Electronic Supplementary Material (ESI) for RSC Advances.

Green Synthesis of 1, 4-Benzodiazipines over La_2O_3 and $La(OH)_3$ Catalysts: Possibility of Langmuir-Hinshelwood adsorption

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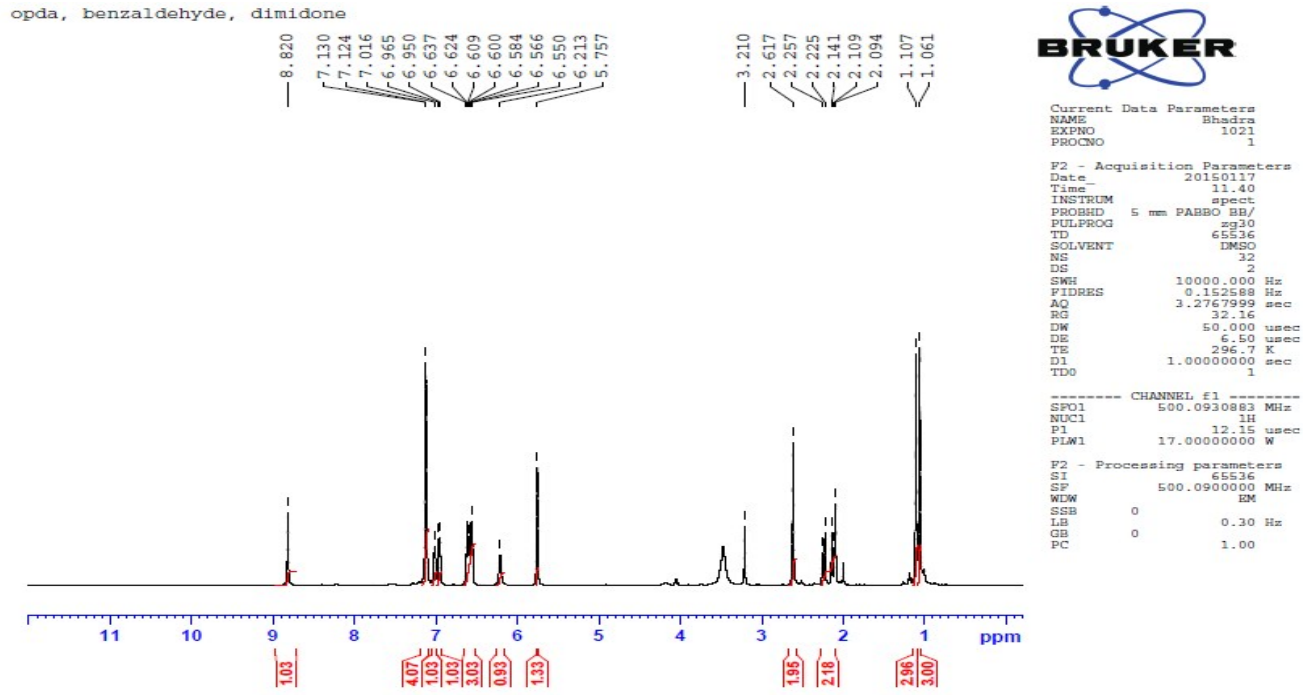
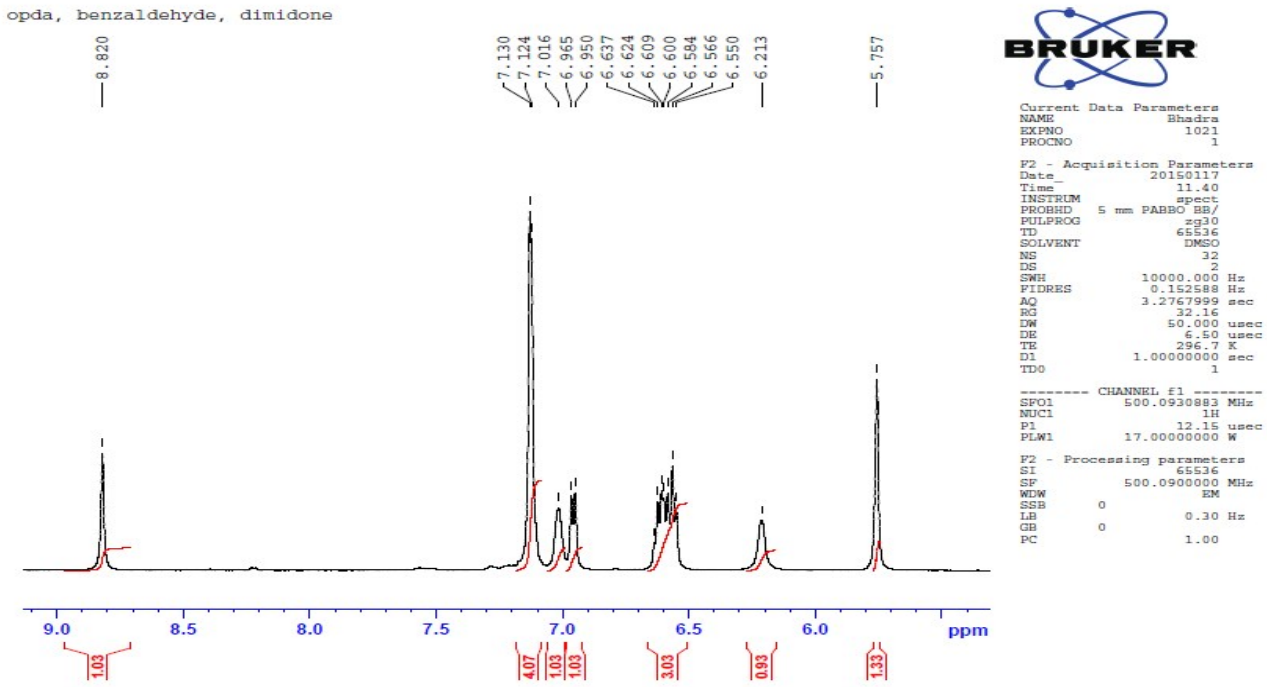
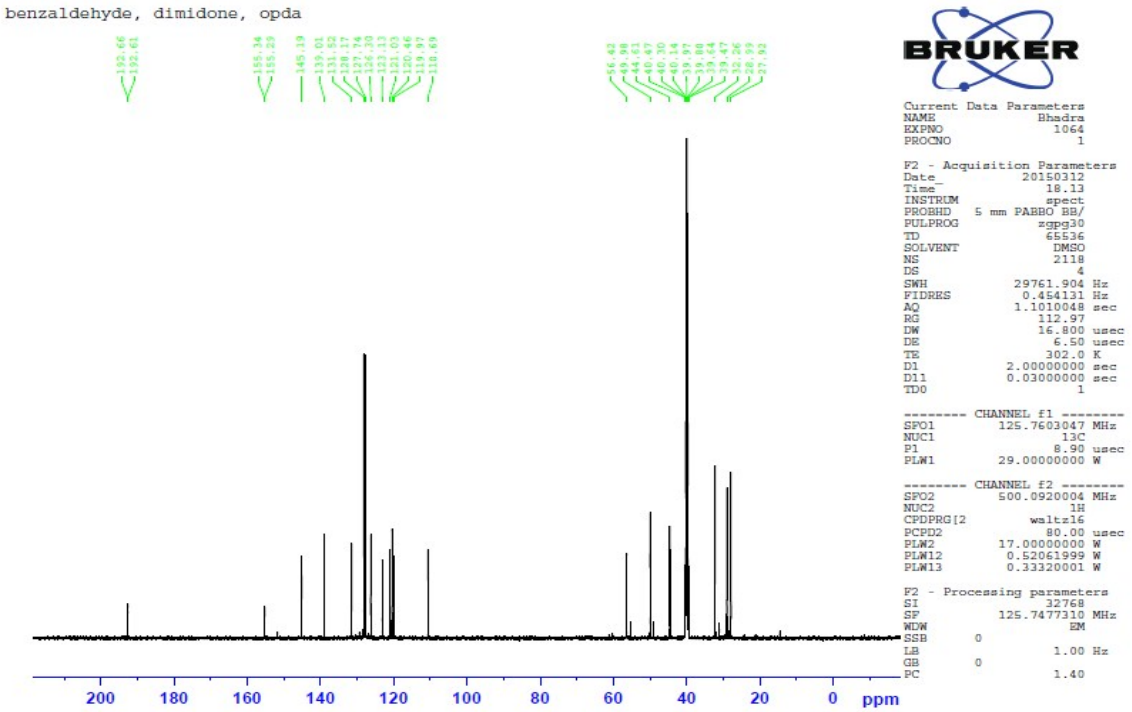
^{1}H NMR Spectrum of 1,1-dimethyl-11-phenyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e] [1,4]diazepin-3(2H)-one.





^{13}C NMR Spectrum of 1,1-dimethyl-11-phenyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one

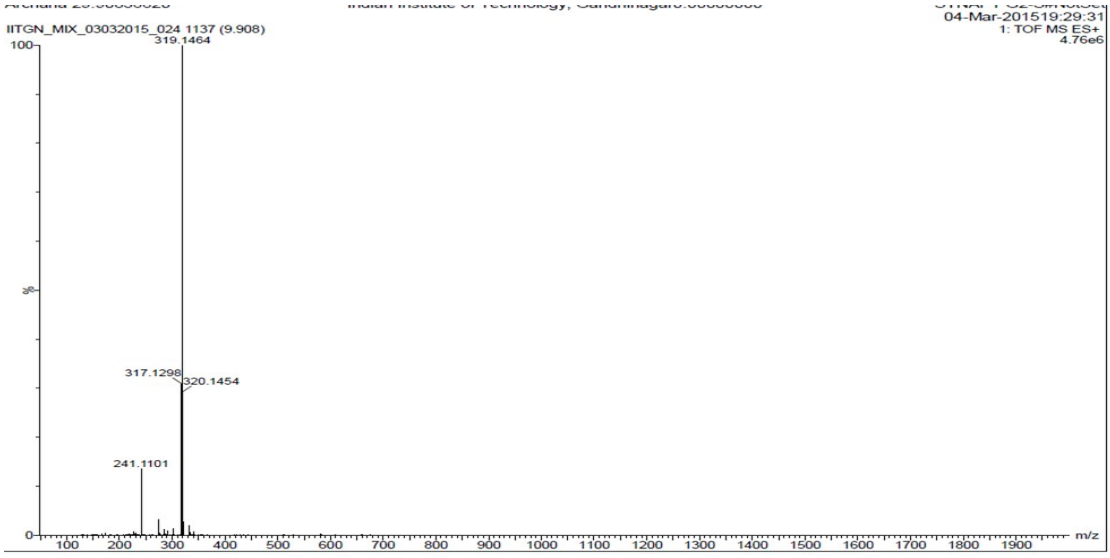


Mass spectrum of 1,1-dimethyl-11-phenyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one

