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## Supplementary Material

### **Solvent-free Synthesis of Novel Benzothiazole-substituted 4-Thiazolidinones Using Nano Silica-bonded 5-*n*-Propyl-octahydro-pyrimido[1,2-*a*]azepinium Chloride as Catalyst**

*Robabeh Baharfar*<sup>A,B</sup> and *Narges Shariati*<sup>A</sup>

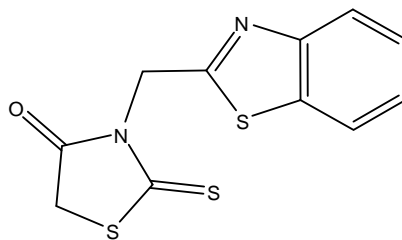
<sup>A</sup>Faculty of Chemistry, University of Mazandaran, PO Box 47415, Babolsar, Iran

<sup>B</sup>Corresponding author. Email: baharfar@umz.ac.ir

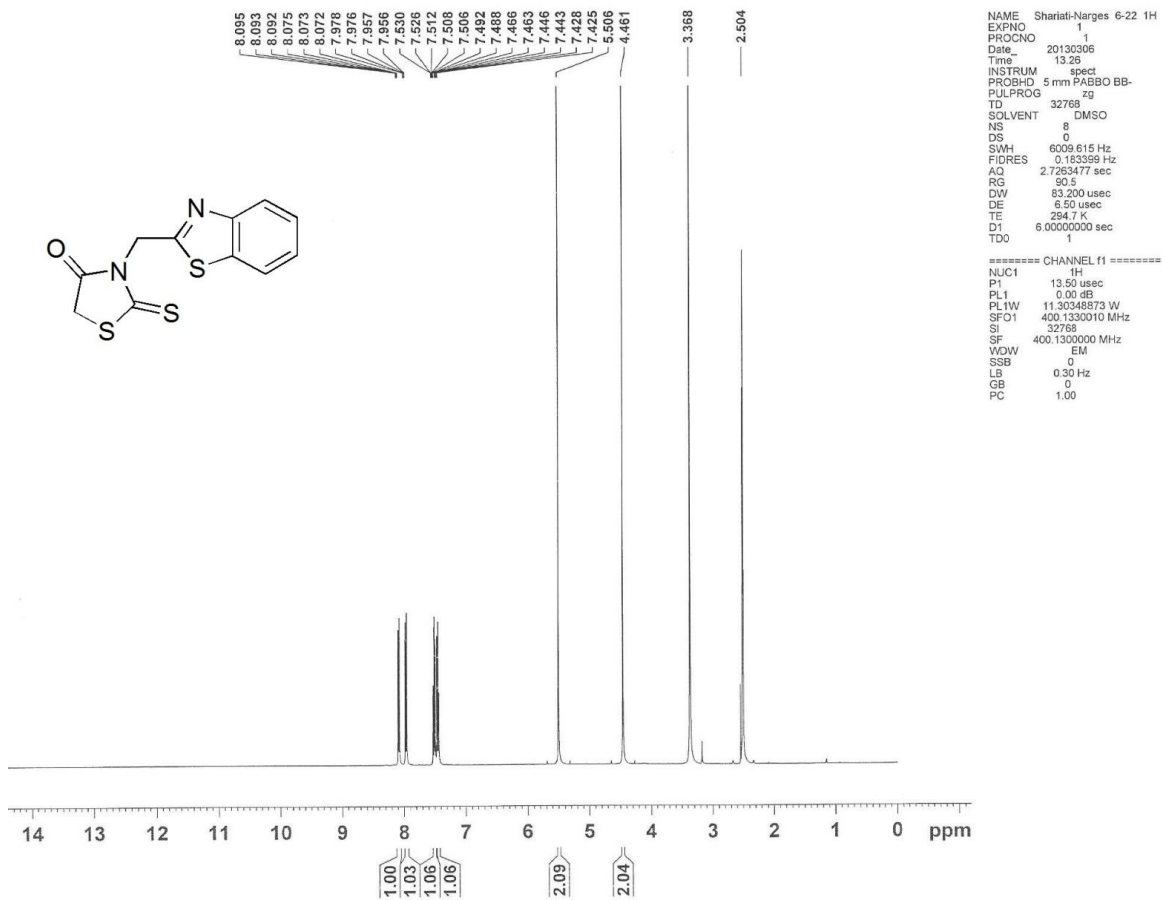
#### **Contents:**

Copies of <sup>1</sup>H NMR, <sup>13</sup>C NMR, Mass and FT-IR for compounds **3**, **5a-p**

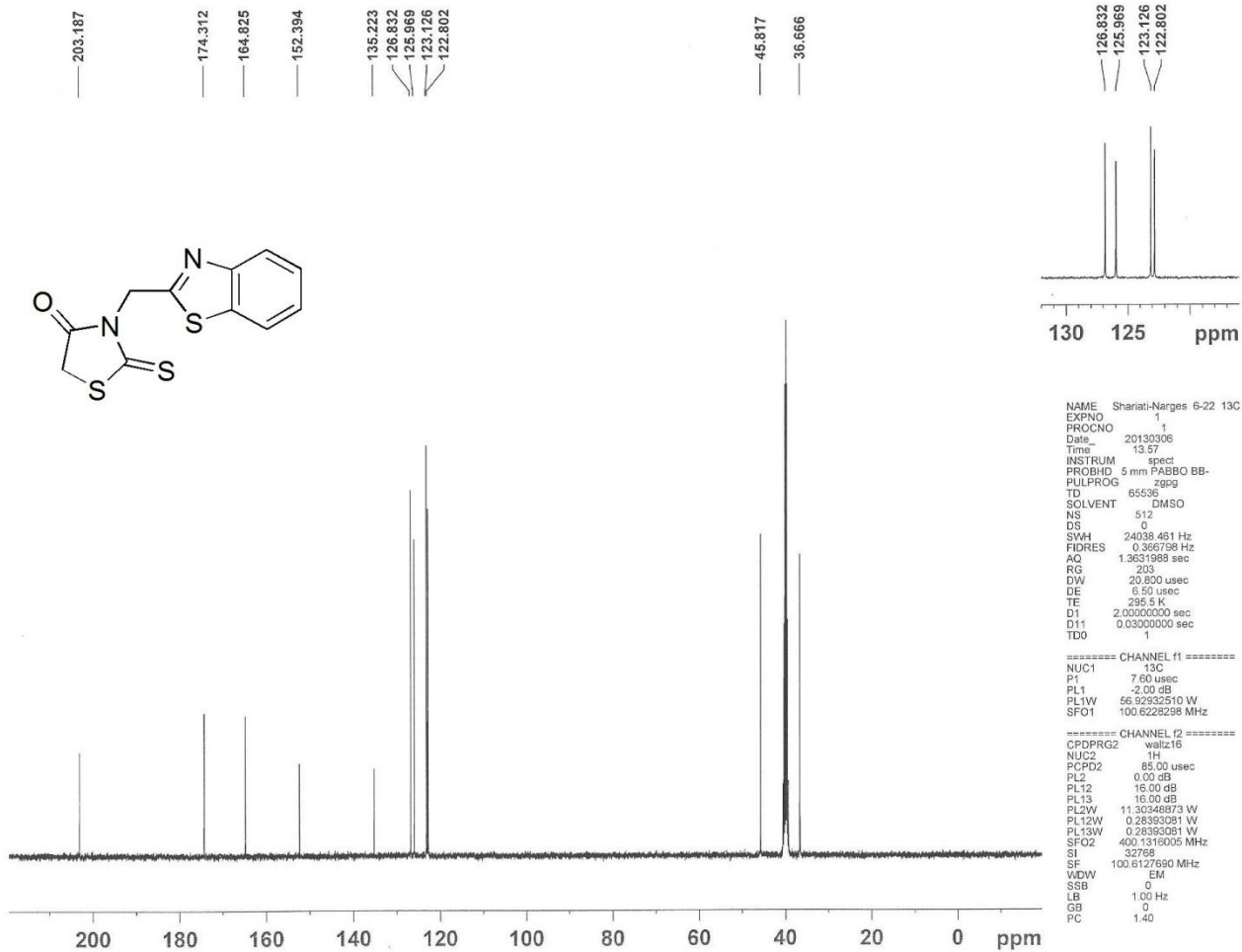
**3-(benzo[d]thiazol-2-ylmethyl)-2-thioxothiazolidin-4-one (3)**



