

# Studies on the Synthesis of Apoptolidin: Synthesis of a C<sub>1</sub>-C<sub>27</sub> Fragment of Apoptolidin D

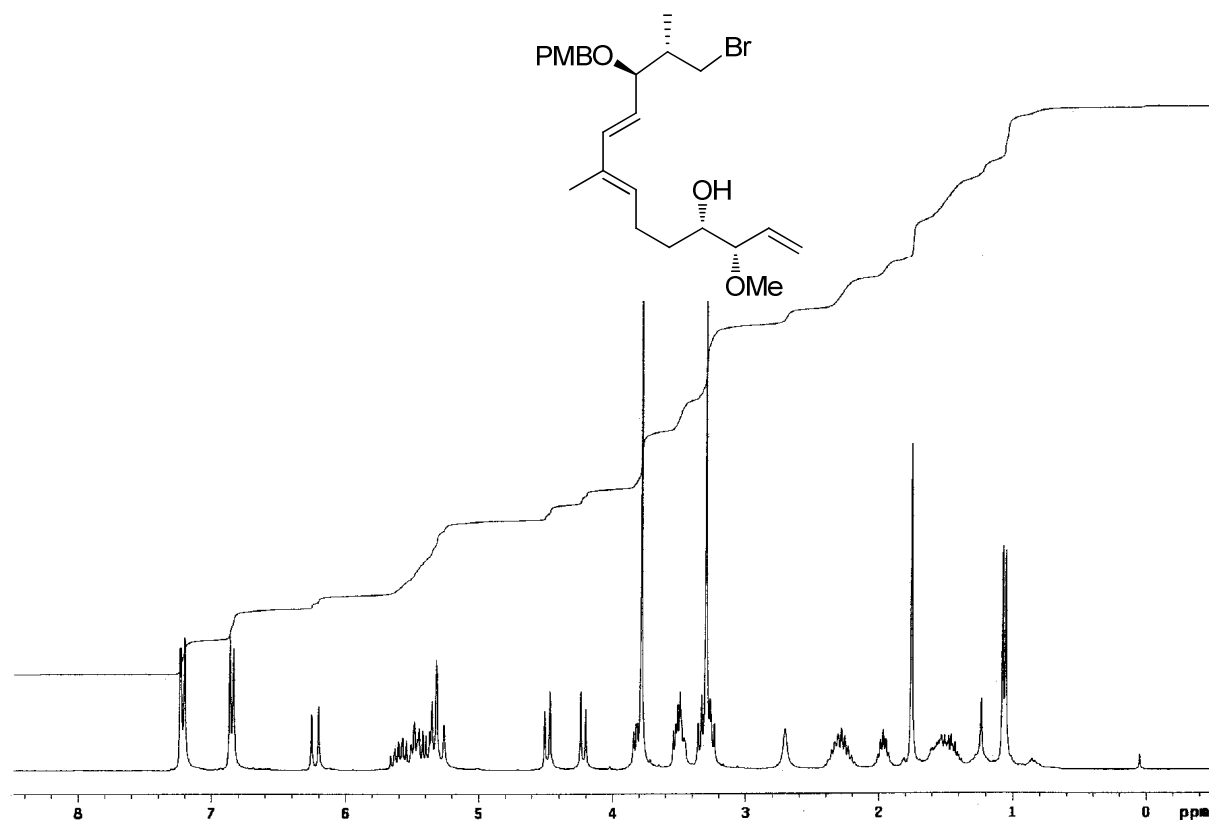
*Madduri Srinivasarao, Youngsoon Kim, Xiaojin Li, Daniel W. Robbins and Philip L. Fuchs\*.*

Department of Chemistry, Purdue University, West Lafayette, Indiana 47907

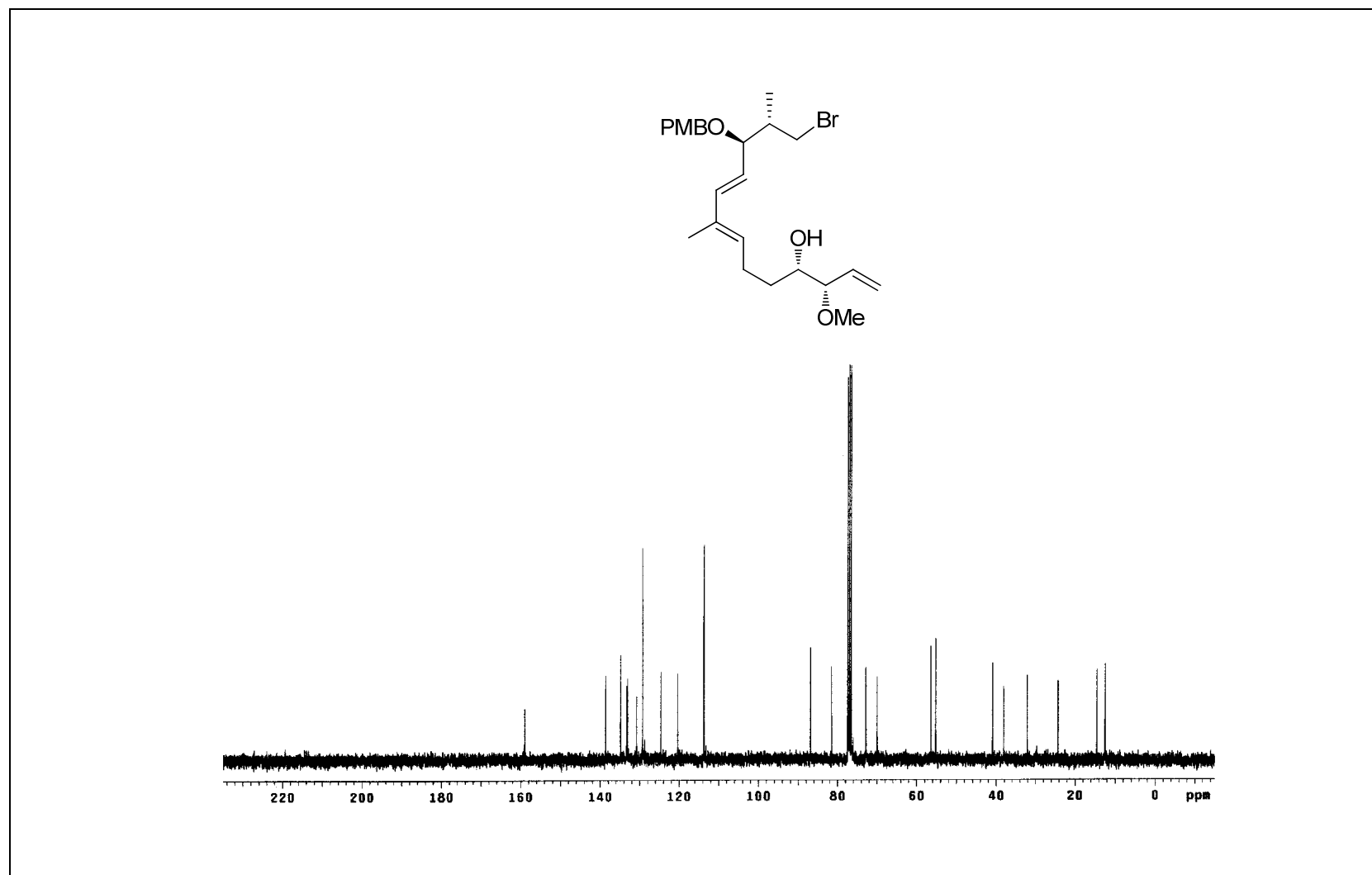
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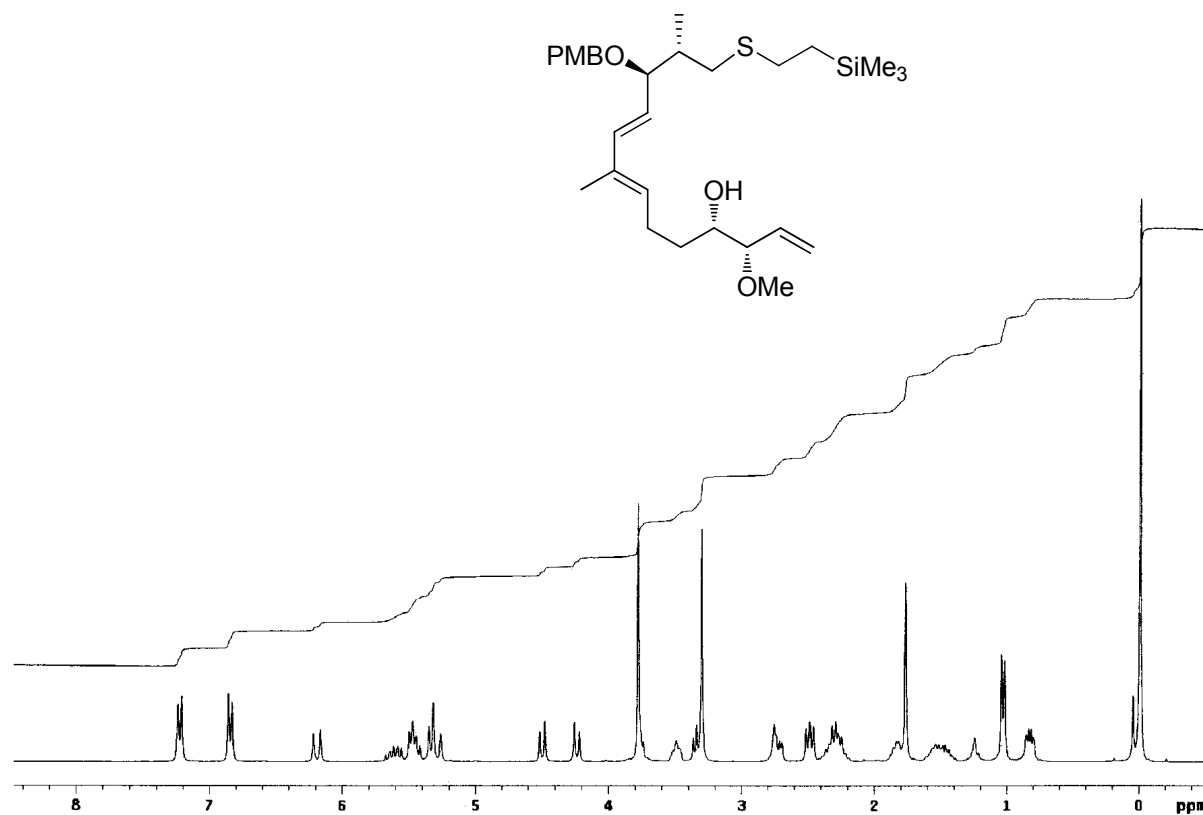
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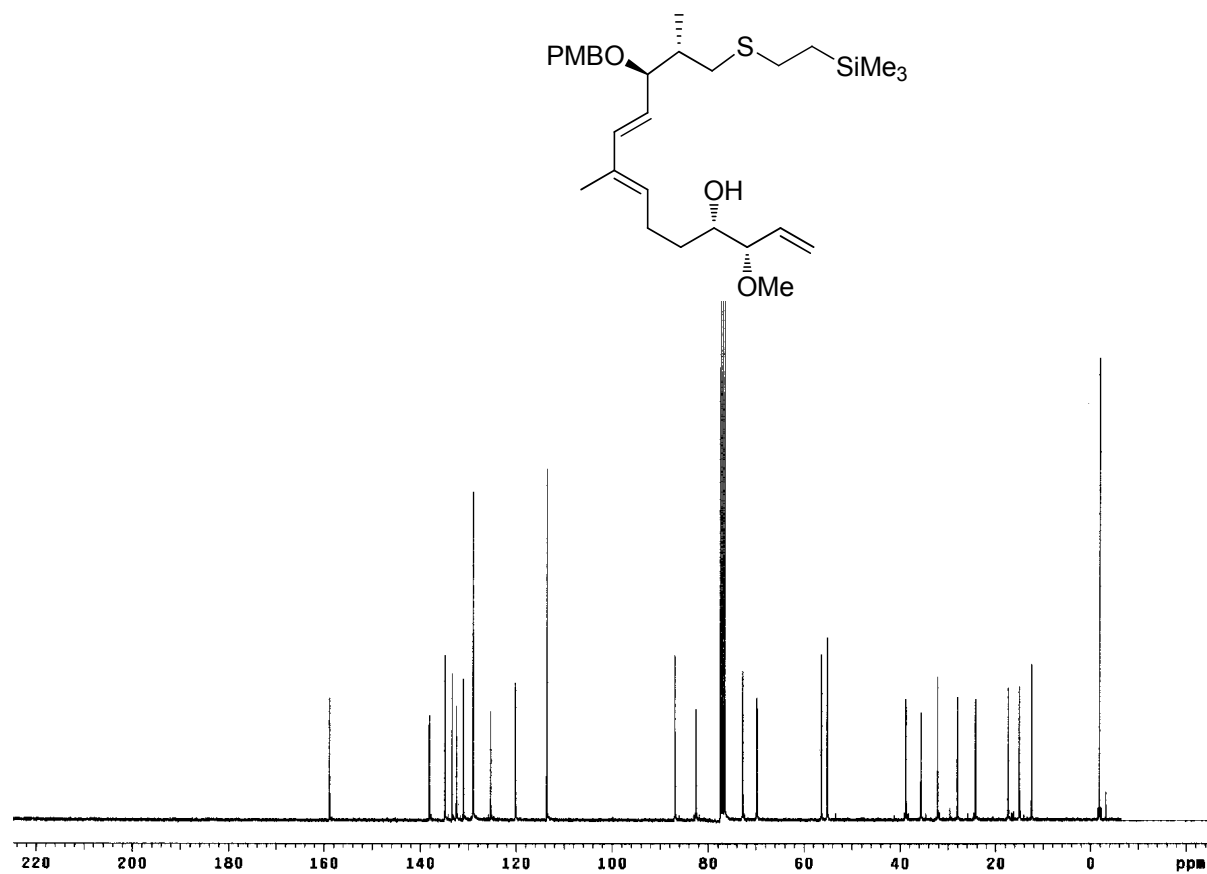
300 MHz  $^1\text{H}$  NMR of compound **9** in  $\text{CDCl}_3$



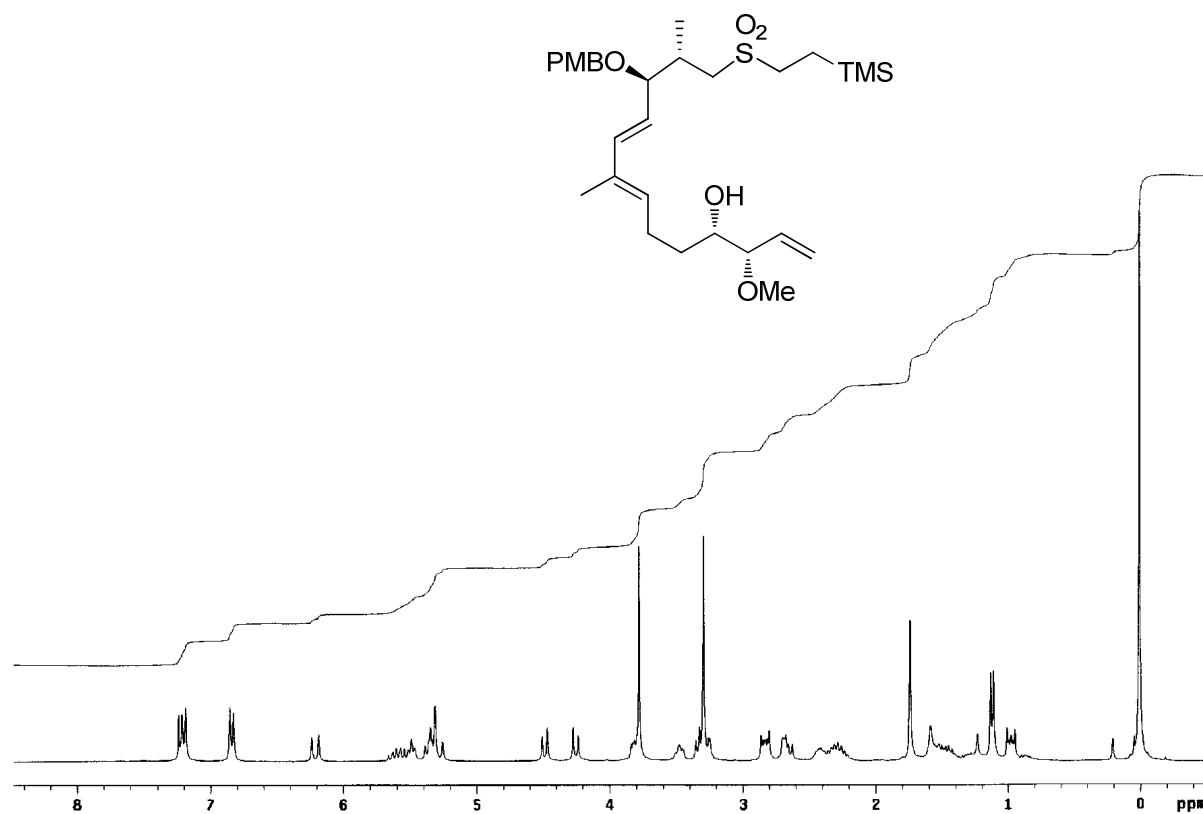
75 MHz  $^{13}\text{C}$  NMR of compound **9** in  $\text{CDCl}_3$



