

Supplementary data:

For

DOI: 10.57647/j.ijc.2026.1602.18

RESEARCH PAPER

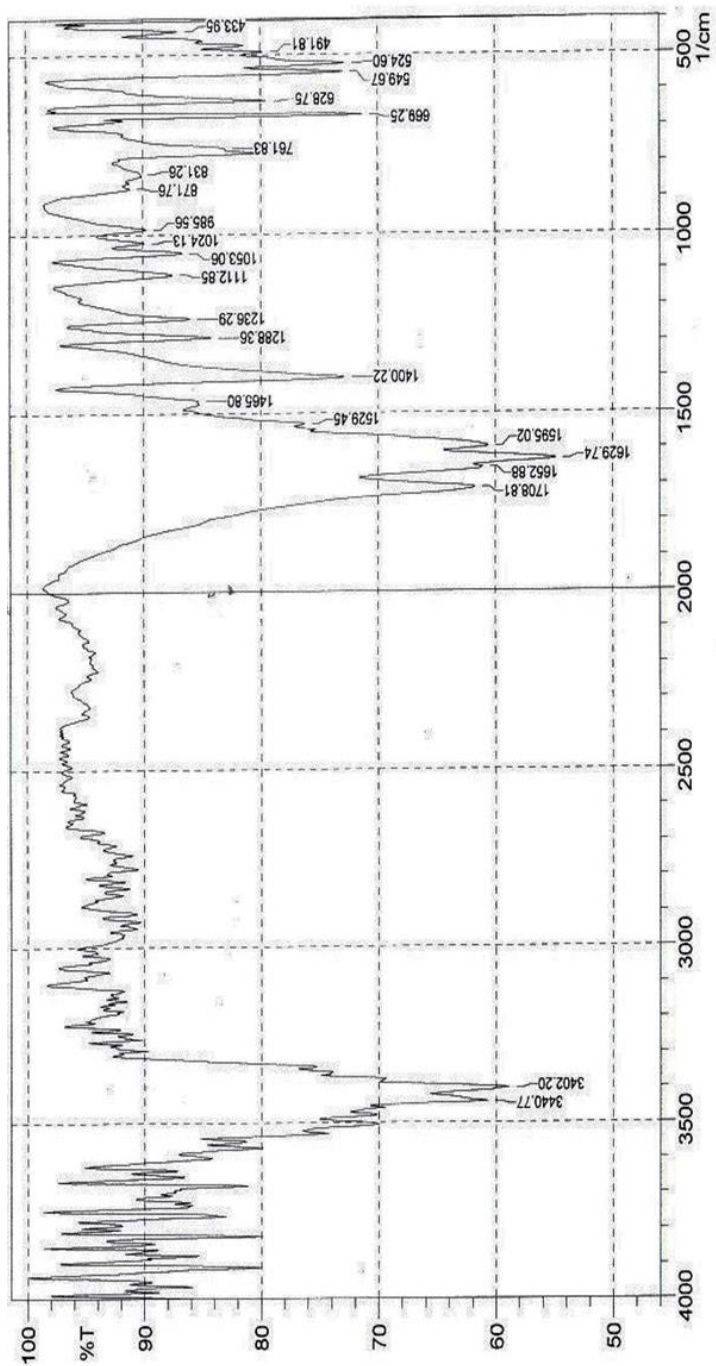
Hercynite@SiO₂-APTS-Proline as a Novel Magnetic Nanocatalyst for the Regioselective Synthesis of New Spiro[indoline-3,5'-pyridopyrimidine/dipyrimidine] Derivatives

Haniyeh Bozorgi, Hassan Kefayati, * Mohammad Nikpassand

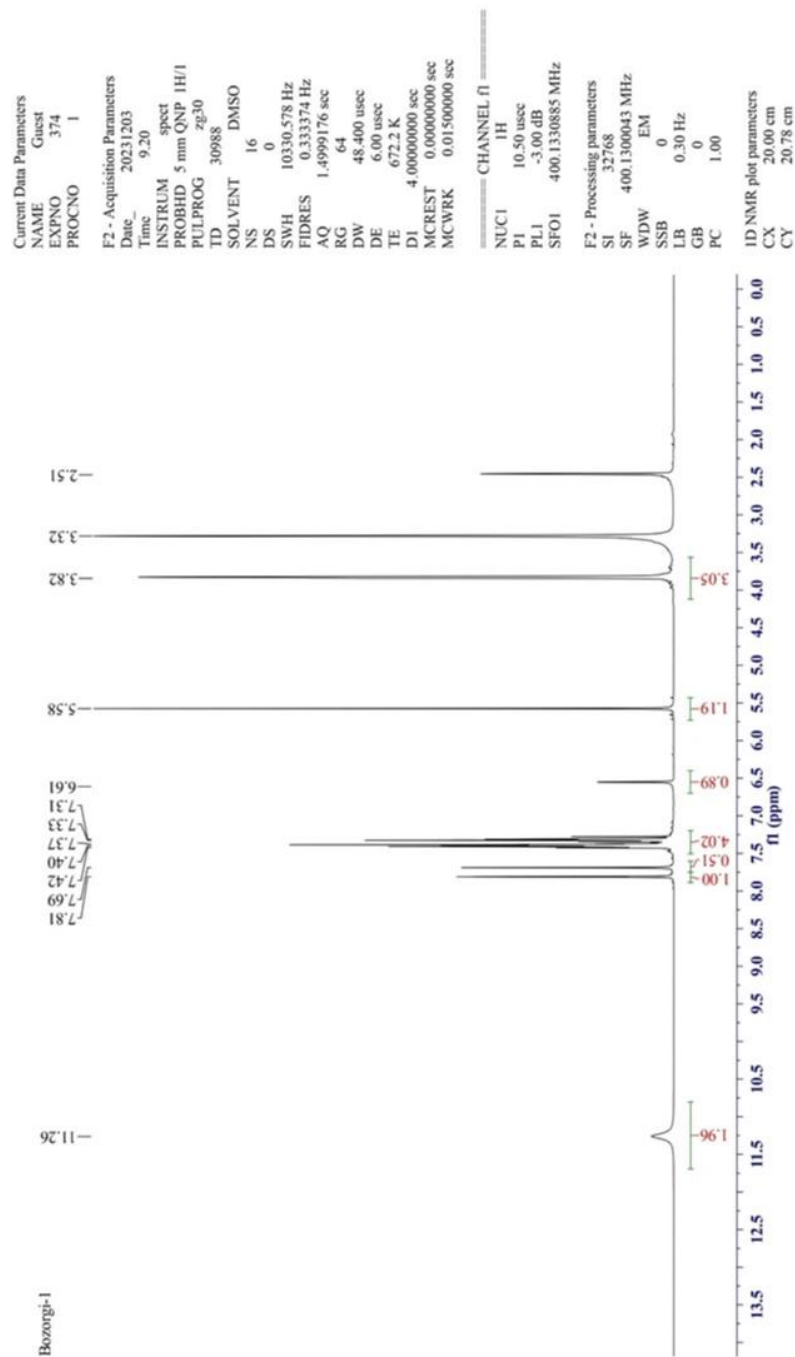
Department of Chemistry, Ra.C., Islamic Azad University, Rasht, Iran

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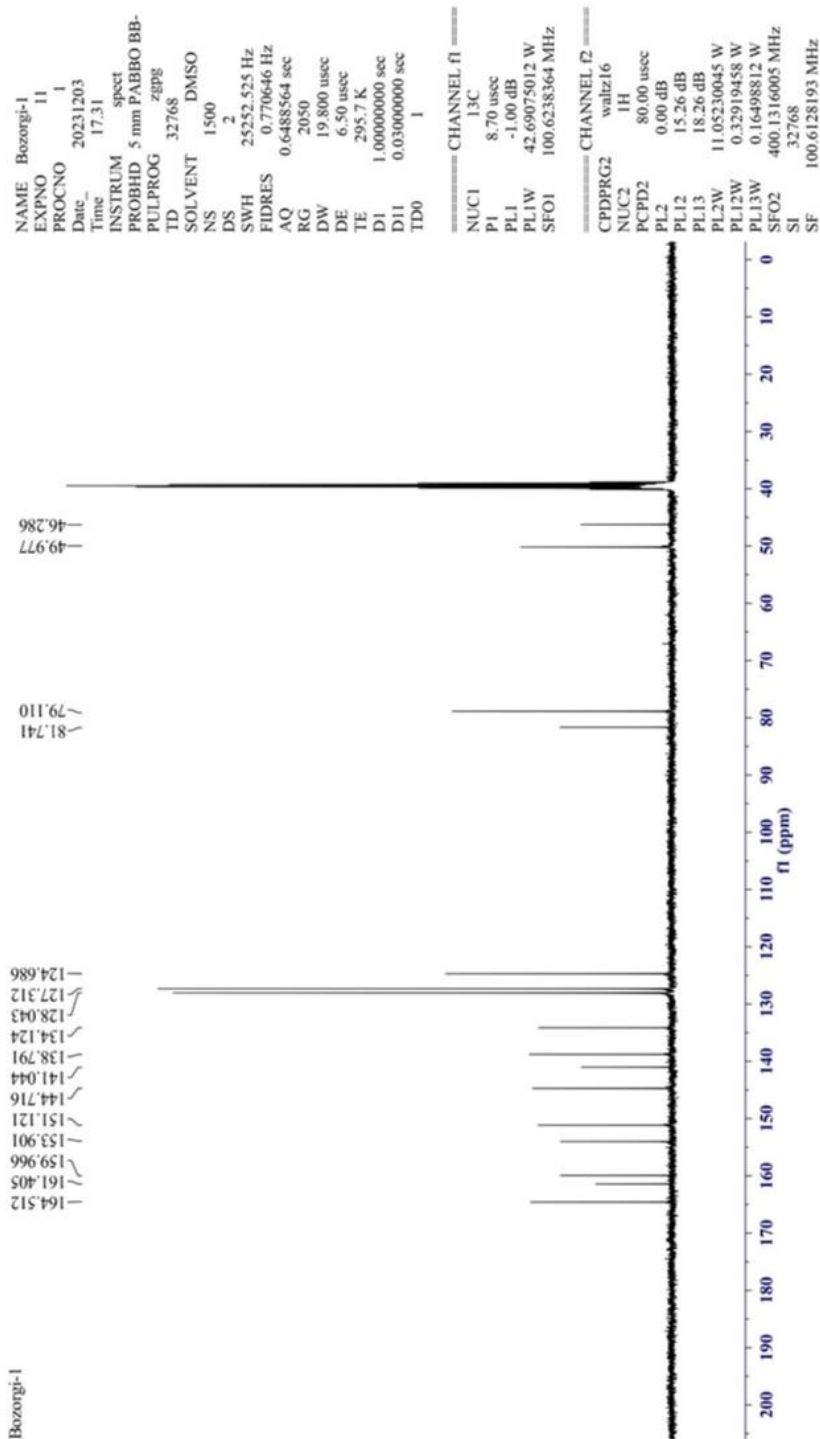
FT-IR Methyl 7'-amino-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4a)



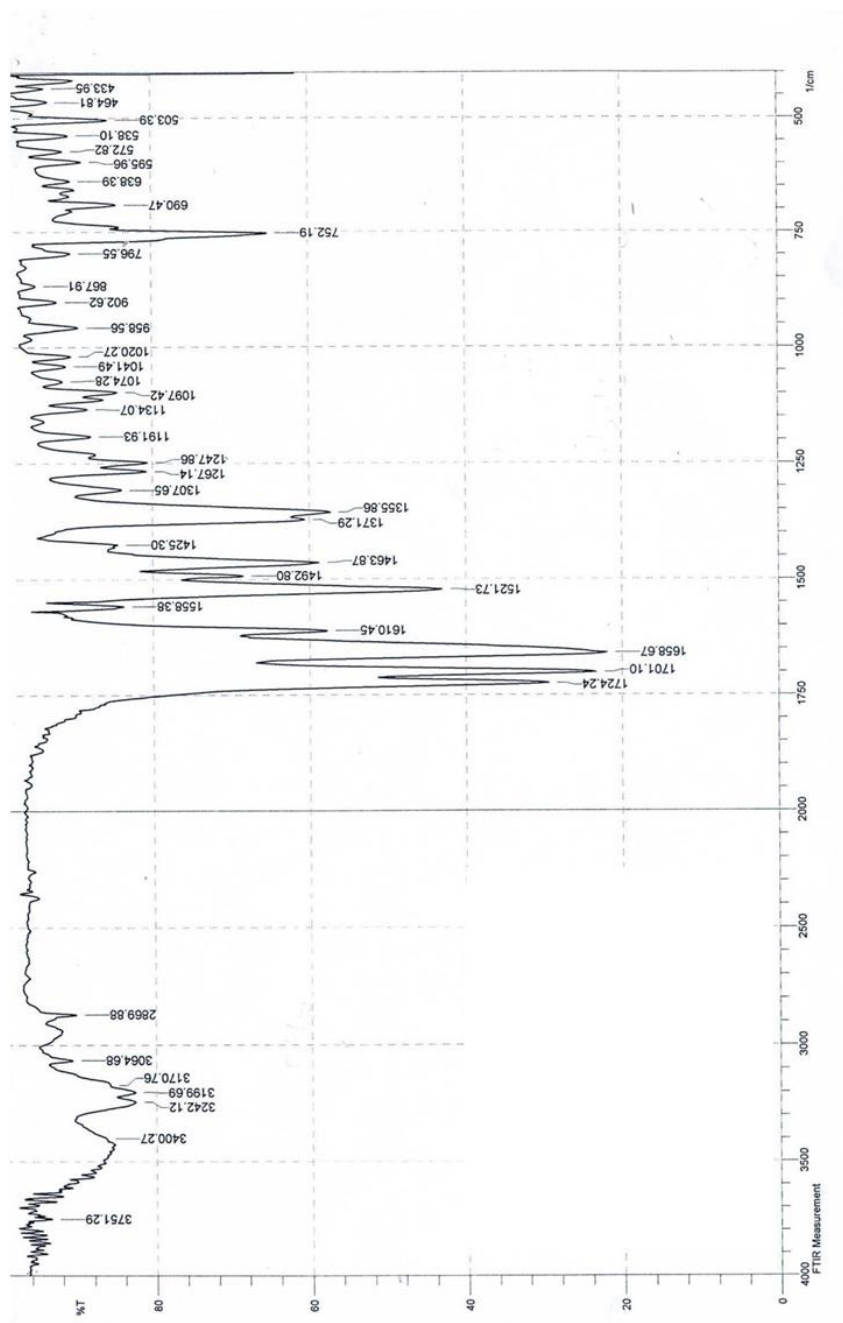
¹H NMR Methyl 7'-amino-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4a)



¹³C NMR Methyl 7'-amino-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4a)



FT-IR Methyl-7'-amino-1,1',3'-trimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4b)



^1H NMR Methyl-7'-amino-1,1',3'-trimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4b)



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EXPNO 37
PROCNO 1

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PULPROG zgpg30
TD 16384
SOLVENT DMSO
SOLVENT 20
DS 0
SMH 4990.020 Hz
FIDRES 0.304567 Hz
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RG 287.4
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TE 300.0 K
D1 3.00000000 sec

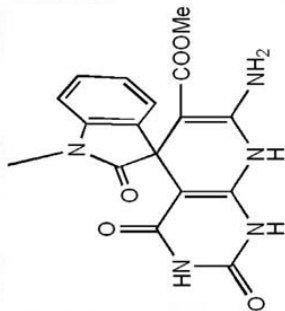
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F2 - Processing parameters
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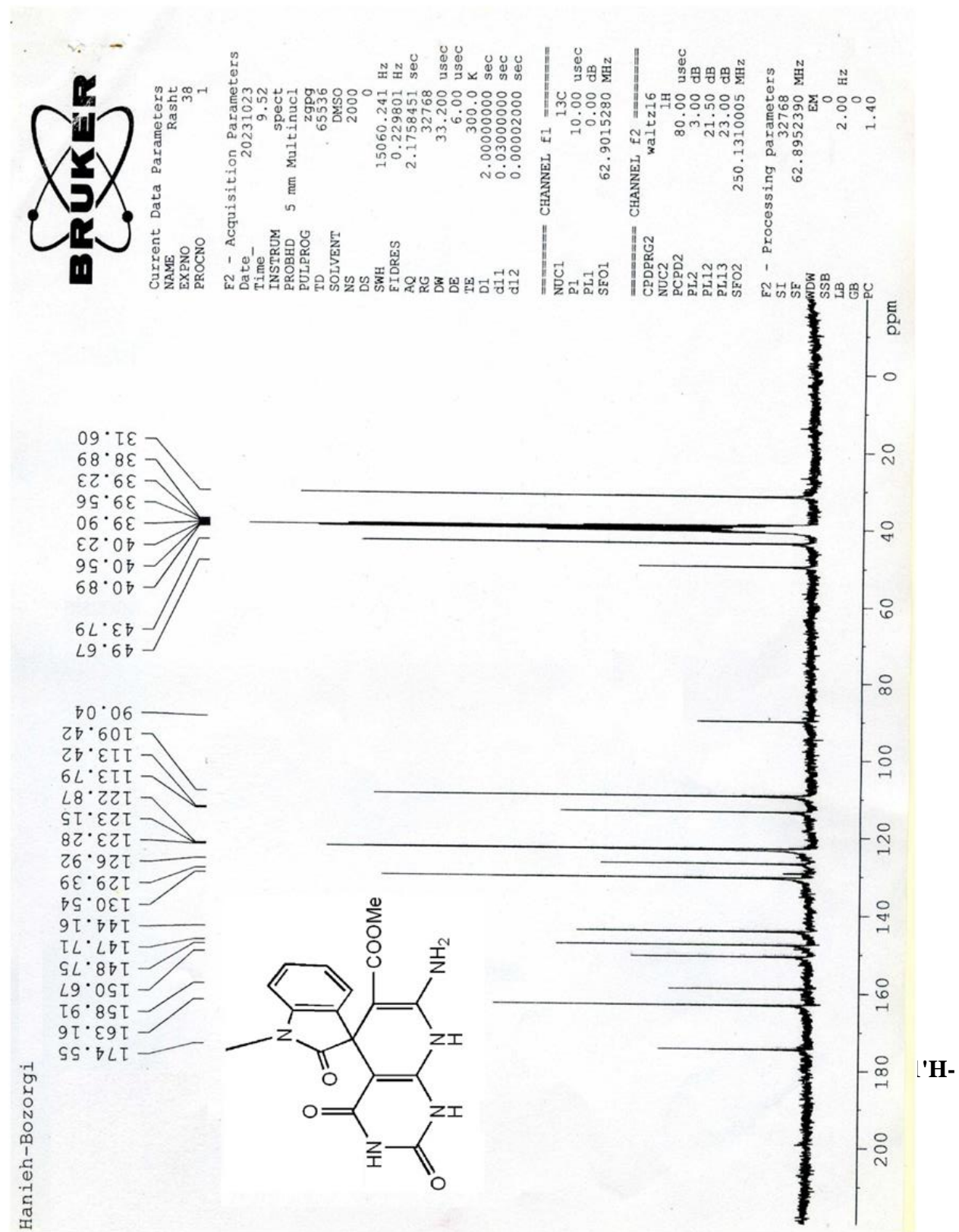
Haniyeh-Bozorgi

