

DMAP-Promoted domino annulation of β -ketothioamides with internal alkynes: A highly regioselective access to functionalized 1,3-thiazolidin-4-ones at room temperature

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Tammannstr. 2, 37077 Goettingen

Supporting Information

Table of Content

1. General scheme	S2
2. Copies of ¹ H and ¹³ C NMR spectra of the compounds 3aa-3wb	S3—S58

- **General Scheme:** Starting materials **1** and **2** are defined in the following general reaction Scheme 1.



1a: R¹ = Ph; R² = Ph; **2a:** R³ = Et

1b: R¹ = 4-Br-C₆H₄; R² = Ph; **2b:** R³ = Me

1c: R¹ = 4-Me-C₆H₄; R² = Ph;

1d: R¹ = 2-Cl-C₆H₄; R² = Ph;

1e: R¹ = 3,4-OCH₂O-C₆H₃; R² = Ph;

1f: R¹ = 4-Ph-C₆H₄; R² = Ph;

1g: R¹ = 1-naphthyl; R² = Ph;

1h: R¹ = 2-thienyl; R² = Ph;

1i: R¹ = 2-furyl; R² = Ph;

1j: R¹ = *i*-propyl; R² = Ph;

1k: R¹ = *t*-butyl; R² = Ph;

1l: R¹ = 4-Br-C₆H₄; R² = Me;

1m: R¹ = 4-Me-C₆H₄; R² = Me;

1n: R¹ = 3,4-OCH₂O-C₆H₃; R² = Me

1o: R¹ = 2-thienyl; R² = Me;

1p: R¹ = 4-OMe-C₆H₄; R² = *n*-butyl;

1q: R¹ = 2-thienyl; R² = *n*-butyl;

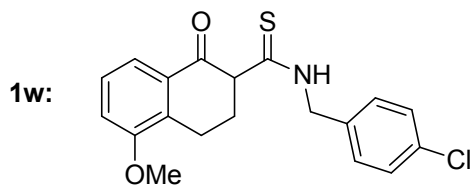
1r: R¹ = 4-OMe-C₆H₄; R² = cyclopropyl;

1s: R¹ = 2-thienyl; R² = cyclopropyl;

1t: R¹ = 2-thienyl; R² = cyclohexyl;

1u: R¹ = 2-thienyl; R² = PhCH₂;

1v: R¹ = 1-naphthyl; R² = 4-Cl-C₆H₄CH₂.

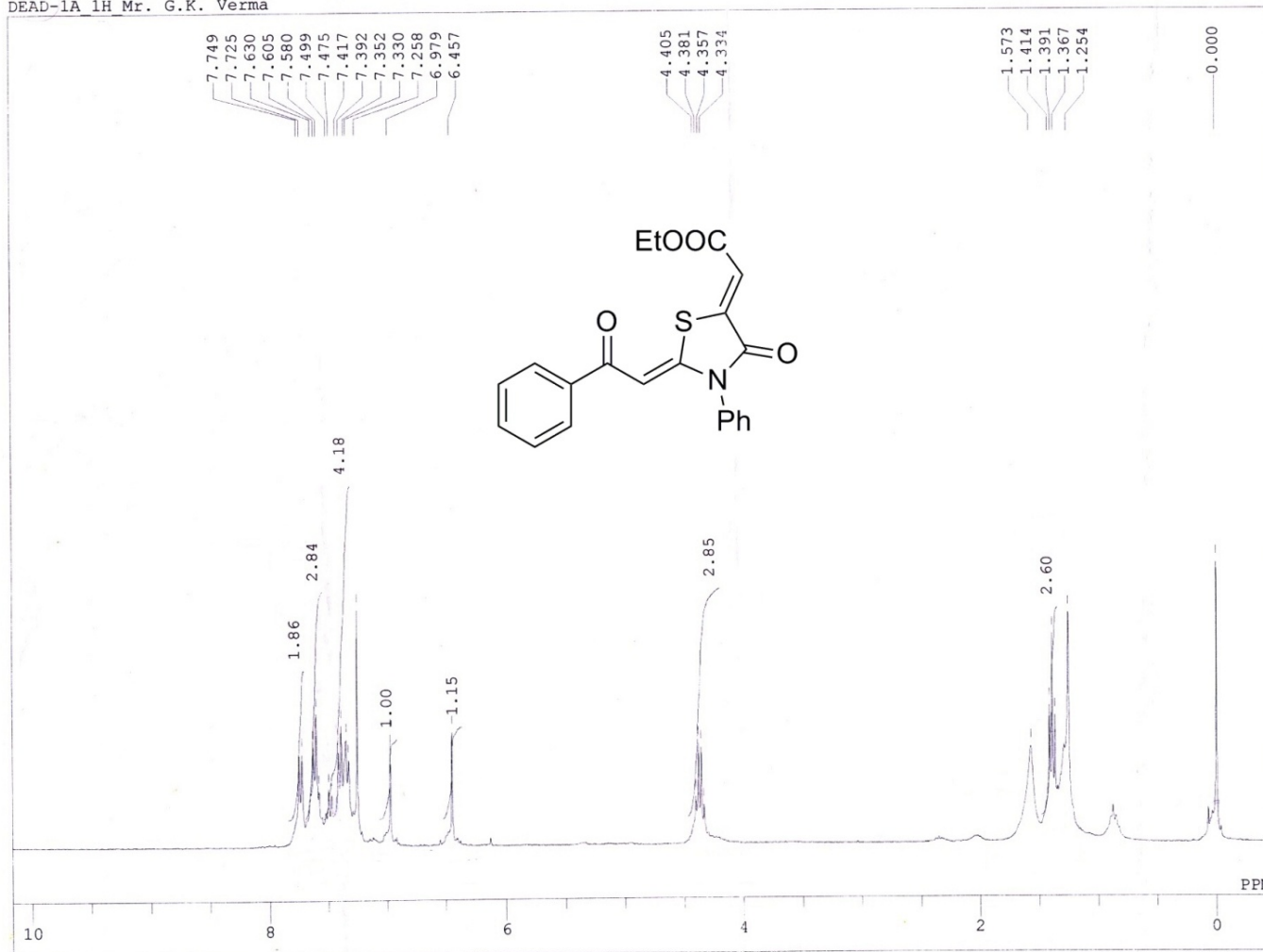


Scheme 1 Synthesis of thiazolidine-4-one derivatives **3**.

Copies of ^1H & ^{13}C -NMR Spectra

^1H & ^{13}C -NMR Spectra of 3aa:

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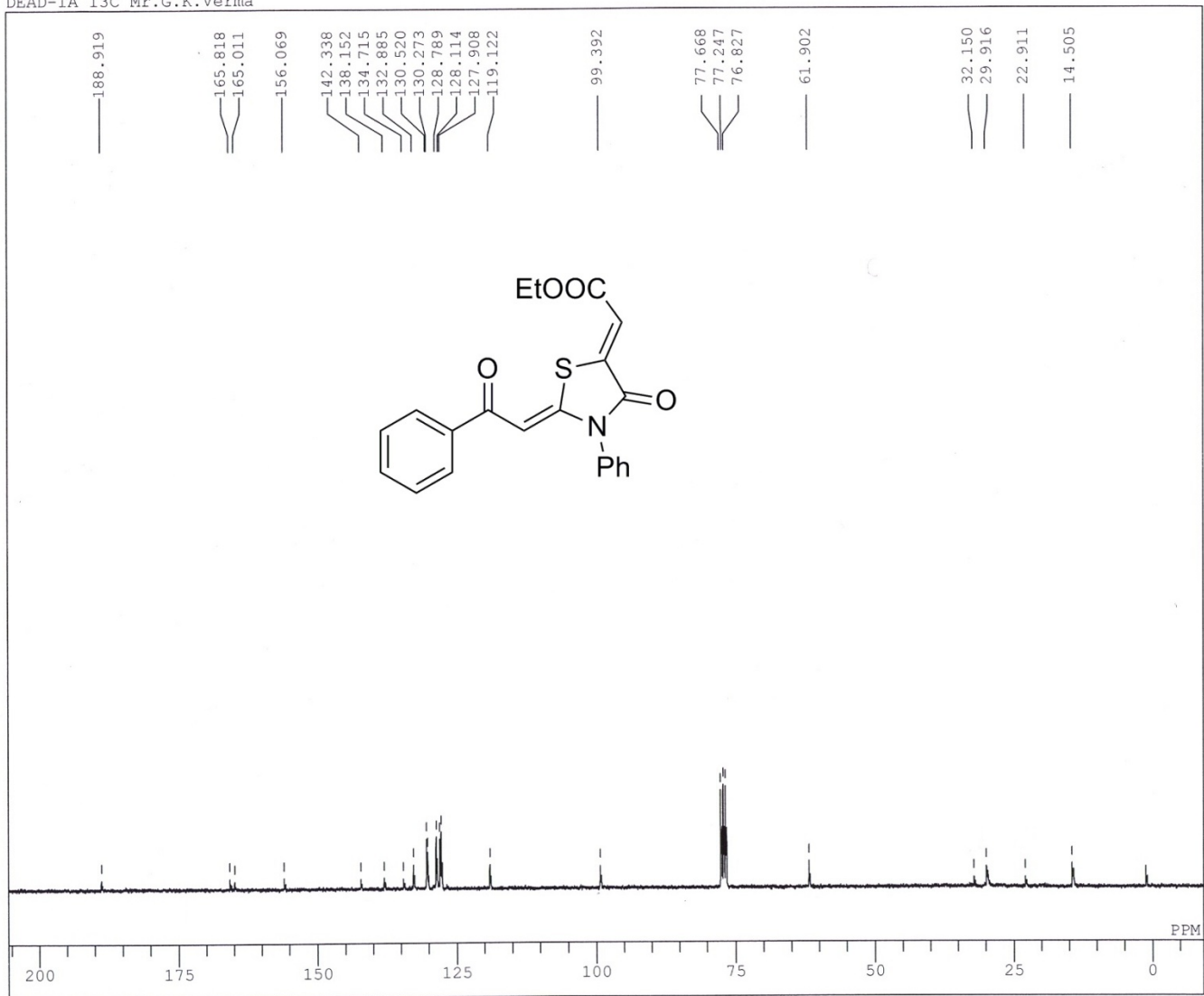


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

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OBFIN 1150.0 Hz
POINT 32768
FREQU 6016.8 Hz
SCANS 32
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IRNUC 1H
CTEMP 19.1 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 21

C:\WINNMR98\Data\DEAD-1A_13C1BCM_E5.als
DEAD-1A 13C Mr.G.K.Verma



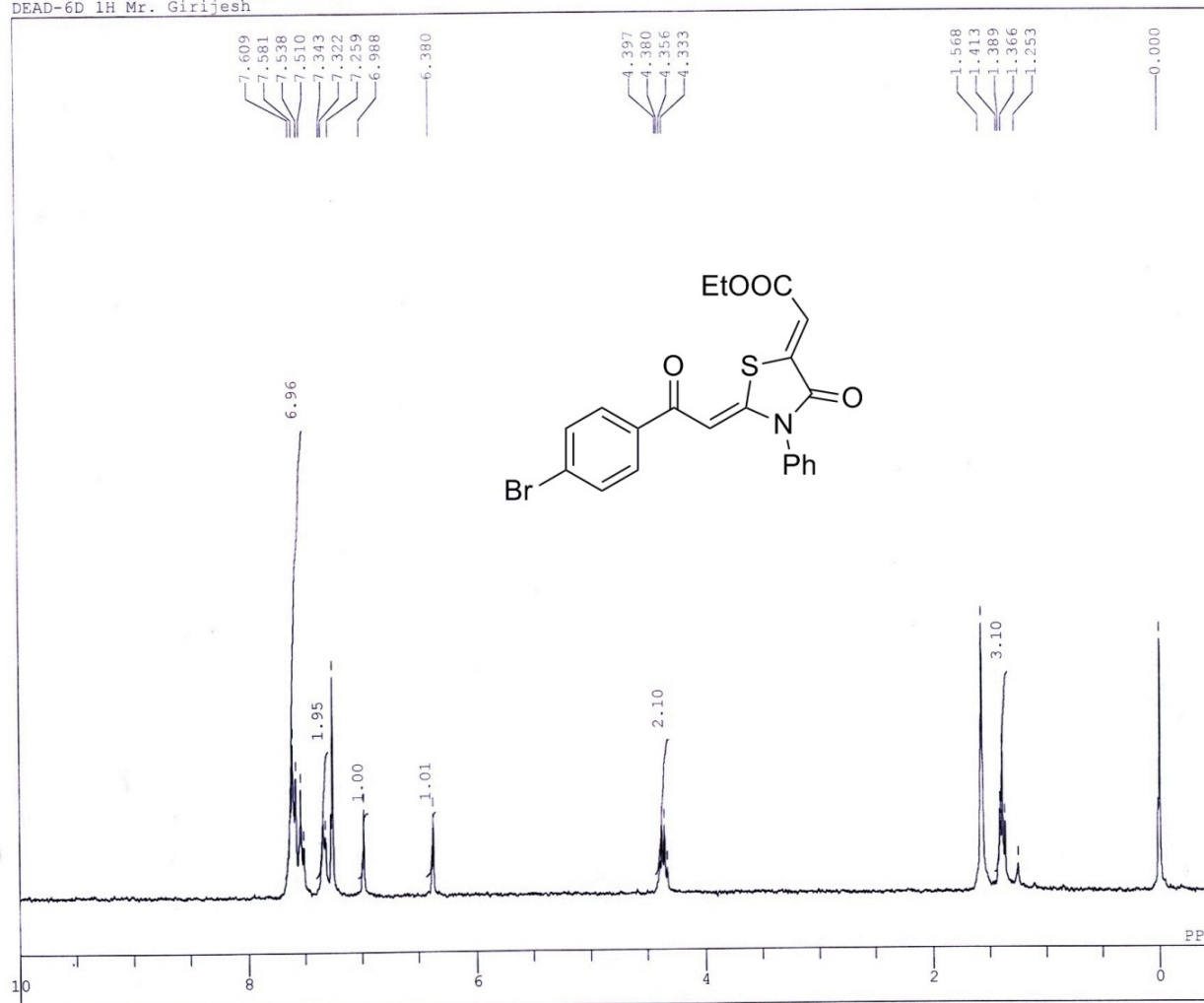
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

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OBSET 127.30 KHz
OBFIN 44.7 Hz
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FREQU 20408.1 Hz
SCANS 2176
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 18.7 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

¹H & ¹³C-NMR Spectra of 3ba:

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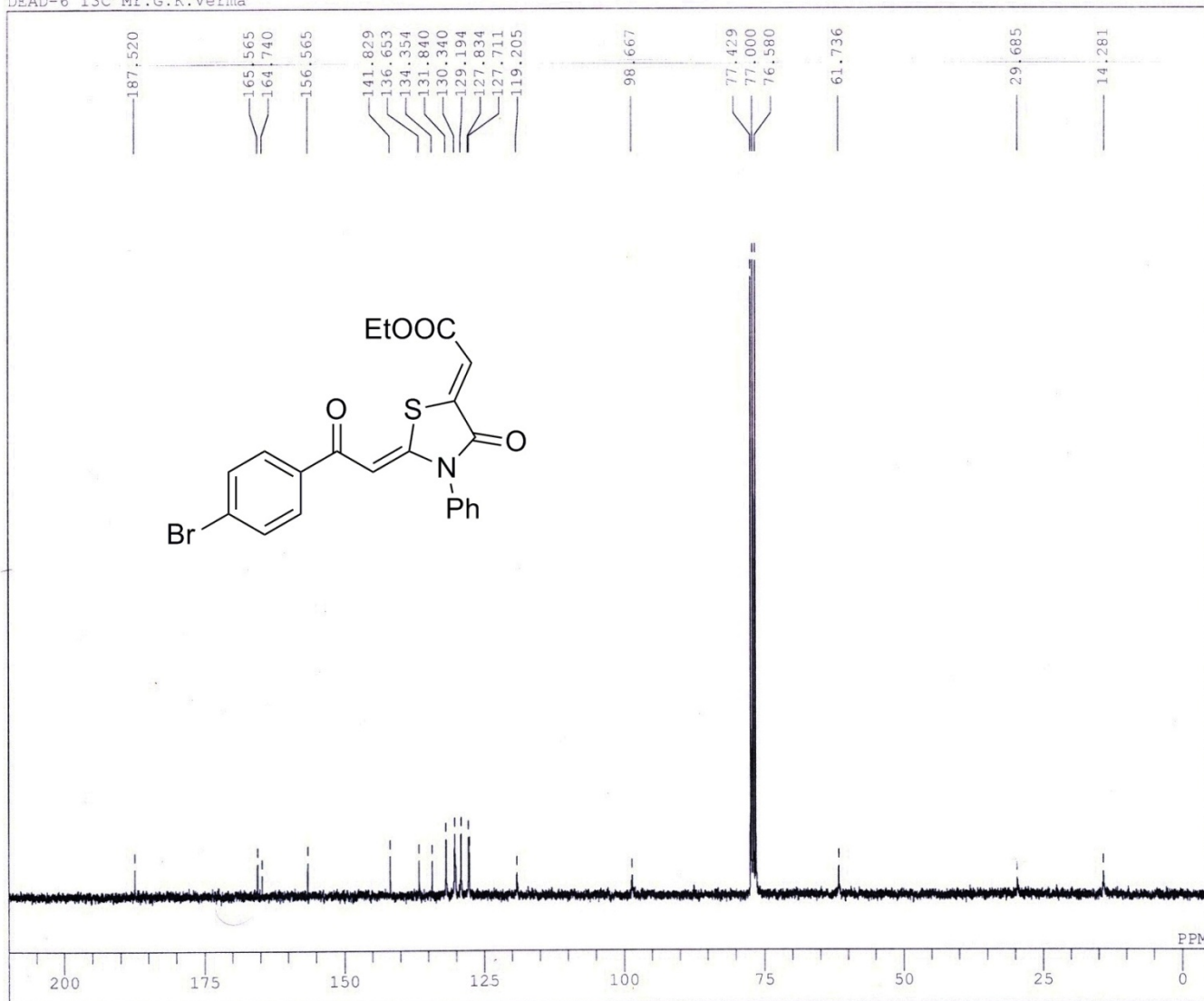


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Operator : Nagendra Kumar
Shishir Singh

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RGAIN 28

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DEAD-6 13C Mr.G.K.Verma



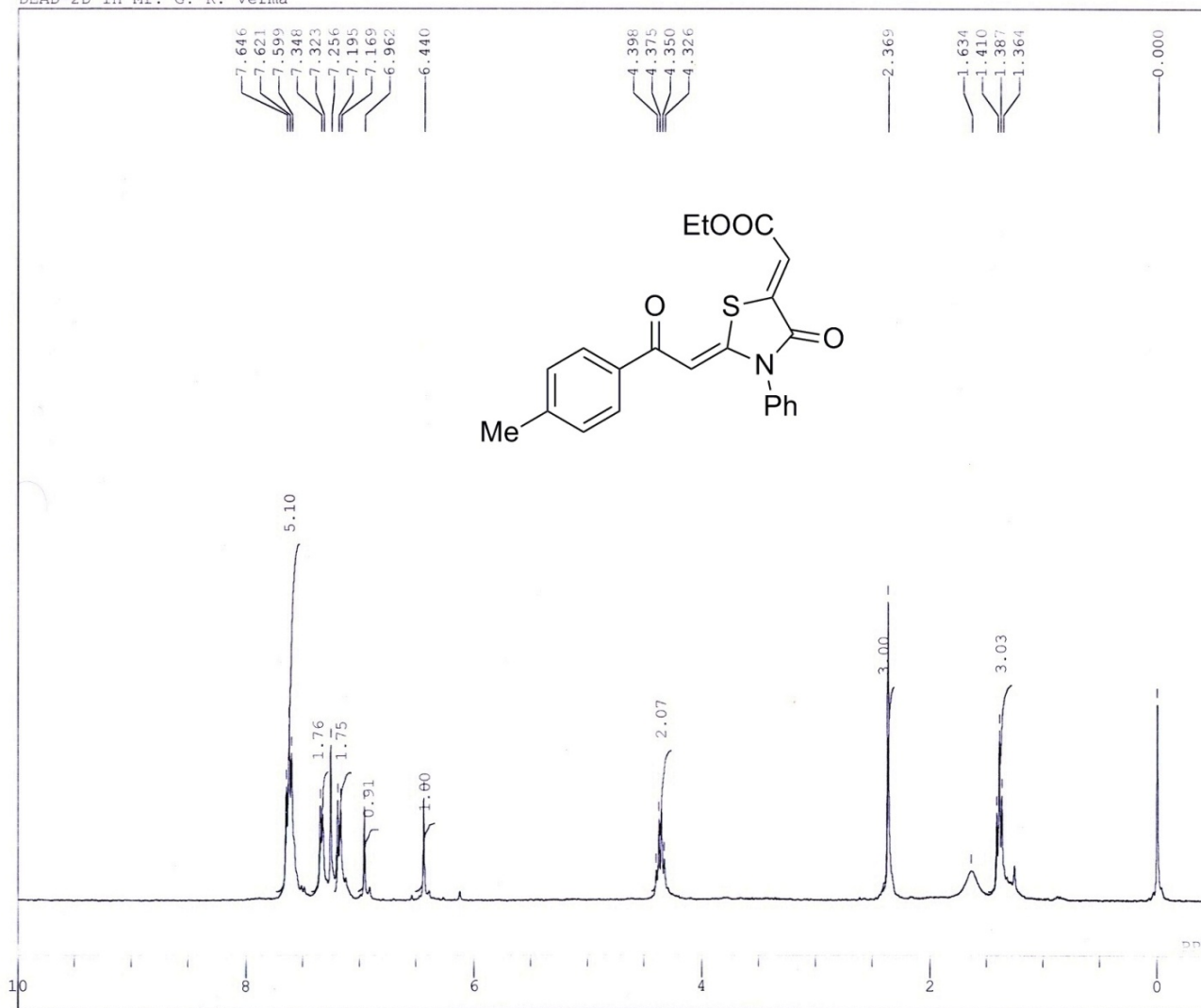
JEOL AL300 FTNMR
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Operator : Nagendra Kumar
Shishir Singh

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FREQU 20408.1 Hz
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PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 19.6 c
SLVNT CDCL3
EXREF 77.00 ppm
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RGAIN 18

¹H & ¹³C-NMR Spectra of 3ca:

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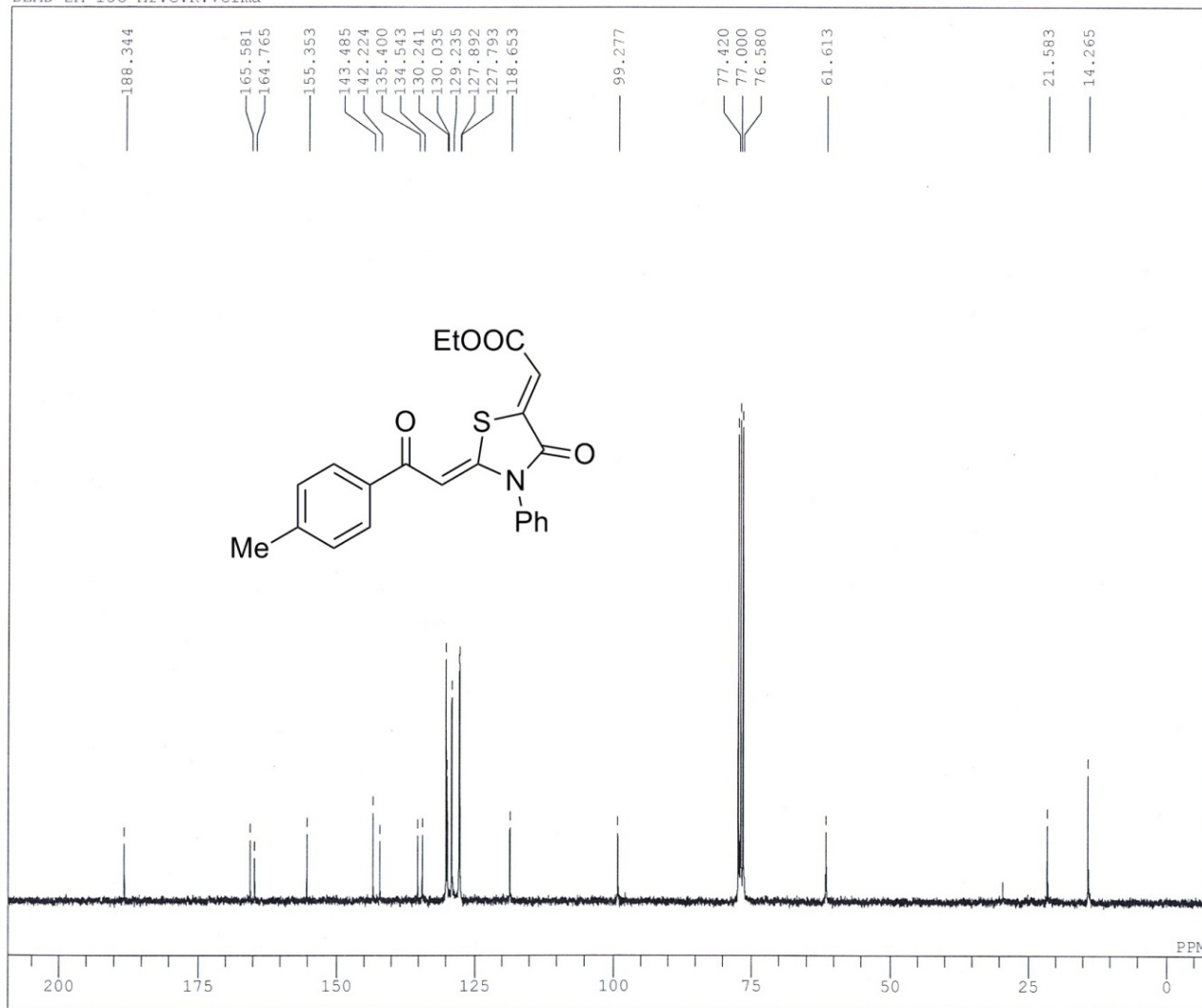


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Operator : Nagendra Kumar
Shishir Singh

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DATIM Tue Nov 26 17:40:49 20:
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OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 8
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 20.9 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.22 Hz
RGAIN 22

