

## Supplementary Material

### Synthesis and characterization of heterocyclic compounds incorporating 2-pyrazoline and 1,3-thiazol-4-one moieties with antimicrobial significance

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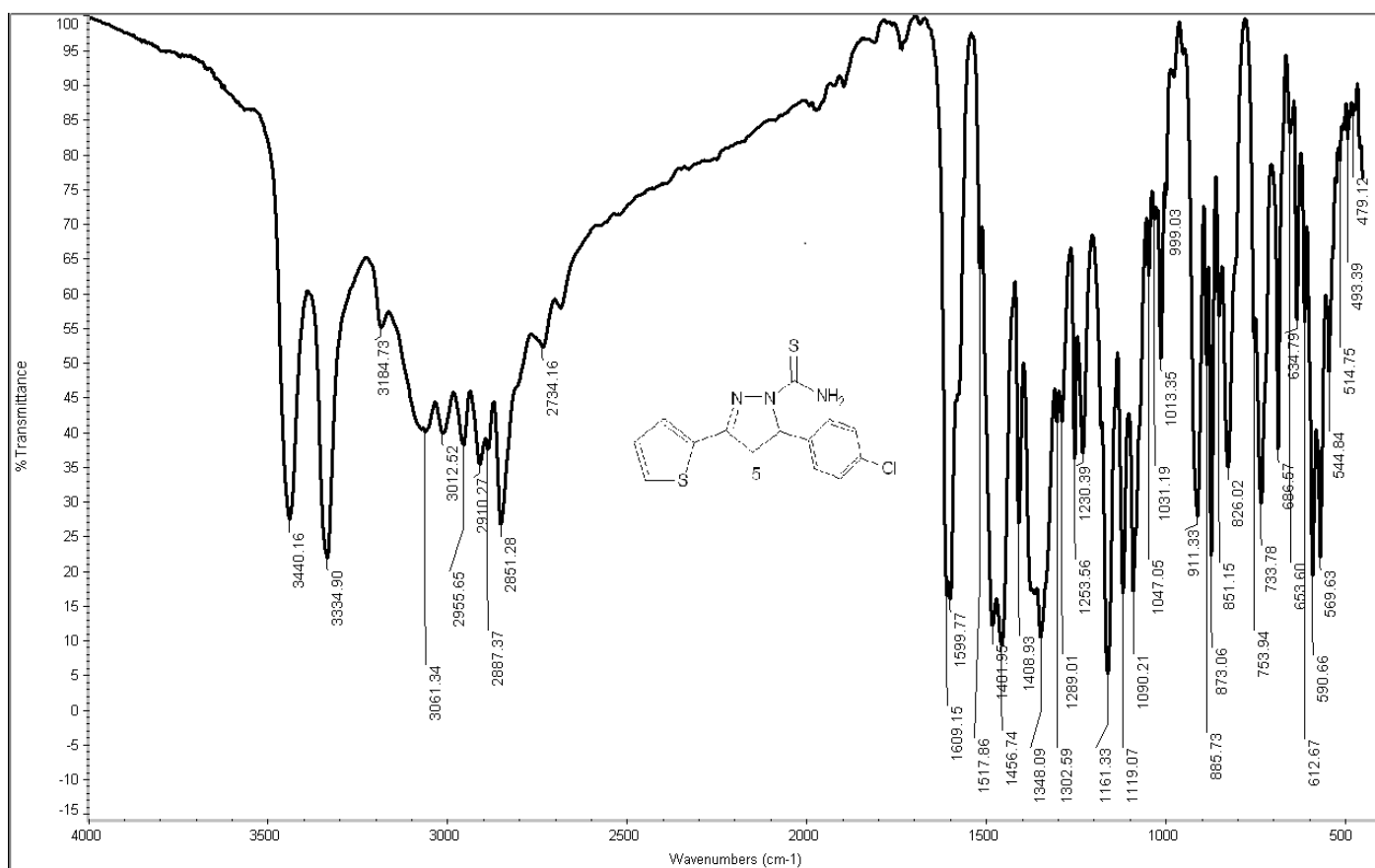
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<sup>b</sup> Department of Chemistry, Faculty of Science, Assiut University, Assiut 71516, Egypt

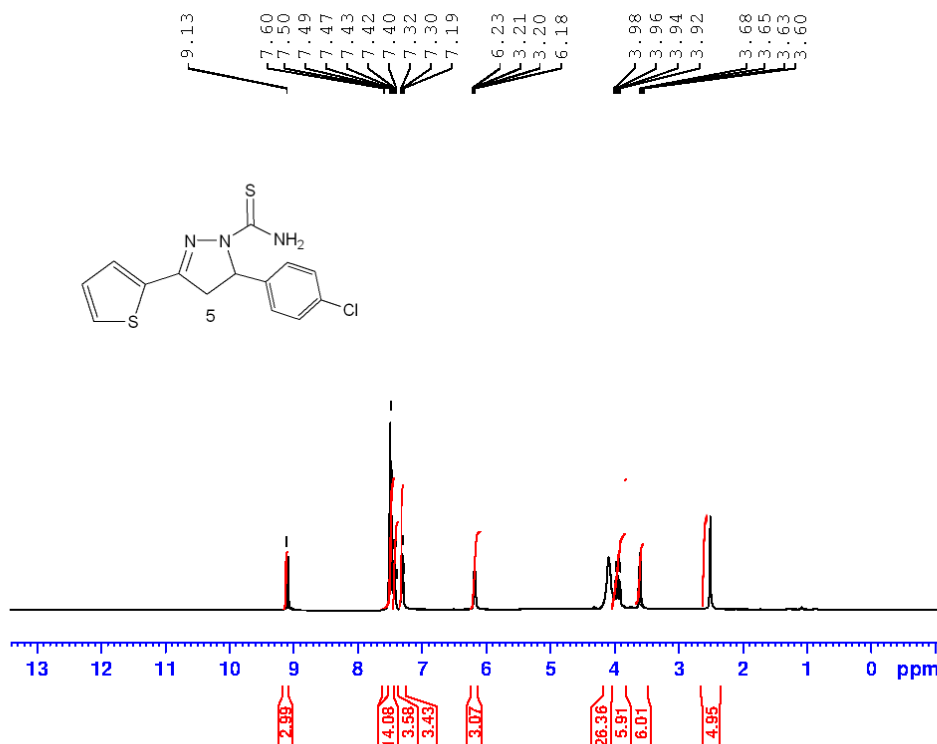
Email: [ahmed.abeed76@aun.edu.eg](mailto:ahmed.abeed76@aun.edu.eg)

#### Table of Contents

IR and <sup>1</sup> H NMR spectra of compound <b>5</b> .....	S2
<sup>13</sup> C NMR spectrum of <b>5</b> and IR spectrum of <b>6</b> .....	S3
<sup>1</sup> H and <sup>13</sup> C NMR spectra of <b>6</b> .....	S4
IR and <sup>1</sup> H NMR spectra of compound <b>7</b> .....	S5
<sup>13</sup> C NMR spectrum of <b>7</b> and IR spectrum of <b>8</b> .....	S6
<sup>1</sup> H spectrum of <b>8</b> and IR spectrum of <b>9</b> .....	S7
<sup>1</sup> H NMR and <sup>13</sup> C NMR spectra of <b>9</b> .....	S8
IR and <sup>1</sup> H NMR spectra of <b>10</b> .....	S9
<sup>13</sup> C NMR spectrum of <b>10</b> and <sup>1</sup> H NMR spectrum of <b>11</b> .....	S10
IR and <sup>1</sup> H NMR spectra of <b>12</b> .....	S11
IR and <sup>1</sup> H NMR spectra of <b>13</b> .....	S12
<sup>13</sup> C NMR spectrum of <b>13</b> and IR spectrum of <b>14</b> .....	S13
<sup>1</sup> H NMR spectrum of <b>14</b> and IR spectrum of <b>15</b> .....	S14
<sup>1</sup> H NMR spectrum of <b>15</b> and IR spectrum of <b>16</b> .....	S15
<sup>1</sup> H NMR and <sup>13</sup> C NMR spectra of <b>16</b> .....	S16



A5  
proton\_su DMSO (C:\nmr-data) Student 5



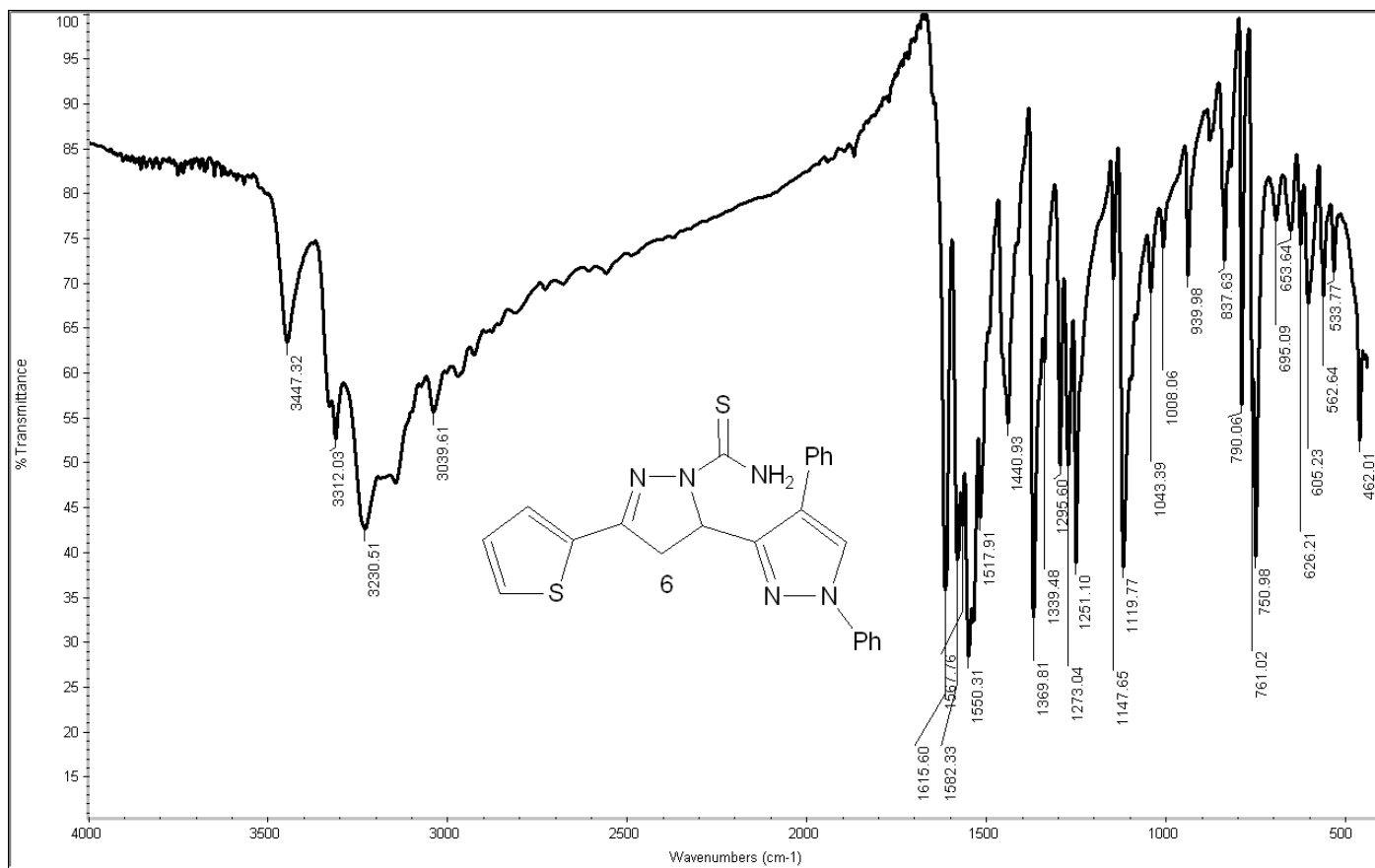
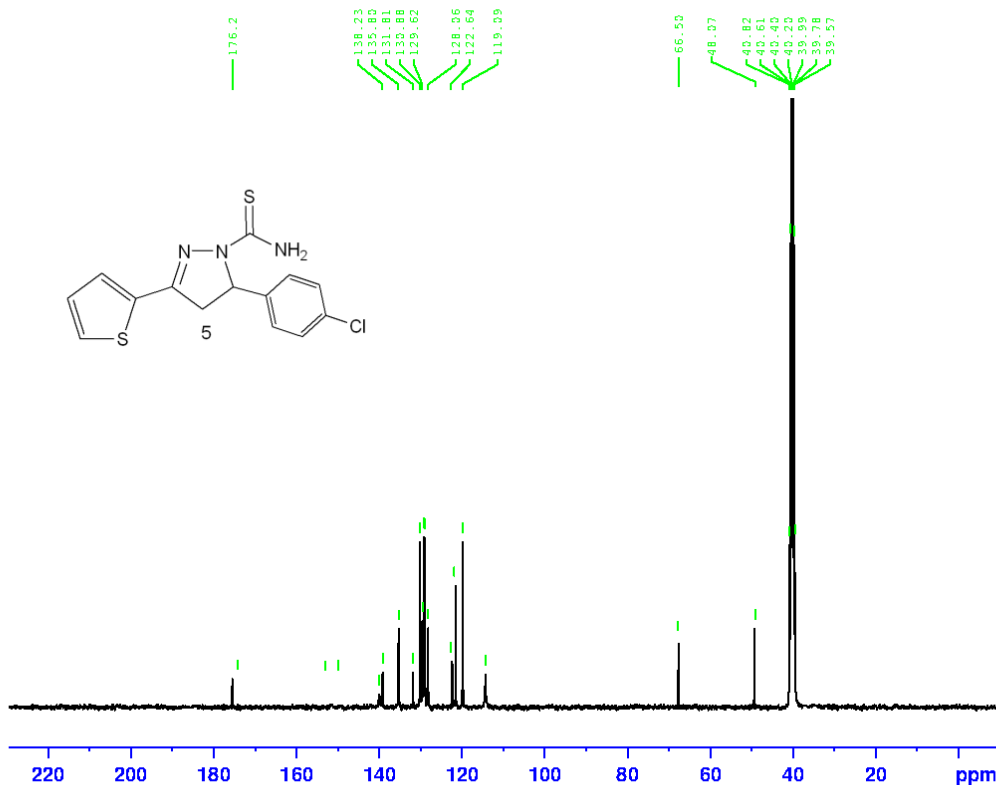
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 EXPNO 230  
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F2 - Acquisition Parameters  
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 PULPROG zg30  
 ID 65536  
 SOLVENT DMSO  
 NS 100  
 DS 2  
 SWH 8012.820 Hz  
 FIDRES 0.122266 Hz  
 AQ 4.0894465 sec  
 RG 158.76  
 DW 62.400 usec  
 DE 6.50 usec  
 TE 323.2 K  
 D1 1.00000000 sec  
 TD 1