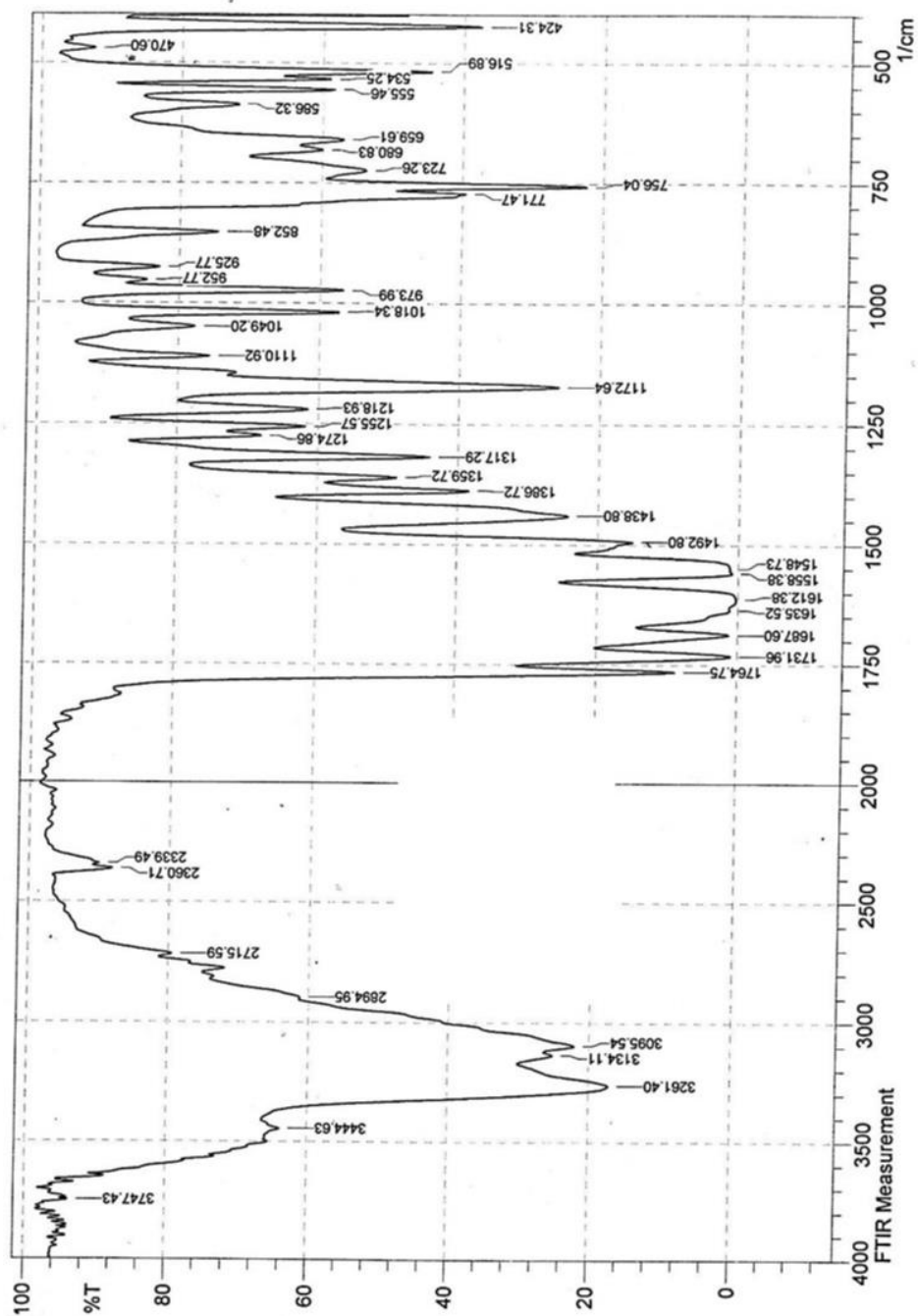
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2.699
2.634
2.468
1.030



¹³C NMR Methyl-7'-amino-1,1',3'-trimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4b)





¹H NMR Methyl-7'-amino-1-benzyl-1',3'-dimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4c)

Hanieh-Bozorgi-B

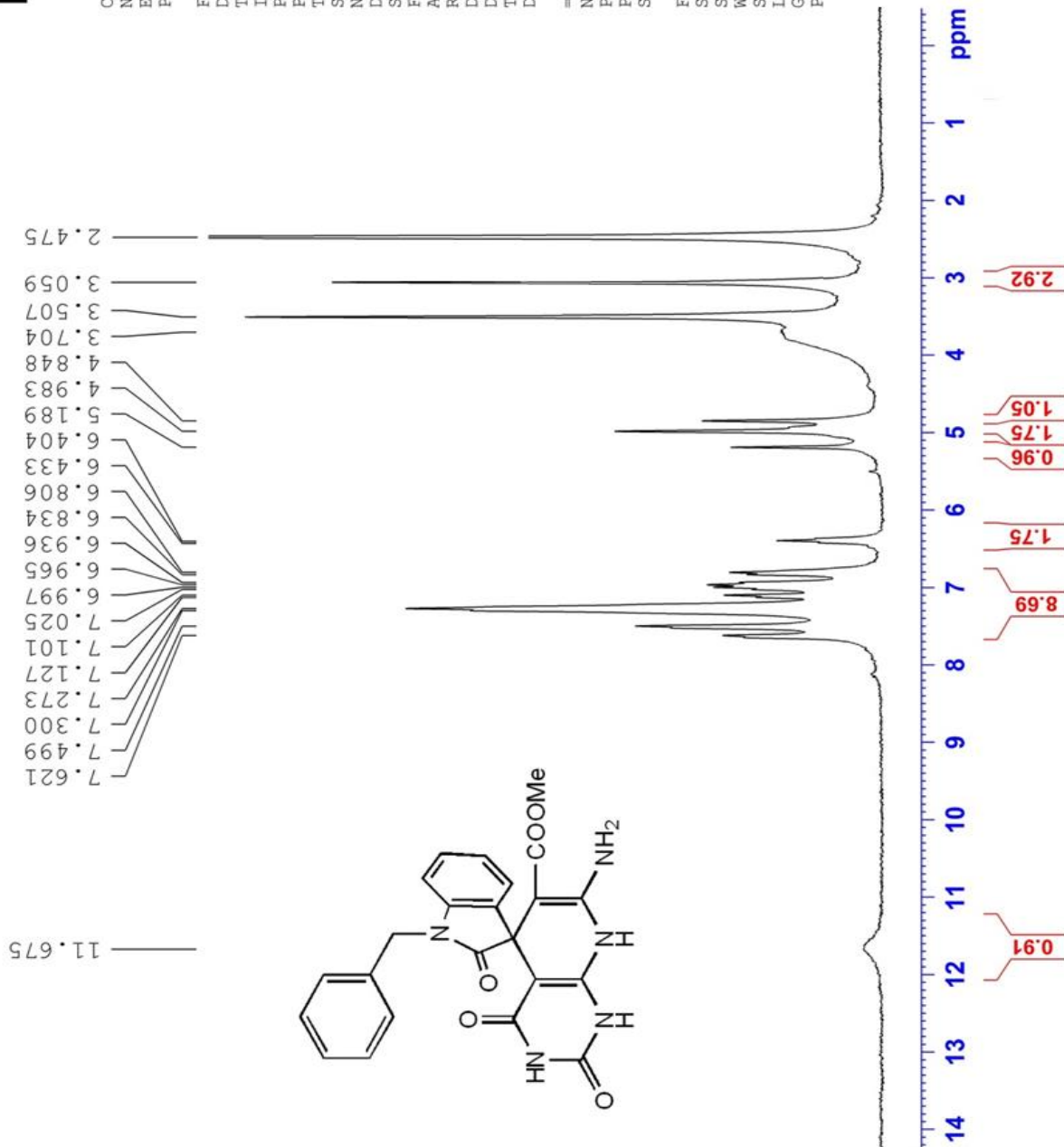


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EXPNO 19
PROCNO 1

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PULPROG zg
TD 16384
SOLVENT DMSO
NS 60
DS 0
SWH 3742.515 Hz
FIDRES 0.228425 Hz
AQ 2.1889524 sec
RG 32
DW 133.600 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec

===== CHANNEL f1 =====
NUC1 1H
P1 9.00 usec
PL1 3.00 dB
SF01 250.1317509 MHz

F2 - Processing parameters
SI 32768
SF 250.1300000 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.00



spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4c)



Current Data Parameters
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EXPNO 20
PROCNO 1

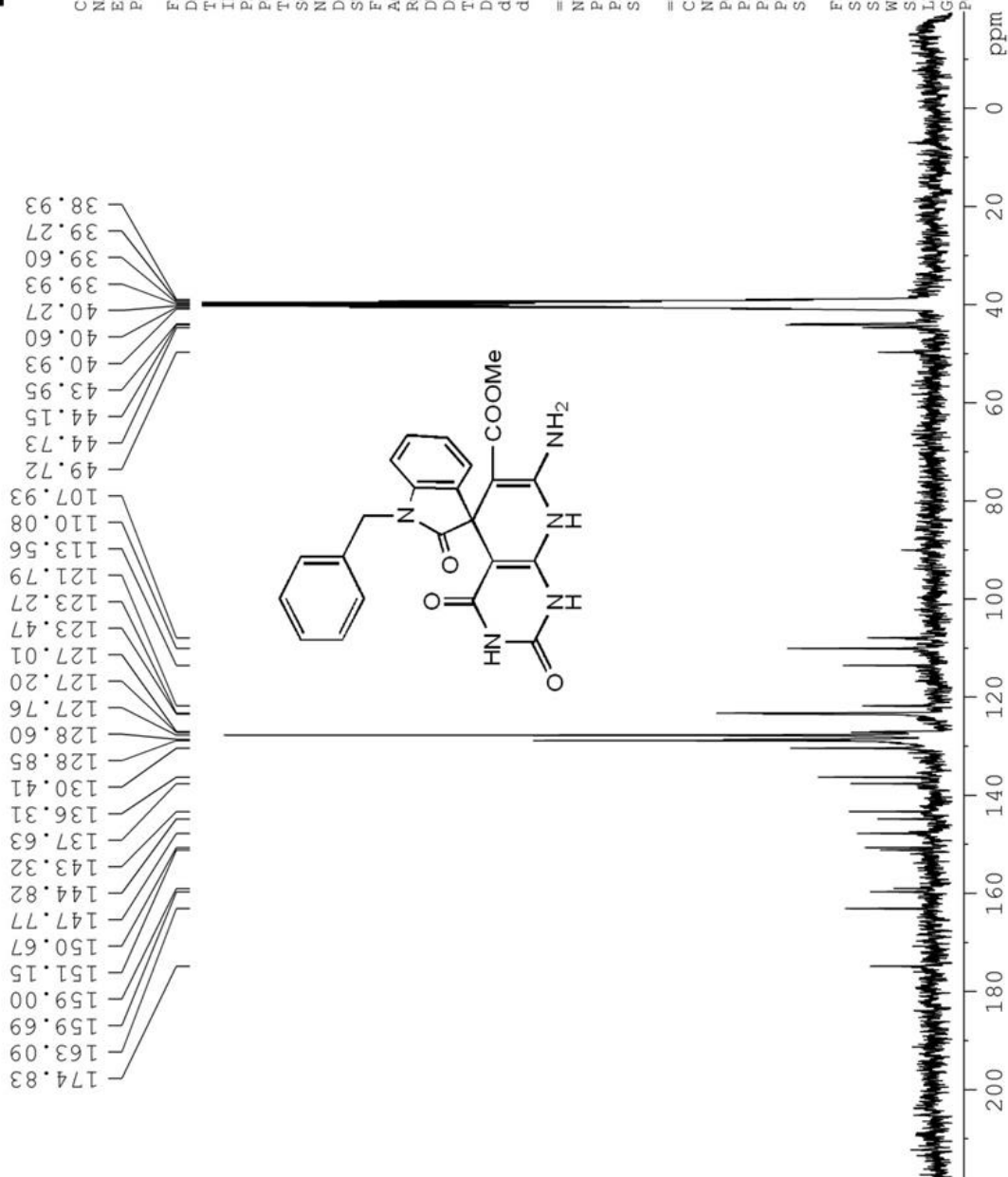
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NS 1500
DS 0
SWH 15060.241 Hz
FIDRES 0.229801 Hz
AQ 2.1758451 sec
RG 1625.5
DW 33.200 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
d12 0.00002000 sec

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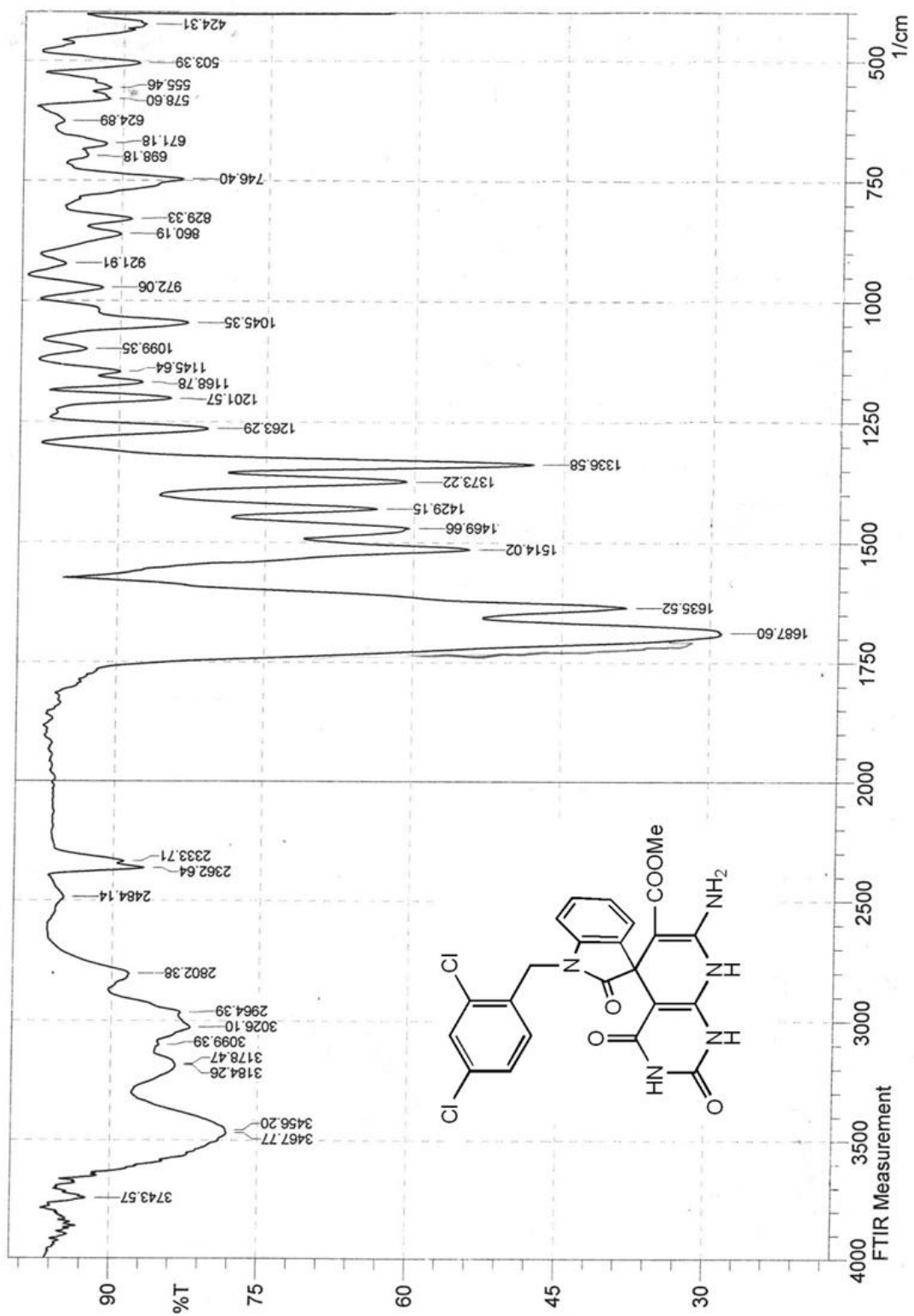
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PL13 23.00 dB
SF02 250.1310005 MHz

F2 - Processing parameters
SI 32768
SF 62.8952390 MHz
WDW EM
SSB 0
LB 3.00 Hz
GB 0
PC 1.40

Hanieh-Bozorgi-B



FT-IR Methyl-7'-amino-1-(2,4-dichlorobenzyl)-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1*H*-spiro[indoline-3,5'-pyrido[2,3-*d*]pyrimidine]-6'-carboxylate (4d)



¹H NMR

Methyl-7'-amino-1-(2,4-dichlorobenzyl)-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'*H*-spiro[indoline-3,5'-pyrido[2,3-*d*]pyrimidine]-6'-carboxylate (4d)



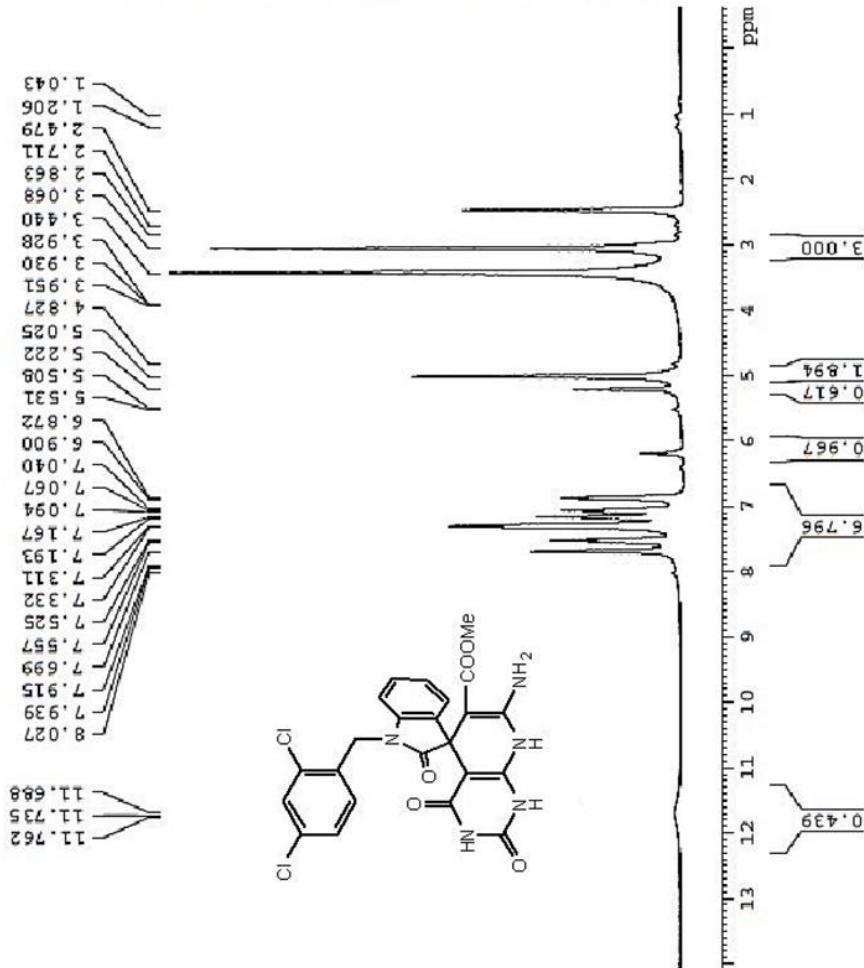
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EXPNO 384
PROCNO 1

