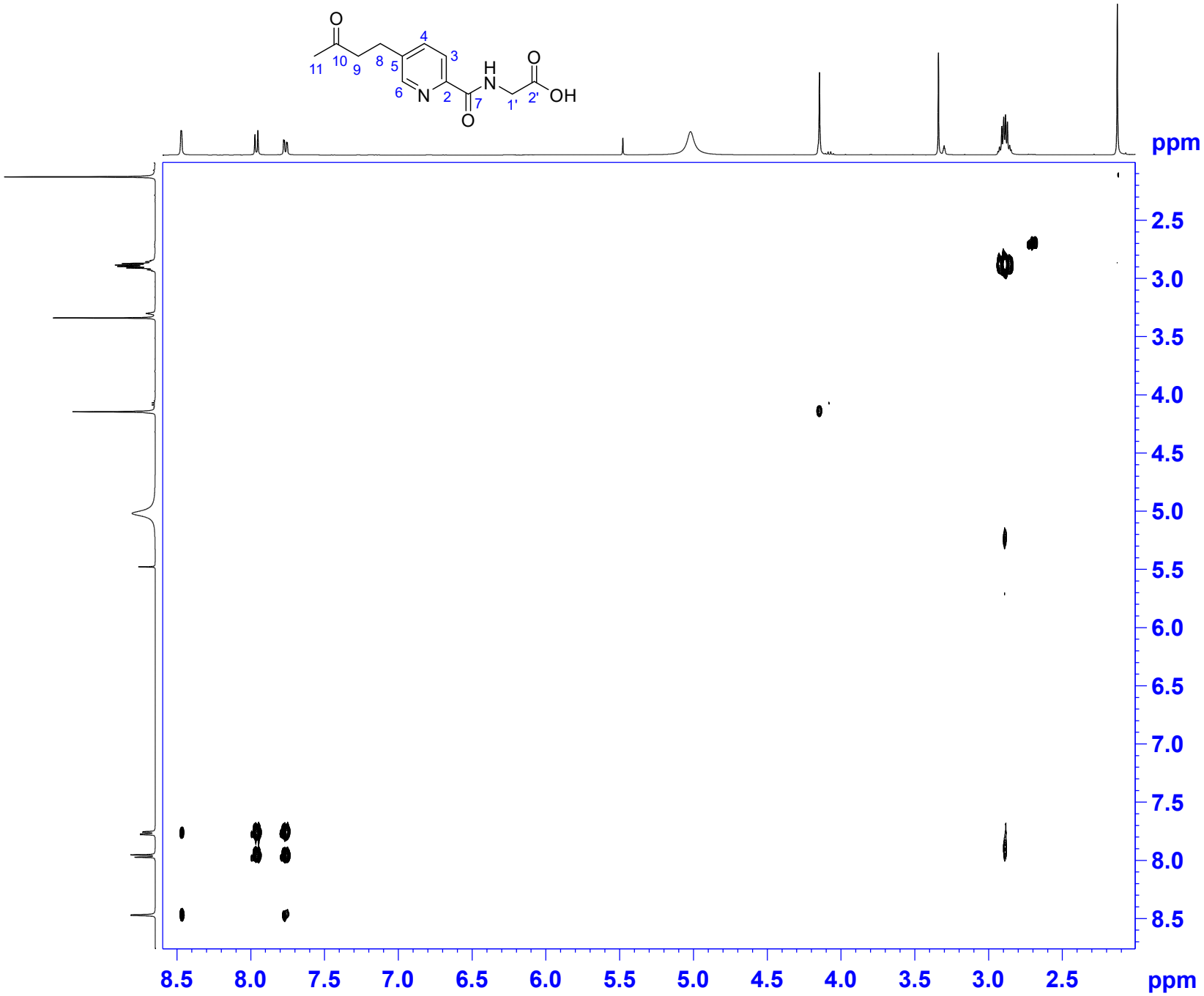
======== CHANNEL f1 ========	
SFO1	100.6228293 MHz
NUC1	13C
P1	12.37 usec
SI	32768
SF	100.6126354 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

Figure S10. HSQC spectrum of compound **2** in CD_3OD.




```
NAME          ZBC-2 M 62mg
EXPNO                    4
PROCNO                   1
Date_             20200506
Time                 10.50
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG   hsqcetgpsisp2.2
TD                    1024
SOLVENT                MeOD
NS                       4
DS                      32
SWH               4000.000 Hz
FIDRES               3.906250 Hz
AQ                0.1280500 sec
RG                      203
DW                 125.000 usec
DE                   6.50 usec
TE                   294.4 K
CNST2           145.0000000
CNST17           -0.5000000
D0                0.00000300 sec
D1                2.00000000 sec
D4                0.00172414 sec
D11               0.03000000 sec
D16               0.00020000 sec
D24               0.00089000 sec
IN0               0.00002260 sec

======== CHANNEL f1 ========
SFO1            400.1320007 MHz
NUC1                    1H
P1                   13.90 usec
P2                   27.80 usec
P28                1000.00 usec
ND0                      2
TD                     256
SFO1              100.6238 MHz
FIDRES             86.421463 Hz
SW                  219.867 ppm
FnMODE     Echo-Antiecho
SI                    1024
SF              400.1300088 MHz
WDW                   QSINE
SSB                      2
LB                    0.00 Hz
GB                       0
PC                    1.40
SI                    1024
MC2         echo-antiecho
SF               100.6126358 MHz
WDW                   QSINE
SSB                      2
LB                    0.00 Hz
GB                       0
```

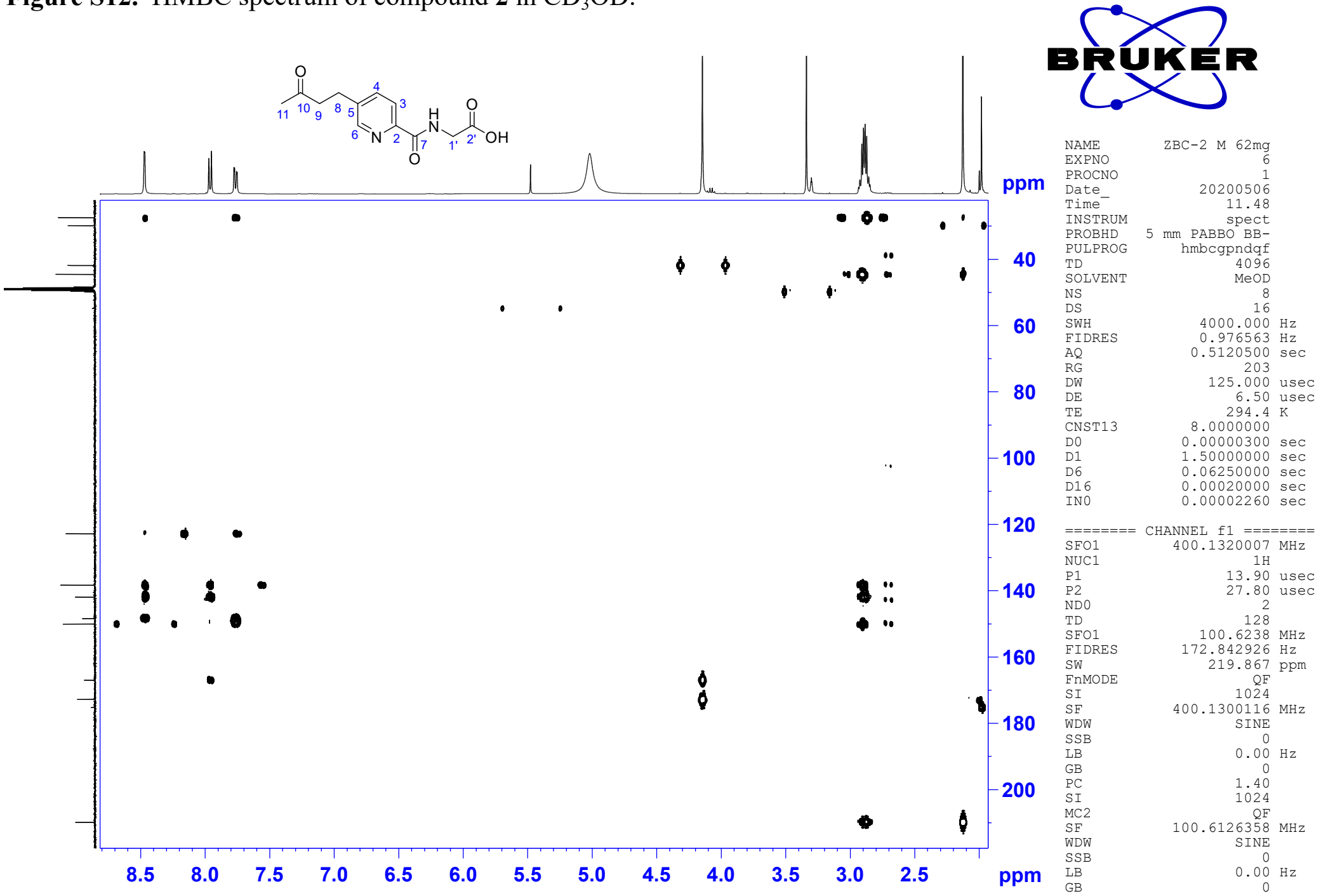
Figure S11. ^{1}H– ^{1}H COSY spectrum of compound **2** in CD_3OD.



BRUKER

```
NAME          ZBC-2 M 62mg
EXPNO                    5
PROCNO                   1
Date_             20200506
Time                 11.28
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG       cosygpmfqf
TD                    2048
SOLVENT               MeOD
NS                       4
DS                       8
SWH           4000.000 Hz
FIDRES           1.953125 Hz
AQ            0.2560500 sec
RG                     203
DW             125.000 usec
DE               6.50 usec
TE                294.6 K
D0            0.00000300 sec
D1            2.00000000 sec
D13           0.00000400 sec
D16           0.00020000 sec
IN0           0.00025000 sec

======== CHANNEL f1 ========
SFO1         400.1320007 MHz
NUC1                   1H
P1                13.90 usec
ND0                    1
TD                   128
SFO1           400.132 MHz
FIDRES        31.250000 Hz
SW                9.997 ppm
FnMODE                QF
SI                  1024
SF           400.1300116 MHz
WDW                 SINE
SSB                    0
LB                  0.00 Hz
GB                     0
PC                  1.40
SI                  1024
MC2                   QF
SF           400.1300116 MHz
WDW                 SINE
SSB                    0
LB                  0.00 Hz
GB                     0
```

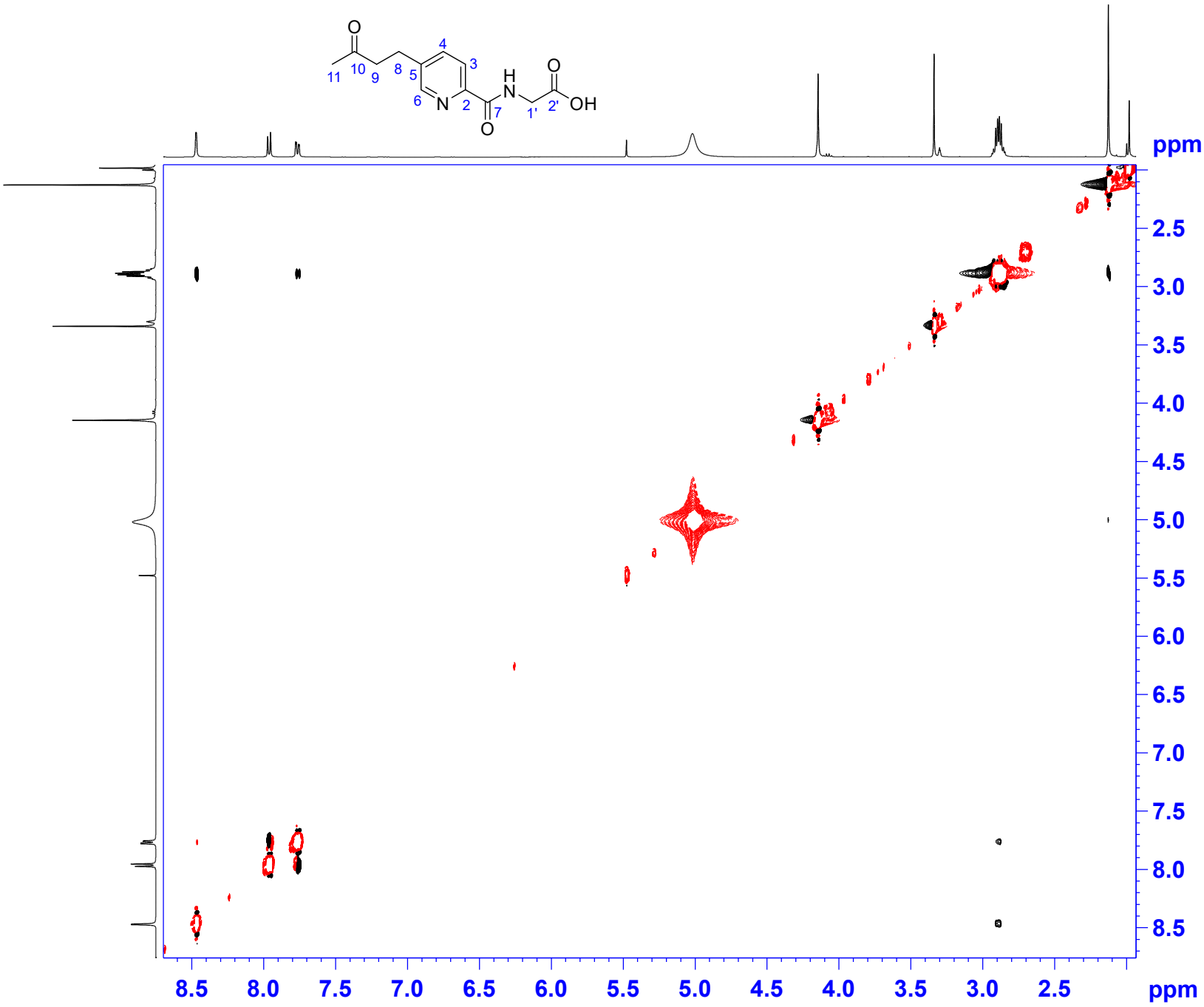
Figure S12. HMBC spectrum of compound **2** in CD_3OD.



BRUKER

NAME	ZBC-2 M 62mg
EXPNO	6
PROCNO	1
Date_	20200506
Time	11.48
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	hmbcgpndqf
TD	4096
SOLVENT	MeOD
NS	8
DS	16
SWH	4000.000 Hz
FIDRES	0.976563 Hz
AQ	0.5120500 sec
RG	203
DW	125.000 usec
DE	6.50 usec
TE	294.4 K
CNST13	8.0000000
D0	0.00000300 sec
D1	1.50000000 sec
D6	0.06250000 sec
D16	0.00020000 sec
IN0	0.00002260 sec
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	13.90 usec
P2	27.80 usec
ND0	2
TD	128
SFO1	100.6238 MHz
FIDRES	172.842926 Hz
SW	219.867 ppm
FnMODE	QF
SI	1024
SF	400.1300116 MHz
WDW	SINE
SSB	0
LB	0.00 Hz
GB	0
PC	1.40
SI	1024
MC2	QF
SF	100.6126358 MHz
WDW	SINE
SSB	0
LB	0.00 Hz
GB	0

Figure S13. NOESY spectrum of compound **2** in CD_3OD.



BRUKER

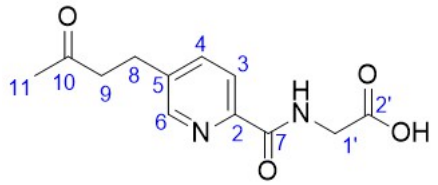
NAME	ZBC-2 M 62mg
EXPNO	7
PROCNO	1
Date_	20200506
Time	12.25
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	noesygpphpp
TD	2048
SOLVENT	MeOD
NS	8
DS	32
SWH	4000.000 Hz
FIDRES	1.953125 Hz
AQ	0.2560500 sec
RG	64
DW	125.000 usec
DE	6.50 usec
TE	294.5 K
D0	0.00010730 sec
D1	2.00000000 sec
D8	0.30000001 sec
D11	0.03000000 sec
D12	0.00002000 sec
D16	0.00020000 sec
IN0	0.00025000 sec
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	13.90 usec
P2	27.80 usec
P17	2500.00 usec
ND0	1
TD	256
SFO1	400.132 MHz
FIDRES	15.625000 Hz
SW	9.997 ppm
FnMODE	States-TPPI
SI	1024
SF	400.1300116 MHz
WDW	QSINE
SSB	2
LB	0.00 Hz
GB	0
PC	1.00
SI	1024
MC2	States-TPPI
SF	400.1300116 MHz
WDW	QSINE
SSB	2
LB	0.00 Hz
GB	0

Figure S14. HRESIMS spectrum of compound **2**.

Elemental Composition Report

Single Mass Analysis

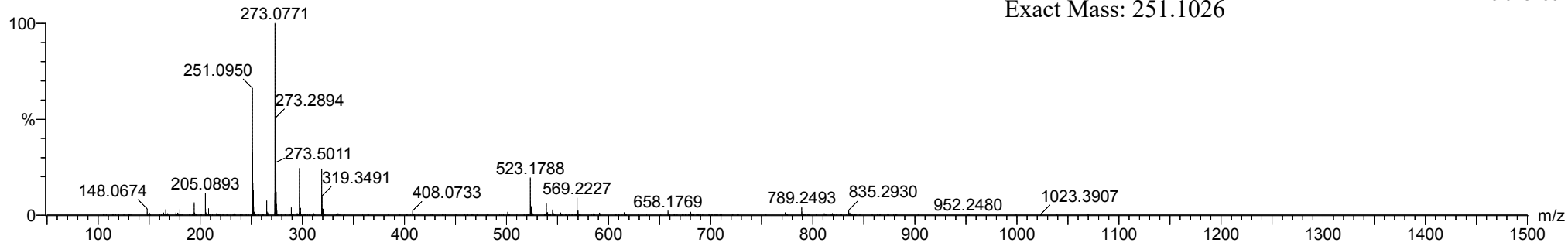
Tolerance = 40.0 mDa / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3



Chemical Formula: $C_{12}H_{15}N_2O_4^+$
Exact Mass: 251.1026

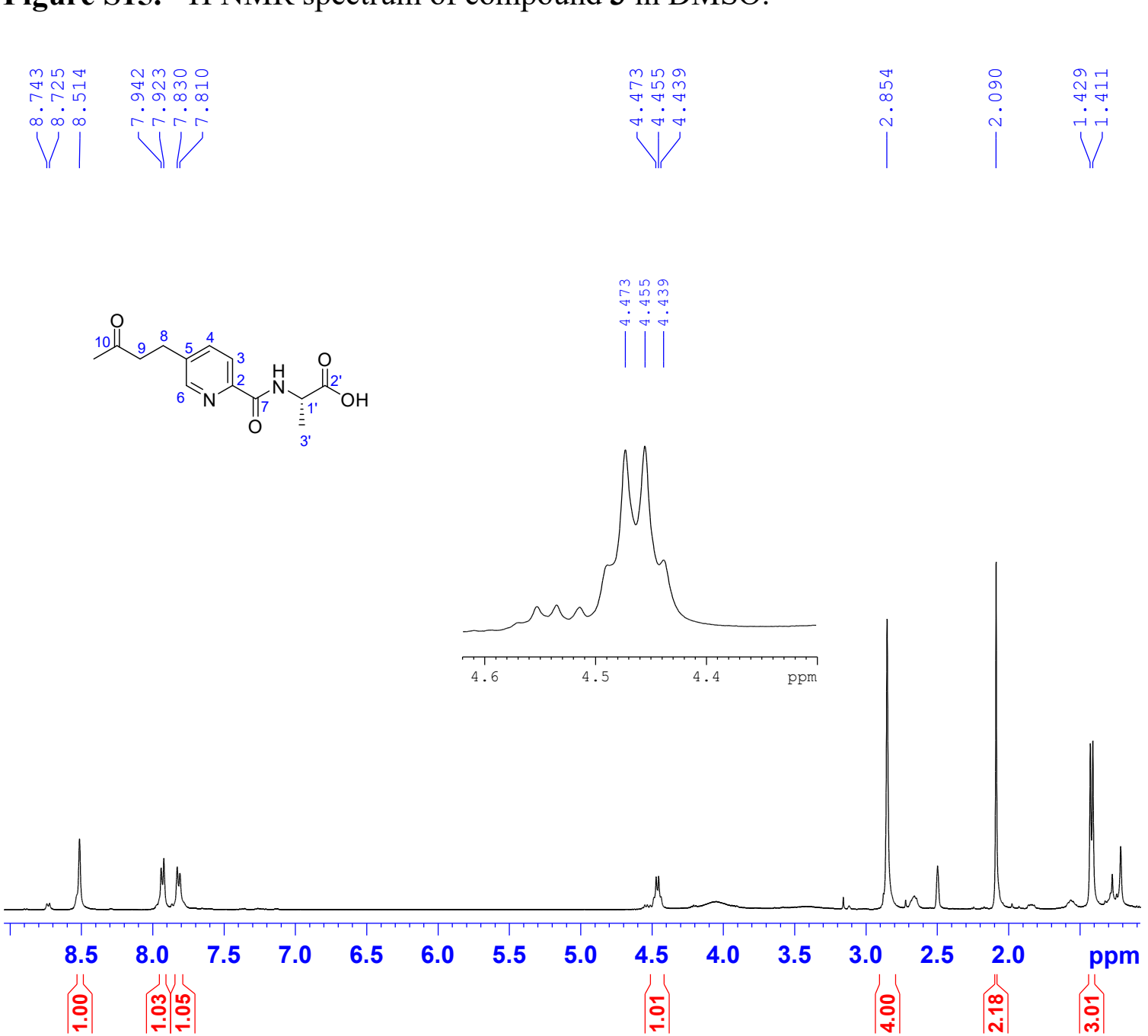
Monoisotopic Mass, Even Electron Ions
69 formula(e) evaluated with 6 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:
C: 0-13 H: 0-50 N: 0-5 O: 0-5

