Electronic Supplementary Material (ESI) for Organic & Biomolecular Chemistry.

A concise approach for the synthesis of bitungolides:Total syntheses of (–)-bitungolide B &E

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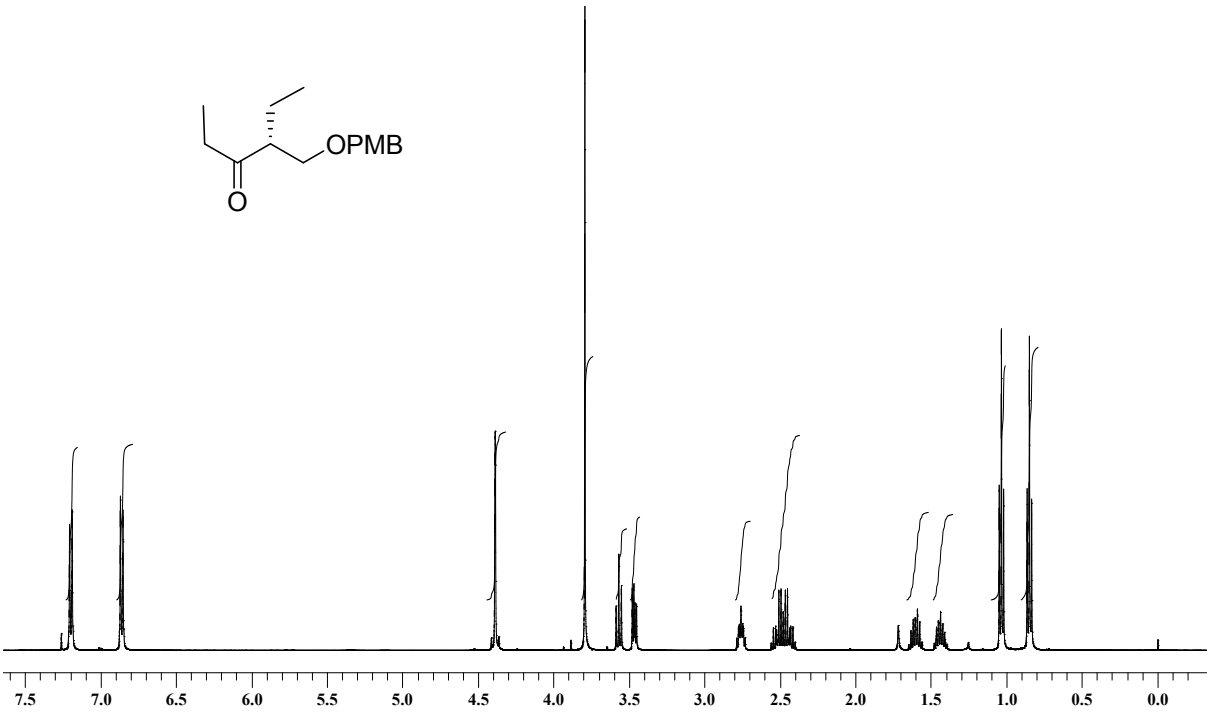
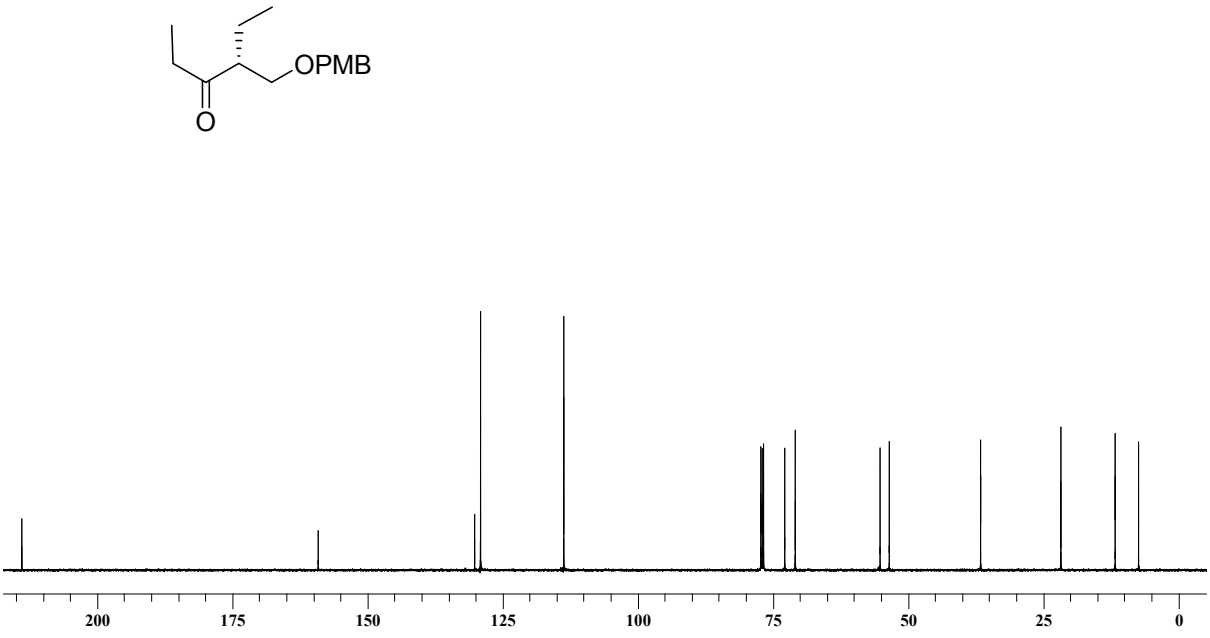
Supporting Information

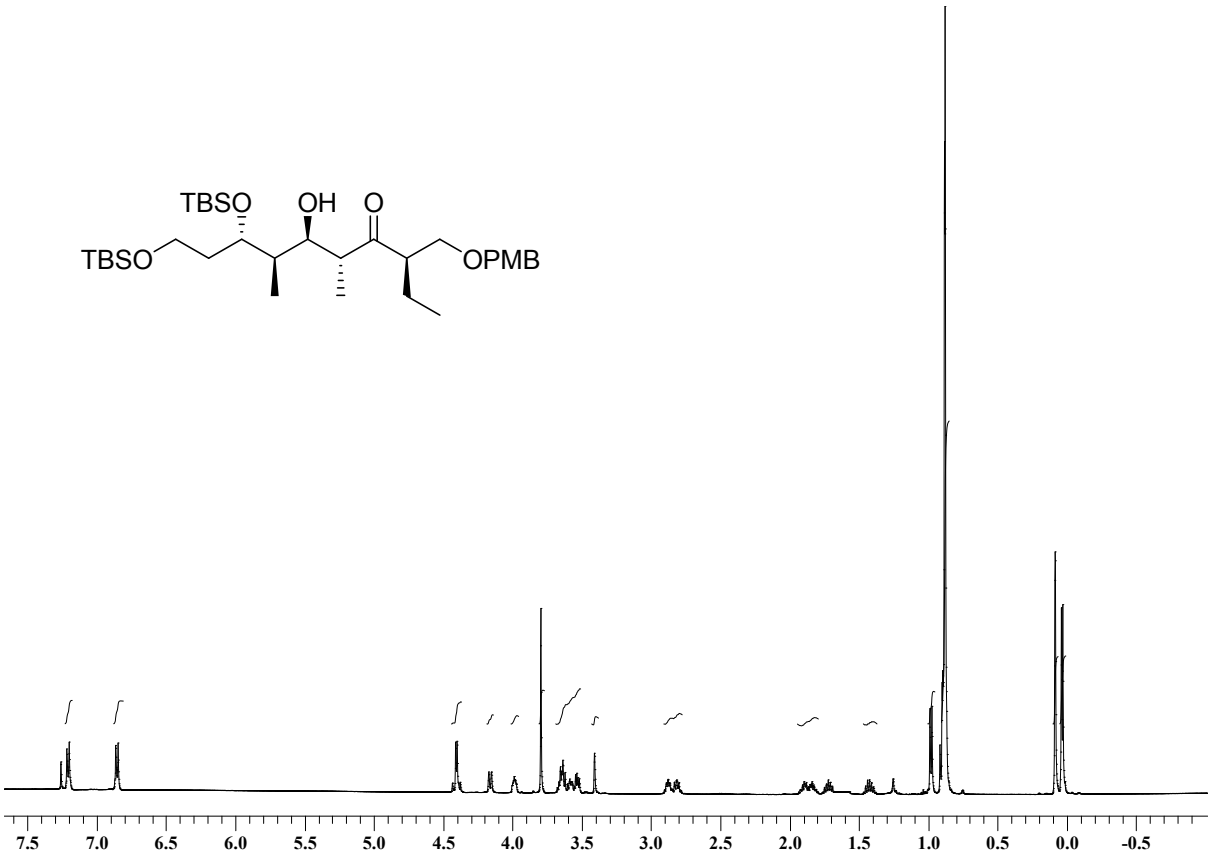
Table of contents



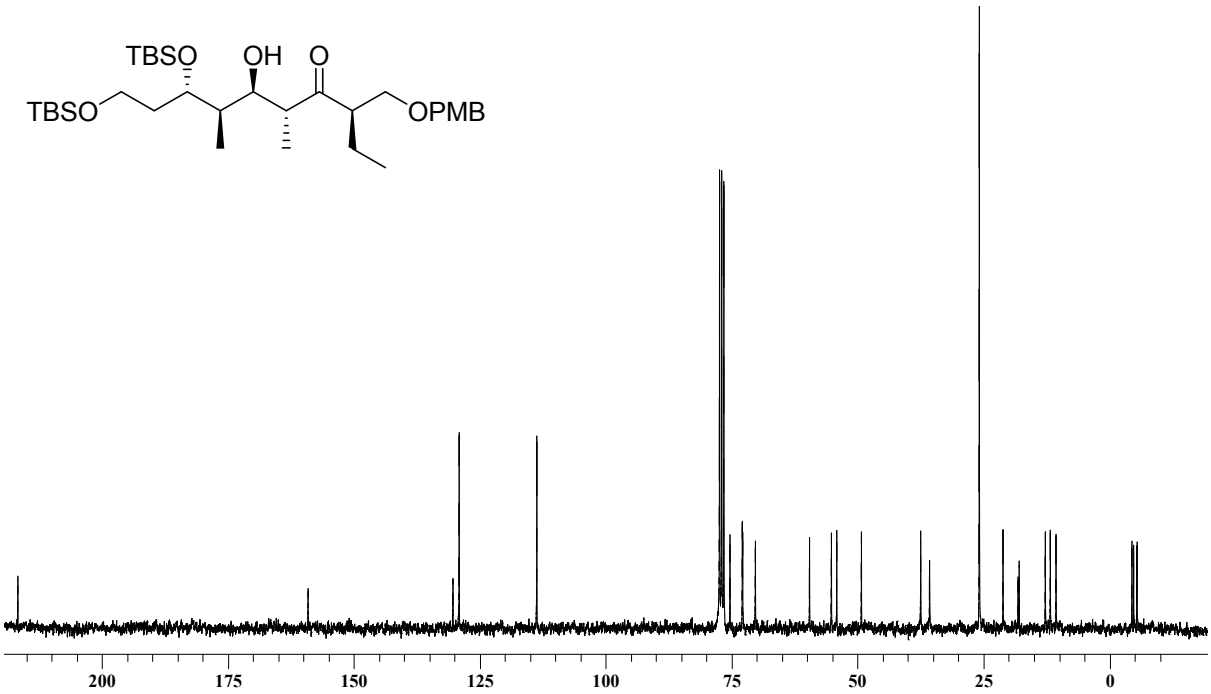
^{1}H NMR spectrum of 15 ($CDCl_3$, 500 MHz)



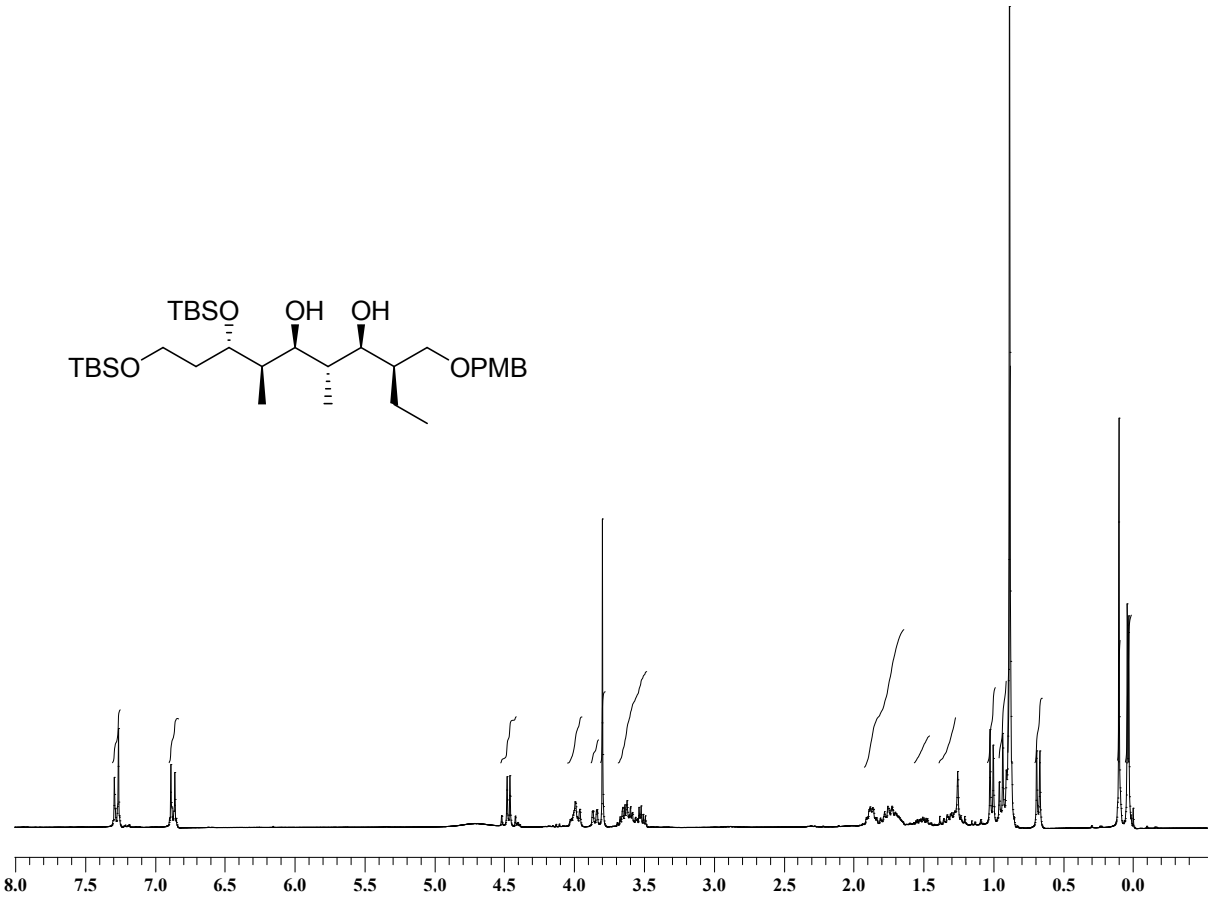
^{13}C NMR spectrum of 15 ($CDCl_3$, 125 MHz)



^{1}H NMR spectrum of 18 ($CDCl_3$, 300 MHz)



^{13}C NMR spectrum of 18 ($CDCl_3$, 75 MHz)