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TD 16384
SOLVENT DMSO
NS 20
DS 0
SWH 4980.020 Hz
FIDRES 0.304567 Hz
AQ 1.6417259 sec
RG 32
LW 100.200 usec
DE 6.00 usec
TE 300.0 K
D1 3.00000000 sec

***** CHANNEL f1 *****
NUC1 1H
P1 9.00 usec
PL1 3.00 dB
SFO1 250.1317509 MHz

F2 - Processing Parameters
SI 32768
SF 250.1300000 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

Hanieh-Bozorgi - P



¹³C NMR Methyl-7'-amino-1-(2,4-dichlorobenzyl)-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4d)



Current Data Parameters
NAME: farran-2
EXPNO: 369
PROCNO: 1

F2 - Acquisition Parameters

Date_ 20230606
Time 8.58
INSTRUM spect
PROBHD 5 mm Multispec1
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 515
DS 0
SWH 15060.241 Hz
FIDRES 0.229801 Hz
AQ 2.111878 sec
RG 32768
DM 33.200 usec
DE 6.00 usec
TE 300.0 K
D1 3.0000000 sec
d11 0.0300000 sec
d12 0.0002000 sec

----- CHANNEL f1 -----

NUC1 ¹³C
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PL1 0.00 dB
SFO1 62.9015280 MHz

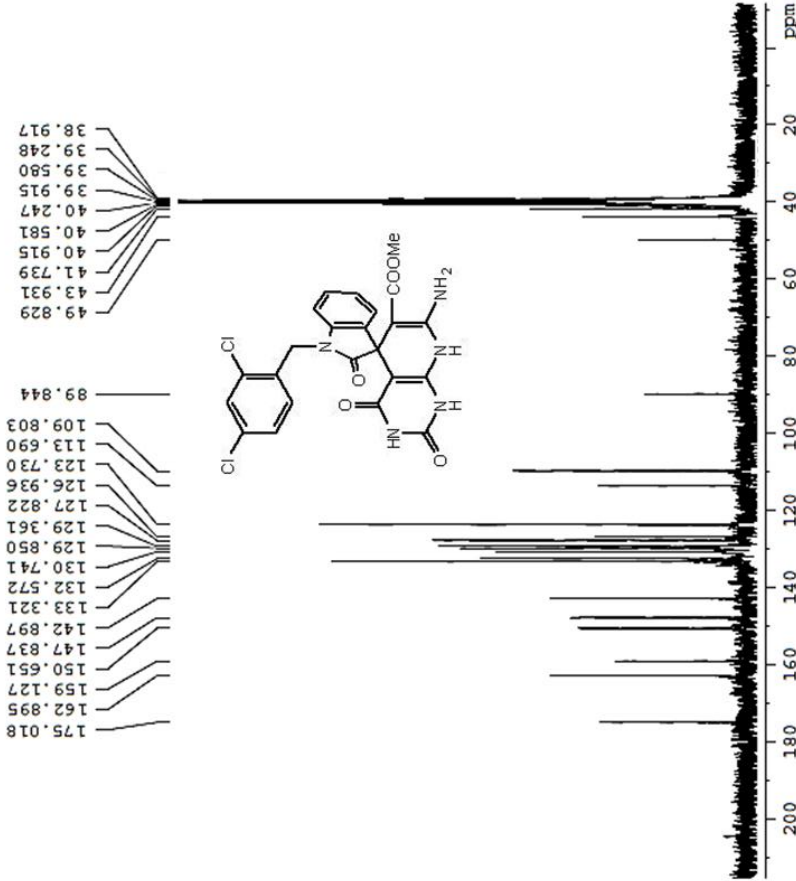
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CPDPRG2 waltz16
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PL2 0.00 dB
PL12 21.50 dB
PL13 21.00 dB
SFO2 250.1310005 MHz

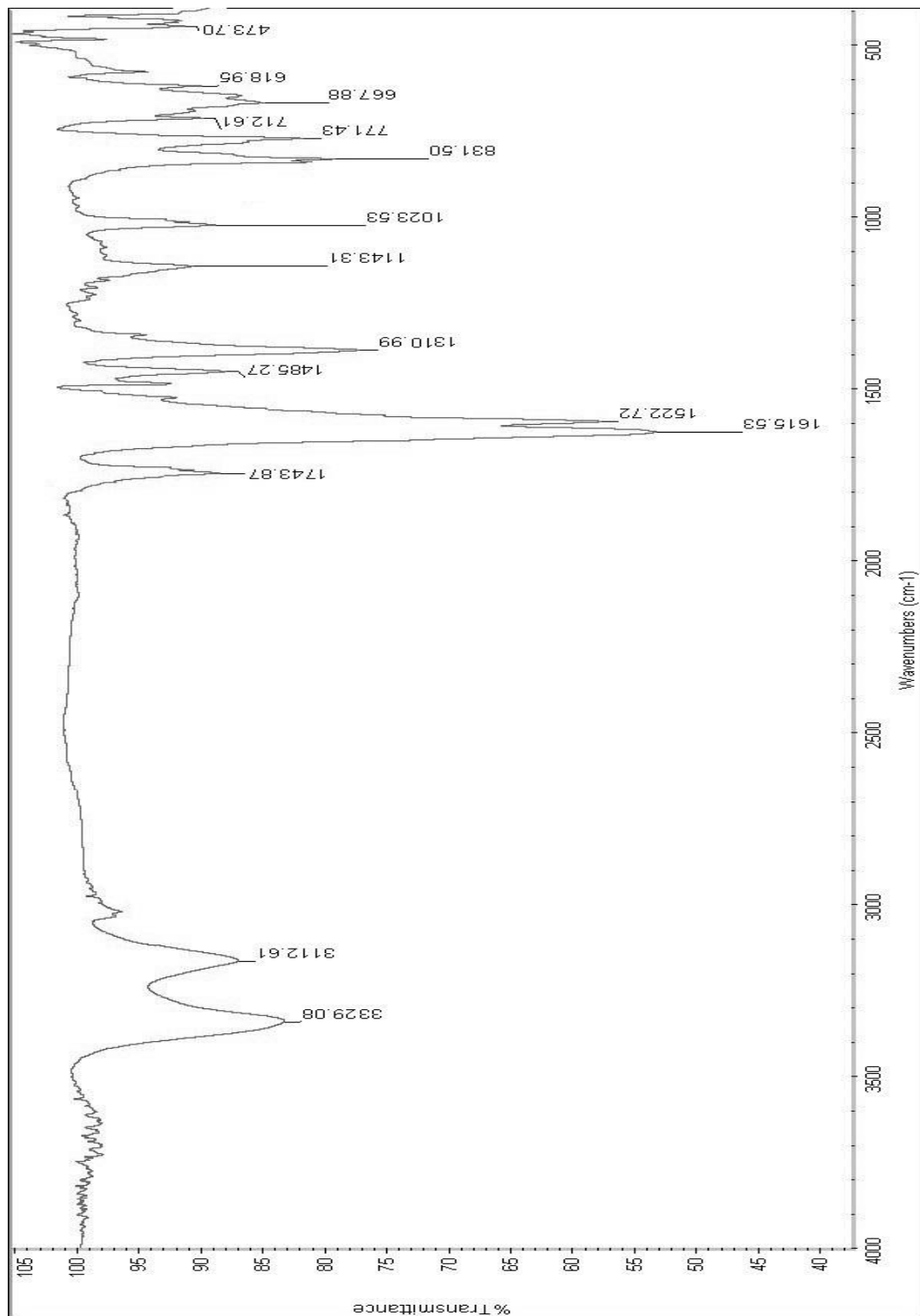
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SSB 0
LB 2.00 Hz
GB 0
PC 1.40

Hanieh-Bozorgi



FT-IR methyl 7'-amino-1',3'-dimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4e)



¹H NMR methyl 7'-amino-1',3'-dimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4e)



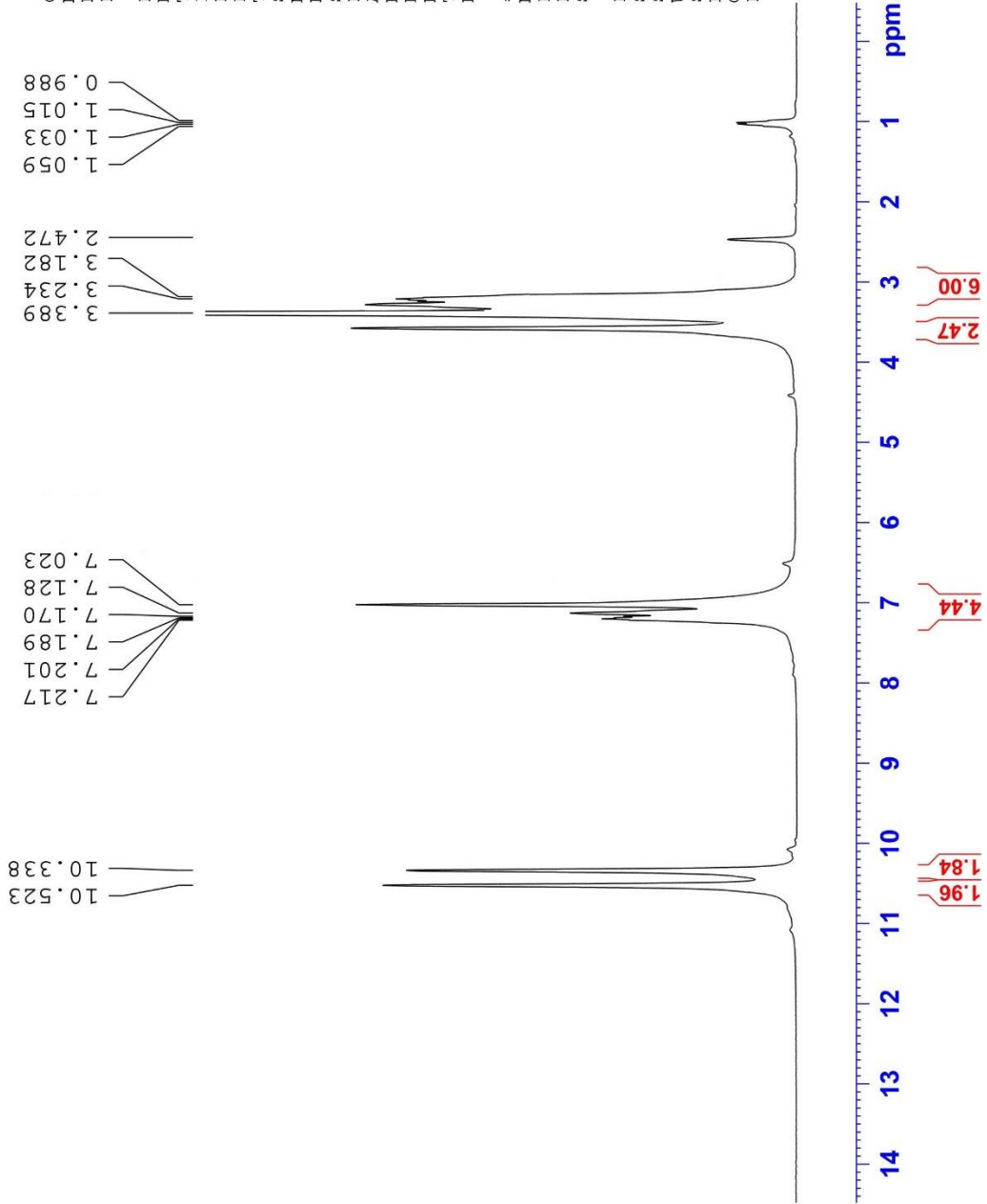
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PROCNO   1

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PULPROG zg
TD       16384
SOLVENT  DMSO
NS       20
DS       0
SWH      4990.020 Hz
FIDRES   0.304567 Hz
AQ       1.6417269 sec
RG       32
DW       100.200 usec
DE       6.00 usec
TE       300.0 K
D1       2.00000000 sec

===== CHANNEL f1 =====
NUC1     1H
P1       9.00 usec
PL1      3.00 dB
SFO1     250.1320010 MHz

F2 - Processing parameters
SI       32768
SF       250.1300000 MHz
WDW      EM
SSB      0
LB       0.50 Hz
GB       0
PC       1.00
    