ZBC-2-June-2 88 (0.354) Cm (88:183)
1: TOF MS ES+



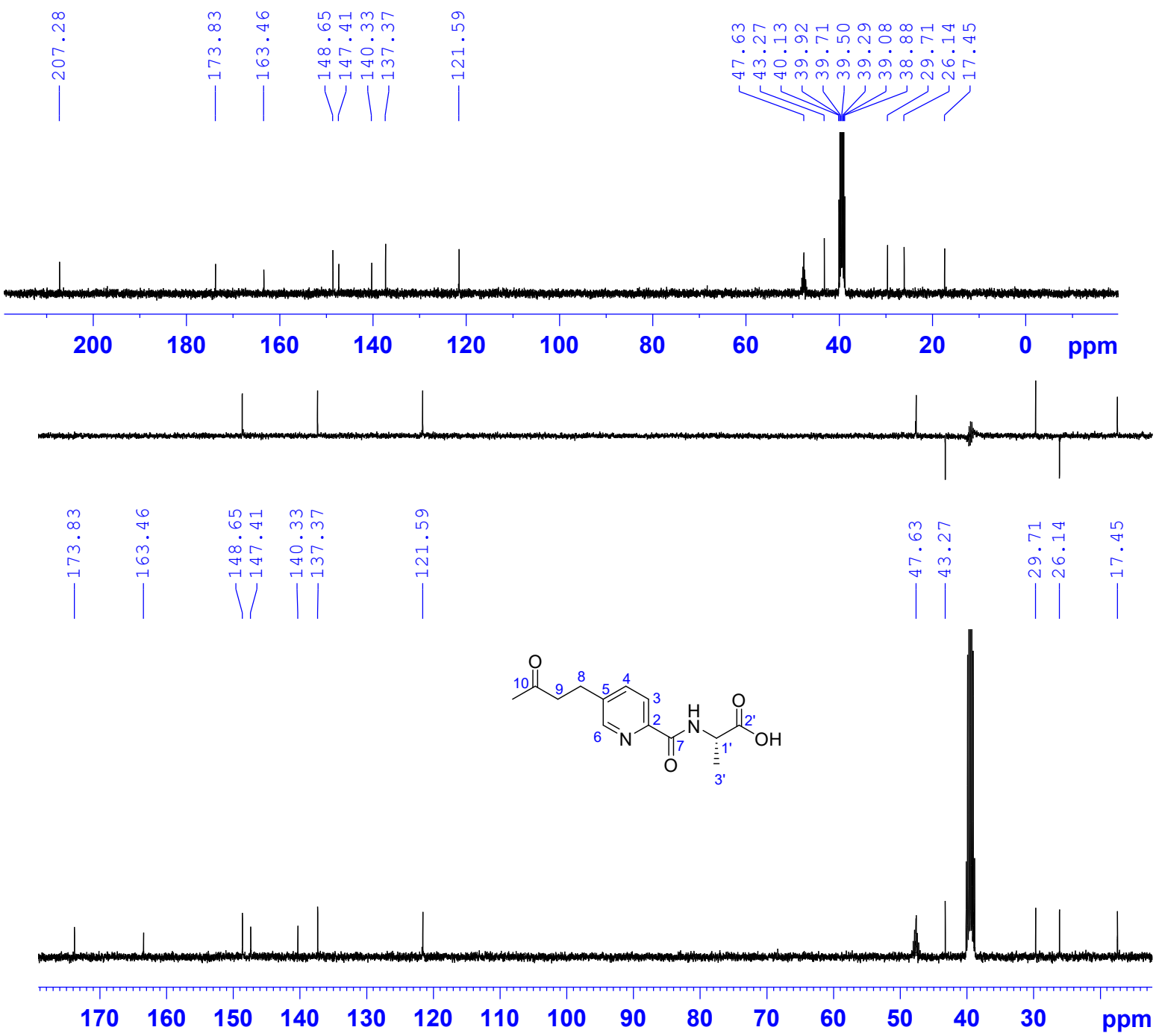
Minimum:				-1.5				
Maximum:		40.0	10.0	50.0				
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
251.0950	251.0919	3.1	12.3	6.5	2224.2	0.761	46.71	C13 H15 O5
	251.1032	-8.2	-32.7	6.5	2224.8	1.419	24.19	C12 H15 N2 O4
	251.0569	38.1	151.7	12.5	2225.0	1.557	21.08	C13 H7 N4 O2
	251.0668	28.2	112.3	7.5	2226.8	3.395	3.36	C11 H11 N2 O5
	251.1144	-19.4	-77.3	6.5	2227.0	3.651	2.60	C11 H15 N4 O3
	251.0780	17.0	67.7	7.5	2227.3	3.881	2.06	C10 H11 N4 O4

Figure S15. ^{1}H NMR spectrum of compound **3** in DMSO.




```
NAME        ZBC-46 DMSO 40mg
EXPNO                      1
PROCNO                     1
Date_               20220615
Time                  21.01
INSTRUM               spect
PROBHD     5 mm PABBO BB-
PULPROG                zg30
TD                    65536
SOLVENT                DMSO
NS                       22
DS                        2
SWH                8012.820 Hz
FIDRES                0.122266 Hz
AQ                 4.0894966 sec
RG                       144
DW                    62.400 usec
DE                     6.50 usec
TE                    296.8 K
D1                1.00000000 sec
TD0                       1

======== CHANNEL f1 ========
SFO1            400.1324710 MHz
NUC1                      1H
P1                    13.90 usec
SI                    32768
SF              400.1300031 MHz
WDW                      EM
SSB                       0
LB                     0.30 Hz
GB                        0
PC                     1.00
```

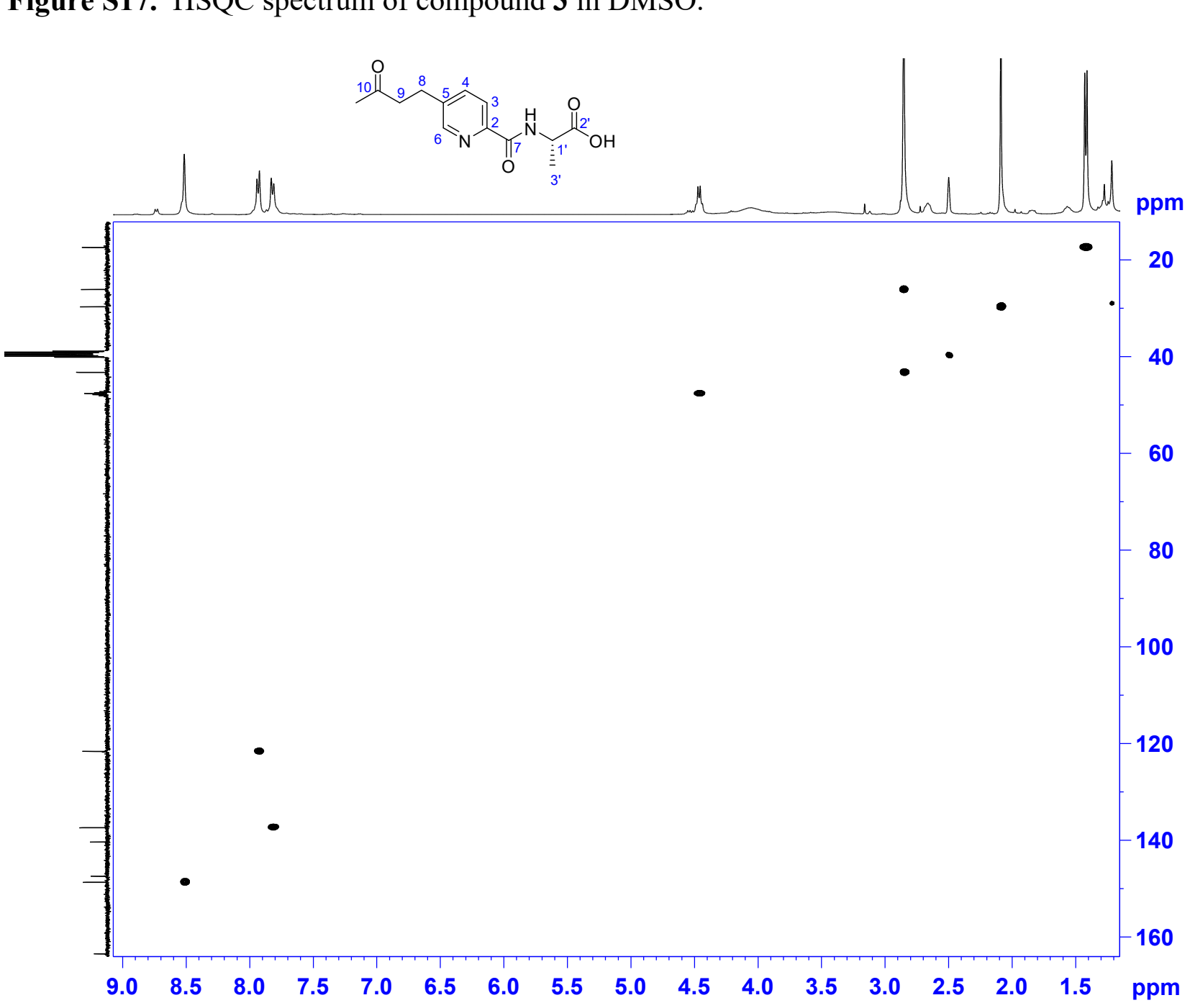
Figure S16. ^{13}C NMR spectrum of compound **3** in DMSO.



BRUKER

NAME	ZBC-46 DMSO 40mg
EXPNO	2
PROCNO	1
Date_	20220615
Time	21.04
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	DMSO
NS	59
DS	4
SWH	24038.461 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	20.800 usec
DE	6.50 usec
TE	296.9 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228293 MHz
NUC1	13C
P1	12.37 usec
SI	32768
SF	100.6128043 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

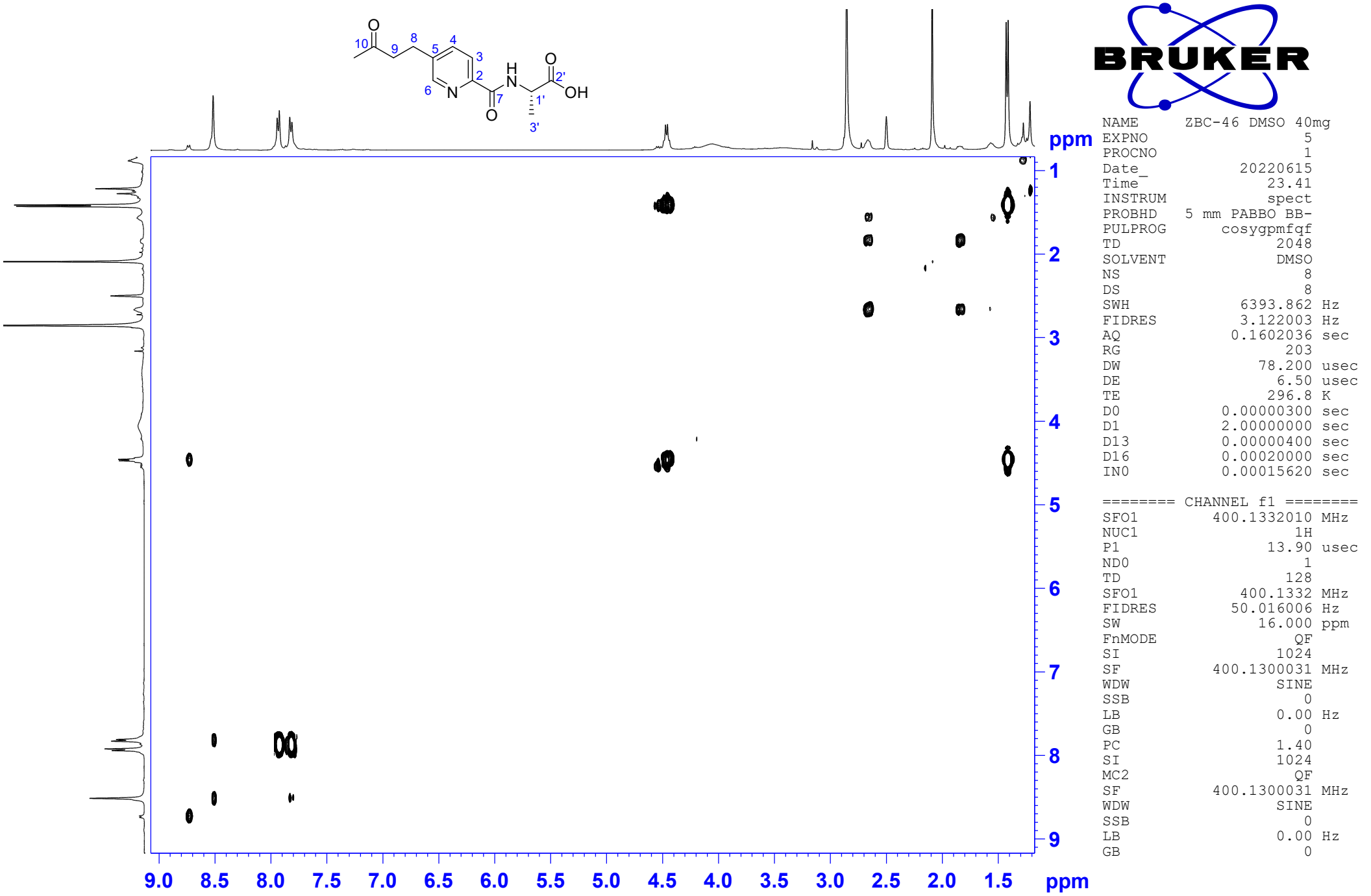
Figure S17. HSQC spectrum of compound **3** in DMSO.



BRUKER

NAME	ZBC-46 DMSO 40mg
EXPNO	4
PROCNO	1
Date_	20220615
Time	21.17
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	hsqcetgpsisp2.2
TD	1024
SOLVENT	DMSO
NS	16
DS	32
SWH	6393.862 Hz
FIDRES	6.244006 Hz
AQ	0.0801268 sec
RG	203
DW	78.200 usec
DE	6.50 usec
TE	296.9 K
CNST2	145.0000000
CNST17	-0.5000000
D0	0.00000300 sec
D1	2.00000000 sec
D4	0.00172414 sec
D11	0.03000000 sec
D16	0.00020000 sec
D24	0.00089000 sec
IN0	0.00002260 sec
======== CHANNEL f1 ========	
SFO1	400.1332010 MHz
NUC1	1H
P1	13.90 usec
P2	27.80 usec
P28	1000.00 usec
ND0	2
TD	256
SFO1	100.6238 MHz
FIDRES	86.421463 Hz
SW	219.867 ppm
FnMODE	Echo-Antiecho
SI	1024
SF	400.1300031 MHz
WDW	QSINE
SSB	2
LB	0.00 Hz
GB	0
PC	1.40
SI	1024
MC2	echo-antiecho
SF	100.6128043 MHz
WDW	QSINE
SSB	2
LB	0.00 Hz
GB	0

Figure S18. ^{1}H– ^{1}H COSY spectrum of compound **3** in DMSO.



BRUKER

NAME	ZBC-46 DMSO 40mg
EXPNO	5
PROCNO	1
Date_	20220615
Time	23.41
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	cosygpmfqf
TD	2048
SOLVENT	DMSO
NS	8
DS	8
SWH	6393.862 Hz
FIDRES	3.122003 Hz
AQ	0.1602036 sec
RG	203
DW	78.200 usec
DE	6.50 usec
TE	296.8 K
D0	0.00000300 sec
D1	2.00000000 sec
D13	0.00000400 sec
D16	0.00020000 sec
IN0	0.00015620 sec
======== CHANNEL f1 ========	
SFO1	400.1332010 MHz
NUC1	1H
P1	13.90 usec
ND0	1
TD	128
SFO1	400.1332 MHz
FIDRES	50.016006 Hz
SW	16.000 ppm
FnMODE	QF
SI	1024
SF	400.1300031 MHz
WDW	SINE
SSB	0
LB	0.00 Hz
GB	0
PC	1.40
SI	1024
MC2	QF
SF	400.1300031 MHz
WDW	SINE
SSB	0
LB	0.00 Hz
GB	0

Figure S19. HMBC spectrum of compound **3** in DMSO.

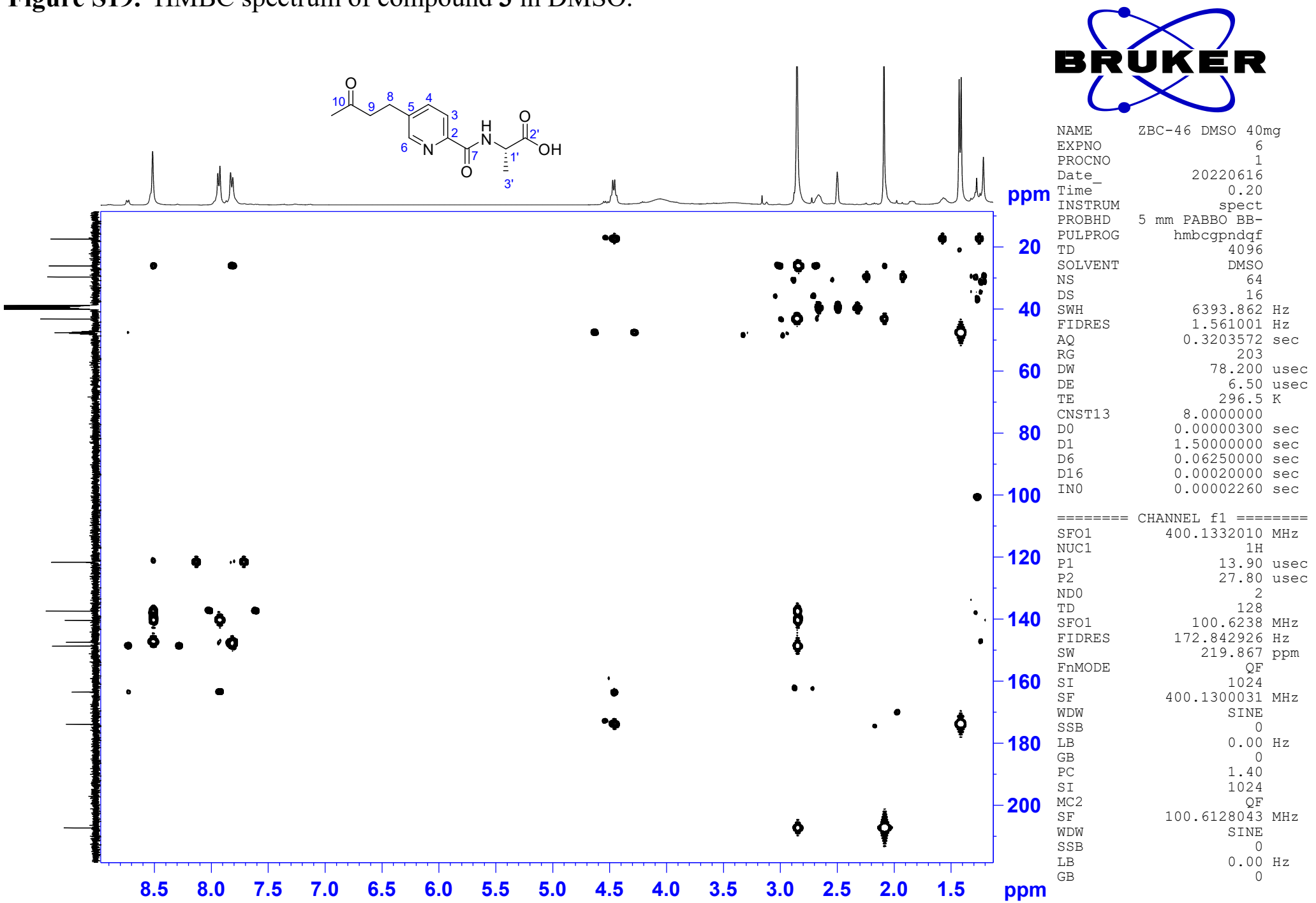
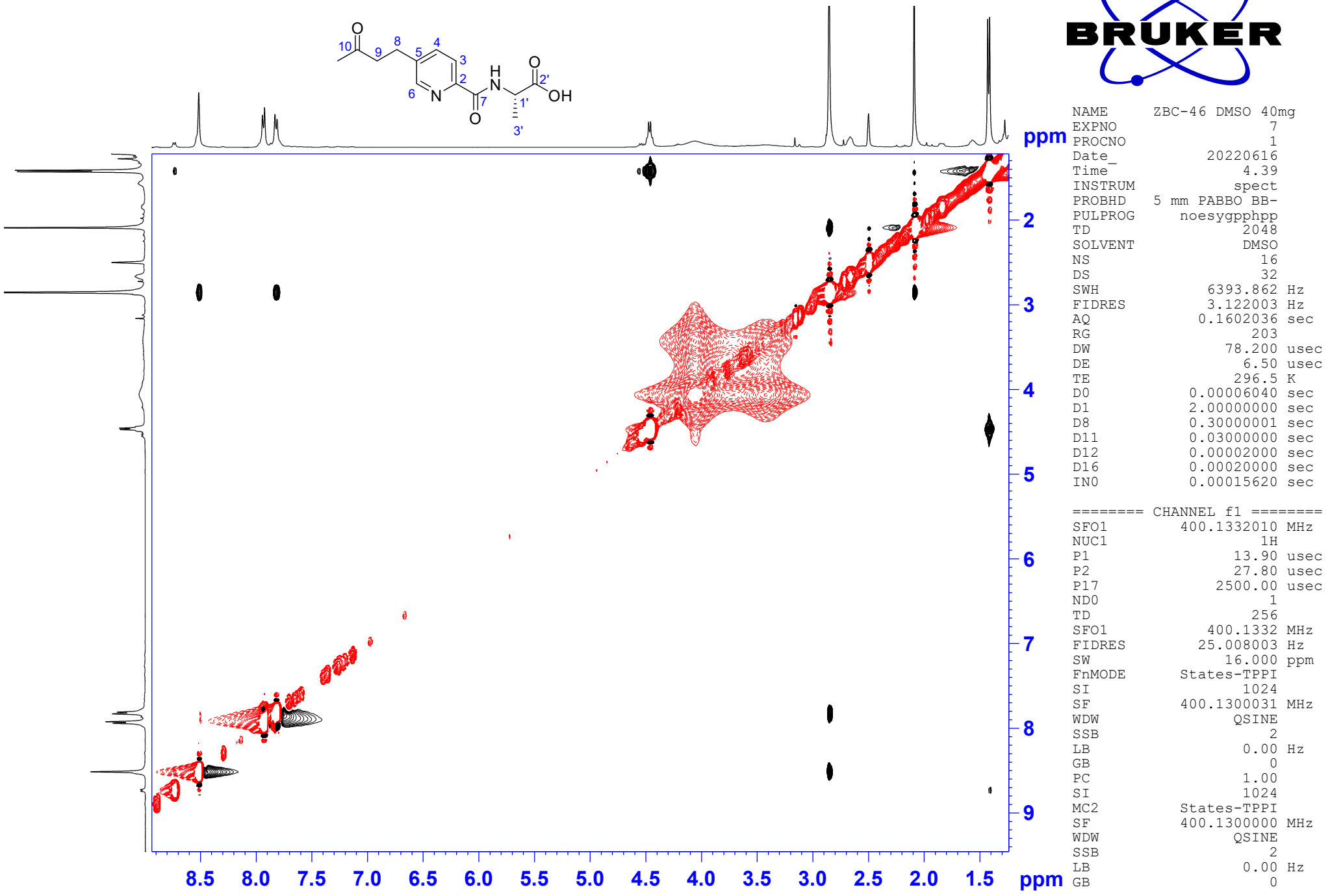


Figure S20. NOESY spectrum of compound **3** in DMSO.