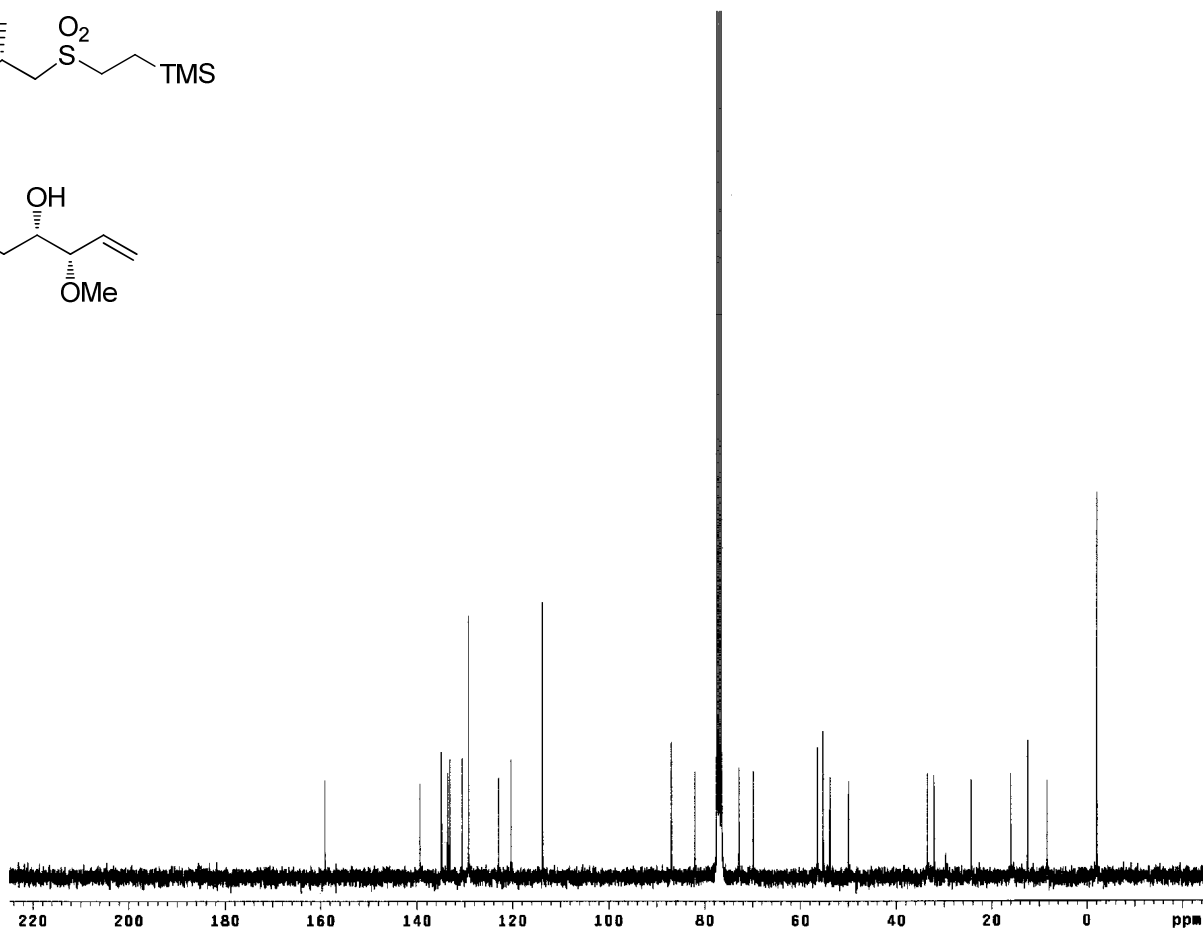
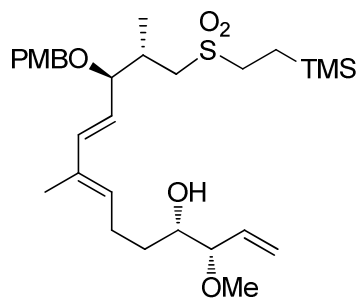
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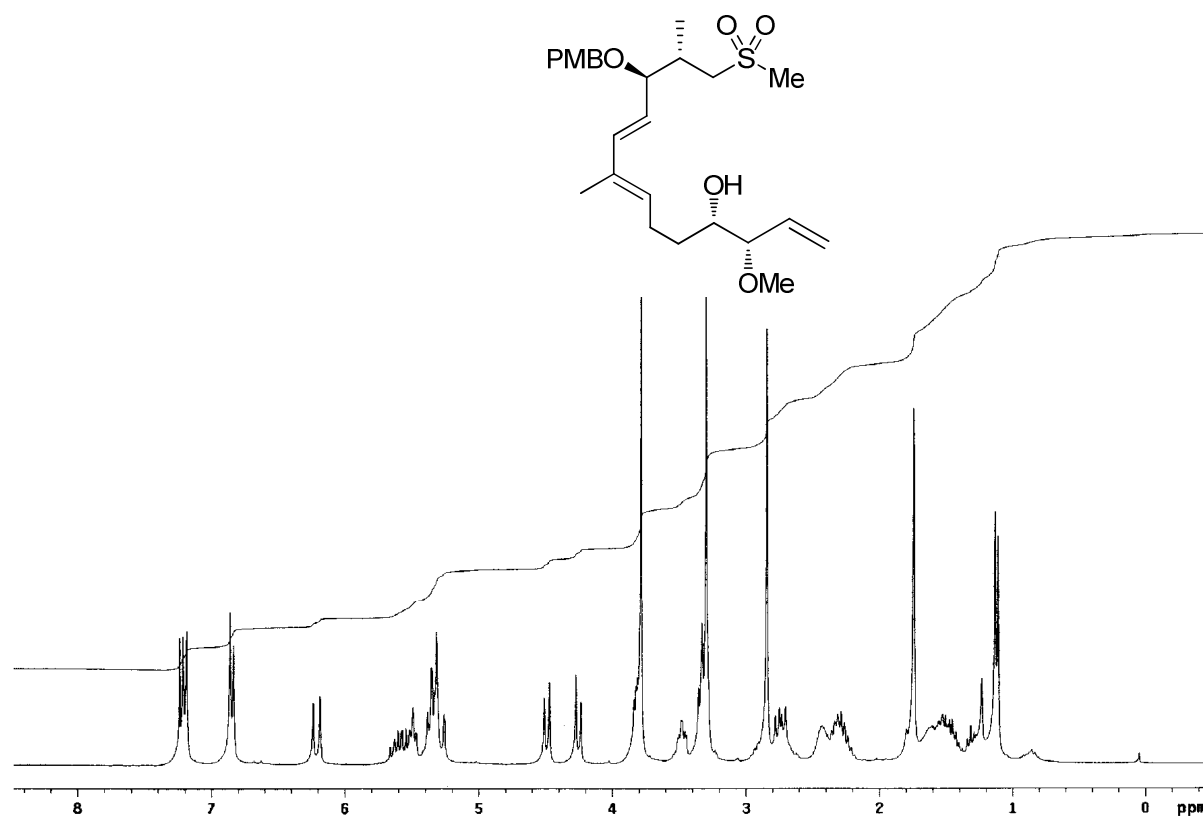
75 MHz  $^{13}\text{C}$  NMR of compound **10** in  $\text{CDCl}_3$



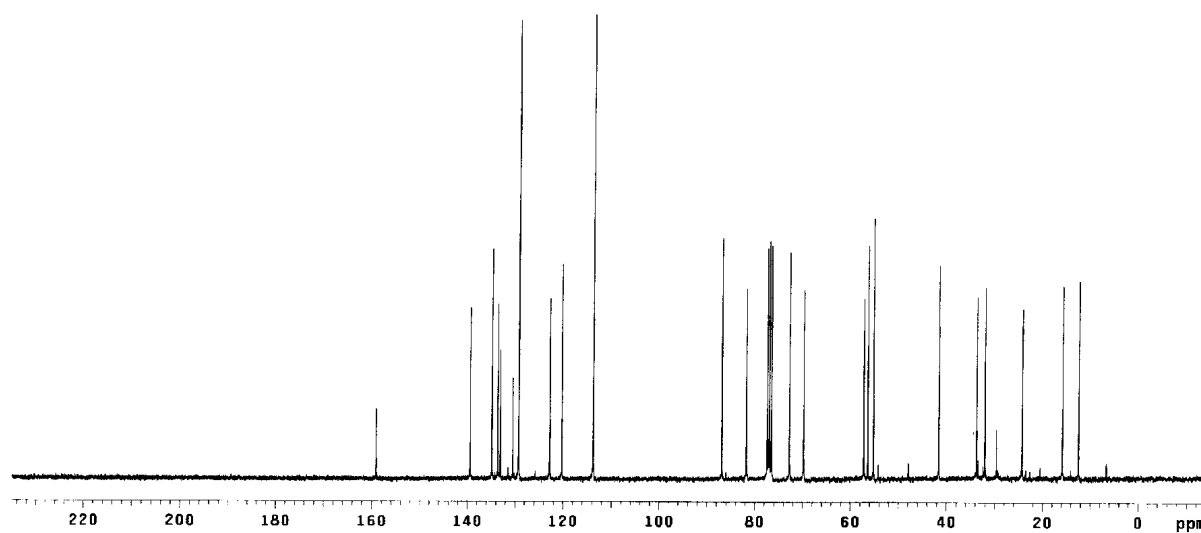
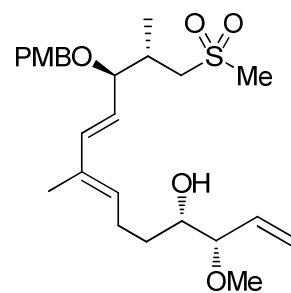
300 MHz <sup>1</sup>H NMR of compound **6** in CDCl<sub>3</sub>



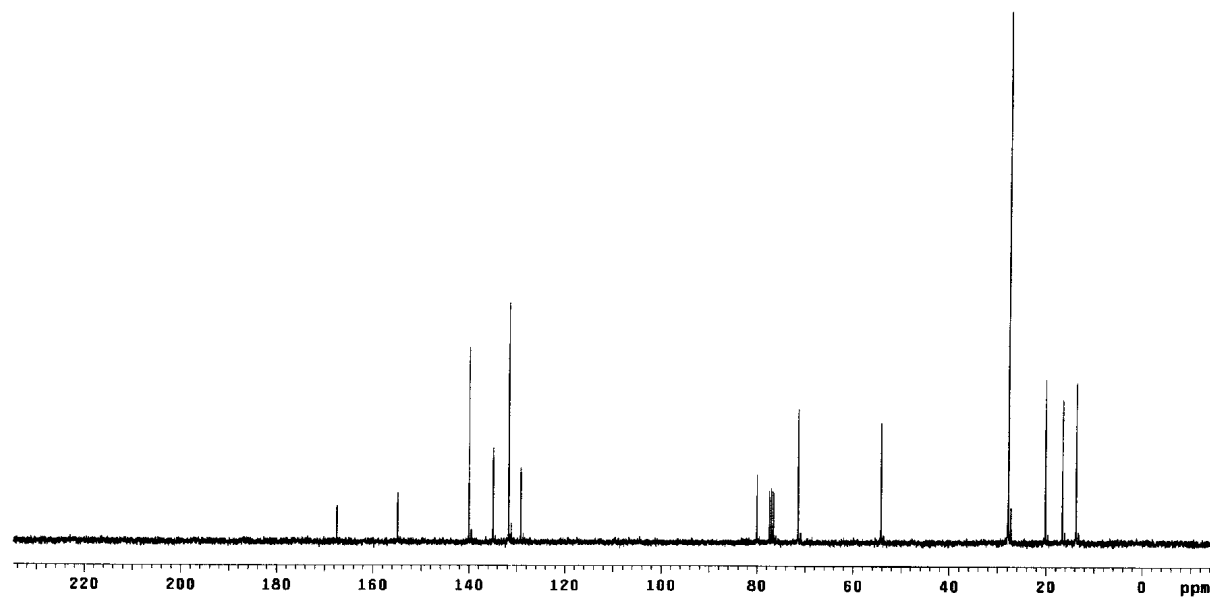
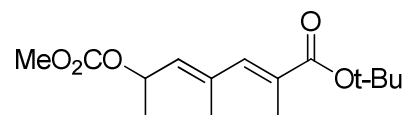
75 MHz <sup>13</sup>C NMR of compound **6** in CDCl<sub>3</sub>



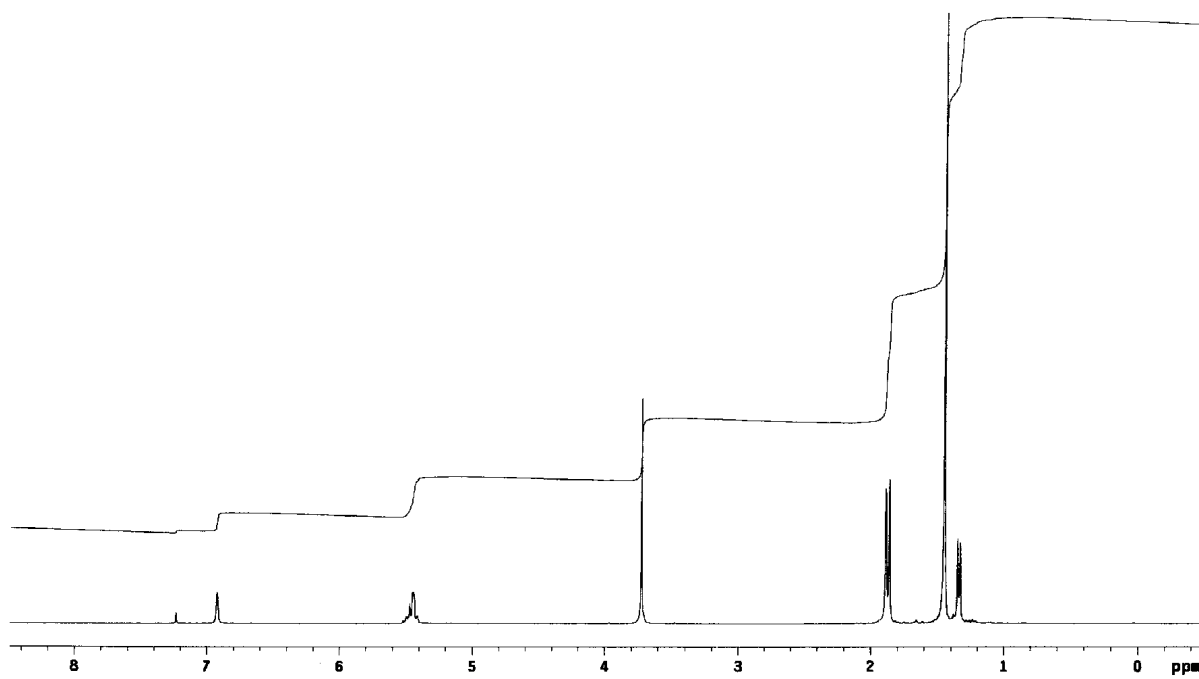
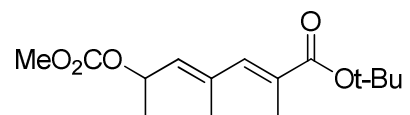
300 MHz  $^1\text{H}$  NMR of compound **11** in  $\text{CDCl}_3$



