

Total syntheses of coronatines by *exo*-selective Diels-Alder reaction and their biological activities on stomatal opening

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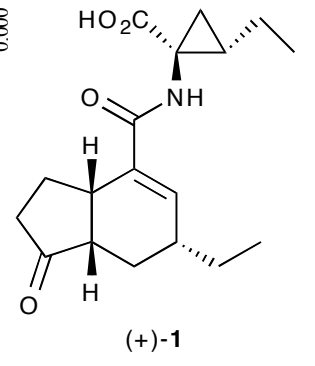
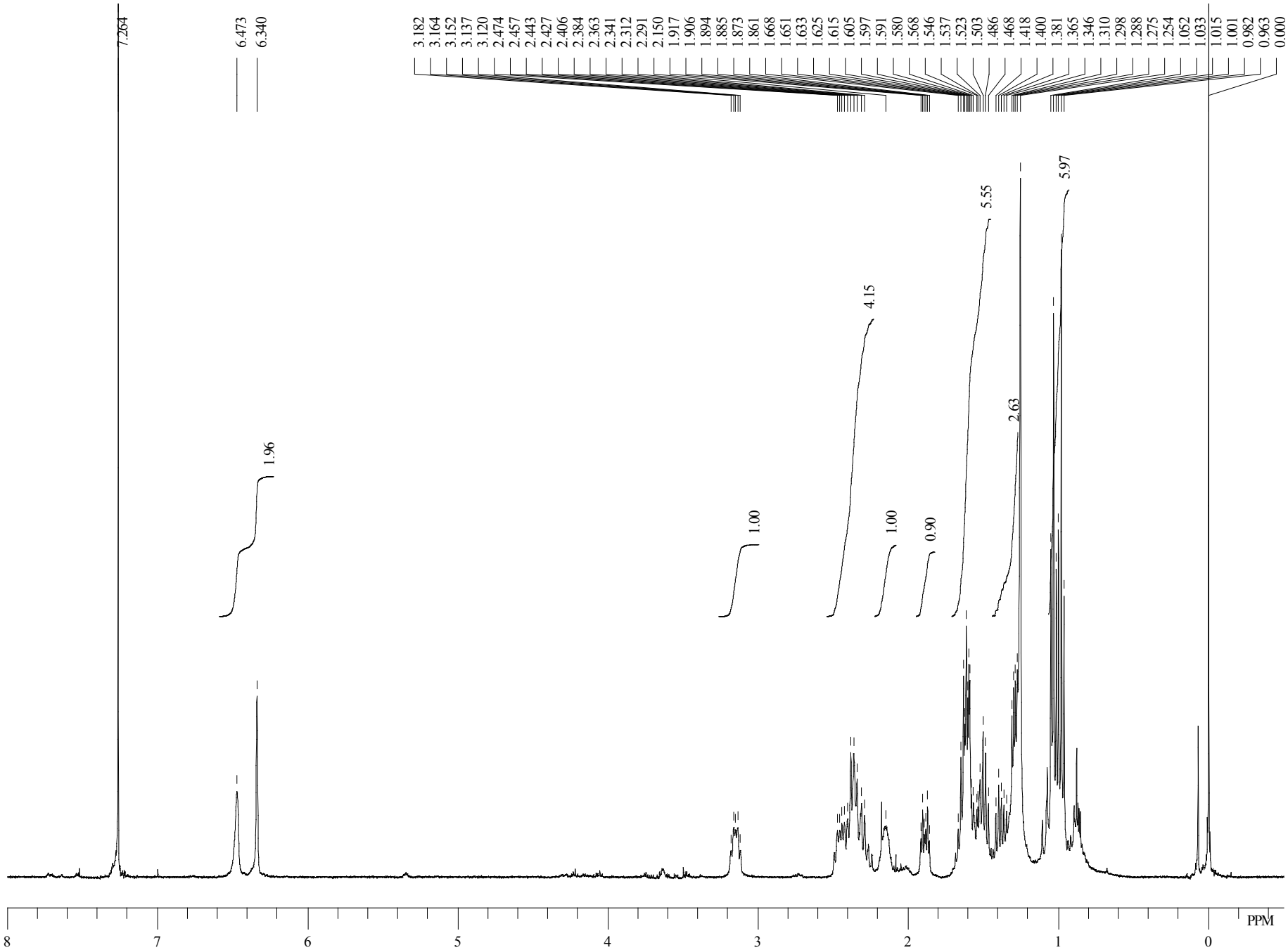
^b *Innovative Use of Light and Materials/Life, PREST, JST, 4-1-8 Honcho, Kawaguchi, Saitama, 332-0012, Japan*

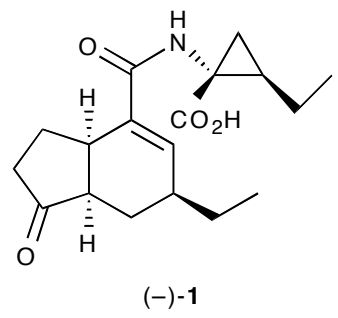
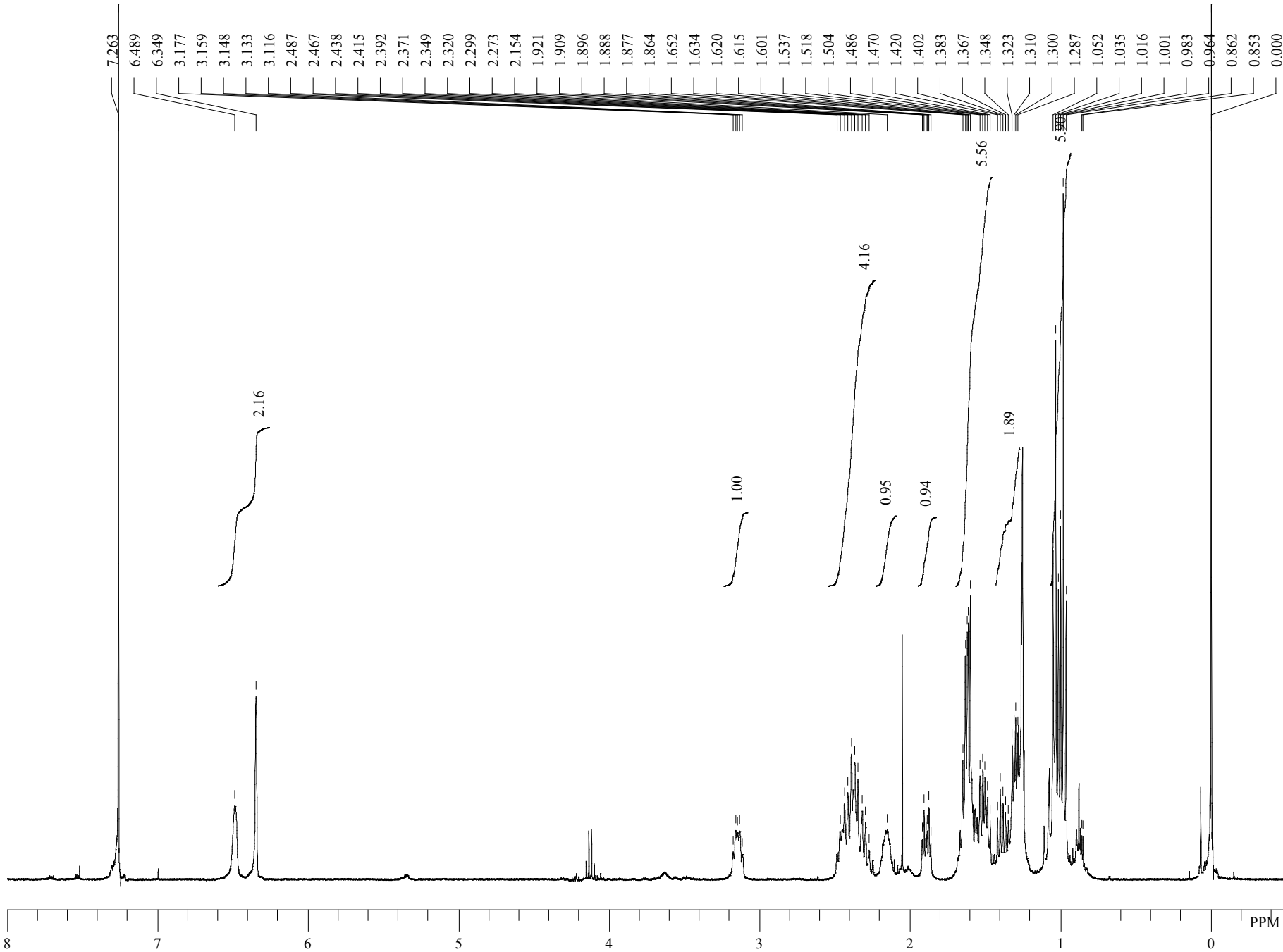
Supplementary Information

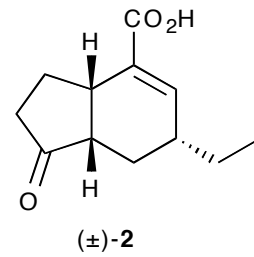
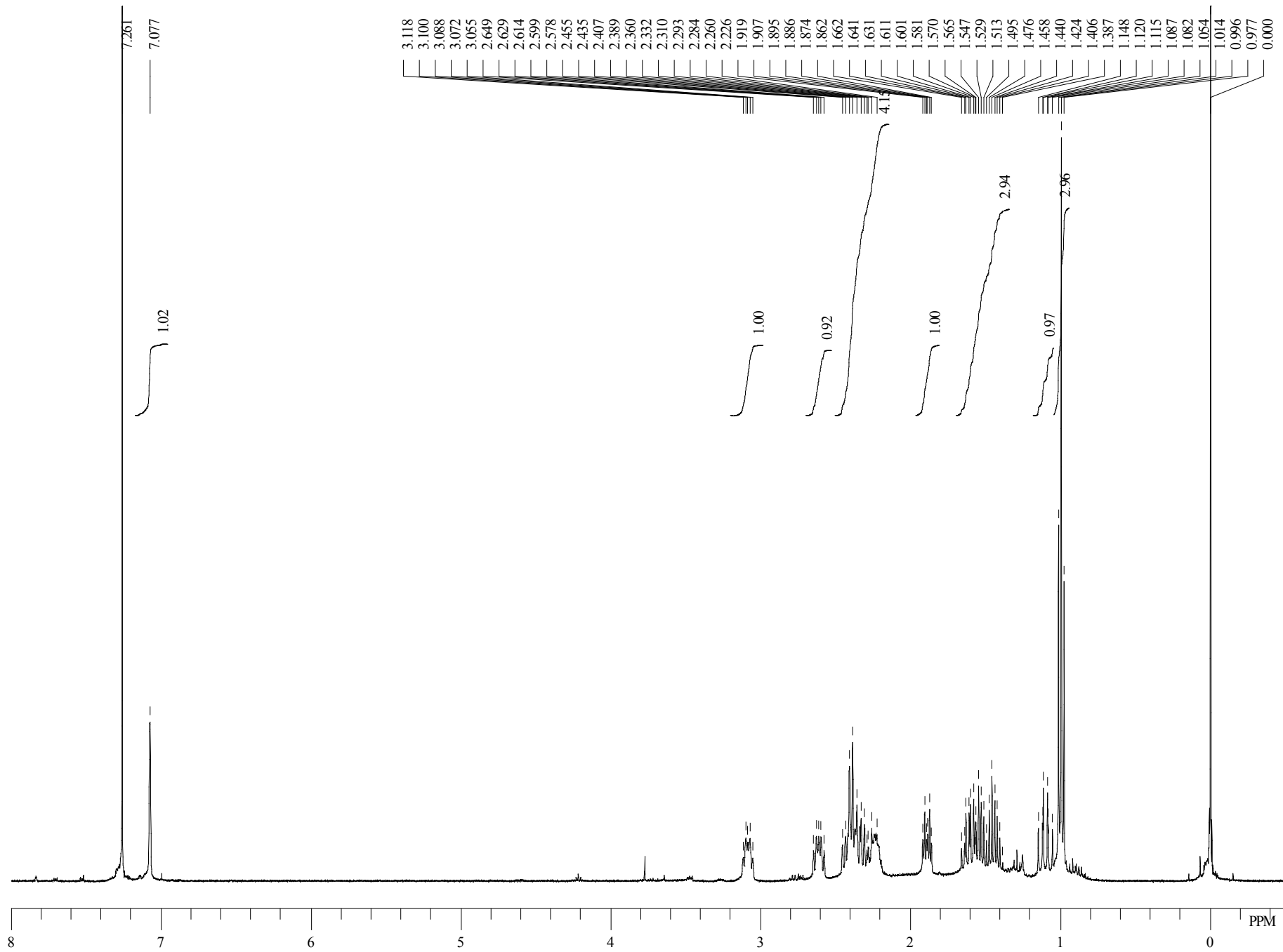
¹H NMR spectra of compounds (+)-**1**, (–)-**1**, **2**, **13**, **15**, **17**, **26**, (+)-**27**, and (–)-**27**, and ¹H and ¹³C NMR spectra of compounds (+)-**7**, (–)-**7**, **18**, **19**, **21**, **22**, **23**, **24**, and **25**.

