

Supporting information

Synthesis and antibacterial activity of ricinoleic acid glycosides

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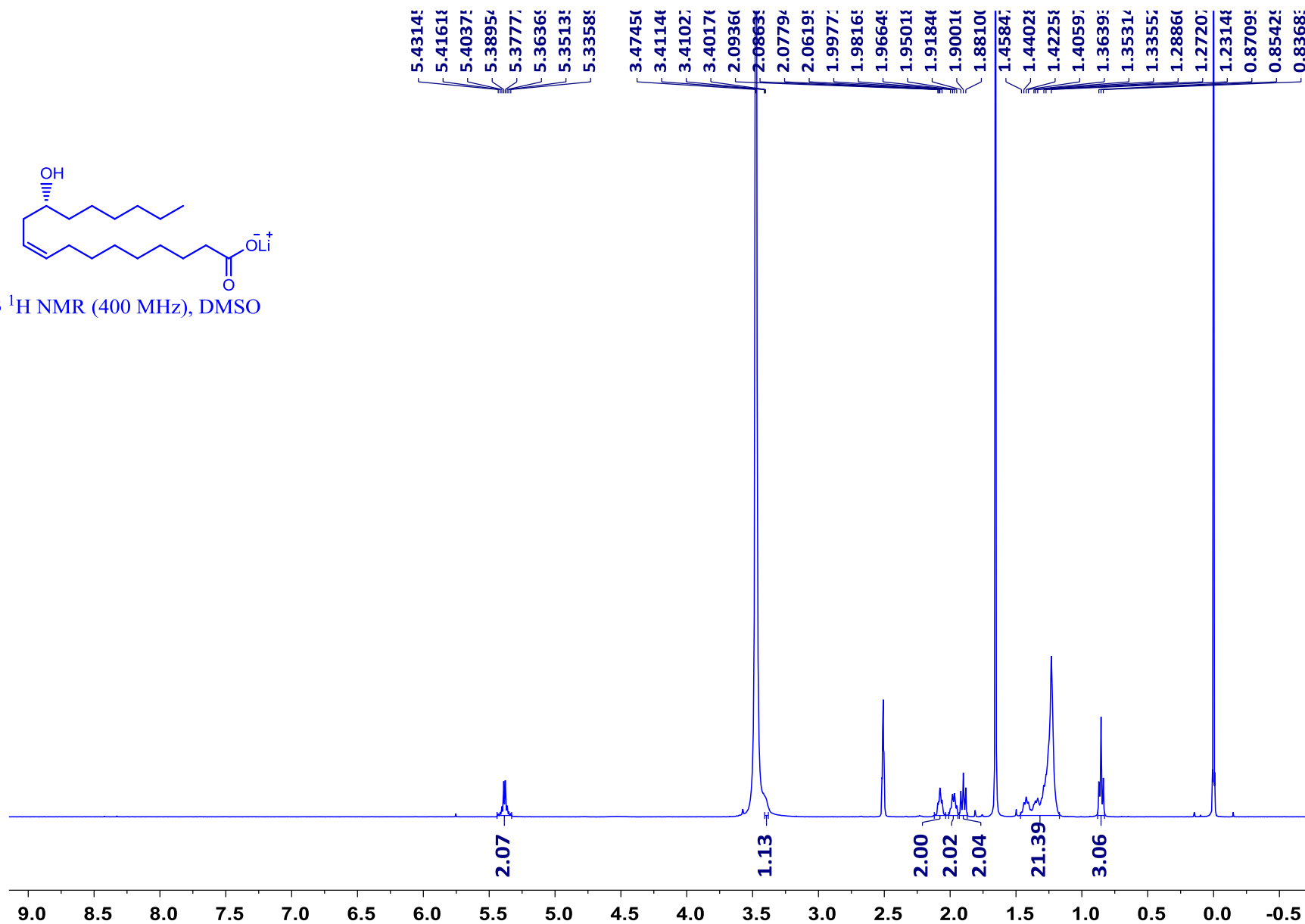
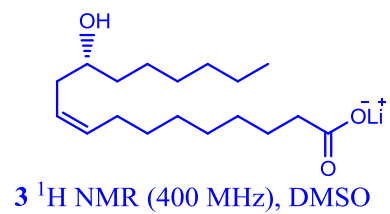
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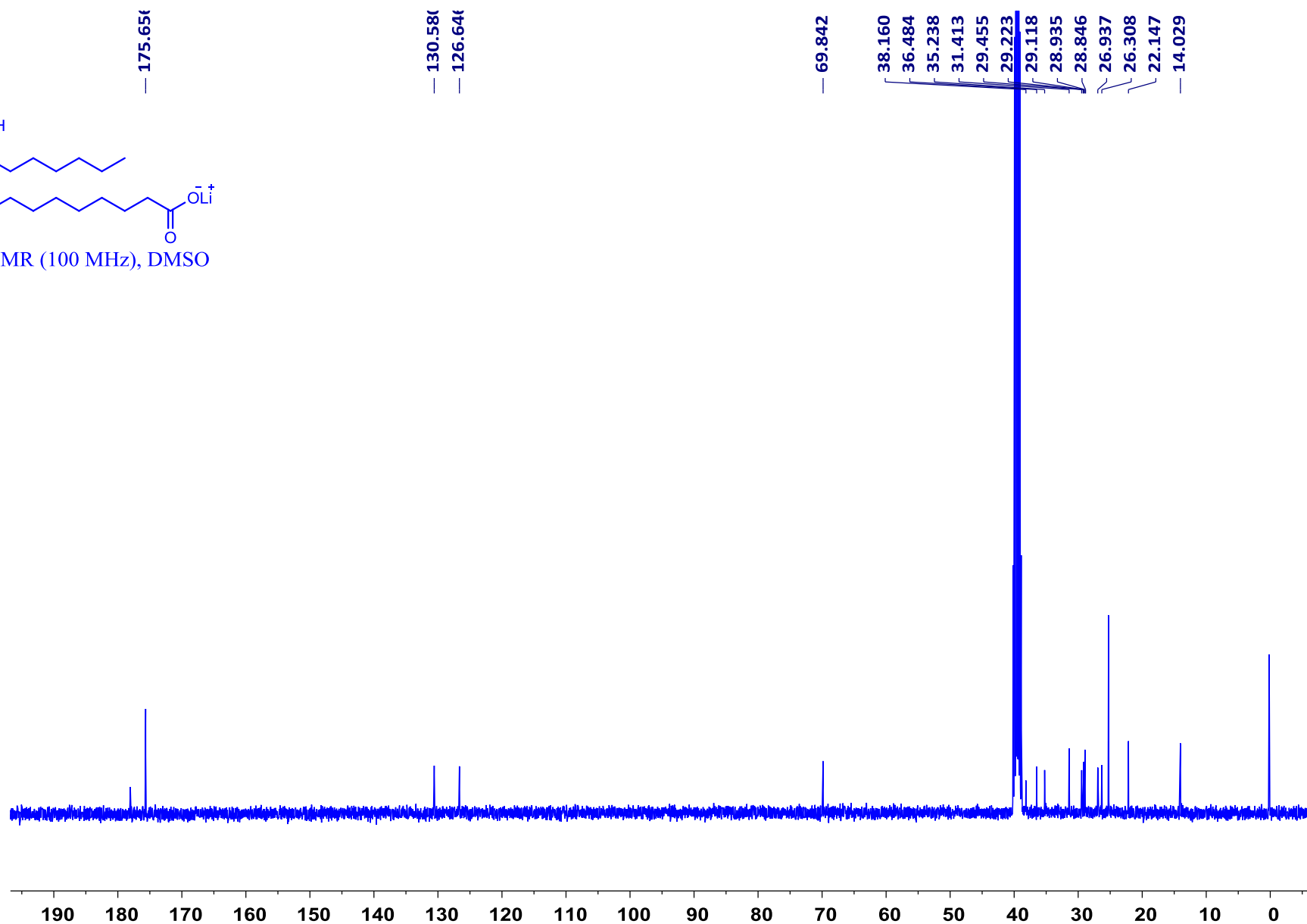
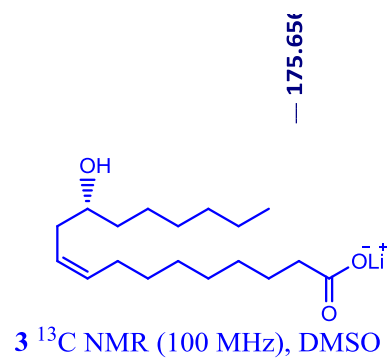
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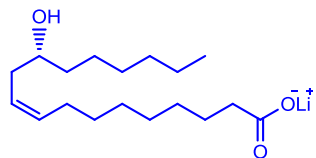
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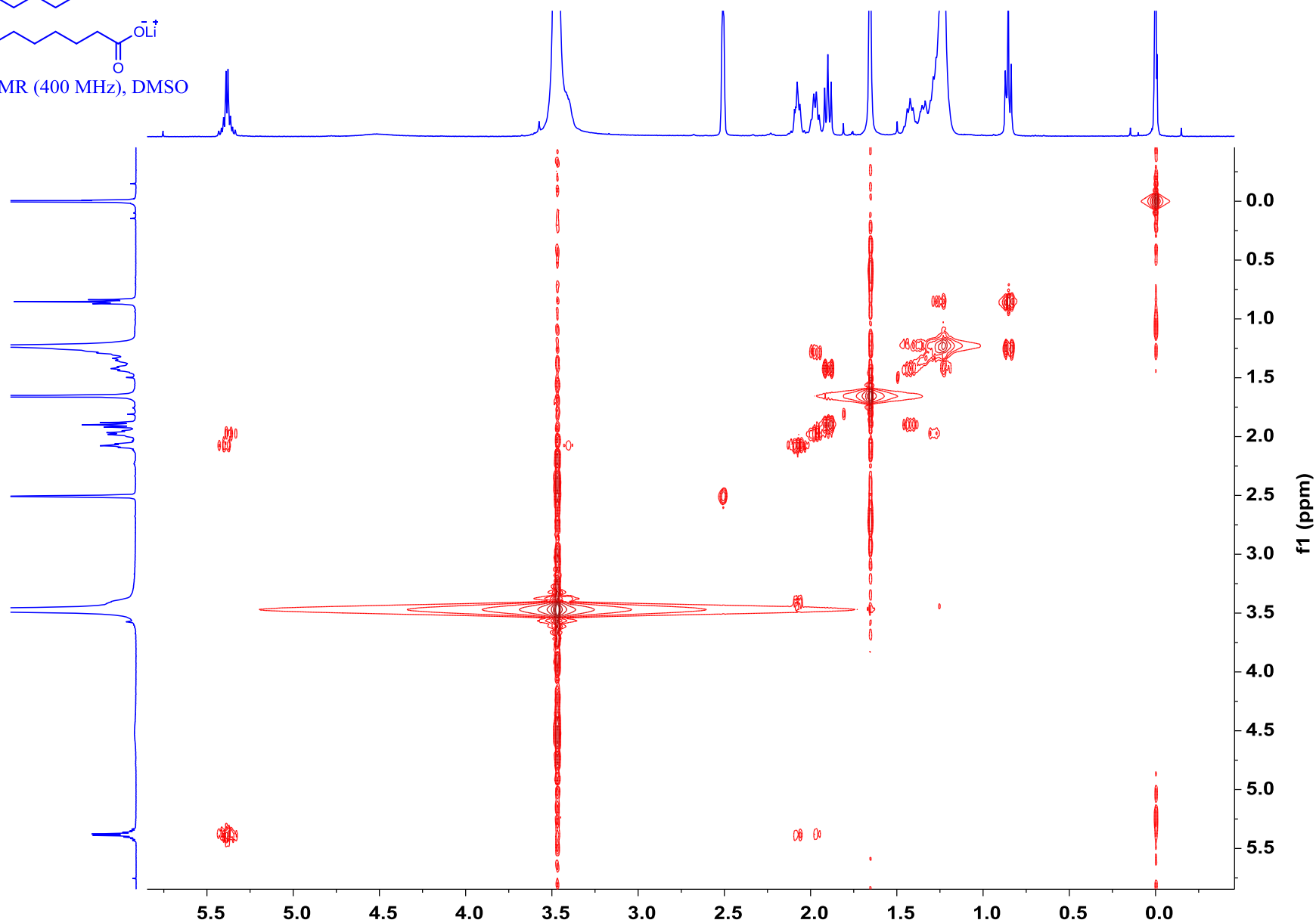
129	¹ H NMR spectrum of compound 49 + 49a (400 MHz, CDCl ₃)	S135
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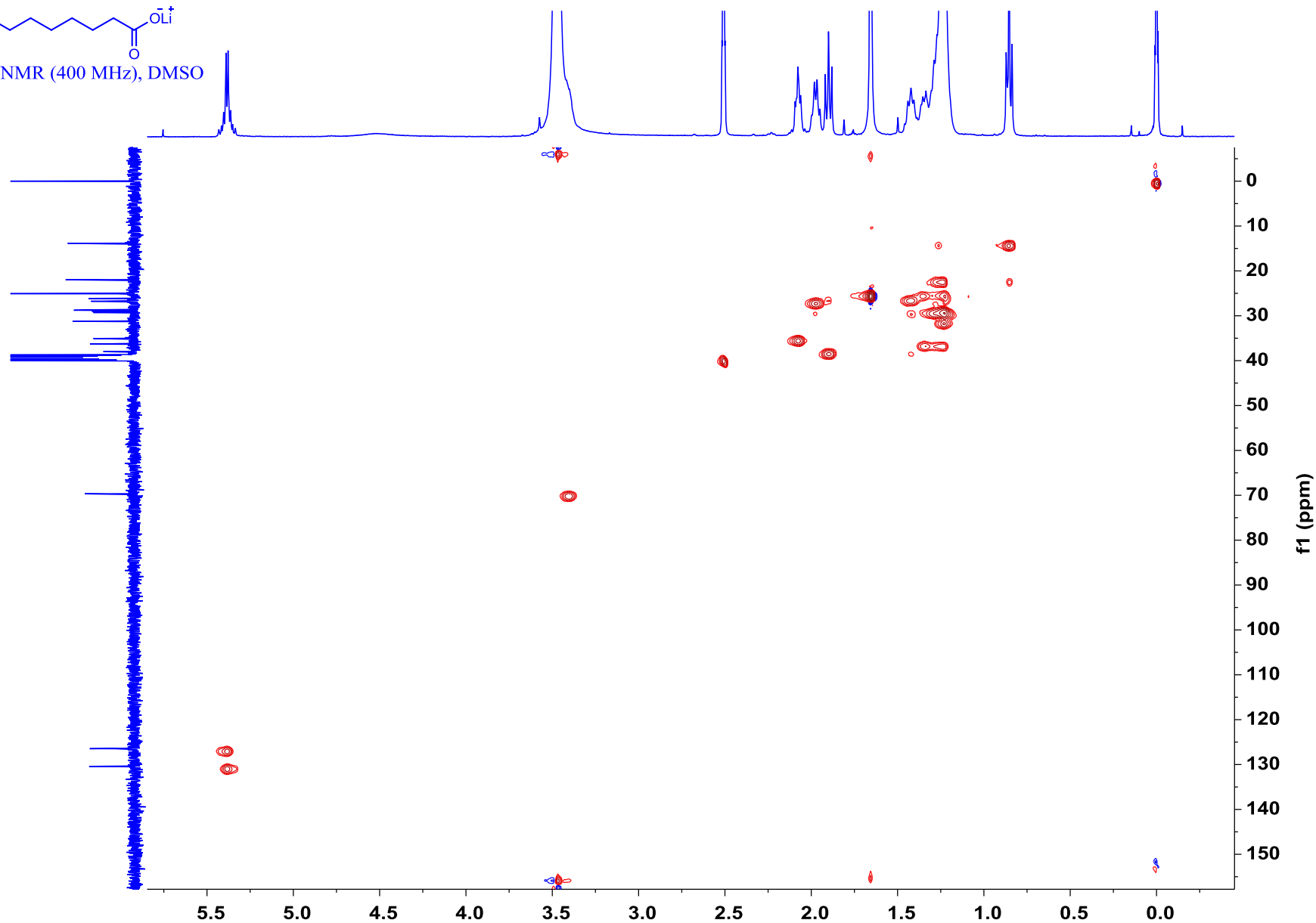


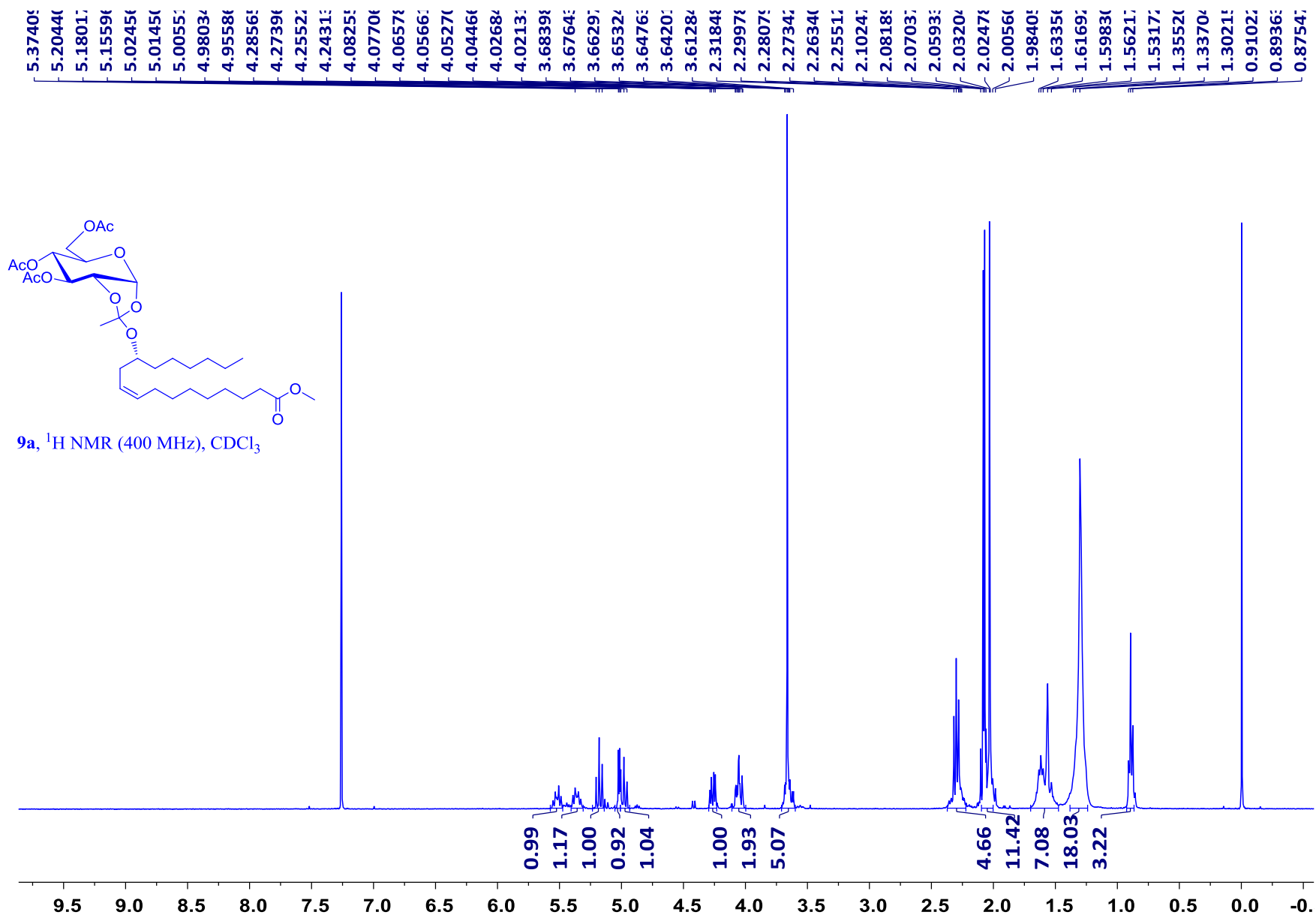


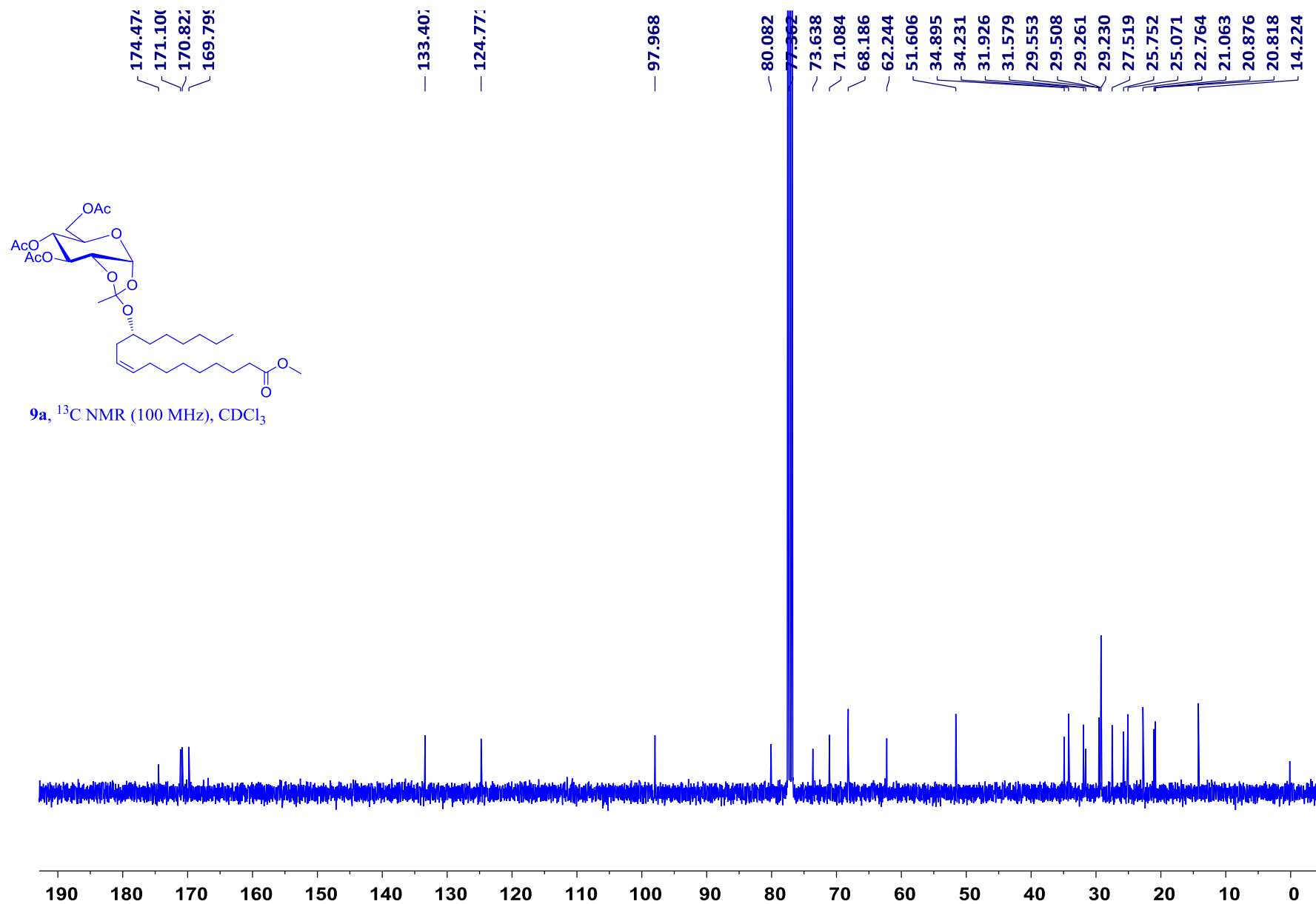


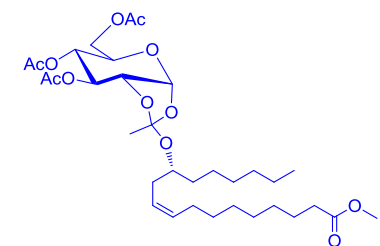
3 gCOSY NMR (400 MHz), DMSO



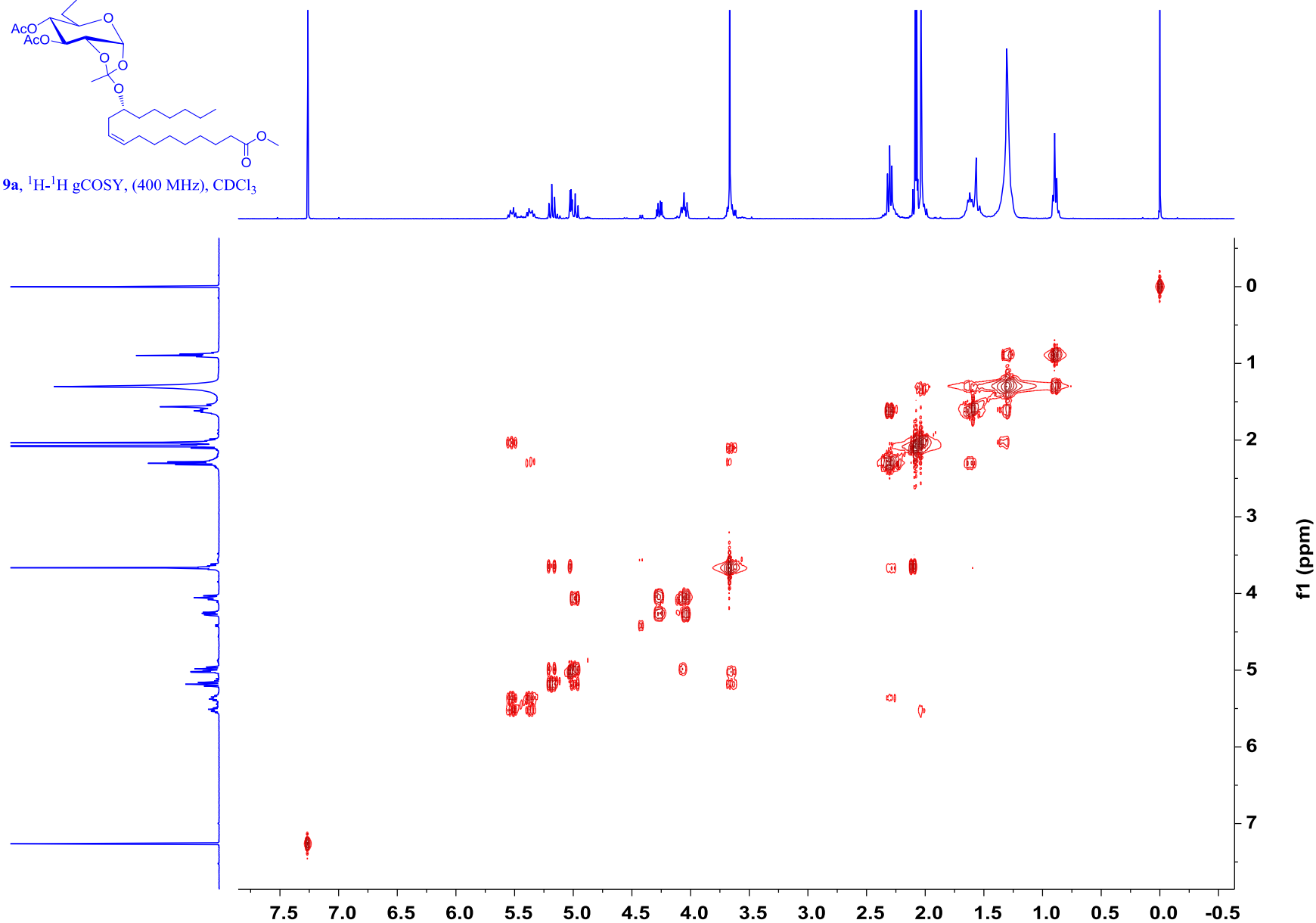


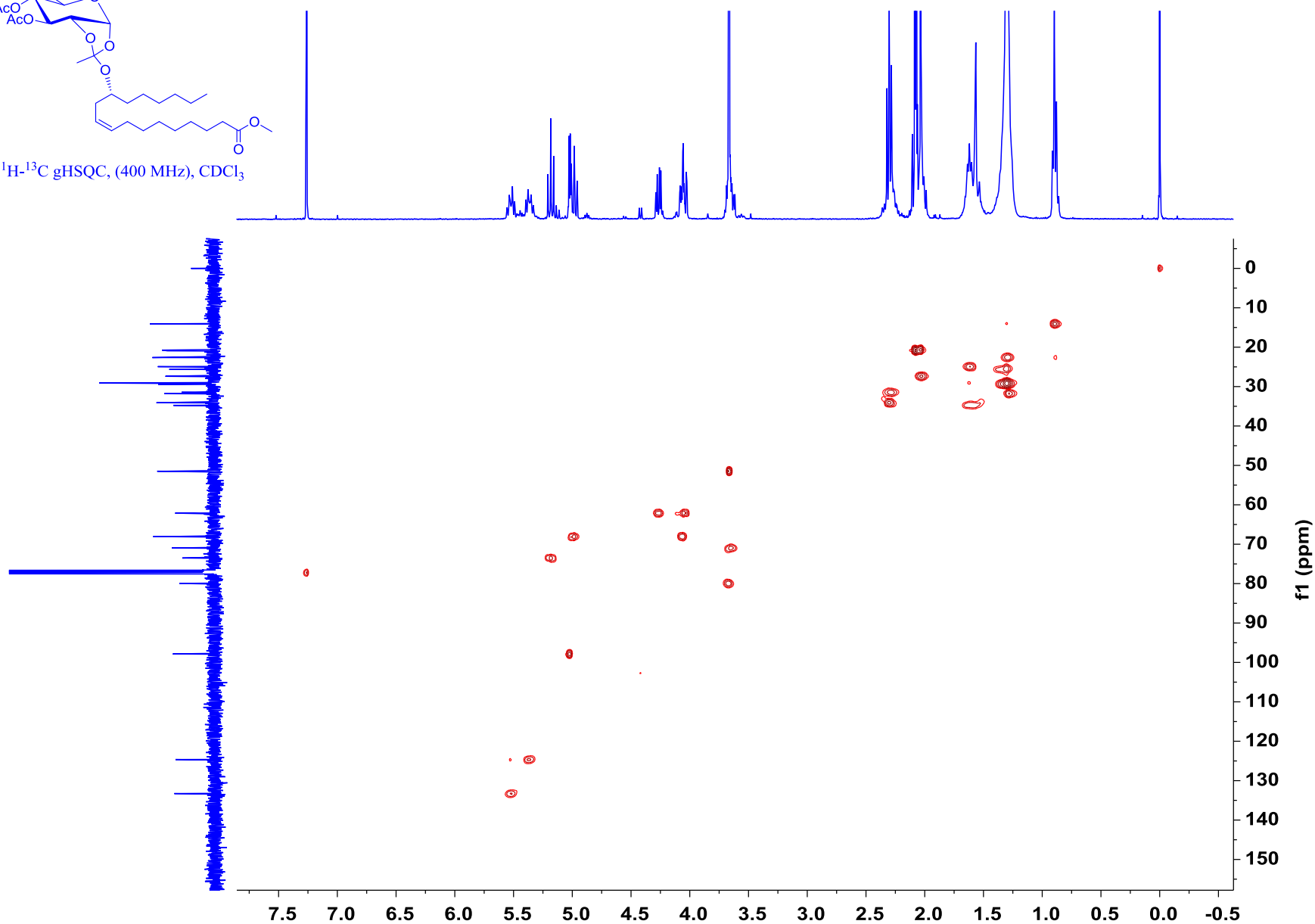
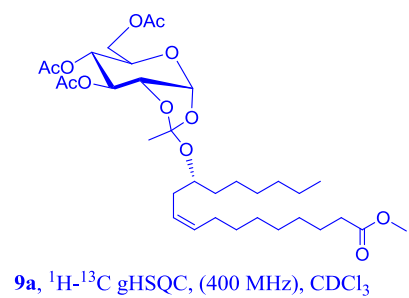


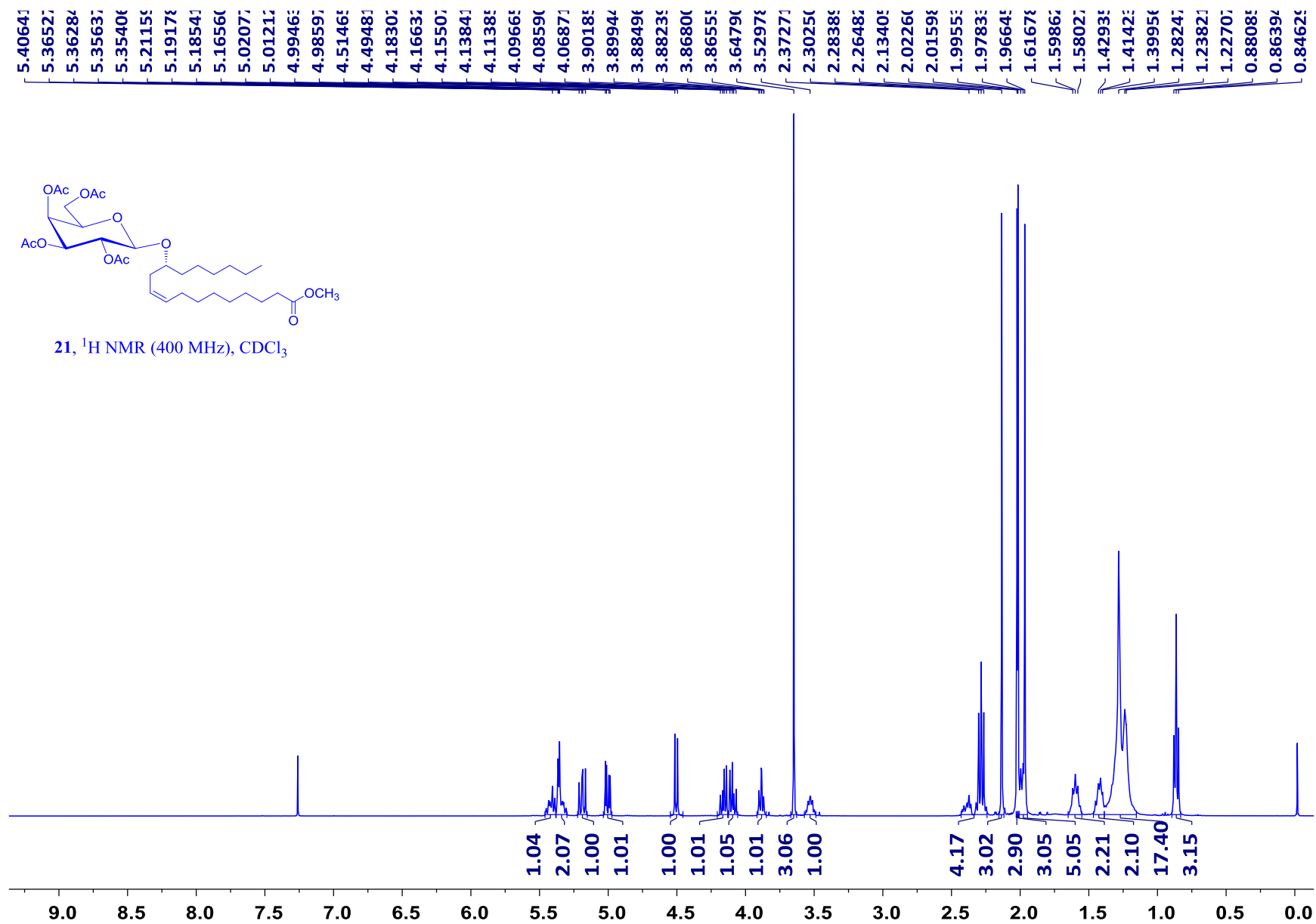


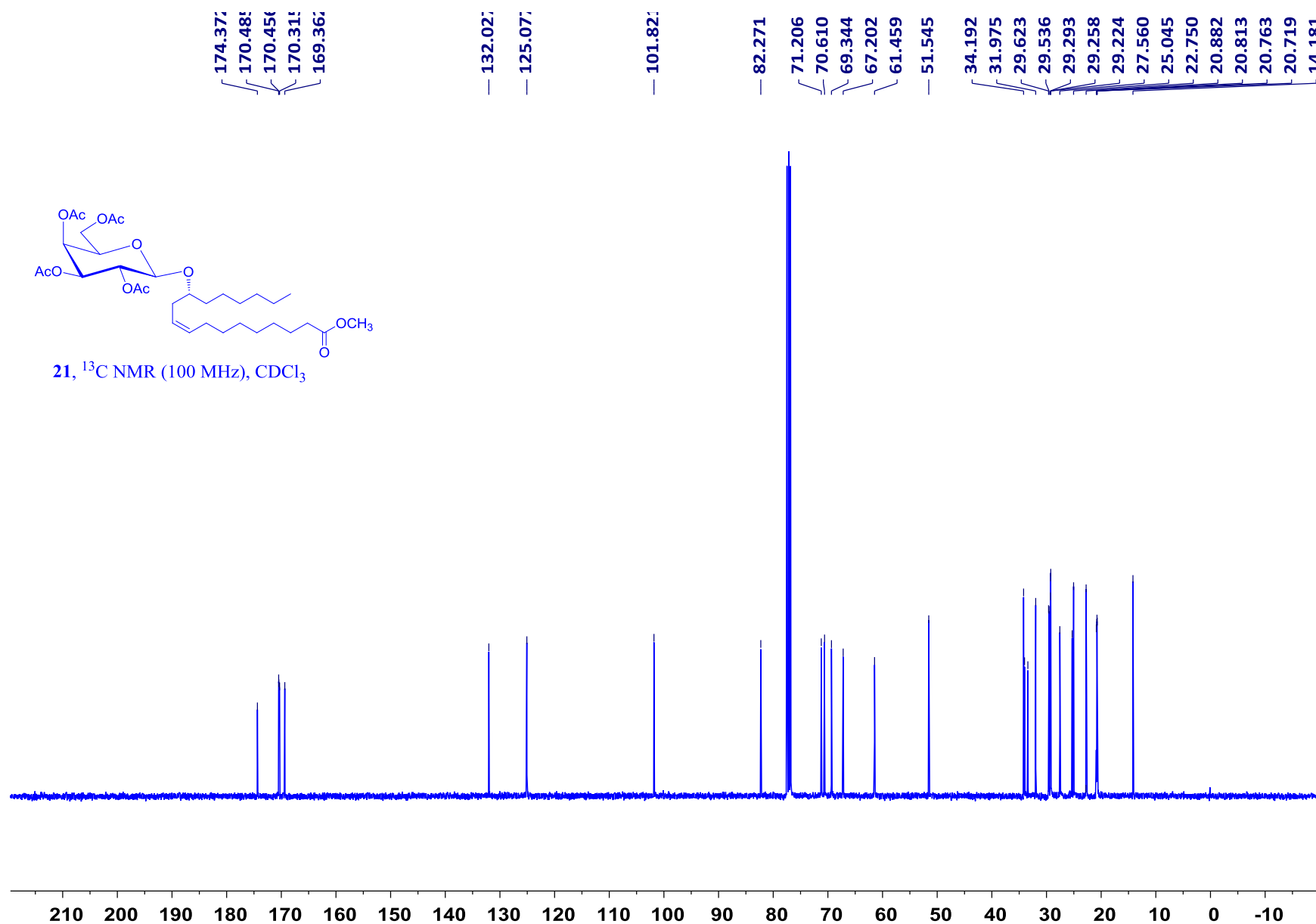


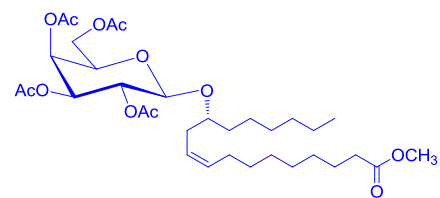
9a, ^1H - ^1H gCOSY, (400 MHz), CDCl_3



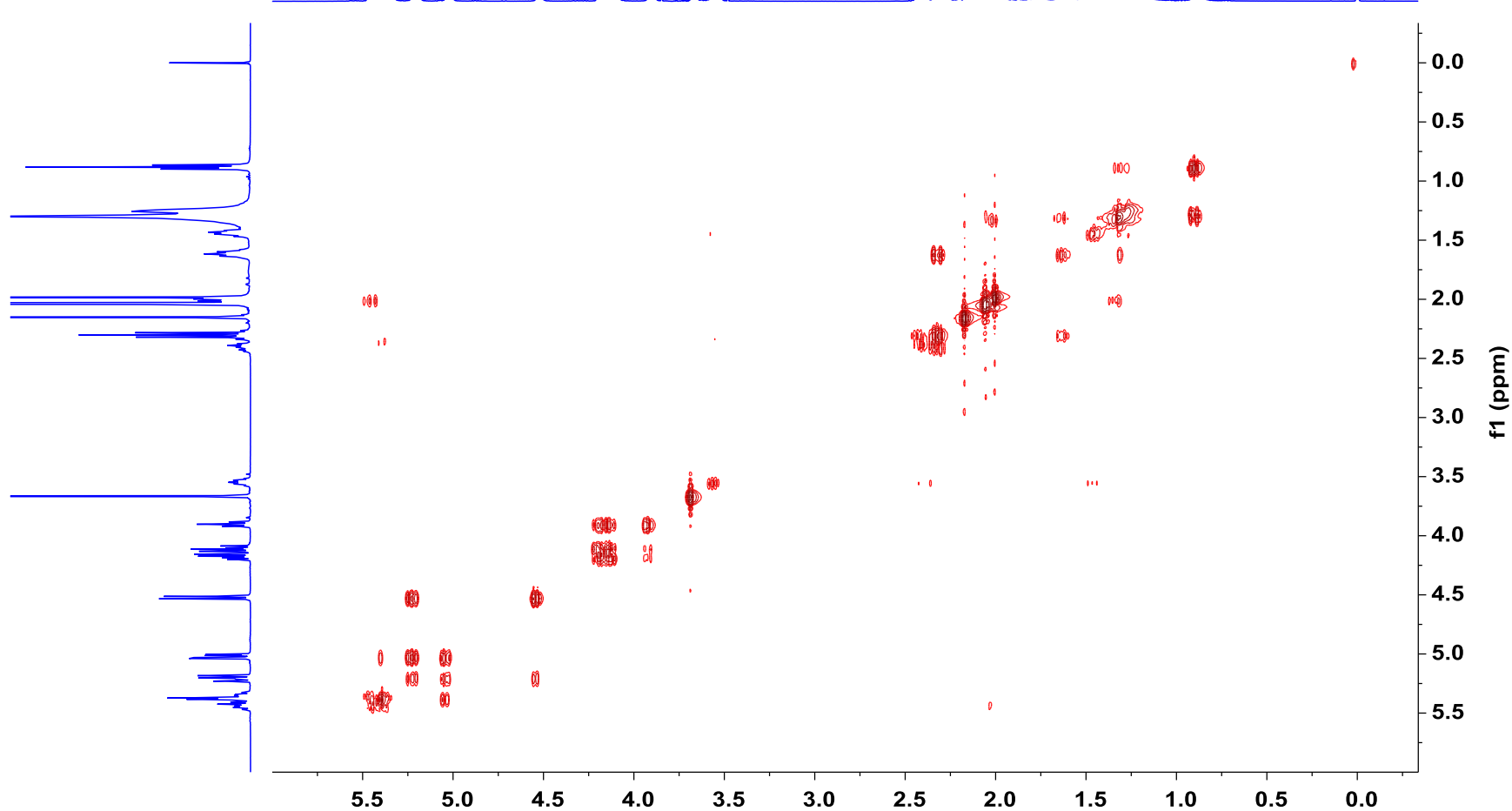


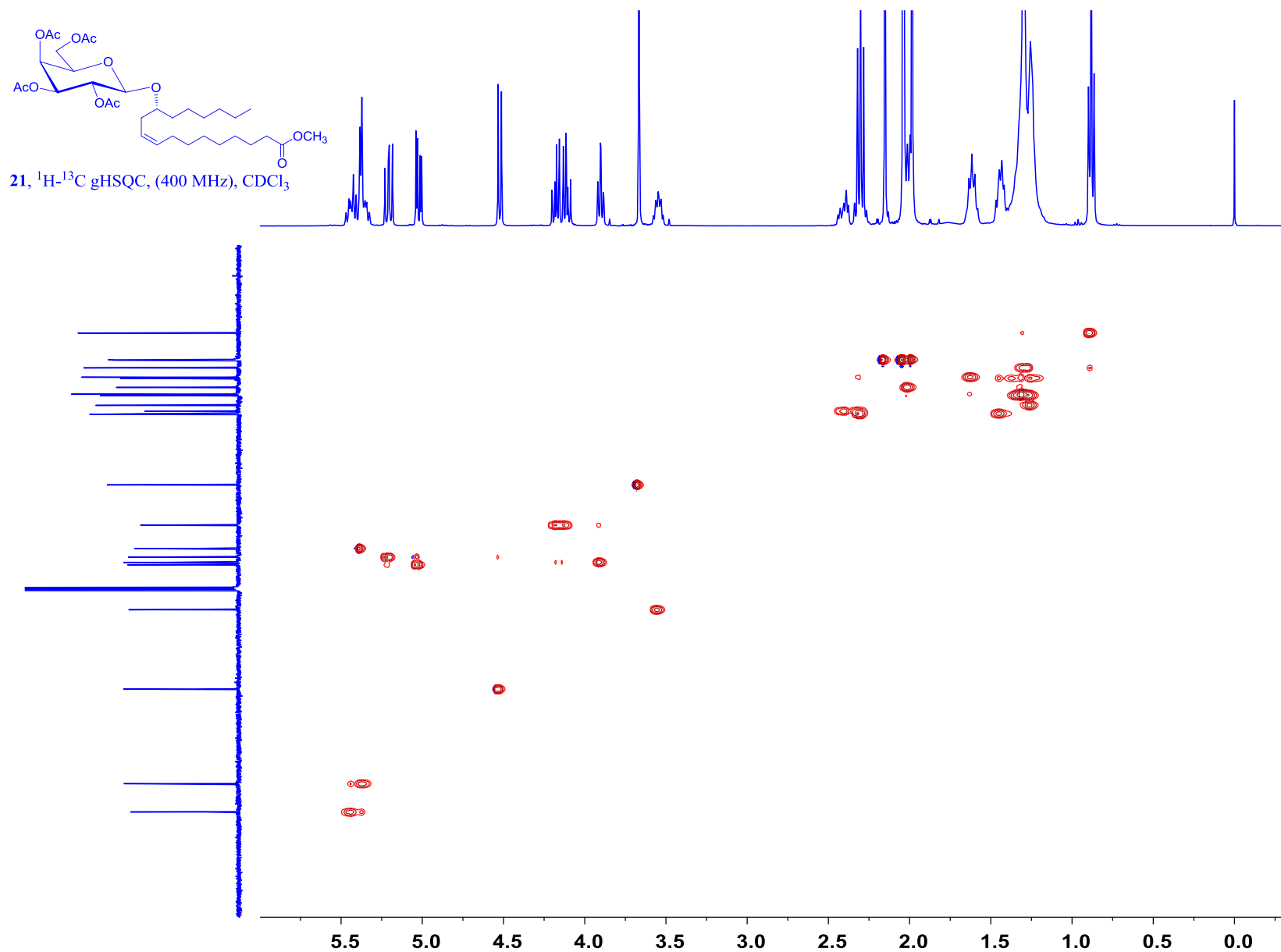


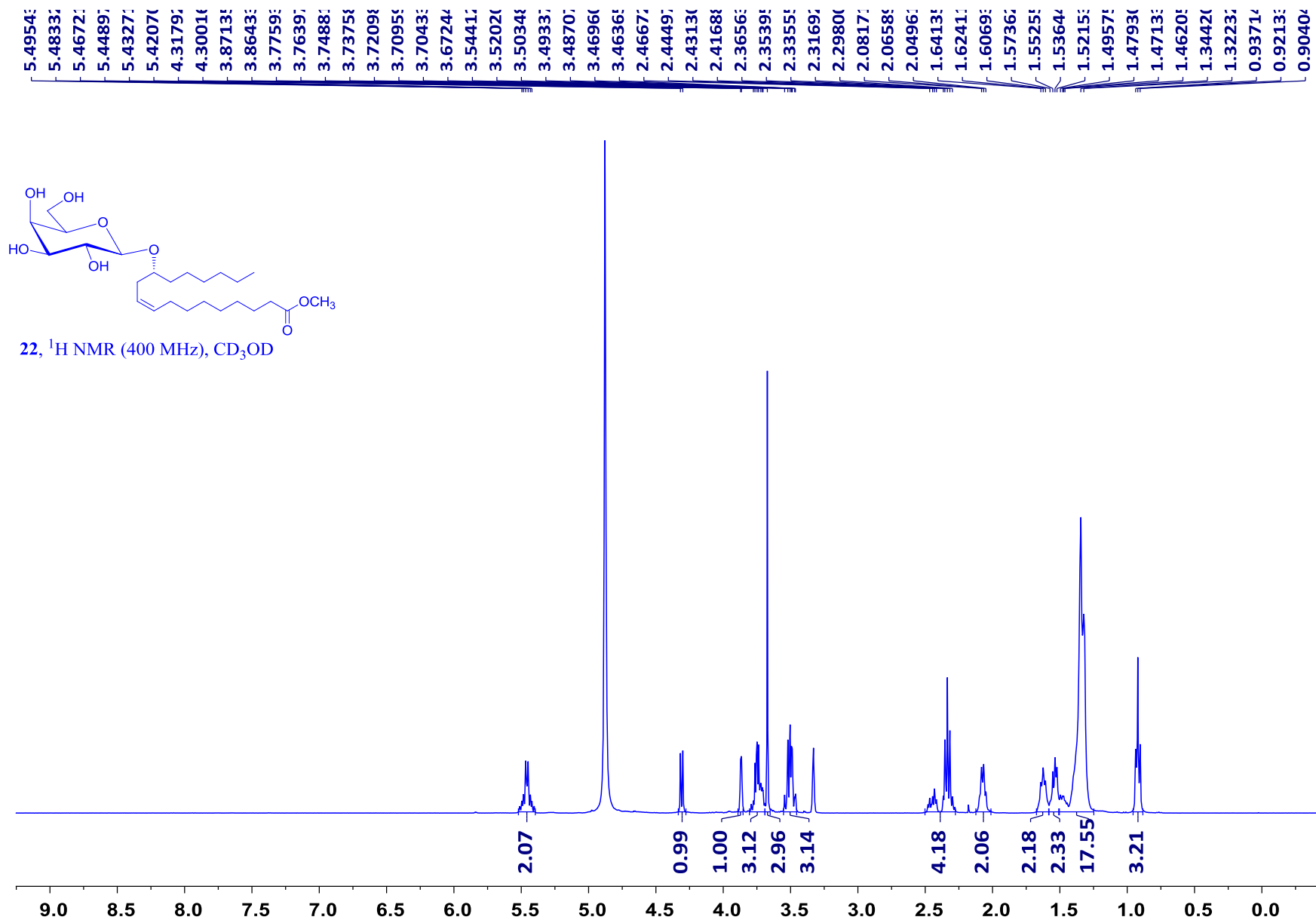


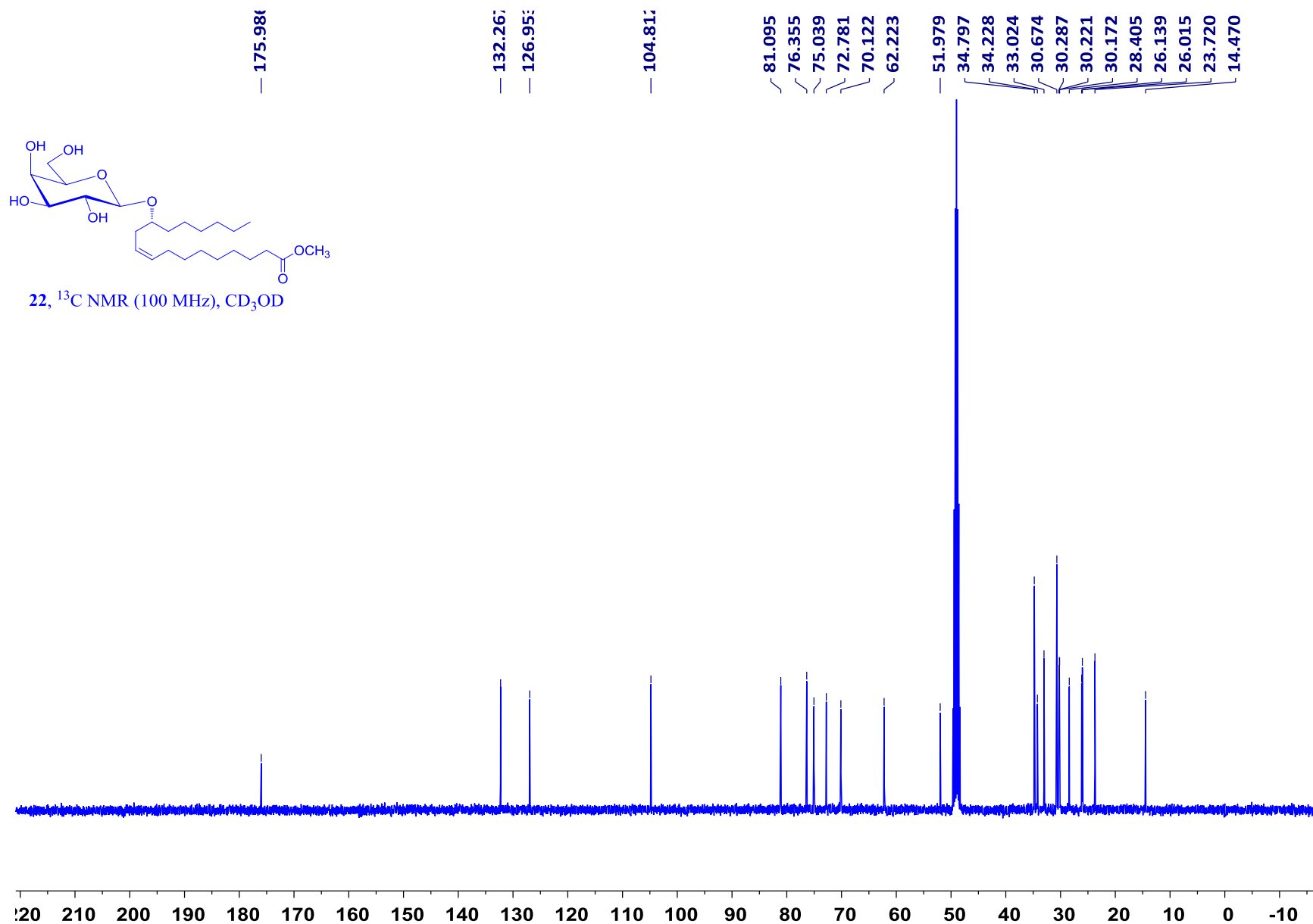


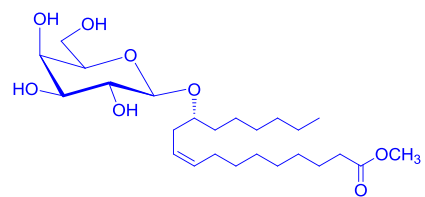
21, ^1H - ^1H gCOSY, (400 MHz), CDCl_3



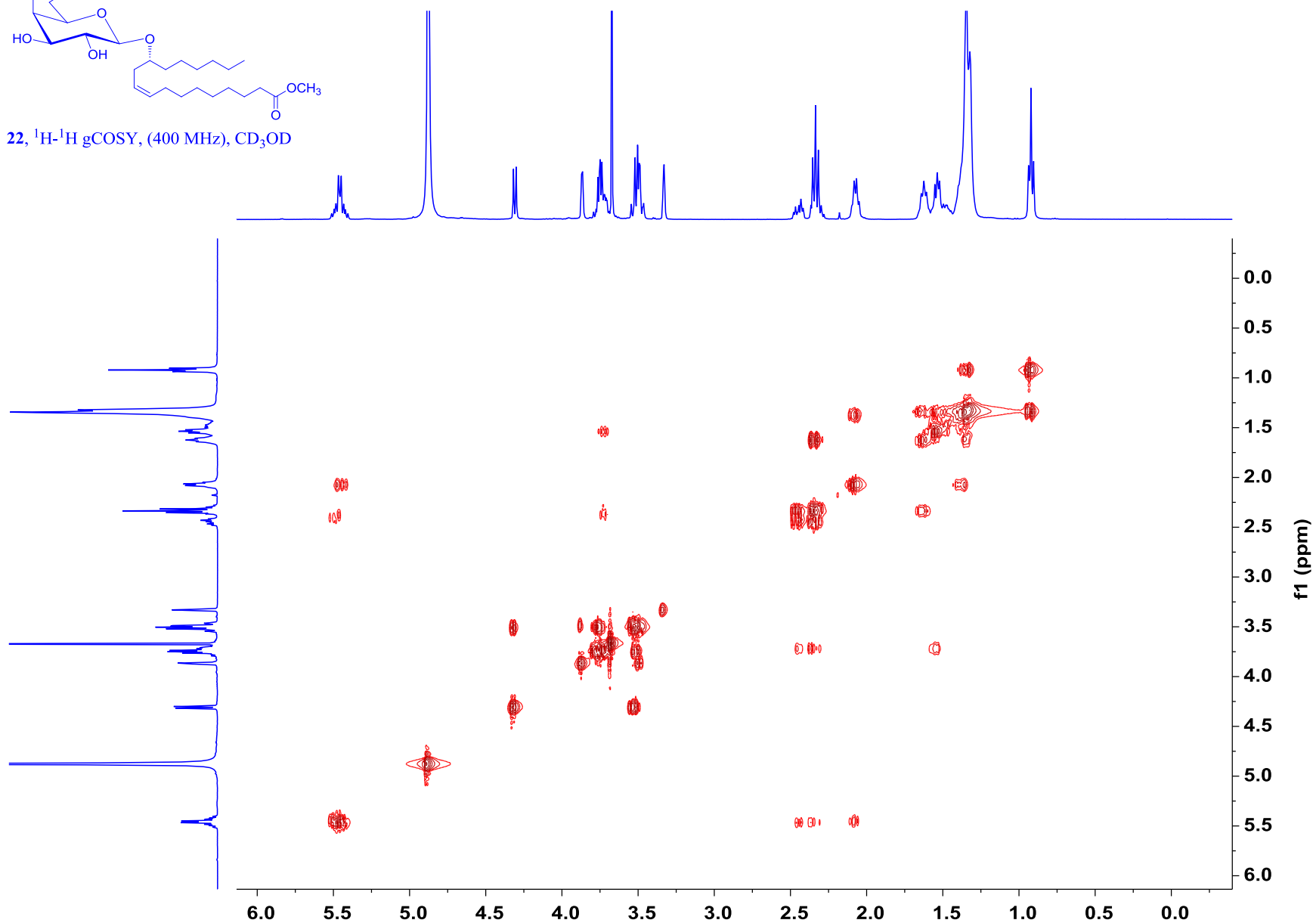


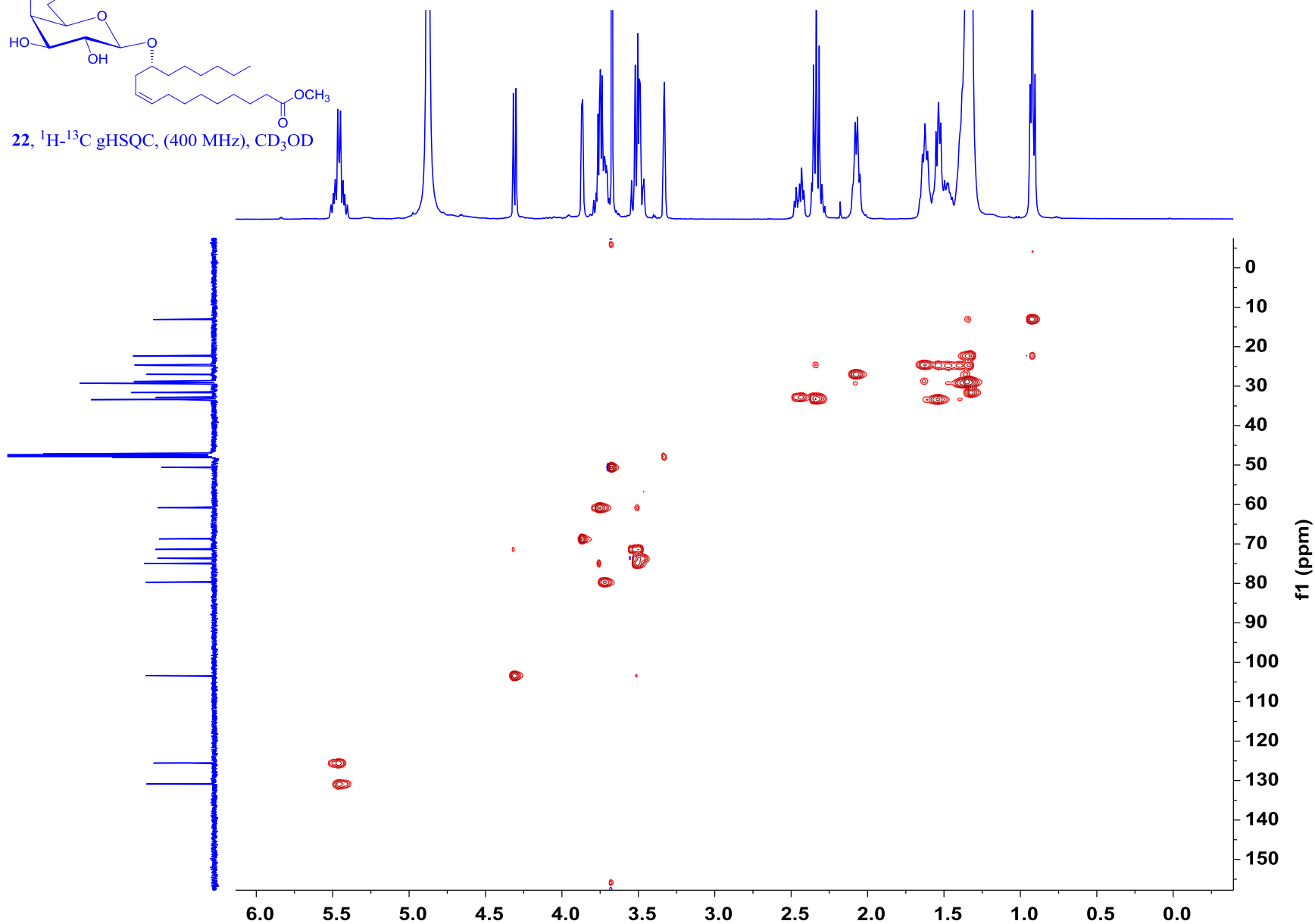
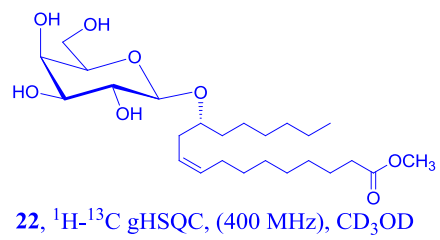