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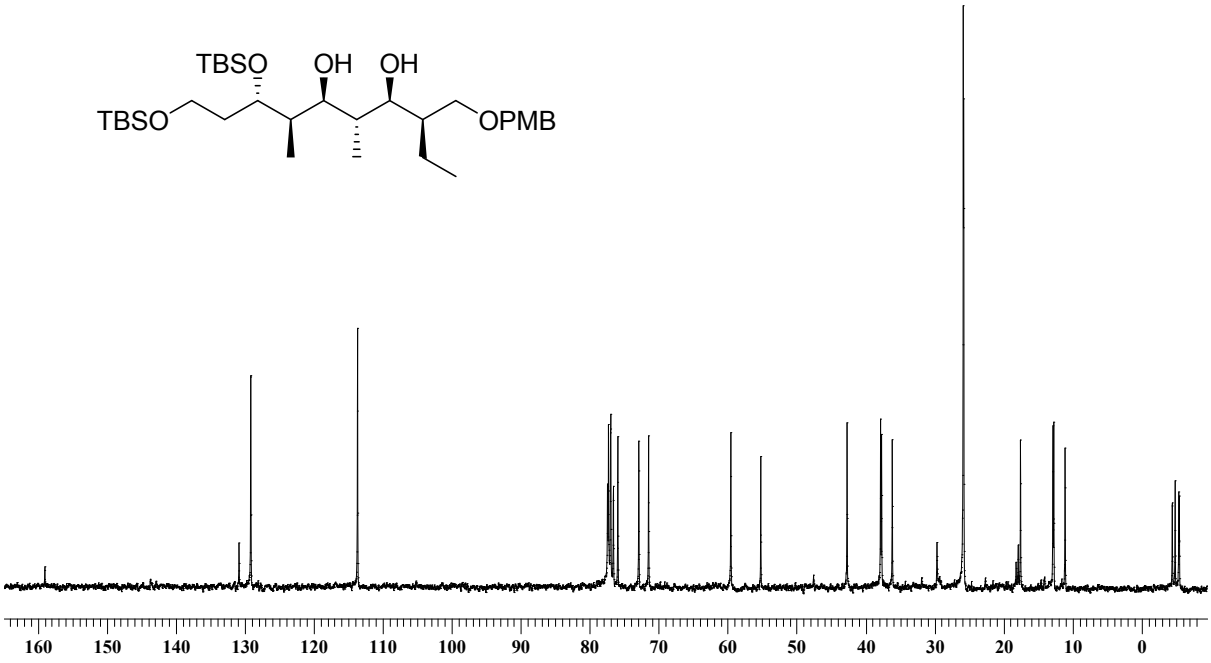
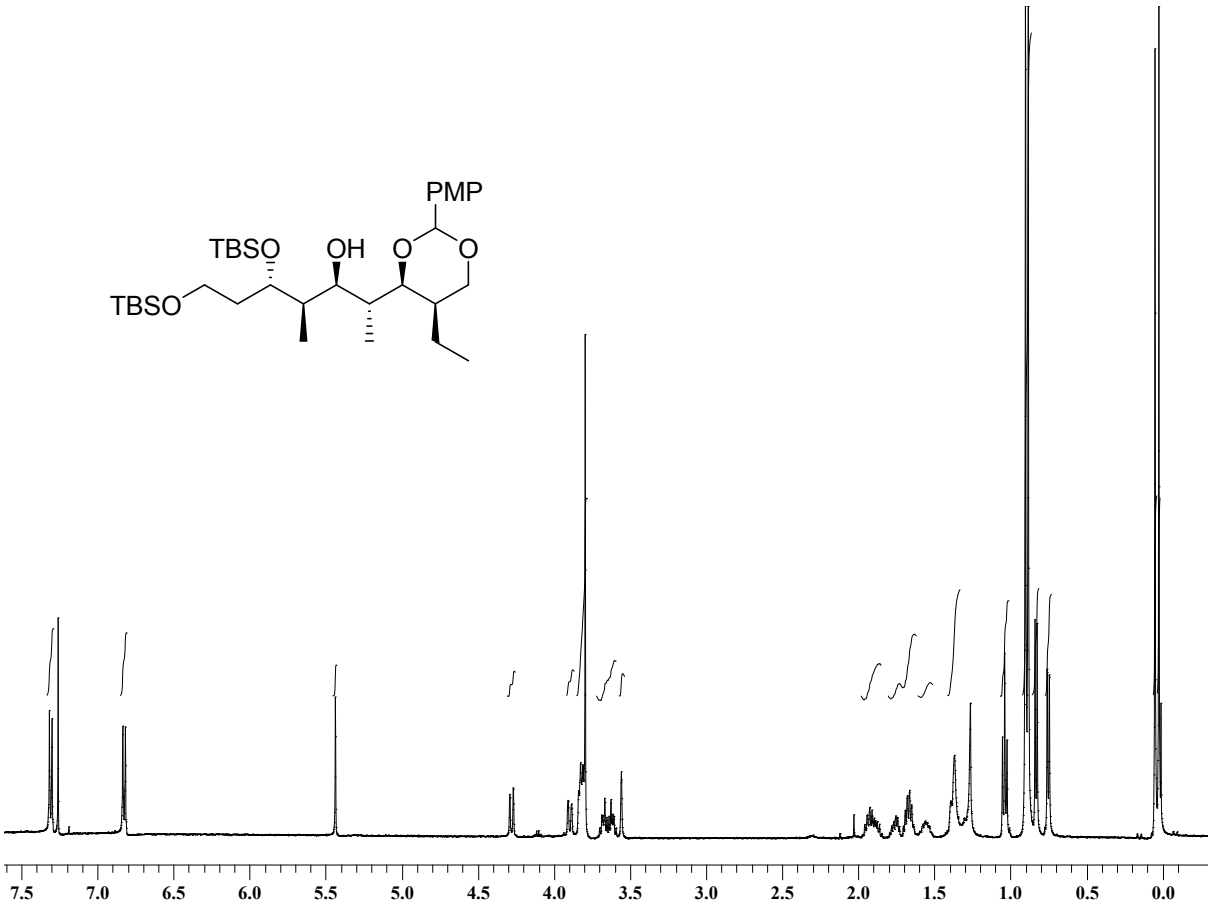


^{13}C NMR spectrum of 19 ($CDCl_3$, 75 MHz)



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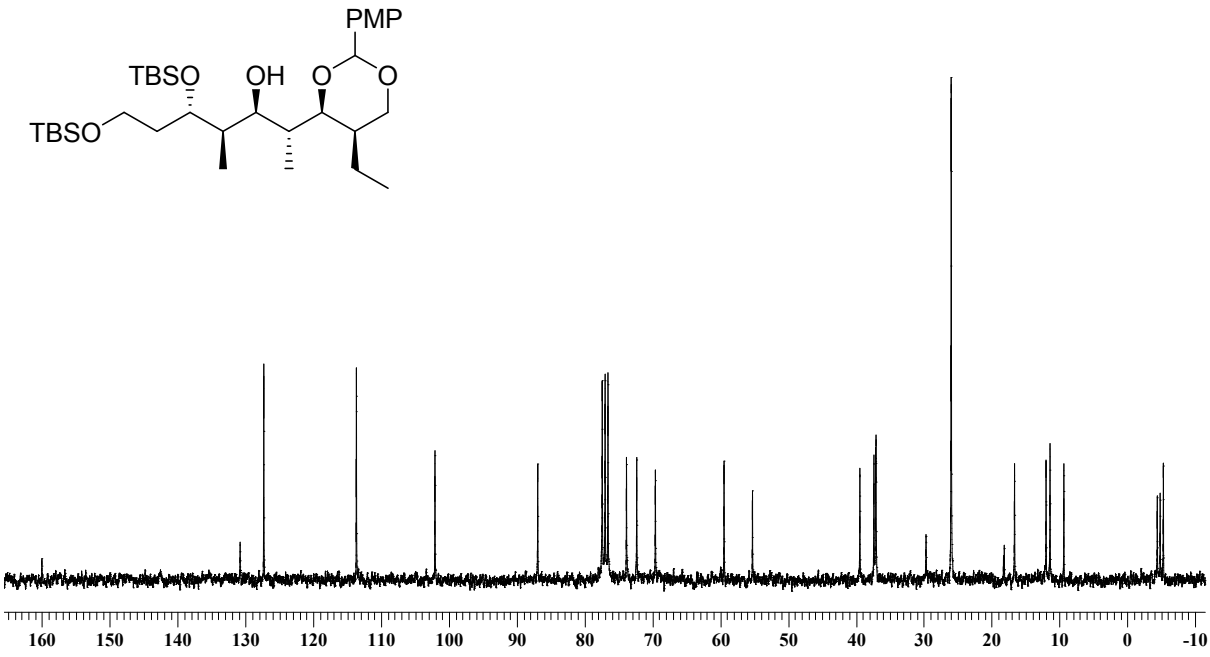

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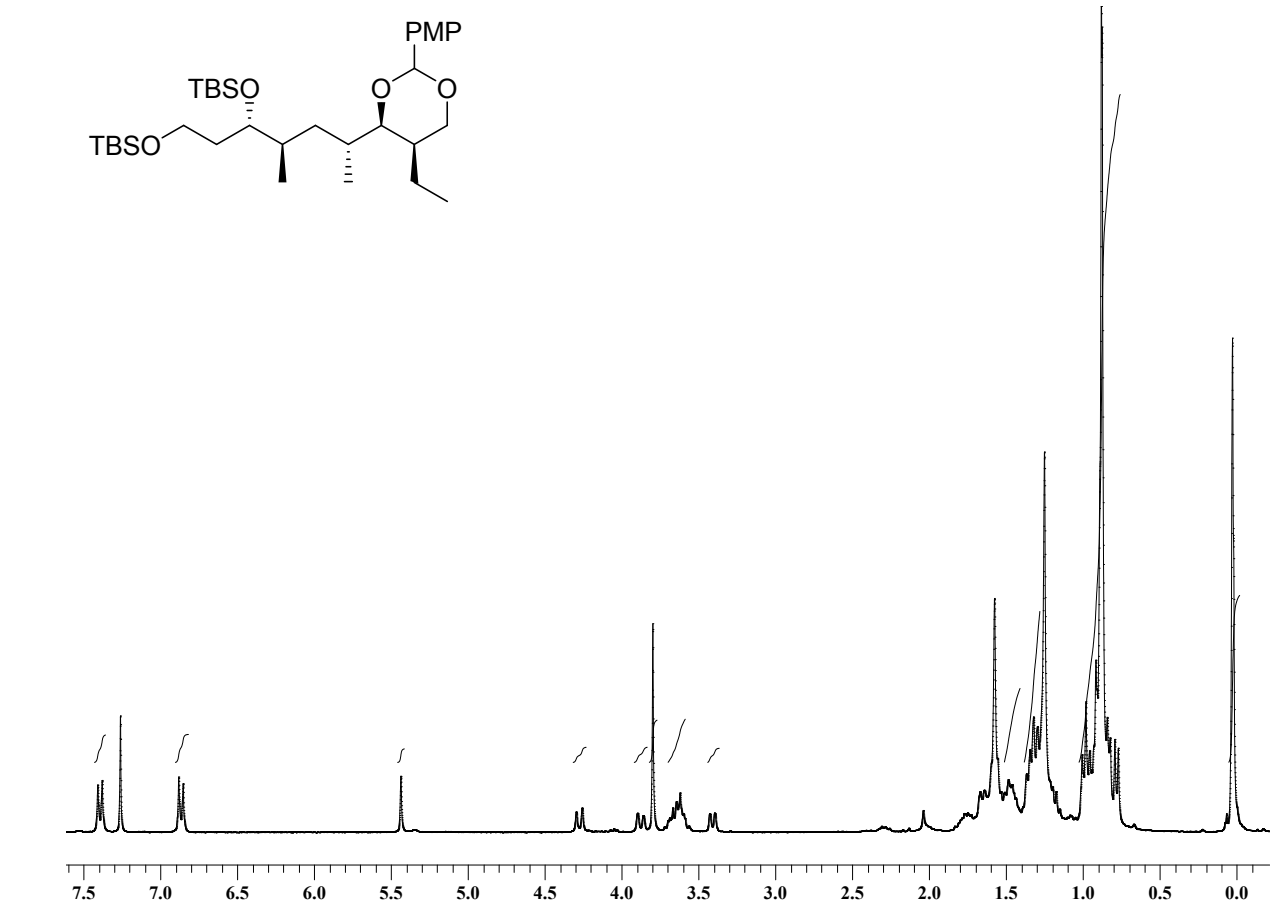

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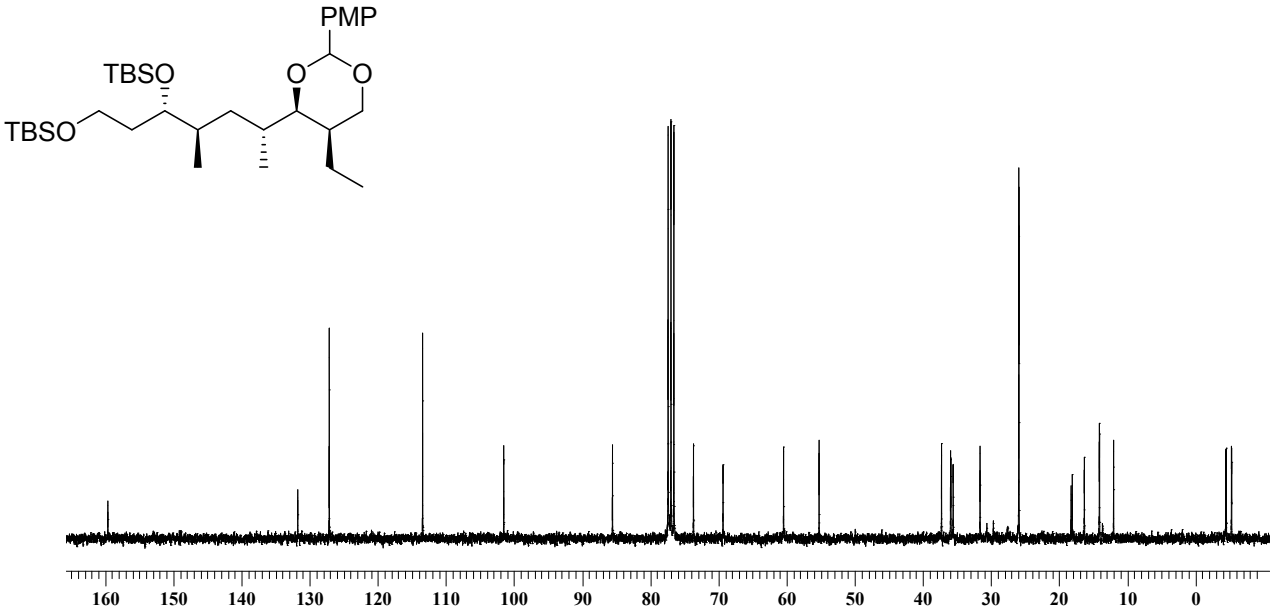
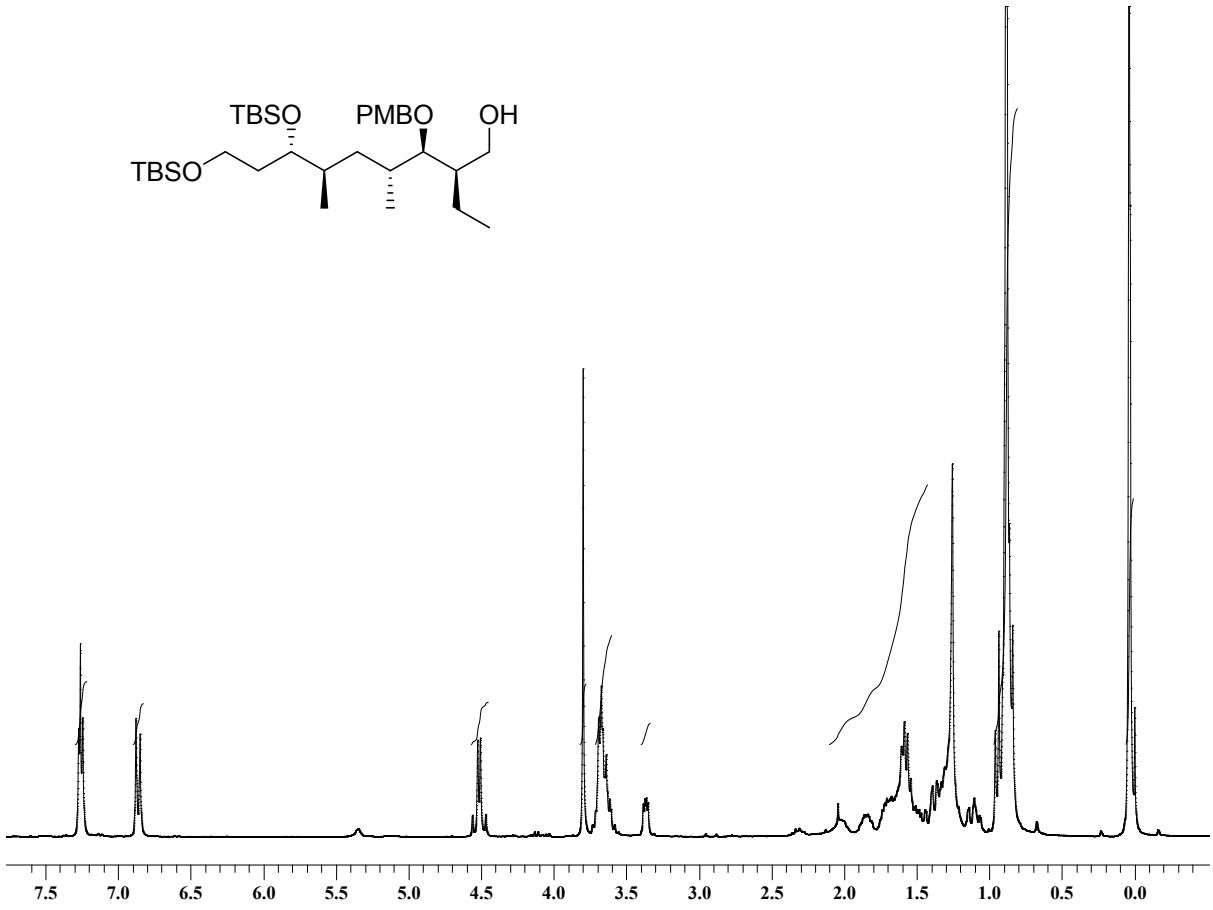