BRUKER

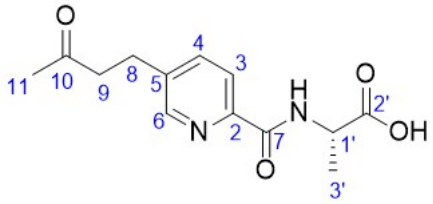
NAME	ZBC-46 DMSO 40mg
EXPNO	7
PROCNO	1
Date_	20220616
Time	4.39
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	noesygpphpp
TD	2048
SOLVENT	DMSO
NS	16
DS	32
SWH	6393.862 Hz
FIDRES	3.122003 Hz
AQ	0.1602036 sec
RG	203
DW	78.200 usec
DE	6.50 usec
TE	296.5 K
D0	0.00006040 sec
D1	2.00000000 sec
D8	0.30000001 sec
D11	0.03000000 sec
D12	0.00002000 sec
D16	0.00020000 sec
IN0	0.00015620 sec
======== CHANNEL f1 ========	
SFO1	400.1332010 MHz
NUC1	1H
P1	13.90 usec
P2	27.80 usec
P17	2500.00 usec
ND0	1
TD	256
SFO1	400.1332 MHz
FIDRES	25.008003 Hz
SW	16.000 ppm
FnMODE	States-TPPI
SI	1024
SF	400.1300031 MHz
WDW	QSINE
SSB	2
LB	0.00 Hz
GB	0
PC	1.00
SI	1024
MC2	States-TPPI
SF	400.1300000 MHz
WDW	QSINE
SSB	2
LB	0.00 Hz
GB	0

Figure S21. HRESIMS spectrum of compound **3**.

Elemental Composition Report

Single Mass Analysis

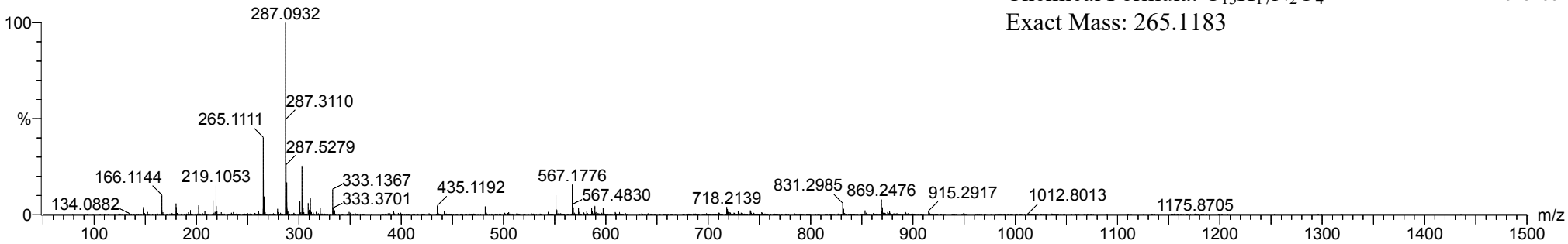
Tolerance = 40.0 mDa / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3



Monoisotopic Mass, Even Electron Ions
60 formula(e) evaluated with 4 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:
C: 0-13 H: 0-50 N: 0-5 O: 0-5

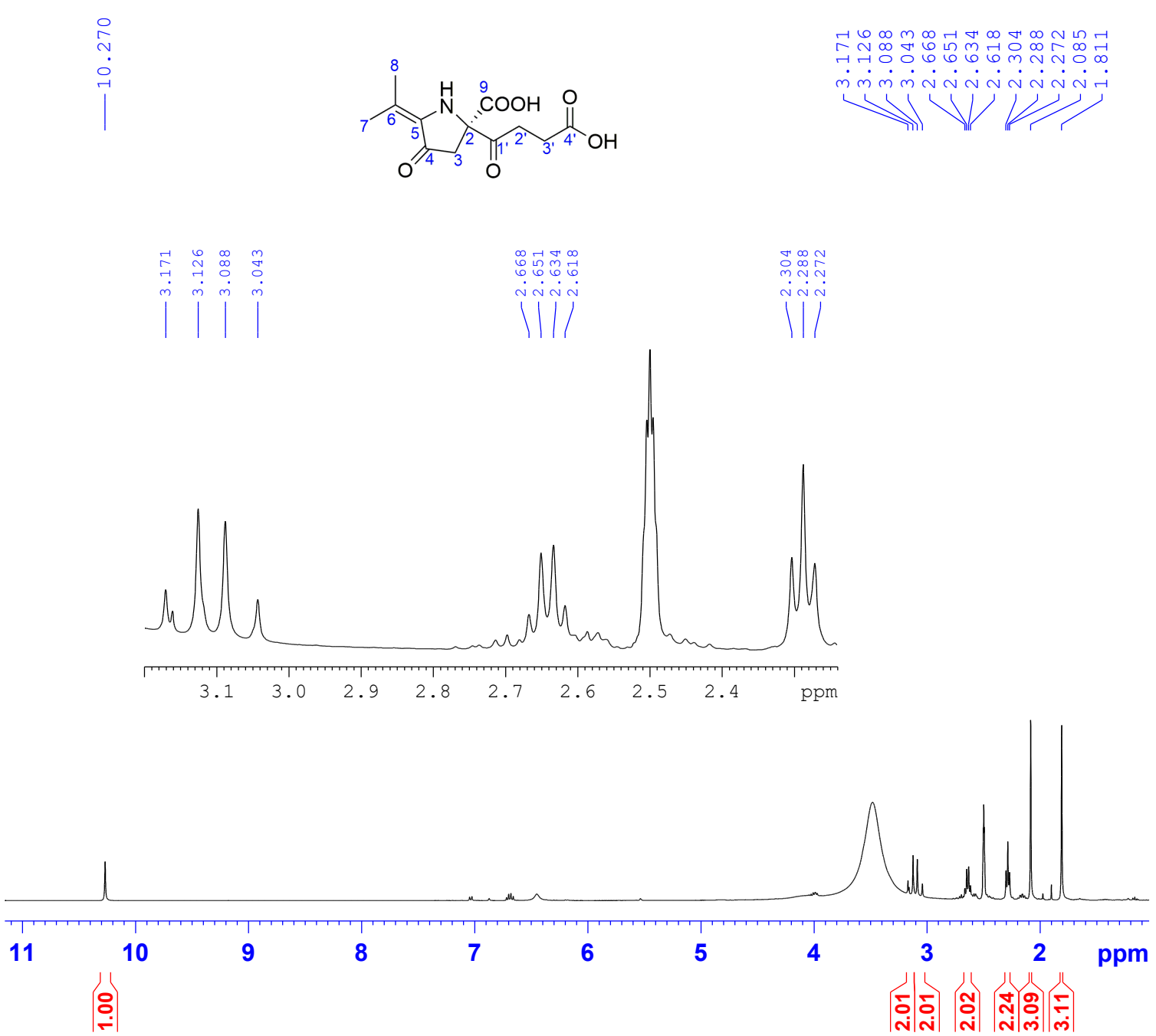
ZBC-46-June 120 (0.468) Cm (32:193)
1: TOF MS ES+

Chemical Formula: $C_{13}H_{17}N_2O_4^+$ 2.62e+007
Exact Mass: 265.1183



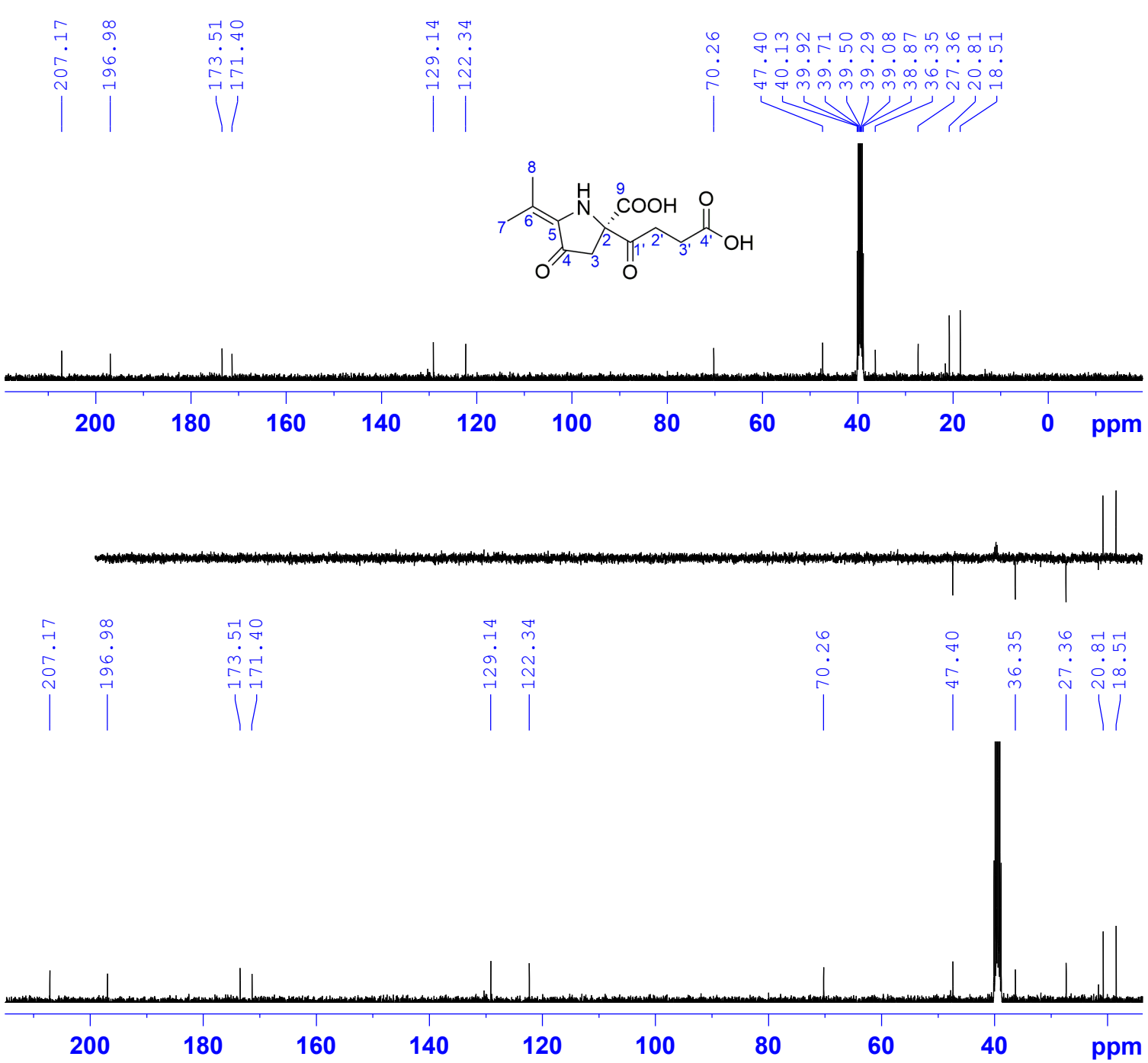
Minimum:				-1.5				
Maximum:		40.0	10.0	50.0				
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
265.1111	265.1188	-7.7	-29.0	6.5	2329.5	0.498	60.74	C13 H17 N2 O4
	265.0824	28.7	108.3	7.5	2330.6	1.596	20.28	C12 H13 N2 O5
	265.1301	-19.0	-71.7	6.5	2331.3	2.234	10.71	C12 H17 N4 O3
	265.0937	17.4	65.6	7.5	2331.5	2.493	8.27	C11 H13 N4 O4

Figure S22. 1H NMR spectrum of compound 4 in DMSO.



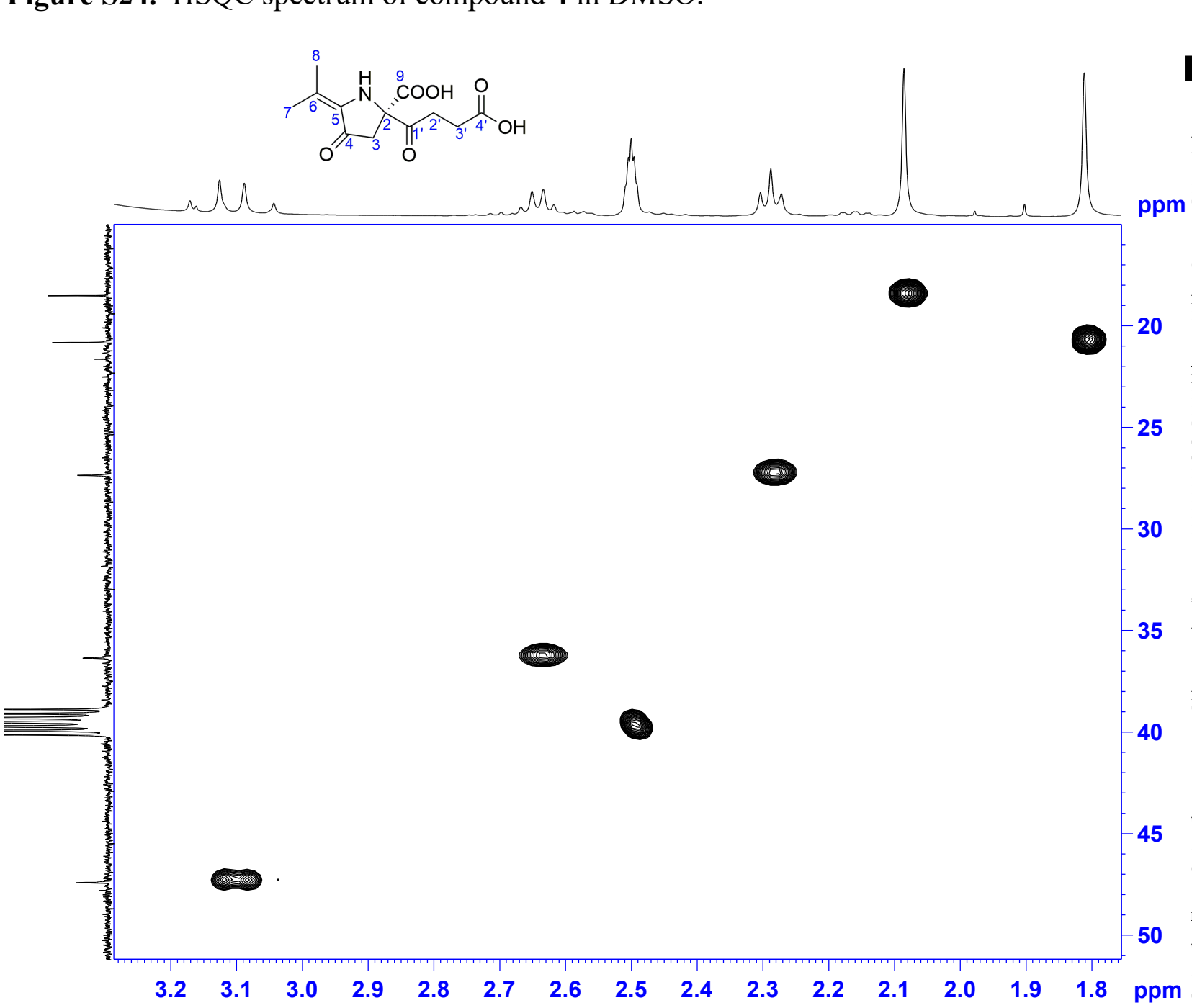

```
NAME        ZBC-16 DMSO 11mg
EXPNO                      1
PROCNO                     1
Date_               20200602
Time                   21.26
INSTRUM                spect
PROBHD    5 mm PABBO BB-
PULPROG                 zg30
TD                     65536
SOLVENT                 DMSO
NS                        44
DS                         2
SWH                 8012.820 Hz
FIDRES              0.122266 Hz
AQ                  4.0894966 sec
RG                       114
DW                    62.400 usec
DE                     6.50 usec
TE                    297.2 K
D1                  1.00000000 sec
TD0                        1

======== CHANNEL f1 ========
SFO1             400.1324710 MHz
NUC1                       1H
P1                    13.90 usec
SI                     32768
SF               400.1300032 MHz
WDW                       EM
SSB                        0
LB                     0.30 Hz
GB                         0
PC                     1.00
```

Figure S23. ^{13}C NMR spectrum of compound **4** in DMSO.




```
NAME        ZBC-16 DMSO 11mg
EXPNO                      2
PROCNO                     1
Date_               20200602
Time                  21.30
INSTRUM                spect
PROBHD     5 mm PABBO BB-
PULPROG                zgpg30
TD                     65536
SOLVENT                DMSO
NS                       198
DS                         4
SWH                24038.461 Hz
FIDRES             0.366798 Hz
AQ                 1.3631988 sec
RG                       203
DW                    20.800 usec
DE                     6.50 usec
TE                    297.5 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                        1

======== CHANNEL f1 ========
SFO1              100.6228293 MHz
NUC1                      13C
P1                     12.37 usec
SI                     32768
SF                100.6128040 MHz
WDW                       EM
SSB                        0
LB                     1.00 Hz
GB                         0
PC                     1.40
```

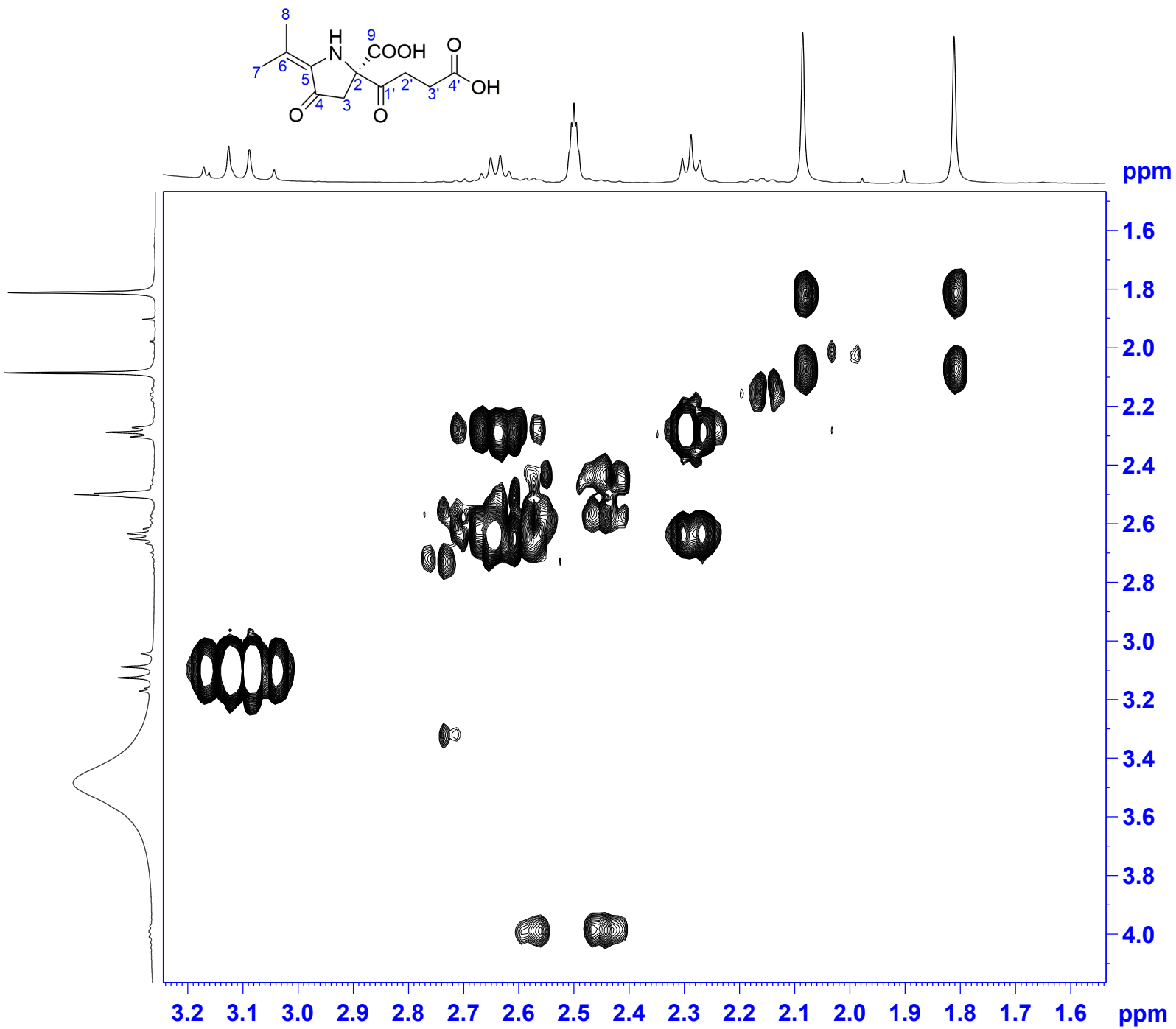
Figure S24. HSQC spectrum of compound **4** in DMSO.