```



¹³C NMR methyl 7'-amino-1',3'-dimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4e)



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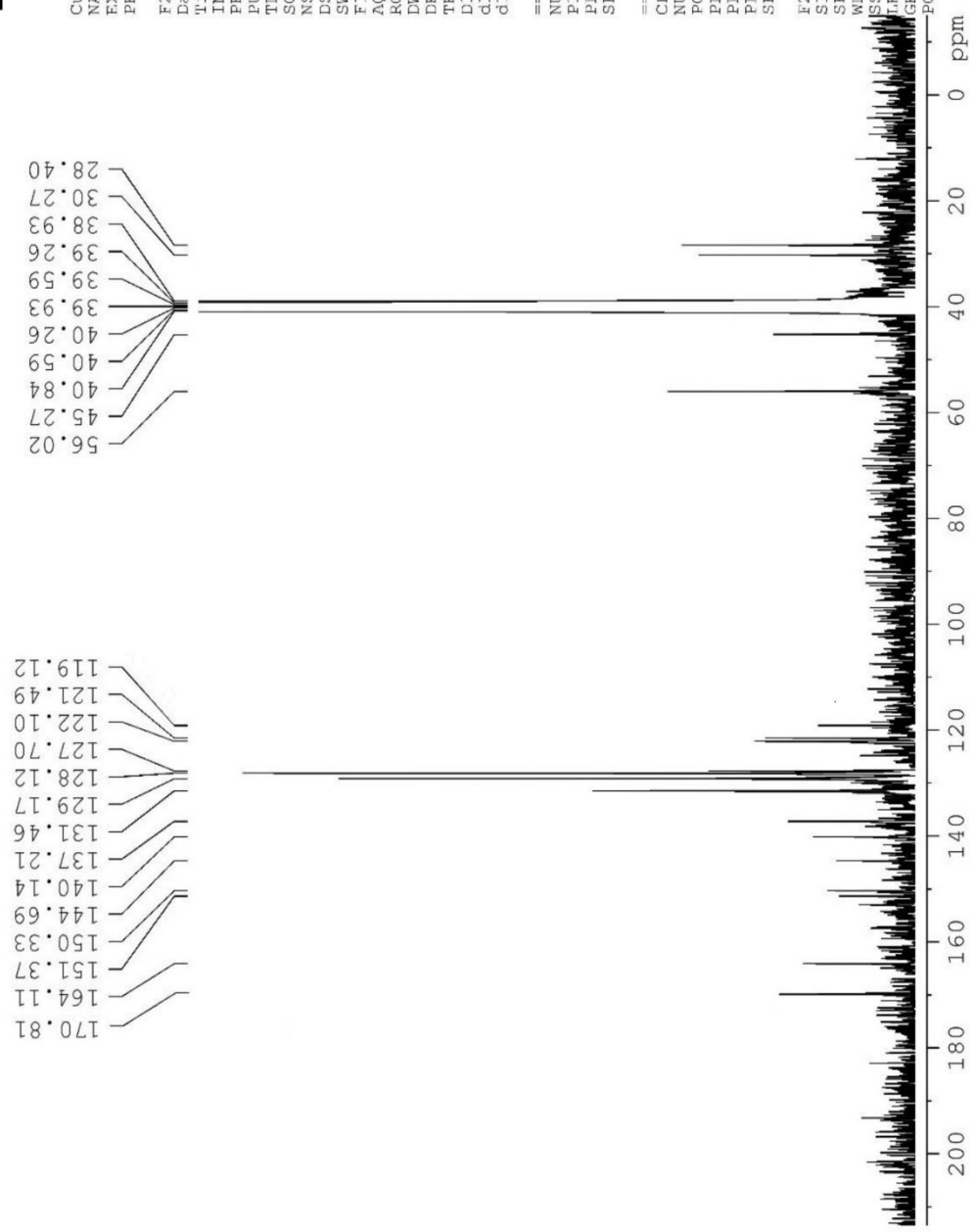
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PULPROG       zgpg
TD            65536
SOLVENT       DMSO
NS            0240
DS            0
SWH           15060.241 Hz
FIDRES        0.229801 Hz
AQ            2.1758451 sec
RG            1625.5
DW            33.200 usec
DE            6.00 usec
TE            300.0 K
D1            2.00000000 sec
d11           0.03000000 sec
d12           0.00002000 sec

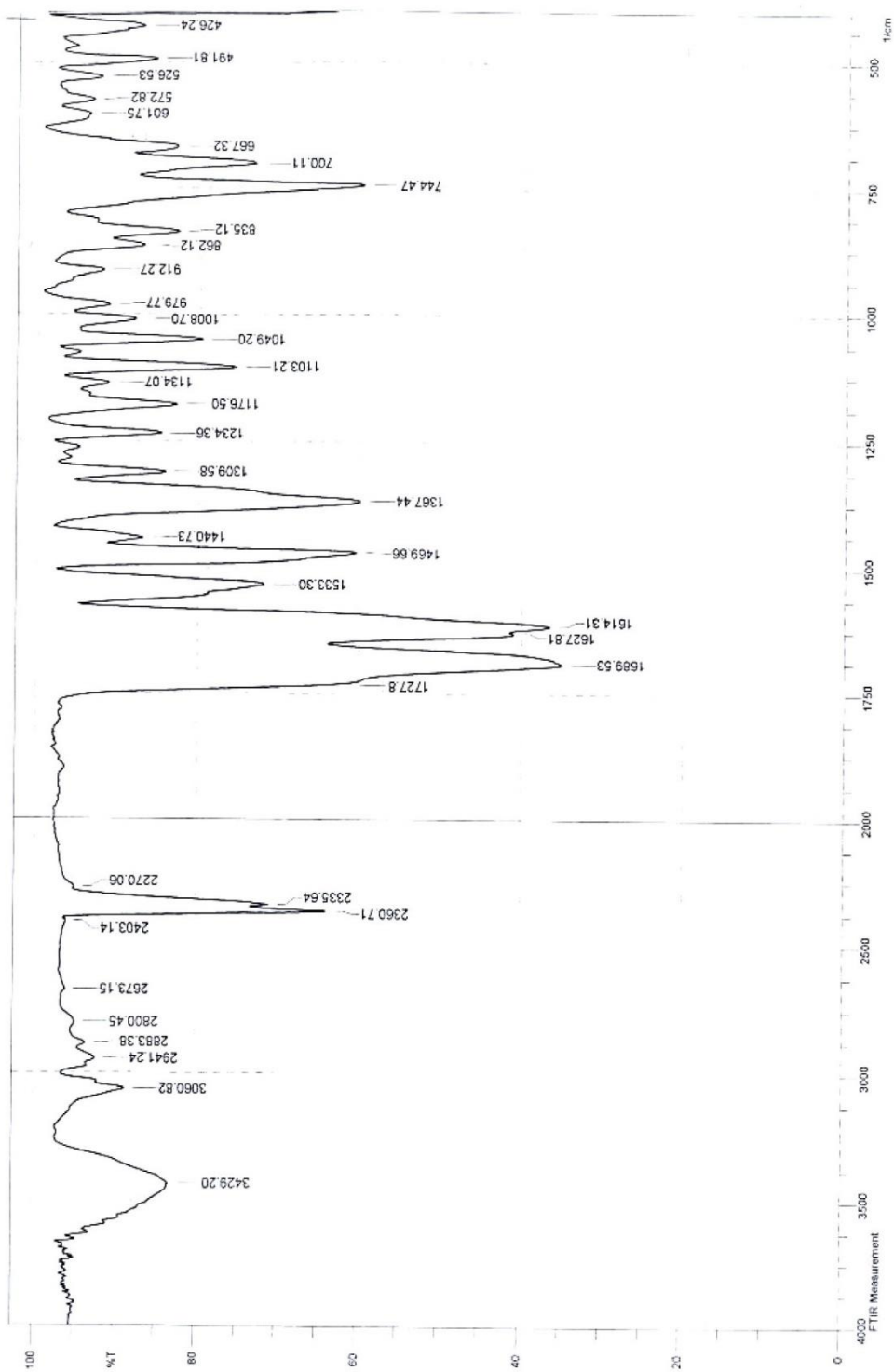
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PL1           0.00 dB
SFO1          62.9015280 MHz

=====
CHANNEL f2 =====
CPDPRG2       waltz16
NUC2          1H
PCPD2         80.00 usec
PL2           3.00 dB
PL12          21.50 dB
PL13          23.00 dB
SFO2          250.1310005 MHz

F2 - Processing parameters
SI            32768
SF            62.8952390 MHz
WDW           EM
SSB           0
GB            0
PC            1.40
  
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FT-IR methyl 7'-amino-1,1',3'-trimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4f)



¹H NMR methyl 7'-amino-1,1',3'-trimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4f)

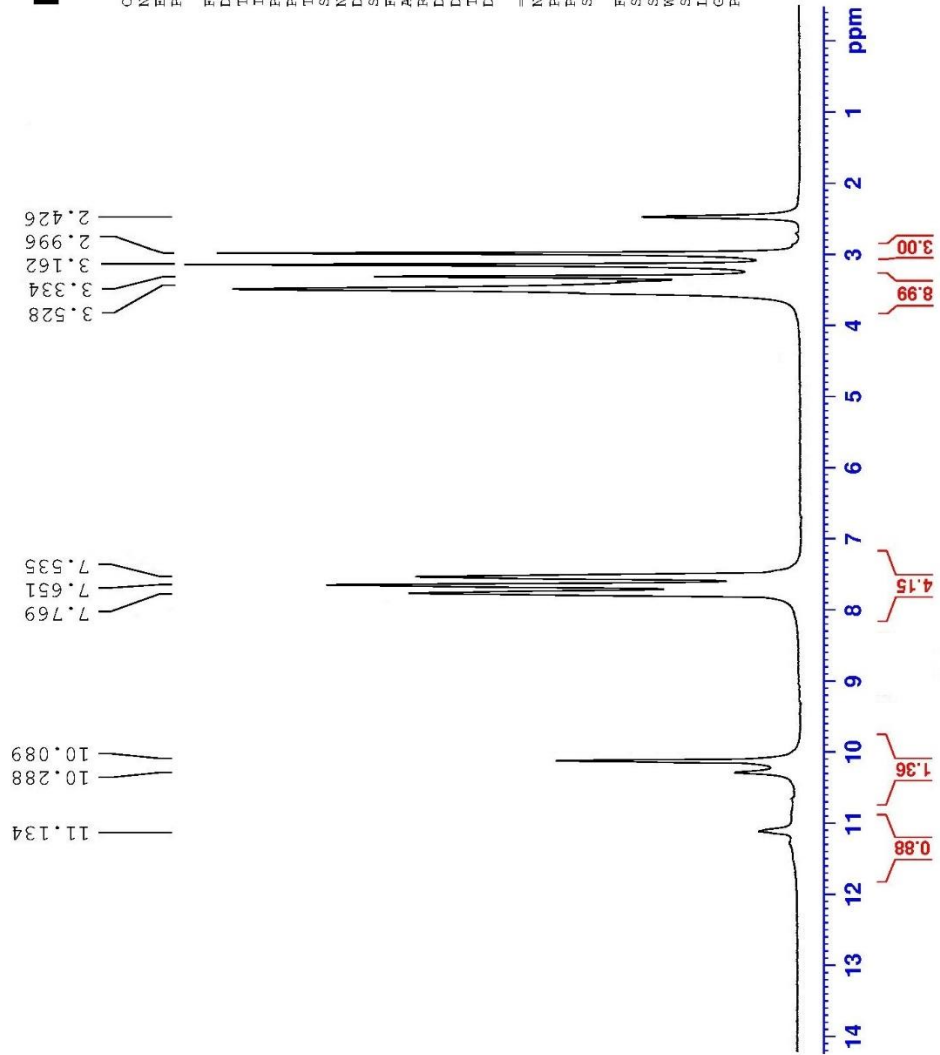


Current Data Parameters
NAME Rasht-2
EXPNO 405
PROCNO 1

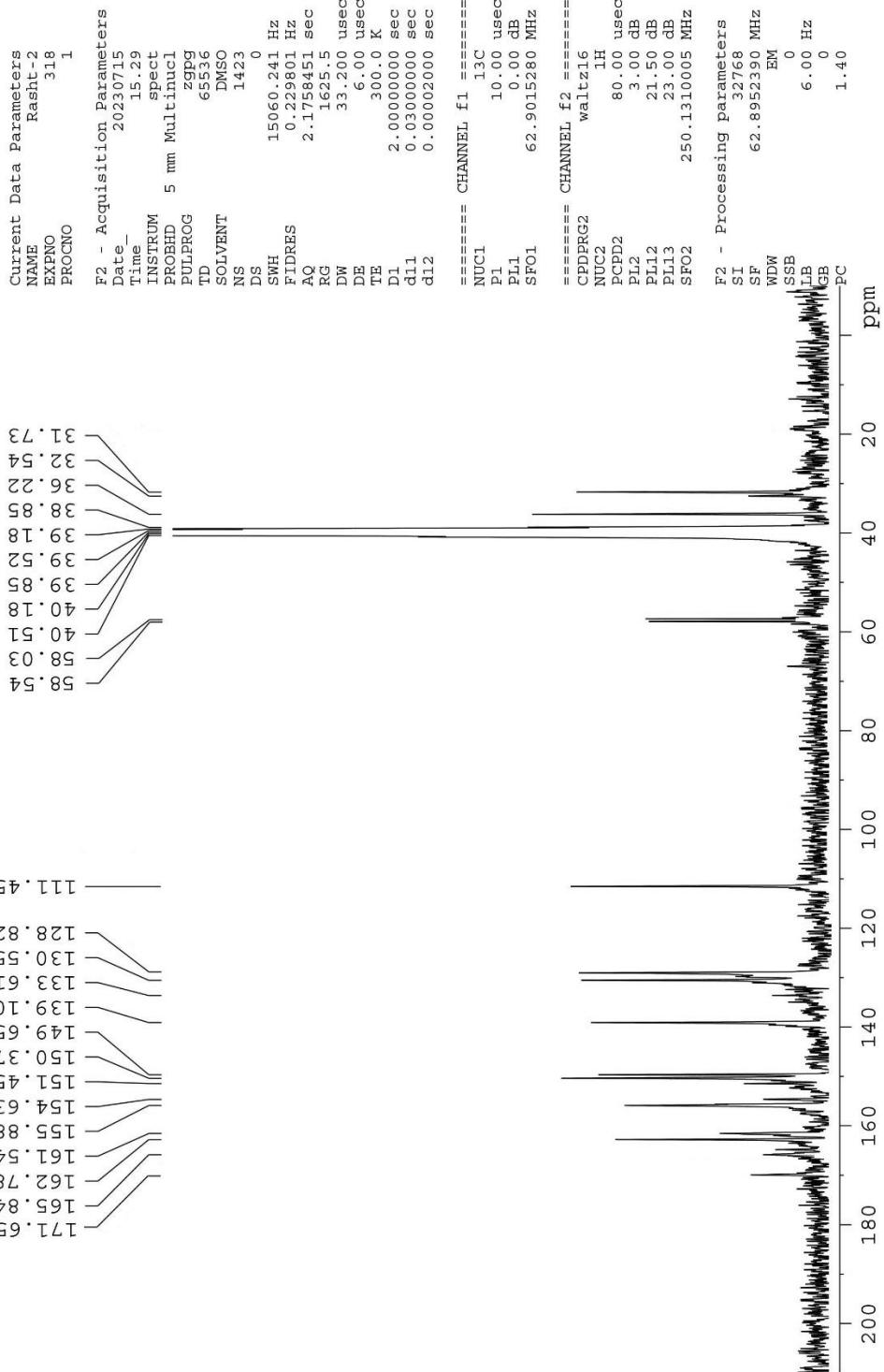
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PULPROG zg
TD 16384
SOLVENT DMSO
NS 20
DS 0
SWH 4990.020 Hz
FIDRES 0.304567 Hz
AQ 1.6417269 sec
RG 32
DW 100.200 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec

==== CHANNEL f1 =====
NUC1 1H
P1 9.00 usec
PL1 3.00 dB
SFO1 250.1320010 MHz

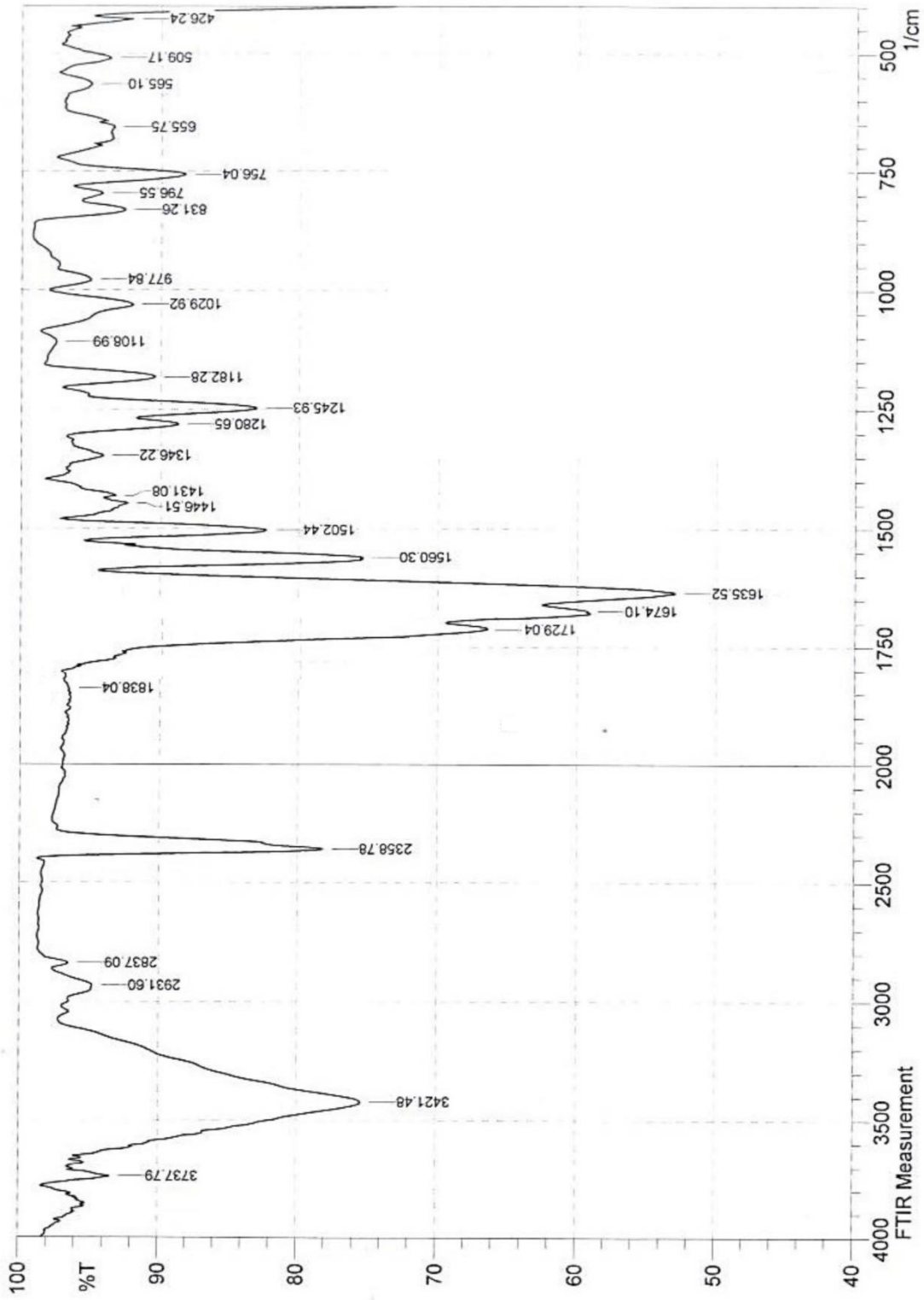
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SSB 0
LB 0.50 Hz
GB 0
PC 1.00



¹³C NMR methyl 7'-amino-1,1',3',4'-trimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4f)



FT-IR methyl 7'-amino-1-benzyl-1',3'-dimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4g)



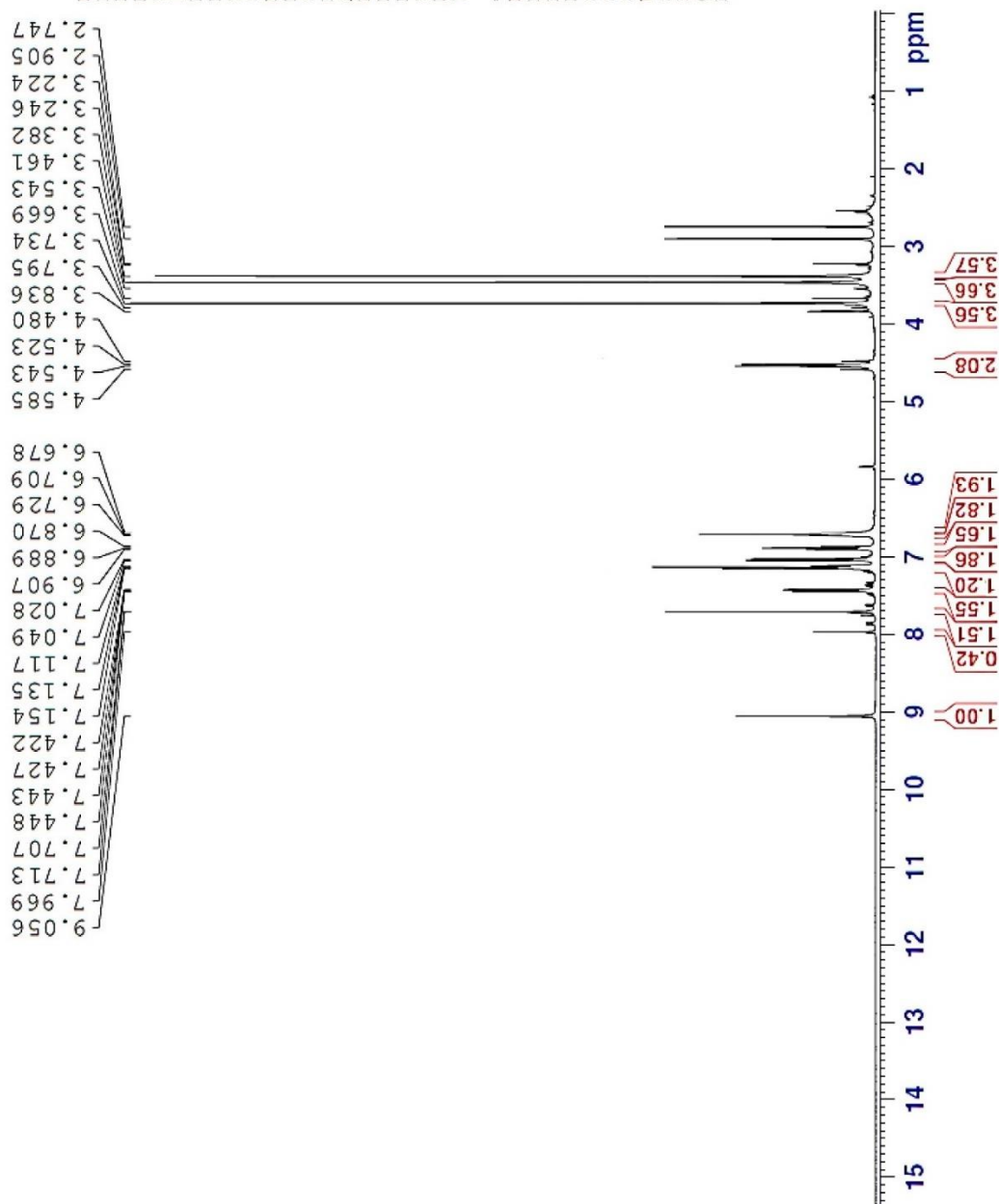
¹H NMR methyl 7'-amino-1-benzyl-1',3'-dimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4g)



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NAME Azad-Rasht UN
EXPNO 82
PROCNO 1
Date_ 20230825
Time 15.11
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
ID 65536
SOLVENT DMSO
NS 20
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 128
DW 62.400 usec
DE 6.50 usec
TE 293.5 K
D1 4.0000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 14.00 usec
PL1 -2.00 dB
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SFO1 400.2236020 MHz
SI 32768
SF 400.2200000 MHz
WDW EM
SSB 0
LB 0
GB 0
PC 1.00
    
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¹³C NMR methyl 7'-amino-1-benzyl-1',3'-dimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4g)

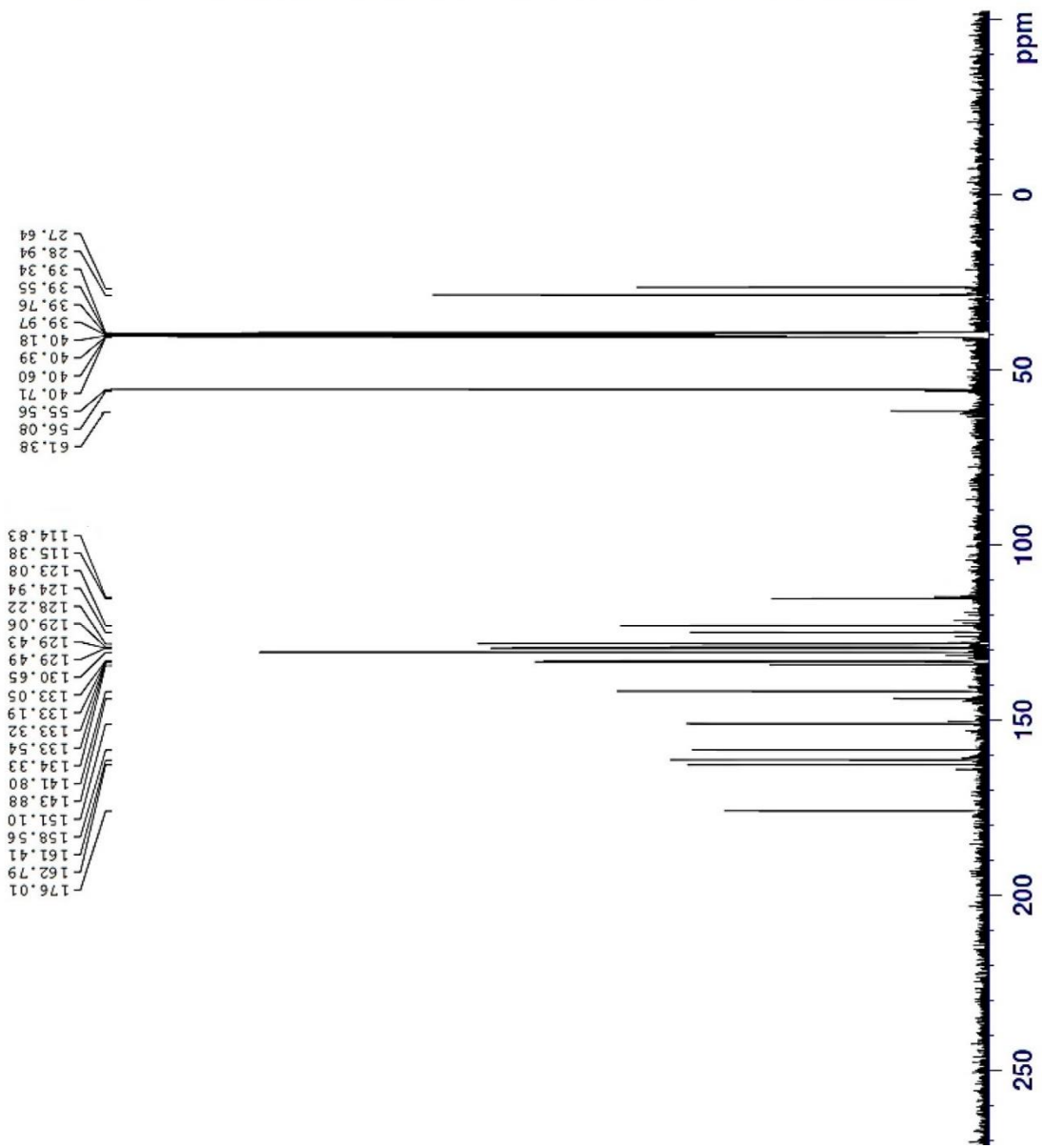


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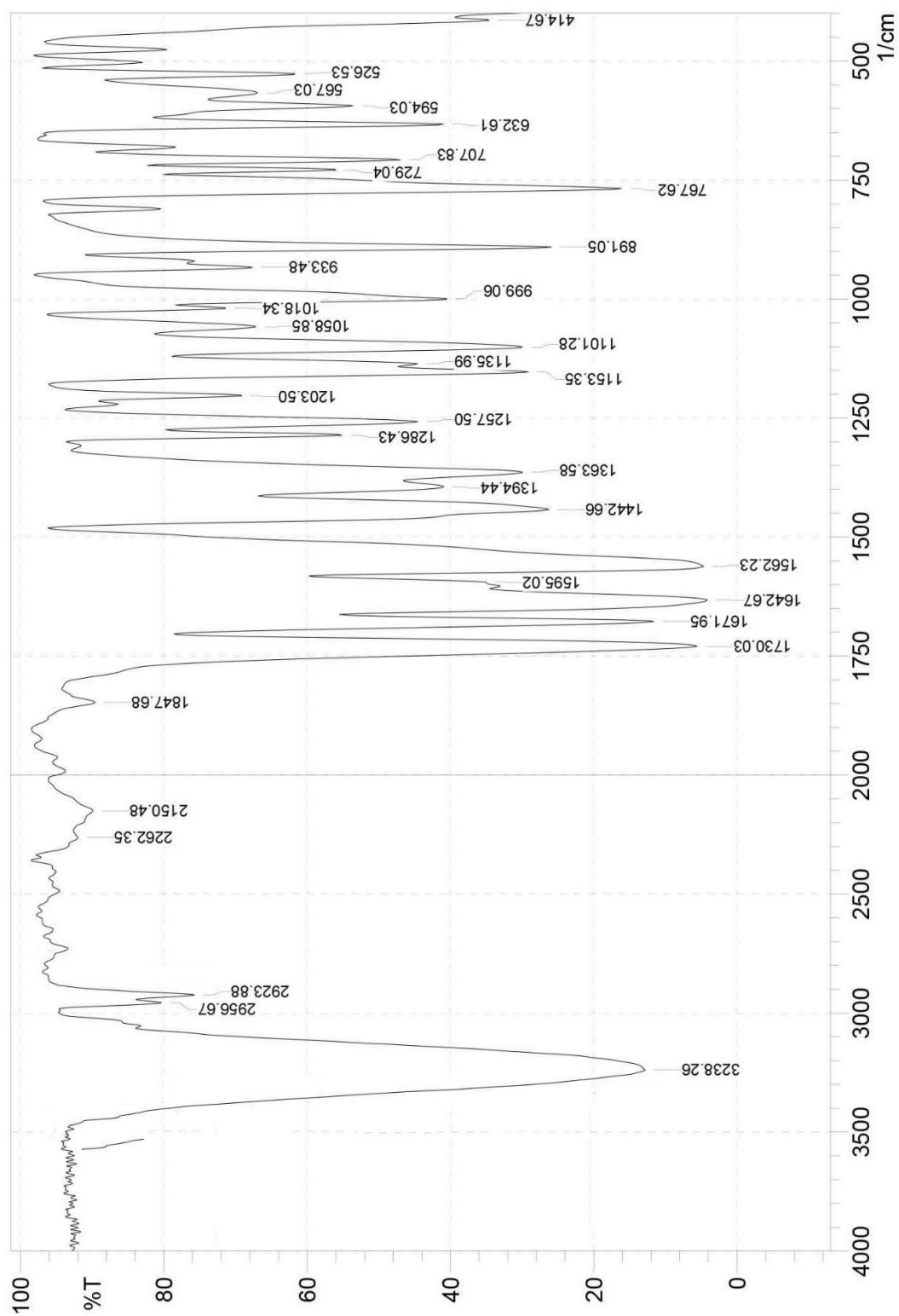
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SOLVENT DMSO
NS 2672
DS 0
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FIDRES 0.544357 Hz
AQ 0.9175540 sec
RG 2050
DW 14.000 usec
DE 6.50 usec
TE 293.5 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 9.00 usec
PL1 -0.90 dB
PL1W 42.02801895 W
SFO1 100.6479784 MHz

===== CHANNEL f2 =====
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NUC2 1H
PCPD2 90.00 usec
PL2 -2.00 dB
PLI2 14.16 dB
PLI3 17.90 dB
PL2W 11.86359406 W
PLI2W 0.28722104 W
PLI3W 0.12139834 W
SFO2 400.2216009 MHz
SI 32768
SF 100.6353990 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
    
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FT-IR methyl (R)-7'-amino-1-(2,4-dichlorobenzyl)-1',3'-dimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4h)



¹H NMR methyl (R)-7'-amino-1-(2,4-dichlorobenzyl)-1',3'-dimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4h)

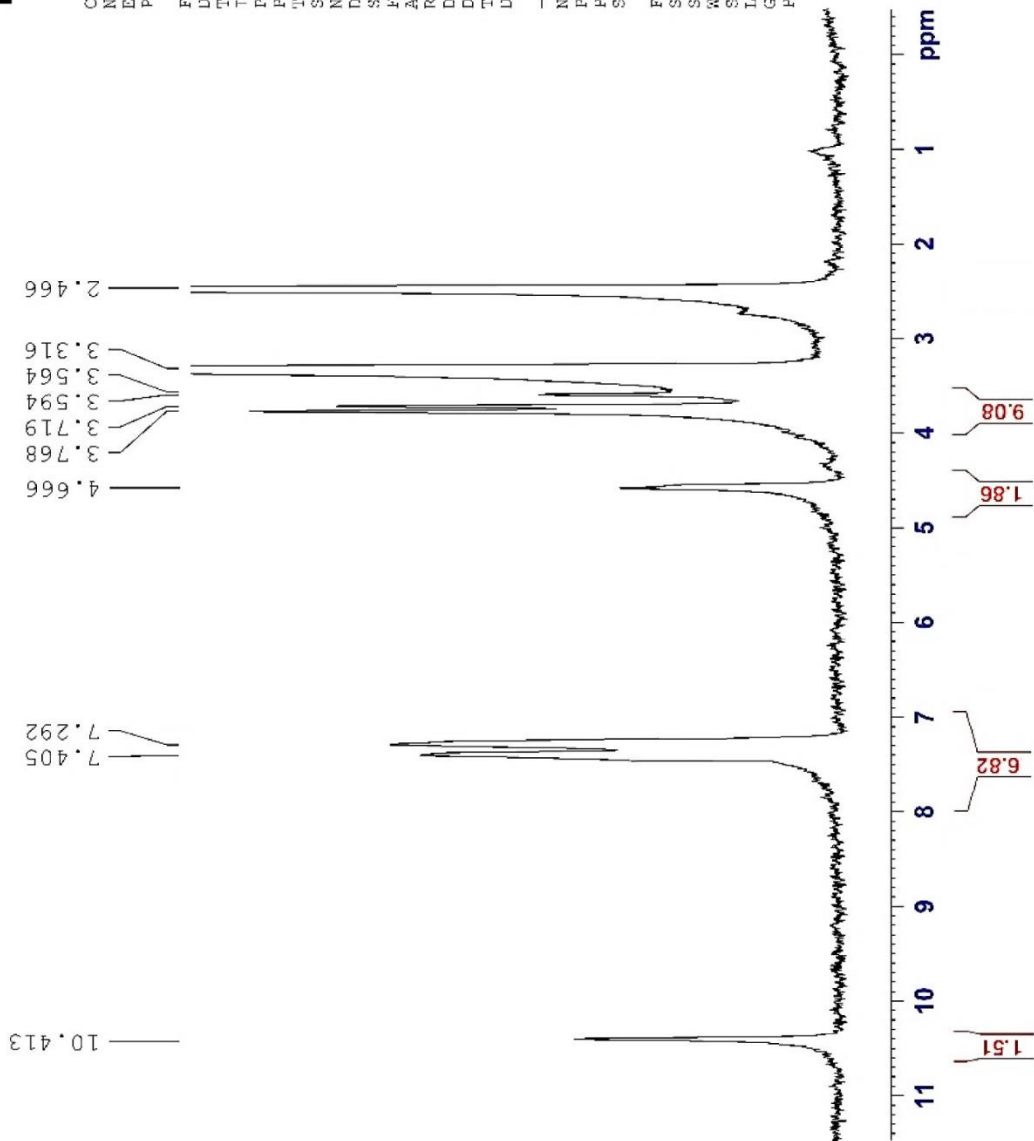


Current Data Parameters
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 Procno 1

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 SOLVENT DMSO
 NS 80
 DS 0
 SWH 3742.515 Hz
 FIDRES 0.228425 Hz
 AQ 2.1889524 sec
 RG 32
 DW 133.600 usec
 DE 6.00 usec
 TE 300.0 K
 D1 2.0000000 sec

----- CHANNEL f1 -----
 NUC1 1H
 P1 9.00 usec
 PL1 3.00 dB
 SFO1 250.1317509 MHz

F2 - Processing parameters
 SI 32768
 SF 250.1300000 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.00



¹³C NMR methyl (R)-7'-amino-1-(2,4-dichlorobenzyl)-1',3'-dimethyl-2,2',4'-trioxo-2',3',4',8'-tetrahydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d]pyrimidine]-6'-carboxylate (4h)