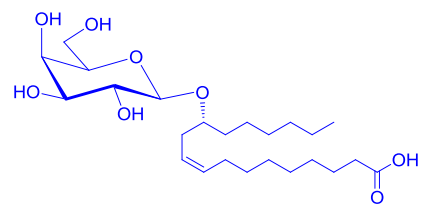




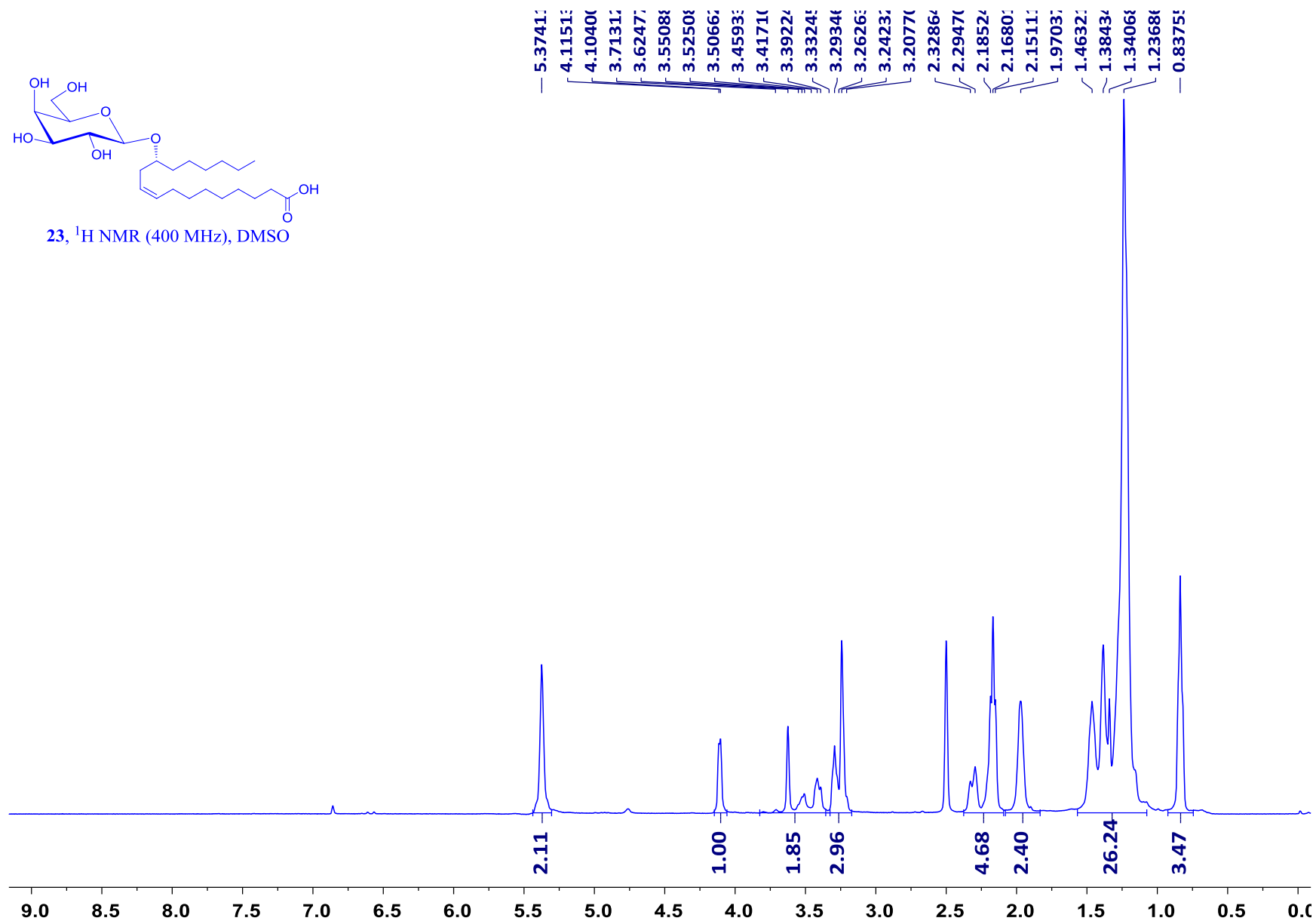
22, ^1H - ^1H gCOSY, (400 MHz), CD_3OD

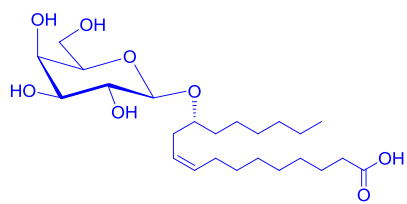




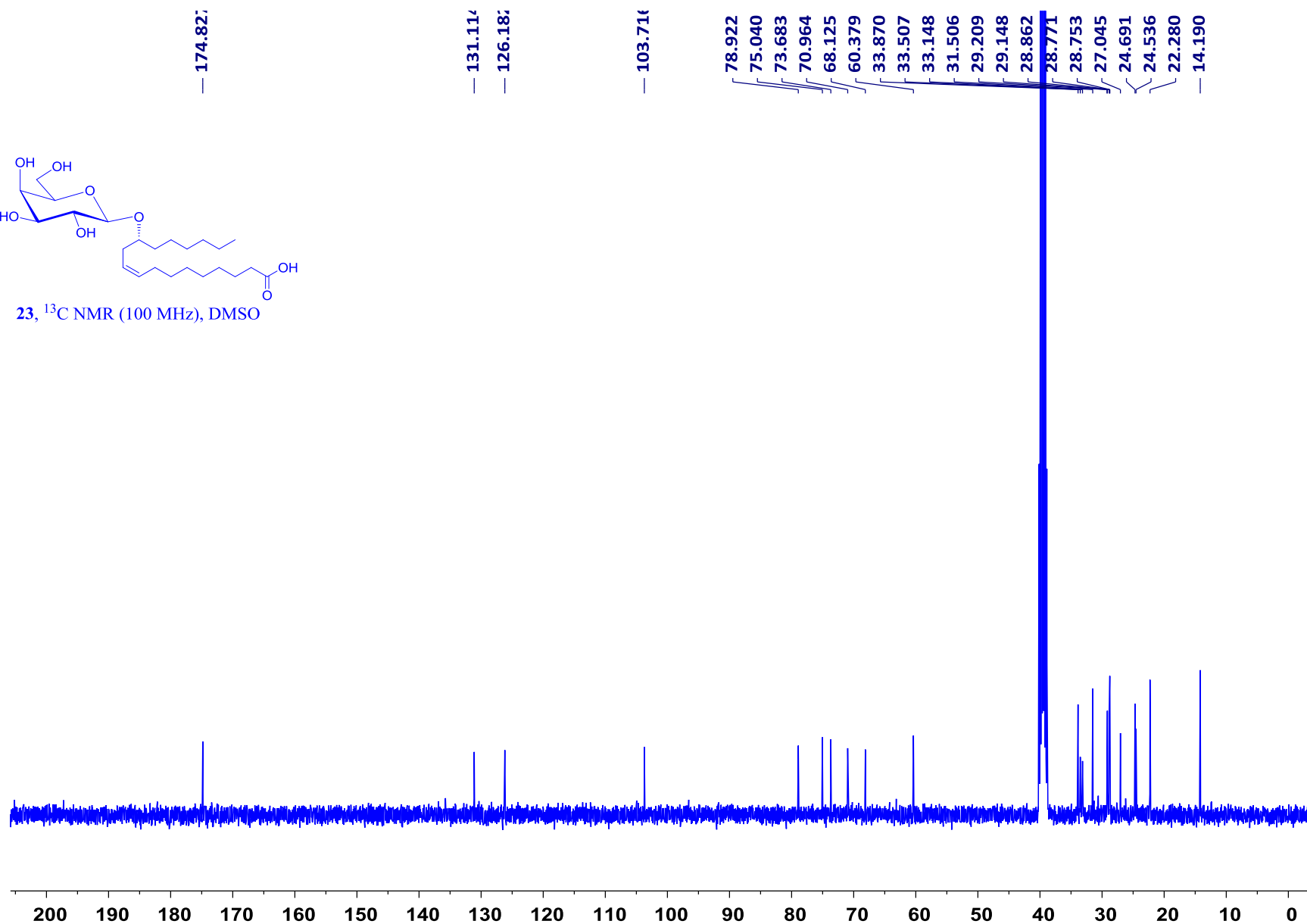


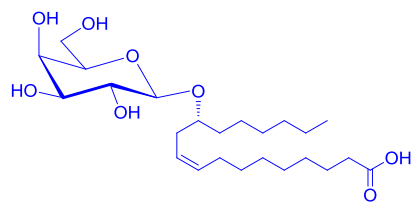
23, ^1H NMR (400 MHz), DMSO



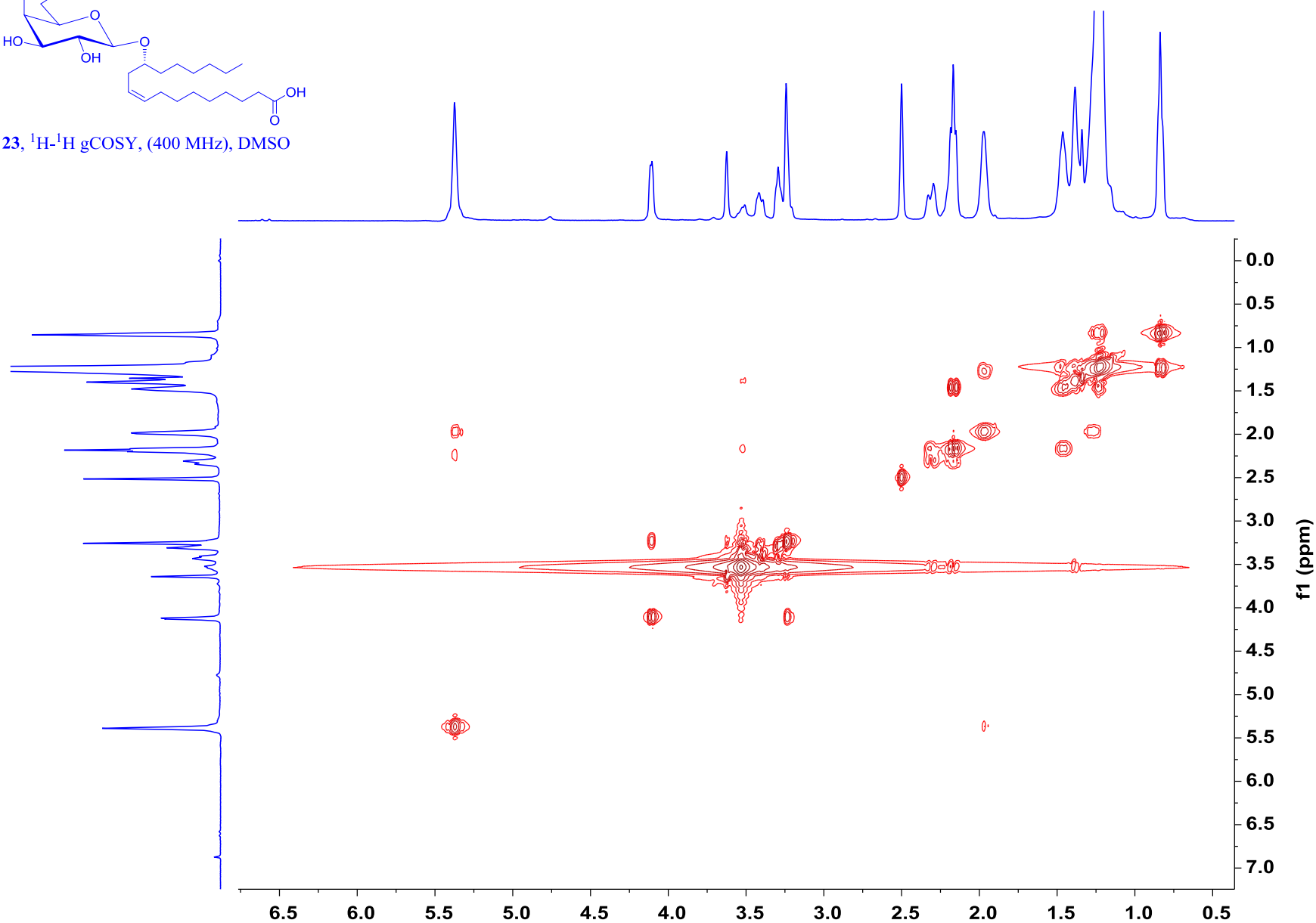


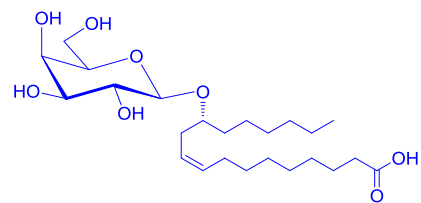
23, ^{13}C NMR (100 MHz), DMSO



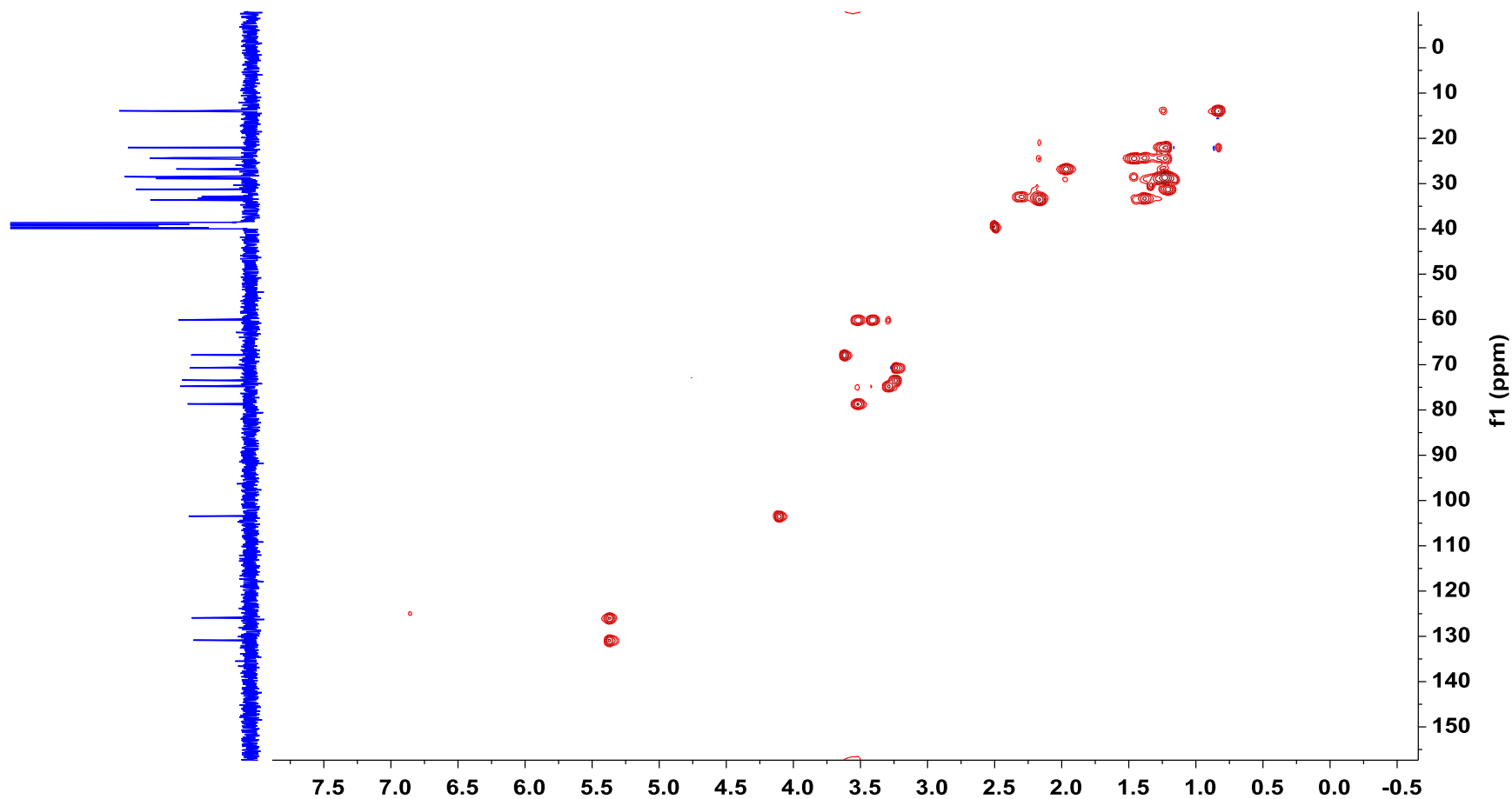


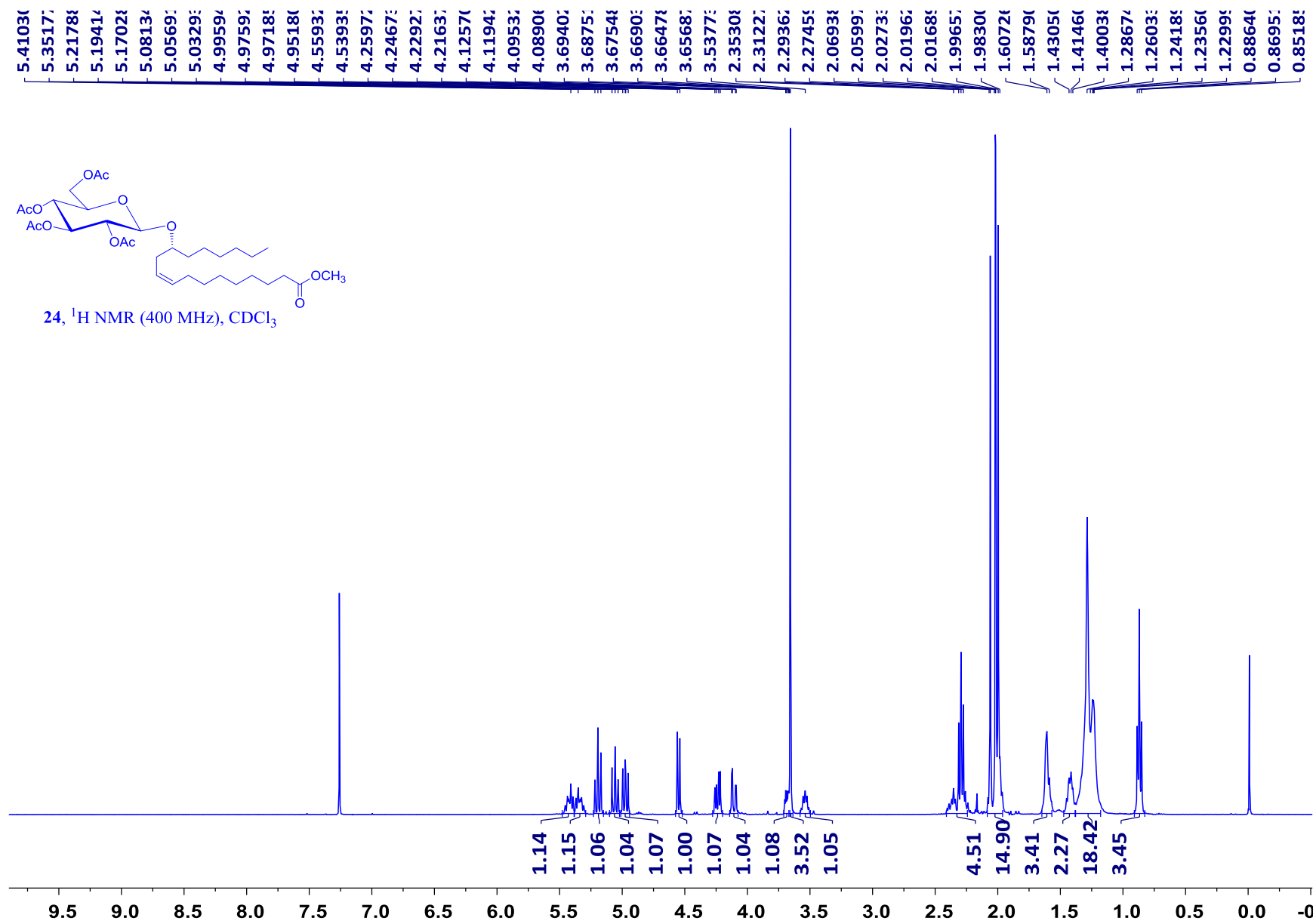
23, ^1H - ^1H gCOSY, (400 MHz), DMSO



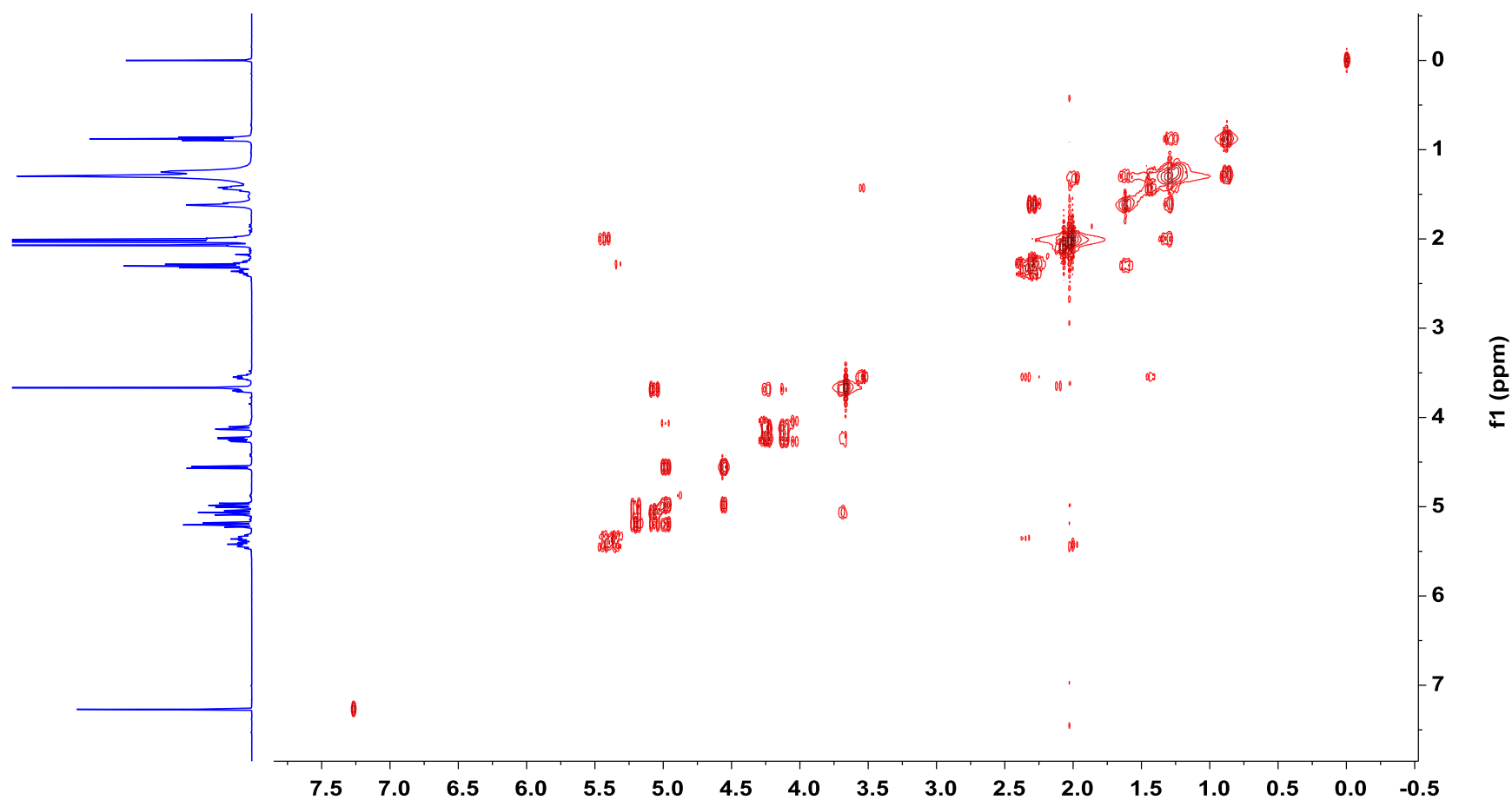
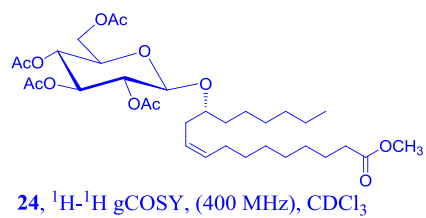


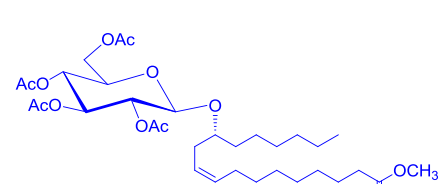
23, ^1H - ^{13}C gHSQC, (400 MHz), DMSO



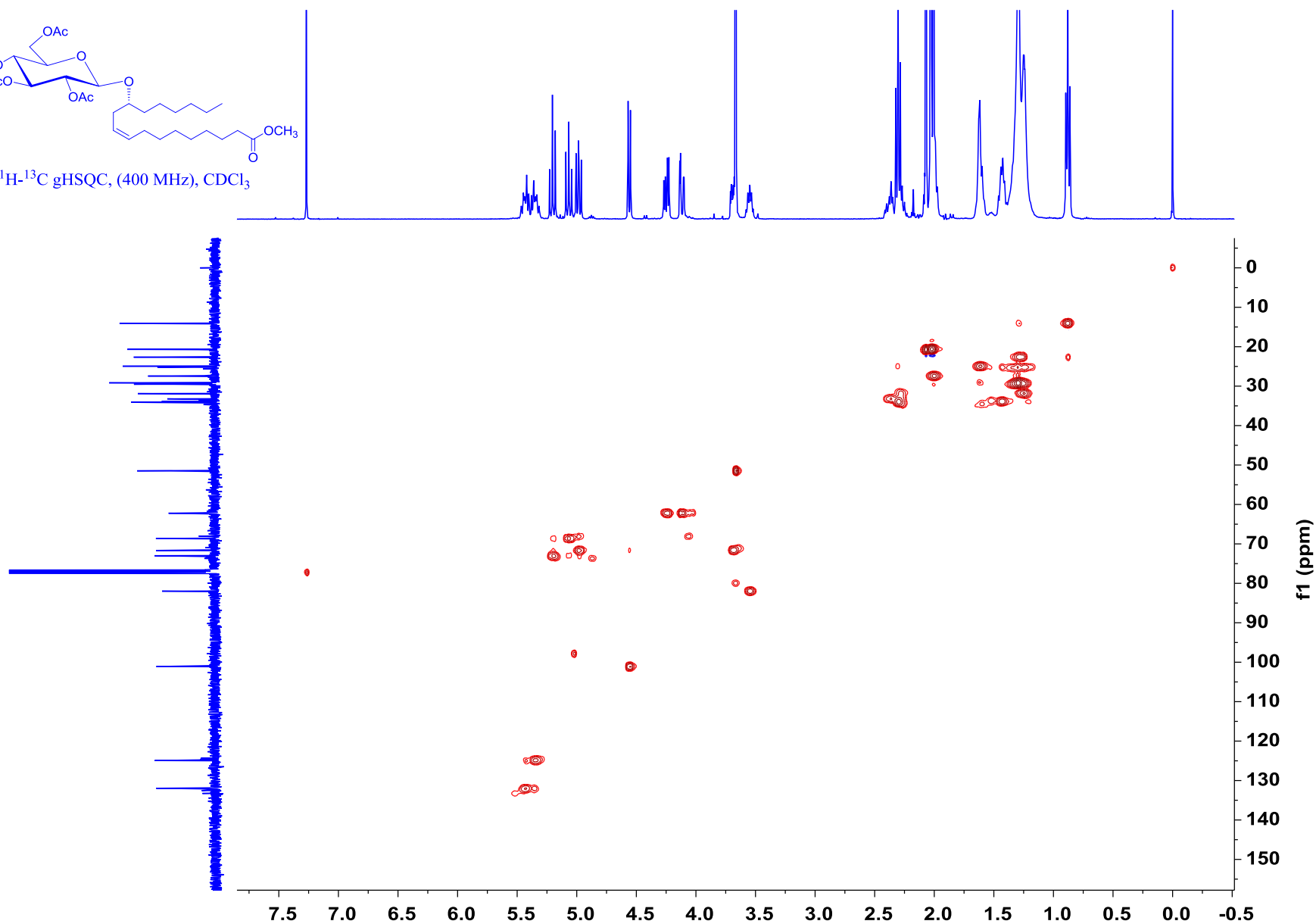


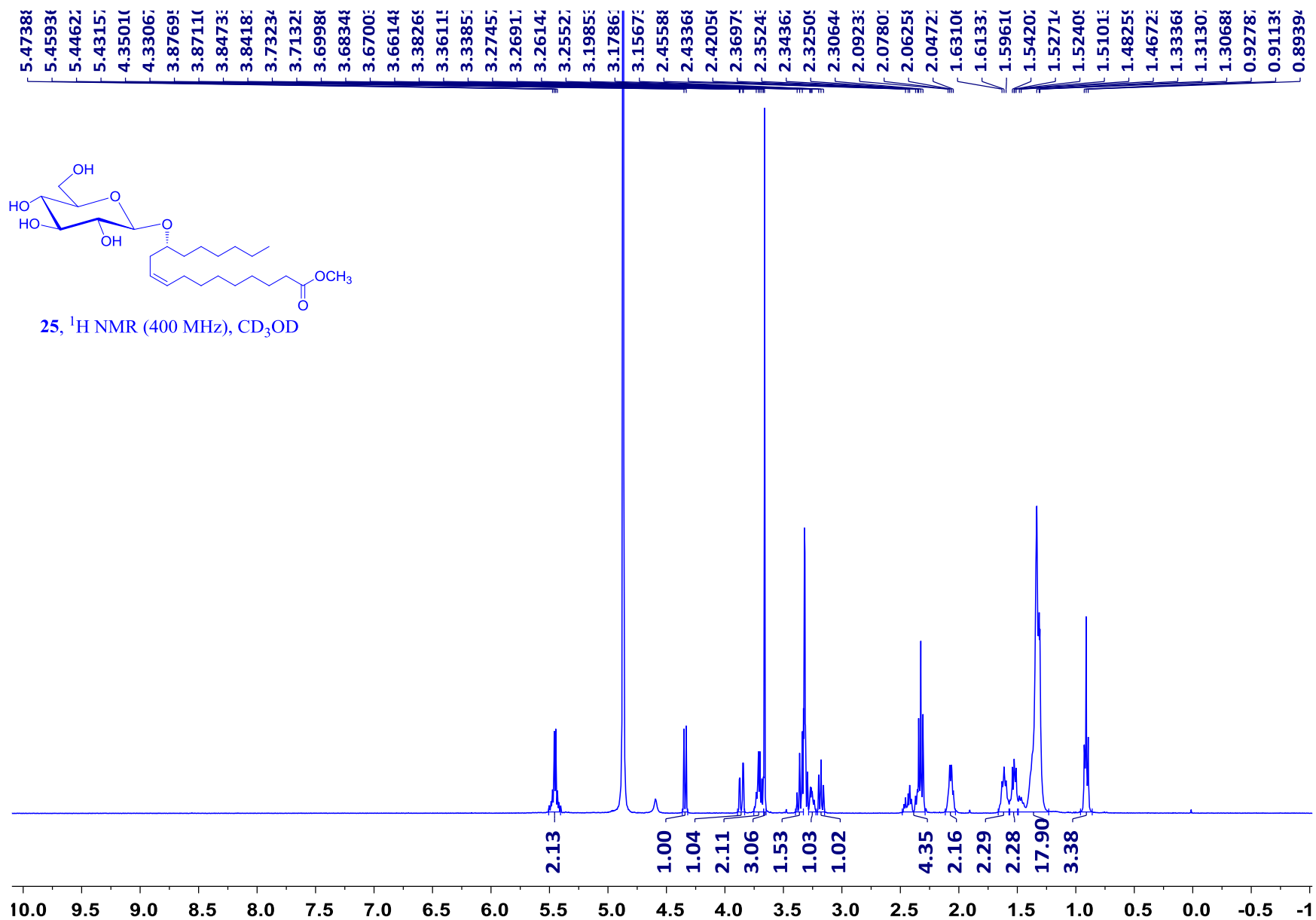


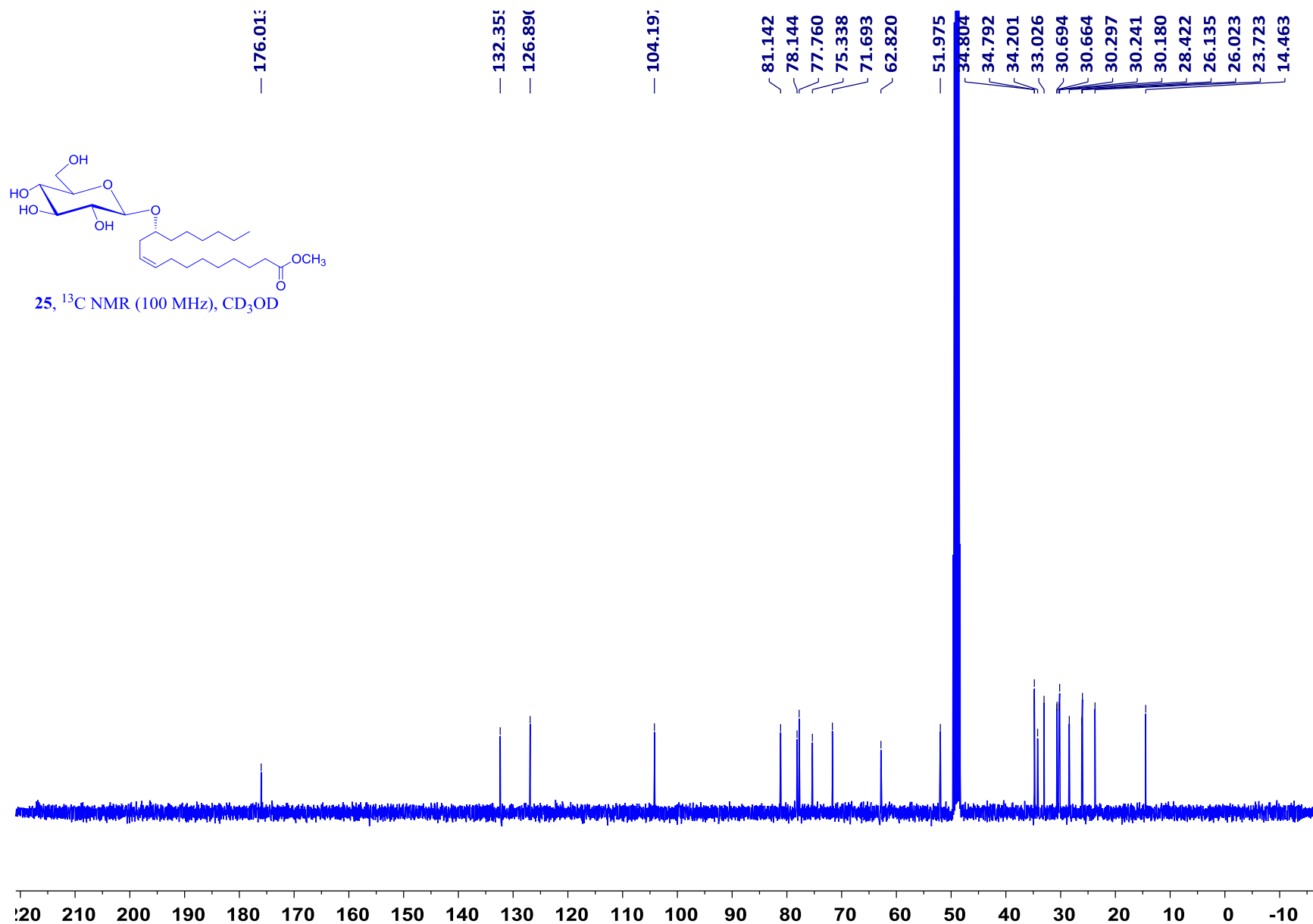


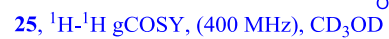


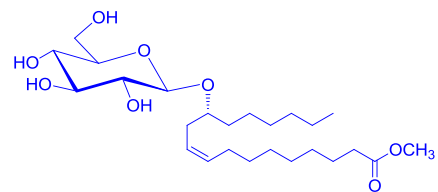
24, ^1H - ^{13}C gHSQC, (400 MHz), CDCl_3



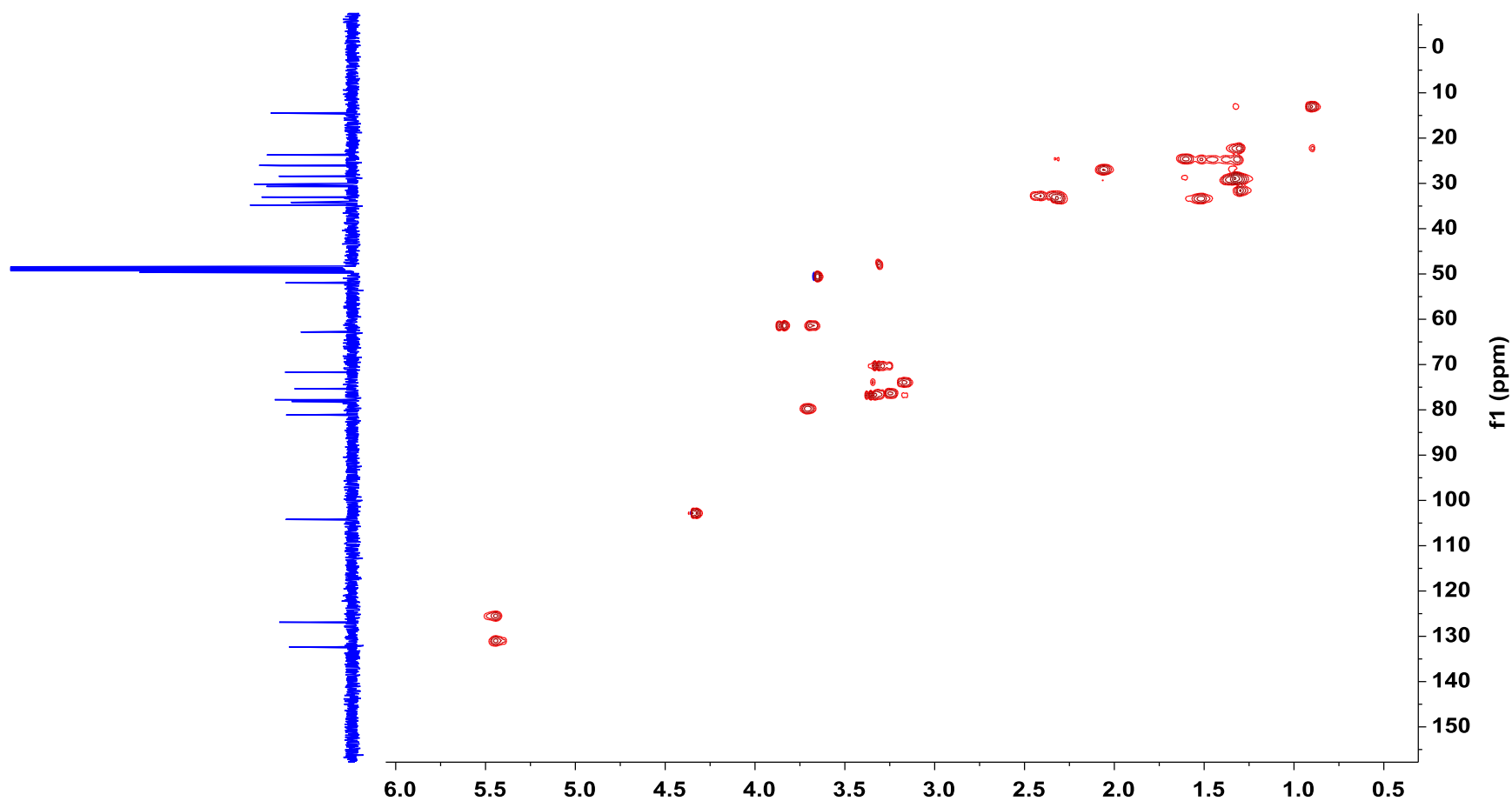


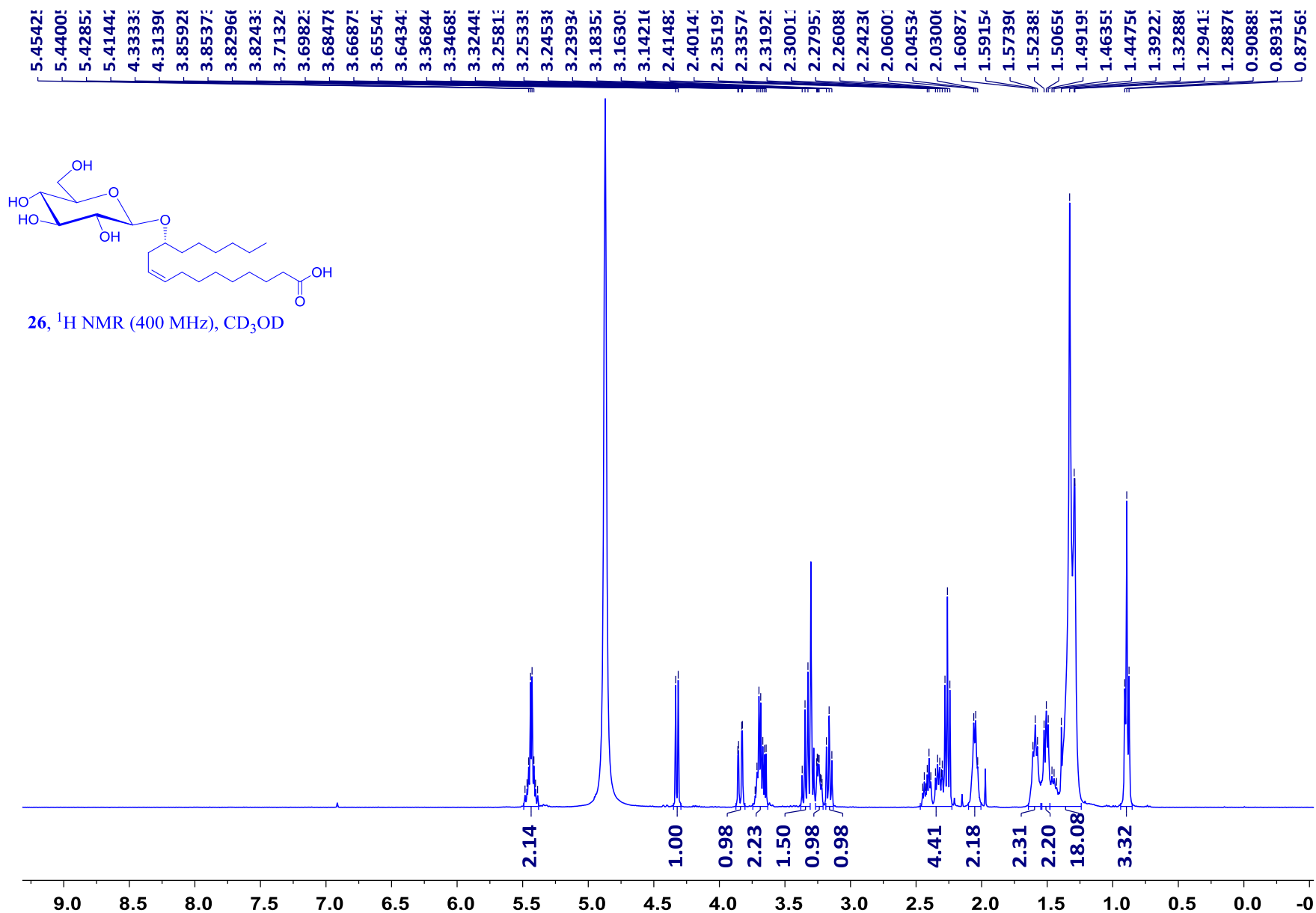


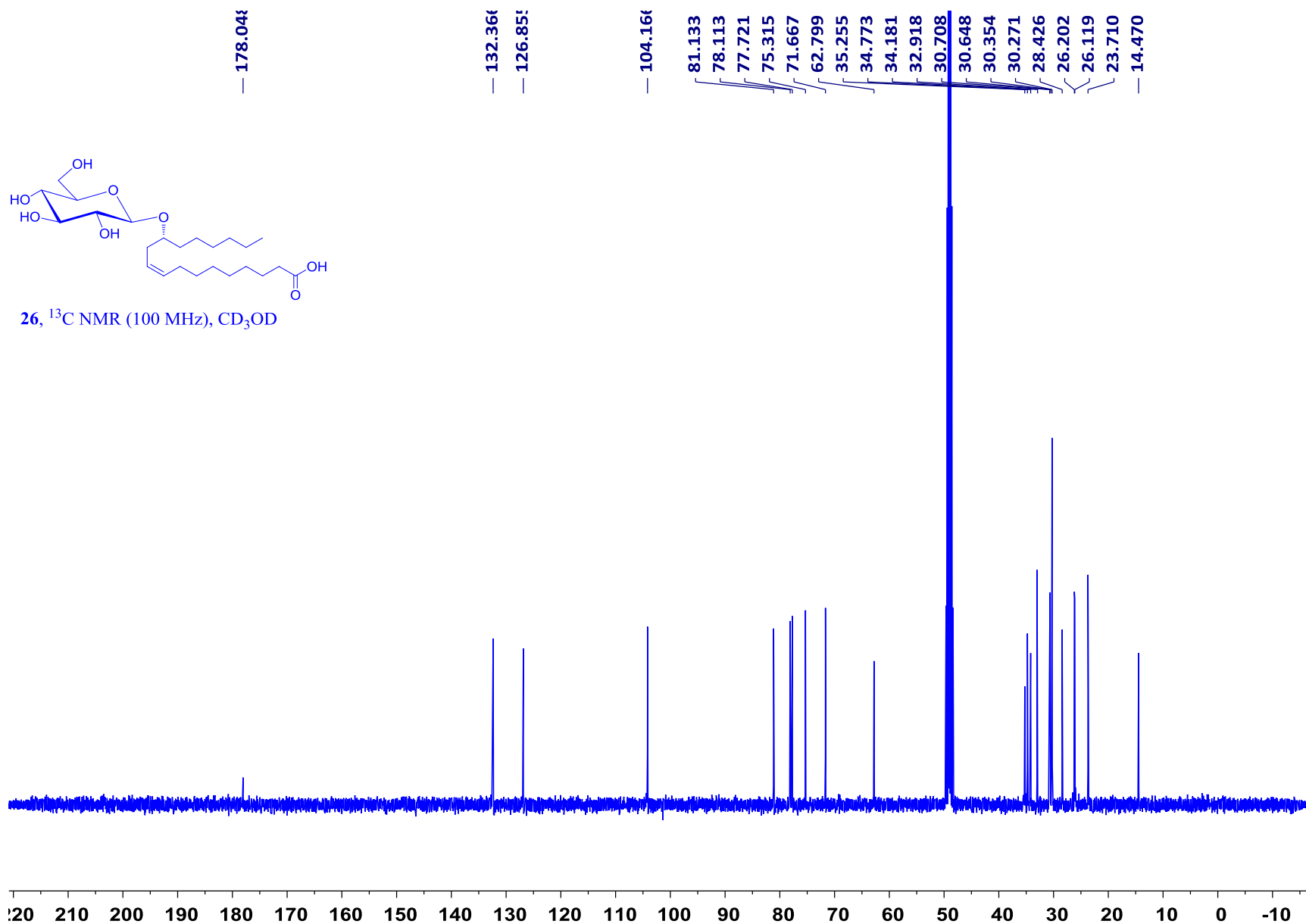


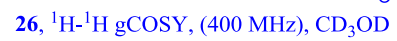


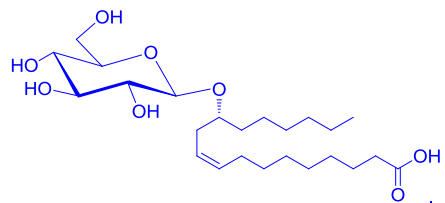
25, ^1H - ^{13}C gHSQC, (400 MHz), CD_3OD