BRUKER

NAME	ZBC-16 DMSO 11mg
EXPNO	4
PROCNO	1
Date_	20200602
Time	21.48
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	hsqcetgpsisp2.2
TD	1024
SOLVENT	DMSO
NS	8
DS	32
SWH	4795.396 Hz
FIDRES	4.683004 Hz
AQ	0.1068191 sec
RG	203
DW	104.267 usec
DE	6.50 usec
TE	297.4 K
CNST2	145.0000000
CNST17	-0.5000000
D0	0.00000300 sec
D1	2.00000000 sec
D4	0.00172414 sec
D11	0.03000000 sec
D16	0.00020000 sec
D24	0.00089000 sec
IN0	0.00002260 sec
======== CHANNEL f1 ========	
SFO1	400.1324008 MHz
NUC1	1H
P1	13.90 usec
P2	27.80 usec
P28	1000.00 usec
ND0	2
TD	256
SFO1	100.6238 MHz
FIDRES	86.421463 Hz
SW	219.867 ppm
FnMODE	Echo-Antiecho
SI	1024
SF	400.1300033 MHz
WDW	QSINE
SSB	2
LB	0.00 Hz
GB	0
PC	1.40
SI	1024
MC2	echo-antiecho
SF	100.6128040 MHz
WDW	QSINE
SSB	2
LB	0.00 Hz
GB	0

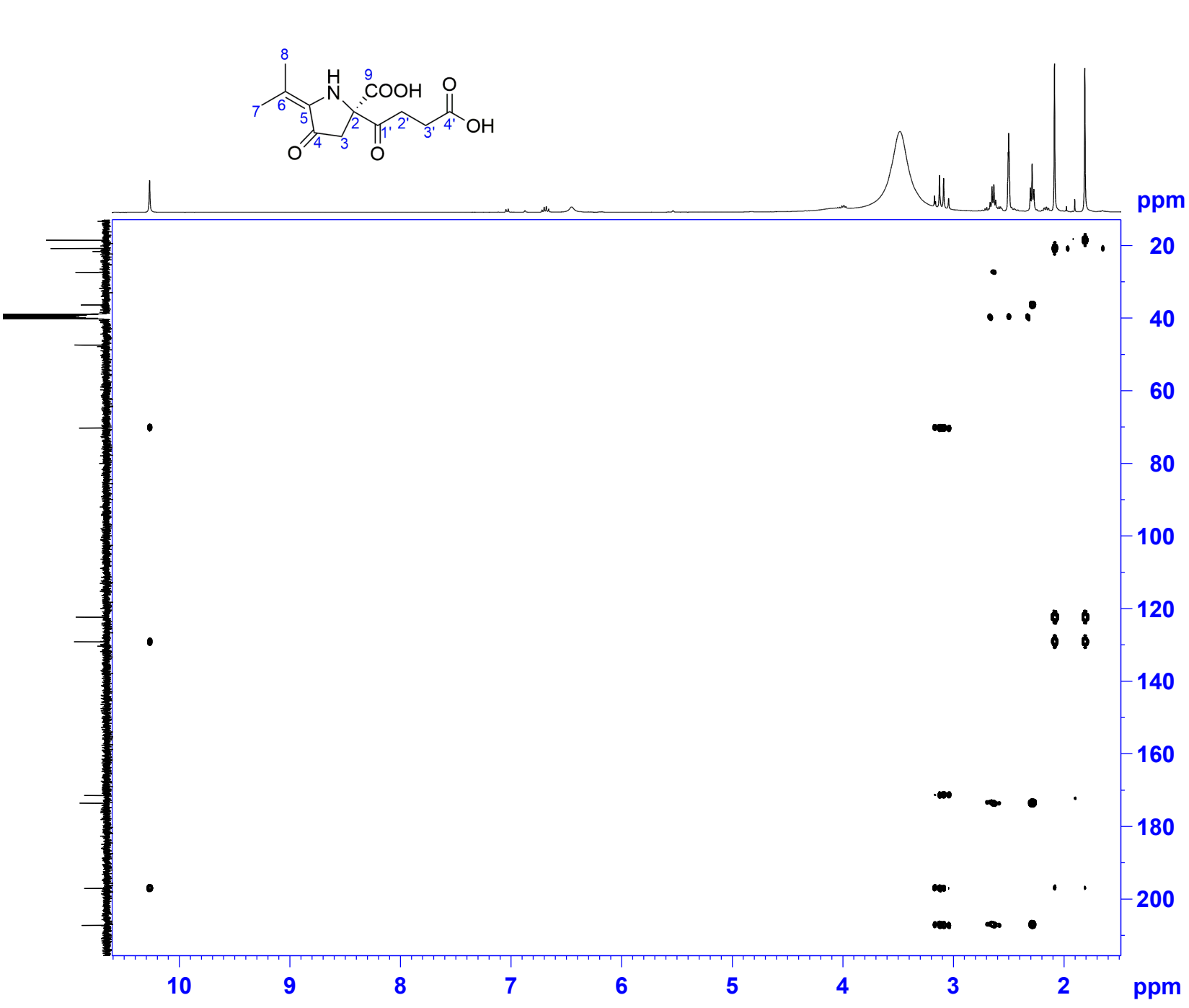
Figure S25. ^{1}H– ^{1}H COSY spectrum of compound **4** in DMSO.



BRUKER

```
NAME        ZBC-16 DMSO 11mg
EXPNO                      5
PROCNO                     1
Date_               20200602
Time                  23.02
INSTRUM                spect
PROBHD    5 mm PABBO BB-
PULPROG         cosygpmfqf
TD                      2048
SOLVENT                 DMSO
NS                         8
DS                         8
SWH                4807.692 Hz
FIDRES             2.347506 Hz
AQ                 0.2130420 sec
RG                       203
DW                   104.000 usec
DE                     6.50 usec
TE                    297.2 K
D0                 0.00000300 sec
D1                 2.00000000 sec
D13                0.00000400 sec
D16                0.00020000 sec
IN0                0.00020820 sec

======== CHANNEL f1 ========
SFO1            400.1324008 MHz
NUC1                       1H
P1                      13.90 usec
ND0                        1
TD                       128
SFO1               400.1324 MHz
FIDRES            37.524014 Hz
SW                   12.004 ppm
FnMODE                   QF
SI                     1024
SF              400.1300033 MHz
WDW                    SINE
SSB                        0
LB                      0.00 Hz
GB                         0
PC                      1.40
SI                     1024
MC2                      QF
SF              400.1300033 MHz
WDW                    SINE
SSB                        0
LB                      0.00 Hz
GB                         0
```

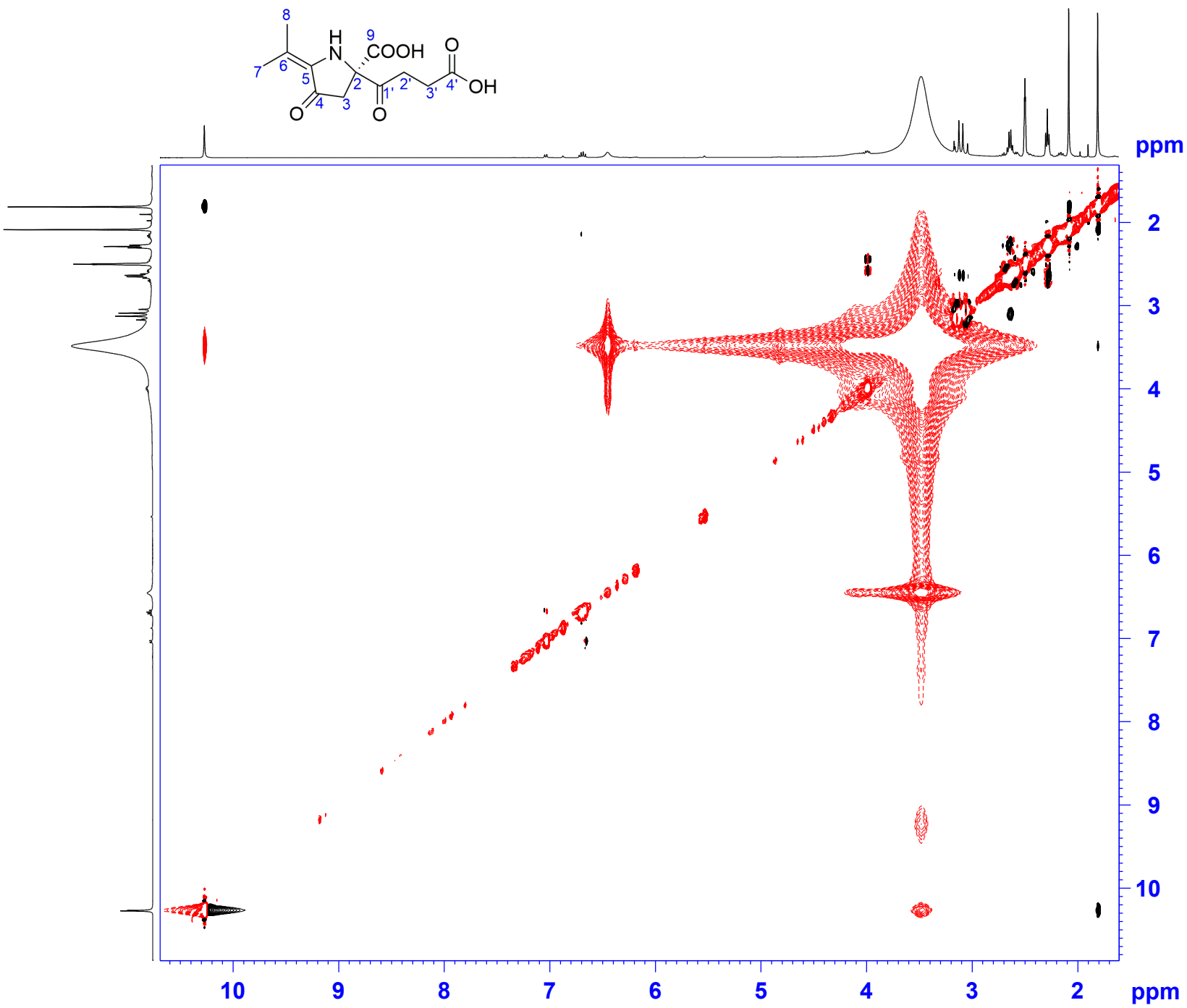
Figure S26. HMBC spectrum of compound **4** in DMSO.

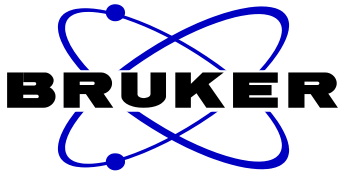


BRUKER

NAME	ZBC-16 DMSO 11mg
EXPNO	6
PROCNO	1
Date_	20200602
Time	23.41
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	hmbcgpndqf
TD	4096
SOLVENT	DMSO
NS	16
DS	16
SWH	4807.692 Hz
FIDRES	1.173753 Hz
AQ	0.4260340 sec
RG	203
DW	104.000 usec
DE	6.50 usec
TE	296.9 K
CNST13	8.0000000
D0	0.00000300 sec
D1	1.50000000 sec
D6	0.06250000 sec
D16	0.00020000 sec
IN0	0.00002260 sec
======== CHANNEL f1 ========	
SFO1	400.1324008 MHz
NUC1	1H
P1	13.90 usec
P2	27.80 usec
ND0	2
TD	128
SFO1	100.6238 MHz
FIDRES	172.842926 Hz
SW	219.867 ppm
FnMODE	QF
SI	1024
SF	400.1300033 MHz
WDW	SINE
SSB	0
LB	0.00 Hz
GB	0
PC	1.40
SI	1024
MC2	QF
SF	100.6128040 MHz
WDW	SINE
SSB	0
LB	0.00 Hz
GB	0

Figure S27. NOESY spectrum of compound **4** in DMSO.





NAME	ZBC-16 DMSO 11mg	
EXPNO	7	
PROCNO	1	
Date_	20200603	
Time	0.51	
INSTRUM	spect	
PROBHD	5 mm PABBO BB-	
PULPROG	noesygpphpp	
TD	2048	
SOLVENT	DMSO	
NS	32	
DS	32	
SWH	4795.396	Hz
FIDRES	2.341502	Hz
AQ	0.2135881	sec
RG	114	
DW	104.267	usec
DE	6.50	usec
TE	296.9	K
D0	0.00008640	sec
D1	2.00000000	sec
D8	0.30000001	sec
D11	0.03000000	sec
D12	0.00002000	sec
D16	0.00020000	sec
IN0	0.00020820	sec
======== CHANNEL f1 ========		
SFO1	400.1324008	MHz
NUC1	1H	
P1	13.90	usec
P2	27.80	usec
P17	2500.00	usec
ND0	1	
TD	256	
SFO1	400.1324	MHz
FIDRES	18.762007	Hz
SW	12.004	ppm
FnMODE	States-TPPI	
SI	1024	
SF	400.1300033	MHz
WDW	QSINE	
SSB	2	
LB	0.00	Hz
GB	0	
PC	1.00	
SI	1024	
MC2	States-TPPI	
SF	400.1300033	MHz
WDW	QSINE	
SSB	2	
LB	0.00	Hz
GB	0	

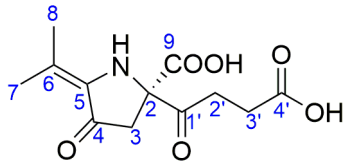
Figure S28. HRESIMS spectrum of compound **4**.

Elemental Composition Report

Single Mass Analysis

Tolerance = 40.0 mDa / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

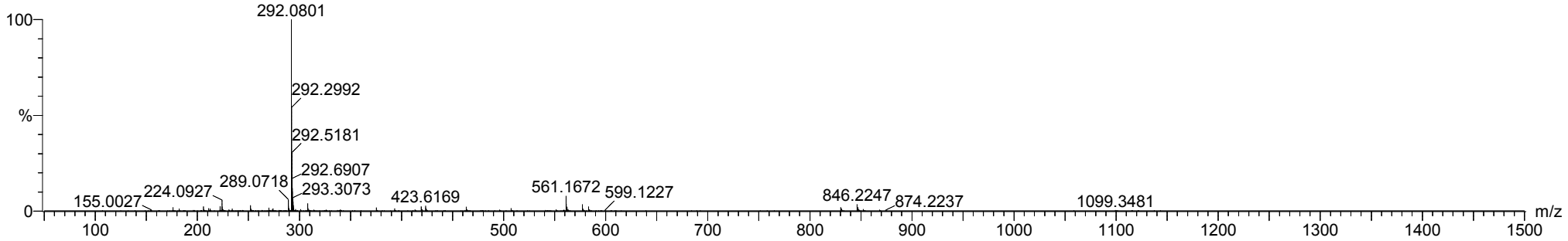
Monoisotopic Mass, Even Electron Ions
87 formula(e) evaluated with 10 results within limits (up to 50 best isotopic matches for each mass)
Elements Used:
C: 10-14 H: 0-40 N: 0-5 O: 0-7 Na: 1-1



Chemical Formula: $C_{12}H_{15}NNaO_6^+$
Exact Mass: 292.0792

ZBC-16 98 (0.390) Cm (51:262)
1: TOF MS ES+

2.40e+008



Minimum:				-1.5				
Maximum:		40.0	10.0	50.0				
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
292.0801	292.0546	25.5	87.3	6.5	2895.5	0.777	46.00	C10 H11 N3 O6 Na
	292.1022	-22.1	-75.7	5.5	2896.1	1.426	24.03	C10 H15 N5 O4 Na
	292.0909	-10.8	-37.0	5.5	2896.9	2.181	11.29	C11 H15 N3 O5 Na
	292.0433	36.8	126.0	6.5	2897.1	2.381	9.24	C11 H11 N O7 Na
	292.0797	0.4	1.4	5.5	2897.3	2.615	7.32	C12 H15 N O6 Na
	292.1161	-36.0	-123.3	4.5	2899.3	4.613	0.99	C13 H19 N O5 Na
	292.0447	35.4	121.2	11.5	2899.9	5.194	0.56	C12 H7 N5 O3 Na
	292.0698	10.3	35.3	10.5	2900.5	5.860	0.29	C14 H11 N3 O3 Na
	292.0810	-0.9	-3.1	10.5	2900.8	6.076	0.23	C13 H11 N5 O2 Na
	292.1174	-37.3	-127.7	9.5	2902.1	7.462	0.06	C14 H15 N5 O Na

Figure S29. The proposed fragmentation scheme of compound **1** by ESI-QTrap-MS/MS.

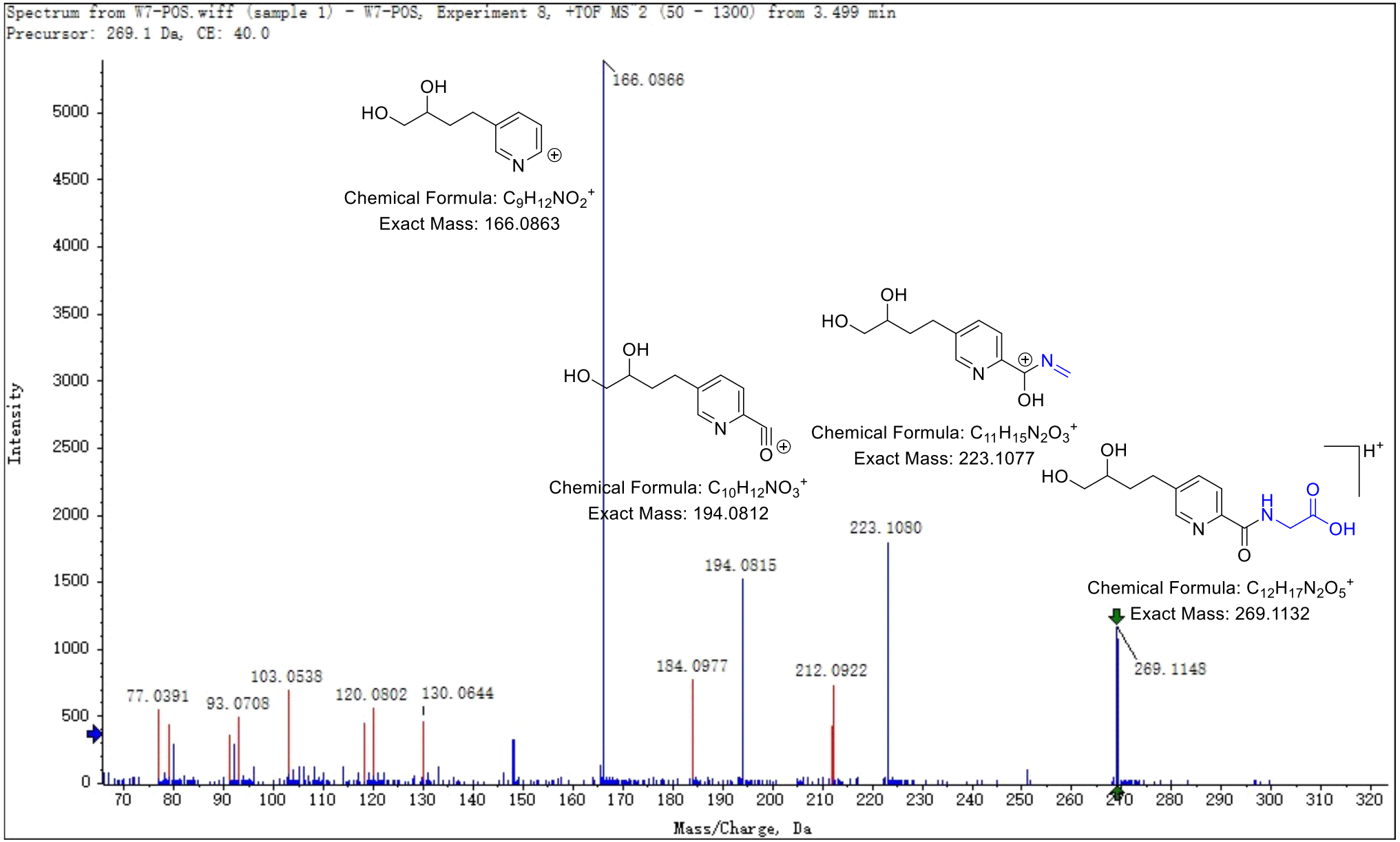
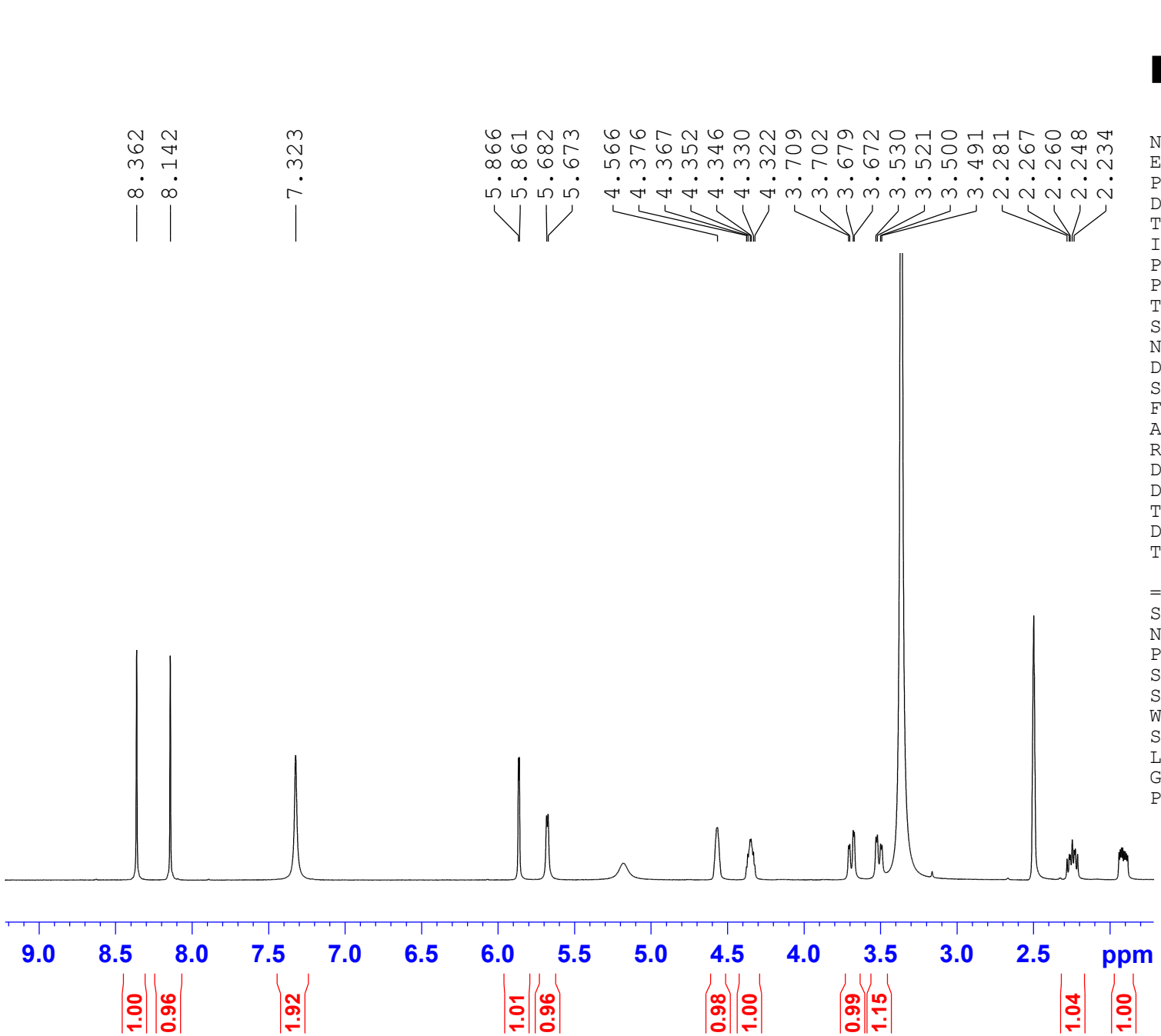
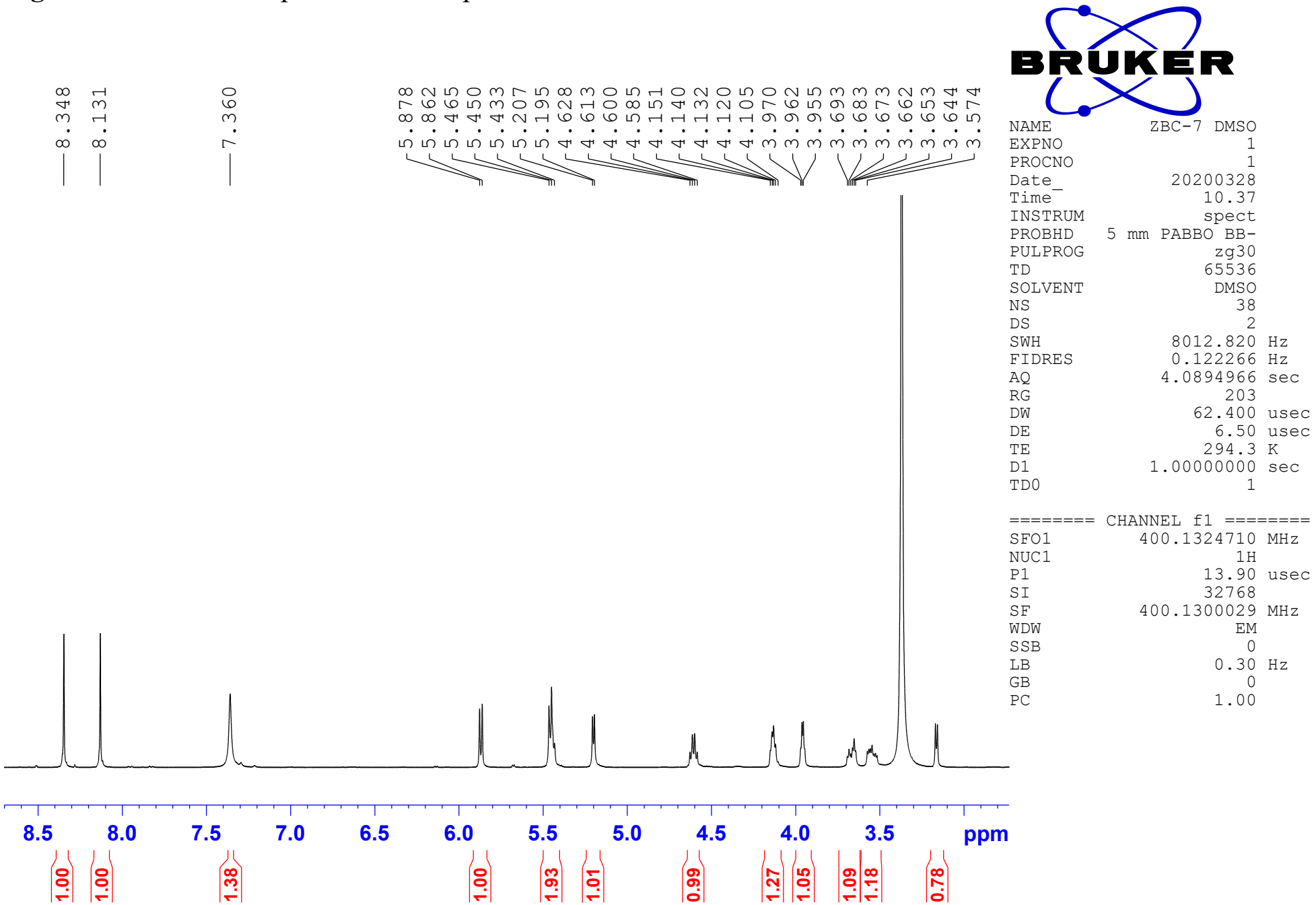