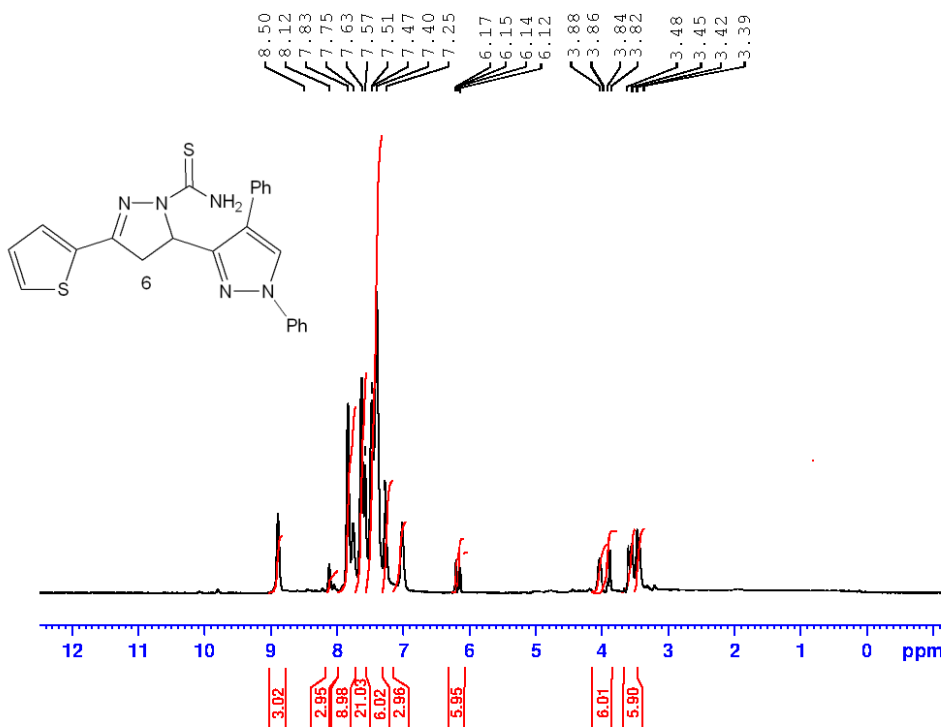
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 NUC1 1H  
 B1 12.00 usec  
 PLW1 22.00000000 W

F2 - Processing parameters  
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 SF 400.1300000 MHz  
 WDW EM  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 BC 1.00

A5  
c13\_su DMSO (C:\nmr-data} Student 12



A6  
proton\_su CDC13 {C:\nmr-data} Student 14



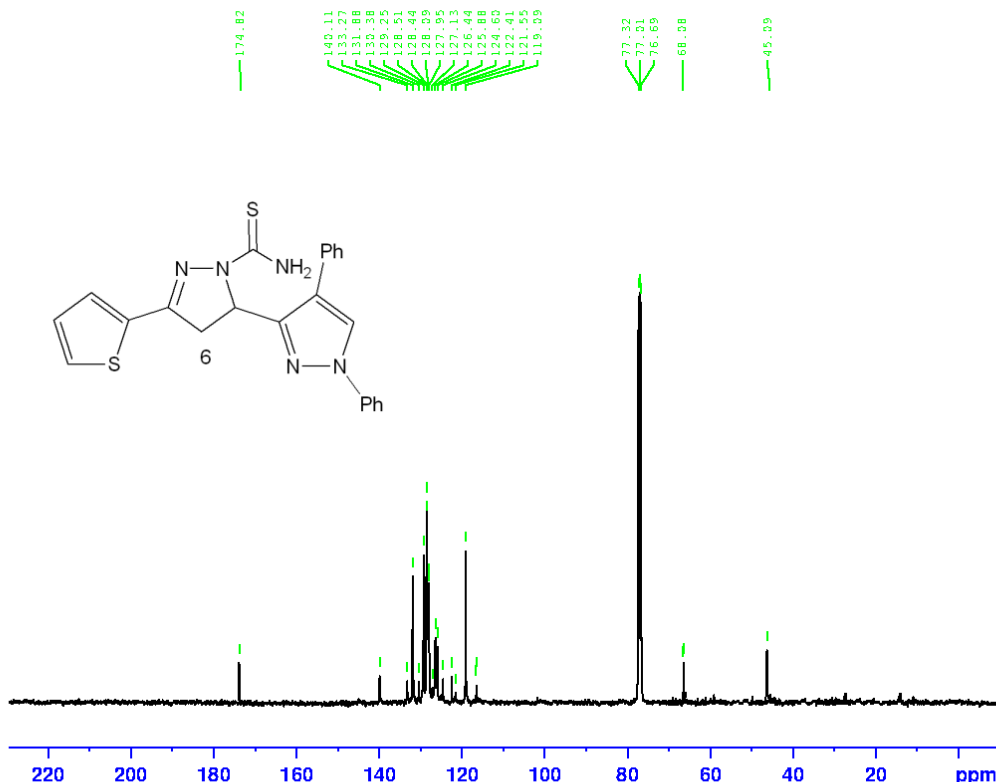
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EXPNO 120  
PROCNO 1

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PULPROG zg30  
TD 65536  
SOLVENT CDCl3  
NS 20  
DS 2  
SWH 8012.820 Hz  
FIDRES 0.122266 Hz  
AQ 4.0894465 sec  
RG 69.22  
DW 62.400 usec  
DE 6.50 usec  
TE 323.2 K  
D1 1.00000000 sec  
TD0 1

===== CHANNEL f1 =====  
SFO1 400.1324710 MHz  
NUC1 1H  
P1 12.00 usec  
PLW1 22.00000000 W

F2 - Processing parameters  
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SSB 0  
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GB 0  
PC 1.00

A6  
c13\_su CDC13 {C:\nmr-data} Student 6



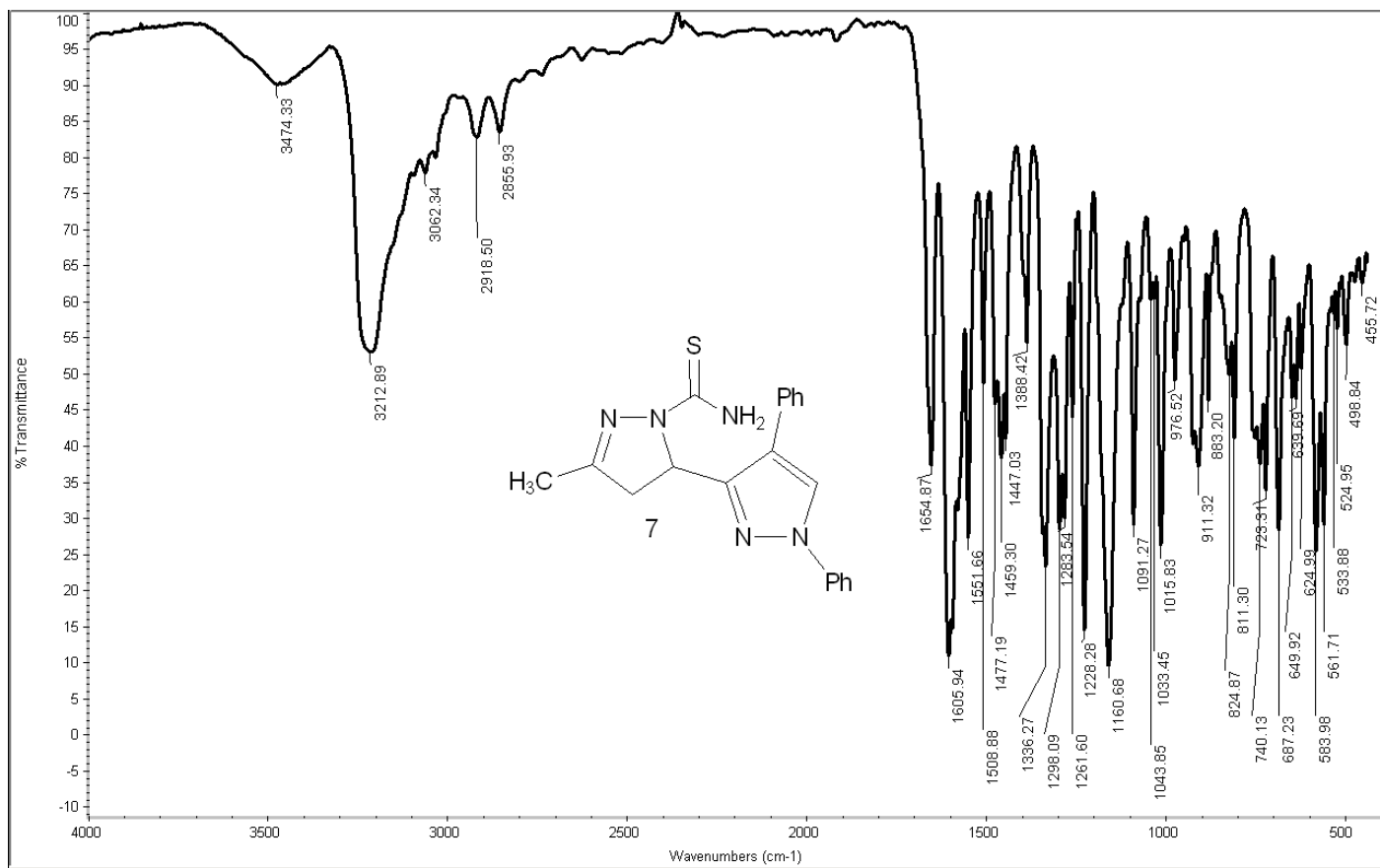
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EXPNO 241  
PROCNO 1

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Time 22.16  
INSTRUM spect  
PROBHD 5 mm PABBO BB/  
PULPROG zgpg30  
TD 65536  
SOLVENT CDCl3  
NS 1100  
DS 4  
SWH 24038.461 kHz  
FIDRES 0.366798 kHz  
AQ 1.3631488 sec  
RG 87.69  
DW 20.800 usec  
DE 6.50 usec  
TE 323.1 K  
D1 2.00000000 sec  
D11 0.03000000 sec  
TD0 1