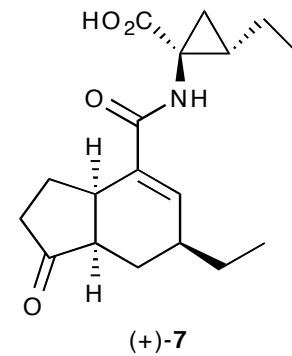
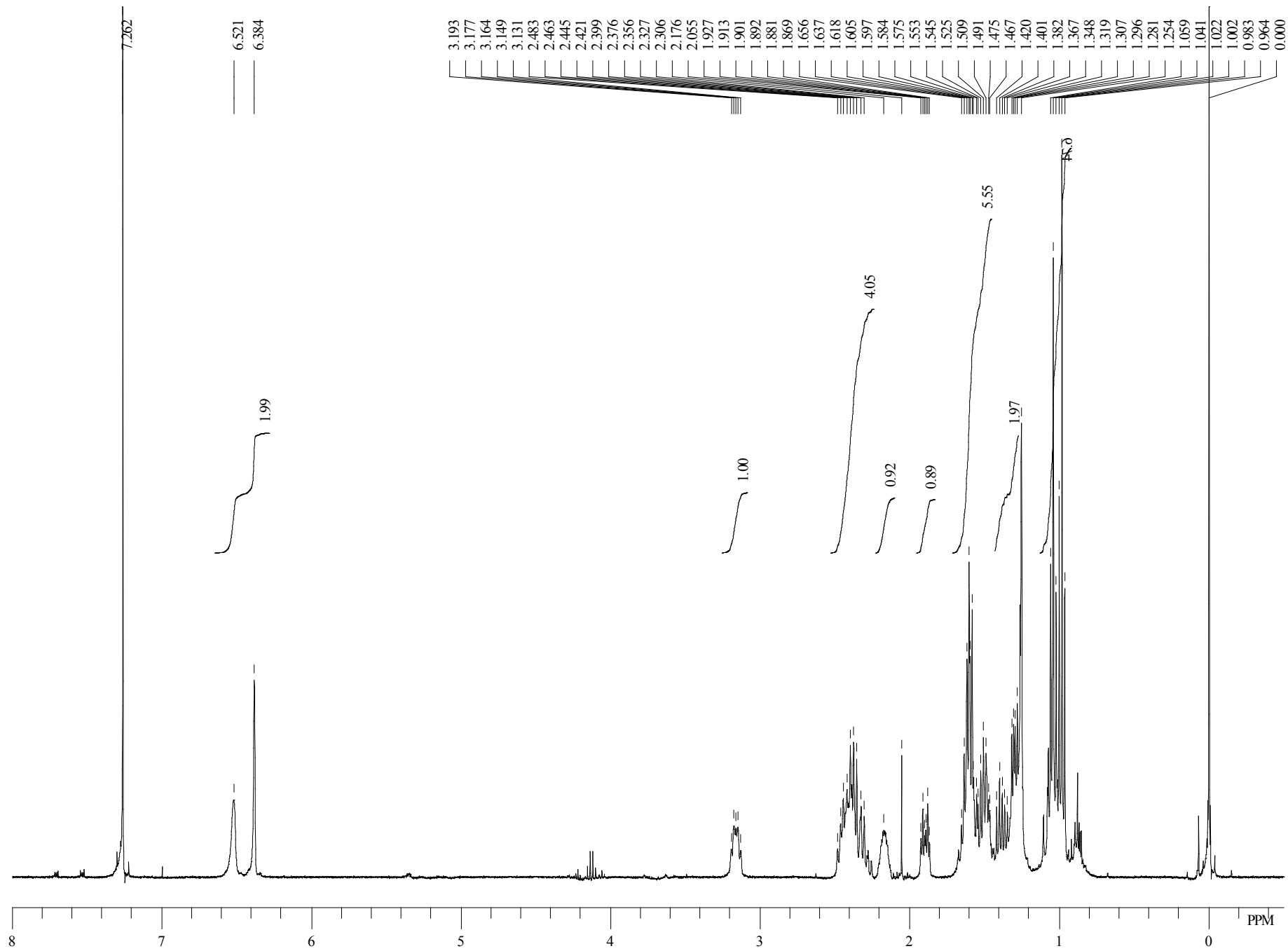
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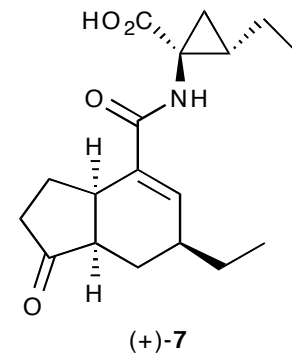
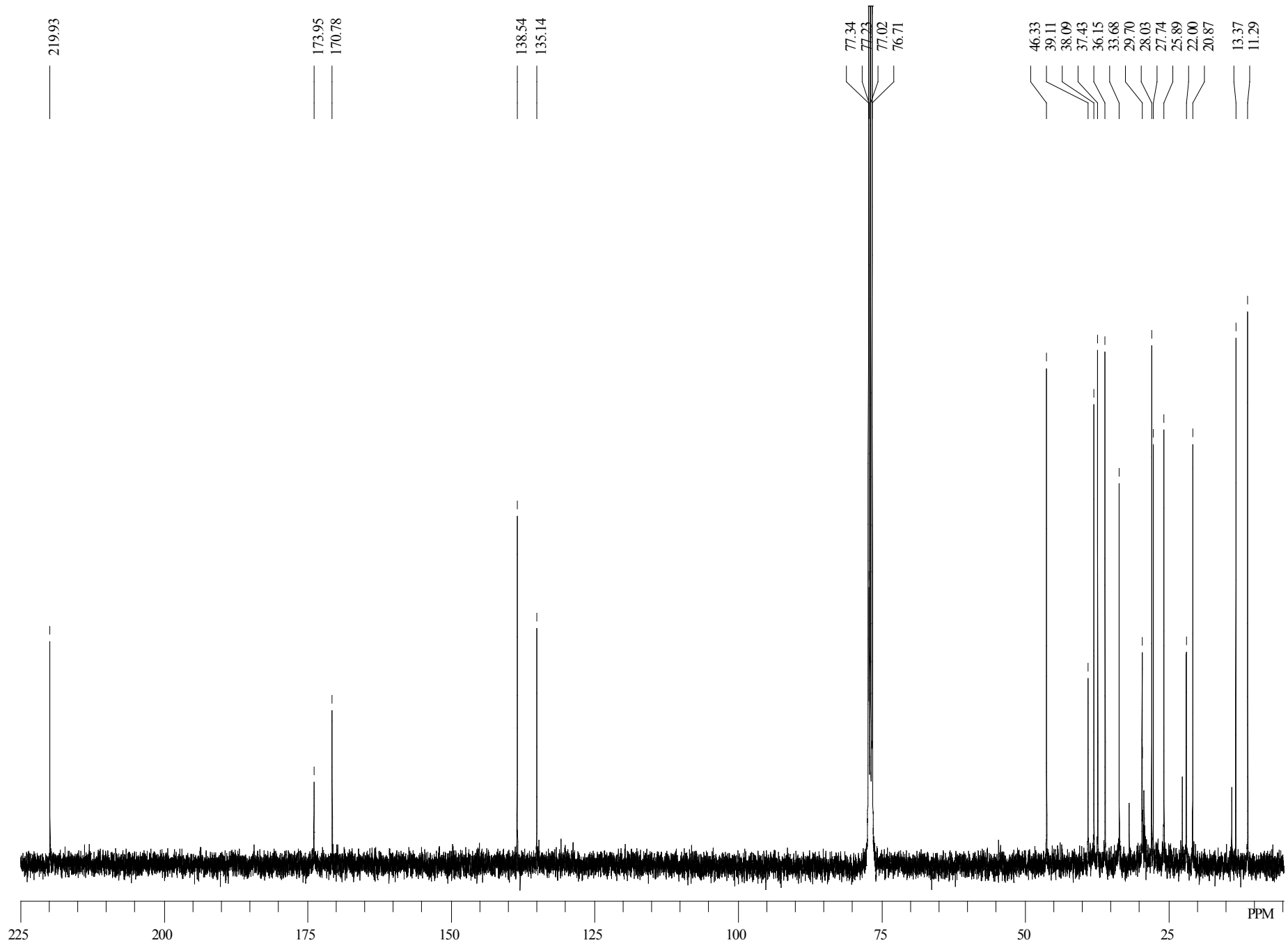
HPLC chromatograms for chiral HPLC analyses of (+)-**1** and (–)-**1**, (+)-**7** and (–)-**7**, and (+)-**27** and (–)-**27**.

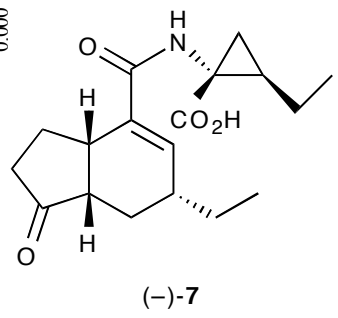
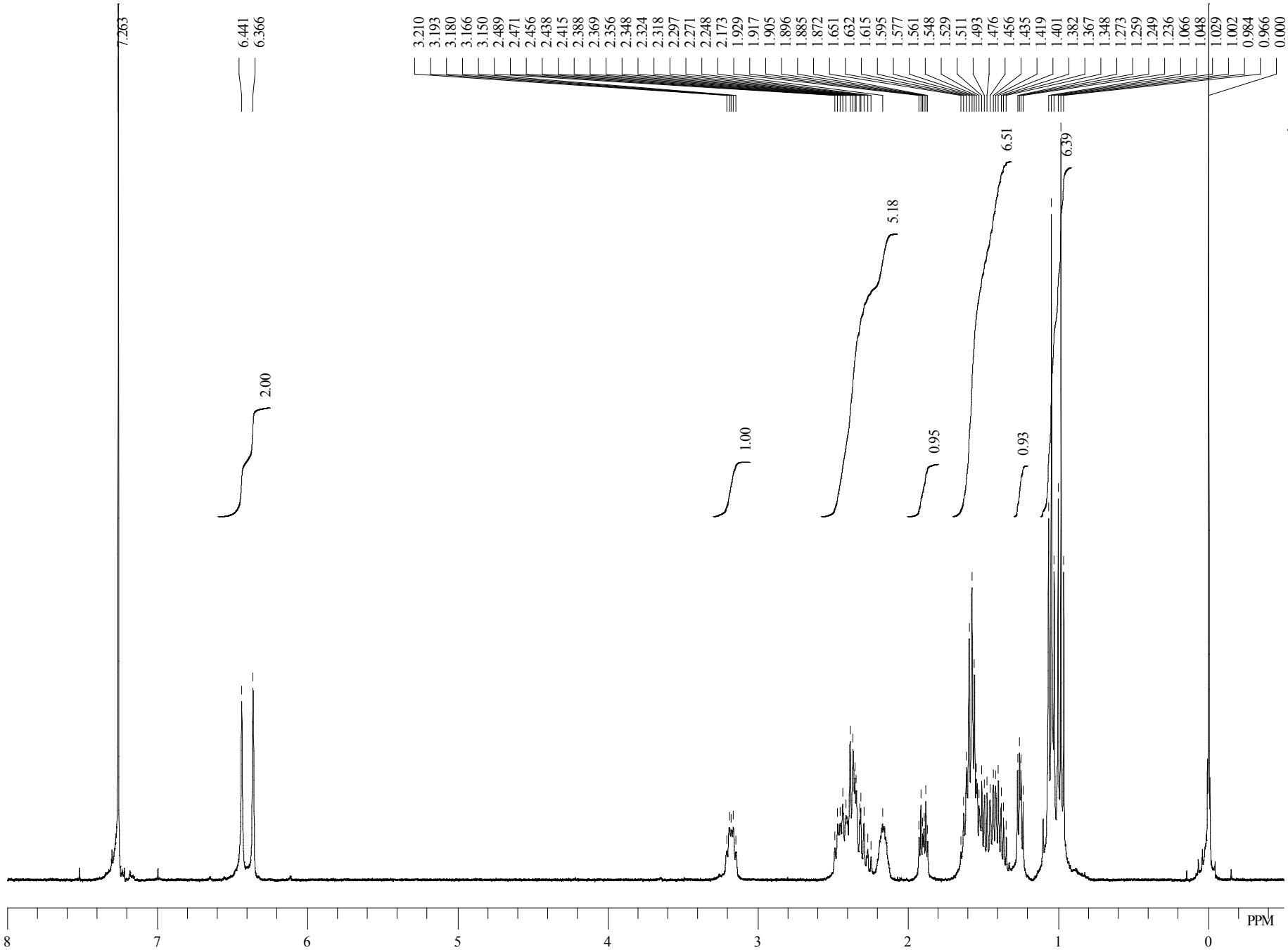


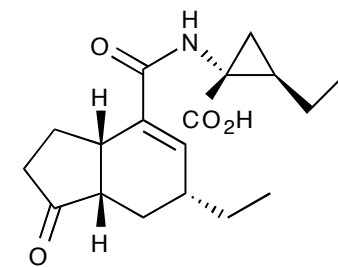
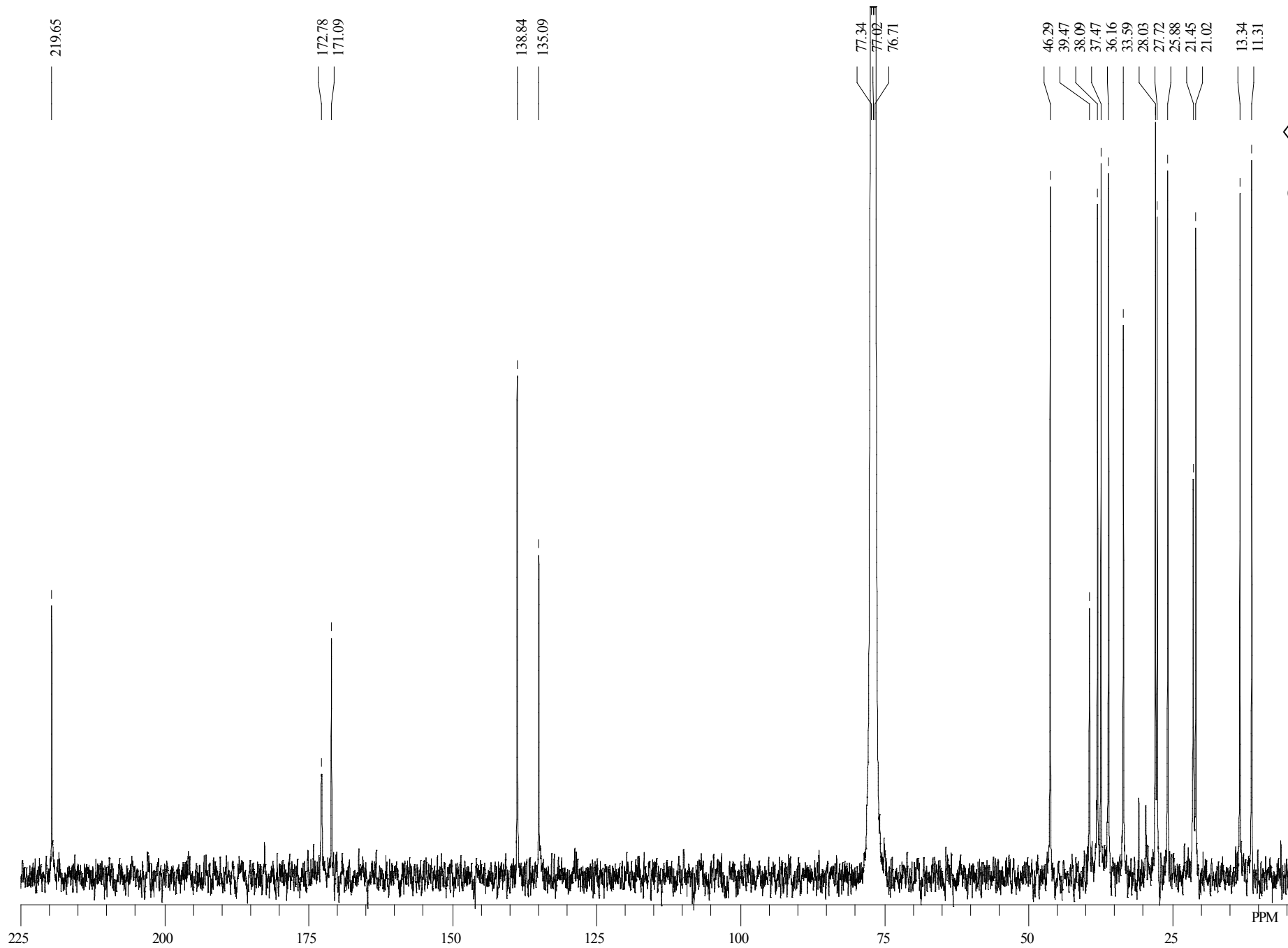