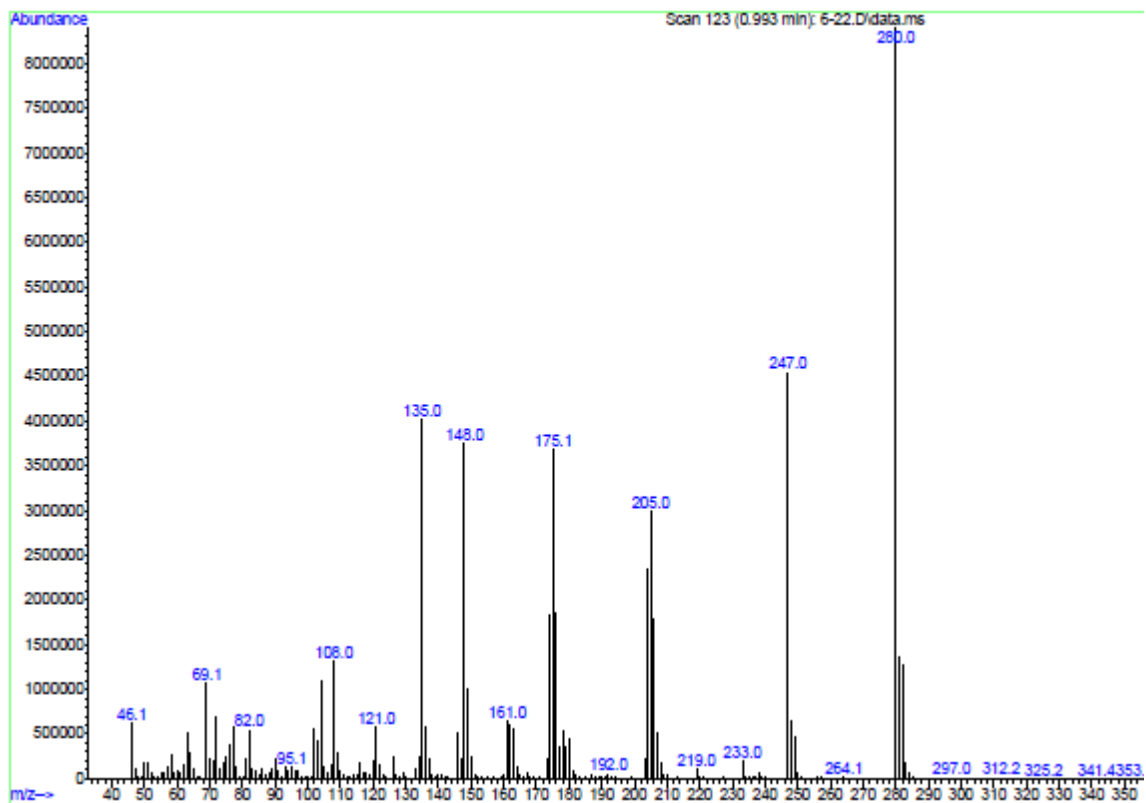
**<sup>1</sup>H NMR of compound 3**



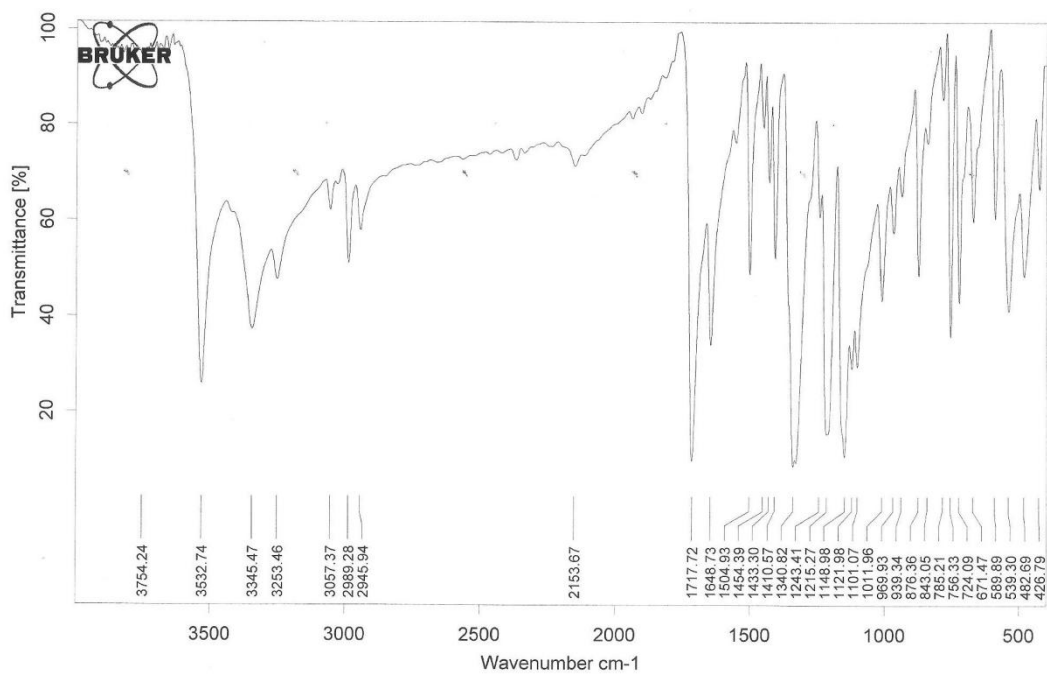
### <sup>13</sup>C NMR of compound 3



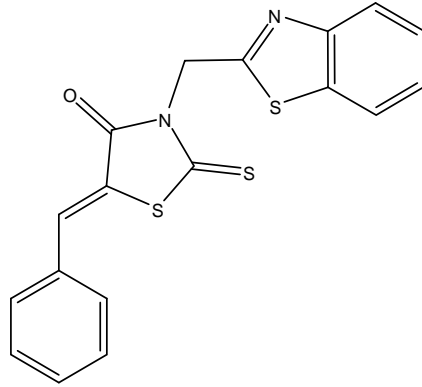
### Mass spectra of compound 3



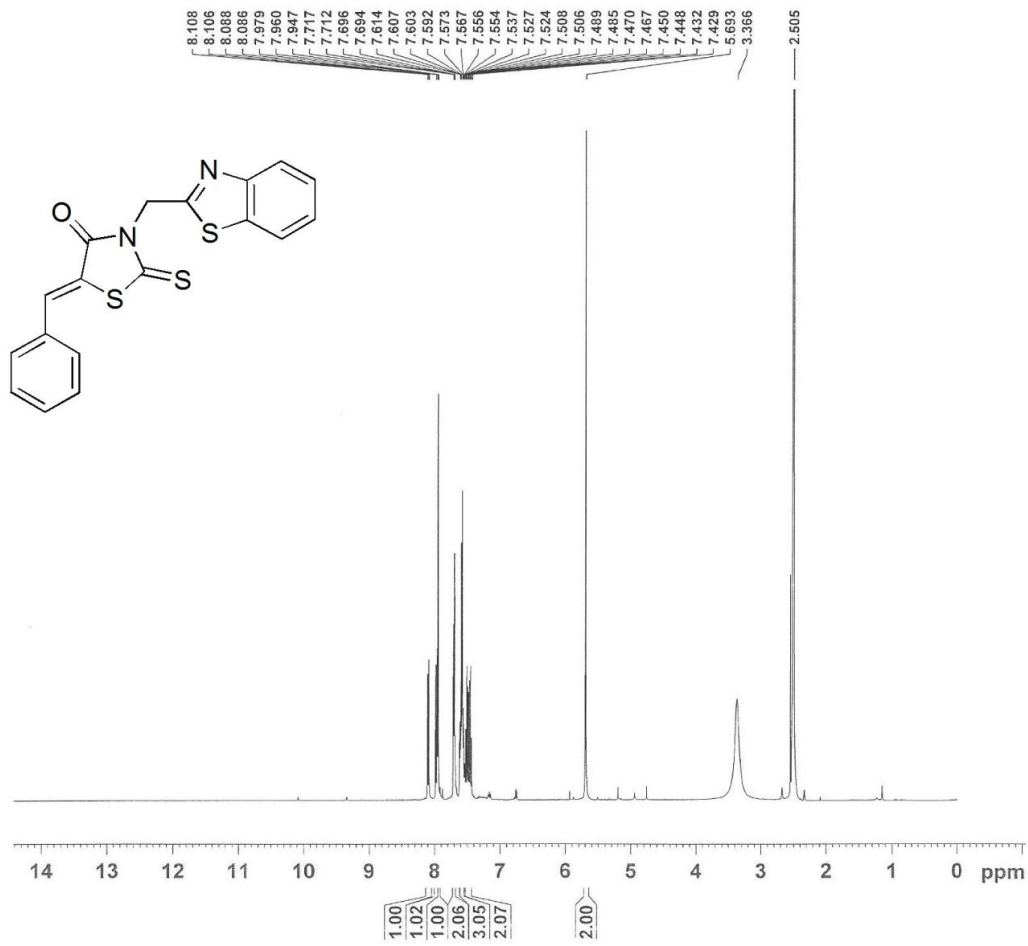
### FT-IR of compound 3



**3-(benzo[d]thiazol-2-ylmethyl)-5-benzylidene-2-thioxothiazolidin-4-one (5a)**



**<sup>1</sup>H NMR of compound 5a**



6-25

```

NAME  Shariati-Narges 1H
EXPNO  1
PROCNO  1
Date_  20130409
Time  10.47
INSTRUM  spect
PROBHD  5 mm PABBO BB-
PULPROG  zg
TD  32768
SOLVENT  DMSO
NS  8
DS  0
SWH  6009.615 Hz
FIDRES  0.183399 Hz
AQ  2.7263477 sec
RG  128
DW  83.200 usec
DE  6.50 usec
TE  294.9 K
D1  6.0000000 sec
TDO  1

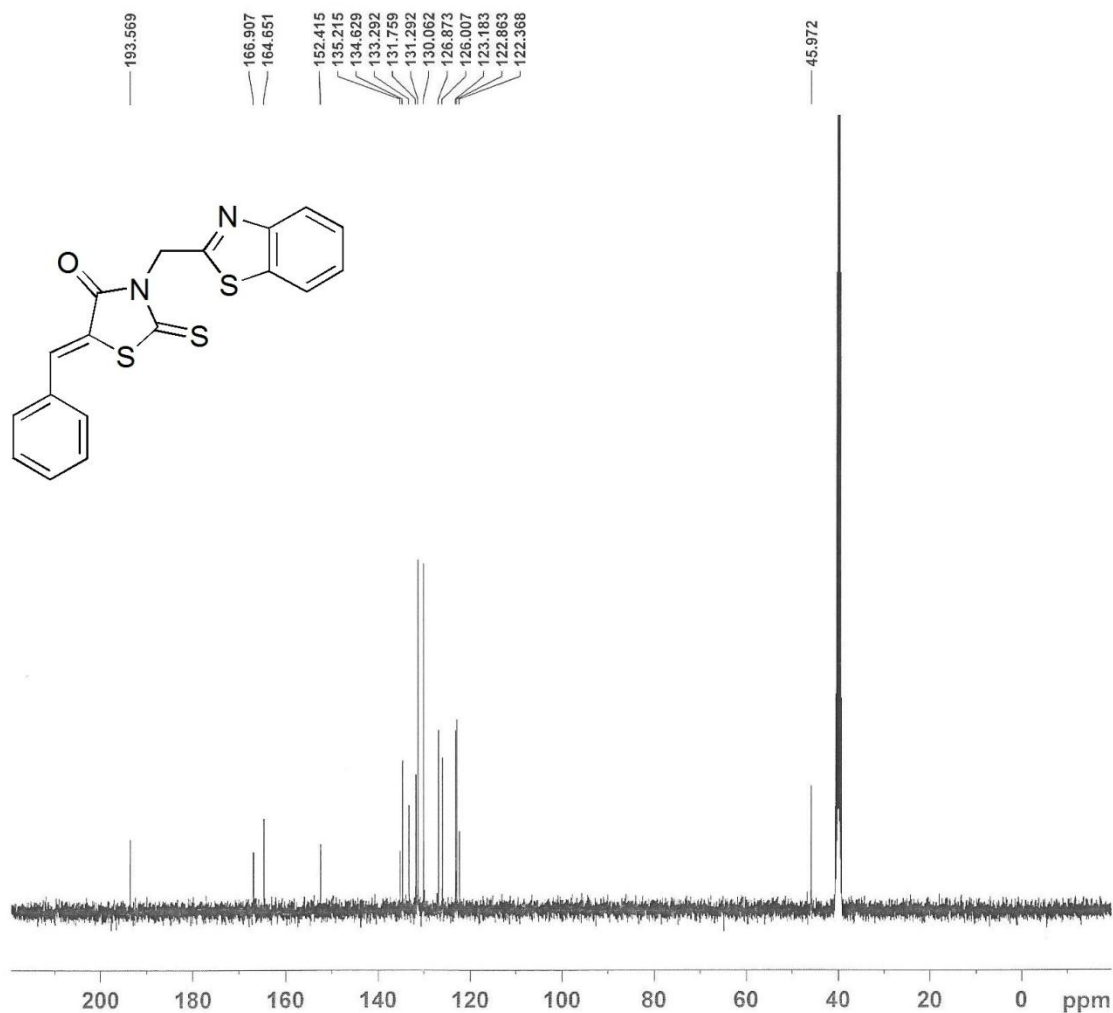
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===== CHANNEL f1 =====
NUC1  1H
P1  13.50 usec
PL1  0.00 dB
PL1W  11.30348873 W
SFO1  400.1330010 MHz
SI  32768
SF  400.1300000 MHz
WDW  EM
SSB  0
LB  0.30 Hz
GB  0
PC  1.00

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# <sup>13</sup>C NMR of compound 5a



6-25

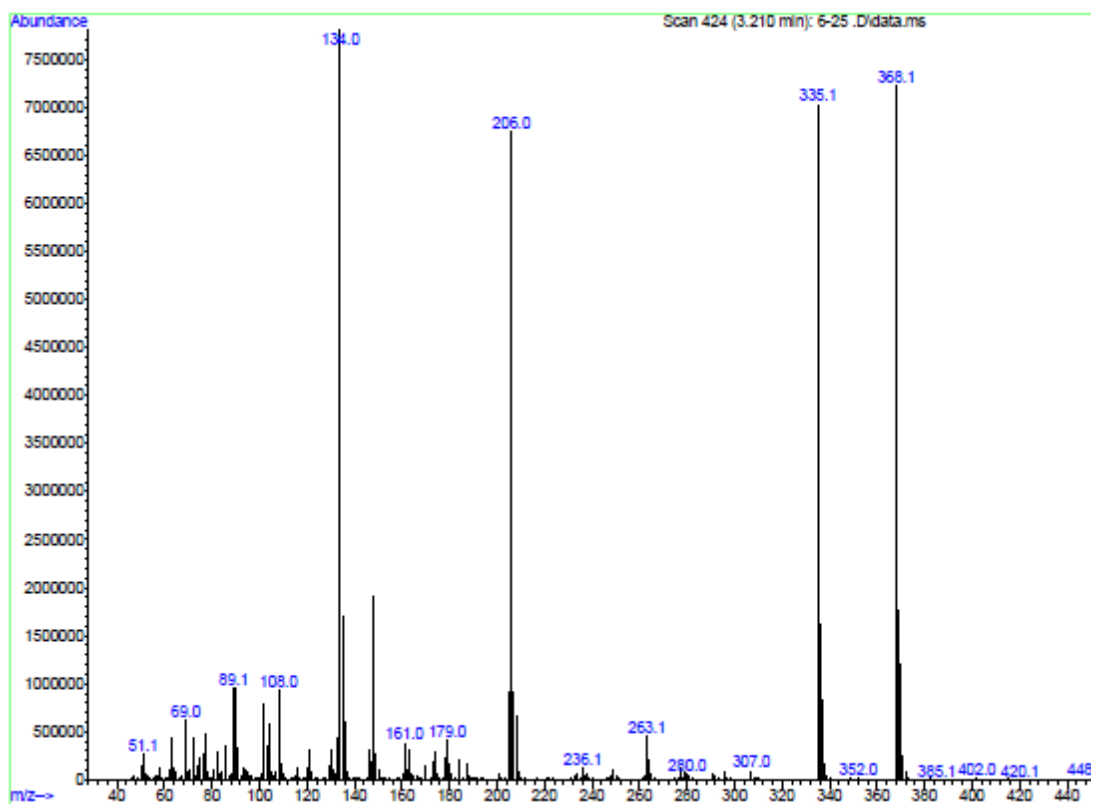
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EXPNO 1  
PROCNO 1  
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Time 10.53  
INSTRUM spect  
PROBHD 5 mm PABBO BB-  
PULPROG zgpg  
TD 65536  
SOLVENT DMSO  
NS 323  
DS 0  
SWH 24038.461 Hz  
FIDRES 0.366798 Hz  
AQ 1.3631988 sec  
RG 203  
DW 20.800 usec  
DE 6.50 usec  
TE 295.0 K  
D1 2.0000000 sec  
D11 0.0300000 sec  
TDO 1

===== CHANNEL f1 =====  
NUC1 13C  
P1 7.60 usec  
PL1 -2.00 dB  
PL1W 56.9232510 W  
SFO1 100.6228298 MHz

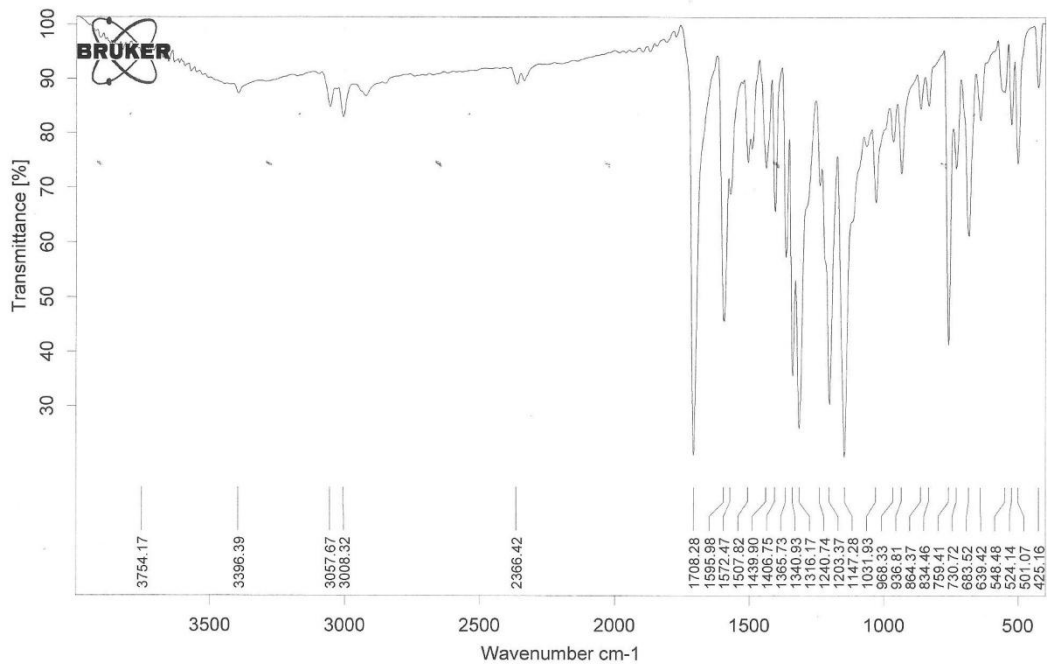
===== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 85.00 usec  
PL2 0.00 dB  
PL12 16.00 dB  
PL13 16.00 dB  
PL2W 11.30349873 W  
PL12W 0.28393081 W  
PL13W 0.28393081 W  
SFO2 400.1316005 MHz  
SF 32768  
SF 100.6127690 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40



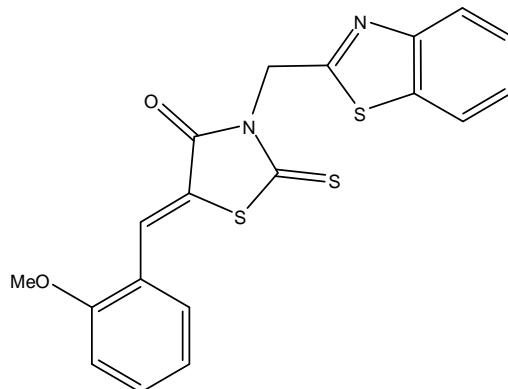
## Mass spectra of compound 5a



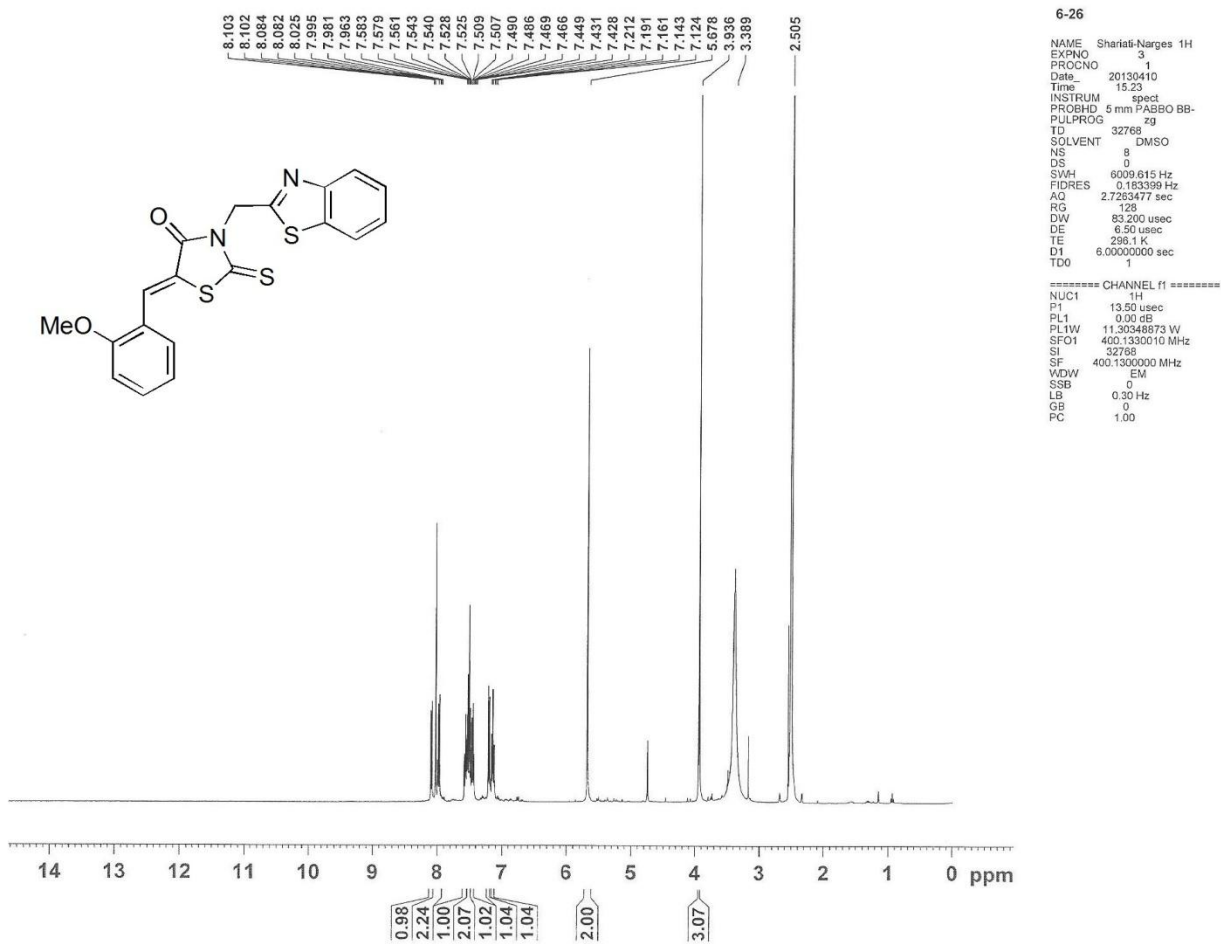
# FT-IR of compound 5a



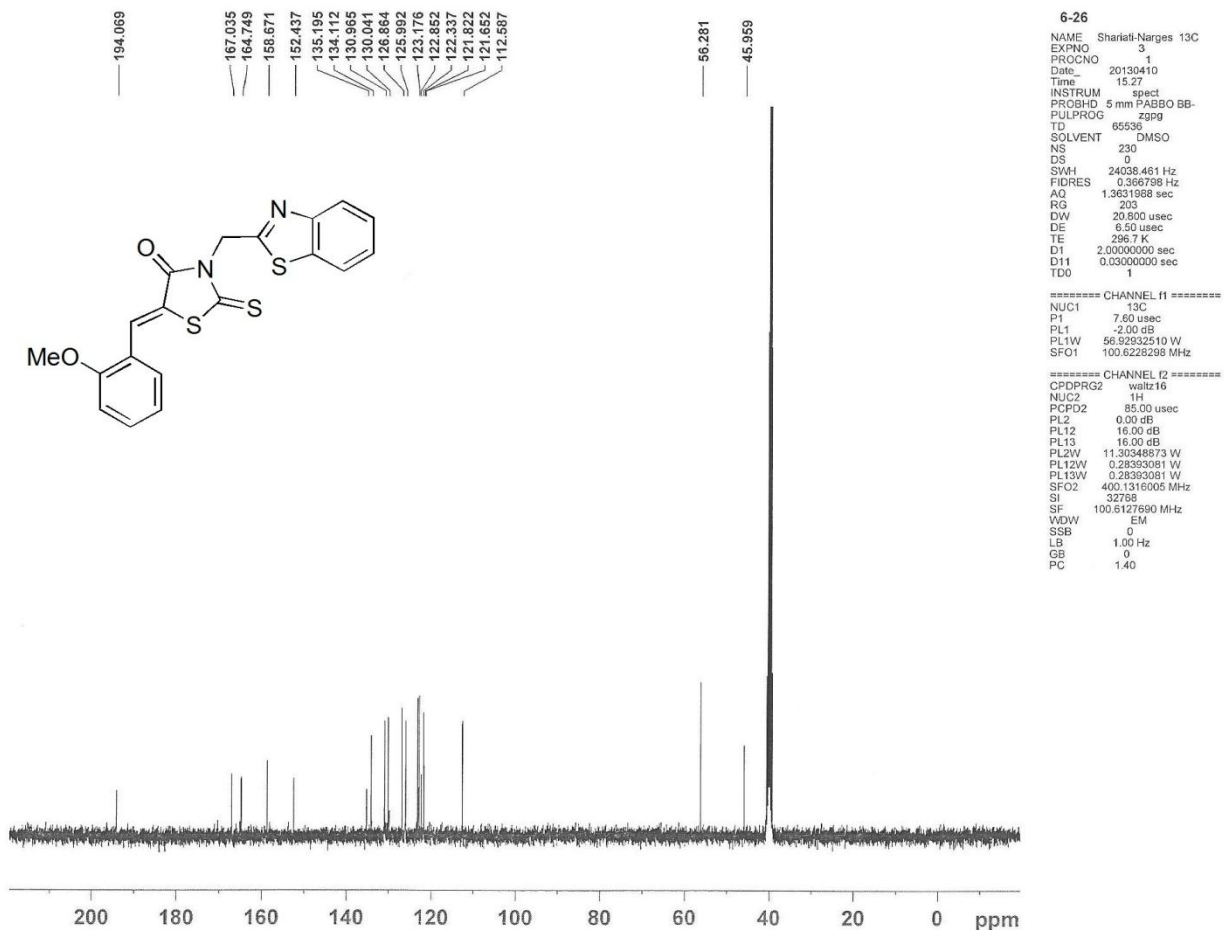
**3-(benzo[d]thiazol-2-ylmethyl)-5-(2-methoxybenzylidene)-2-thioxothiazolidin-4-one (5b)**



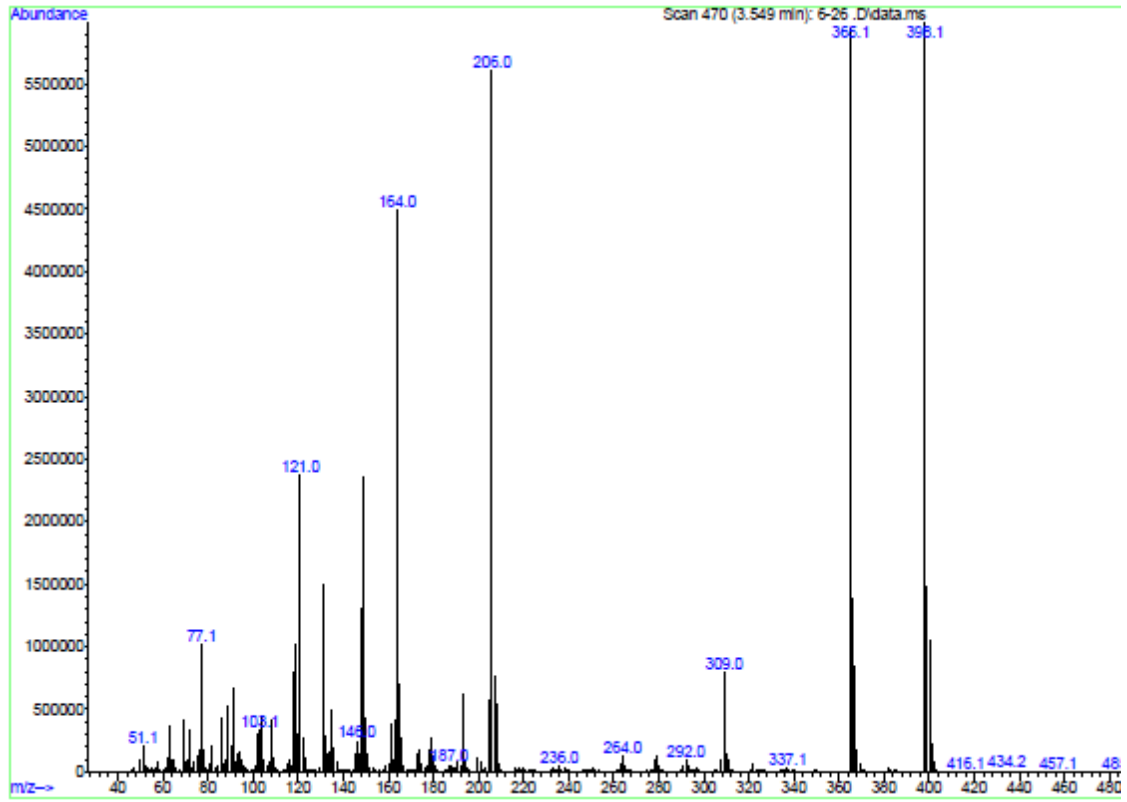
**<sup>1</sup>H NMR of compound 5b**



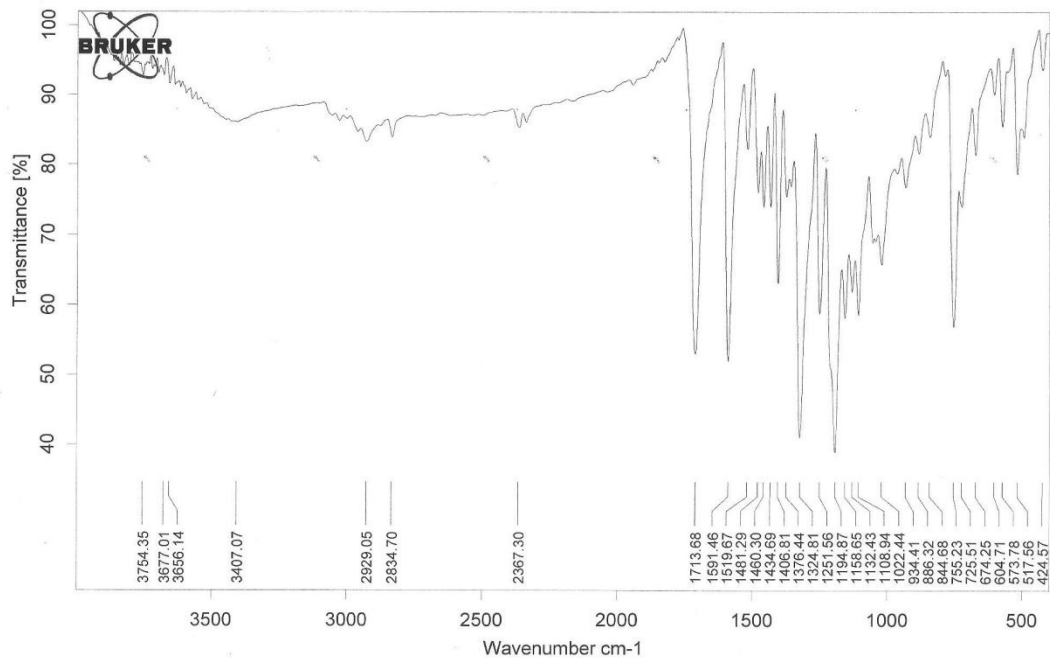
# <sup>13</sup>C NMR of compound 5b



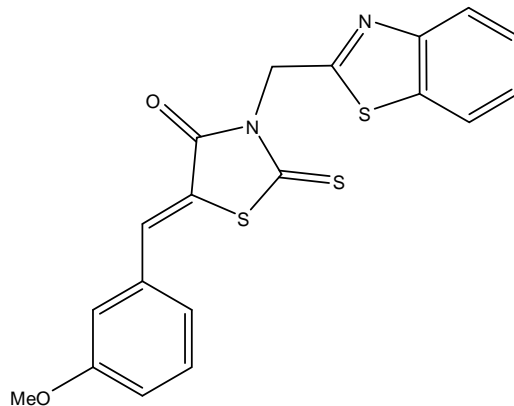
# Mass spectra of compound 5b



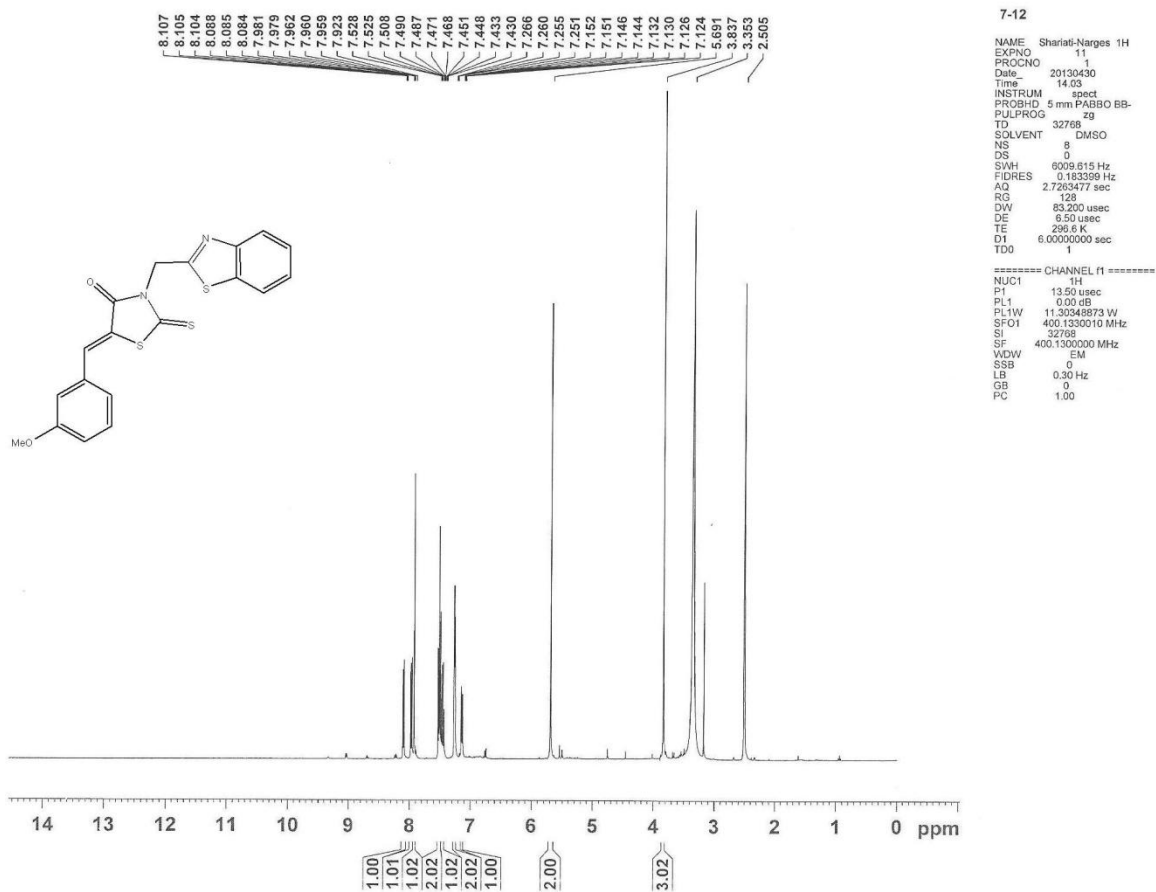
# FT-IR of compound 5b



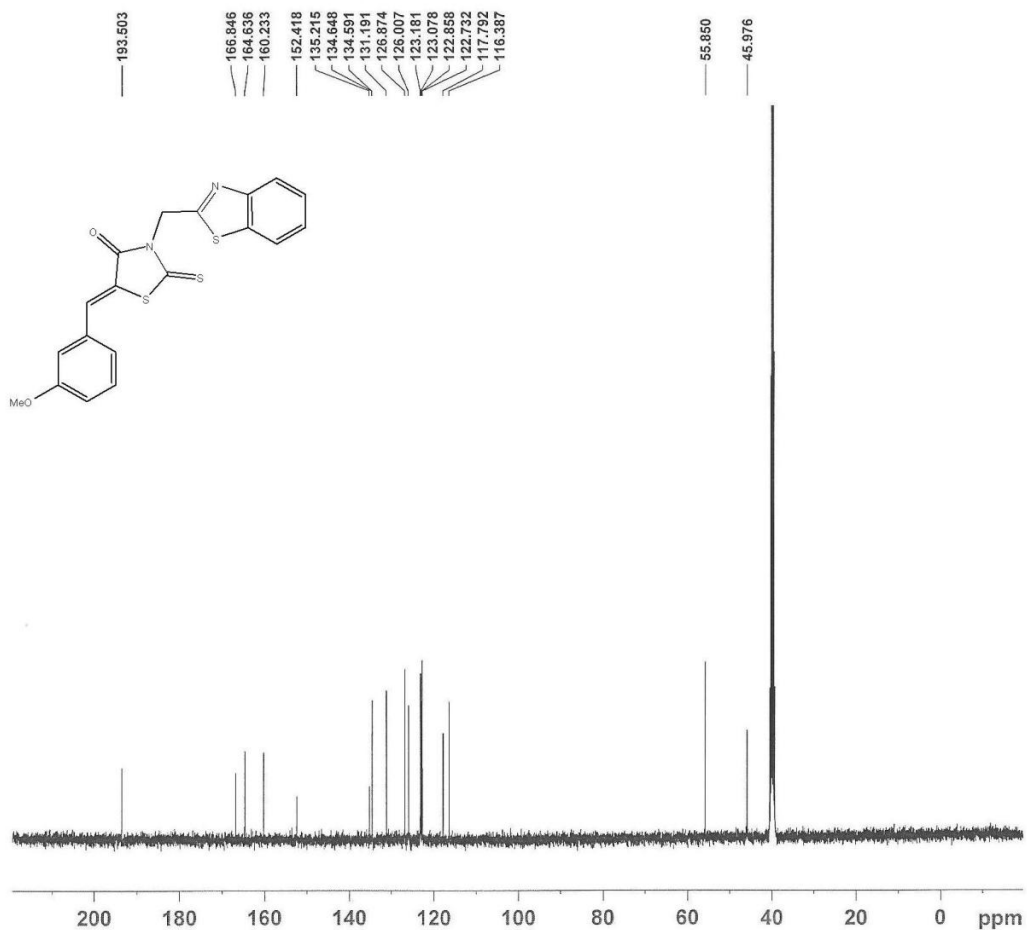