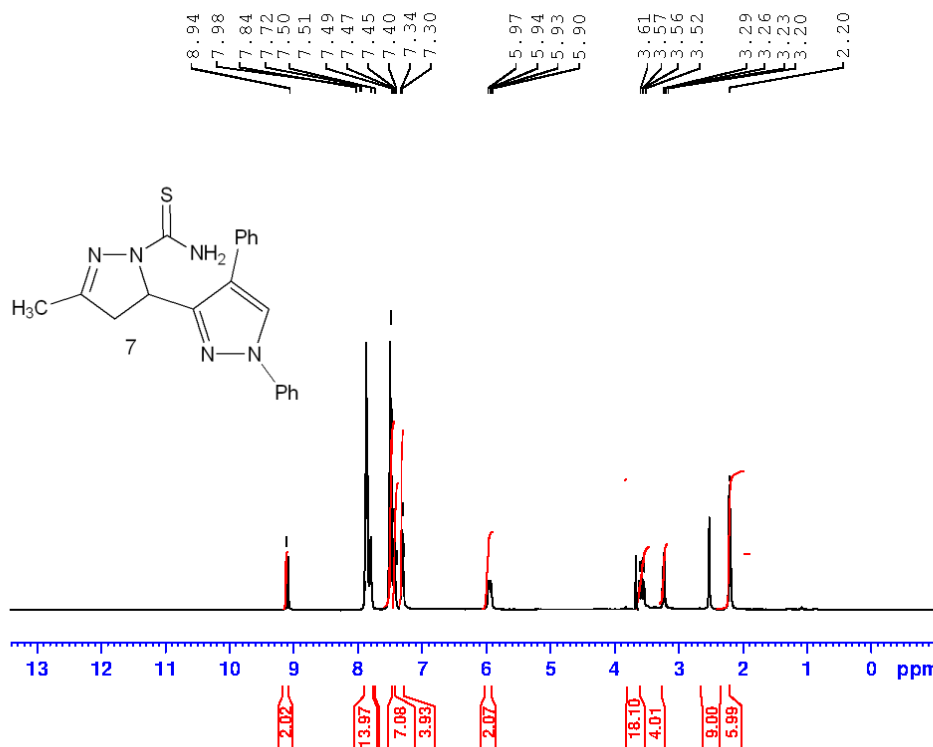
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NUC1 13C  
P1 9.50 usec  
PLW1 56.00000000 W

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NUC2 1H  
PCPD2 waltz16  
PCPD2 90.00 usec  
PLW2 22.00000000 W  
PLW12 0.41091001 W  
PLW13 0.33284000 W

F2 - Processing parameters  
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SF 100.6127690 MHz  
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GB 0  
PC 1.40



A7  
proton\_su DMSO (C:\nmr-data) Student 5



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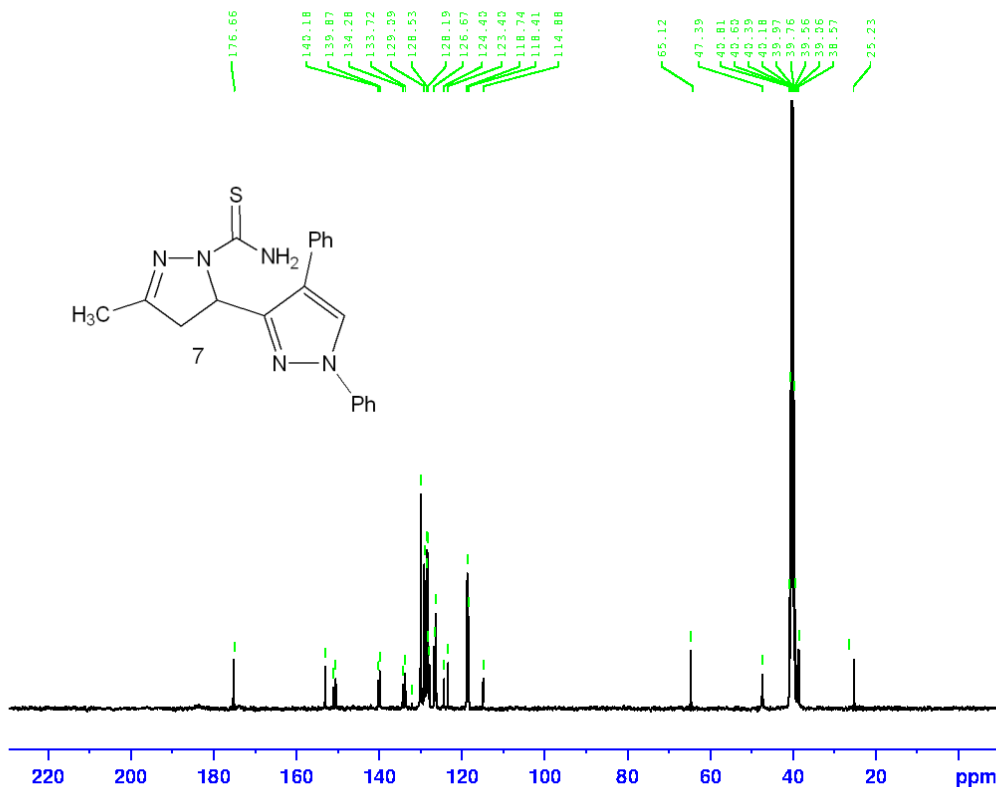
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EXPNO        230
PROCNO       1

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PULPROG      zg30
ID           65536
SOLVENT      DMSO
NS           100
DS           2
SWH          8012.820 Hz
FIDRES      0.122266 Hz
AQ           4.0894465 sec
RG           158.76
DW           62.400 usec
DE           6.50 usec
TE           323.2 K
D1           1.00000000 sec
TD           1

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SFO1         400.1324710 MHz
NUC1         1H
P1           12.00 usec
PLW1        22.00000000 W

F2 - Processing parameters
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SF           400.1300000 MHz
WDW          EM
SSB          0
LB           0.30 Hz
GB           0
BC           1.00
    
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A7  
c13\_su DMSO (C:\nmr-data} Student 13



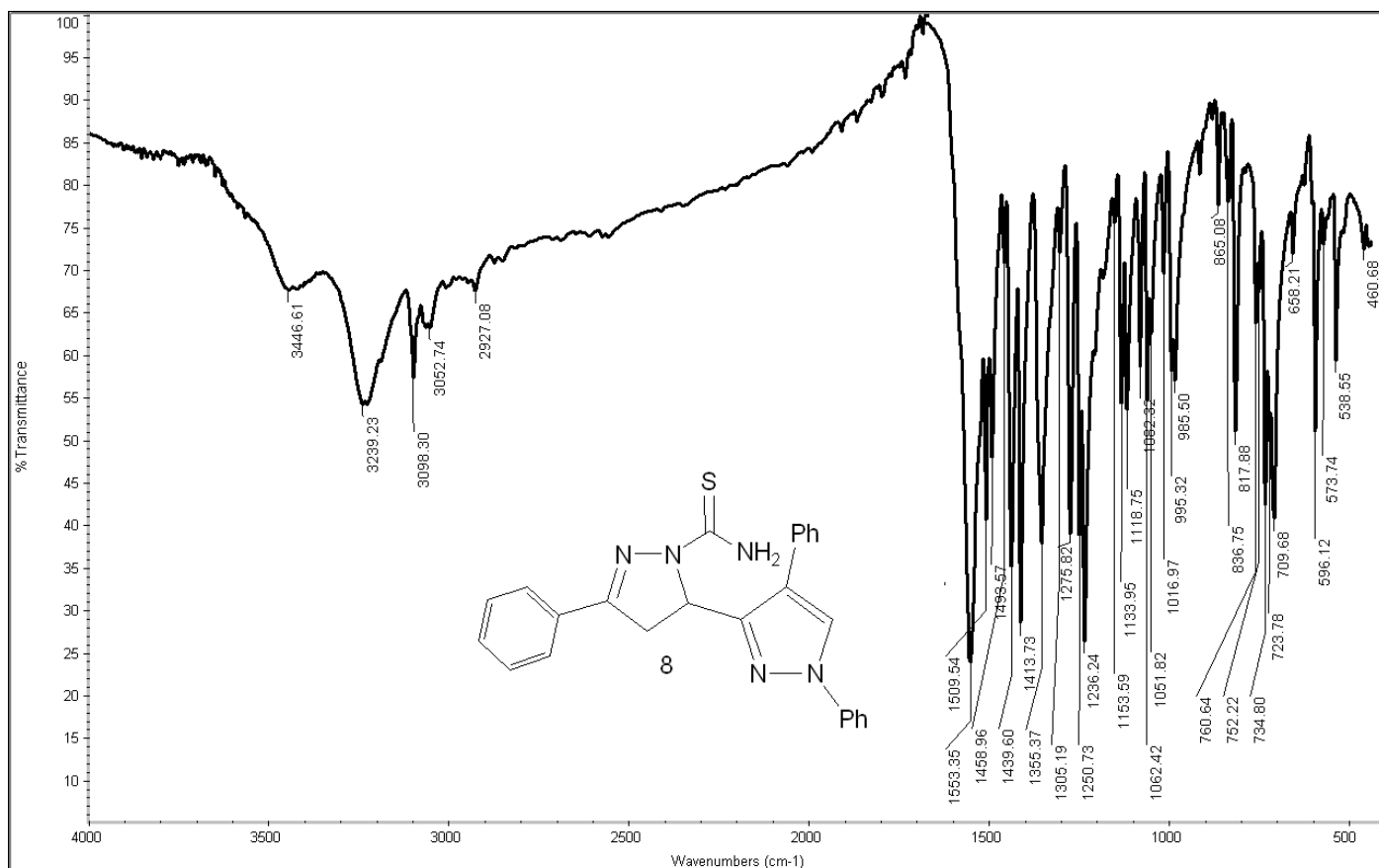
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EXPNO 111  
PROCNO 1

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PROBHD 5 mm PABBO BB/  
PULPROG zgpg30  
TD 65536  
SOLVENT DMSO  
NS 1100  
DS 4  
SWH 24038.461 kHz  
FIDRES 0.366798 Hz  
AQ 1.3631488 s  
RG 199.04  
DW 20.800 us  
DE 6.50 us  
TE 323.2 K  
D1 2.0000000 s  
D11 0.0300000 s  
TD0 1

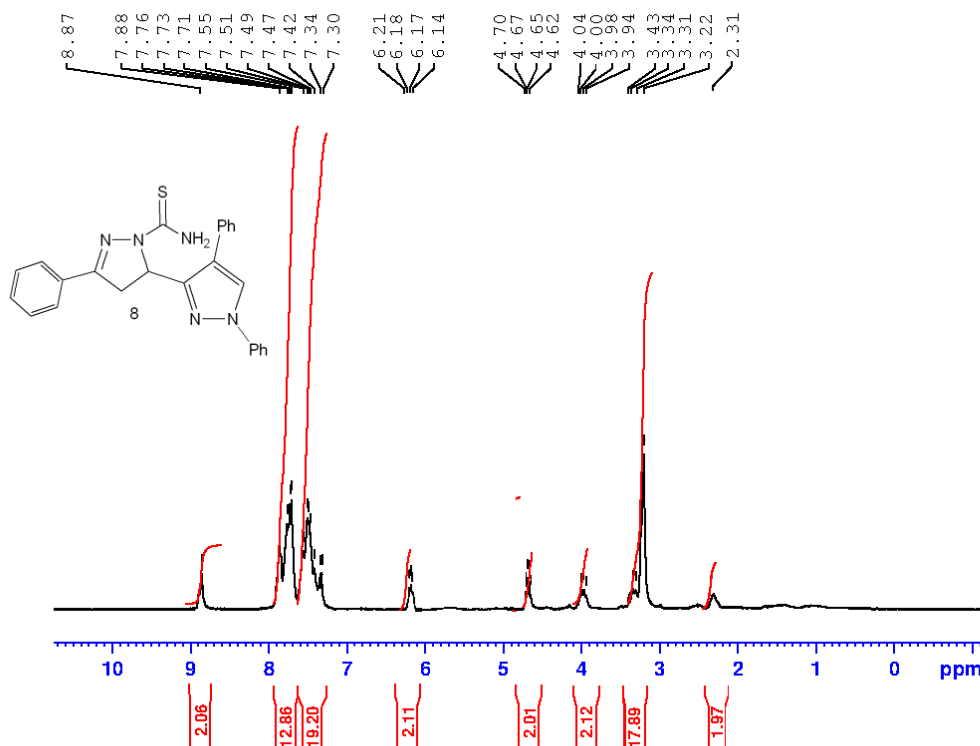
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NUC1 13C  
P1 9.50 us  
PLW1 56.0000000 kHz

----- CHANNEL f2 -----  
SFO2 400.1316005 MHz  
NUC2 1H  
CPCPRG2 waltz16  
PCPD2 90.00 us  
PLW2 22.0000000 kHz  
PLW12 0.41091001 kHz  
PLW13 0.33284000 kHz

F2 - Processing parameters  
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SF 100.6127690 MHz  
WDW EM  
SSB 0  
LB 6.00 Hz  
GB 0  
PC 1.40