Figure S30. ^{1}H NMR spectrum of compound **5** in DMSO.



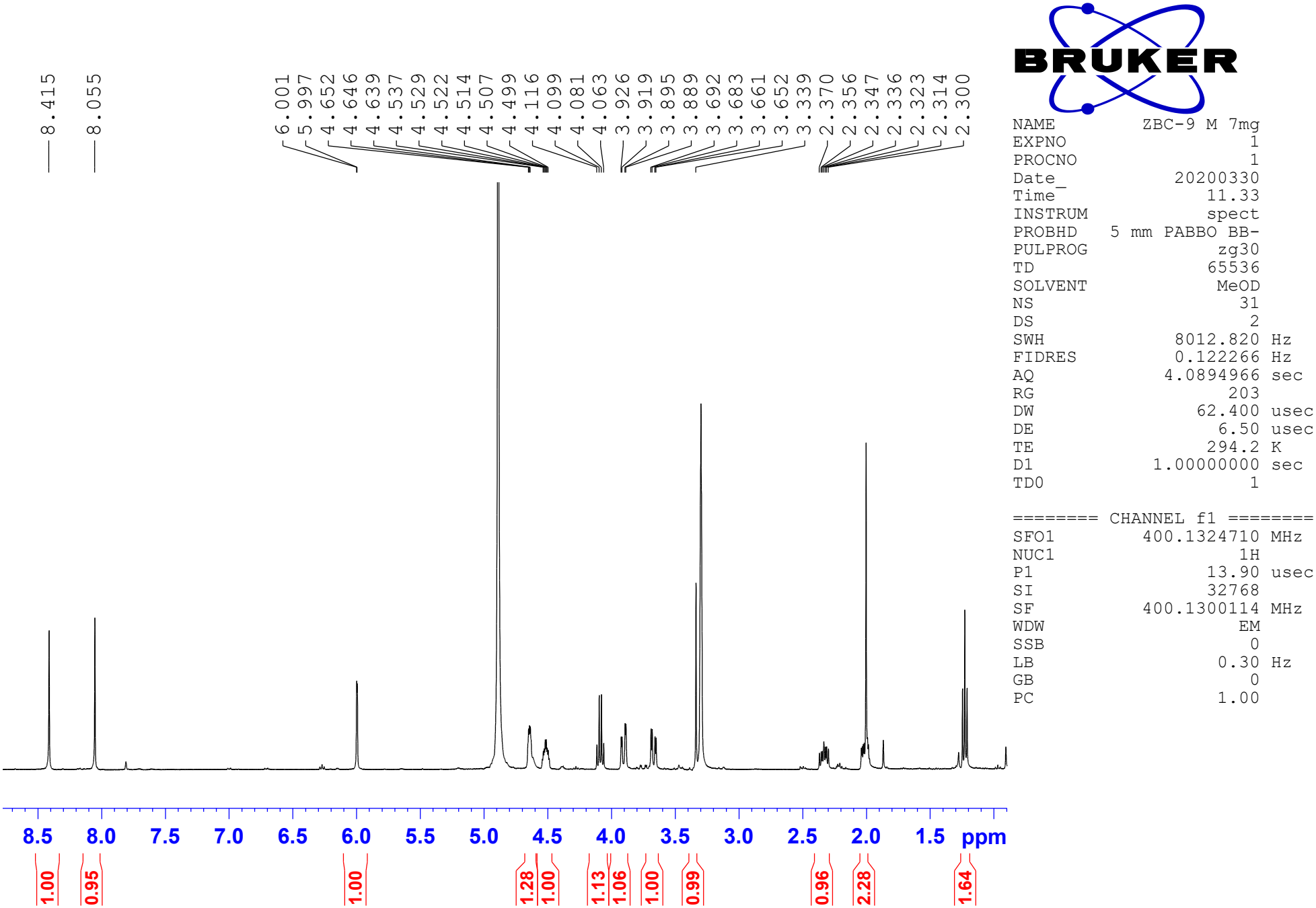
NAME	ZBC-6 DMSO
EXPNO	1
PROCNO	1
Date_	20200328
Time	9.58
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	DMSO
NS	32
DS	2
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	203
DW	62.400 usec
DE	6.50 usec
TE	294.1 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	13.90 usec
SI	32768
SF	400.1300030 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

Figure S31. ^{1}H NMR spectrum of compound **6** in DMSO.



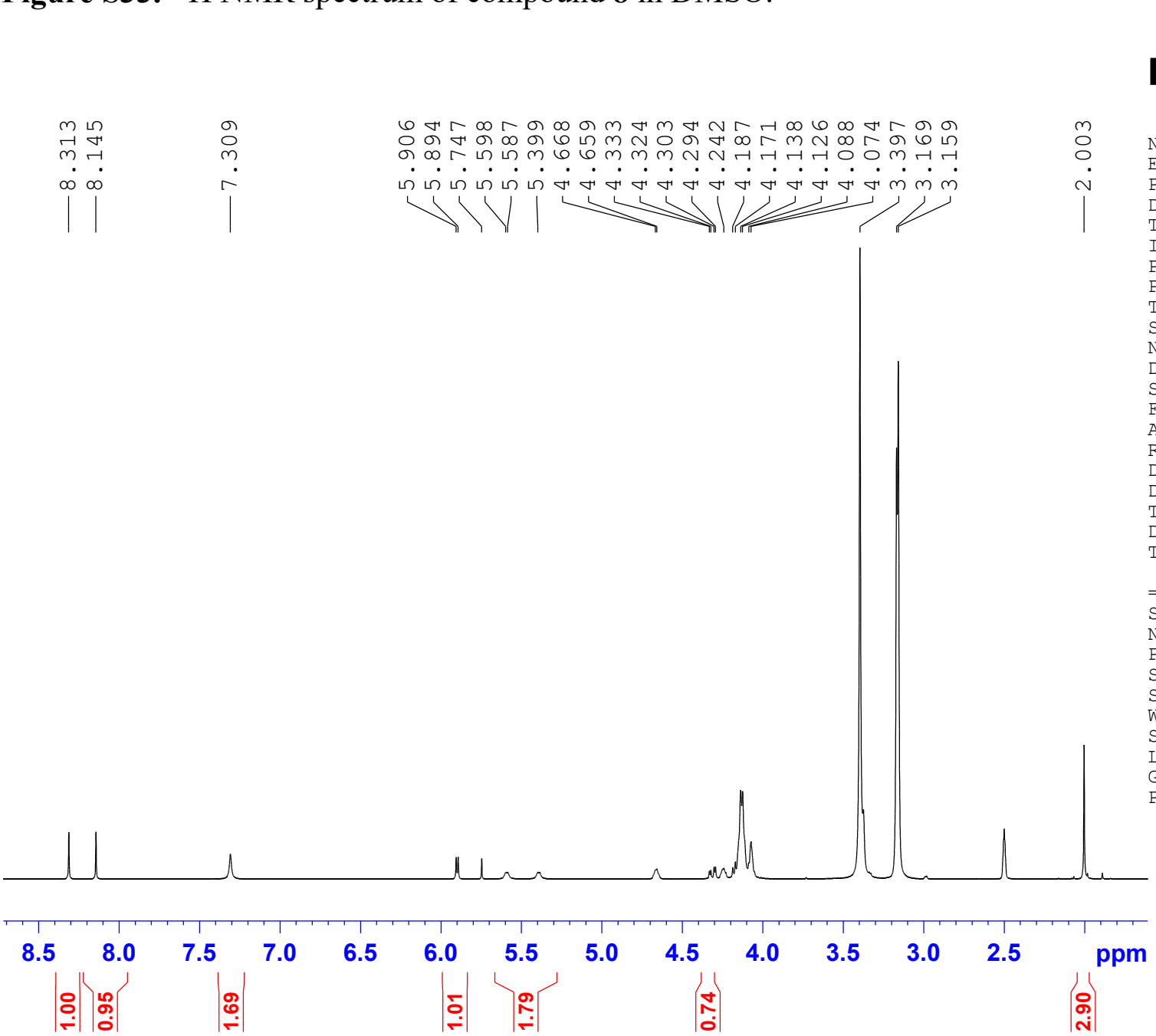

```
NAME            ZBC-7 DMSO
EXPNO                    1
PROCNO                   1
Date_             20200328
Time                10.37
INSTRUM             spect
PROBHD    5 mm PABBO BB-
PULPROG              zg30
TD                  65536
SOLVENT              DMSO
NS                     38
DS                      2
SWH              8012.820 Hz
FIDRES           0.122266 Hz
AQ               4.0894966 sec
RG                    203
DW                 62.400 usec
DE                  6.50 usec
TE                 294.3 K
D1              1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
SFO1          400.1324710 MHz
NUC1                   1H
P1                  13.90 usec
SI                  32768
SF            400.1300029 MHz
WDW                    EM
SSB                     0
LB                   0.30 Hz
GB                      0
PC                   1.00
```

Figure S32. ^{1}H NMR spectrum of compound **7** in CD_3OD.



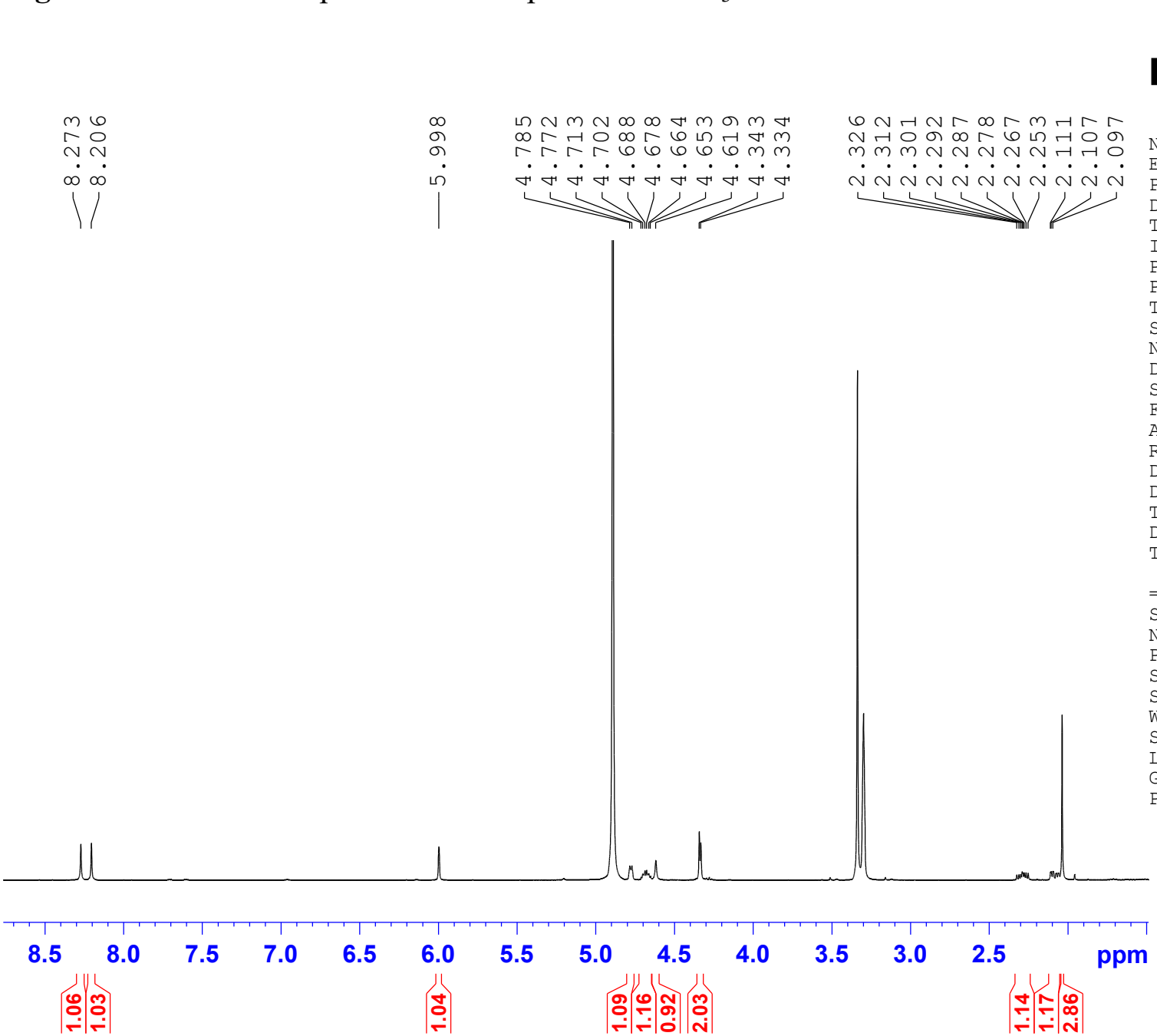

```
NAME          ZBC-9 M 7mg
EXPNO                   1
PROCNO                  1
Date_            20200330
Time                11.33
INSTRUM             spect
PROBHD   5 mm PABBO BB-
PULPROG              zg30
TD                  65536
SOLVENT              MeOD
NS                     31
DS                      2
SWH              8012.820 Hz
FIDRES           0.122266 Hz
AQ             4.0894966 sec
RG                    203
DW                 62.400 usec
DE                  6.50 usec
TE                 294.2 K
D1            1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
SFO1         400.1324710 MHz
NUC1                   1H
P1                 13.90 usec
SI                 32768
SF           400.1300114 MHz
WDW                    EM
SSB                     0
LB                  0.30 Hz
GB                      0
PC                   1.00
```

Figure S33. ^{1}H NMR spectrum of compound **8** in DMSO.