^{13}C NMR spectrum of 21 ($CDCl_3$, 75 MHz)



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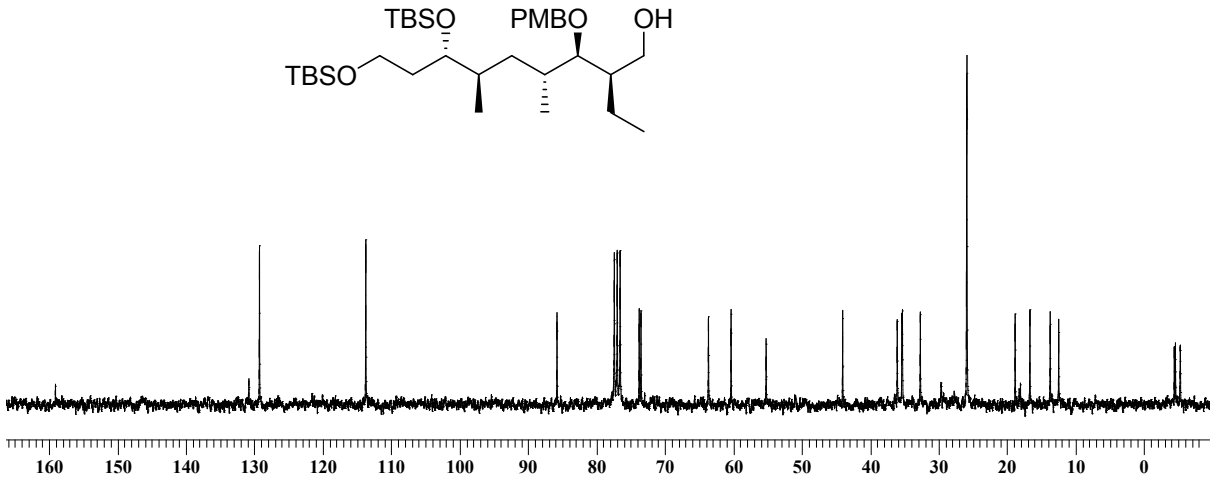

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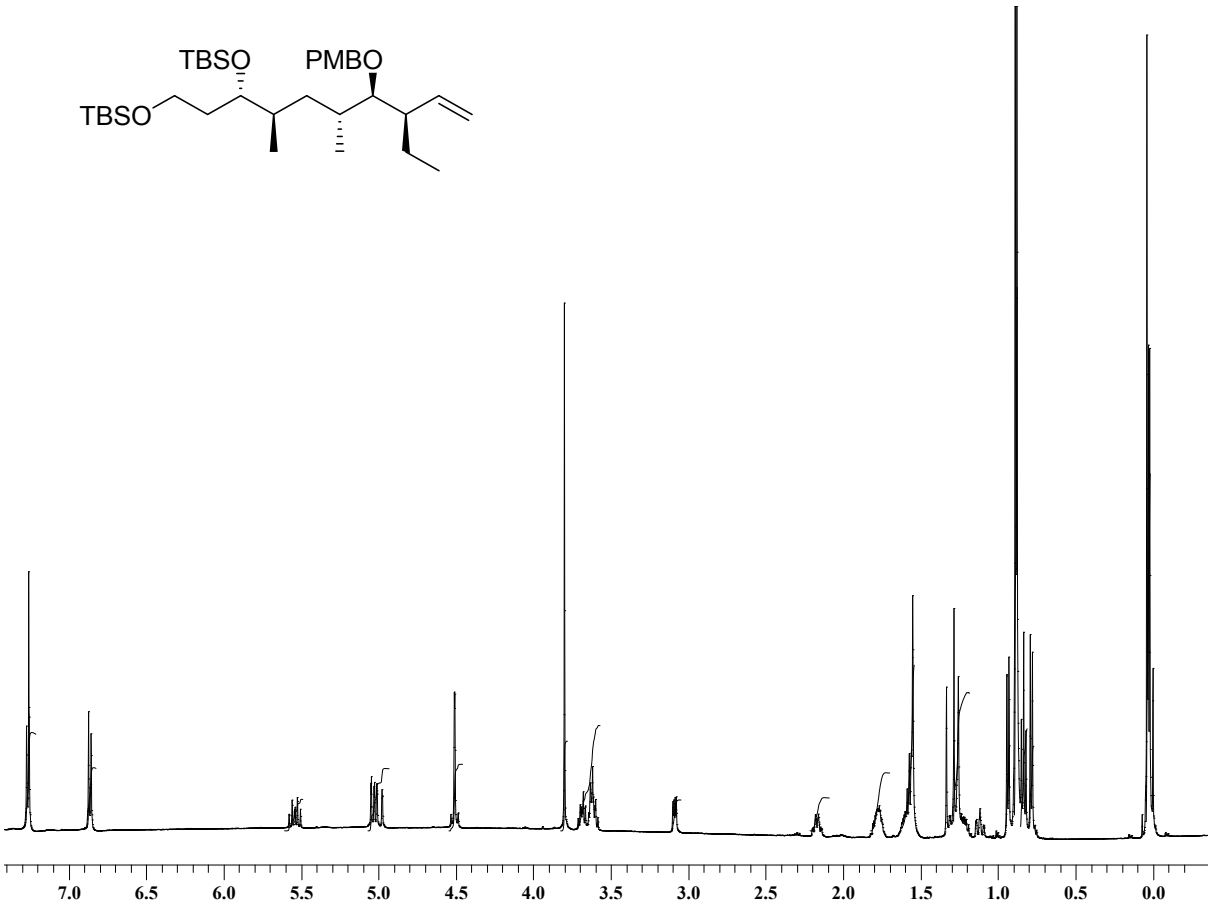

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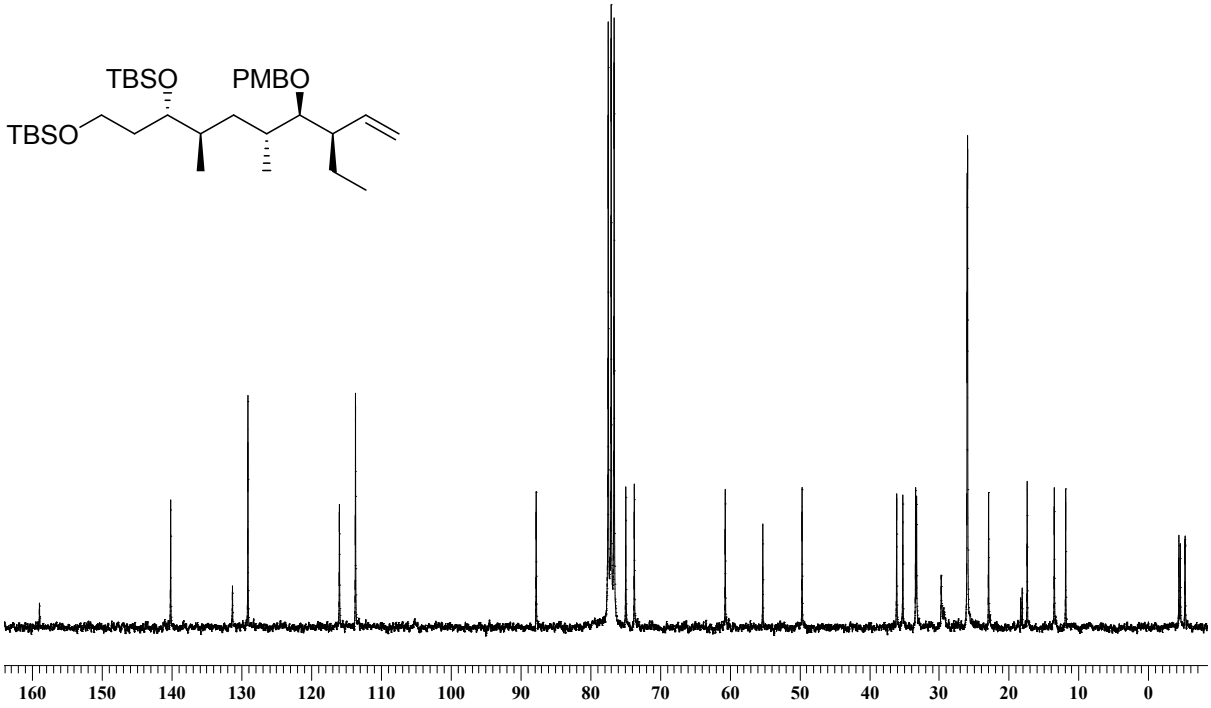

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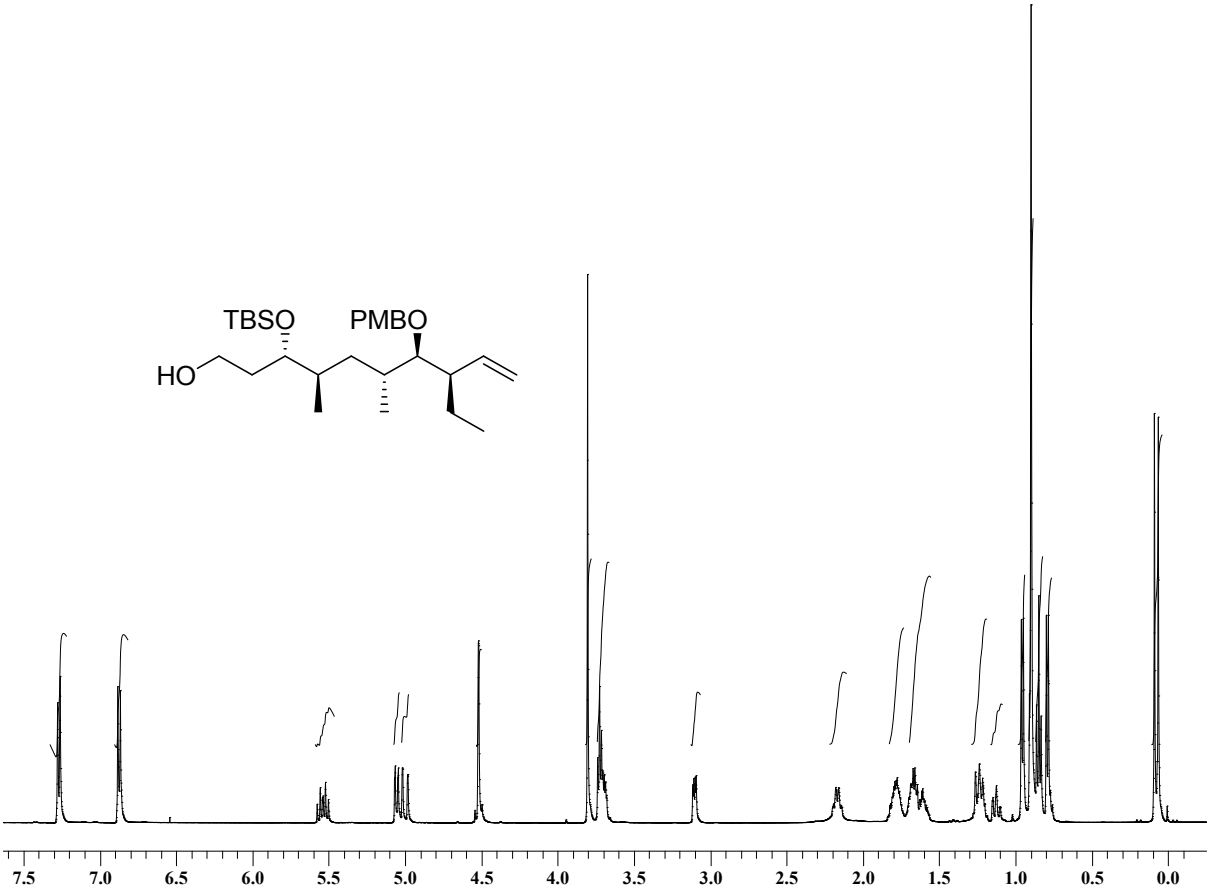

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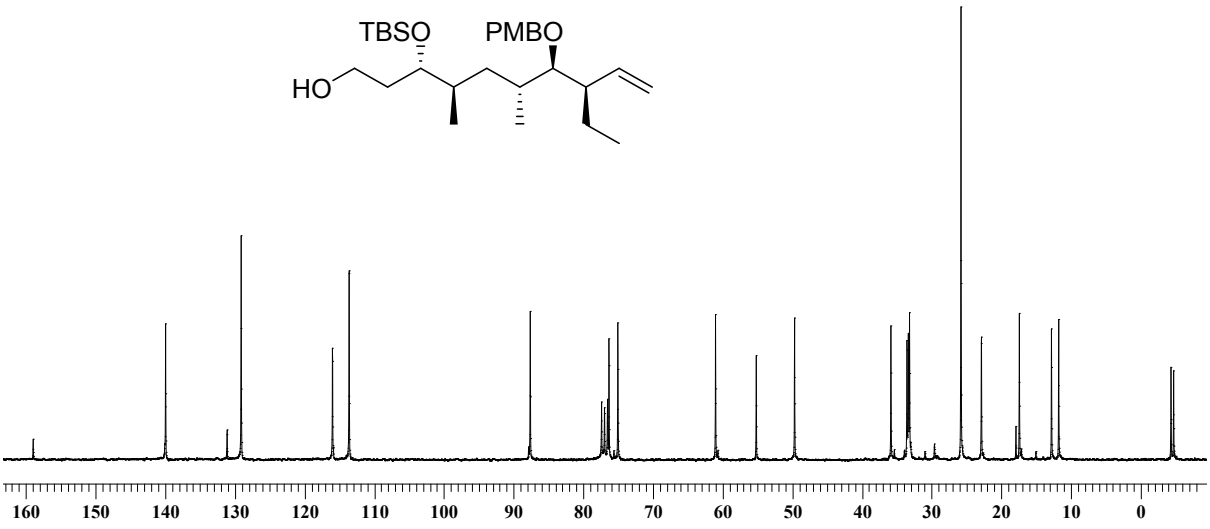

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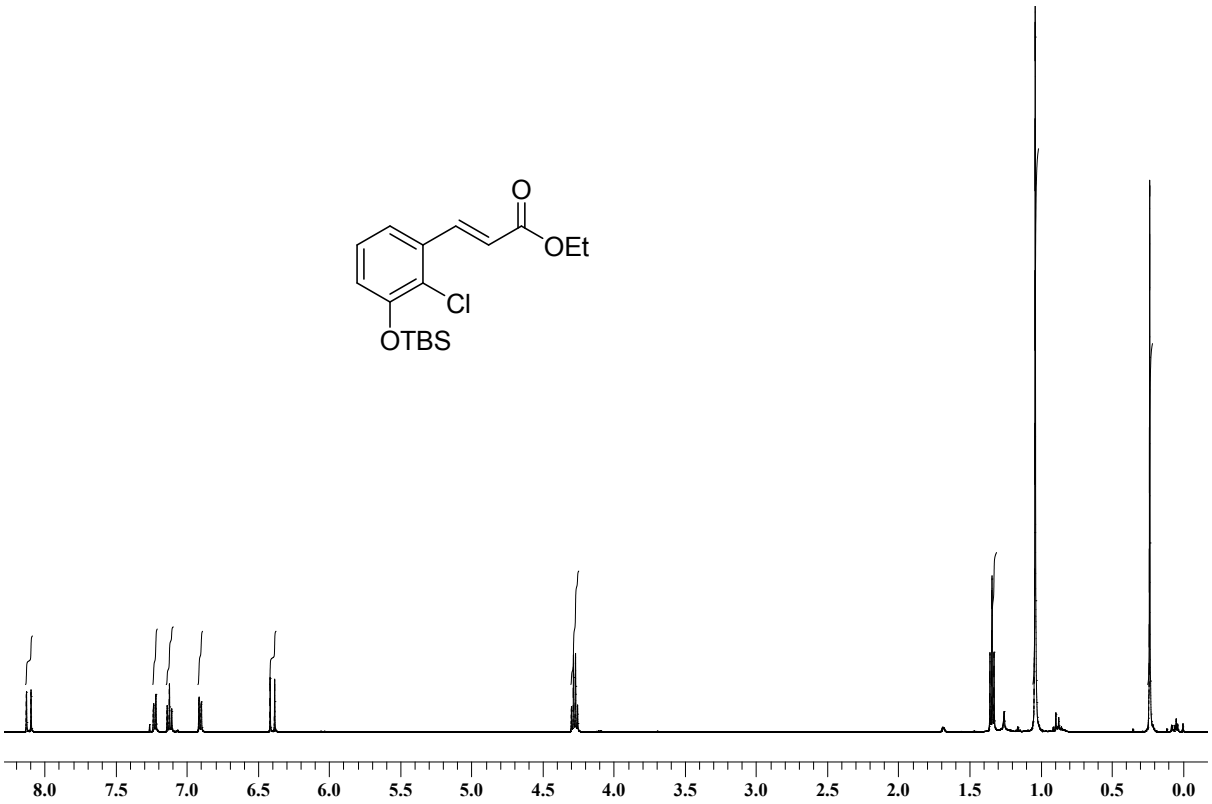