A8  
proton\_su DMSO (C:\nmr-data} Student 24



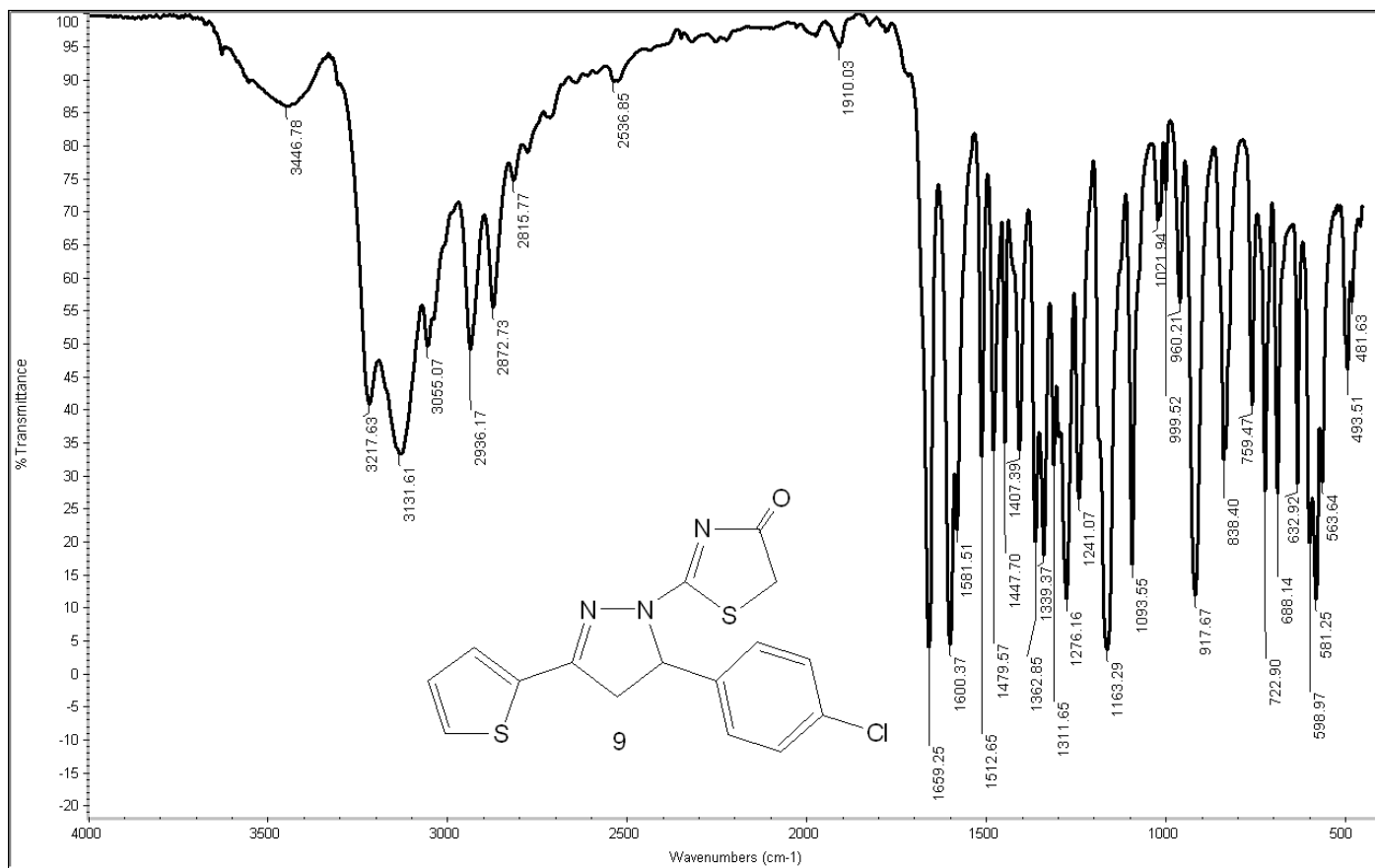
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EXNO          200
PROCNO        1

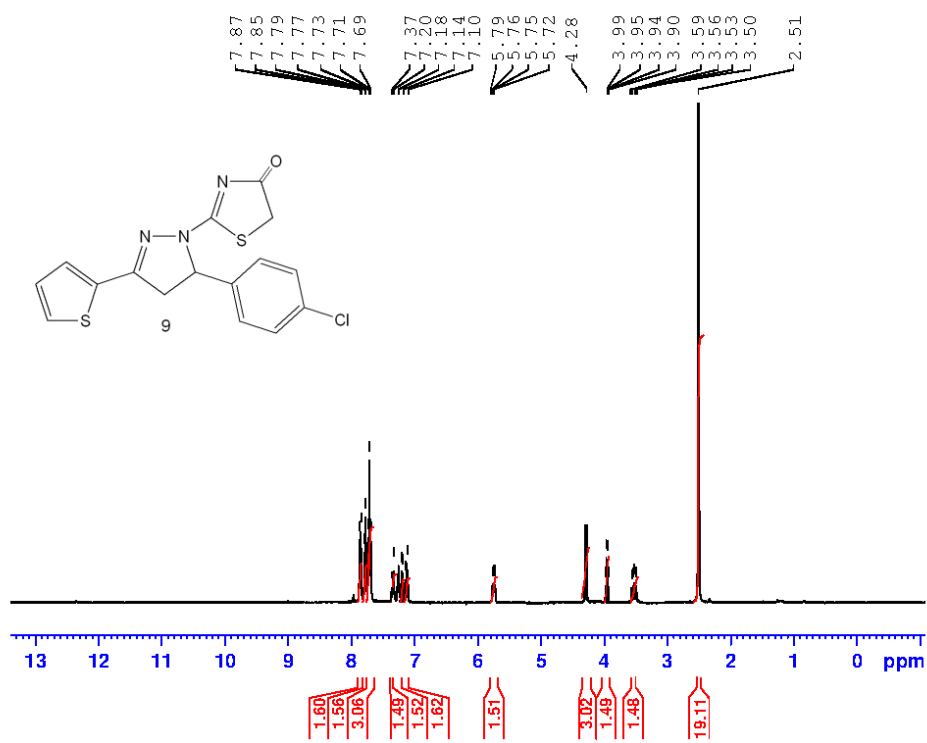
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PULPROG       zg30
TD            65536
SOLVENT       DMSO
NS            20
DS            2
SWH           8012.920 Hz
FIDRES        0.122266 Hz
AQ            4.0894465 sec
RG            199.04
DW            62.400 usec
DE            6.50 usec
TE            323.3 K
D1            1.00000000 sec
TD0           1

===== CHANNEL f1 =====
SFO1          400.1324710 MHz
NUC1          1H
P1            12.00 usec
PLW1          22.00000000 W

F2 - Processing parameters
SI            65536
SF            400.1300000 MHz
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A9  
proton\_su DMSO (C:\nmr-data} Student 22



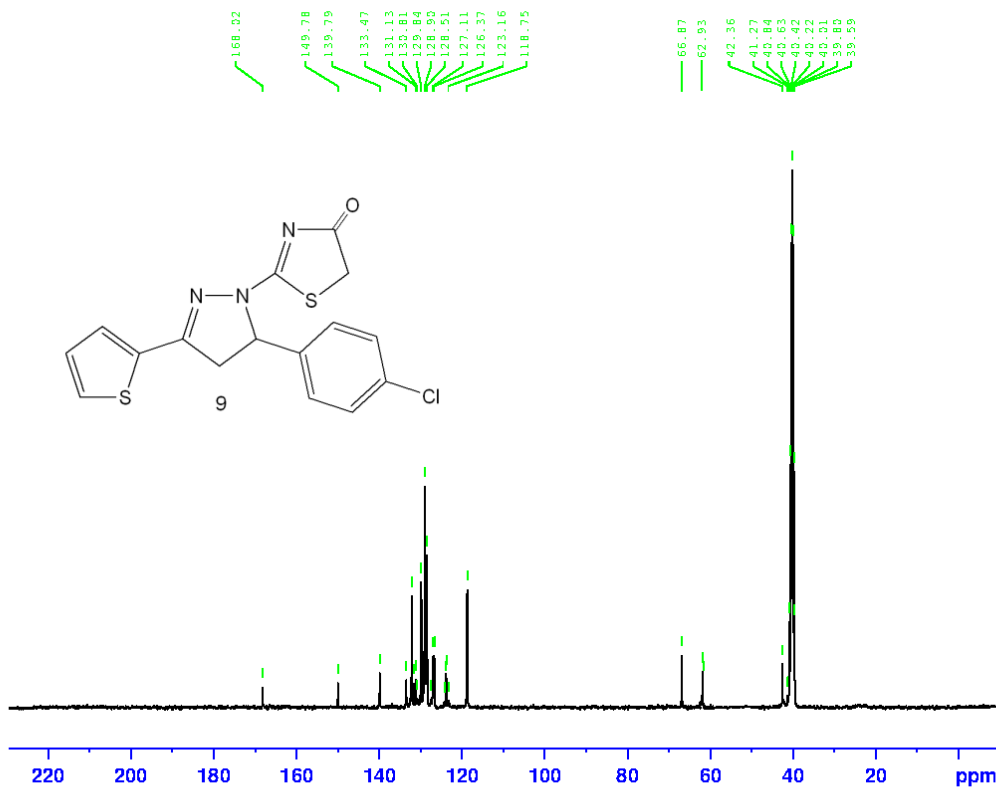
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Current Data Parameters
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EXPNO    180
PROCNO   1

F2 - Acquisition Parameters
Date_    20250109
Time     12.52
INSTRUM  spect
PROBHD   5 mm PABBO B8/
PULPROG  zg30
ID       65536
SOLVENT  DMSO
NS       2
DS       2
SWH      8012.820 Hz
FIDRES   0.122266 Hz
AQ       4.0894465 sec
RG       199.04
DW       62.400 usec
DE       6.50 usec
TE       323.3 K
DL       1.00000000 sec
TD0      1

===== CHANNEL f1 =====
SFO1     400.1324710 MHz
NUC1     1H
P1       12.00 usec
PLW1     22.00000000 W

F2 - Processing parameters
SI       65536
SF       400.1300000 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00
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A9  
c13\_su DMSO (C:\nmr-data} Student 8



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EXPNO    261
PROCNO   1

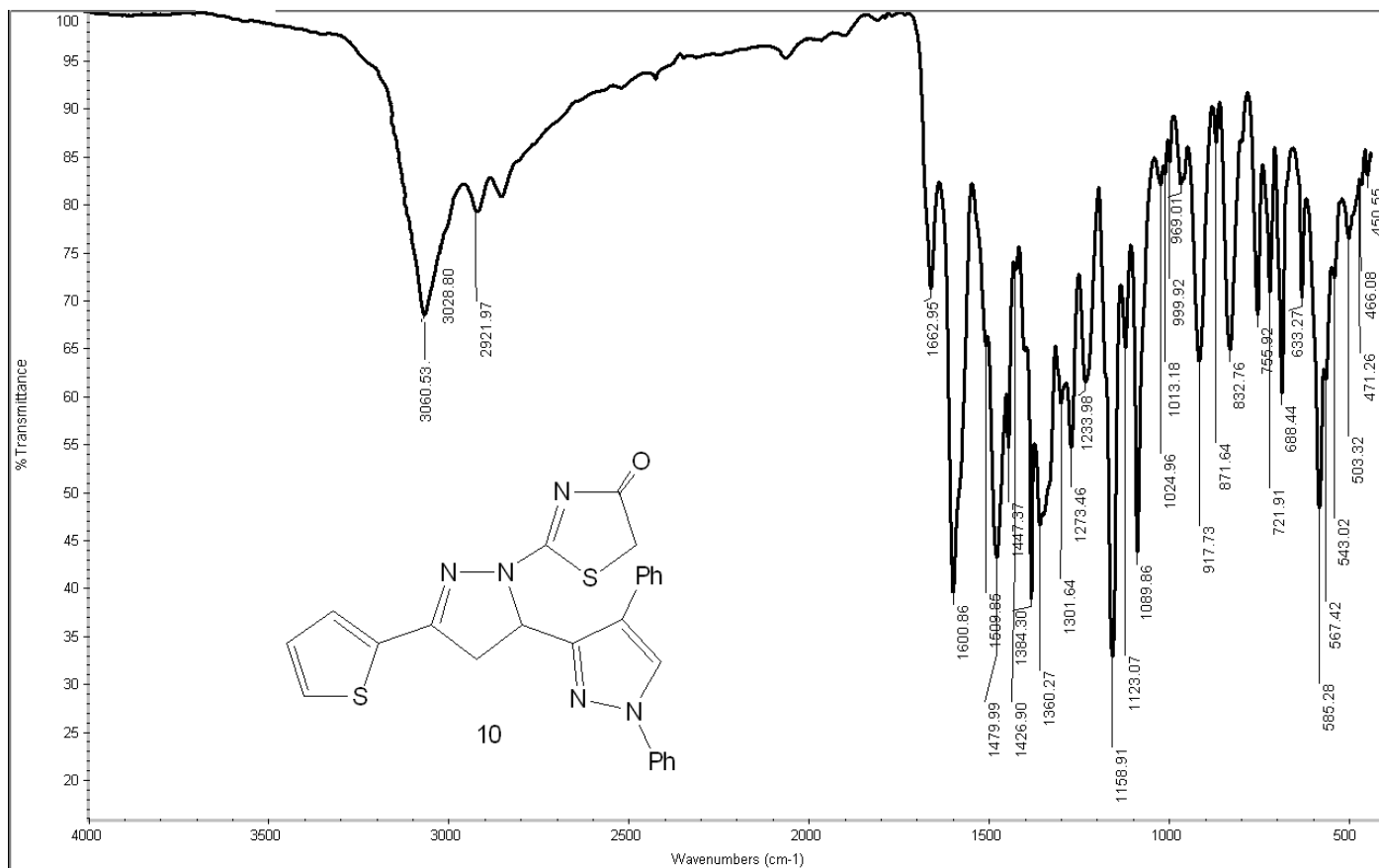
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Date_    20250118
Time     0.50
INSTRUM  spect
PROBHD   5 mm PABBO B8/
PULPROG  zgpg30
ID       65536
SOLVENT  DMSO
NS       4
DS       4
SWH      24038.461 MHz
FIDRES   0.366798 MHz
AQ       1.3631488 sec
RG       100.43
DW       20.800 usec
DE       6.50 usec
TE       323.1 K
DL       2.00000000 sec
D11      0.03000000 sec
TD0      1