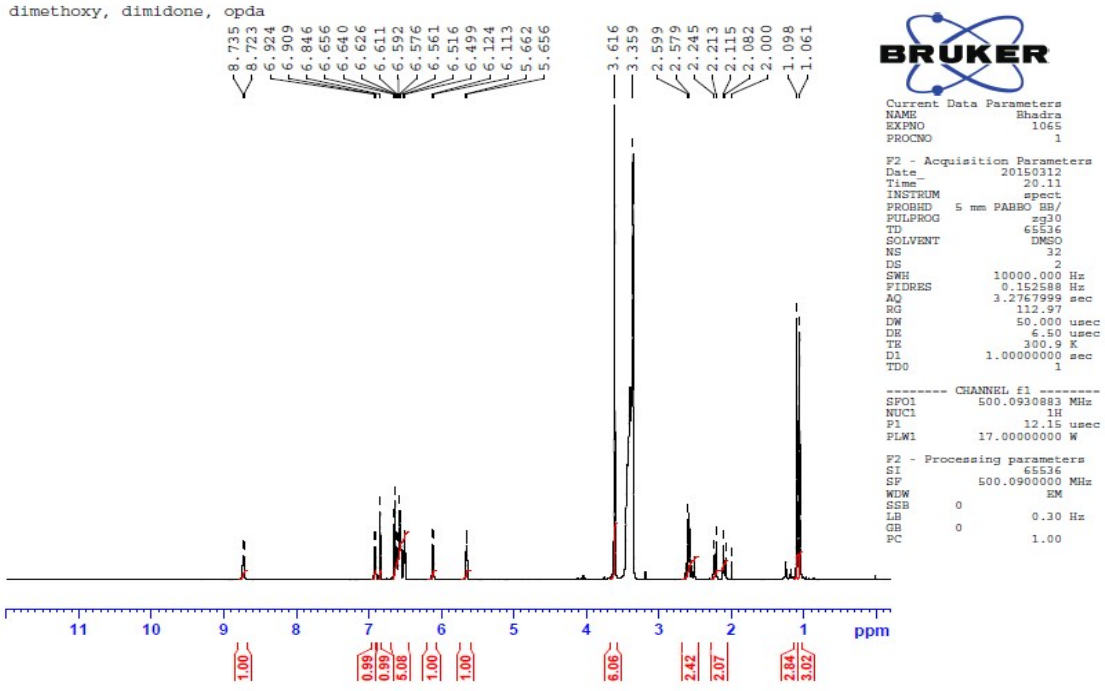
Exact mass: 318.4122

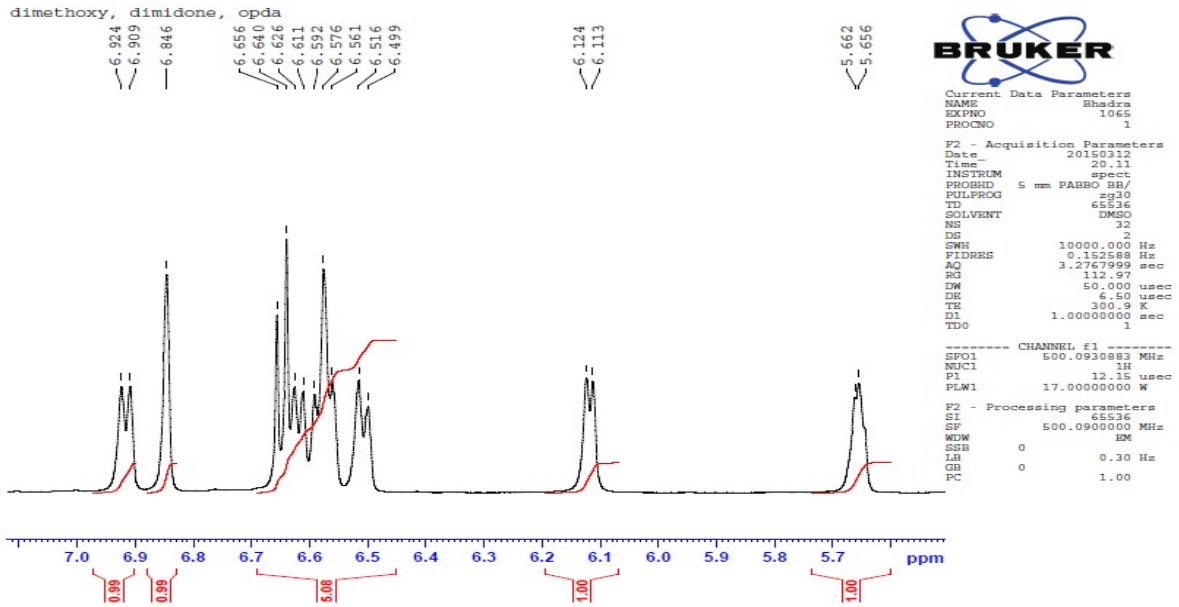
Mass obtained in the positive mode: 319.1464

Elemental composition: $C_{21}H_{22}N_2O$

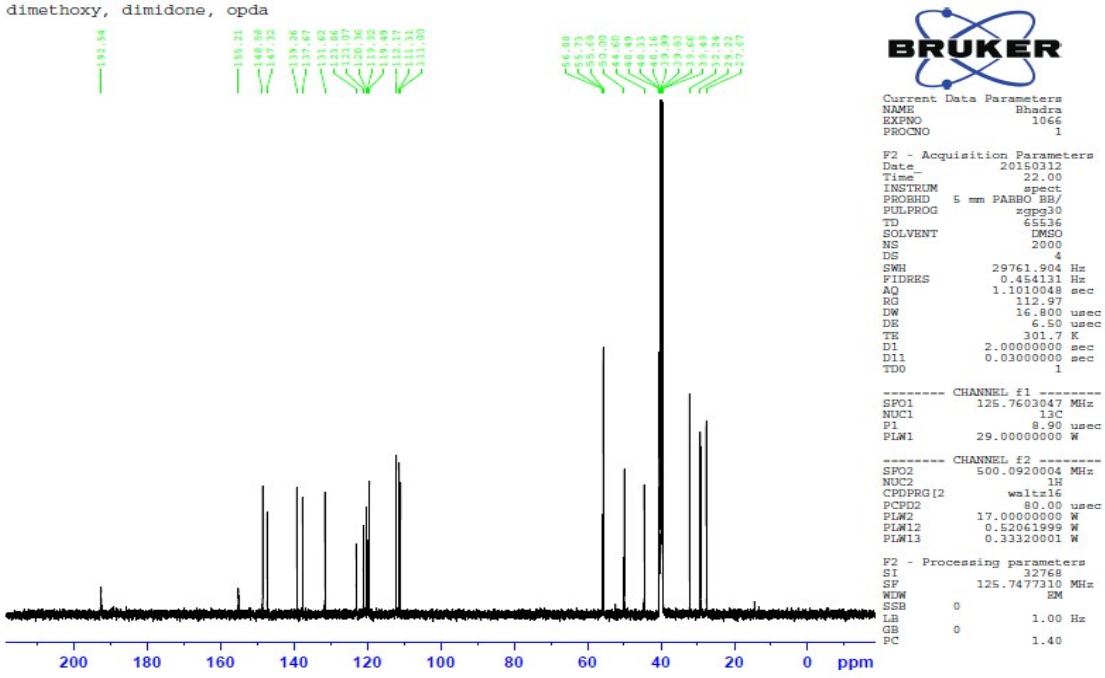


^{1}H NMR Spectrum of 11-(4-(dimethylamino)phenyl)-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one





^{13}C NMR Spectrum of 11-(4-(dimethylamino)phenyl)-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one

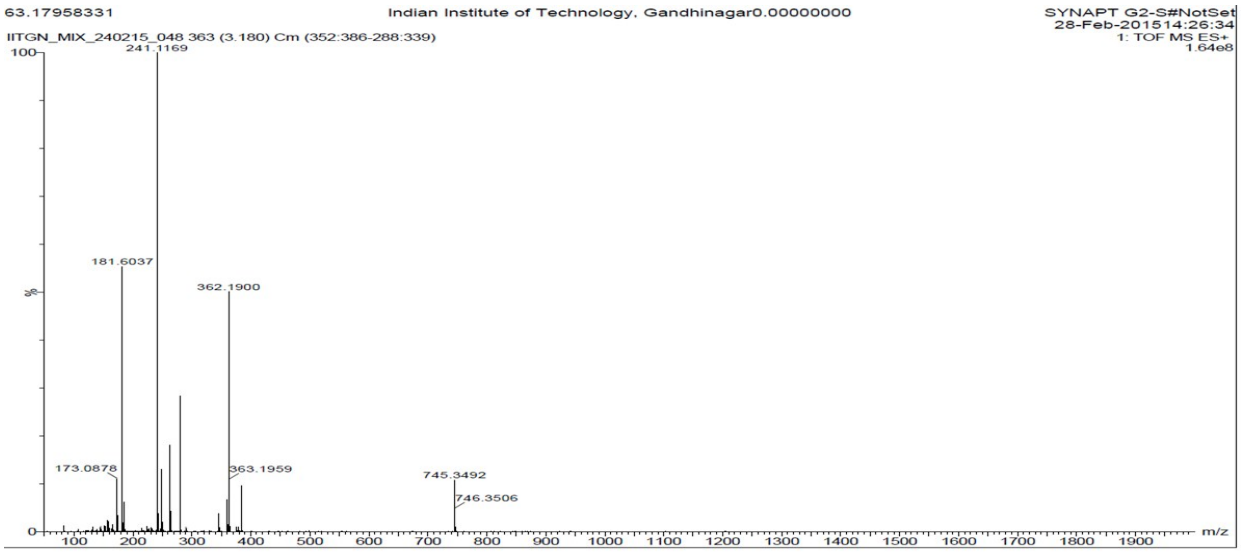


Mass spectrum of 11-(4-(dimethylamino)phenyl)-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one

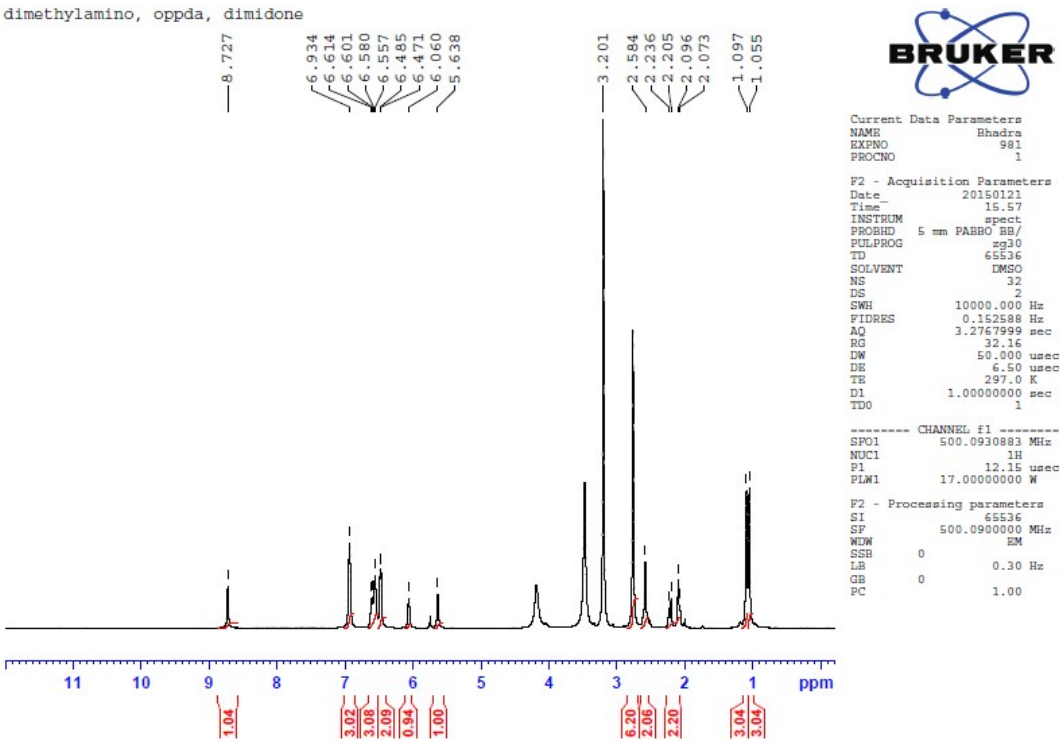
Exact mass: 361.2154

Mass obtained in the positive mode: 362.19

Elemental composition: $C_{23}H_{27}N_3O$



^{1}H NMR Spectrum of 11-(2,3-dimethoxyphenyl)-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.