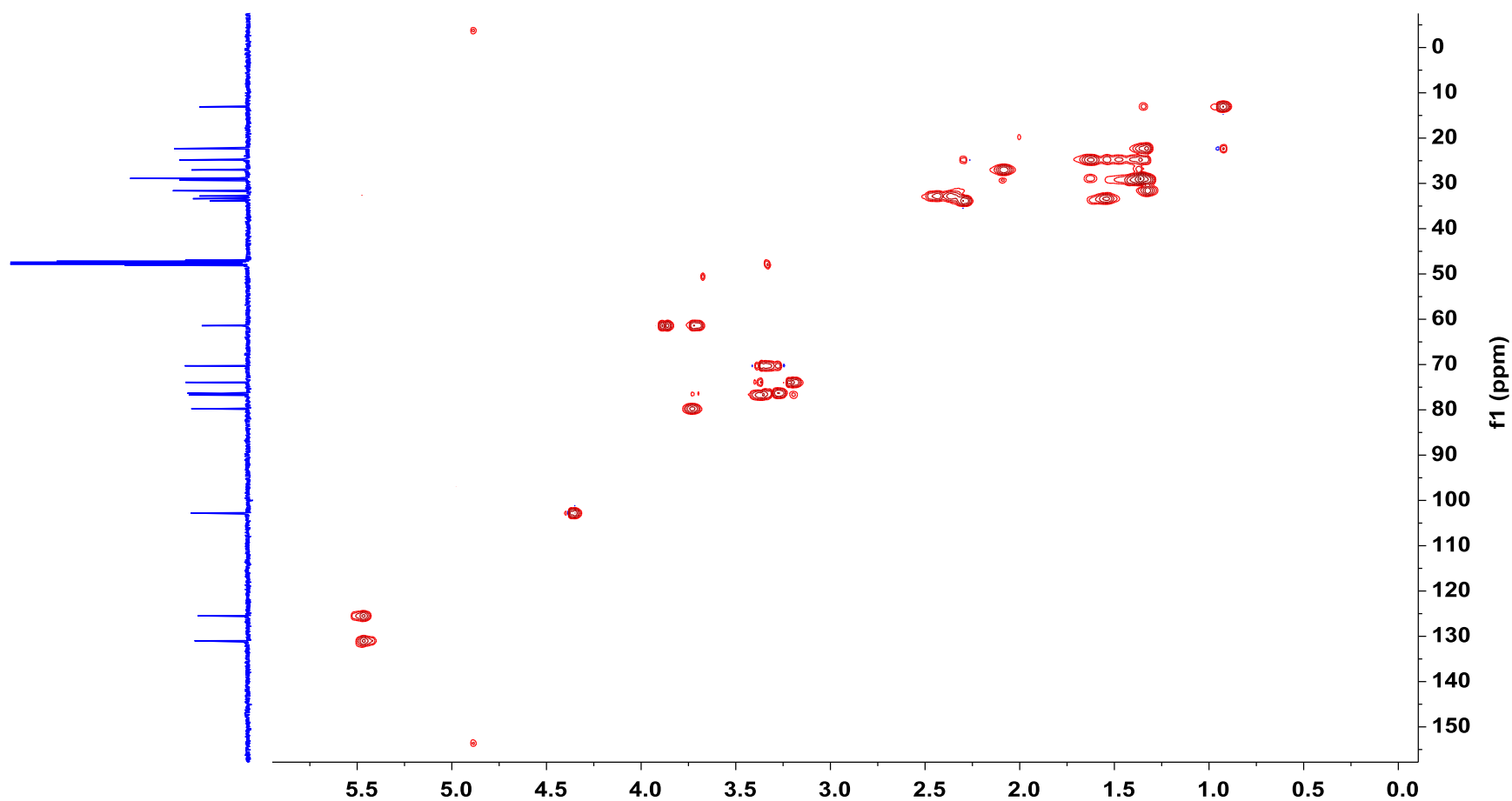


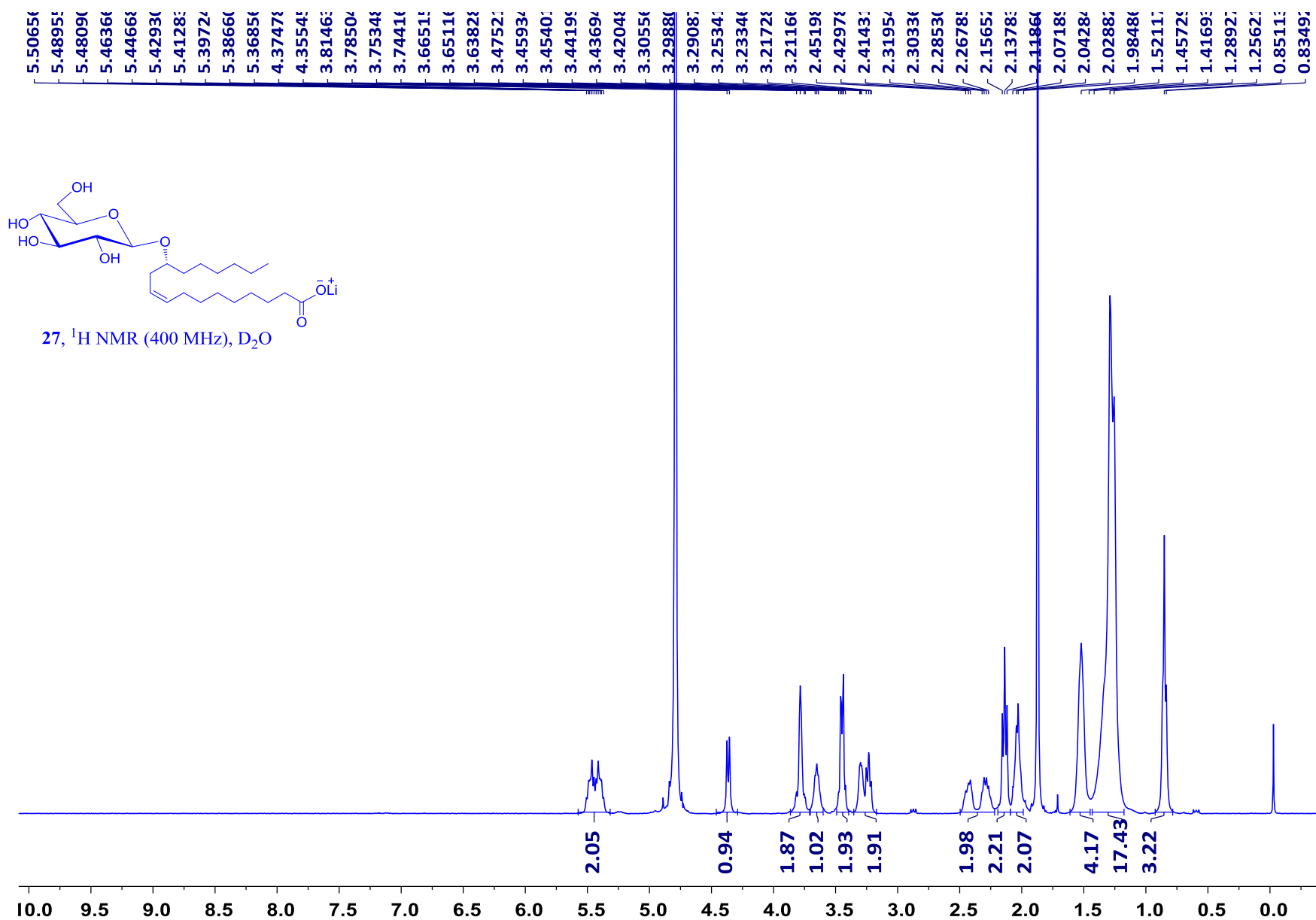


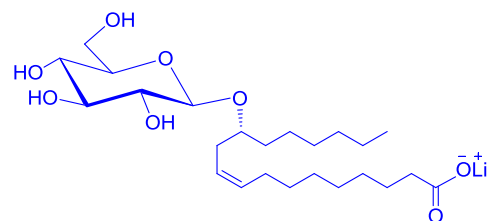




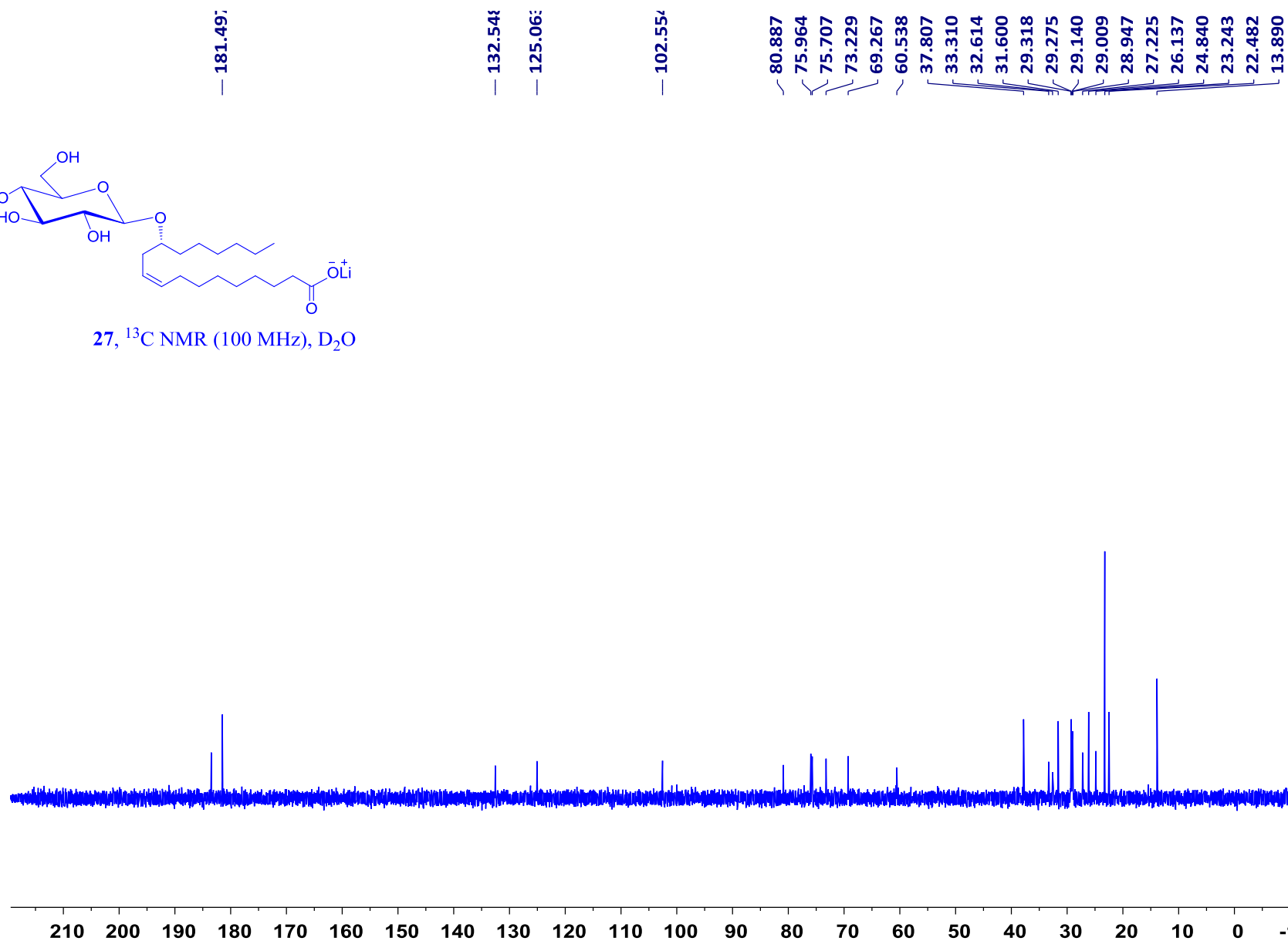
26, ^1H - ^{13}C gHSQC, (400 MHz), CD_3OD

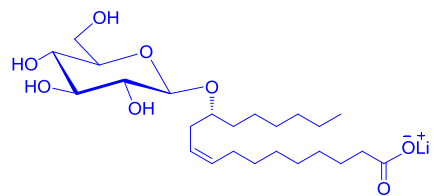




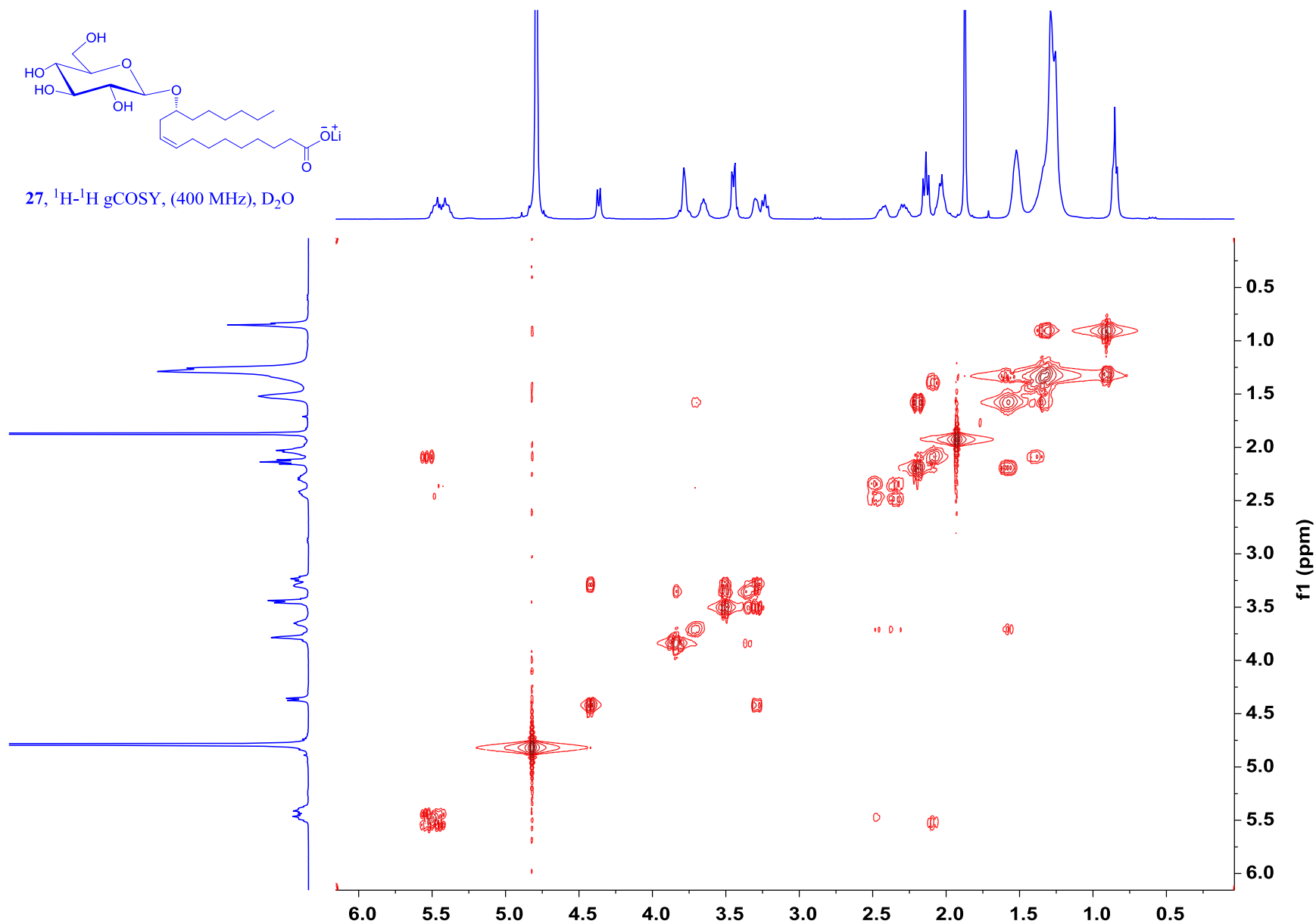


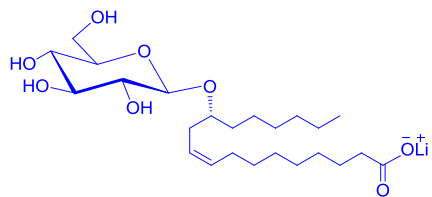
27, ^{13}C NMR (100 MHz), D_2O



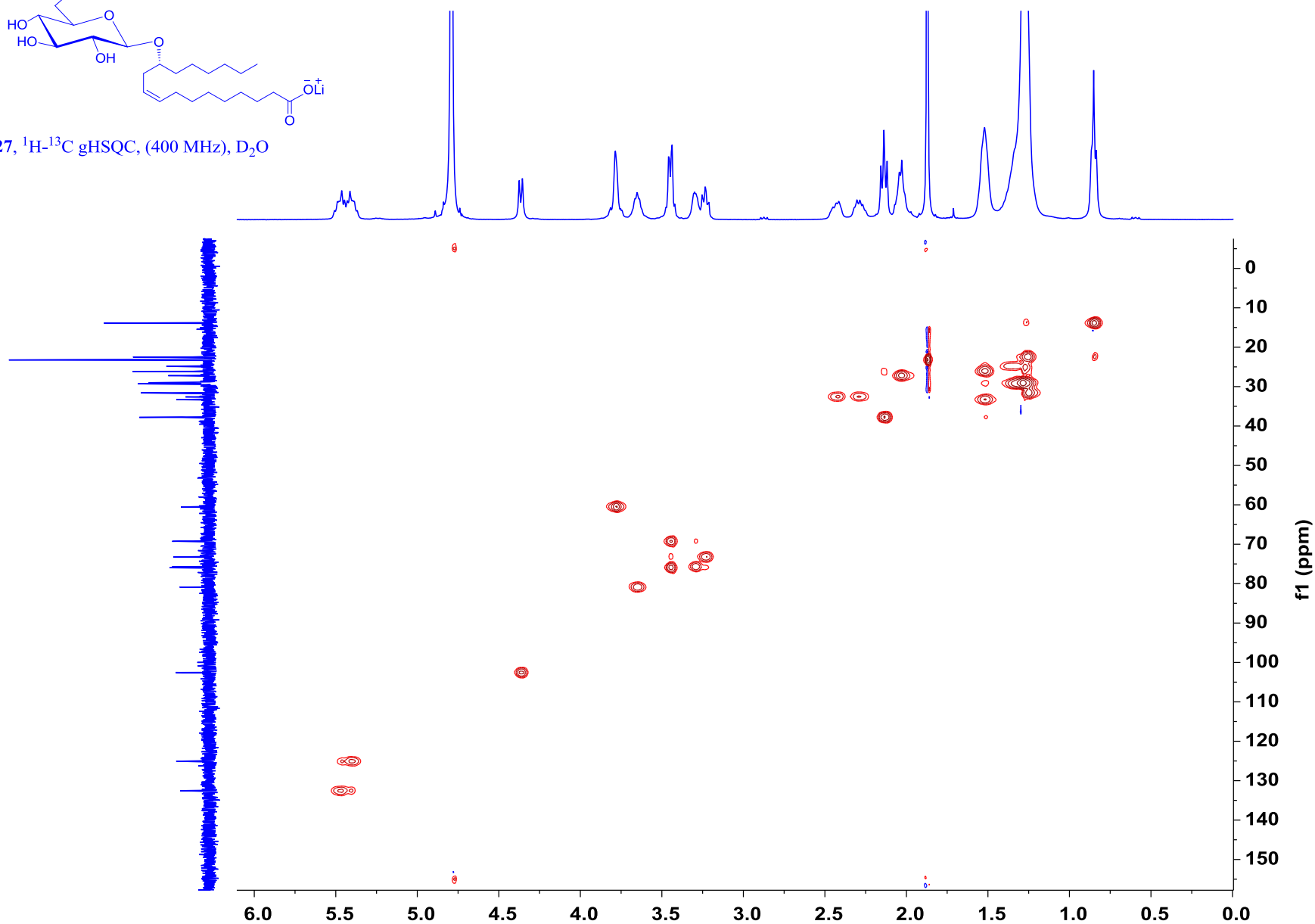


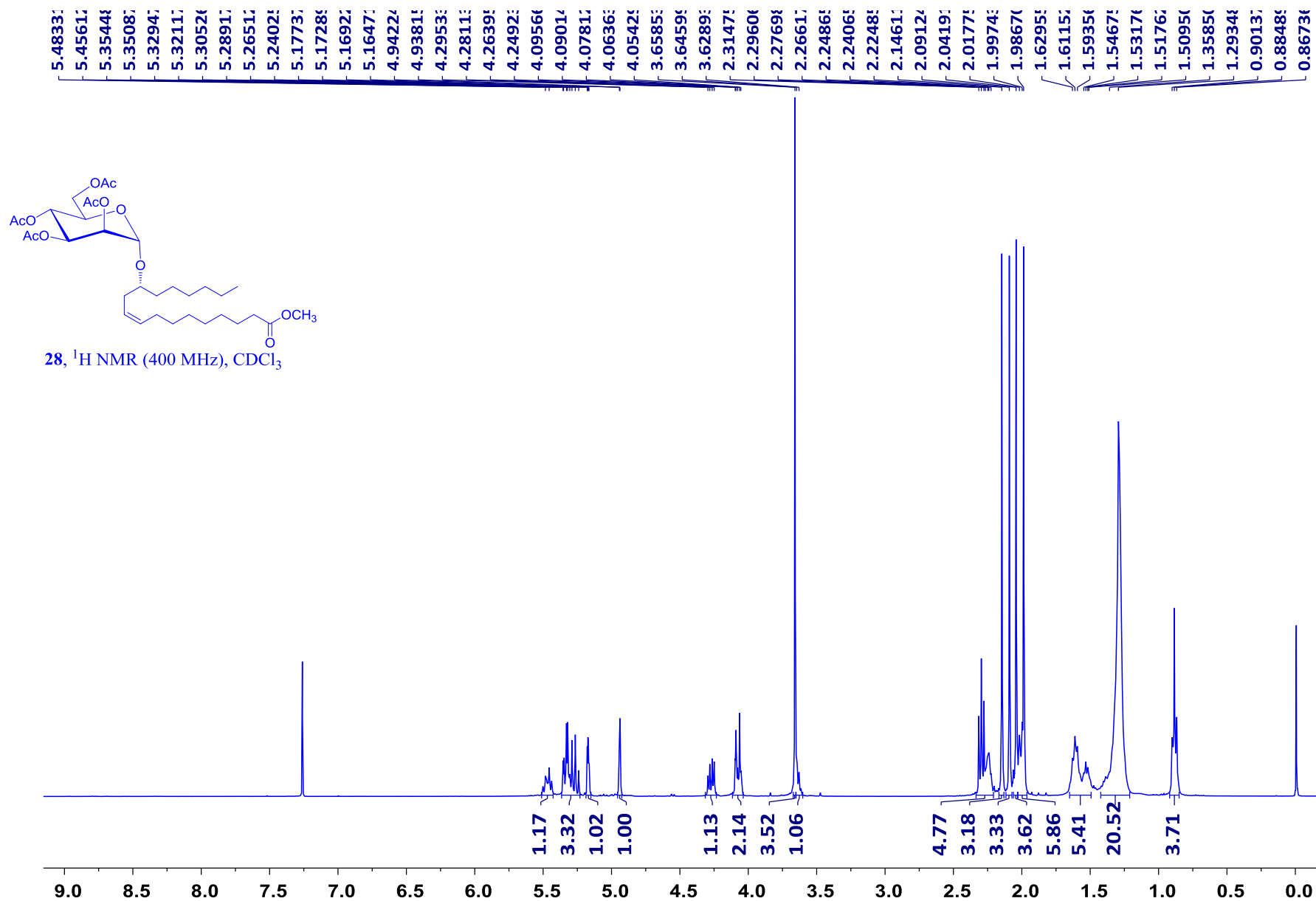
27, ^1H - ^1H gCOSY, (400 MHz), D_2O

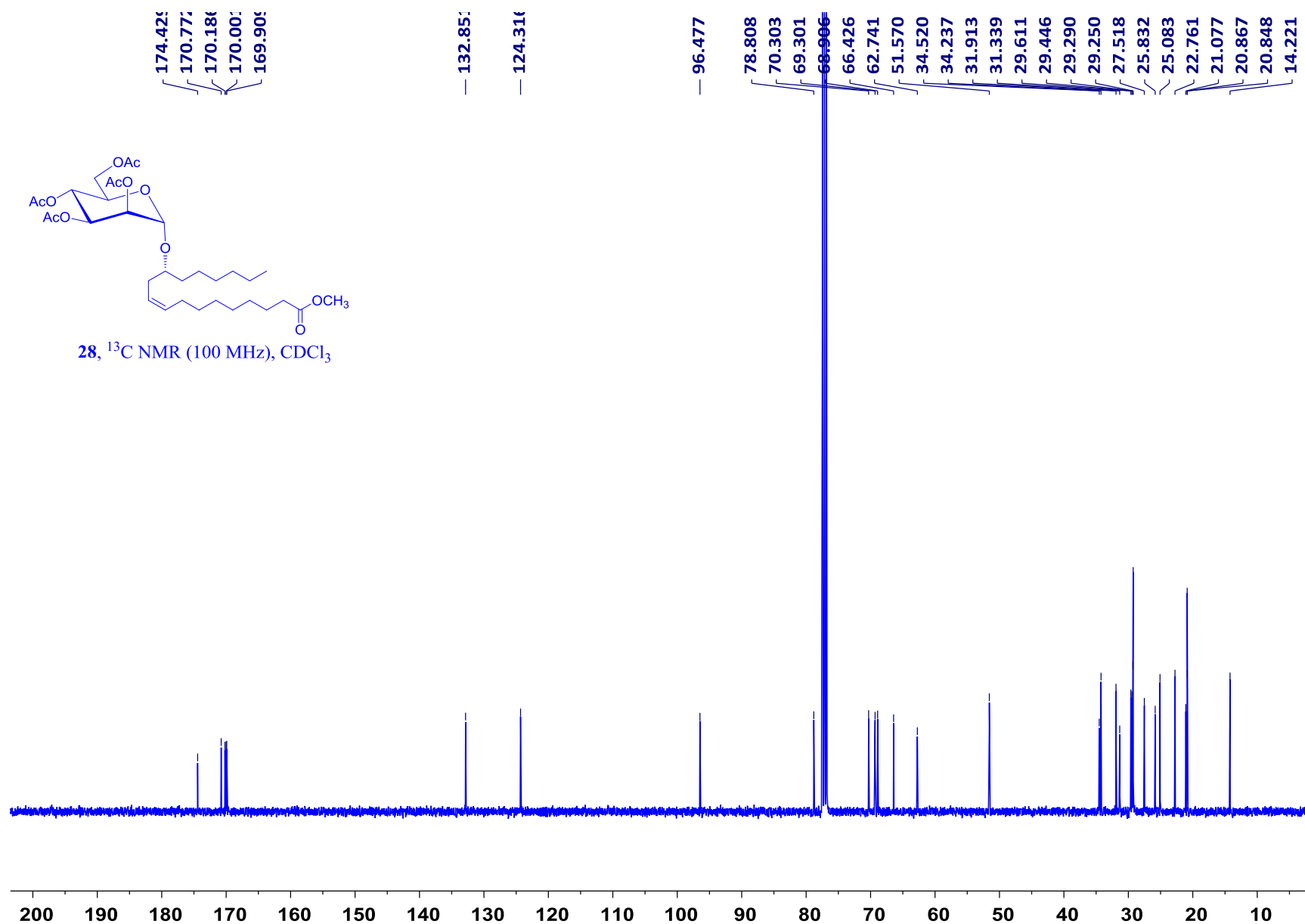


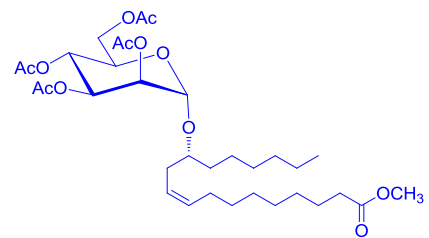


27, ^1H - ^{13}C gHSQC, (400 MHz), D_2O

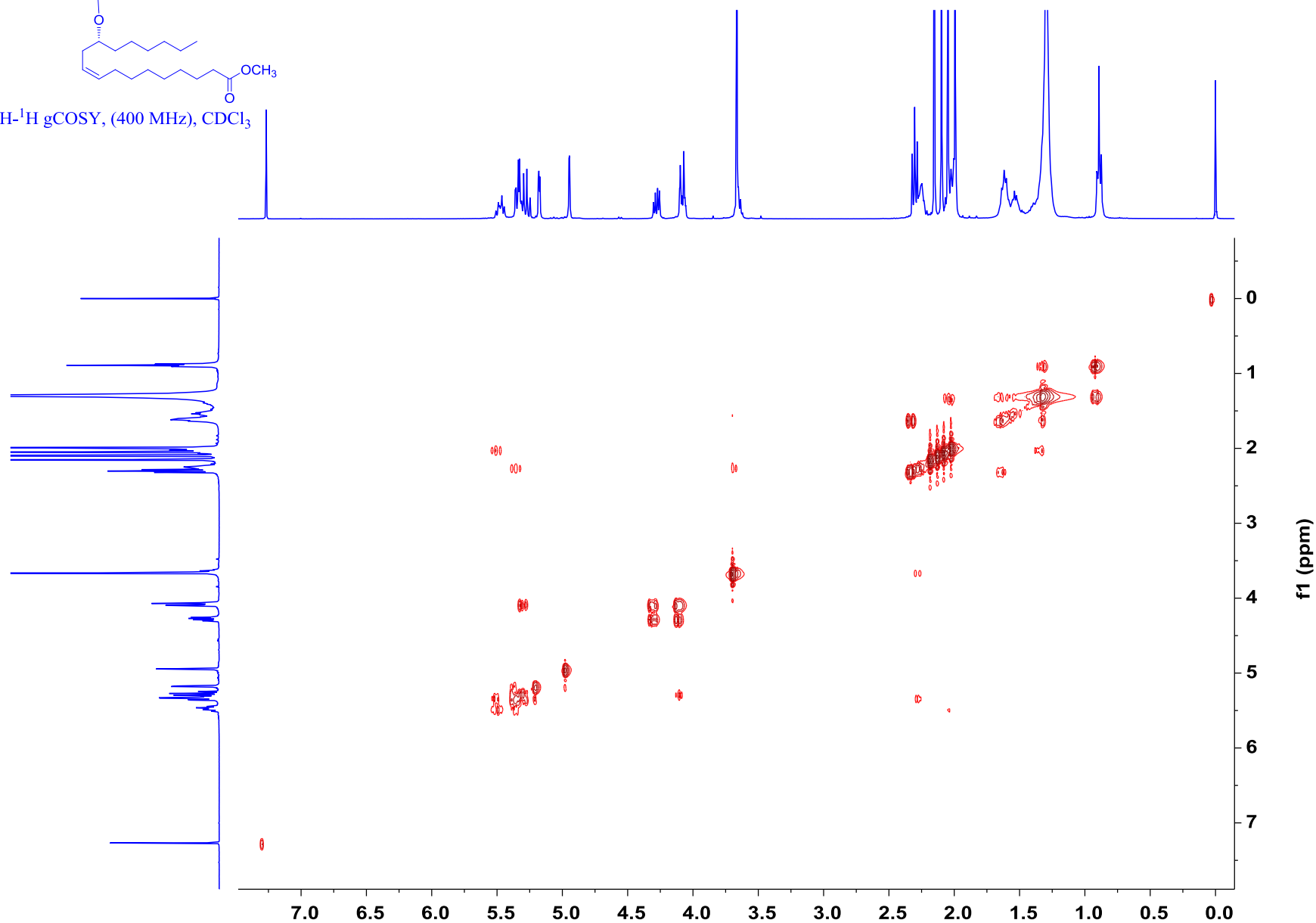


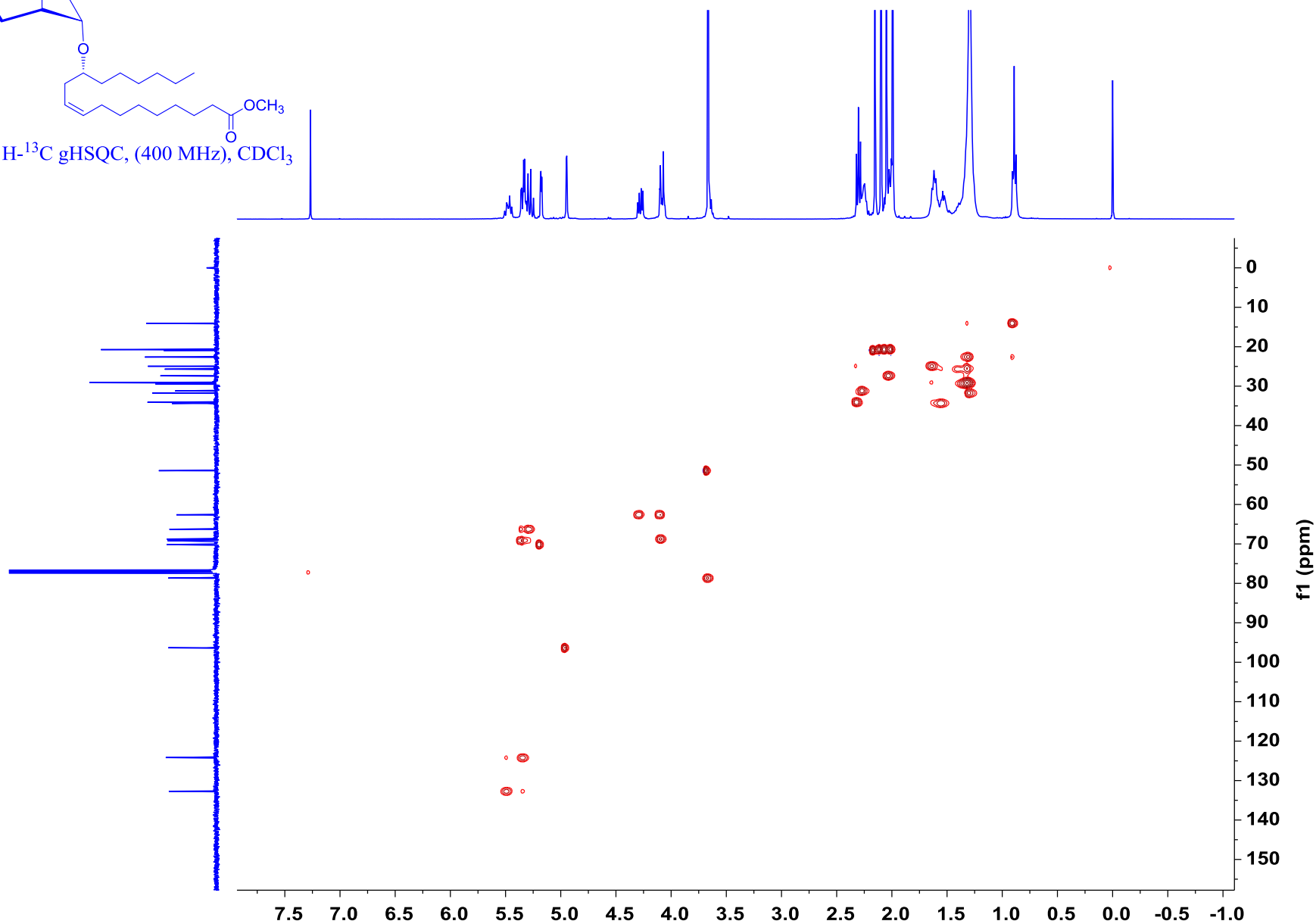
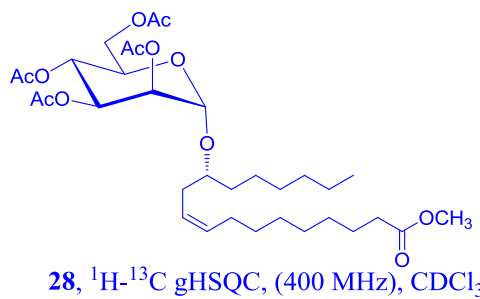