----- CHANNEL f1 -----
SFO1     100.6238364 MHz
NUC1     13C
P1       9.50 usec
PLW1     56.00000000 W

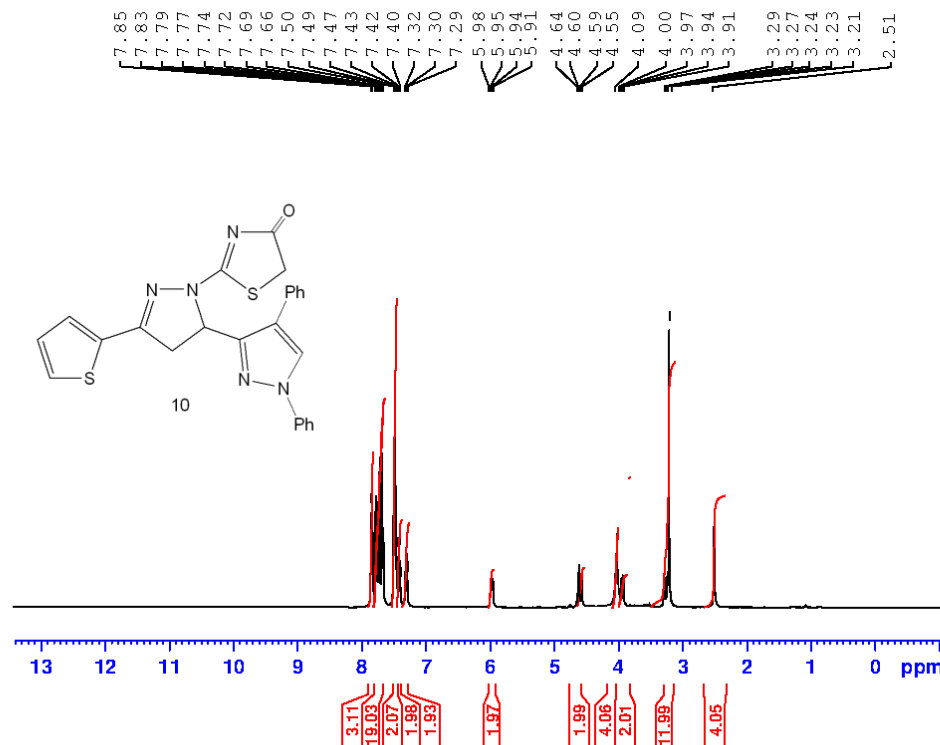
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SFO2     400.1316005 MHz
NUC2     1H
CPDPRG2  waltz16
PCPD2    90.00 usec
PLW2     22.00000000 W
PLW12    0.41091001 W
PLW13    0.33284000 W

F2 - Processing parameters
SI       100.6127690 MHz
WDW      EM
SSB      0
LB       6.00 MHz
GB       0
PC       1.40
```





A10  
proton\_su DMSO (C:\nmr-data) Student 5



```

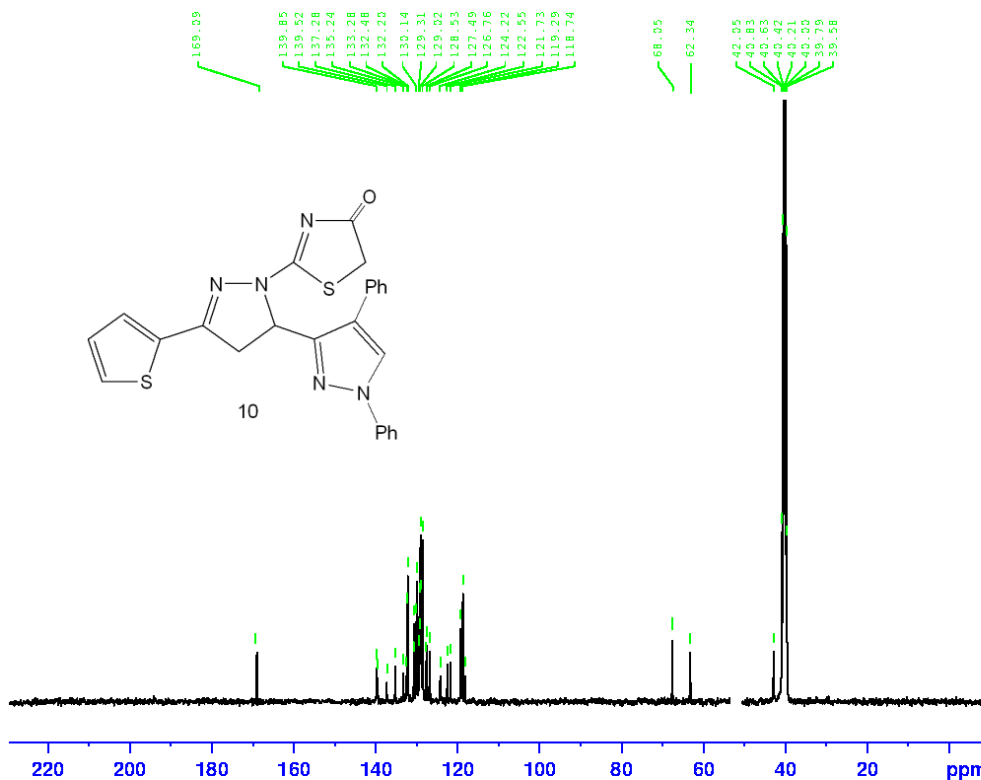
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EXPNO         230
PROCNO        1

F2 - Acquisition Parameters
Date_         20250108
Time          19.47
INSTRUM       spect
PROBHD        5 mm PABBO BB/
PULPROG       zg30
ID            65536
SOLVENT       DMSO
NS            100
DS             2
SWH           8012.820 Hz
FIDRES        0.122266 Hz
AQ            4.0894465 sec
RG            158.76
DW            62.400 usec
DE            6.50 usec
TE            323.2 K
D1            1.00000000 sec
TD            1

===== CHANNEL f1 =====
SFO1          400.1324710 MHz
NUC1           1H
B1            12.00 usec
PLW1          22.00000000 W

F2 - Processing parameters
SI            65536
SF            400.1300000 MHz
WDW           EM
SSB           0
LB            0.30 Hz
GB            0
BC            1.00
    