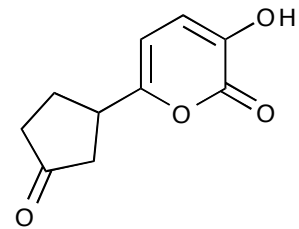
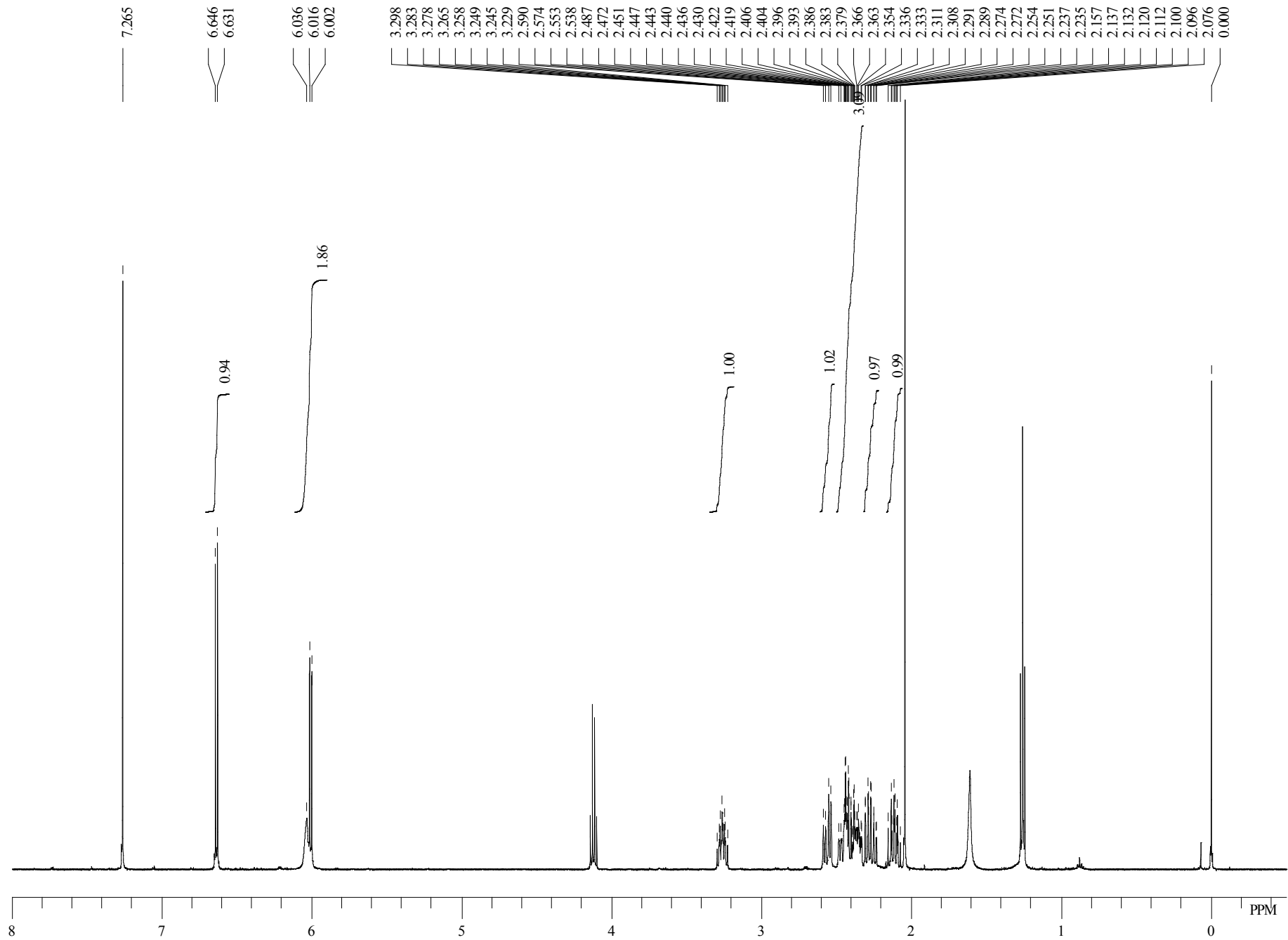




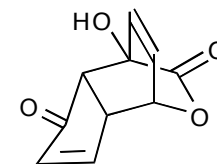
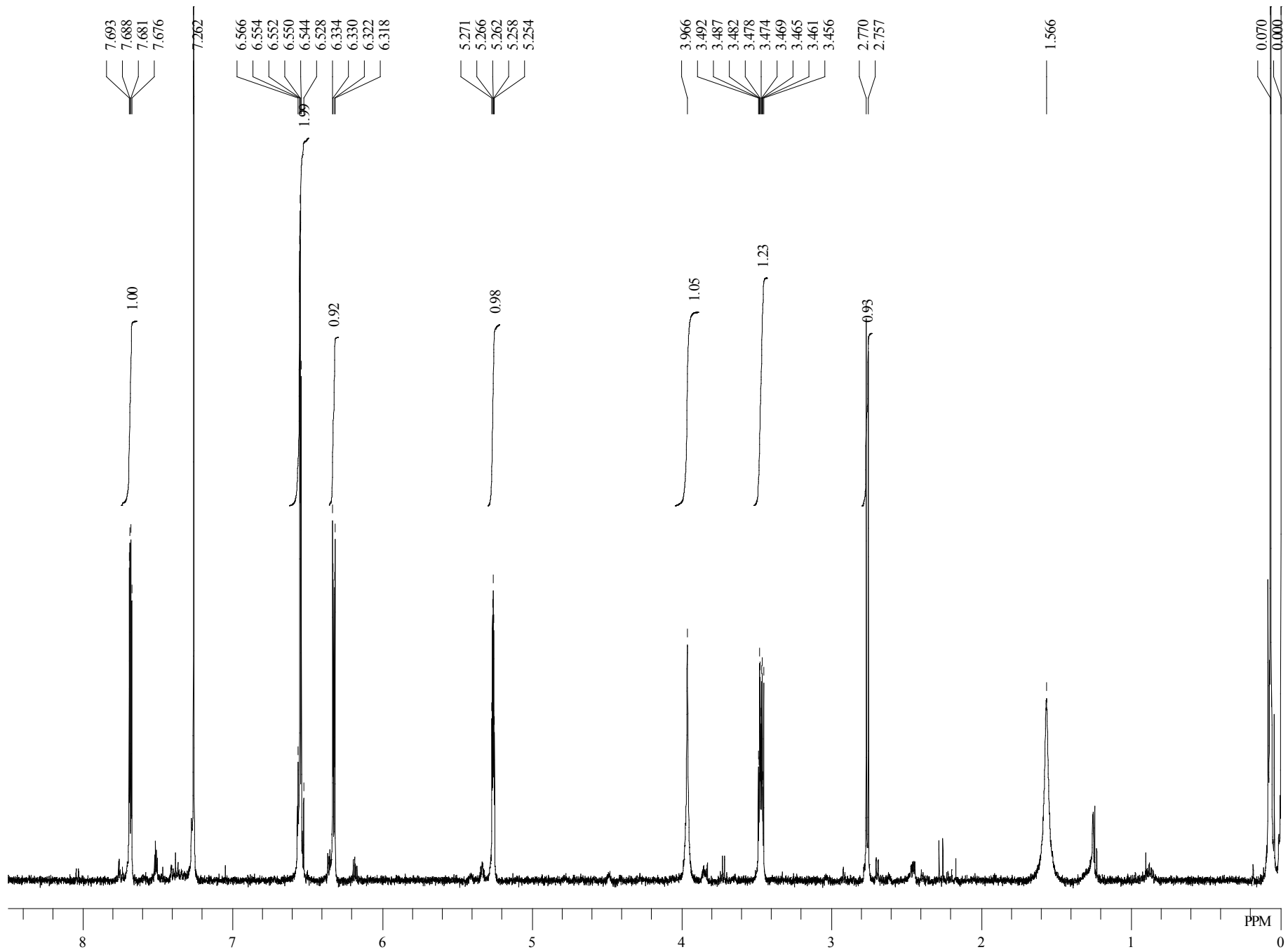




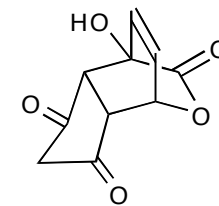
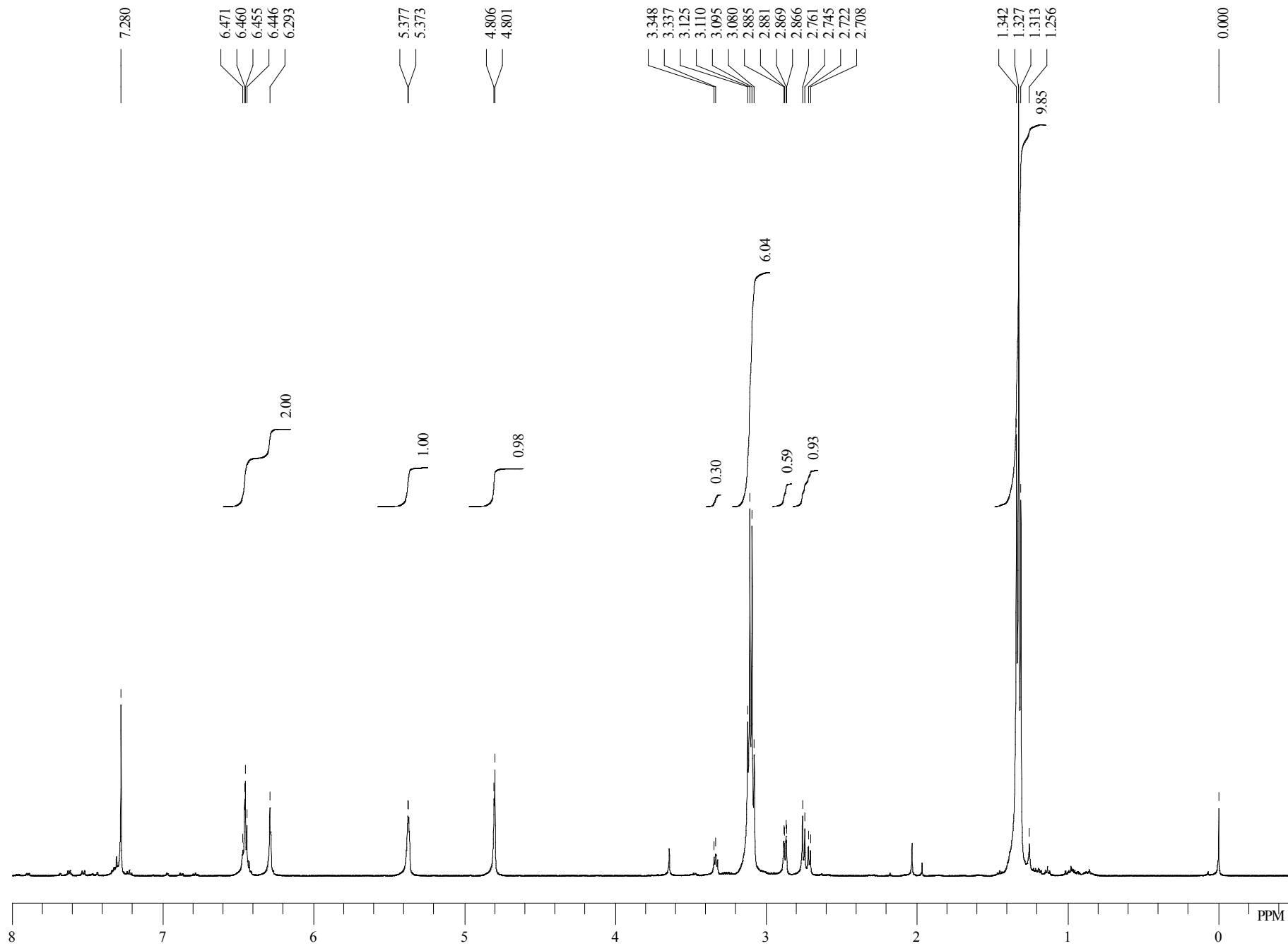
(-)-7