75 MHz <sup>13</sup>C NMR of compound **11** in CDCl<sub>3</sub>

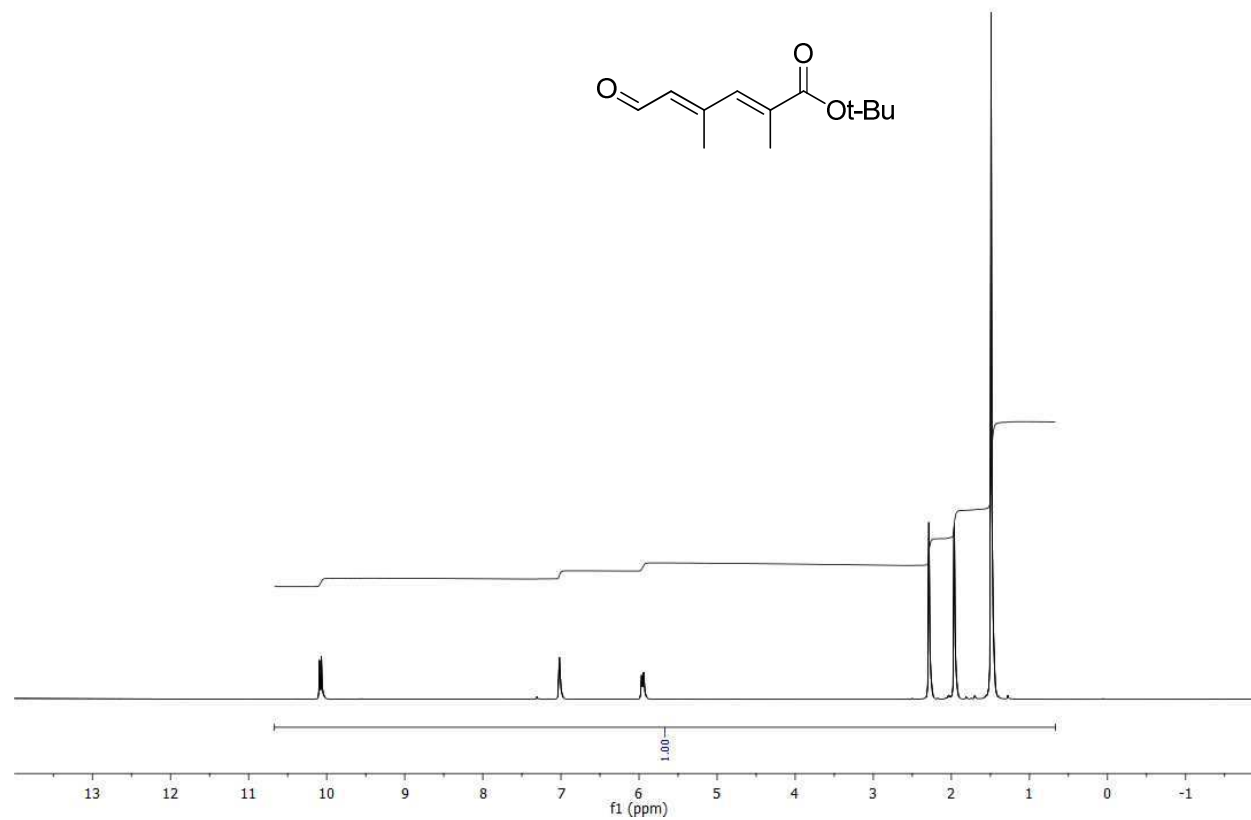
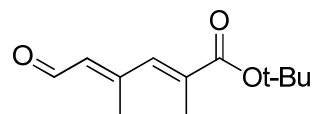


75 MHz  $^{13}C$  NMR of compound **13** in  $CDCl_3$

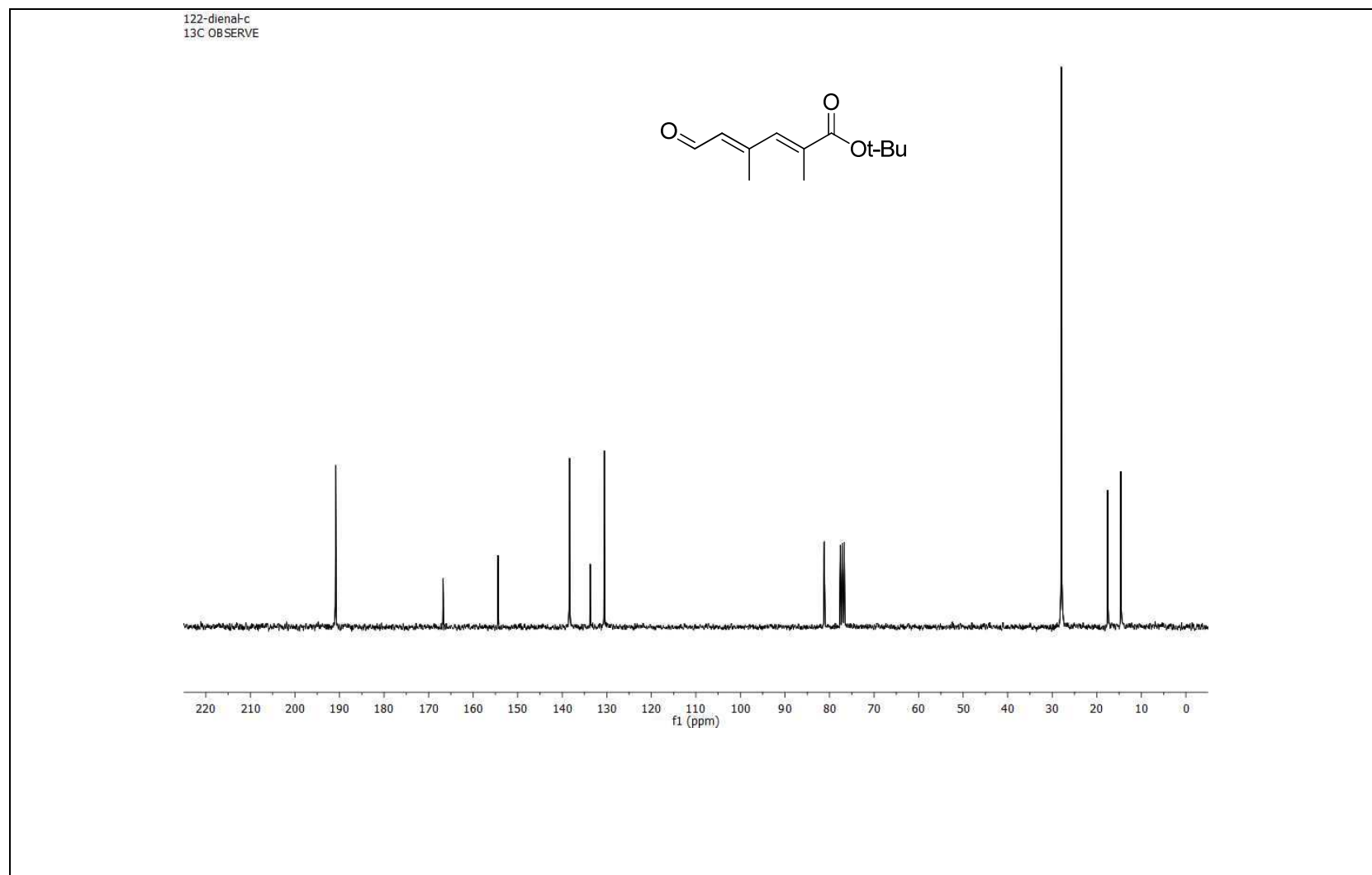


300 MHz  $^1\text{H}$  NMR of compound **13** in  $\text{CDCl}_3$

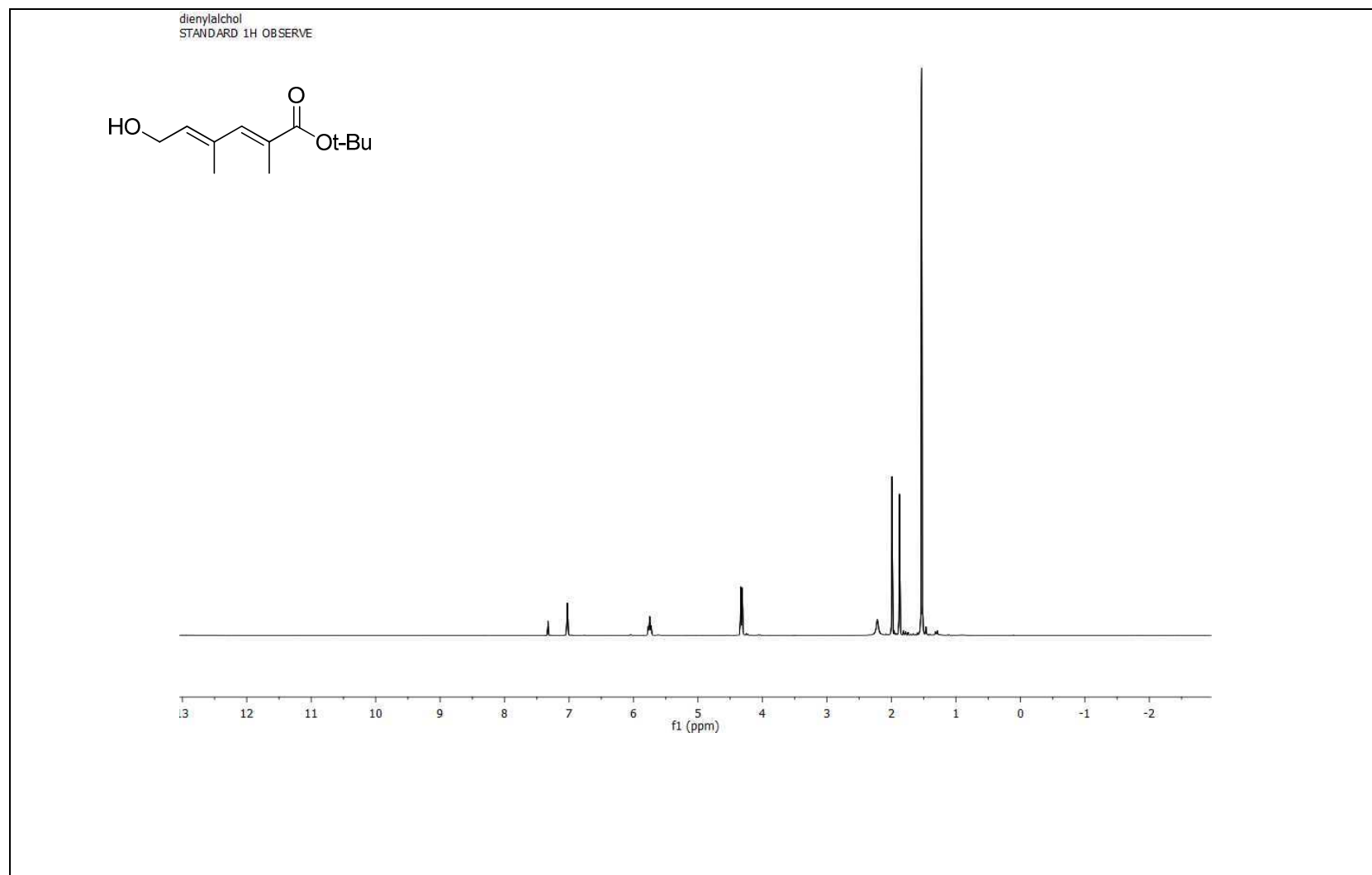
122-dienal-h  
122-2-dienal-proton



300 MHz  $^1\text{H}$  NMR of compound **15** in  $\text{CDCl}_3$



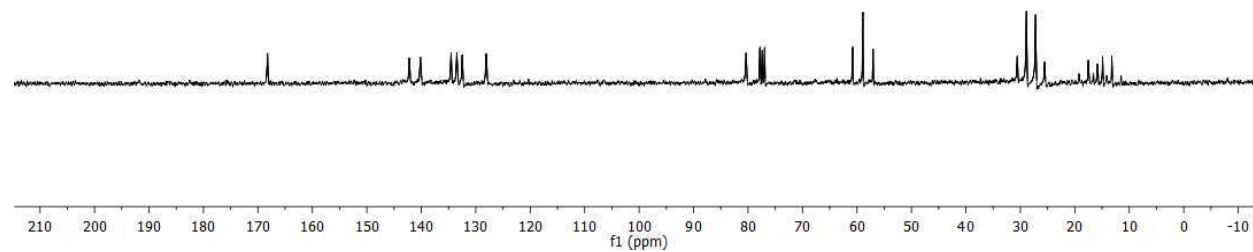
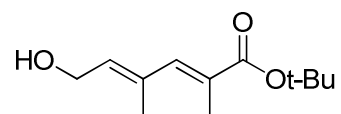
75 MHz  $^{13}\text{C}$  NMR of compound **15** in  $\text{CDCl}_3$



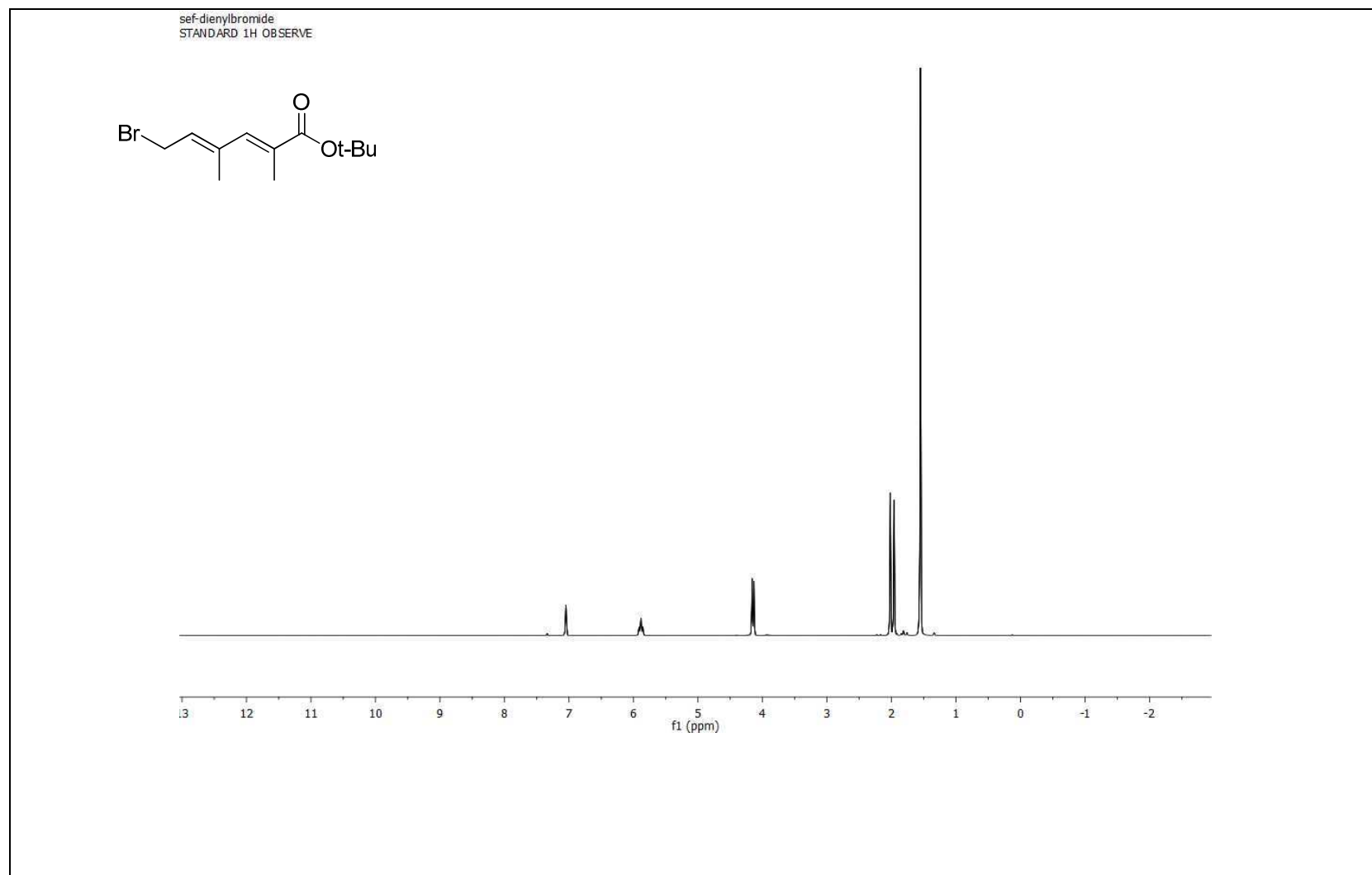
300 MHz <sup>1</sup>H NMR of compound **16** in CDCl<sub>3</sub>

dienylal-C  
13C OBSERVE

No proton decoupling

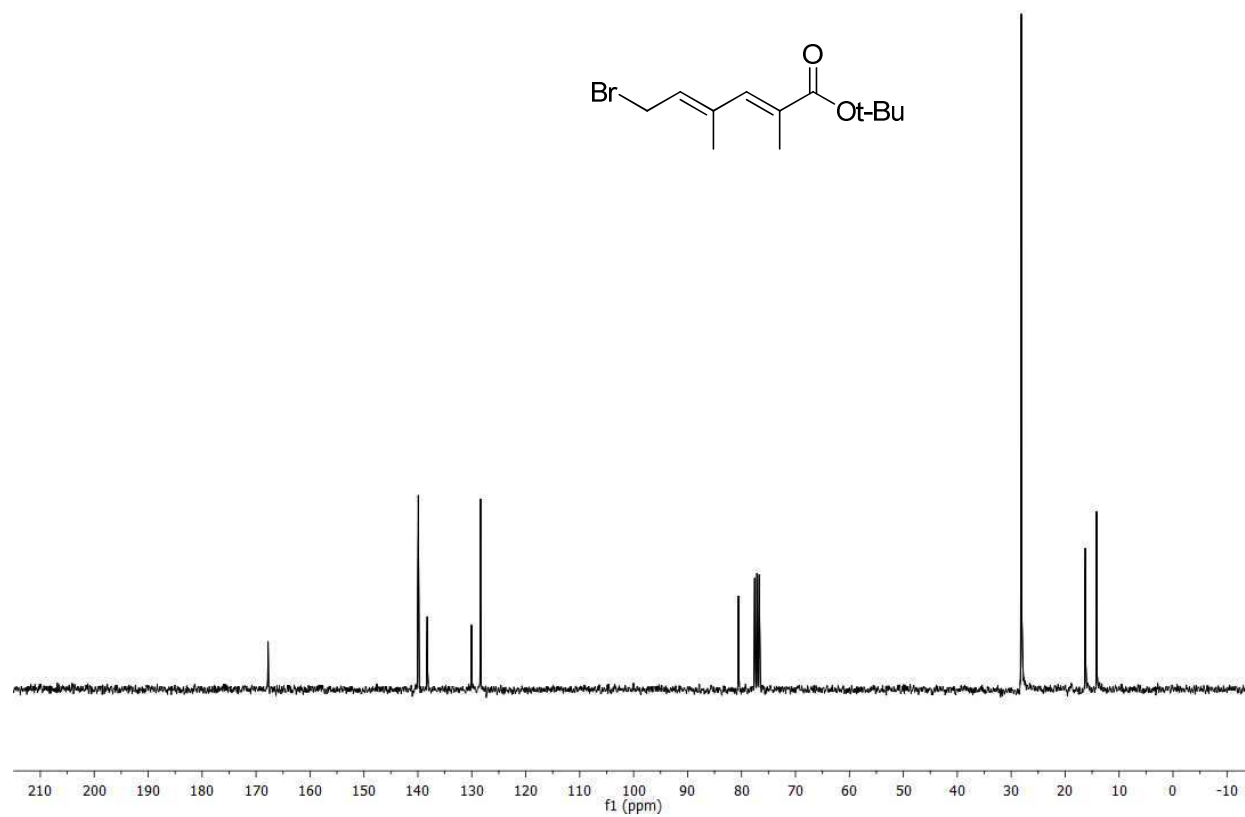
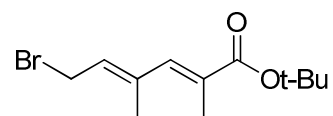