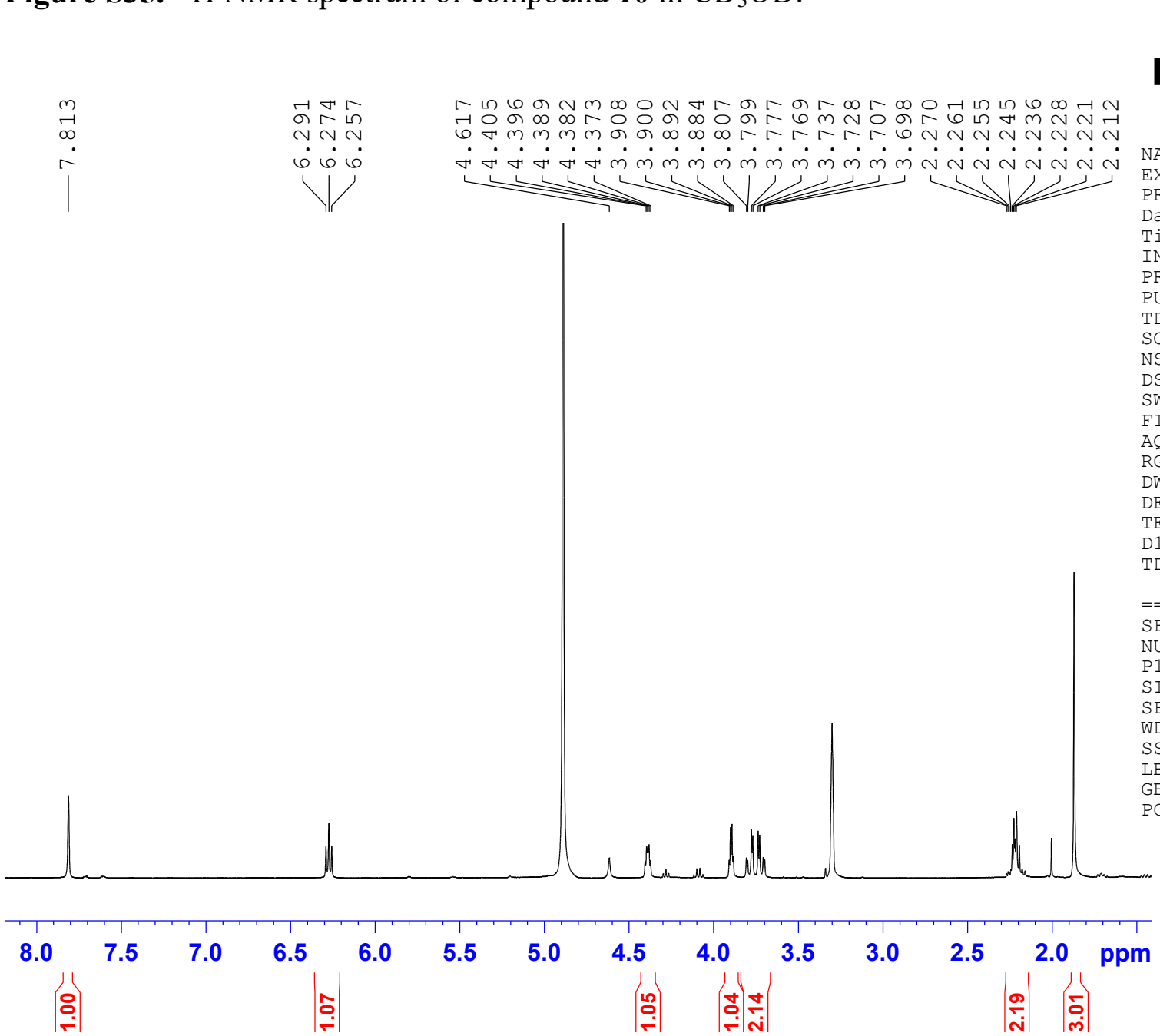

```
NAME        ZBC-19 DMSO 4mg
EXPNO                     1
PROCNO                    1
Date_              20200405
Time                 18.42
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG                zg30
TD                    65536
SOLVENT                DMSO
NS                       41
DS                        2
SWH                8012.820 Hz
FIDRES             0.122266 Hz
AQ                 4.0894966 sec
RG                       144
DW                    62.400 usec
DE                     6.50 usec
TE                    293.9 K
D1                1.00000000 sec
TD0                       1

======== CHANNEL f1 ========
SFO1           400.1324710 MHz
NUC1                     1H
P1                    13.90 usec
SI                    32768
SF             400.1300030 MHz
WDW                      EM
SSB                       0
LB                     0.30 Hz
GB                        0
PC                     1.00
```

Figure S34. ^{1}H NMR spectrum of compound **9** in CD_3OD.




```
NAME          ZBC-32 M 2mg
EXPNO                    1
PROCNO                   1
Date_             20200421
Time                 10.02
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG               zg30
TD                   65536
SOLVENT               MeOD
NS                      40
DS                       2
SWH               8012.820 Hz
FIDRES            0.122266 Hz
AQ              4.0894966 sec
RG                     203
DW                  62.400 usec
DE                   6.50 usec
TE                  294.1 K
D1             1.00000000 sec
TD0                      1

======== CHANNEL f1 ========
SFO1          400.1324710 MHz
NUC1                    1H
P1                   13.90 usec
SI                   32768
SF            400.1300116 MHz
WDW                     EM
SSB                      0
LB                    0.30 Hz
GB                       0
PC                    1.00
```

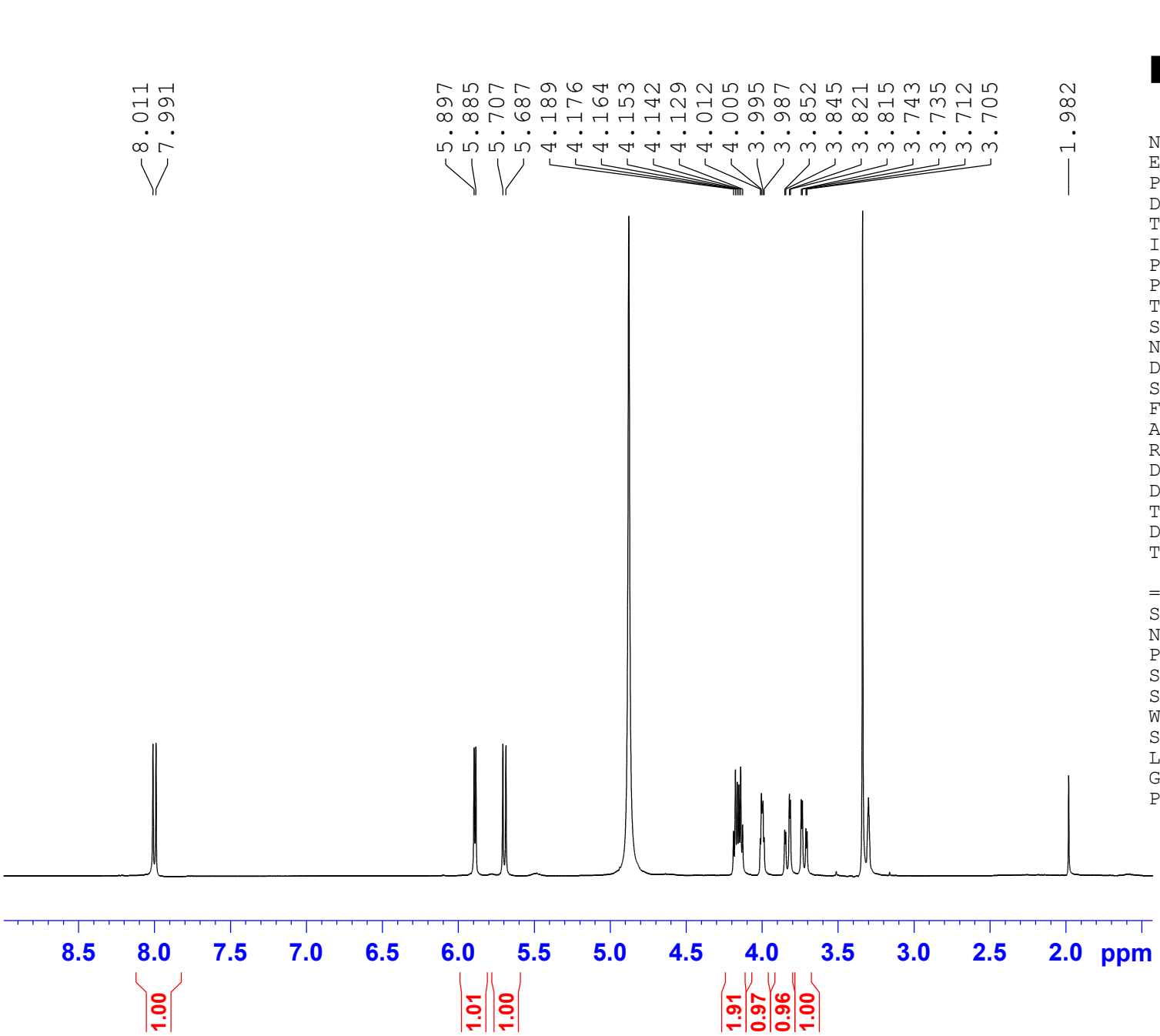
Figure S35. ^{1}H NMR spectrum of compound **10** in CD_3OD.



BRUKER

NAME	ZBC-8 M 11mg
EXPNO	1
PROCNO	1
Date_	20200330
Time	11.09
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	MeOD
NS	43
DS	2
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	181
DW	62.400 usec
DE	6.50 usec
TE	294.1 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	13.90 usec
SI	32768
SF	400.1300115 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

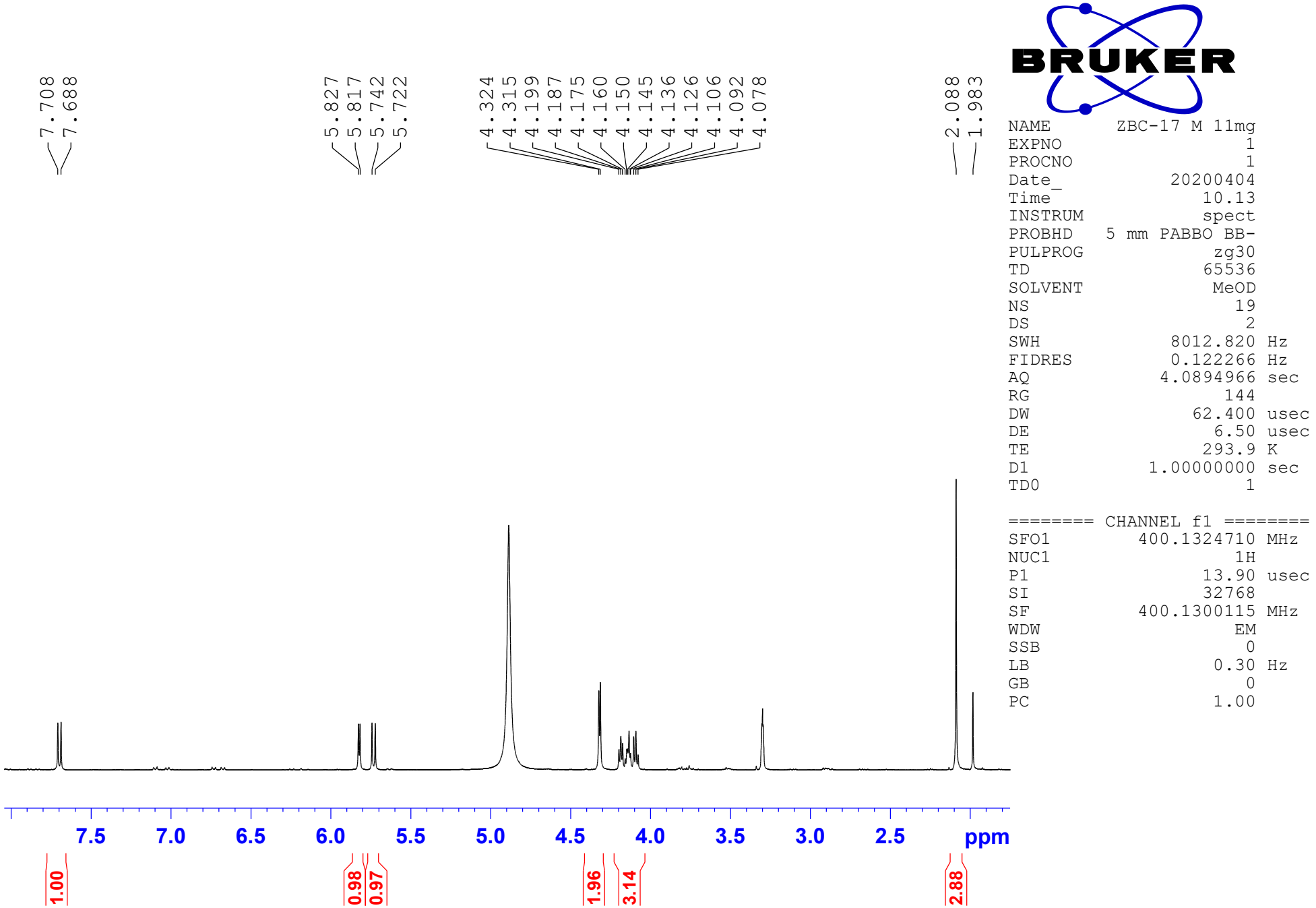
Figure S36. ^{1}H NMR spectrum of compound **11** in CD_3OD.



BRUKER

NAME	ZBC-13 M 26mg	
EXPNO	1	
PROCNO	1	
Date_	20200331	
Time	22.14	
INSTRUM	spect	
PROBHD	5 mm PABBO BB-	
PULPROG	zg30	
TD	65536	
SOLVENT	MeOD	
NS	18	
DS	2	
SWH	8012.820	Hz
FIDRES	0.122266	Hz
AQ	4.0894966	sec
RG	101	
DW	62.400	usec
DE	6.50	usec
TE	294.3	K
D1	1.00000000	sec
TD0	1	
======== CHANNEL f1 ========		
SFO1	400.1324710	MHz
NUC1	1H	
P1	13.90	usec
SI	32768	
SF	400.1300114	MHz
WDW	EM	
SSB	0	
LB	0.30	Hz
GB	0	
PC	1.00	

Figure S37. ^{1}H NMR spectrum of compound **12** in CD_3OD.




```
NAME          ZBC-17 M 11mg
EXPNO                     1
PROCNO                    1
Date_              20200404
Time                  10.13
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG               zg30
TD                   65536
SOLVENT               MeOD
NS                      19
DS                       2
SWH               8012.820 Hz
FIDRES            0.122266 Hz
AQ              4.0894966 sec
RG                     144
DW                  62.400 usec
DE                   6.50 usec
TE                  293.9 K
D1             1.00000000 sec
TD0                      1

======== CHANNEL f1 ========
SFO1          400.1324710 MHz
NUC1                    1H
P1                   13.90 usec
SI                   32768
SF            400.1300115 MHz
WDW                     EM
SSB                      0
LB                    0.30 Hz
GB                       0
PC                    1.00
```

Figure S38. ^{1}H NMR spectrum of compound **13** in $CDCl_3$.

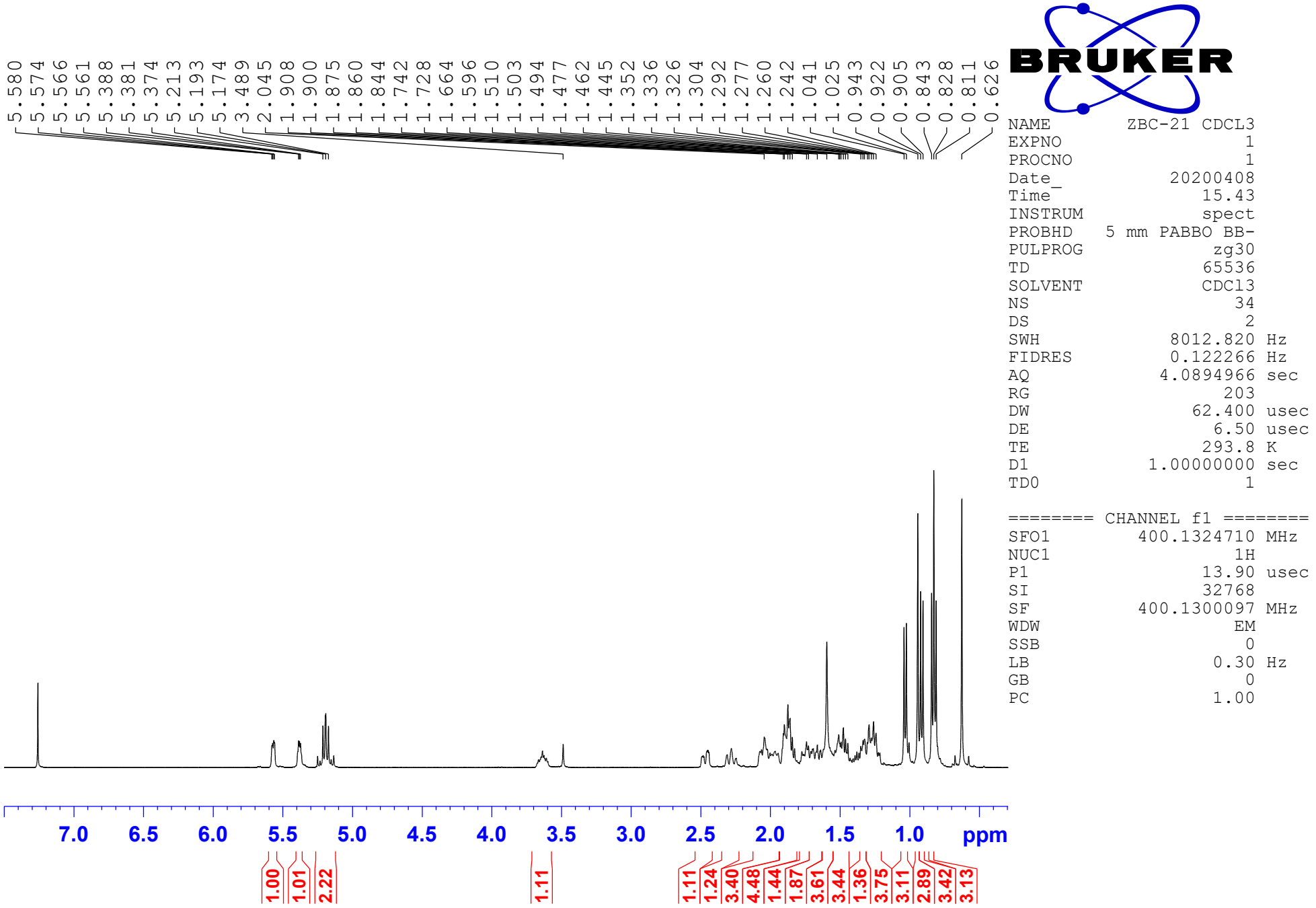
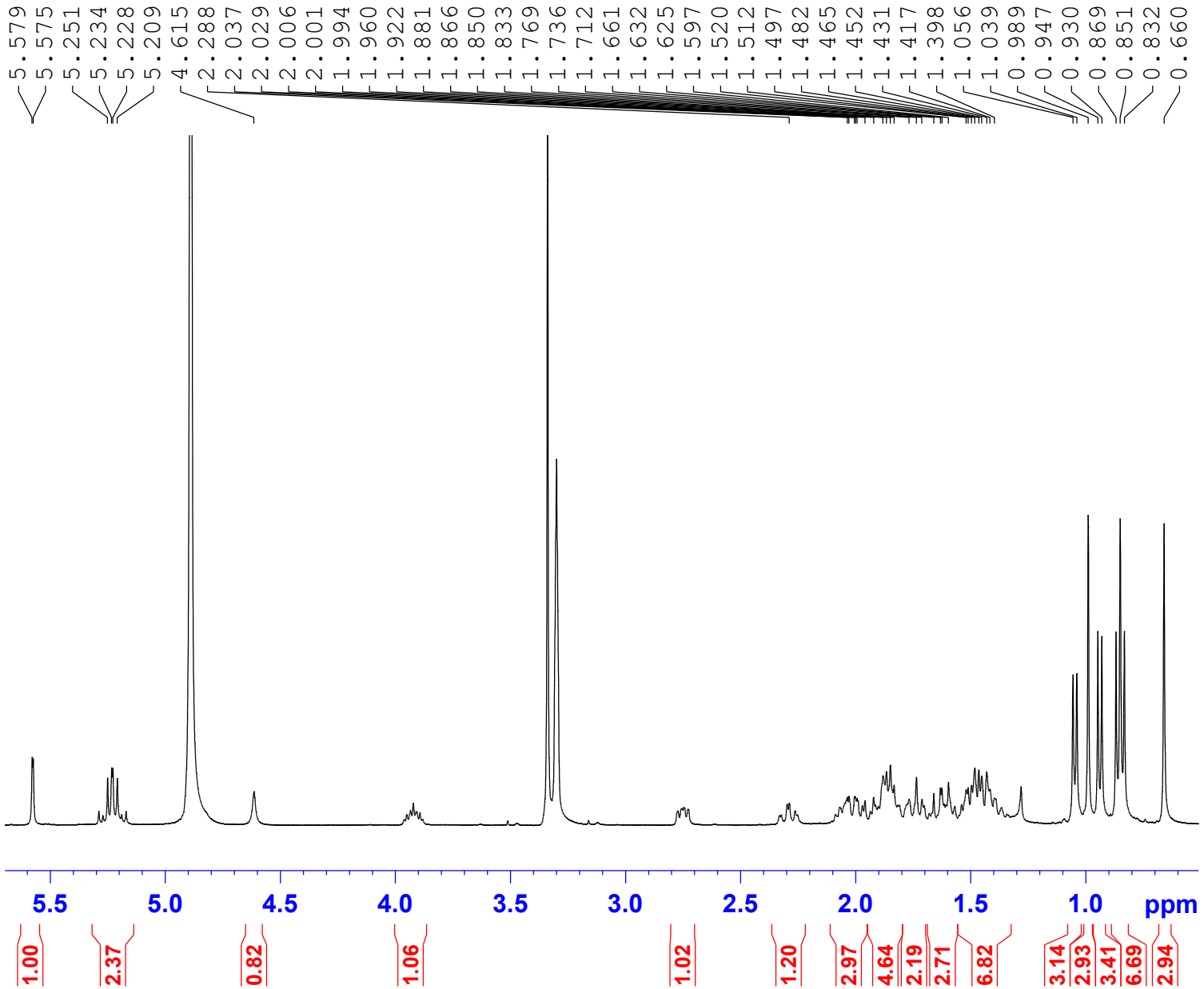


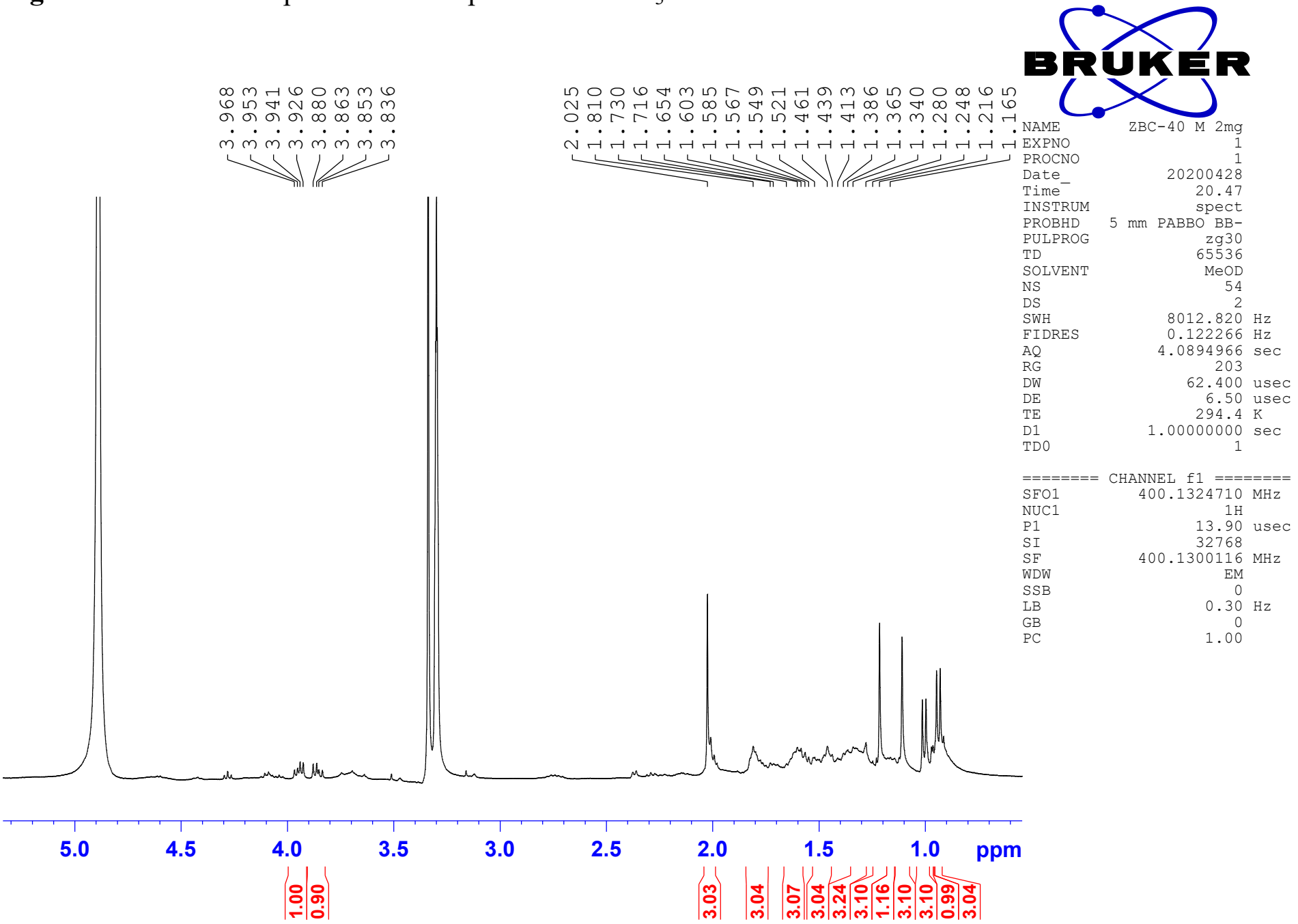
Figure S39. ^{1}H NMR spectrum of compound **14** in CD_3OD.