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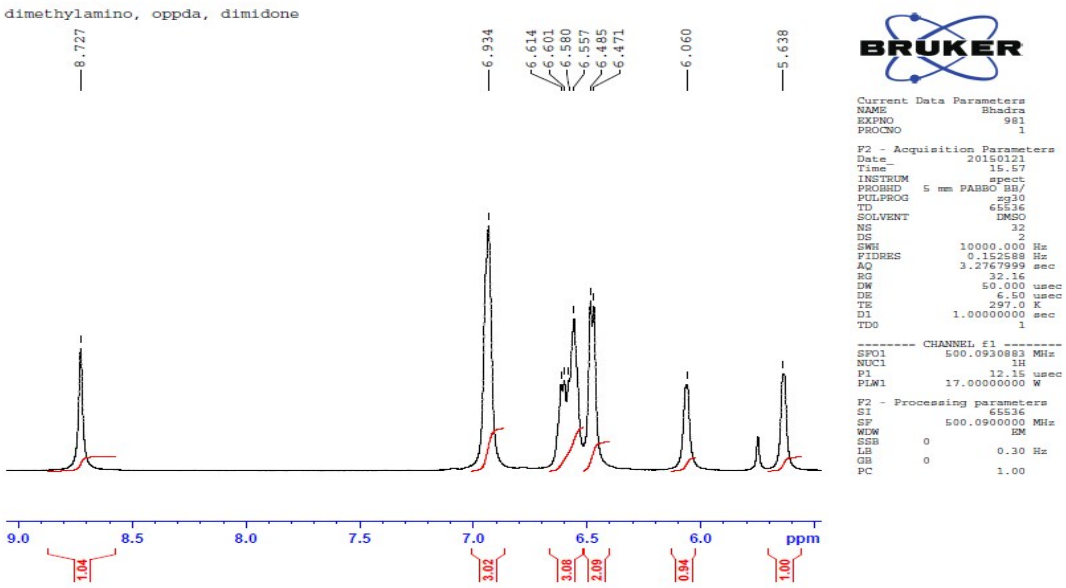
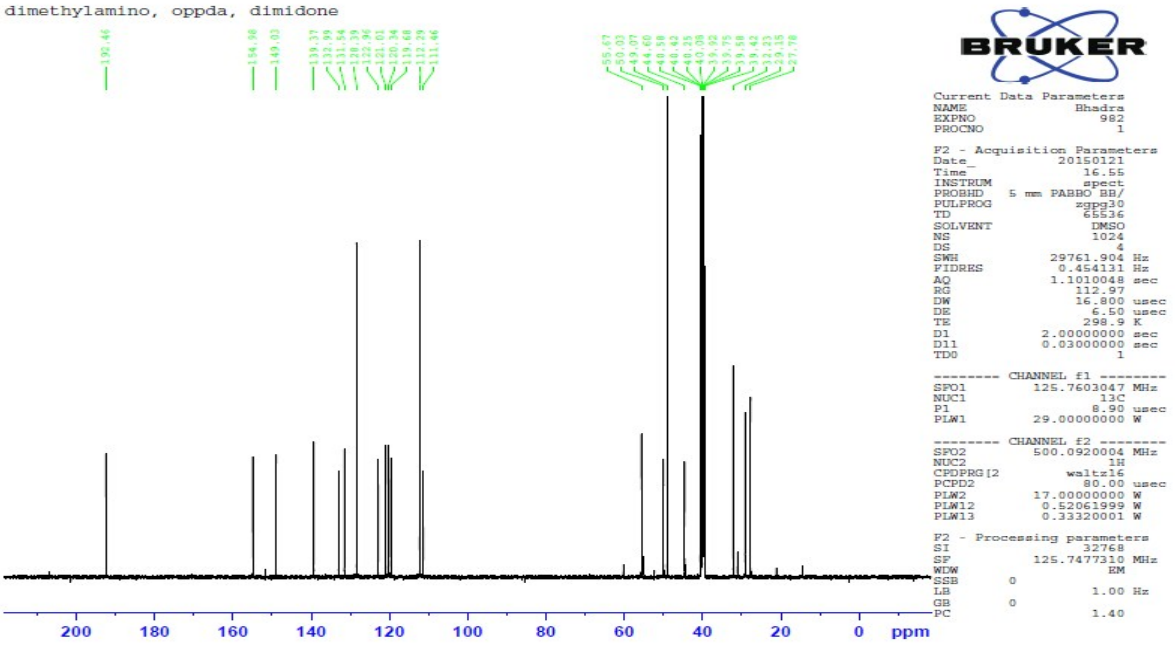
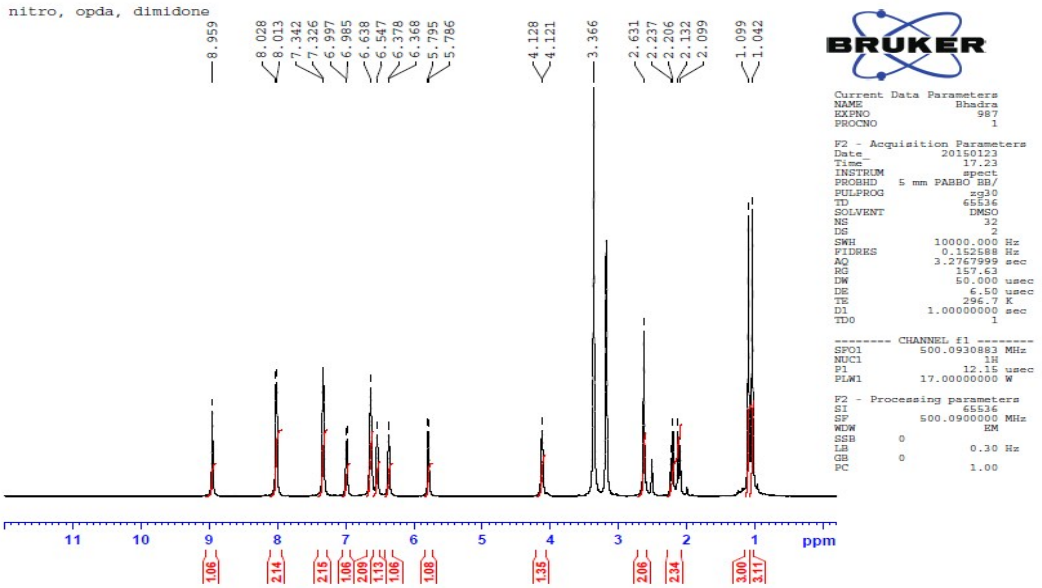
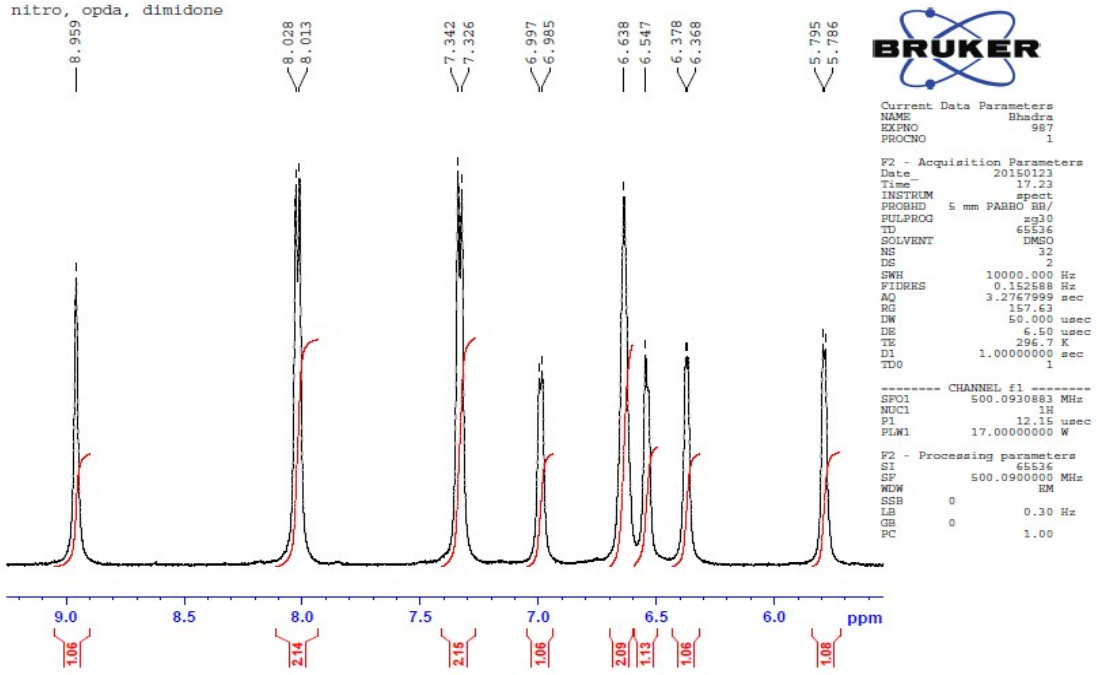


^{13}C NMR Spectrum of 11-(2,3-dimethoxyphenyl)-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one

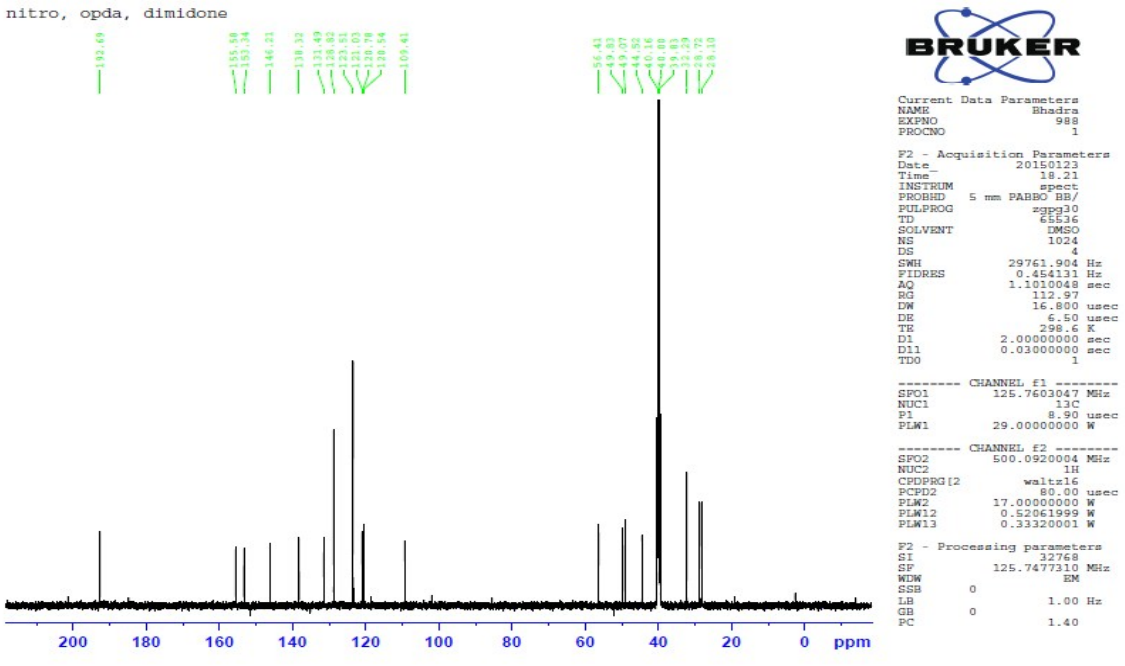


^{1}H NMR Spectrum of 1,1-dimethyl-11-(4-nitrophenyl)-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.