75 MHz  $^{13}\text{C}$  NMR of compound **16** in  $\text{CDCl}_3$

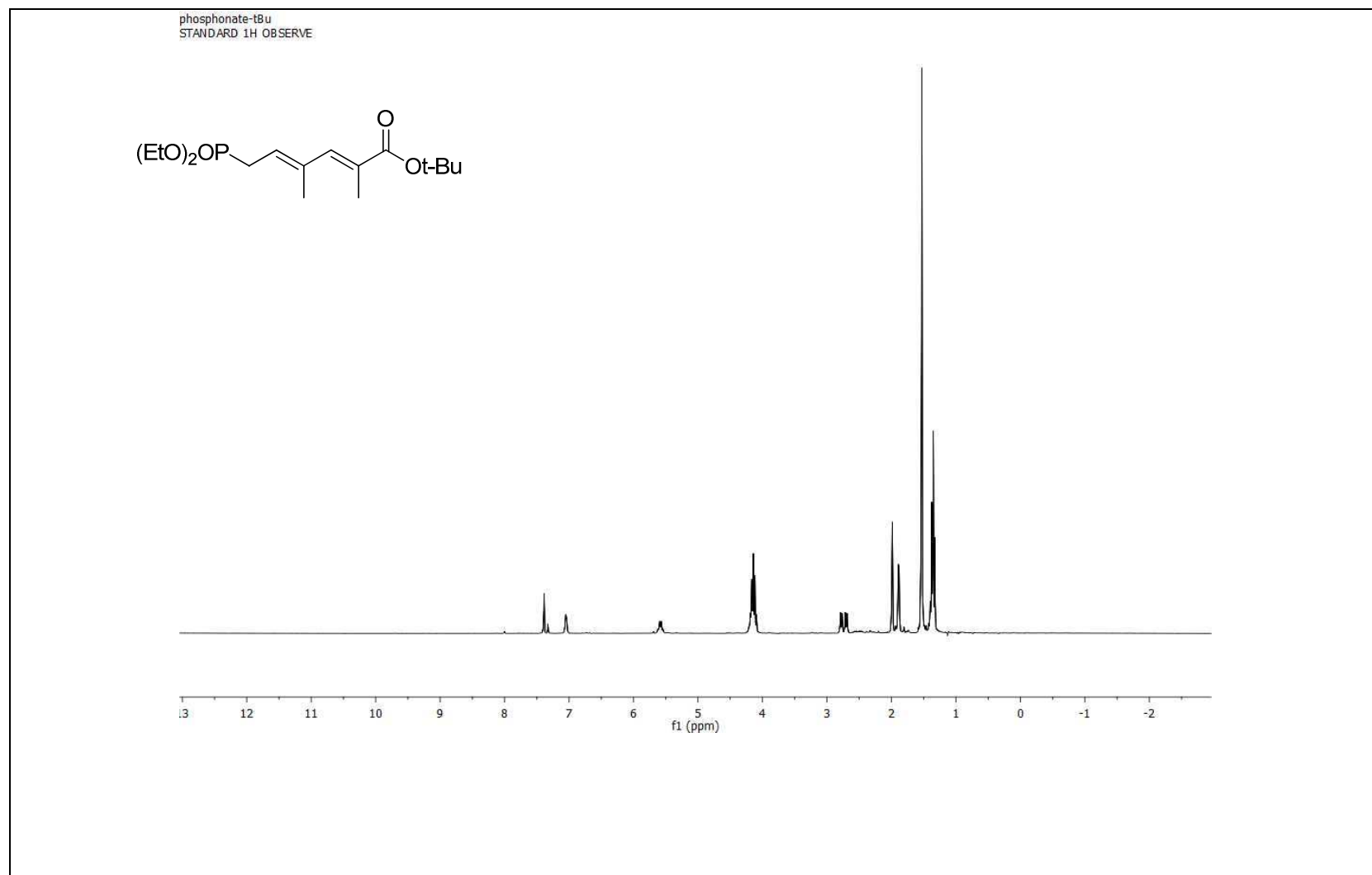


300 MHz <sup>1</sup>H NMR of compound **17** in CDCl<sub>3</sub>

sef-c-dienylbromide  
13C OBSERVE

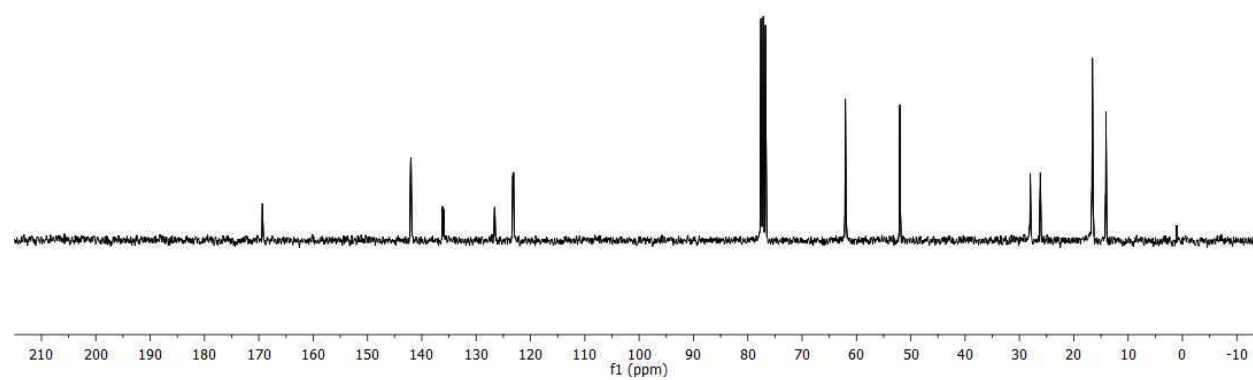
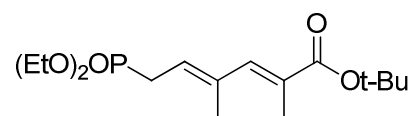


75 MHz  $^{13}\text{C}$  NMR of compound **17** in  $\text{CDCl}_3$



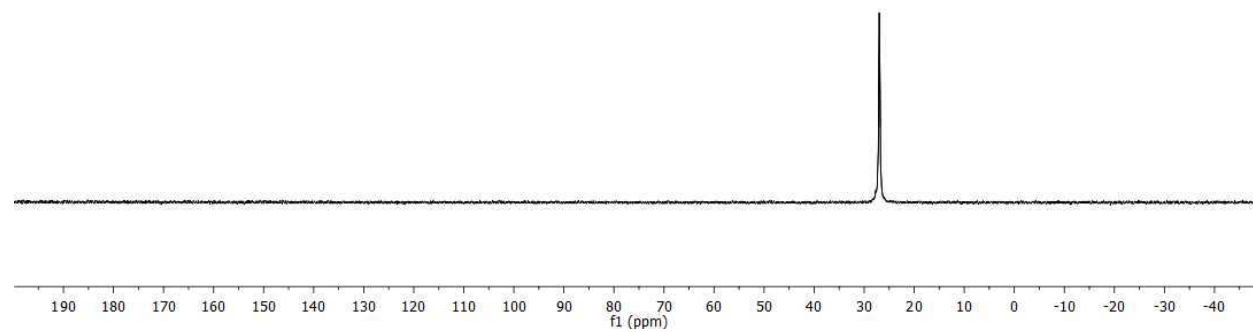
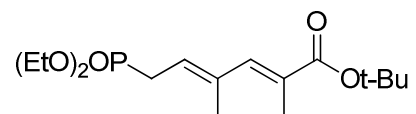
300 MHz <sup>1</sup>H NMR of compound **21** in CDCl<sub>3</sub>

Me-Phos-C  
13C OBSERVE

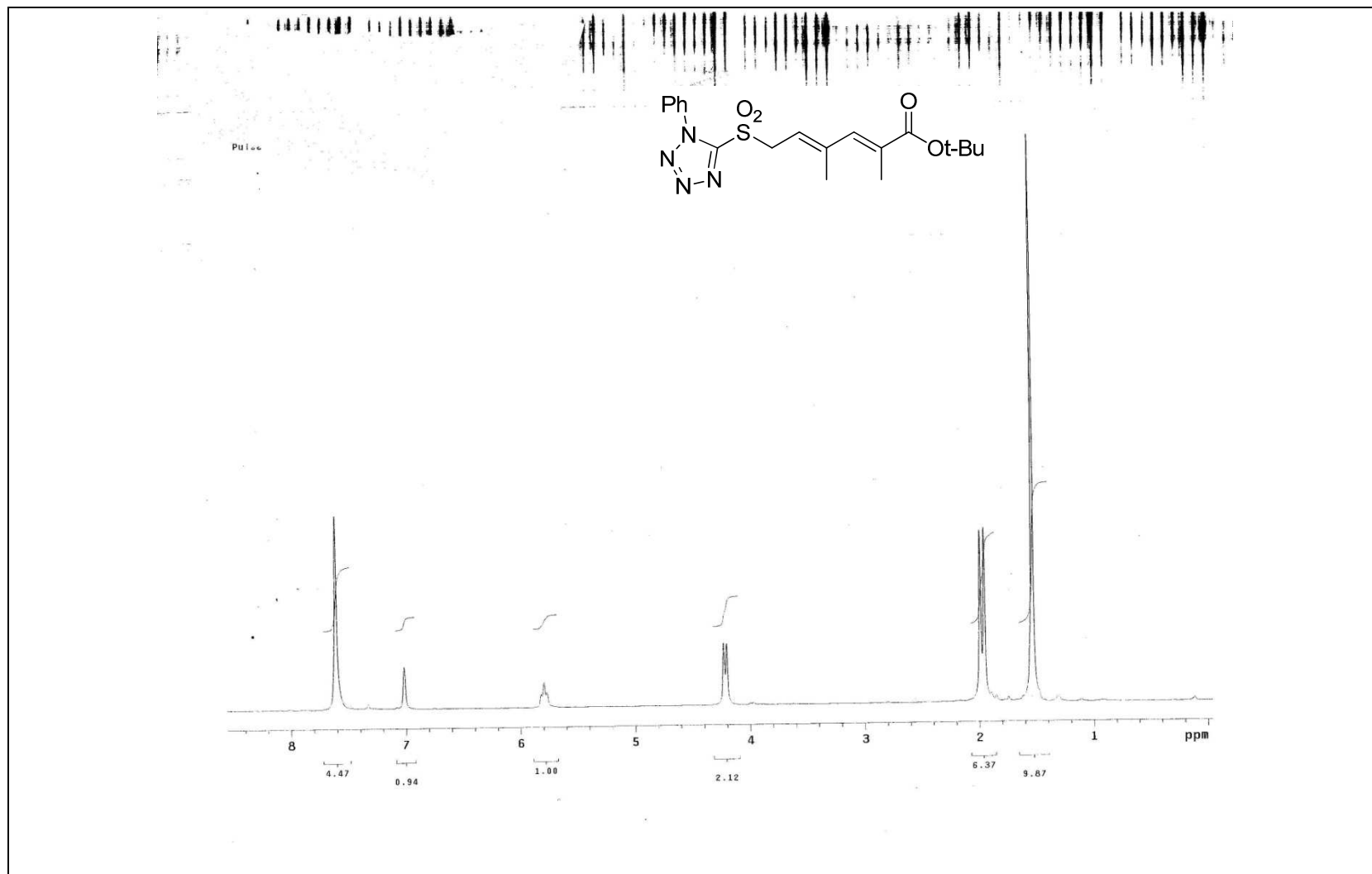


75 MHz <sup>13</sup>C NMR of compound **21** in CDCl<sub>3</sub>

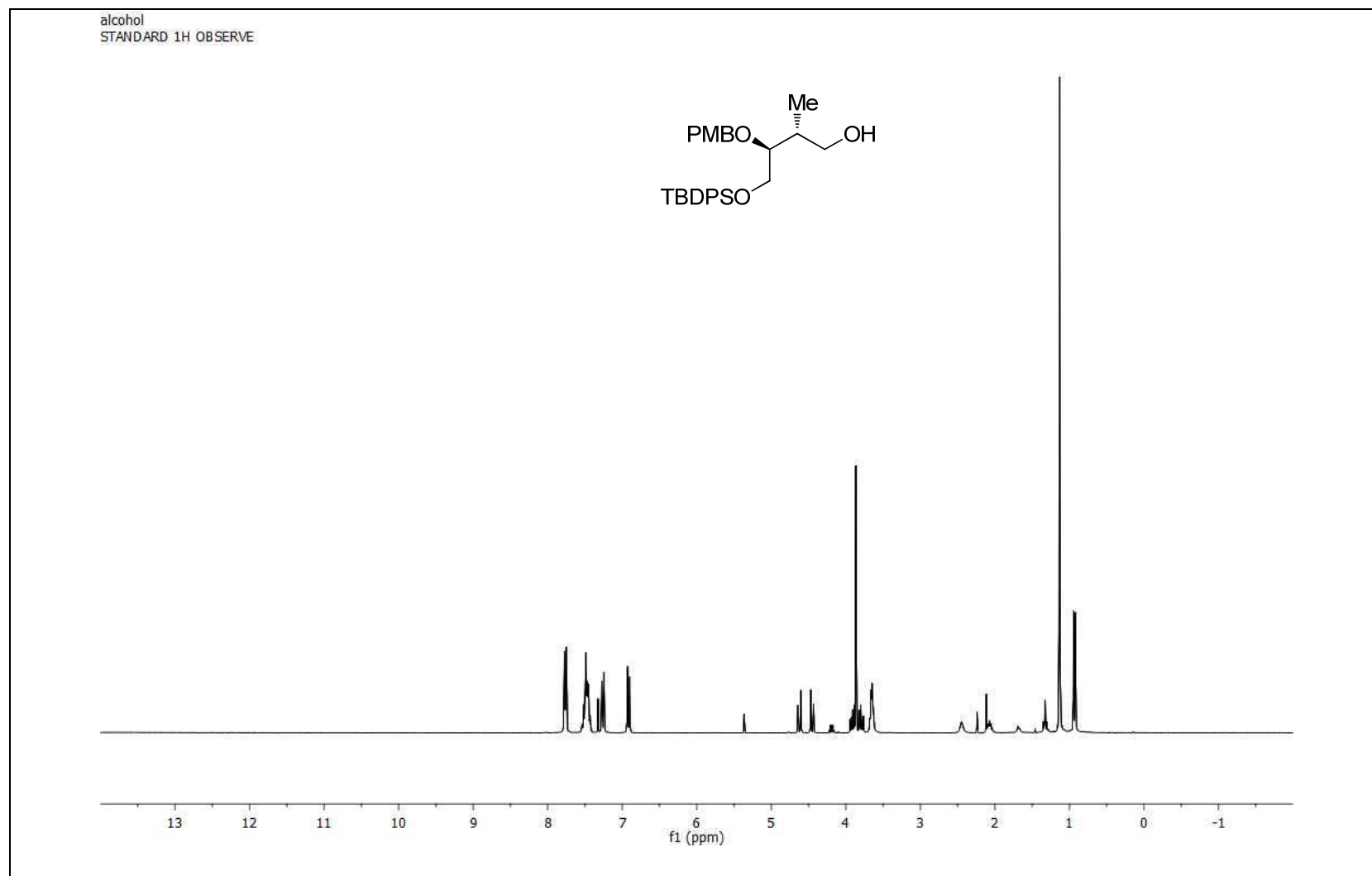
me-phos-P  
P-31 STANDARD PARAMETERS  
PHOSPHATE REGION