BRUKER

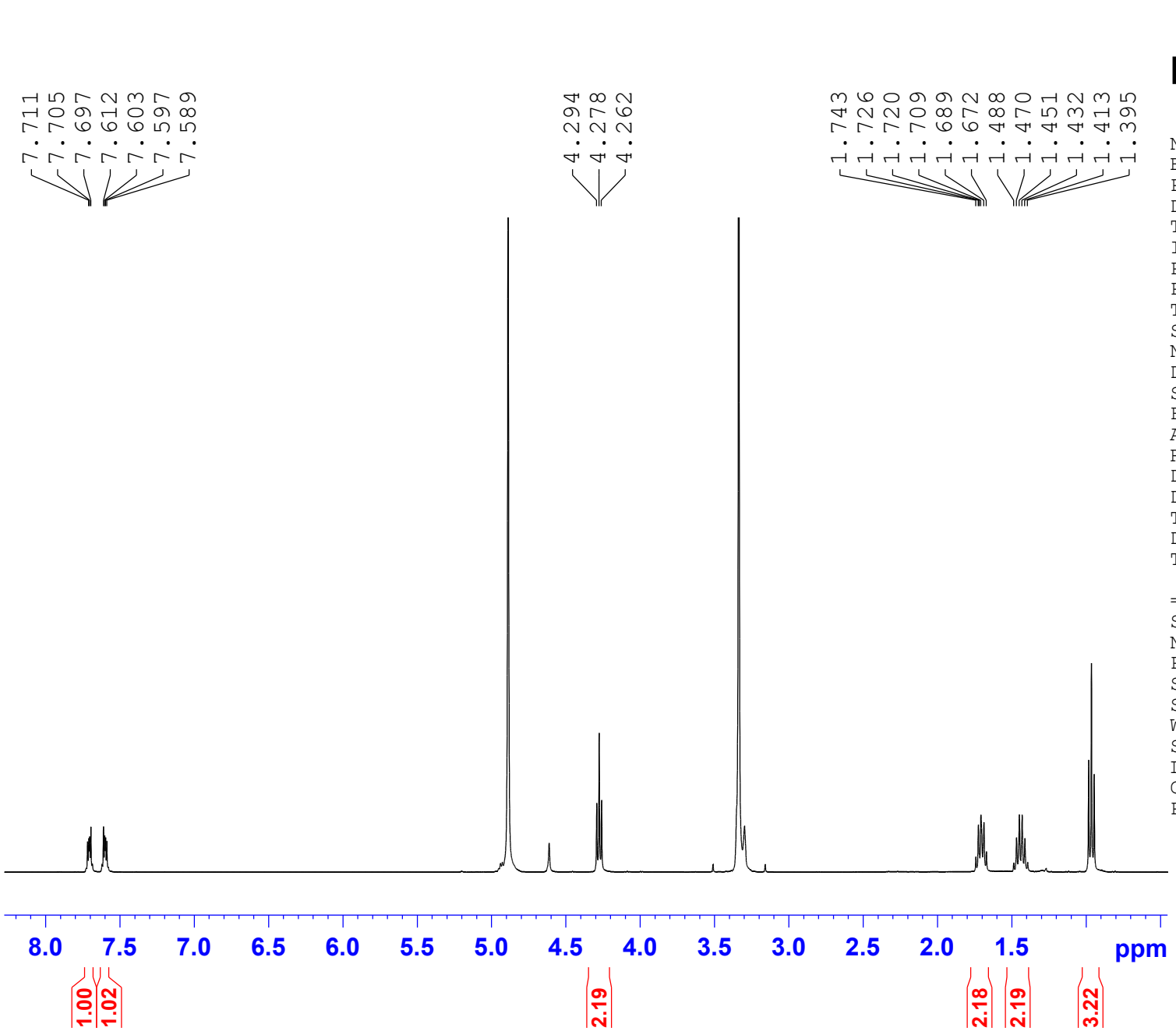
NAME	ZBC-47 M 7mg
EXPNO	1
PROCNO	1
Date_	20200502
Time	20.18
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	MeOD
NS	30
DS	2
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	181
DW	62.400 usec
DE	6.50 usec
TE	294.3 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	13.90 usec
SI	32768
SF	400.1300113 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

Figure S40. ^{1}H NMR spectrum of compound **15** in CD_3OD.




```
NAME          ZBC-40 M 2mg
EXPNO                    1
PROCNO                   1
Date_             20200428
Time                 20.47
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG               zg30
TD                   65536
SOLVENT               MeOD
NS                      54
DS                       2
SWH               8012.820 Hz
FIDRES               0.122266 Hz
AQ                4.0894966 sec
RG                     203
DW                  62.400 usec
DE                   6.50 usec
TE                  294.4 K
D1             1.00000000 sec
TD0                      1

======== CHANNEL f1 ========
SFO1           400.1324710 MHz
NUC1                   1H
P1                  13.90 usec
SI                   32768
SF             400.1300116 MHz
WDW                    EM
SSB                     0
LB                   0.30 Hz
GB                      0
PC                   1.00
```

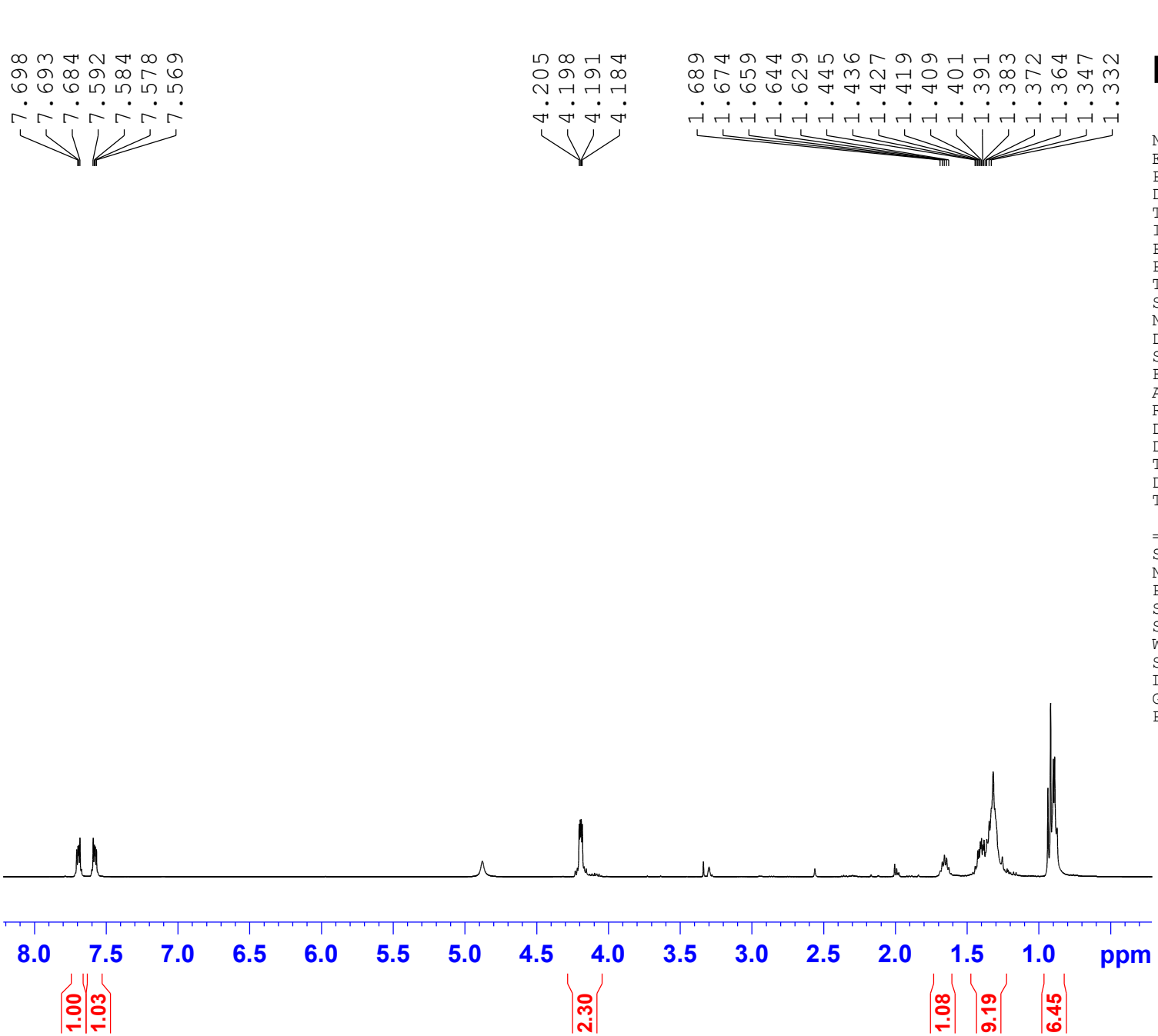
Figure S41. ^{1}H NMR spectrum of compound **16** in CD_3OD.



BRUKER

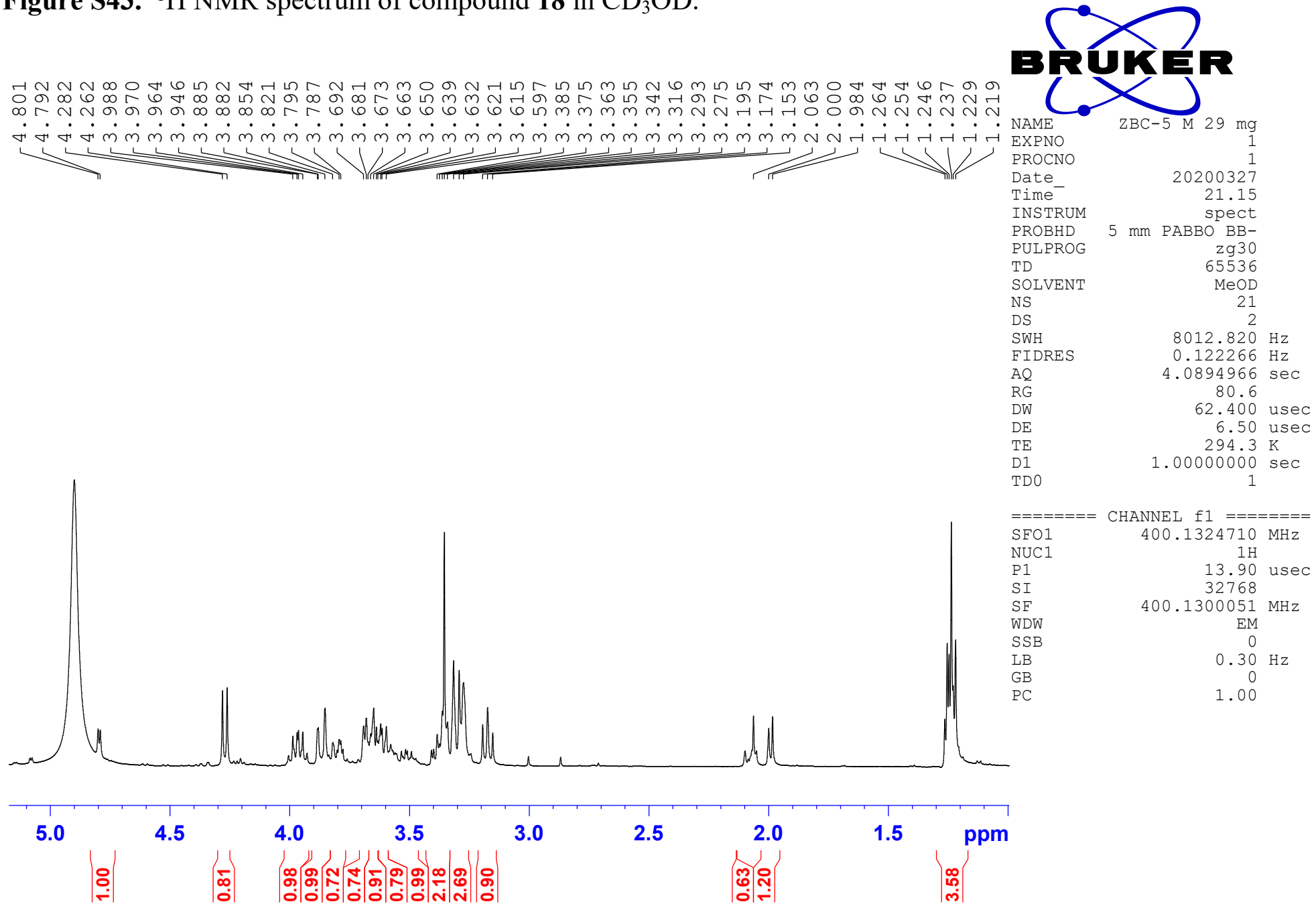
NAME	ZBC-34 M
EXPNO	1
PROCNO	1
Date_	20200421
Time	11.41
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	MeOD
NS	25
DS	2
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	71.8
DW	62.400 usec
DE	6.50 usec
TE	294.3 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	13.90 usec
SI	32768
SF	400.1300115 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

Figure S42. ^{1}H NMR spectrum of compound **17** in CD_3OD.




```
NAME          ZBC-1 M 125mg
EXPNO                     1
PROCNO                    1
Date_              20200323
Time                  22.28
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG                zg30
TD                    65536
SOLVENT                MeOD
NS                       25
DS                        2
SWH                8012.820 Hz
FIDRES                0.122266 Hz
AQ                 4.0894966 sec
RG                       32
DW                    62.400 usec
DE                     6.50 usec
TE                    294.5 K
D1                 1.00000000 sec
TD0                       1

======== CHANNEL f1 ========
SFO1           400.1324710 MHz
NUC1                     1H
P1                    13.90 usec
SI                    32768
SF             400.1300115 MHz
WDW                      EM
SSB                       0
LB                     0.30 Hz
GB                        0
PC                     1.00
```

Figure S43. ^{1}H NMR spectrum of compound **18** in CD_3OD.



BRUKER

NAME	ZBC-5 M 29 mg
EXPNO	1
PROCNO	1
Date_	20200327
Time	21.15
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	MeOD
NS	21
DS	2
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	80.6
DW	62.400 usec
DE	6.50 usec
TE	294.3 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	13.90 usec
SI	32768
SF	400.1300051 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

Figure S44. ^{1}H NMR spectrum of compound **19** in CD_3OD.

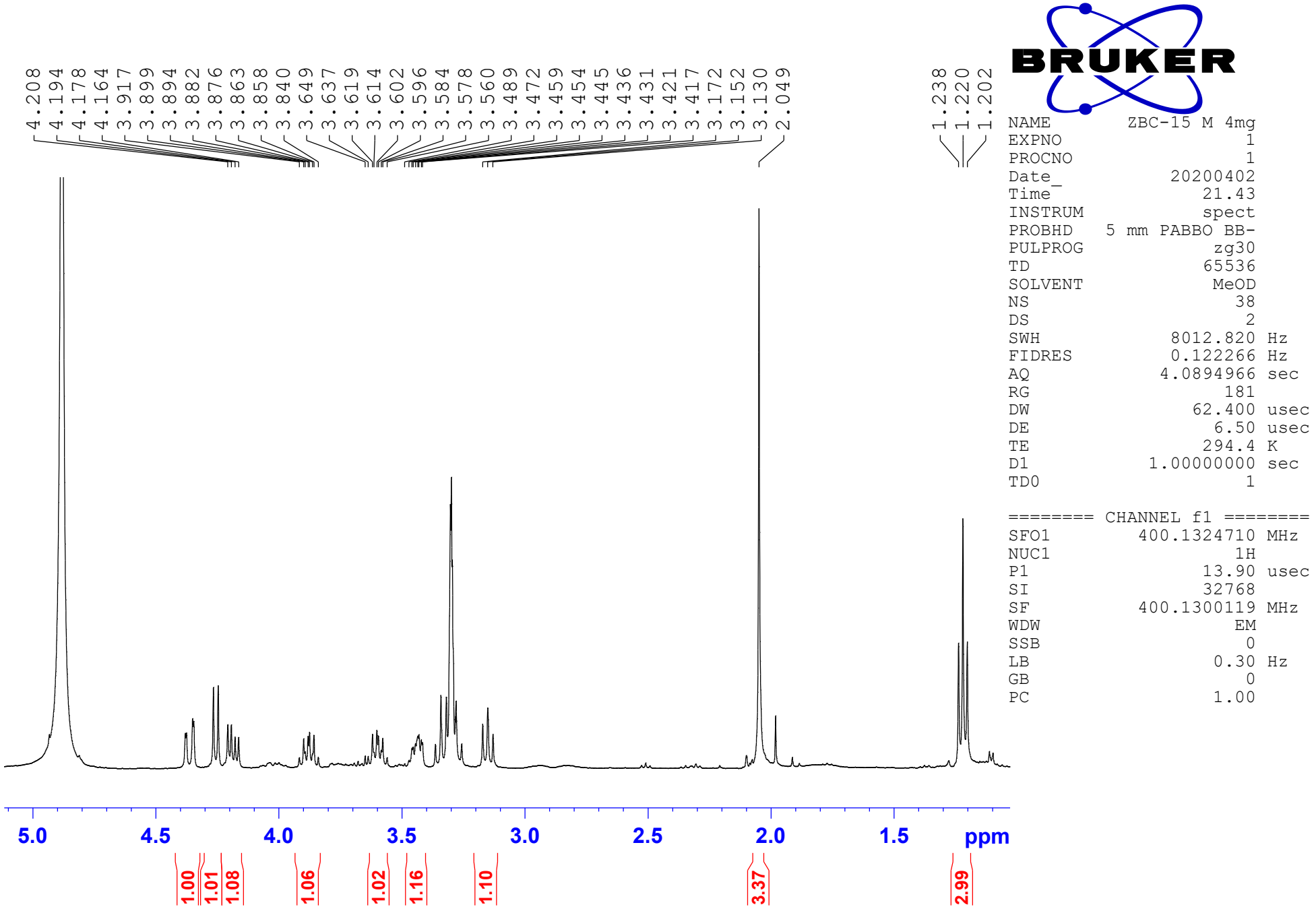


Figure S45. ^{1}H NMR spectrum of compound **20** in CD_3OD.