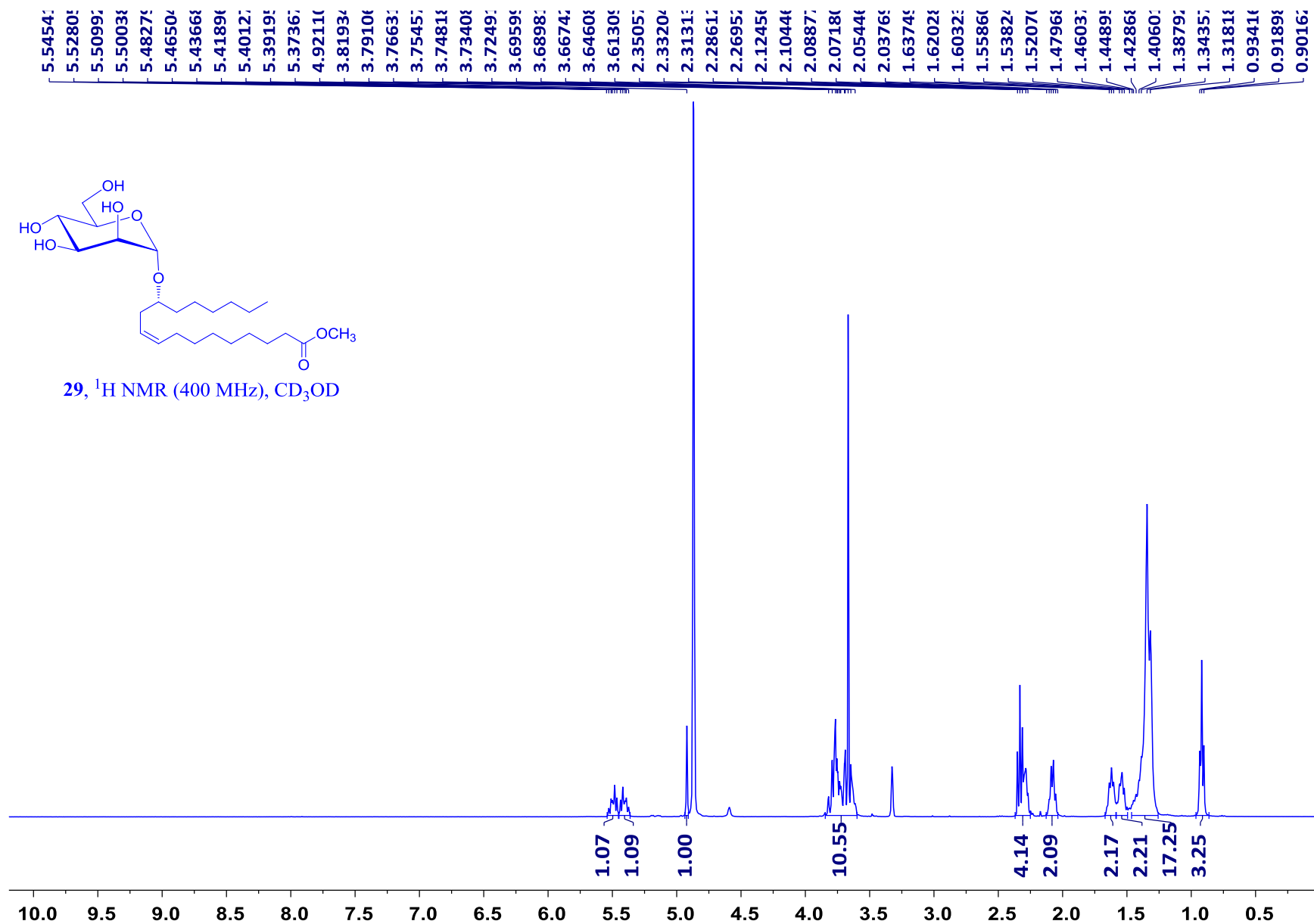


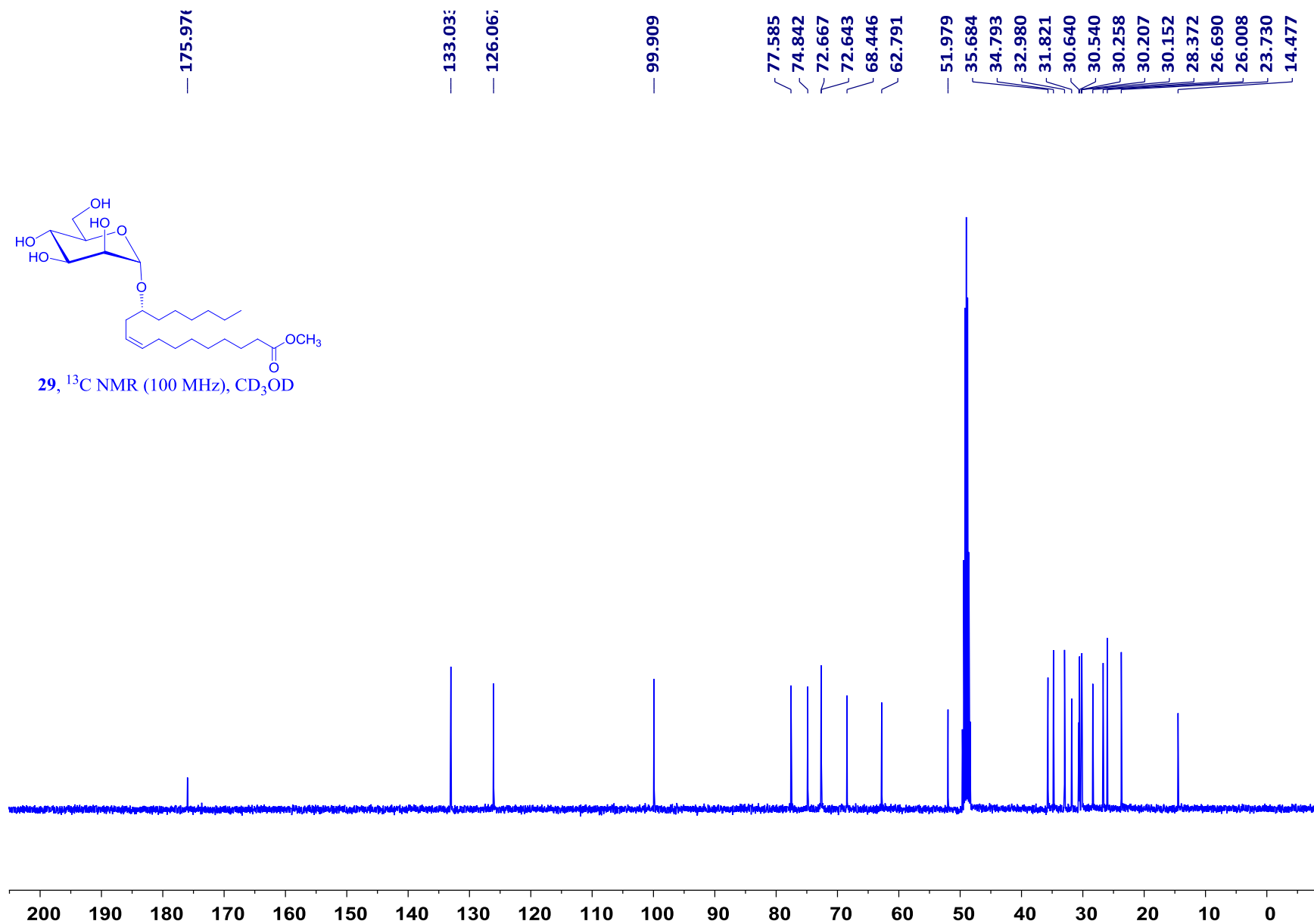


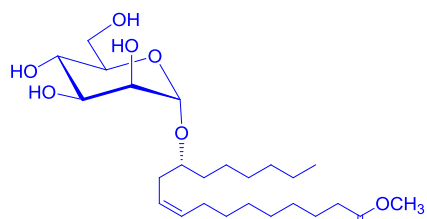
28, ^1H - ^1H gCOSY, (400 MHz), CDCl_3



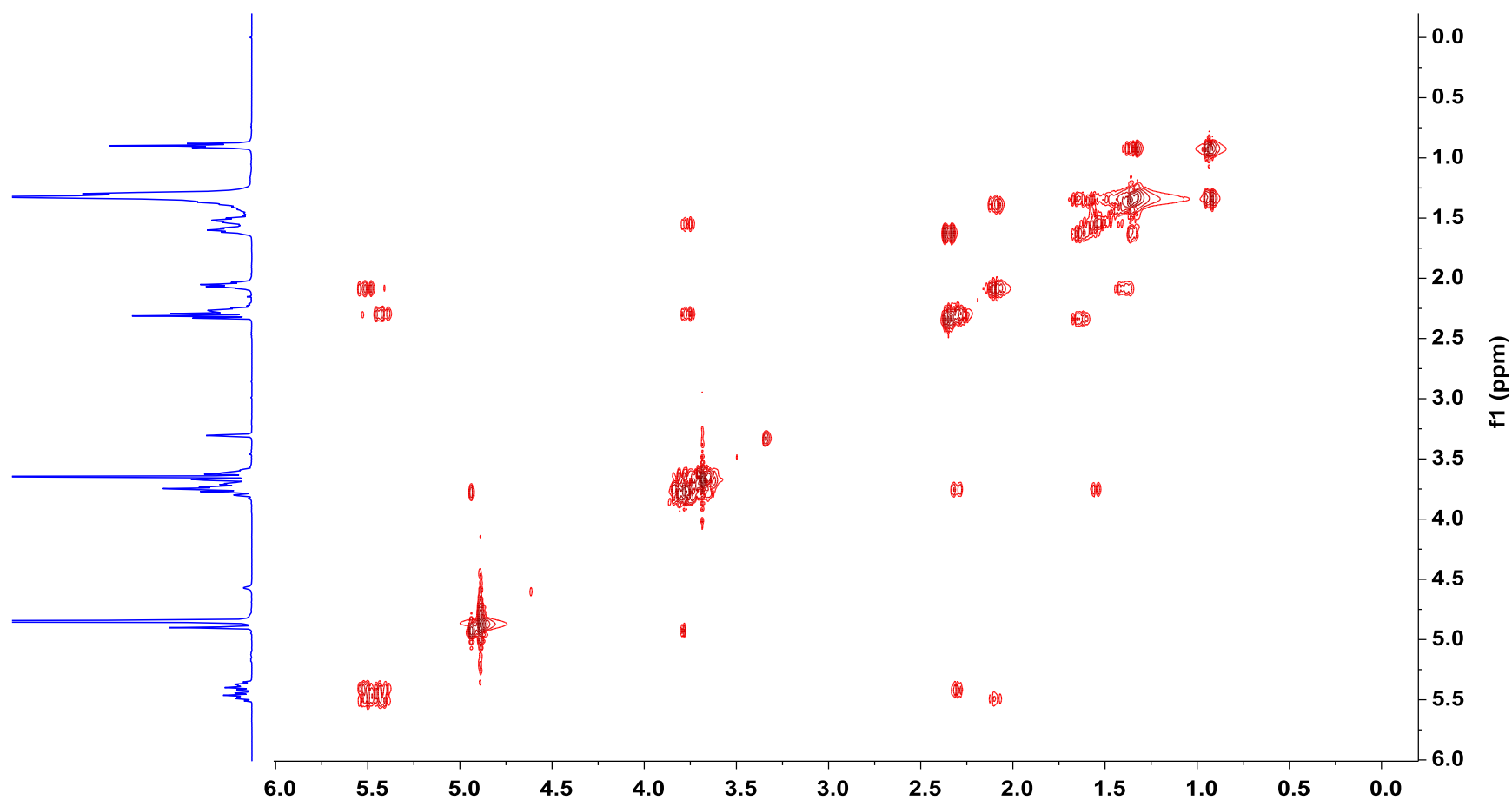


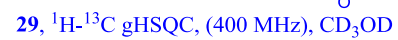


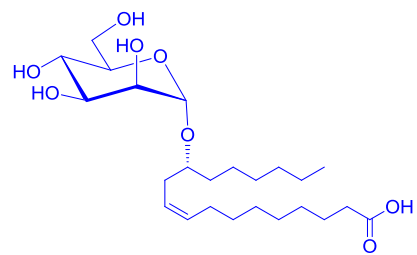




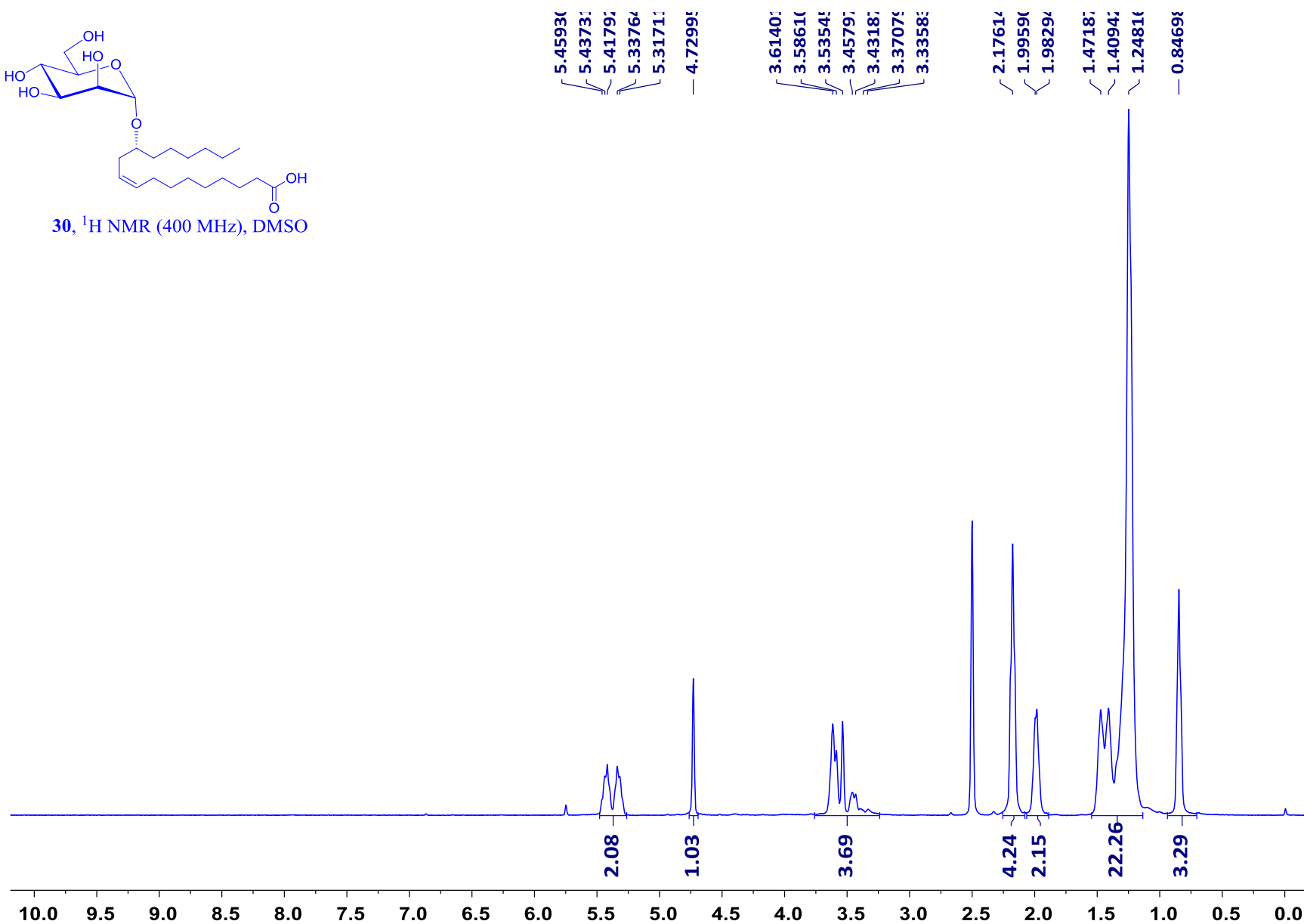
29, ¹H-¹H gCOSY, (400 MHz), CD₃OD

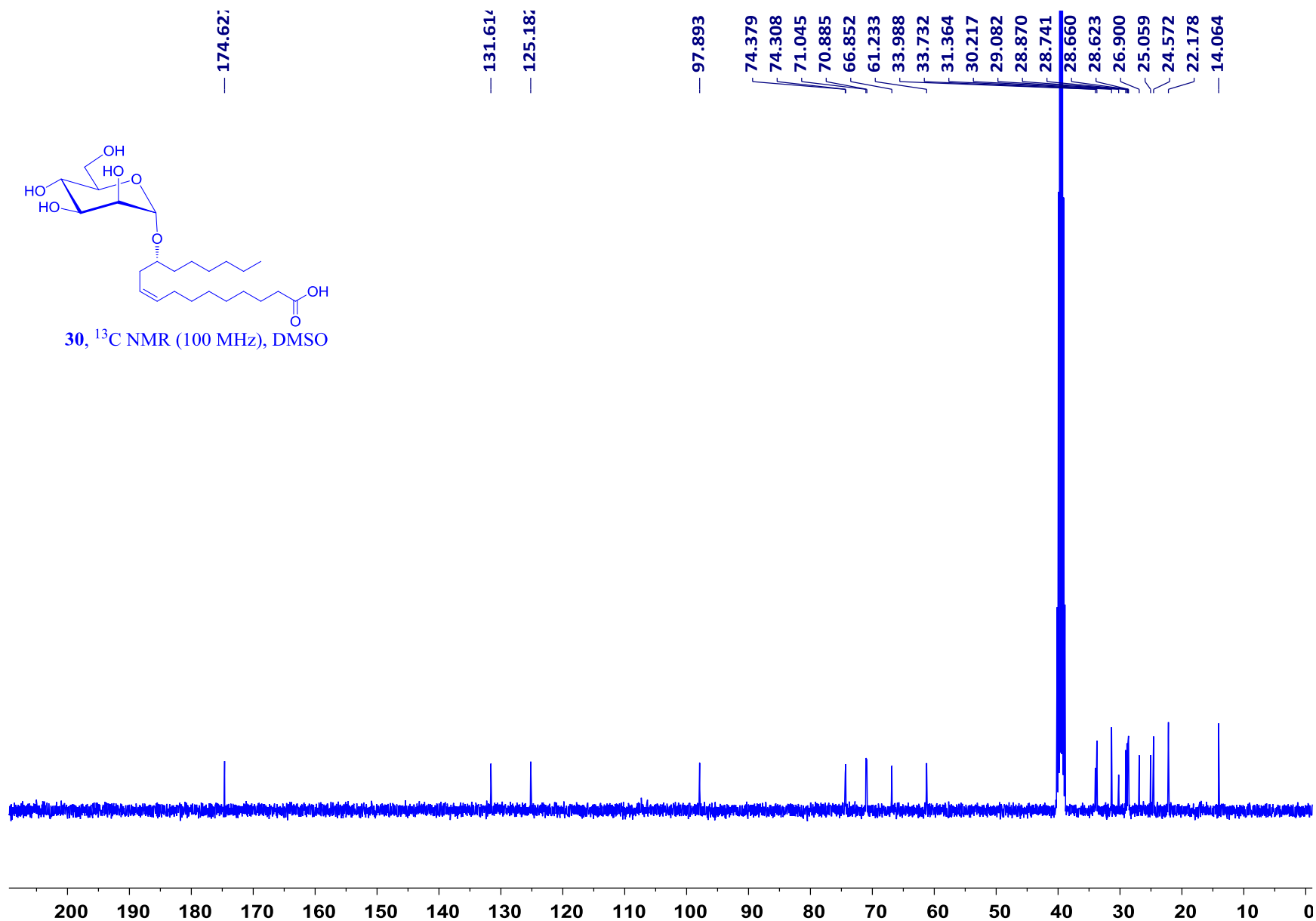


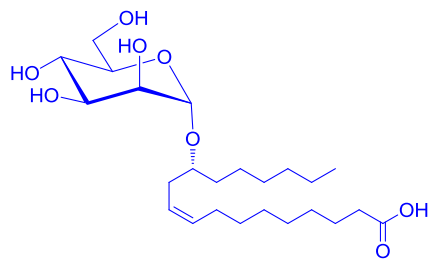




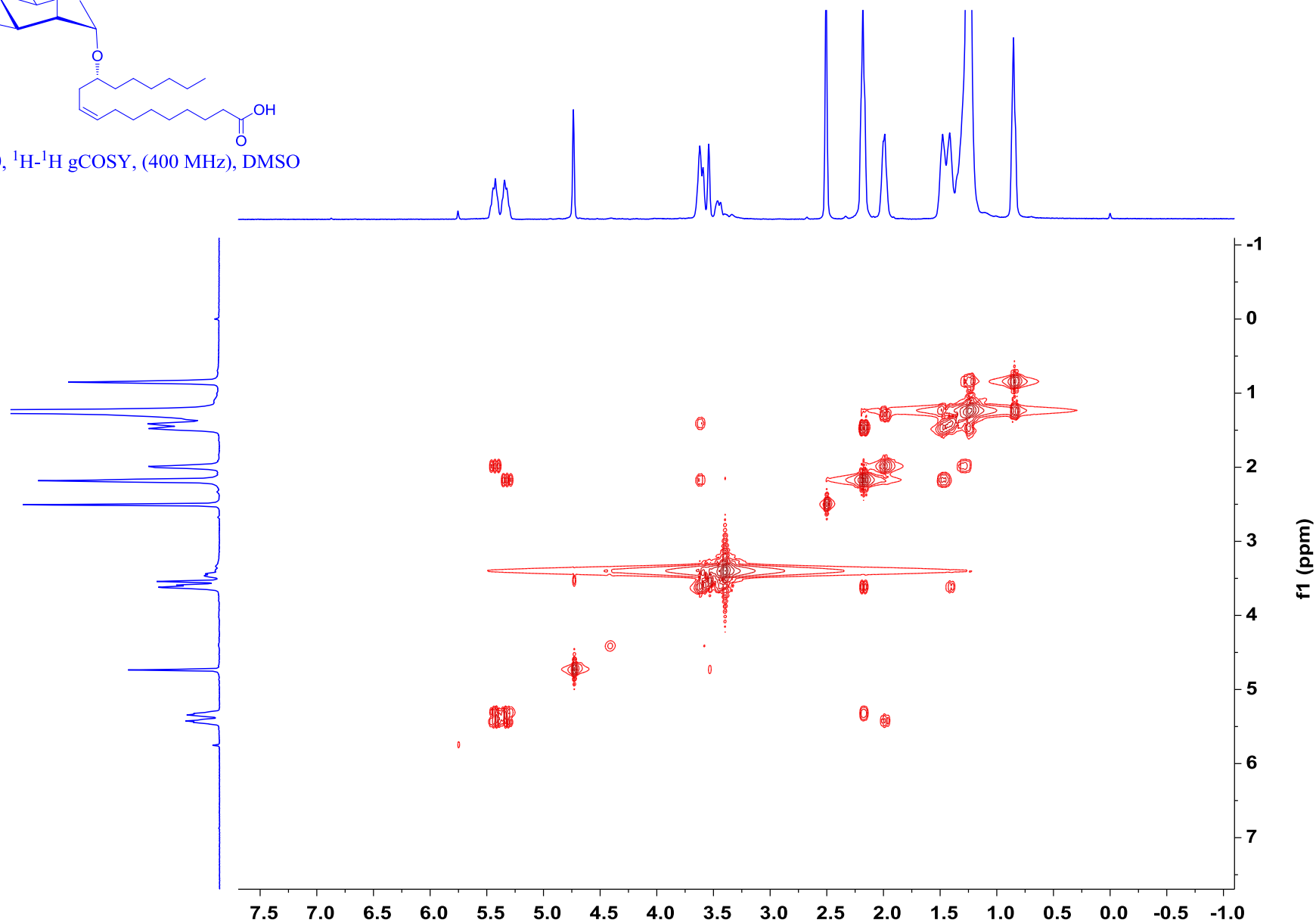
30, ^1H NMR (400 MHz), DMSO

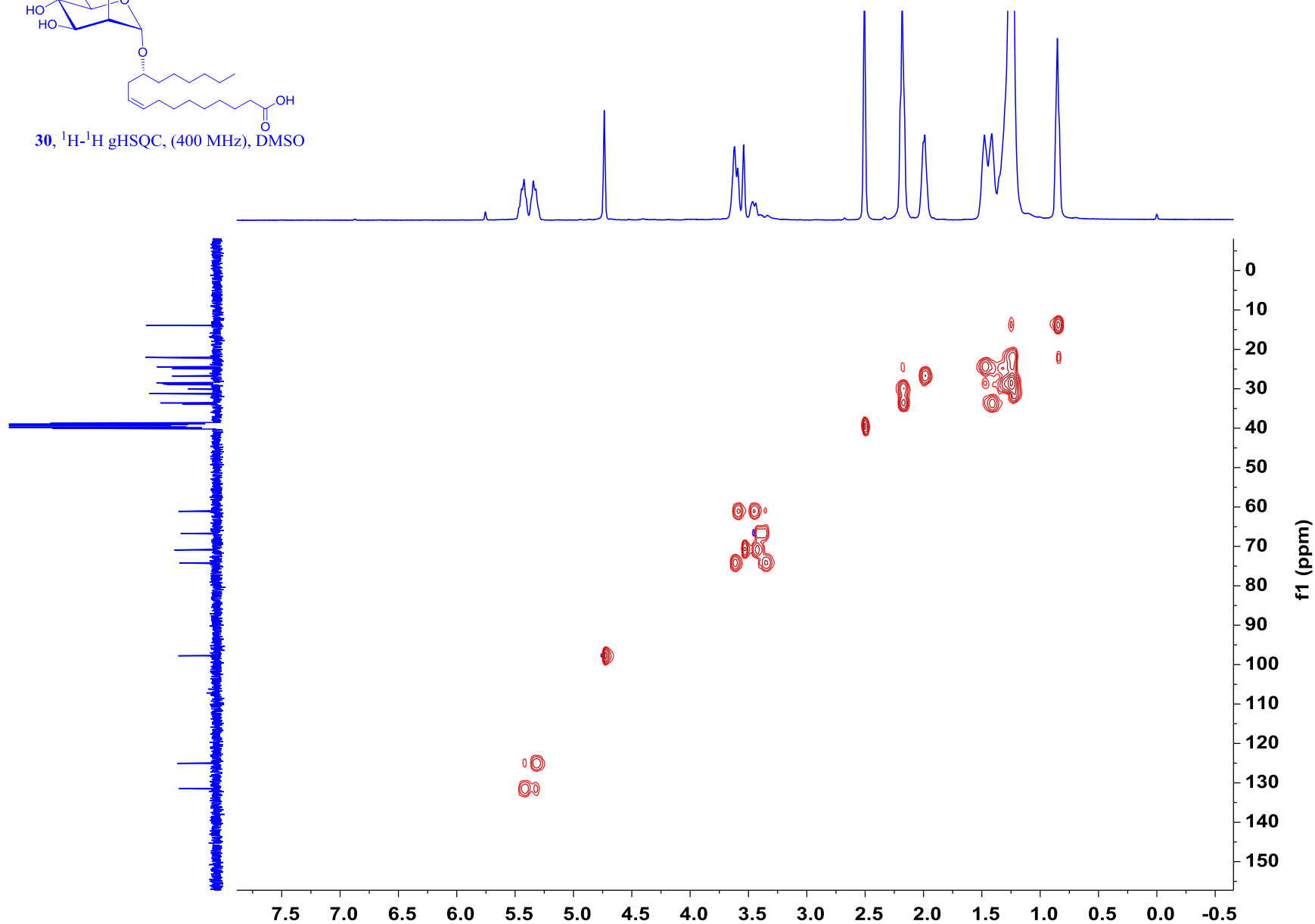
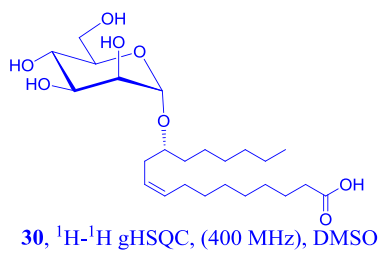


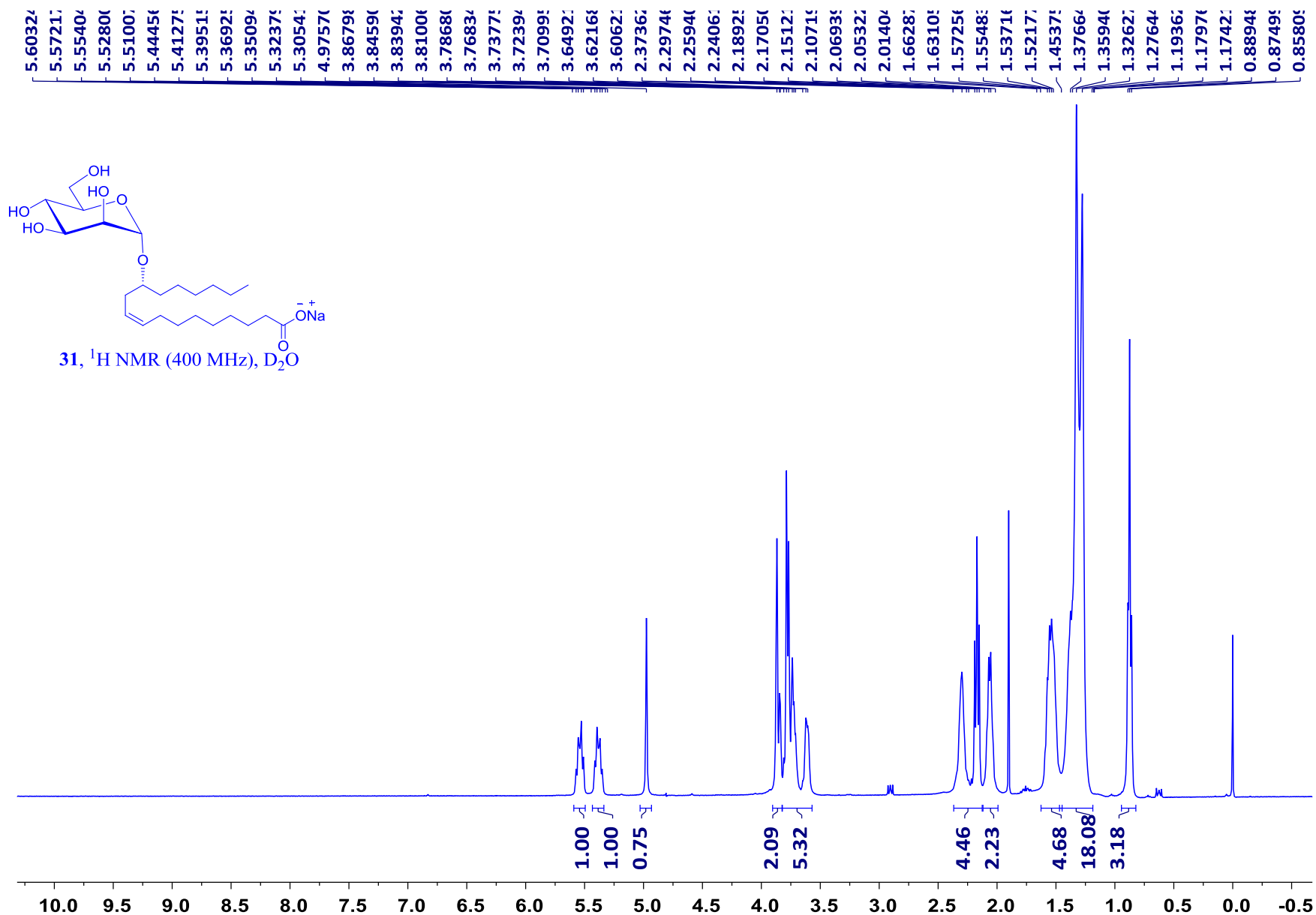


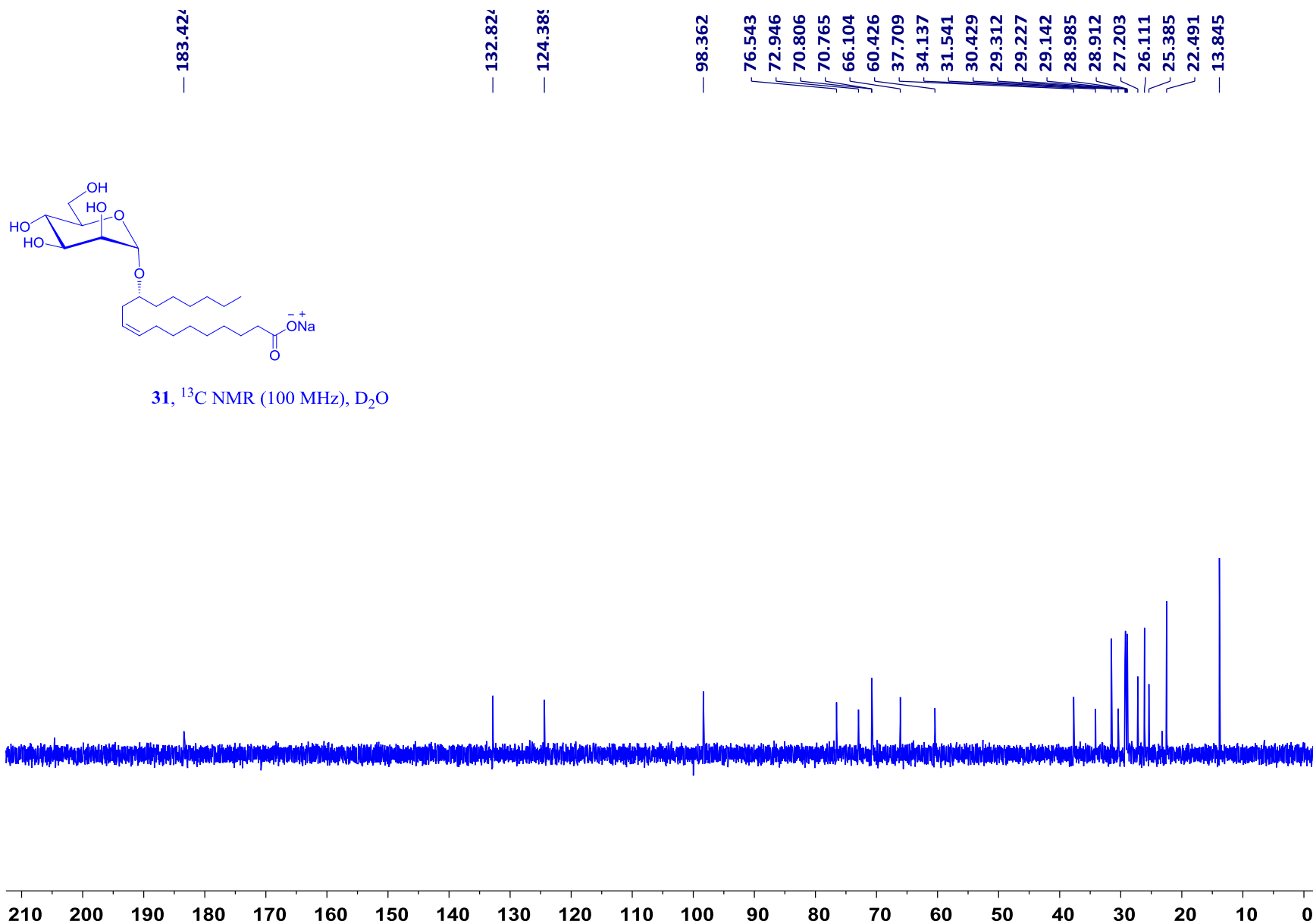


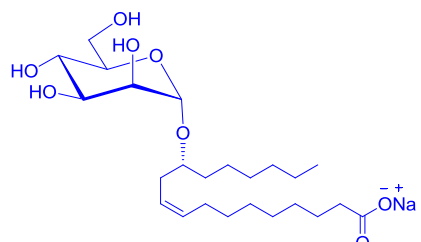
30, ^1H - ^1H gCOSY, (400 MHz), DMSO



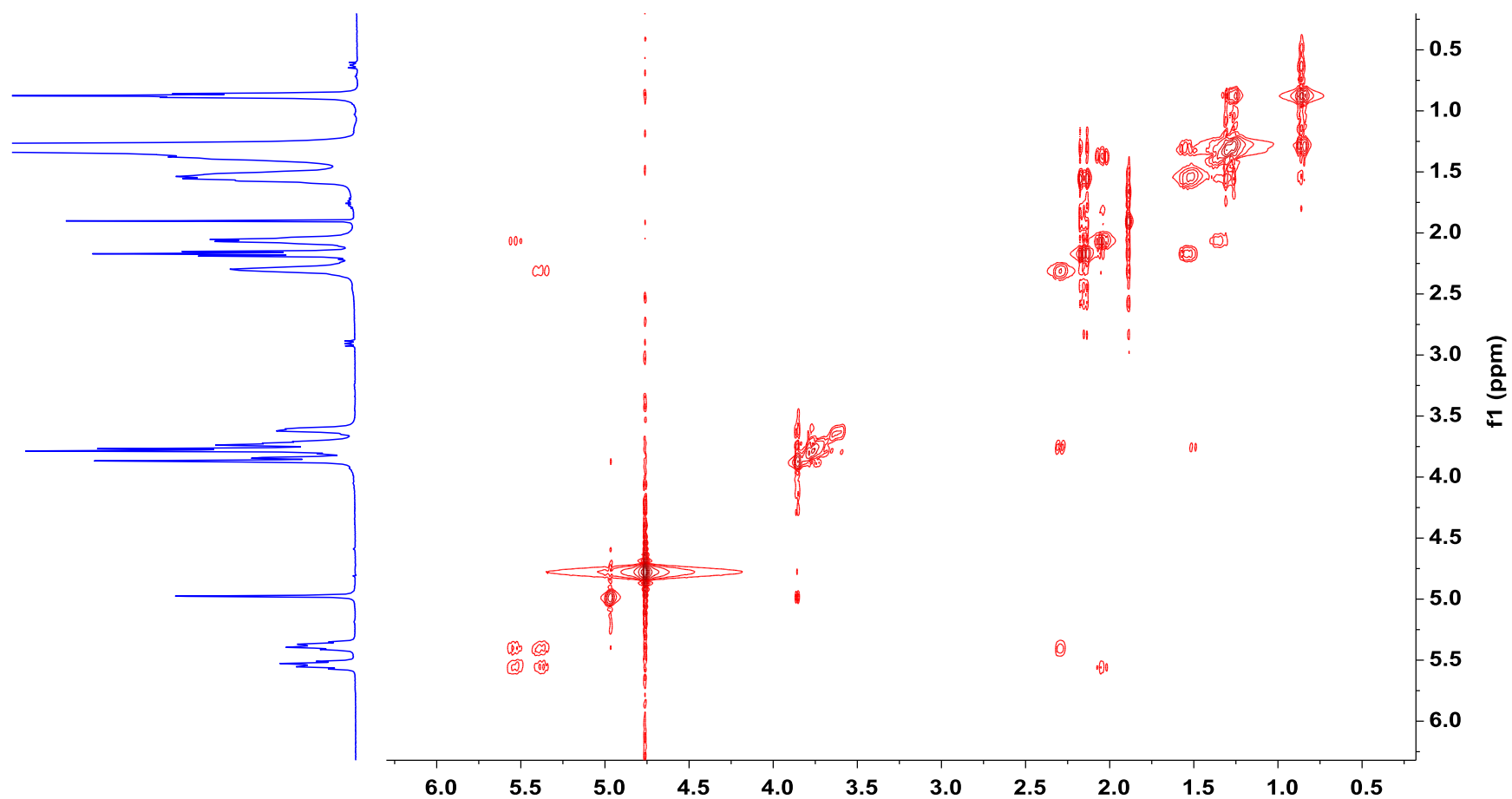


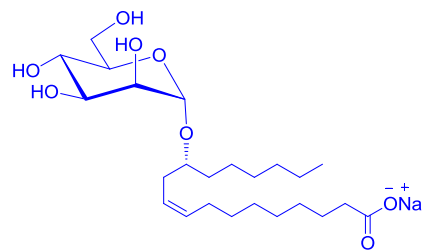




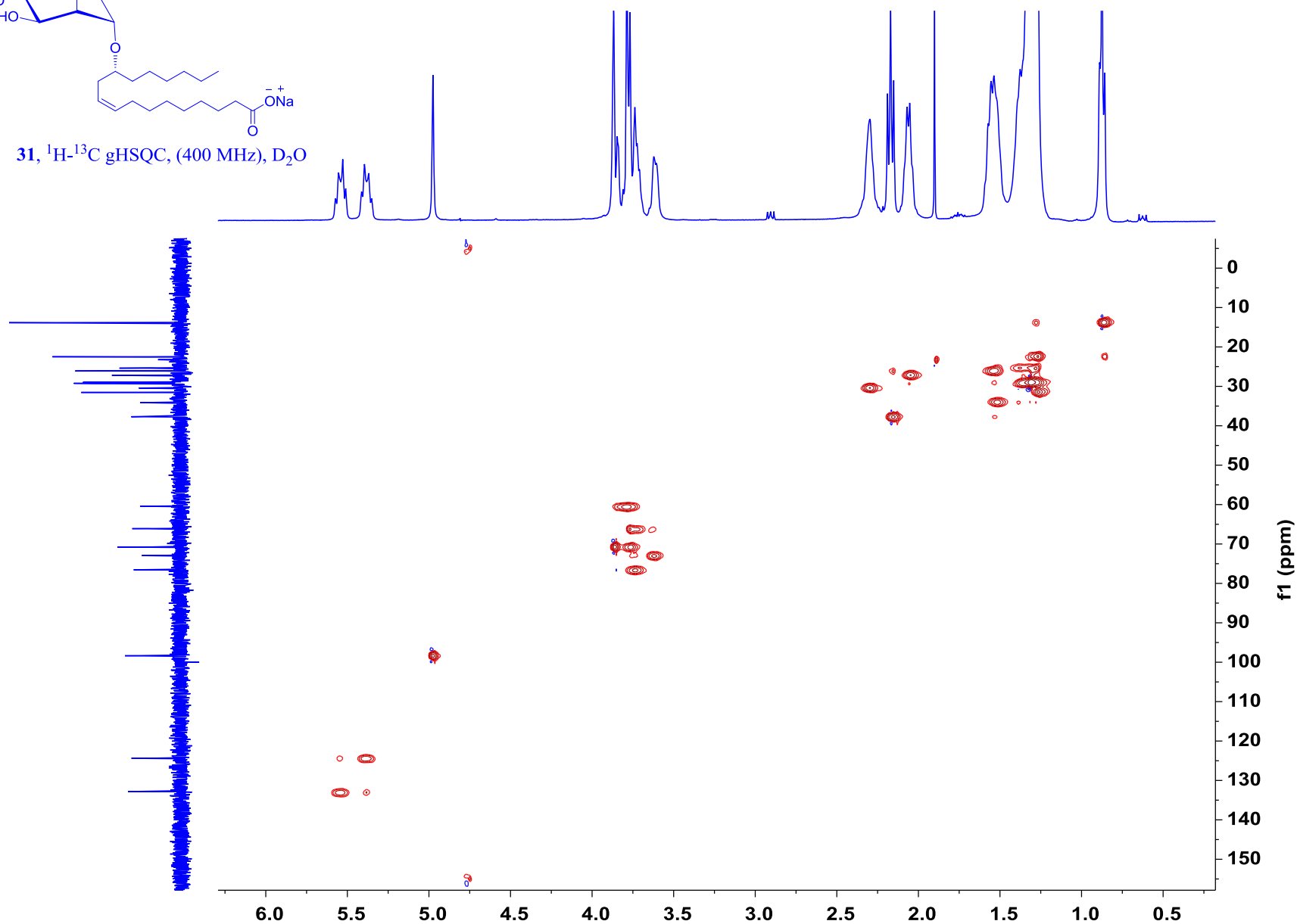


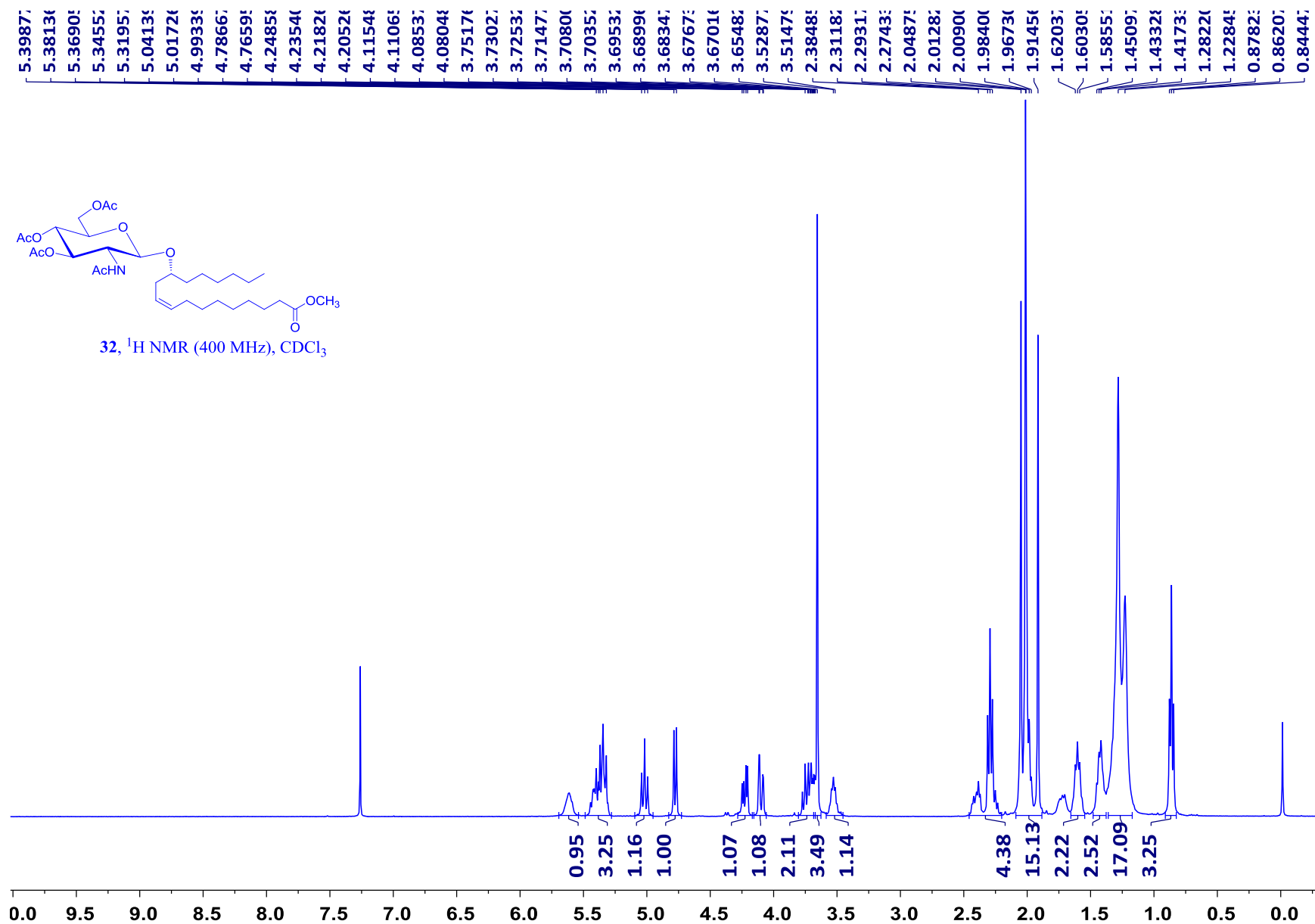
31, ^1H - ^1H gCOSY, (400 MHz), D_2O

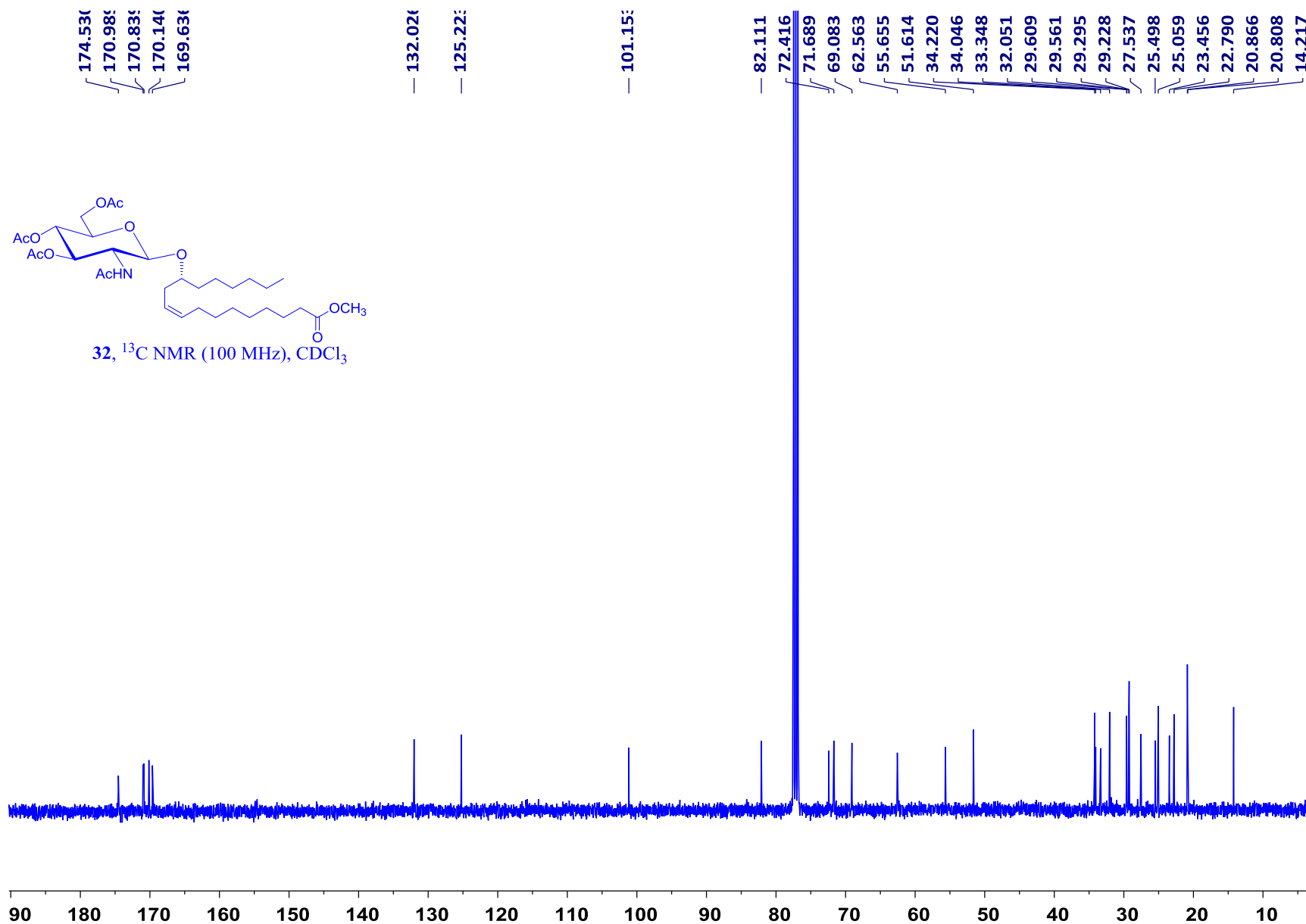


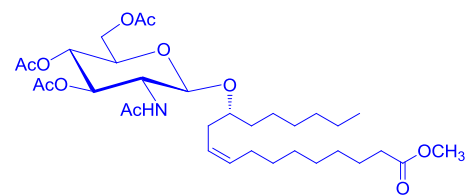


31, ^1H - ^{13}C gHSQC, (400 MHz), D_2O

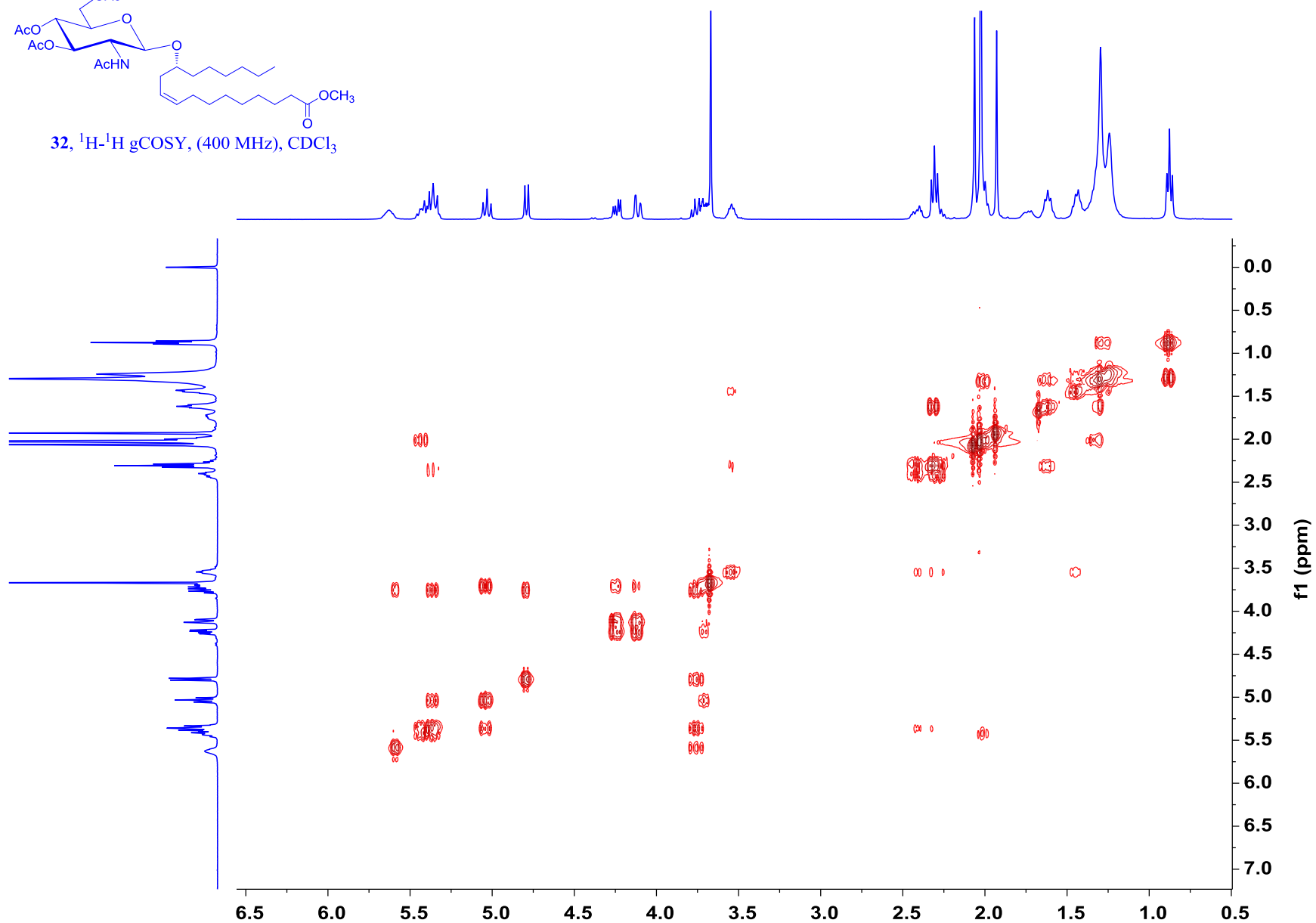


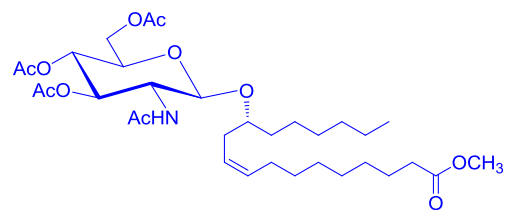




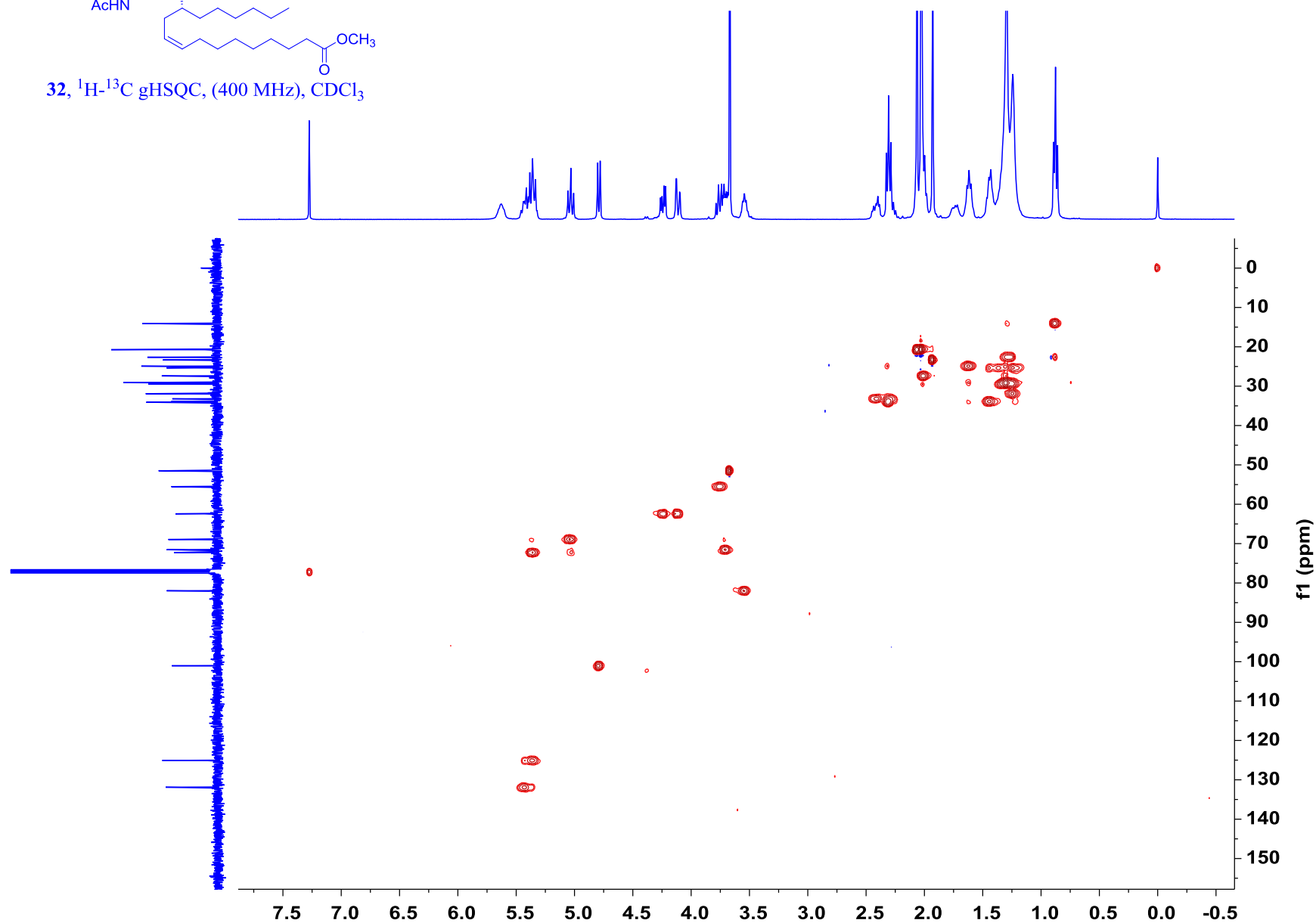


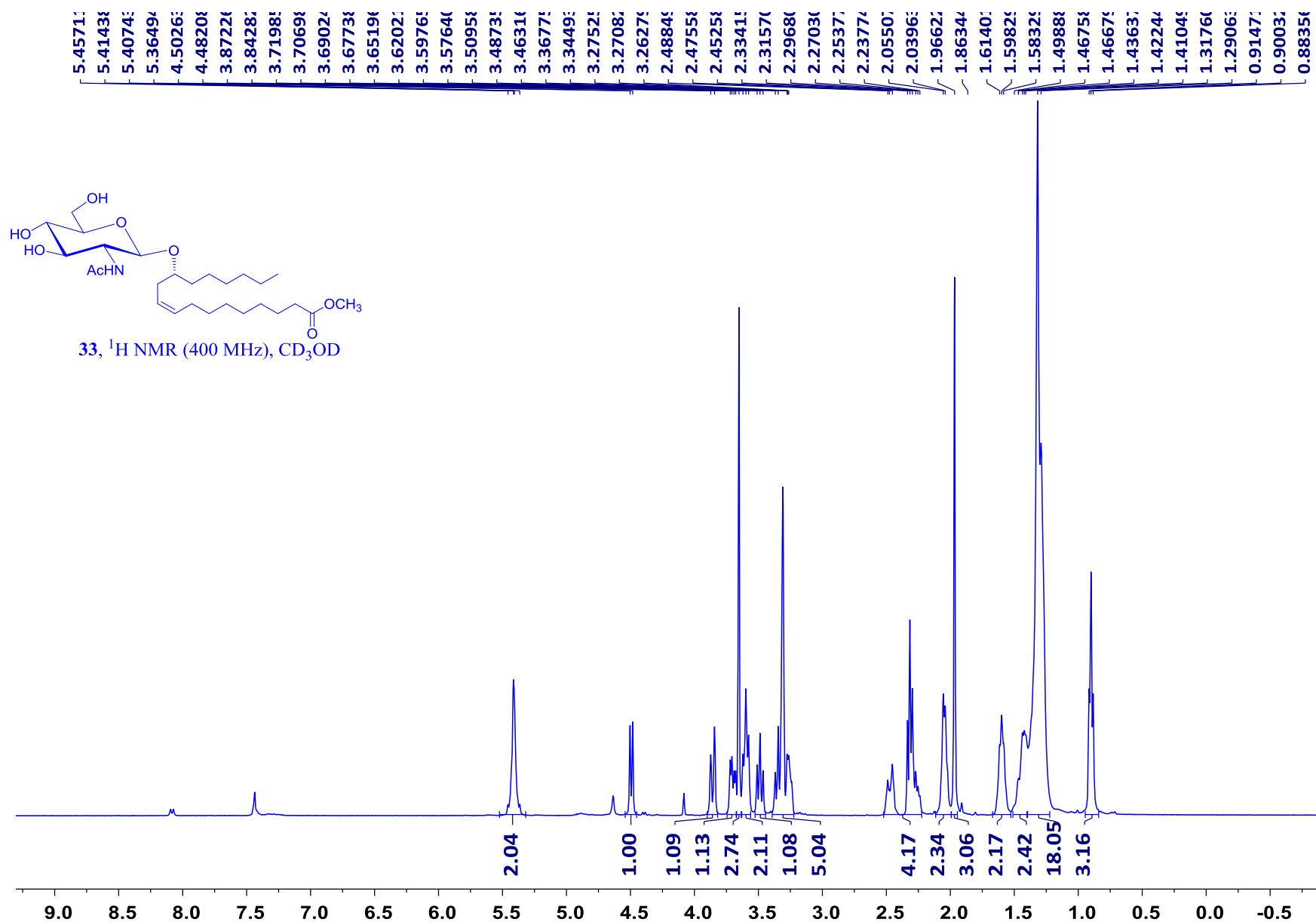
32, ^1H - ^1H gCOSY, (400 MHz), CDCl_3

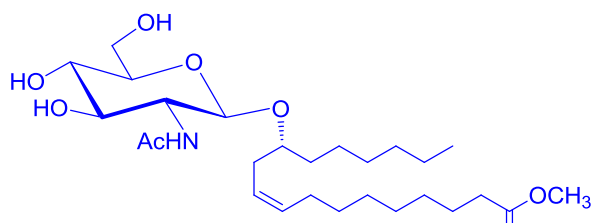




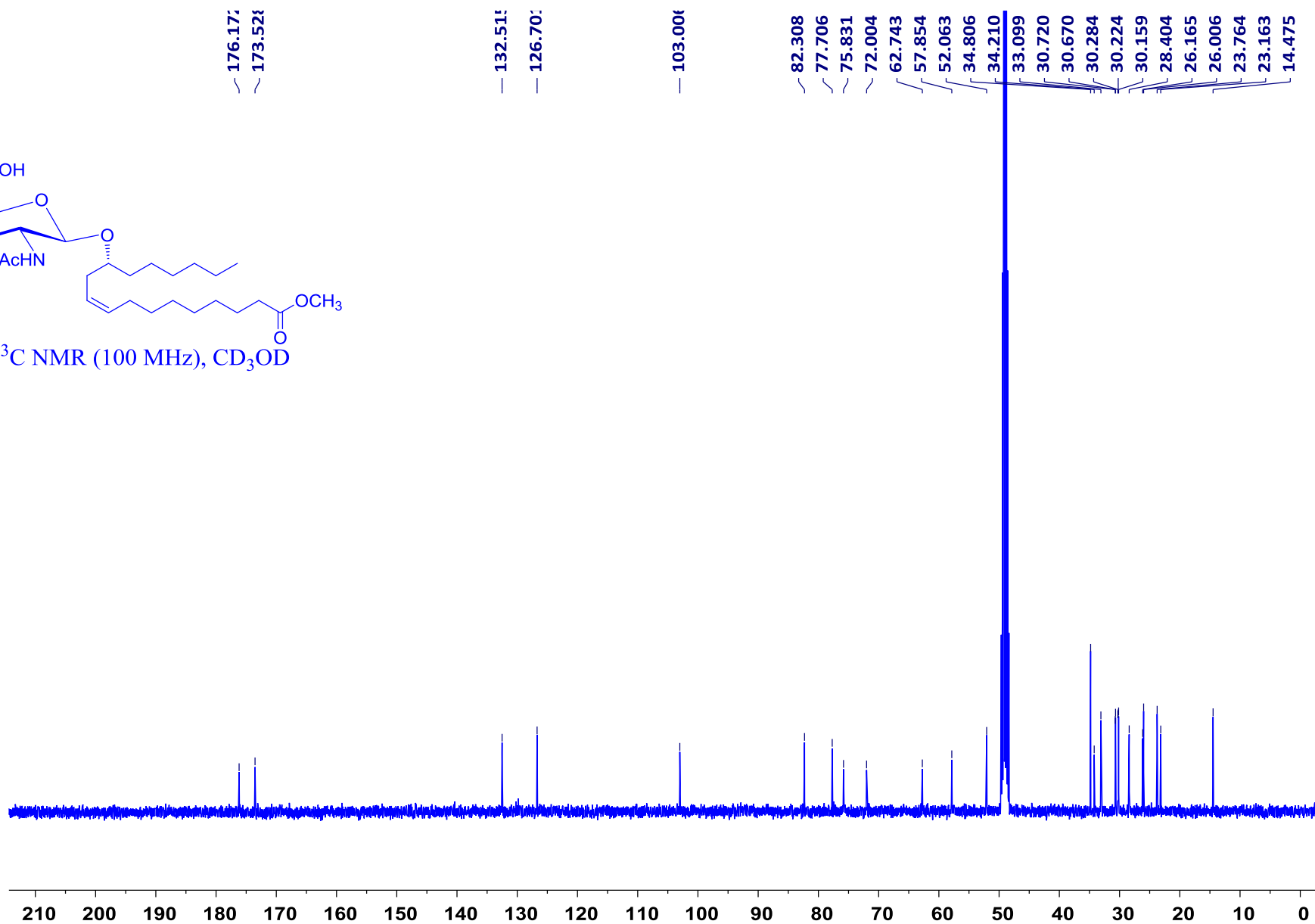
32, ^1H - ^{13}C gHSQC, (400 MHz), CDCl_3