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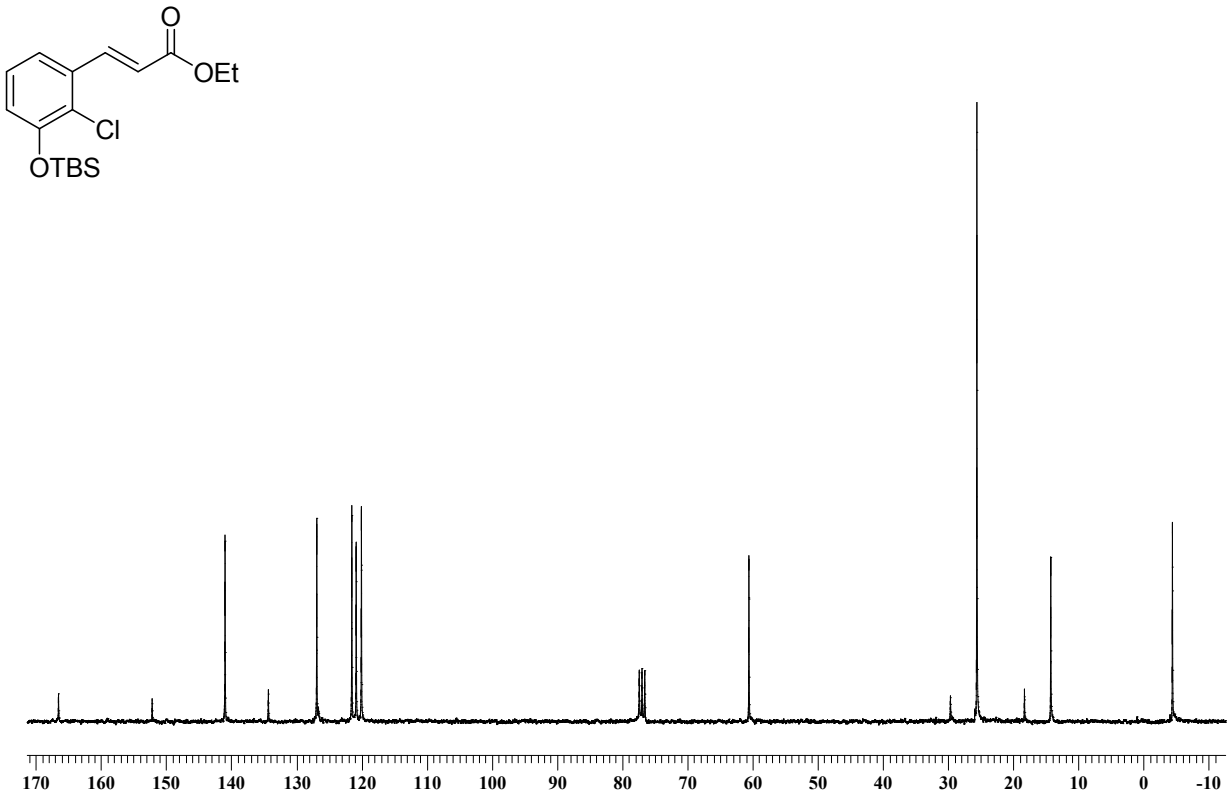

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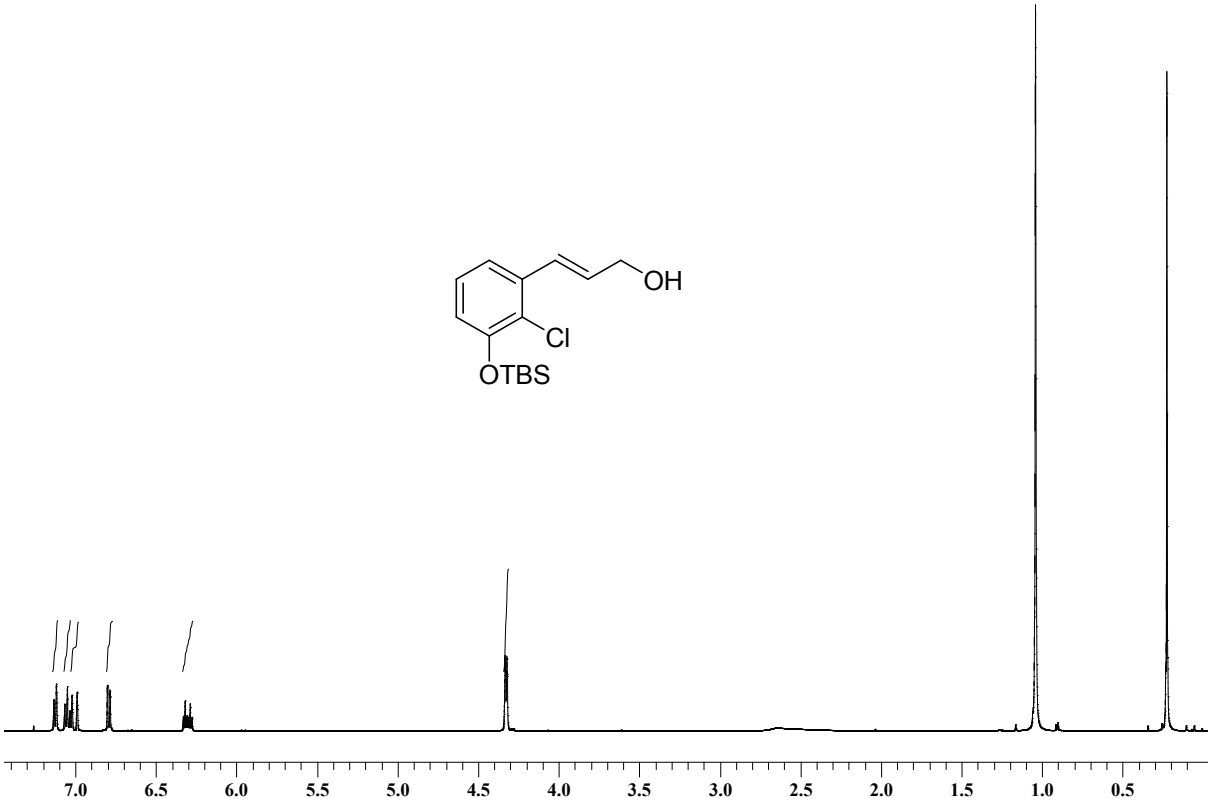

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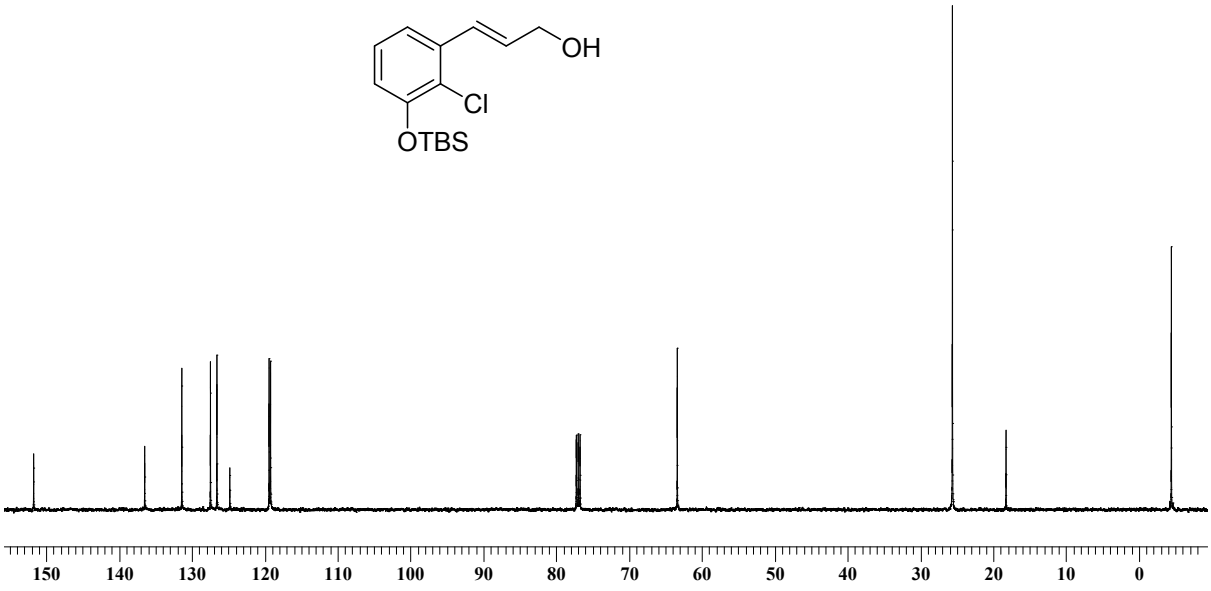
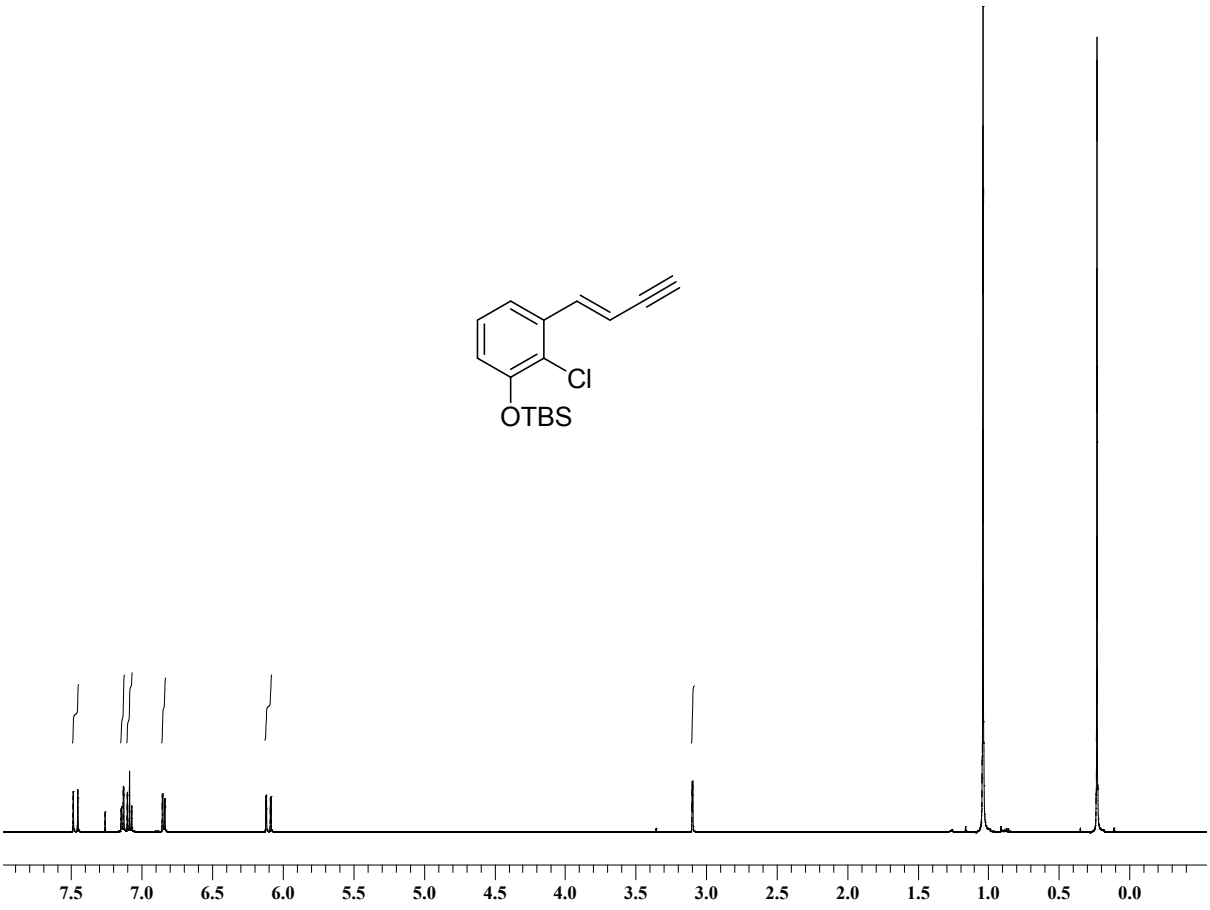
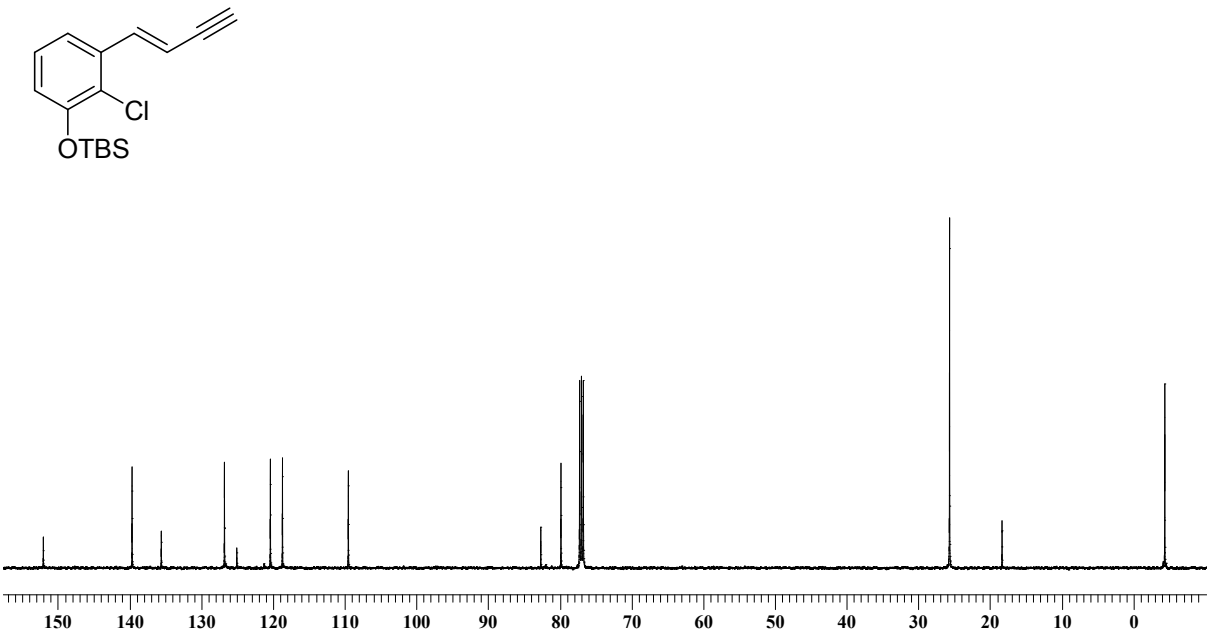