**3-(benzo[d]thiazol-2-ylmethyl)-5-(3-methoxybenzylidene)-2-thioxothiazolidin-4-one (5c)**



**<sup>1</sup>H NMR of compound 5c**



# <sup>13</sup>C NMR of compound 5c



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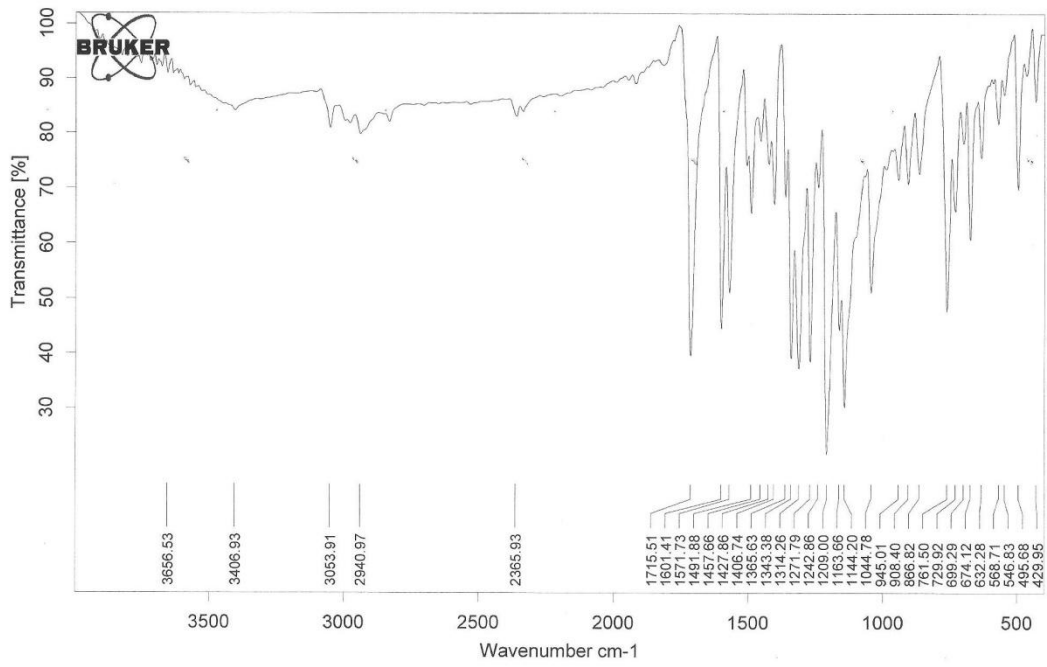
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EXPNO 11
PROCNO 1
Date_ 20130430
Time 14.34
INSTRUM spect
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PULPROG zgpg
TD 65536
SOLVENT DMSO
NS 512
DS 0
SWH 24038.461 Hz
FIDRES 0.366758 Hz
AQ 1.3631988 sec
RG 203
DW 20.920 usec
DE 6.50 usec
TE 297.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TDO 1

===== CHANNEL f1 =====
NUC1 13C
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PL1 -2.00 dB
PL1W 56.92632510 W
SFO1 100.6228298 MHz

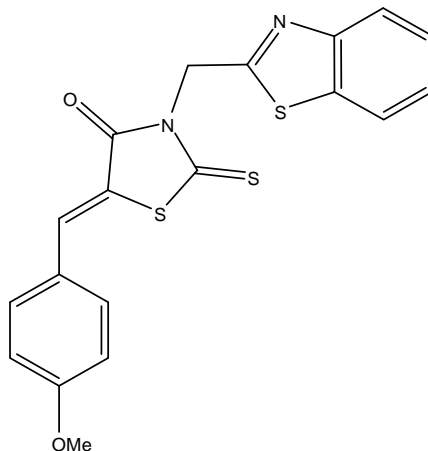
===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 85.00 usec
PL2 0.00 dB
PL12 16.00 dB
PL13 16.00 dB
PL2W 11.30348973 W
PL12W 0.28393081 W
PL13W 0.28393081 W
SFO2 400.1318005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
    
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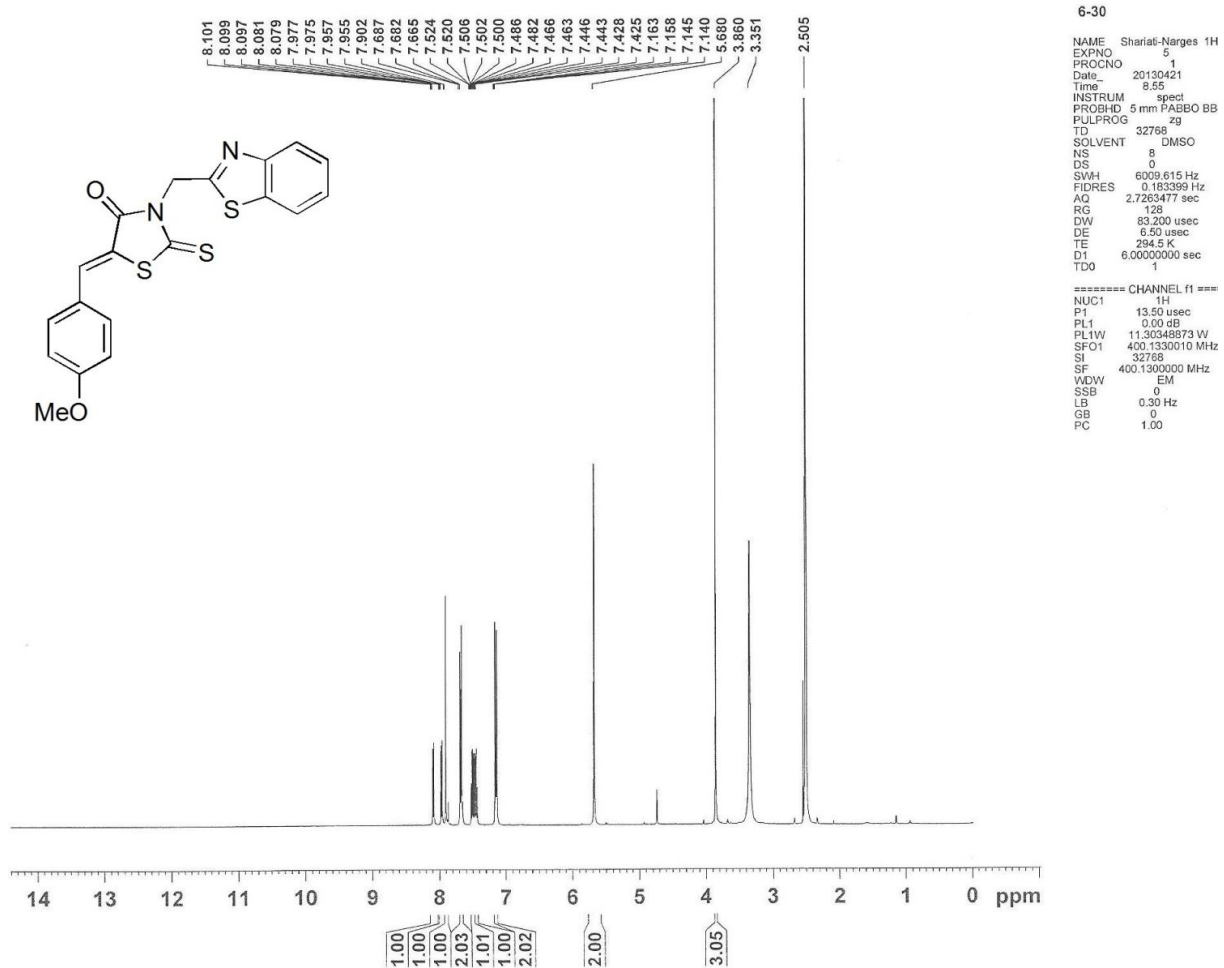
# FT-IR of compound 5c



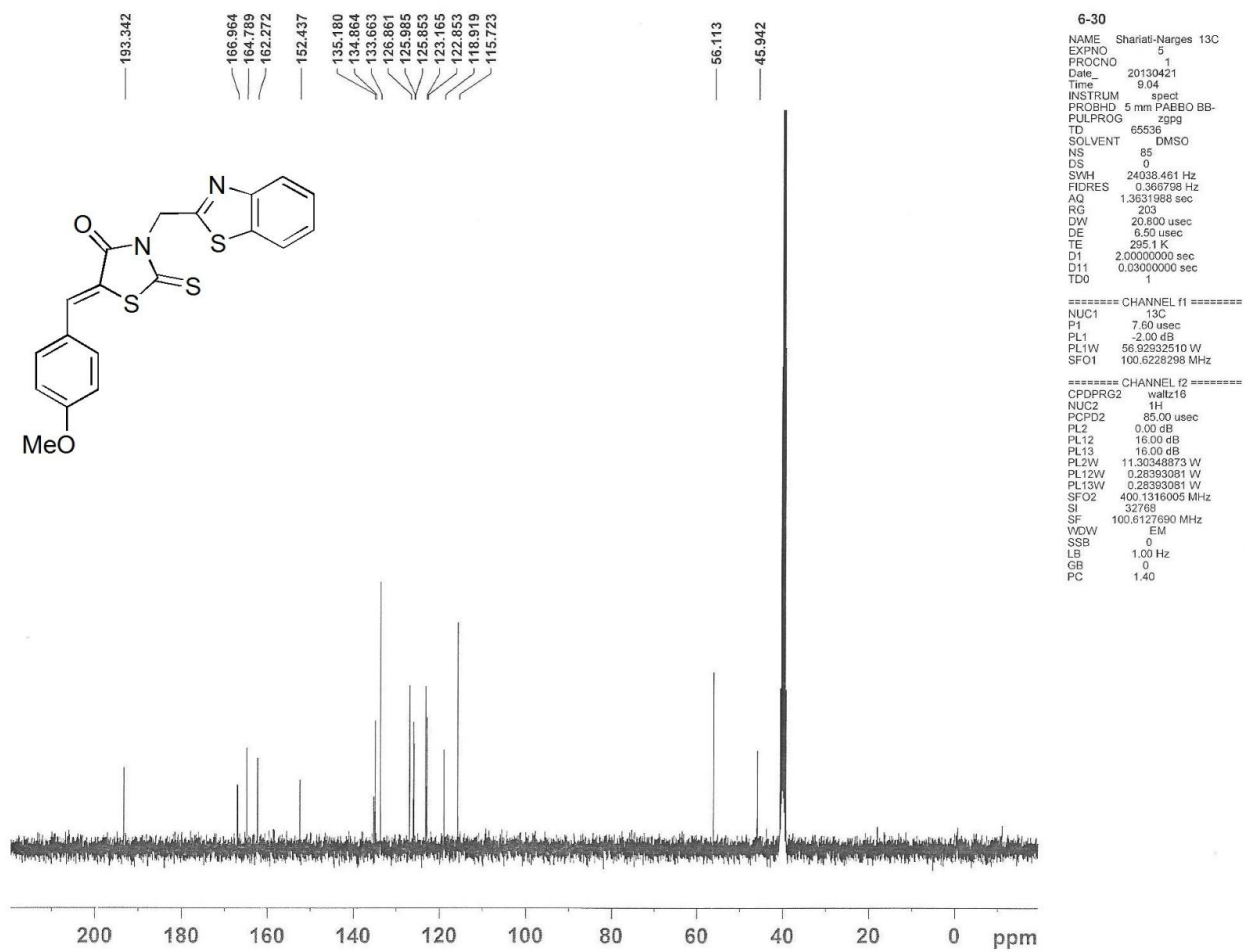
**3-(benzo[d]thiazol-2-ylmethyl)-5-(4-methoxybenzylidene)-2-thioxothiazolidin-4-one (5d)**



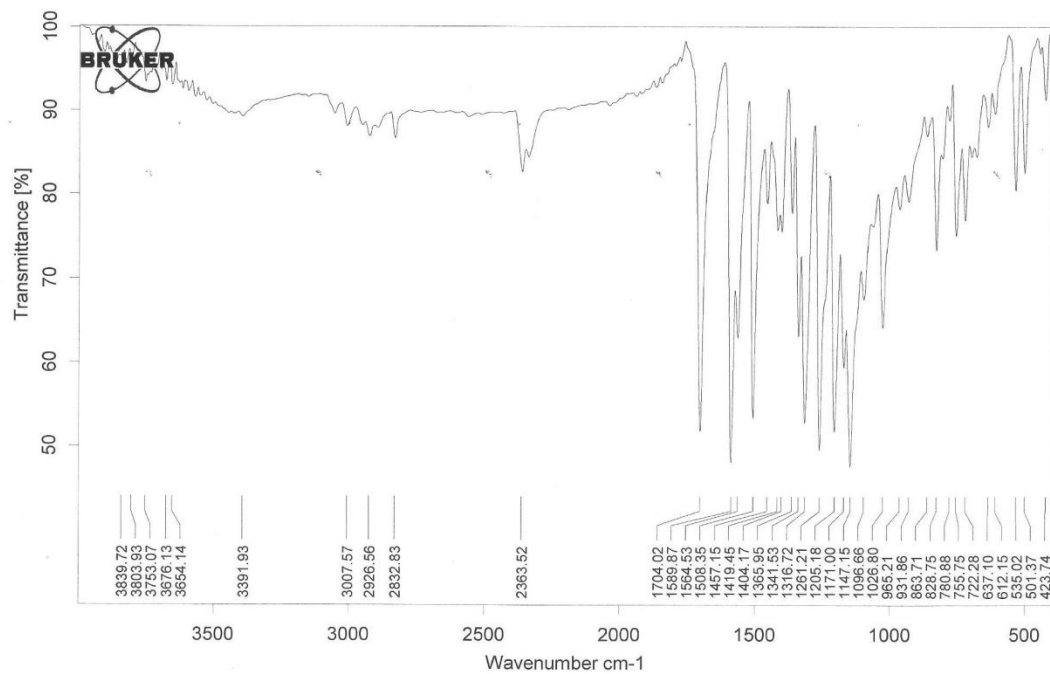
**<sup>1</sup>H NMR of compound 5d**



# <sup>13</sup>C NMR of compound 5d

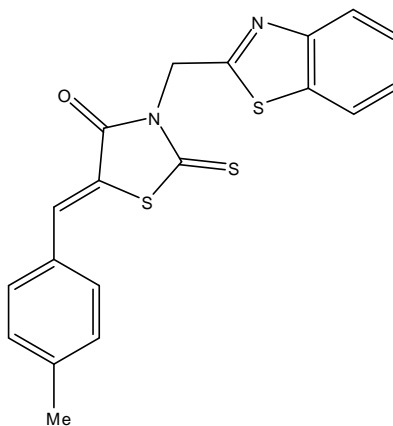


# FT-IR of compound 5d

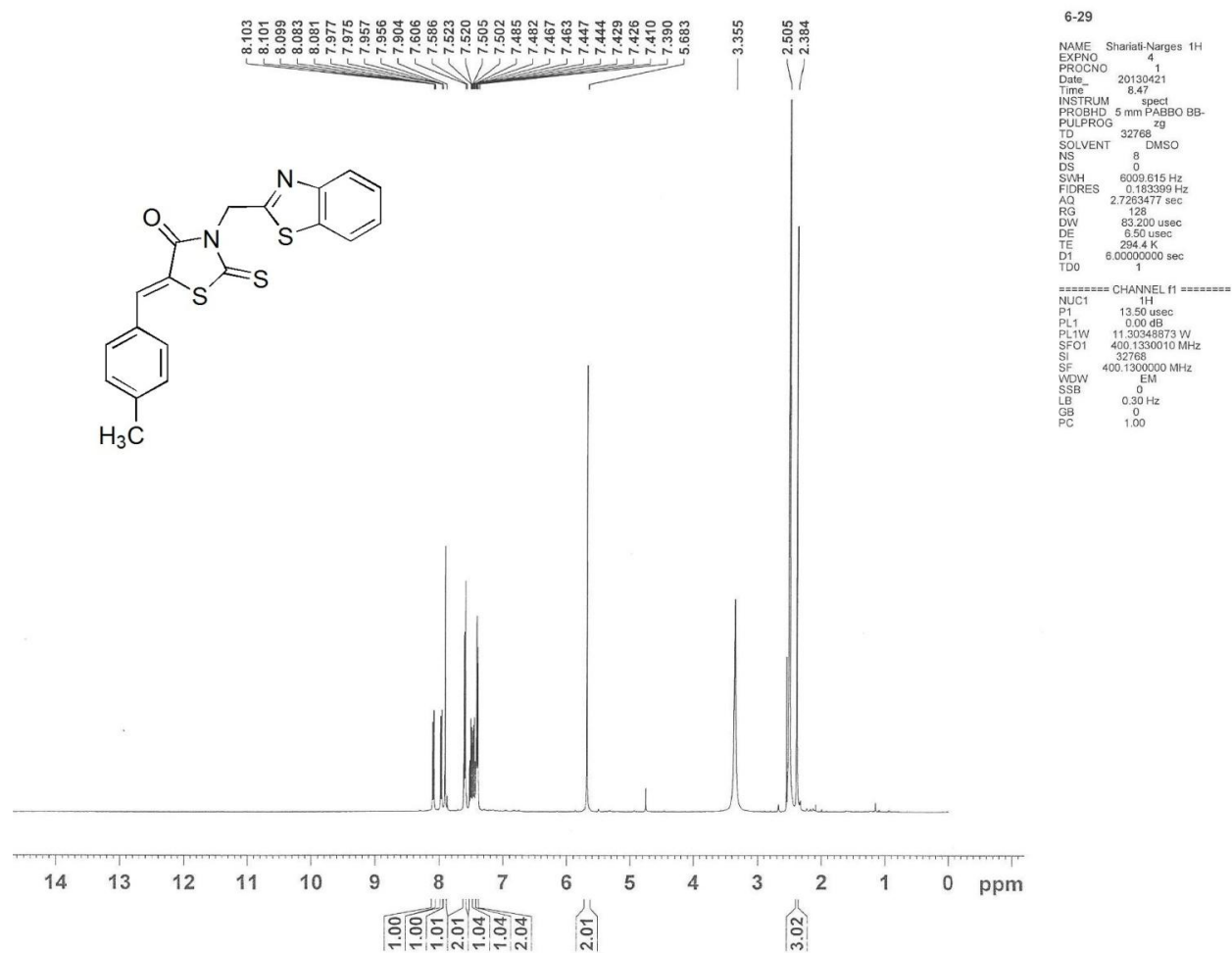


D:\ORGANIC I\IKH NOROZI\1.0	6-30	Instrument type and / or accessory	12/05/2013
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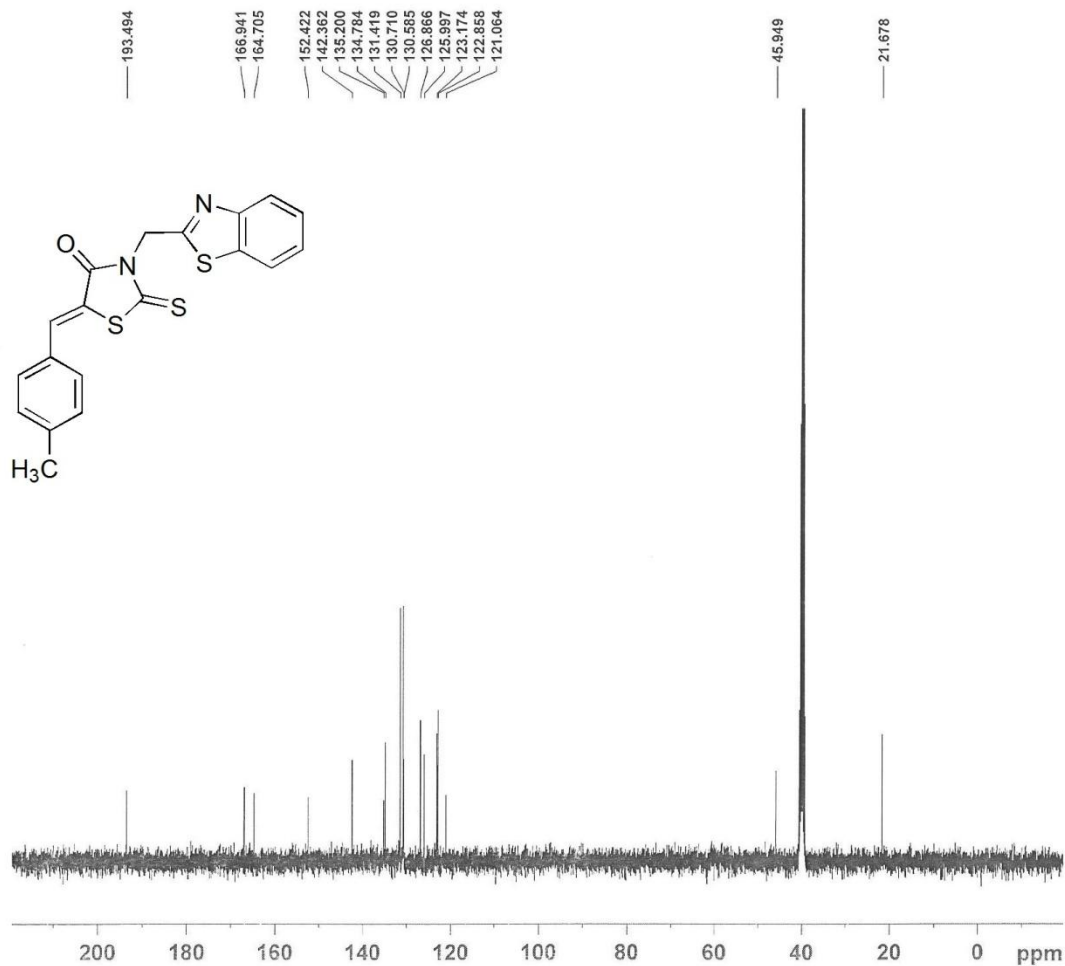
**3-(benzo[d]thiazol-2-ylmethyl)-5-(4-methylbenzylidene)-2-thioxothiazolidin-4-one (5e)**



**<sup>1</sup>H NMR of compound 5e**



# <sup>13</sup>C NMR of compound 5e



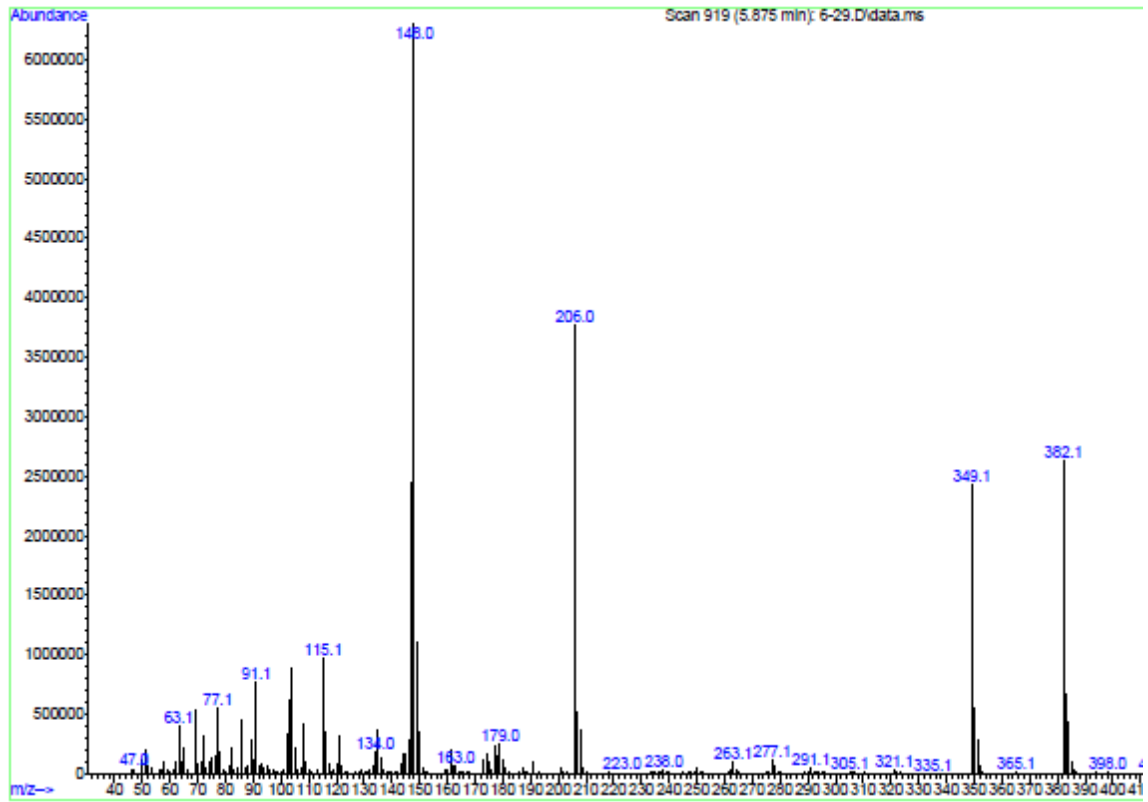
6-29

NAME Shariat-Narges 13C  
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PROCNO 1  
Date\_ 20130421  
Time 8.51  
INSTRUM spect  
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PULPROG zgpg  
TD 65536  
SOLVENT DMSO  
NS 64  
DS 0  
SWH 24038.461 Hz  
FIDRES 0.366798 Hz  
AQ 1.3631988 sec  
RG 203  
DW 20.800 usec  
DE 6.50 usec  
TE 295.0 K  
D1 2.0000000 sec  
D11 0.0300000 sec  
TD0 1

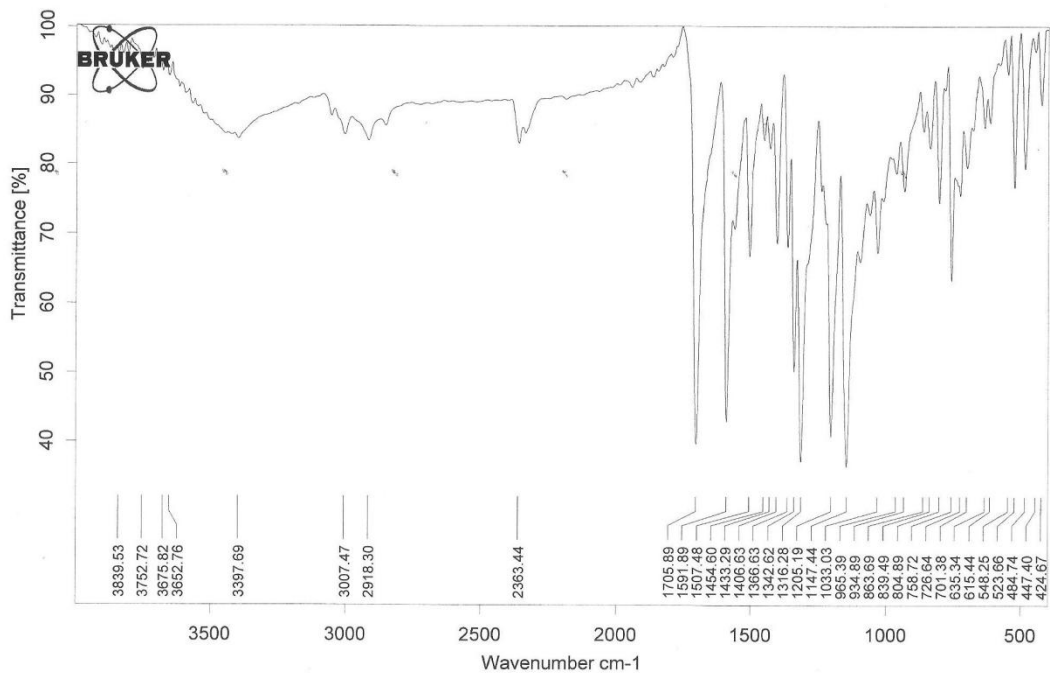
===== CHANNEL f1 =====  
NUC1 13C  
P1 7.60 usec  
PL1 -2.00 dB  
PL1W 56.92332510 W  
SFO1 100.6228298 MHz

===== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 85.00 usec  
PL2 0.00 dB  
PL12 16.00 dB  
PL13 16.00 dB  
PL2W 11.30348873 W  
PL12W 0.28333081 W  
PL13W 0.28333081 W  
SFO2 400.1316005 MHz  
SI 32768  
SF 100.6127690 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40

# Mass spectra of compound 5e

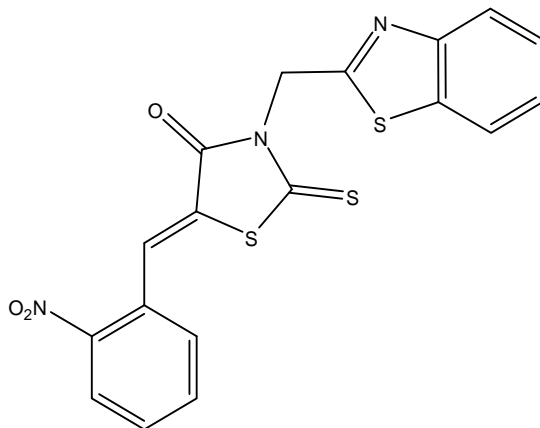