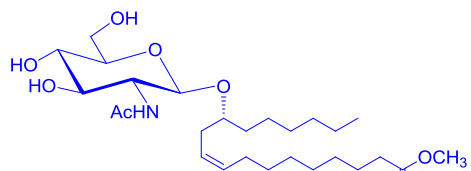




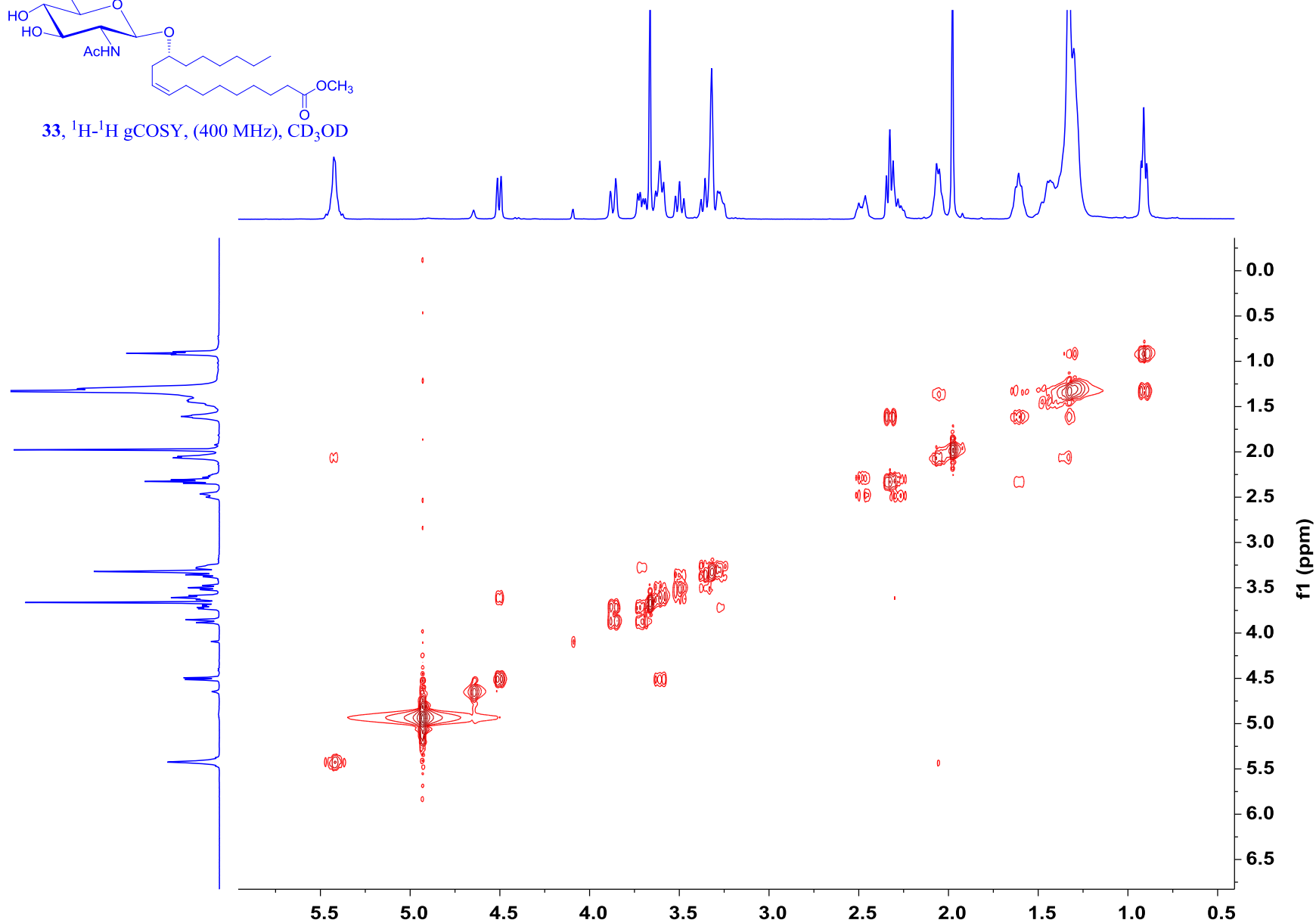


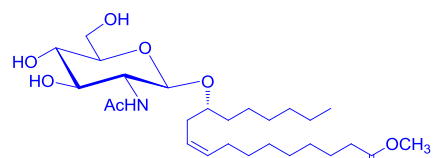
33, ^{13}C NMR (100 MHz), CD_3OD



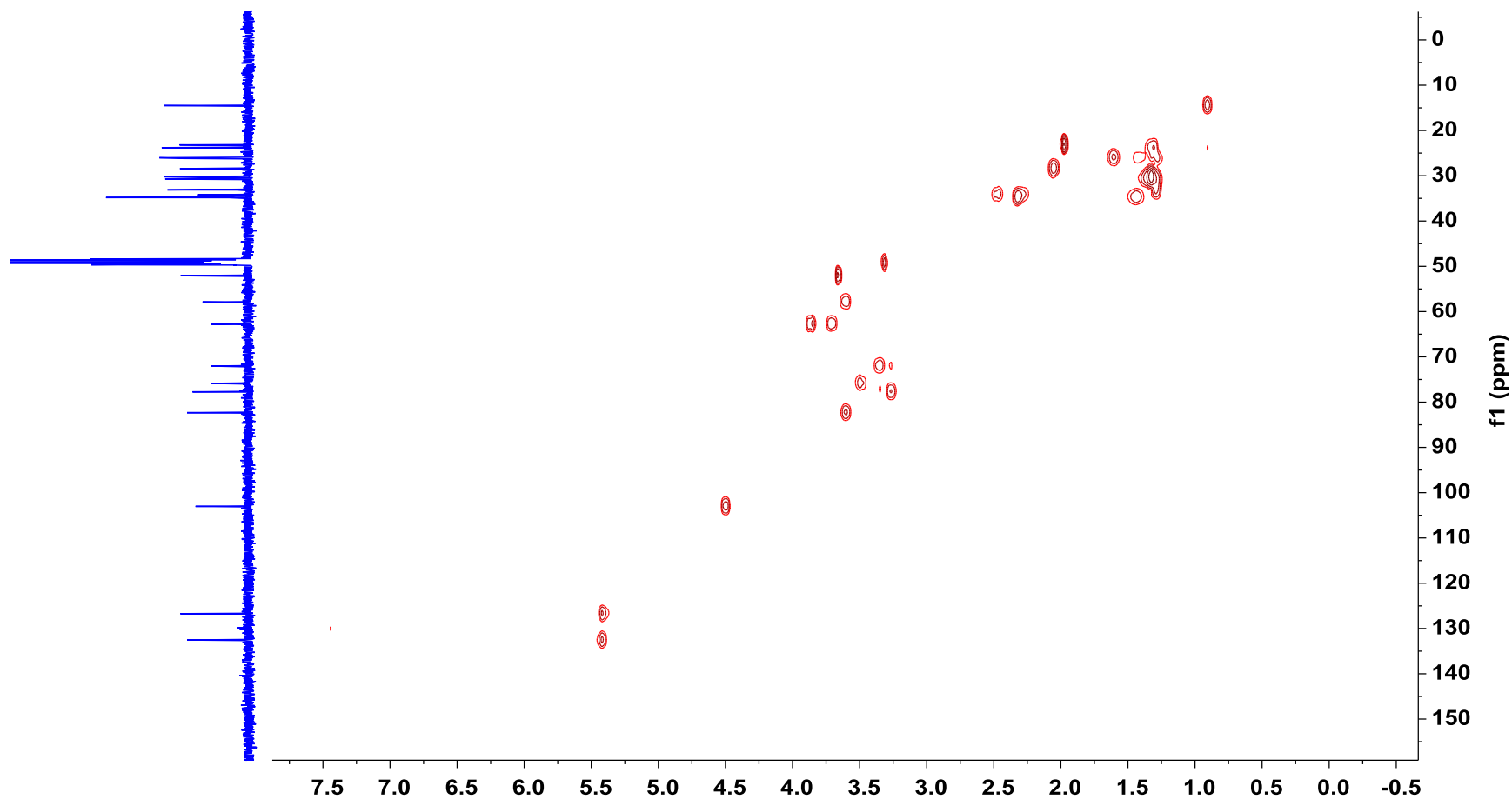


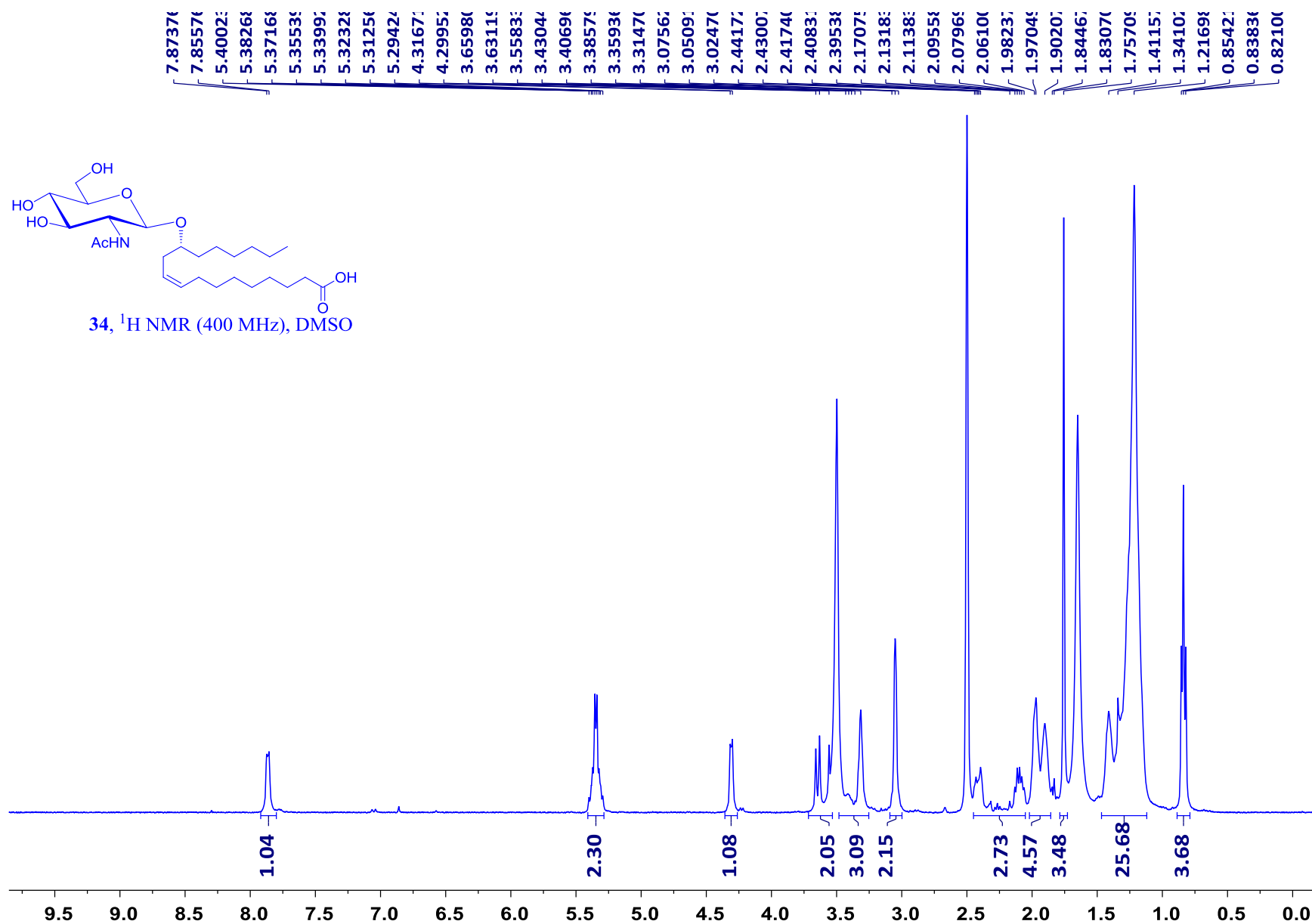
33, ^1H - ^1H gCOSY, (400 MHz), CD_3OD

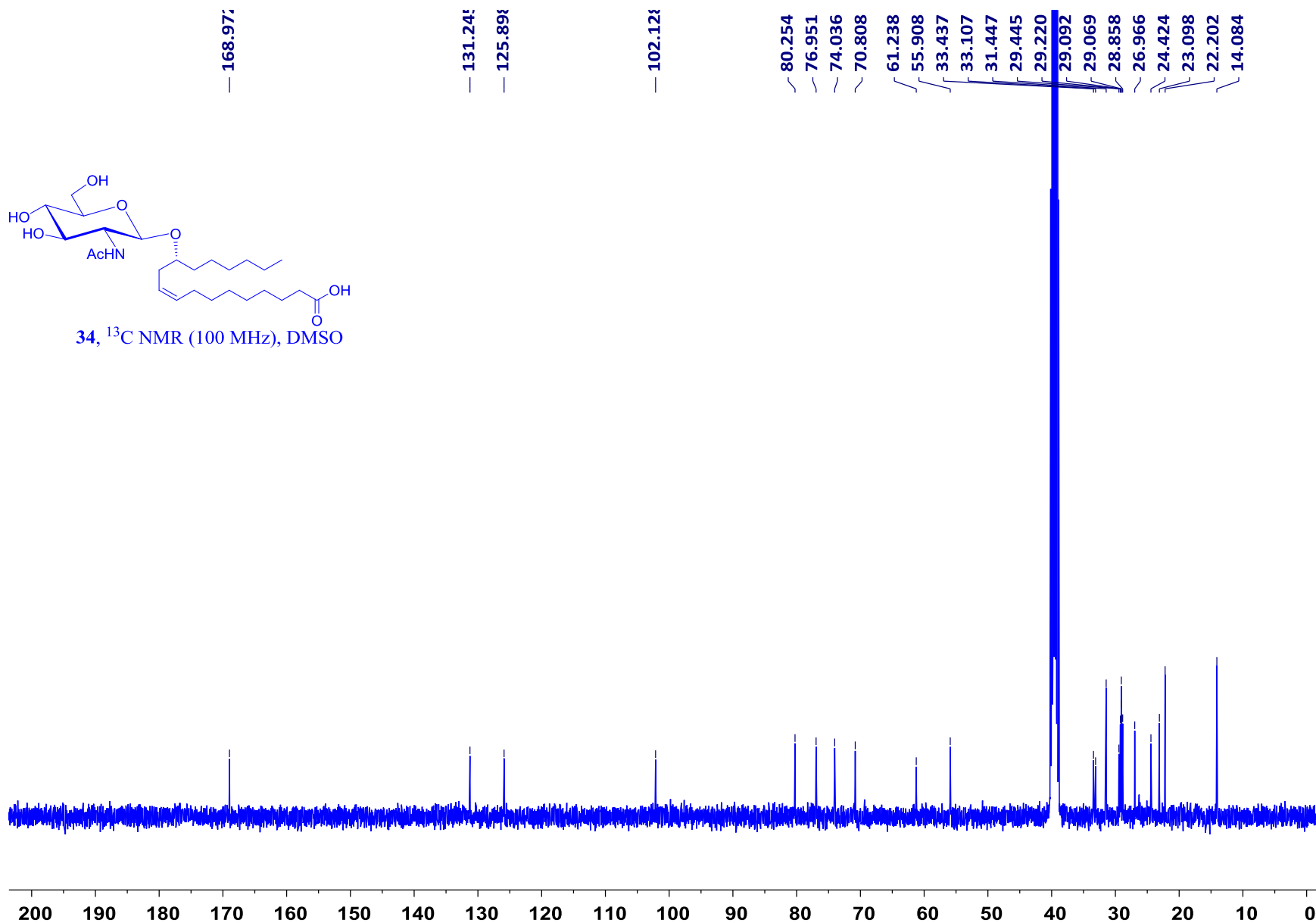


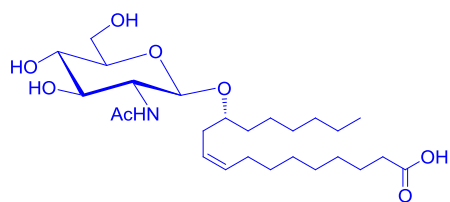


33, ^1H - ^{13}C gHSQC, (400 MHz), CD_3OD

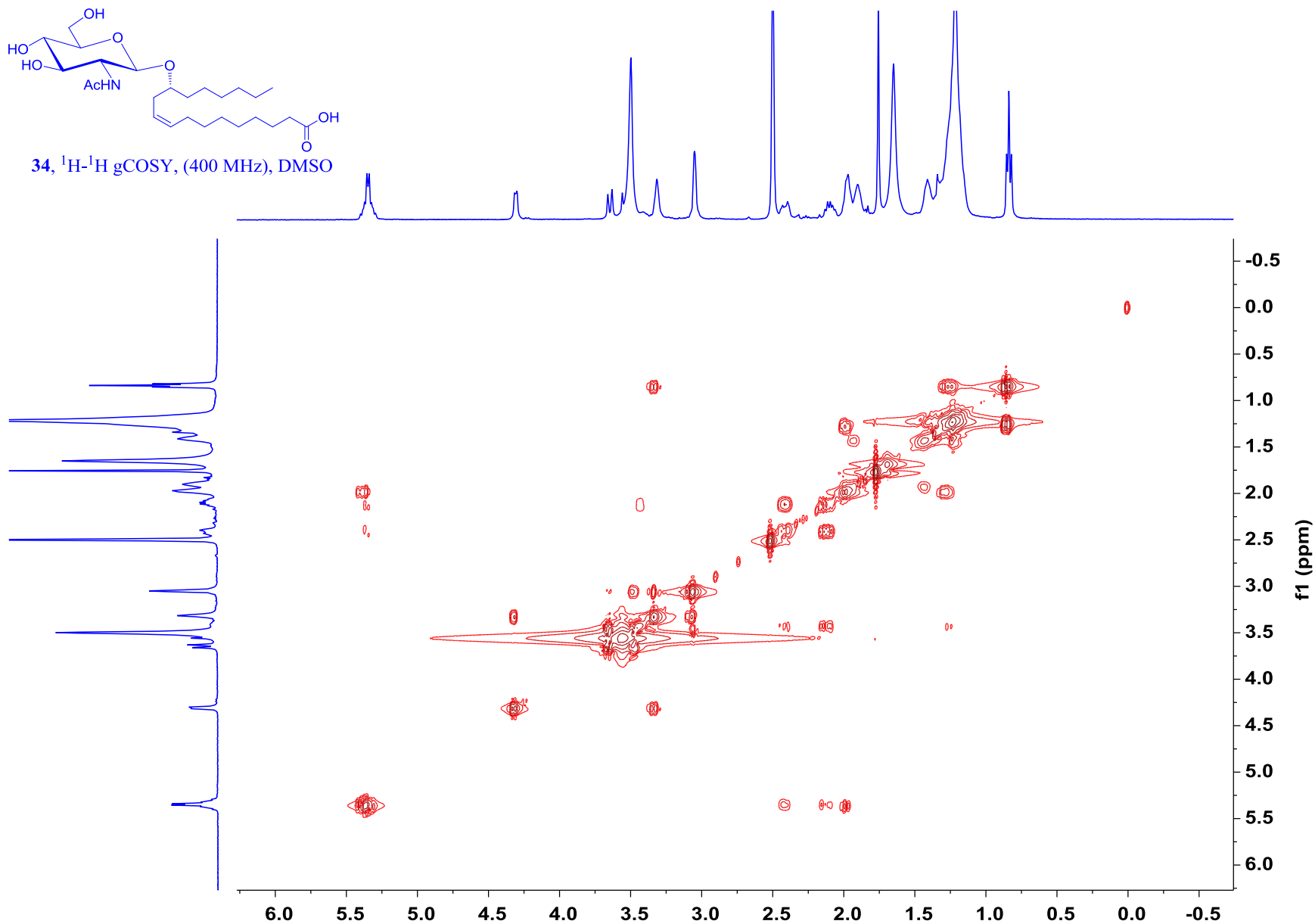


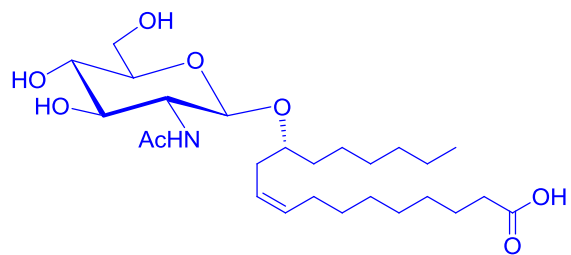




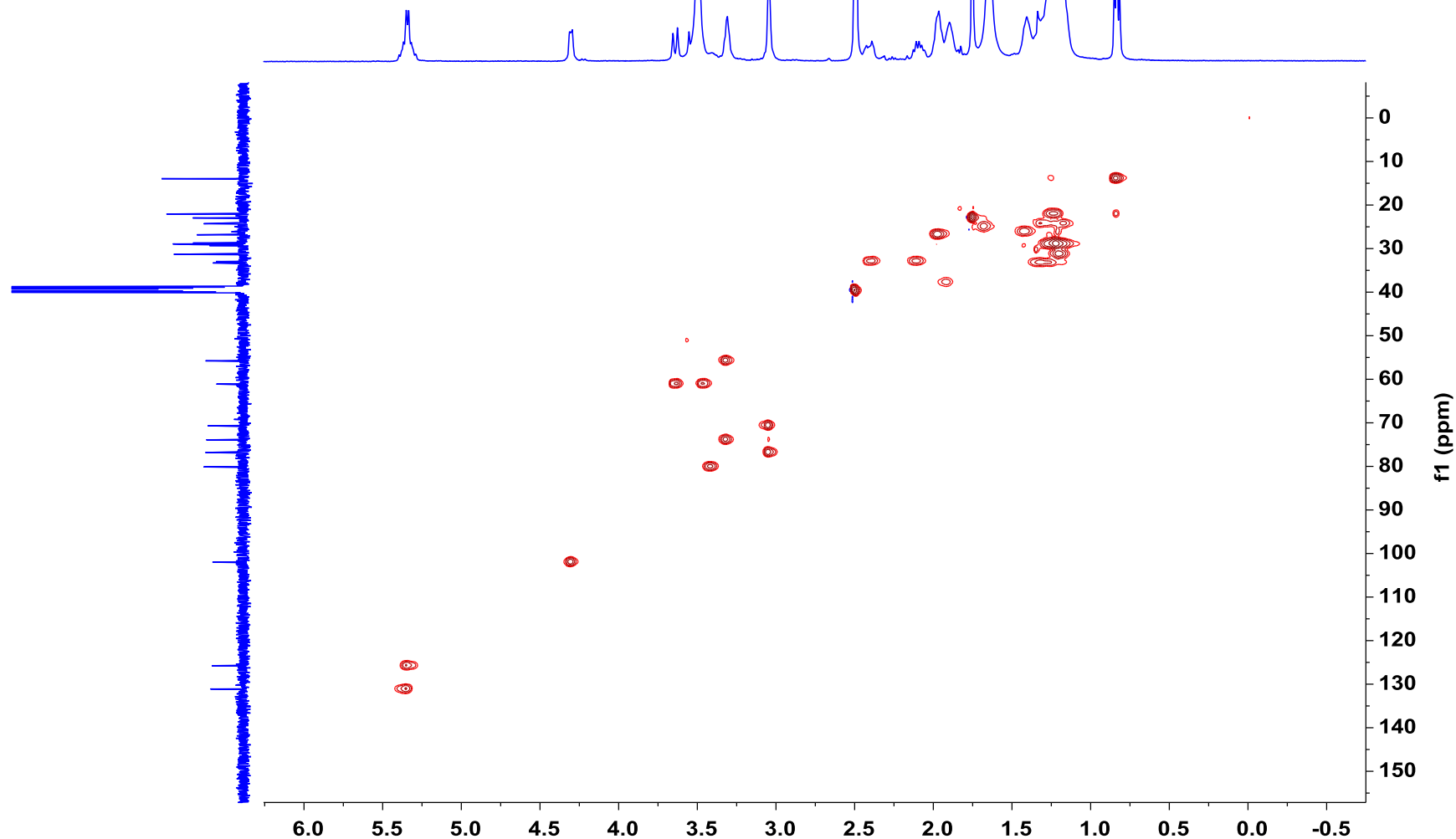


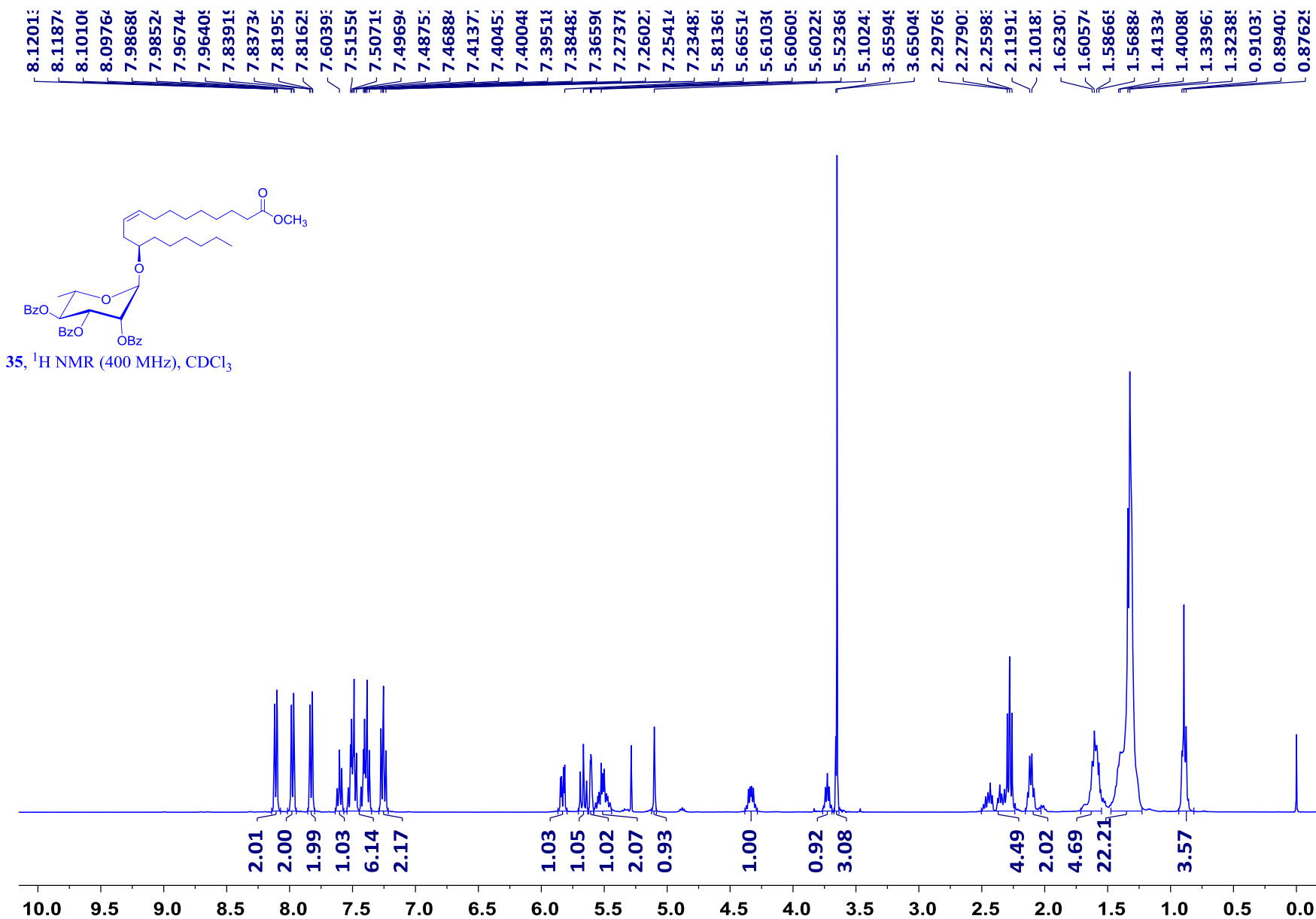
34, ^1H - ^1H gCOSY, (400 MHz), DMSO

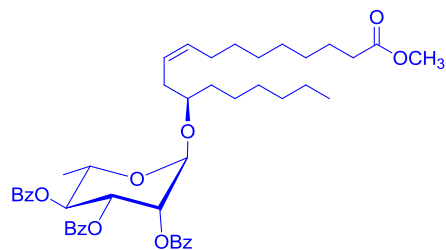




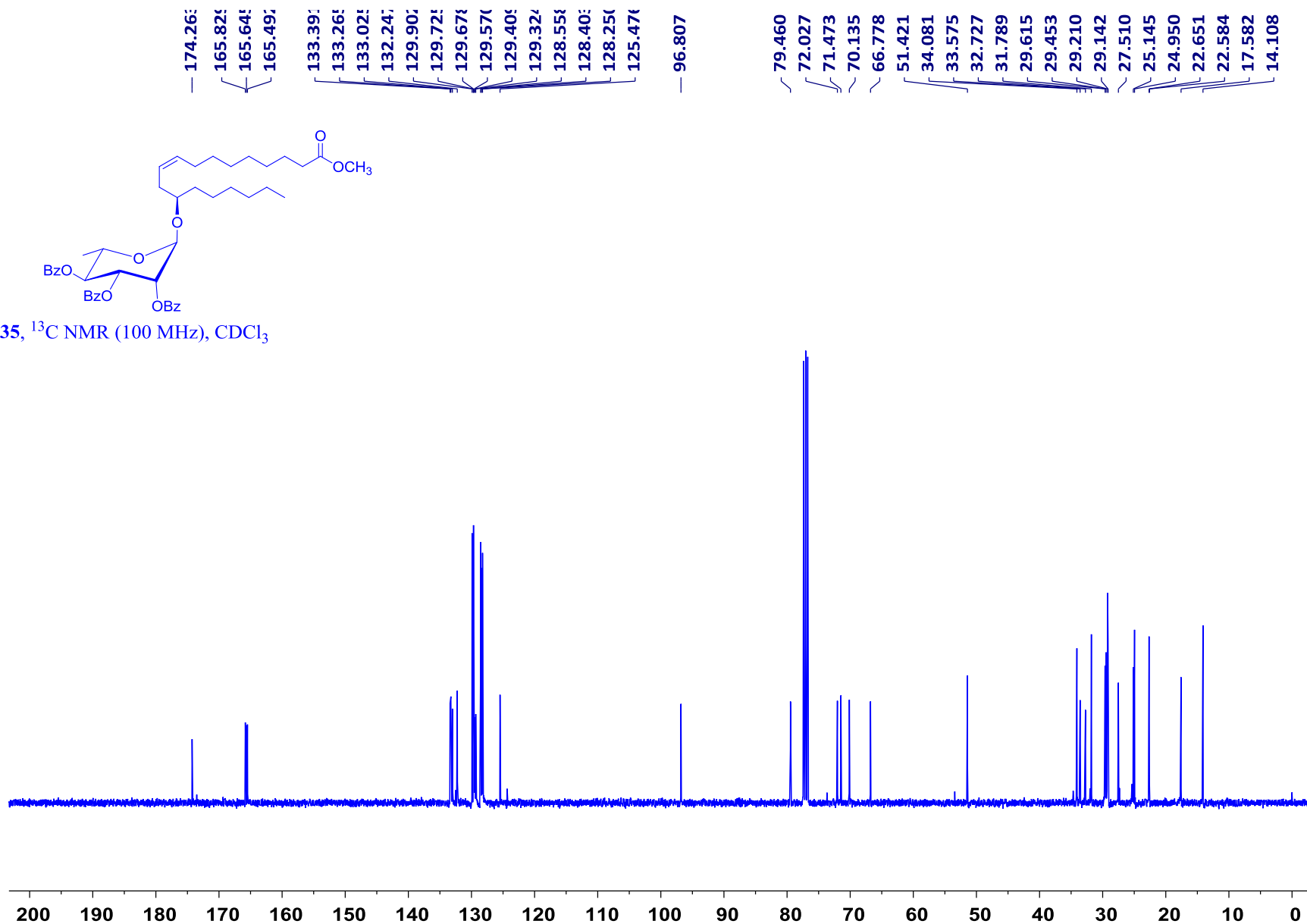
34, ^1H - ^1H gHSQC, (400 MHz), DMSO

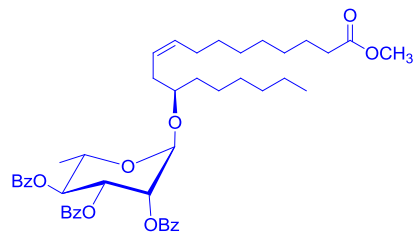




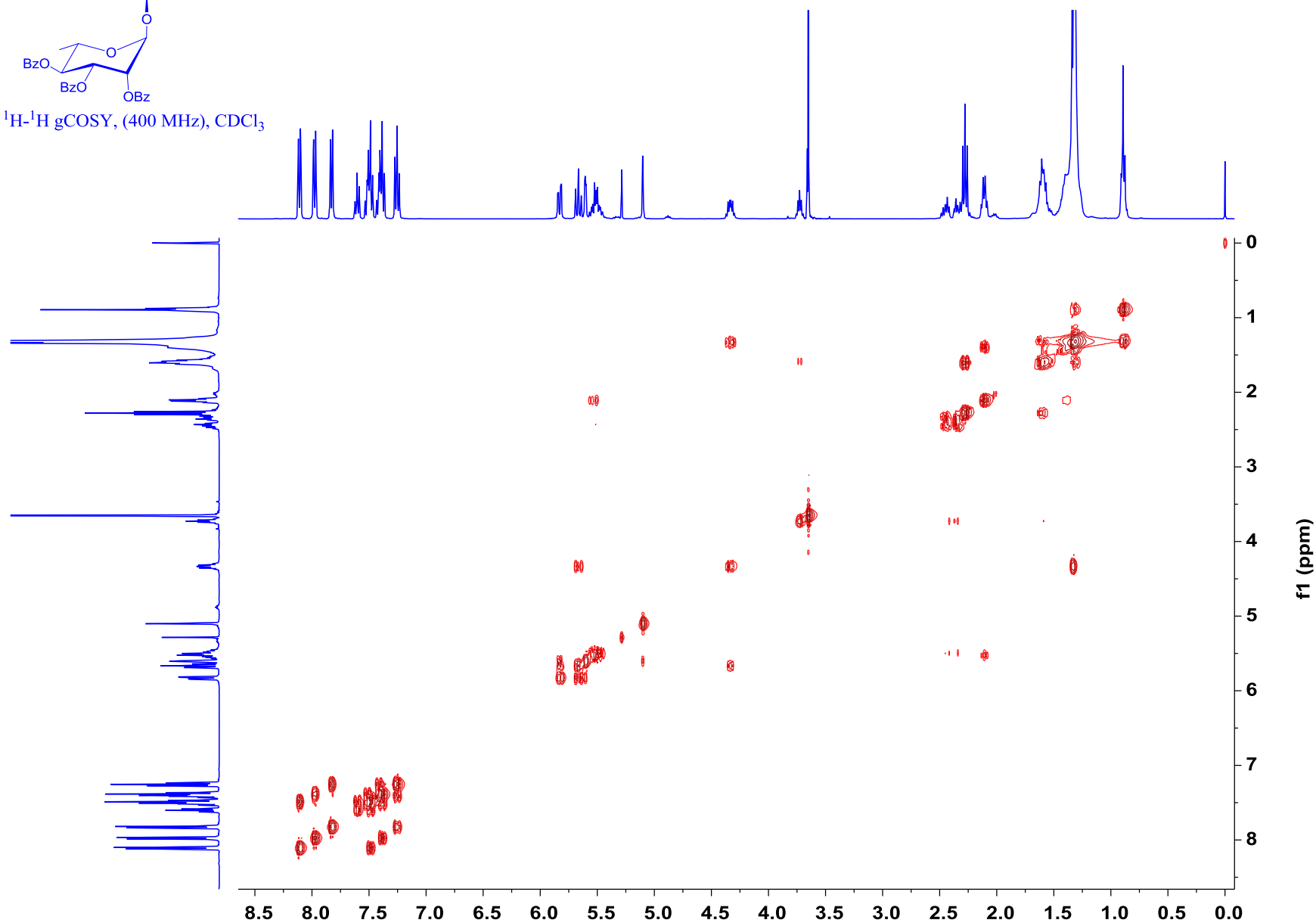


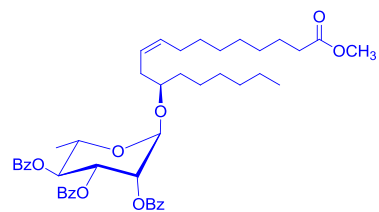
35, ^{13}C NMR (100 MHz), CDCl_3



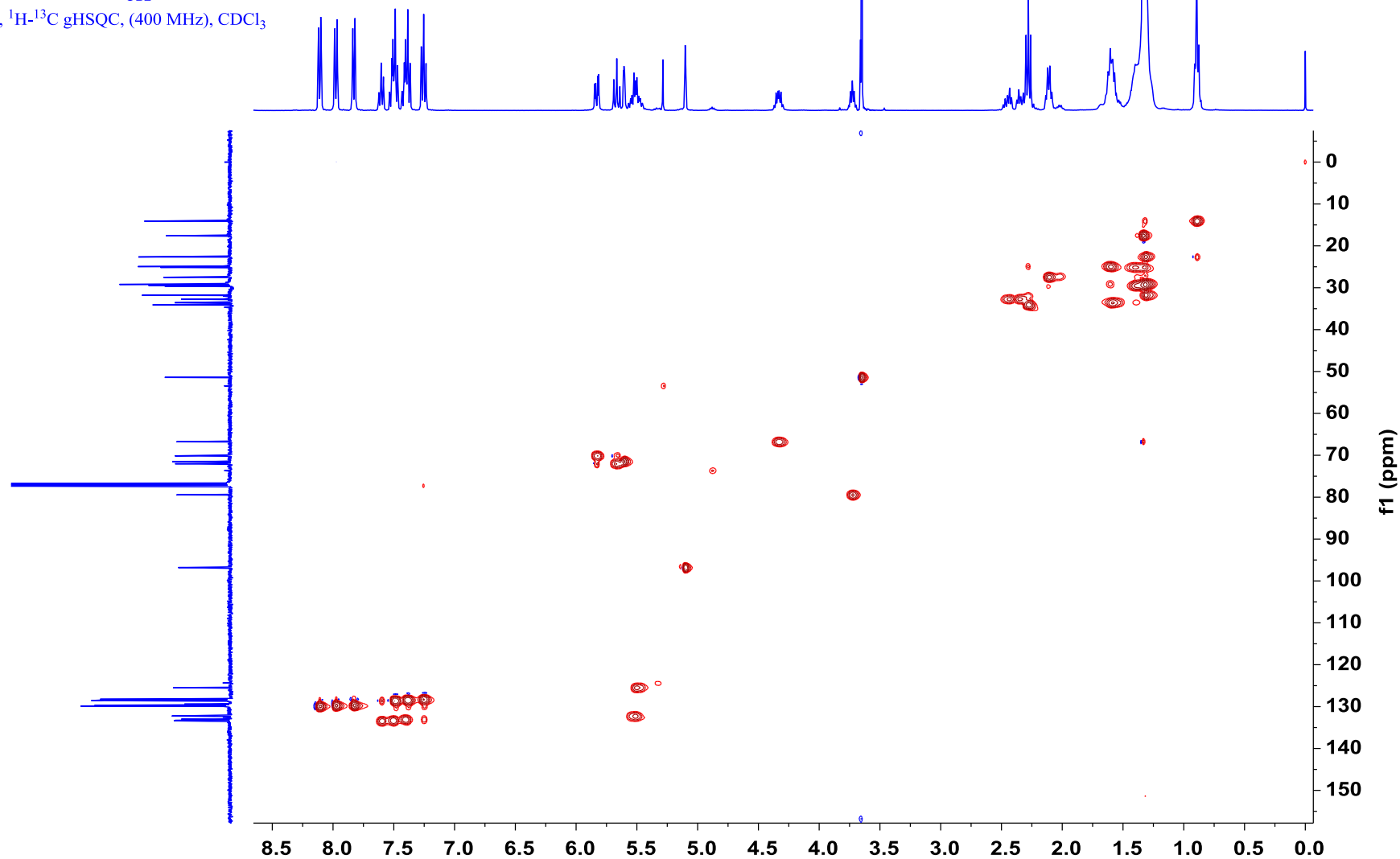


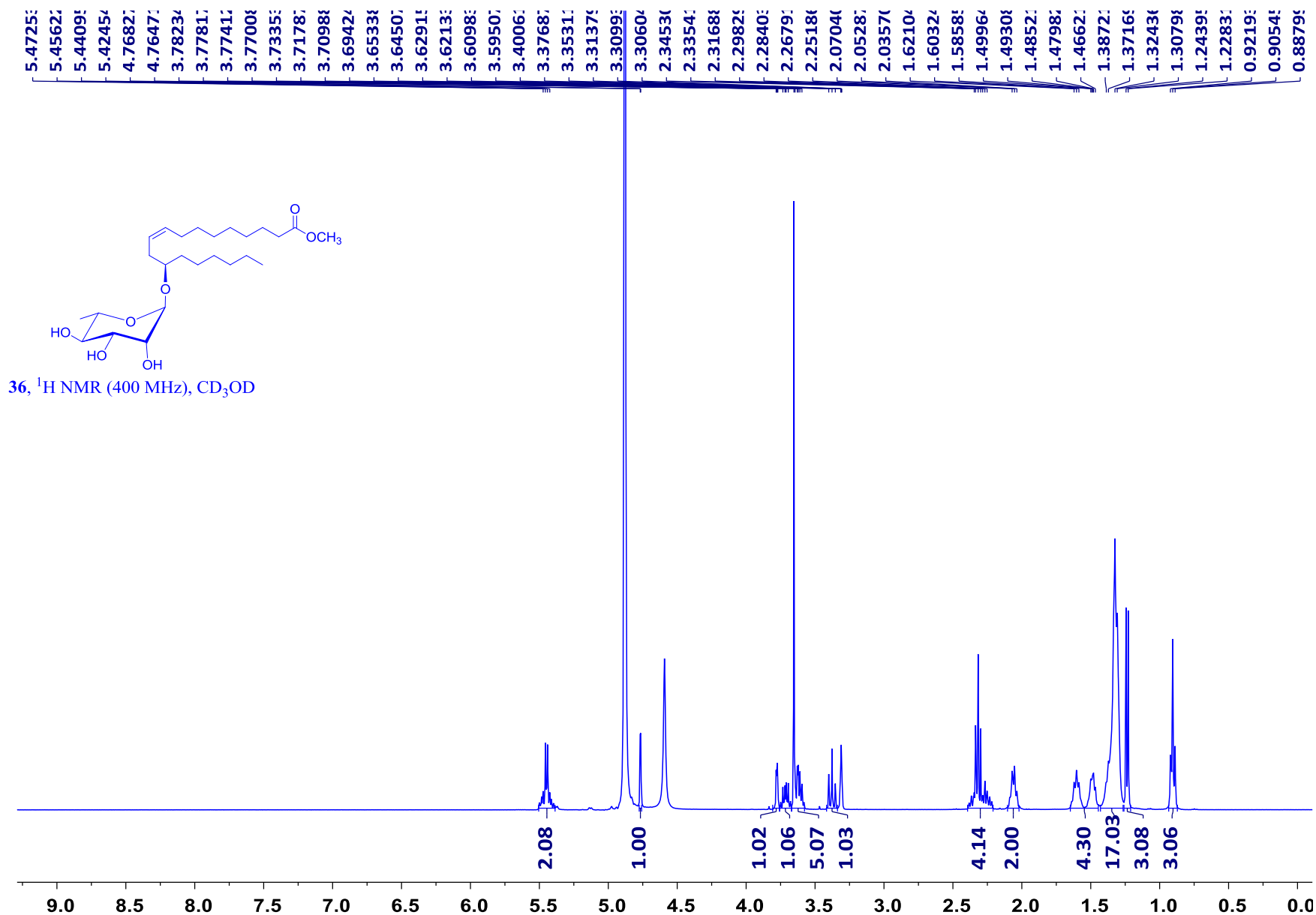
35, ^1H - ^1H gCOSY, (400 MHz), CDCl_3

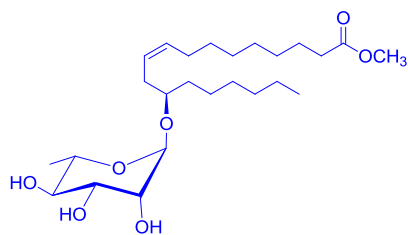




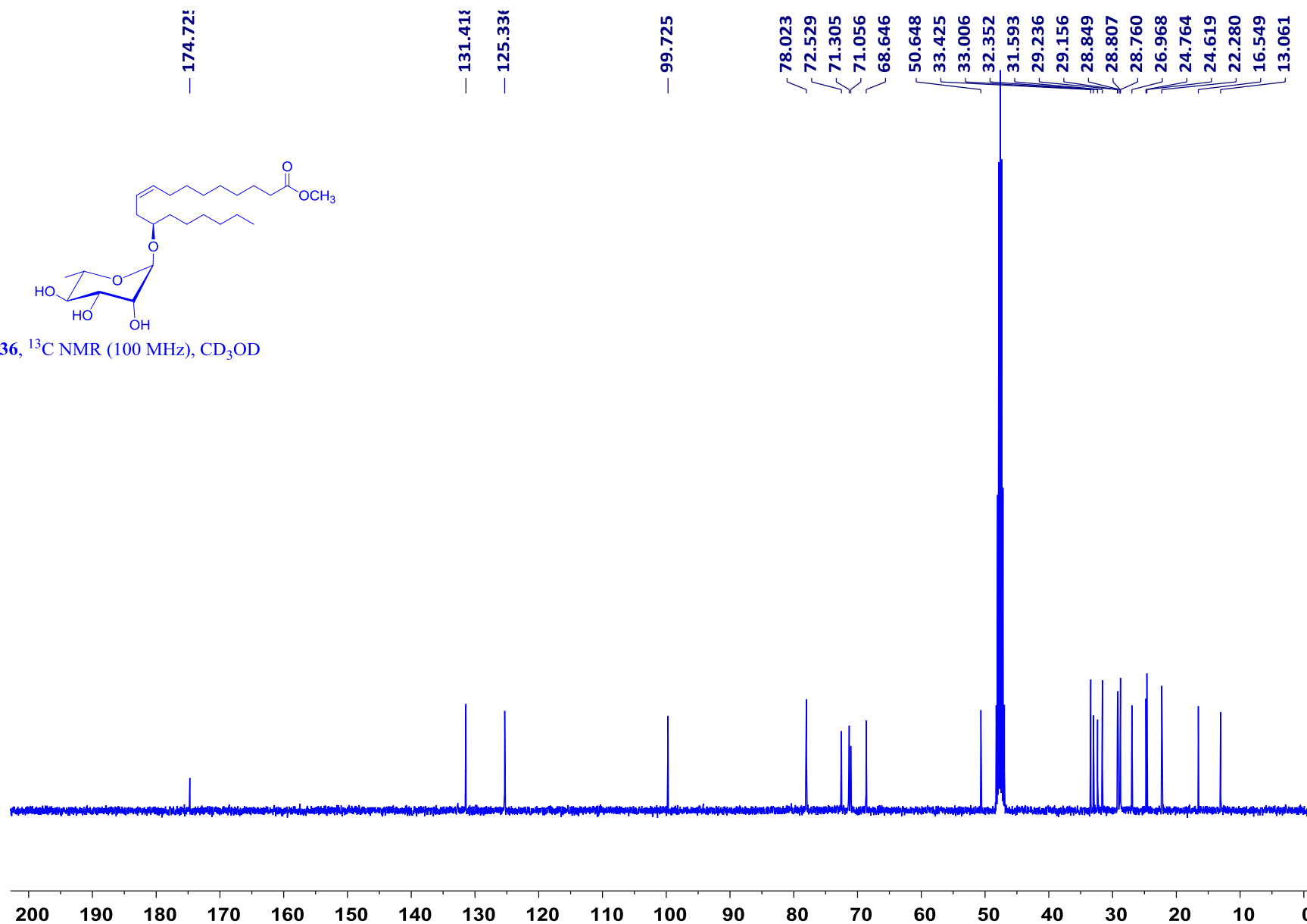
35, ^1H - ^{13}C gHSQC, (400 MHz), CDCl_3

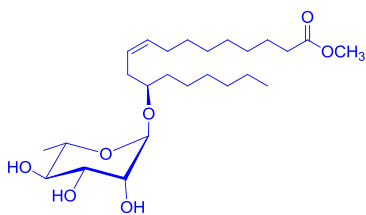




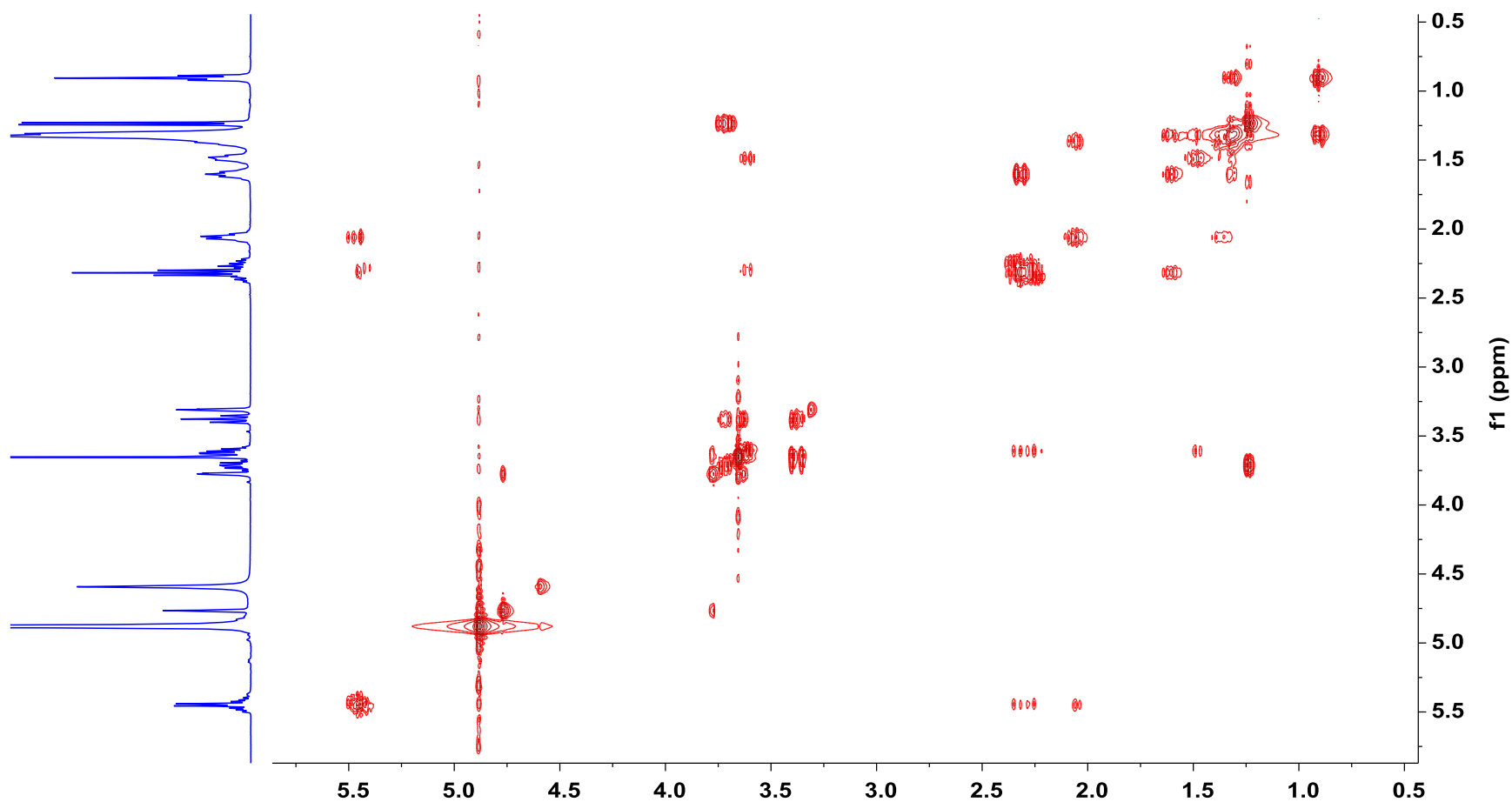


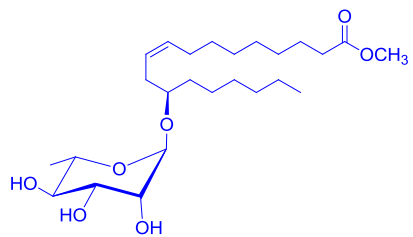
36, ^{13}C NMR (100 MHz), CD_3OD



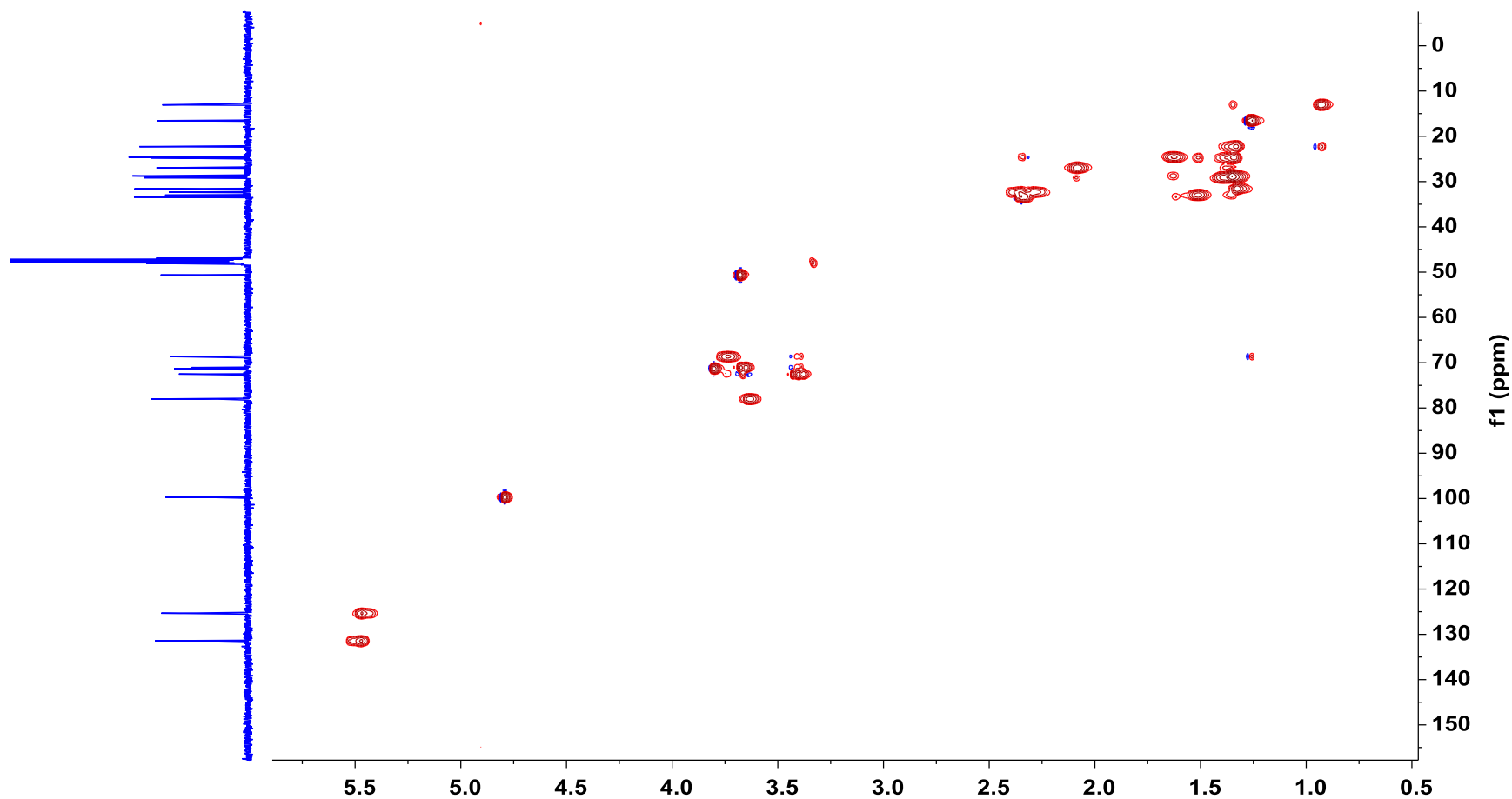


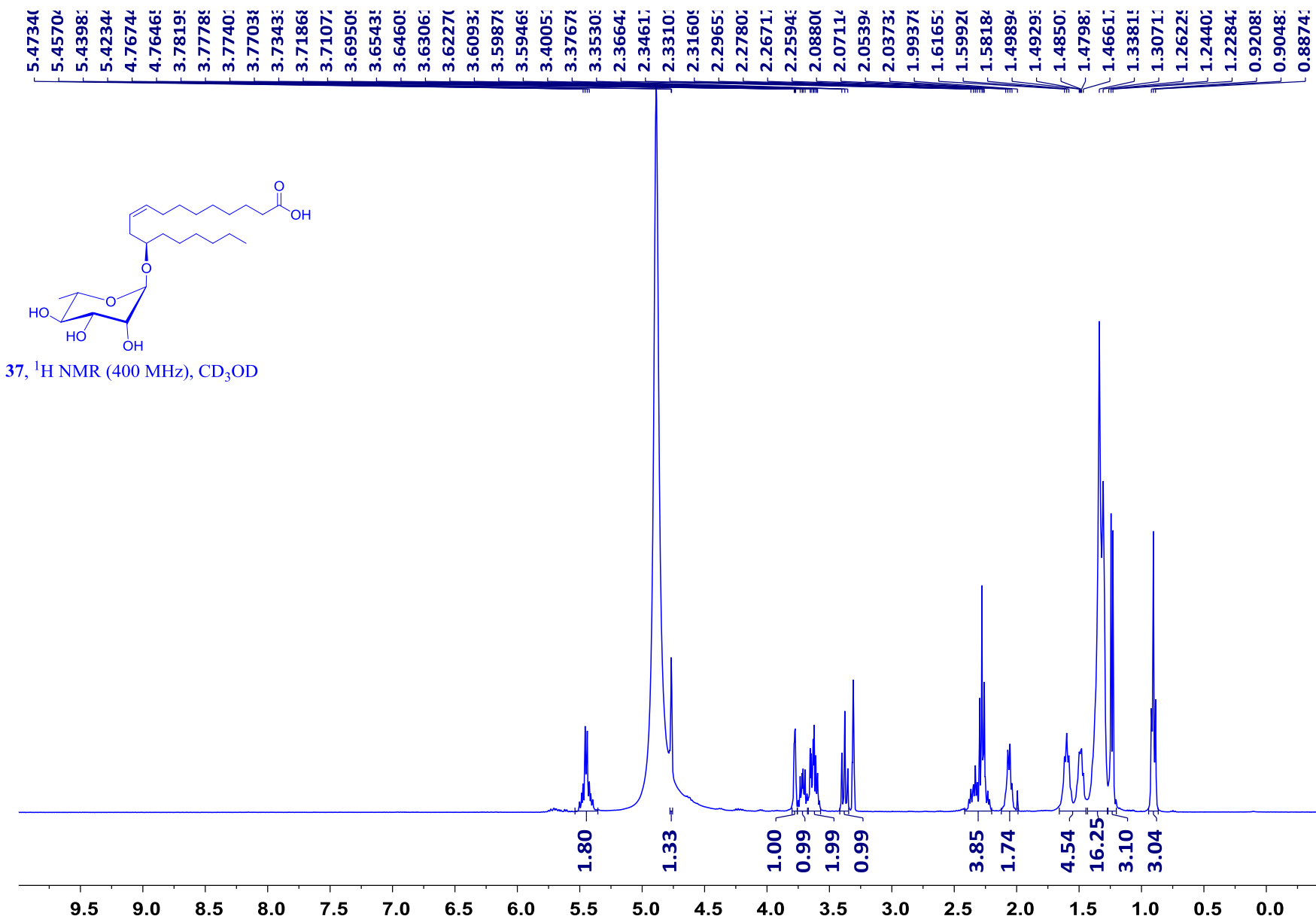
36, ¹H-¹H gCOSY, (400 MHz), CD₃OD

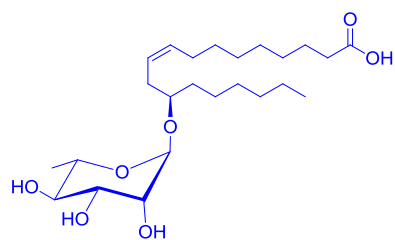




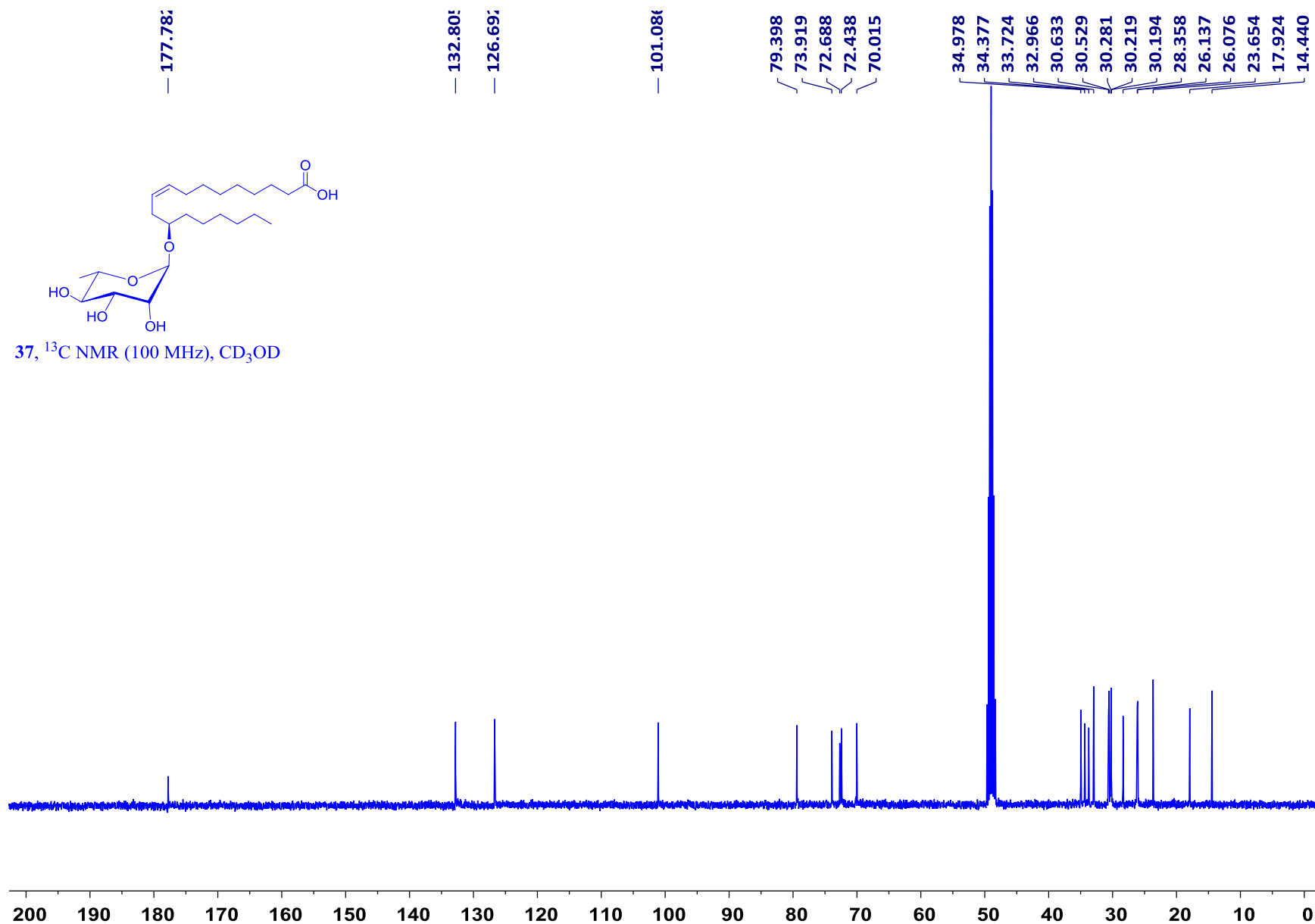
36, ^1H - ^{13}C gHSQC, (400 MHz), CD_3OD