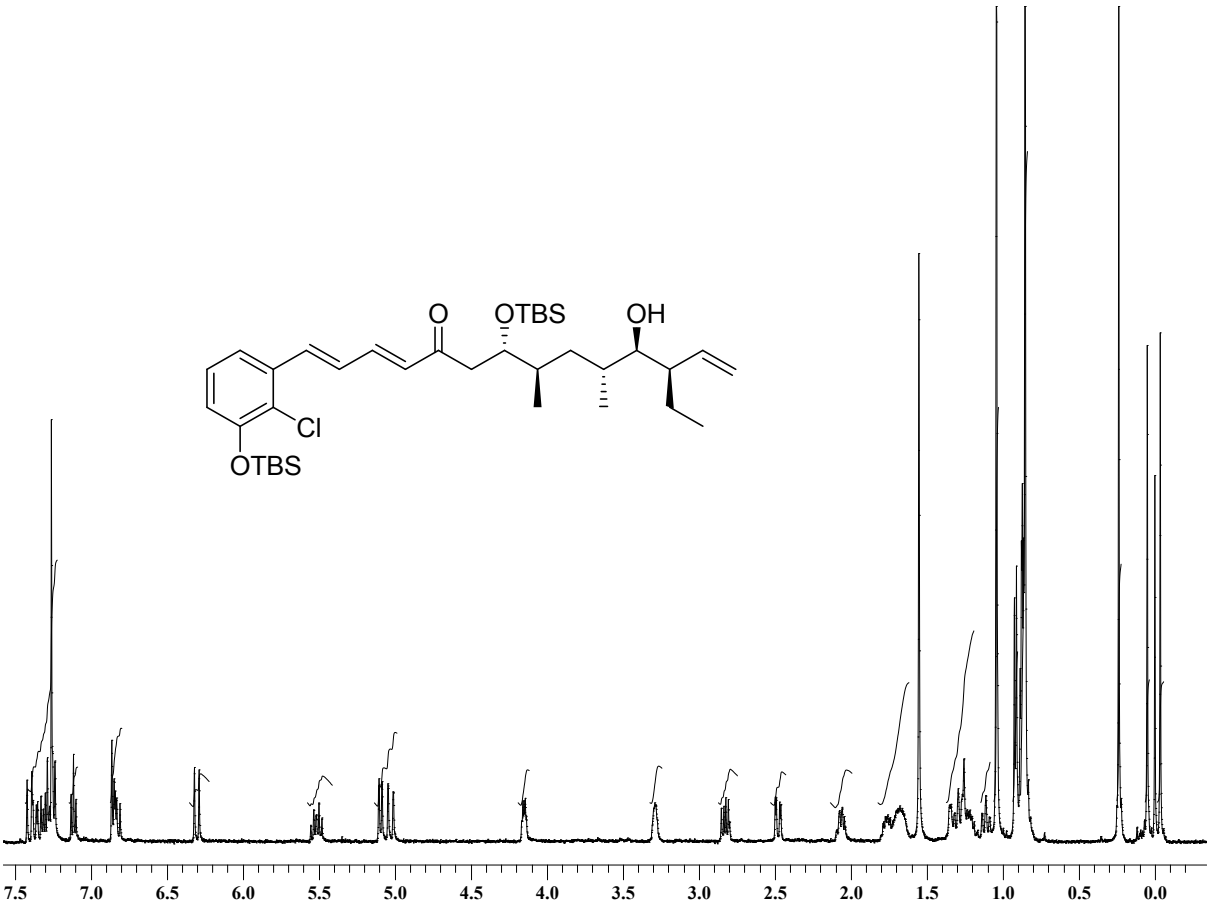
^{13}C NMR spectrum of 28 ($CDCl_3$, 75 MHz)



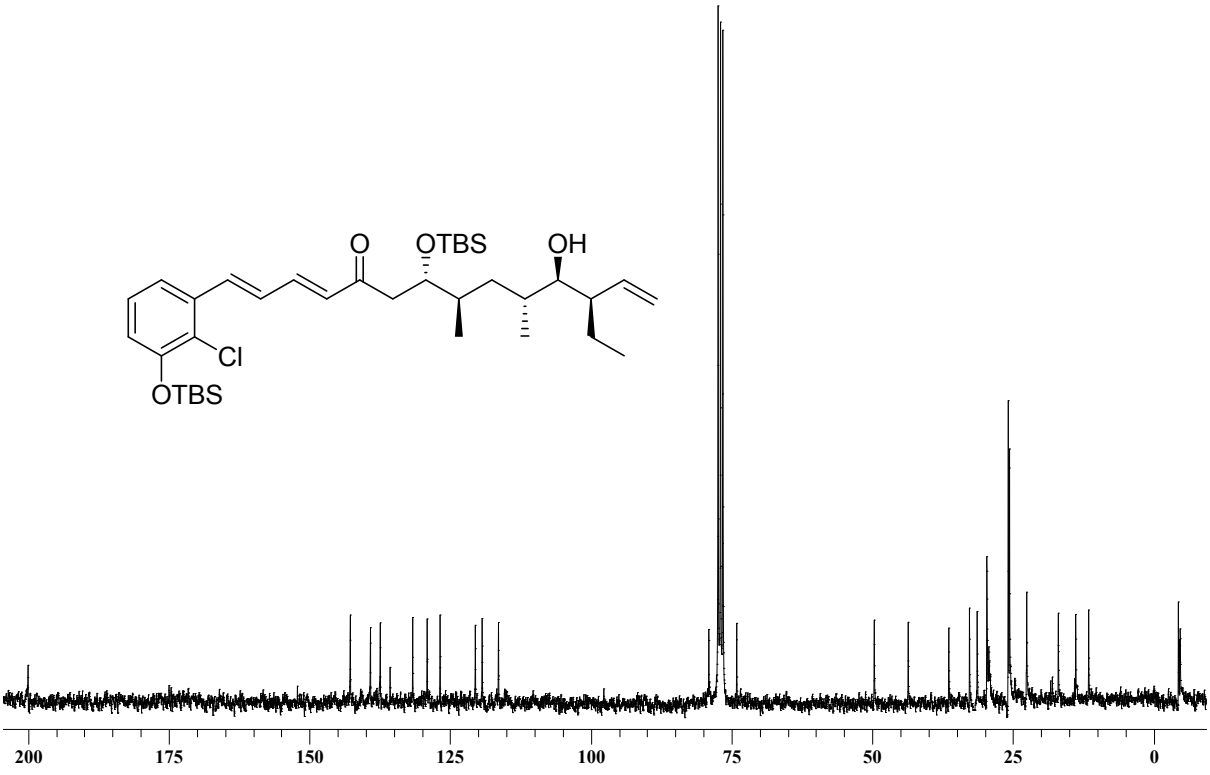
^{1}H NMR spectrum of 12a ($CDCl_3$, 500 MHz)



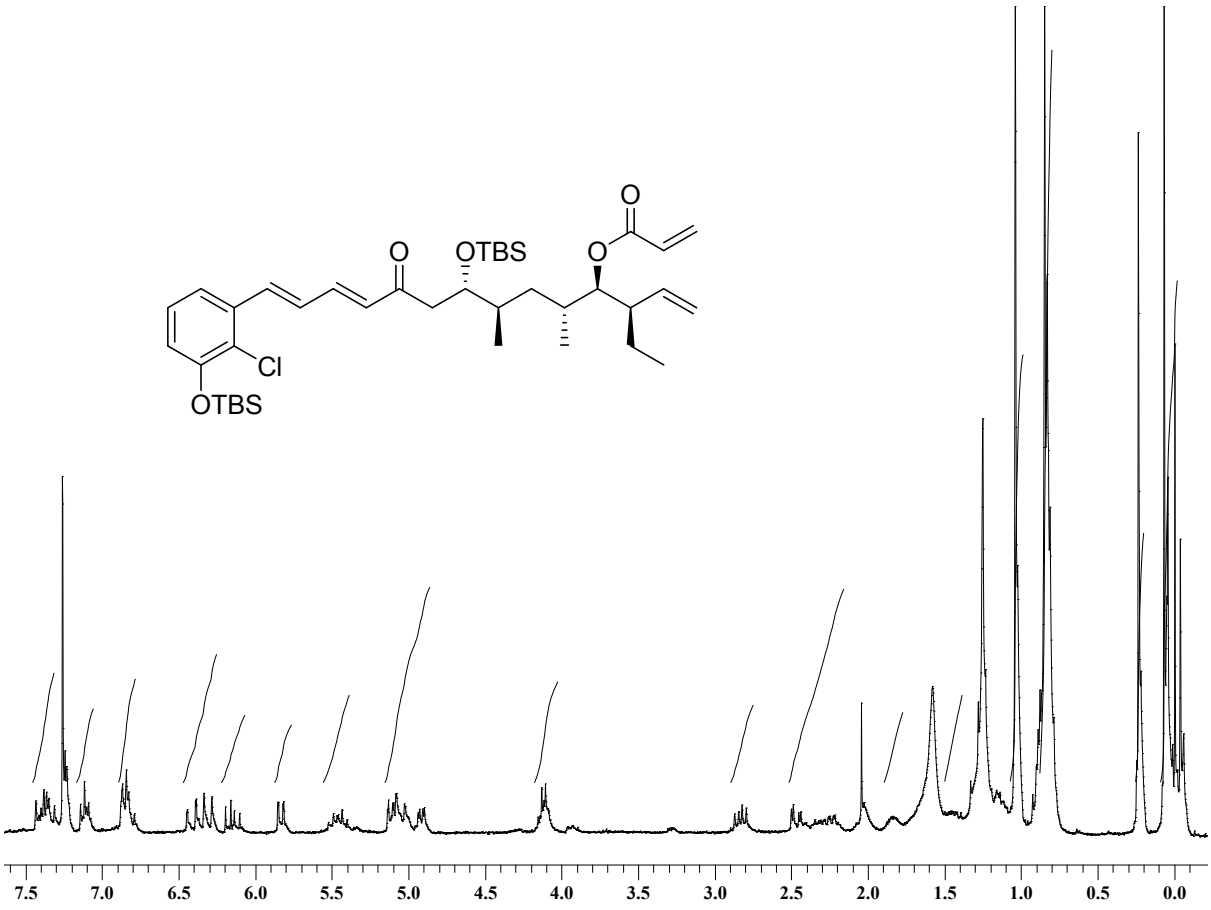
^{13}C NMR spectrum of 12a ($CDCl_3$, 75 MHz)



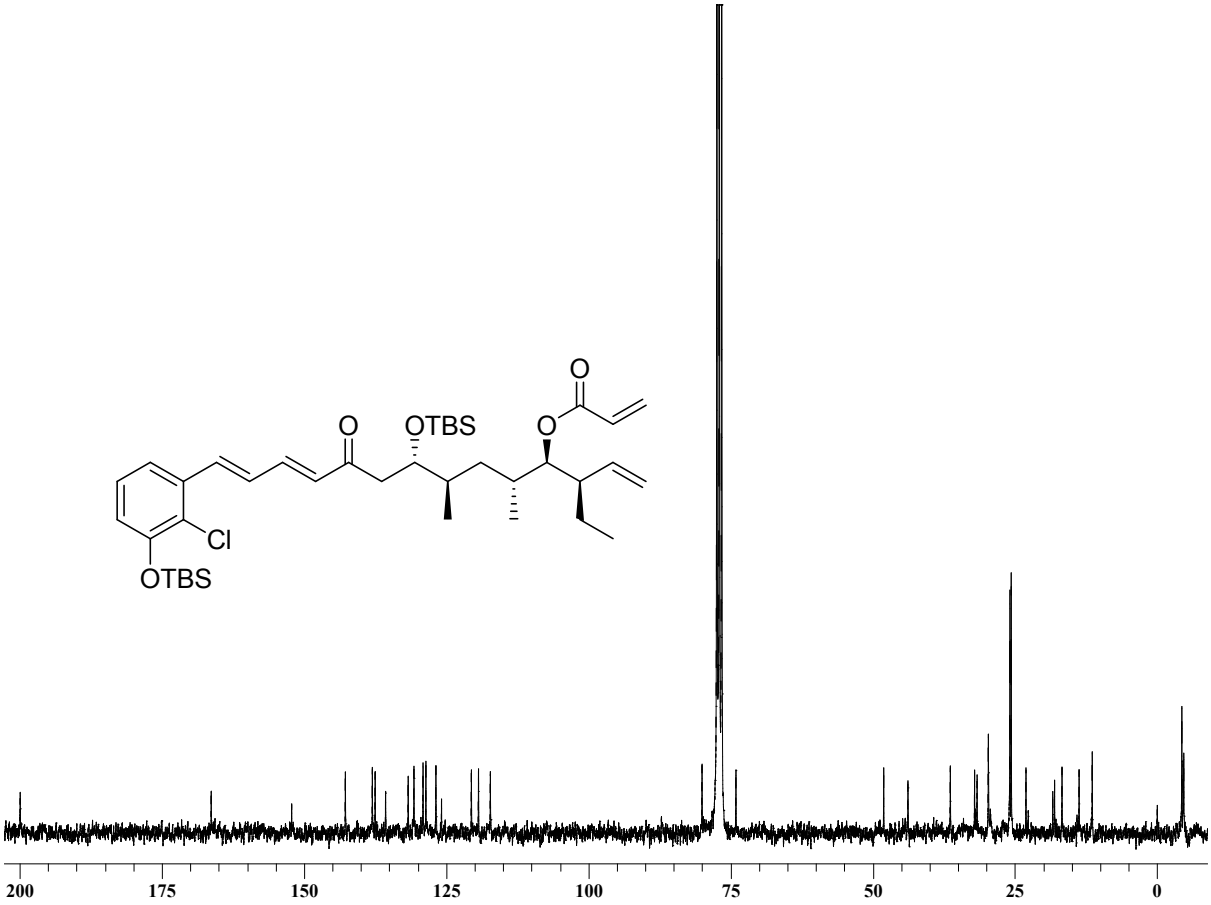
^{1}H NMR spectrum of 30 ($CDCl_3$, 500 MHz)



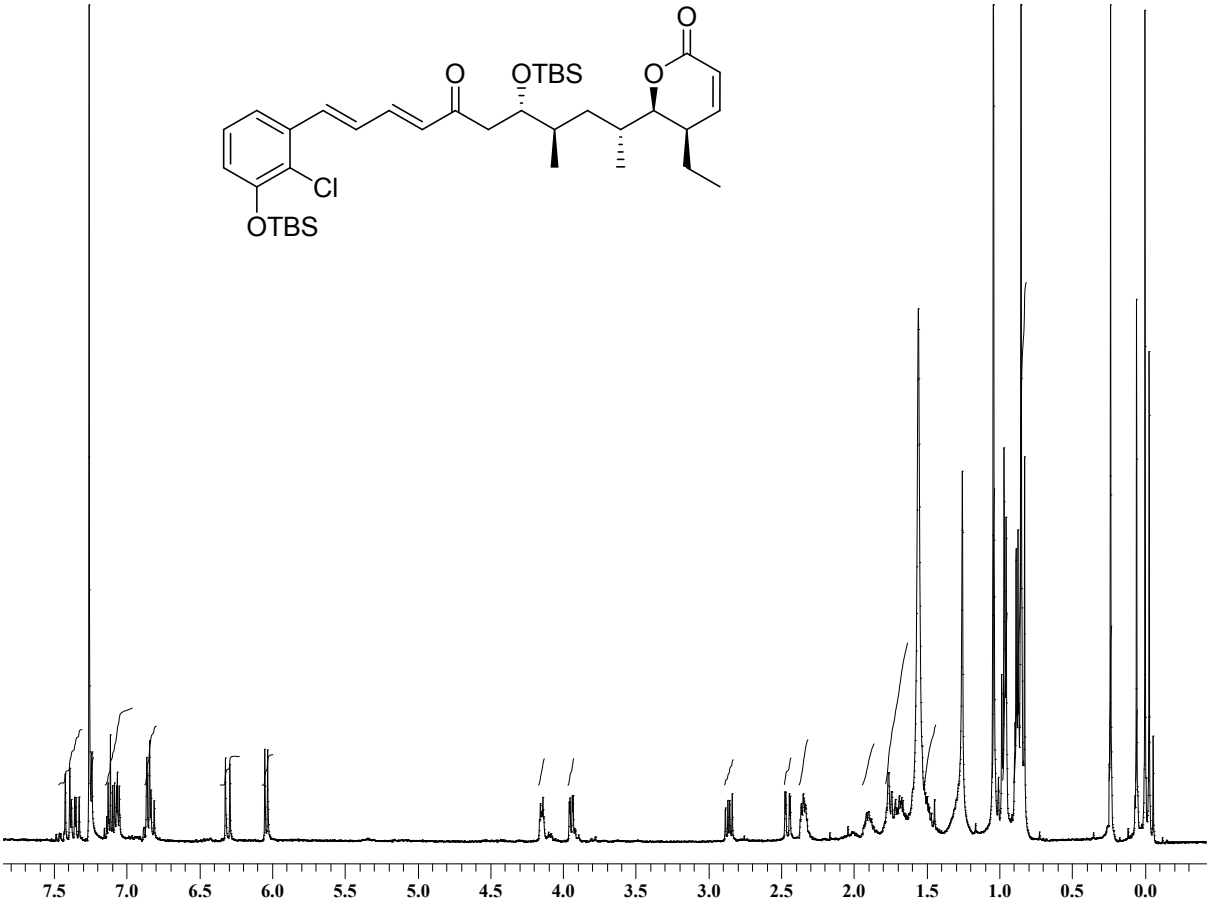
^{13}C NMR spectrum of 30 ($CDCl_3$, 75 MHz)