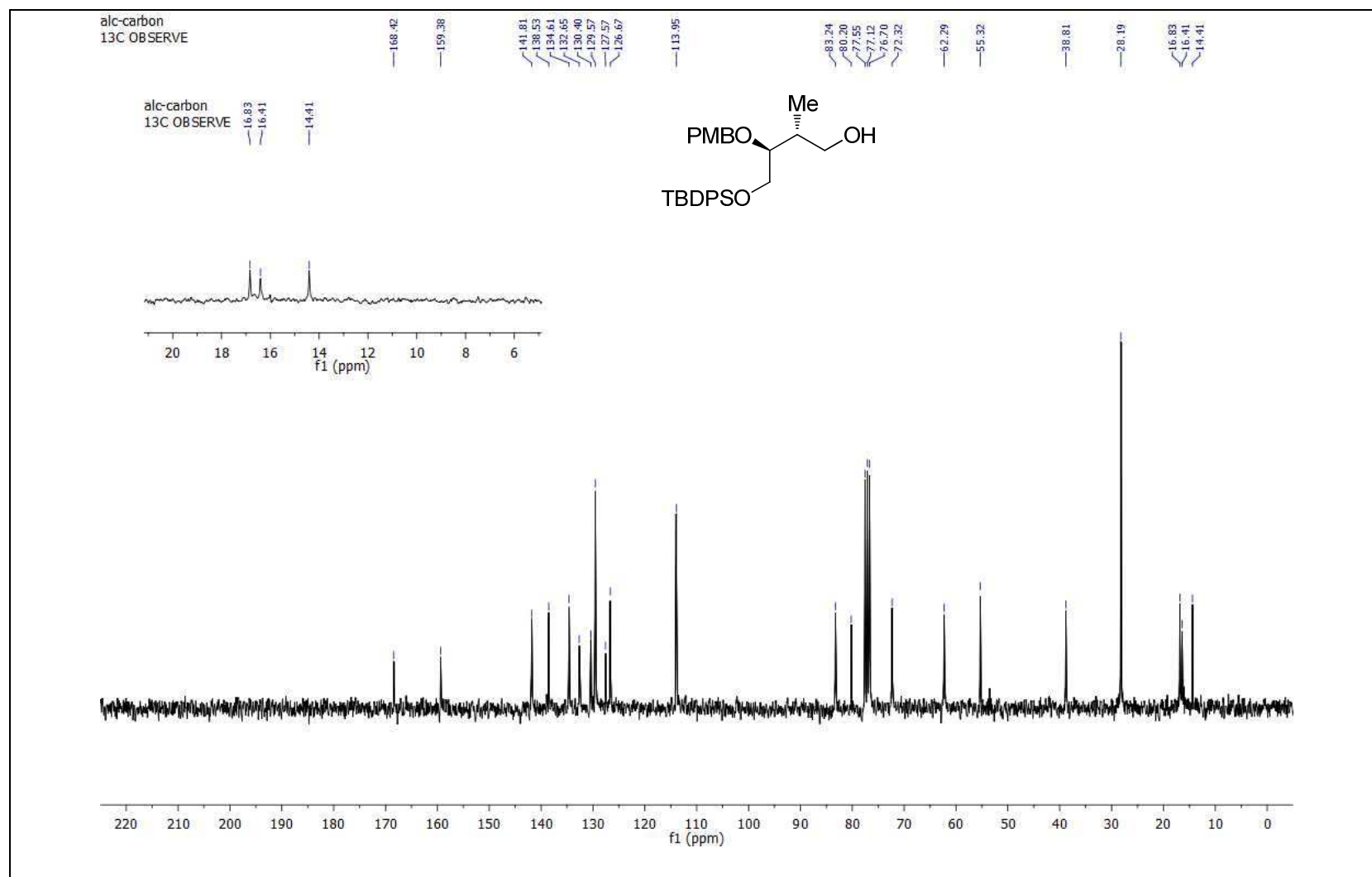
121 MHz  $^{31}\text{P}$  NMR of compound **21** in  $\text{CDCl}_3$



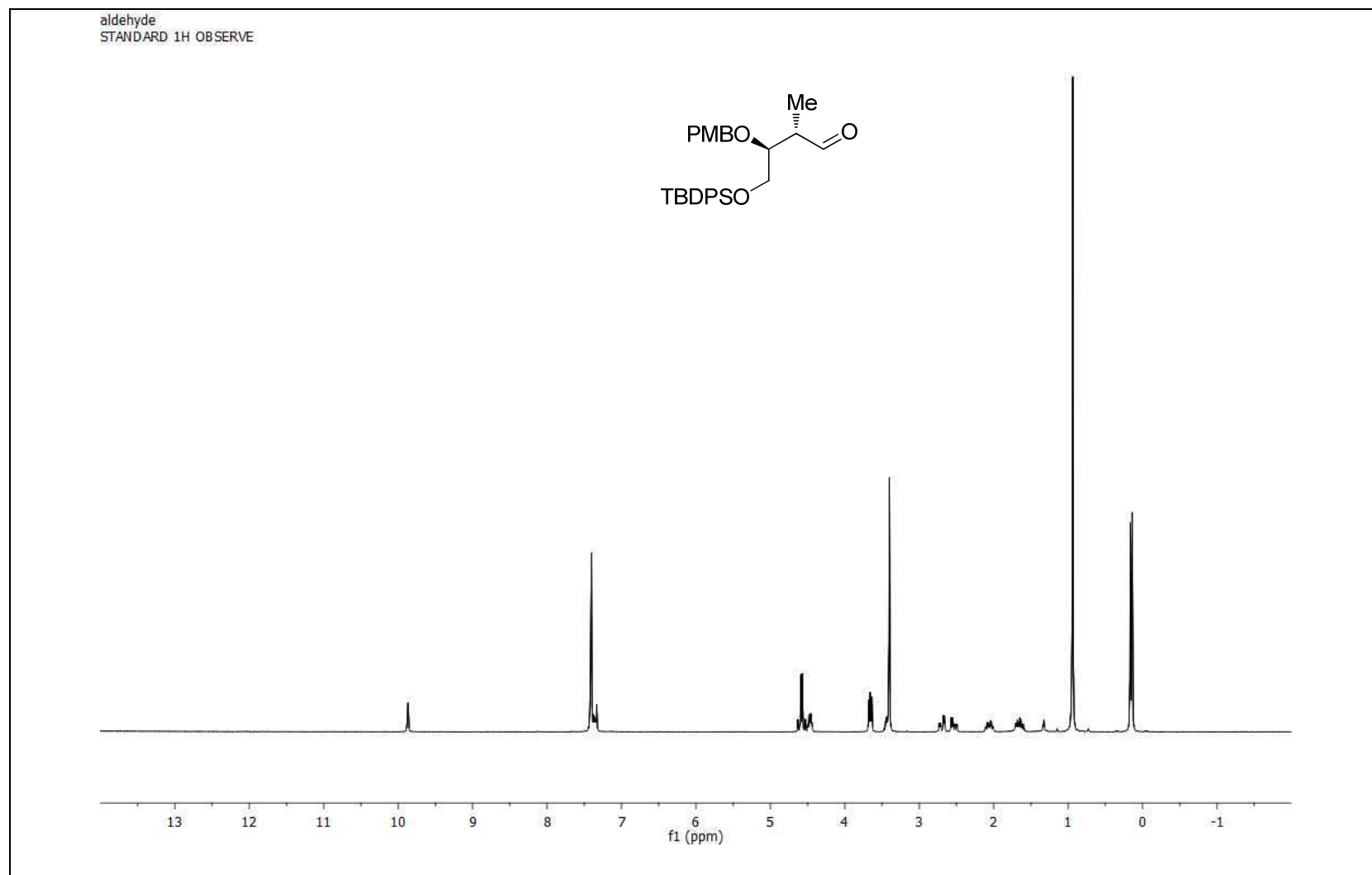
300 MHz  $^1\text{H}$  NMR of compound **19** in  $\text{CDCl}_3$



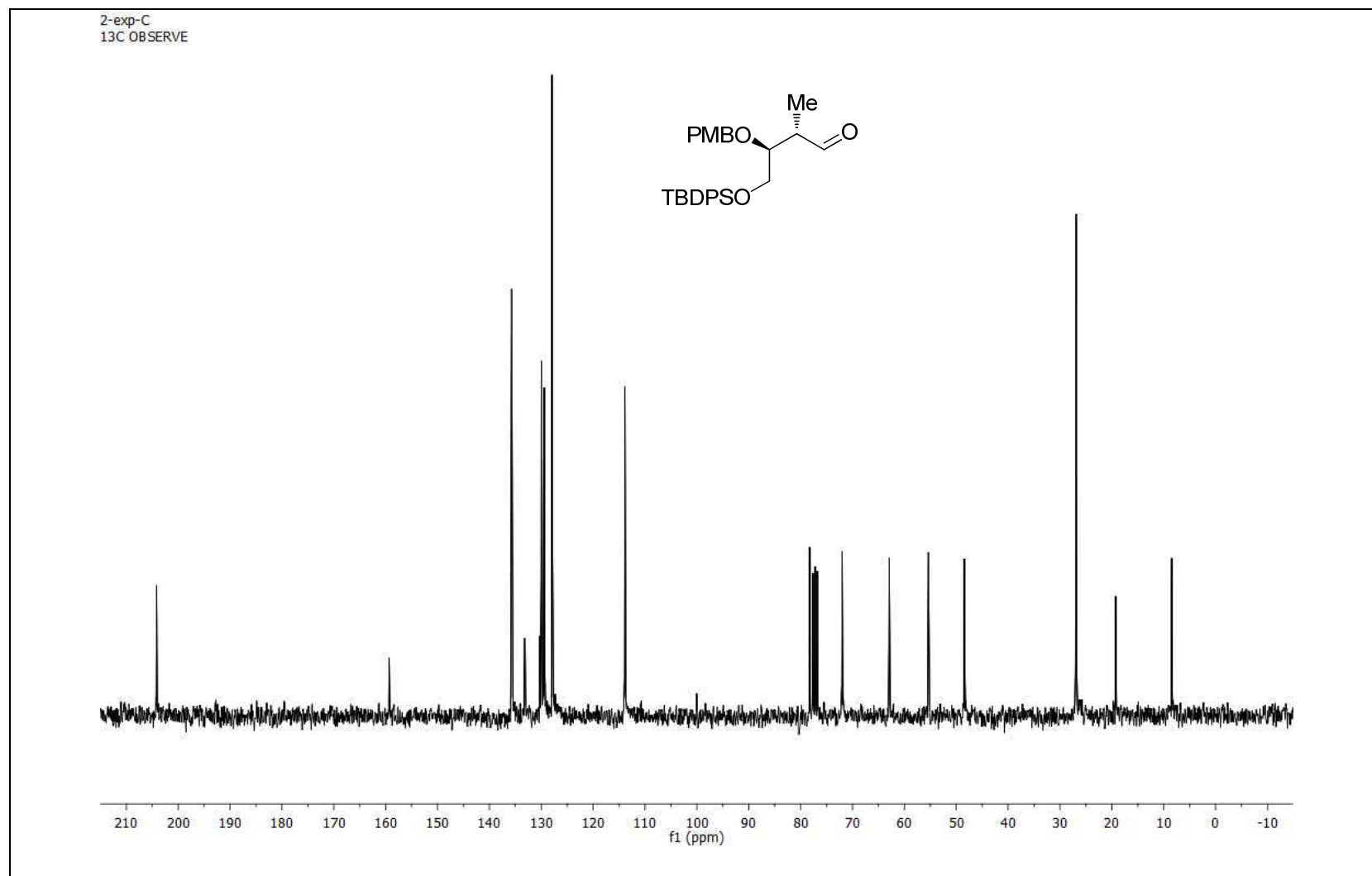
300 MHz  $^1\text{H}$  NMR of compound **24** in  $\text{CDCl}_3$



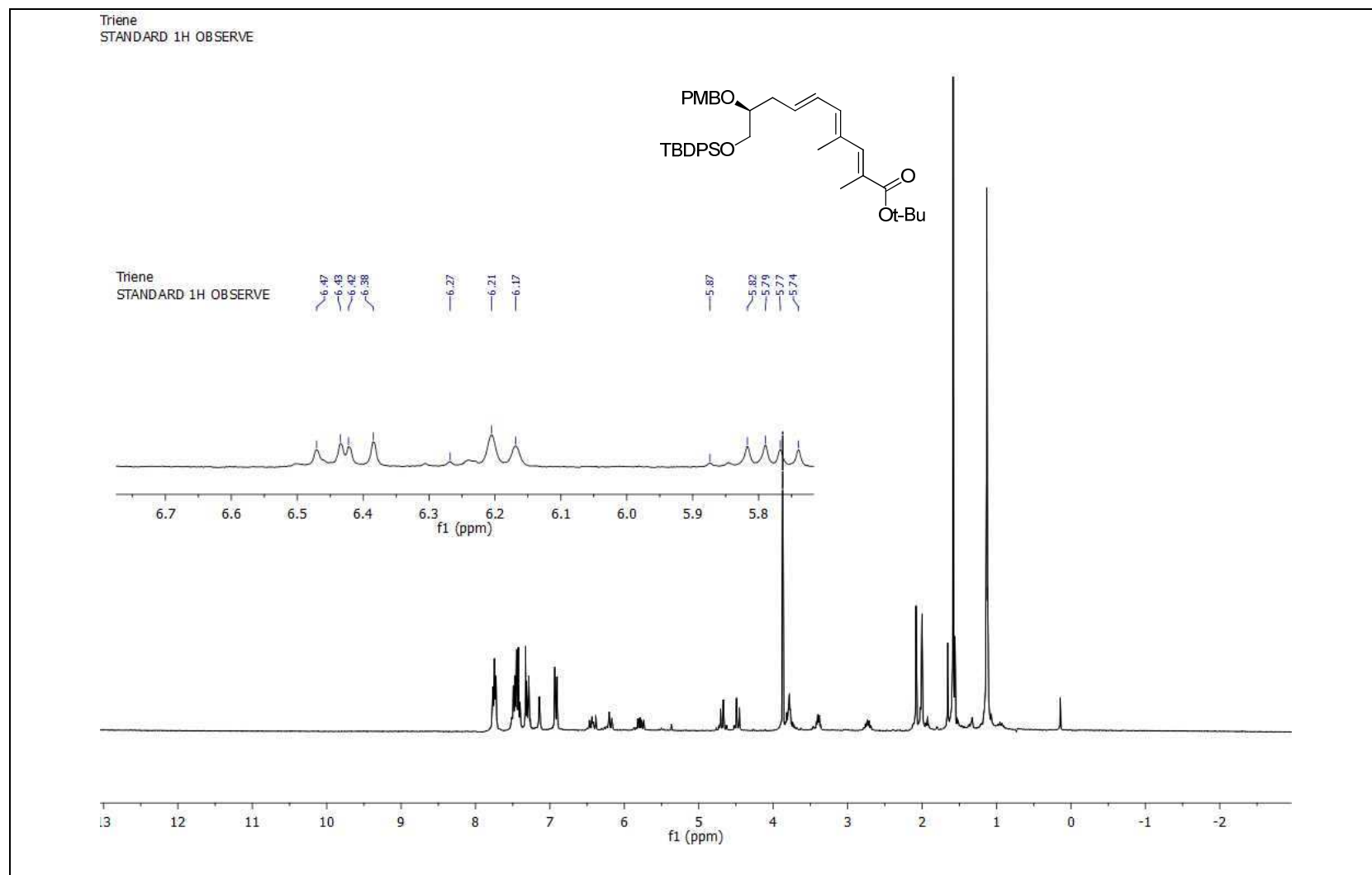
75 MHz  $^{13}\text{C}$  NMR of compound **24** in  $\text{CDCl}_3$