C:\Girijesh K. Verma\DEAD-2A_13C.als
DEAD-2A 13C Mr.G.K.Verma



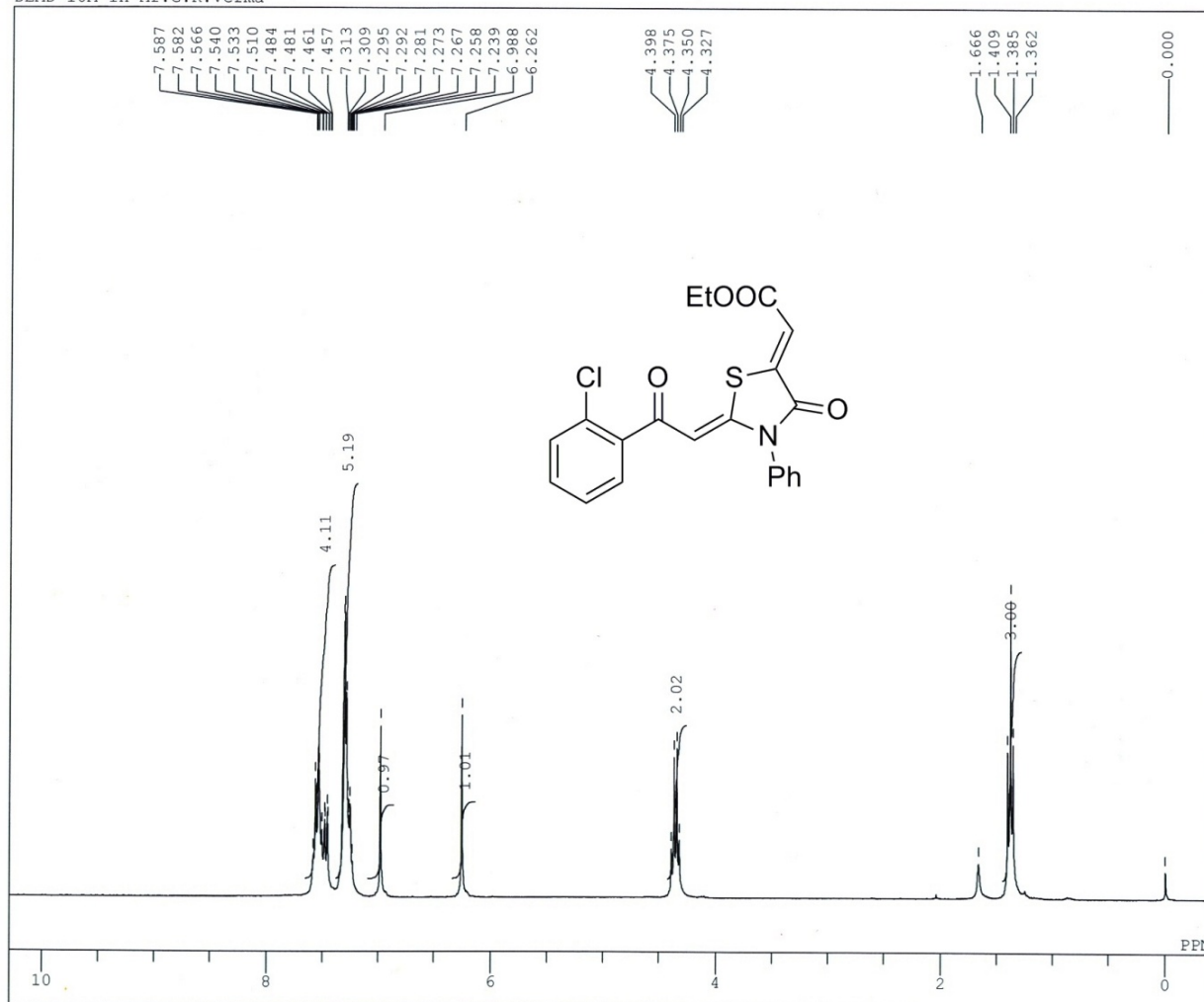
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Operator : Nagendra Kumar
Shishir Singh

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DATIM Tue Jun 25 02:14:39 20
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 2500
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 24.0 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 23

¹H & ¹³C-NMR Spectra of 3da:

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DEAD-10A_1H Mr.G.K.Verma

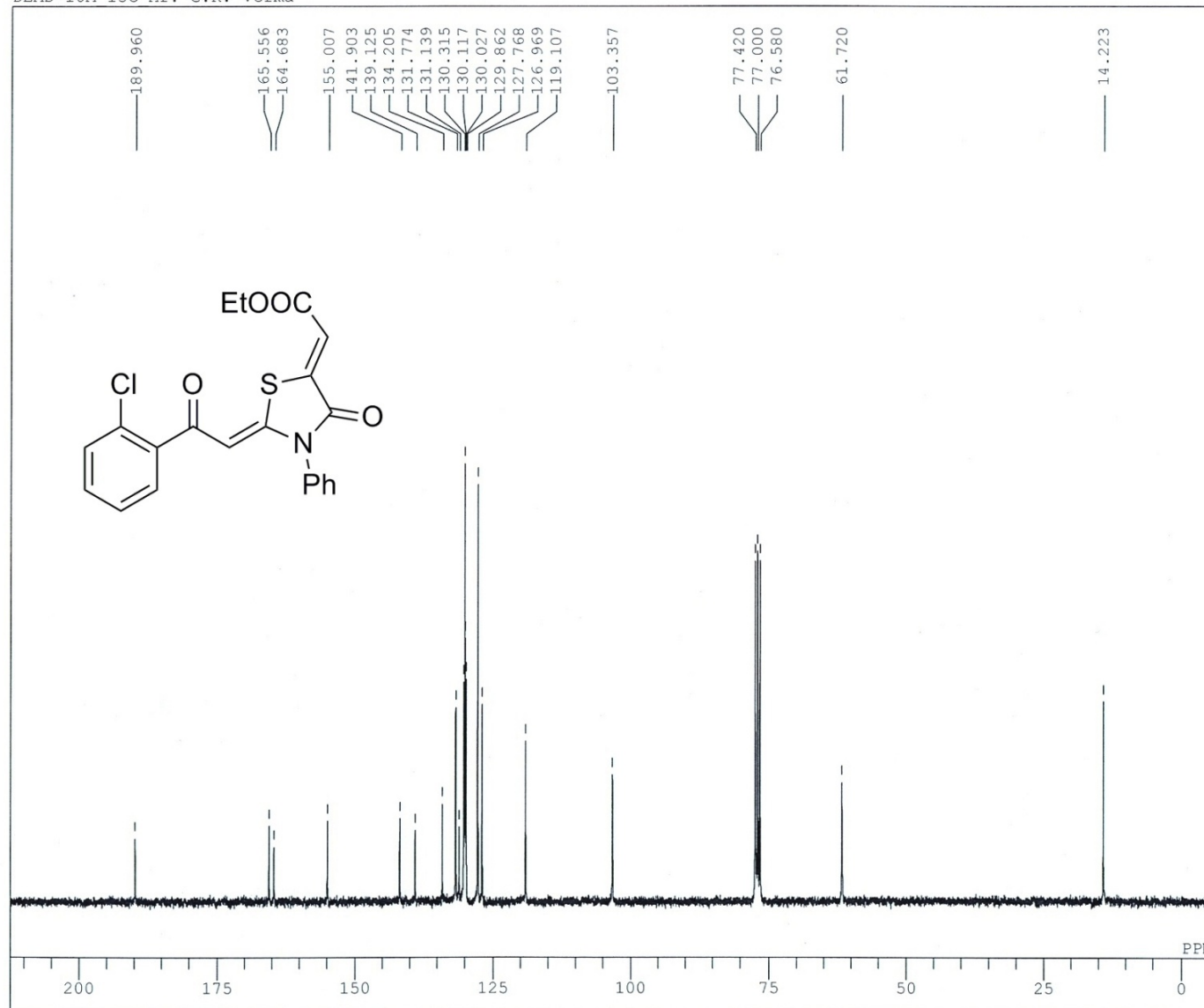


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Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-10A_1H Mr.G.K.Verr
DATIM Thu Jul 04 13:26:03 20:
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OBSET 130.00 KHz
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POINT 32768
FREQU 9505.7 Hz
SCANS 16
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PD 1.547 sec
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IRNUC 1H
CTEMP 24.9 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 0.12 Hz
RGAIN 16

C:\Girijesh K. Verma\DEAD-10A_13C.als
DEAD-10A 13C Mr. G.K. Verma



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Operator : Nagendra Kumar
Shishir Singh

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PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 22.1 c
SLVNT CDCL3
EXREF 77.00 ppm
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RGAIN 24

¹H & ¹³C-NMR Spectra of 3ea:

C:\WINNMR98\COMMON\DEFAULT.ALS
DEAD-11G 1H Mr. G. K. Verma

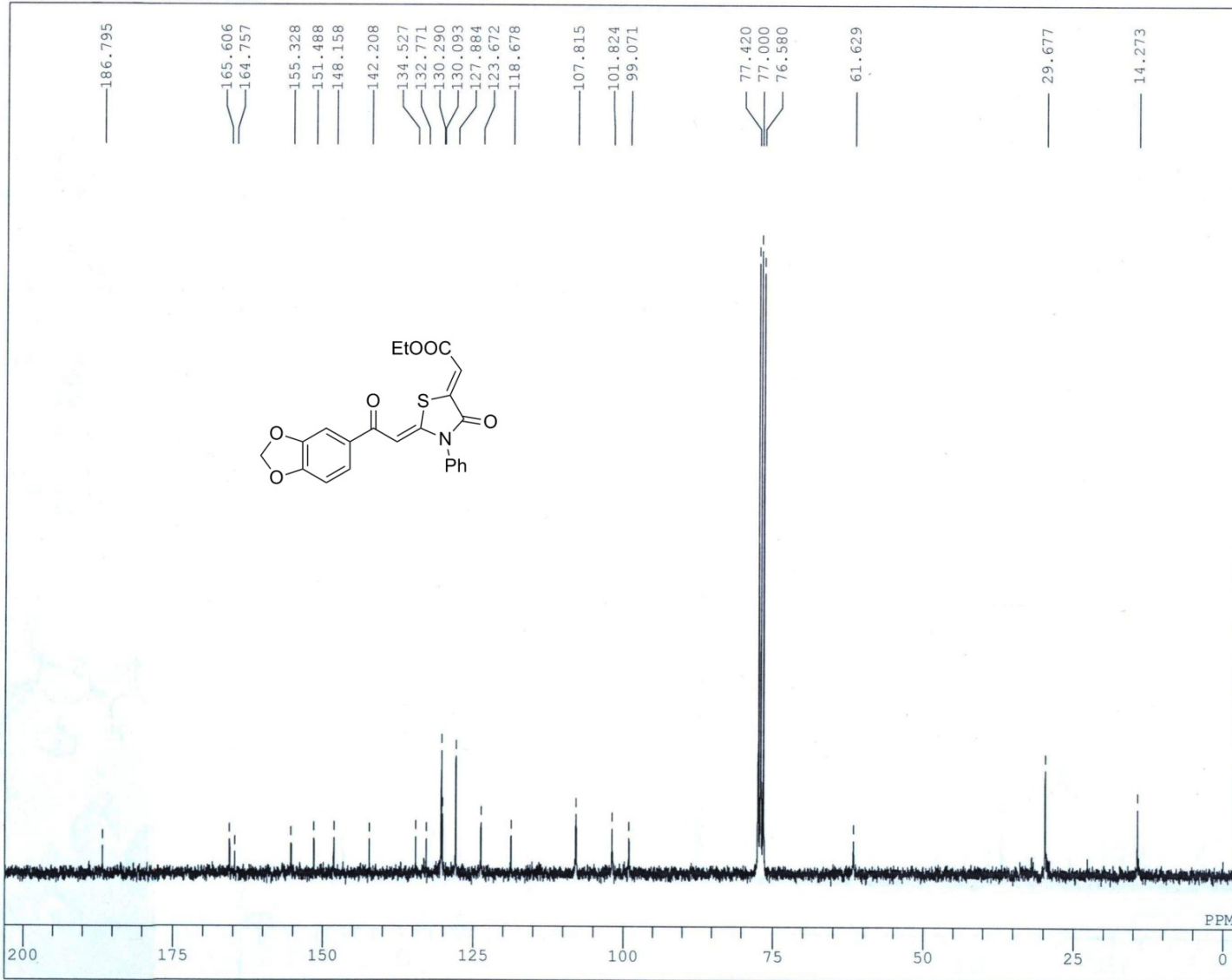


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Operator : Nagendra Kumar
Shishir Singh

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DATIM Tue Nov 26 17:35:29 20:
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POINT 32768
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SCANS 7
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IRNUC 1H
CTEMP 21.7 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.22 Hz
RGAIN 24

C:\WINNMR98\Data\DEAD-11A_13C1BCM_E4.als
DEAD-11A 13C Mr.G.K.Verma



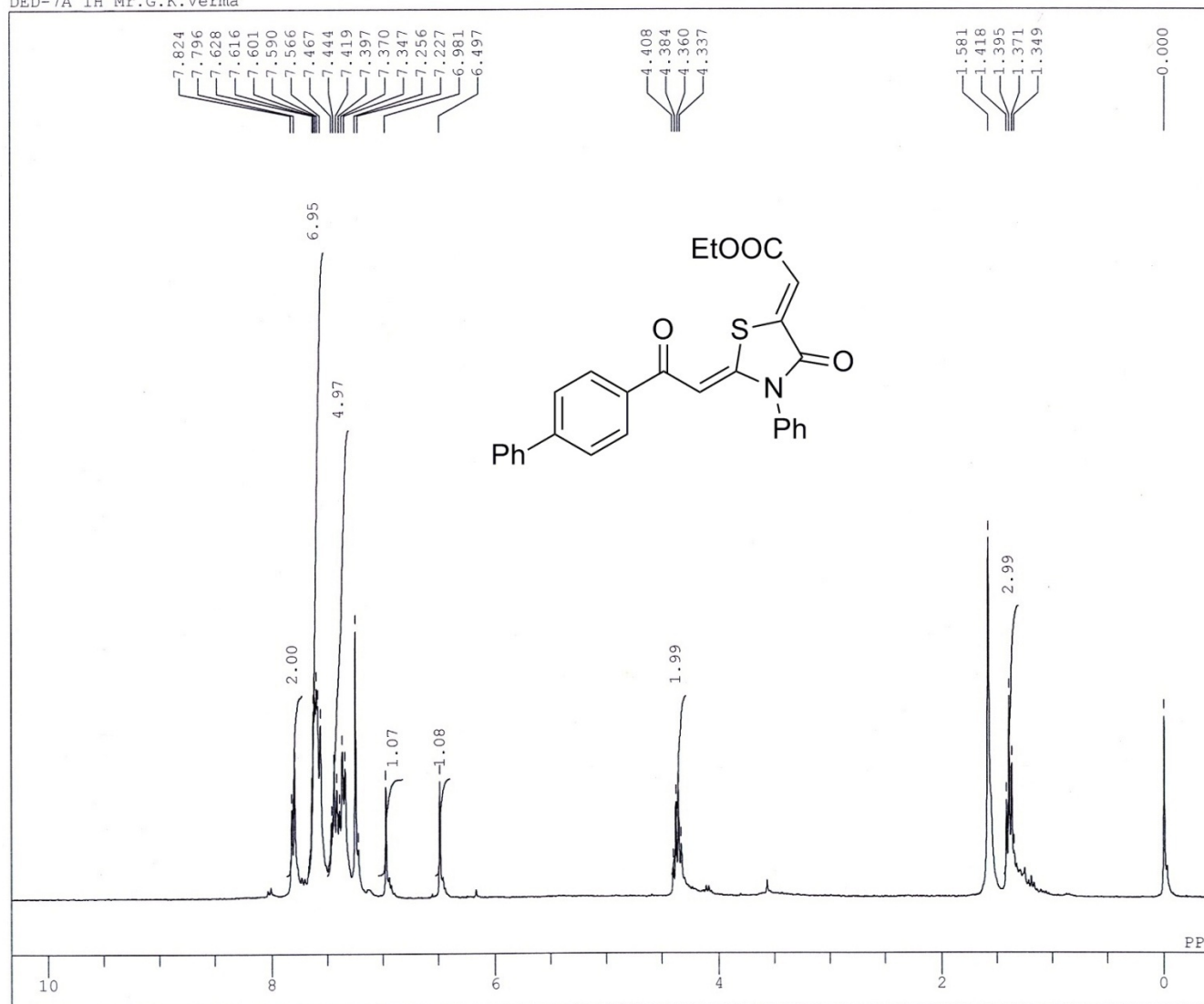
JEOL AL300 FTNMR
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Operator : Nagendra Kuma
Shishir Singh

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EXMOD BCM
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OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 2000
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 21.7 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24

¹H & ¹³C-NMR Spectra of 3fa:

C:\Girijesh K. Verma\DED-7A_1H_.als
DED-7A 1H Mr.G.K.Verma

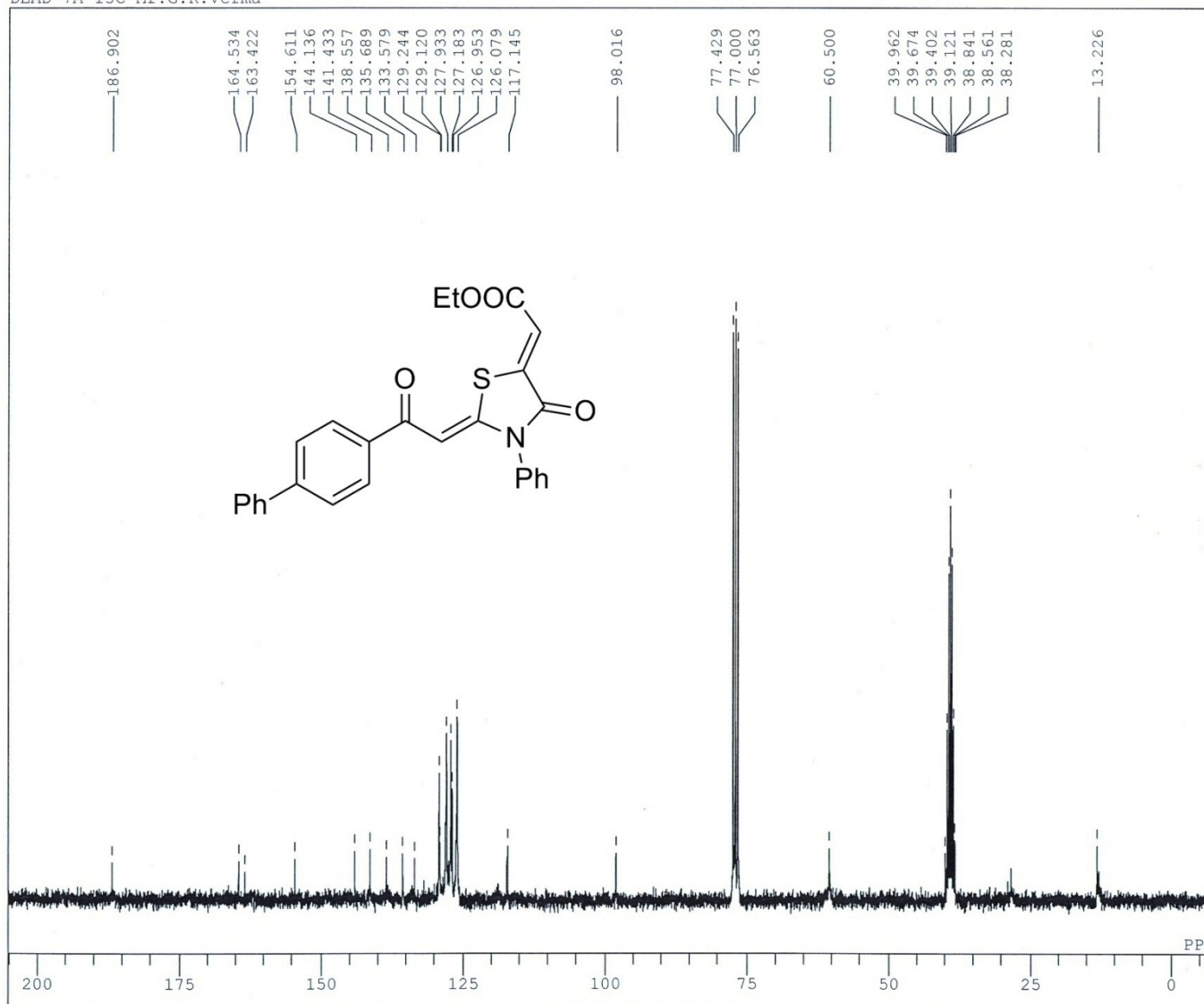


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Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DED-7A_1H Mr.G.K.Verma
DATIM Fri Jun 28 11:45:41 20:
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EXMOD NON
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OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 26
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PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 24.7 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 21

C:\Girijesh K. Verma\DEAD-7A_13C.als
DEAD-7A 13C Mr.G.K.Verma



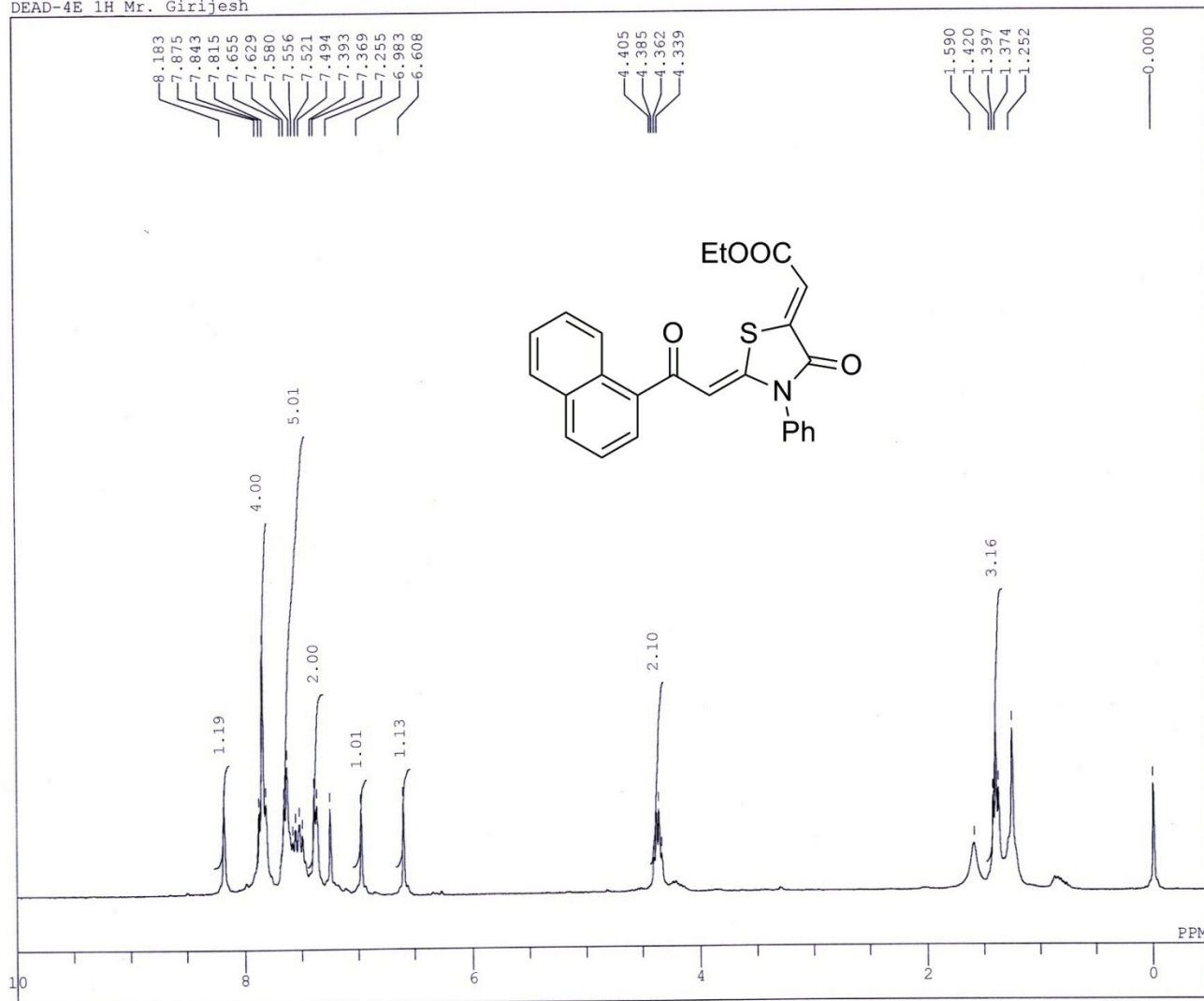
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Operator : Nagendra Kumar
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OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
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PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 50.3 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.22 Hz
RGAIN 23

¹H & ¹³C-NMR Spectra of 3ga:

C:\Girijesh K. Verma\DEAD-4E_1H.als
DEAD-4E 1H Mr. Girijesh

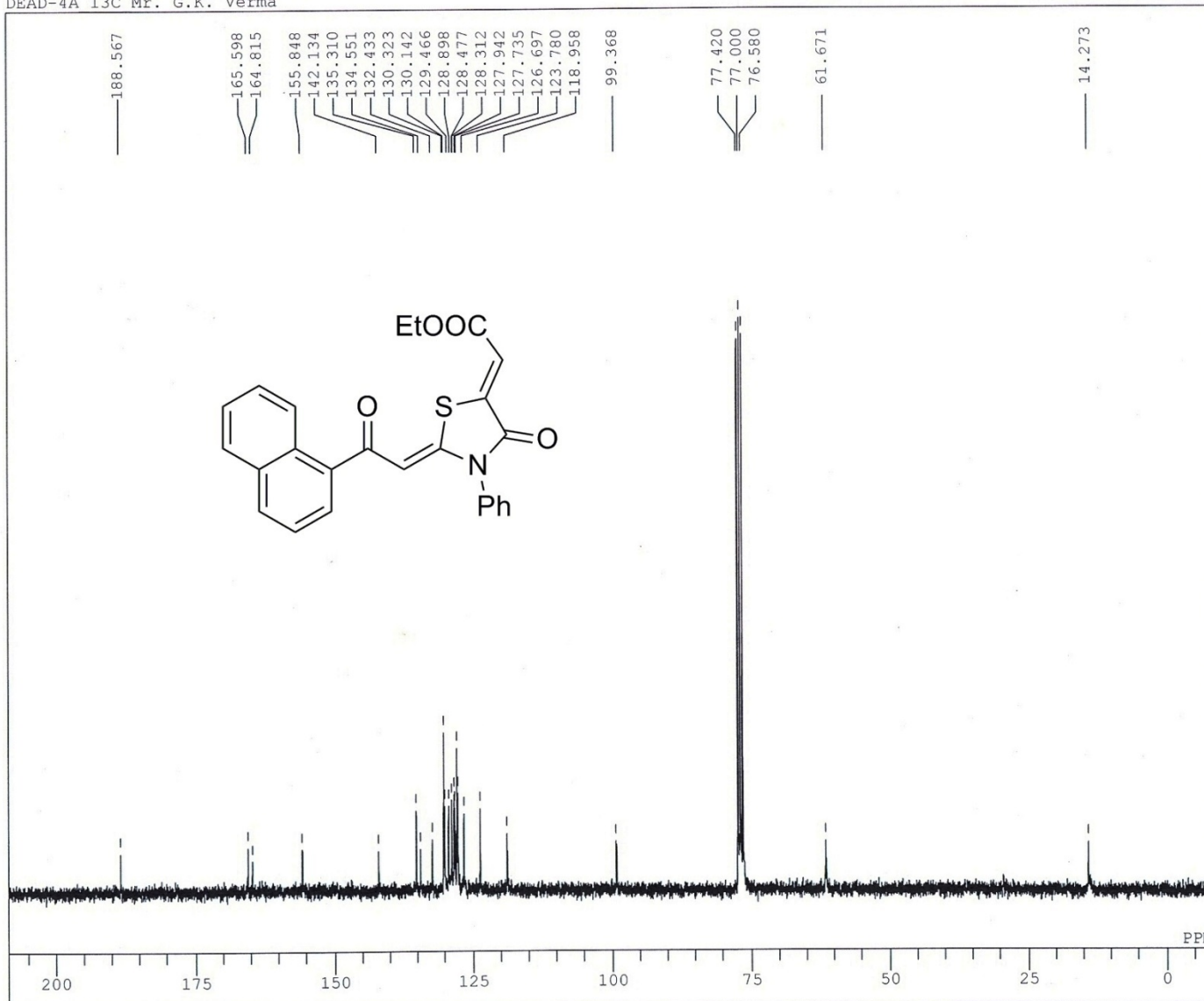


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CHEMISTRY DEPARTMENT
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VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

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OBSET 130.00 KHz
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POINT 32768
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PW1 5.2 us
IRNUC 1H
CTEMP 20.8 c
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RGAIN 20