```

A10  
c13\_su DMSO (C:\nmr-data} Student 3



Current Data Parameters  
NAME Jan21-2025  
EXPNO 211  
PROCNO 1

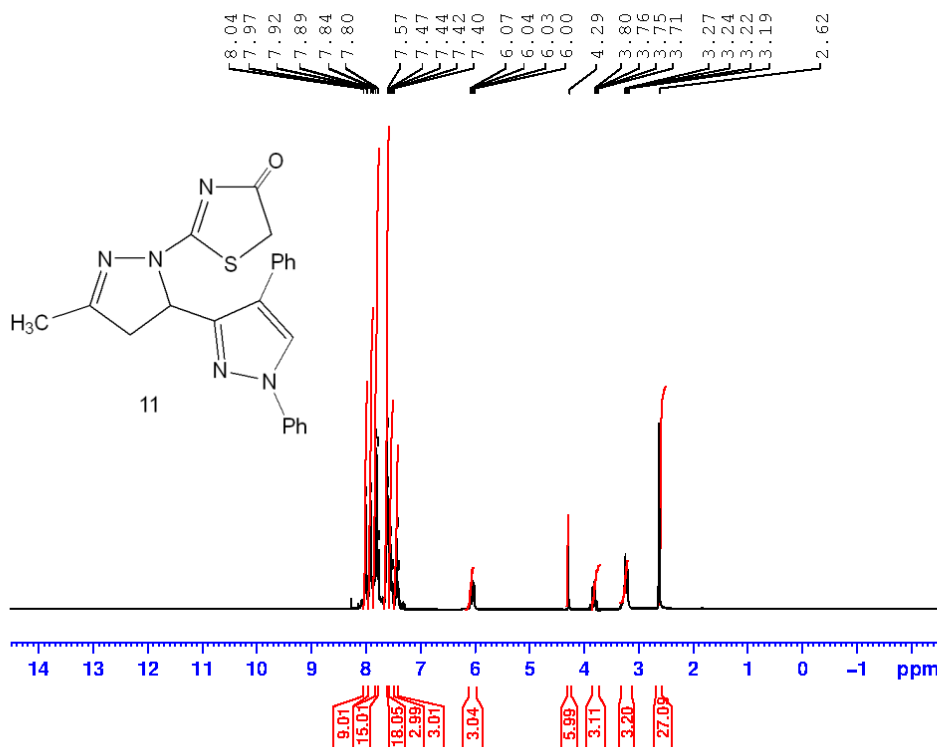
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Date\_ 20250121  
Time 18.02  
INSTRUM spect  
PROBHD 5 mm PABBO BB/  
PULPROG zgpg30  
TD 65536  
SOLVENT DMSO  
NS 1100  
DS 4  
SWH 24038.461 Hz  
FIDRES 0.366798 Hz  
AQ 1.3631488 sec  
RG 100.43  
DW 20.800 usec  
DE 6.50 usec  
TE 323.1 K  
D1 2.00000000 sec  
D11 0.03000000 sec  
TD0 1

----- CHANNEL f1 -----  
SFO1 100.6238364 MHz  
NUC1 13C  
P1 9.50 usec  
PLW1 56.00000000 W

----- CHANNEL f2 -----  
SFO2 400.1316005 MHz  
NUC2 1H  
CPDPRG2 waltz16  
PCPD2 90.00 usec  
PLW2 22.00000000 W  
PLW12 0.41091001 W  
PLW13 0.33284000 W

F2 - Processing parameters  
SI 32768  
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LB 6.00 Hz  
GB 0  
PC 1.40

A12  
proton\_su DMSO (C:\nmr-data} Student 10

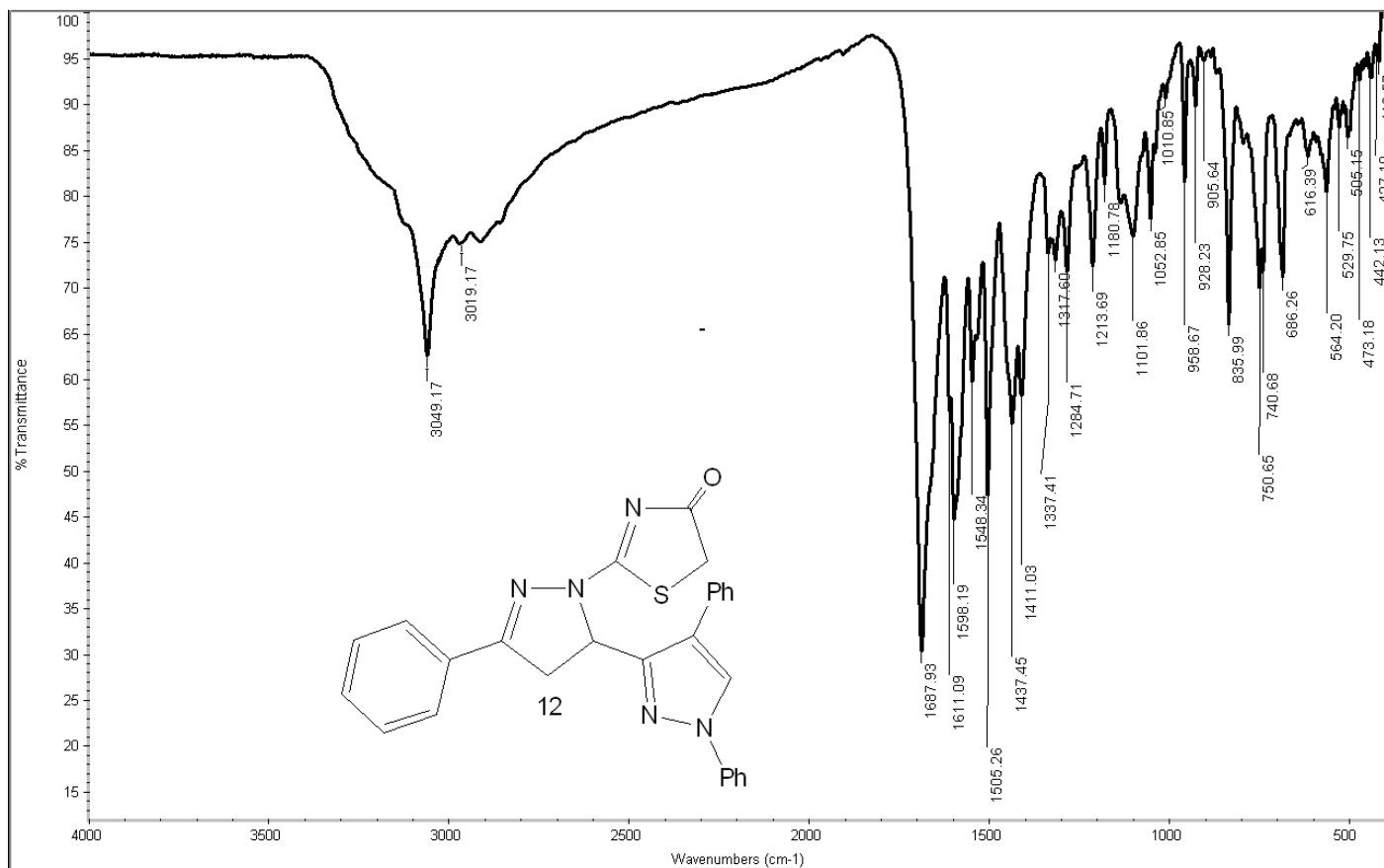


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PROCNO 1

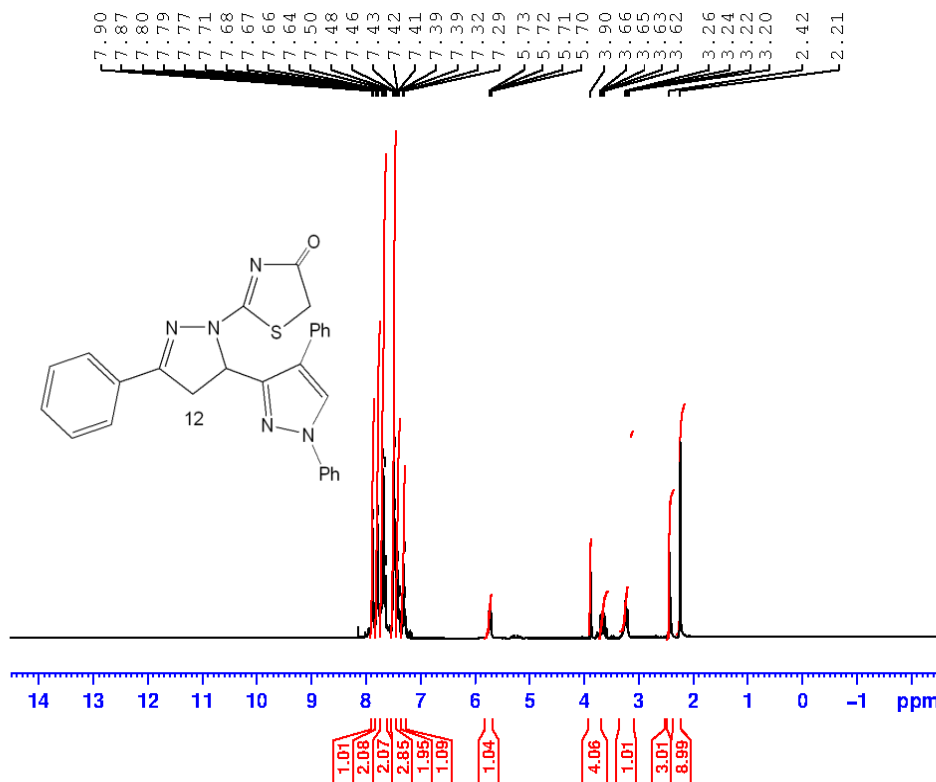
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Time 1.14  
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PULPROG zg30  
TD 65536  
SOLVENT DMSO  
NS 100  
DS 2  
SWH 8012.720 Hz  
FIDRES 0.123266 Hz  
AQ 4.1744561 sec  
RG 106.18  
DW 62.400 usec  
DE 6.50 usec  
TE 323.2 K  
D1 1.00000000 sec  
TD0 1

===== CHANNEL f1 =====  
SFO1 400.1324710 MHz  
NUC1 1H  
P1 12.00 usec  
PLW1 22.00000000 W

F2 - Processing parameters  
SI 65536  
SF 400.1300000 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00



A11  
proton\_su DMSO (C:\nmr-data} Student 10



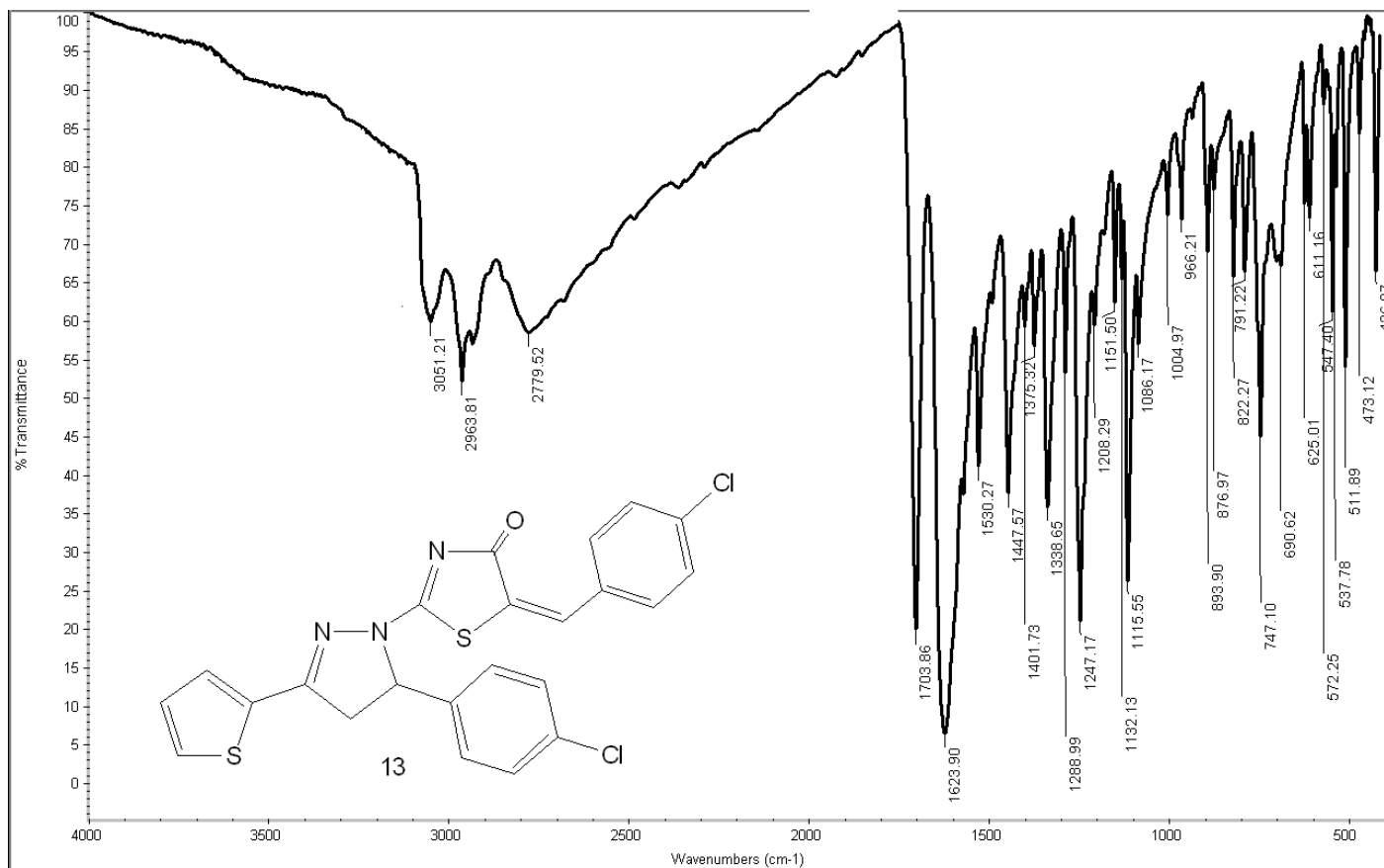
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Current Data Parameters
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PROCNO        1

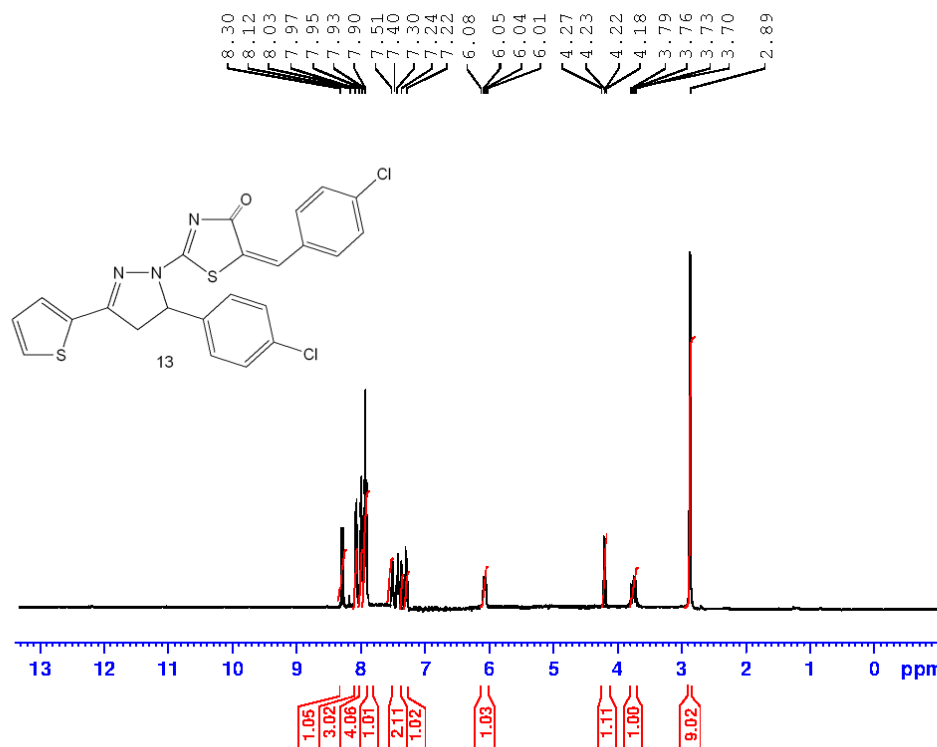
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Time          2.34
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PROBHD        5 mm PABBO BB/
PULPROG       zg30
TD            65536
SOLVENT       DMSO
NS            100
DS            2
SWH           8012.820 Hz
FIDRES        0.122266 Hz
AQ            4.0894465 sec
RG            106.18
DW            62.400 usec
DE            6.50 usec
TE            323.2 K
D1            1.00000000 sec
TD0           1

===== CHANNEL f1 =====
SFO1          400.1324710 MHz
NUC1          1H
P1            12.00 usec
PLW1          22.00000000 W

F2 - Processing parameters
SI            65536
SF            400.1300000 MHz
WDW           EM
SSB           0
LB            0.30 Hz
GB            0
PC            1.00
    
```