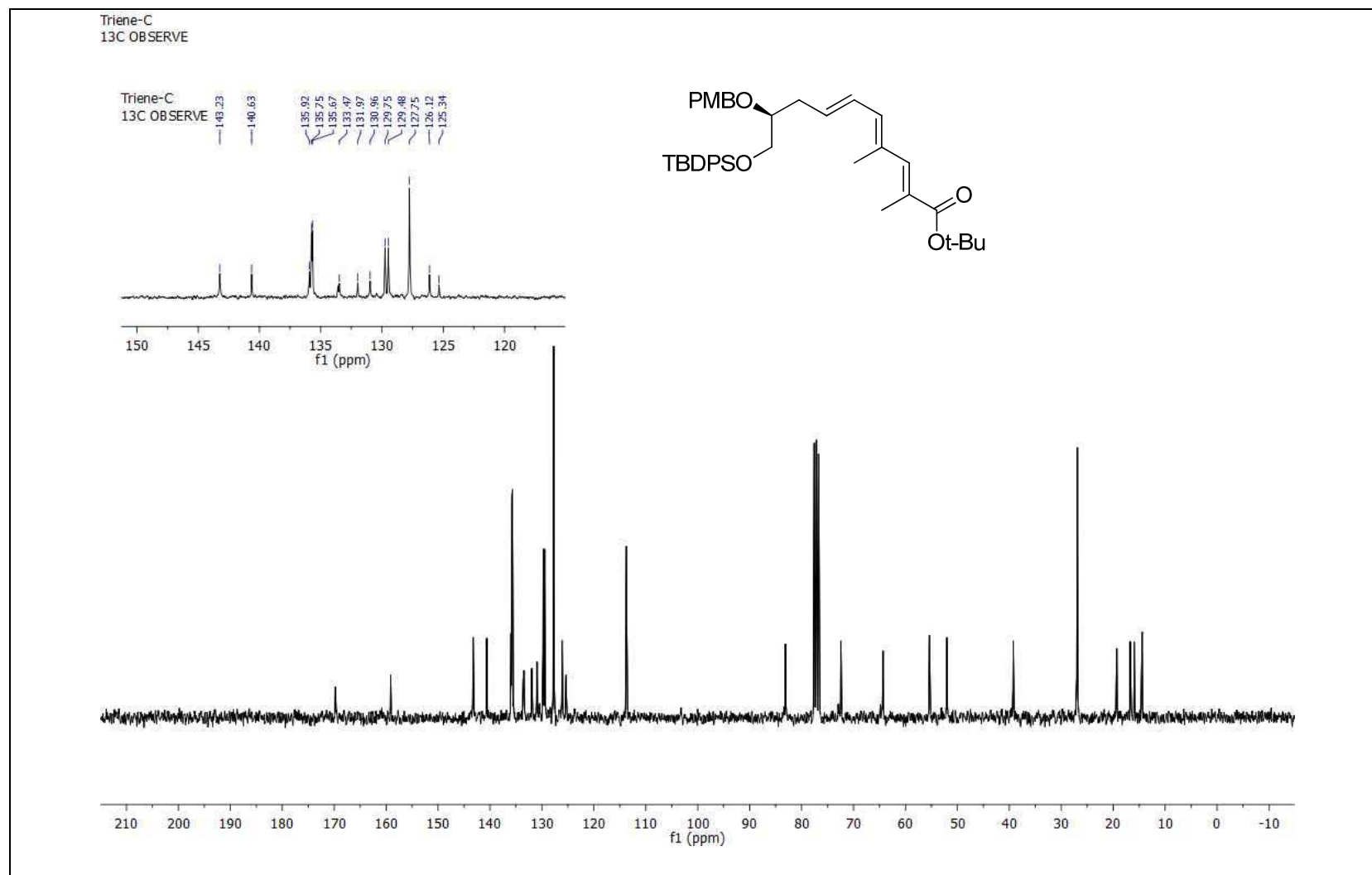
300 MHz  $^1\text{H}$  NMR of compound **25** in  $\text{CDCl}_3$



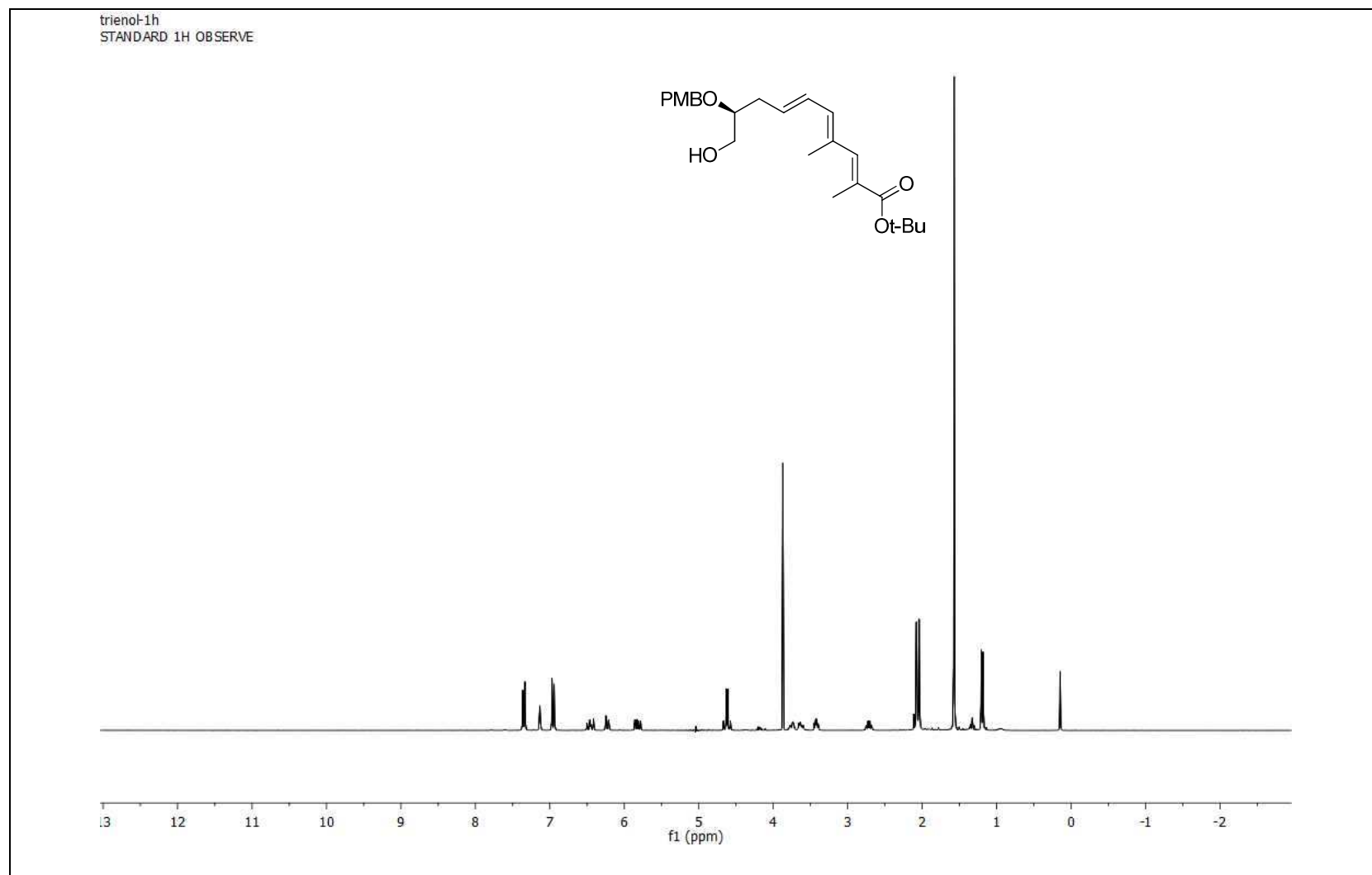
75 MHz  $^{13}\text{C}$  NMR of compound **25** in  $\text{CDCl}_3$



300 MHz  $^1\text{H}$  NMR of compound **26** in  $\text{CDCl}_3$

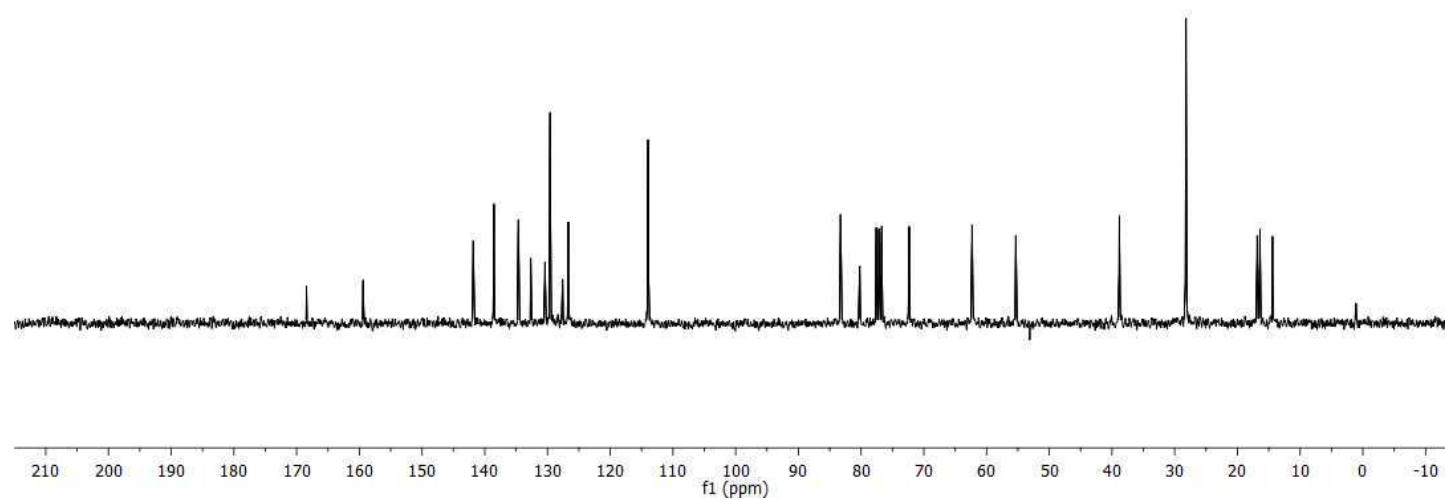
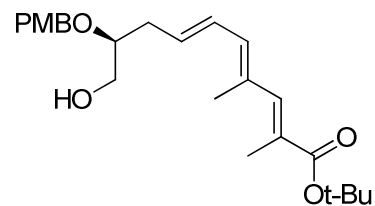