```

Current Data Parameters
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PROCNO   1

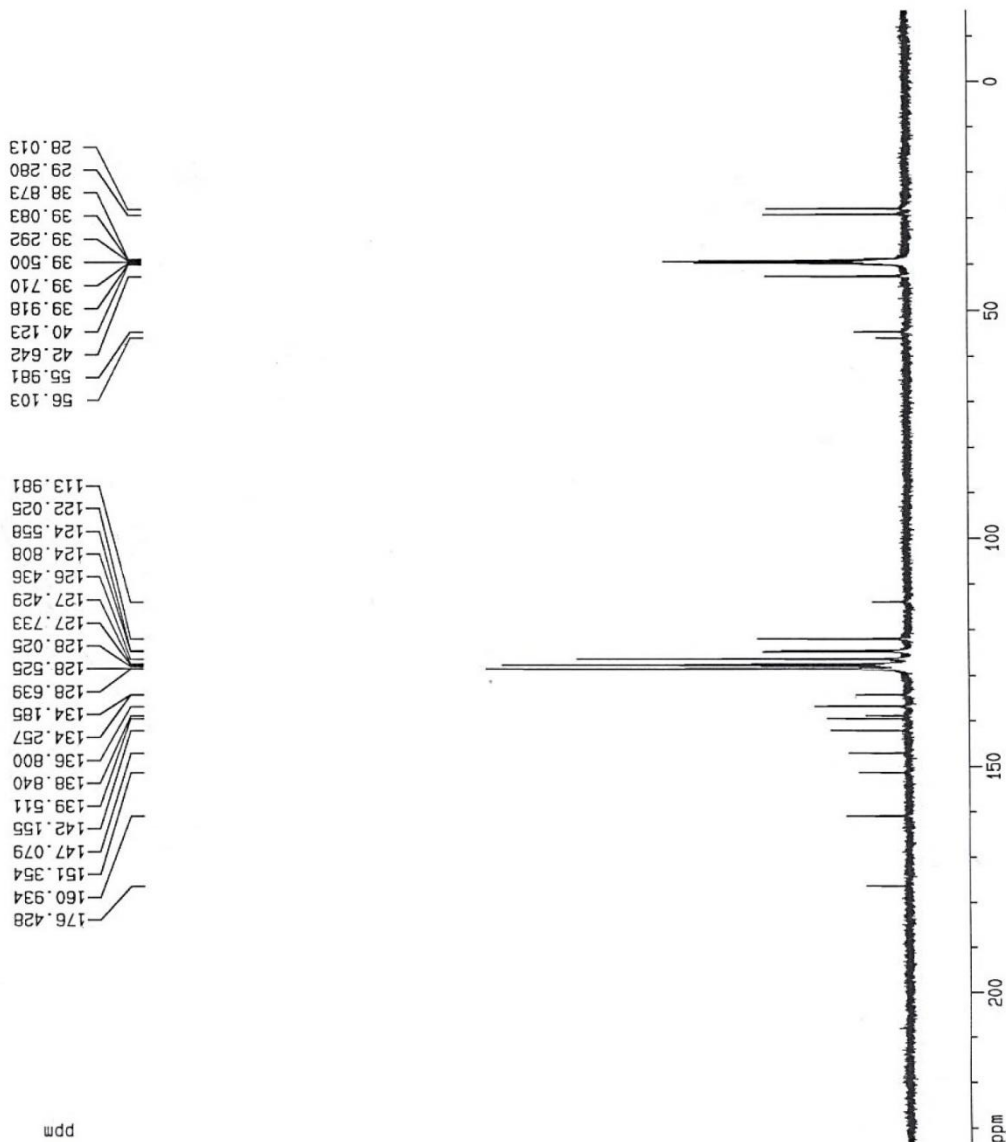
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PULPROG  zgpgg
TD        2768
SOLVENT  DMSO
NS        1000
DS        0
SWH       25125.629 Hz
FIDRES   0.766773 Hz
AQ        0.6521332 sec
RG        3072
DM        19.900 usec
DE        6.00 usec
TE        300.0 K
D1        10.00000000 sec
D11       0.03000000 sec
D12       0.00002000 sec

===== CHANNEL f1 =====
NUC1      13C
P1        9.30 usec
PL1       -6.00 dB
SFO1      100.627959 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD2    65.00 usec
PL2       0.00 dB
PL12     19.00 dB
PL13     19.00 dB
SFO2     400.1316005 MHz

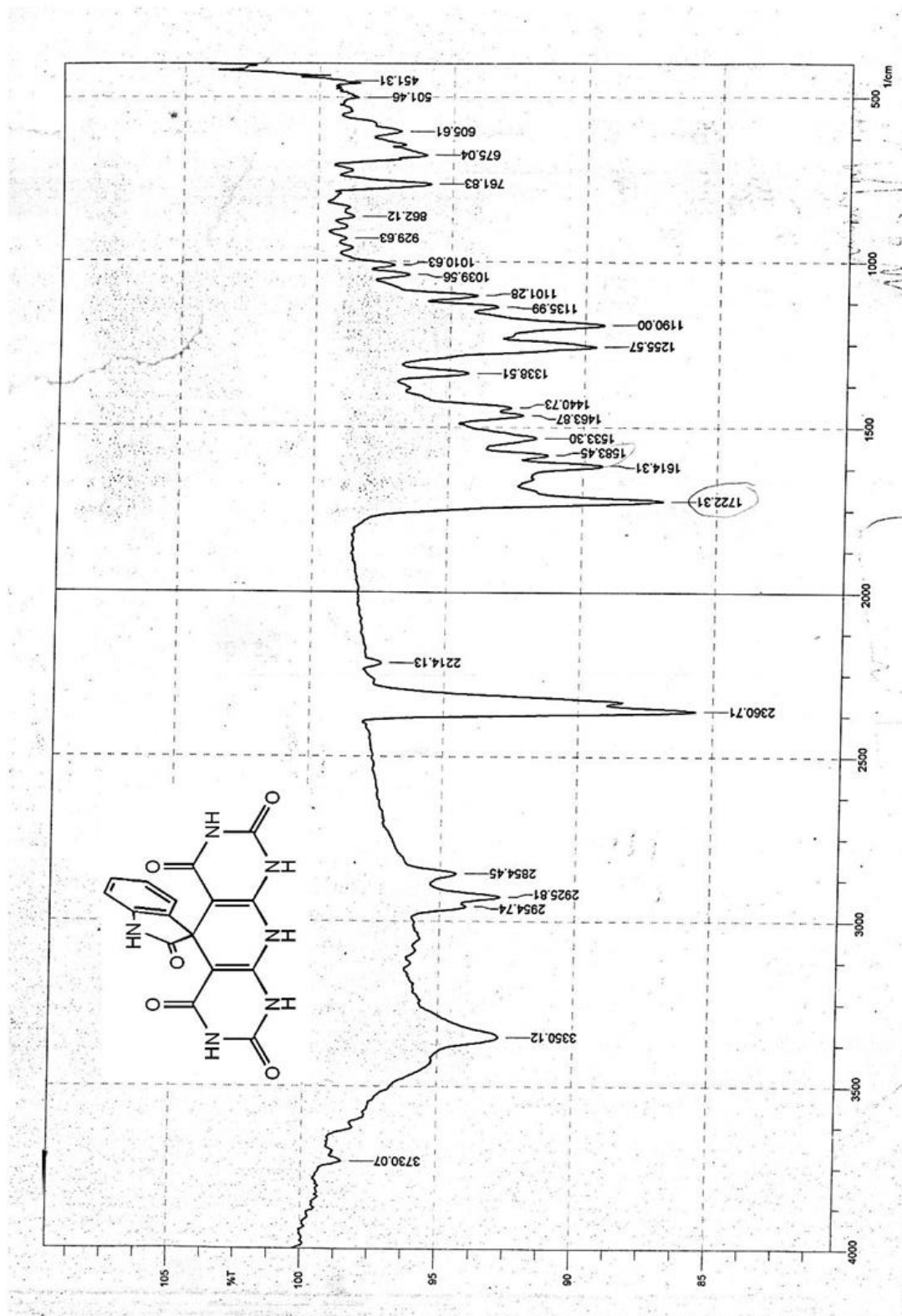
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SF        100.6126050 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       233.365 ppm
F1        23479.56 Hz
F2P       -16.360 ppm
F2        -1646.05 Hz
PPMCM     12.46829 ppm/cm
HZDM      1256.26052 Hz/cm
    
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FT-IR

10',10a'-dihydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,4a'H,7'H,9'H)-pentaone (9a)



¹H NMR 10',10a'-dihydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,4a'H,7'H,9'H)-pentaone (9a)