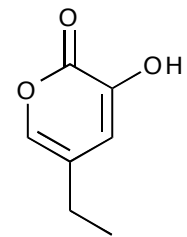
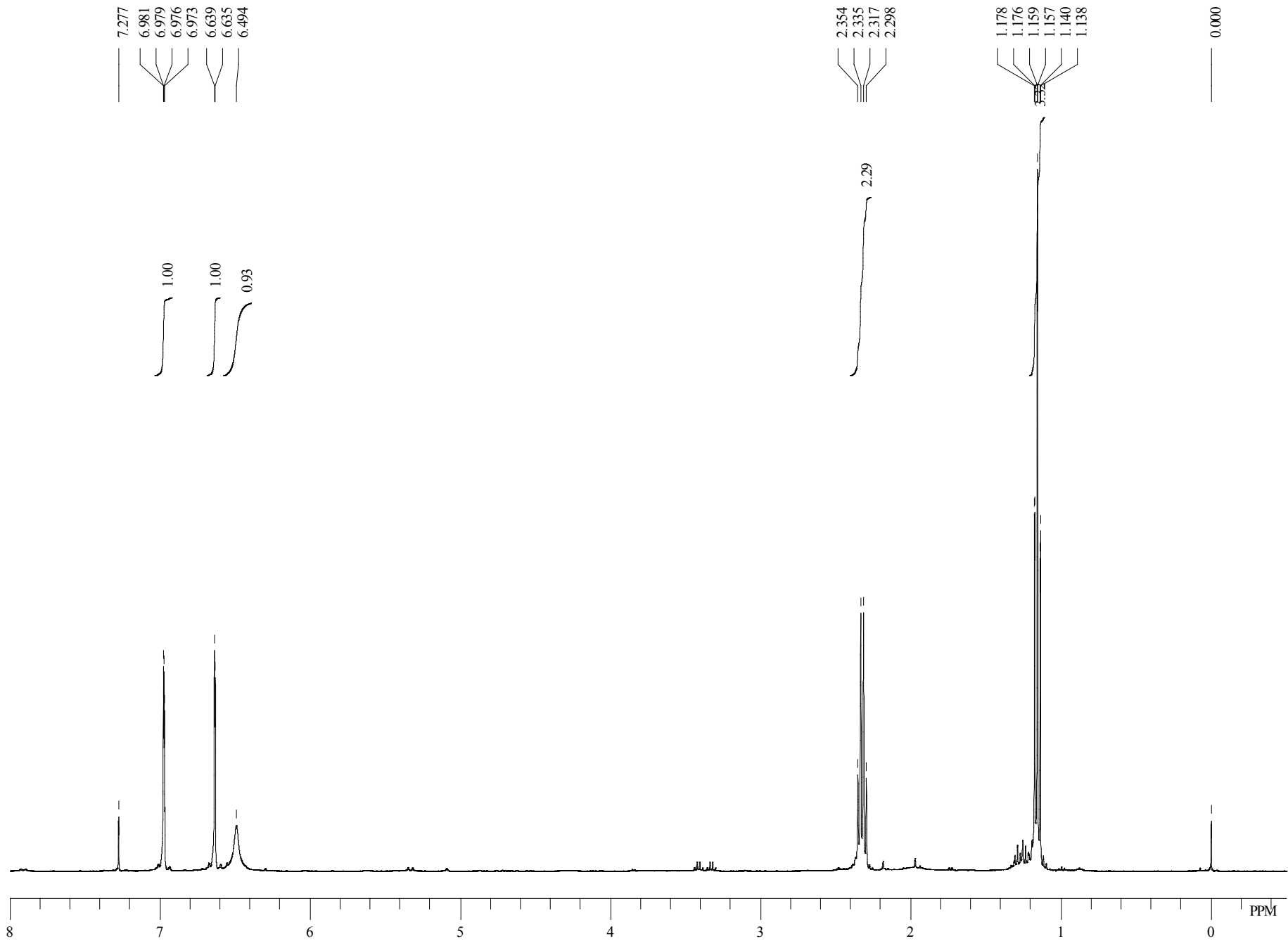
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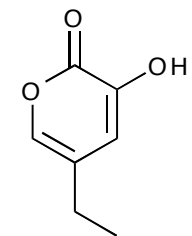
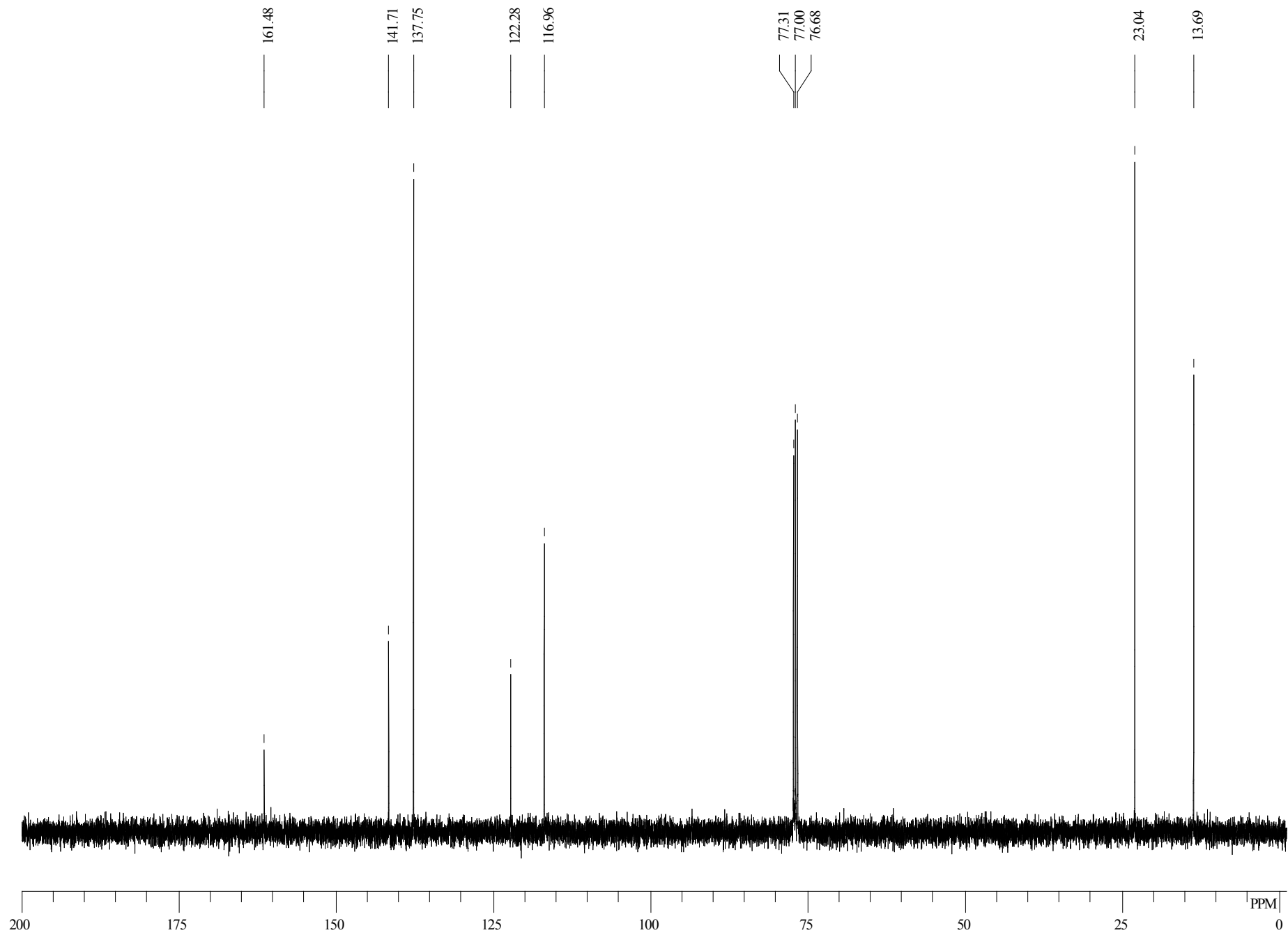
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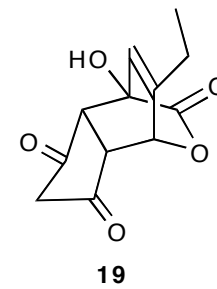
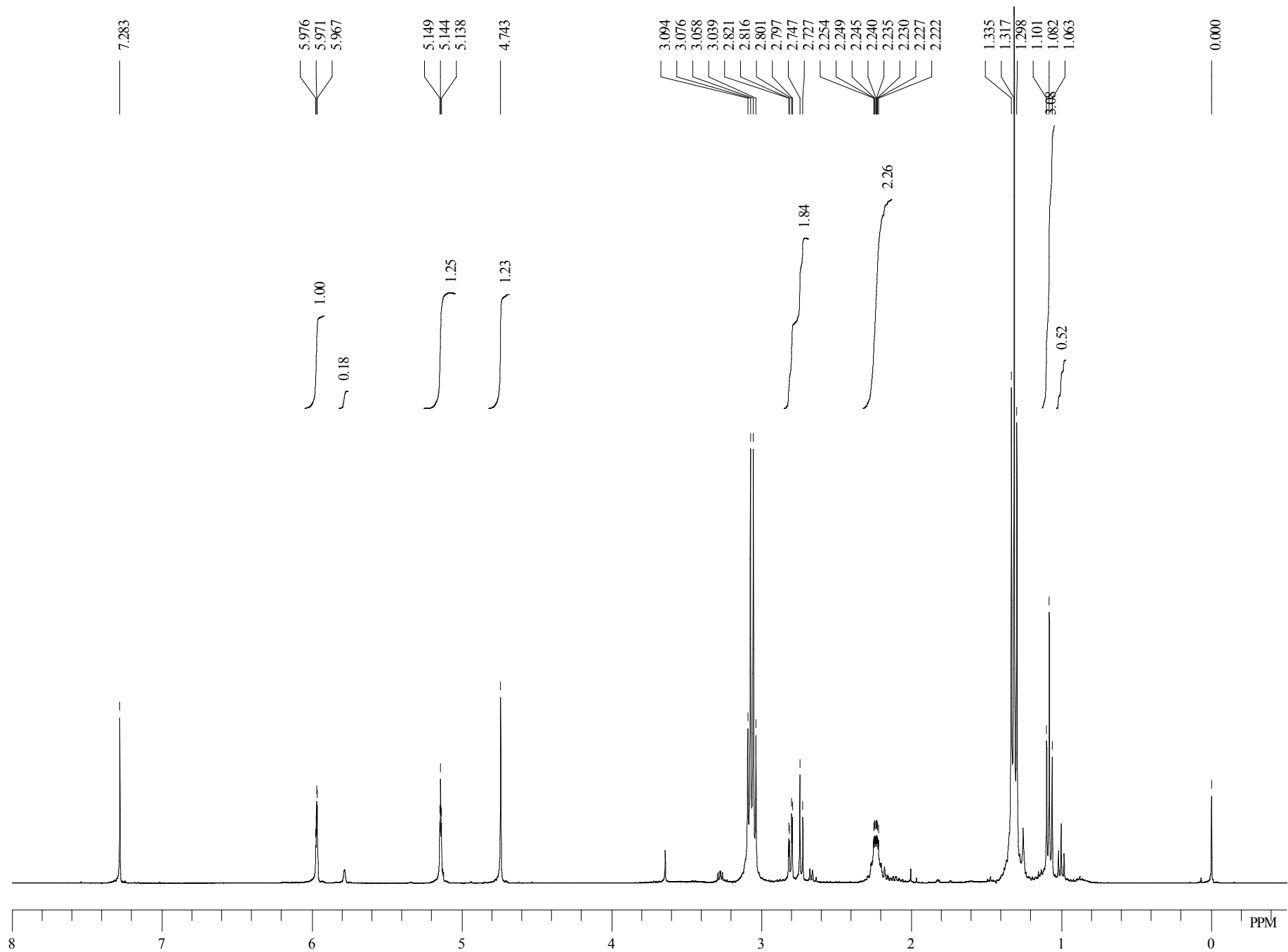
17



18



18



200.73
199.53

174.40

145.60

127.17

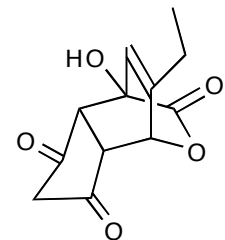
104.71

78.22
77.47
77.32
77.20
77.00
76.68

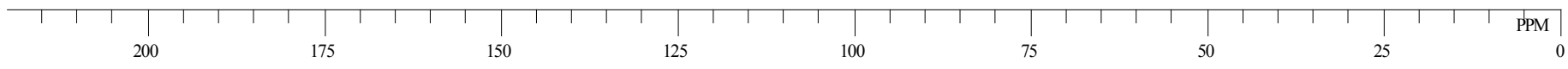
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49.73
45.86

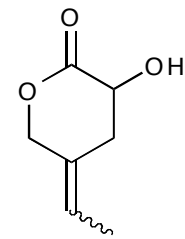
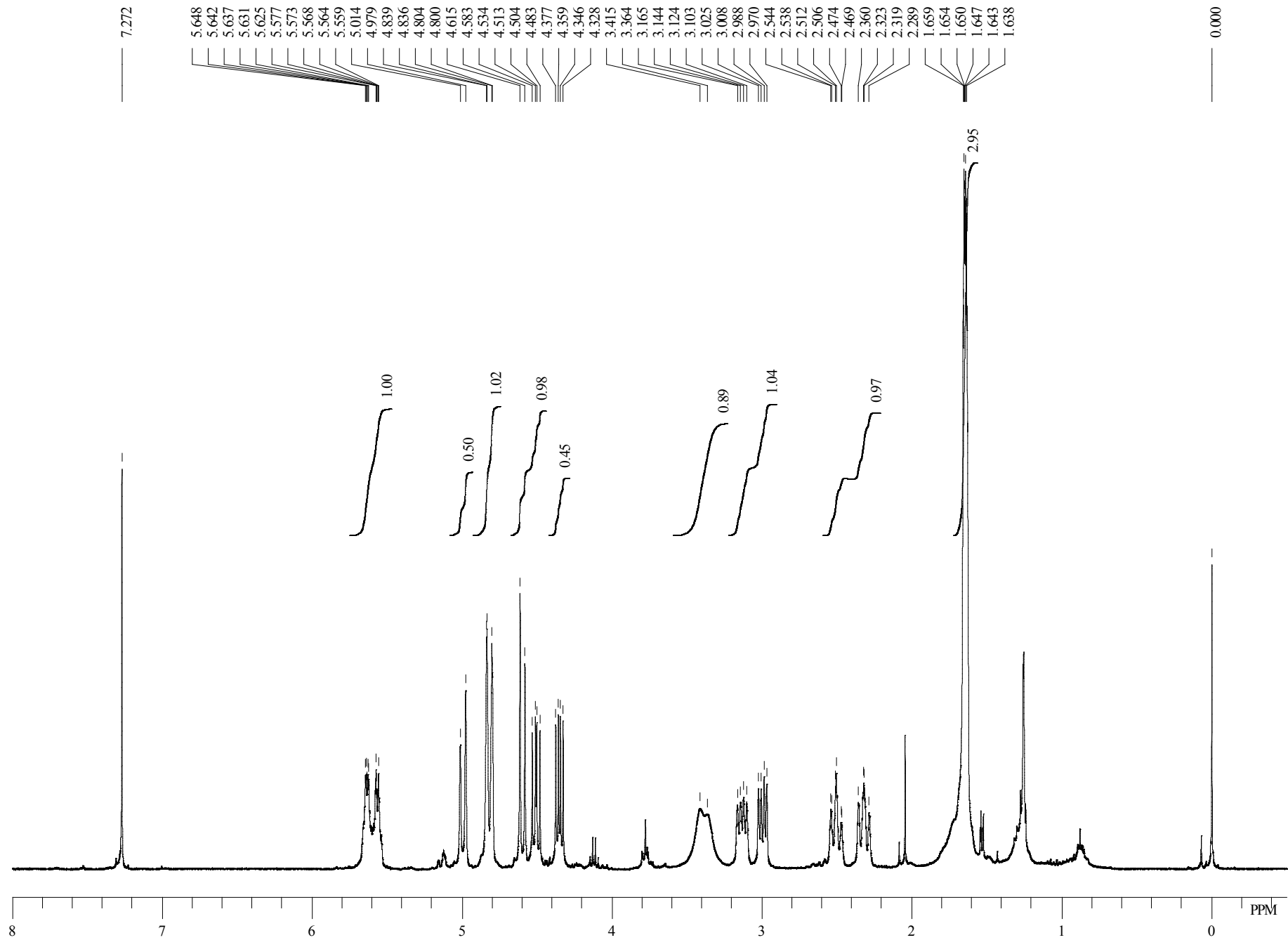
24.39