75 MHz  $^{13}\text{C}$  NMR of compound **26** in  $\text{CDCl}_3$

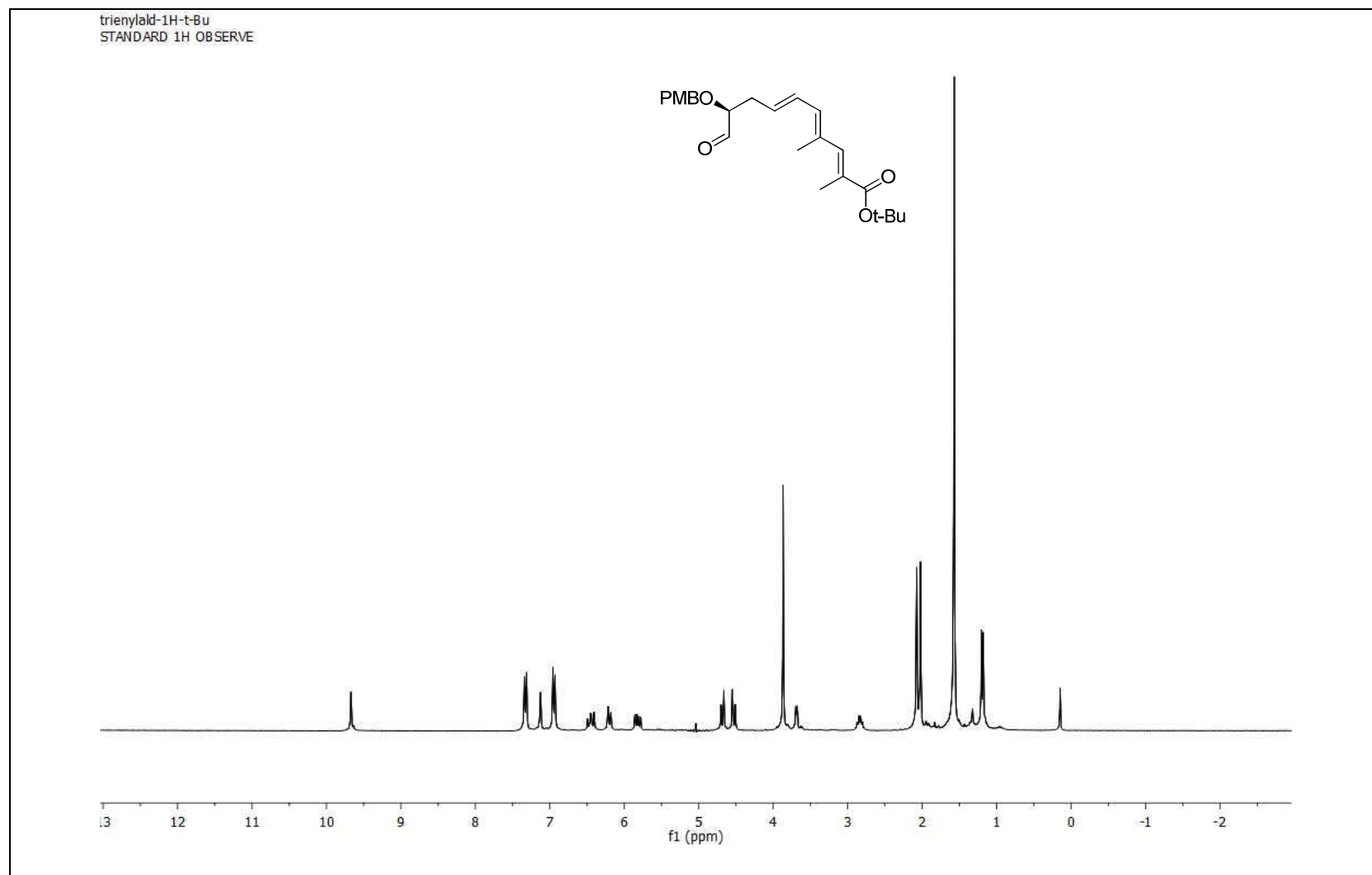


300 MHz  $^1\text{H}$  NMR of compound **27** in  $\text{CDCl}_3$

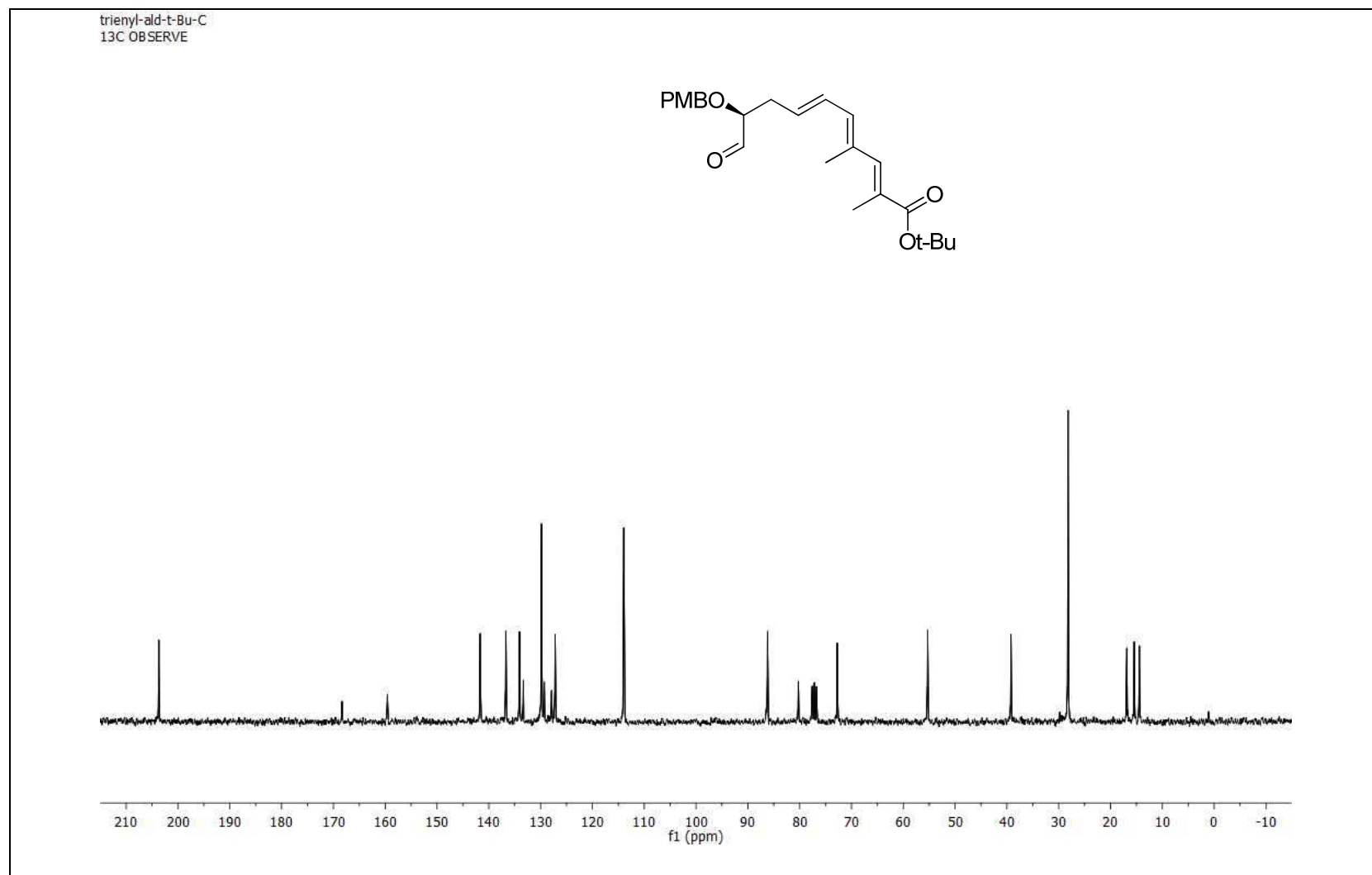
trienol-C  
13C OBSERVE



75 MHz  $^{13}\text{C}$  NMR of compound **27** in  $\text{CDCl}_3$

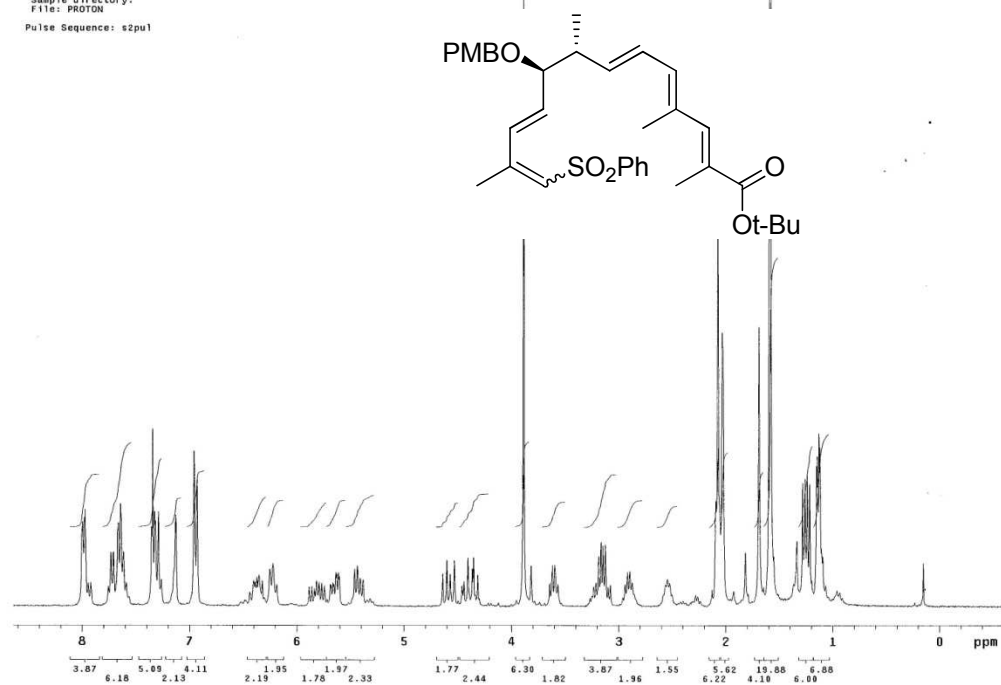


300 MHz <sup>1</sup>H NMR of compound **28** in CDCl<sub>3</sub>



75 MHz <sup>13</sup>C NMR of compound **28** in CDCl<sub>3</sub>

HVE-unmethylated  
 Data Collected on: inova300-1-inova300  
 Archive directory: /mnt/02/fuchs/mr/iniva/vnarsys/data  
 Sample directory:  
 File: PROTON  
 Pulse Sequence: s2pu1



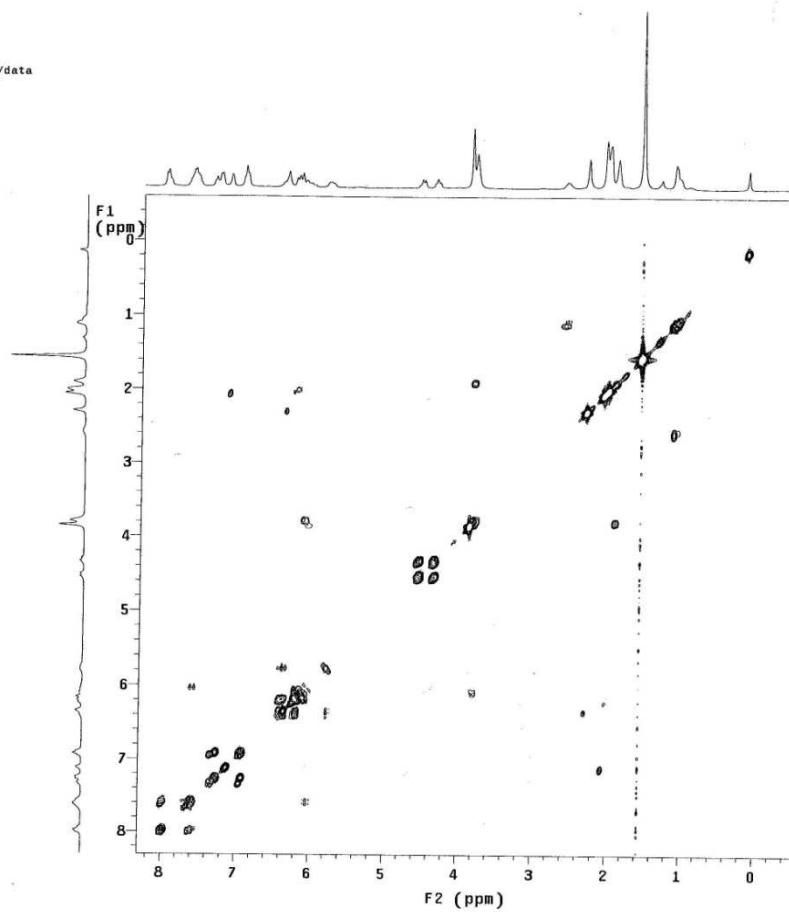
300 MHz <sup>1</sup>H NMR of compound **30** in CDCl<sub>3</sub>

STANDARD 1H OBSERVE

Data Collected on: inova800-2-inovahifreq  
 Archive directory: /mnt/d2/fuchs/msr/iniva/vnmrsys/data  
 Sample directory:  
 File: gcosy

Pulse Sequence: gcosy  
 Solvent: CDCl<sub>3</sub>

Relax. delay 1.000 sec  
 Acq. time 0.191 sec  
 Width 2676.4 Hz  
 2D Width 2676.4 Hz  
 2 repetitions  
 256 increments  
 OBSERVE M1, 299.9794119 MHz  
 DATA PROCESSING  
 Sine bell 0.096 sec  
 F1 DATA PROCESSING  
 Sine bell 0.048 sec  
 FT size 1024 x 1024  
 Total time 10 min



300 MHz <sup>1</sup>H-<sup>1</sup>H COSY NMR of compound **30** in CDCl<sub>3</sub>

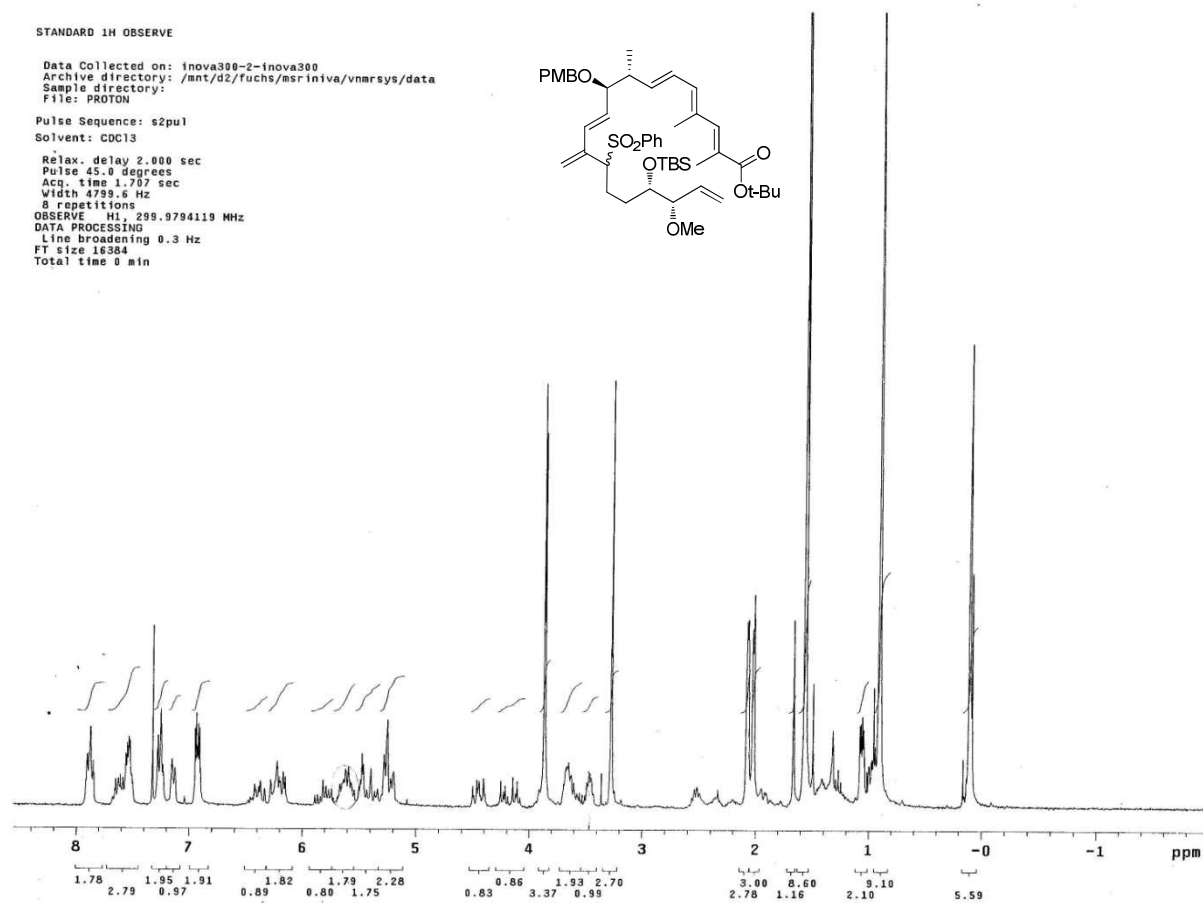
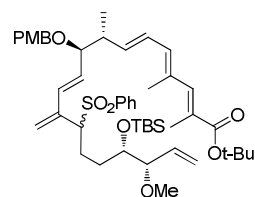


STANDARD 1H OBSERVE

Data Collected on: inova300-2-inova300  
 Archive directory: /mnt/d2/fuchs/msriniva/vnmrsys/data  
 Sample directory:  
 File: PROTON

Pulse Sequence: s2pul  
 Solvent: CDCl3

Relax. delay 2.000 sec  
 Pulse 45.9 degrees  
 Acq. time 1.707 sec  
 Width 4799.6 Hz  
 8 repetitions  
 OBSERVE H1, 299.9794119 MHz  
 DATA PROCESSING  
 Line broadening 0.3 Hz  
 FT size 16384  
 Total time 0 min



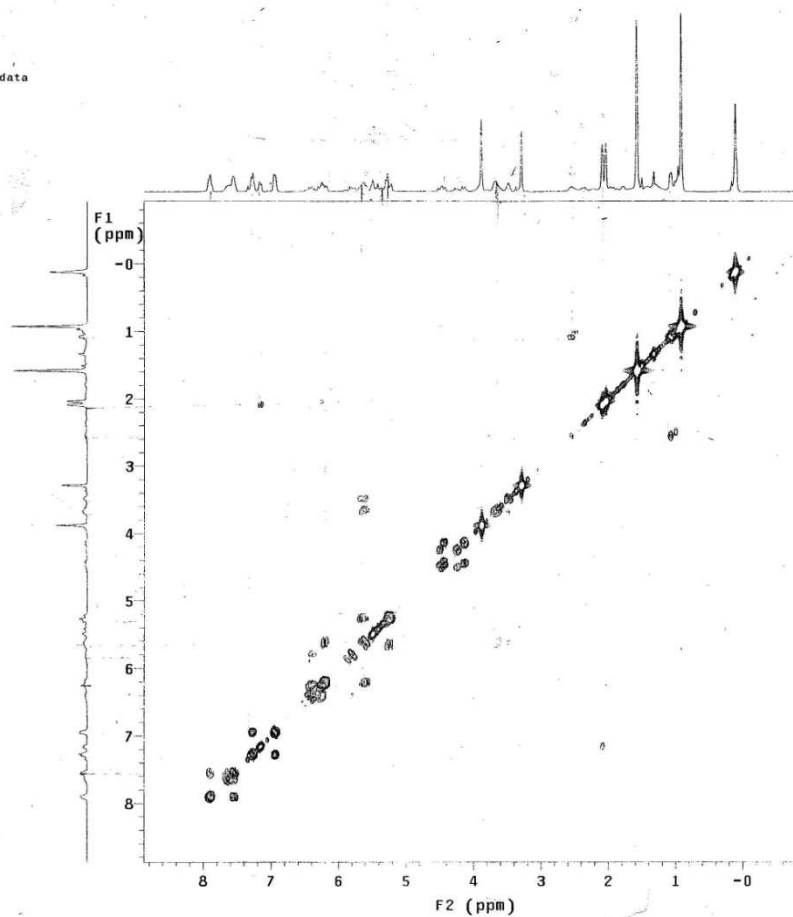
300 MHz  $^1\text{H}$  NMR of compound **34** in  $\text{CDCl}_3$

STANDARD 1H OBSERVE

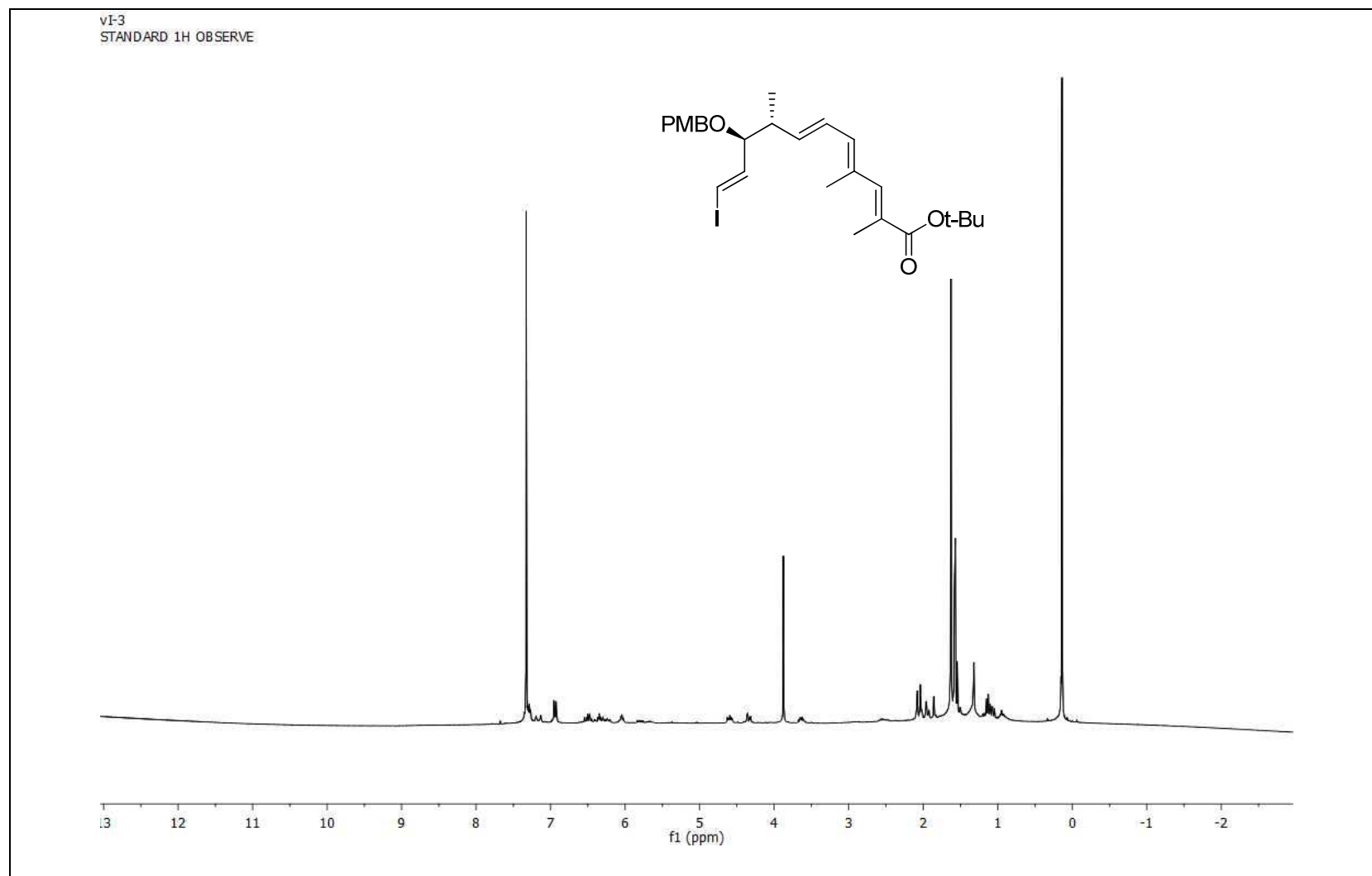
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Archive directory: /mnt/d2/fuchs/mr/iniva/vnmr/sys/data  
Sample directory:  
File: gcosy