^{13}C NMR Spectrum of 1,1-dimethyl-11-(4-nitrophenyl)-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.

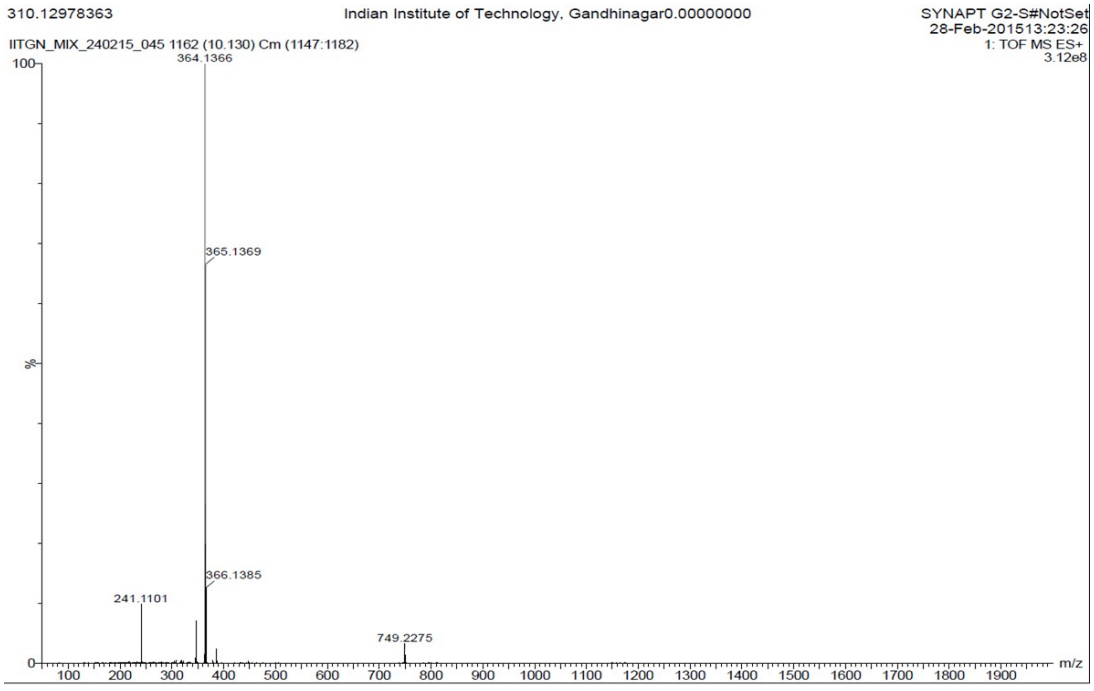


Mass spectrum of 1,1-dimethyl-11-(4-nitrophenyl)-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one

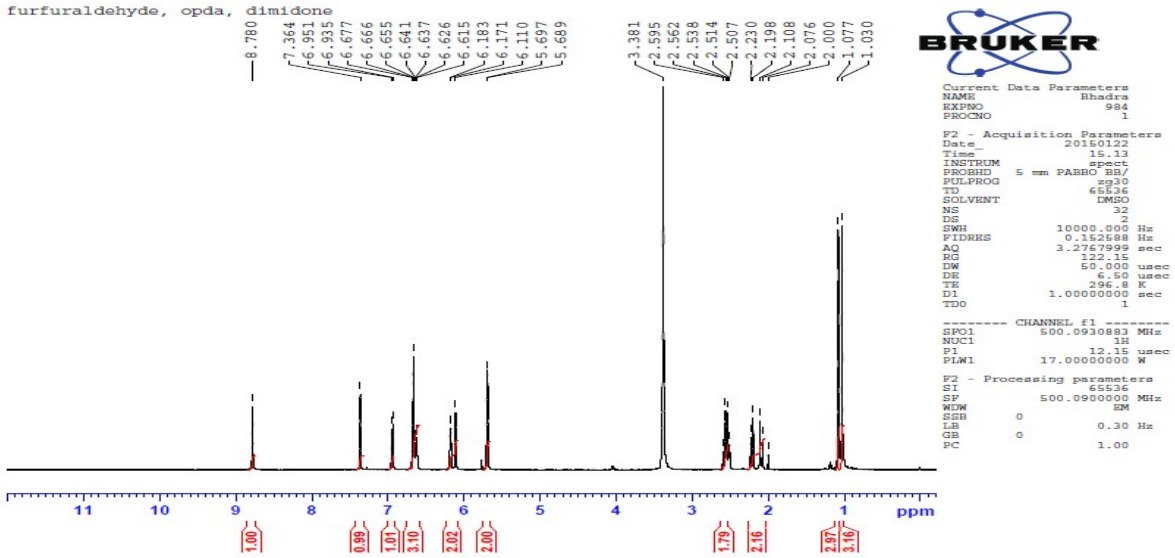
Exact mass: 363.1583

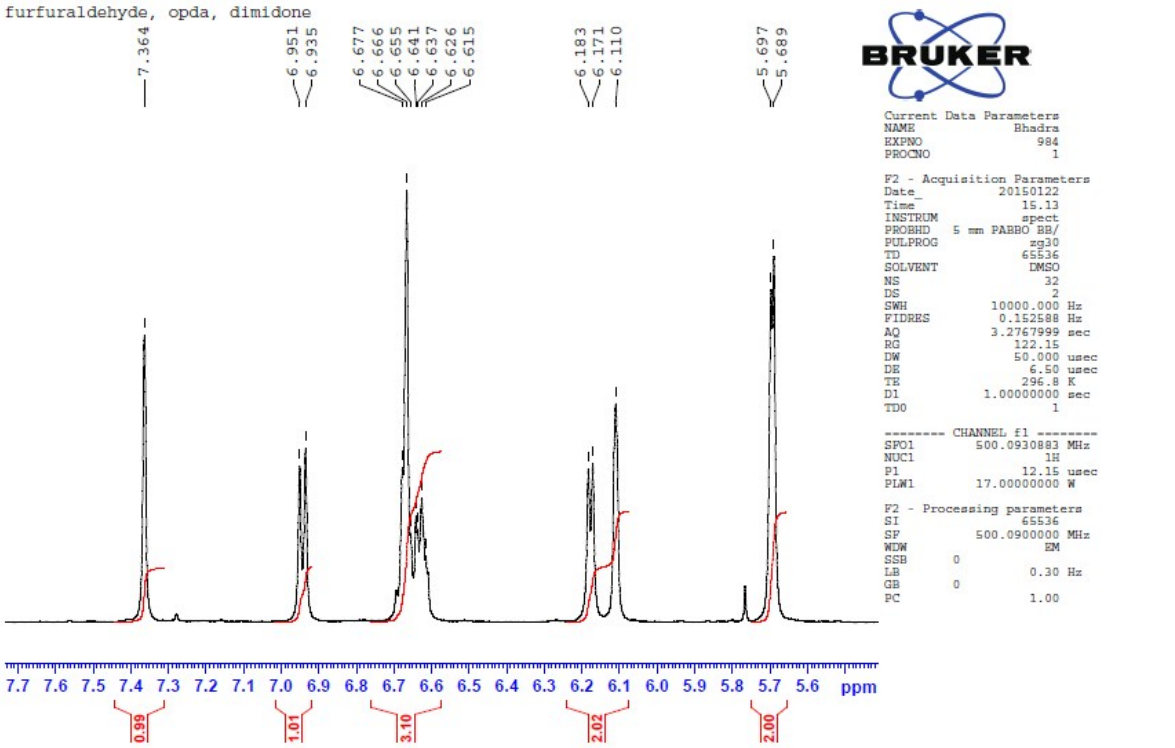
Mass obtained in the positive mode: 364.1366

Elemental composition: $C_{21}H_{21}N_3O_3$

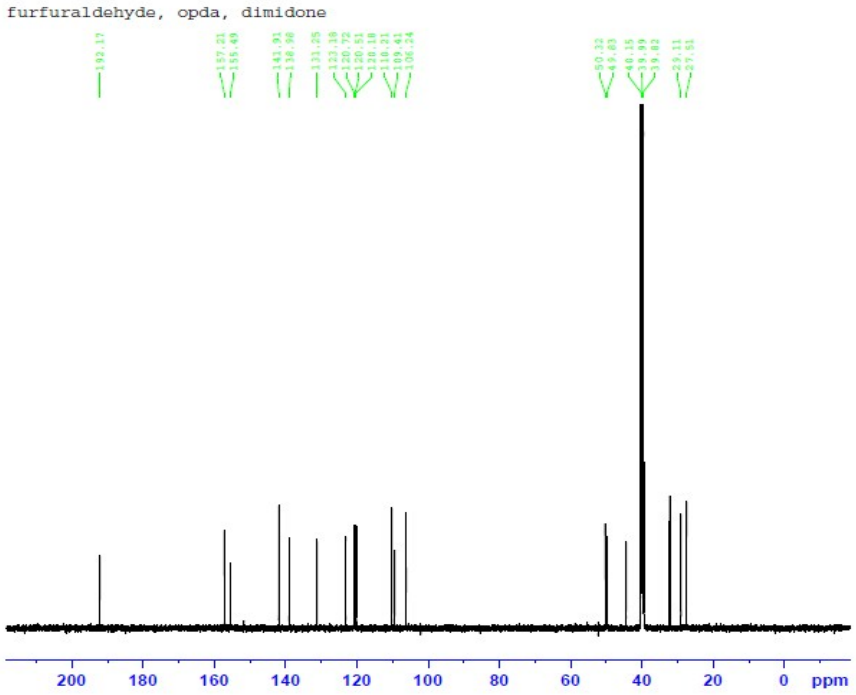


^{1}H NMR Spectrum of 11-(furan-2-yl)-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.





^{13}C NMR Spectrum of 11-(furan-2-yl)-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.



BRUKER

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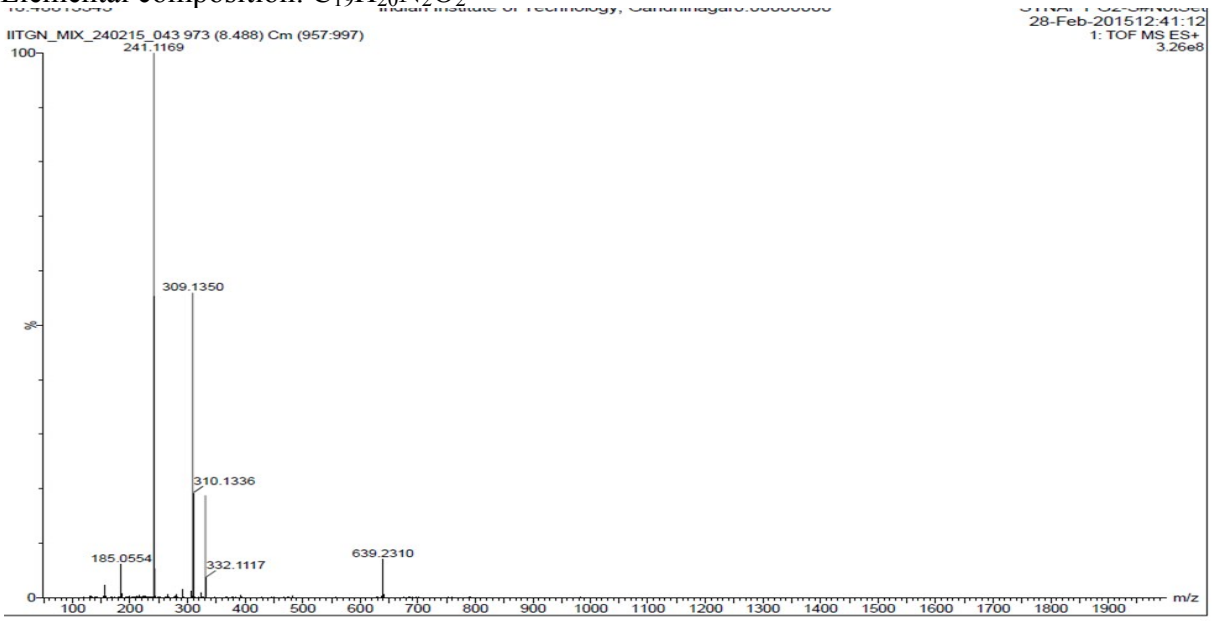
Mass spectrum of 11-(furan-2-yl)-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.