C:\Girijesh K. Verma\DEAD-4A_13C.als
DEAD-4A 13C Mr. G.K. Verma



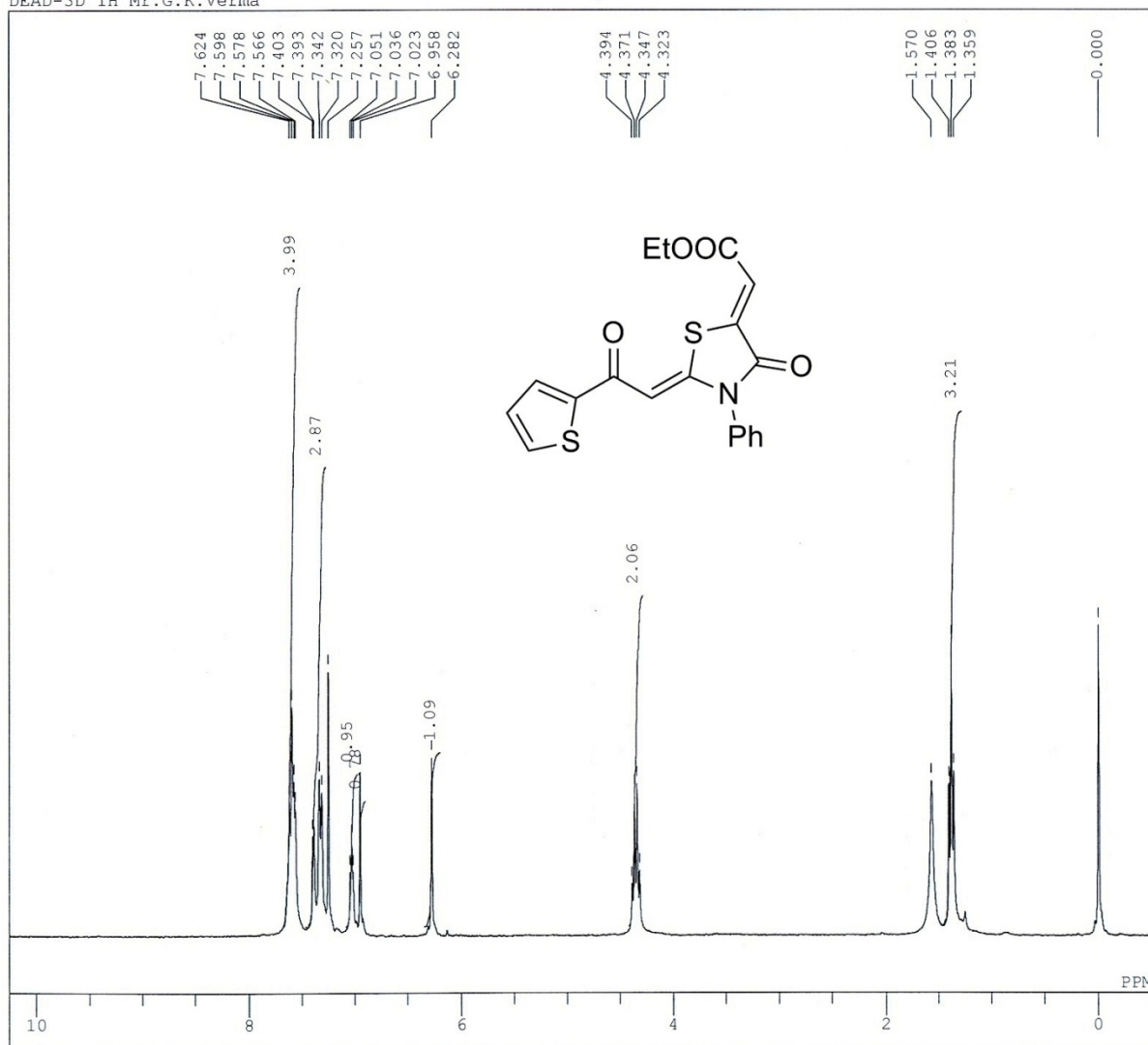
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

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COMNT DEAD-4A_13C Mr. G.K. Ve
DATIM Thu Jun 27 21:02:18 20:
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OBSET 124.00 KHz
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POINT 32768
FREQU 20408.1 Hz
SCANS 2000
ACQTM 1.606 sec
PD 1.394 sec
PWL 5.9 us
IRNUC 1H
CTEMP 24.1 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24

¹H & ¹³C-NMR Spectra of 3ha:

C:\Girijesh K. Verma\DEAD-3D_1H.als
DEAD-3D_1H Mr.G.K.Verma

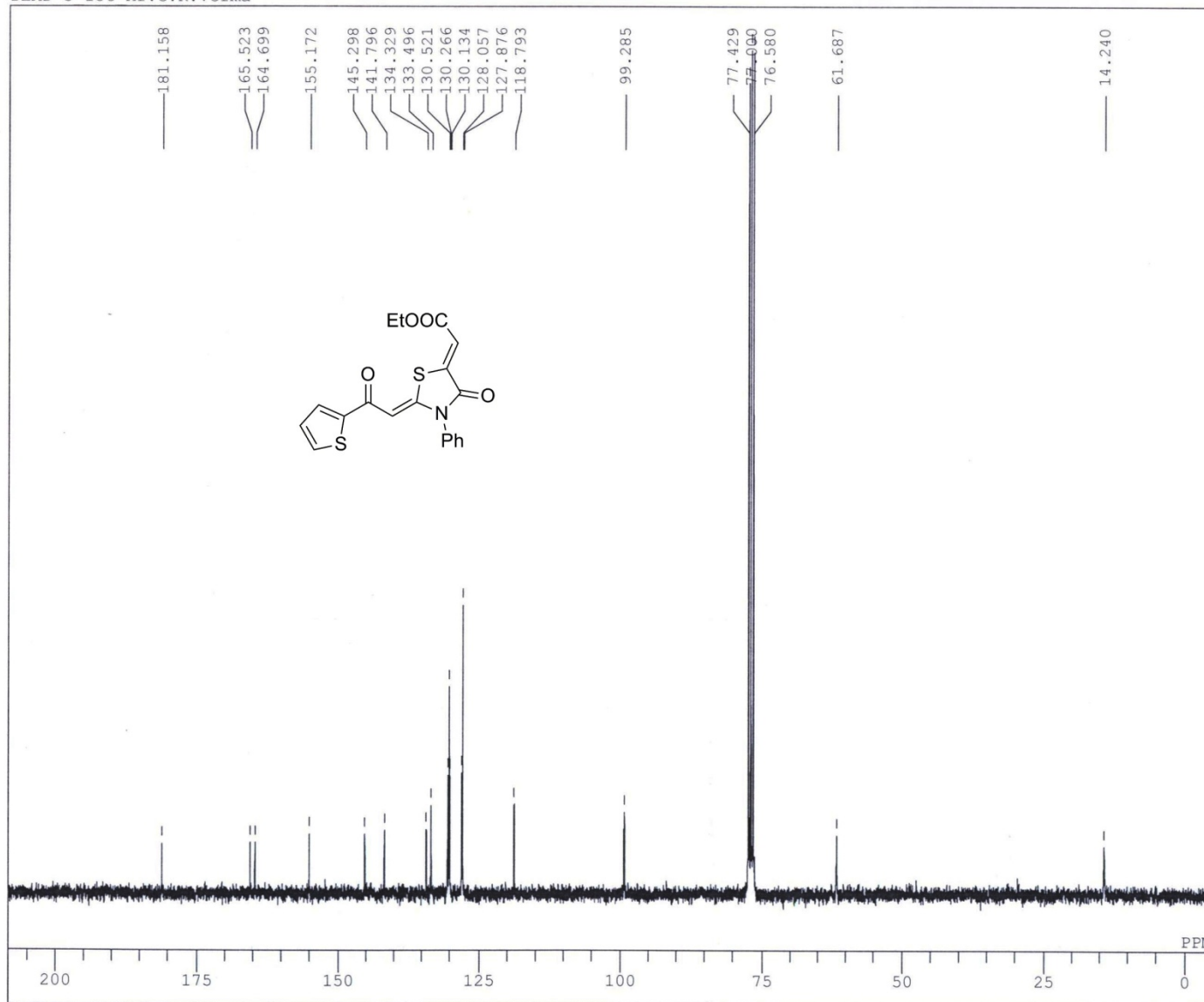


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VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

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OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 20
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PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 23.9 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 23

C:\Girijesh K. Verma\DEAD-3_13C.als
DEAD-3 13C Mr.G.K.Verma



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Operator : Nagendra Kumar
Shishir Singh

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FREQU 20408.1 Hz
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PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 18.1 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 22

¹H & ¹³C-NMR Spectra of 3ia:

C:\WINNMR98\COMMON_DEFAULT.ALS
DEAD-13C 1H Mr. Girijesh K. Verma

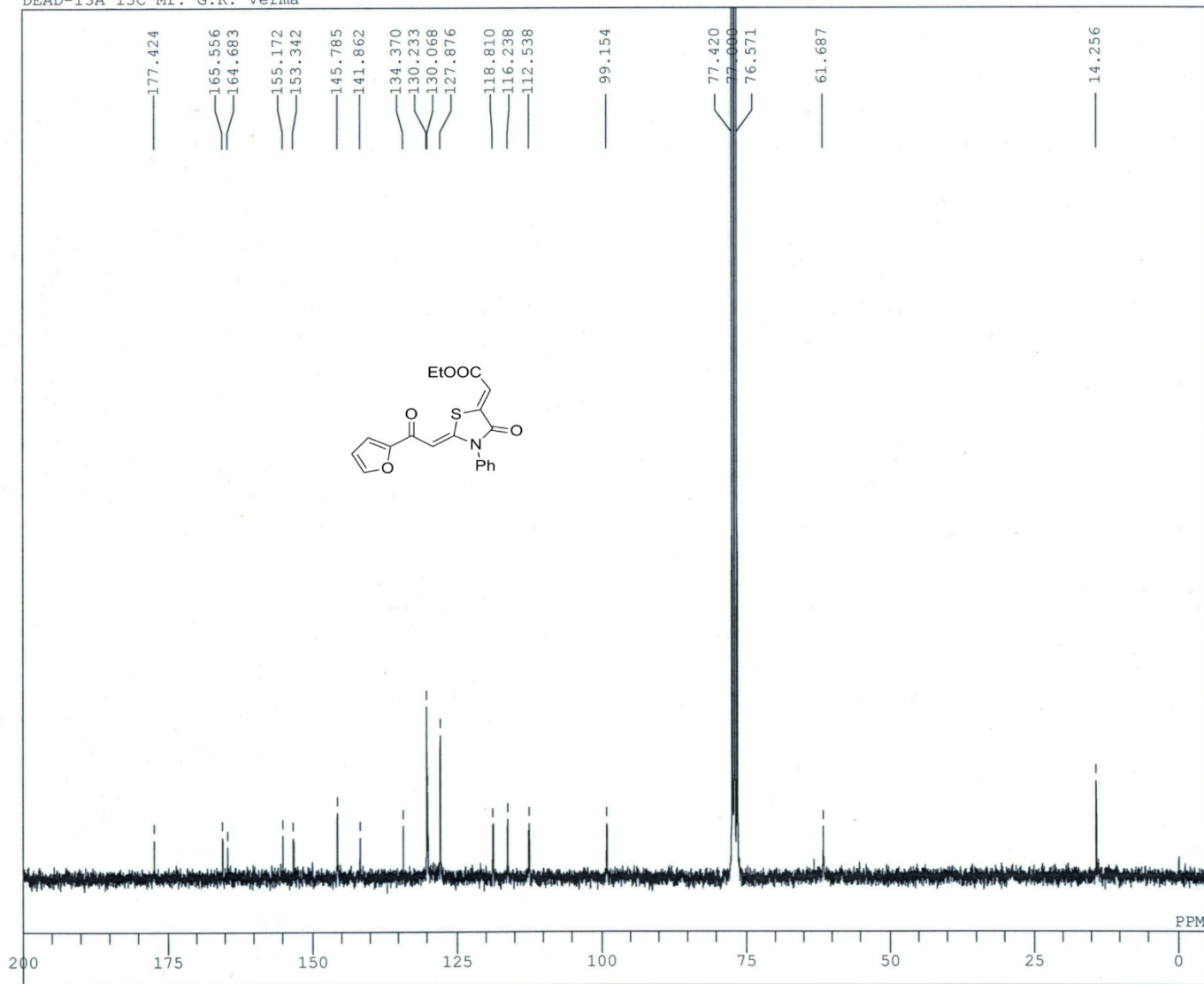


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Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEI
COMNT DEAD-13C 1H Mr. Girije
DATIM Thu Nov 28 12:15:29 20
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
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ACQTM 3.447 sec
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PW1 5.2 us
IRNUC 1H
CTEMP 18.9 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 24

C:\Girijesh K. Verma\DEAD-13A_13C.als
DEAD-13A 13C Mr. G.K. Verma



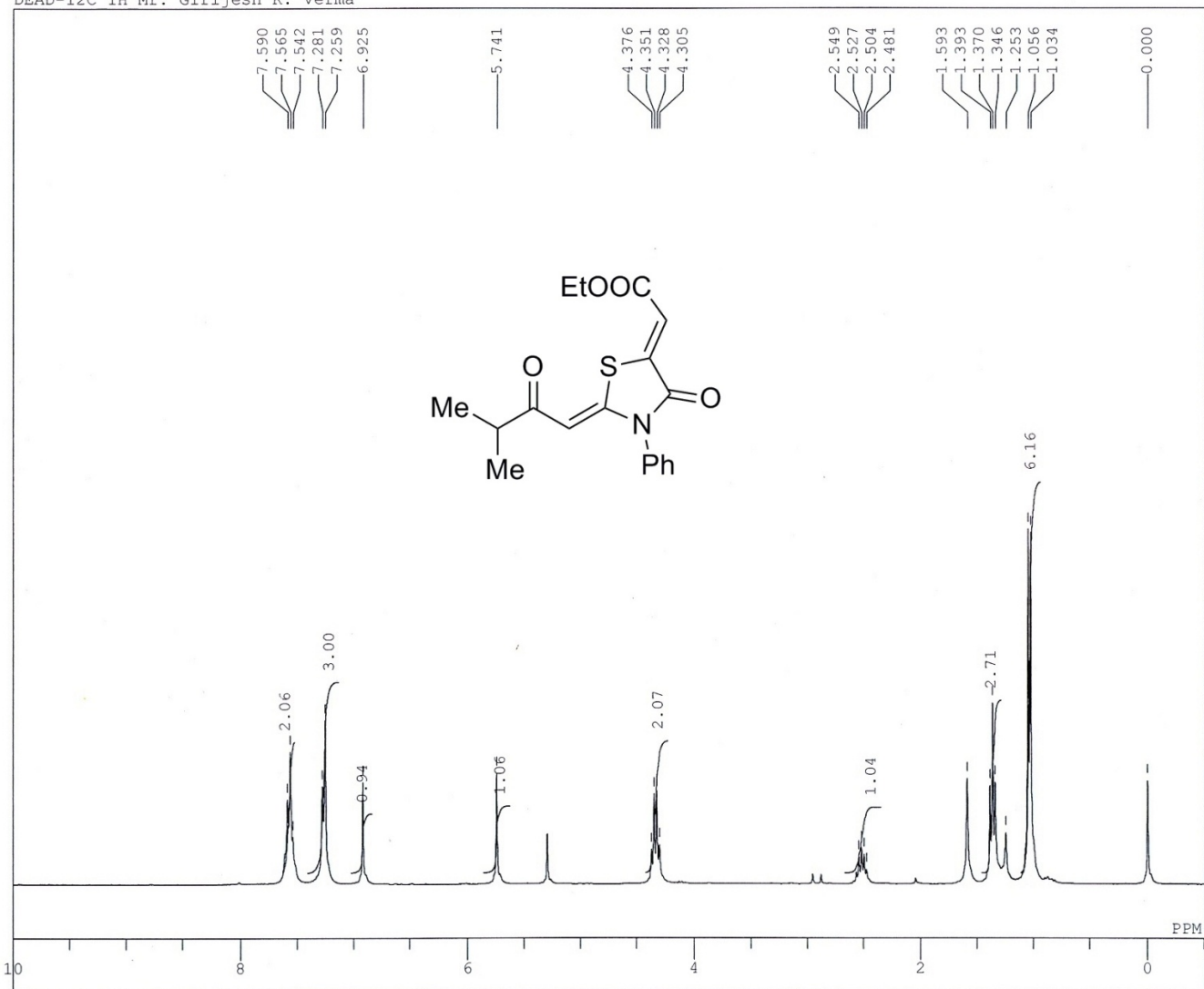
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-13A_13C_Mr. G.K. \\
DATIM Wed Jul 10 02:57:01 20:
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OBFIN 1840.0 Hz
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FREQU 20408.1 Hz
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PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 22.9 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24

¹H & ¹³C-NMR Spectra of 3ja:

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DEAD-12C 1H Mr. Girijesh K. Verma

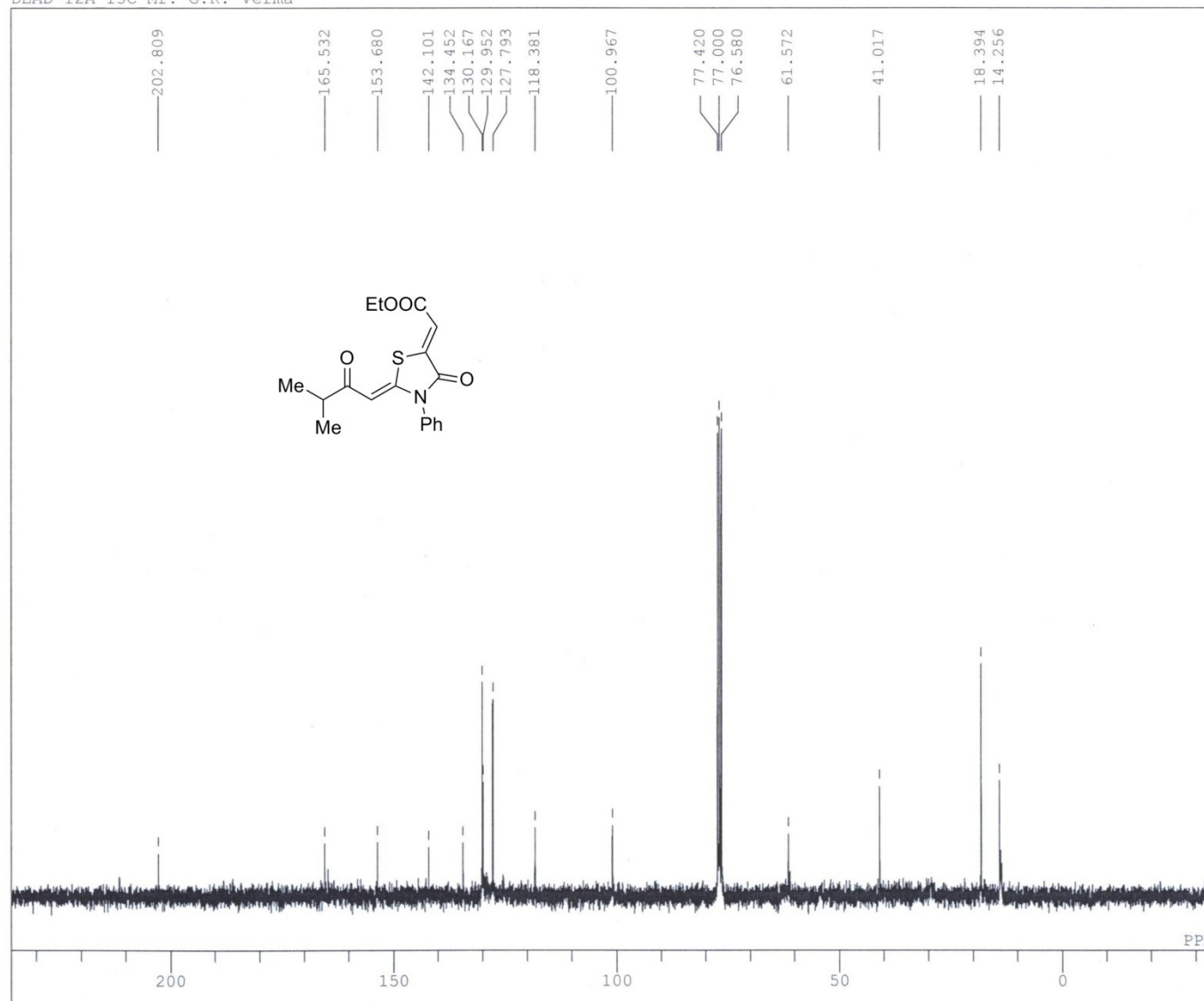


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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DEAD-12C 1H Mr. Girijesh K. Verma
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IRNUC 1H
CTEMP 18.8 c
SLVNT CDCL3
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RGAIN 20

C:\Girijesh K. Verma\DEAD-12A_13C.als
DEAD-12A 13C Mr. G.K. Verma



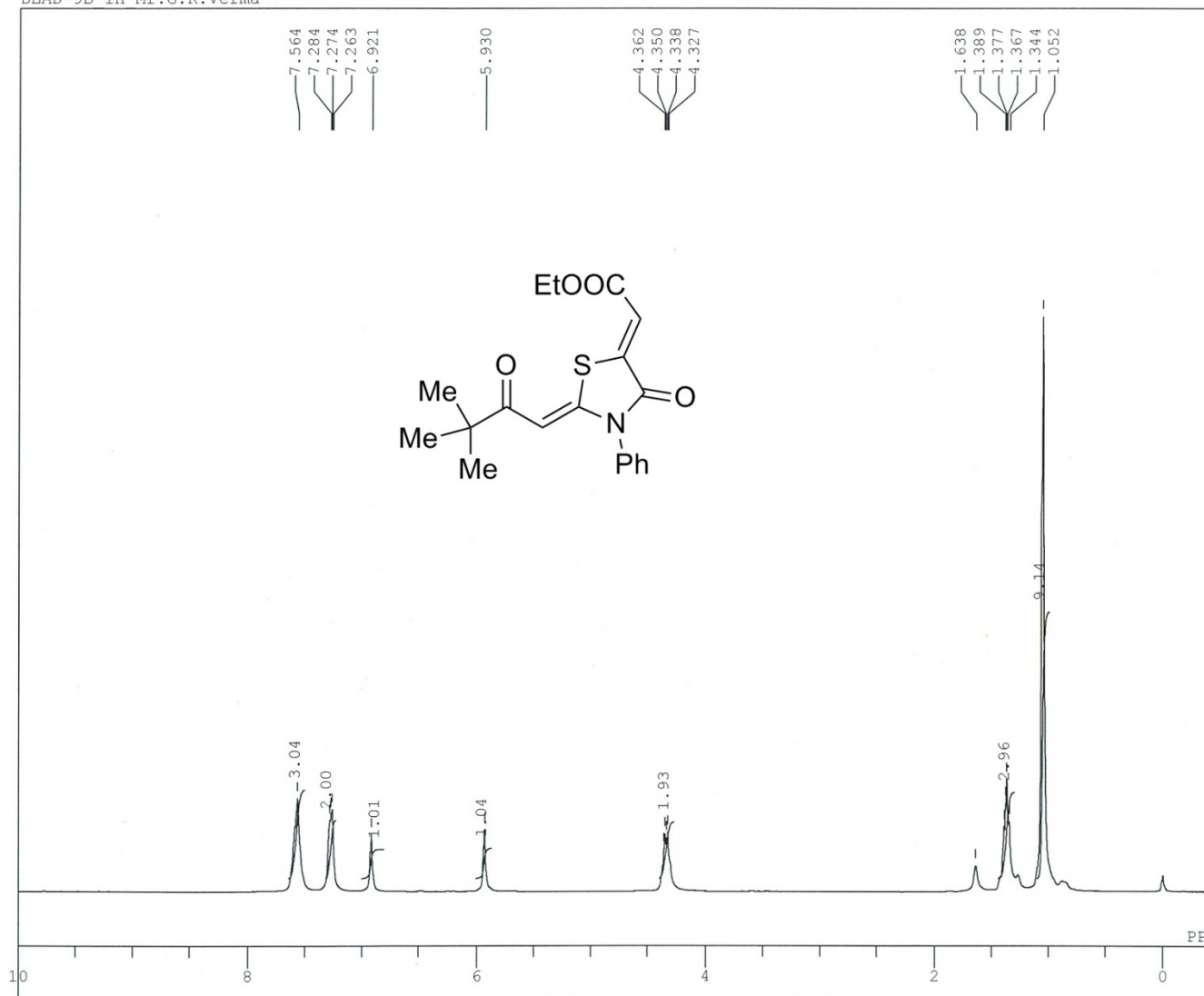
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-12A_13C Mr. G.K. \\
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EXMOD BCM
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OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
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ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 23.9 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 23

¹H & ¹³C-NMR Spectra of 3ka:

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DEAD-9B 1H Mr.G.K.Verma

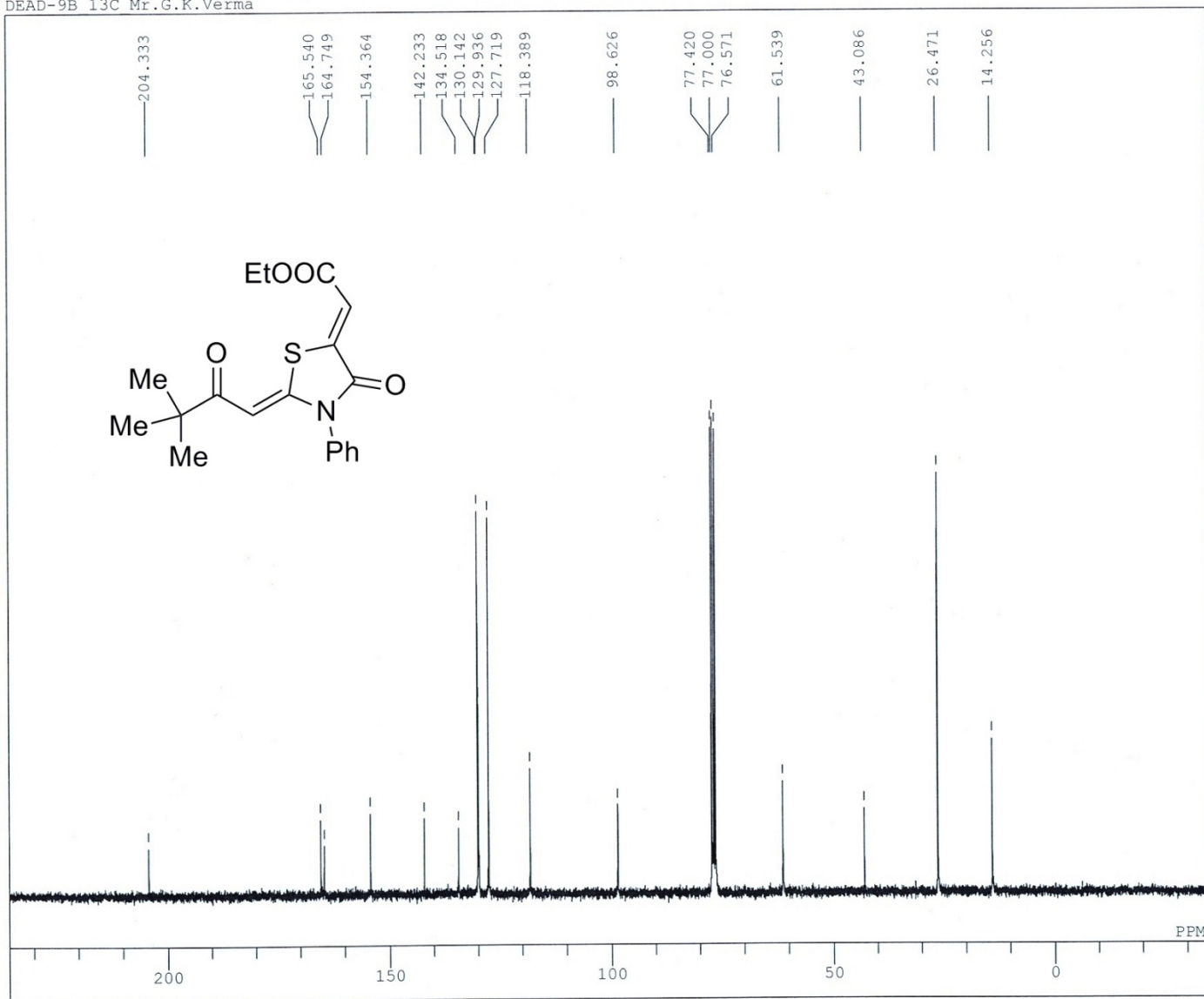


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-9B_1H_Mr.G.K.Verma
DATIM Wed Jul 03 16:06:44 20:
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 28
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 25.5 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.22 Hz
RGAIN 16