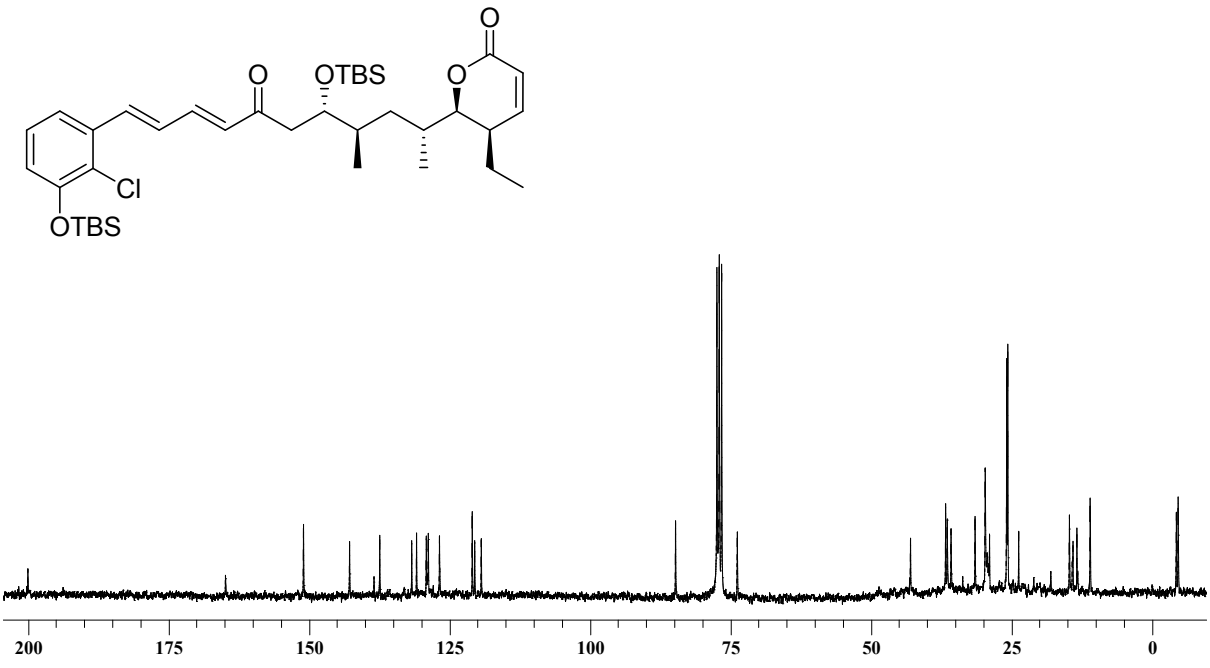
^{1}H NMR spectrum of 10a ($CDCl_3$, 300 MHz)



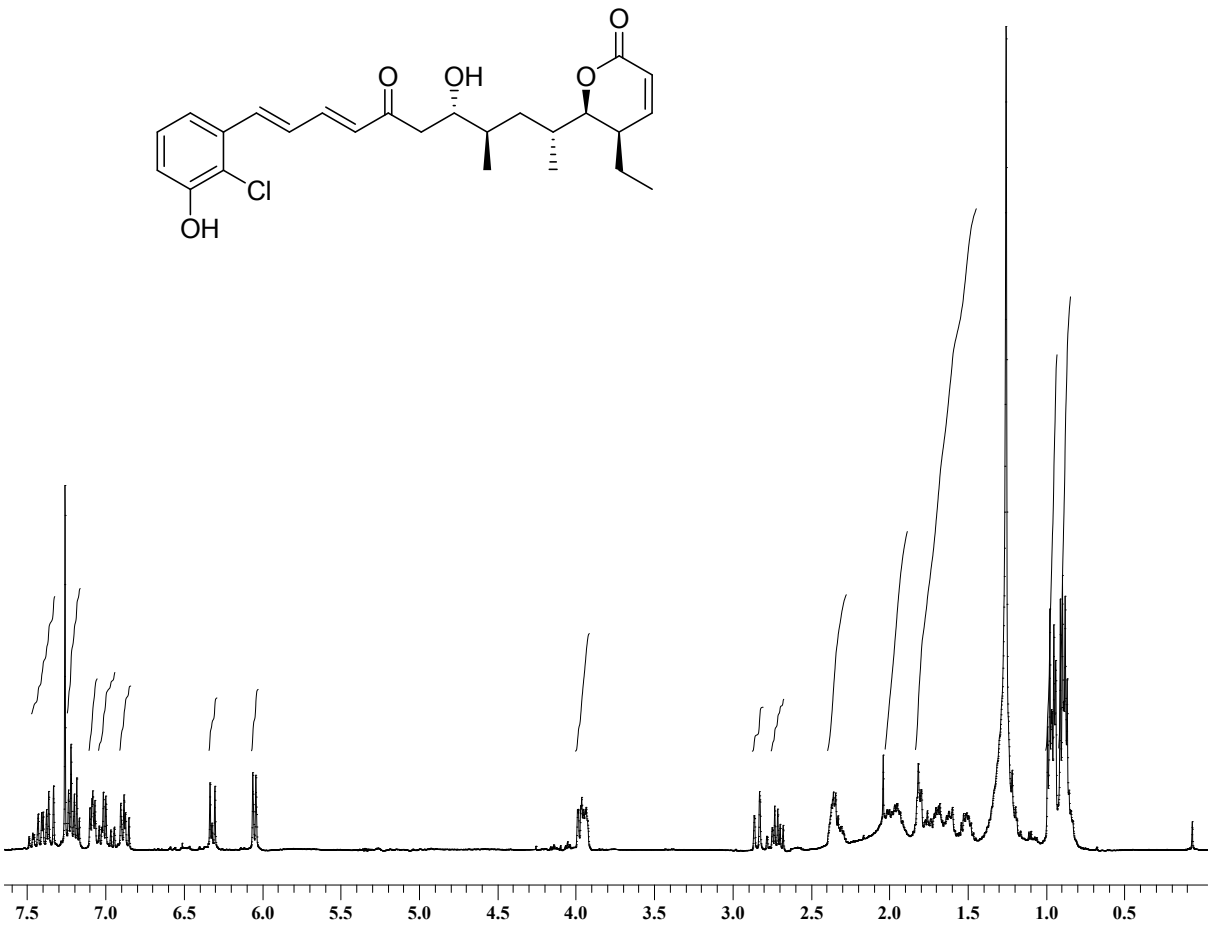
^{13}C NMR spectrum of 10a ($CDCl_3$, 75 MHz)



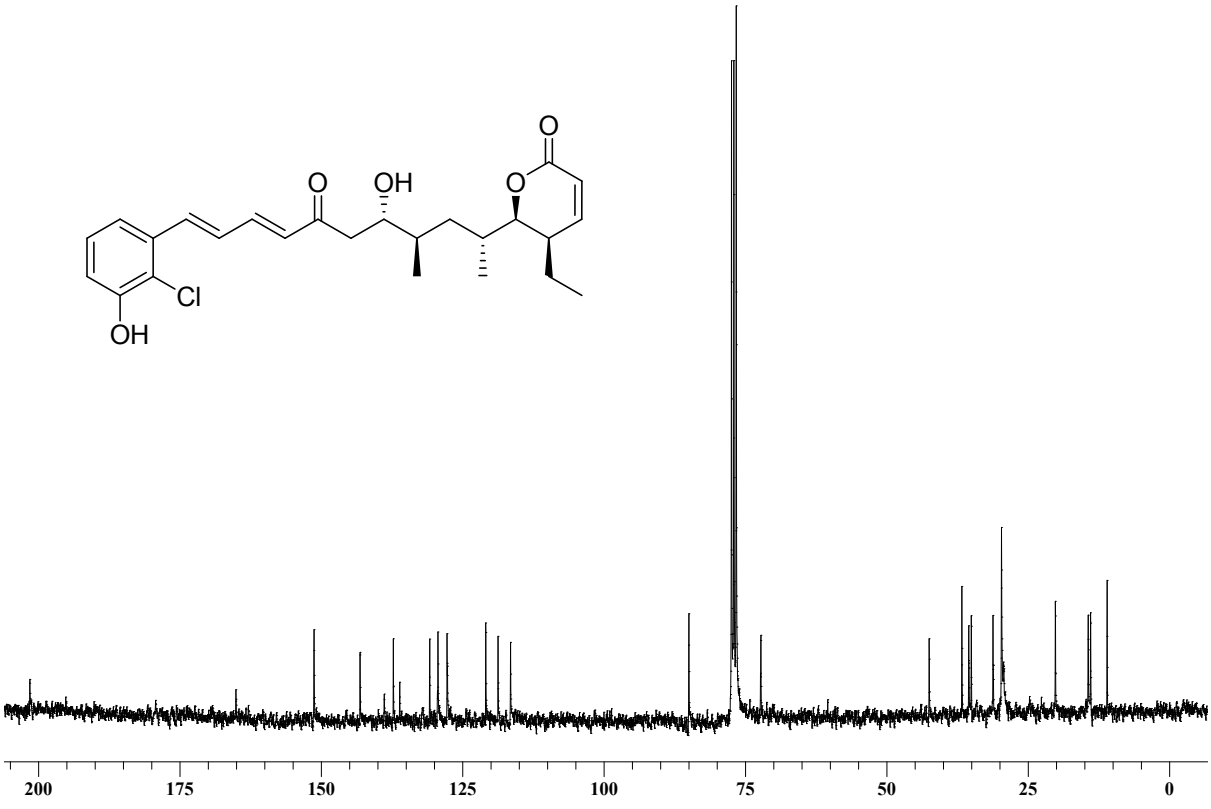
^{1}H NMR spectrum of 9a ($CDCl_3$, 500 MHz)



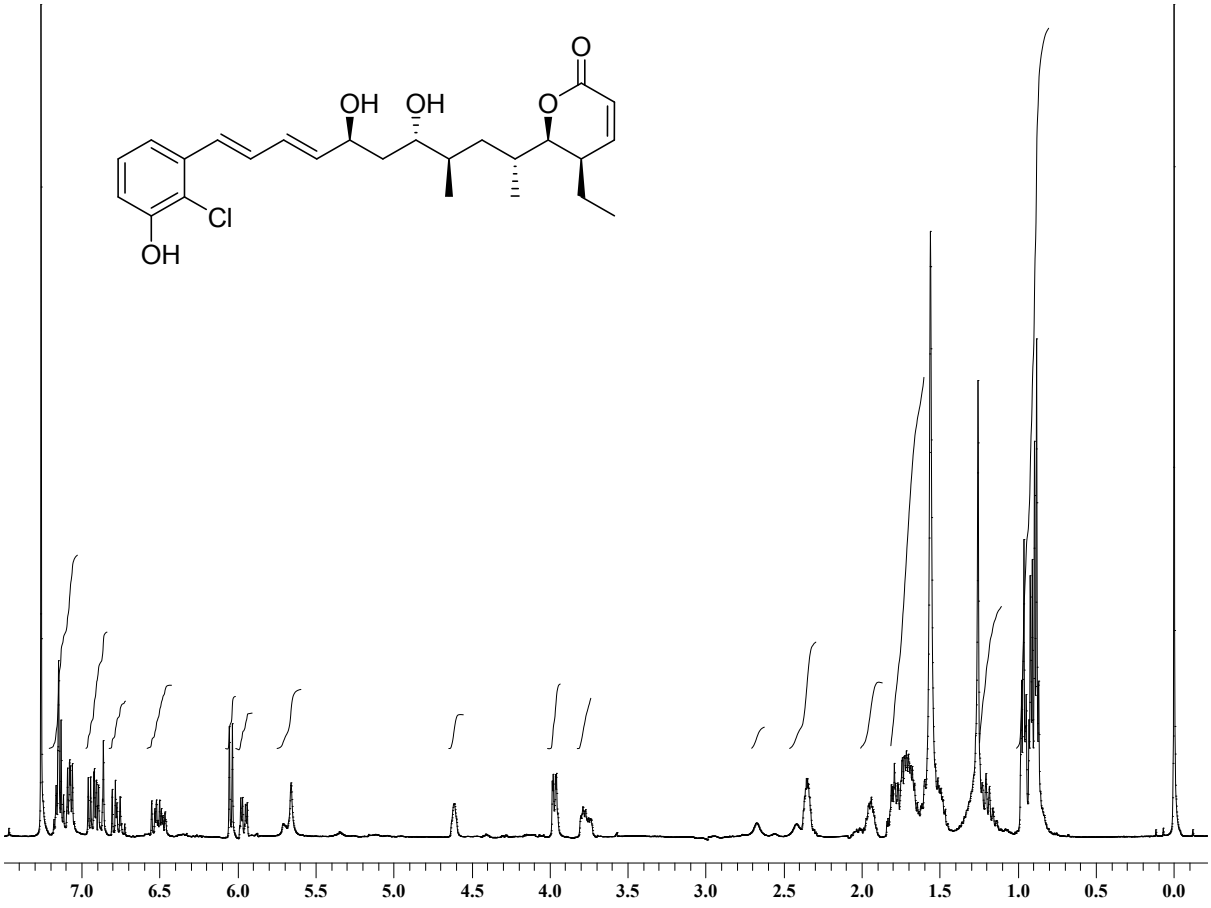
^{13}C NMR spectrum of 9a ($CDCl_3$, 75 MHz)



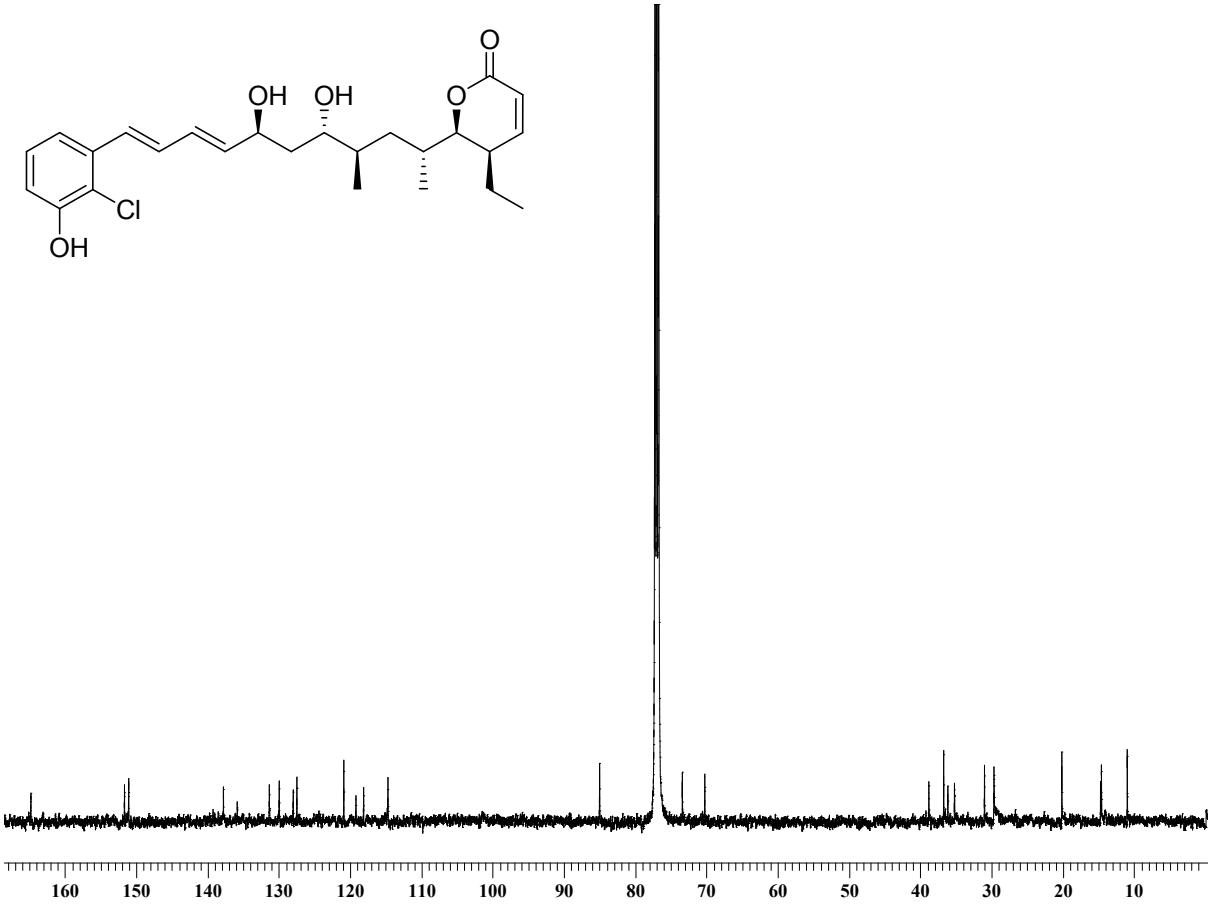
^{1}H NMR spectrum of 31 ($CDCl_3$, 300 MHz)