Exact mass: 308.1525

Mass obtained in the positive mode: 309.1350

Elemental composition: $C_{19}H_{20}N_2O_2$

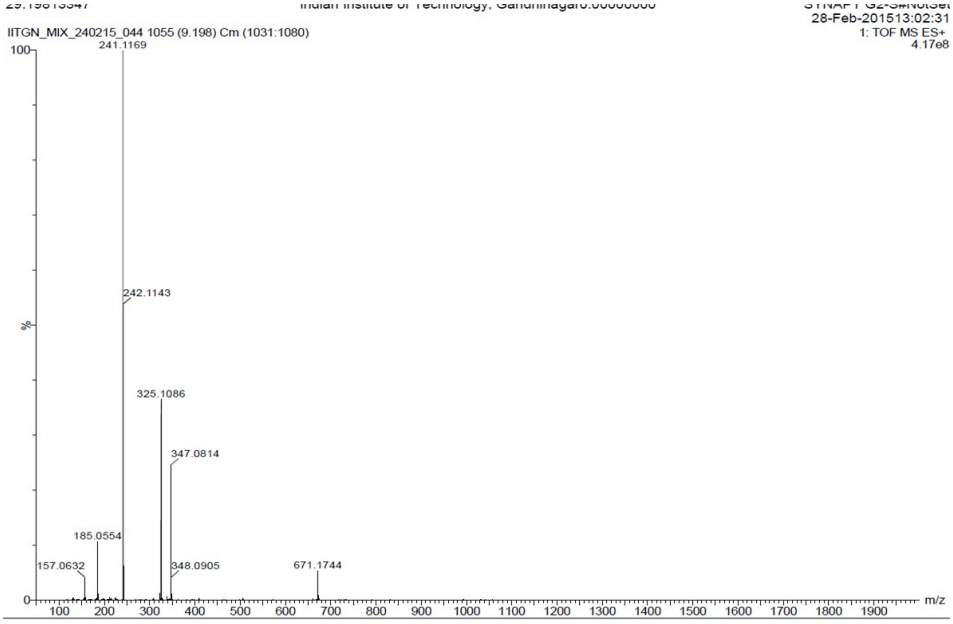


Mass spectrum of 1,1-dimethyl-11-(thiophen-2-yl)-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one

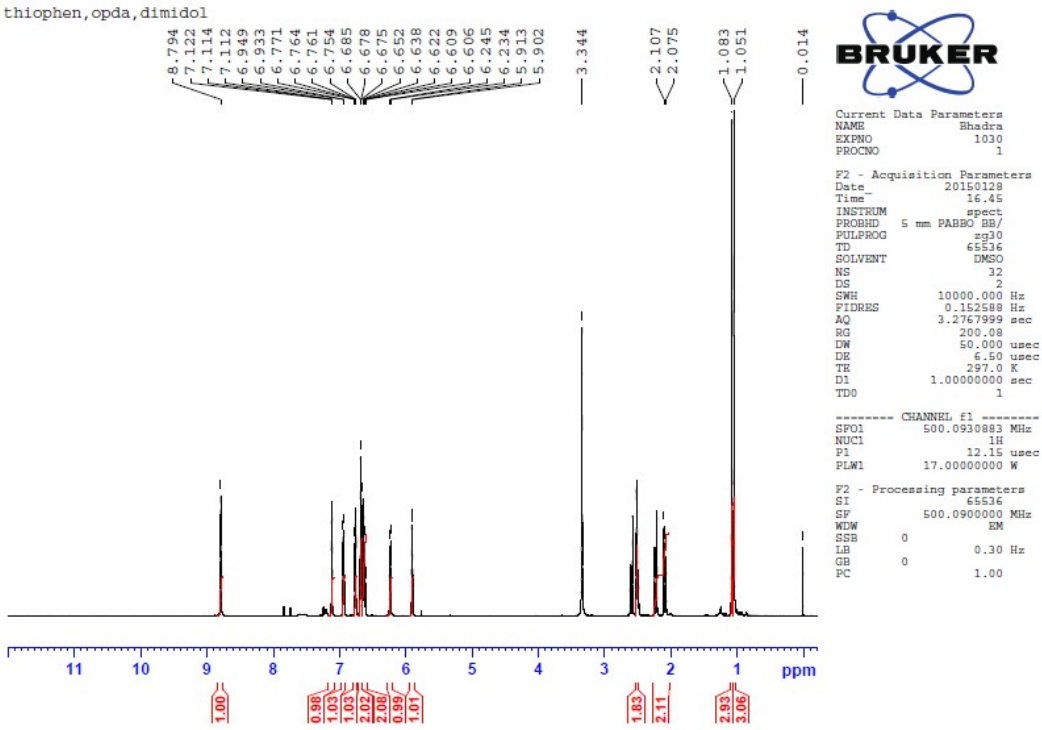
Exact mass: 325.1086

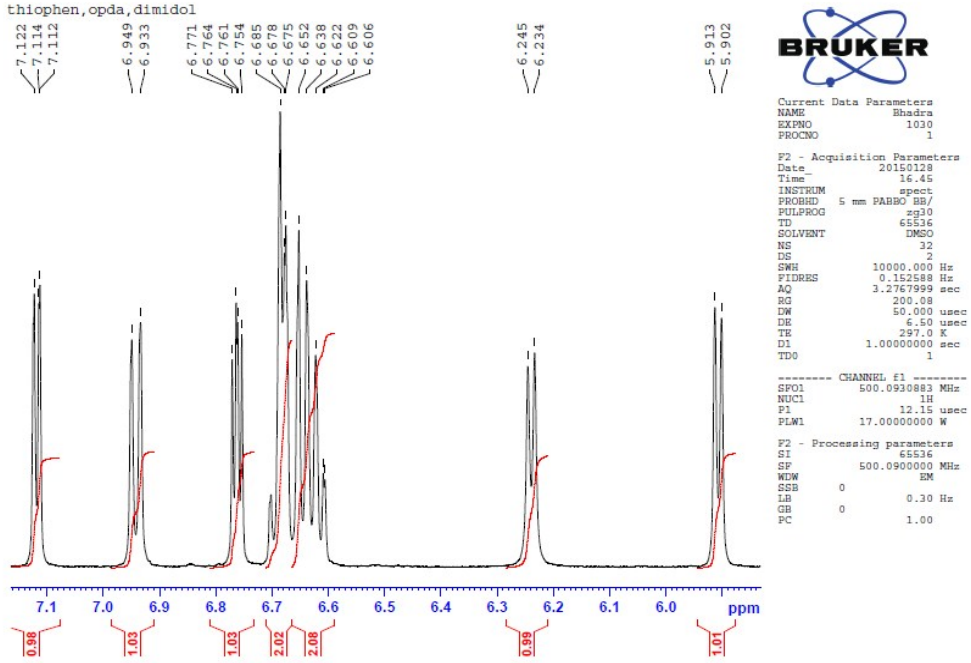
Mass obtained in the positive mode: 325.1086

Elemental composition: $C_{19}H_{20}N_2OS$

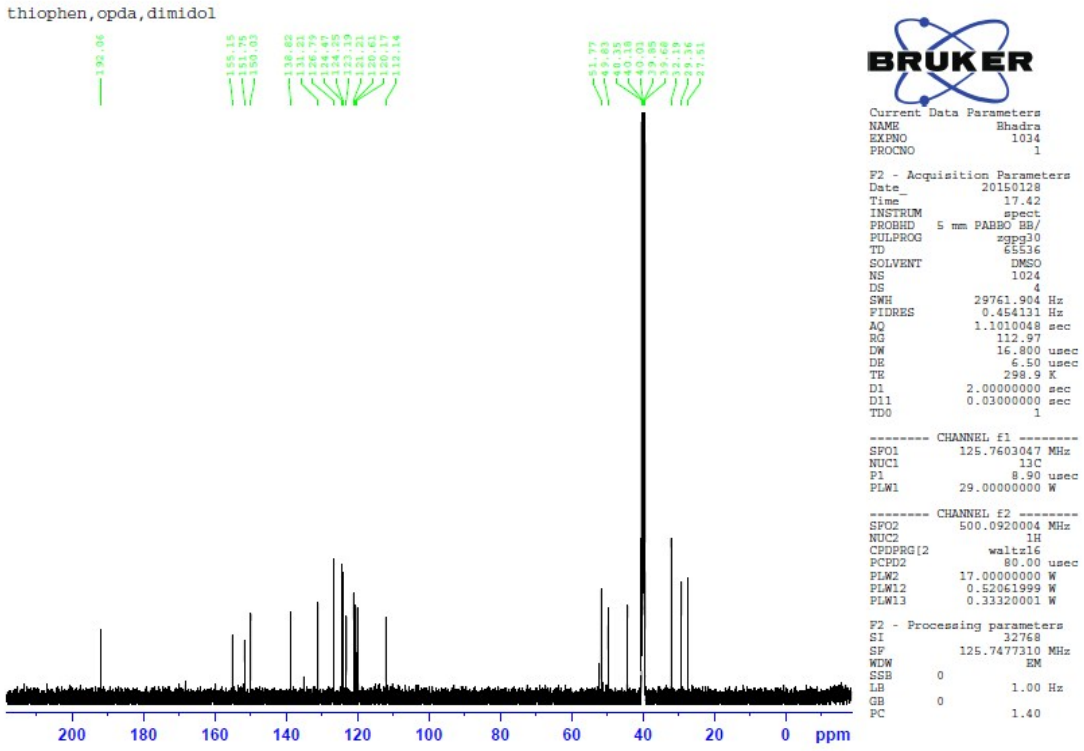


^{1}H NMR Spectrum of 1,1-dimethyl-11-(thiophen-2-yl)-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.





^{13}C NMR Spectrum of 1,1-dimethyl-11-(thiophen-2-yl)-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.