C:\Girijesh K. Verma\DEAD-9B_13C.als
DEAD-9B_13C Mr.G.K.Verma



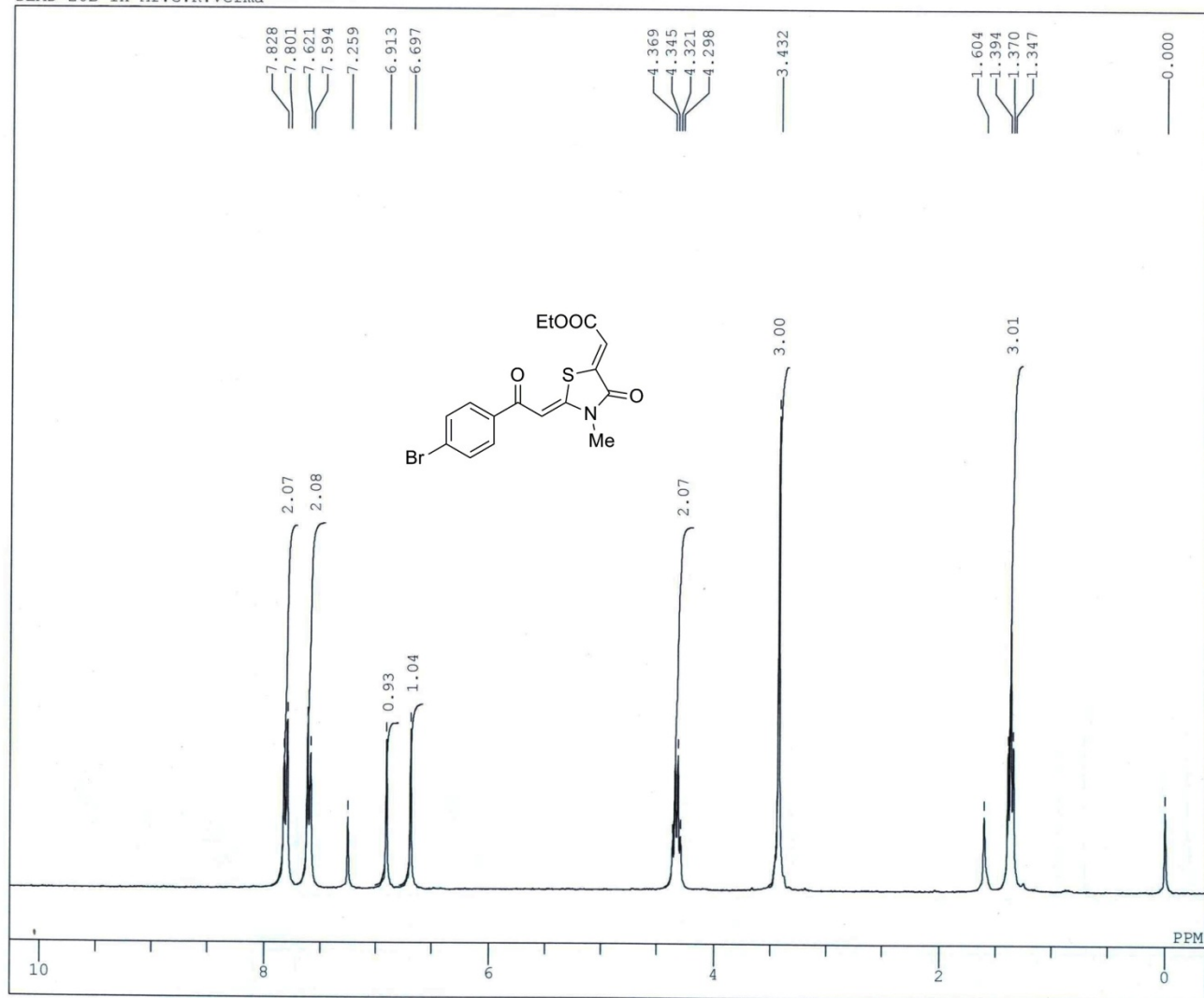
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-9B_13C Mr.G.K.Verr
DATIM Wed Jul_03 20:06:22 20:
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 2000
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 21.8 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 23

¹H & ¹³C-NMR Spectra of 3la:

C:\Girijesh K. Verma\DEAD-20B_1H.als
DEAD-20B 1H Mr.G.K.Verma

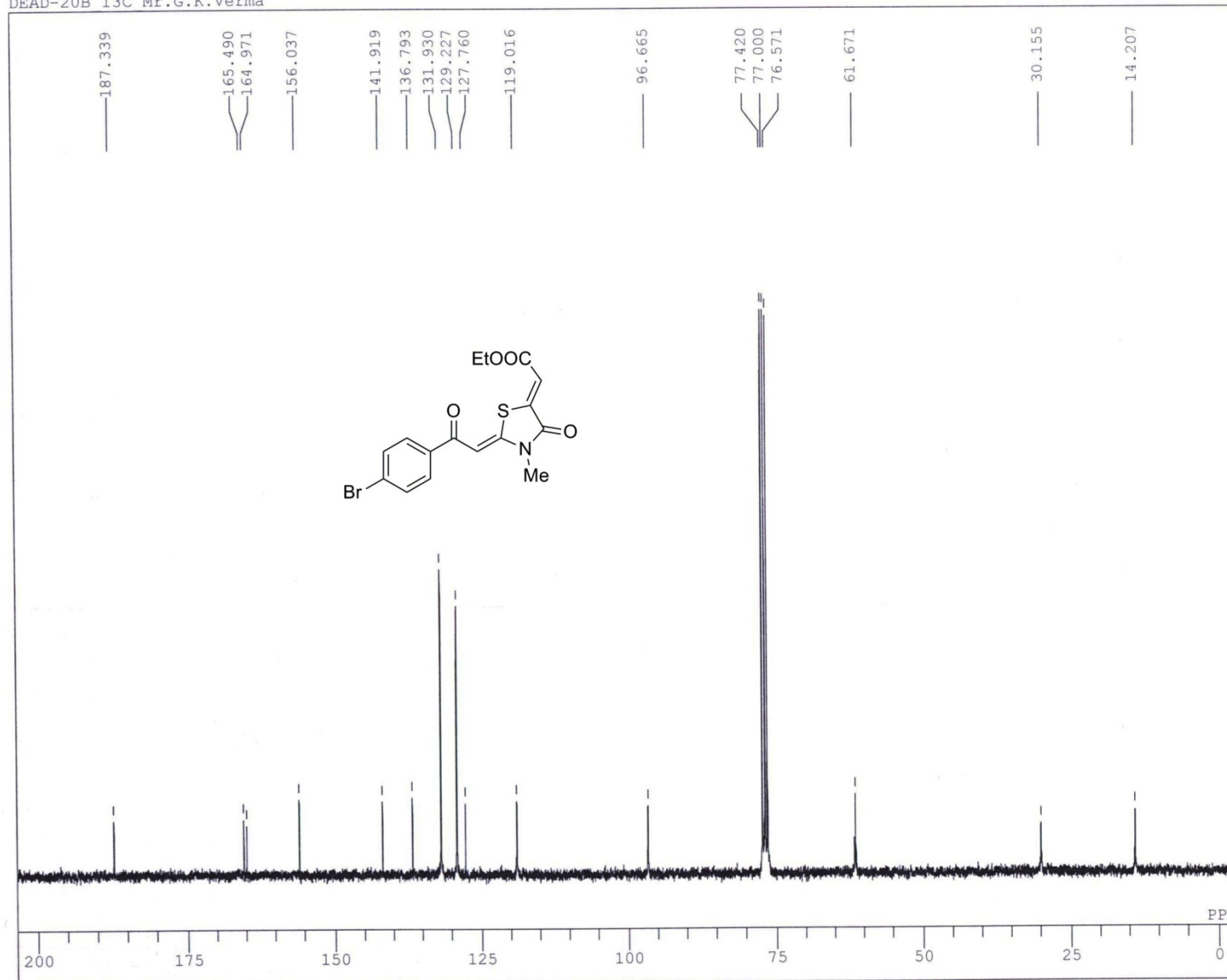


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DF
COMNT DEAD-20B 1H Mr.G.K.Verr
DATIM Tue Aug 13 17:42:23 20
OBNUC 1H
EXMOD NON
OBFREQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 8
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 23.8 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 21

C:\Girijesh K. Verma\DEAD-20B_13C.als
DEAD-20B 13C Mr.G.K.Verma



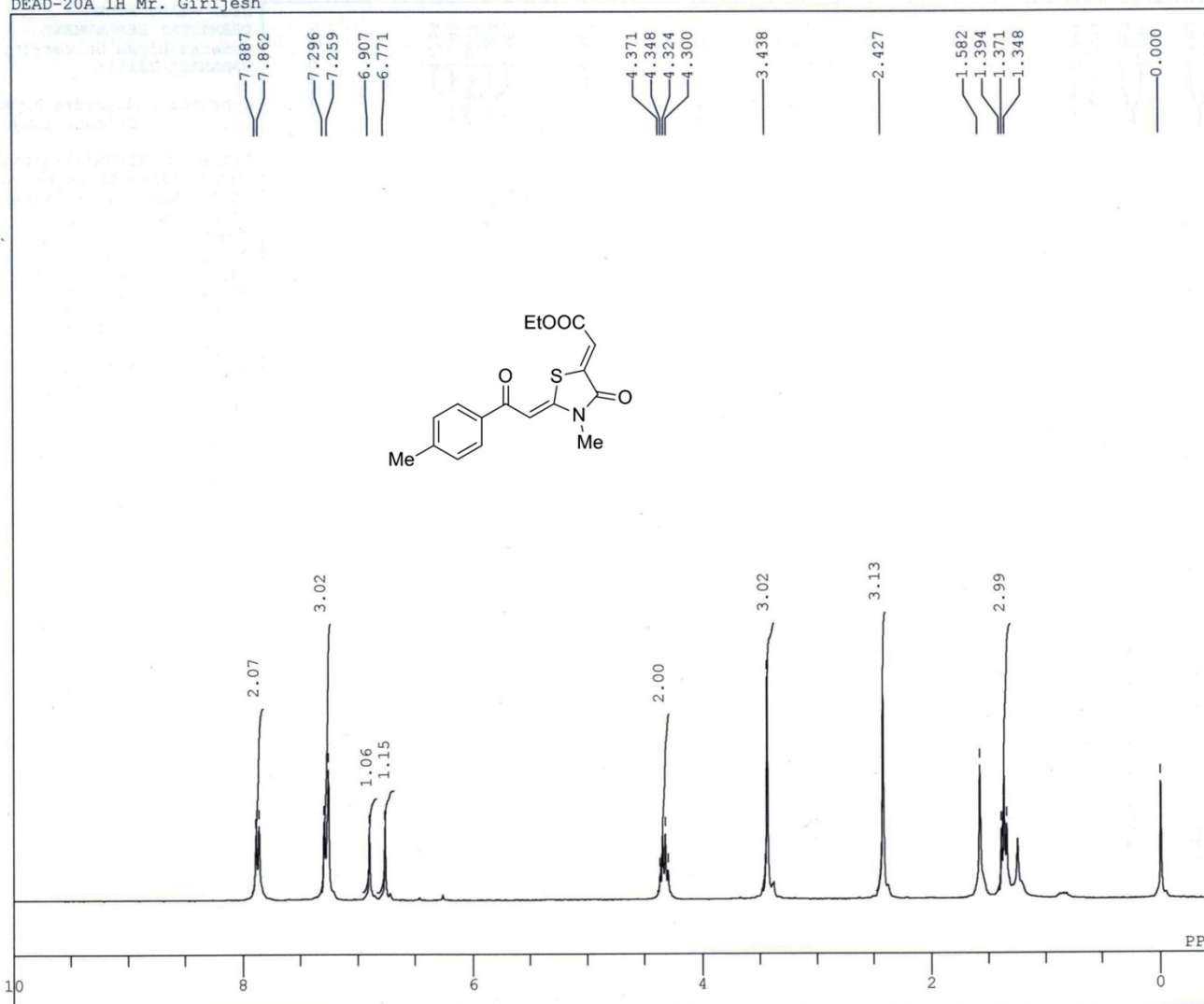
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

DFILE C:\Girijesh K. Ve
COMNT DEAD-20B 13C Mr.G
DATIM Tue Aug 20 09:54:
OBNUC 13C
EXMOD BCM
OBFREQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 1950
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 22.5 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24

¹H & ¹³C-NMR Spectra of 3ma:

C:\Girijesh K. Verma\DEAD-20A_1H.als
DEAD-20A 1H Mr. Girijesh

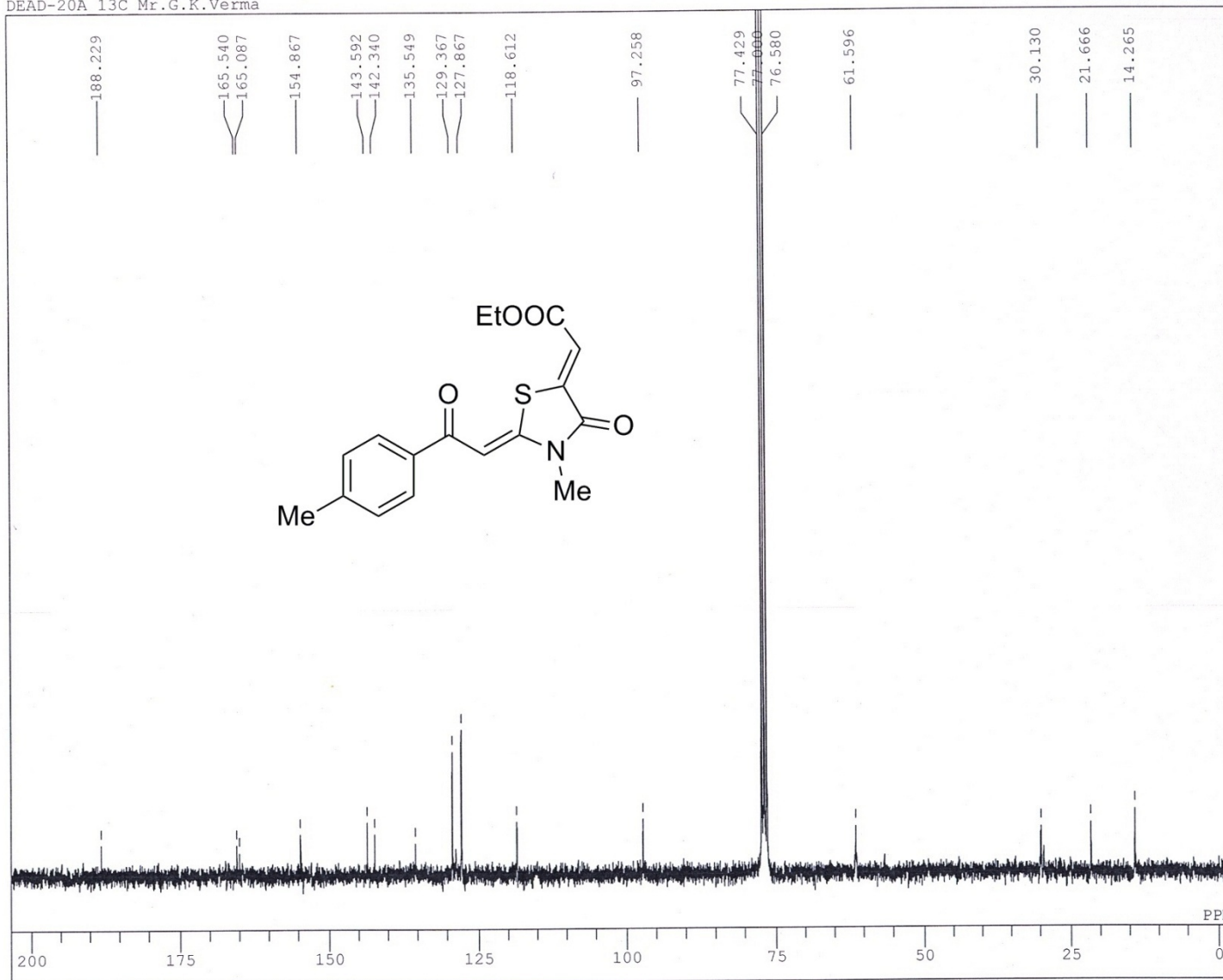


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-20A_1H Mr. Girije:
DATIM Wed Jul 24 14:04:16 20:
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 6016.8 Hz
SCANS 16
ACQTM 5.446 sec
PD 1.547 sec
PW1 5.6 us
IRNUC 1H
CTEMP 22.4 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 22

C:\Girijesh K. Verma\DEAD-20A_13C2.als
DEAD-20A 13C Mr.G.K.Verma



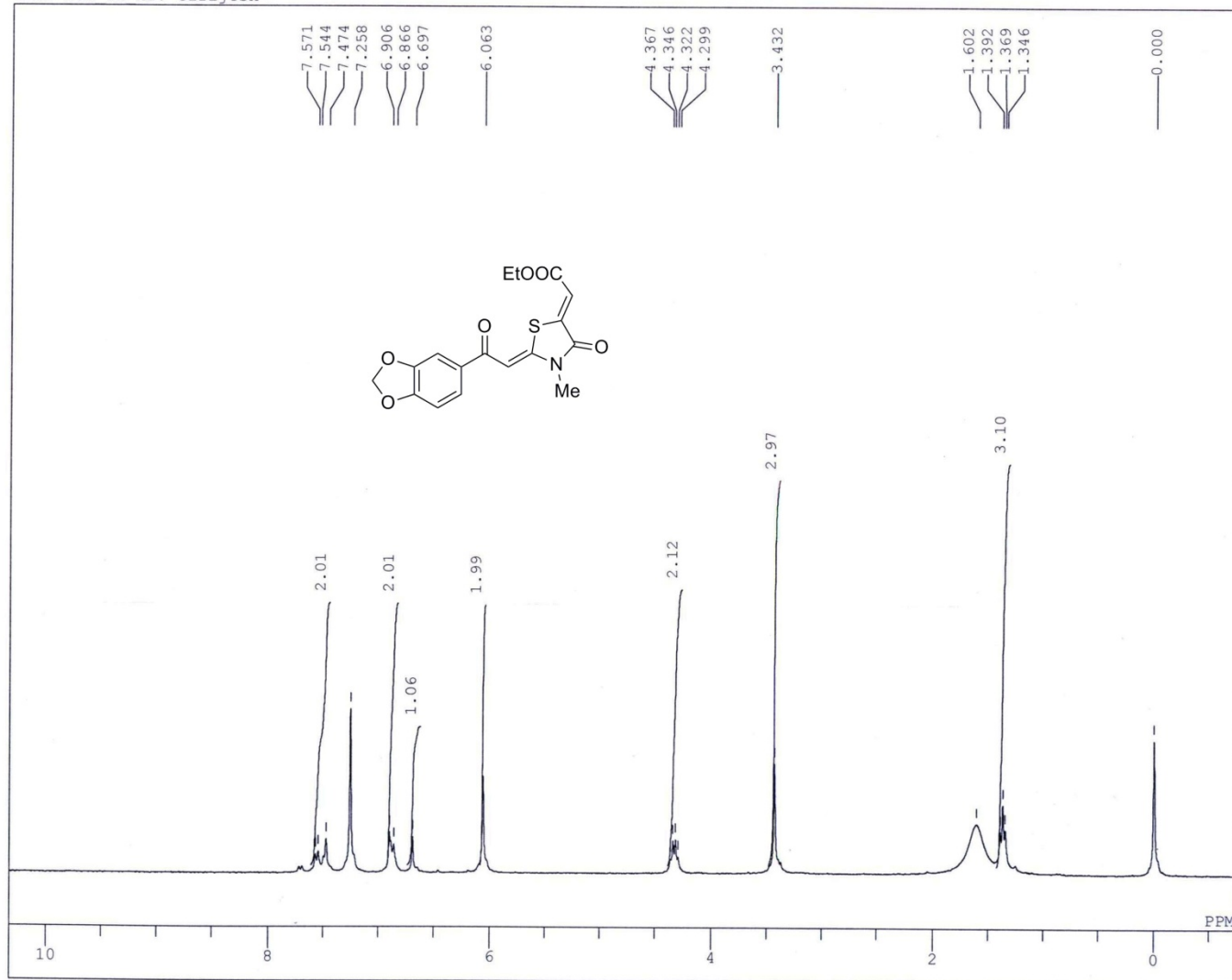
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

DFILE C:\Girijesh K. Ve
COMNT DEAD-20A 13C Mr.G
DATIM Tue Jul 30 07:30:
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 2000
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 22.1 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24

¹H & ¹³C-NMR Spectra of 3na:

C:\Girijesh K. Verma\DEAD-18A_1H.als
DEAD-18A 1H Mr. Girijesh

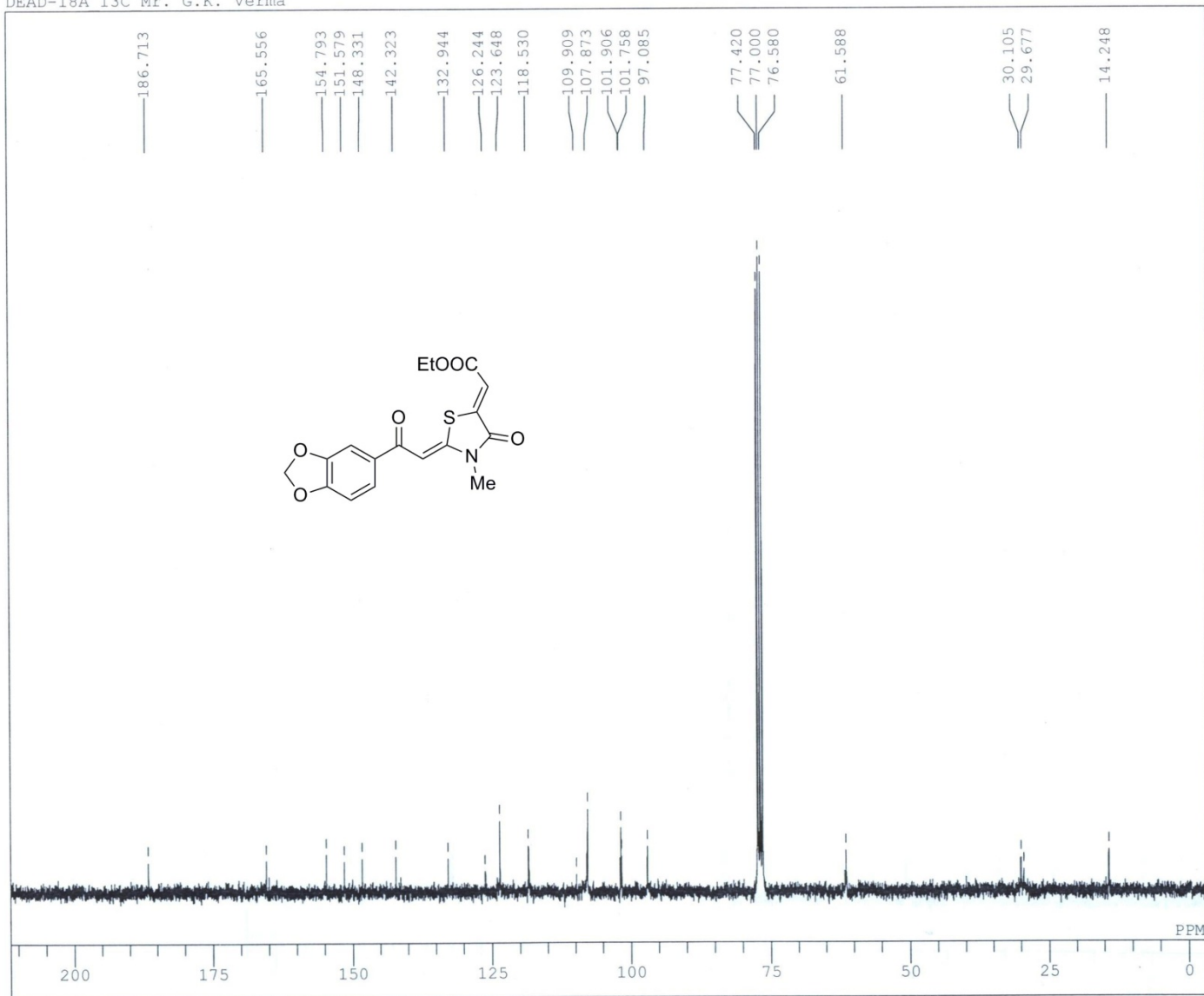


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

DFILE C:\Girijesh K. Ve
COMNT DEAD-18A 1H Mr. G
DATIM Thu Jul 18 16:40:
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 50
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 20.5 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 25

C:\Girijesh K. Verma\DEAD-18A_13C.als
DEAD-18A 13C Mr. G.K. Verma



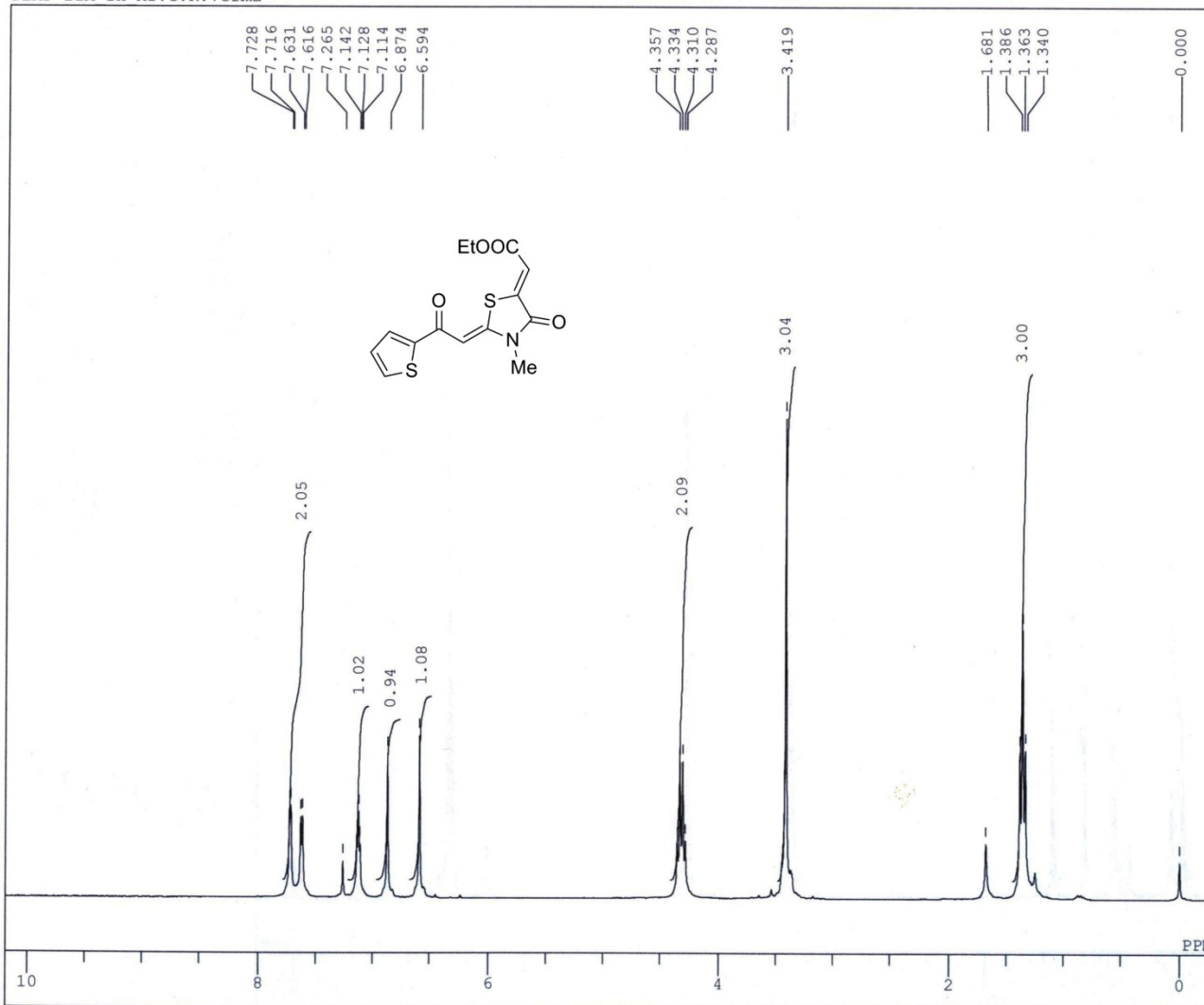
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-18A_13C Mr. G.K. V
DATIM Thu Aug 01 21:43:48 20
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 2000
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 25.0 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24