^{13}C NMR spectrum of 31 ($CDCl_3$, 75 MHz)



^{1}H NMR spectrum of 7 ($CDCl_3$, 500 MHz)



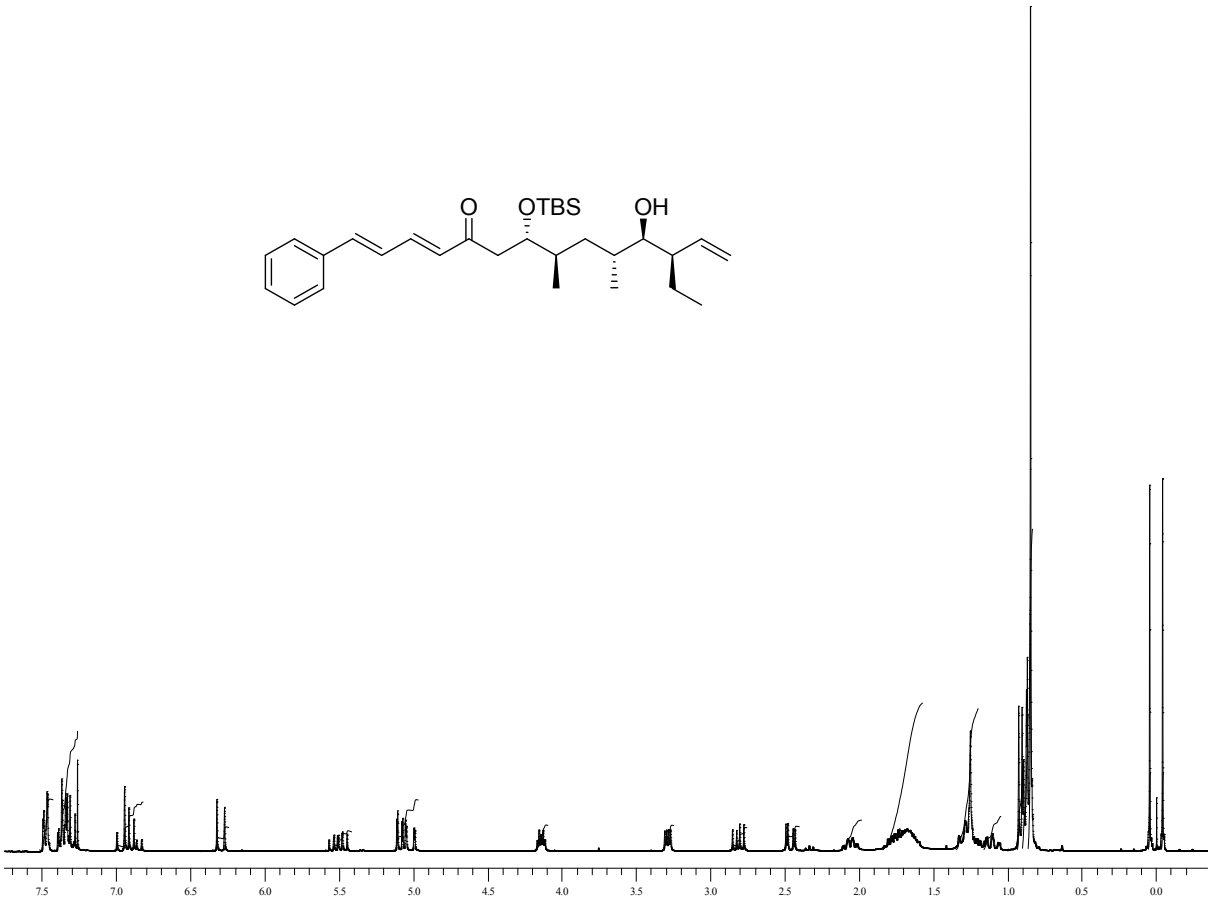
^{13}C NMR spectrum of 7 (CDCl3, 125 MHz)

^{1}H and ^{13}C NMR tabular comparison between the natural and synthetic (−)-bitungolide B in $CDCl_3$:

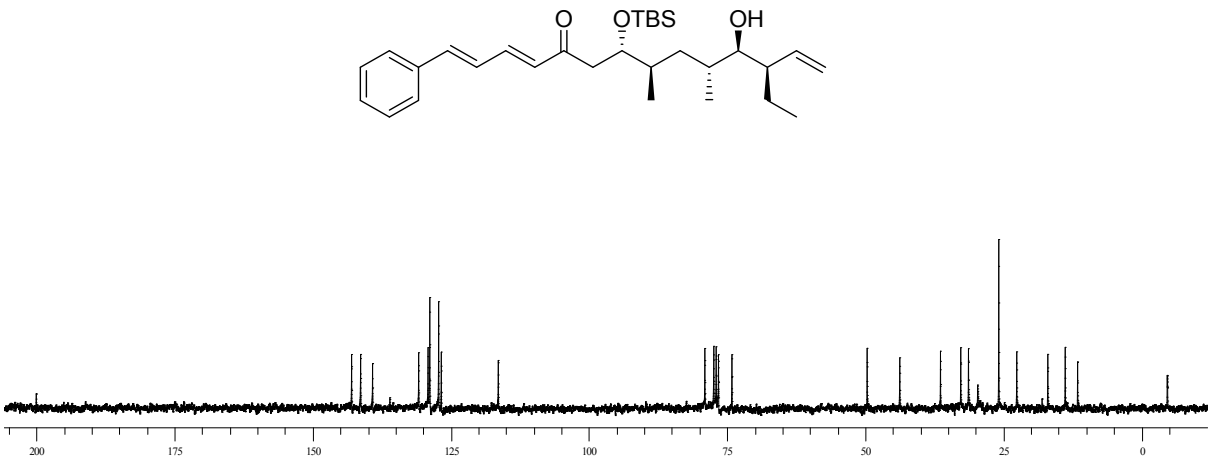
S.No	**Natural (500 MHz, $CDCl_3$)**	**Synthetic (500 MHz, $CDCl_3$)**
1	**7.16 (m, 1H)**	**7.16 (m, 1H)**
2	**7.14 (m, 1H)**	**7.14 (m, 1H)**
3	**7.08 (dd, *J* = 9.8, 6.4, 1H)**	**7.07 (dd, *J* = 9.8, 6.7, 1H)**
4	**6.88 (d, *J* = 15.5, 1H)**	**6.88 (d, *J* = 15.3, 1H)**
5	**6.78 (dd, *J* = 15.5, 10.4, 1H)**	**6.78 (dd, *J* = 14.8, 9.8, 1H)**
6	**6.77 (dd, *J* = 8.0, 2.0, 1H)**	**6.90 (m, 1H)**
7	**6.53 (ddd, *J* = 15.3, 10.4, 1.0 1H)**	**6.52 (ddd, *J* = 15.8, 9.9, 1.9 1H)**
8	**6.05 (d, *J* = 9.8, 1H)**	**6.05 (d, *J* = 9.8, 1H)**
9	**5.96 (dd, *J* = 15.3, 5.8, 1H)**	**5.96 (dd, *J* = 15.3, 5.9, 1H)**
10	**5.65 (brs, OH)**	**5.66 (brs, OH)**
11	**4.62 (m, 1H)**	**4.61 (m, 1H)**
12	**3.97 (dd, *J* = 10.4, 3.0, 1H)**	**3.97 (dd, *J* = 10.8, 2.9, 1H)**
13	**3.80 (m, 1H)**	**3.79 (m, 1H)**
14	**2.73 (brs, OH)**	**2.68 (brs, OH)**
15	**2.47 (brs, OH)**	**2.43 (brs, OH)**
16	**2.36 (m, 1H)**	**2.36 (m, 1H)**
17	**1.95 (m, 1H)**	**1.95 (m, 1H)**
18	**1.83 (m, 1H), 1.80 (m, 1H), 1.74 (m, 1H), 1.72 (m, 1H), 1.69 (m, 1H),**	**1.84 – 1.67 (m, 5H)**
19	**1.50 (m, 1H)**	**1.50 (m, 1H)**
20	**1.20 (ddd, *J* = 13.0, 10.0, 2.0 1H)**	**1.20 (ddd, *J* = 12.8, 10.8, 1.9 1H)**
21	**0.96 (t, 7.6, 3H)**	**0.96 (t, 7.9, 3H)**

22	**0.91 (d, 6.4, 3H)**	**0.91 (d, 6.9, 3H)**
23	**0.89 (d, 6.7, 3H)**	**0.89 (d, 6.9, 3H)**

S.No	**Natural (125 MHz, $CDCl_3$)**	**Synthetic (125 MHz, $CDCl_3$)**
1	**164.9**	**164.8**
2	**151.6**	**151.6**
3	**151.2**	**151.1**
4	**137.8**	**137.8**
5	**135.8**	**135.8**
6	**131.3**	**131.3**
7	**129.9**	**129.9**
8	**128.0**	**128.0**
9	**127.5**	**127.5**
10	**120.9**	**120.9**
11	**119.0**	**119.1**
12	**118.1**	**118.1**
13	**114.7**	**114.7**
14	**85.0**	**85.0**
15	**73.4**	**73.4**
16	**70.3**	**70.3**
17	**38.7**	**38.8**
18	**36.7**	**36.7**
19	**36.1**	**36.1**
20	**35.2**	**35.2**
21	**31.0**	**31.0**
22	**20.1**	**20.1**
23	**14.7**	**14.7**
24	**14.6**	**14.6**
25	**11.0**	**11.0**

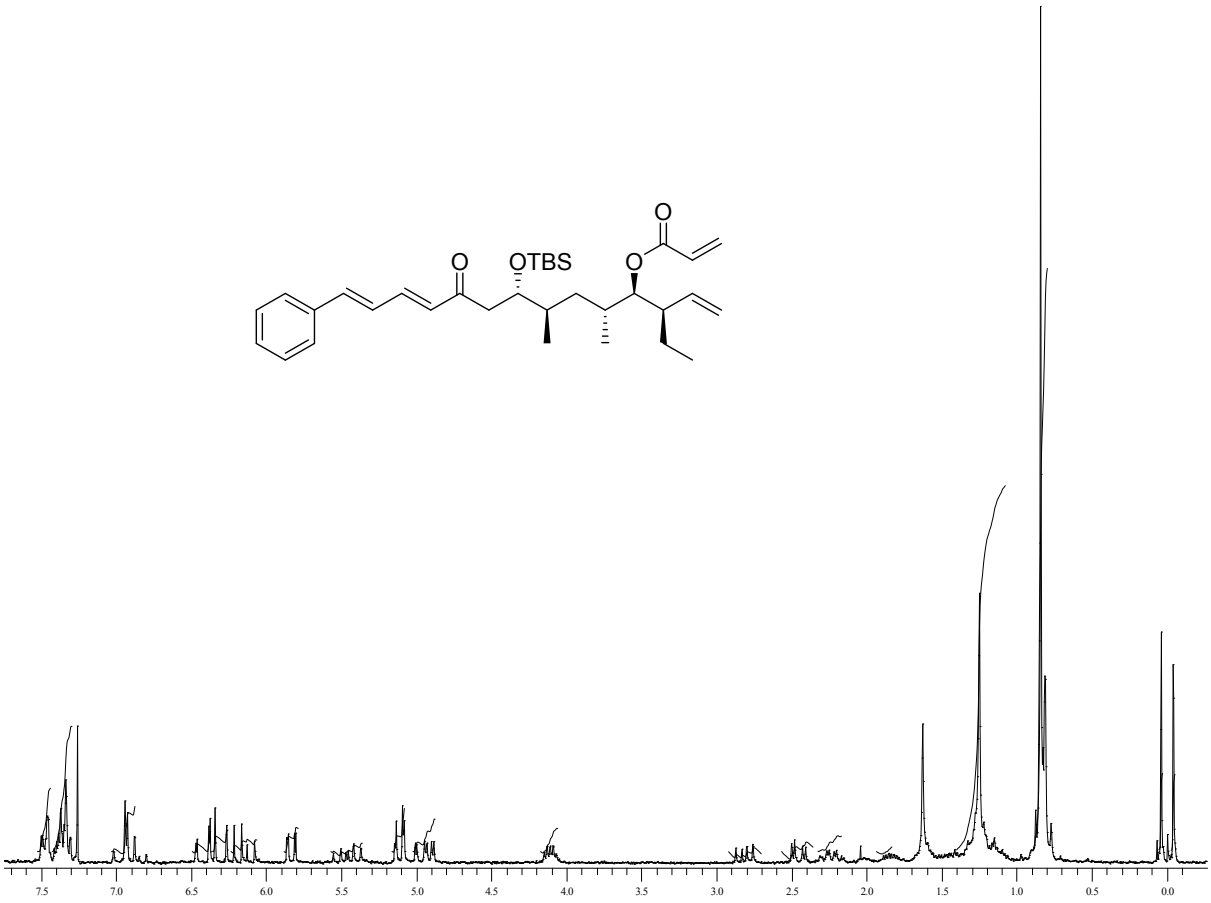


^{1}H NMR spectrum of **32** ($CDCl_3$, 300MHz)

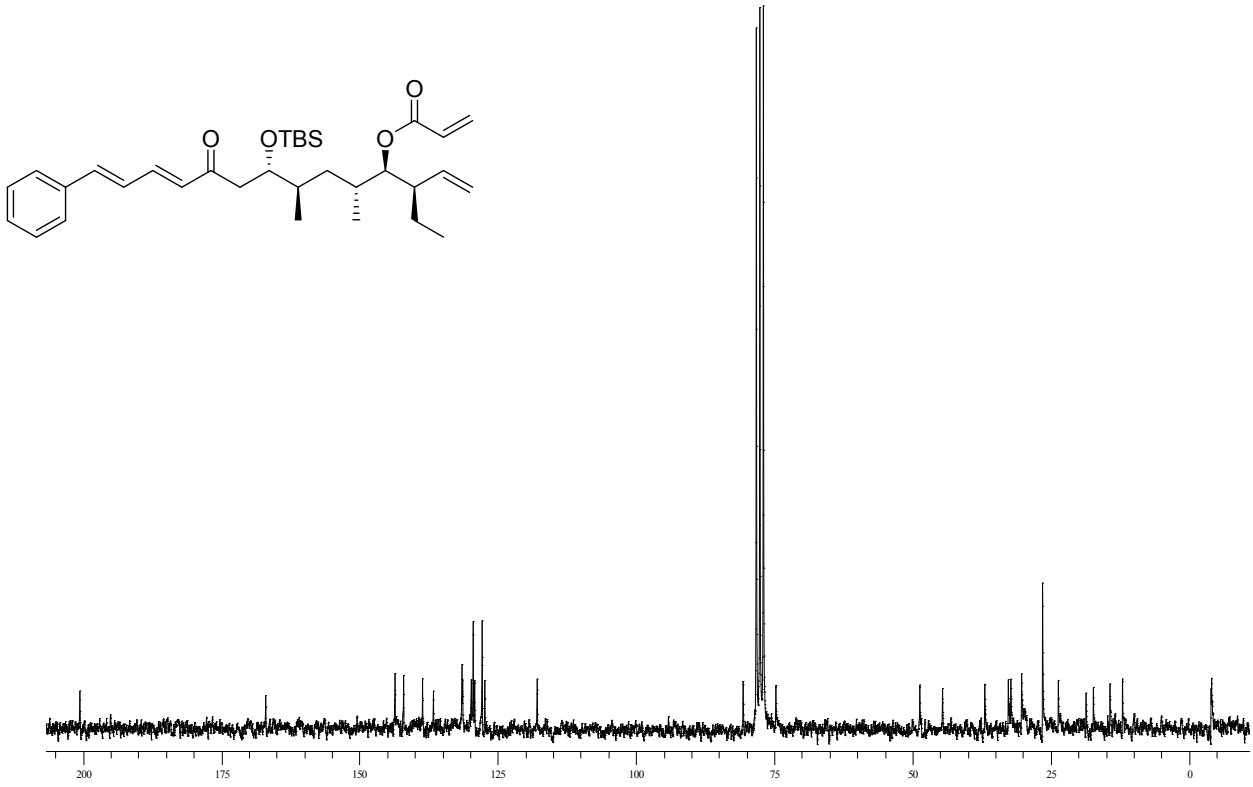


^{13}C NMR spectrum of **32** ($CDCl_3$, 75MHz)