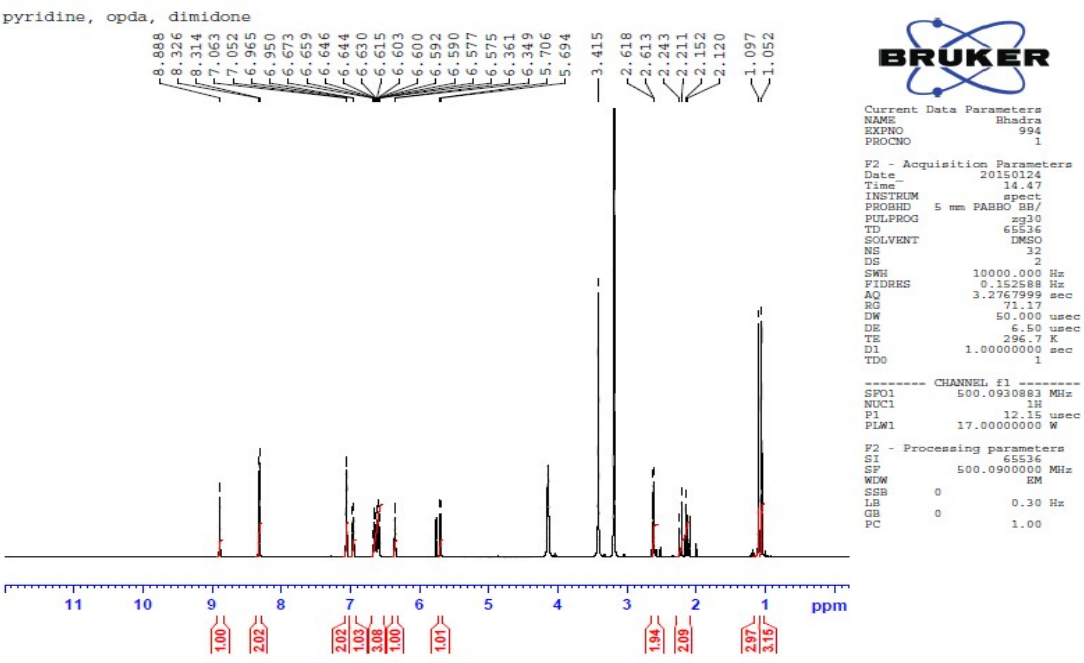
Mass spectrum of 1,1-dimethyl-11-(thiophen-2-yl)-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one

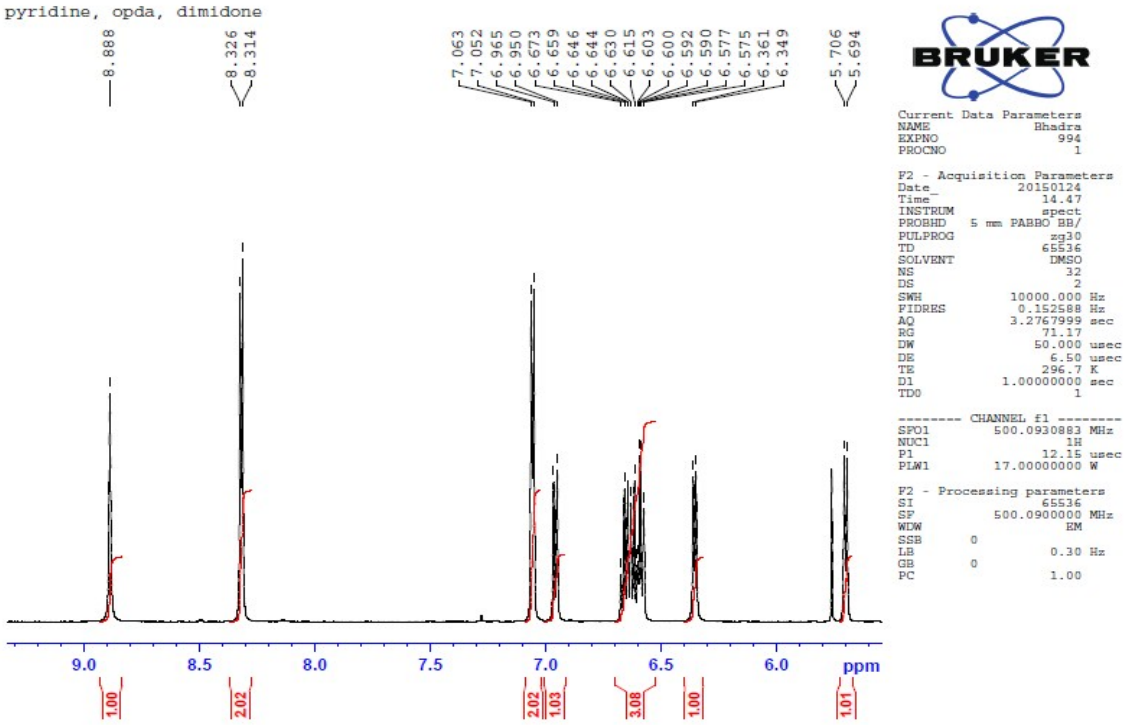
Exact mass: 325.1086

Mass obtained in the positive mode: 325.1086

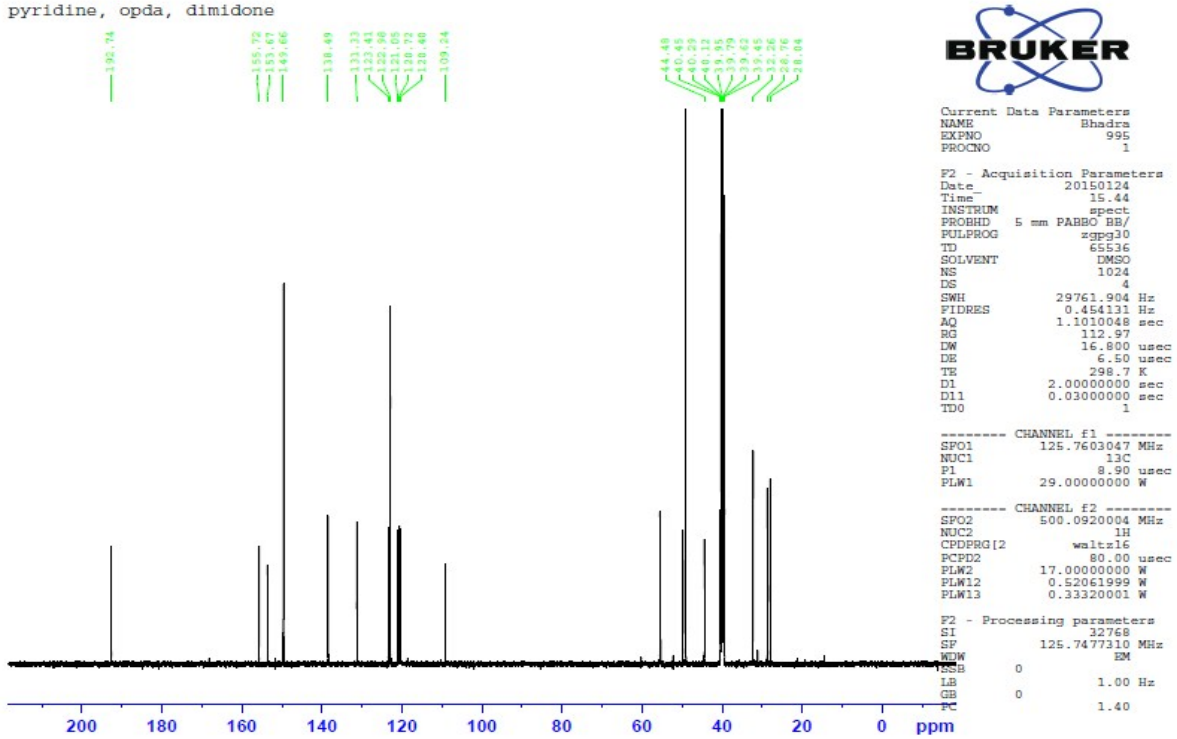
Elemental composition: $C_{19}H_{20}N_2OS$

^{1}H NMR Spectrum of 1,1-dimethyl-11-(pyridin-4-yl)-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.