# FT-IR of compound 5e

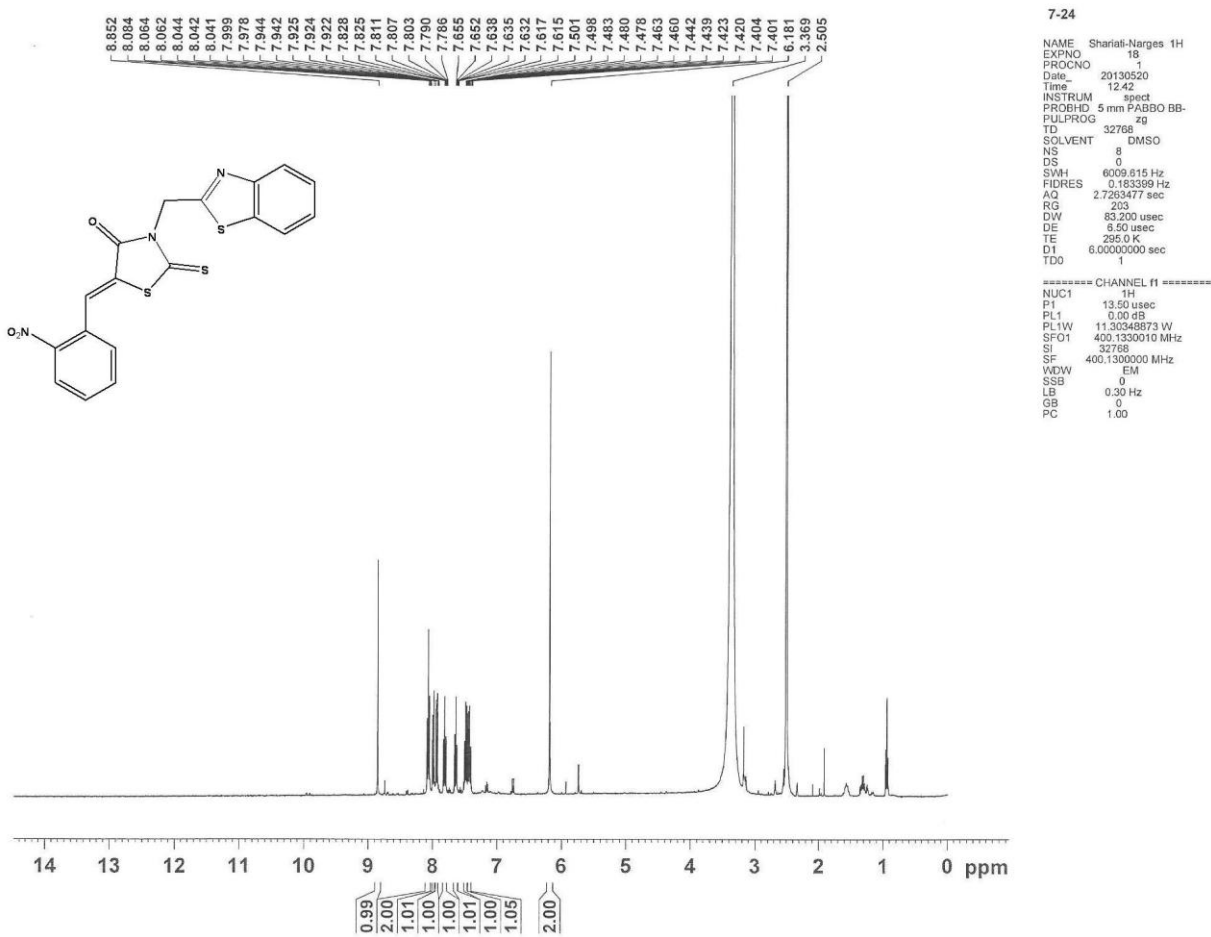




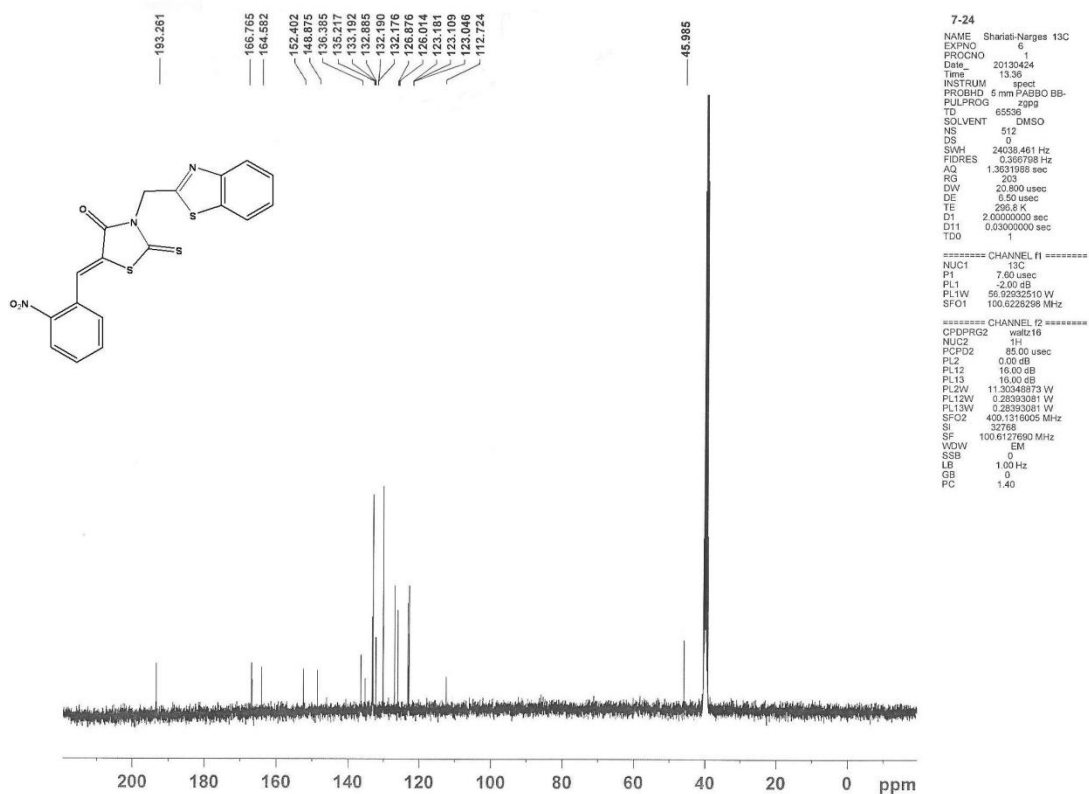
**3-(benzo[d]thiazol-2-ylmethyl)-5-(2-nitrobenzylidene)-2-thioxothiazolidin-4-one (5f)**



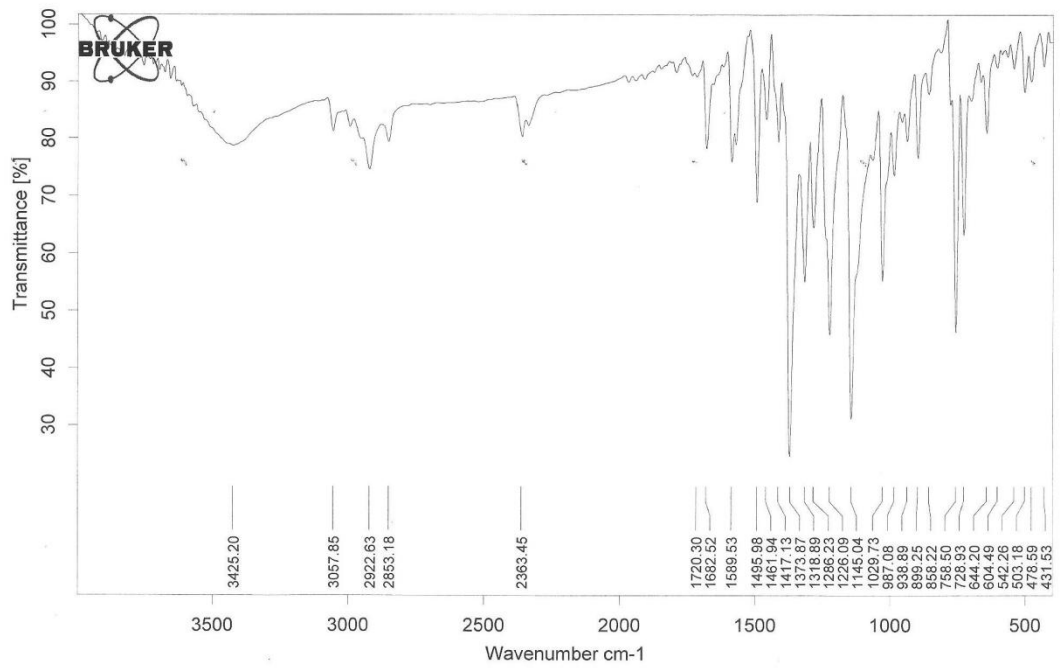
**<sup>1</sup>H NMR of compound 5f**



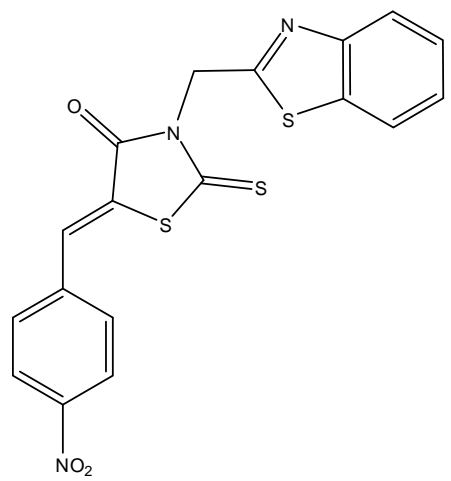
# <sup>13</sup>C NMR of compound 5f



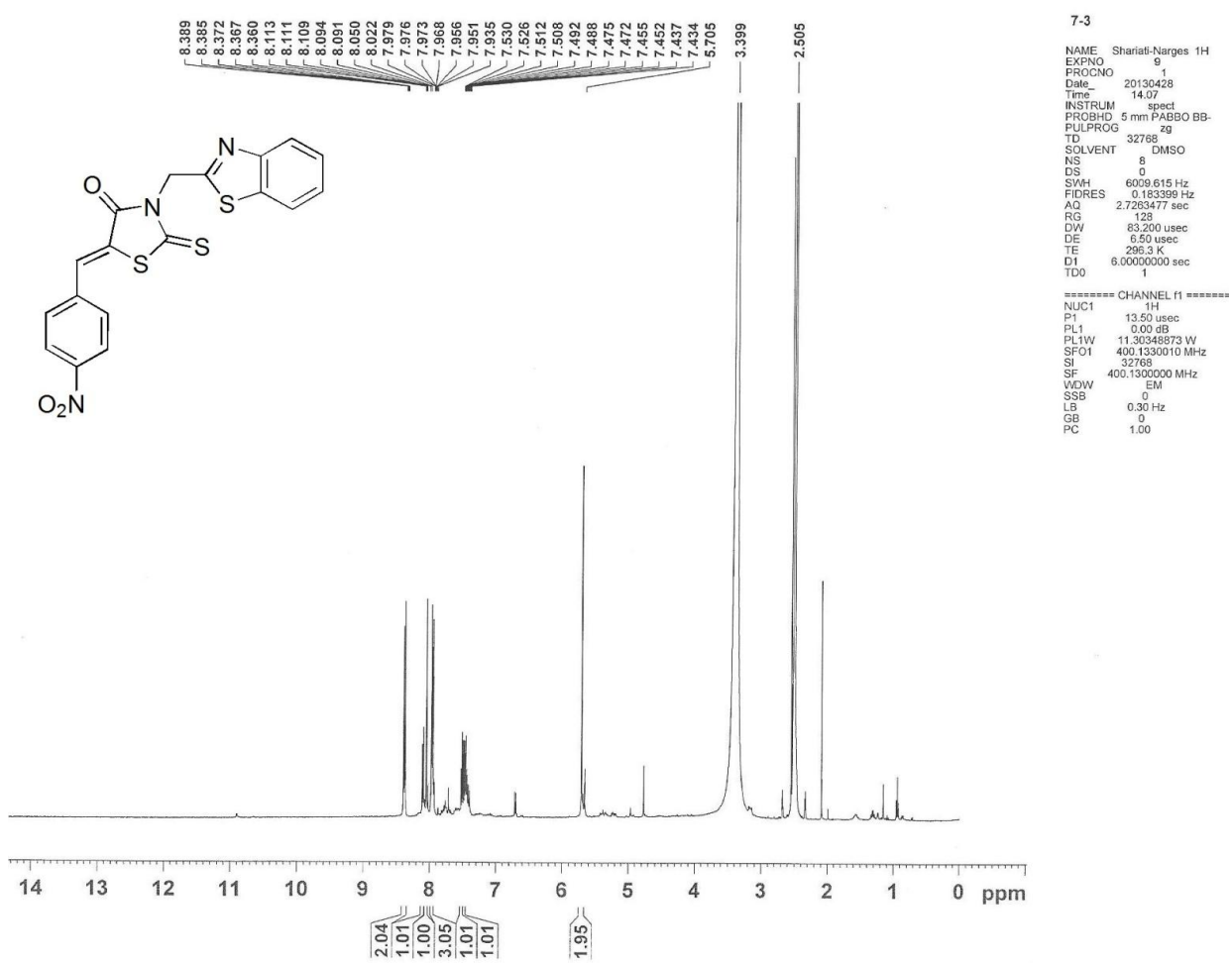
# FT-IR of compound 5f



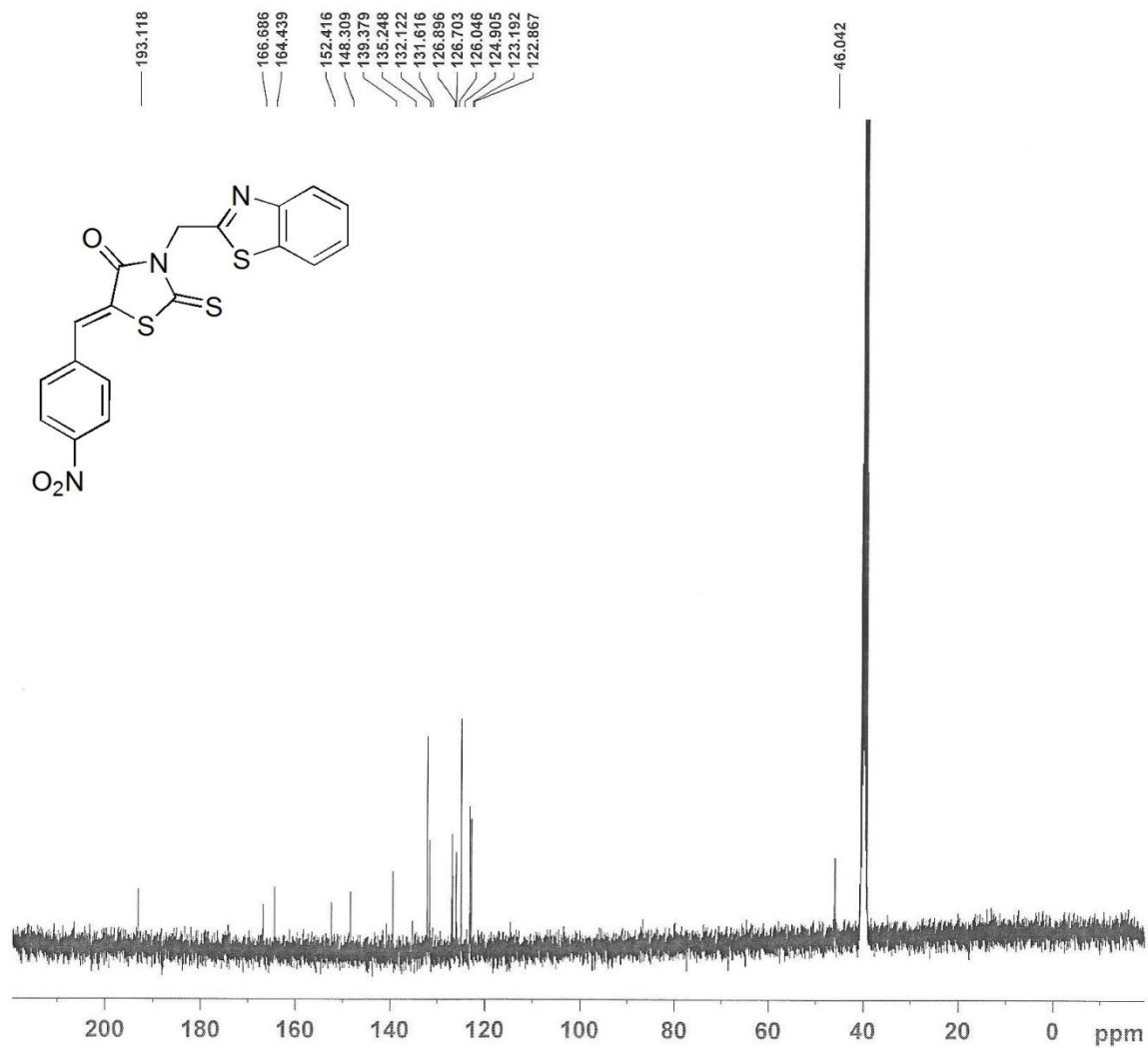
**3-(benzo[d]thiazol-2-ylmethyl)-5-(4-nitrobenzylidene)-2-thioxothiazolidin-4-one (5g)**



**<sup>1</sup>H NMR of compound 5g**



# <sup>13</sup>C NMR of compound 5g

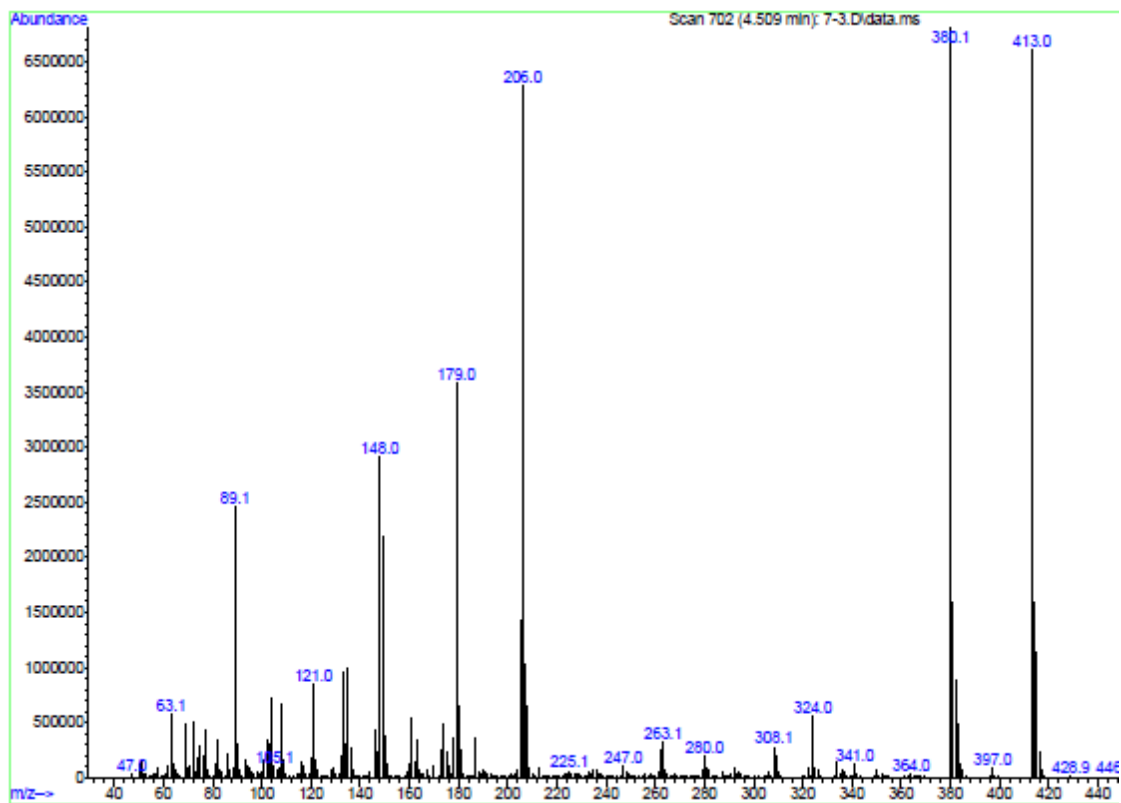


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PROCNO 1  
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INSTRUM spect  
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PULPROG zgpg  
TD 65536  
SOLVENT DMSO  
NS 1024  
DS 0  
SWH 24038.461 Hz  
FIDRES 0.366798 Hz  
AQ 1.3631988 sec  
RG 203  
DW 20.800 usec  
DE 6.60 usec  
TE 297.2 K  
D1 2.0000000 sec  
D11 0.03000000 sec  
TDO 1

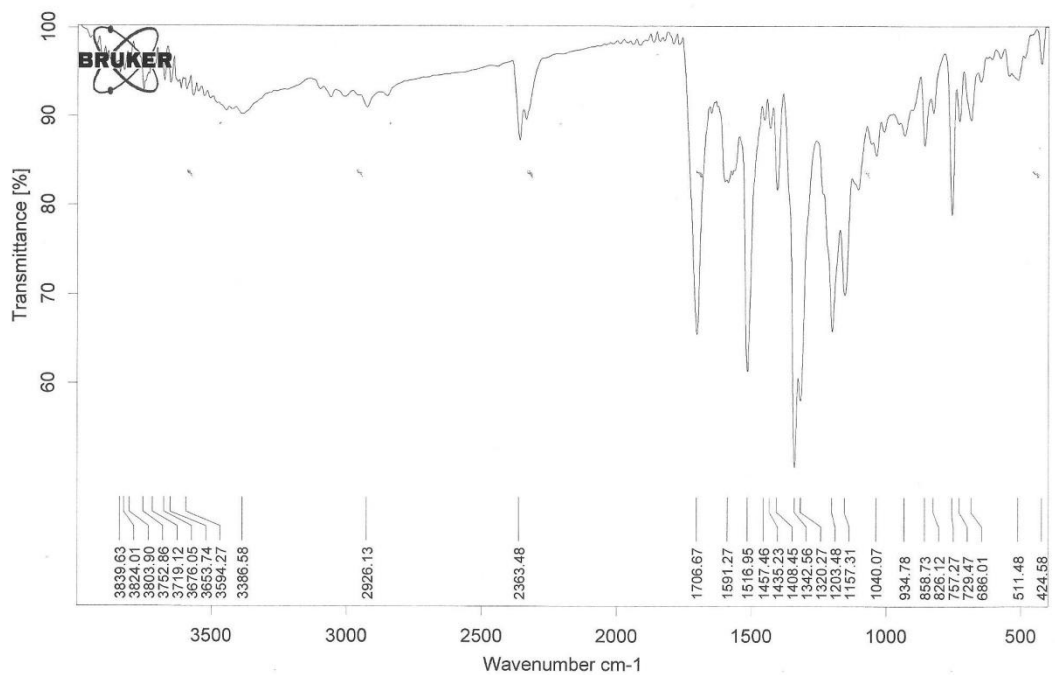
===== CHANNEL f1 =====  
NUC1 13C  
P1 7.60 usec  
PL1 -2.00 dB  
PL1W 56.9232510 W  
SFO1 100.6228296 MHz

===== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 85.00 usec  
PL2 0.00 dB  
PL12 18.00 dB  
PL13 18.00 dB  
PL2W 11.30348873 W  
PL12W 0.28393081 W  
PL13W 0.28393081 W  
SFO2 400.1316005 MHz  
SI 32768  
SF 100.6127690 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40

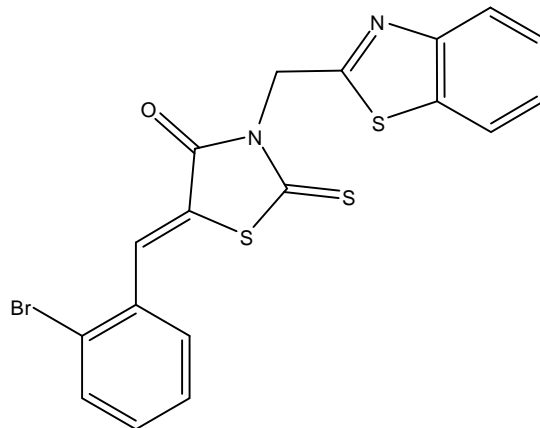
## Mass spectra of compound 5g



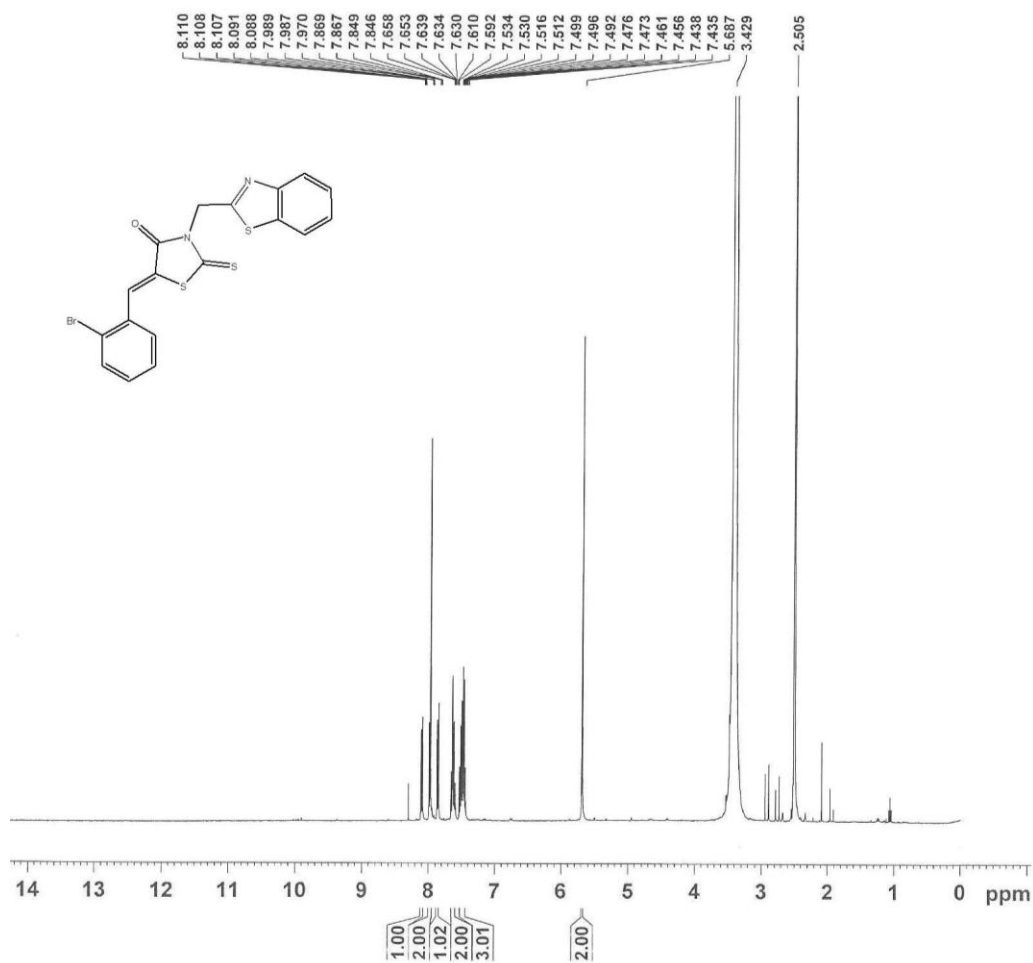
# FT-IR of compound 5g



**3-(benzo[d]thiazol-2-ylmethyl)-5-(2-bromobenzylidene)-2-thioxothiazolidin-4-one (5h)**



**<sup>1</sup>H NMR of compound 5h**



7-22

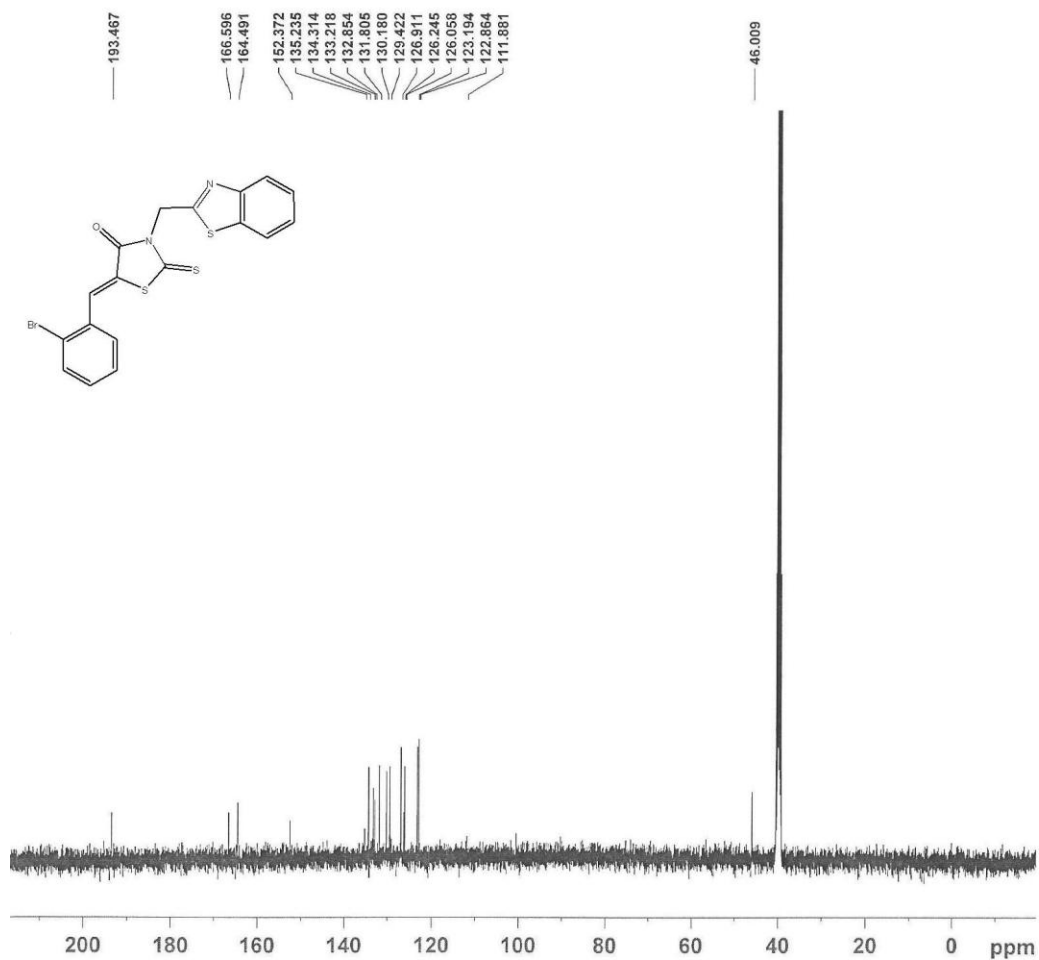
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PROCNO 1
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Time 12.54
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PULPROG zg
TD 32768
SOLVENT DMSO
NS 8
DS 0
SWH 8009.615 Hz
FIDRES 0.183398 Hz
AQ 2.7263477 sec
RG 80.6
DW 83.230 usec
DE 6.50 usec
TE 295.7 K
DI 6.00000000 sec
D1 1
TDO

===== CHANNEL f1 =====
NUC1 1H
P1 13.50 usec
PL1 0.00 dB
PL1W 11.30348973 W
SFO1 400.130010 MHz
SI 32768
SF 400.130000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
    
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# <sup>13</sup>C NMR of compound 5h



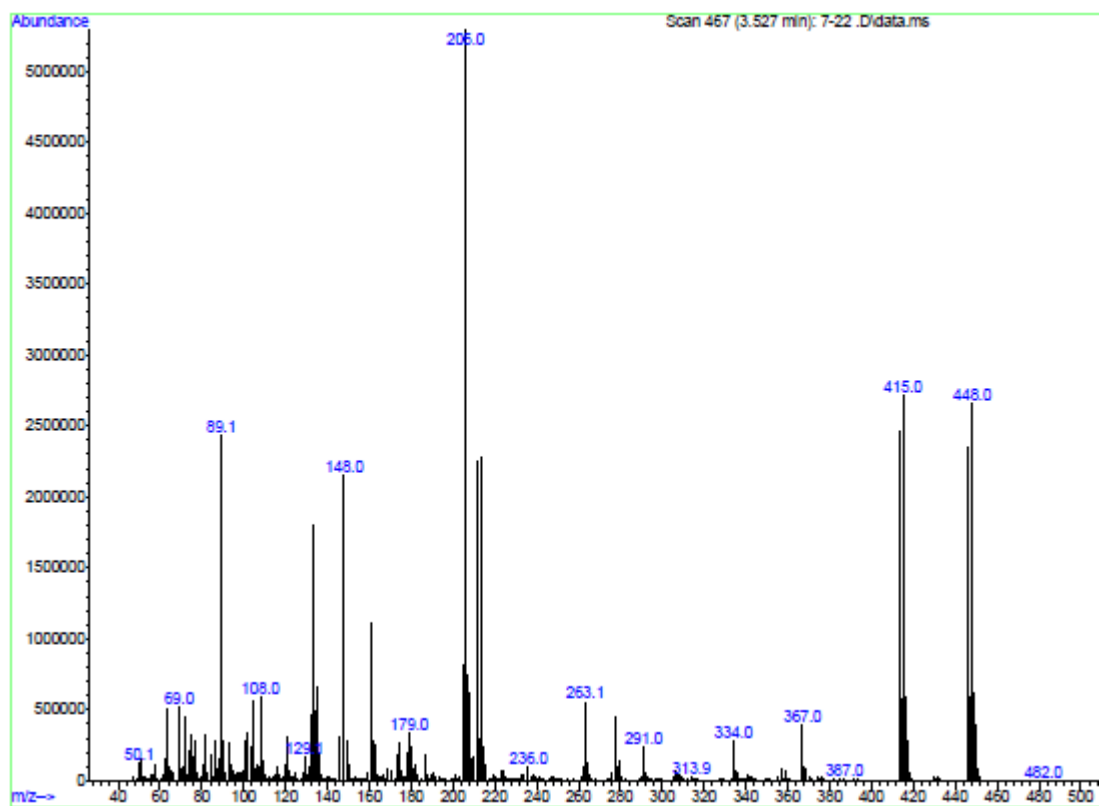
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NAME Shariati-Narges 13C  
EXPNO 15  
PROCNO 1  
Date\_ 20130508  
Time 13.21  
INSTRUM spect  
PROBHD 5 mm PABBO BB-  