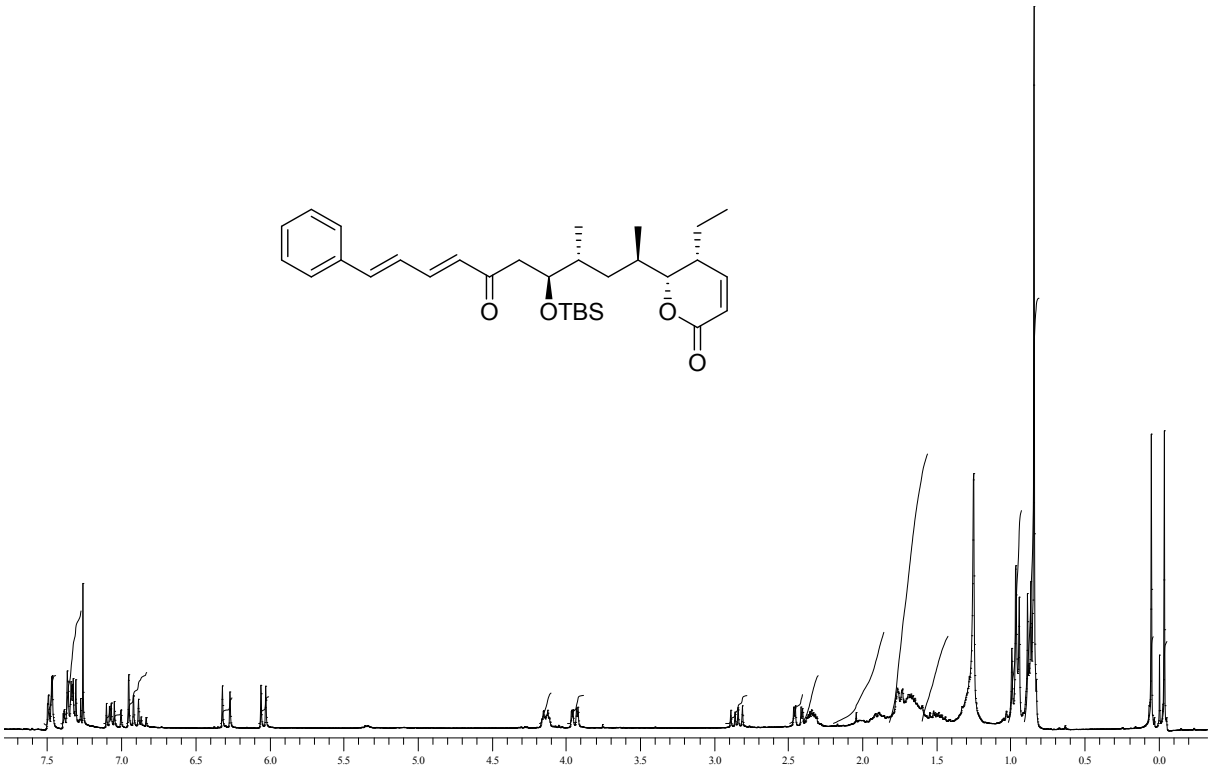
S-23



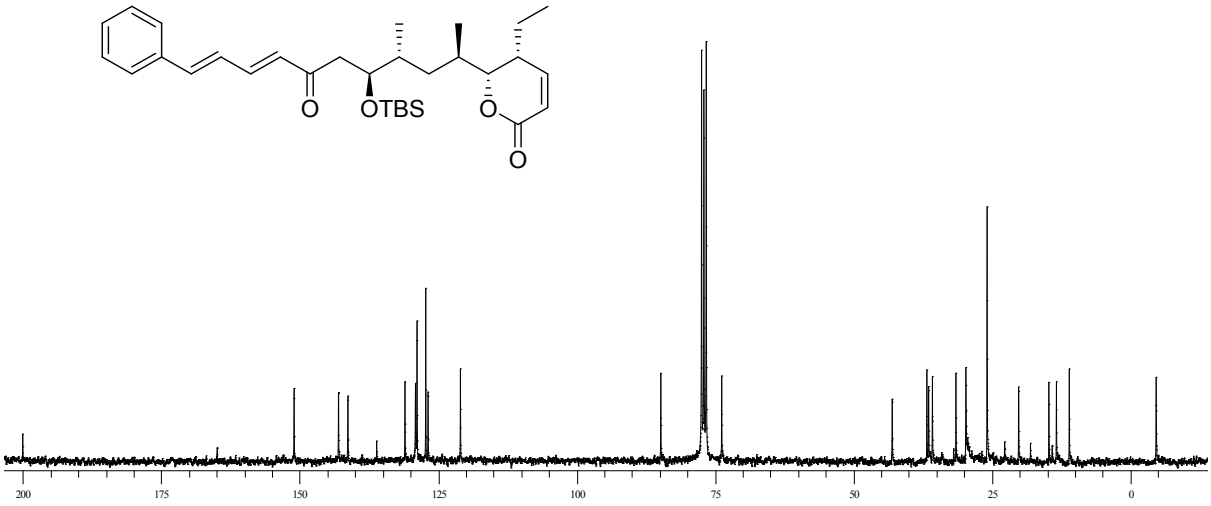
^{1}H NMR spectrum of **10b** ($CDCl_3$, 300MHz)



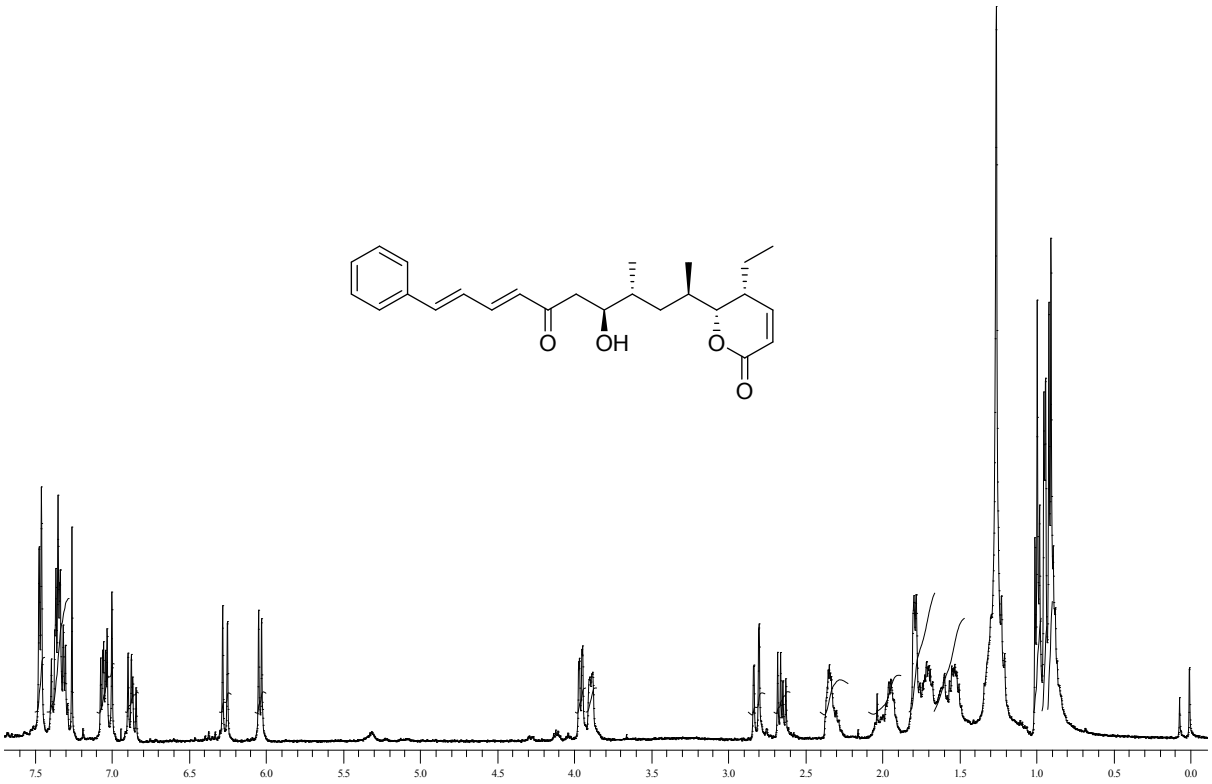
^{13}C NMR spectrum of **10b** ($CDCl_3$, 75 MHz)



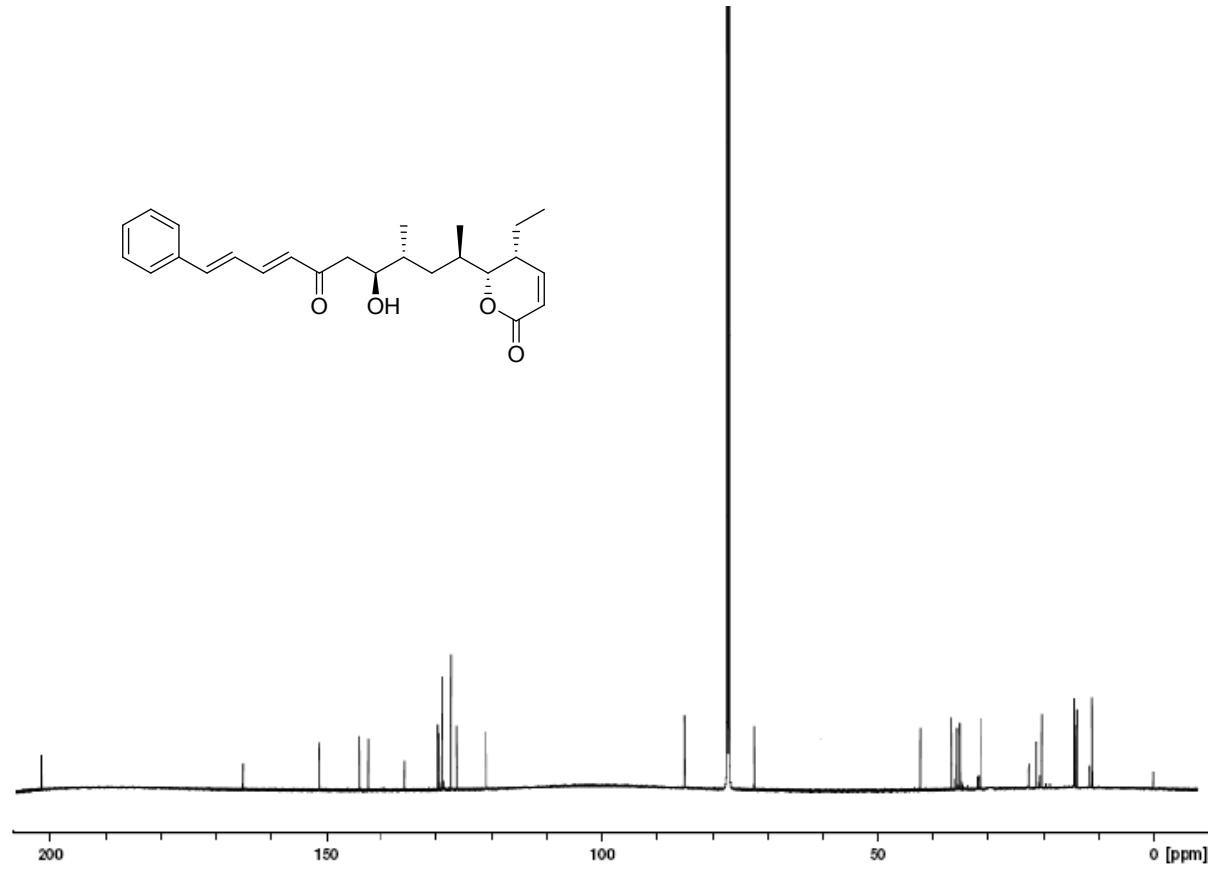
^{1}H NMR spectrum of **9b** ($CDCl_3$, 300MHz)



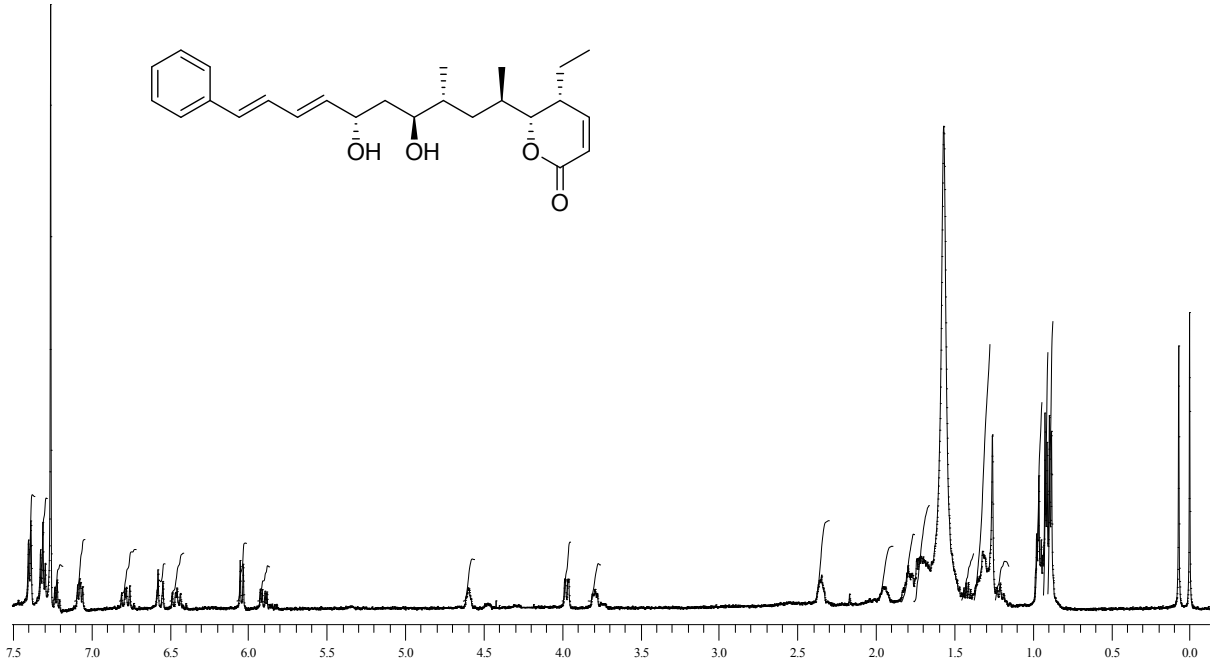
^{13}C NMR spectrum of **9b** ($CDCl_3$, 75MHz)



^{1}H NMR spectrum of **33** ($CDCl_3$, 500MHz)



^{13}C NMR spectrum of **33** ($CDCl_3$, 150 MHz)



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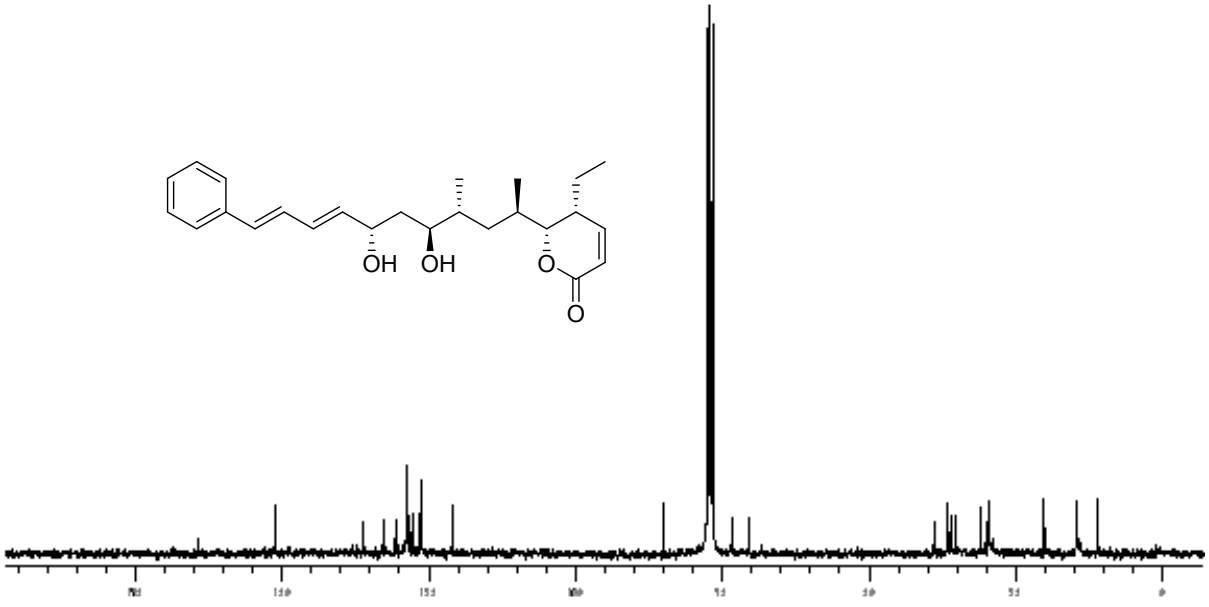

^{13}C NMR spectrum of **8** ($CDCl_3$, 75MHz)