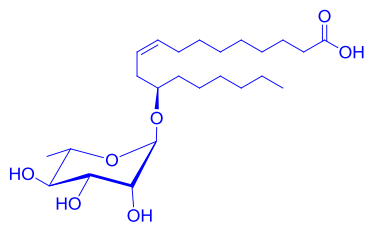




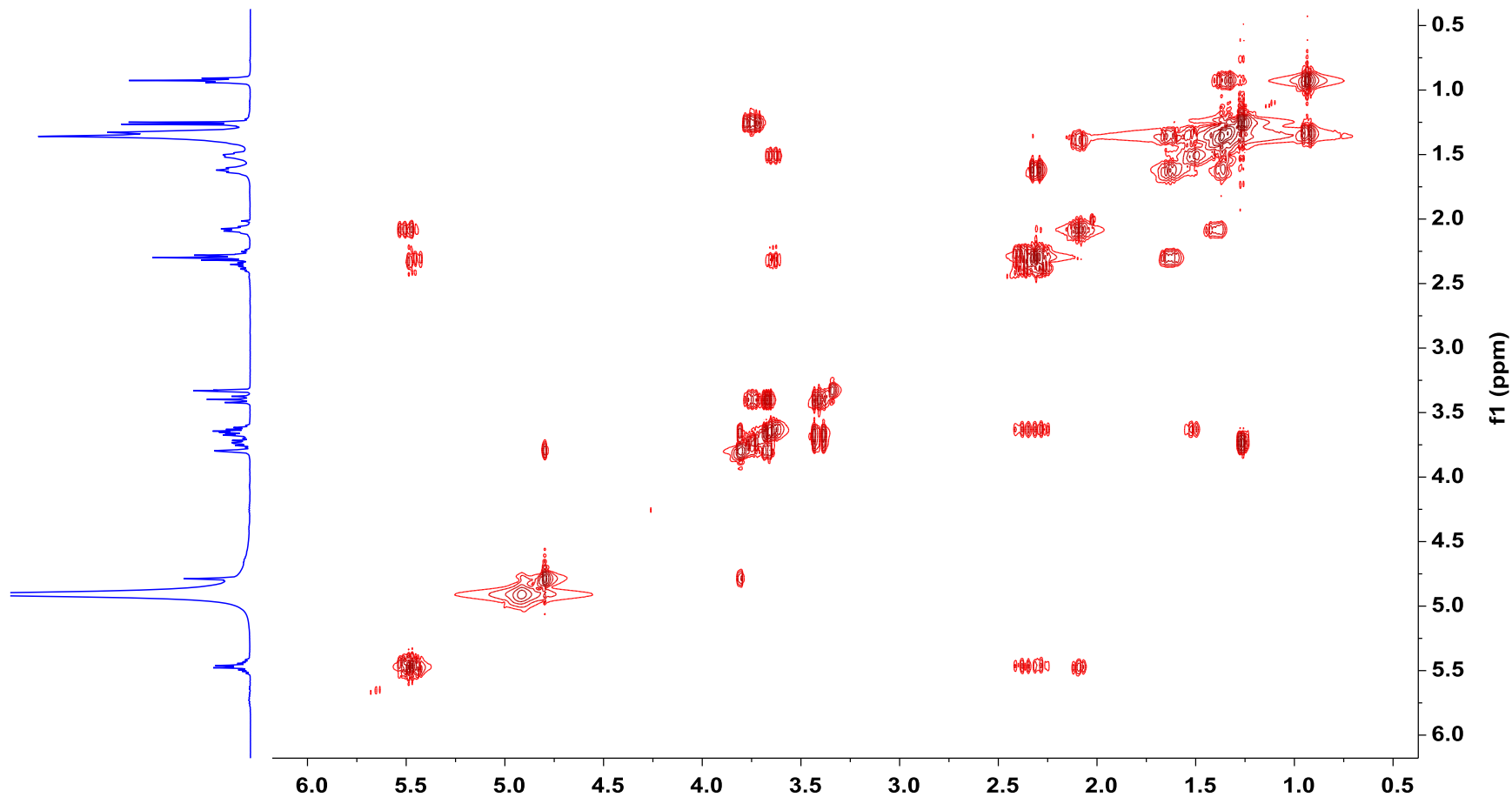


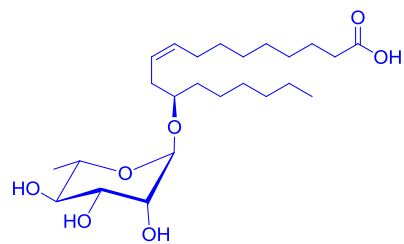
37, ^{13}C NMR (100 MHz), CD_3OD



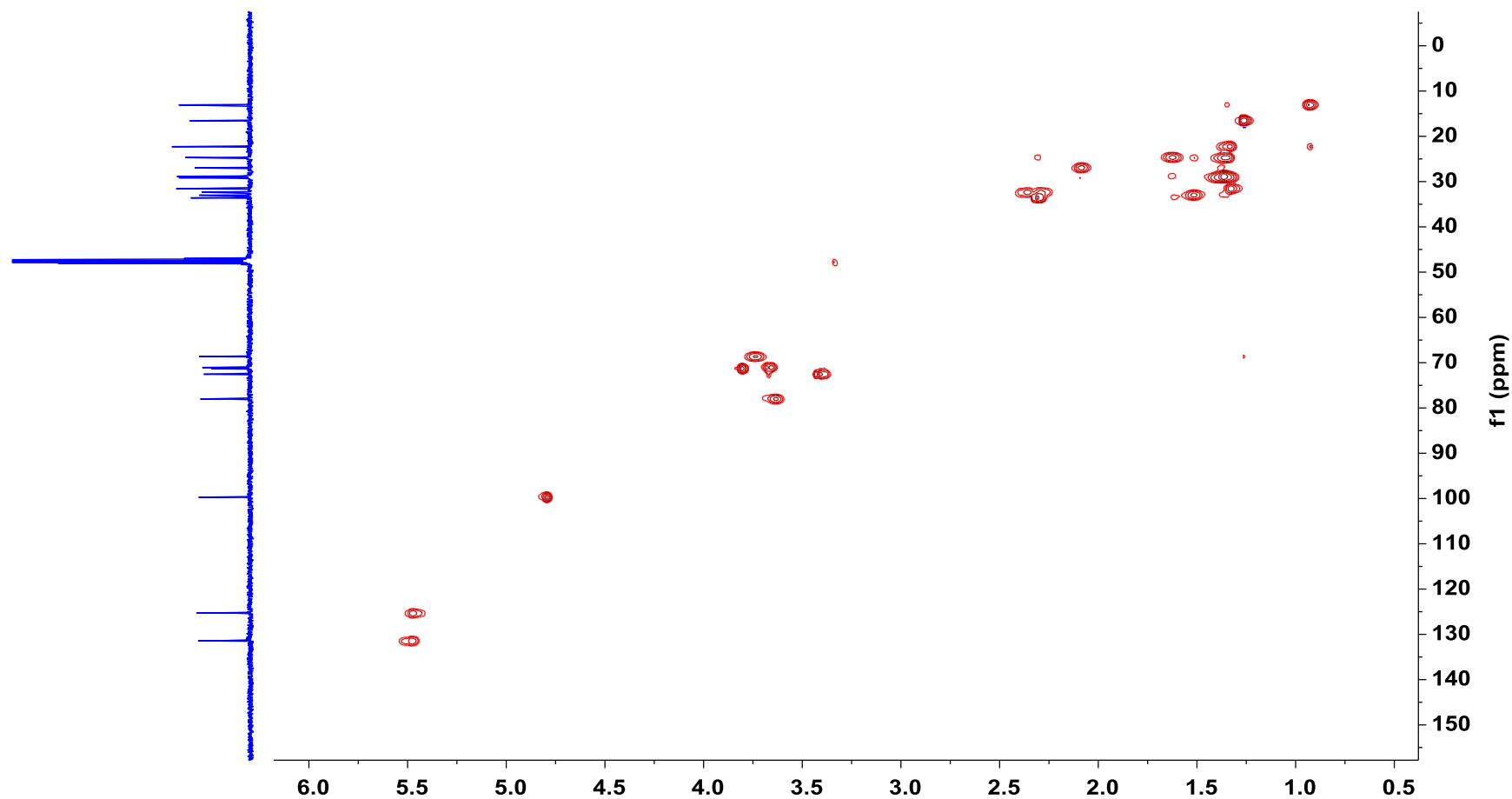


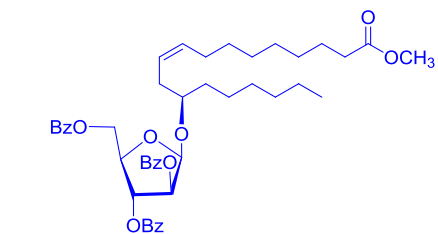
37, ^1H - ^1H gCOSY, (400 MHz), CD_3OD



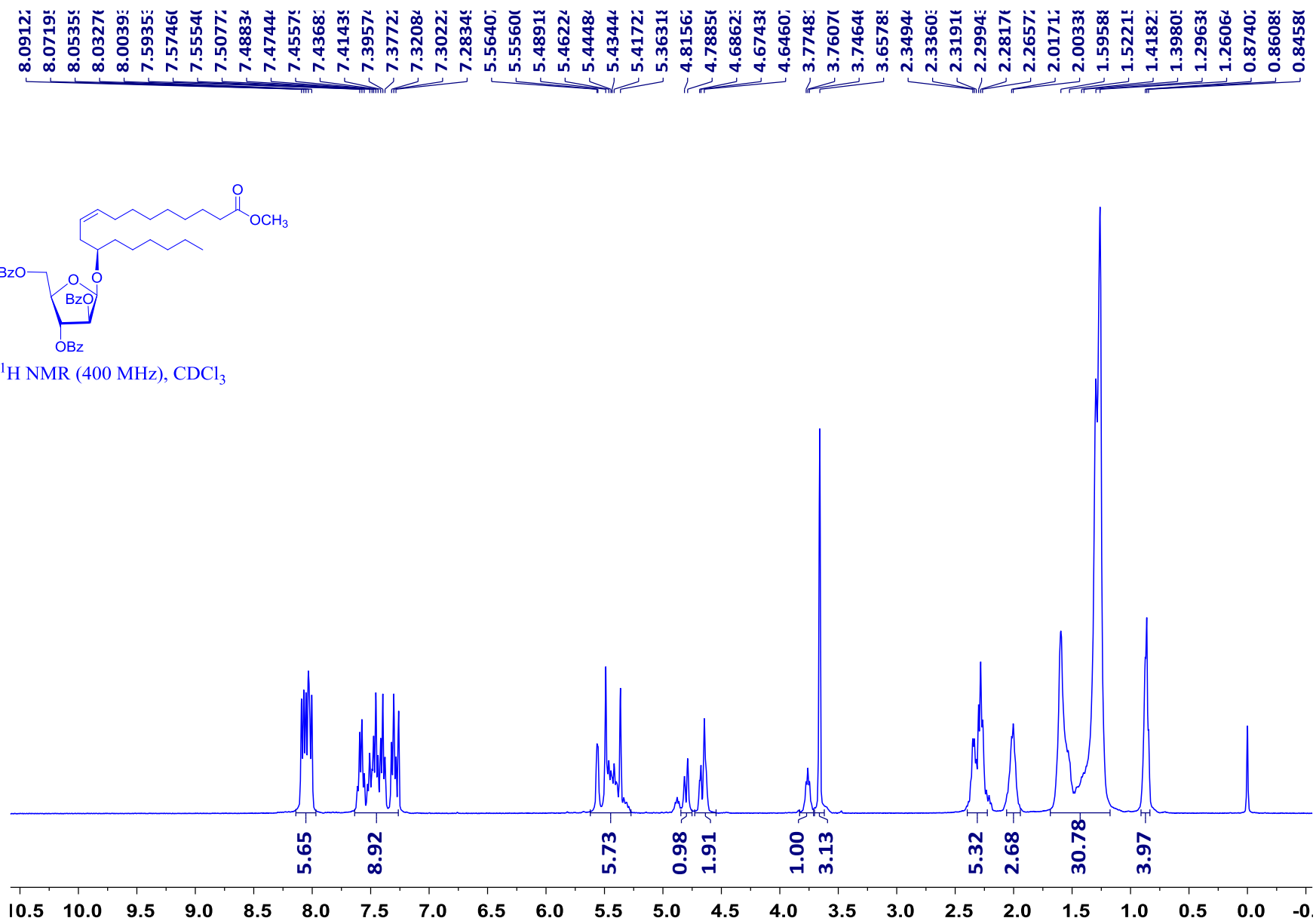


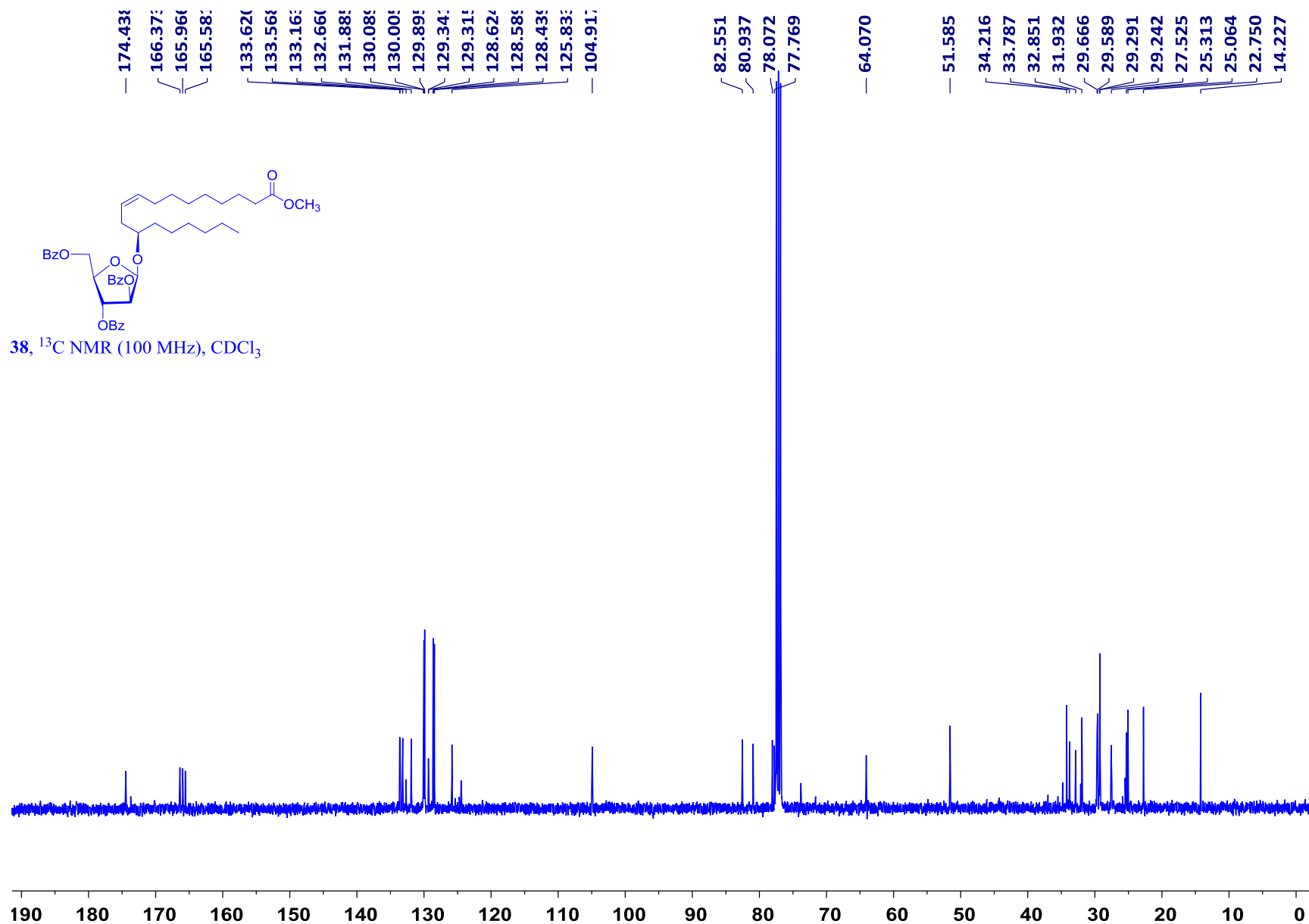
37, ^1H - ^{13}C gHSQC, (400 MHz), CD_3OD

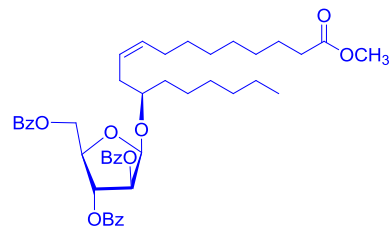




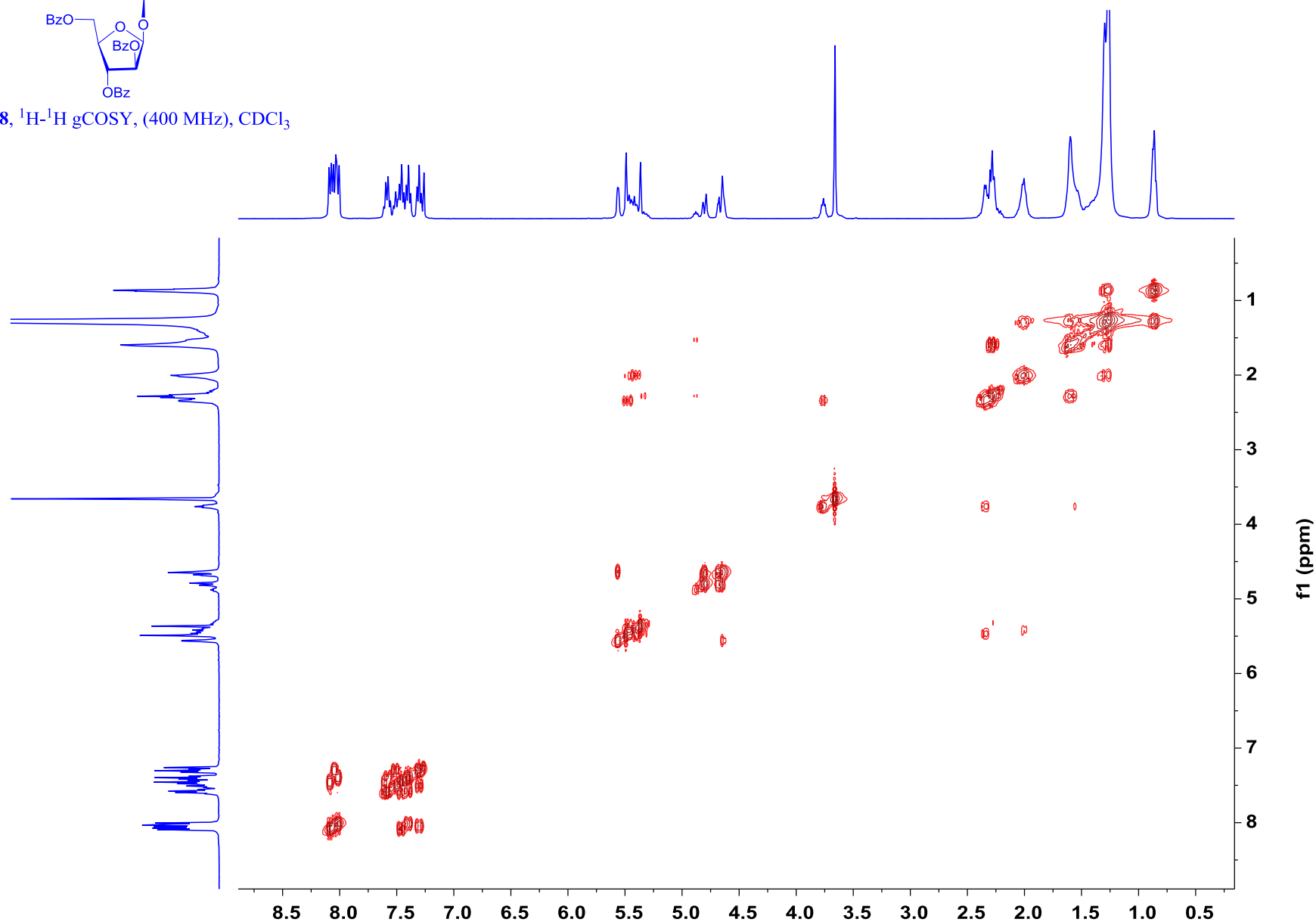
38, ¹H NMR (400 MHz), CDCl₃

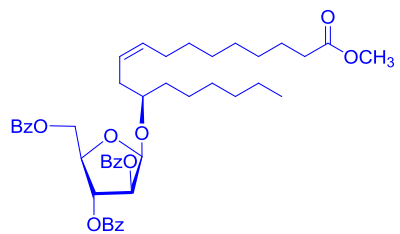




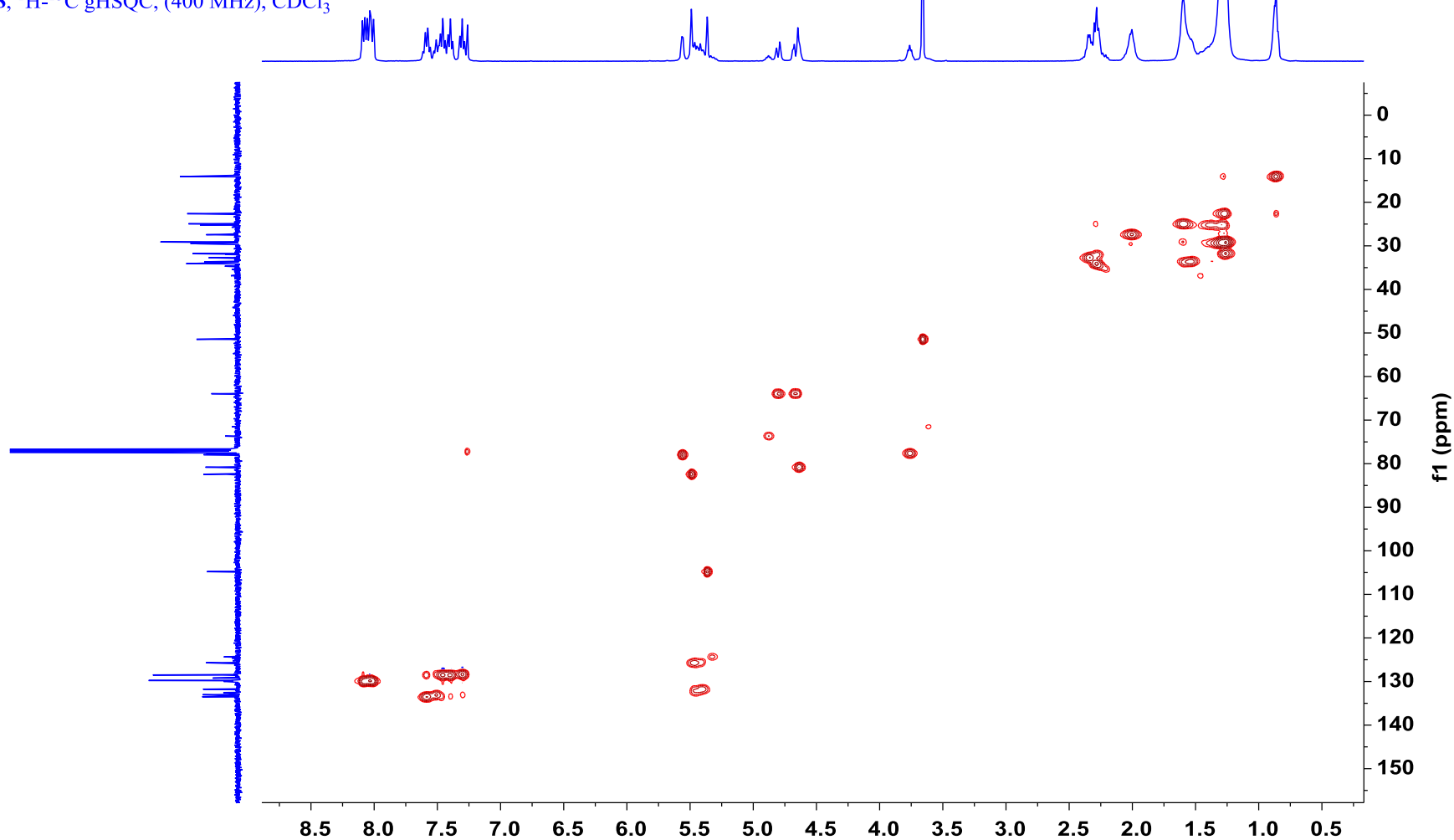


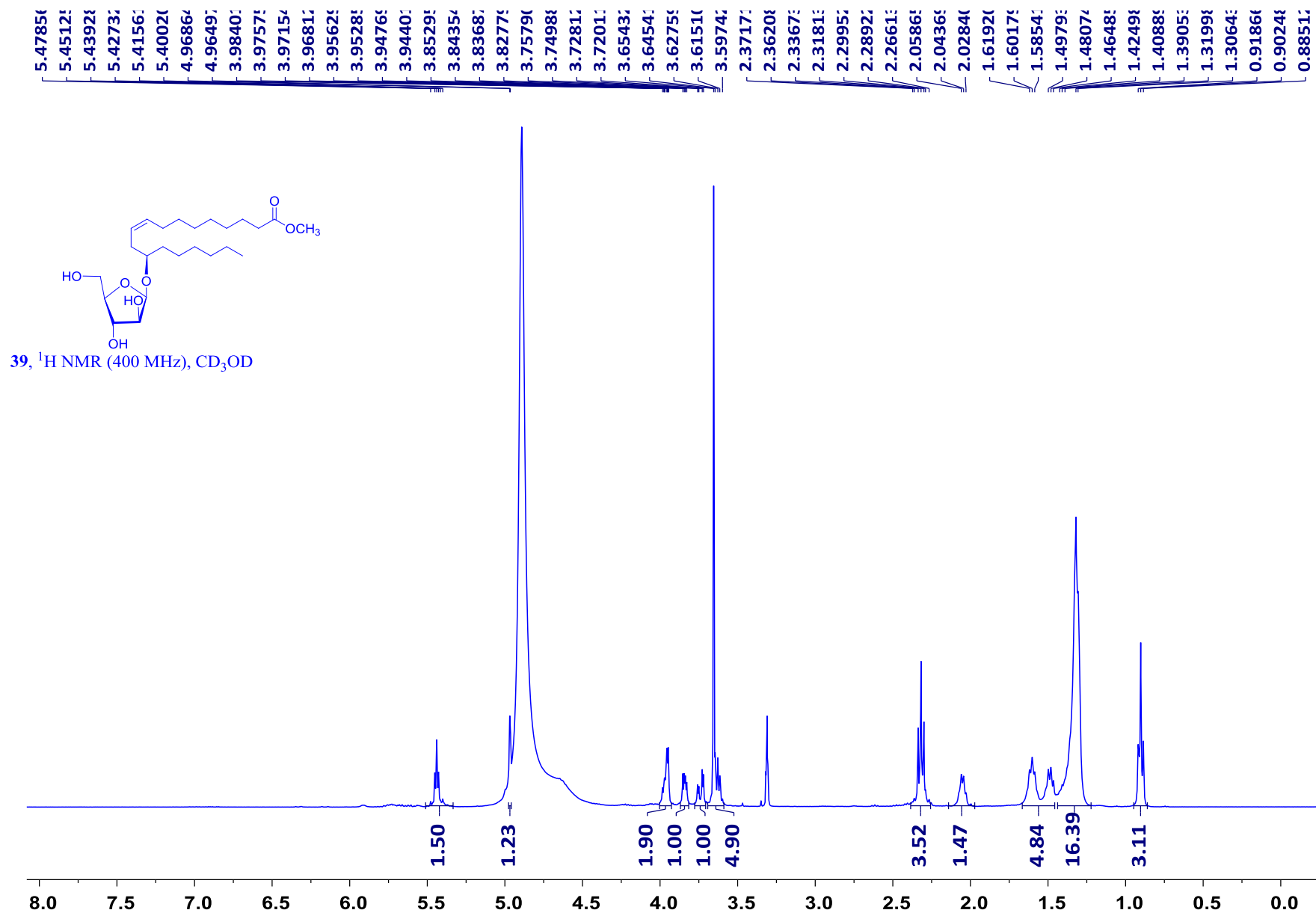
38, ^1H - ^1H gCOSY, (400 MHz), CDCl_3

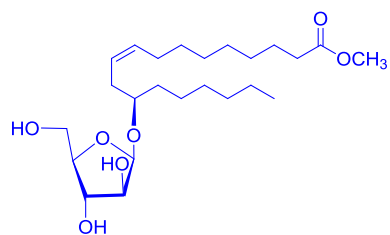




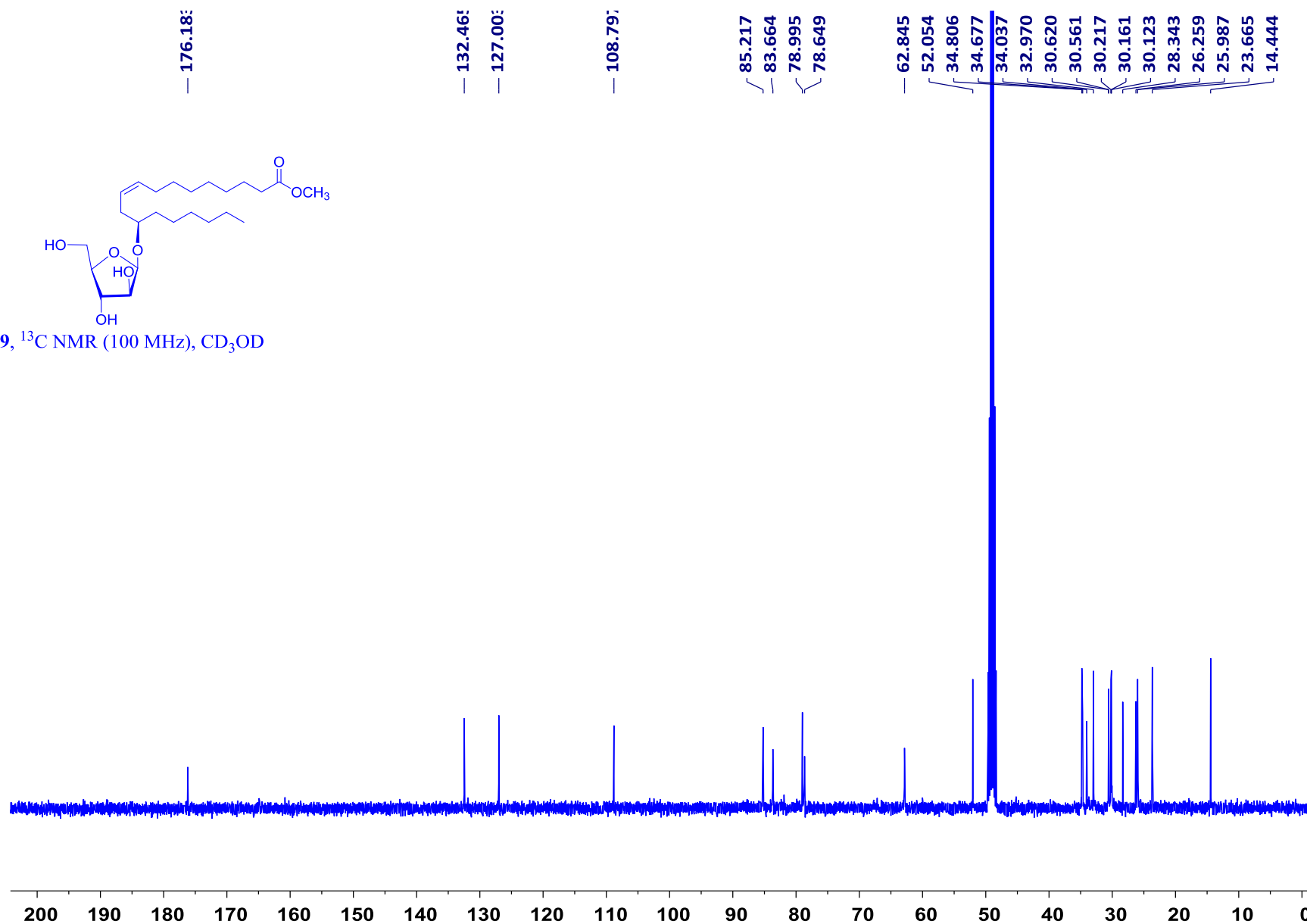
38, ^1H - ^{13}C gHSQC, (400 MHz), CDCl_3