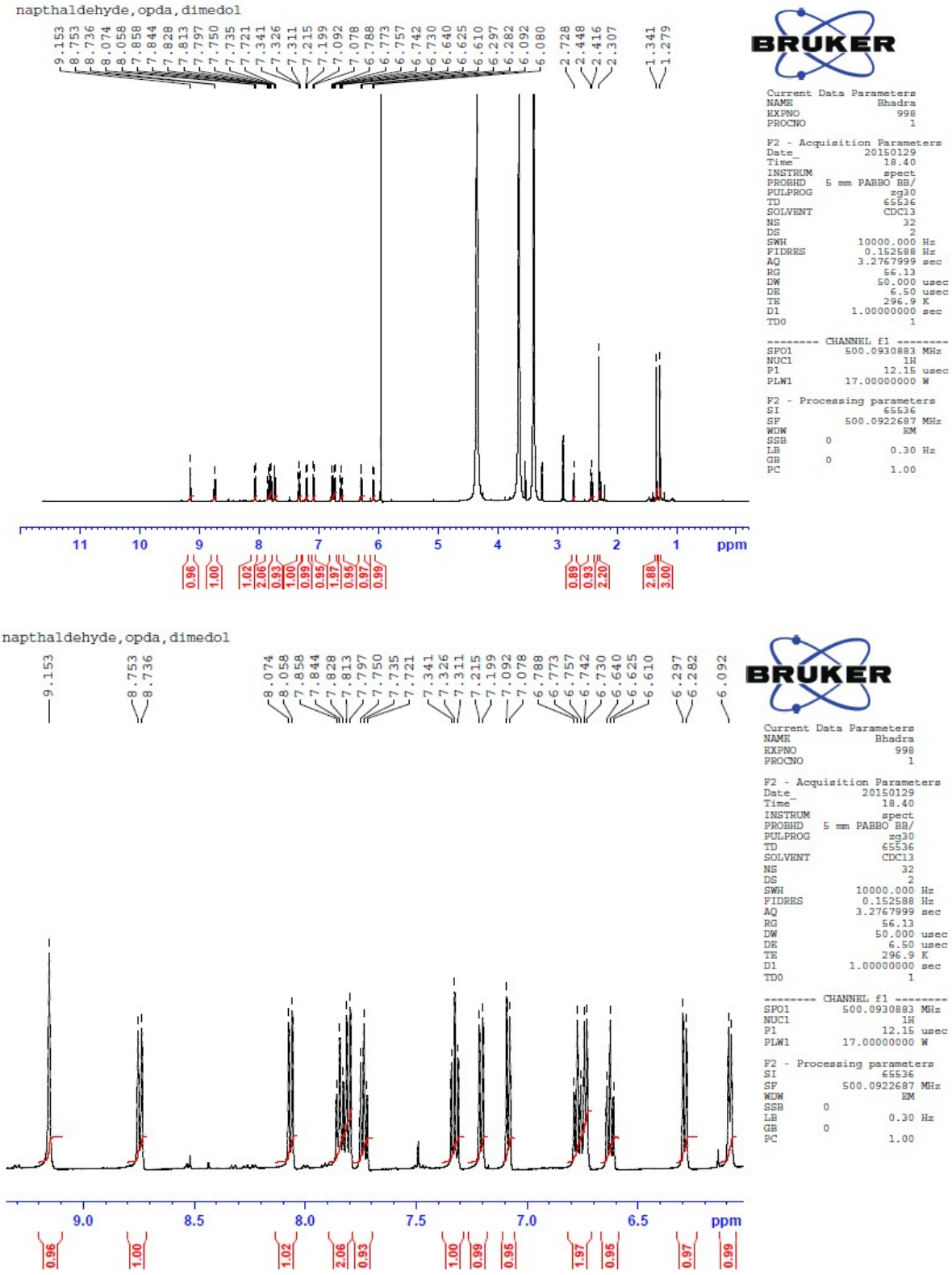




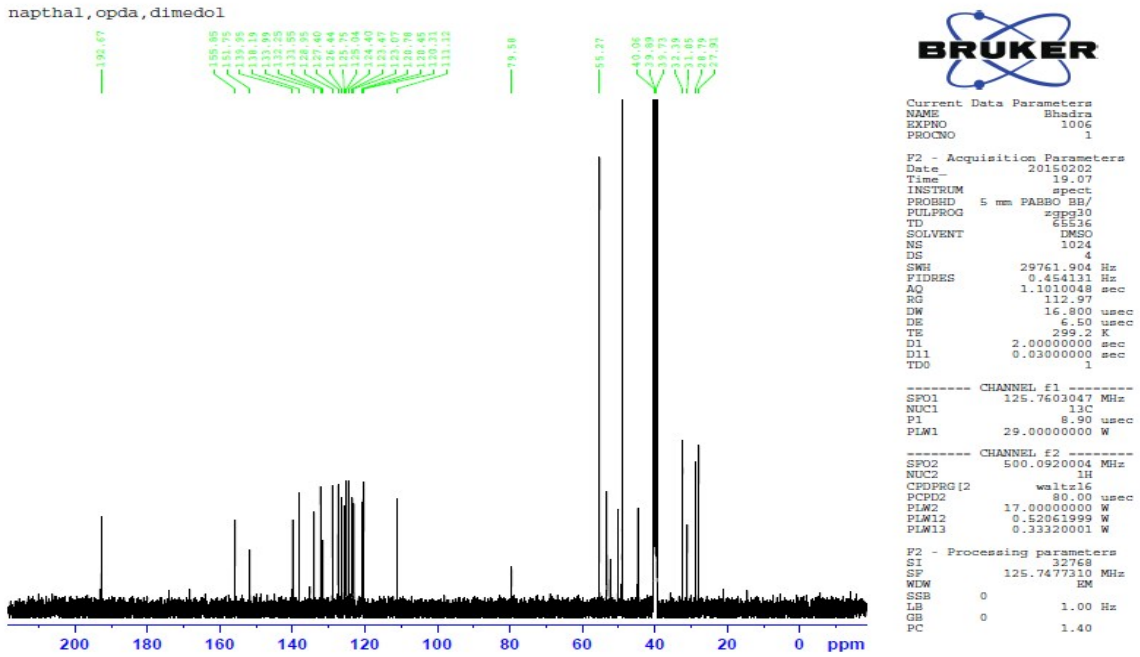
^{13}C NMR Spectrum of 1,1-dimethyl-11-(pyridin-4-yl)-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.



^{1}H NMR Spectrum of 1,1-dimethyl-11-(naphthalen-1-yl)-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.



^{13}C NMR Spectrum of 1,1-dimethyl-11-(naphthalen-1-yl)-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.

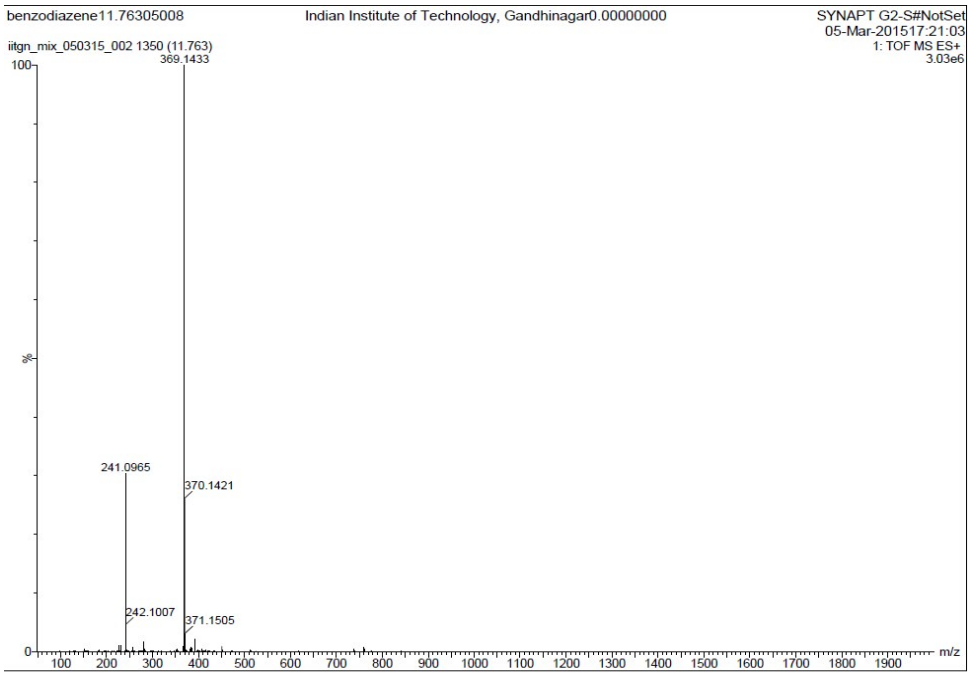


Mass spectrum of of 1,1-dimethyl-11-(naphthalen-1-yl)-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one

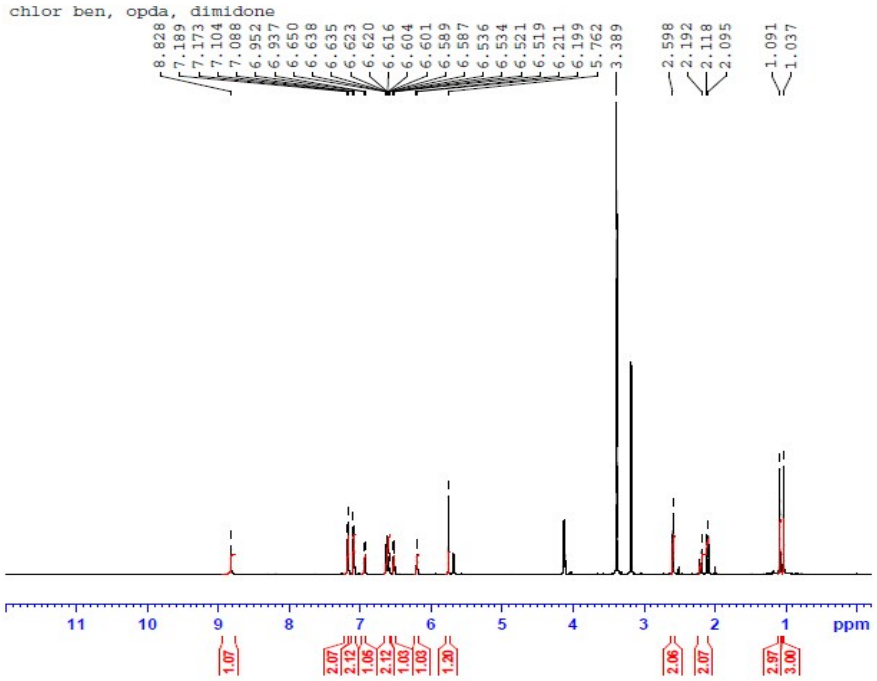
Exact mass: 368.1889

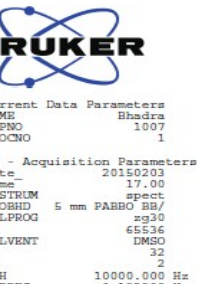
Mass obtained in the positive mode: 369.1433

Elemental composition: $C_{25}H_{24}N_2O$



^{1}H NMR Spectrum of 11-(4-chlorophenyl)-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.



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P1                      12.15 usec
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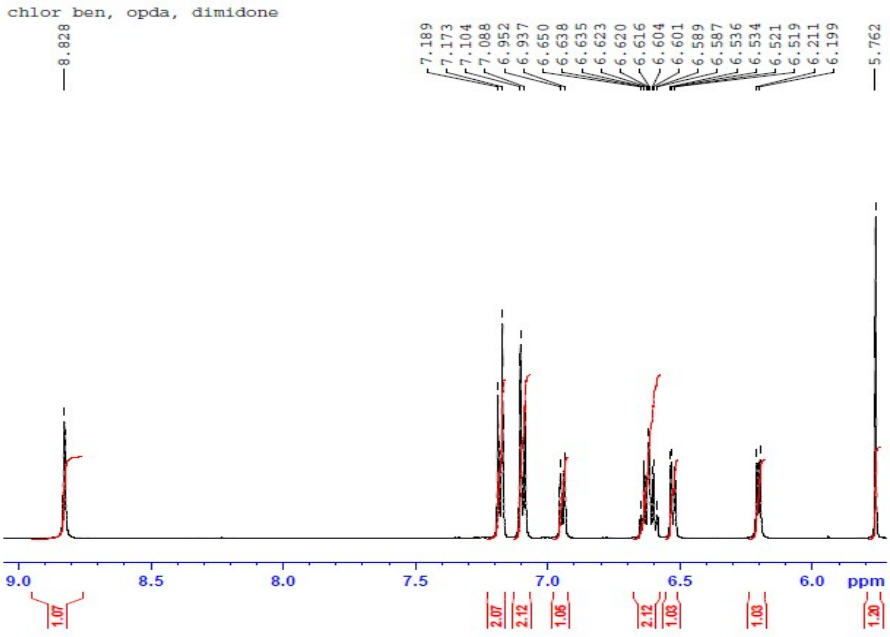


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TE                    297.0 K
D1                1.00000000 sec
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P1                      12.15 usec
PLW1           17.00000000 W

F2 - Processing parameters
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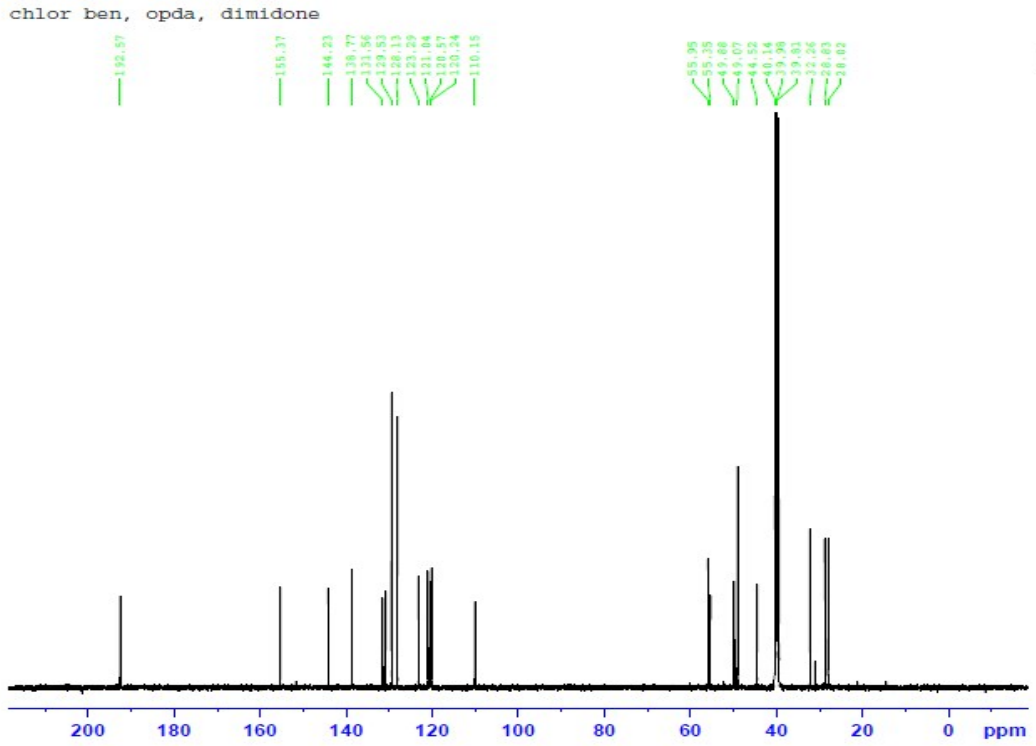
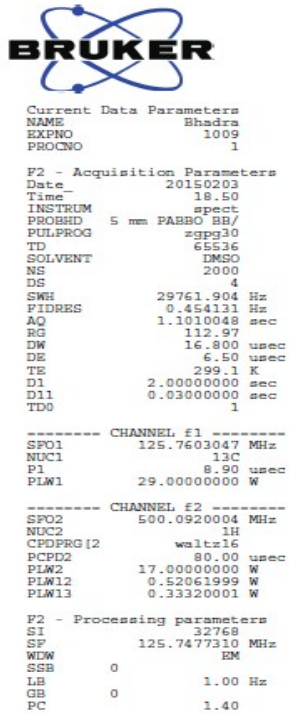
^{13}C NMR Spectrum of 11-(4-chlorophenyl)-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one.