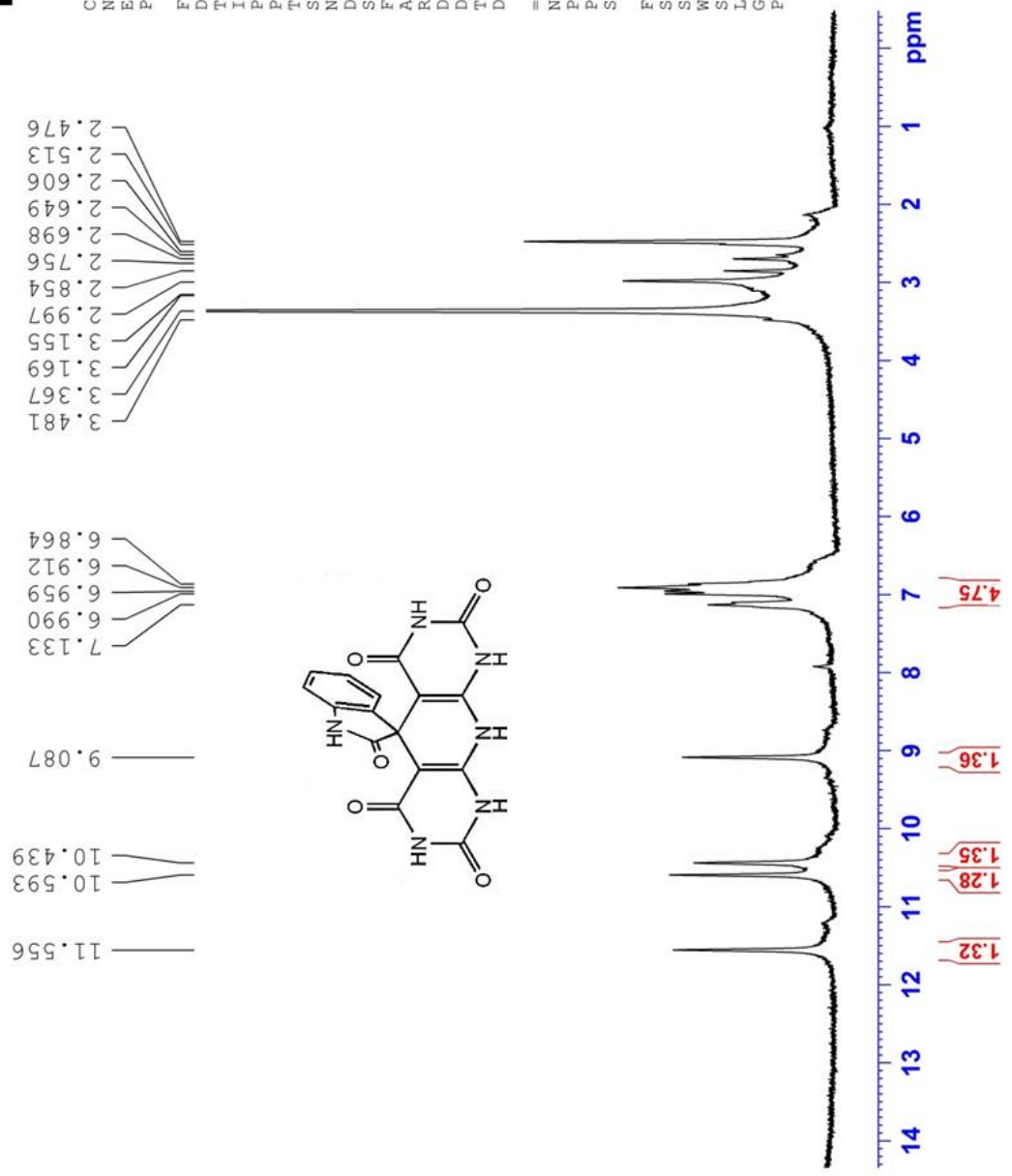
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 PULPROG zg
 TD 16384
 SOLVENT DMSO
 NS 40
 DS 0
 SWH 3742.515 Hz
 FIDRES 0.228425 Hz
 AQ 2.1889524 sec
 RG 32
 DW 133.600 usec
 DE 6.00 usec
 TE 300.0 K
 D1 2.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.00 usec
 PL1 3.00 dB
 SFO1 250.1317509 MHz

F2 - Processing parameters
 SI 32768
 SF 250.1300000 MHz
 WDW EM
 SSB 0
 LB 0.25 Hz
 GB 0
 PC 1.00

Hanieh-Bozorgi-D



¹³C NMR 10',10a'-dihydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrимidine]-2,2',4',6',8'(3'H,4a'H,7'H,9'H)-pentaone (9a)



Current Data Parameters
 NAME Rasht-2
 EXPNO 14
 PROCNO 1

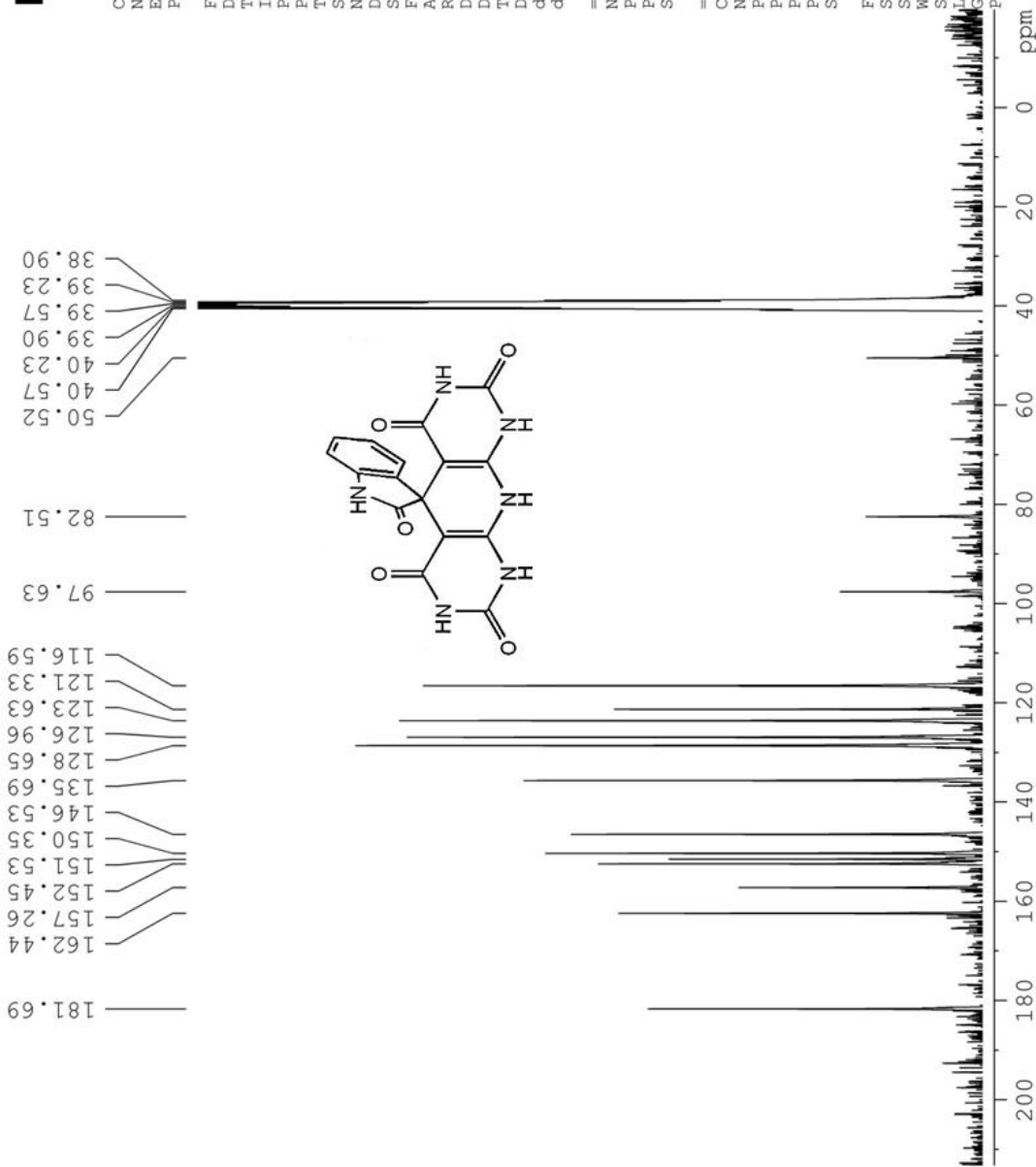
F2 - Acquisition Parameters
 Date_ 20240105
 Time 10.50
 INSTRUM spect
 PROBHD 5 mm Multinucl
 PULPROG zgpg
 TD 65536
 SOLVENT DMSO
 NS 970
 DS 0
 SWH 15060.241 Hz
 FIDRES 0.229801 Hz
 AQ 2.1758451 sec
 RG 1625.5
 DW 33.200 usec
 DE 6.00 usec
 TE 300.0 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 d12 0.00002000 sec

==== CHANNEL f1 =====
 NUC1 13C
 P1 10.00 usec
 PL1 0.00 dB
 SFO1 62.9015280 MHz

==== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 FCPD2 80.00 usec
 PL2 3.00 dB
 PL12 21.50 dB
 PL13 23.00 dB
 SFO2 250.1310005 MHz

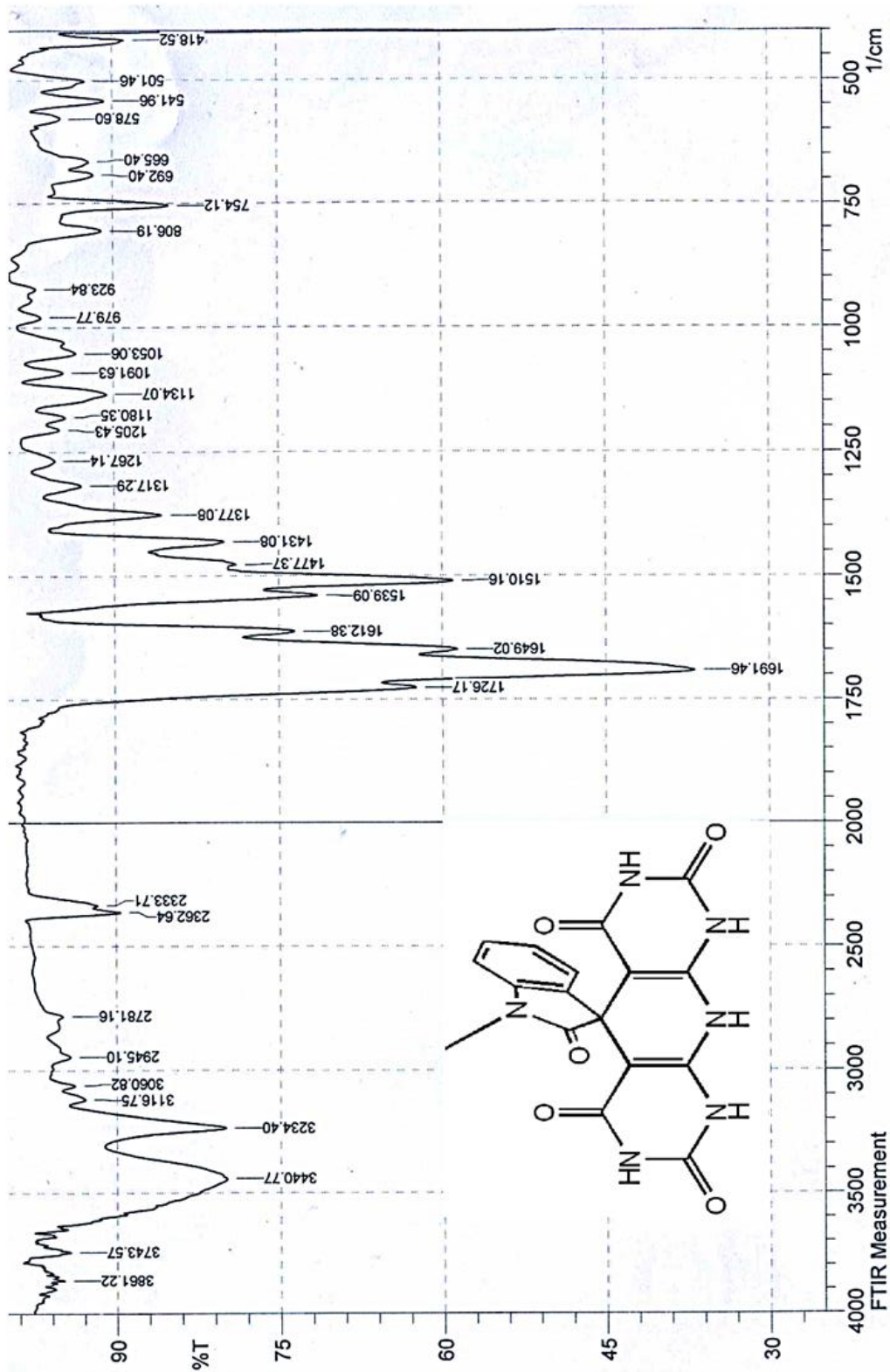
F2 - Processing parameters
 SI 32768
 SF 62.8952390 MHz
 WDW EM
 SSB 0
 LB 3.00 Hz
 GB 0
 PC 1.40

Hanieh-Bozorgi-D



FT-IR

1-Methyl-10',10a'-dihydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,4a'H,7'H,9'H)-pentaone (9b)



¹H NMR 1-Methyl-10',10a'-dihydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,4a'H,7'H,9'H)-pentaone (9b)



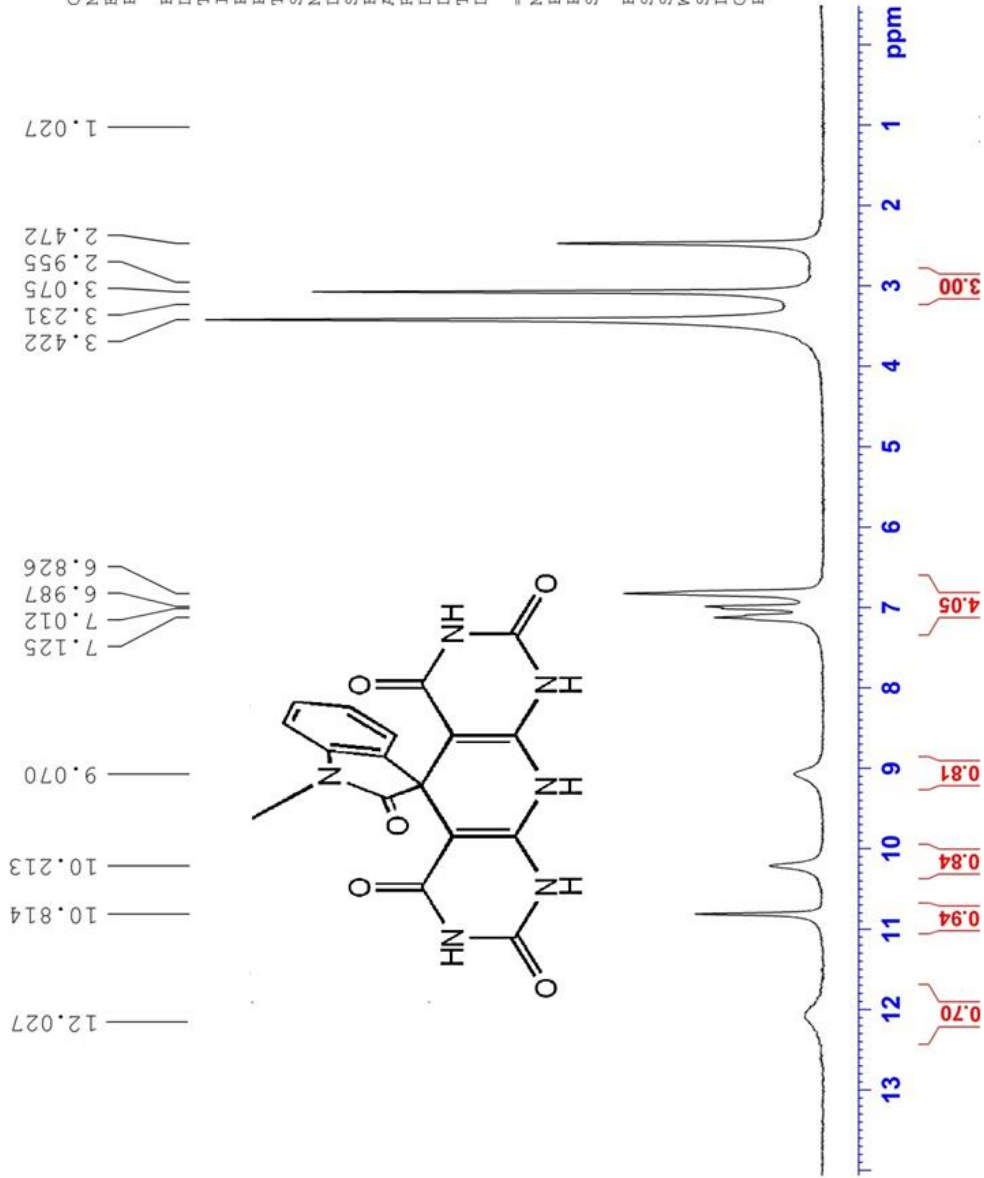
Current Data Parameters
NAME Rashf-2
EXPNO 16
PROCNO 1

F2 - Acquisition Parameters
Date_ 20240105
Time 11.00
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 16384
SOLVENT DMSO
NS 60
DS 0
SWH 3742.515 Hz
FIDRES 0.228425 Hz
AQ 2.1889524 sec
RG 32
DW 133.600 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec

===== CHANNEL f1 =====
NUC1 1H
P1 9.00 usec
PL1 3.00 dB
SFO1 250.1317509 MHz

F2 - Processing parameters
SI 32768
SF 250.1300000 MHz
WDW EM
SSB 0
LB 0.50 Hz
GB 0
PC 1.00

Hanieh-Bozorgi-C



¹³C NMR 1-Methyl-10',10a'-dihydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,4a'H,7'H,9'H)-pentaone (9b)