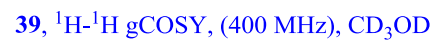


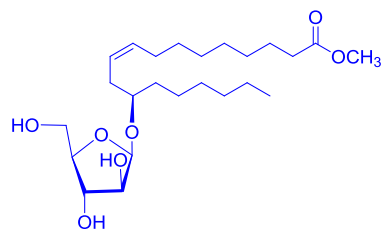




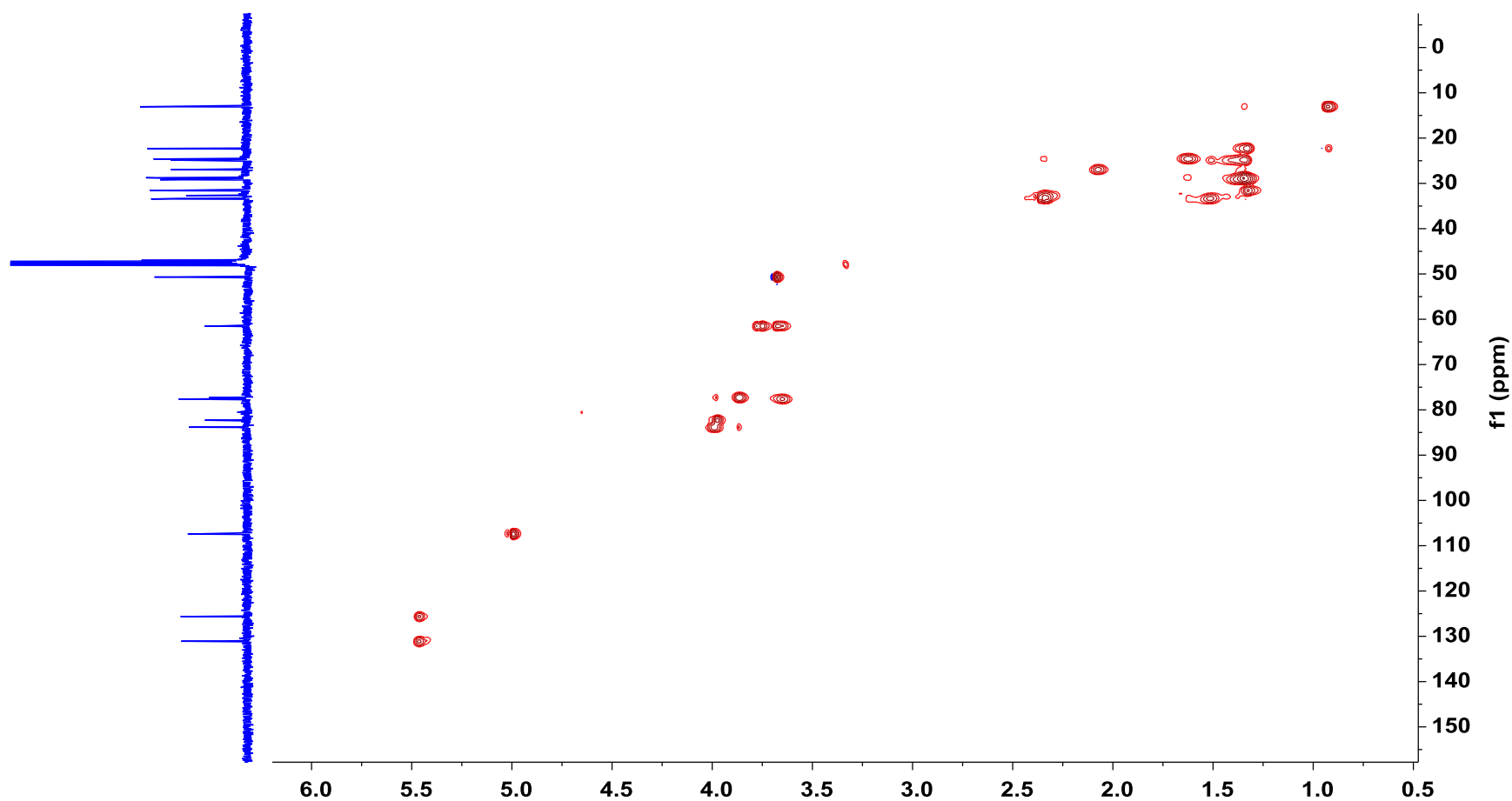
39, ^{13}C NMR (100 MHz), CD_3OD

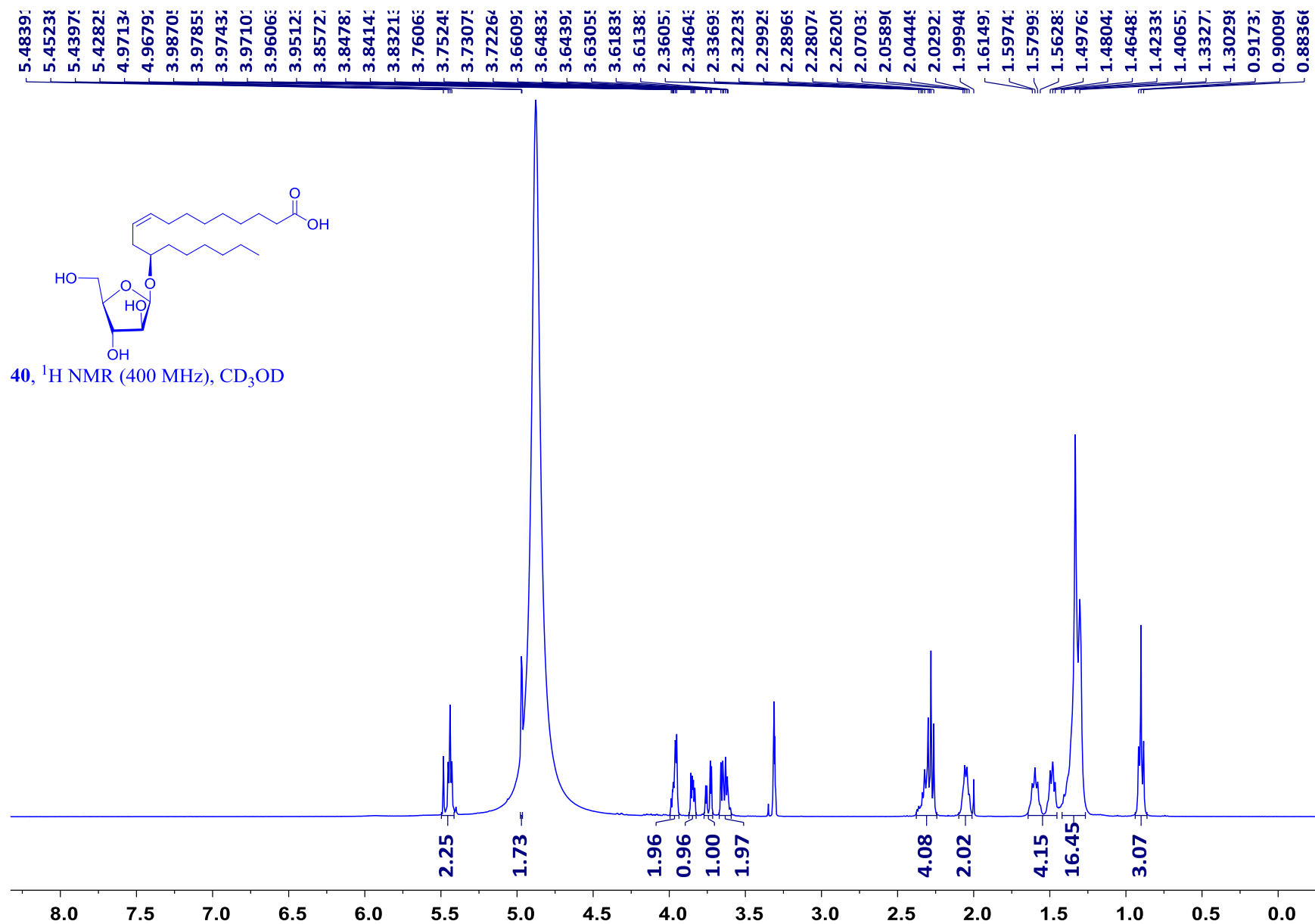


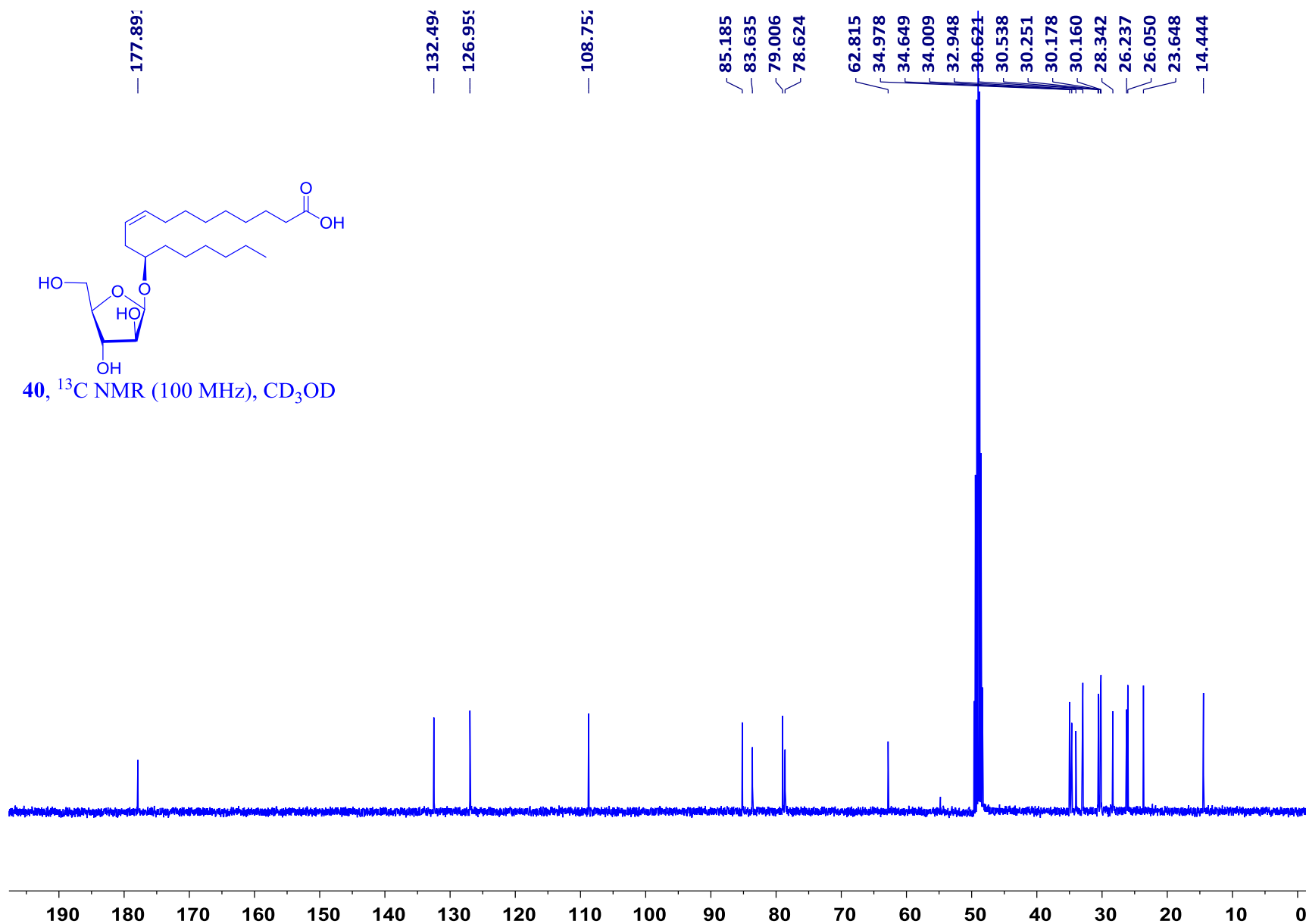


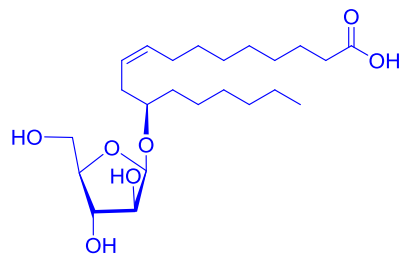


39, ^1H - ^{13}C gHSQC, (400 MHz), CD_3OD

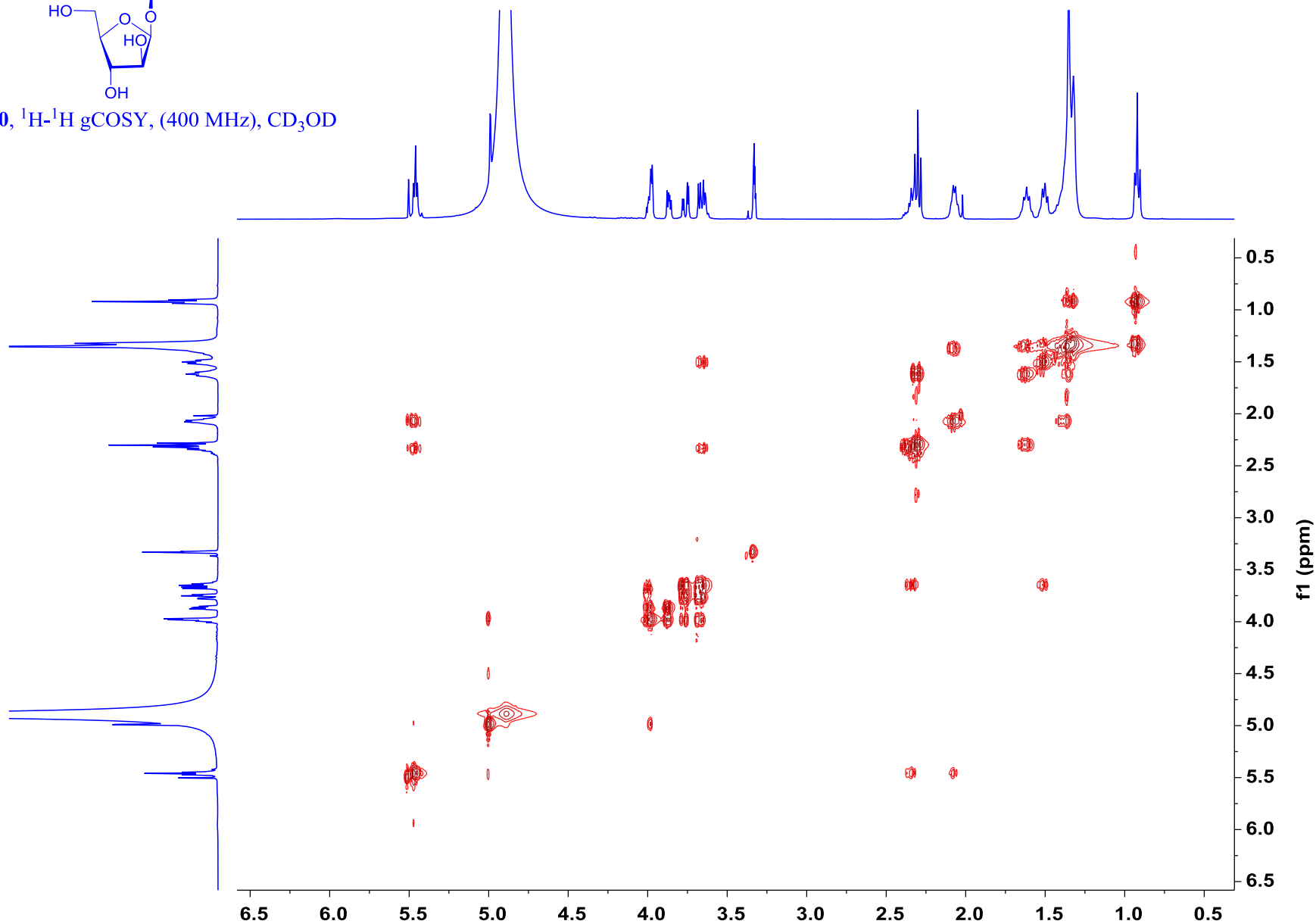


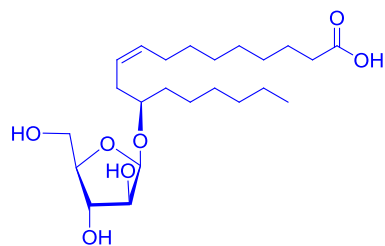




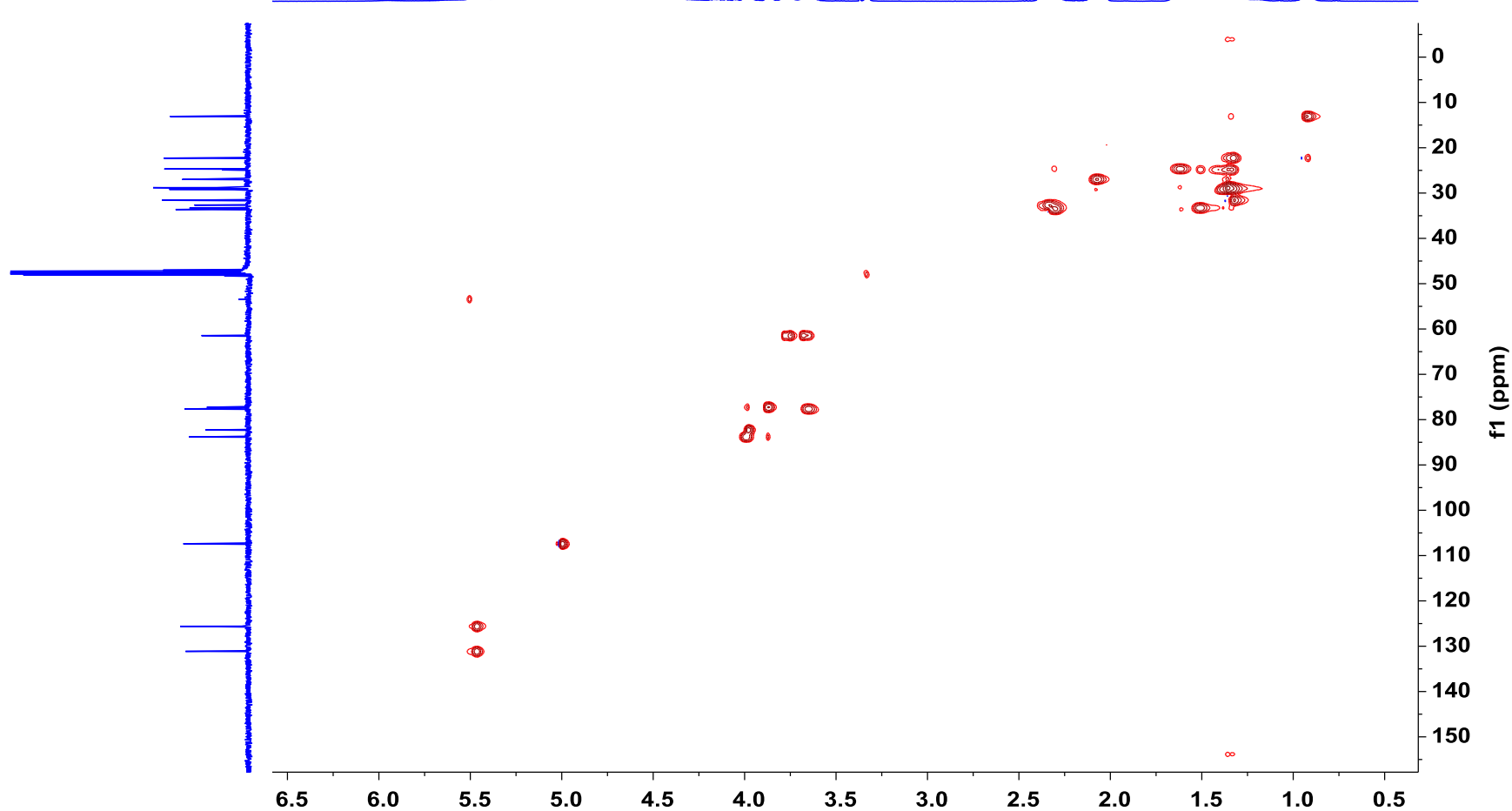


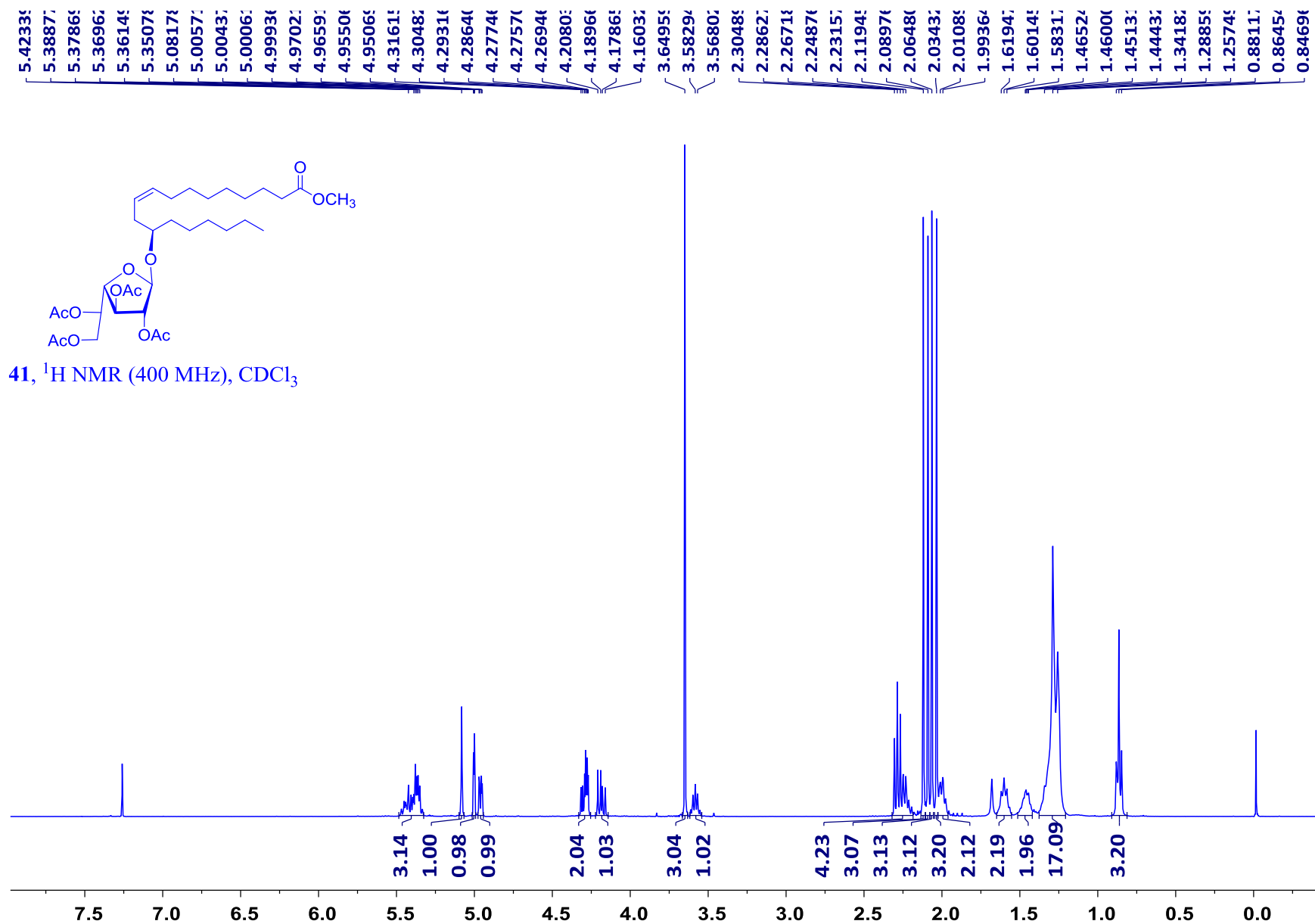
40, ^1H - ^1H gCOSY, (400 MHz), CD_3OD

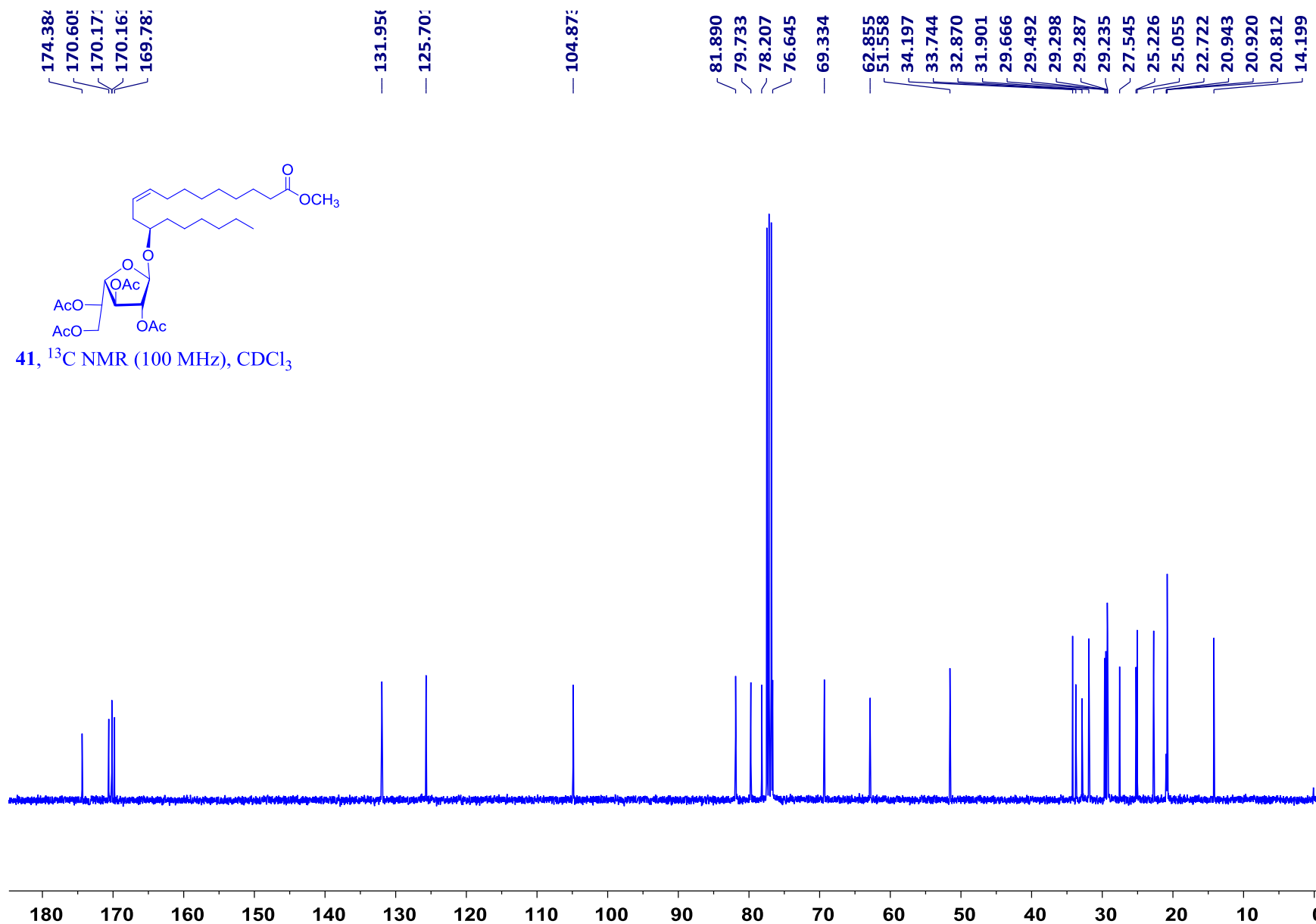


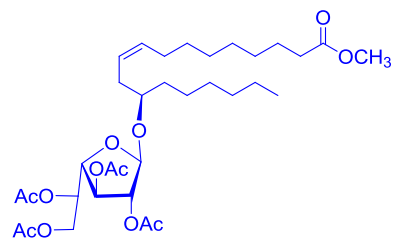


40, ^1H - ^{13}C gHSQC, (400 MHz), CD_3OD

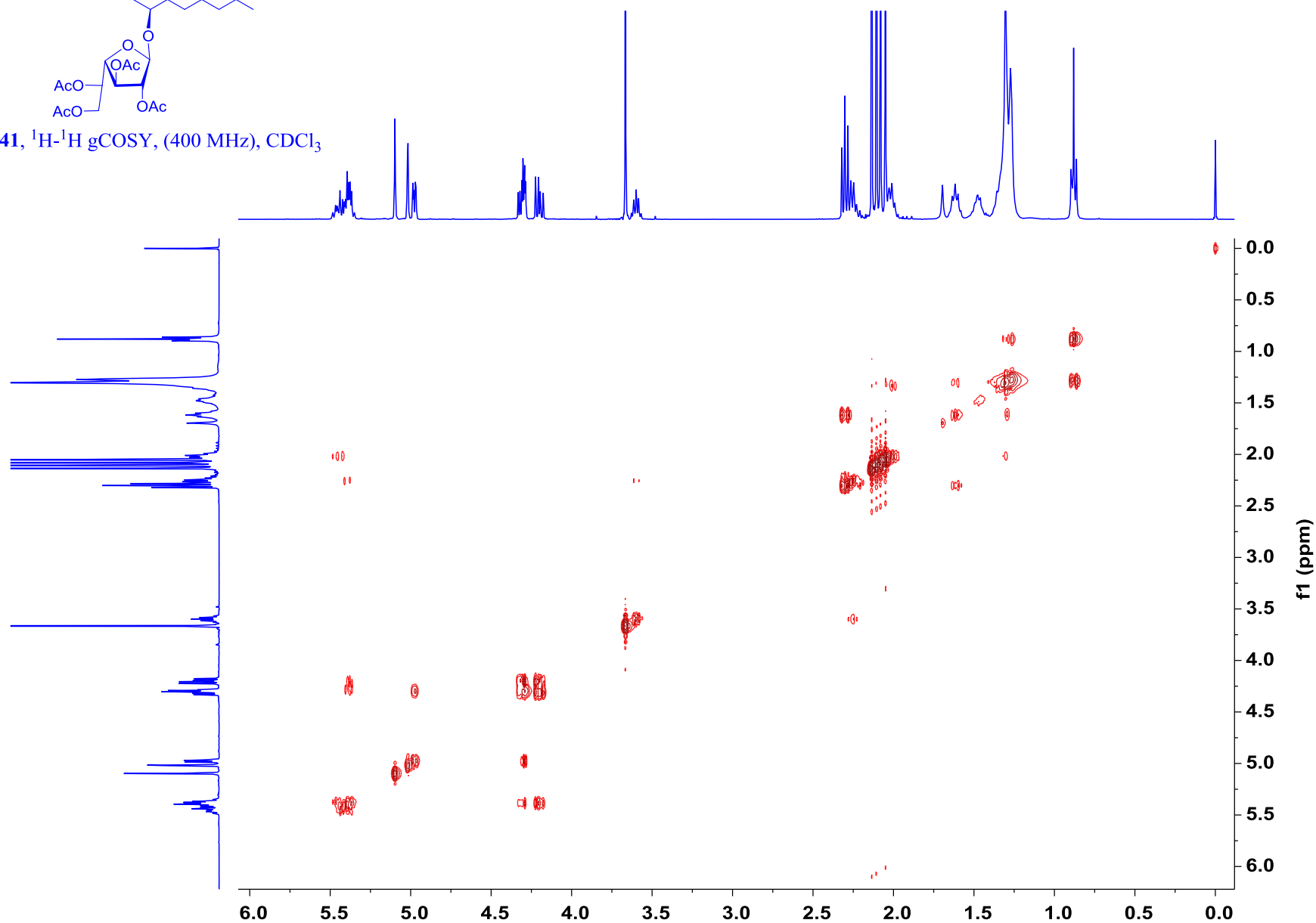


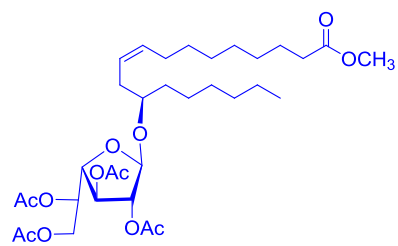




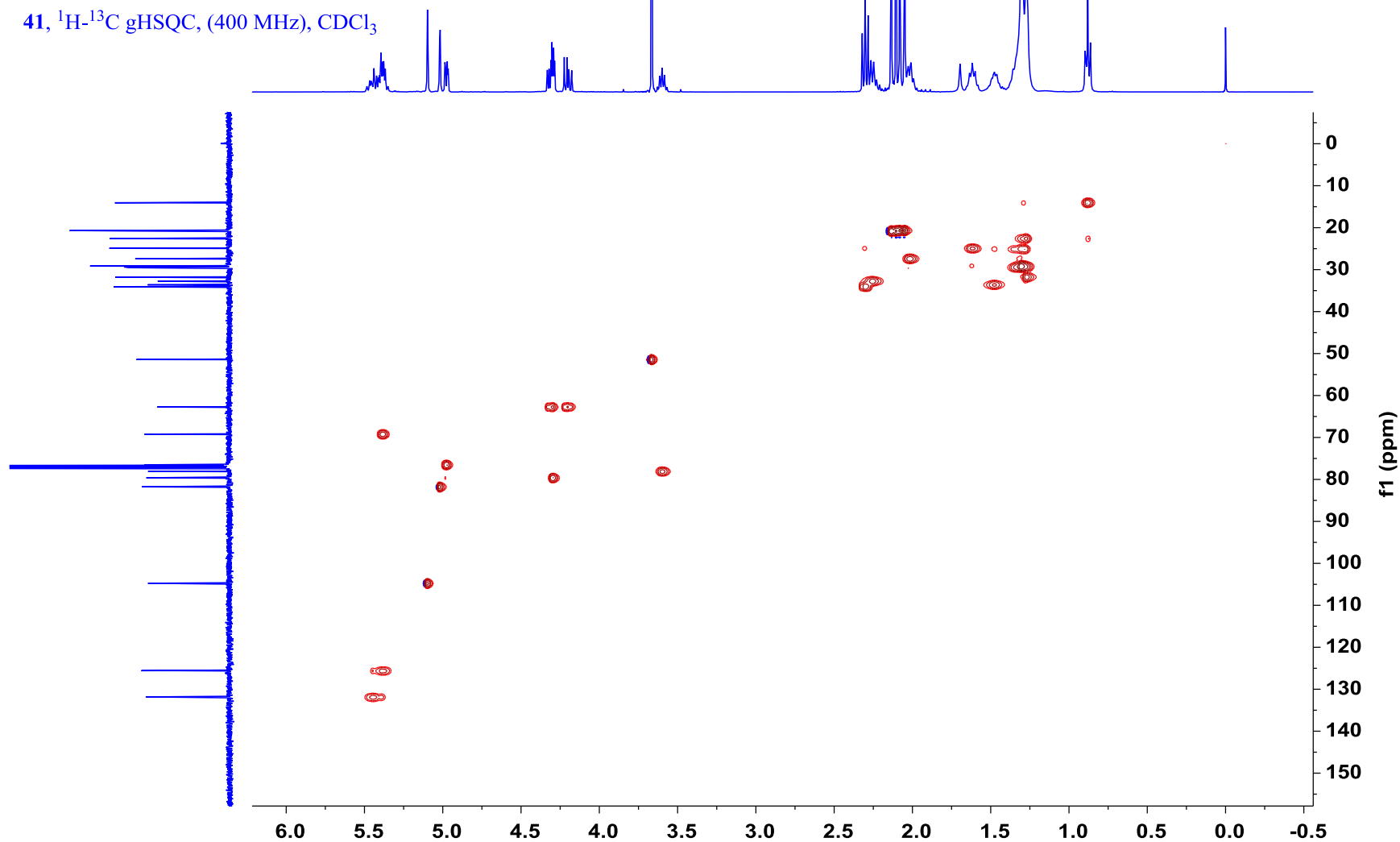


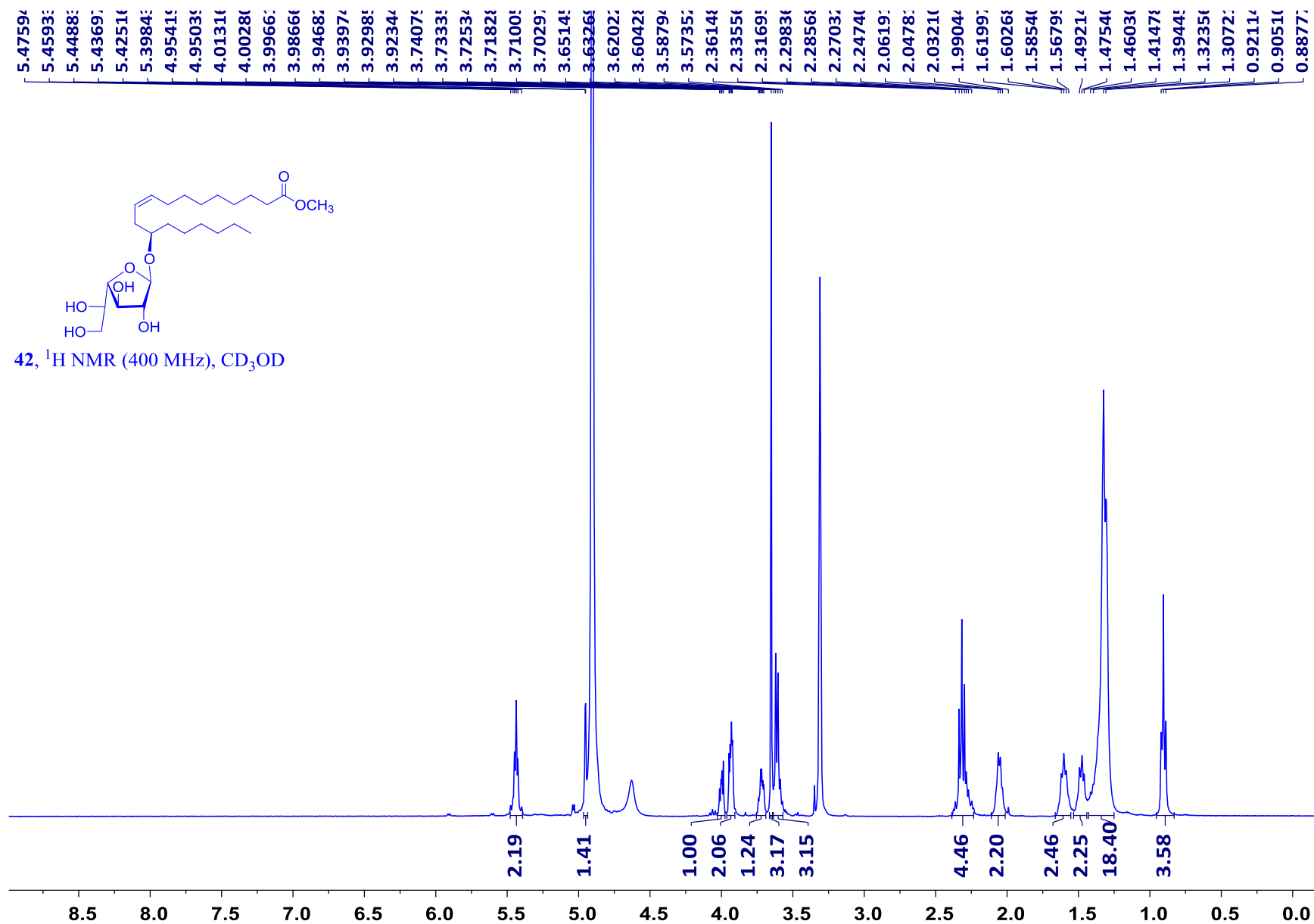
41, ^1H - ^1H gCOSY, (400 MHz), CDCl_3

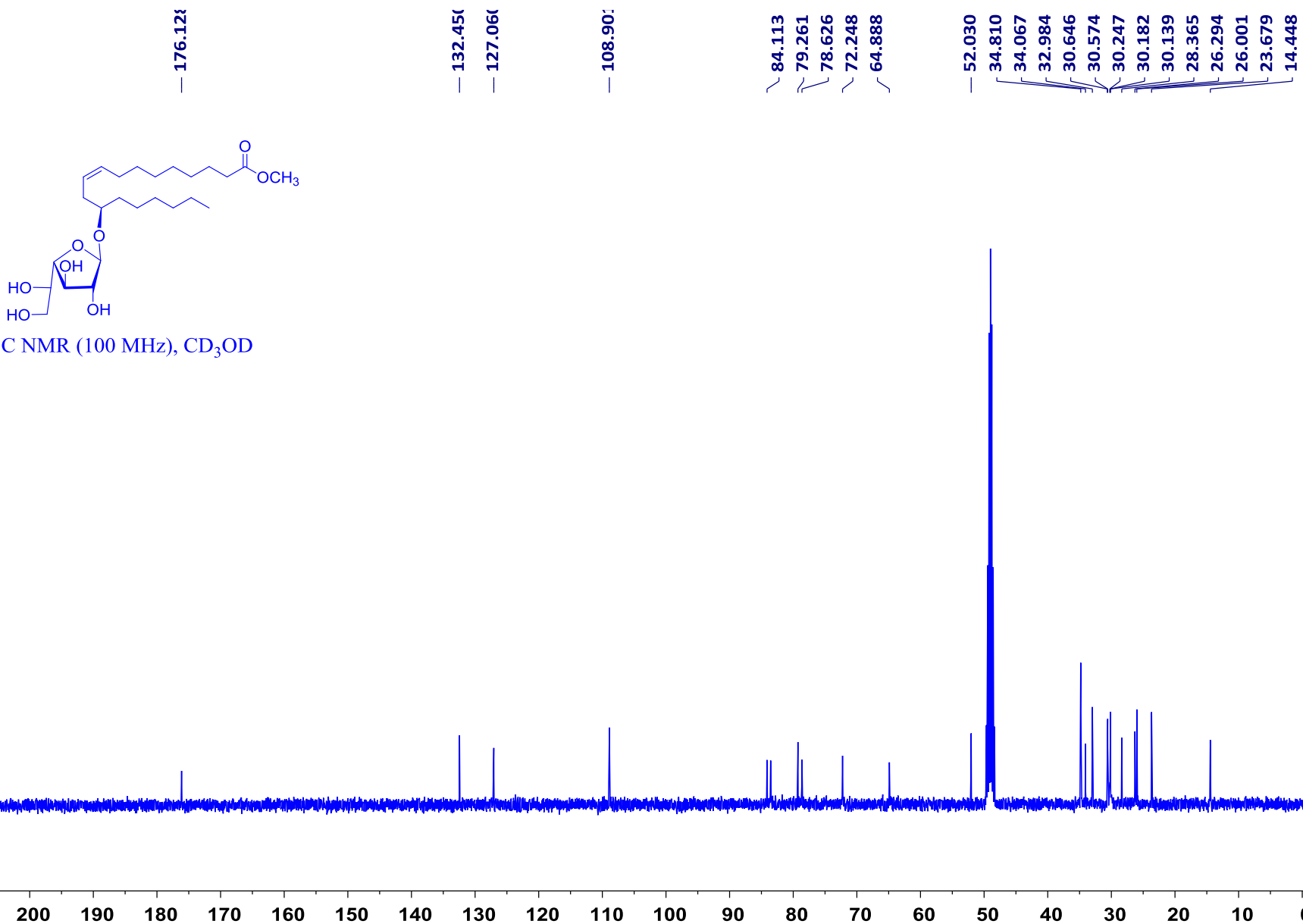


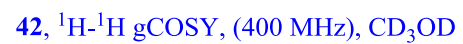


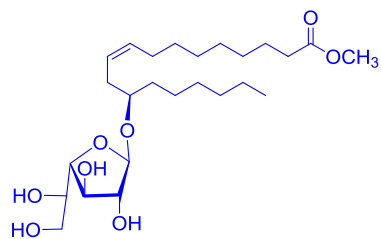
41, ^1H - ^{13}C gHSQC, (400 MHz), CDCl_3