¹H & ¹³C-NMR Spectra of 30a:

C:\Girijesh K. Verma\DEAD-21A_1H_als
DEAD-21A 1H Mr.G.K.Verma

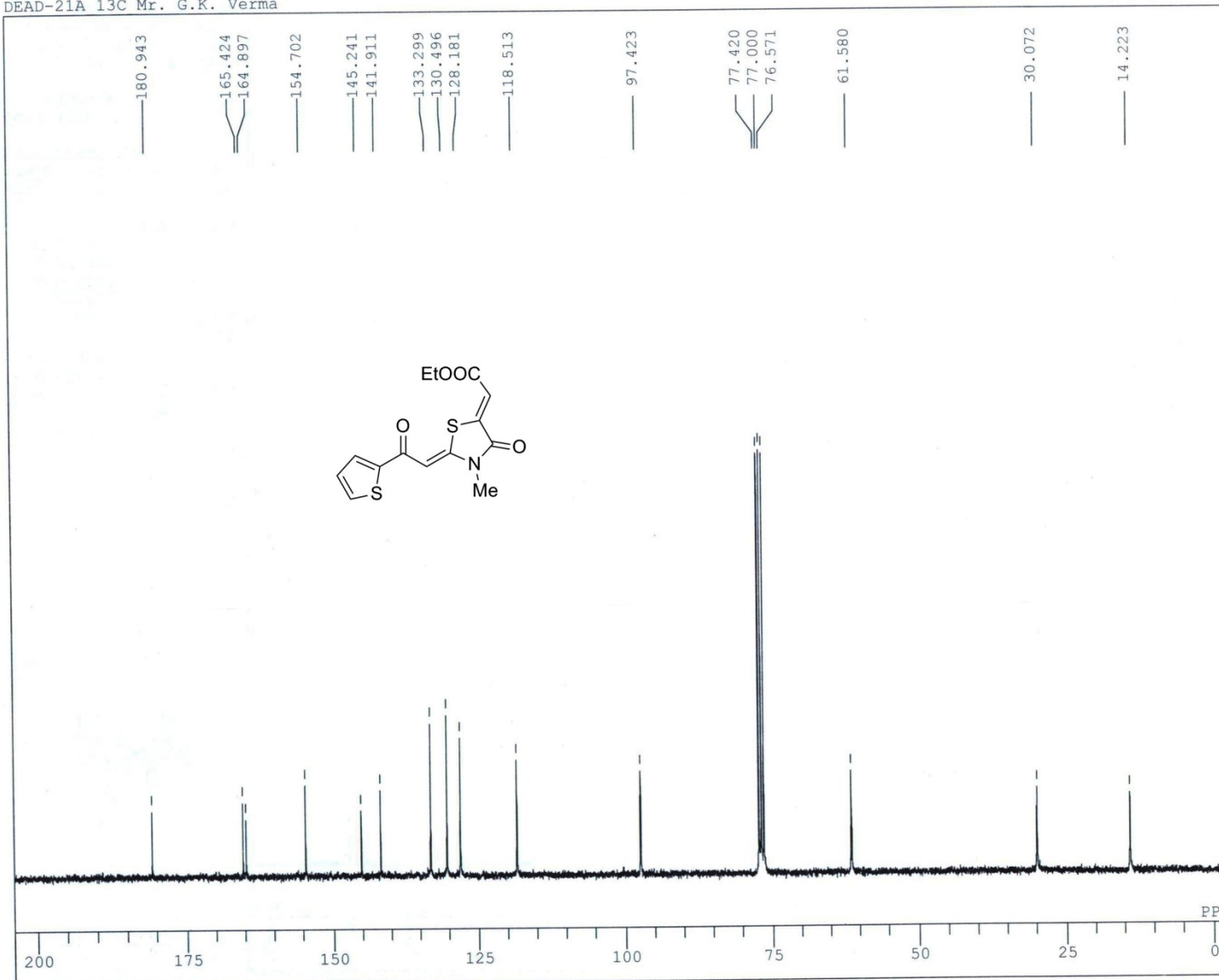


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DEAD-21A_1H_Mr.G.K.Verr
COMNT DEAD-21A_1H_Mr.G.K.Verr
DATIM Wed Jul 24 17:54:15 20
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 24.1 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 17

C:\WINNMR98\Data\DEAD-21A_13C1BCM_E3.als
DEAD-21A 13C Mr. G.K. Verma



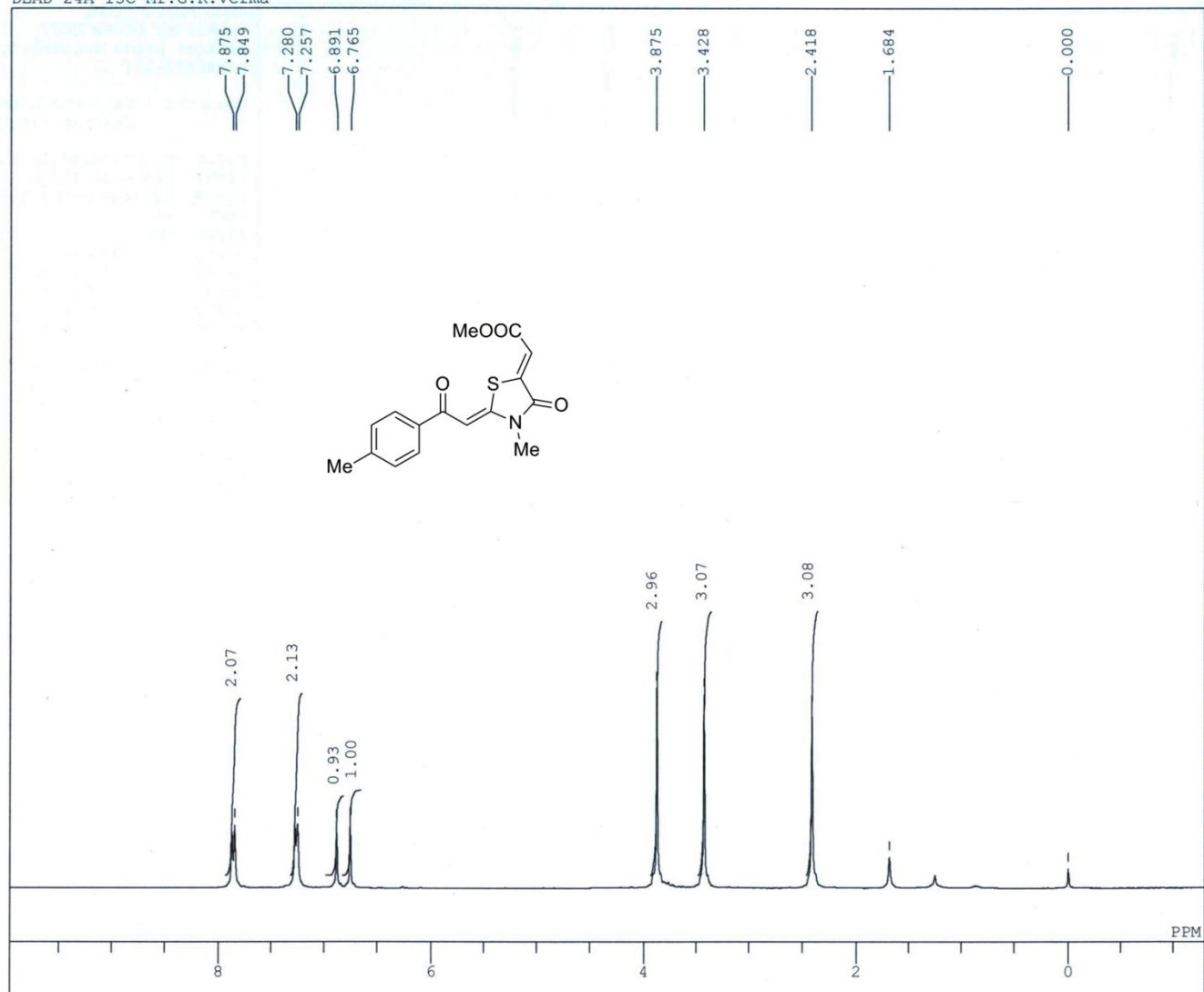
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

DFILE C:\WINNMR98\Data\
COMNT DEAD-21A 13C Mr. V
DATIM Thu Aug 01 00:08:
OBNUC 13C
EXMOD BCM
OBFREQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 2500
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 23.2 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24

¹H & ¹³C-NMR Spectra of 3mb:

C:\Girijesh K. Verma\DEAD-24A_1H.als
DEAD-24A_13C Mr.G.K.Verma

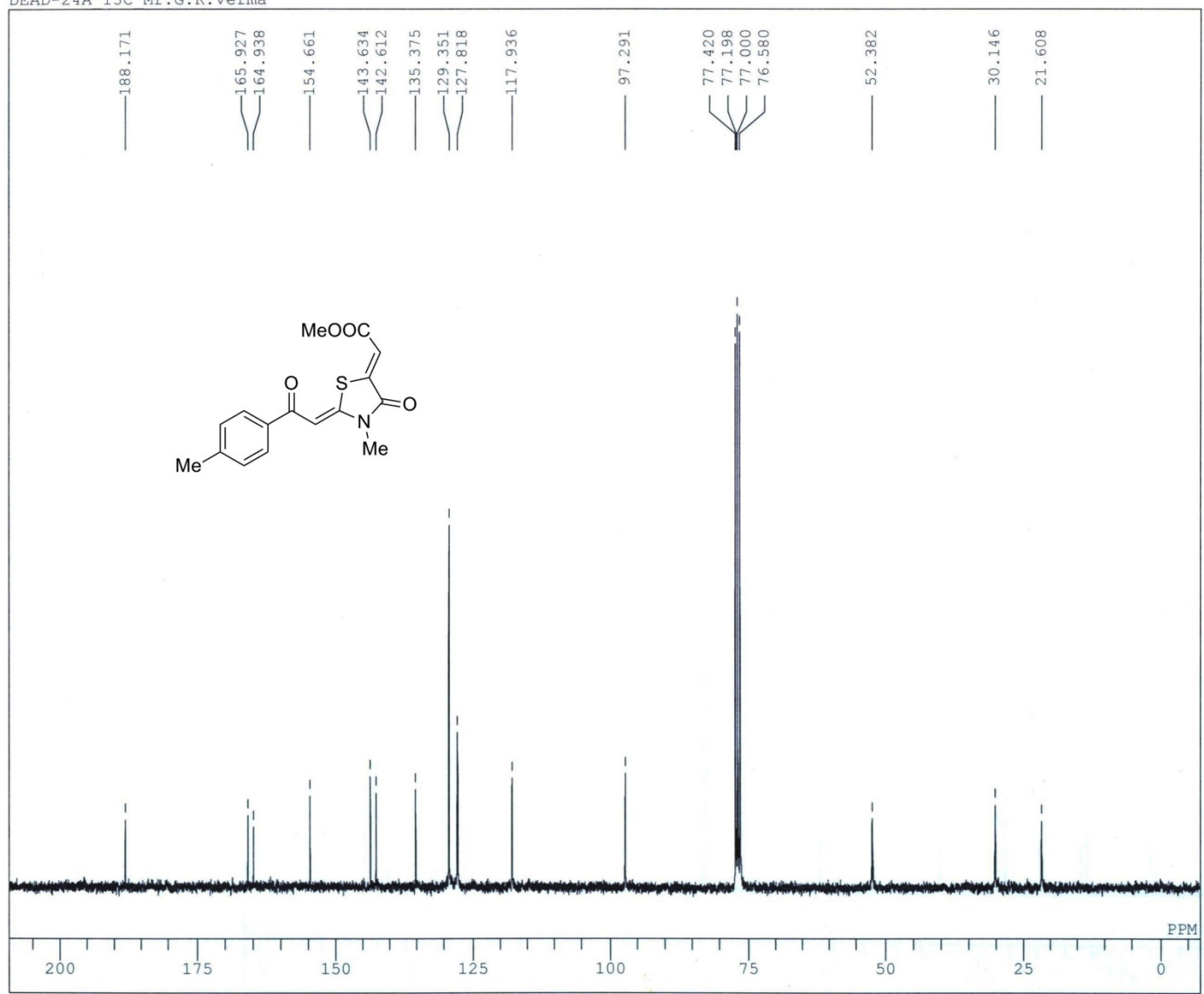


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-24A_13C Mr.G.K.Ve
DATIM Tue Aug 06 23:58:40 20:
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 6016.8 Hz
SCANS 32
ACQTM 5.446 sec
PD 1.547 sec
PW1 5.6 us
IRNUC 1H
CTEMP 17.1 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.22 Hz
RGAIN 17

C:\Girijesh K. Verma\DEAD-24A_13C.als
 DEAD-24A 13C Mr.G.K.Verma



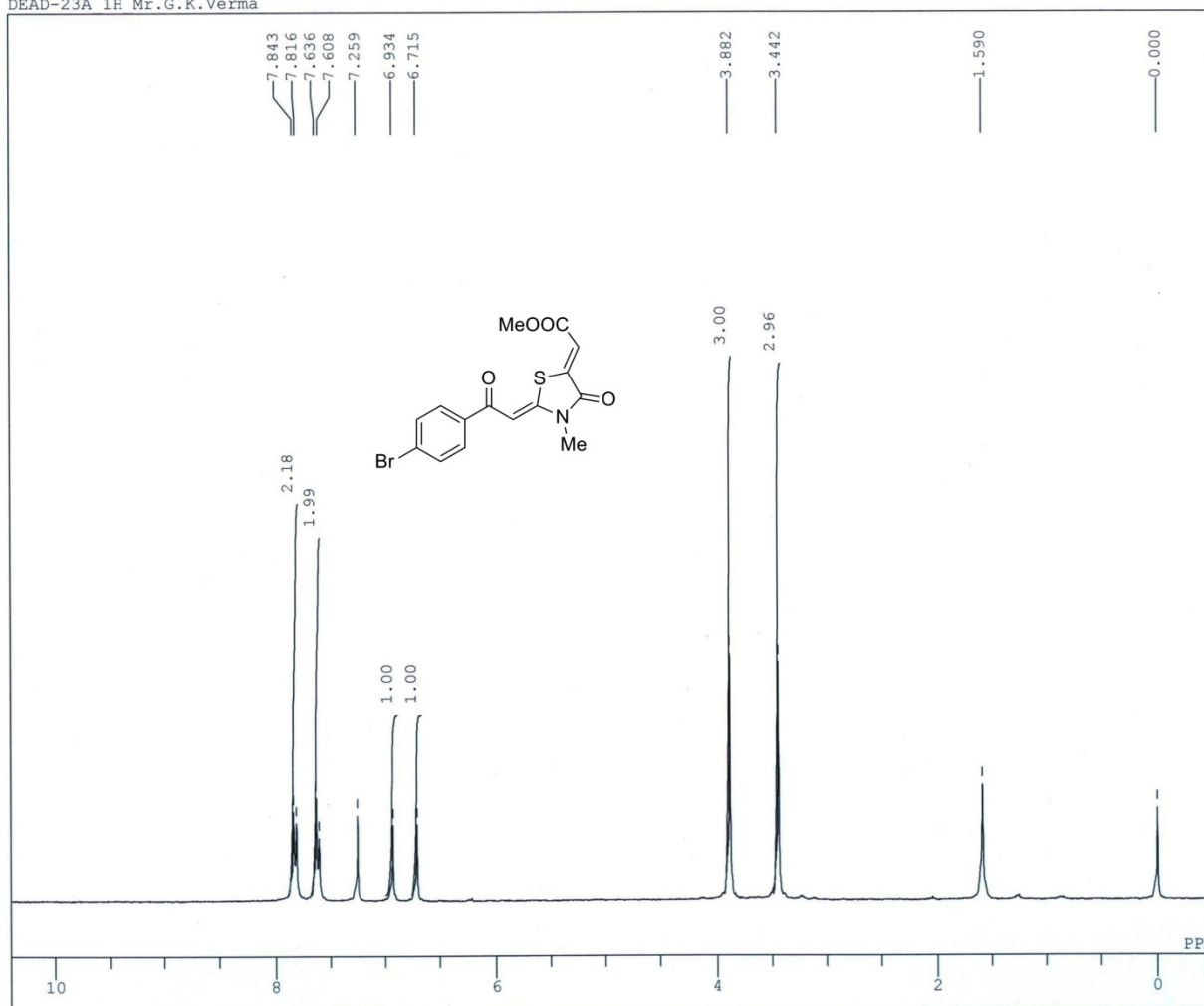
JEOL AL300 FTNMR
 CHEMISTRY DEPARTMENT
 Banaras Hindu University,
 VARANASI-221005

Operator : Nagendra Kumar
 Shishir Singh

DFILE C:\Girijesh K. Verma\DI
 COMNT DEAD-24A 13C Mr.G.K.Ve
 DATIM Wed Aug 07 01:39:03 20:
 OBNUC 13C
 EXMOD BCM
 OBFRQ 75.45 MHz
 OBSET 124.00 KHz
 OBFIN 1840.0 Hz
 POINT 32768
 FREQU 20408.1 Hz
 SCANS 2000
 ACQTM 1.606 sec
 PD 1.394 sec
 PW1 5.9 us
 IRNUC 1H
 CTEMP 19.1 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.22 Hz
 RGAIN 24

¹H & ¹³C-NMR Spectra of 3lb:

C:\WINNMR98\COMMON\DEFAULT.ALS
DEAD-23A 1H Mr.G.K.Verma

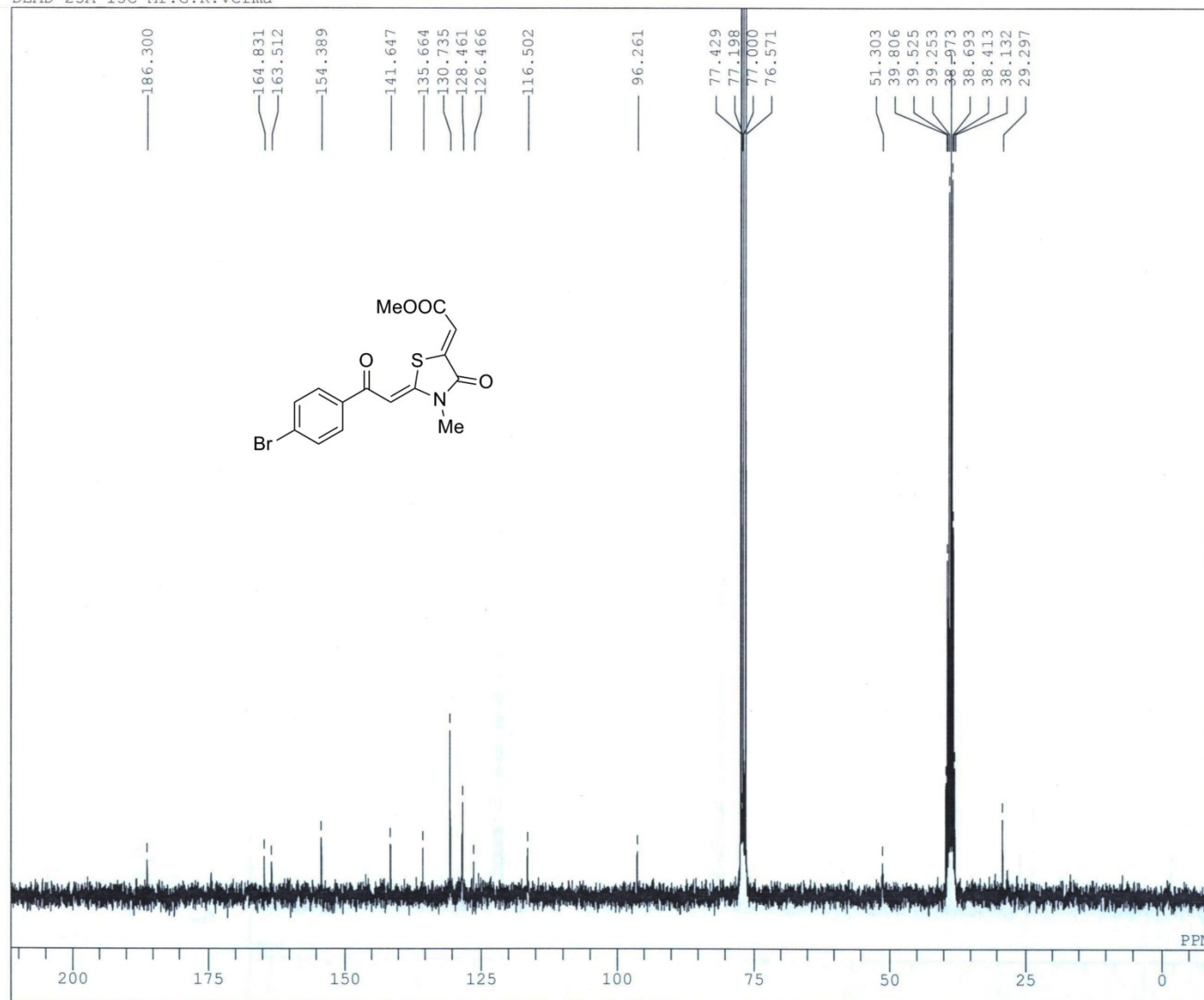


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON\DEI
COMNT DEAD-23A 1H Mr.G.K.Verr
DATIM Mon Aug 12 16:45:31 20
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 9
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 21.7 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 23

C:\Girijesh K. Verma\DEAD-23A_13C.als
DEAD-23A 13C Mr.G.K.Verma



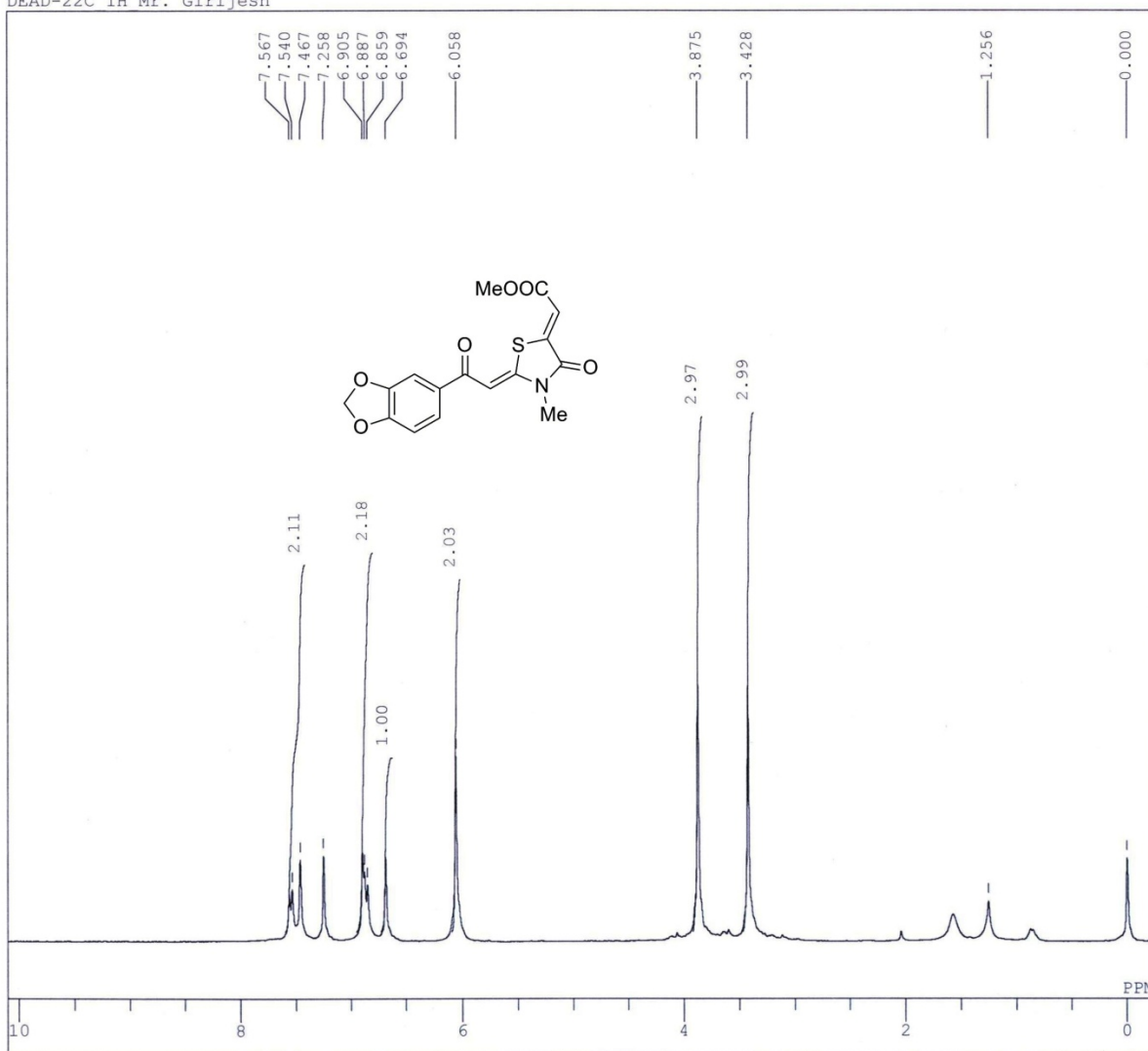
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DEAD-23A_13C.Mr.G.K.Verma
COMNT DEAD-23A_13C Mr.G.K.Verma
DATIM Tue Aug 13 23:14:46 2008
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 2000
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 23.7 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 23

¹H & ¹³C-NMR Spectra of 3nb:

C:\WINNMR98\Data\DEAD-22C_1H2NON_E1.als
DEAD-22C 1H Mr. Girijesh

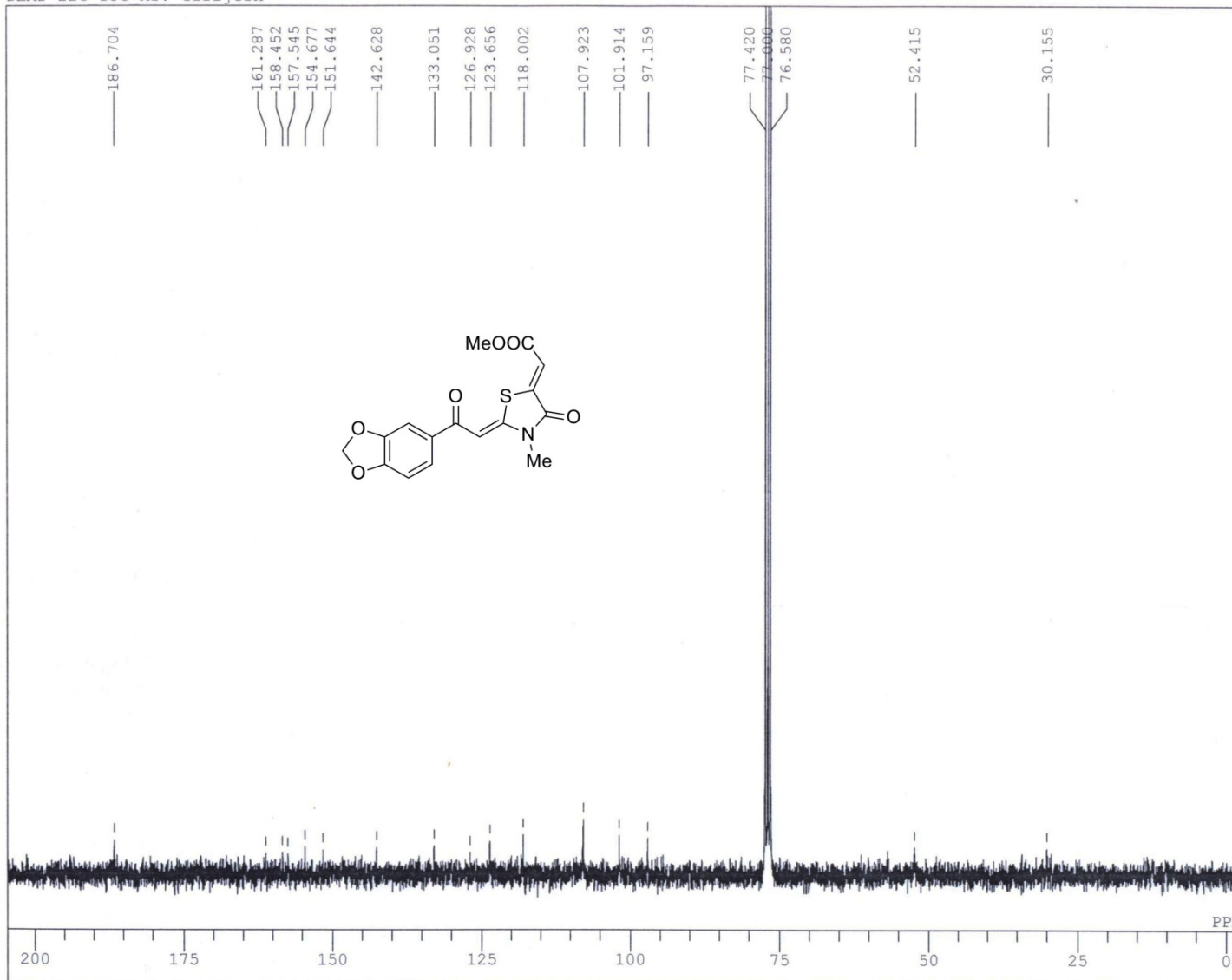


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\Data\DEAD-22C_1H2NON_
COMNT DEAD-22C_1H_Mr. Girijesh
DATIM Mon Dec 02 15:34:57 2013
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 6016.8 Hz
SCANS 32
ACQTM 5.446 sec
PD 1.547 sec
PW1 5.6 us
IRNUC 1H
CTEMP 22.5 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 22