PULPROG zgpg  
TD 65536  
SOLVENT DMSO  
NS 550  
DS 0  
SWH 24038.461 Hz  
FIDRES 0.366798 Hz  
AQ 1.3631988 sec  
RG 203  
DW 20.800 usec  
DE 6.50 usec  
TE 296.4 K  
D1 2.0000000 sec  
D11 0.0300000 sec  
TD0 1

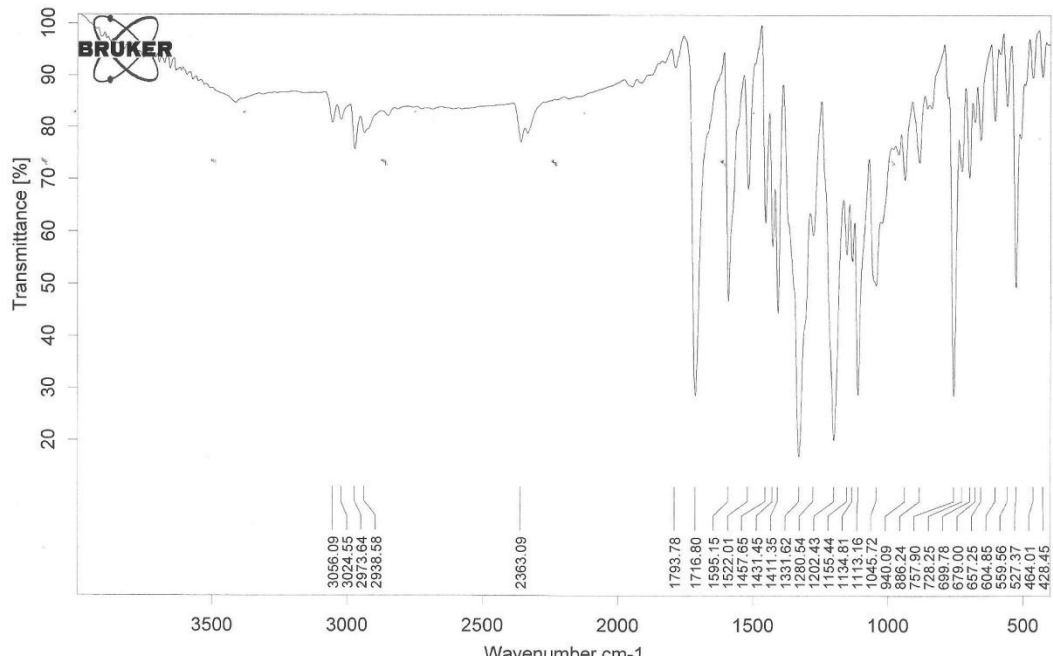
===== CHANNEL f1 =====  
NUC1 13C  
P1 7.60 usec  
PL1 -2.00 dB  
PL1W 56.92932510 W  
SFO1 100.6228298 MHz

===== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 86.00 usec  
PL2 0.00 dB  
PL12 16.00 dB  
PL13 16.00 dB  
PL2W 11.30349873 W  
PL12W 0.28393081 W  
PL13W 0.28393081 W  
SFO2 400.1316005 MHz  
SI 32768  
SF 100.6127690 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40

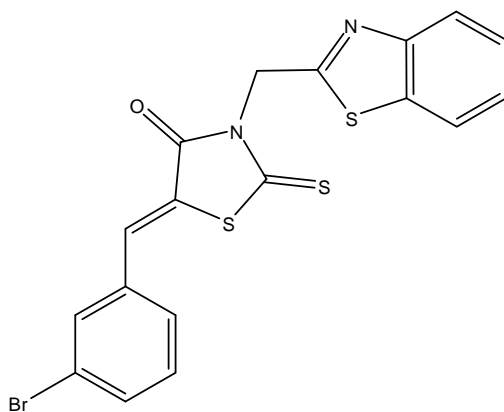
## Mass spectra of compound 5h



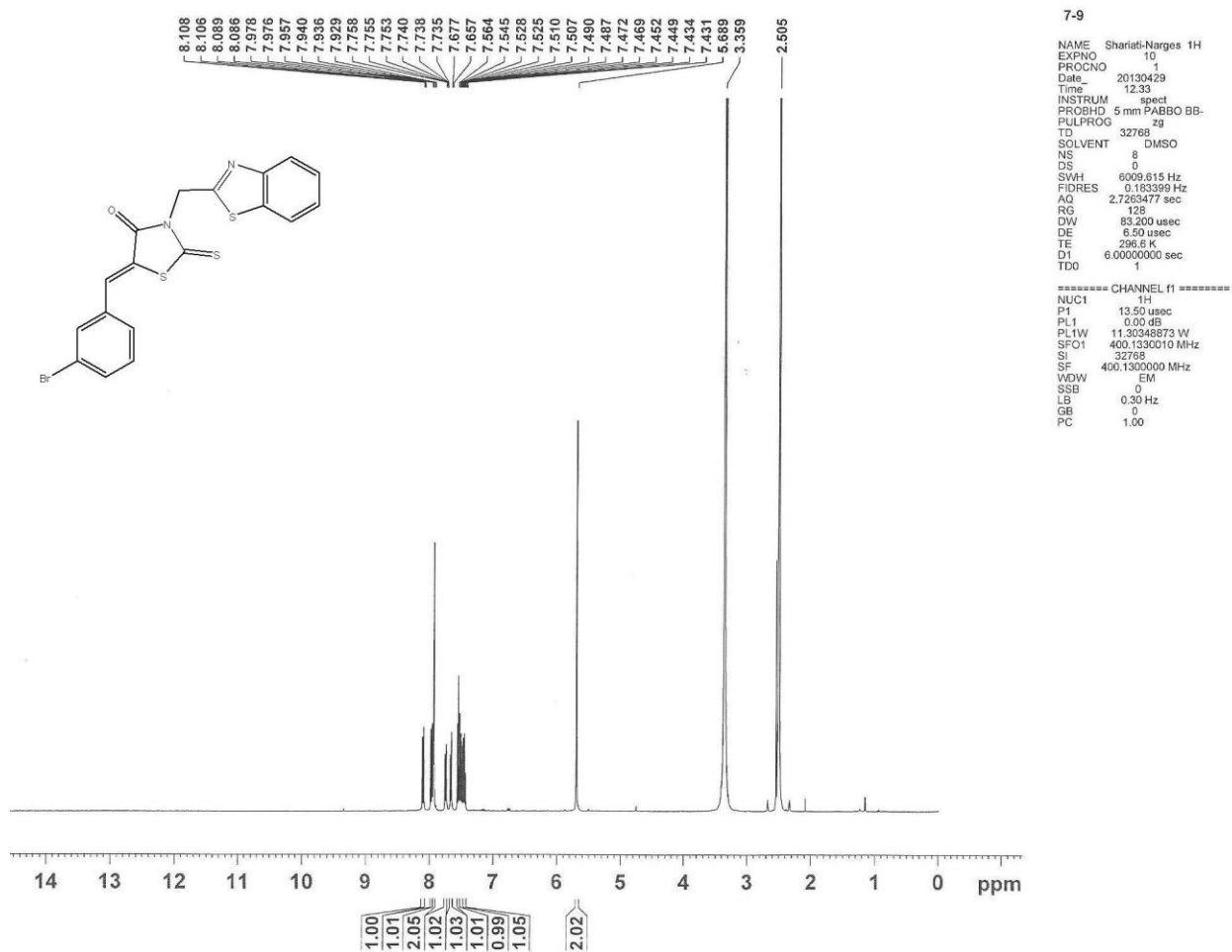
# FT-IR of compound 5h



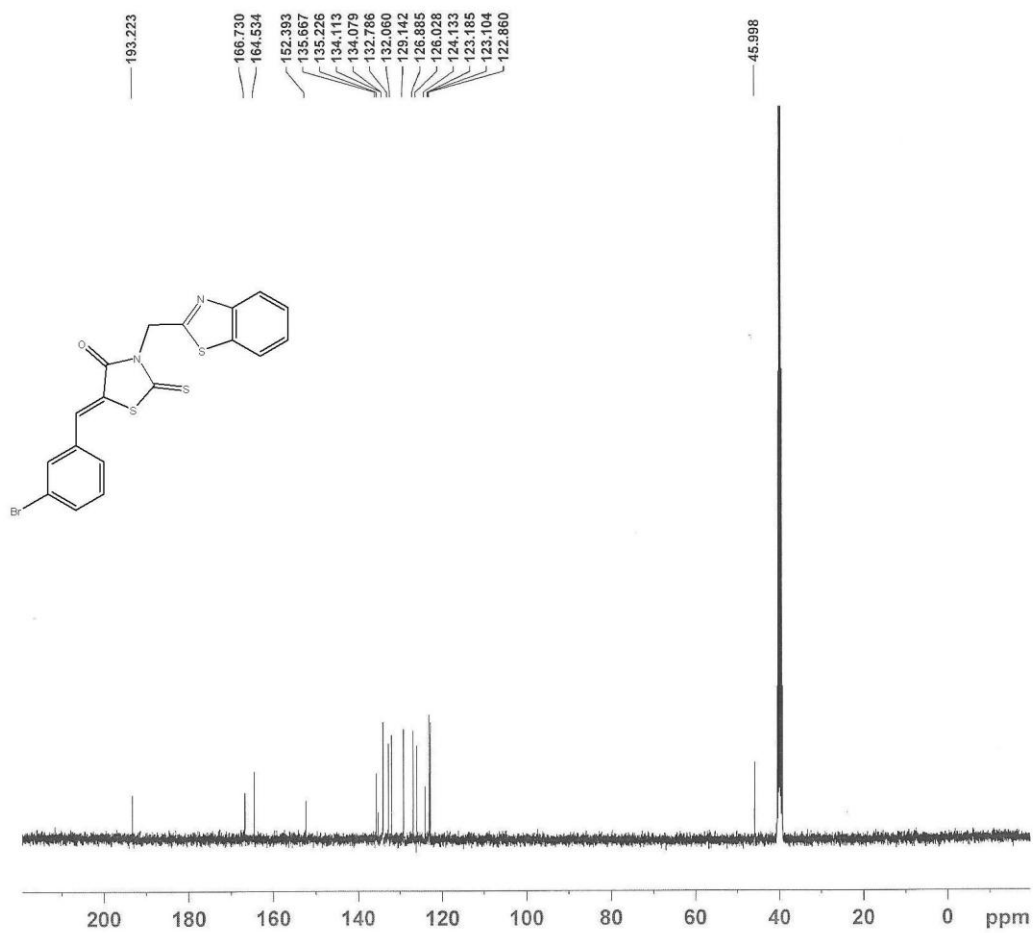
**3-(benzo[d]thiazol-2-ylmethyl)-5-(3-bromobenzylidene)-2-thioxothiazolidin-4-one (5i)**



**<sup>1</sup>H NMR of compound 5i**



# <sup>13</sup>C NMR of compound 5i

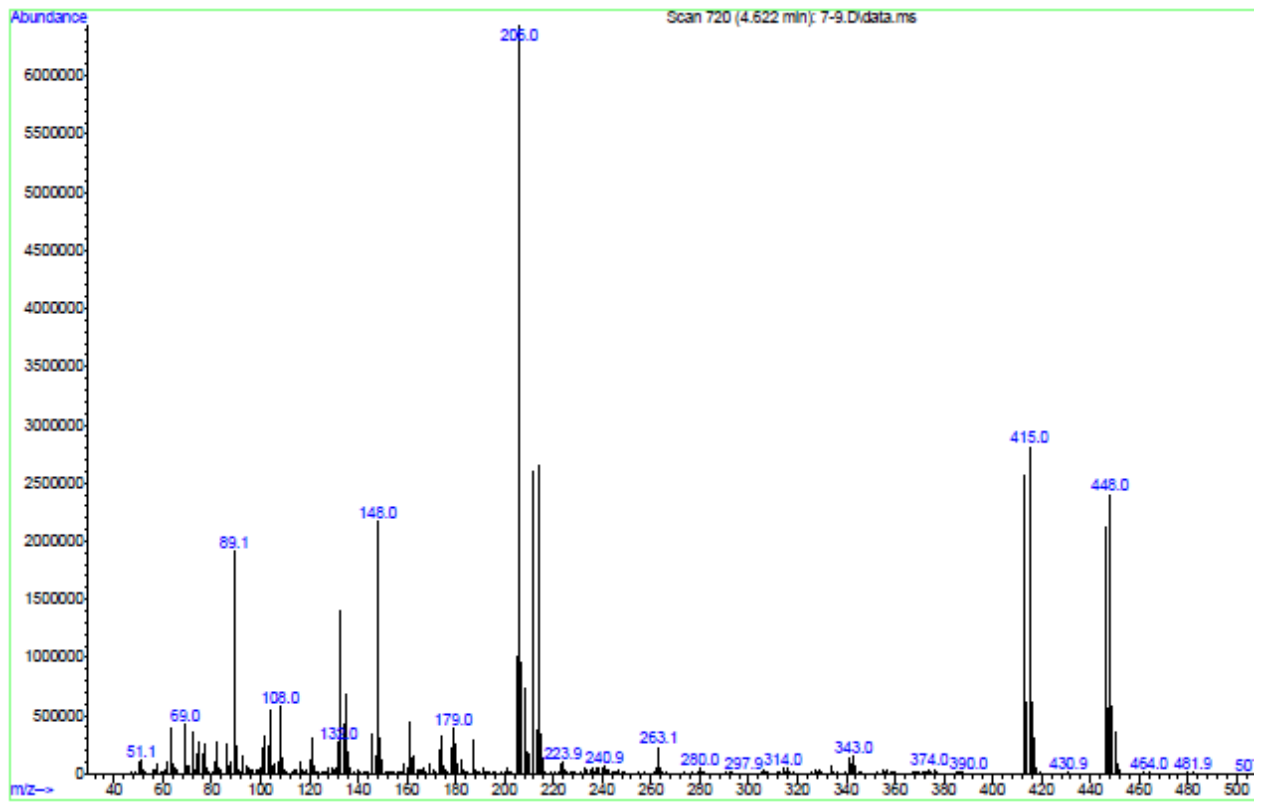


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PROBHD 5 mm PABBO BB-  
PULPROG zgpg  
TD 65536  
SOLVENT DMSO  
NS 628  
DS 0  
SWH 24038.461 Hz  
FIDRES 0.366788 Hz  
AQ 1.3631988 sec  
RG 203  
DW 20.300 usec  
DE 6.50 usec  
TE 297.5 K  
D1 2.0000000 sec  
D11 0.0300000 sec  
TDO 1

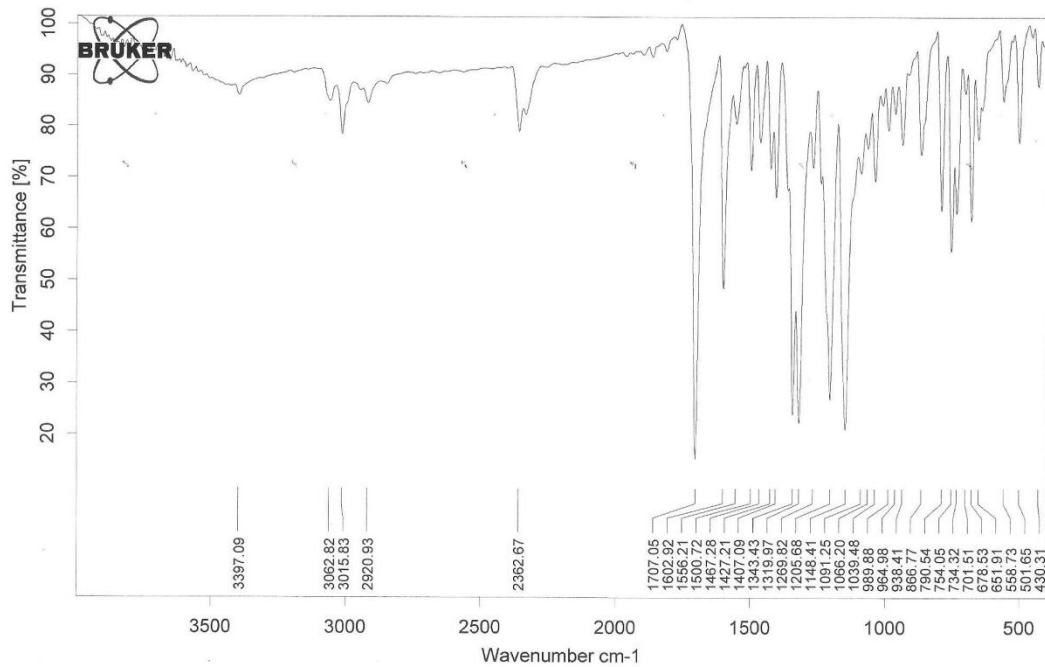
===== CHANNEL f1 =====  
NUC1 13C  
P1 7.60 usec  
PL1 -2.00 dB  
PL1W 56.02332610 W  
SFO1 100.6228298 MHz

===== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 85.00 usec  
PL2 0.00 dB  
PL12 16.00 dB  
PL13 16.00 dB  
PL2W 11.30348873 W  
PL12W 0.28393081 W  
PL13W 0.28393081 W  
SFO2 400.1316005 MHz  
SI 32768  
SF 100.6127690 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40

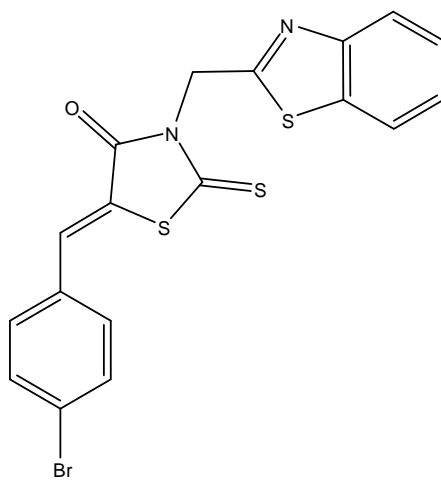
# Mass spectra of compound 5i



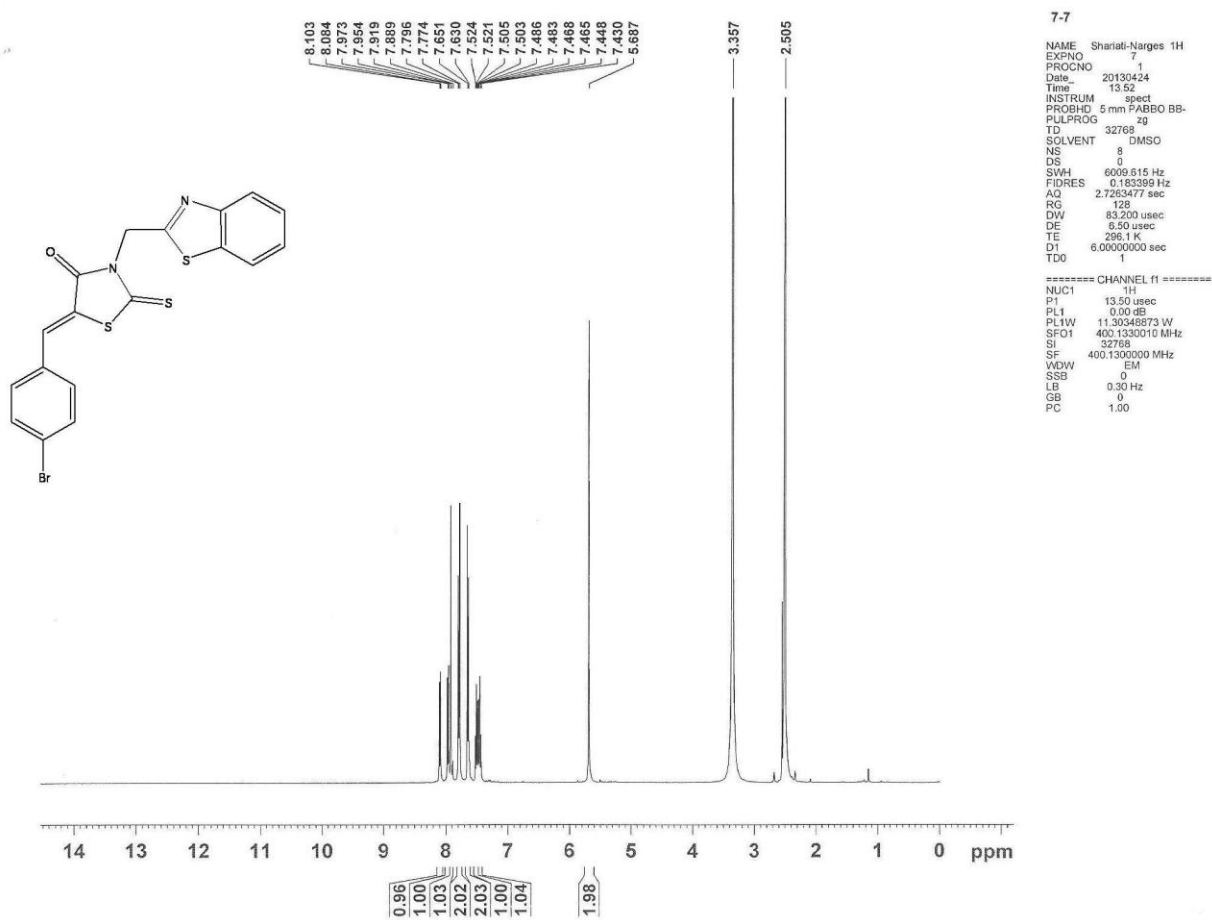
# FT-IR of compound 5i



**3-(benzo[d]thiazol-2-ylmethyl)-5-(4-bromobenzylidene)-2-thioxothiazolidin-4-one (5j)**

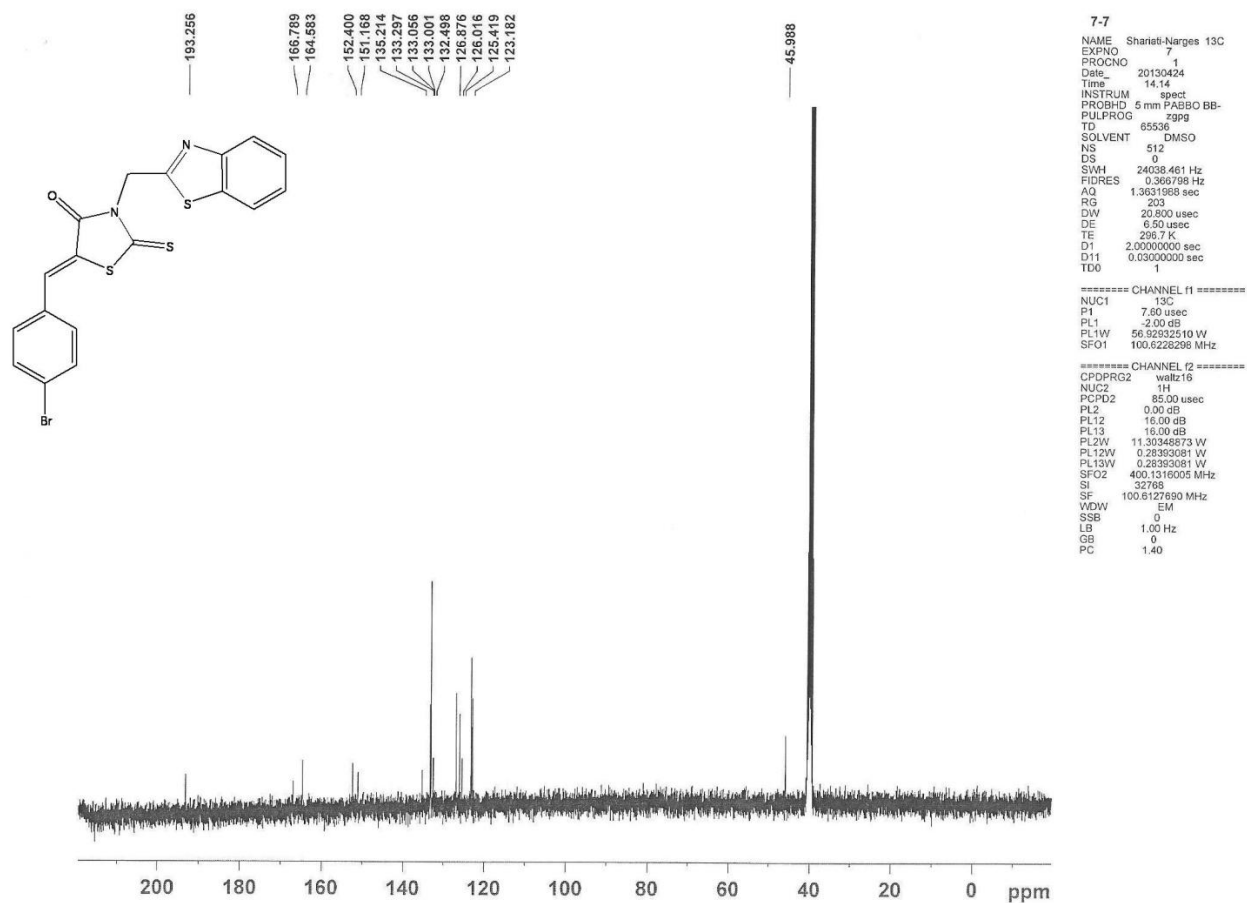


**<sup>1</sup>H NMR of compound 5j**

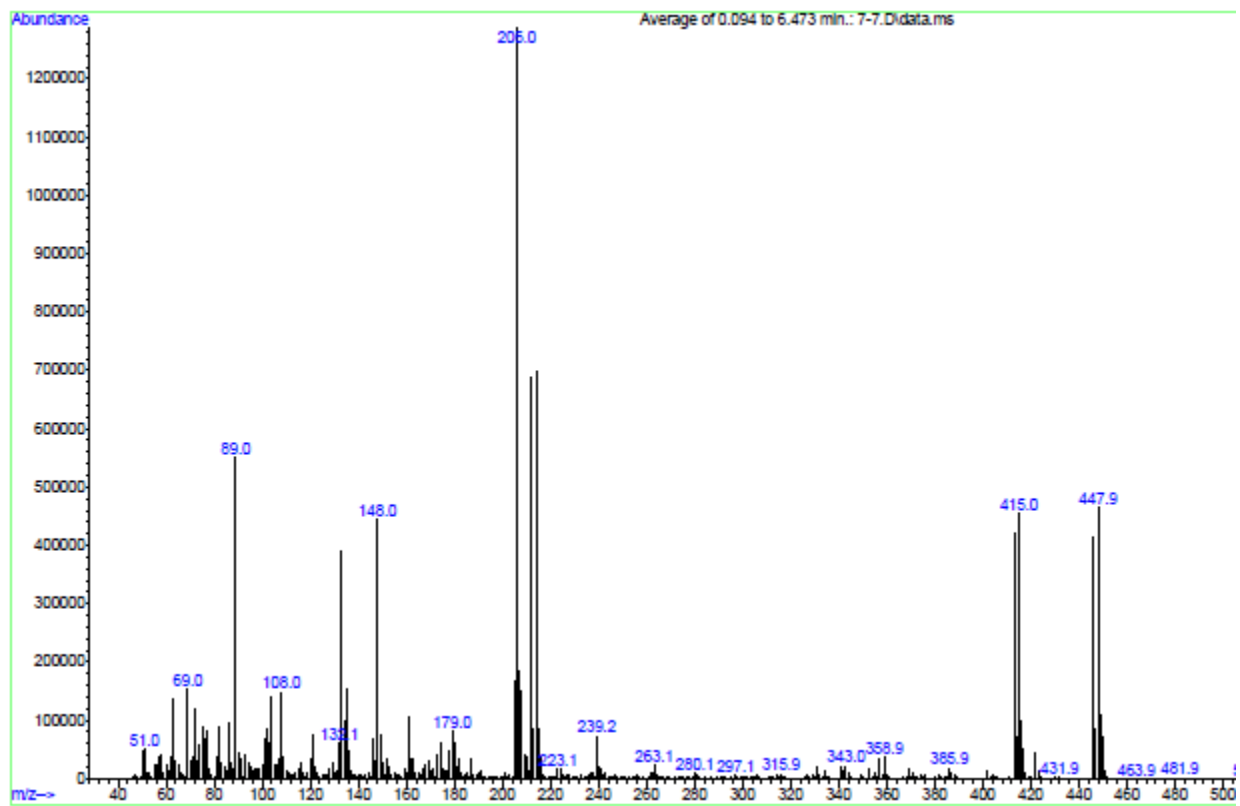




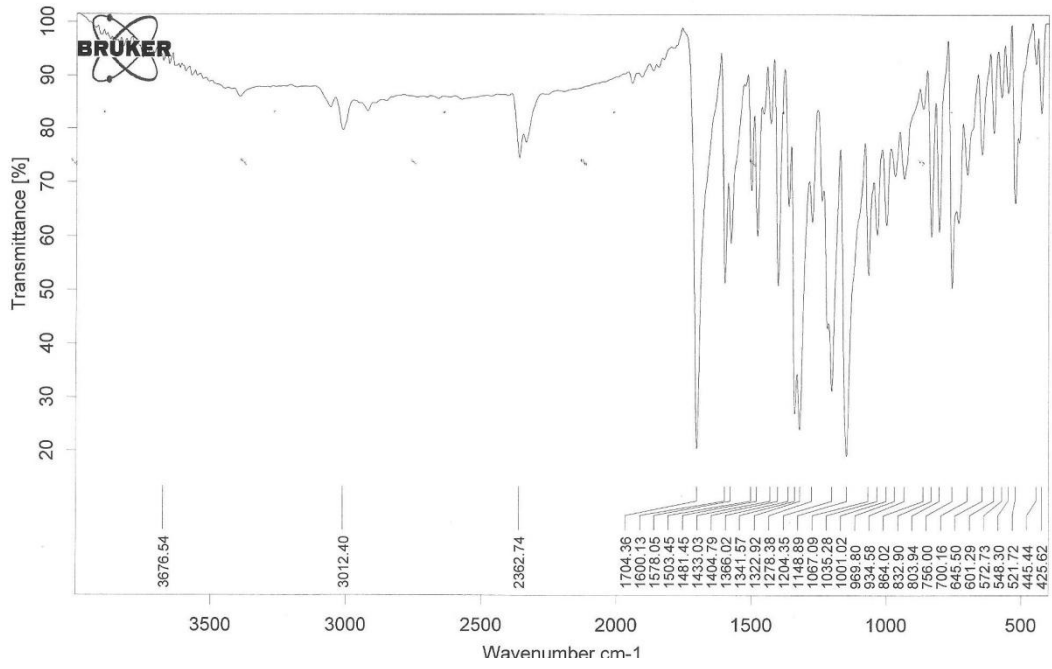
# <sup>13</sup>C NMR of compound 5j



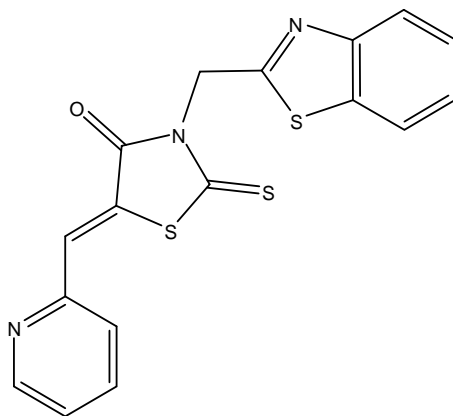
## Mass spectra of compound 5j



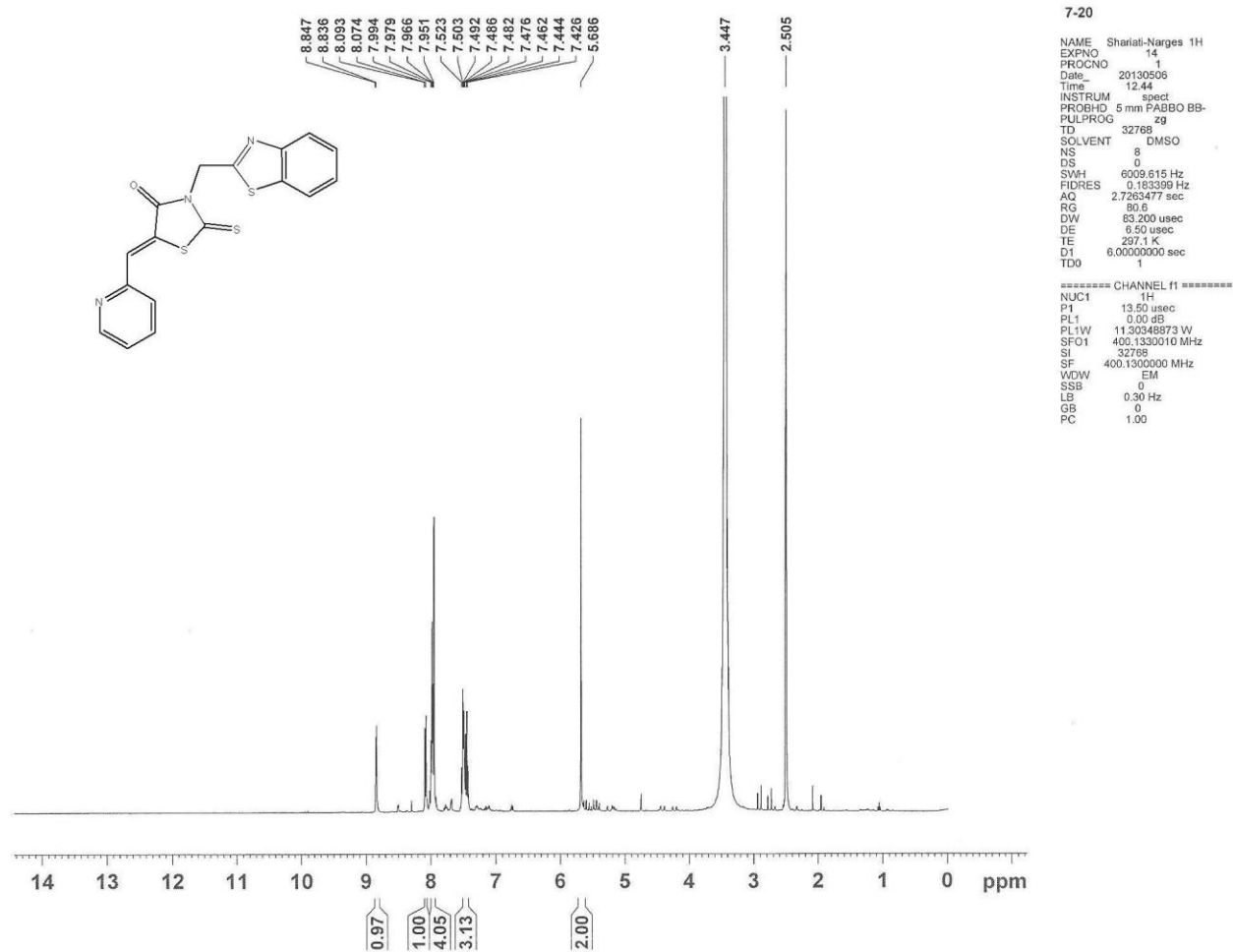
# FT-IR of compound 5j



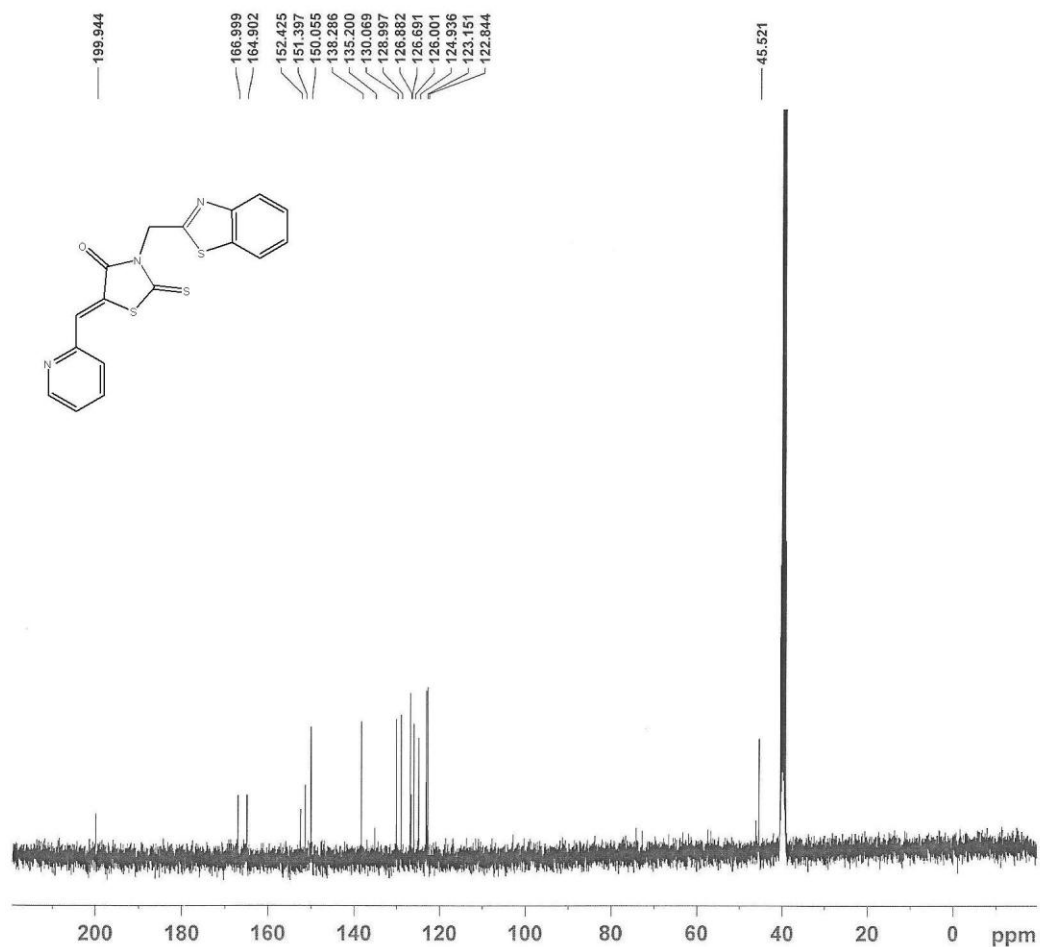
**3-(benzo[d]thiazol-2-ylmethyl)-5-(pyridin-2-ylmethylene)-2-thioxothiazolidin-4-one (5k)**



**<sup>1</sup>H NMR of compound 5k**



# <sup>13</sup>C NMR of compound 5k



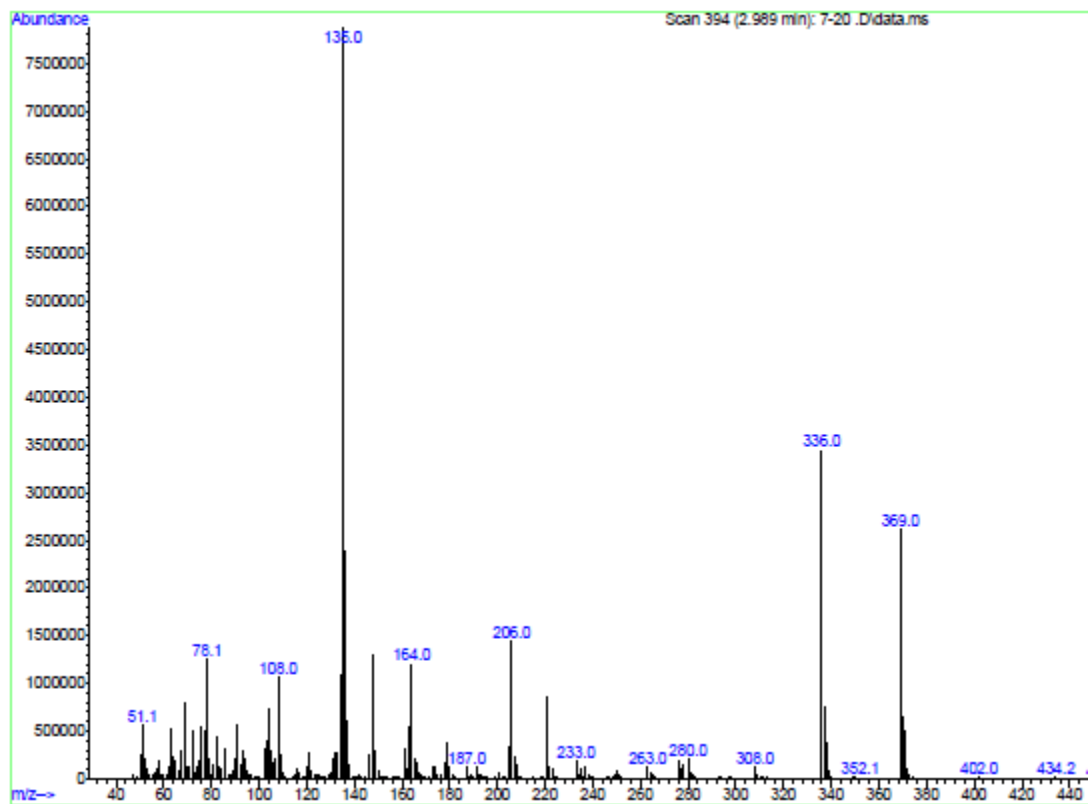
7-20

NAME Shariati-Narges 13C  
EXPNO 14  
PROCNO 1  
Date\_ 20130506  