Pulse Sequence: gcosy  
Solvent: CDCl<sub>3</sub>

Relax. delay 1.000 sec  
Acq. time 0.173 sec  
Width 2951.5 Hz  
2D Width 2951.5 Hz  
2 repetitions  
256 increments  
OBSERVE H1, 299.9598689 MHz  
DATA PROCESSING  
Sine bell 0.087 sec  
F1 DATA PROCESSING  
Sine bell 0.043 sec  
FT size 1024 x 1024  
Total time 0 min

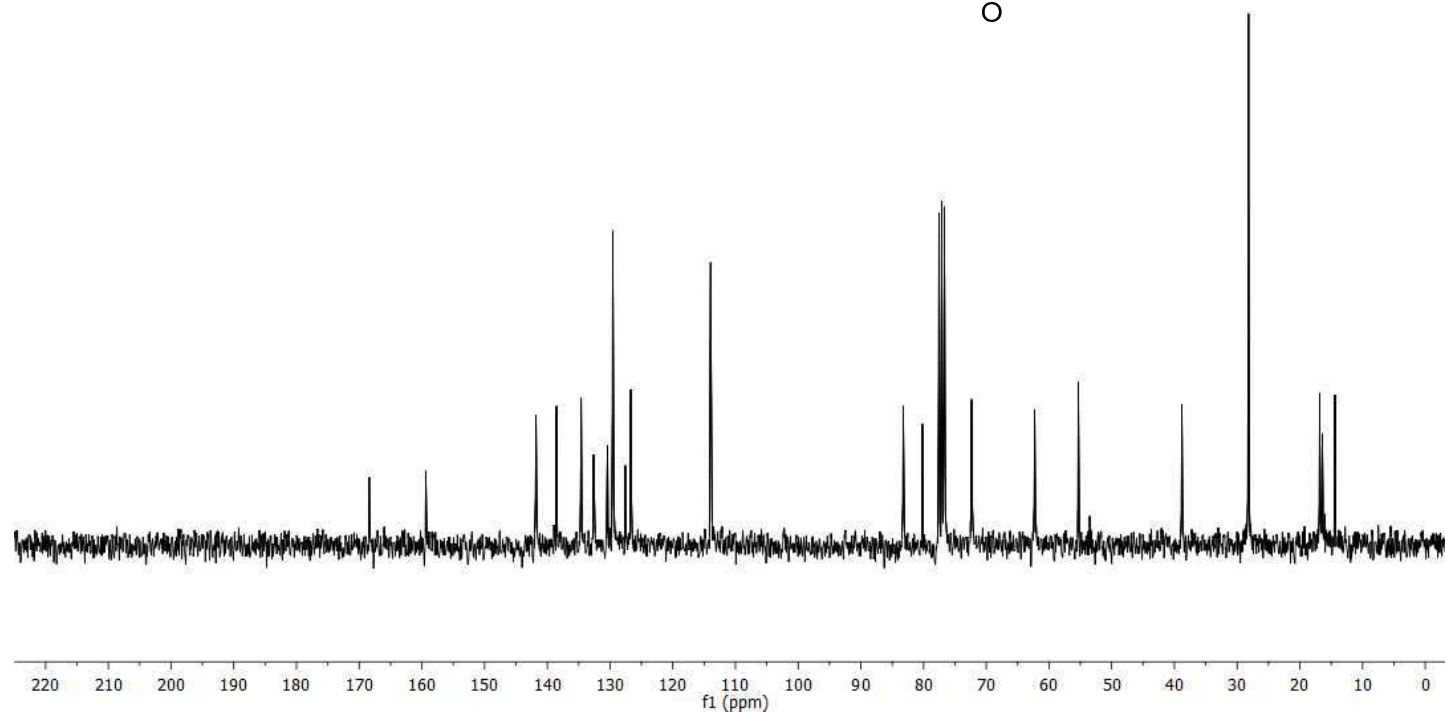
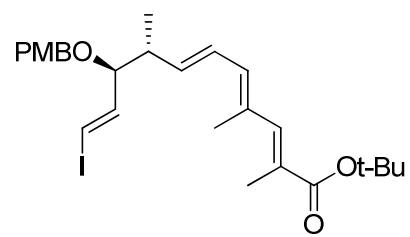


<sup>1</sup>H-<sup>1</sup>H-COSY NMR of compound **34** in CDCl<sub>3</sub>

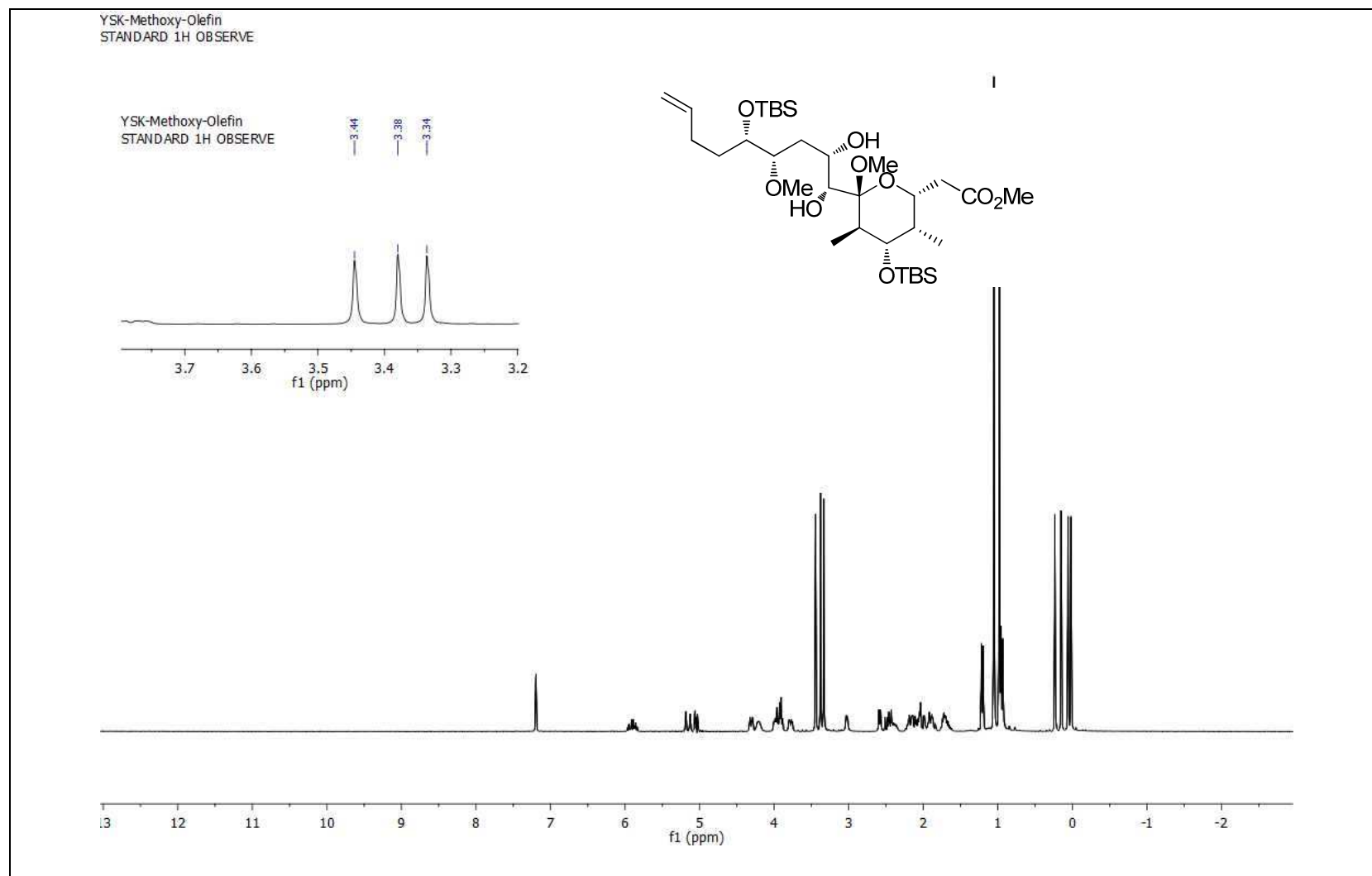


300 MHz  $^1\text{H}$  NMR of compound **35** in  $\text{CDCl}_3$

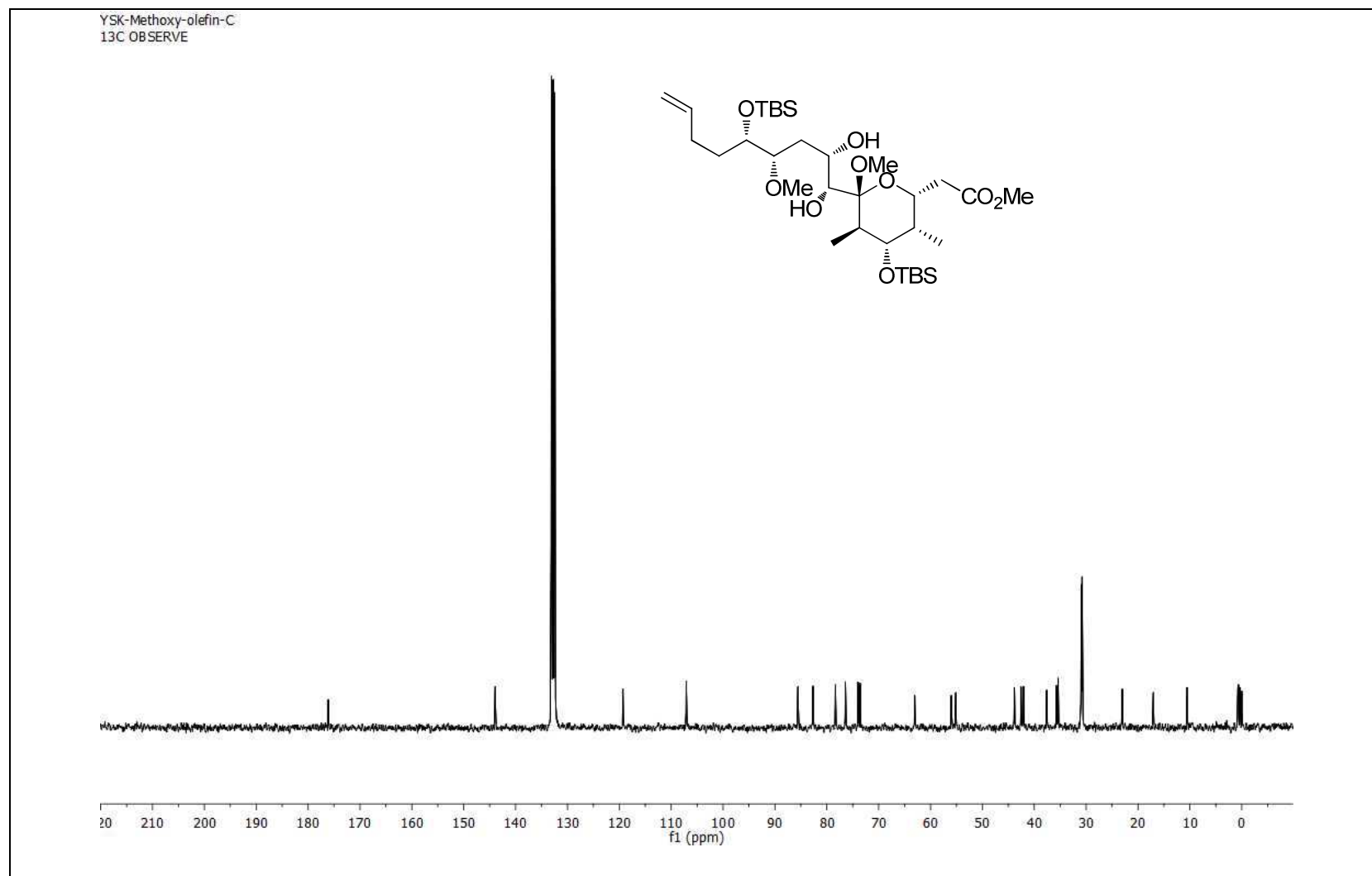
VI  
13C OBSERVE



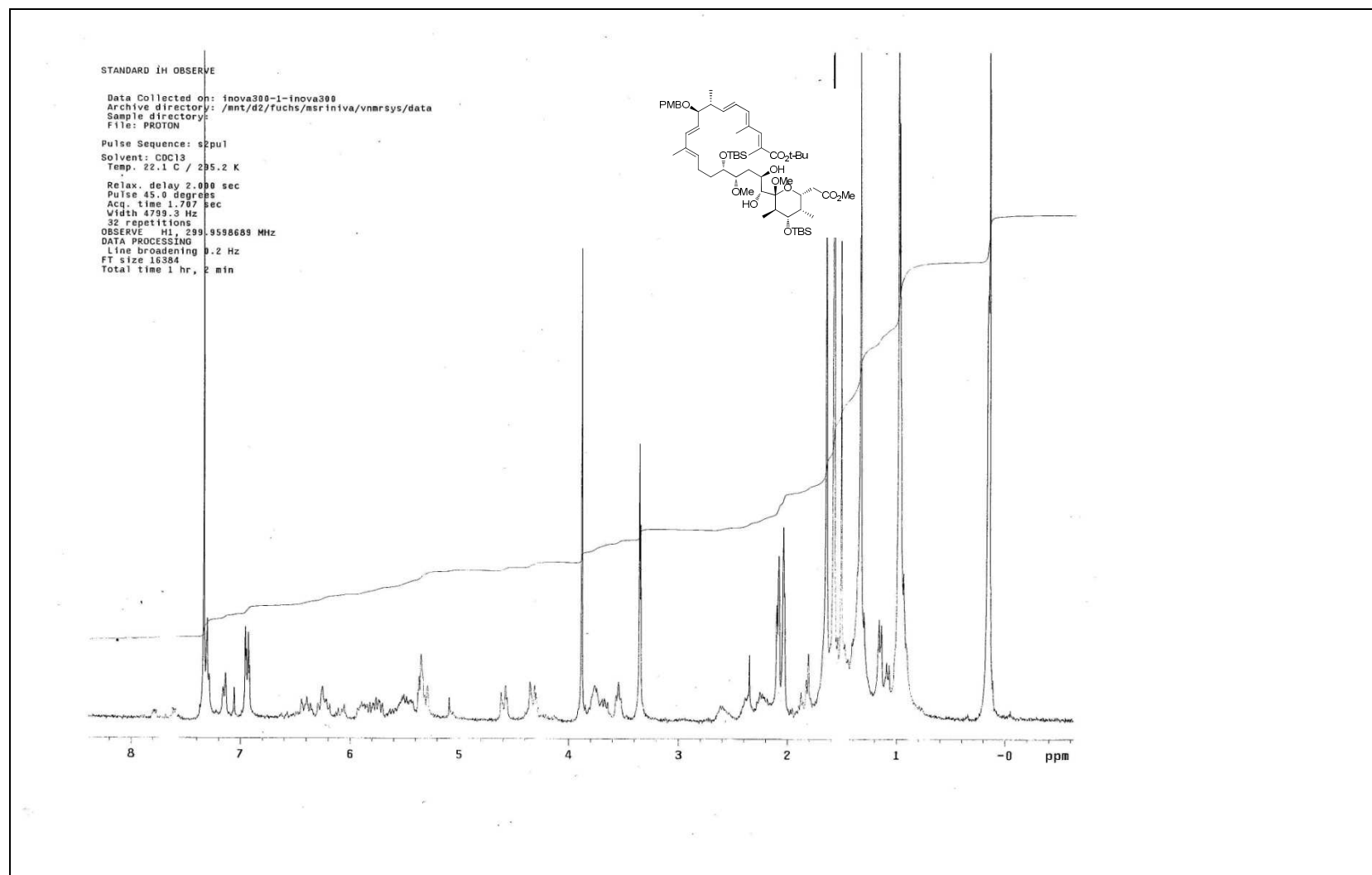
75 MHz  $^{13}\text{C}$  NMR of compound **35** in  $\text{CDCl}_3$



300 MHz <sup>1</sup>H NMR of compound 37 in C<sub>6</sub>D<sub>6</sub>



75 MHz <sup>13</sup>C NMR of compound **37** in C<sub>6</sub>D<sub>6</sub>



300 MHz <sup>1</sup>H NMR of compound **3** in CDCl<sub>3</sub>