A13  
proton\_su DMSO (C:\nmr-data} Student 15



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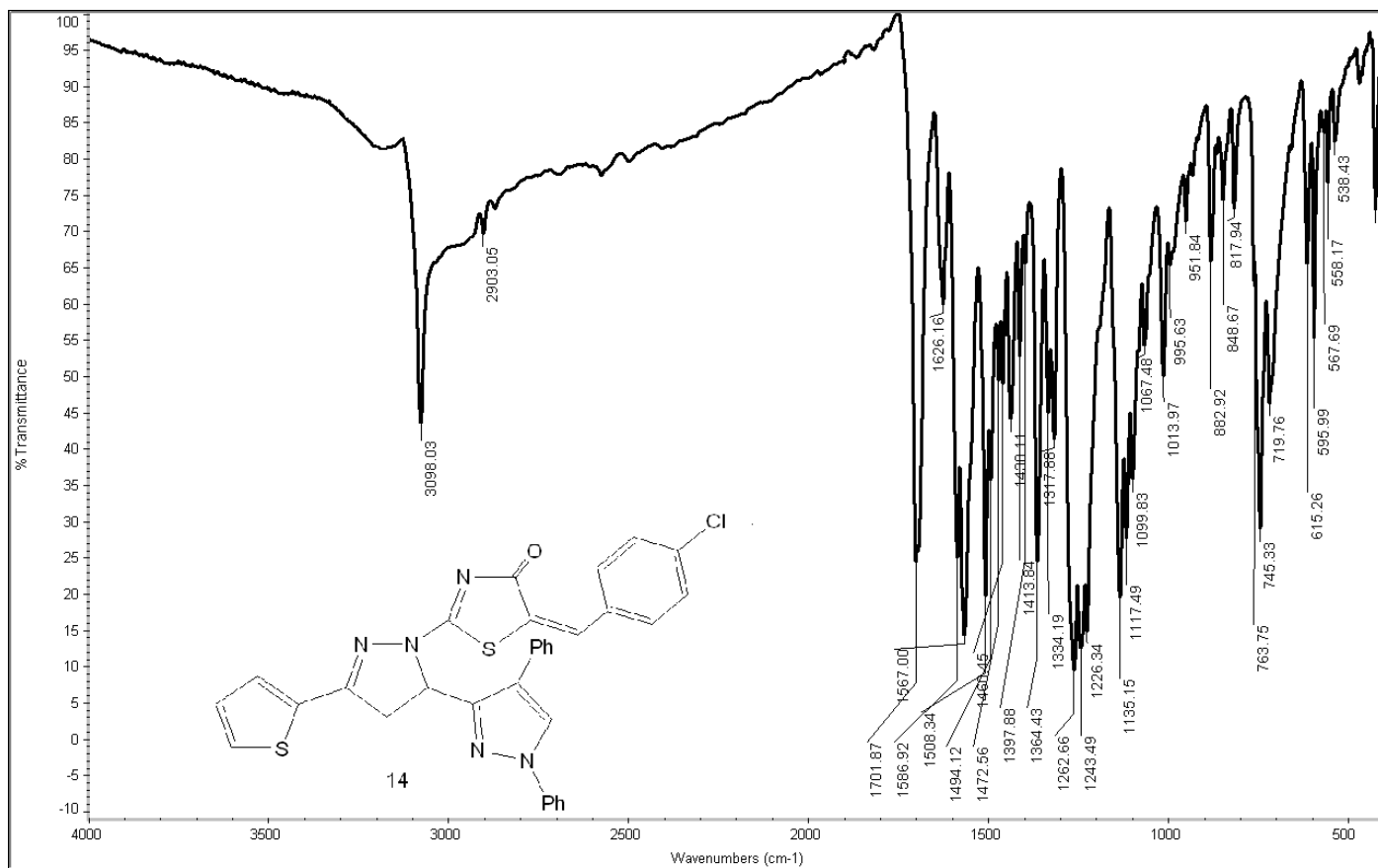
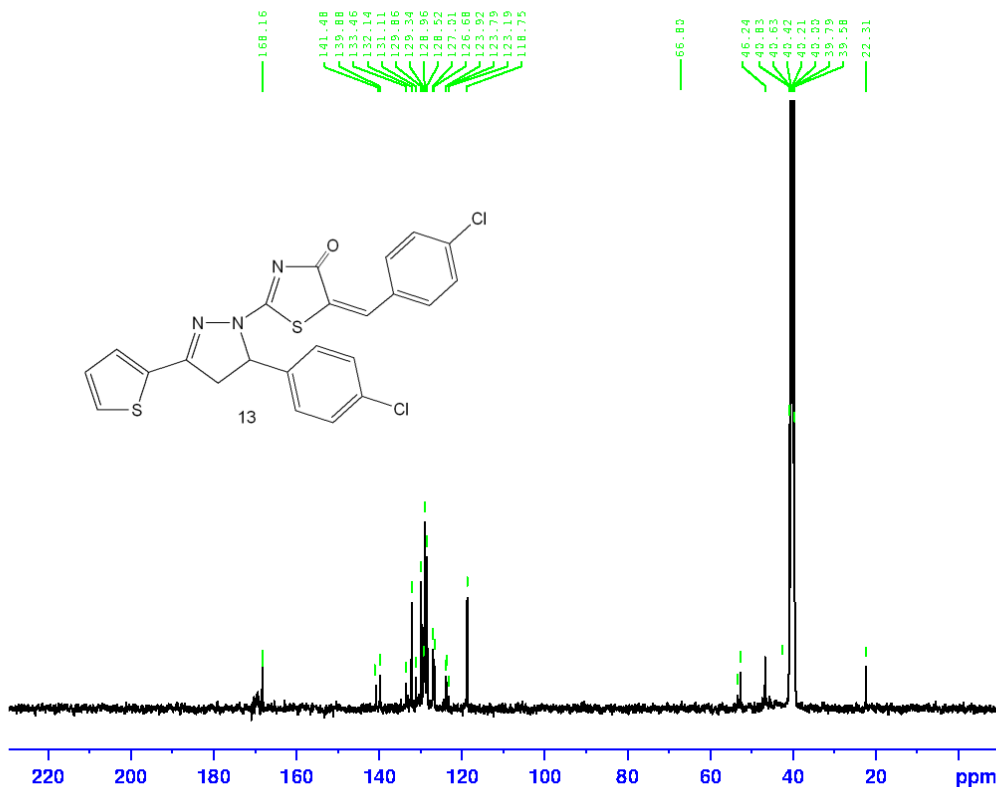
Current Data Parameters
NAME          Jan18-2025
EXPNO        180
PROCNO       1

F2 - Acquisition Parameters
Date_        20250118
Time         12:40
INSTRUM      spect
PROBHD       5 mm PABBO BB/
PULPROG      zg30
ID           65536
SOLVENT      DMSO
NS           20
DS           2
SWH          8012.820 Hz
FIDRES       0.322261 Hz
AQ           5.2894462 sec
RG           199.04
DW           62.400 usec
DE           6.50 usec
TE           323.3 K
D1           1.00000000 sec
TD           1

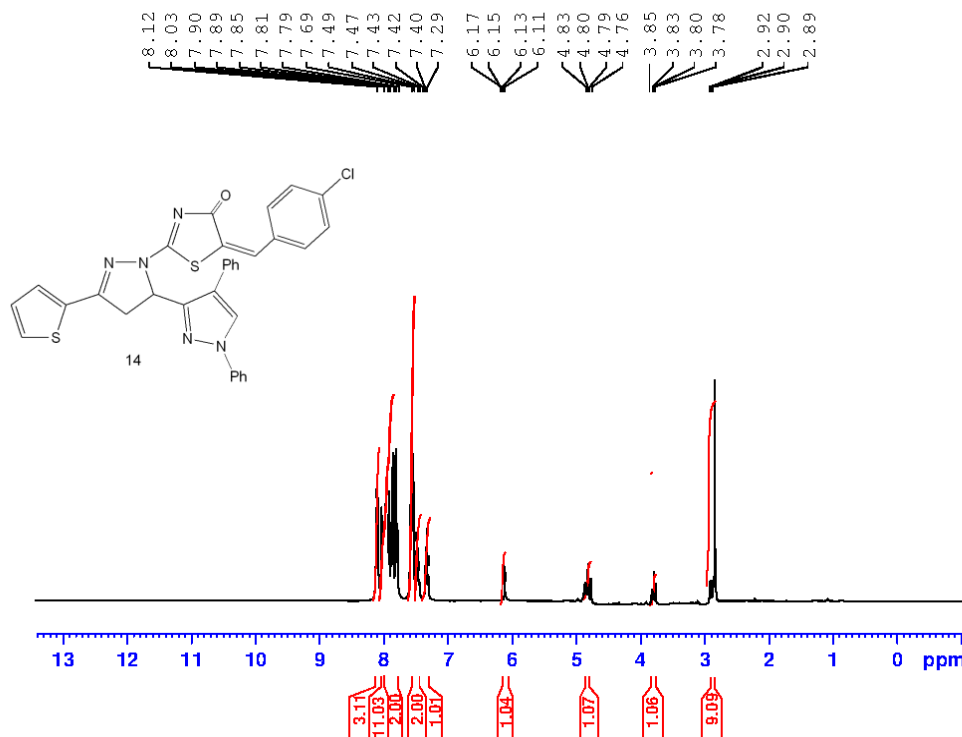
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NUC1         1H
B1           12.00 usec
PLW1         22.00000000 W

F2 - Processing parameters
SI           65536
SF           400.1300000 MHz
WDW          EM
SSB          0
LB           0.30 Hz
GB           0
BC           1.00
    