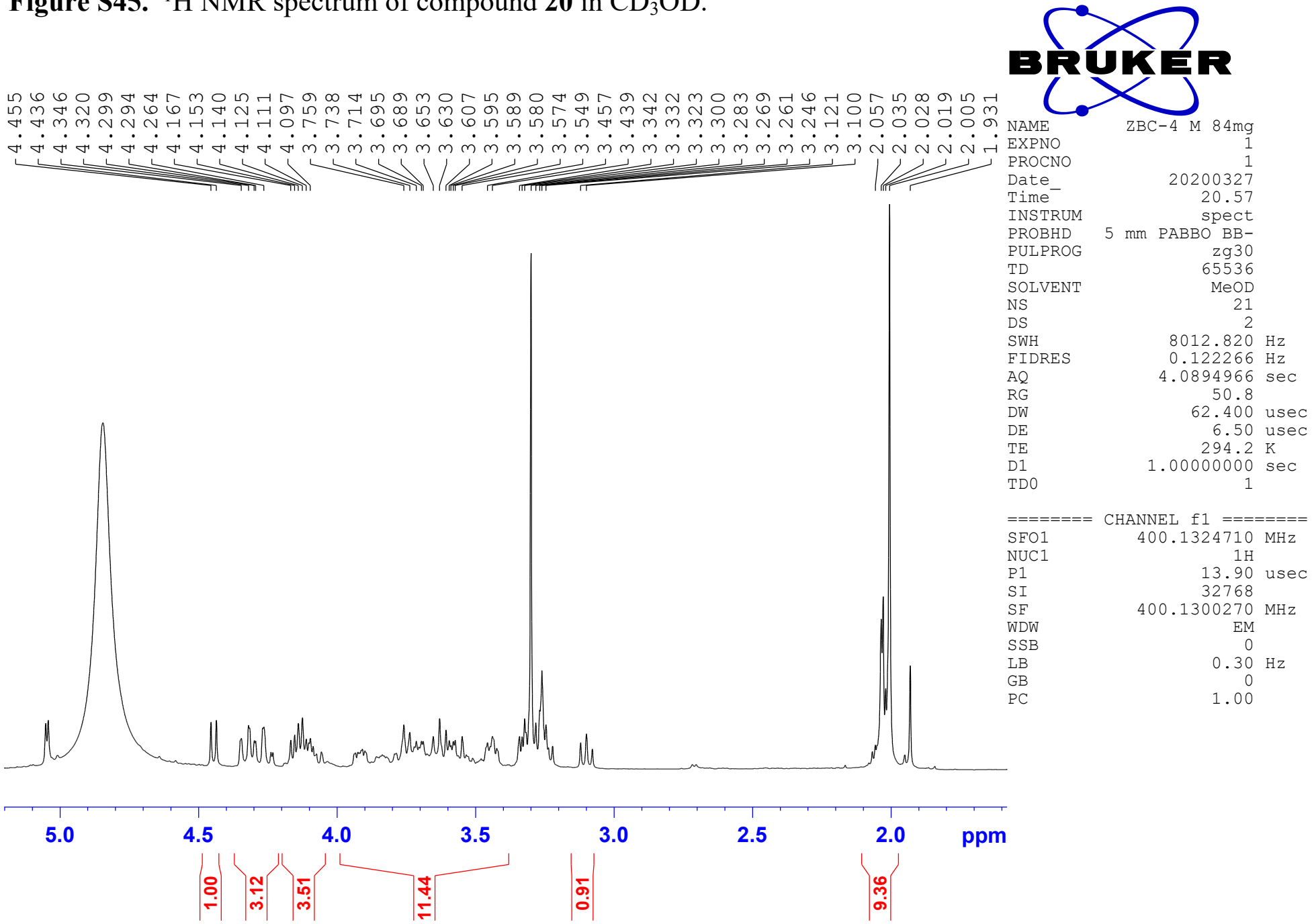
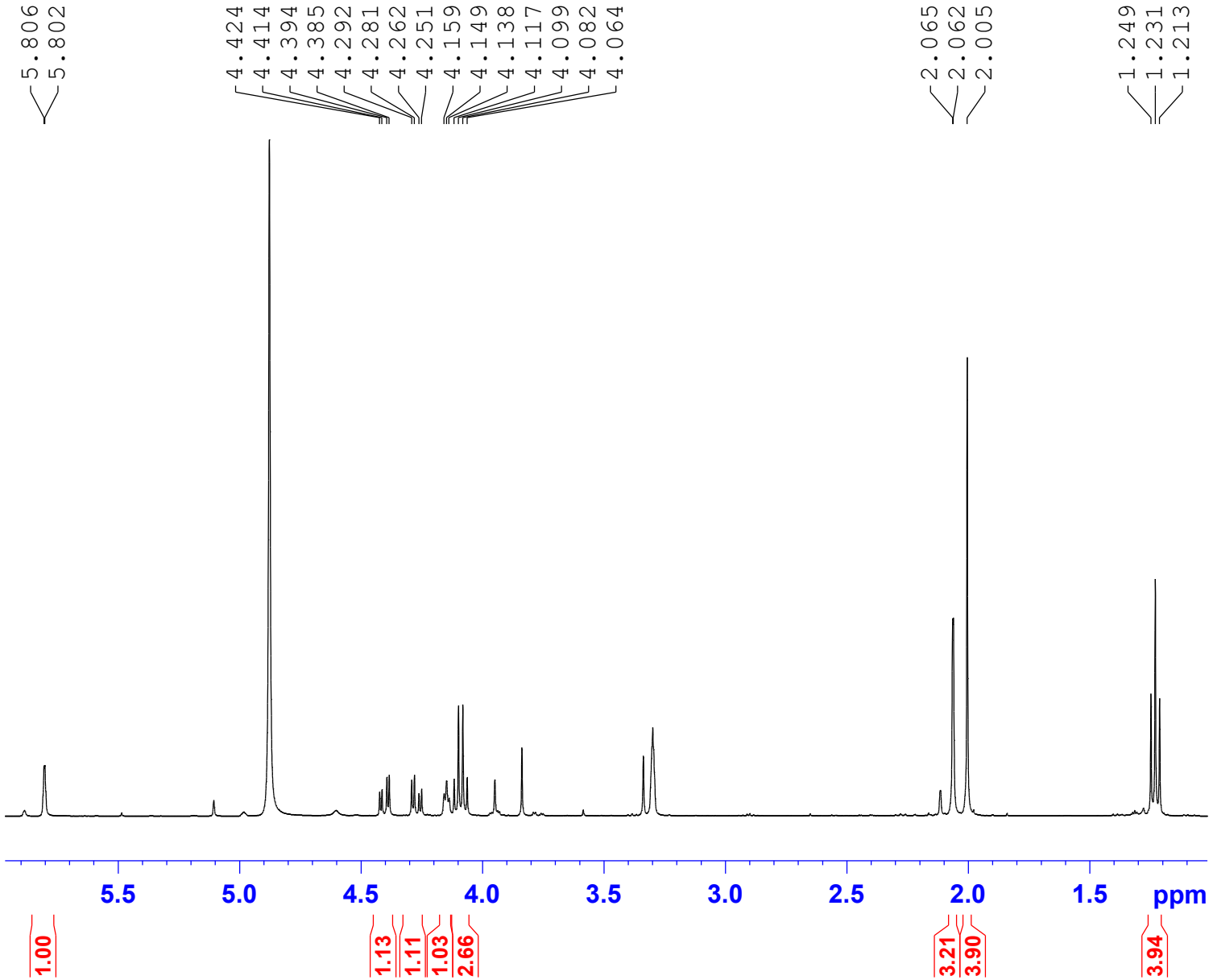


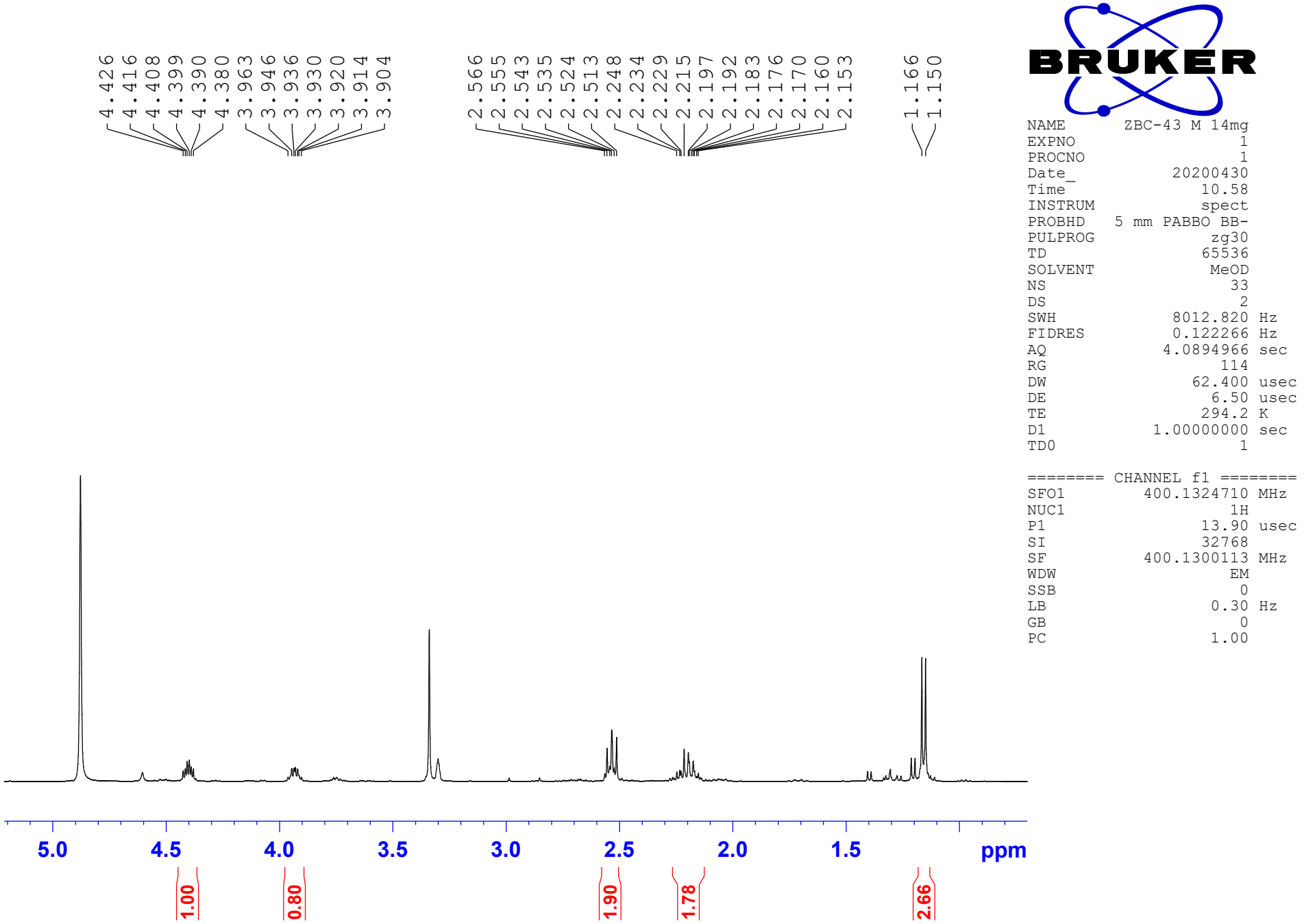
Figure S46. ^{1}H NMR spectrum of compound **21** in CD_3OD.



BRUKER

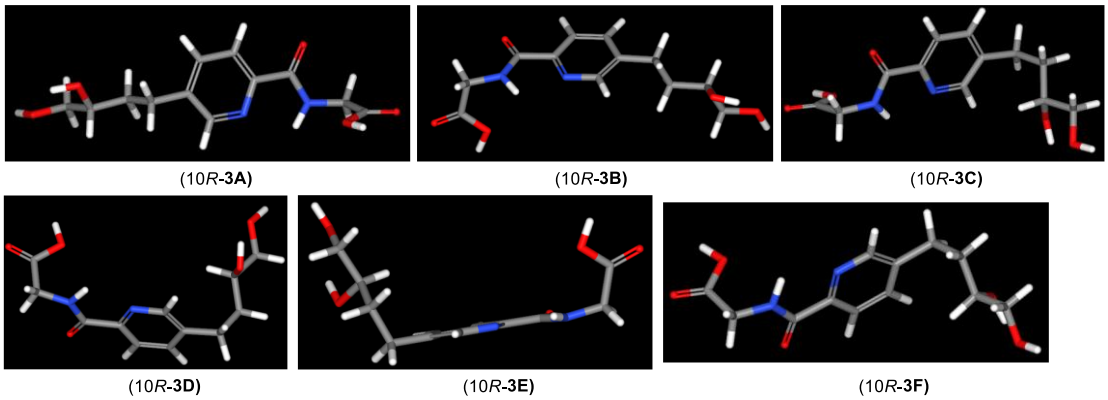
NAME	ZBC-45 M 2mg
EXPNO	1
PROCNO	1
Date_	20200430
Time	17.45
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	MeOD
NS	33
DS	2
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	161
DW	62.400 usec
DE	6.50 usec
TE	294.6 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	13.90 usec
SI	32768
SF	400.1300116 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

Figure S47. ^{1}H NMR spectrum of compound **22** in CD_3OD.



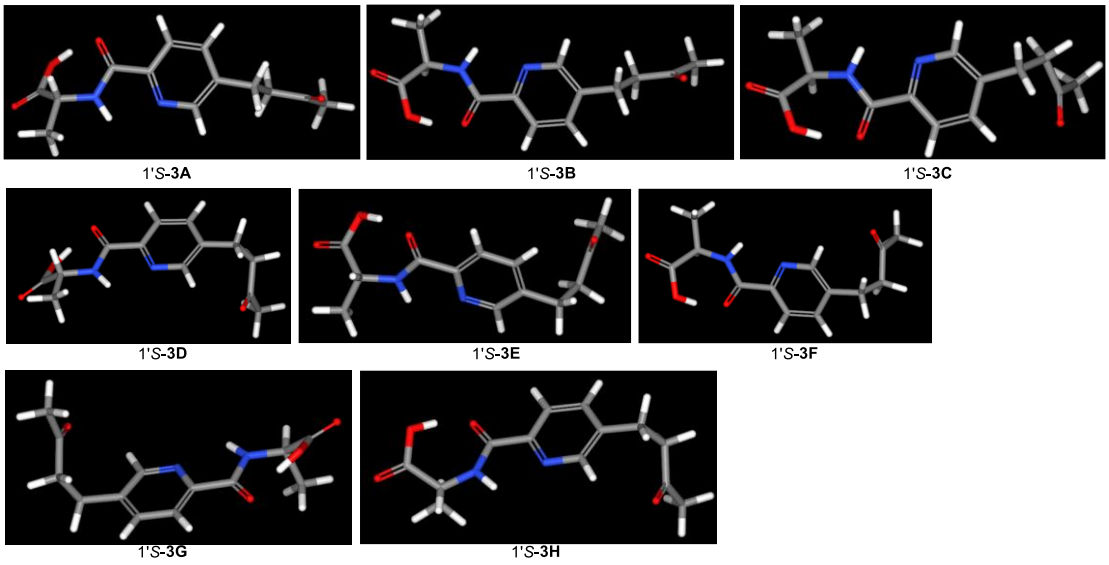

```
NAME          ZBC-43 M 14mg
EXPNO                     1
PROCNO                    1
Date_              20200430
Time                  10.58
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG                zg30
TD                    65536
SOLVENT                MeOD
NS                       33
DS                        2
SWH                8012.820 Hz
FIDRES                0.122266 Hz
AQ                 4.0894966 sec
RG                      114
DW                   62.400 usec
DE                    6.50 usec
TE                   294.2 K
D1                1.00000000 sec
TD0                       1

======== CHANNEL f1 ========
SFO1            400.1324710 MHz
NUC1                      1H
P1                   13.90 usec
SI                    32768
SF              400.1300113 MHz
WDW                      EM
SSB                       0
LB                    0.30 Hz
GB                        0
PC                    1.00
```

Figure S48. Gibbs free energy and equilibrium populations of low-energy conformers of **1** in ECD calculations.



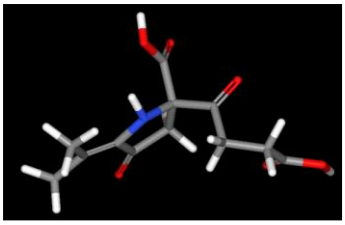
Conformers	Energy (Hartree)	Energy (kcal/mol)	Population (%)	Theory level	Solvent
10*R* -**3A**	-952.8454	-597919.54	20.4	B3LYP/6-311G(d,p)	Methanol
10*R* -**3B**	-952.8454	-597919.52	19.8	B3LYP/6-311G(d,p)	Methanol
10*R* -**3C**	-952.8451	-597919.37	15.3	B3LYP/6-311G(d,p)	Methanol
10*R* -**3D**	-952.8451	-597919.37	15.3	B3LYP/6-311G(d,p)	Methanol
10*R* -**3E**	-952.8451	-597919.34	14.6	B3LYP/6-311G(d,p)	Methanol
10*R* -**3F**	-952.8451	-597919.34	14.6	B3LYP/6-311G(d,p)	Methanol

Figure S49. Gibbs free energy and equilibrium populations of low-energy conformers of **3** in ECD calculations.

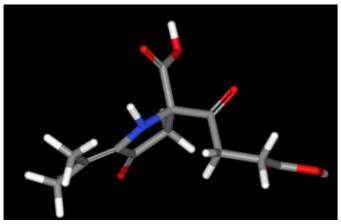


Conformers	Energy (Hartree)	Energy (kcal/mol)	Population (%)	Theory level	Solvent
1′*S*-**3A**	-915.7345	-574632.10	23.1	B3LYP/6-311G(d,p)	Methanol
1′*S* -**3B**	-915.7345	-574632.07	22.0	B3LYP/6-311G(d,p)	Methanol
1′*S* -**3C**	-915.7340	-574631.78	13.5	B3LYP/6-311G(d,p)	Methanol
1′*S* -**3D**	-915.7340	-574631.77	13.3	B3LYP/6-311G(d,p)	Methanol
1′*S* -**3E**	-915.73397	-574631.74	12.6	B3LYP/6-311G(d,p)	Methanol
1′*S* -**3F**	-915.7339	-574631.74	12.6	B3LYP/6-311G(d,p)	Methanol
1′*S* -**3G**	-915.7319	-574630.48	1.5	B3LYP/6-311G(d,p)	Methanol
1′*S* -**3H**	-915.7319	-574630.46	1.4	B3LYP/6-311G(d,p)	Methanol

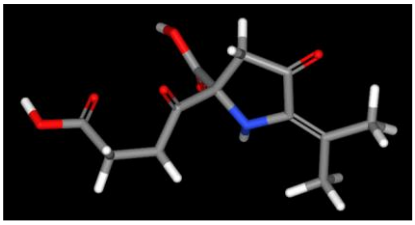
Figure S50. Gibbs free energy and equilibrium populations of low-energy conformers of **4** in ECD calculations.



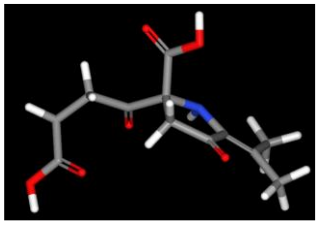
(2*R*-**3A**)



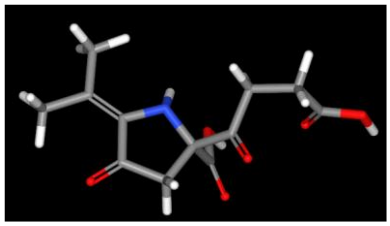
(2*R*-**3B**)



(2*R*-**3C**)



(2*R*-**3D**)



(2*R*-**3E**)

Conformers	Energy (Hartree)	Energy (kcal/mol)	Population (%)	Theory level	Solvent
2*R*-**3A**	-972.7126	-610386.38	33.2	B3LYP/6-311G(d,p)	Methanol
2*R* -**3B**	-972.7123	-610386.19	24.1	B3LYP/6-311G(d,p)	Methanol
2*R* -**3C**	-972.7123	-610386.19	24.1	B3LYP/6-311G(d,p)	Methanol
2*R* -**3D**	-972.7119	-610385.97	16.6	B3LYP/6-311G(d,p)	Methanol
2*R* -**3E**	-972.7096	-610384.50	1.4	B3LYP/6-311G(d,p)	Methanol

Figure S51. UV spectrum of compounds **1-4**.

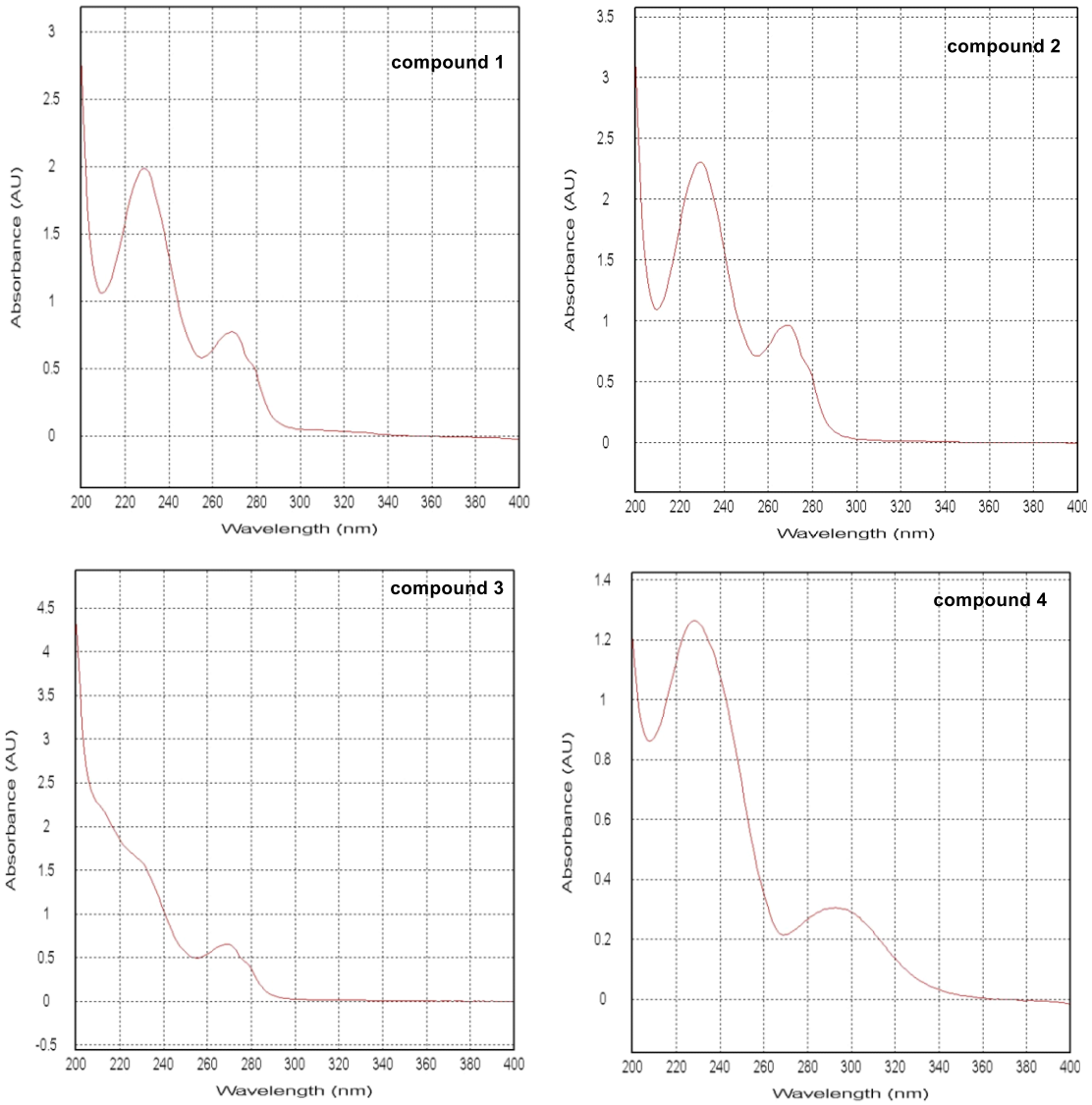


Figure S52. Inhibitory effects of compounds **1**–**22** (1 μM) on LPS-induced nitrite production in BV-2.

NO.	inhibition rate(1uM)	NO.	inhibition rate(1uM)
V	100 ± 1.6	**11**	30.7 ± 4.8
LPS	0 ± 1.6	**12**	12.0 ± 1.0
1	6.7 ± 2.6	**13**	32.9 ± 1.6
2	0.8 ± 0.9	**14**	21.5 ± 3.0
3	28.8 ± 1.9	**15**	20.6 ± 2.2
4	10.8 ± 5.9	**16**	22.2 ± 2.3
5	16.8 ± 2.6	**17**	0 ± 1.9
6	15.8 ± 3.3	**18**	15.5 ± 2.8
7	-1.9 ± 1.0	**19**	26.9 ± 3.2
8	34.2 ± 1.6	**20**	-1.0 ± 1.2
9	7.9 ± 2.6	**21**	38.6 ± 2.1
10	14.2 ± 2.6	**22**	58.2 ± 2.6