Time 13.05  
INSTRUM spect  
PROBHD 5 mm PABBO BB-  
PULPROG zgpg  
TD 65536  
SOLVENT DMSO  
NS 464  
DS 0  
SWH 24038.461 Hz  
FIDRES 0.368798 Hz  
AQ 1.3631988 sec  
RG 203  
DW 20.800 usec  
DE 6.50 usec  
TE 297.4 K  
D1 2.0000000 sec  
D11 0.0300000 sec  
TDO 1

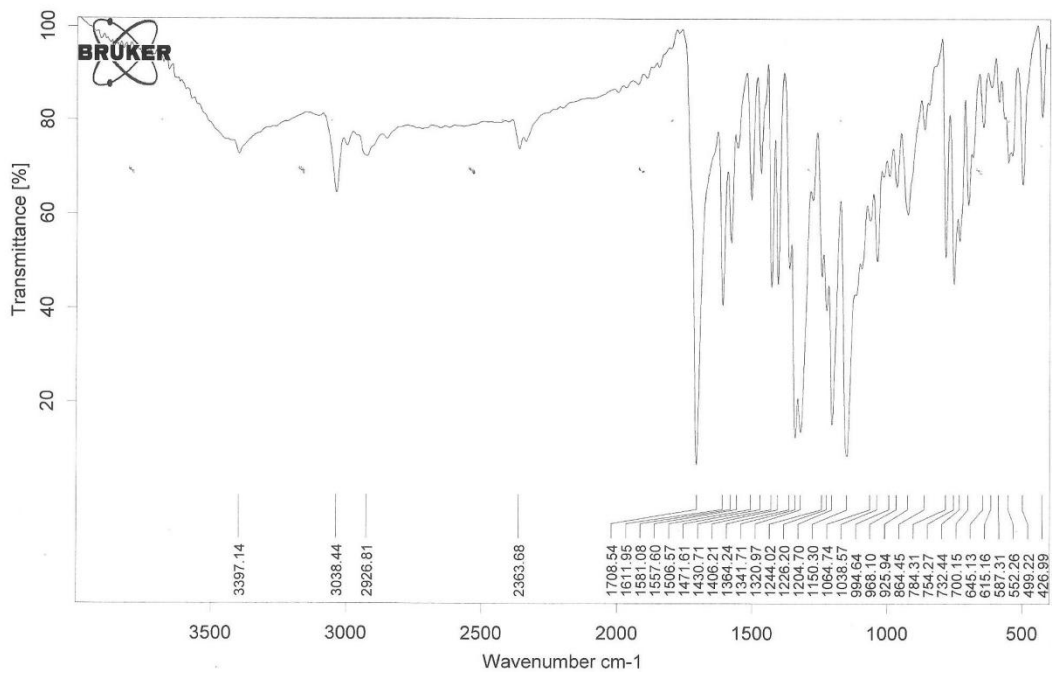
===== CHANNEL f1 =====  
NUC1 13C  
P1 7.00 usec  
PL1 -2.00 dB  
PL1W 56.92932510 W  
SFO1 100.6228298 MHz

===== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 85.00 usec  
PL2 0.00 dB  
PL12 16.00 dB  
PL13 16.00 dB  
PL2W 11.30348873 W  
PL12W 0.28393081 W  
PL13W 0.28393081 W  
SFO2 400.1316005 MHz  
SI 32768  
SF 100.6127690 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40

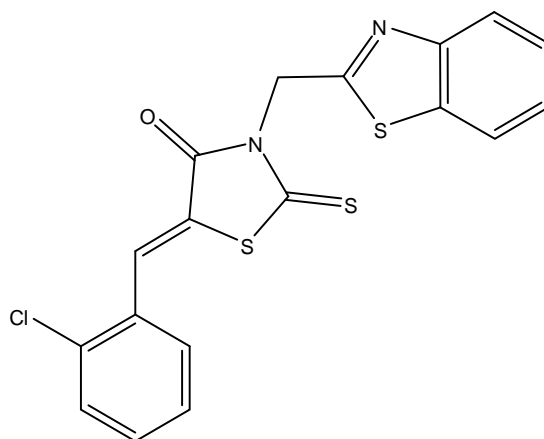
## Mass spectra of compound 5k



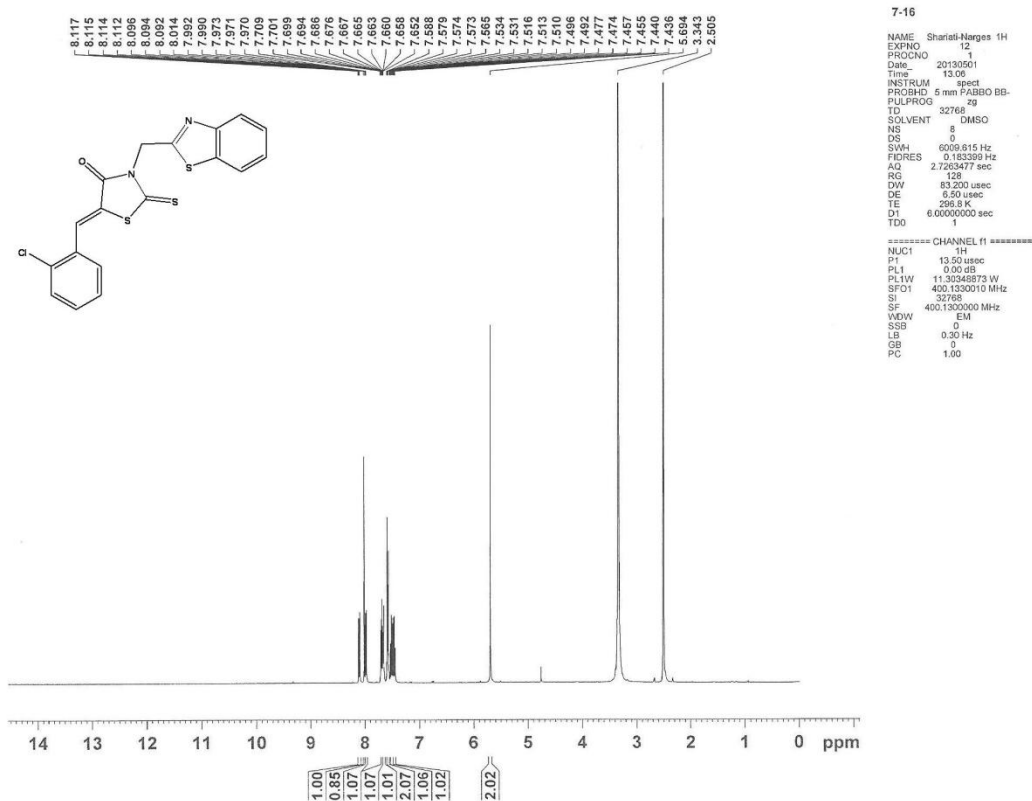
# FT-IR of compound 5k



**3-(benzo[d]thiazol-2-ylmethyl)-5-(2-chlorobenzylidene)-2-thioxothiazolidin-4-one (5l)**

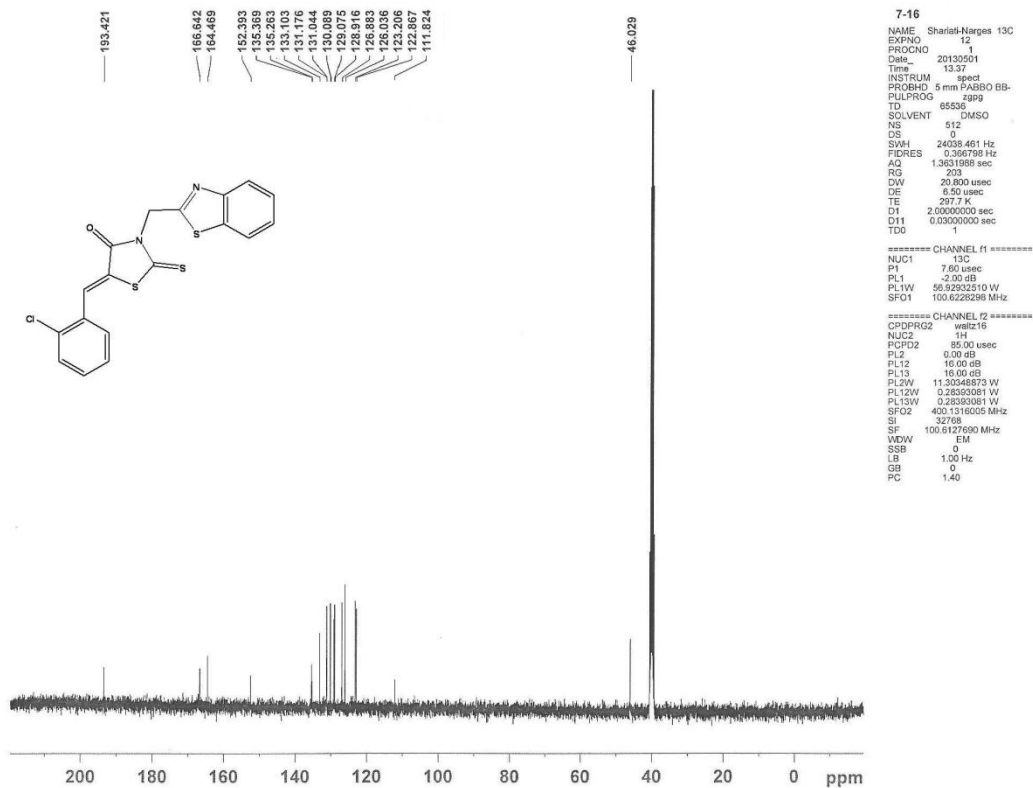


**<sup>1</sup>H NMR of compound 5l**

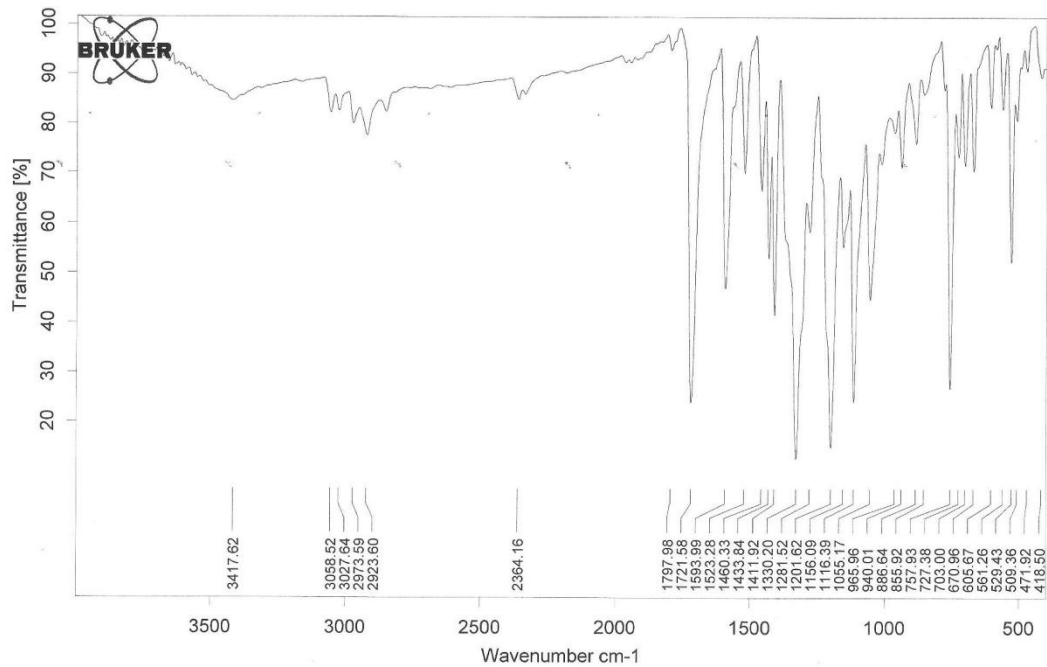




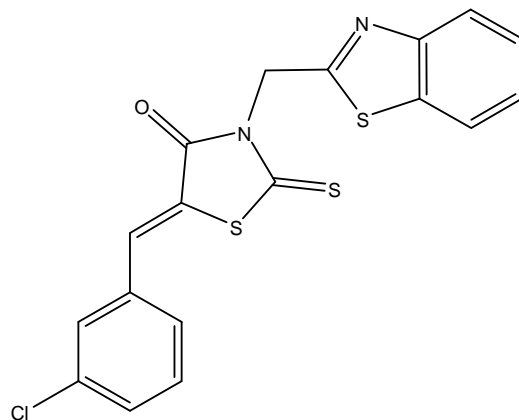
# <sup>13</sup>C NMR of compound 5l



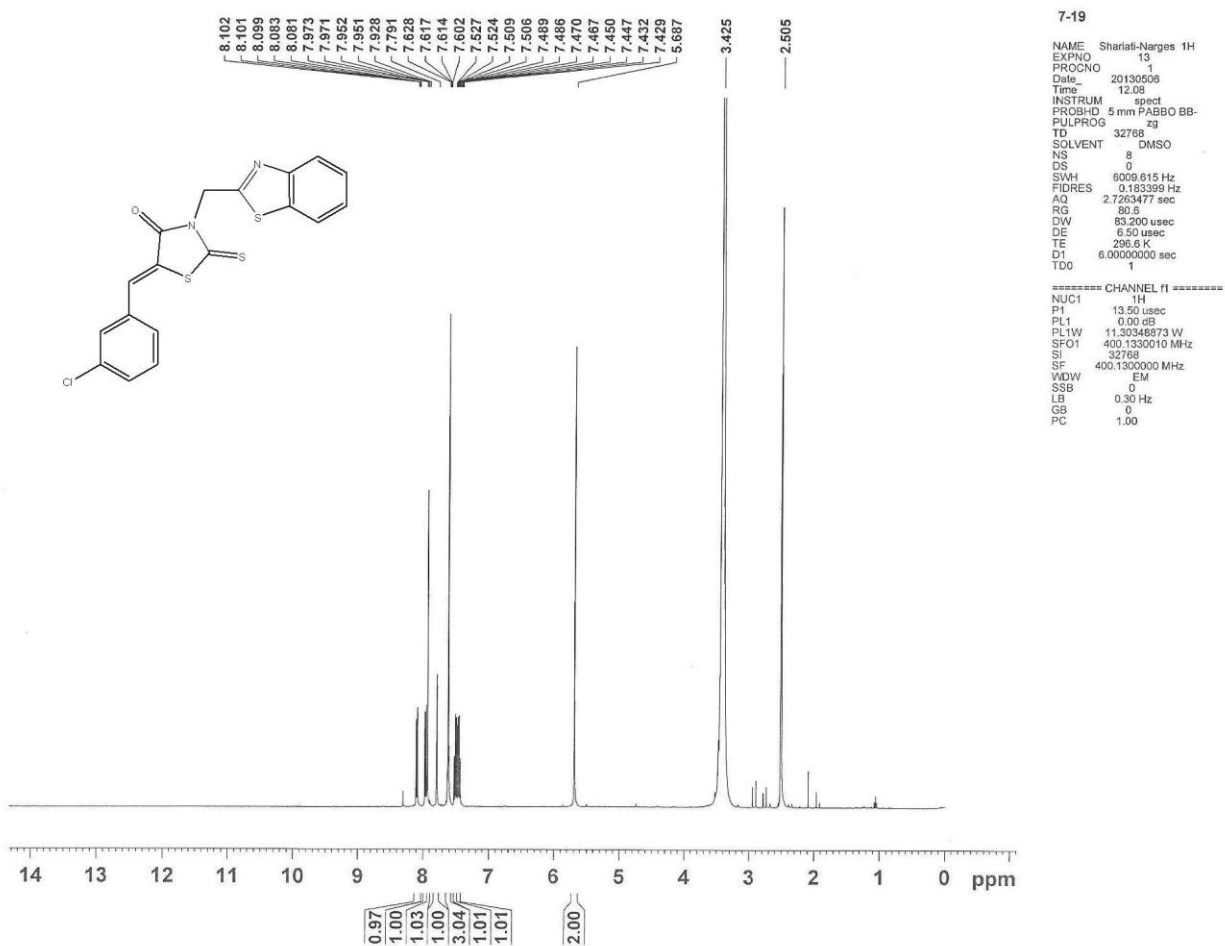
# FT-IR of compound 5l



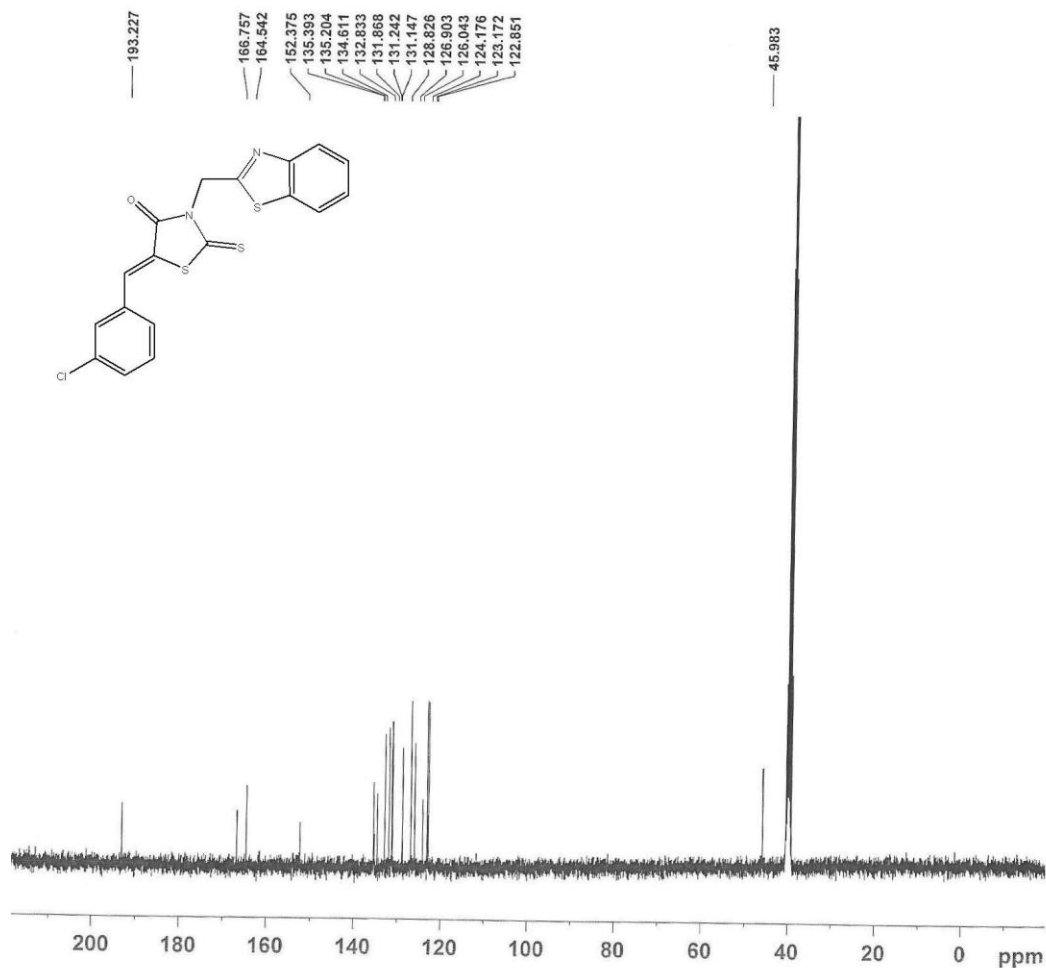
**3-(benzo[d]thiazol-2-ylmethyl)-5-(3-chlorobenzylidene)-2-thioxothiazolidin-4-one (5m)**



**<sup>1</sup>H NMR of compound 5m**



# <sup>13</sup>C NMR of compound 5m

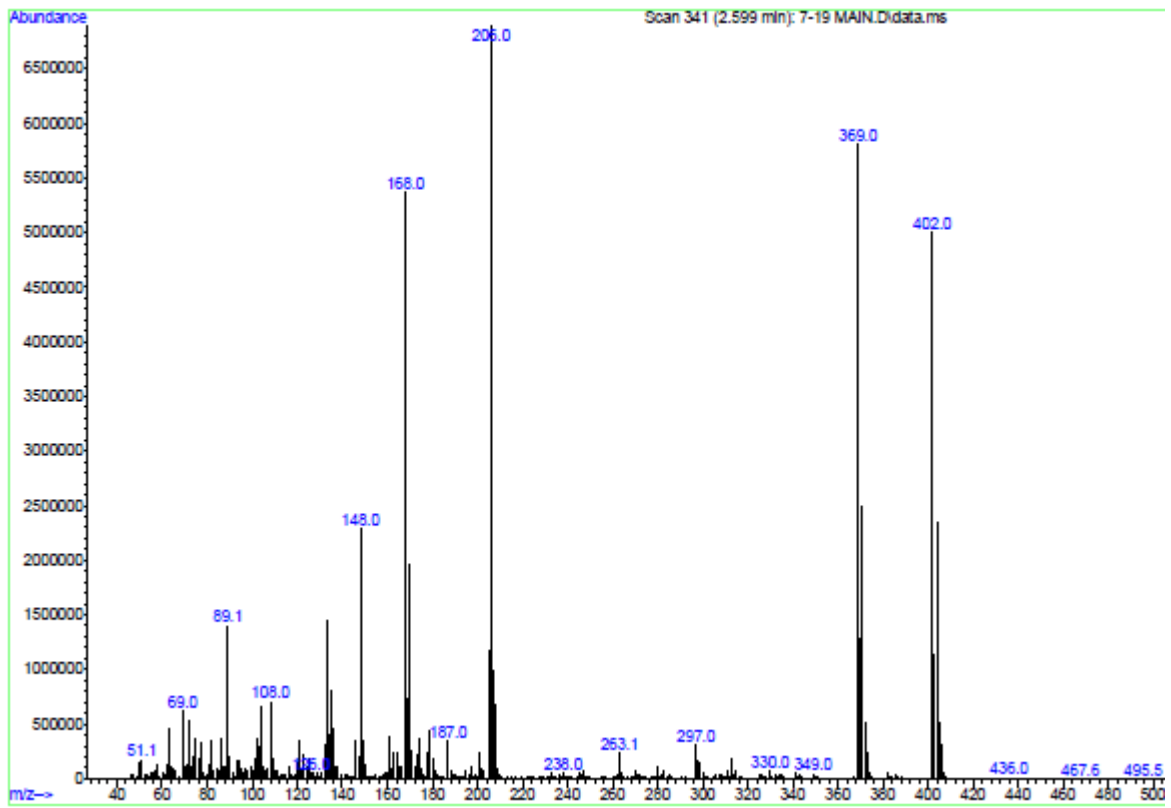


7-19  
NAME Shariati-Narges 13C  
EXPNO 13  
PROCNO 1  
Date\_ 20130506  
Time 12.16  
INSTRUM spect  
PROBHD 5 mm PABBO BB-  
PULPROG zgpg  
TD 65536  
SOLVENT DMSO  
NS 0  
DS 512  
SWH 24038.461 Hz  
FIDRES 0.366798 Hz  
AQ 1.3631988 sec  
RG 203  
DW 20.800 usec  
DE 6.50 usec  
TE 297.2 K  
D1 2.0000000 sec  
D11 0.0300000 sec  
TD0 1

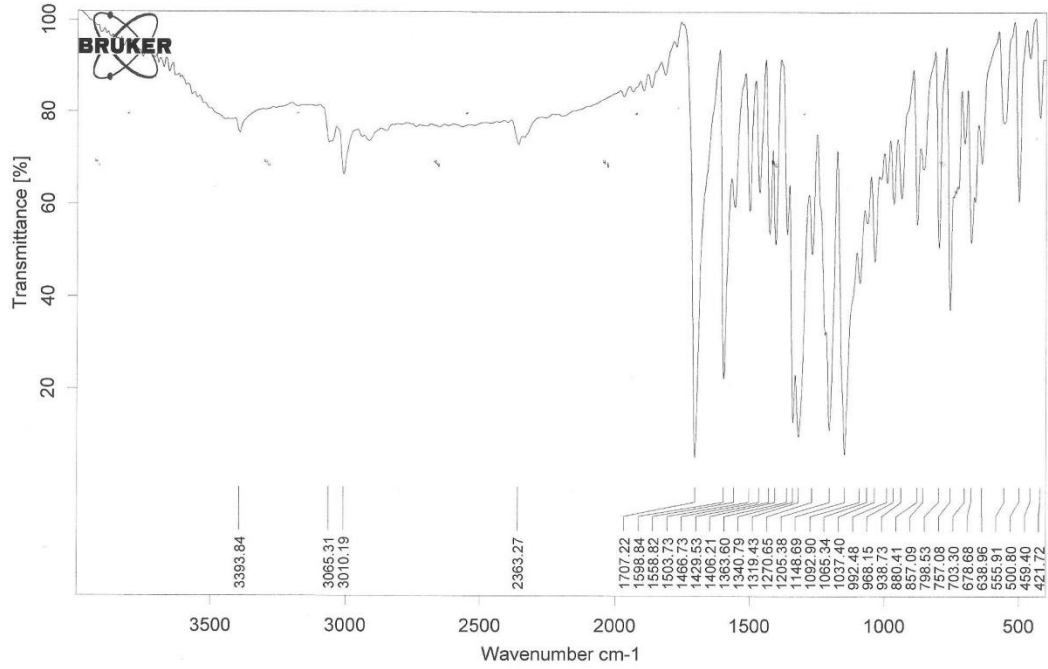
==== CHANNEL f1 =====  
NUC1 13C  
P1 7.60 usec  
PL1 -2.00 dB  
PL1W 56.92932510 W  
SFO1 100.6228298 MHz

==== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 86.00 usec  
PL2 0.00 dB  
PL12 16.00 dB  
PL13 16.00 dB  
PL2W 11.30348873 W  
PL12W 0.28393081 W  
PL13W 0.28393081 W  
SFO2 400.1315005 MHz  
SI 32768  
SF 100.6127690 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40

## Mass spectra of compound 5m

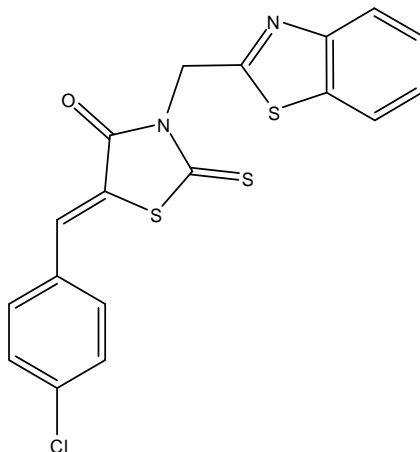


# FT-IR of compound 5m

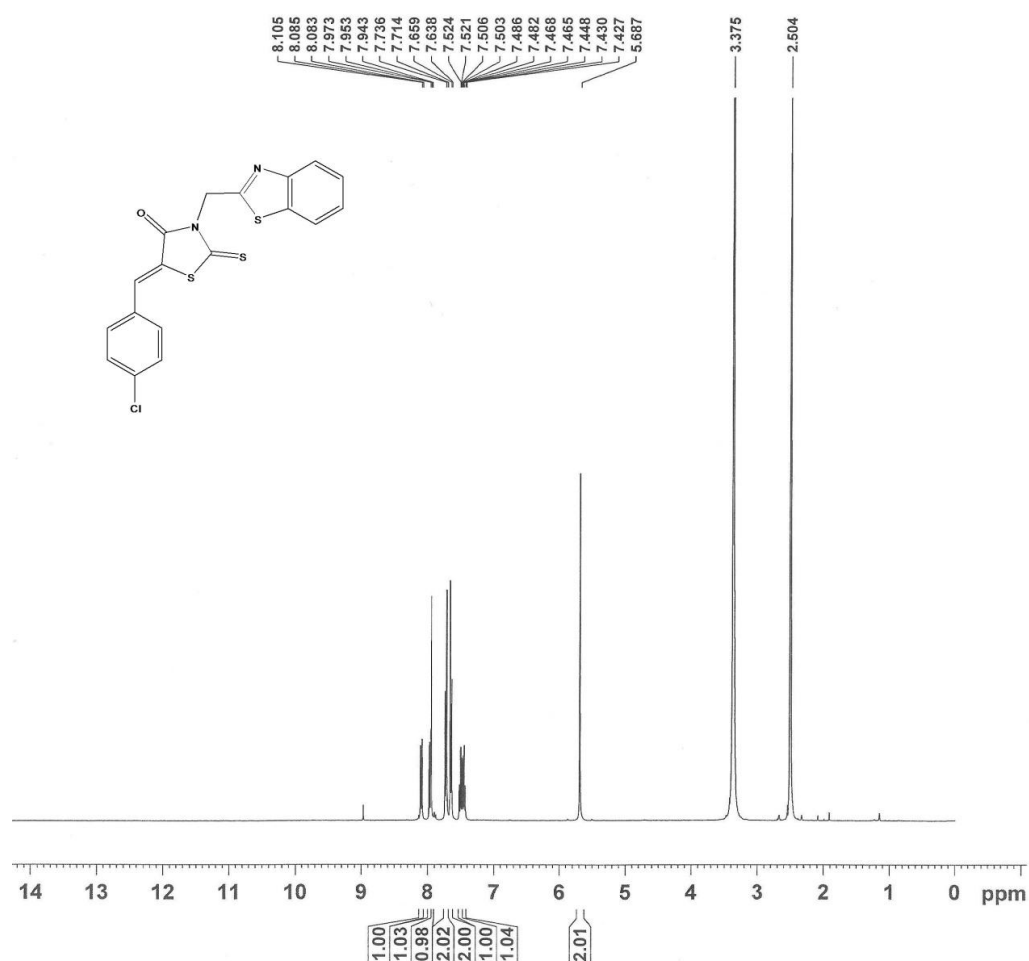


D:\ORGANIC III\KH SHARIATI\1.16	7-19	Instrument type and / or accessory	03/06/2013
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**3-(benzo[d]thiazol-2-ylmethyl)-5-(4-chlorobenzylidene)-2-thioxothiazolidin-4-one (5n)**



**<sup>1</sup>H NMR of compound 5n**



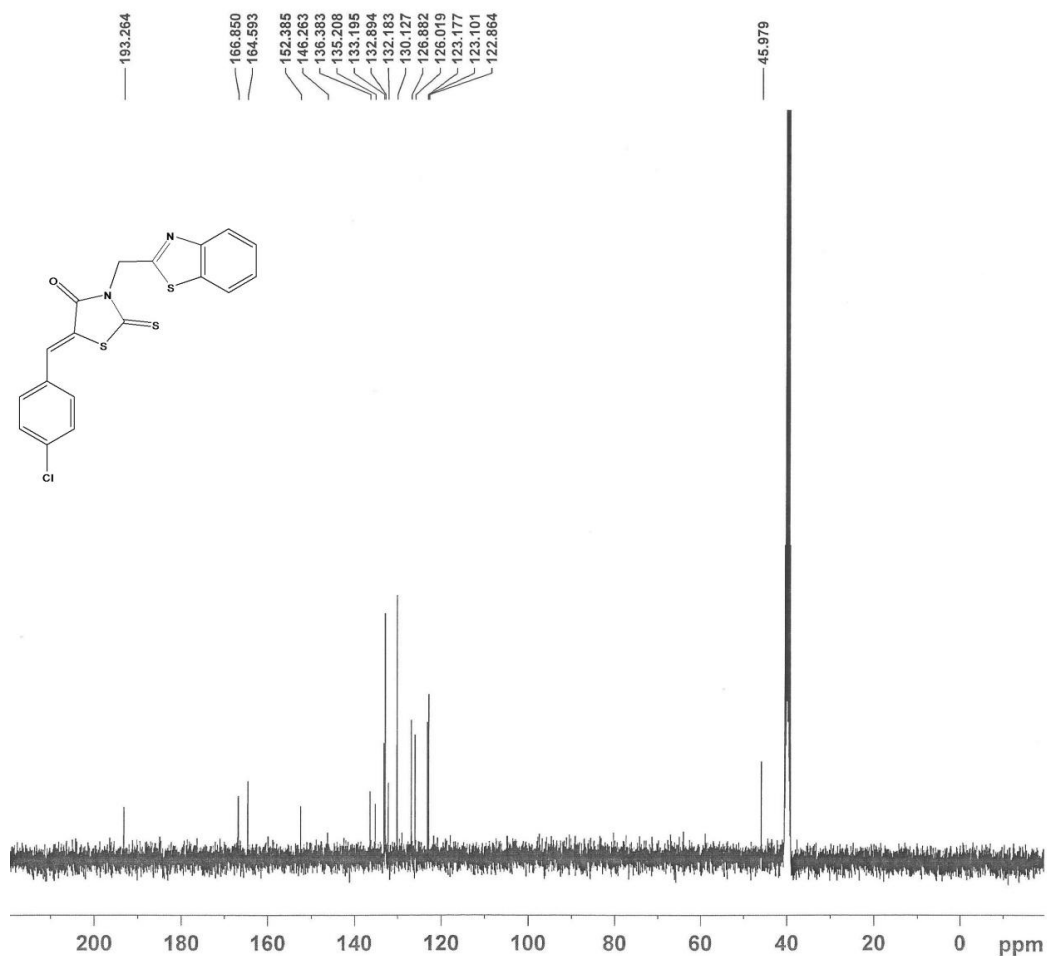
7-5-2