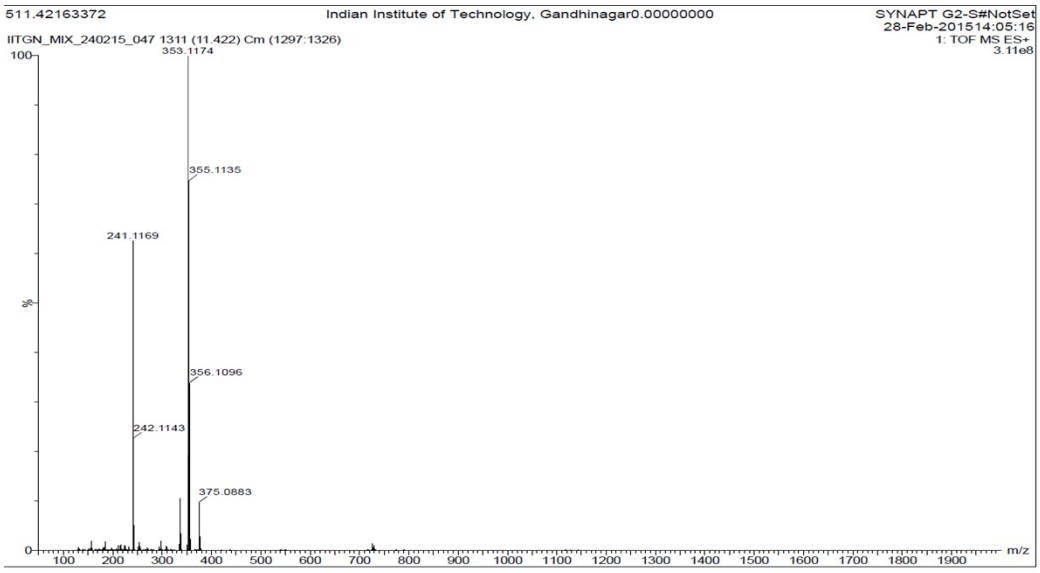


Mass spectrum of 11-(4-chlorophenyl)-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one

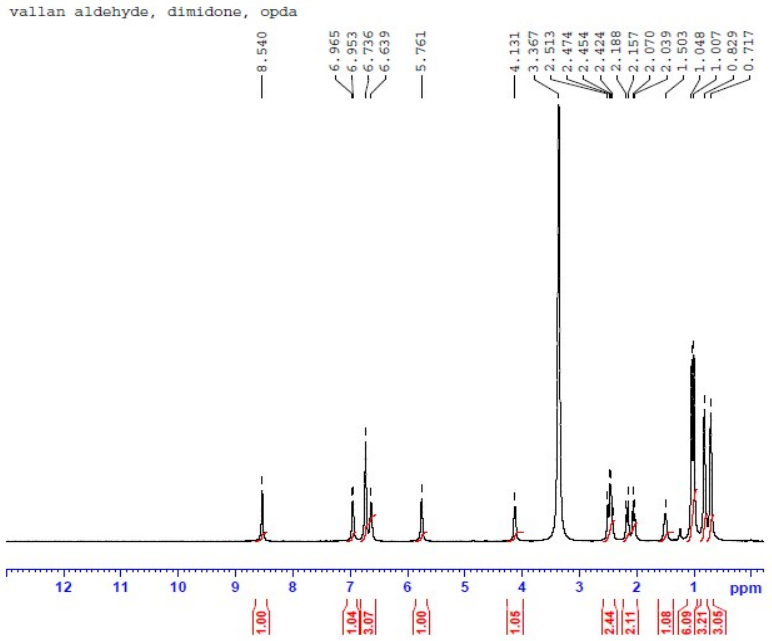
Exact mass: 352.1342

Mass obtained in the positive mode: 353.1174

Elemental composition: $C_{21}H_{21}ClN_2O$



[1]H NMR Spectrum of 11-isobutyl-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one



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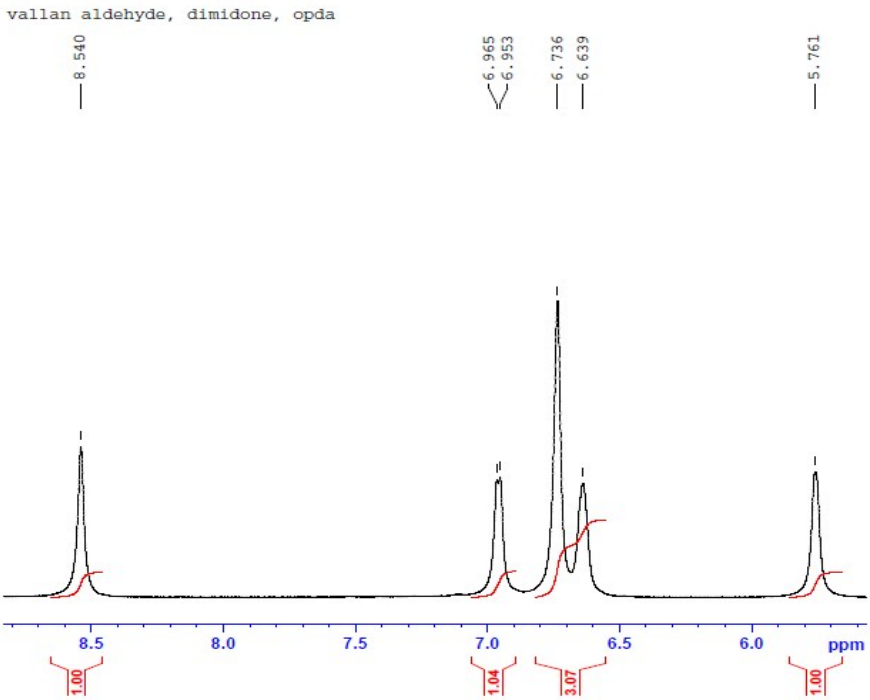
FIDRES                0.152588 Hz
AQ                3.2767999 sec
RG                   112.97
DW                   50.000 usec
DE                     6.50 usec
TE                   299.7 K
D1                1.00000000 sec
TD0                        1

======== CHANNEL f1 ========
SFO1             500.0930883 MHz
NUC1                       1H
P1                      12.15 usec
PLW1             17.00000000 W

F2 - Processing parameters
SI                        65536
SF               500.0900000 MHz
WDW                       EM
SSB                  0
LB                       0.30 Hz
GB                   0
PC                       1.00
```



BRUKER

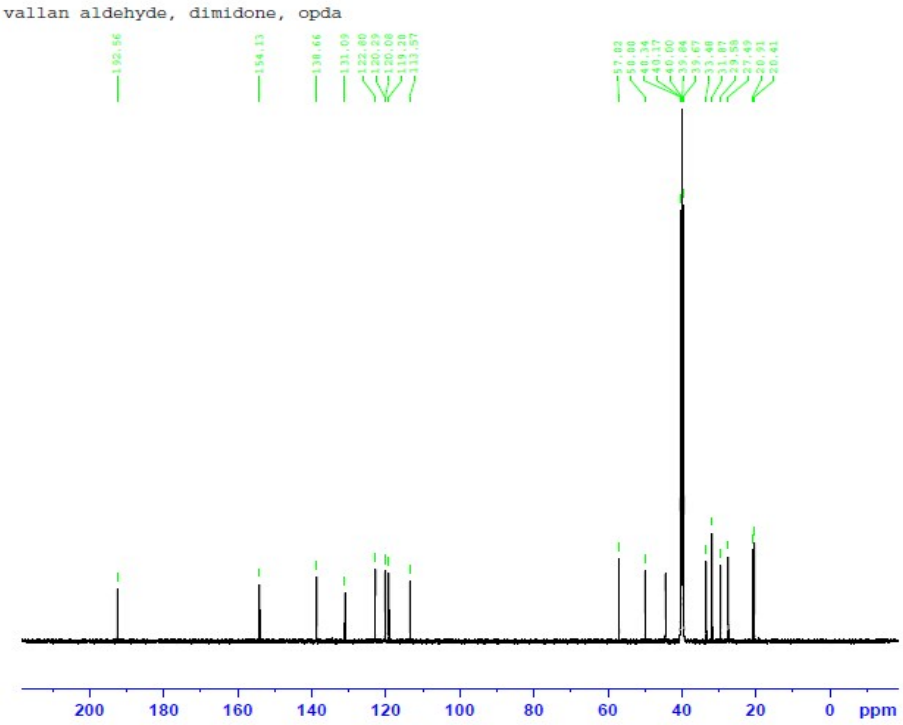
```
Current Data Parameters
NAME                  Bhadra
EXPNO                   1067
PROCNO                     1

F2 - Acquisition Parameters
Date_               20150312
Time                   22.55
INSTRUM                spect
PROBHD   5 mm PABBO BB/
PULPROG                zg30
TD                    65536
SOLVENT                DMSO
NS                       32
DS                        2
SWH               10000.000 Hz
FIDRES                0.152588 Hz
AQ                3.2767999 sec
RG                   112.97
DW                   50.000 usec
DE                     6.50 usec
TE                   299.7 K
D1                1.00000000 sec
TD0                        1

======== CHANNEL f1 ========
SFO1             500.0930883 MHz
NUC1                       1H
P1                      12.15 usec
PLW1             17.00000000 W

F2 - Processing parameters
SI                        65536
SF               500.0900000 MHz
WDW                       EM
SSB                  0
LB                       0.30 Hz
GB                   0
PC                       1.00
```

^{13}C NMR Spectrum of 11-isobutyl-1,1-dimethyl-4,5,10,11-tetrahydro-1H-dibenzo[b,e][1,4]diazepin-3(2H)-one



BRUKER

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Current Data Parameters
NAME                  Bhadra
EXPNO                   1068
PROCNO                     1

F2 - Acquisition Parameters
Date_               20150313
Time                    2.30
INSTRUM                 spect
PROBHD    5 mm PABBO BB/
PULPROG              zgpg30
TD                    65536
SOLVENT                DMSO
NS                      4000
DS                         4
SWH                29761.904 Hz
FIDRES                 0.454131 Hz
AQ                  1.1010048 sec
RG                     112.97
DW                     16.800 usec
DE                      6.50 usec
TE                     301.0 K
D1                  2.00000000 sec
D11                 0.03000000 sec
TD0                        1

======== CHANNEL f1 ========
SFO1               125.7603047 MHz
NUC1                      13C
P1                       8.90 usec
PLW1               29.00000000 W

======== CHANNEL f2 ========
SFO2               500.0920004 MHz
NUC2                      1H
CPDPRG[2               waltz16
PCPD2                   80.00 usec
PLW2               17.00000000 W
PLW12               0.52061999 W
PLW13               0.33320001 W

F2 - Processing parameters
SI                        32768
SF                 125.7477310 MHz
WDW                          EM
SSB             0
LB                       1.00 Hz
GB              0
PC                       1.40
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