C:\Girijesh K. Verma\DEAD-22C_13C.als
DEAD-22C 13C Mr. Girijesh



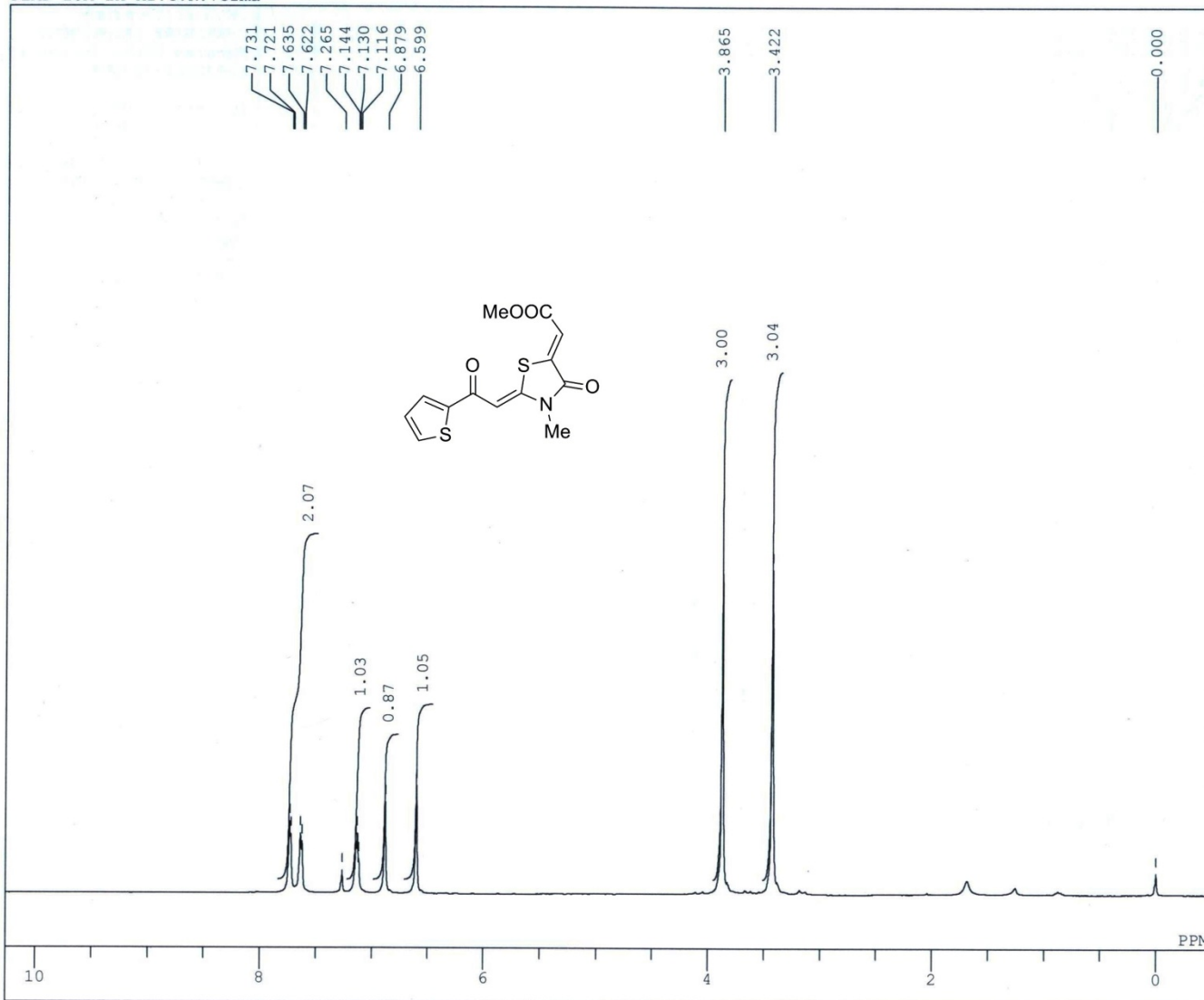
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

DFILE C:\Girijesh K. Ve
COMNT DEAD-22C_13C Mr. (
DATIM Mon Dec 02 15:30:
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 600
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 40.3 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 22

¹H & ¹³C-NMR Spectra of 3ob:

C:\Girijesh K. Verma\DEAD-25A_1H.als
DEAD-25A 1H Mr.G.K.Verma

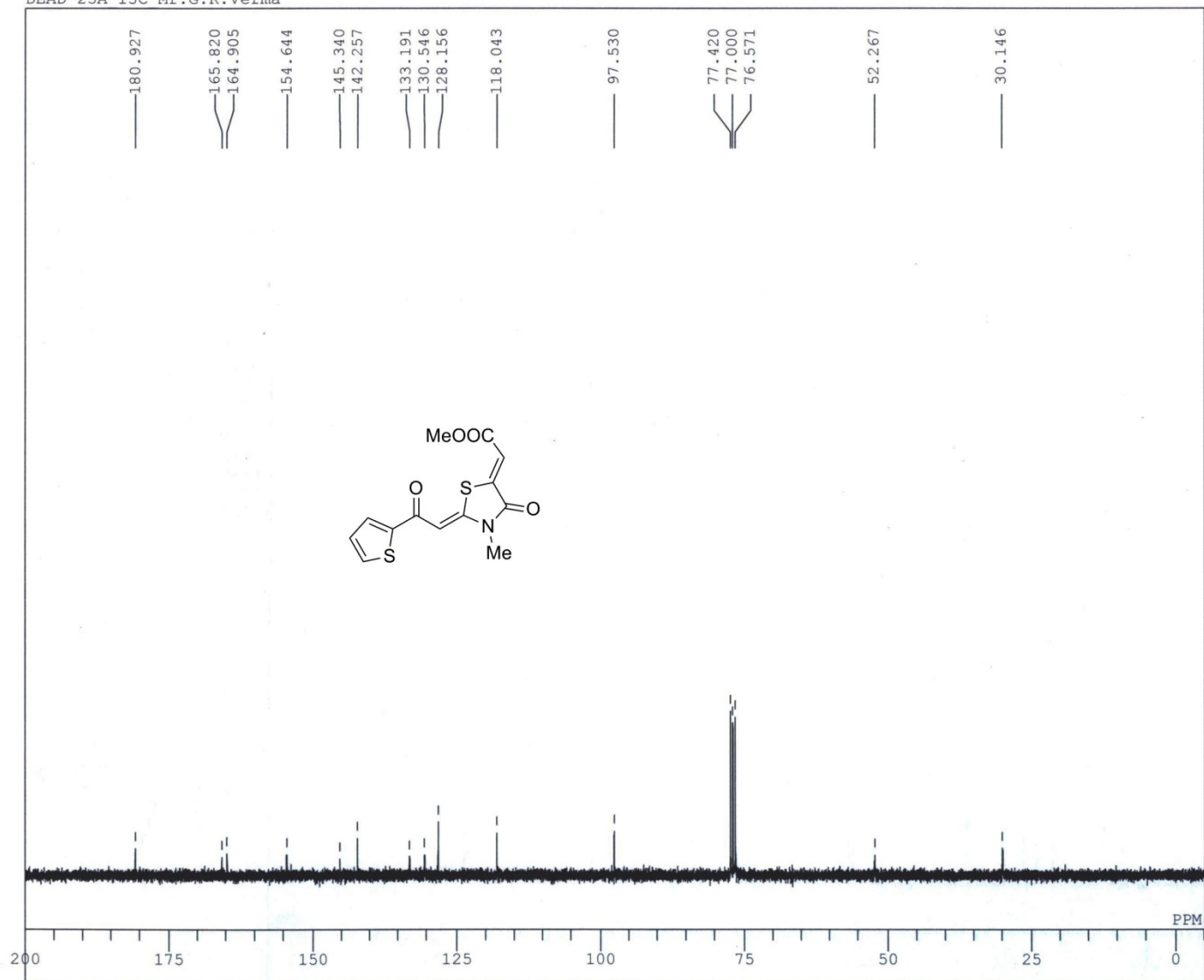


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-25A 1H Mr.G.K.Verr
DATIM Mon Aug 05 16:13:43 20
OBNUC 1H
EXMOD NON
OBFREQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 25.8 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.22 Hz
RGAIN 18

C:\Girijesh K. Verma\DEAD-25A_13C.als
DEAD-25A 13C Mr.G.K.Verma



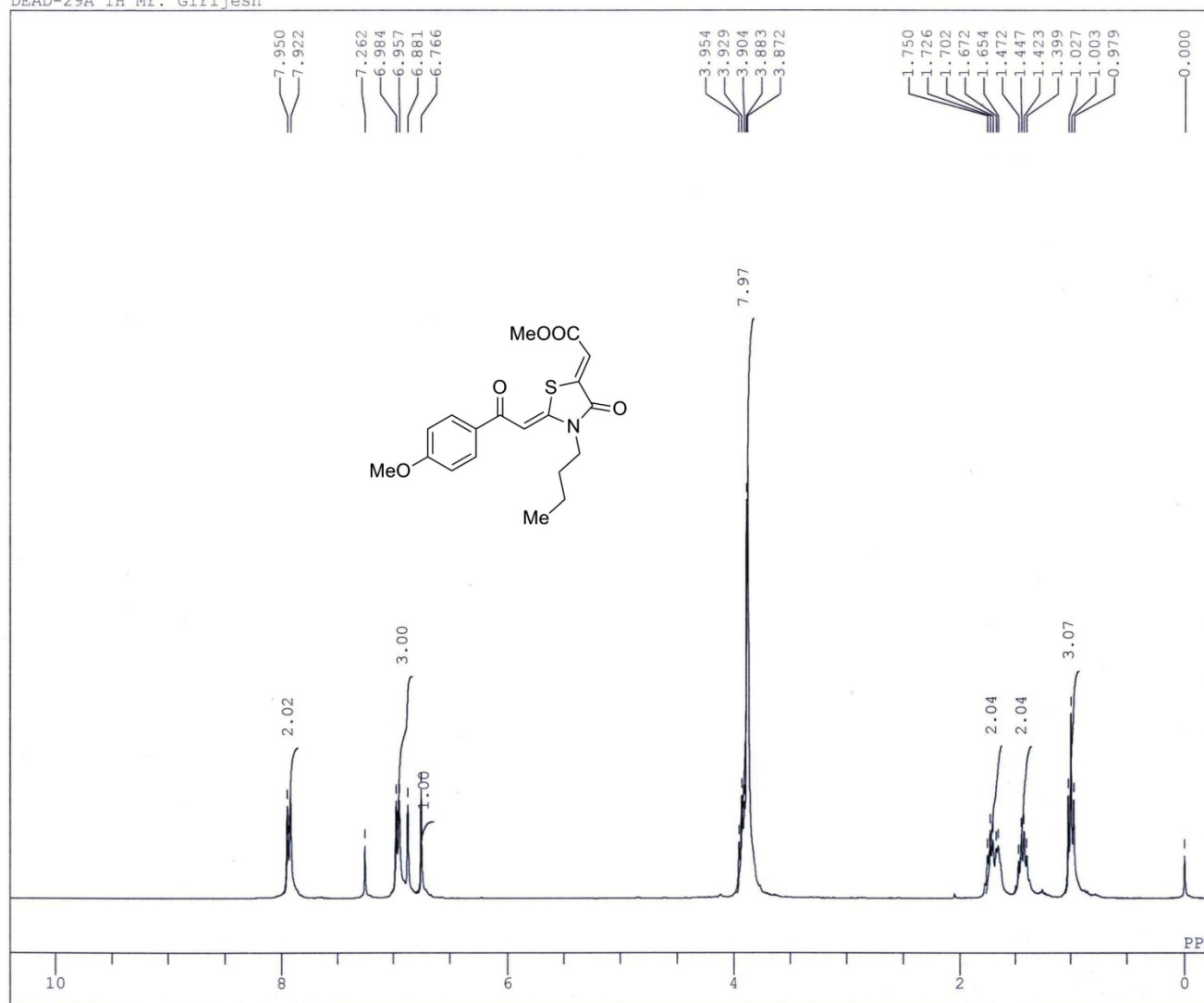
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-25A_13C_Mr.G.K.Ve
DATIM Mon Aug 05 15:31:57 20
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 307
ACQTM 1.606 sec
PD 1.394 sec
PWL 5.9 us
IRNUC 1H
CTEMP 25.5 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 0.12 Hz
RGAIN 24

¹H & ¹³C-NMR Spectra of 3pb:

C:\Girijesh K. Verma\DEAD-29A_1H.als
DEAD-29A 1H Mr. Girijesh

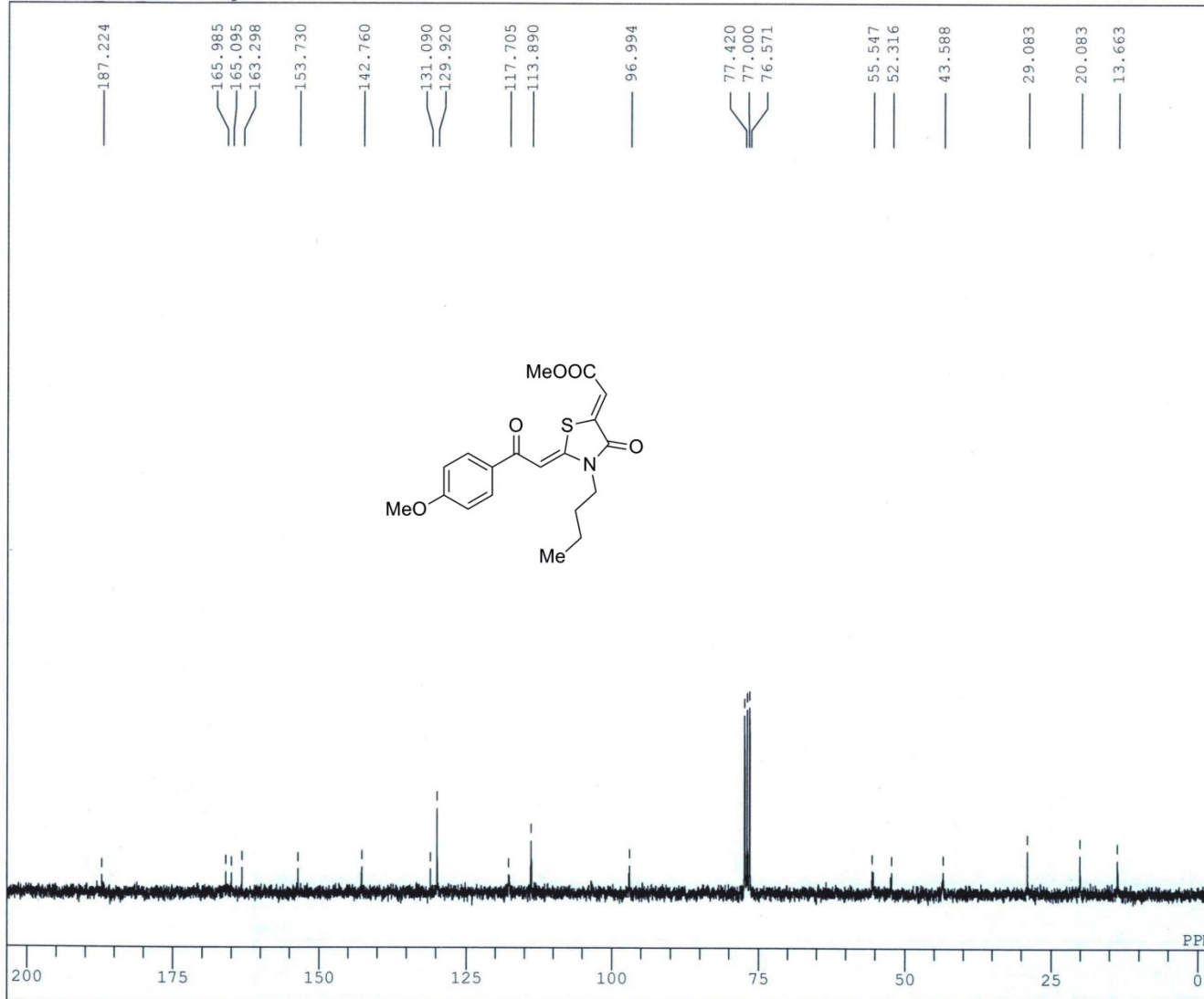


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-29A 1H Mr. Girije:
DATIM Fri Aug 30 11:39:23 20:
OBNUC 1H
EXMOD NON
OBFREQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 21.2 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 17

C:\Girijesh K. Verma\DEAD-29A_13C.als
DEAD-29A 13C Mr. Girijesh



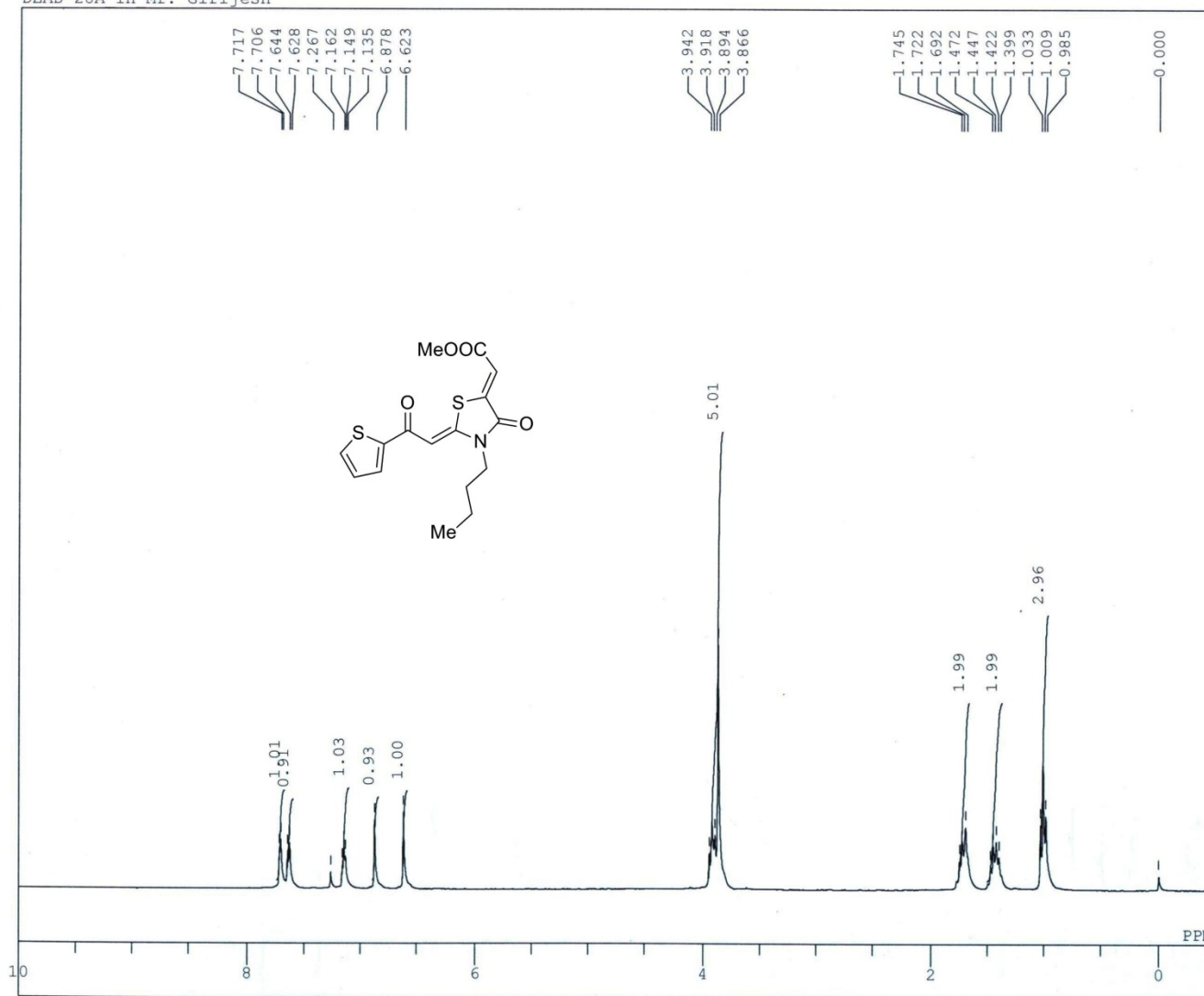
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-29A 13C Mr. Girije
DATIM Fri Aug 30 11:51:09 20
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 171
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 23.3 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24

¹H & ¹³C-NMR Spectra of 3qb:

C:\Girijesh K. Verma\DEAD-28A_1H.als
DEAD-28A 1H Mr. Girijesh

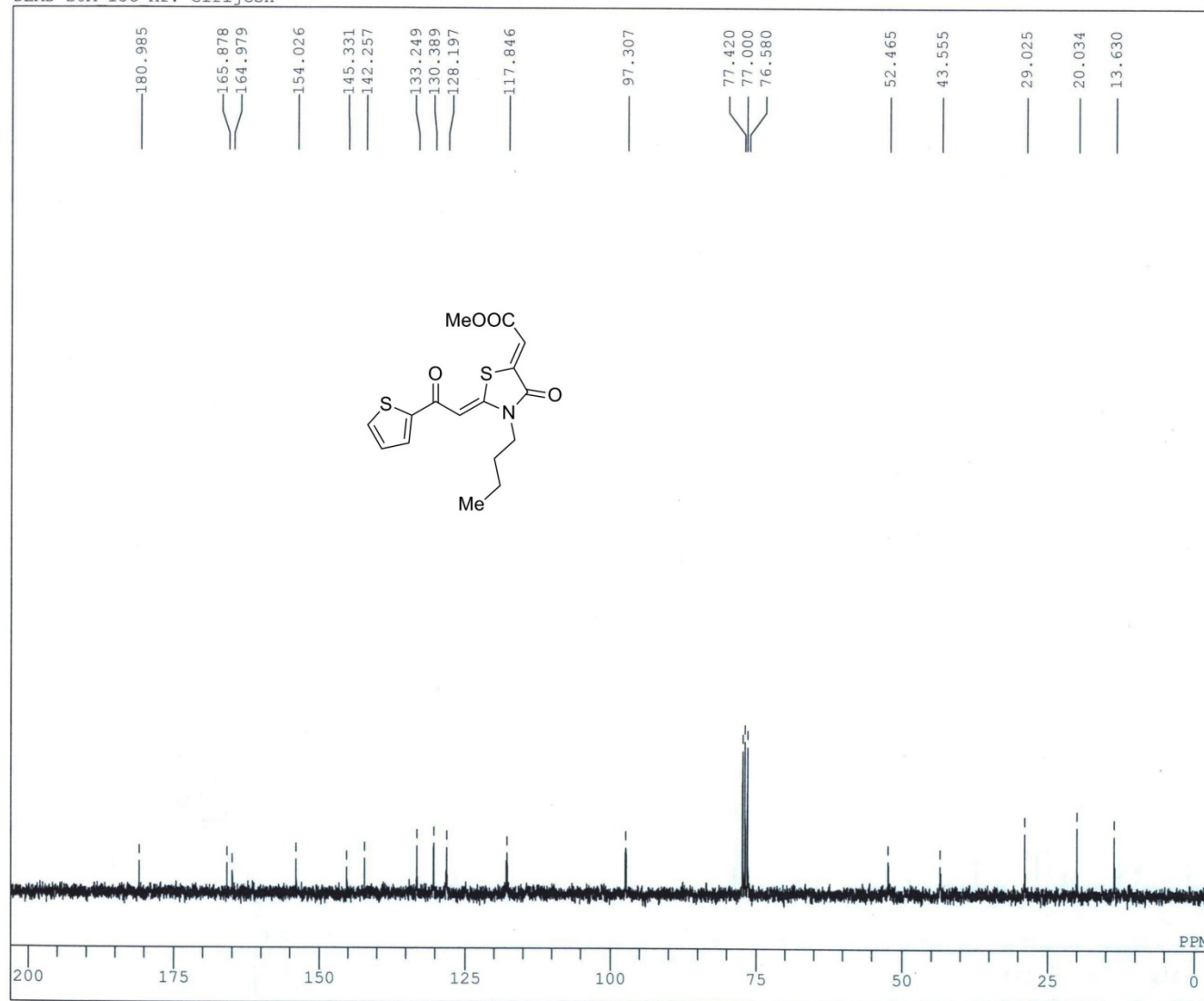


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-28A 1H Mr. Girije:
DATIM Fri Aug 30 12:01:58 20:
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 8
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 25.5 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 16

C:\Girijesh K. Verma\DEAD-28A_13C.als
DEAD-28A 13C Mr. Girijesh



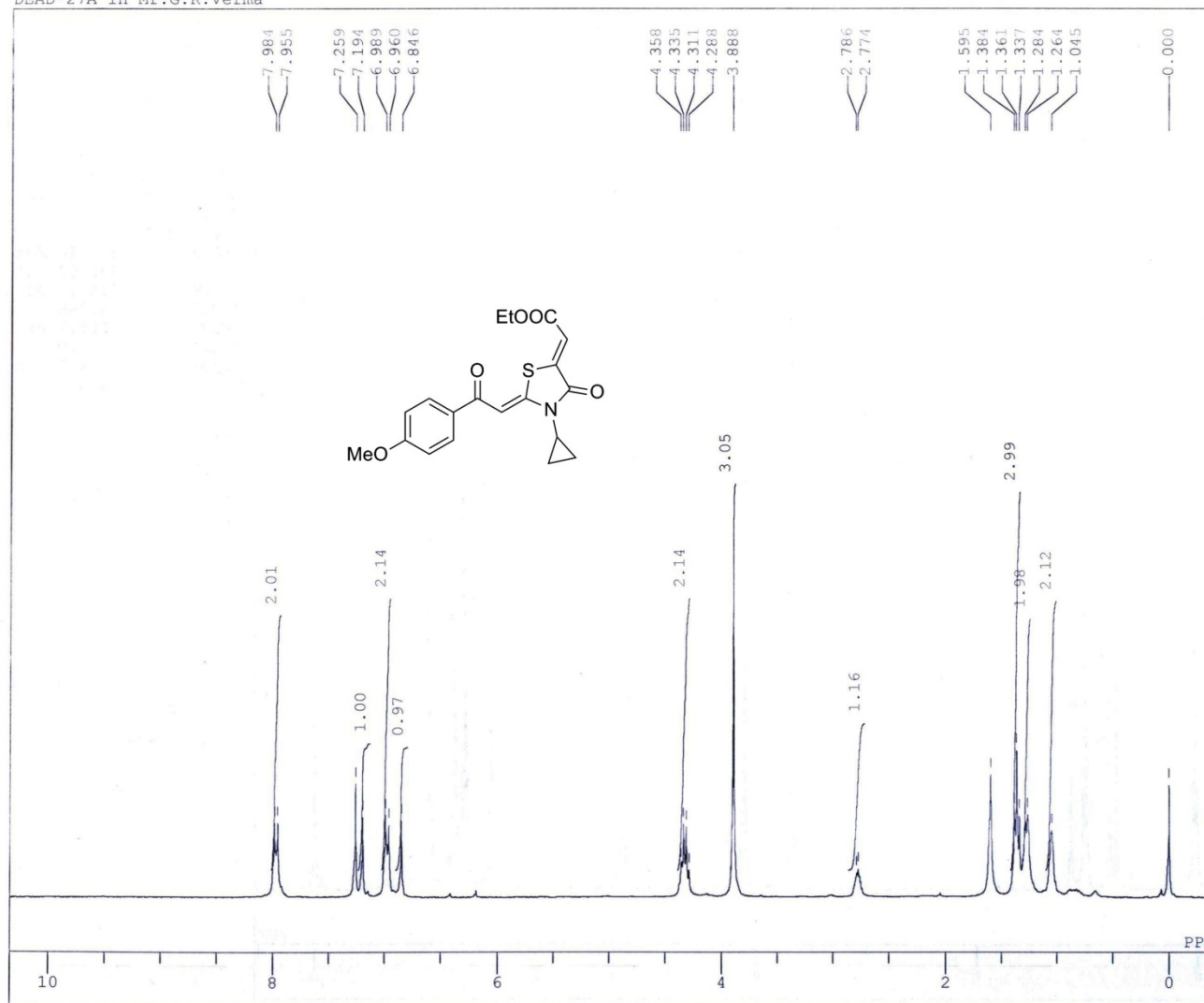
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-28A 13C Mr. Girijesh
DATIM Fri Aug 30 11:58:42 2001
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 91
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 23.5 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 23