10.94
8.99



19





21

175.73
175.45

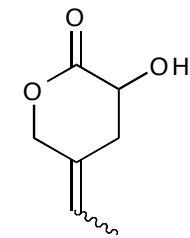
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126.51
124.35
123.40

92.12

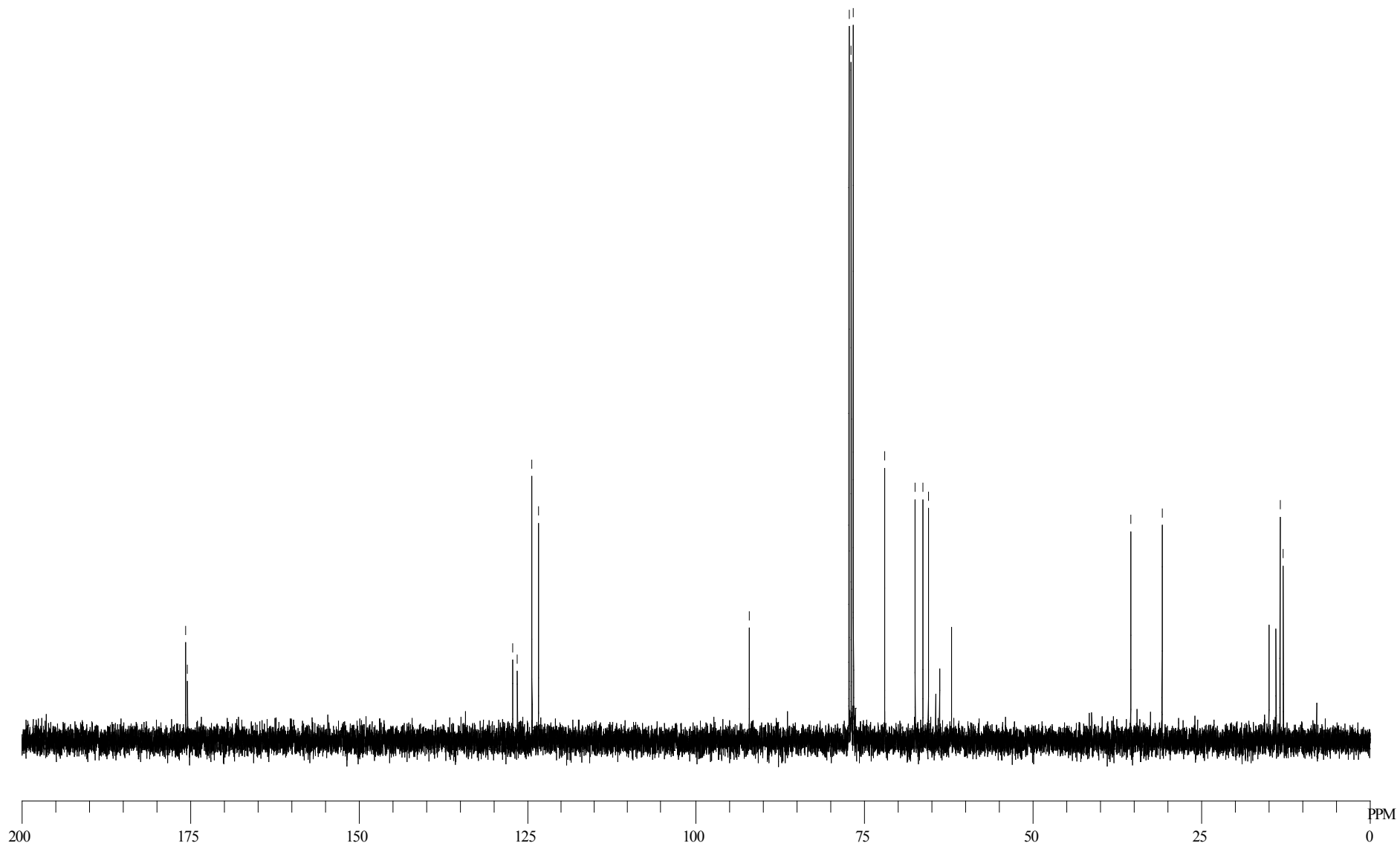
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77.00
76.68
72.01
67.50
66.38
65.54

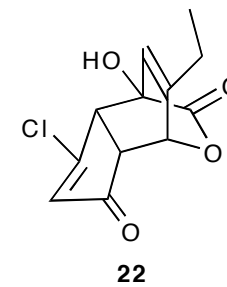
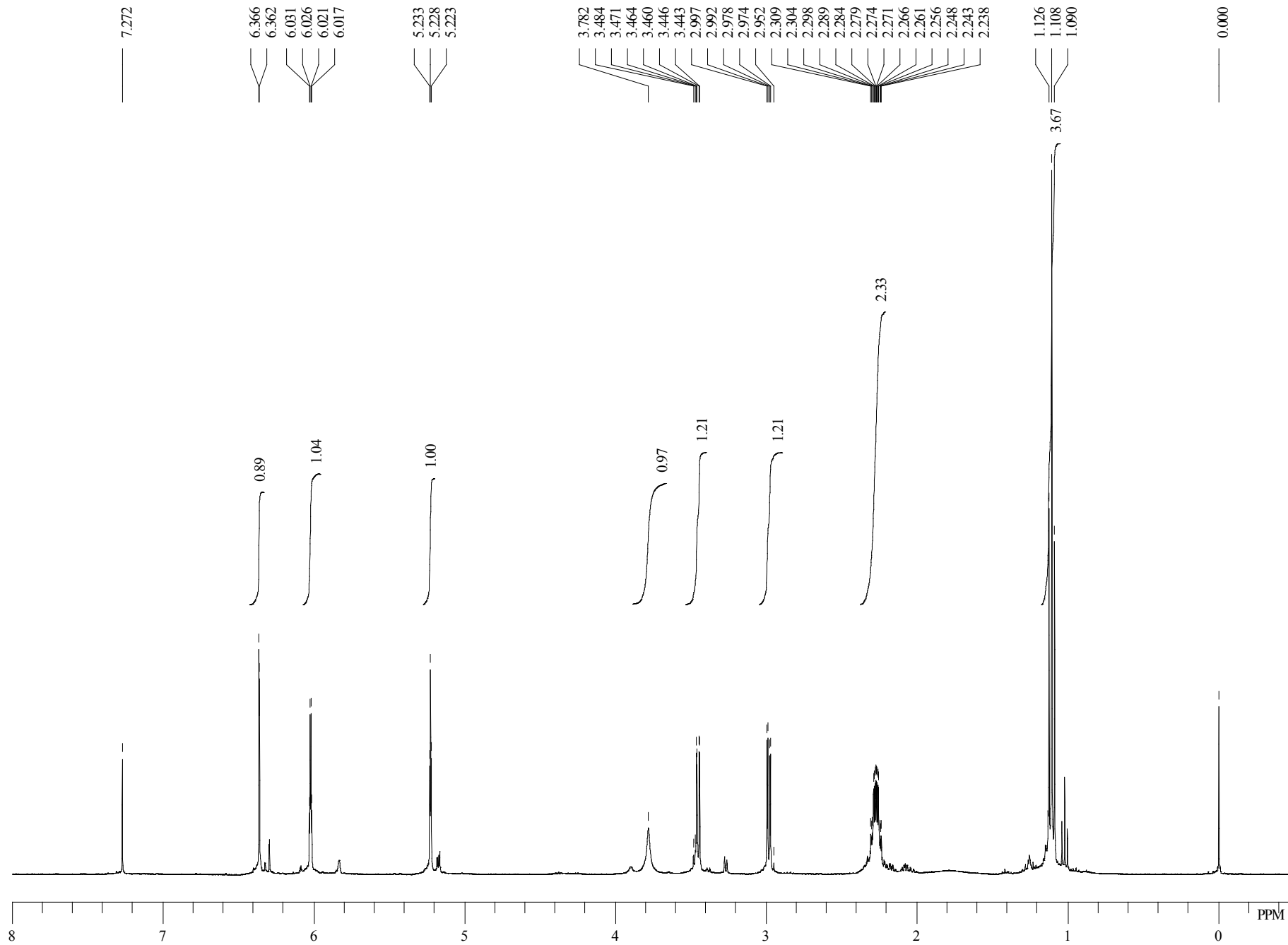
35.54
30.88

13.38
12.88

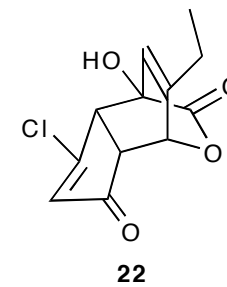
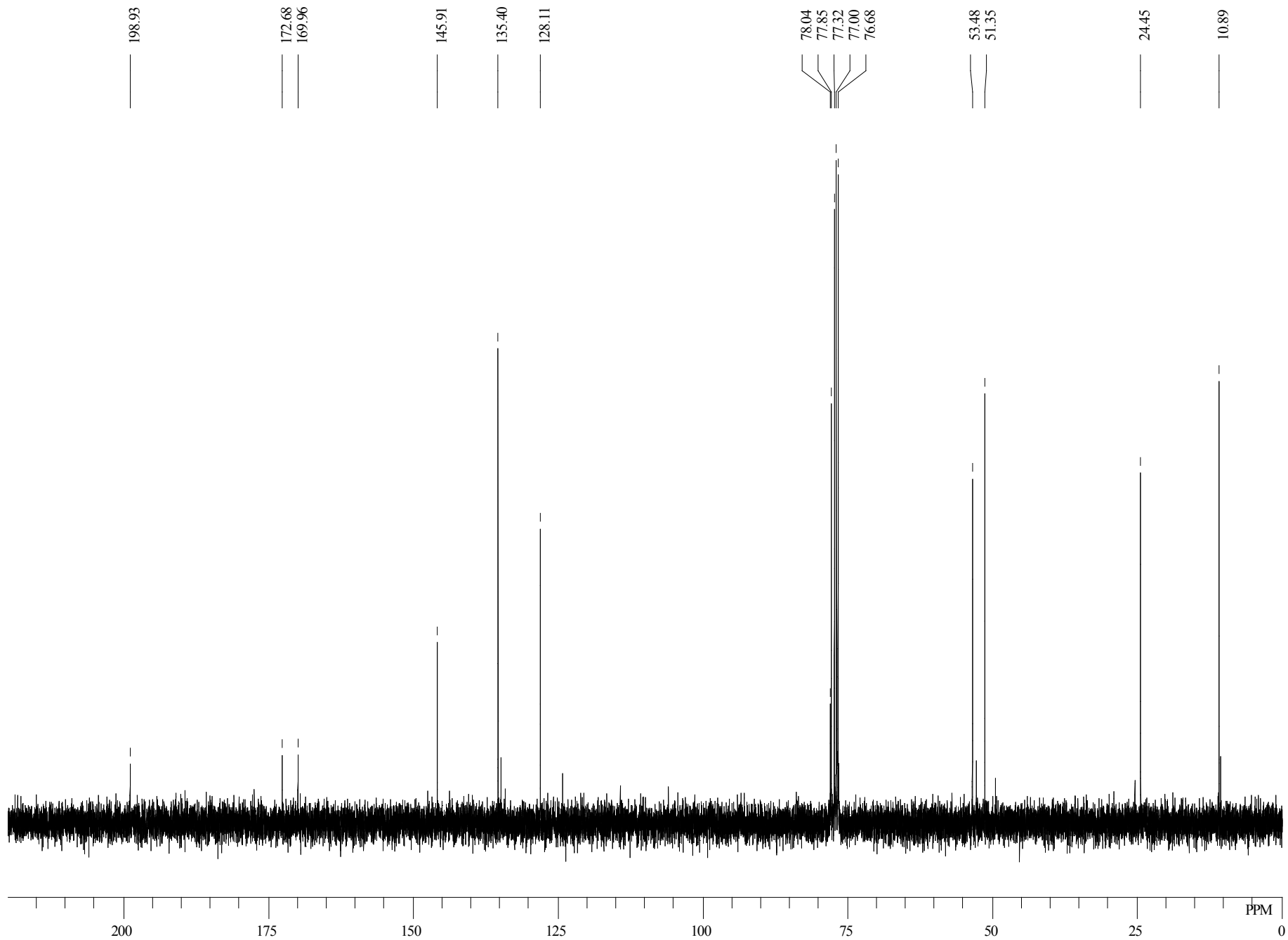