Current Data Parameters
NAME Rasht-2
EXPNO 17
PROCNO 1

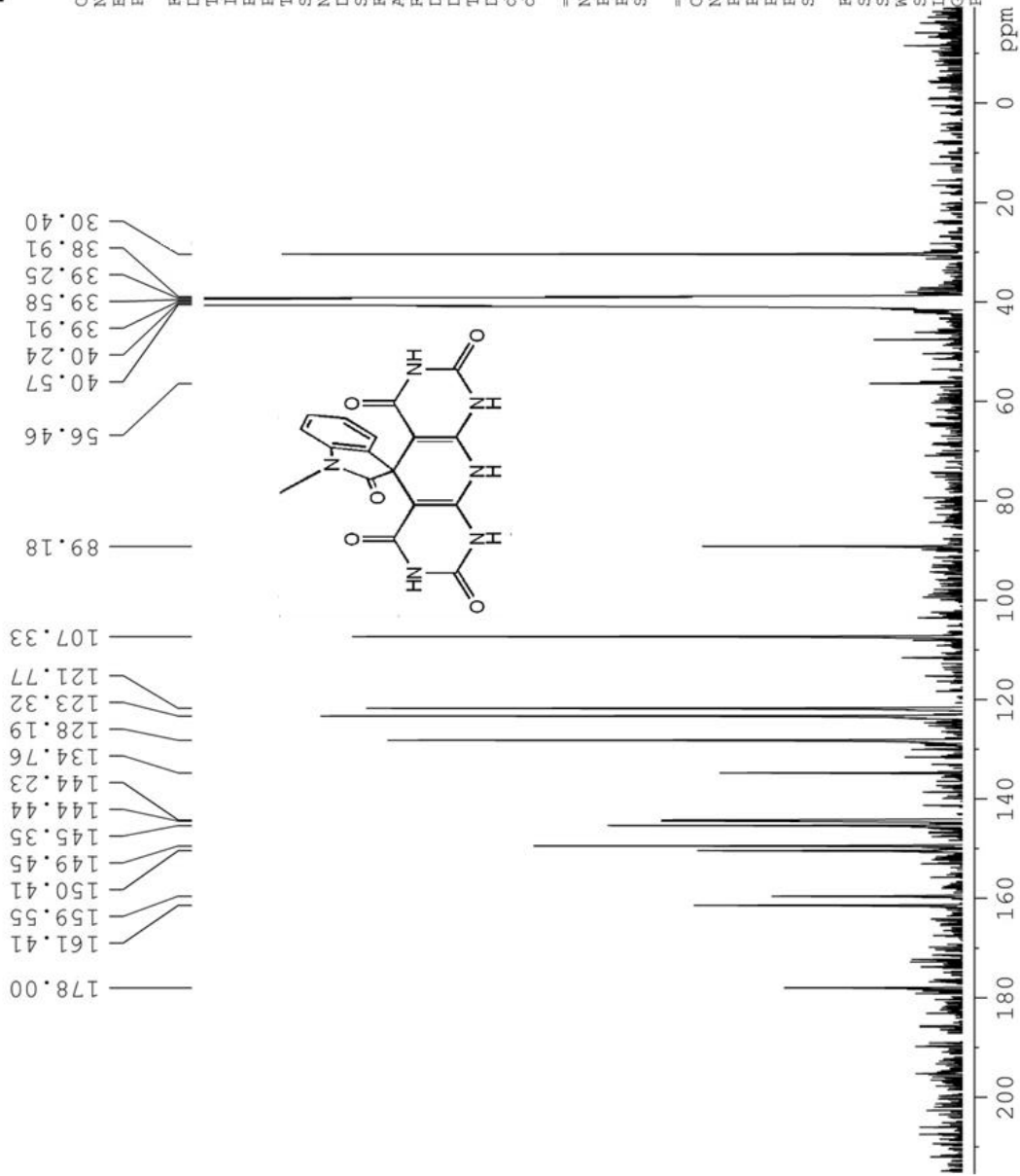
F2 - Acquisition Parameters
Date_ 20240105
Time_ 11.43
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zgpg
TD 65536
SOLVENT DMSO
NS 1779
DS 0
SWH 15060.241 Hz
FIDRES 0.229801 Hz
AQ 2.1758451 sec
RG 1625.5
DW 33.200 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
d12 0.00002000 sec

==== CHANNEL f1 =====
NUC1 13C
P1 10.00 usec
PL1 0.00 dB
SFO1 62.9015280 MHz

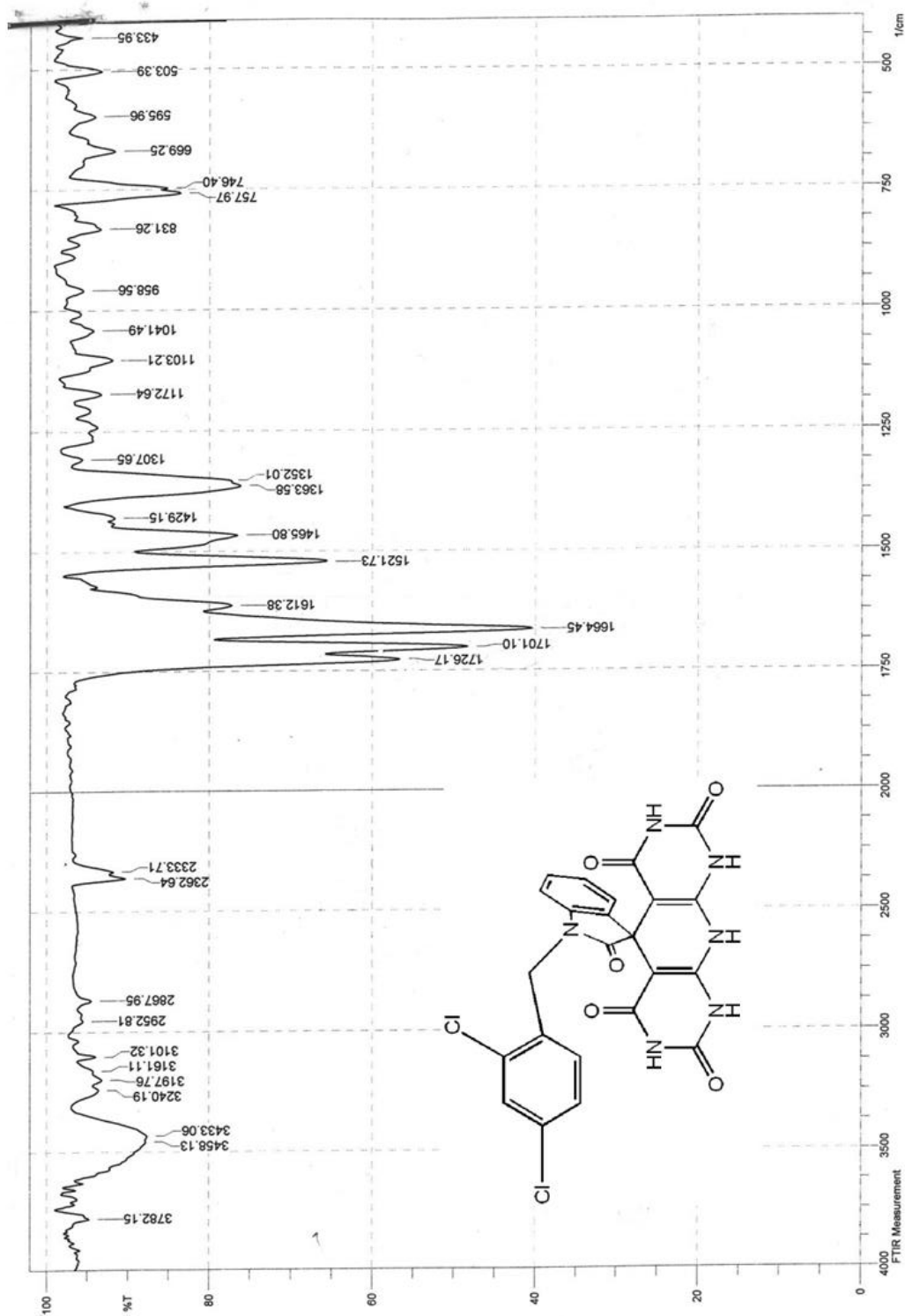
==== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 3.00 dB
PL12 21.50 dB
PL13 23.00 dB
SFO2 250.1310005 MHz

F2 - Processing parameters
SI 32768
SF 62.8952390 MHz
WDW EM
SSB 0
LB 3.00 Hz
GB 0
FC 1.40

Hanieh-Bozorgi-C



FT-IR 1-(2,4-Dichlorobenzyl)-10',10a'-dihydro-1'-H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,4a'H,7'H,9'H)-pentaone (9c)



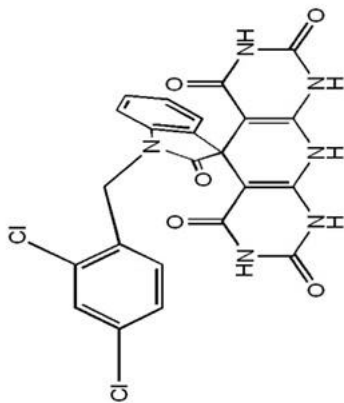
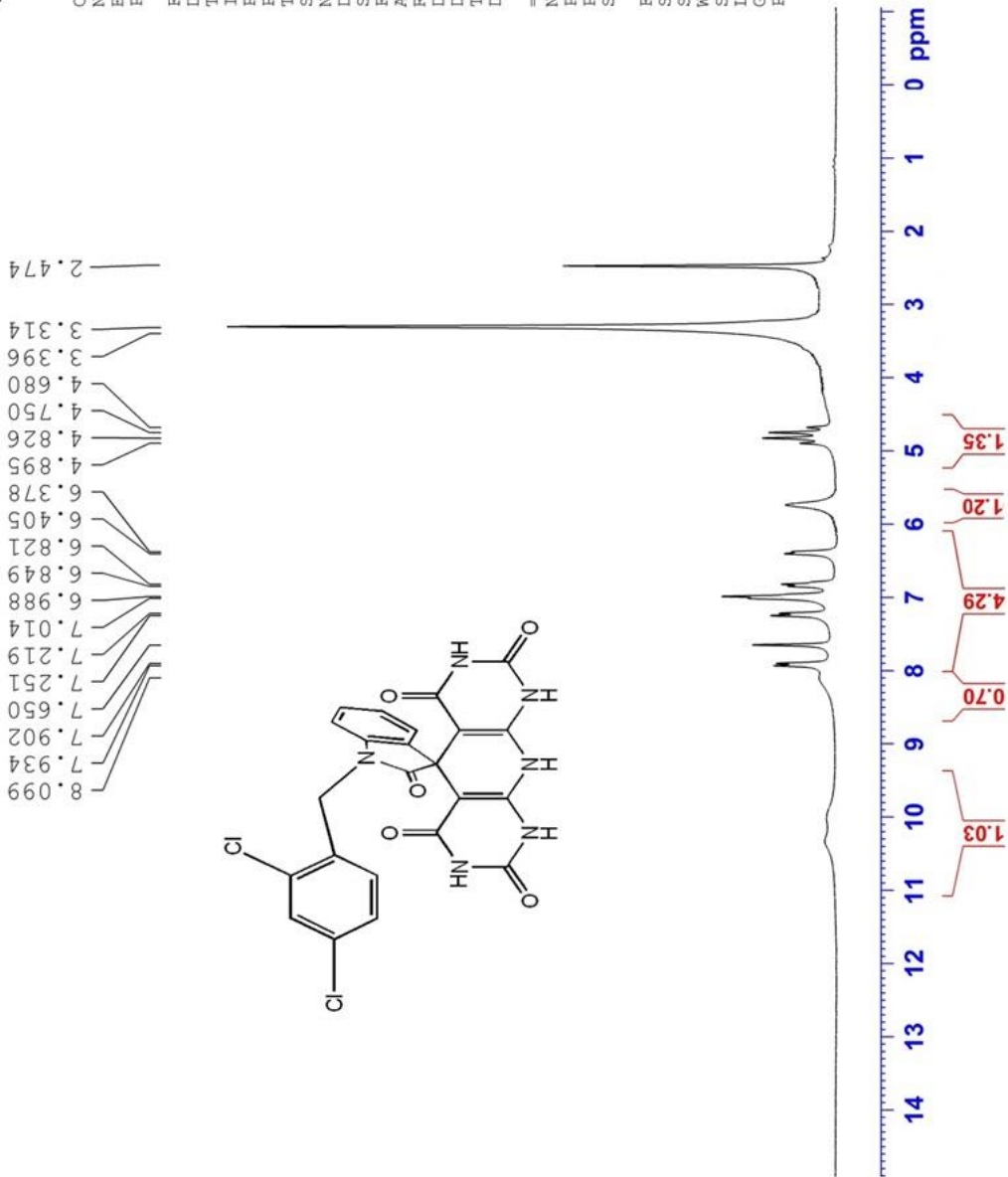


¹H NMR 1-(2,4-Dichlorobenzyl)-10',10a'-dihydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,4a'H,7'H,9'H)-pentaone (9c)

Current Data Parameters
 NAME Rasht
 EXPNO 55
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20231205
 Time_ 9.26
 INSTRUM spect
 PROBHD 5 mm Multinucl
 PULPROG zg
 TD 16384
 SOLVENT DMSO
 NS 30
 DS 0
 SWH 4990.020 Hz
 FIDRES 0.304567 Hz
 AQ 1.6417269 sec
 RG 287.4
 DW 100.200 usec
 DE 6.00 usec
 TE 300.0 K
 D1 3.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.00 usec
 PL1 3.00 dB
 SF01 250.1317509 MHz
 F2 - Processing parameters
 SI 32768
 SF 250.1300000 MHz
 EM
 SSB 0
 LB 2.00 Hz
 GB 0
 PC 1.00



¹³C NMR 1-(2,4-Dichlorobenzyl)-10',10a'-dihydro-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,4a'H,7'H,9'H)-pentaone (9c)



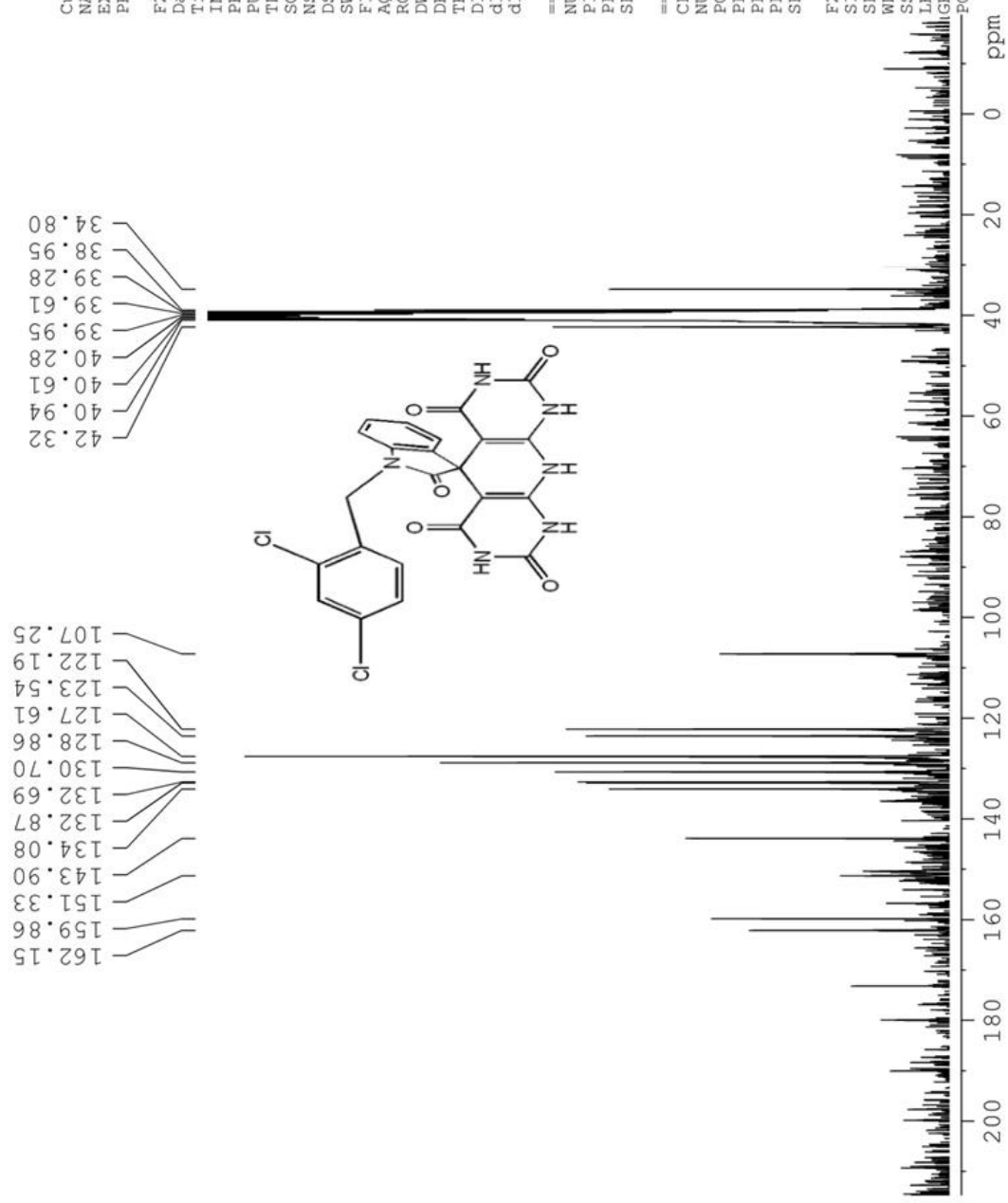
Current Data Parameters
 NAME Rasht
 EXPNO 58
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20231205
 Time_ 10.03
 INSTRUM spect
 PROBHD 5 mm Multinucl
 PULPROG zgpg
 TD 65536
 SOLVENT DMSO
 NS 2698
 DS 0
 SWH 15060.241 Hz
 FIDRES 0.229801 Hz
 AQ 2.1758451 sec
 RG 32768
 DW 33.200 usec
 DE 6.00 usec
 TE 300.0 K
 D1 2.0000000 sec
 d11 0.0300000 sec
 d12 0.0000200 sec

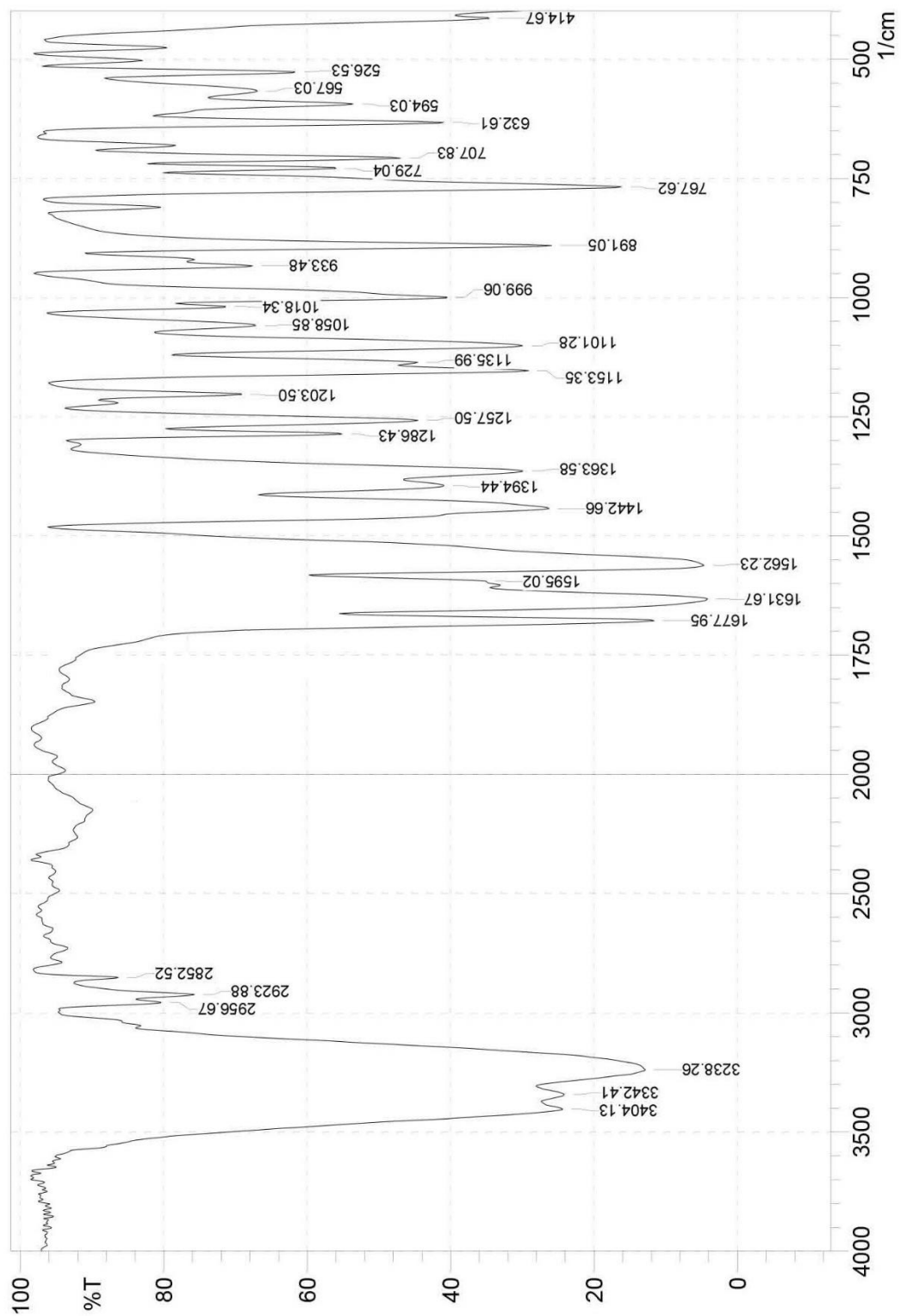
==== CHANNEL f1 =====
 NUC1 13C
 P1 10.00 usec
 PL1 0.00 dB
 SFO1 62.9015280 MHz

==== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 3.00 dB
 PL12 21.50 dB
 PL13 23.00 dB
 SFO2 250.1310005 MHz

F2 - Processing parameters
 SI 32768
 SF 62.8952390 MHz
 WDW EM
 SSB 0
 LB 2.00 Hz
 GB 0
 PC 1.40



FT-IR 1',3'-dimethyl-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8',9',10'H,10'H)-pentaone (9d)



¹H NMR 1',3'-dimethyl-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,7'H,9'H,10'H)-pentaone (9d)



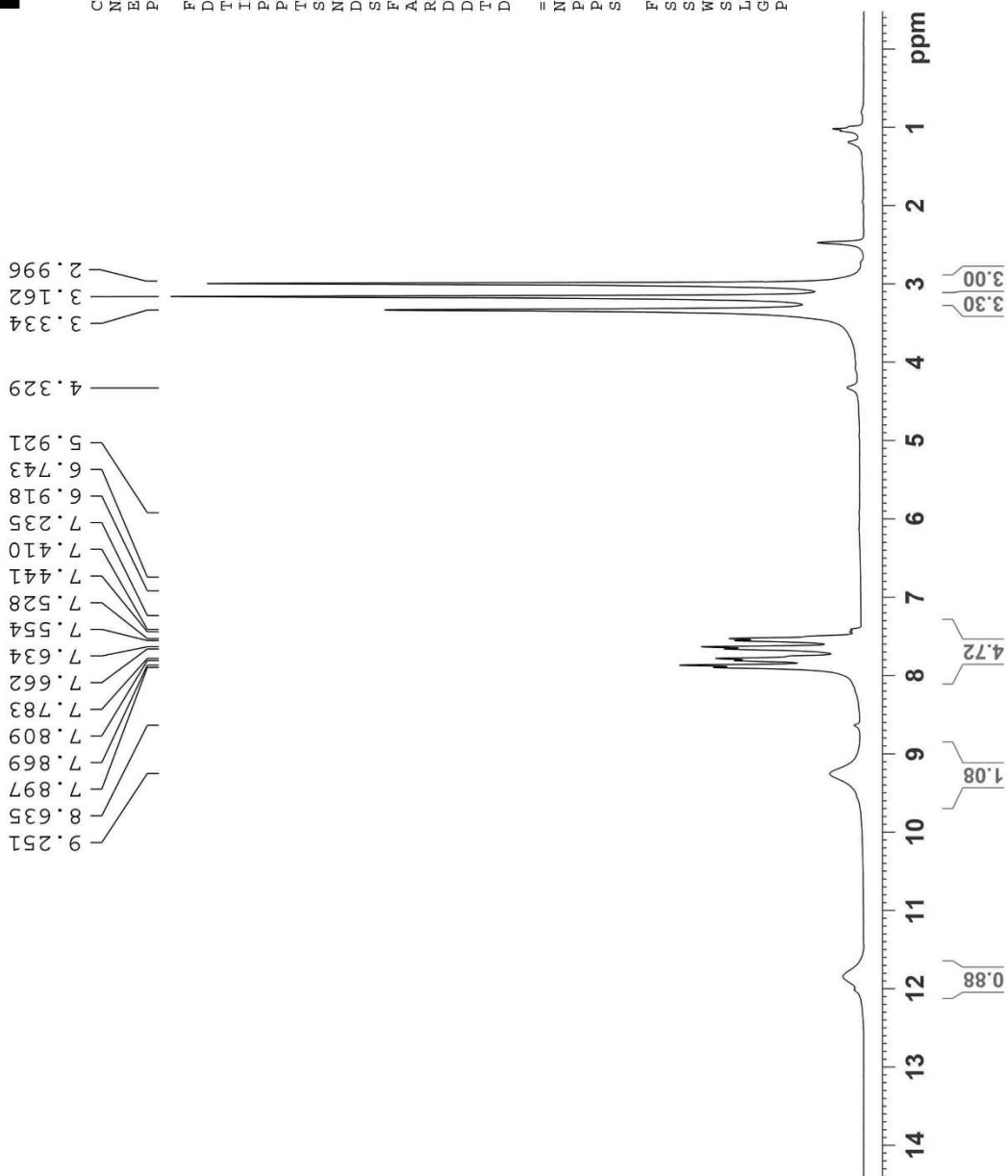
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Current Data Parameters
NAME      Rasht-2
EXPNO    269
PROCNO   1

F2 - Acquisition Parameters
Date_    20230218
Time     1.16
INSTRUM spect
PROBHD   5 mm Multinucl
PULPROG zg
TD       16384
SOLVENT DMSO
NS       20
DS       0
SWH      4990.020 Hz
FIDRES   0.304567 Hz
AQ       1.6417269 sec
RG       32
DW       100.200 usec
DE       6.00 usec
TE       300.0 K
D1       2.0000000 sec

===== CHANNEL f1 =====
NUC1     1H
P1       9.00 usec
PL1      3.00 dB
SFO1     250.1320010 MHz

F2 - Processing parameters
SI       32768
SF       250.1300000 MHz
WDW      EM
SSB      0
LB       1.00 Hz
GB       0
PC       1.00
    
```



¹³C NMR 1',3'-dimethyl-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,7'H,9'H,10'H)-pentaone (9d)



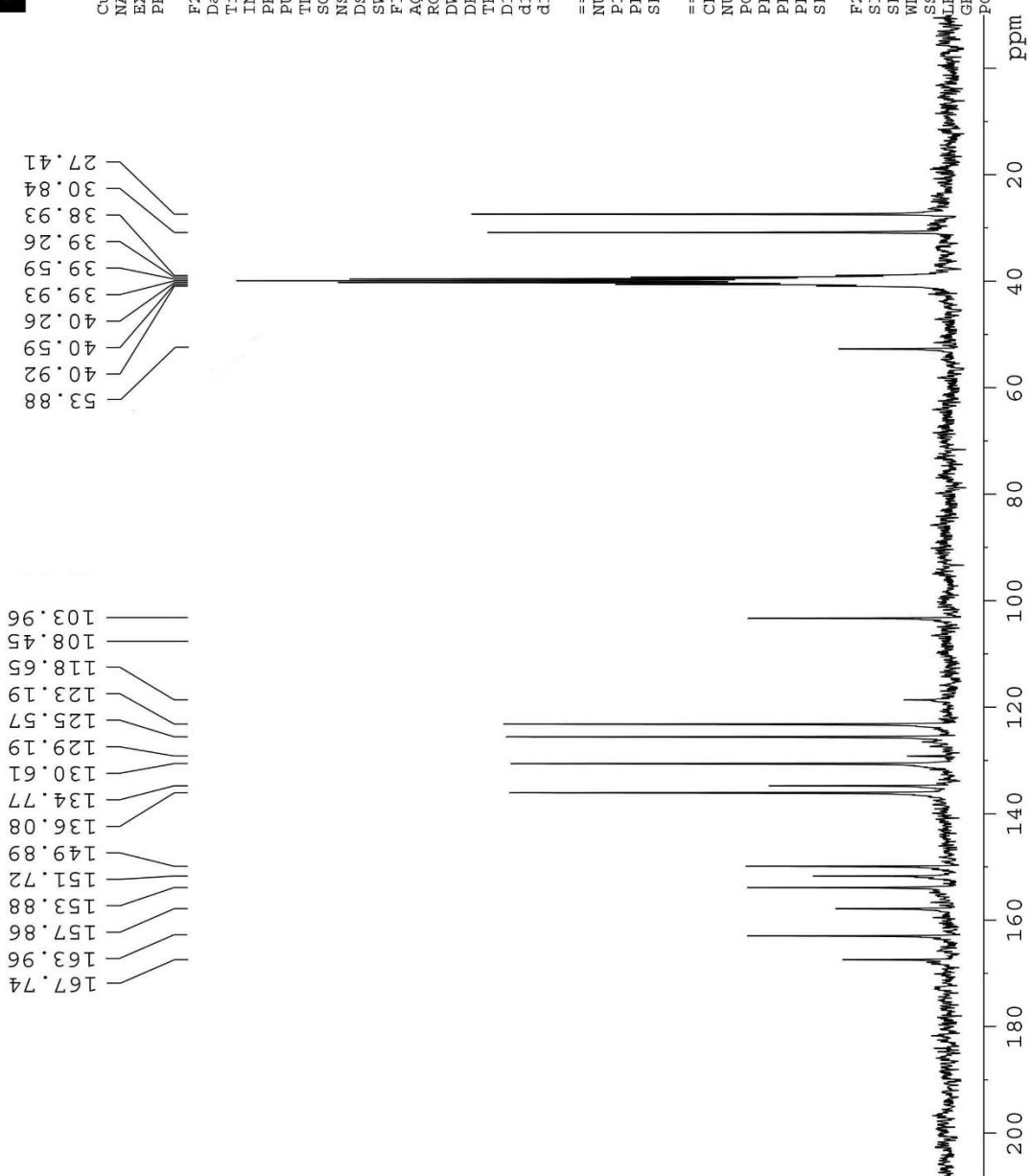
Current Data Parameters
 NAME Rasht-2
 EXPNO 270
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20230218
 Time_ 1.43
 INSTRUM spect
 PROBHD 5 mm Multinucl
 PULPROG zgpg
 TD 65536
 SOLVENT DMSO
 NS 952
 DS 0
 SWH 15060.241 Hz
 FIDRES 0.229801 Hz
 AQ 2.1758451 sec
 RG 1625.5
 DW 33.200 usec
 DE 6.00 usec
 TE 300.0 K
 D1 2.0000000 sec
 d11 0.0300000 sec
 d12 0.0000200 sec

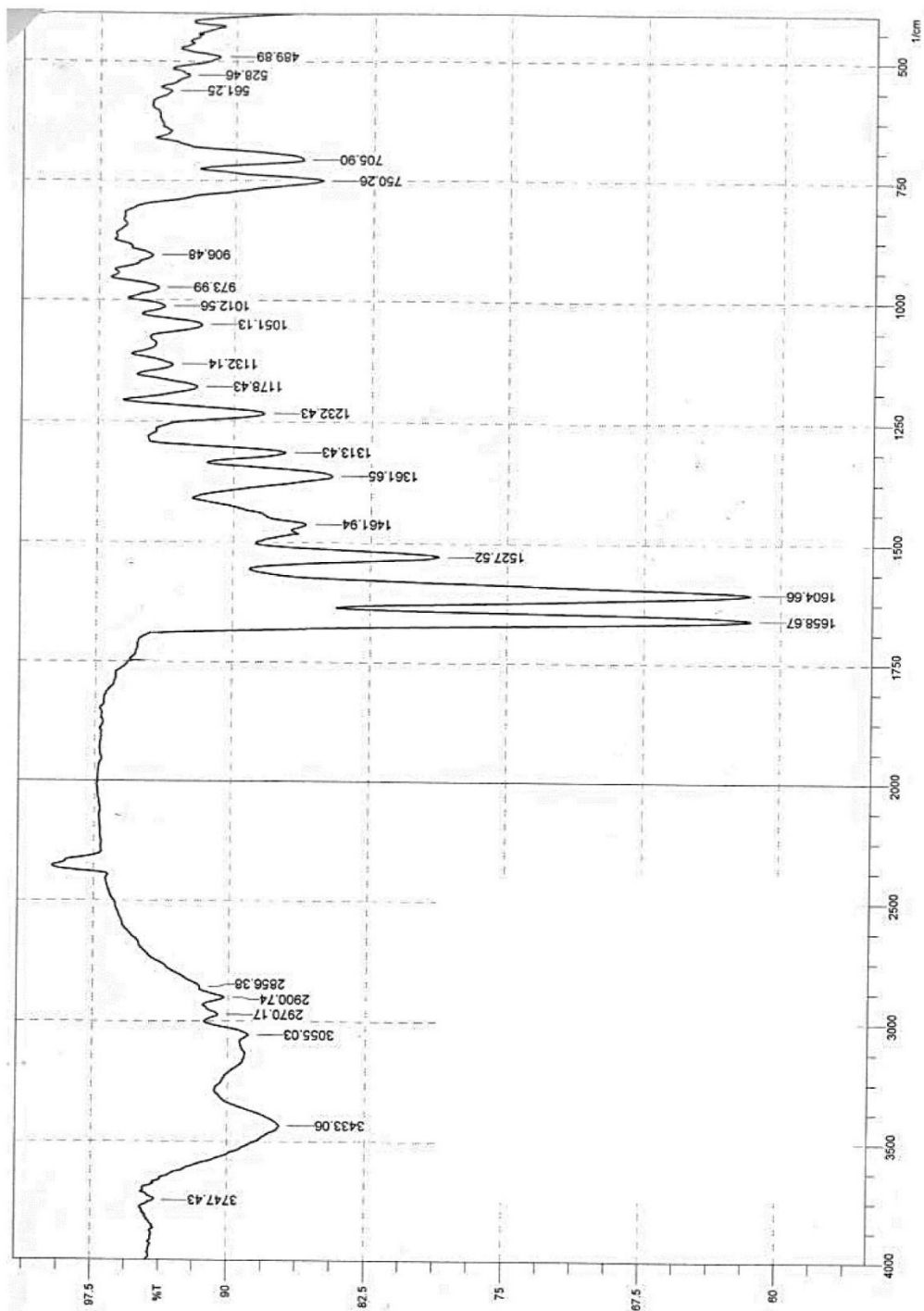
==== CHANNEL f1 =====
 NUC1 ¹³C
 P1 10.00 usec
 PL1 0.00 dB
 SFO1 62.9015280 MHz

==== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 ¹H
 PCPD2 80.00 usec
 PL2 3.00 dB
 PL12 21.50 dB
 PL13 23.00 dB
 SFO2 250.1310005 MHz

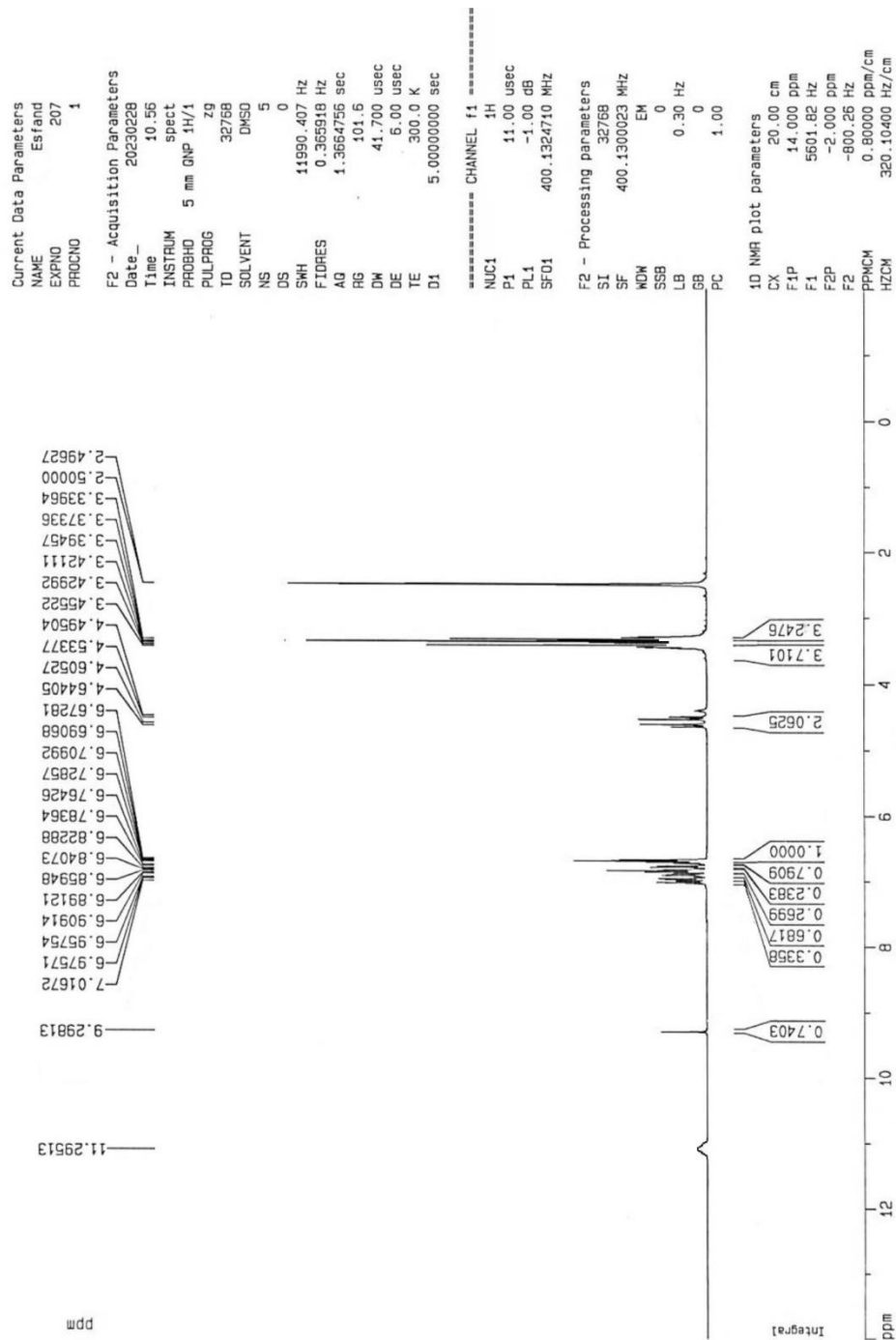
F2 - Processing parameters
 SI 32768
 SF 62.8952390 MHz
 WDW EM
 SSB 0
 GB 0
 PC 1.40



FT-IR (S)-1-(2,4-dichlorobenzyl)-1',3'-dimethyl-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,7'H,9'H,10'H)-pentaone (9e)



¹H NMR (S)-1-(2,4-dichlorobenzyl)-1',3'-dimethyl-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,7'H,9'H,10'H)-pentaone (9e)



¹³C NMR (S)-1-(2,4-dichlorobenzyl)-1',3'-dimethyl-1'H-spiro[indoline-3,5'-pyrido[2,3-d:6,5-d']dipyrimidine]-2,2',4',6',8'(3'H,7'H,9'H,10'H)-pentaone (9e)