```

NAME Shariati-Narges 1H
EXPNO 21
PROCNO 1
Date_ 20130706
Time 8.21
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg
TD 32768
SOLVENT DMSO
NS 8
DS 0
SWH 6009.615 Hz
FIDRES 0.183369 Hz
AQ 2.7263477 sec
RG 114
DIV 83.200 usec
DE 6.50 usec
TE 293.7 K
D1 6.0000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 13.50 usec
PL1 0.00 dB
PL1W 11.30348873 W
SFO1 400.1330010 MHz
SI 32768
SF 400.1300000 MHz
WOW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
    
```

# <sup>13</sup>C NMR of compound 5n



```

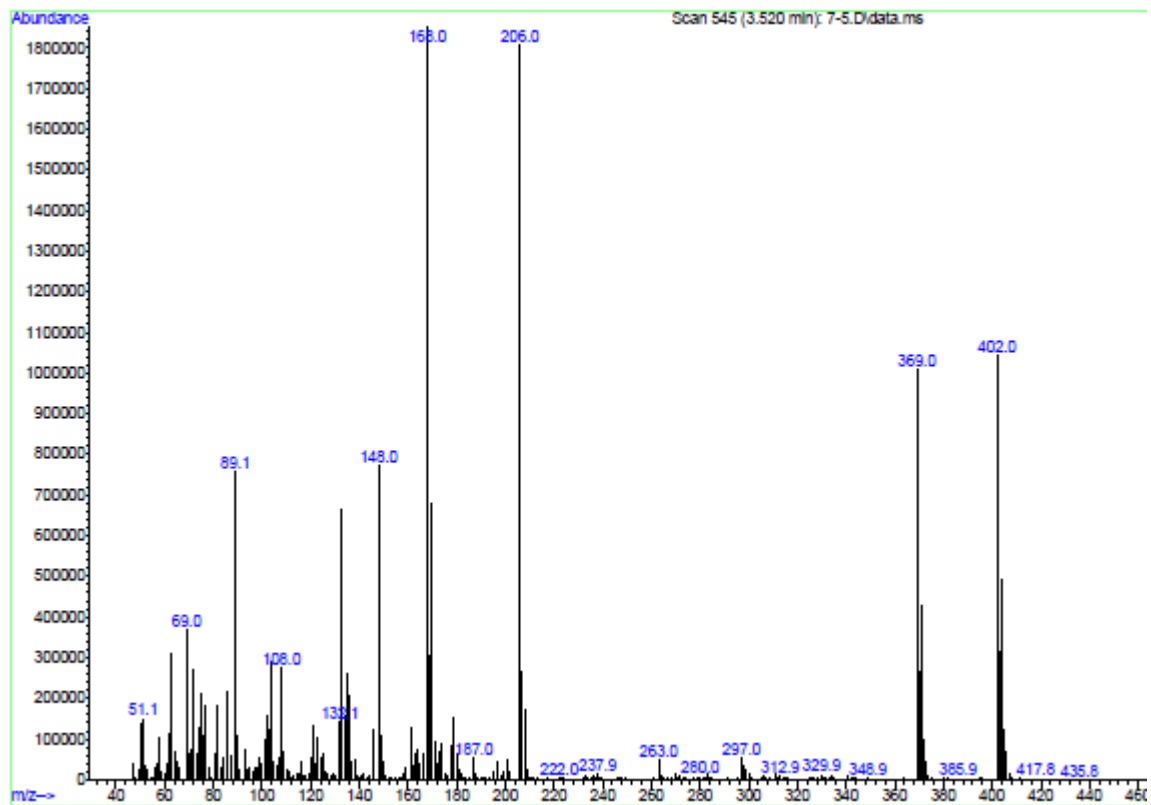
7-5-2
NAME Shariati-Narges 13C
EXPNO 22
PROCNO 1
Date_ 20130706
Time 8.36
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg
TD 65536
SOLVENT DMSO
NS 512
DS 0
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631968 sec
RG 203
DW 20.800 usec
DE 6.50 usec
TE 294.1 K
D1 2.0000000 sec
D11 0.0300000 sec
TDO 1

===== CHANNEL f1 =====
NUC1 13C
P1 7.60 usec
PL1 -2.00 dB
PL1W 56.9232510 W
SFO1 100.6228298 MHz

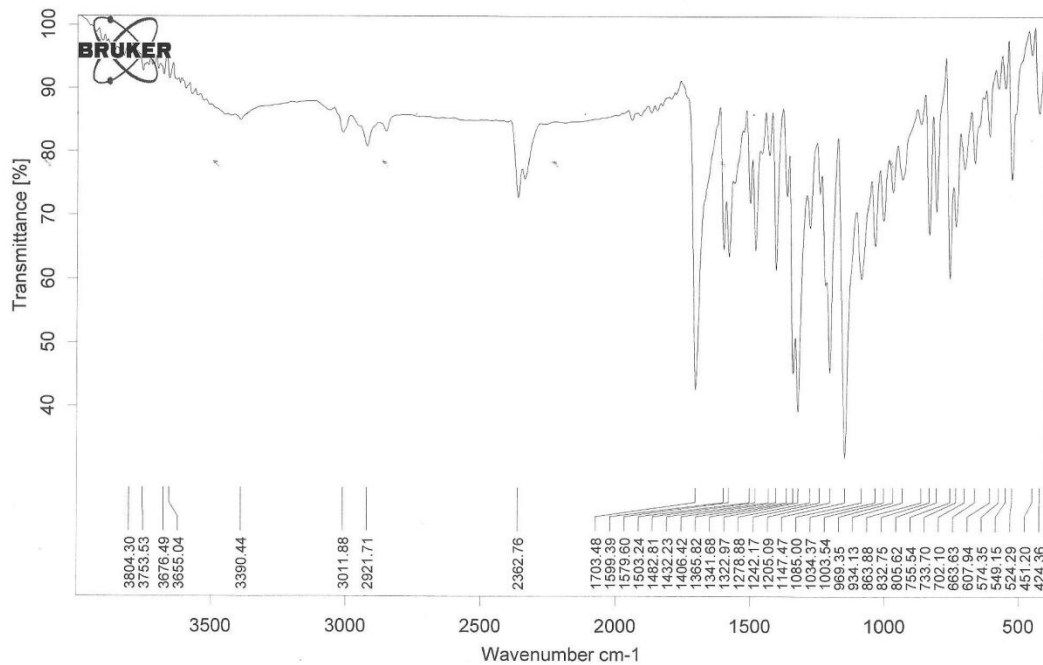
===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 85.00 usec
PL2 0.00 dB
PL12 16.00 dB
PL13 16.00 dB
PL2W 11.30348873 W
PL12W 0.28393081 W
PL13W 0.28393081 W
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
    