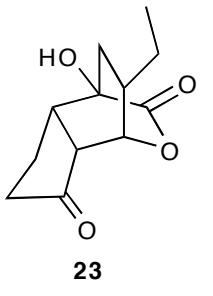
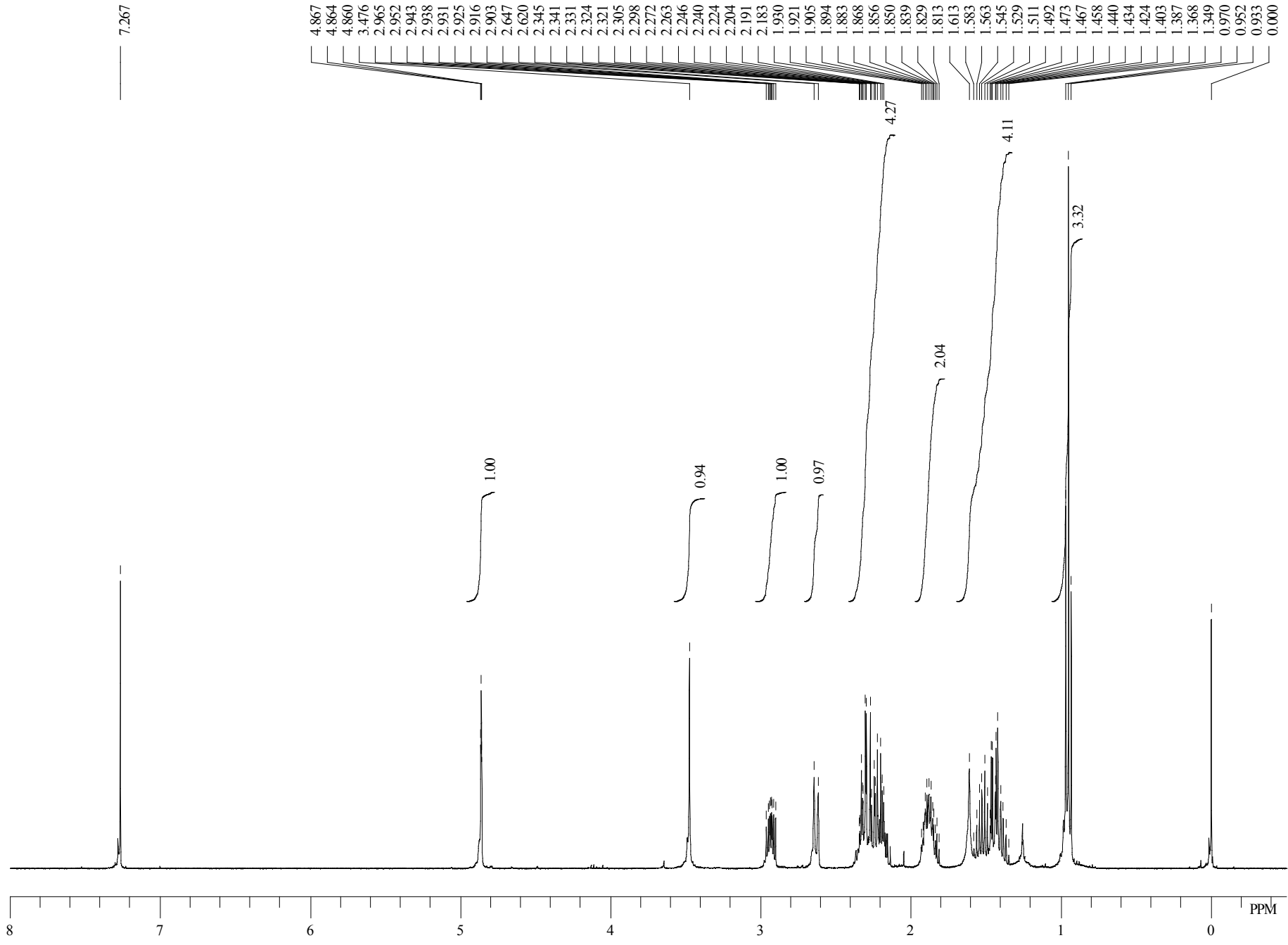
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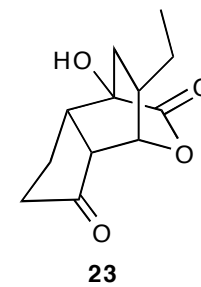
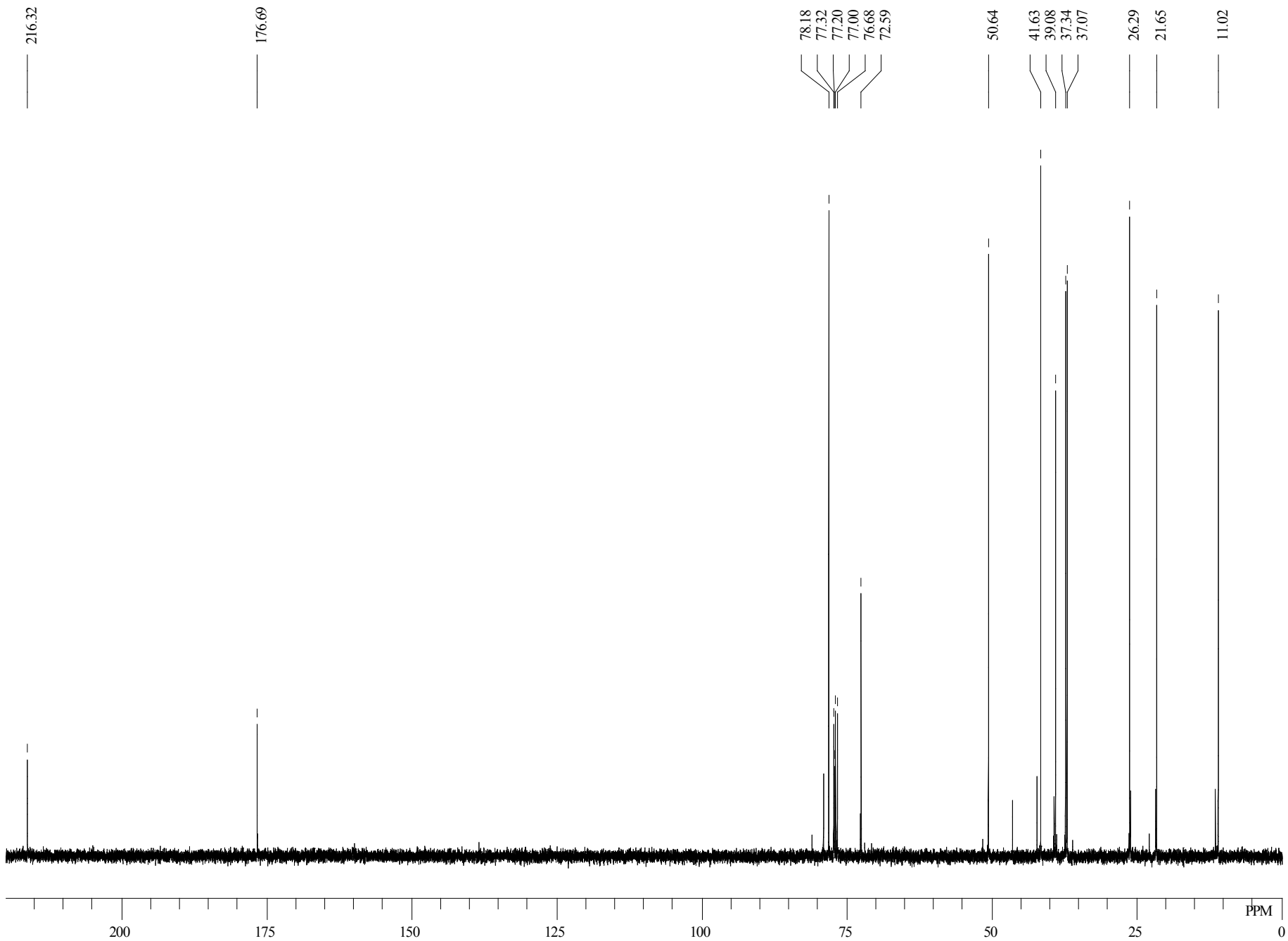


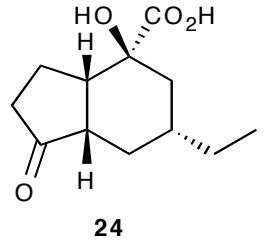
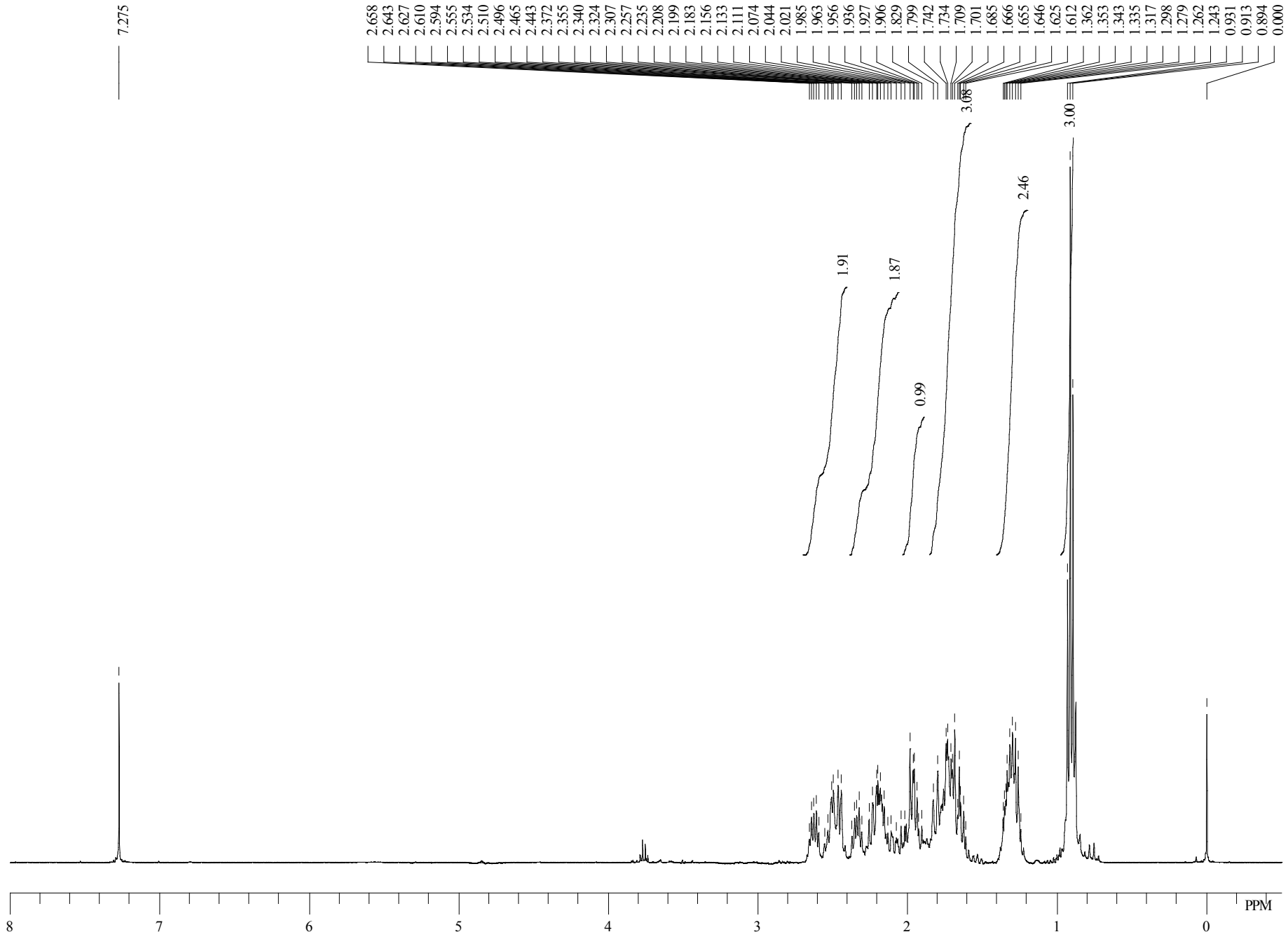