```

A13  
c13\_su DMSO (C:\nmr-data} Student 7



A14  
proton\_su DMSO (C:\nmr-data} Student 5

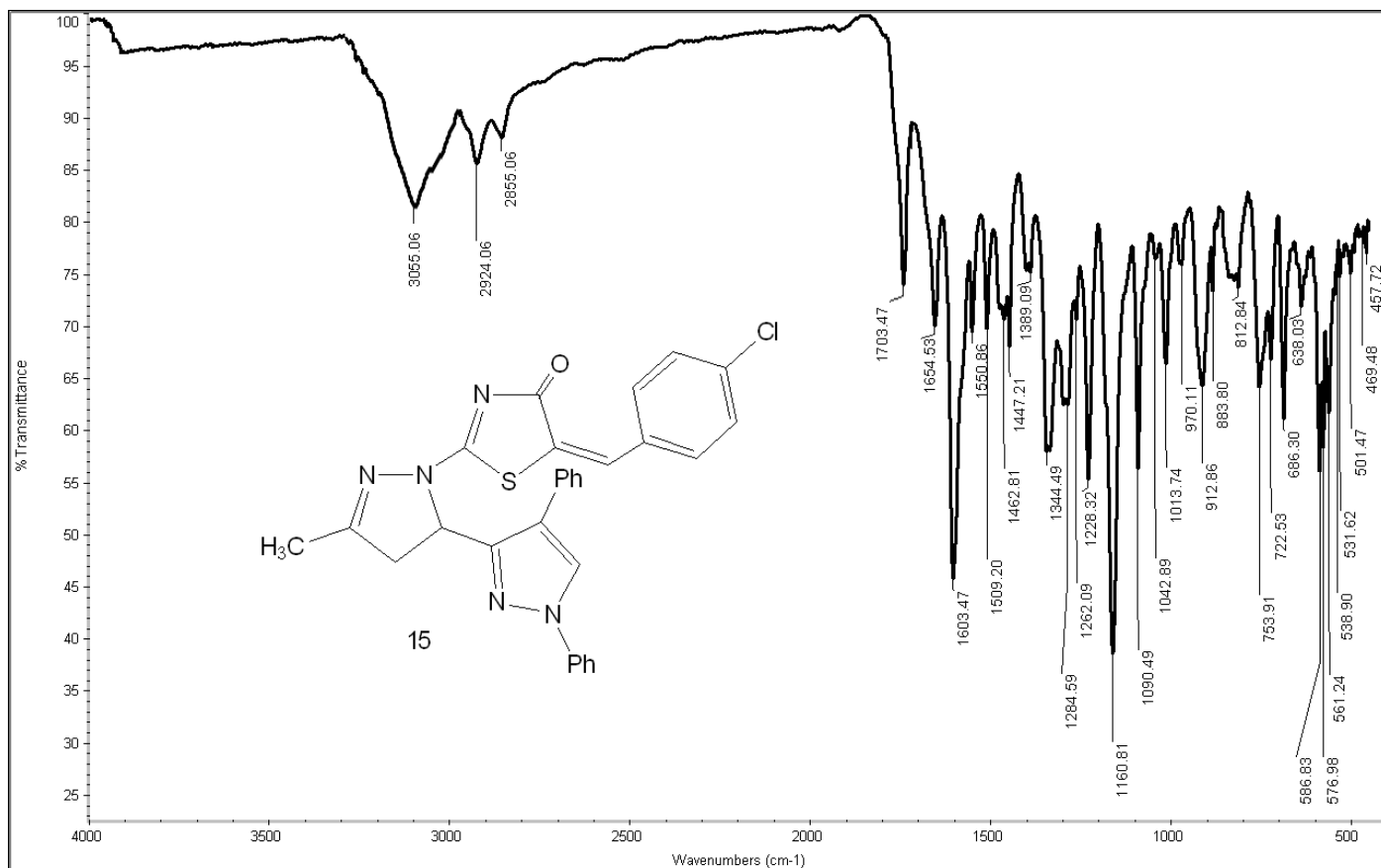


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 EXPNO 233  
 PROCNO 1

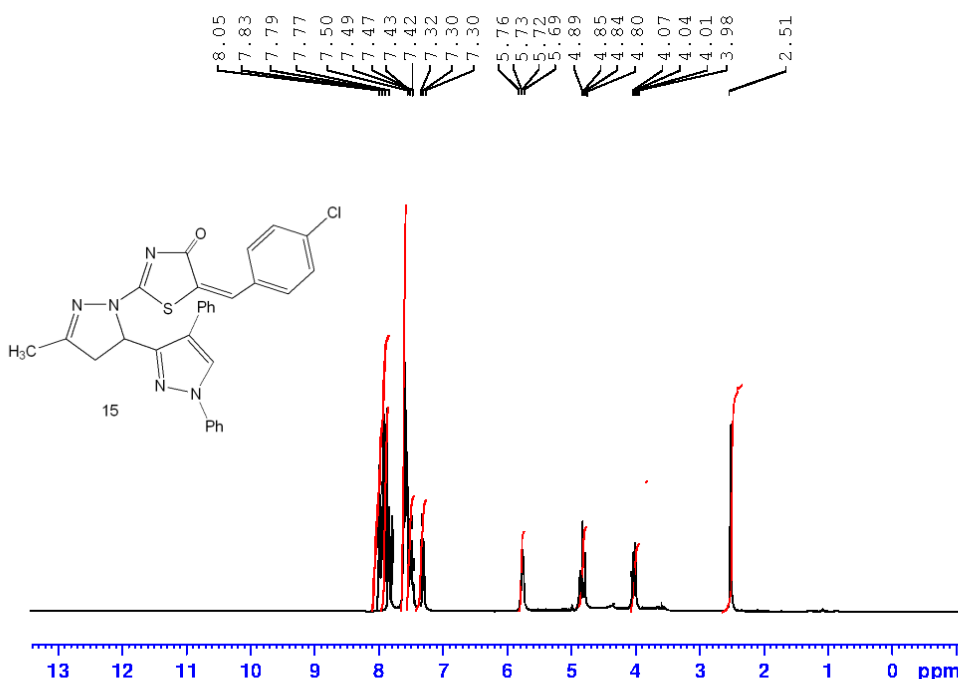
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 Date\_ 20250112  
 Time 20.52  
 INSTRUM spect  
 PROBHD 5 mm PABBO BB/  
 PULPROG zg30  
 ID 65536  
 SOLVENT DMSO  
 NS 100  
 DS 2  
 SWH 8012.854 Hz  
 FIDRES 0.122266 Hz  
 AQ 4.2894459 sec  
 RG 159.76  
 DW 62.400 usec  
 DE 6.50 usec  
 TE 323.2 K  
 D1 1.00000000 sec  
 TDO 1

==== CHANNEL f1 =====  
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 NUC1 1H  
 P1 12.00 usec  
 PLW1 22.00000000 W

F2 - Processing parameters  
 SI 65536  
 SF 400.1300000 MHz  
 WDW EM  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 RC 1.00



A15  
proton\_su DMSO (C:\nmr-data} Student 5



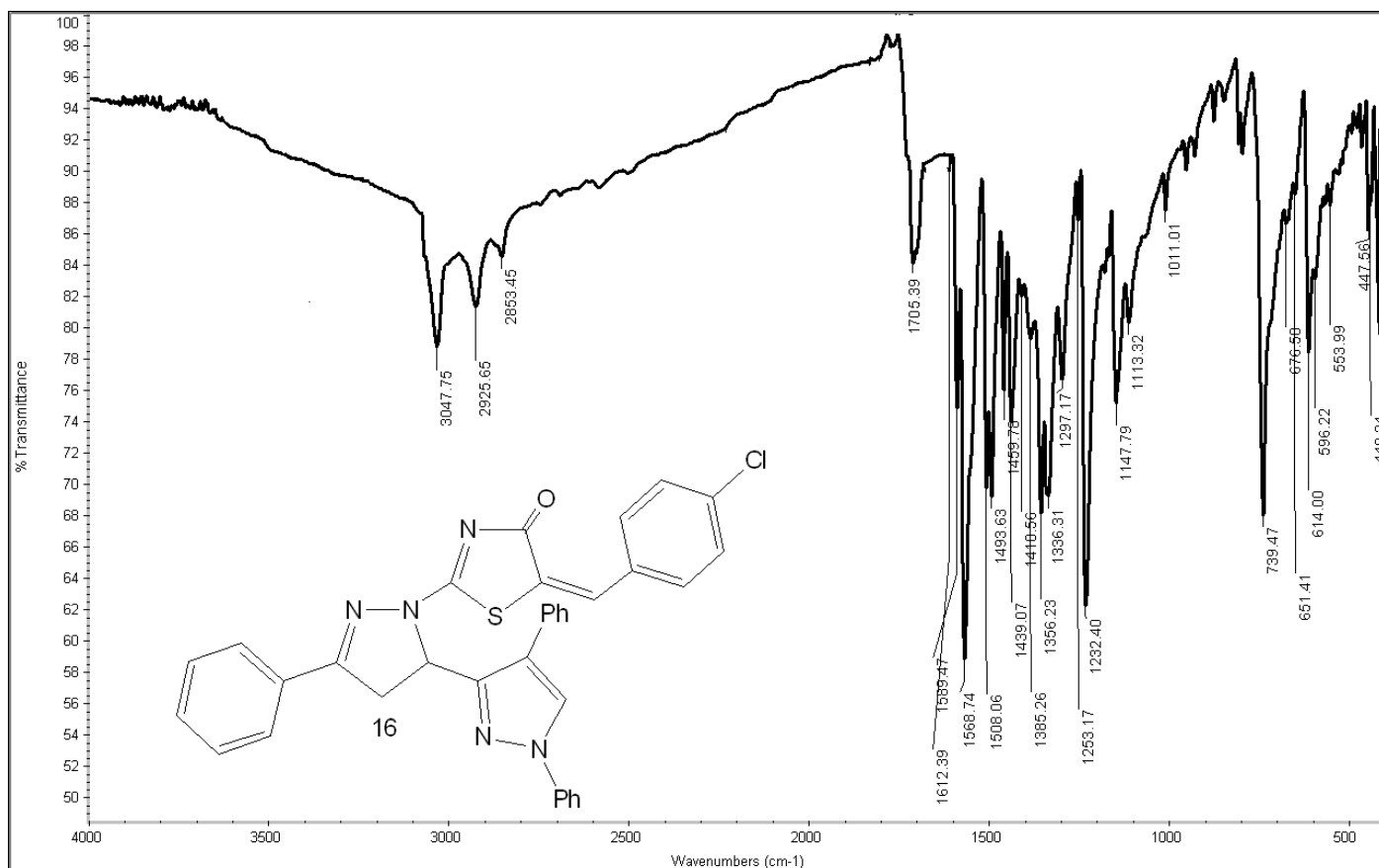
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Current Data Parameters
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PROCNO   1

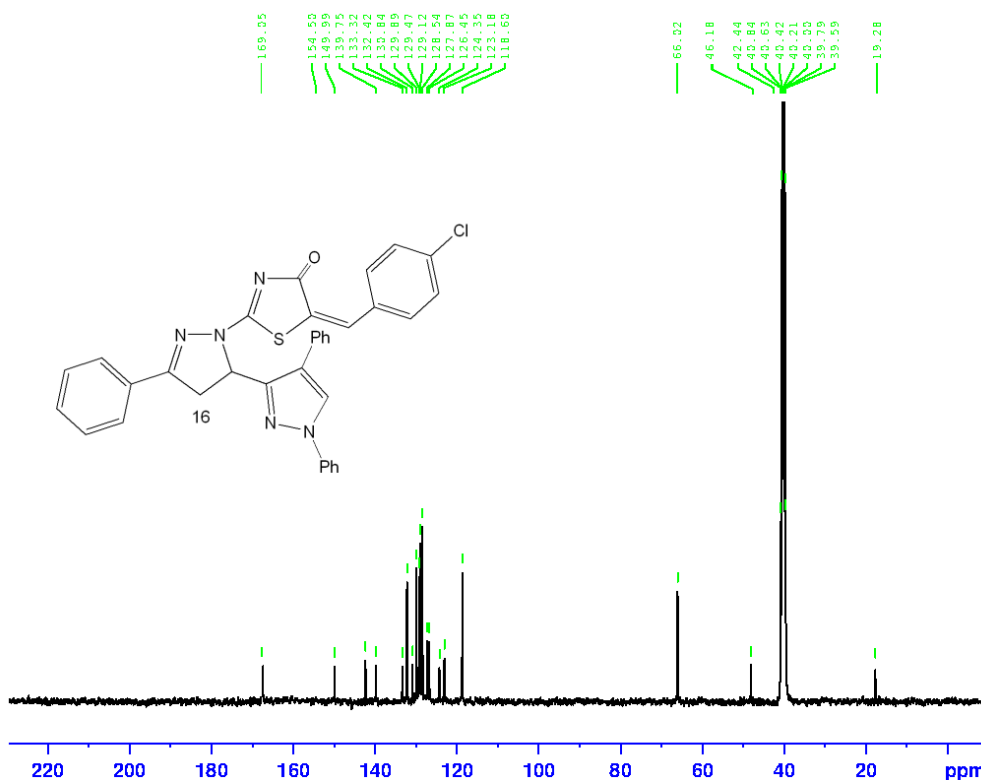
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Date_    20250115
Time     17.40
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PULPROG  zg30
TD       65536
SOLVENT  DMSO
NS       100
DS       2
SWH      8012.920 Hz
FIDRES   0.122266 Hz
AQ       4.0894465 sec
RG       158.76
DW       62.400 usec
DE       6.50 usec
TE       323.2 K
D1       1.00000000 sec
TD0      1

===== CHANNEL f1 =====
SFO1    400.1324710 MHz
NUC1    1H
P1      12.00 usec
PLW1    22.00000000 W

F2 - Processing parameters
SI      65536
SF      400.1300000 MHz
WDW     EM
SSB     0
LB      0.30 Hz
GB      0
PC      1.00
    
```



A16  
c13\_su DMSO {C:\nmr-data} Student 5



Current Data Parameters  
NAME Jan17-2025  
EXPNO 231  
PROCNO 1

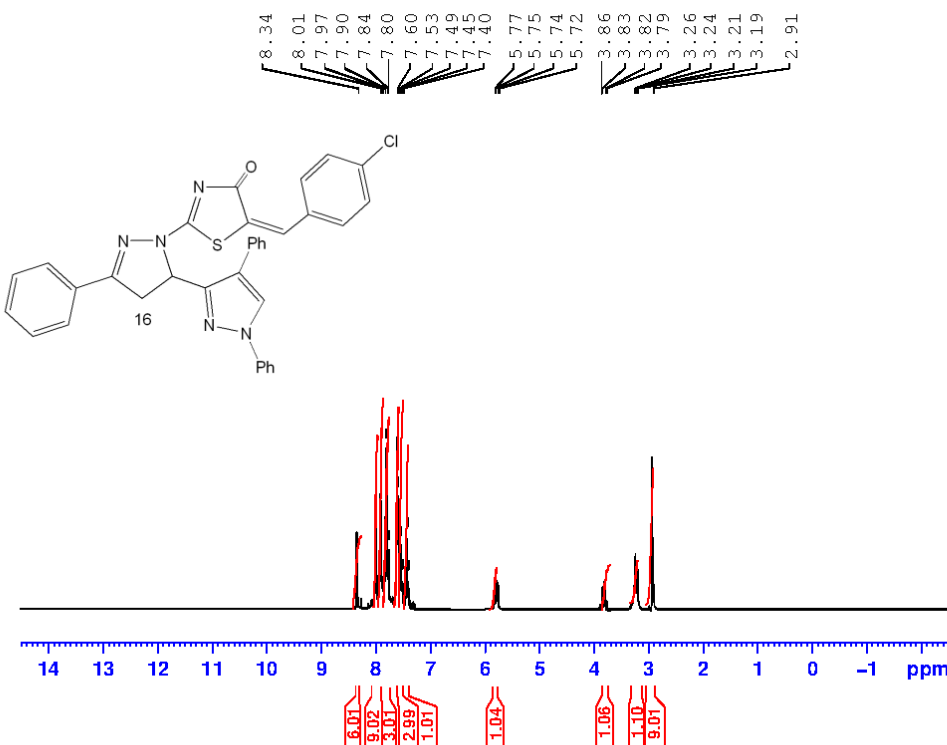
F2 - Acquisition Parameters  
Date\_ 20250117  
Time 23.44  
INSTRUM spect  
PROBHD 5 mm PABBO BB/  
PULPROG zgpg30  
TD 65536  
SOLVENT DMSO  
NS 1100  
DS 4  
SWH 24038.461 kHz  
FIDRES 0.366798 Hz  
AQ 1.3631488 sec  
RG 175.84  
DW 20.800 usec  
DE 6.50 usec  
TE 323.2 K  
D1 2.00000000 sec  
D11 0.03000000 sec  
TD0 1

----- CHANNEL f1 -----  
SFO1 100.6238364 MHz  
NUC1 13C  
P1 9.50 usec  
PLW1 56.00000000 W

----- CHANNEL f2 -----  
SFO2 400.1316005 MHz  
NUC2 1H  
PCPD2 waltz16  
PCPD2 90.00 usec  
PLW2 22.00000000 W  
PLW12 0.41091001 W  
PLW13 0.33284000 W

F2 - Processing parameters  
SI 32768  
SF 100.6127690 MHz  
WDW EM  
SSB 0  
LB 6.00 Hz  
GB 0  
PC 1.40

A16  
proton\_su DMSO {C:\nmr-data} Student 10



Current Data Parameters  
NAME Jan20-2025  
EXPNO 280  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 20250120  
Time 1.14  
INSTRUM spect  
PROBHD 5 mm PABBO BB/  
PULPROG zg30  
TD 65536  
SOLVENT DMSO  
NS 100  
DS 2  
SWH 8012.720 Hz  
FIDRES 0.123266 Hz  
AQ 5.1644362 sec  
RG 106.18  
DW 62.400 usec  
DE 6.50 usec  
TE 323.2 K  
D1 1.00000000 sec  
TD0 1

===== CHANNEL f1 =====  
SFO1 400.1324710 MHz  
NUC1 1H  
P1 12.00 usec  
PLW1 22.00000000 W

F2 - Processing parameters  
SI 65536  
SF 400.1300000 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00