```



# Mass spectra of compound 5n

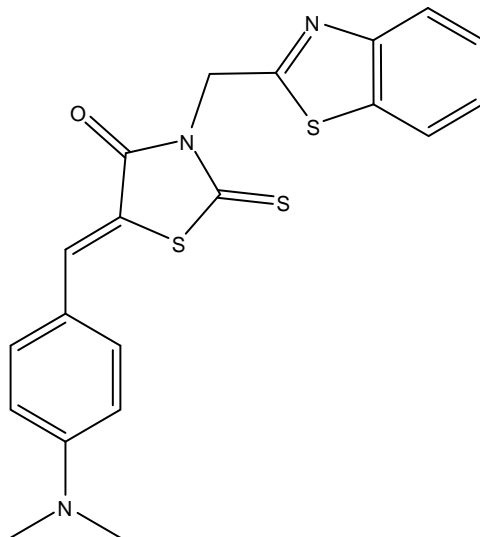


# FT-IR of compound 5n

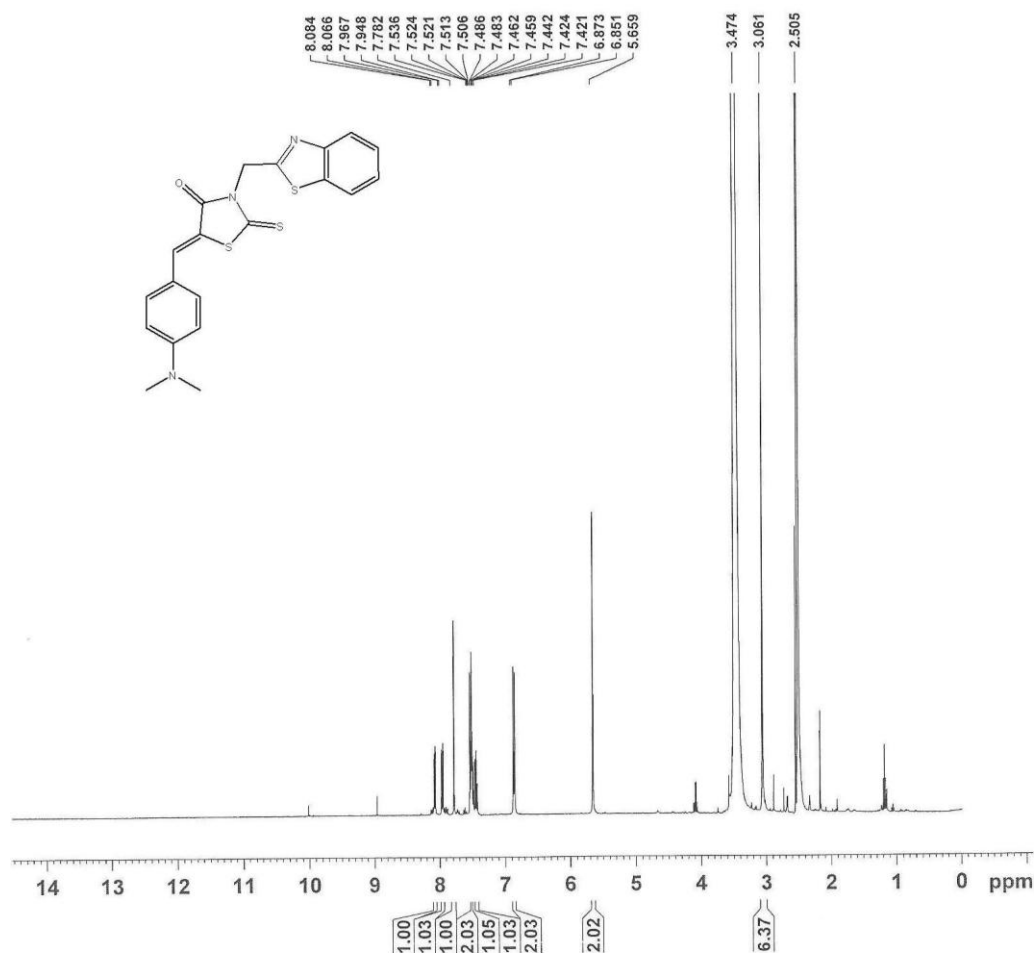


D:\ORGANIC IKH HEYDARI\1.2	7-5	Instrument type and / or accessory	02/06/2013
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**3-(benzo[d]thiazol-2-ylmethyl)-5-(4-(dimethylamino)benzylidene)-2-thioxothiazolidin-4-one (5o)**



**<sup>1</sup>H NMR of compound 5o**



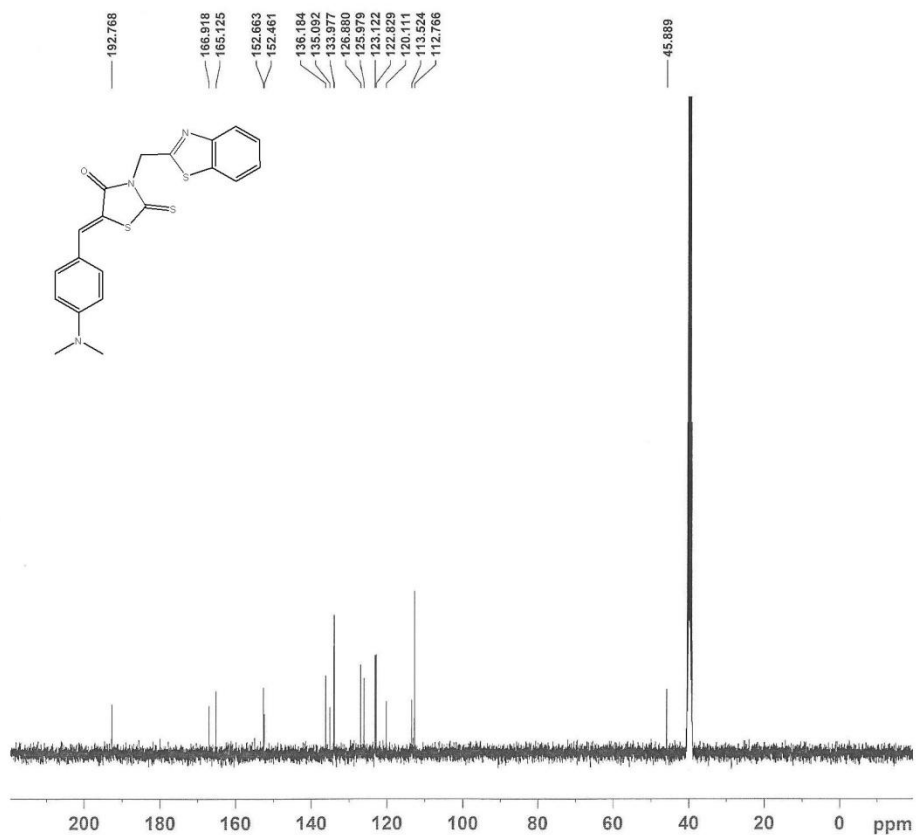
**7-50**

```

NAME  Sharlati-Narpes 1H
EXPNO  20
PROCNO  1
Date_  20130522
Time    12.56
INSTRUM spect
PROBHD  5 mm PABBO BB-
PULPROG zg
TD      32768
SOLVENT DMSO
NS      8
DS      0
SWH     6009.615 Hz
FIDRES  0.183389 Hz
AQ      2.7263477 sec
RG      57
DW      83.200 usec
DE      6.50 usec
TE      295.3 K
DT      6.0000000 sec
TDO     1

===== CHANNEL f1 =====
NUC1    1H
P1      13.50 usec
PL1     0.00 dB
PL1W    11.33348873 W
SFO1    400.1330010 MHz
SI      32768
SF      400.1330000 MHz
WDW     EM
SSB     0
LB      0.30 Hz
GB      0
PC      1.00
    
```

# <sup>13</sup>C NMR of compound 5o



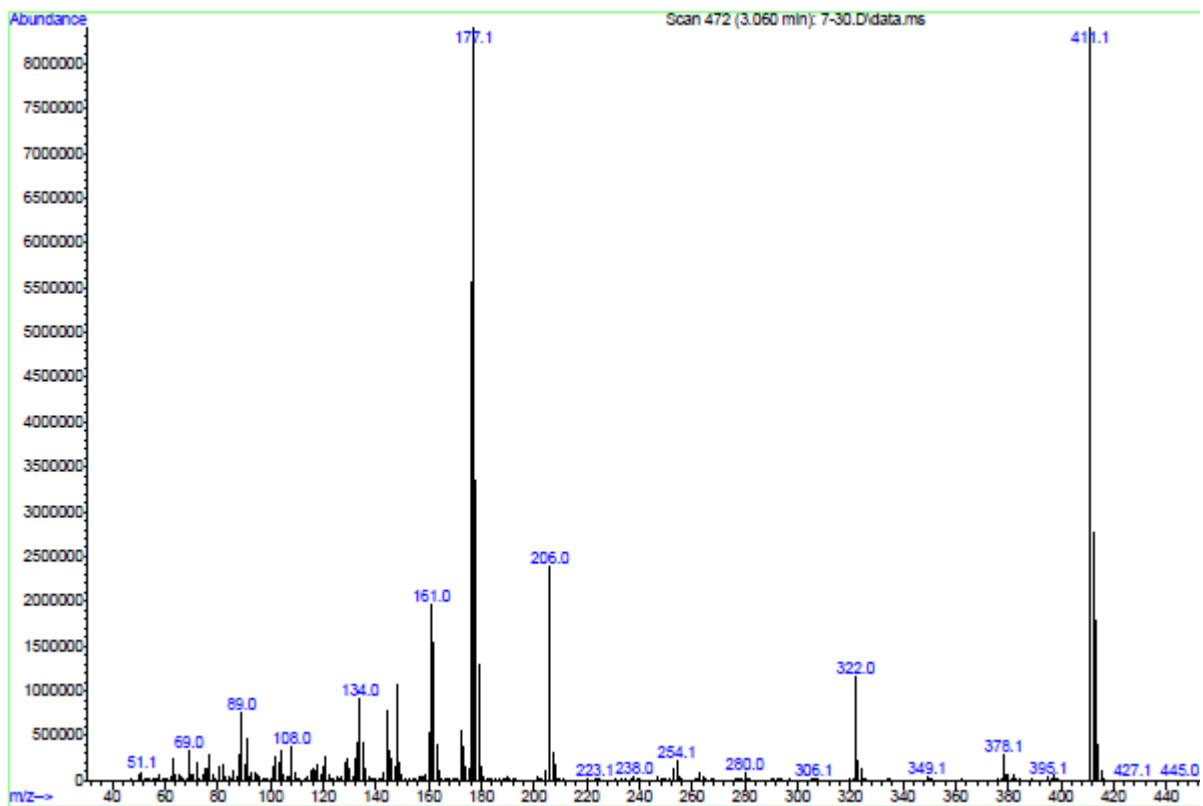
```

7-30
NAME Shafiq-Narges 13C
EXPNO 20
PROCNO 1
Date_ 20130522
Time 13.28
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg
TD 65536
SOLVENT DMSO
NS 1024
DS 0
SVH 24038.461 Hz
FIDRES 0.396798 Hz
AQ 1.3031989 sec
RG 203
DW 20.500 usec
DE 8.50 usec
TE 295.6 K
D1 2.0000000 sec
D11 0.0300000 sec
TD0 1

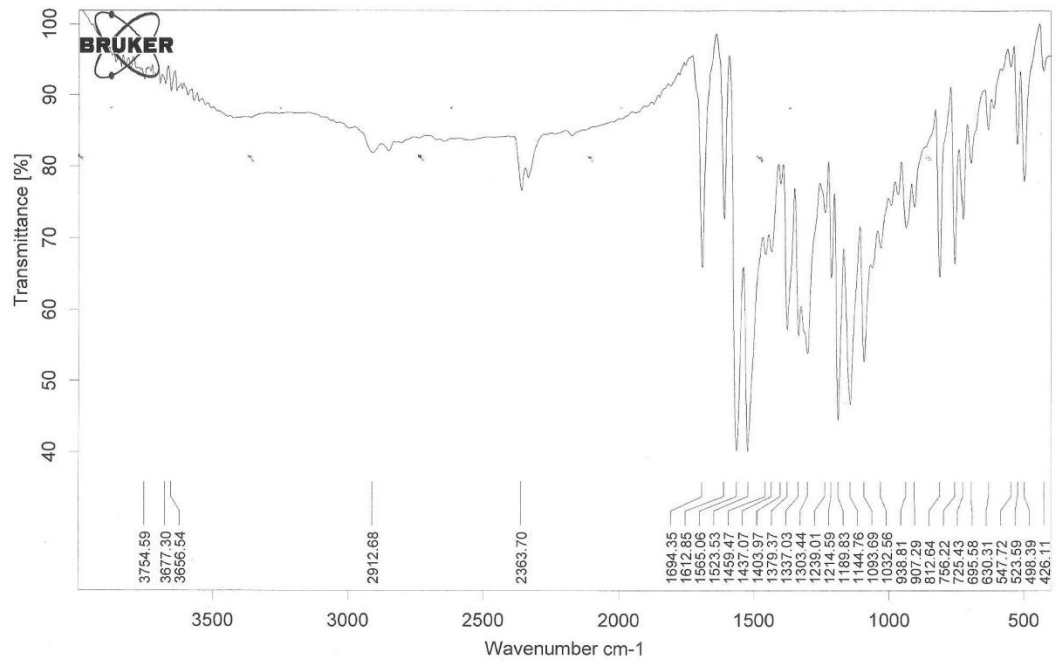
===== CHANNEL f1 =====
NUC1 13C
P1 7.60 usec
PL1 -2.00 dB
PL1W 56.92932510 W
SFO1 100.6228298 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 85.00 usec
PL2 0.00 dB
PL12 16.00 dB
PL13 16.00 dB
PL2W 11.30348873 W
PL12W 0.28393081 W
PL13W 0.28393081 W
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
    
```

## Mass spectra of compound 5o

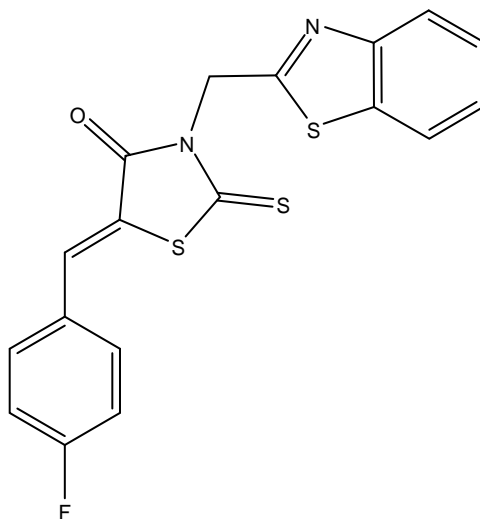


# FT-IR of compound 5o

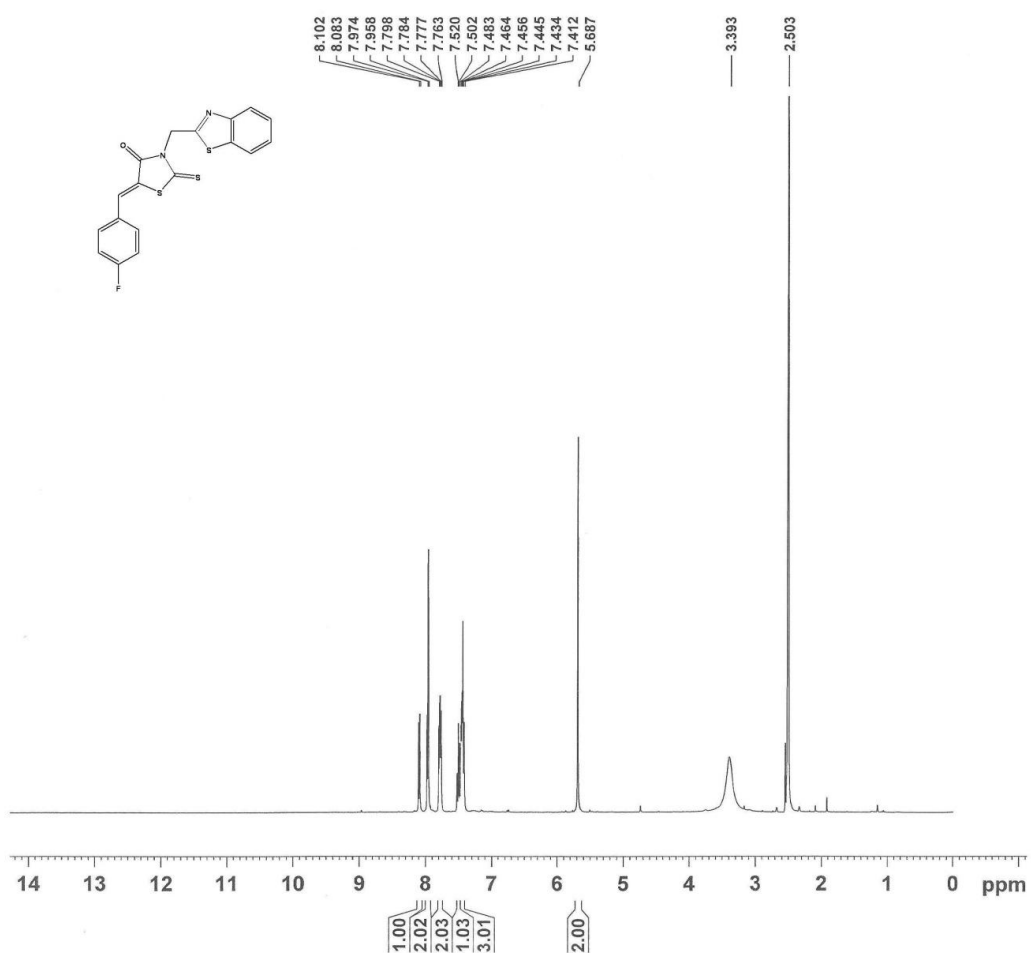


D:\ORGANIC II\INKH SHARIATI\1.20	7-30	Instrument type and / or accessory	03/06/2013
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**3-(benzo[d]thiazol-2-ylmethyl)-5-(4-fluorobenzylidene)-2-thioxothiazolidin-4-one (5p)**



**<sup>1</sup>H NMR of compound 5p**



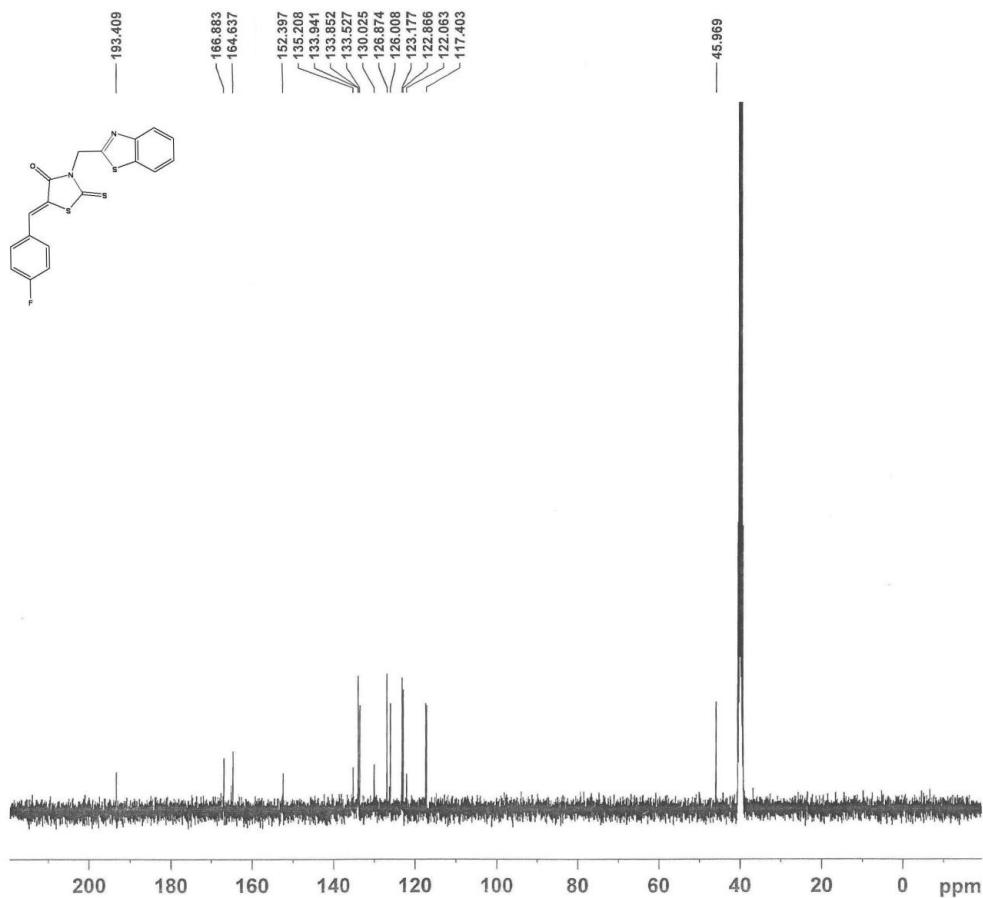
8-22

```

NAME Shariati-Narges 1H
EXPNO 24
PROCNO 1
Date_ 20130803
Time 9.16
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg
TD 32768
SOLVENT DMSO
NS 8
DS 0
SWH 6009.615 Hz
FIDRES 0.183399 Hz
AQ 2.7263477 sec
RG 90.5
DW 83.200 usec
DE 6.50 usec
TE 293.1 K
D1 6.0000000 sec
TDO 1

===== CHANNEL f1 =====
NUC1 1H
P1 13.50 usec
PL1 0.00 dB
PL1W 11.30348873 W
SFO1 400.1300010 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
    
```

# <sup>13</sup>C NMR of compound 5p



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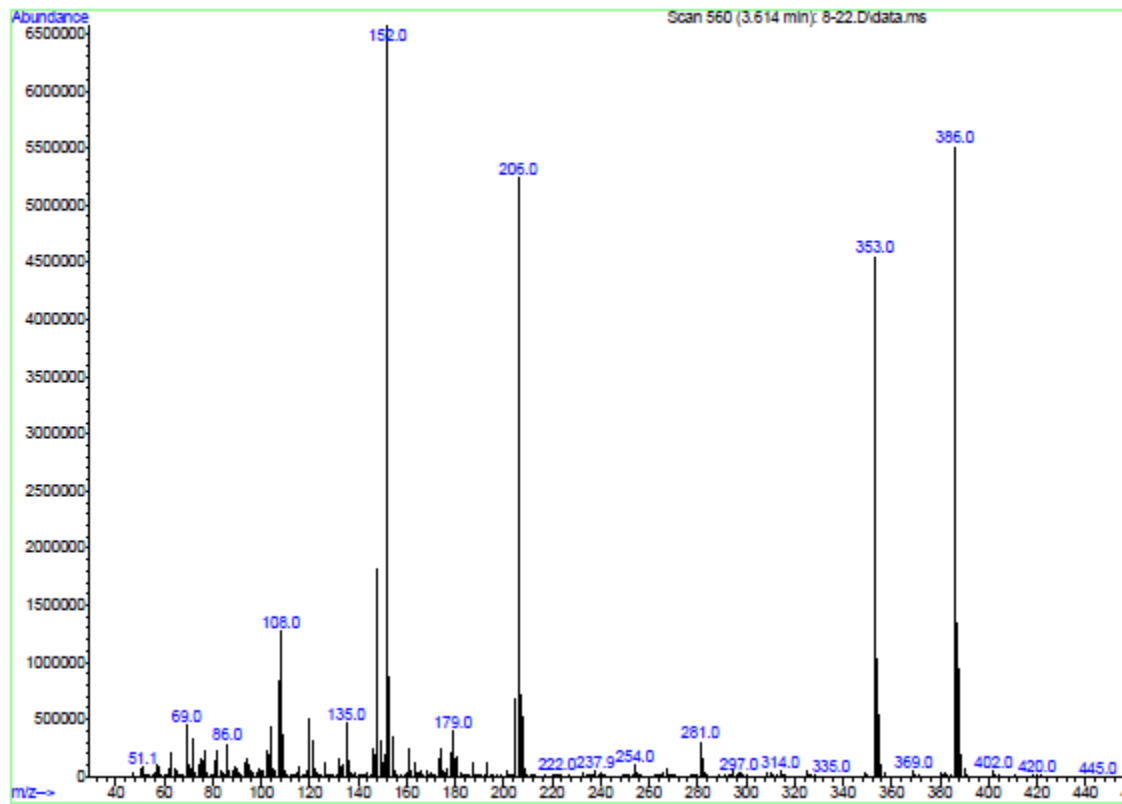
8-22
NAME Shariati-Narges 13C
EXPNO 1
PROCNO 24
Date_ 20130803
Time 9.39
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg
TD 65536
SOLVENT DMSO
NS 521
DS 0
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631968 sec
RG 203
DW 20.800 usec
DE 6.50 usec
TE 293.1 K
D1 2.0000000 sec
D11 0.0300000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 7.60 usec
PL1 -2.00 dB
PL1W 56.92932510 W
SFO1 100.6228298 MHz

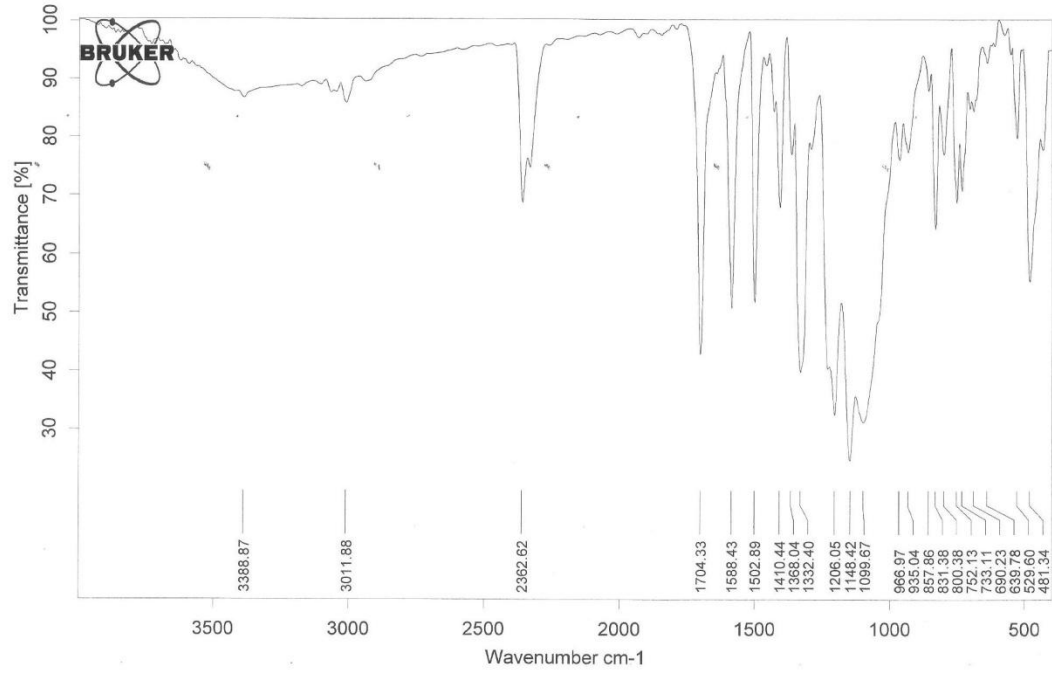
===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 85.00 usec
PL2 0.00 dB
PL12 16.00 dB
PL13 16.00 dB
PL2W 11.30348873 W
PL12W 0.28353081 W
PL13W 0.28353081 W
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
    
```



## Mass spectra of compound 5p



# FT-IR of compound 5p



D:\POLYMER\KH GHASEMI\1.61	8-22	Instrument type and / or accessory	11/08/2013
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