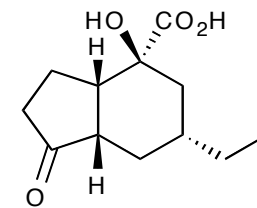
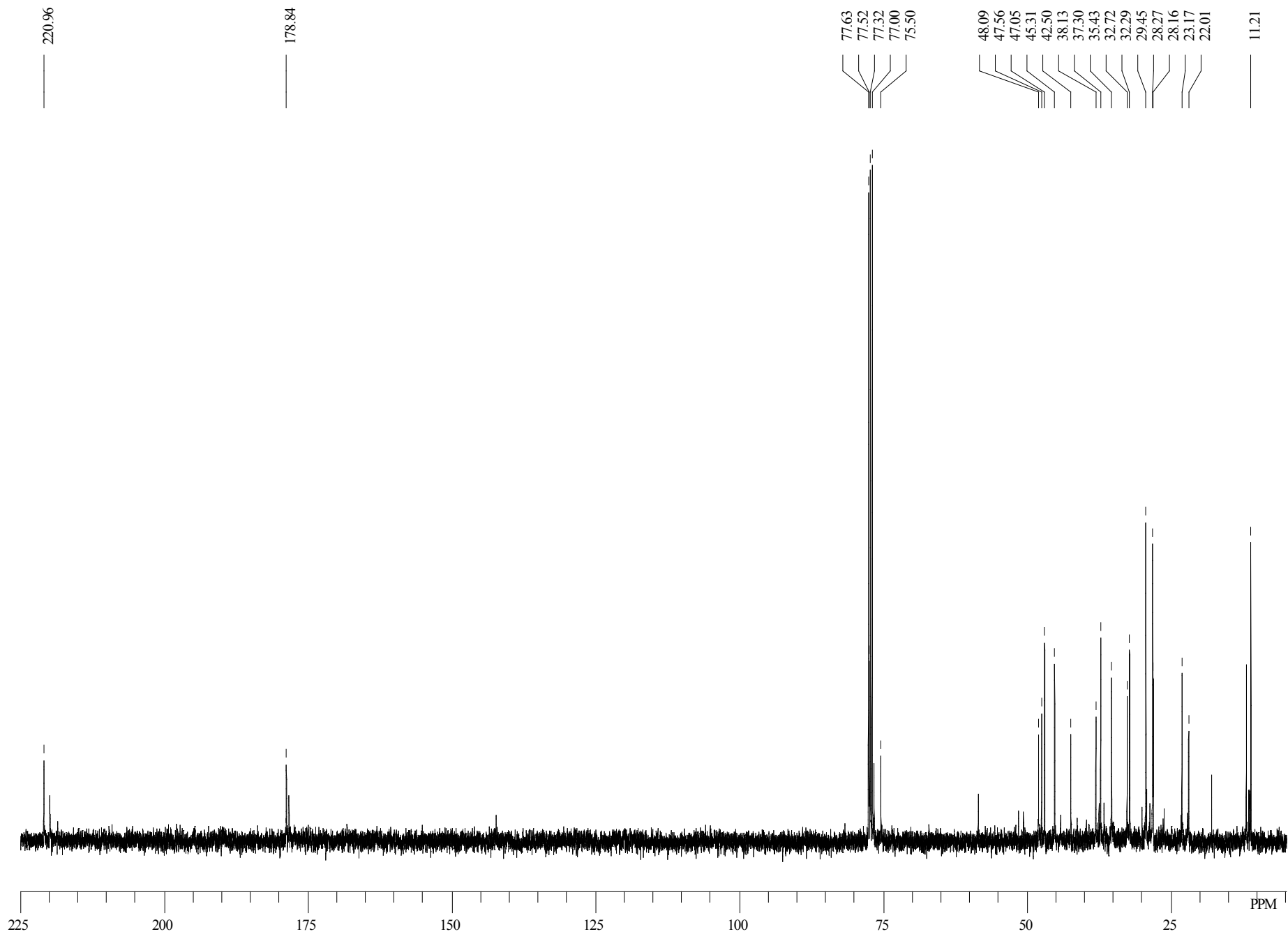
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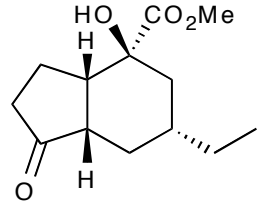
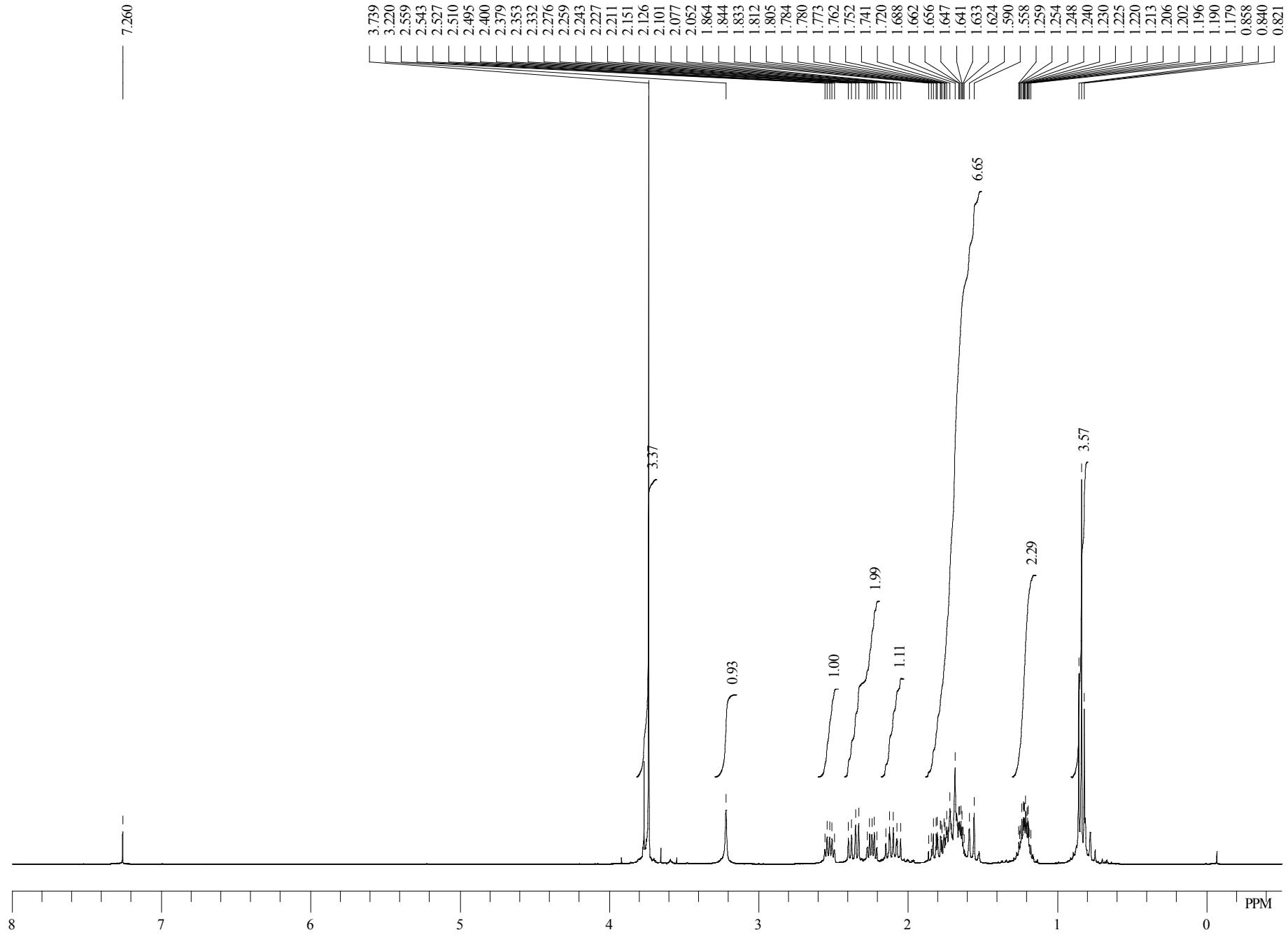


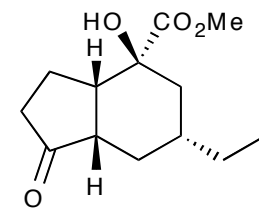
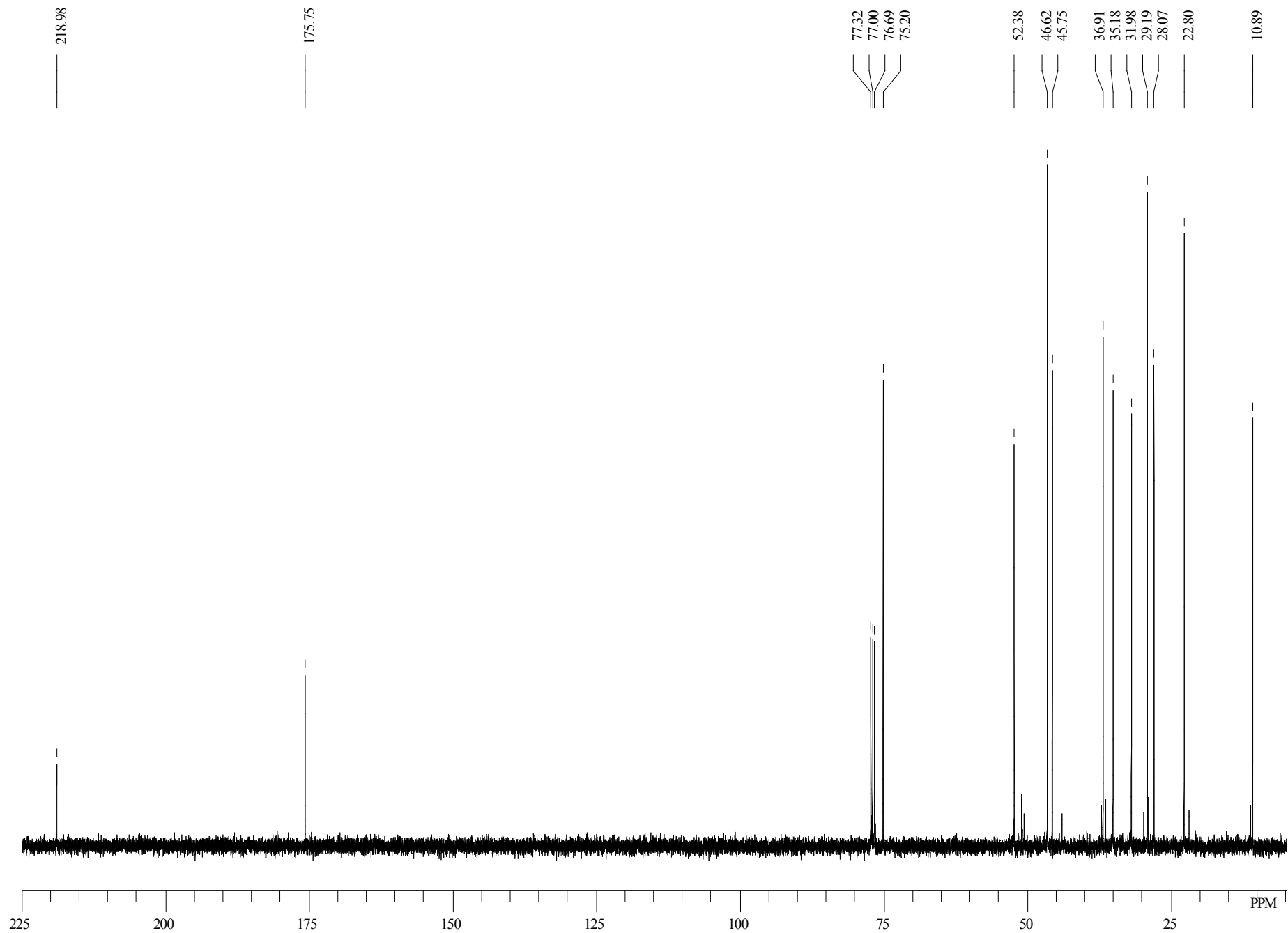




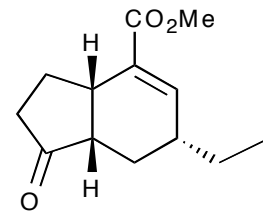
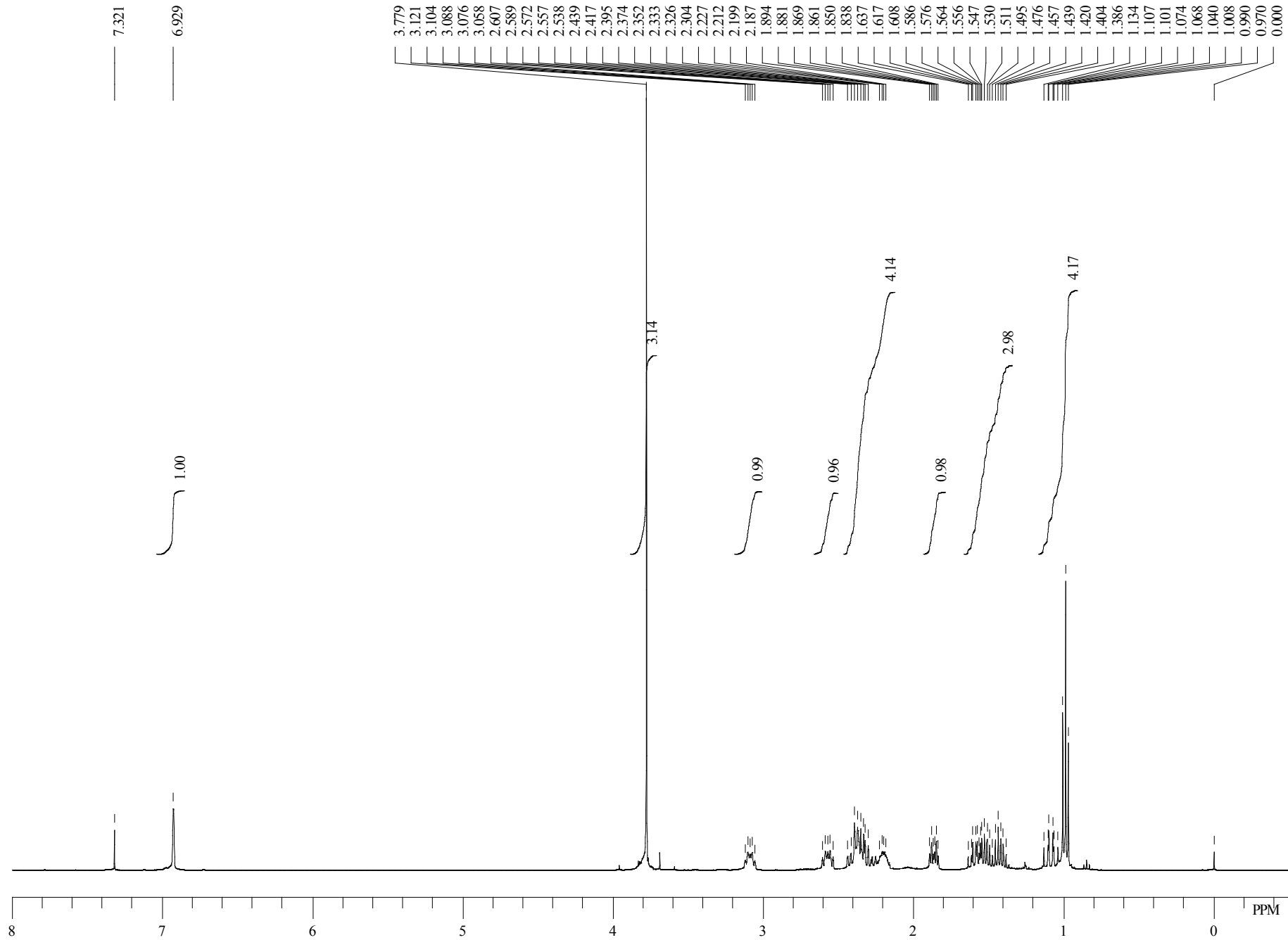


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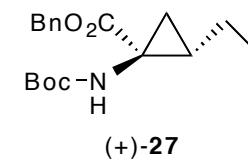
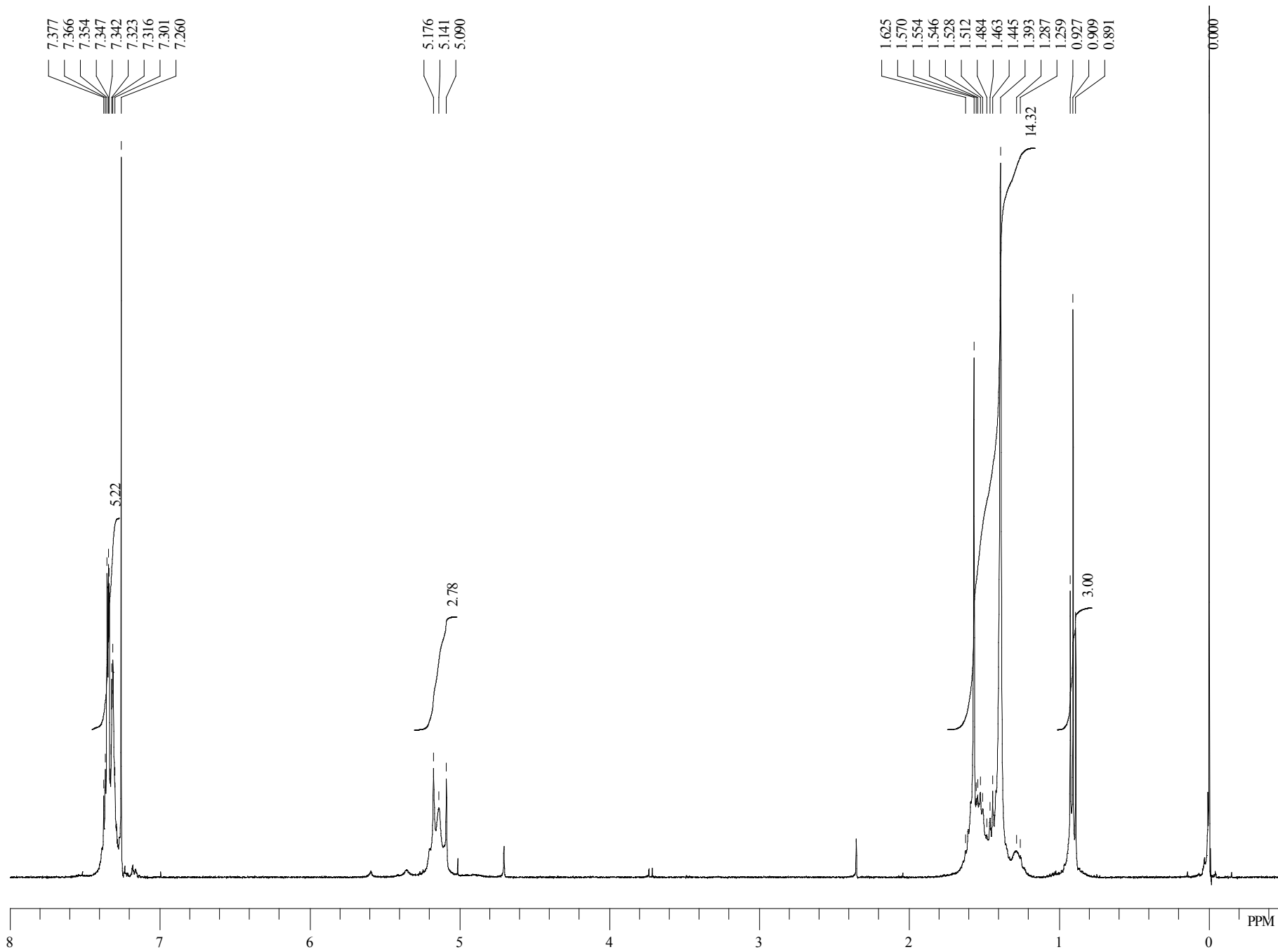