¹H & ¹³C-NMR Spectra of 3ra:

C:\Girijesh K. Verma\DEAD-27A_1H_als
DEAD-27A 1H Mr.G.K.Verma

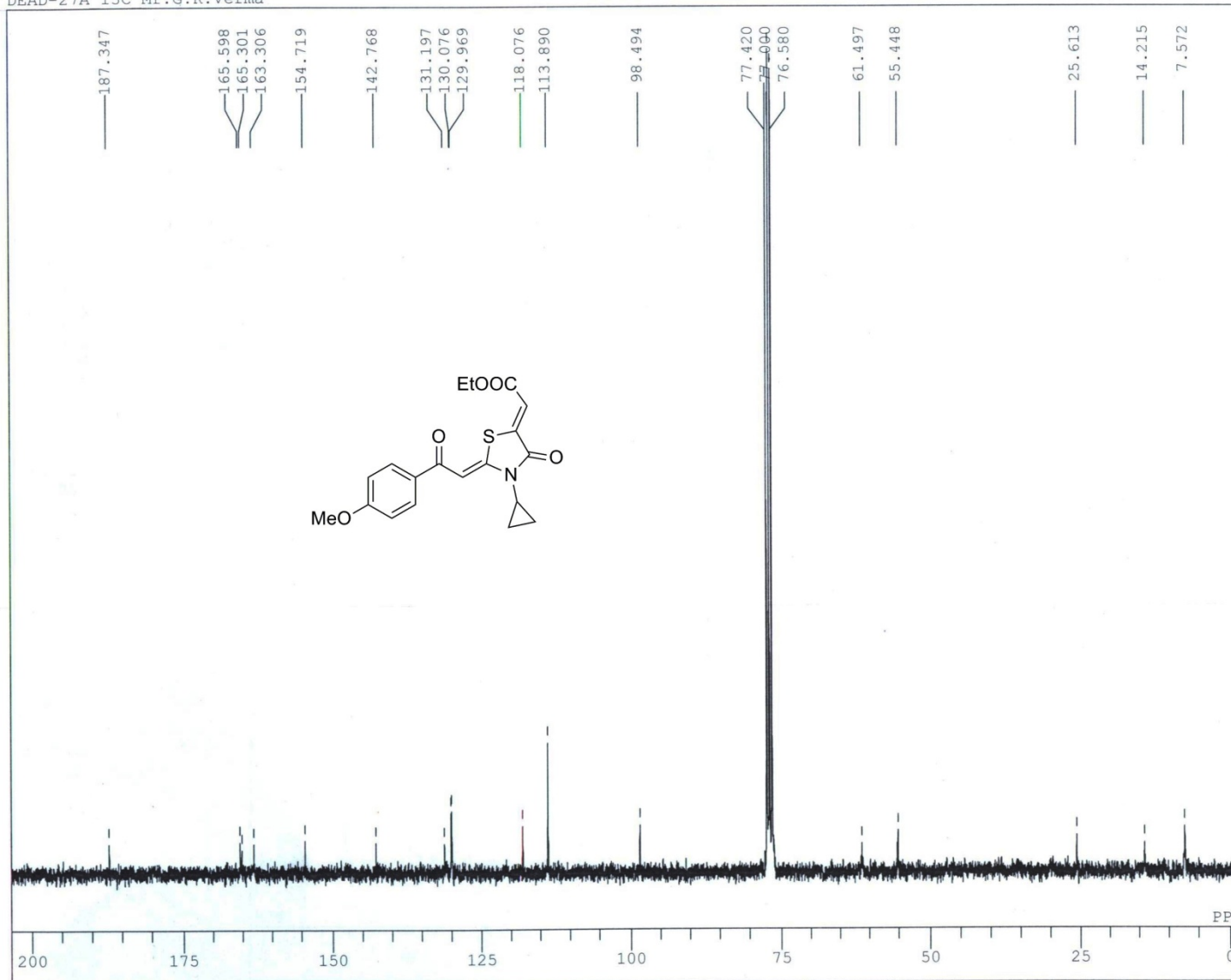


JEOL AL300 FTNMR
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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-27A_1H Mr.G.K.Verr
DATIM Wed Aug 21 11:41:33 20
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 20
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 26.3 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 21

C:\Girijesh K. Verma\DEAD-27A_13C.als
DEAD-27A 13C Mr.G.K.Verma



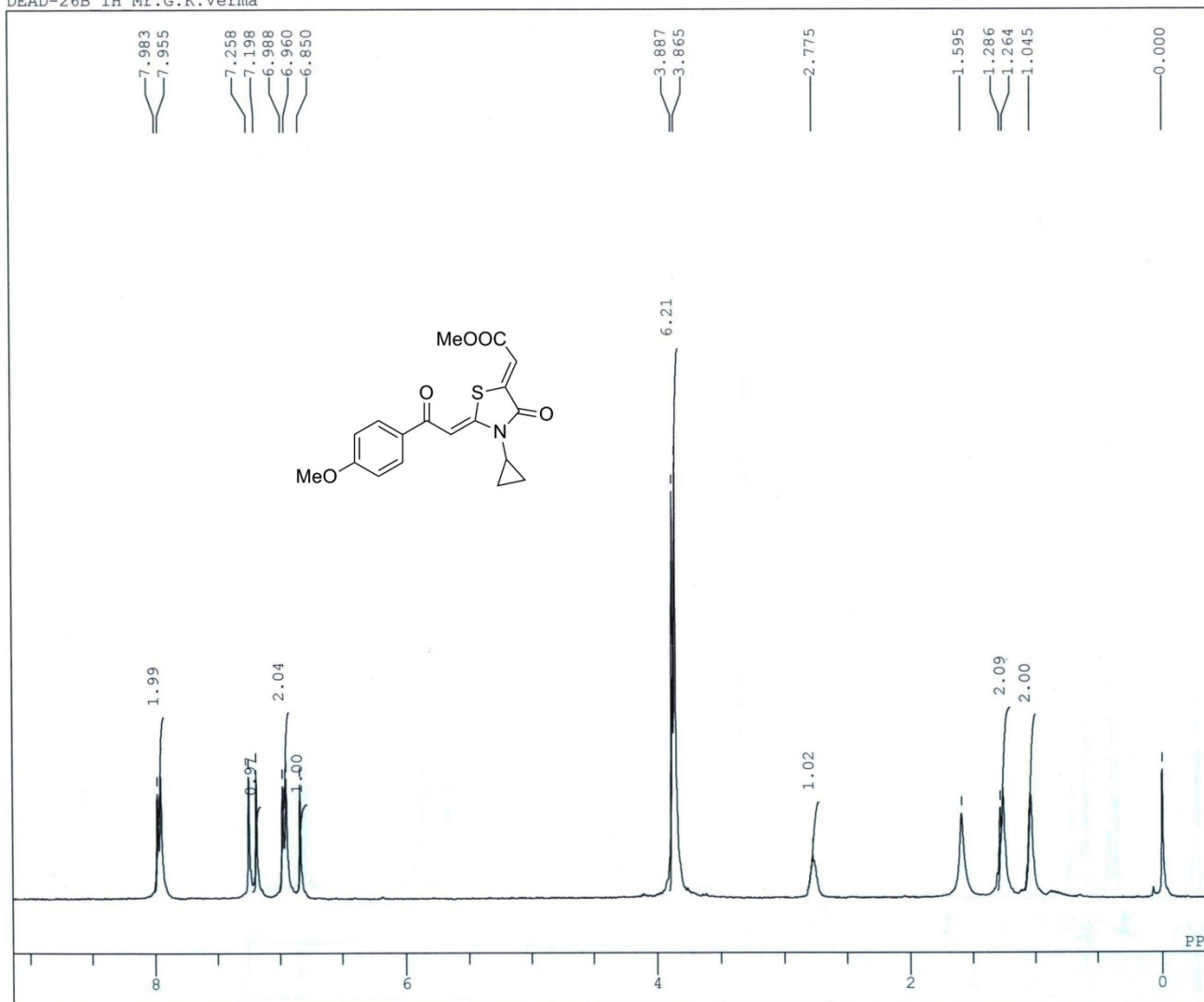
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

DFILE C:\Girijesh K. Ve
COMNT DEAD-27A_13C Mr.G
DATIM Thu Aug 22 20:03:
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 2000
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 22.6 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24

¹H & ¹³C-NMR Spectra of 3rb:

C:\Girijesh K. Verma\DEAD-26B_1H_als
DEAD-26B 1H Mr.G.K.Verma

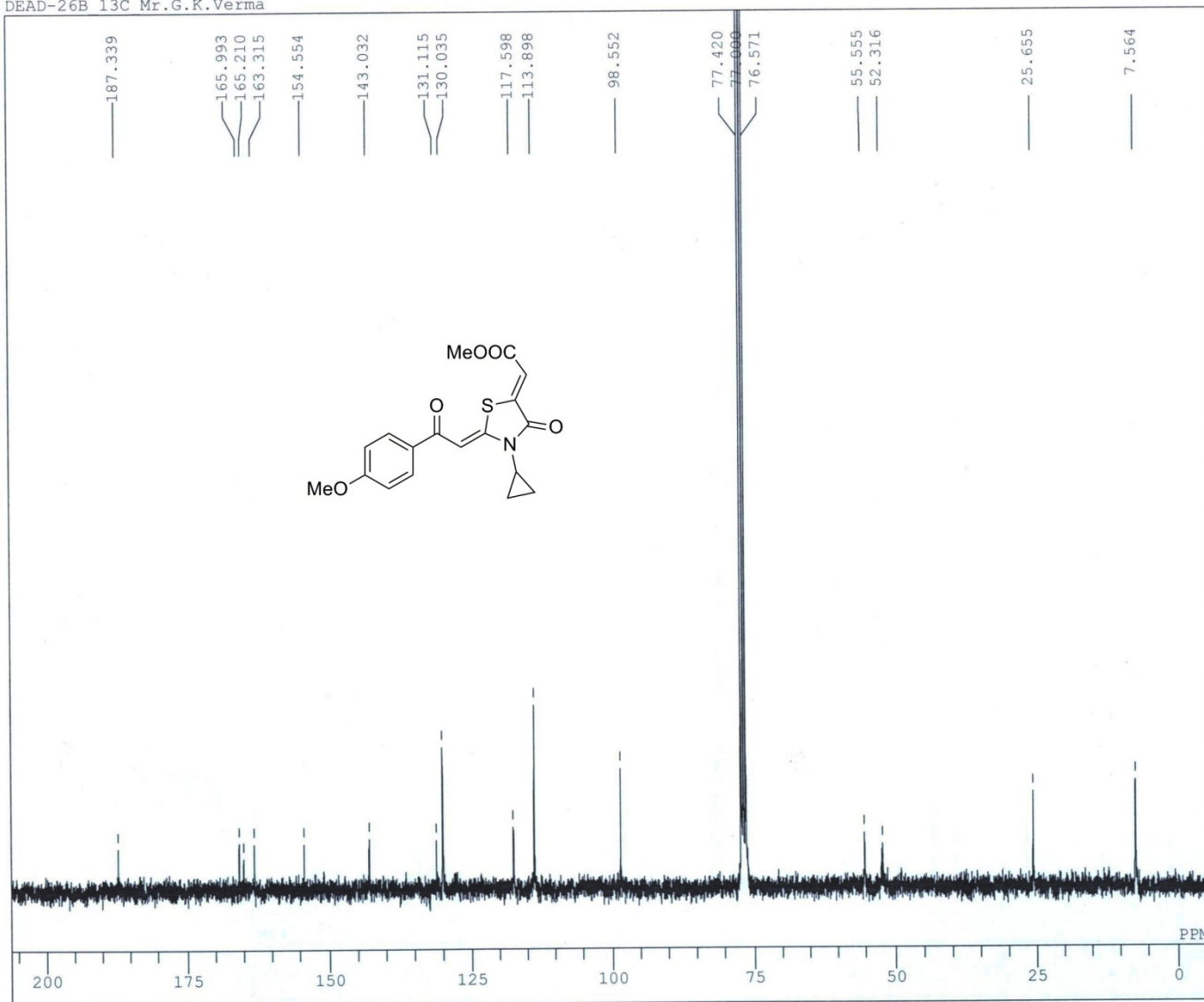


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-26B_1H_Mr.G.K.Verr
DATIM Mon Aug 19 16:10:44 20
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 6
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 23.3 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 21

C:\Girijesh K. Verma\DEAD-26B_13C.als
DEAD-26B 13C Mr.G.K.Verma



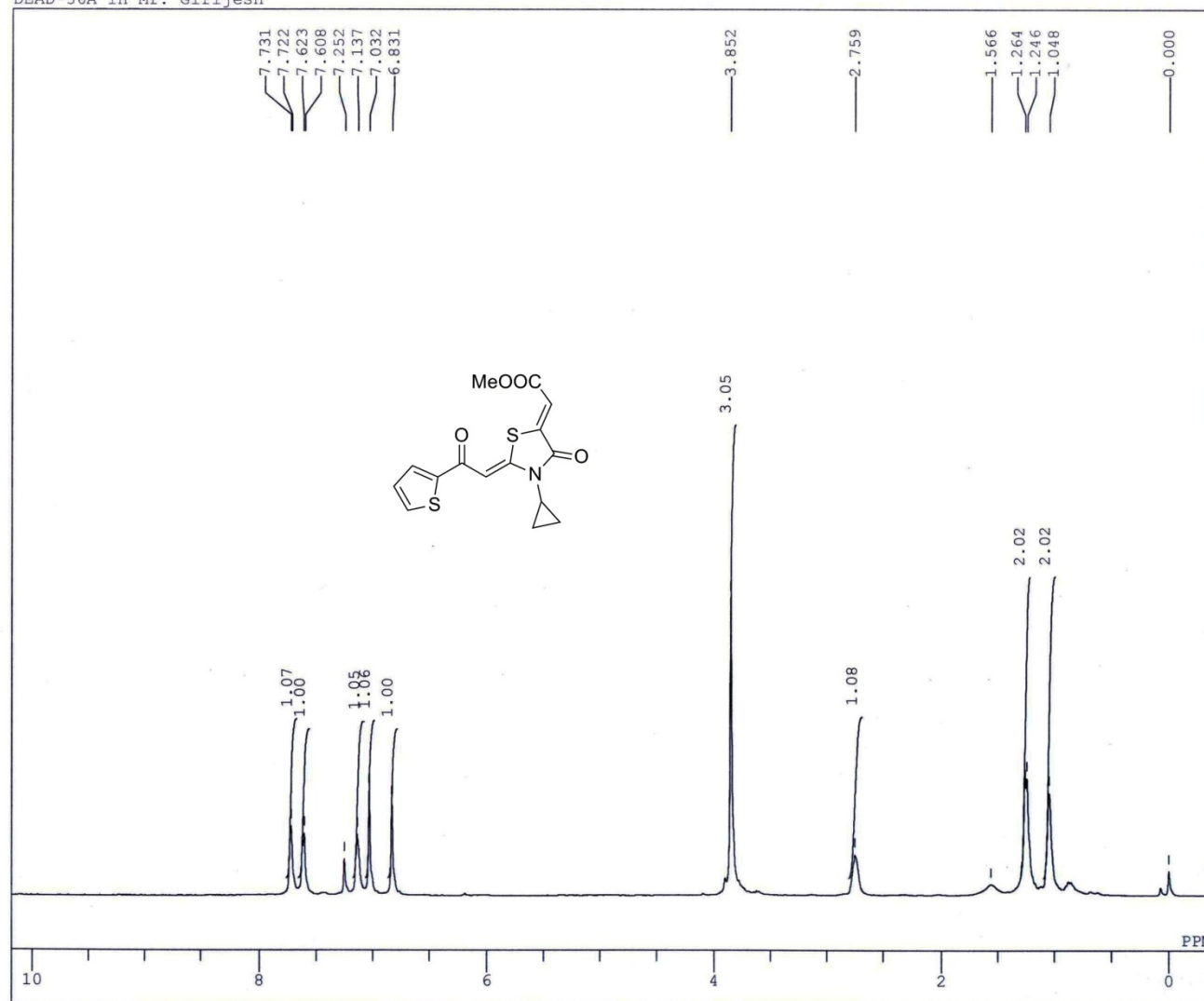
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DEAD-26B_13C.MR
COMNT DEAD-26B_13C Mr.G.K.Verma
DATIM Wed Aug 21 03:48:55 2003
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 2000
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 21.9 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 22

¹H & ¹³C-NMR Spectra of 3sb:

C:\Girijesh K. Verma\DEAD-36A_1H.als
DEAD-36A 1H Mr. Girijesh

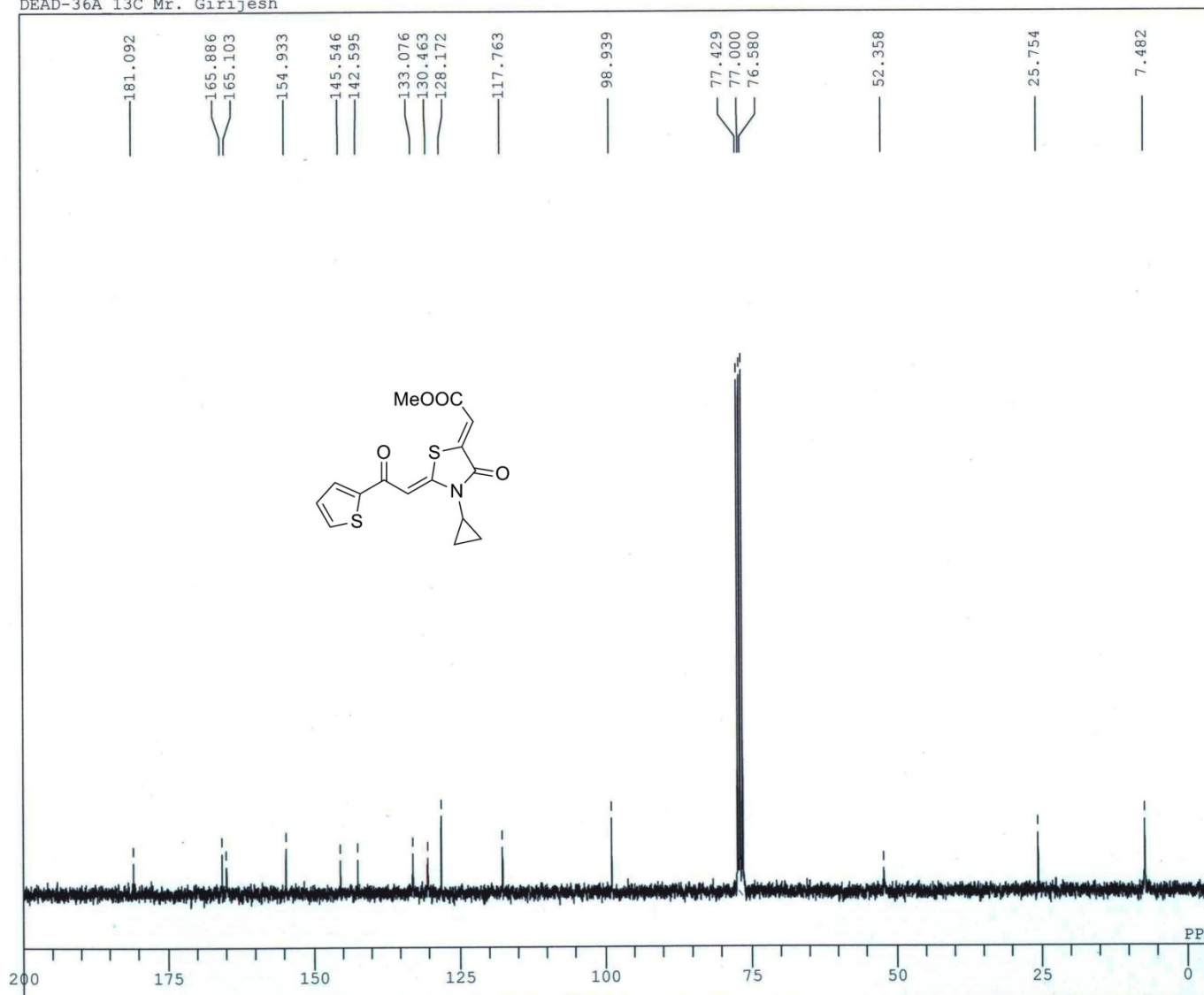


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DEAD-36A_1H.als
COMNT DEAD-36A 1H Mr. Girijesh
DATIM Fri Sep 13 10:45:44 2013
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 32
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 50.3 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 19

C:\WINNMR98\COMMON_DEFAULT.ALS
DEAD-36A 13C Mr. Girijesh



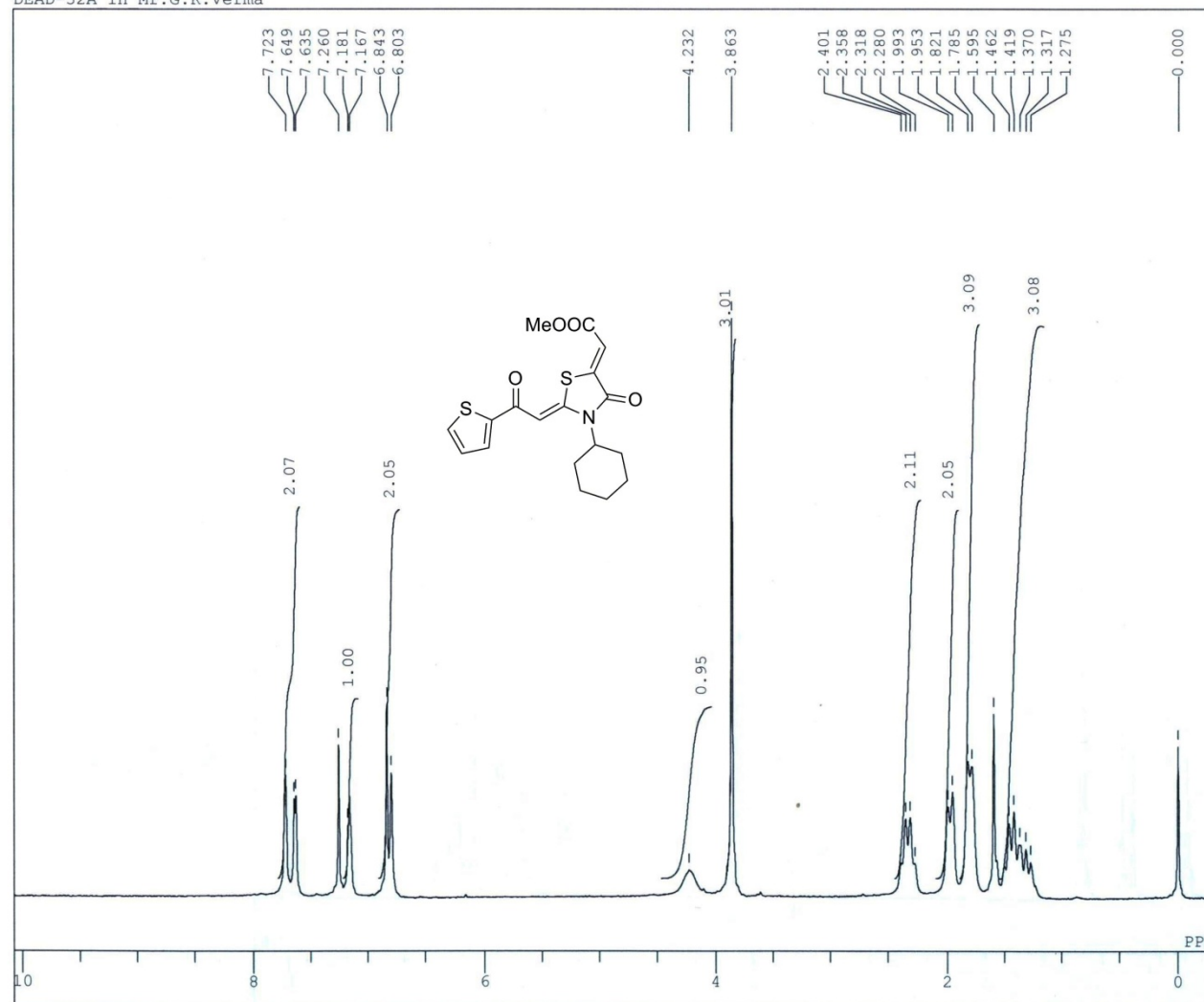
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEI
COMNT DEAD-36A 13C Mr. Girijesh
DATIM Fri Sep 13 10:41:13 2003
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 337
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 50.3 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24

¹H & ¹³C-NMR Spectra of 3tb:

C:\Girijesh K. Verma\DEAD-32A_1H.als
DEAD-32A 1H Mr.G.K.Verma

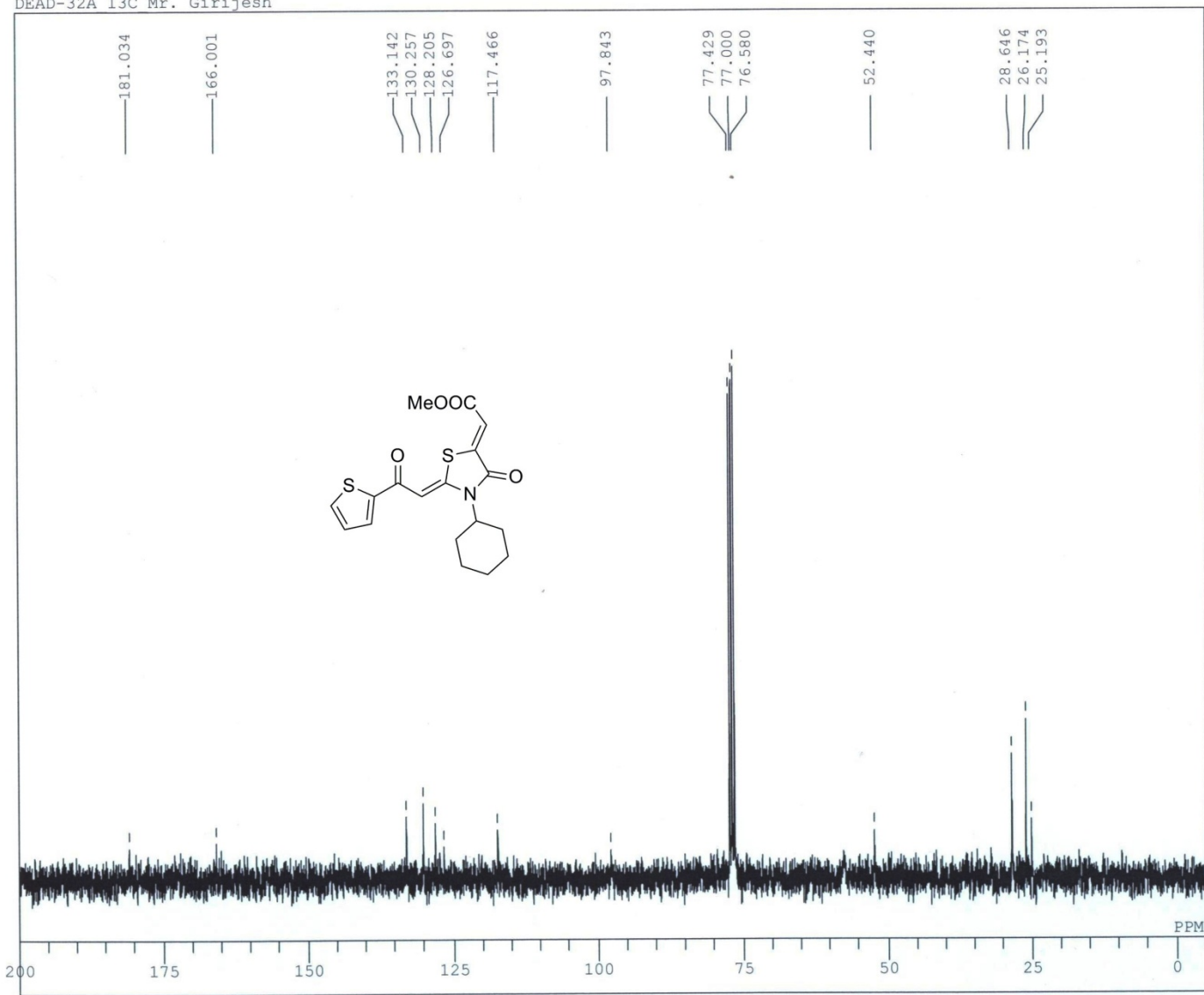


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-32A_1H_Mr.G.K.Verr
DATIM Tue Sep 03 15:50:16 20:
OBNUC 1H
EXMOD NON
OBFREQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 6016.8 Hz
SCANS 16
ACQTM 5.446 sec
PD 1.547 sec
PW1 5.6 us
IRNUC 1H
CTEMP 22.7 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 21

C:\WINNMR98\COMMON_DEFAULT.ALS
DEAD-32A 13C Mr. Girijesh



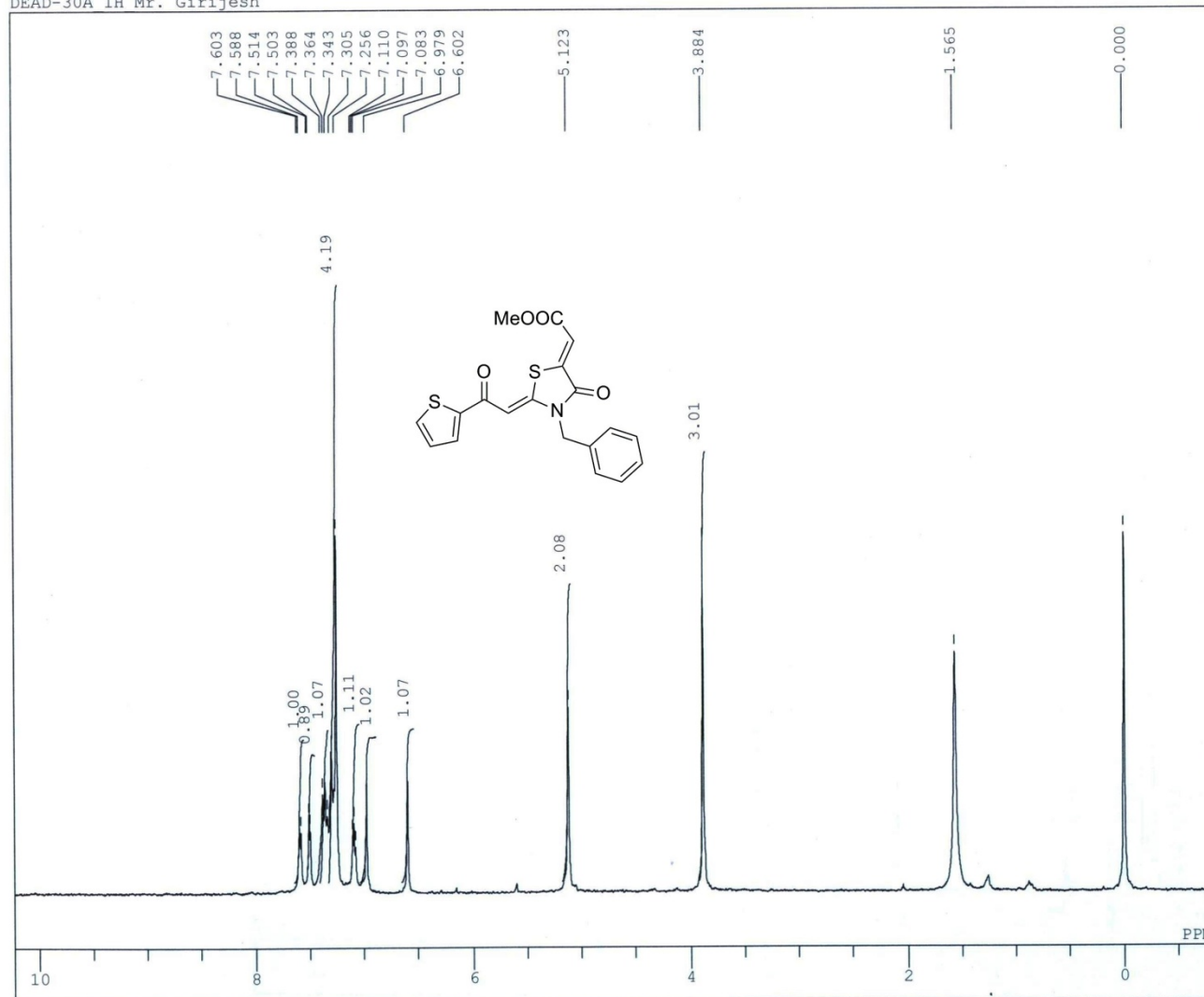
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON\DEI
COMNT DEAD-32A 13C Mr. Girijesh
DATIM Wed Sep 04 14:41:18 2003
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 221
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 26.8 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24

¹H & ¹³C-NMR Spectra of 3ub:

C:\Girijesh K. Verma\DEAD-30A_1H.als
DEAD-30A 1H Mr. Girijesh

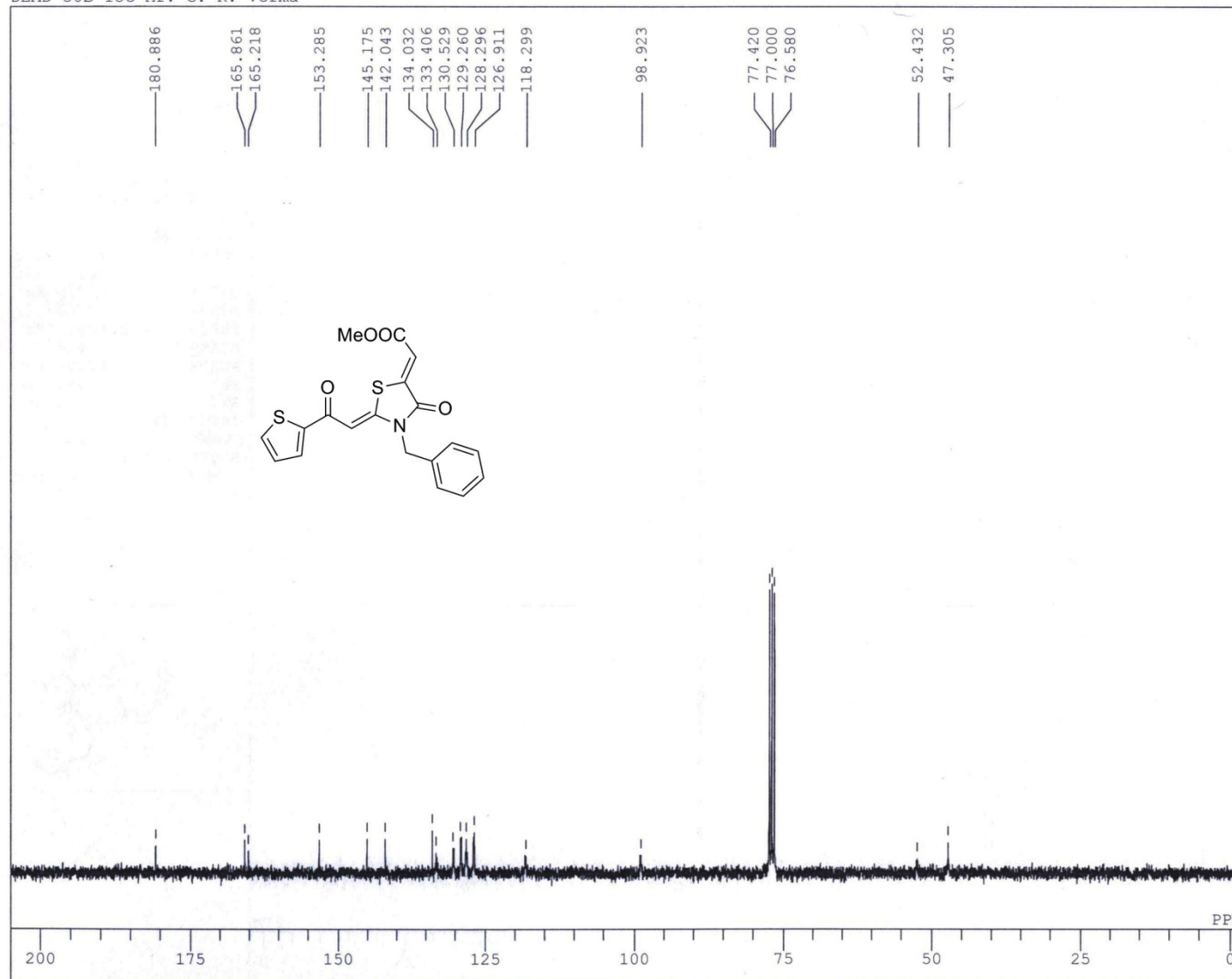


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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-30A_1H Mr. Girije
DATIM Mon Sep 02 16:01:42 20
OBNUC 1H
EXMOD NON
OBFREQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 25.3 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 24

C:\Girijesh K. Verma\DEAD-30B_13C.als
DEAD-30B 13C Mr. G. K. Verma



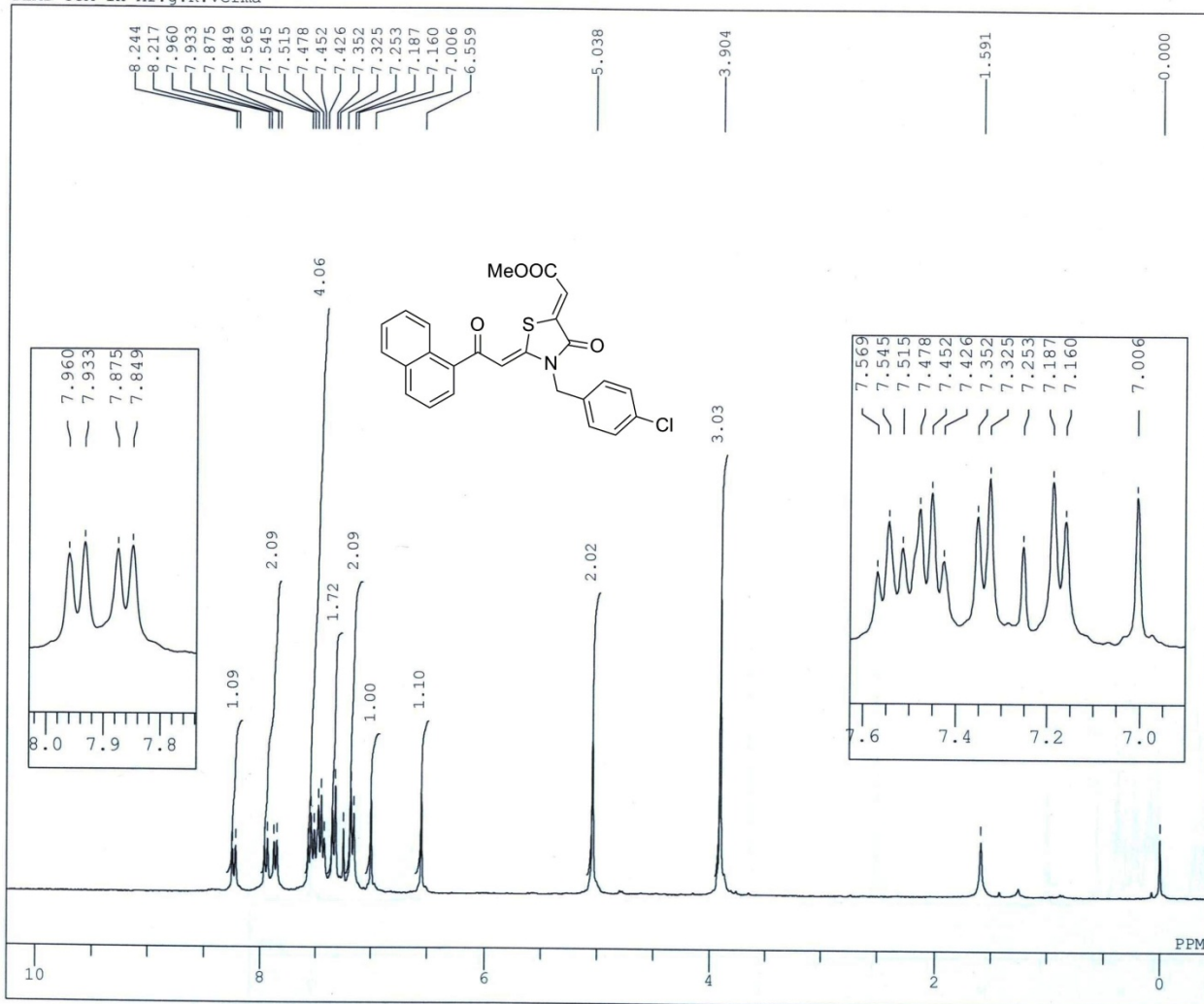
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

DFILE C:\Girijesh K. Ve
COMNT DEAD-30B_13C Mr. '
DATIM Fri Nov 22 17:13:
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBFIN 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 404
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 22.9 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 15

¹H & ¹³C-NMR Spectra of 3vb:

C:\Girijesh K. Verma\DEAD-33A_1H.als
DEAD-33A 1H Mr.g.K.Verma

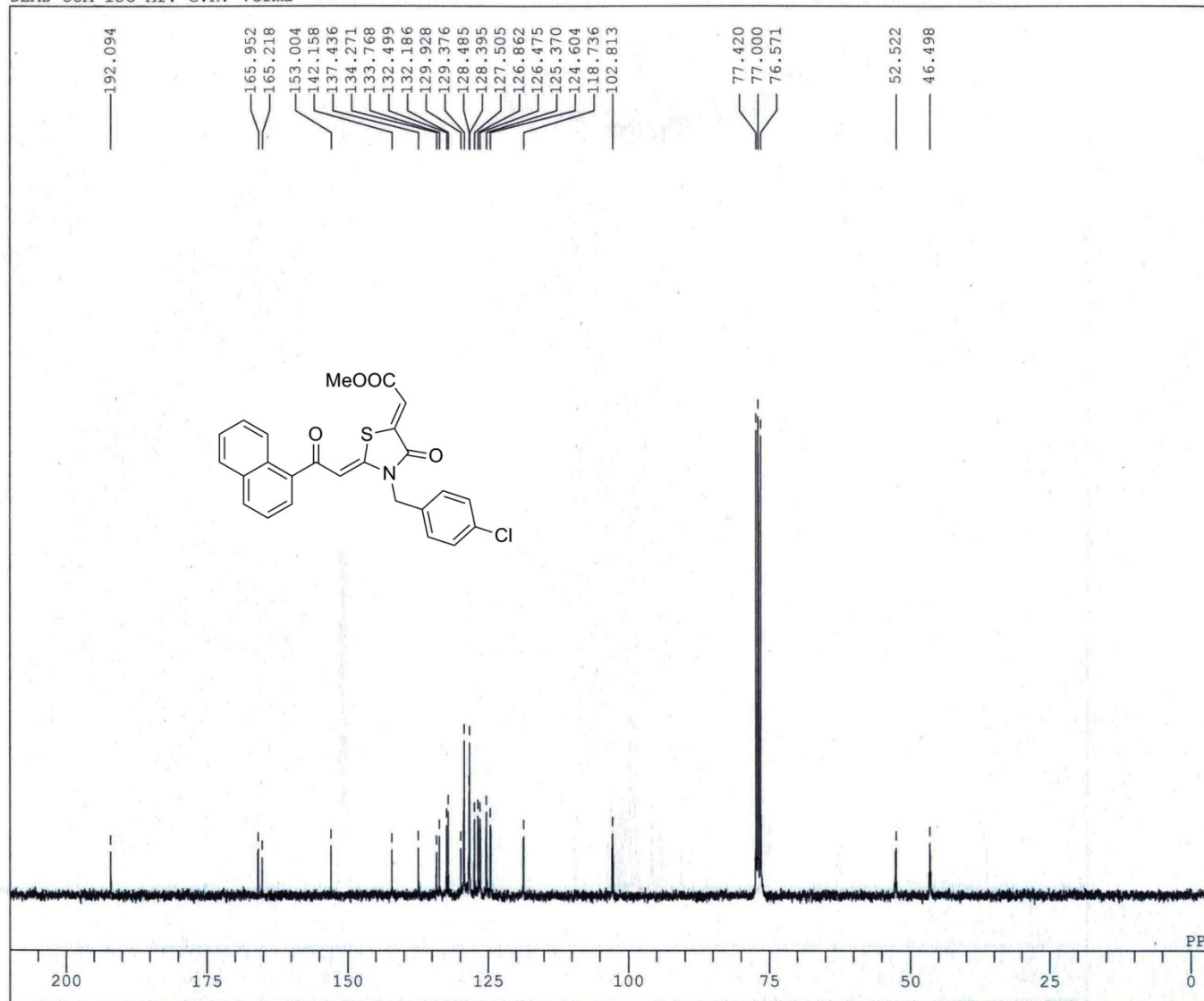


JEOL AL300 FTNMR
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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-33A_1H_Mr.g.K.Verr
DATIM Tue Sep 03 16:46:31 20:
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 8
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 25.1 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 20

C:\Girijesh K. Verma\DEAD-33A_13C.als
 DEAD-33A_13C Mr. G.K. Verma



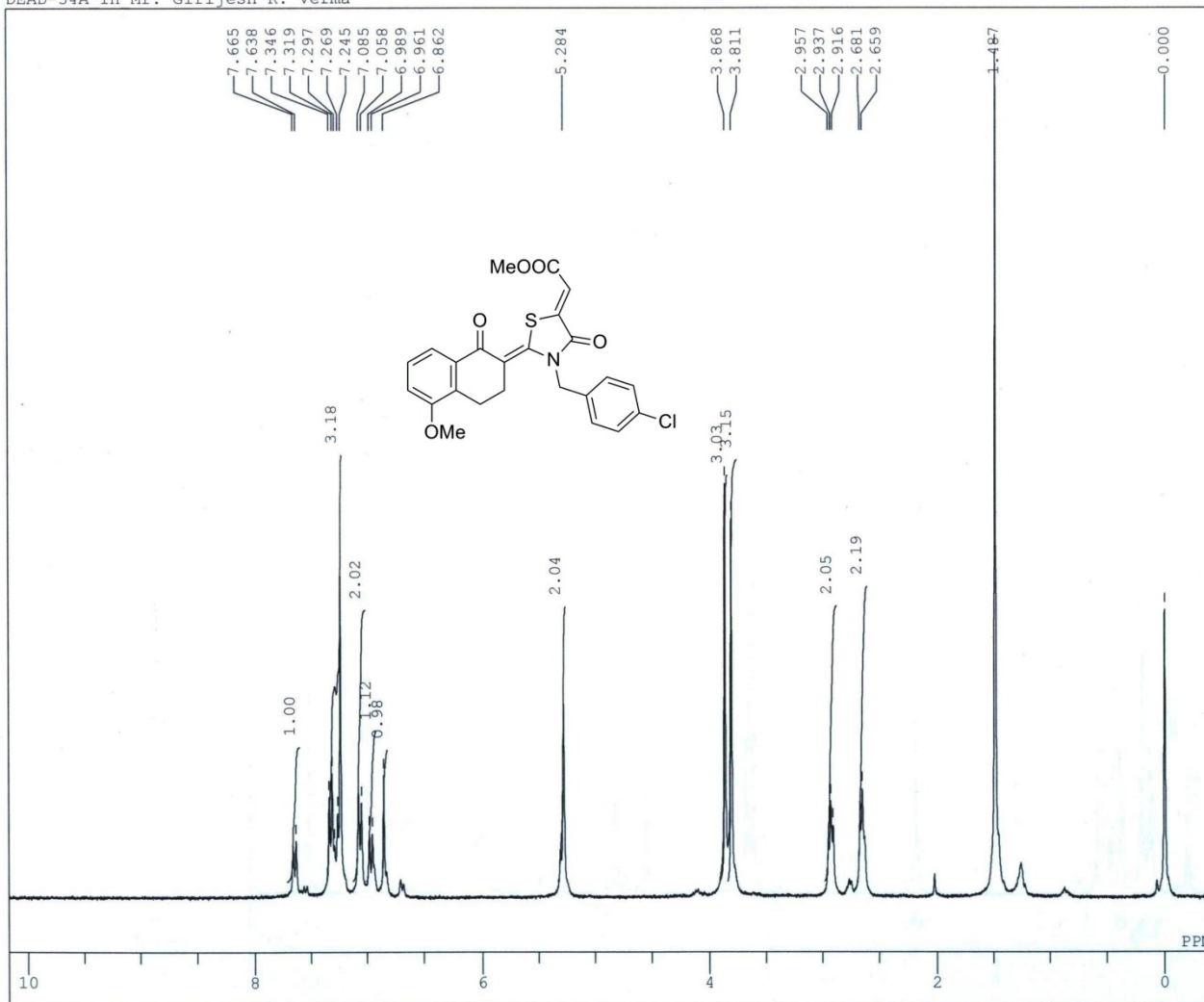
JEOL AL300 FTNMR
 CHEMISTRY DEPARTMENT
 Banaras Hindu University,
 VARANASI-221005

Operator : Nagendra Kumar
 Shishir Singh

DFILE C:\Girijesh K. Verma\DI
 COMNT DEAD-33A_13C Mr. G.K. \
 DATIM Thu Sep 05 06:29:15 20
 OBNUC 13C
 EXMOD BCM
 OBFREQ 75.45 MHz
 OBSET 124.00 KHz
 OBFIN 1840.0 Hz
 POINT 32768
 FREQU 20408.1 Hz
 SCANS 2500
 ACQTM 1.606 sec
 PD 1.394 sec
 PW1 5.9 us
 IRNUC 1H
 CTEMP 22.7 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 24

¹H & ¹³C-NMR Spectra of 3wb:

C:\Girijesh K. Verma\DEAD-34A 1H.als
DEAD-34A 1H Mr. Girijesh K. Verma

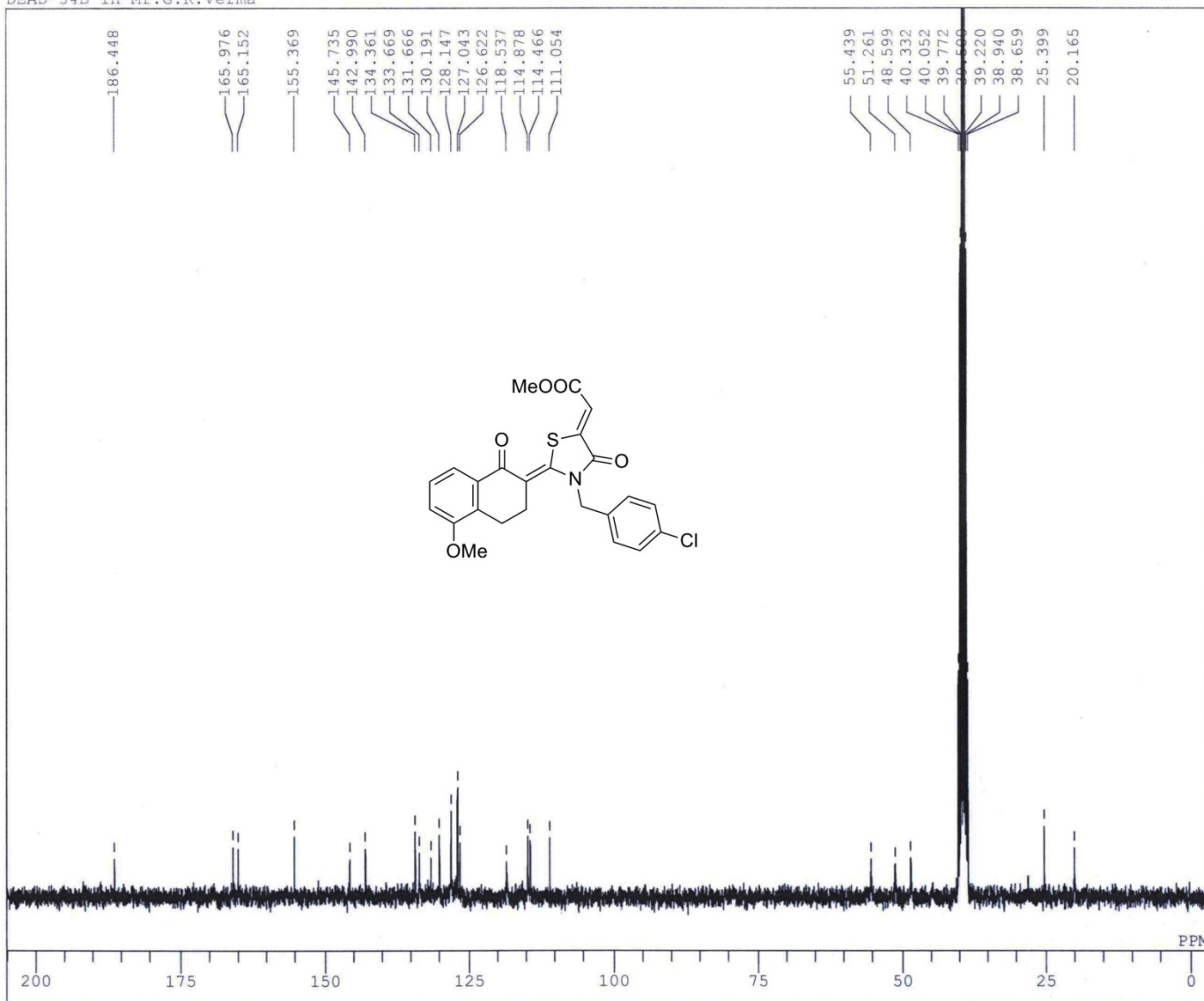


JEOL AL300 FTNMR
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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\Girijesh K. Verma\DI
COMNT DEAD-34A 1H Mr. Girije
DATIM Mon Sep 09 17:35:20 20
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 47
ACQTM 3.447 sec
PD 1.547 sec
PWL 5.2 us
IRNUC 1H
CTEMP 50.3 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 0.12 Hz
RGAIN 23

C:\WINNMR98\Data\DEAD-34B_1H2BCM_E1.als
DEAD-34B 1H Mr.G.K.Verma



JEOL AL300 FTNMR
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VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\Data\DEAD-34B_1H2BCM_E1.als
COMNT DEAD-34B 1H Mr.G.K.Verma
DATIM Thu Nov 21 20:24:58 2001
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 124.00 KHz
OBSF 1840.0 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 2500
ACQTM 1.606 sec
PD 1.394 sec
PW1 5.9 us
IRNUC 1H
CTEMP 120.3 c
SLVNT DMSO
EXREF 39.50 ppm
BF 1.20 Hz
RGAIN 25