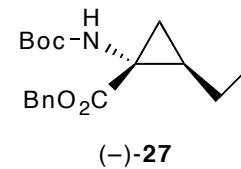
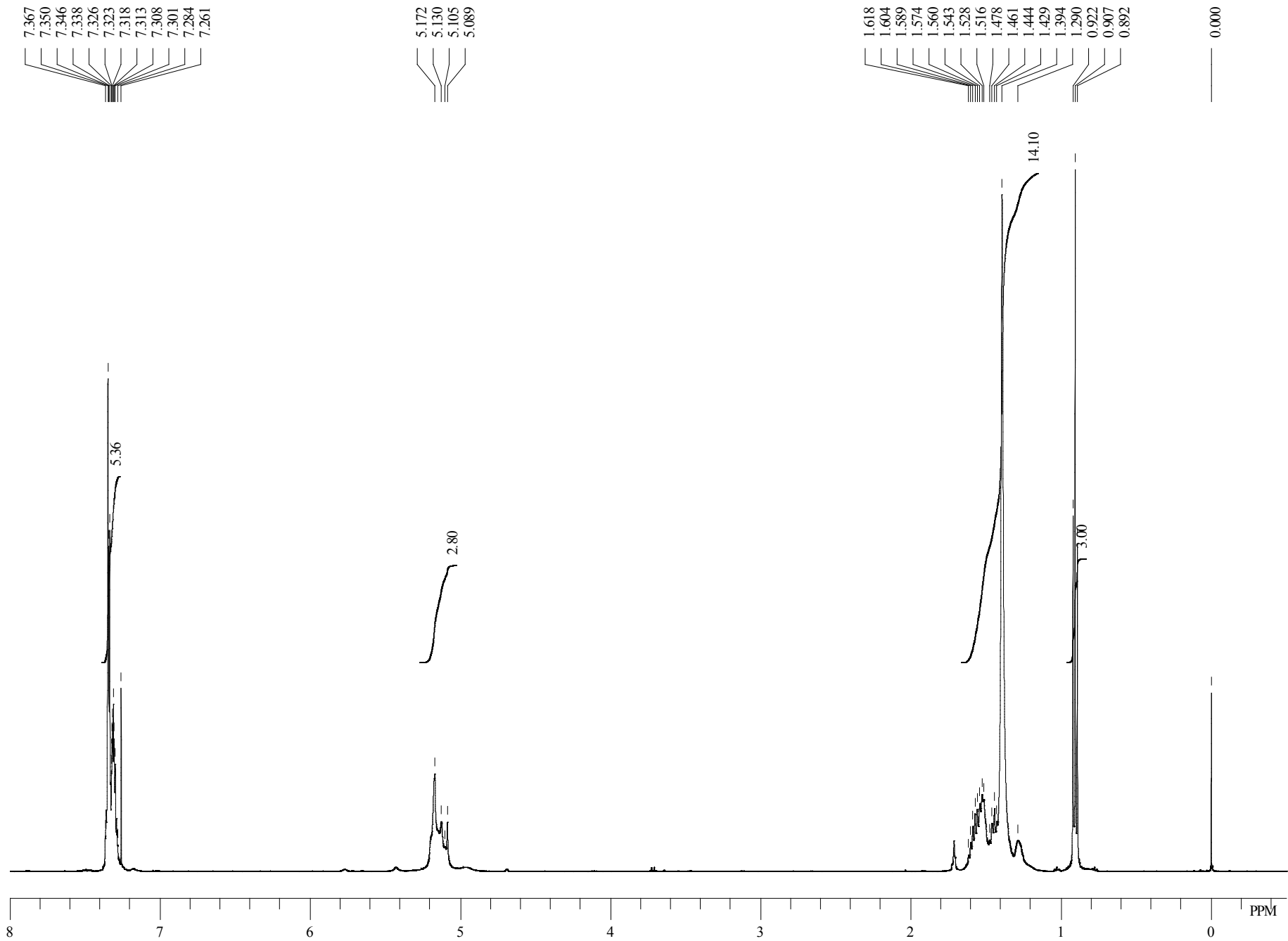


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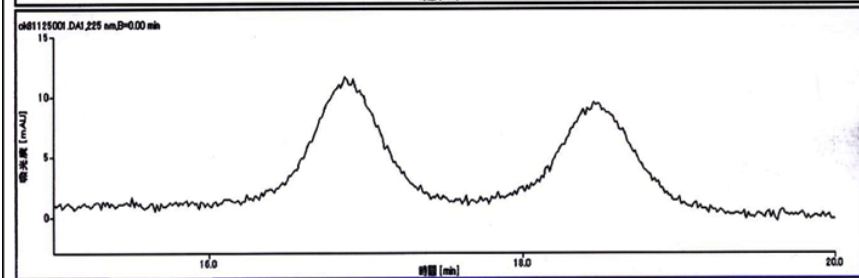
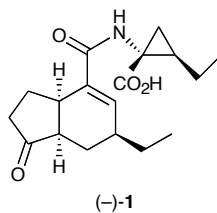
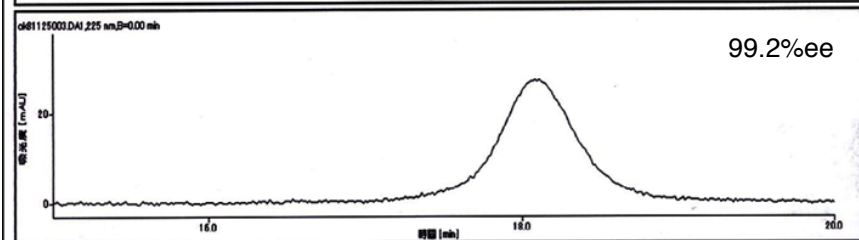
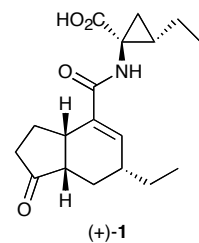
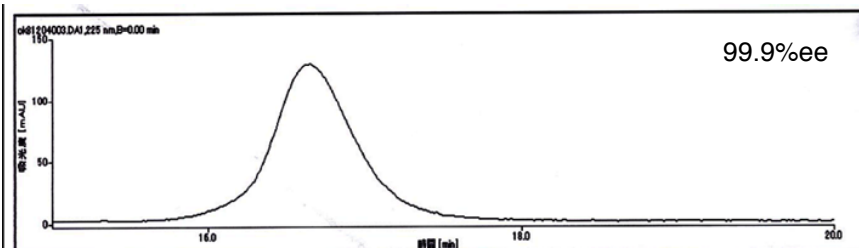


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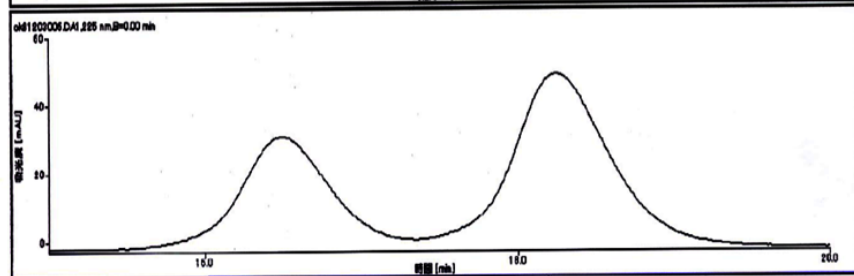
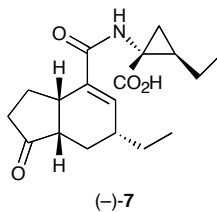
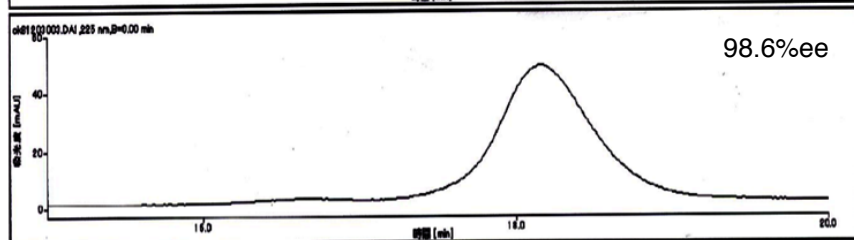
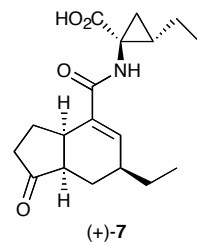
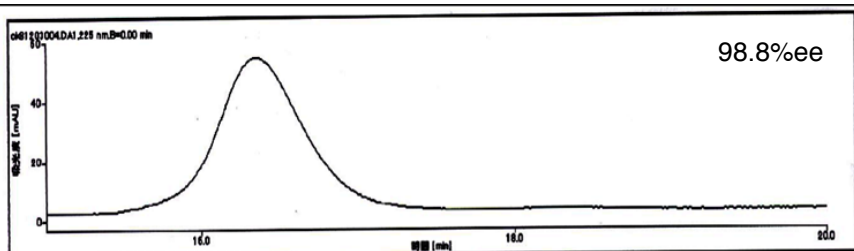


HPLC analysis of diastereomers of coronatine (+)-1 and (-)-1.
Sumichiral OA-3100 (4.6 × 250 mm, Sumitomo Chemical Co., Ltd., Japan),
90% *n*-hexane–9.6% EtOH containing 0.4% TFA, 1.0 mL/min, UV 230 nm.
Coronatine (+)-1 at Rt = 16.6 min and (-)-1 at Rt = 17.8 min.



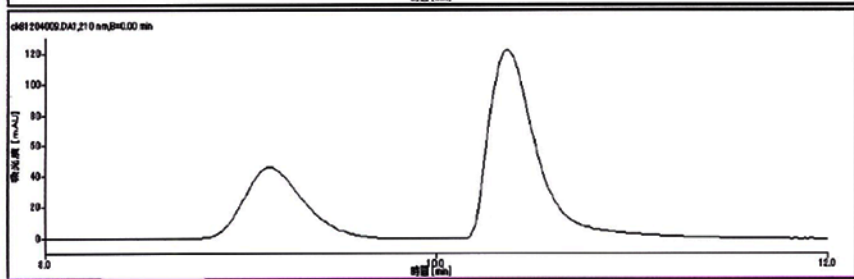
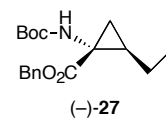
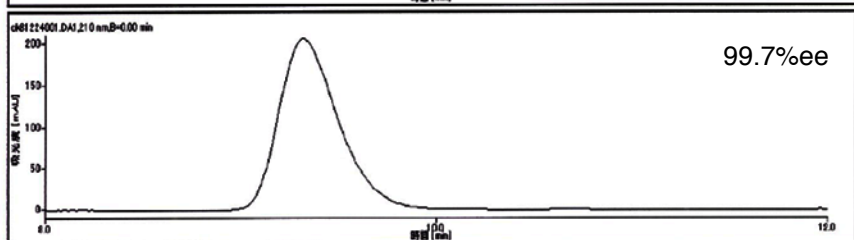
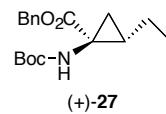
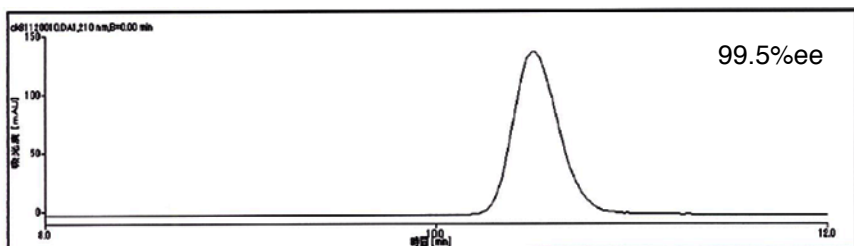
Co-injection
(+)-1 : (-)-1
2 : 1

HPLC analysis of diastereomers of coronatine (+)-7 and (-)-7.
Sumichiral OA-3100 (4.6 × 250 mm, Sumitomo Chemical Co., Ltd., Japan),
0.03 M NH₄OAc in MeOH, 1.0 mL/min, UV 220 nm.
(+)-7 at Rt = 16.2 min and (-)-7 at Rt = 17.7 min.



Co-injection
(+)-7 : (-)-7
1 : 2

HPLC analysis of diastereomers of coronatine (+)-**27** and (-)-**27**.
DAICEL Chiralcel OD (4.6 × 250 mm, DAICEL Co., Ltd., Japan),
98% *n*-hexane–2% *i*-PrOH, 1.0 mL/min, UV 220 nm.
(-)-**27** at Rt = 9.1 min and (+)-**27** at Rt = 10.5 min.



Co-injection
(-)-**27** : (+)-**27**
1 : 2