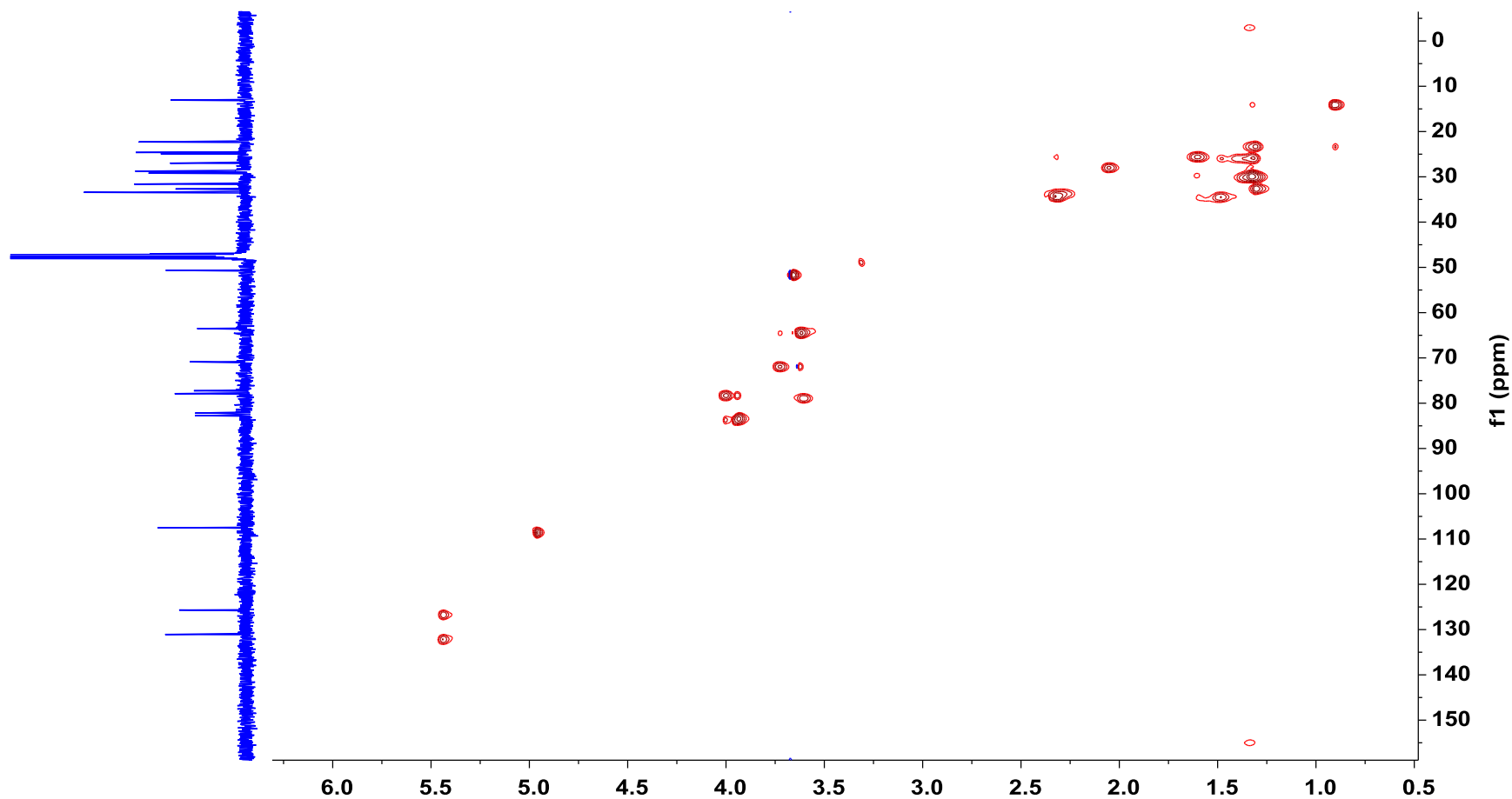


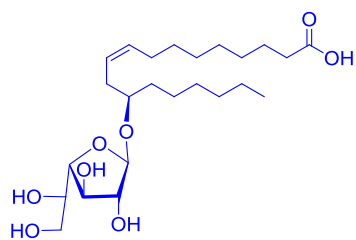




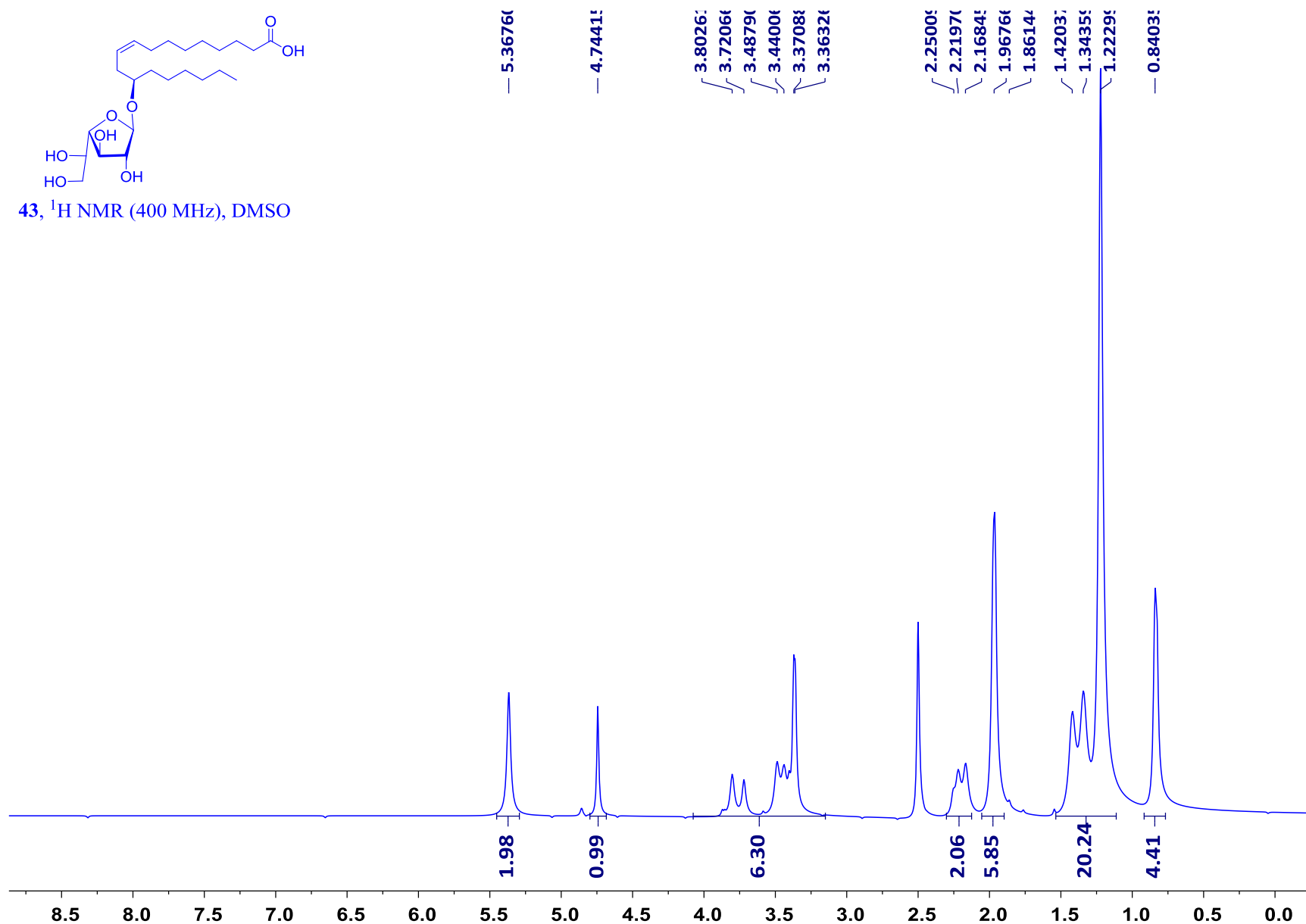


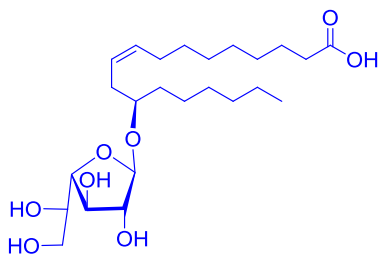
42, ¹H-¹³C gHSQC, (400 MHz), CD₃OD



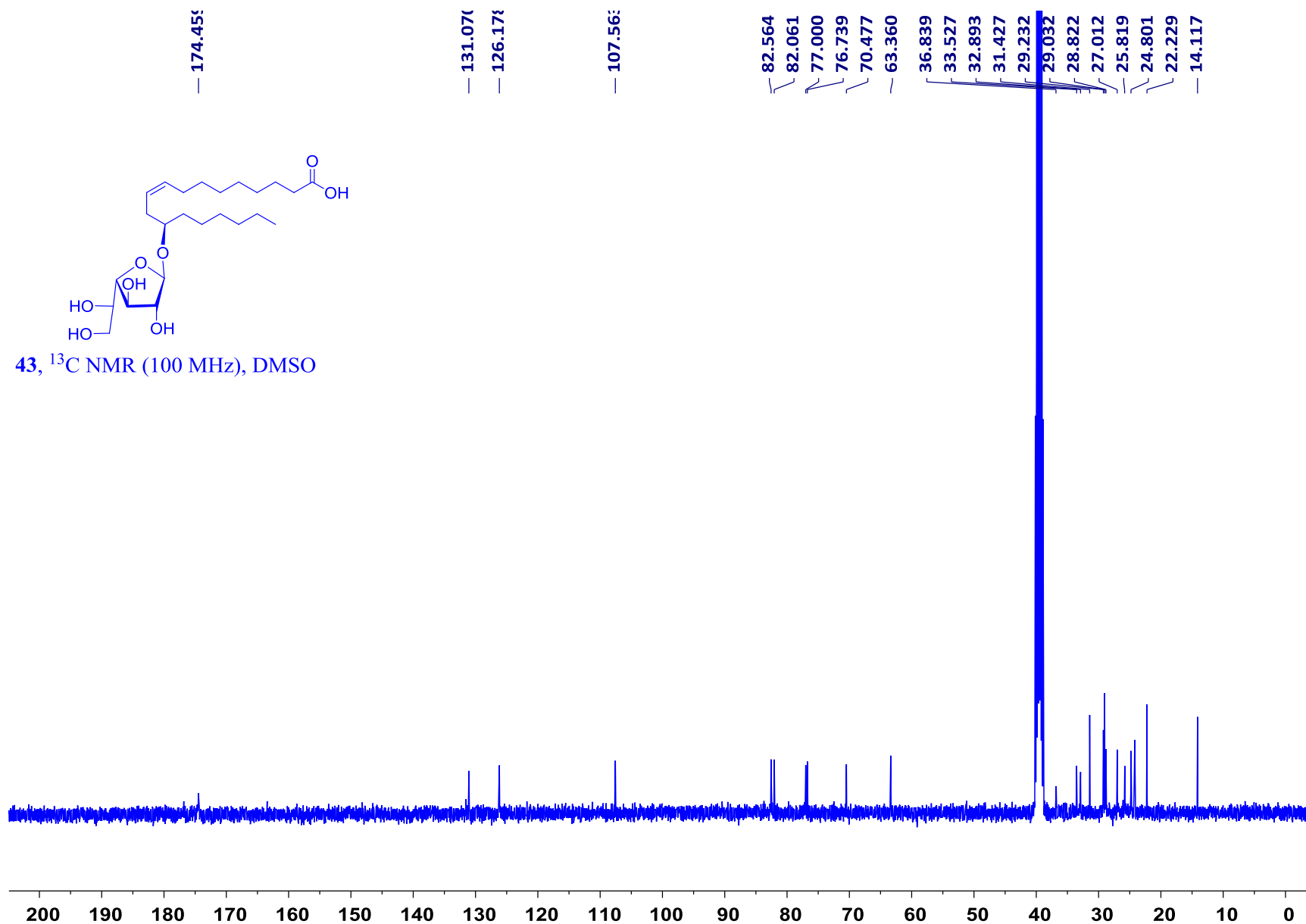


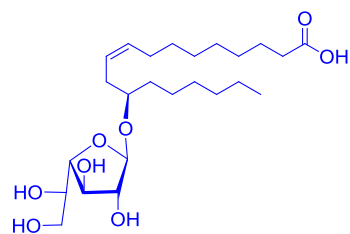
43, ^1H NMR (400 MHz), DMSO



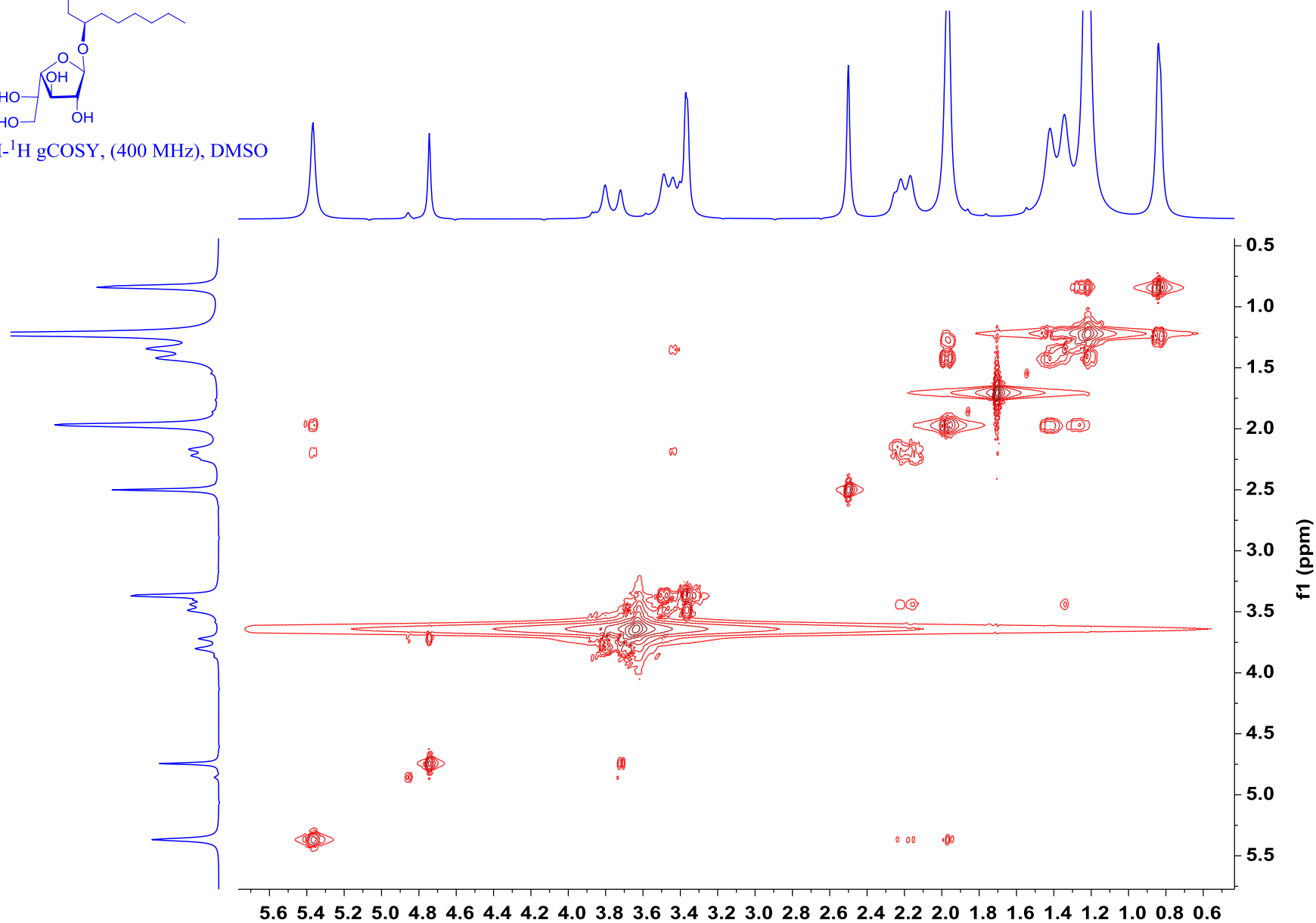


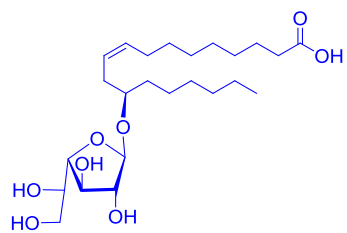
43, ^{13}C NMR (100 MHz), DMSO



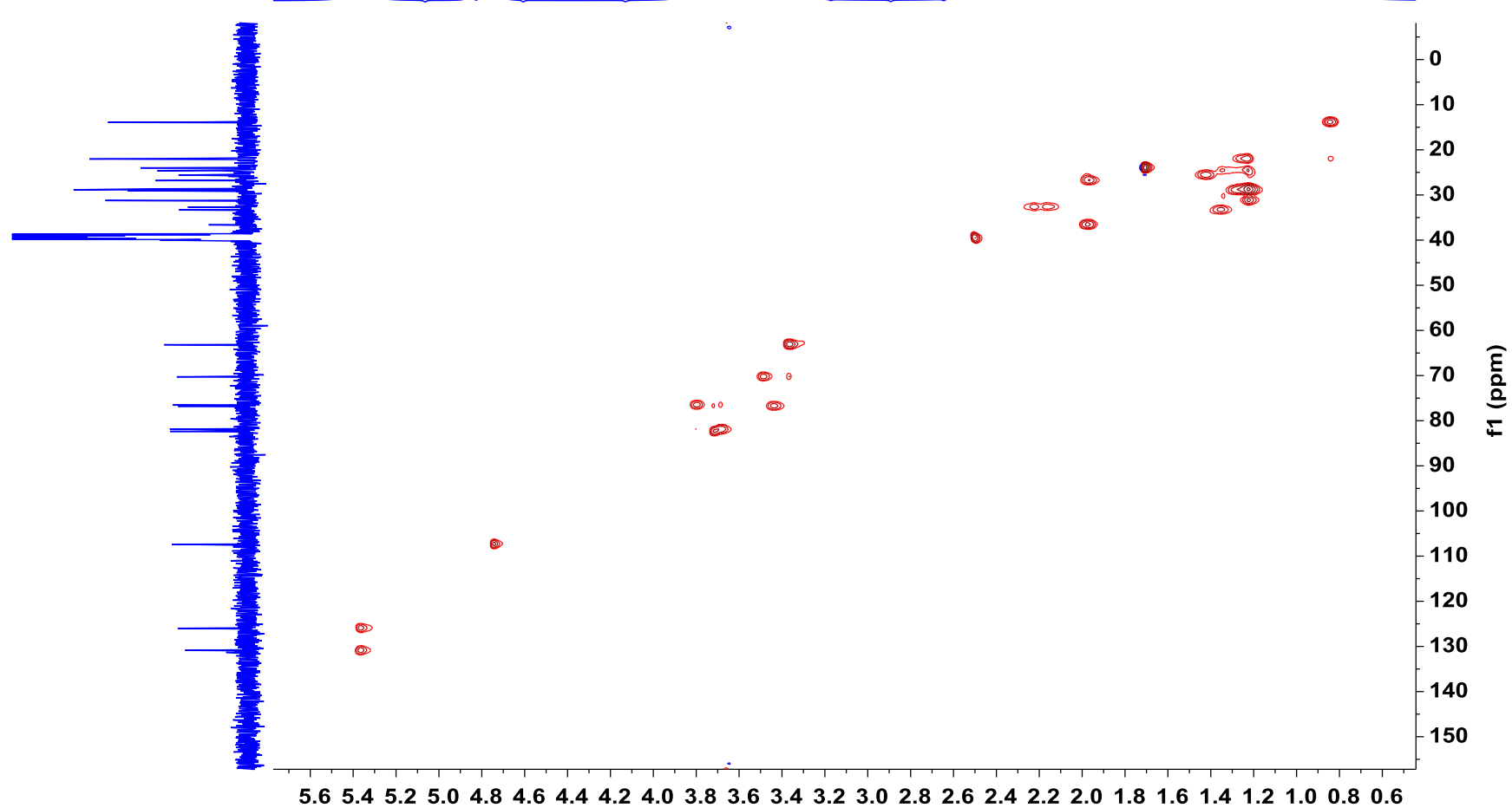


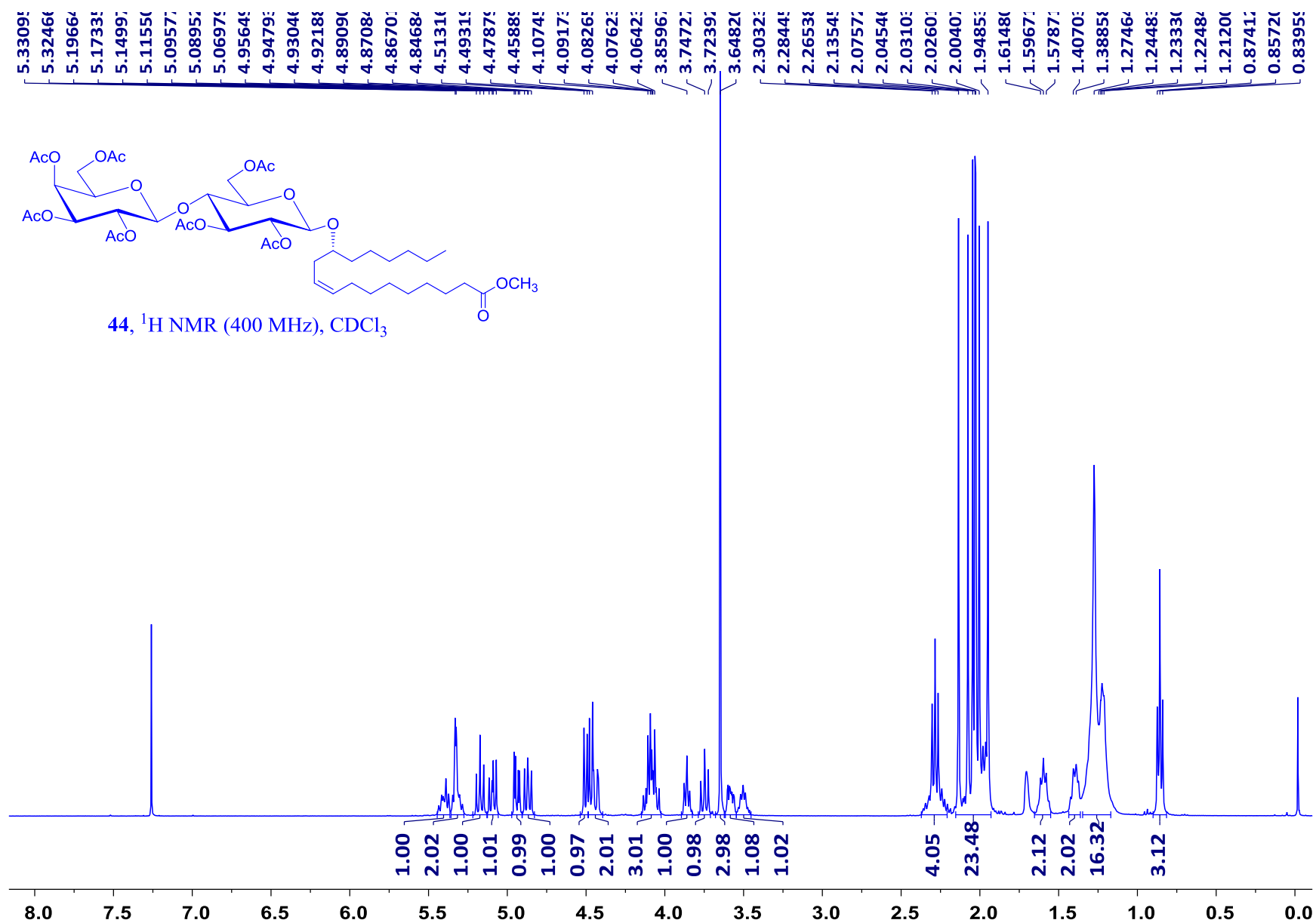
43, ^1H - ^1H gCOSY, (400 MHz), DMSO

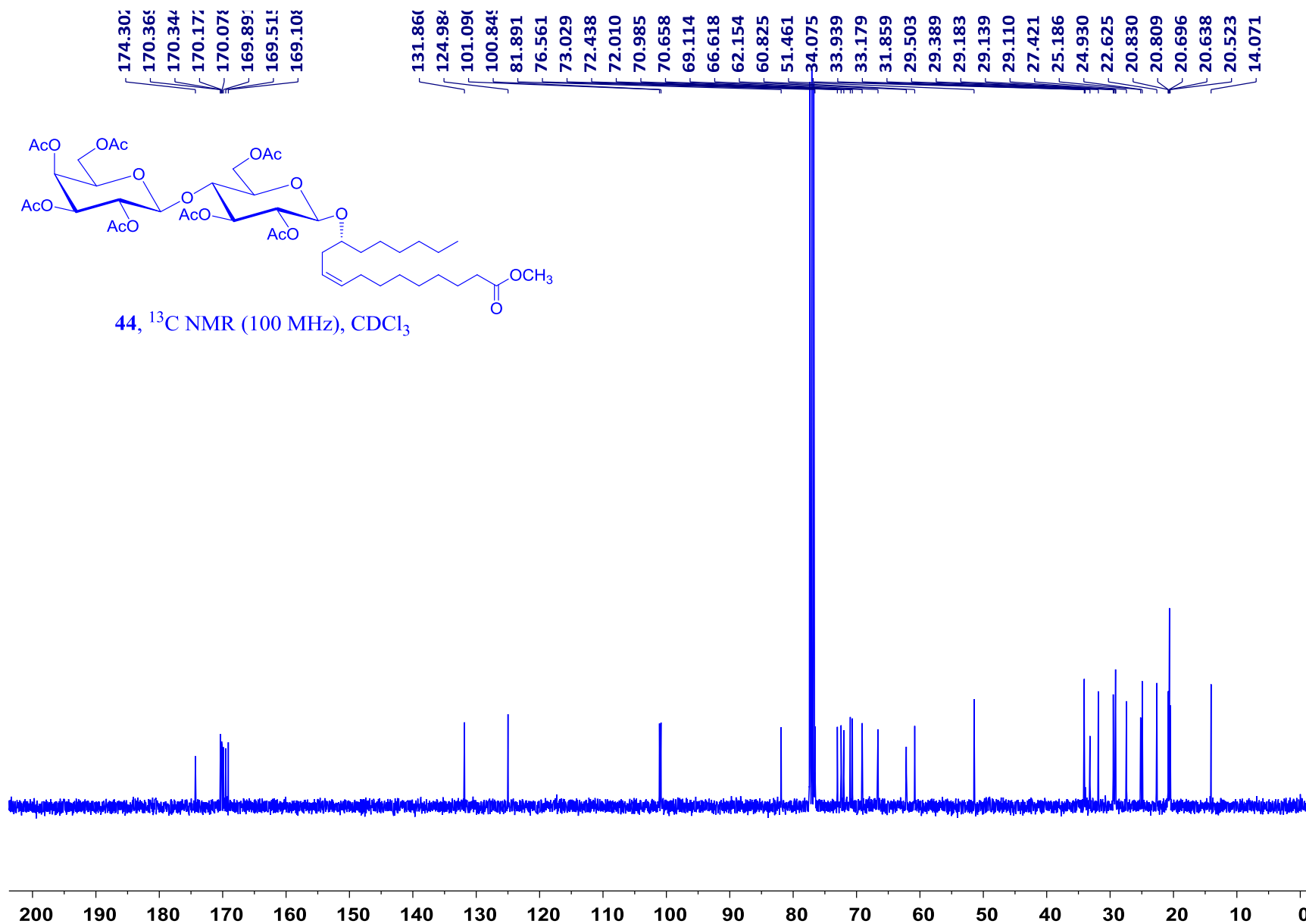


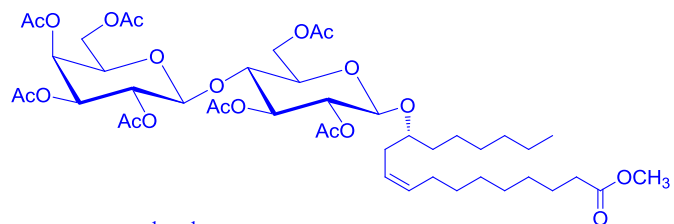


43, ^1H - ^1H gHSQC, (400 MHz), DMSO

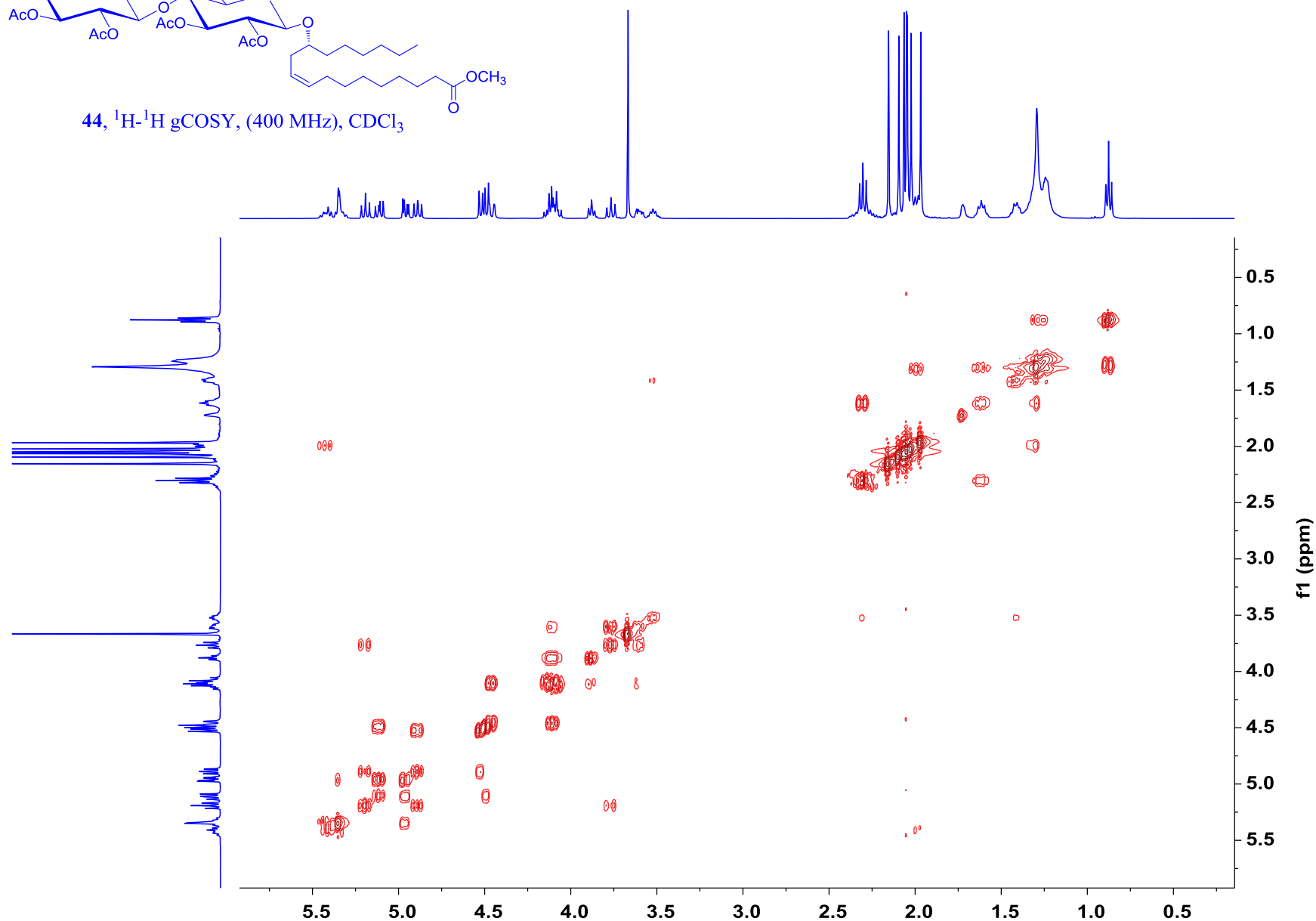


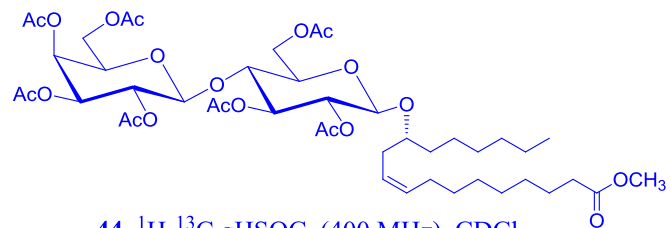




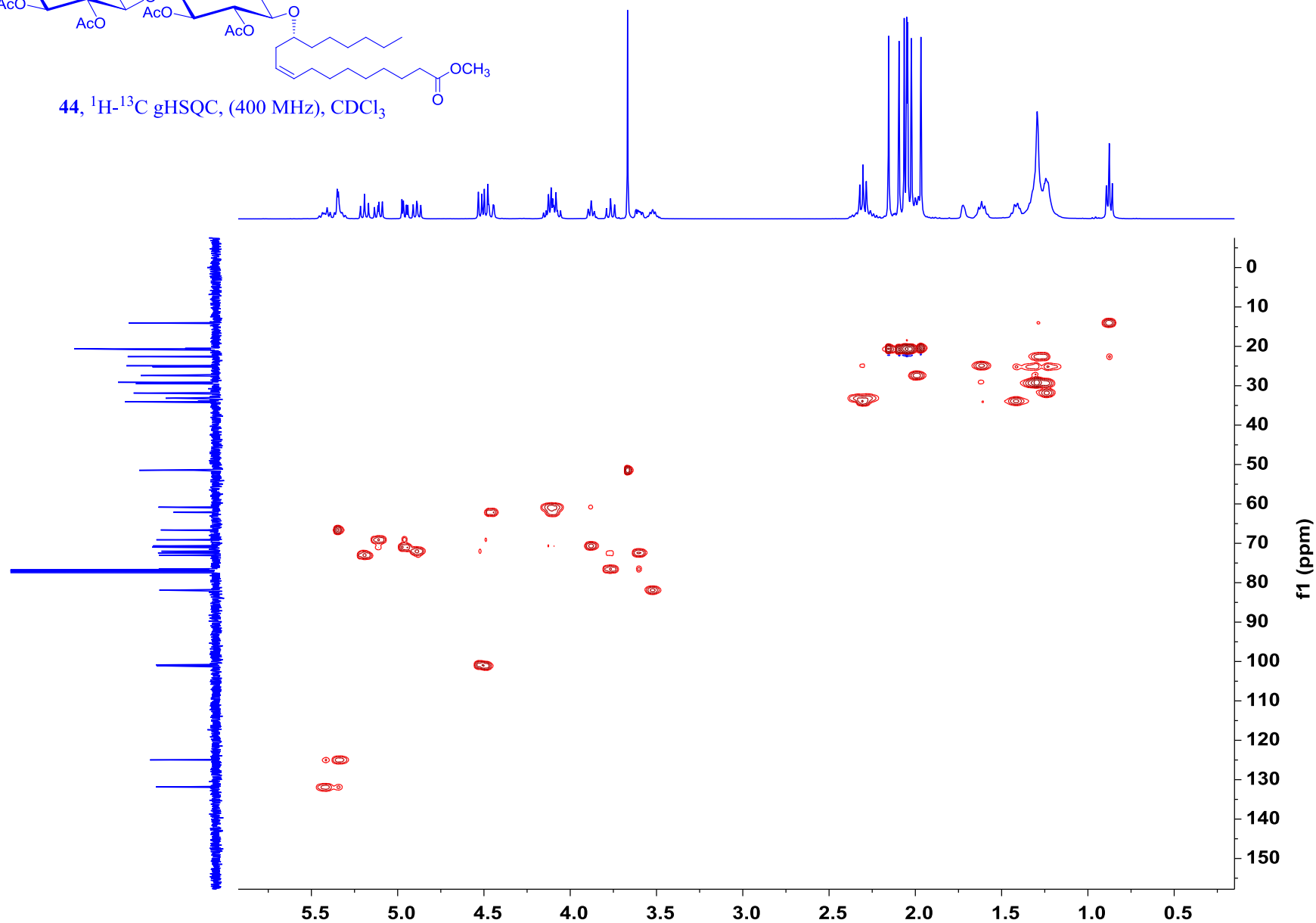


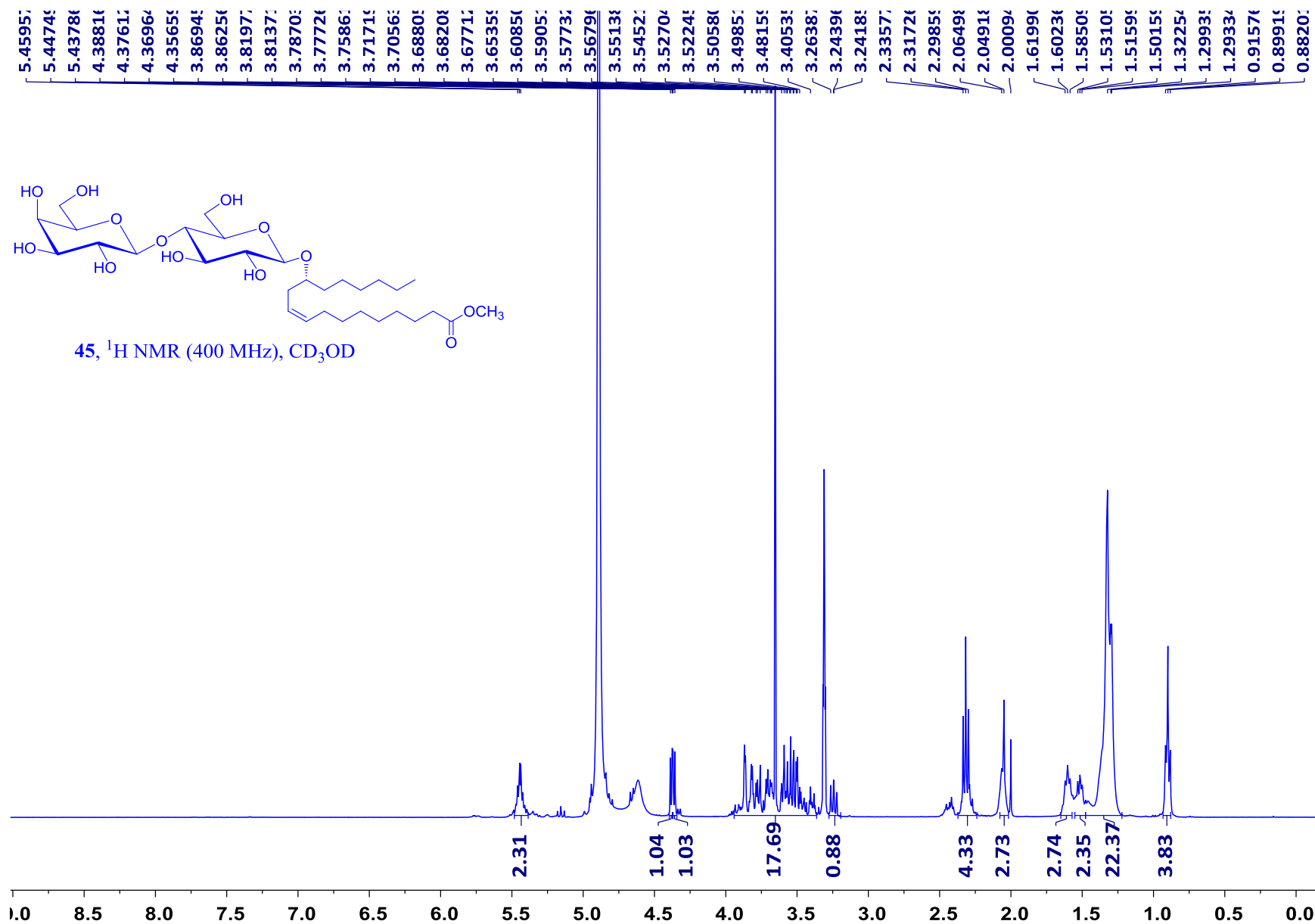
44, ^1H - ^1H gCOSY, (400 MHz), CDCl_3

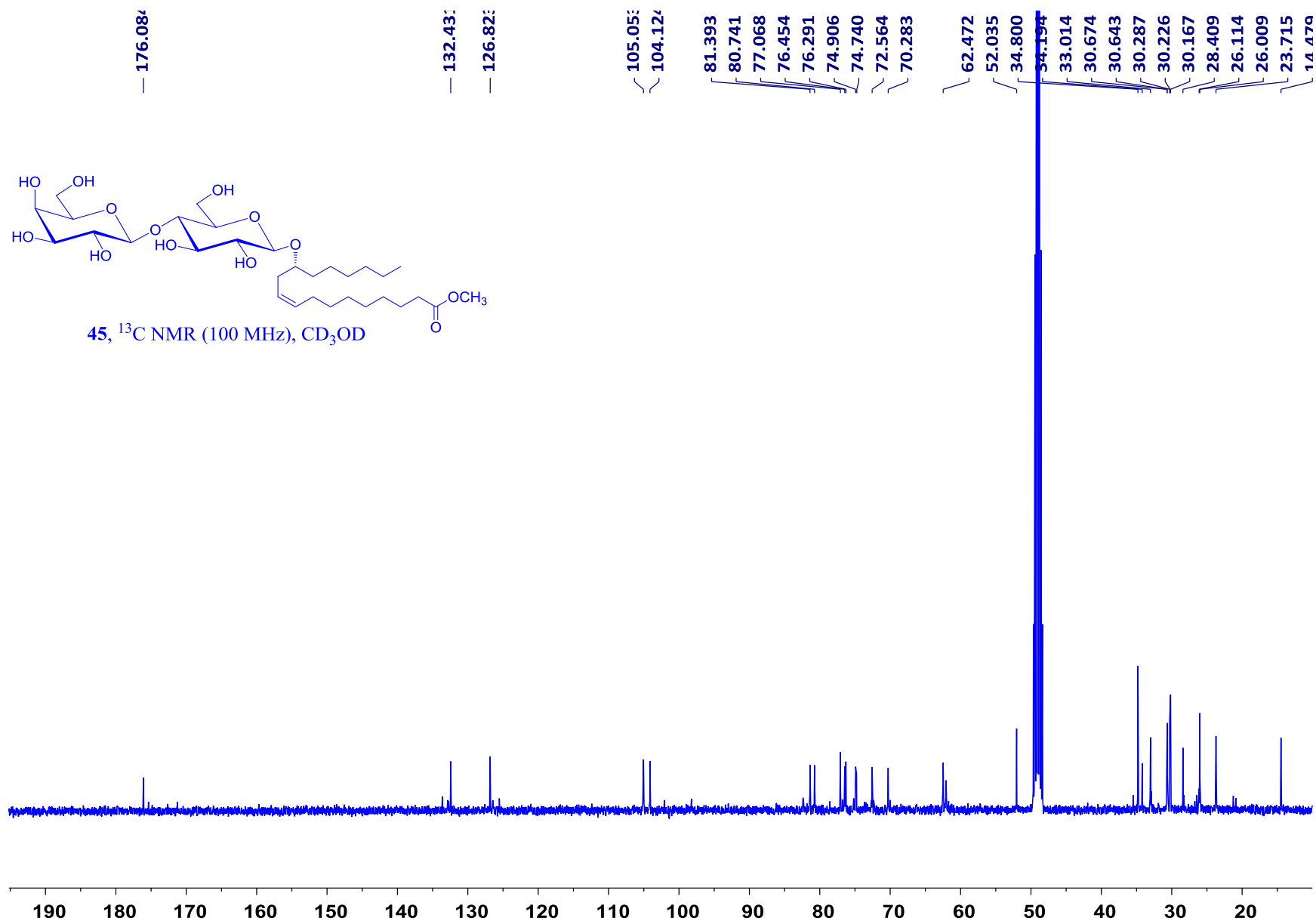


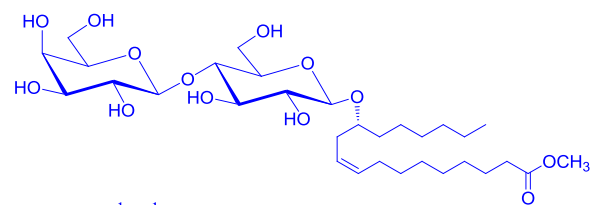


44, ¹H-¹³C gHSQC, (400 MHz), CDCl₃

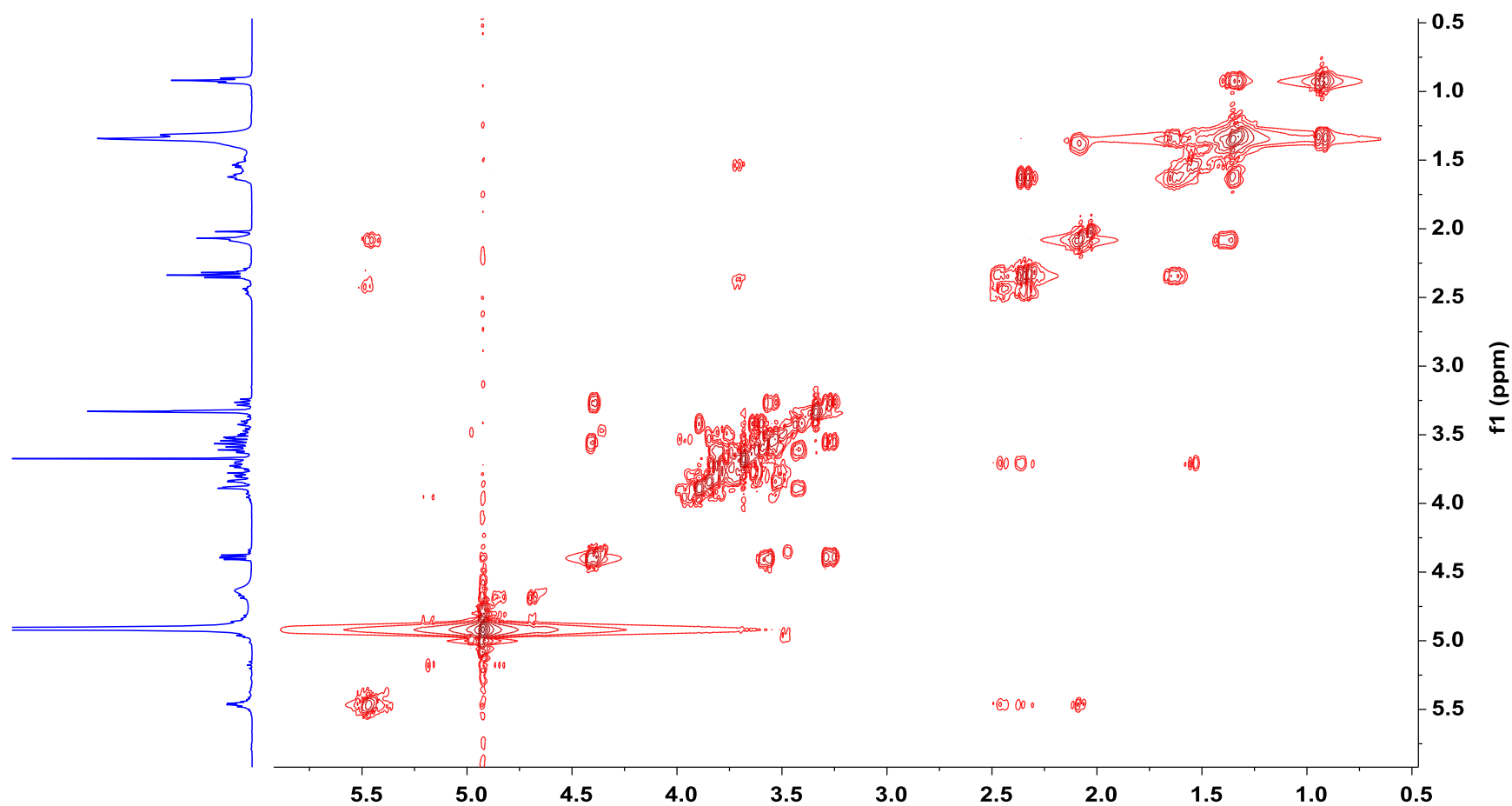


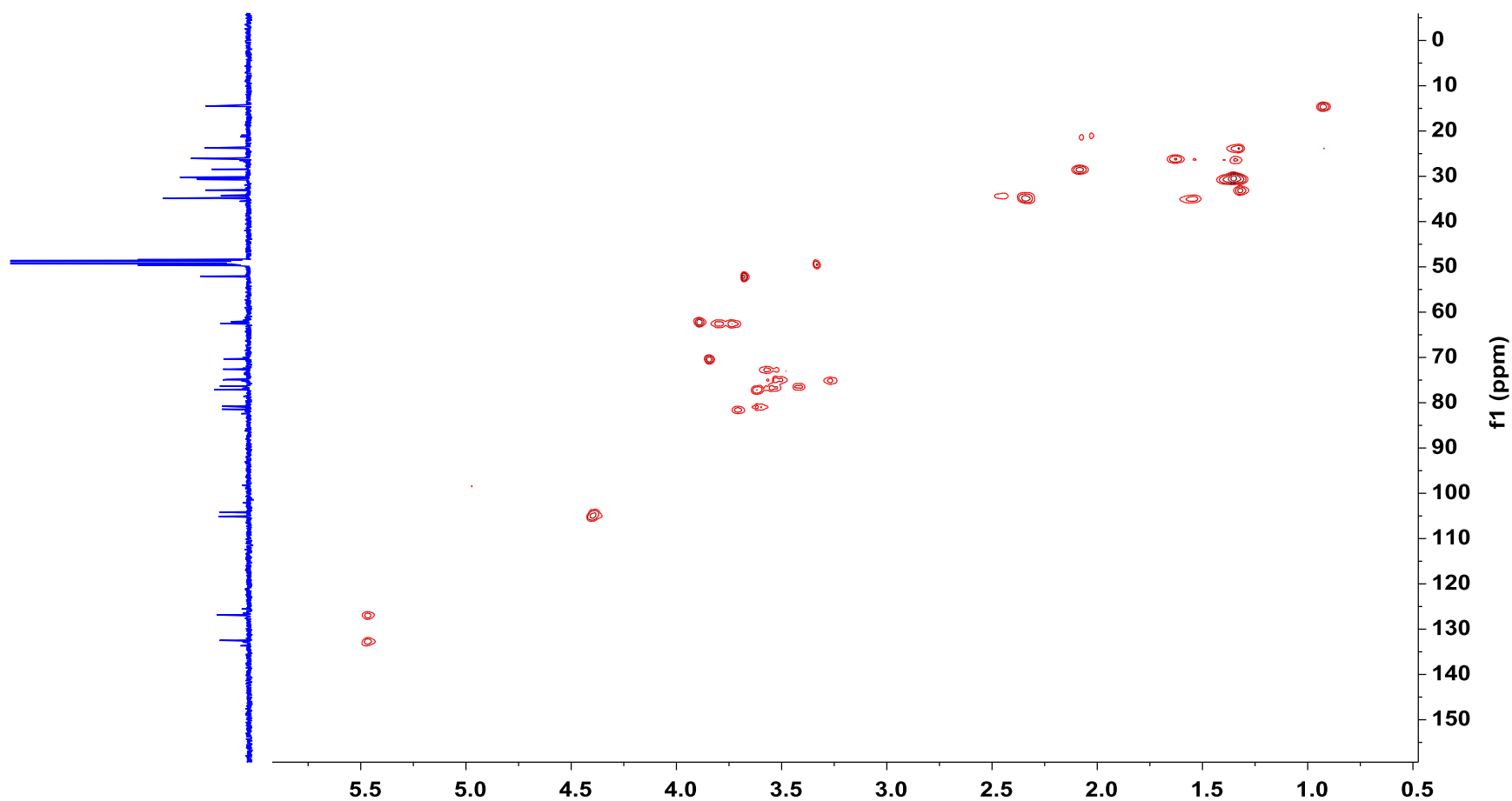
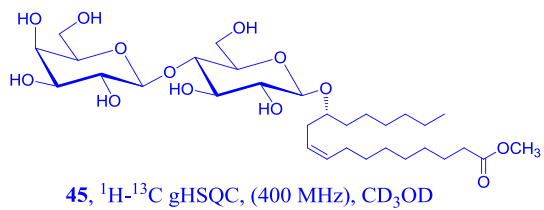


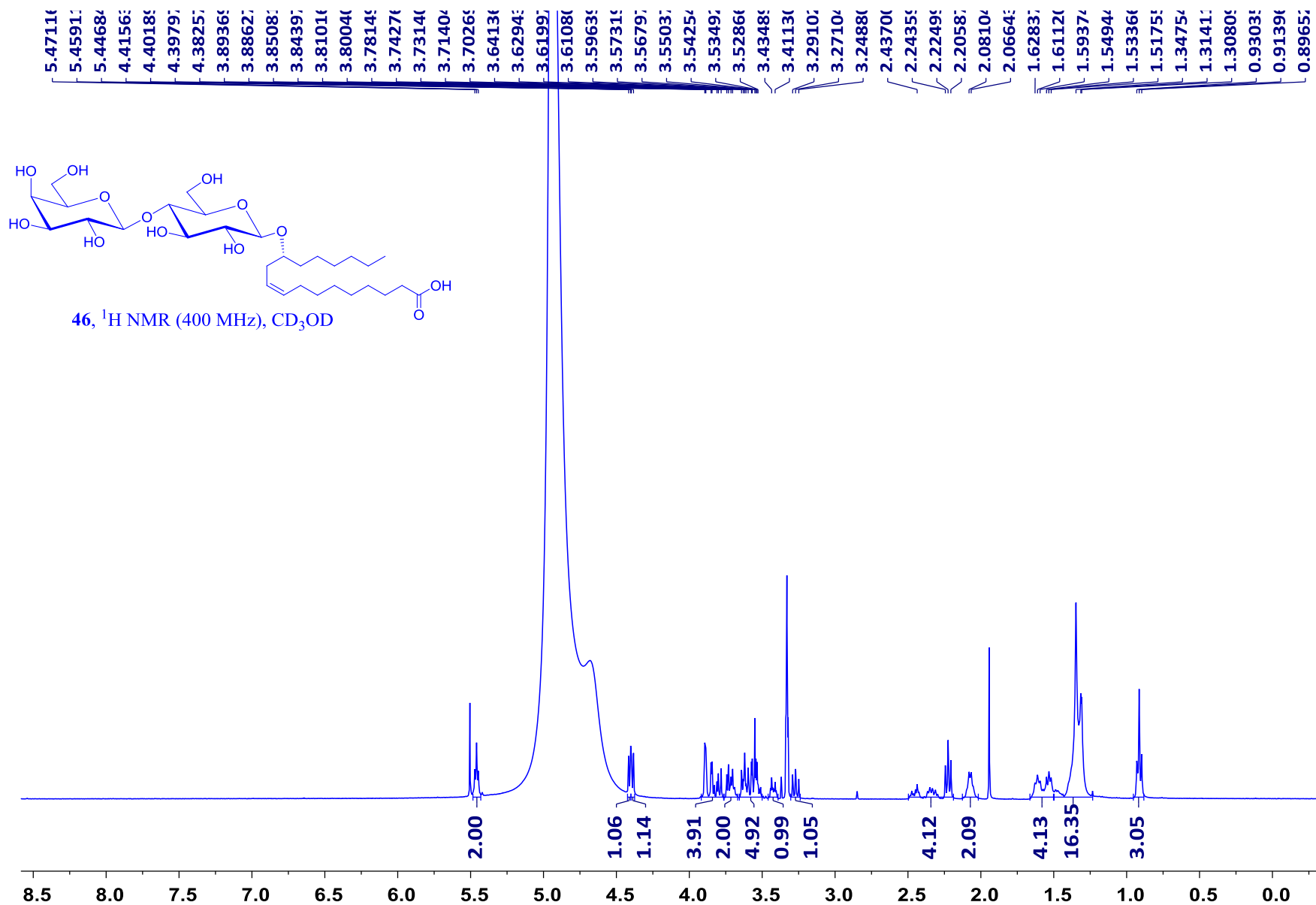


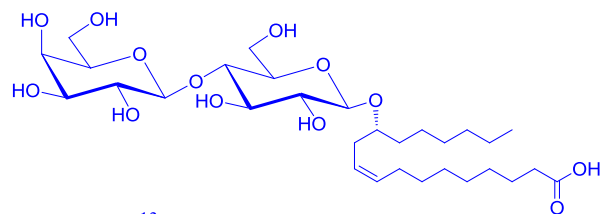


45, ^1H - ^1H gCOSY, (400 MHz), CD_3OD

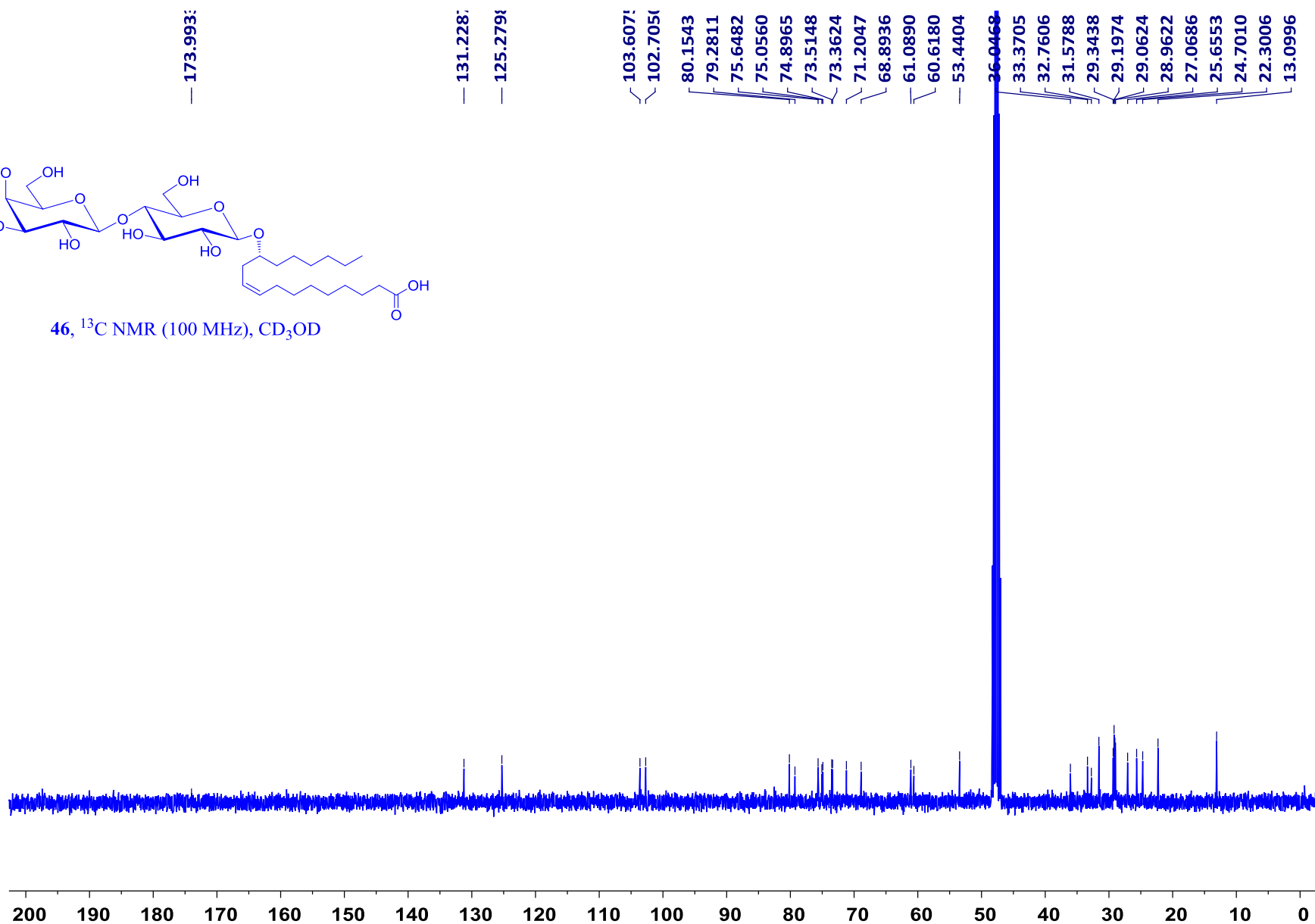


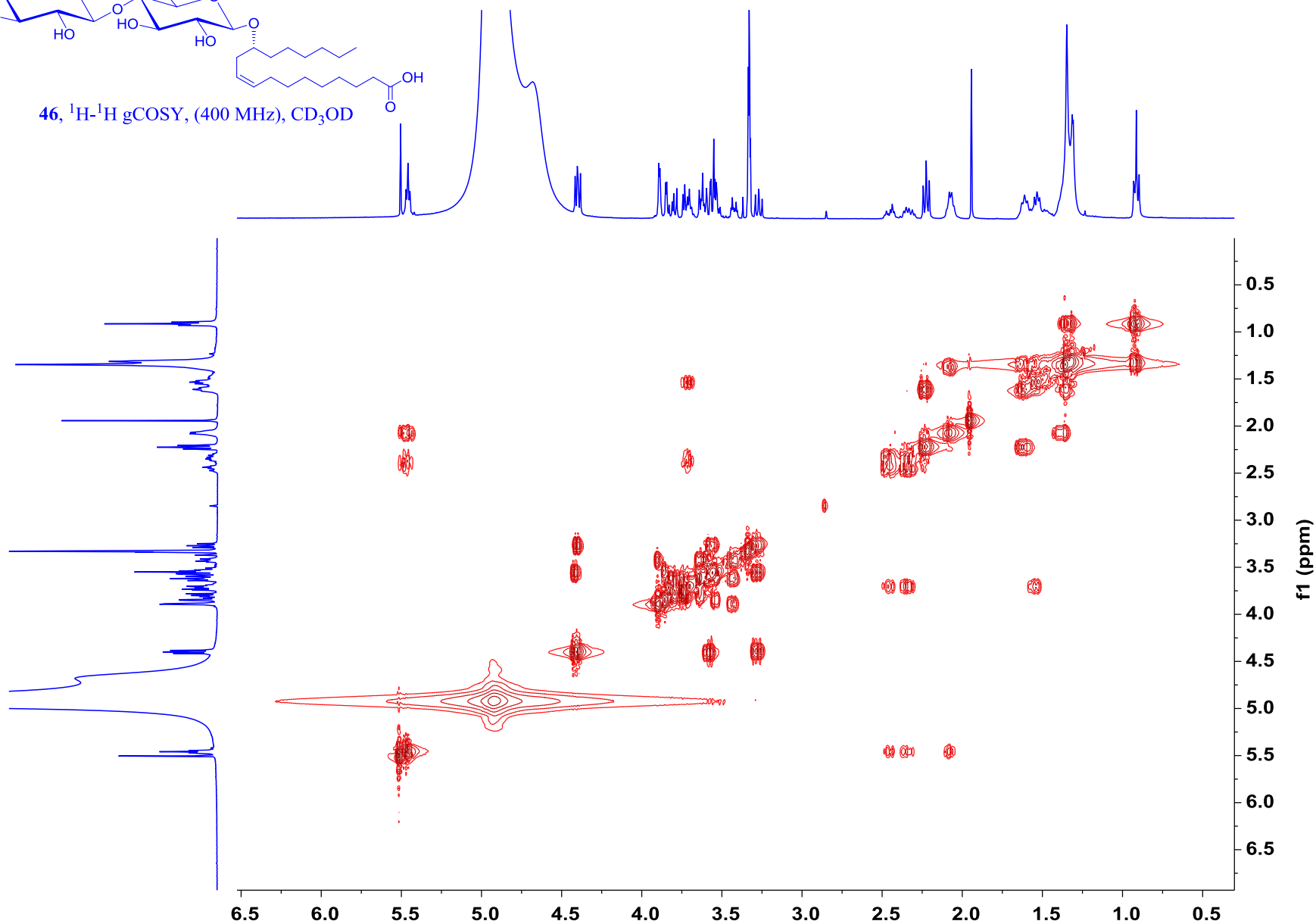
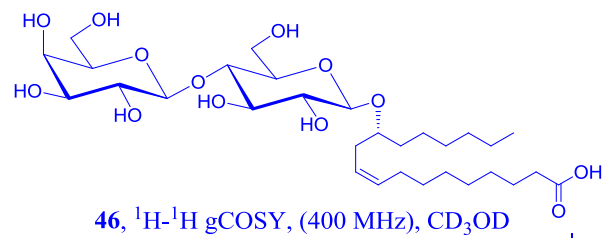


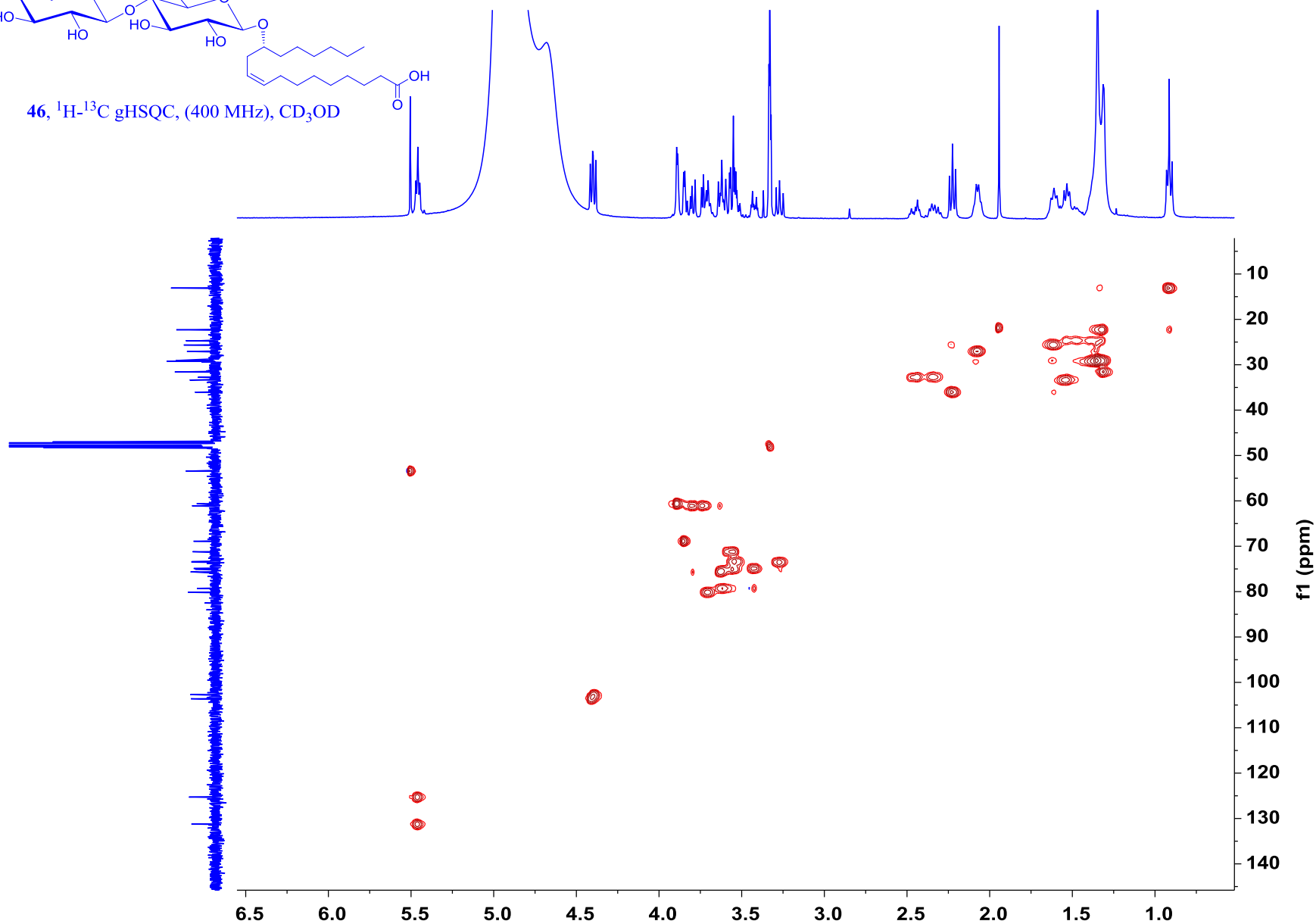
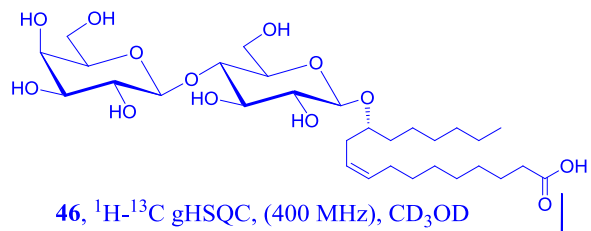


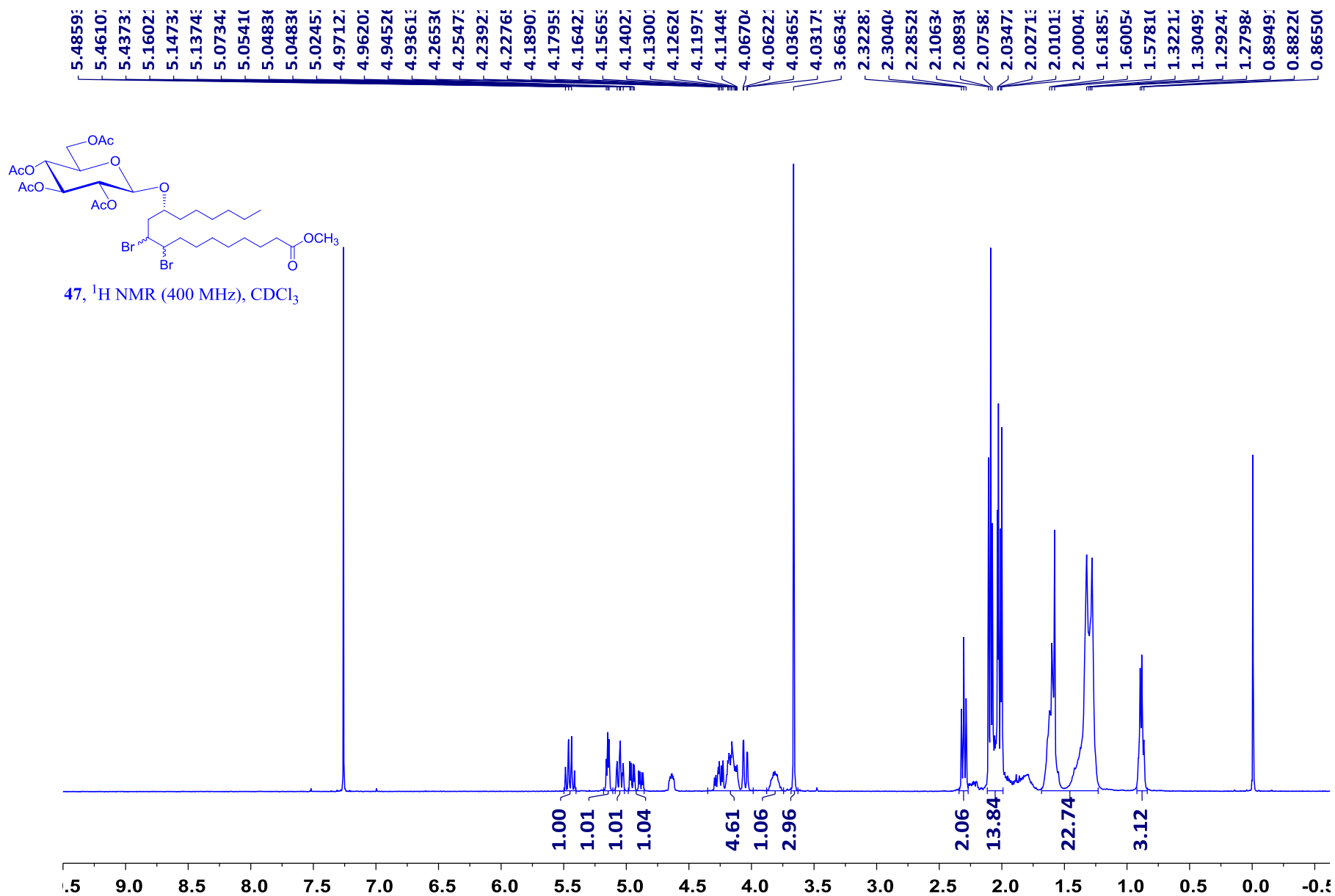


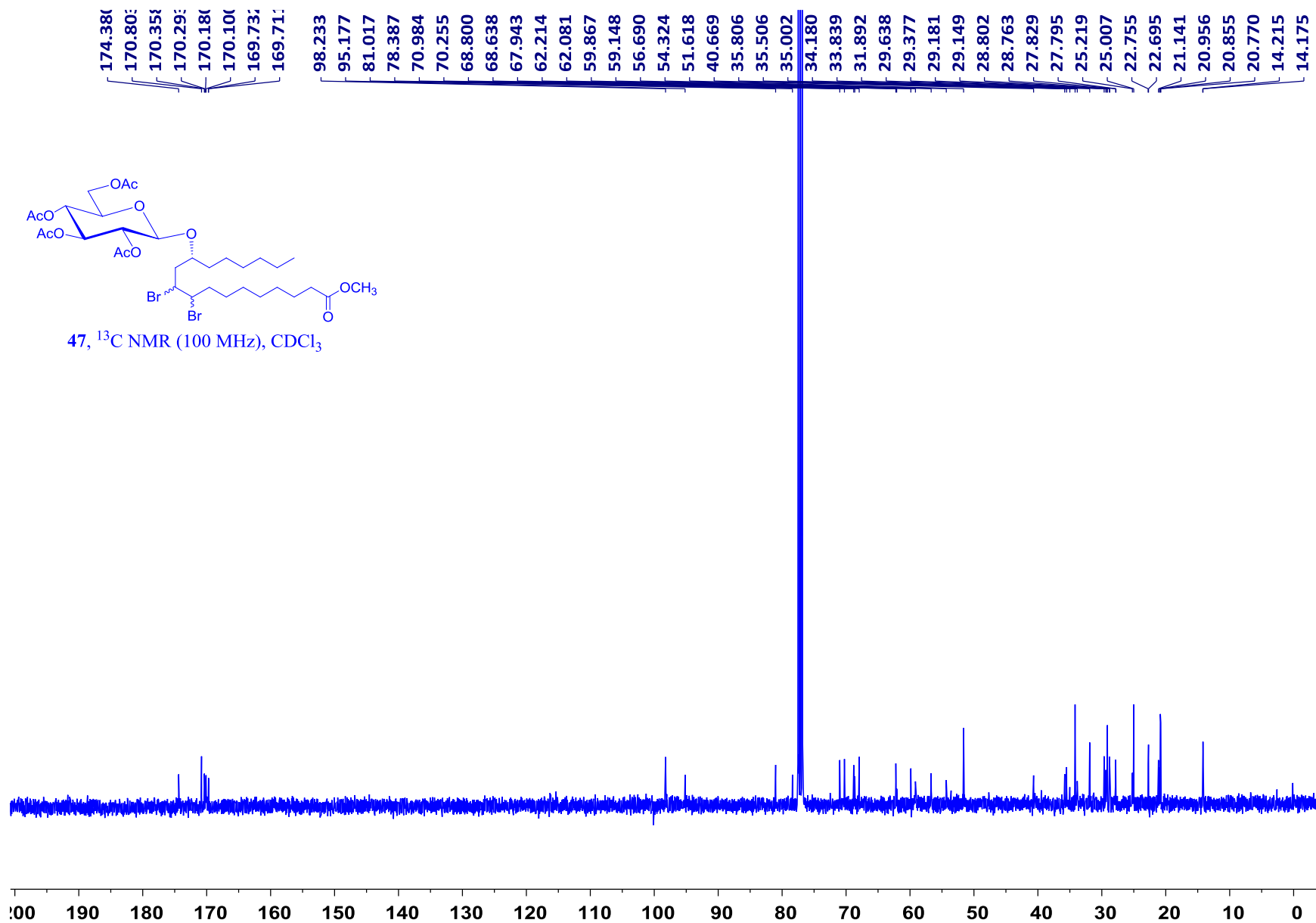
46, ^{13}C NMR (100 MHz), CD_3OD

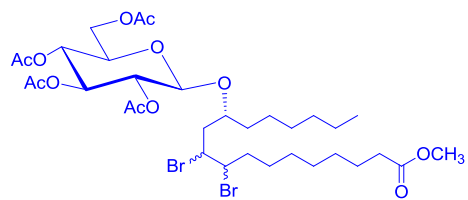




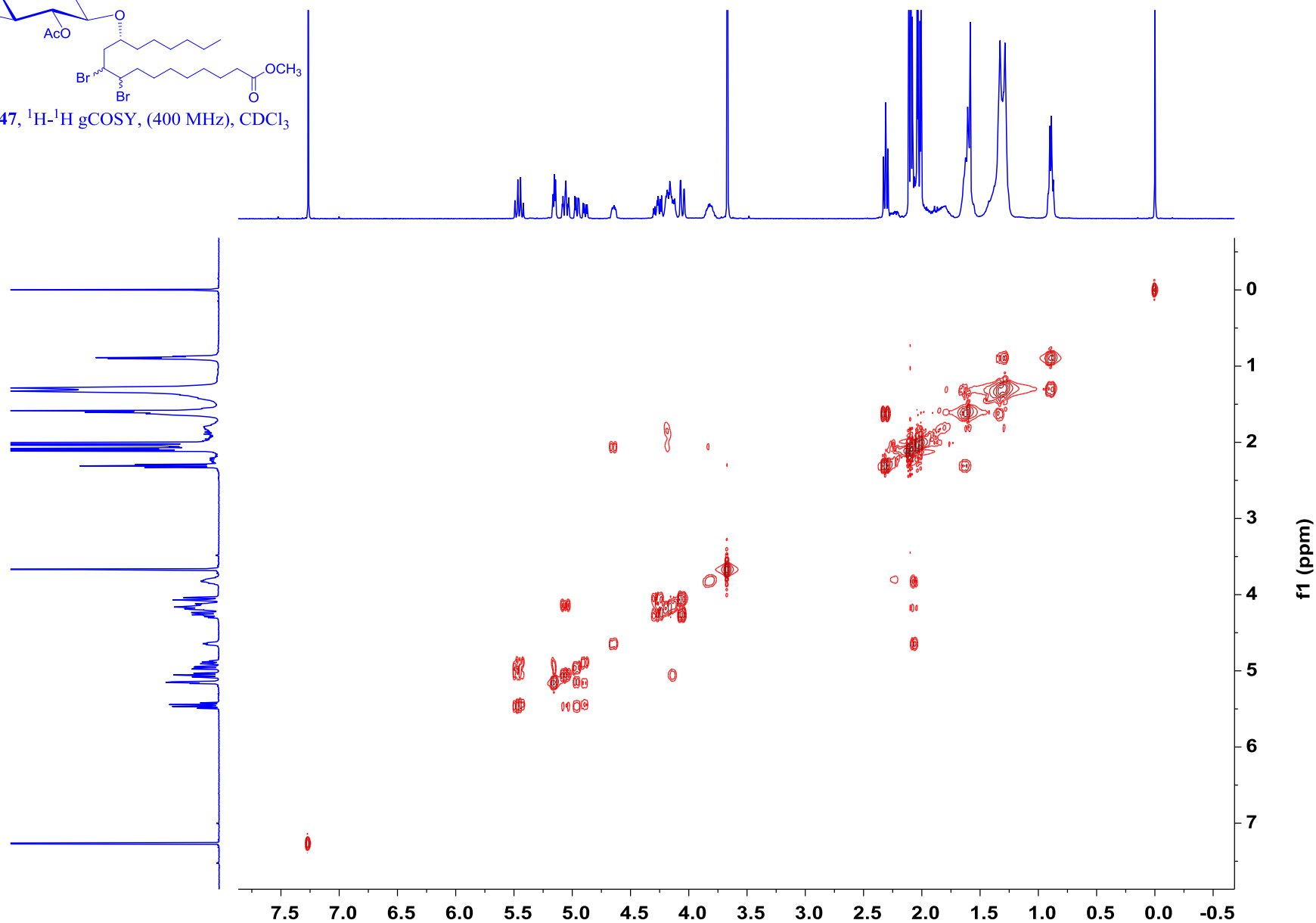


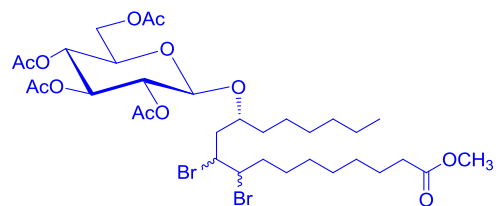




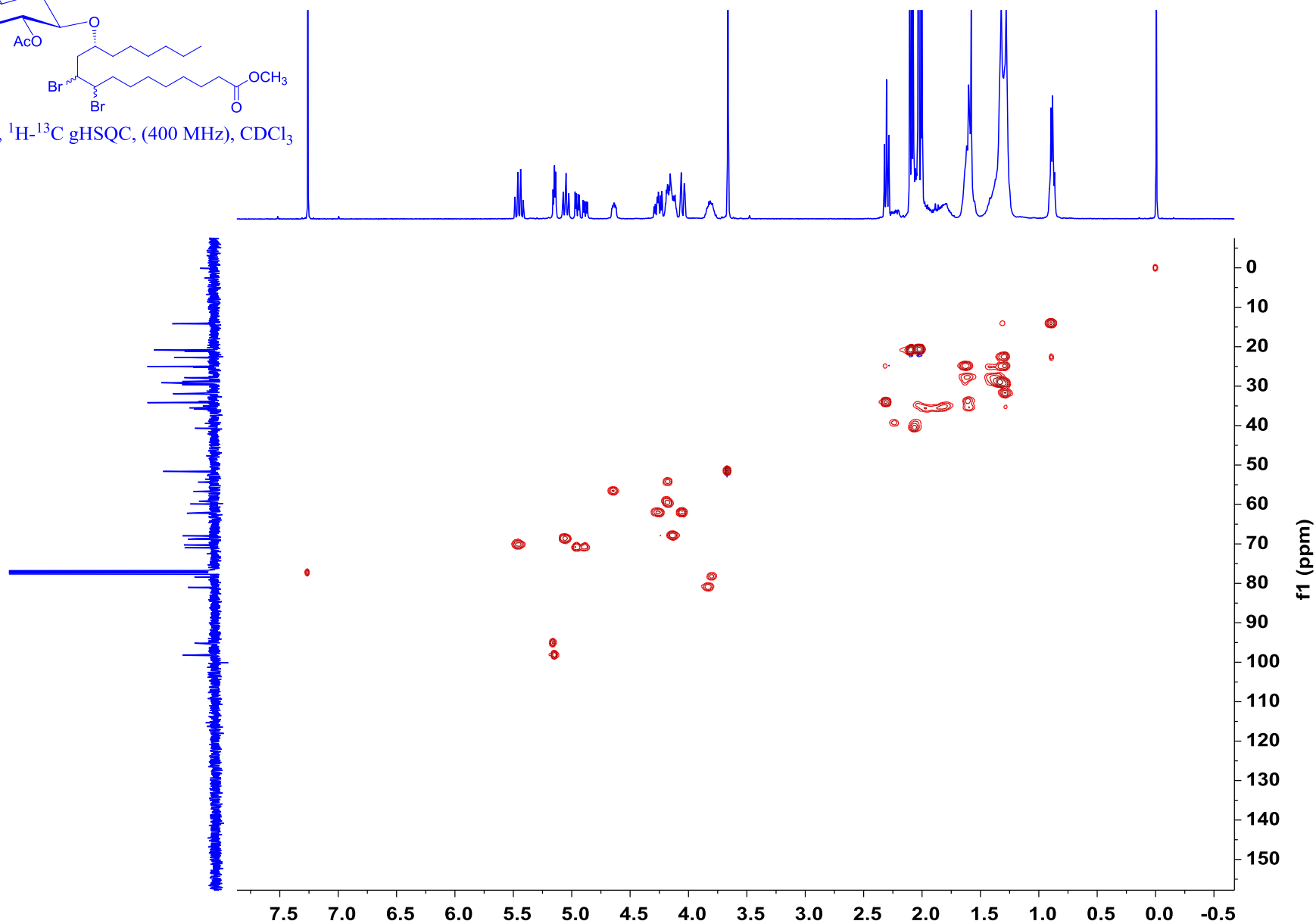


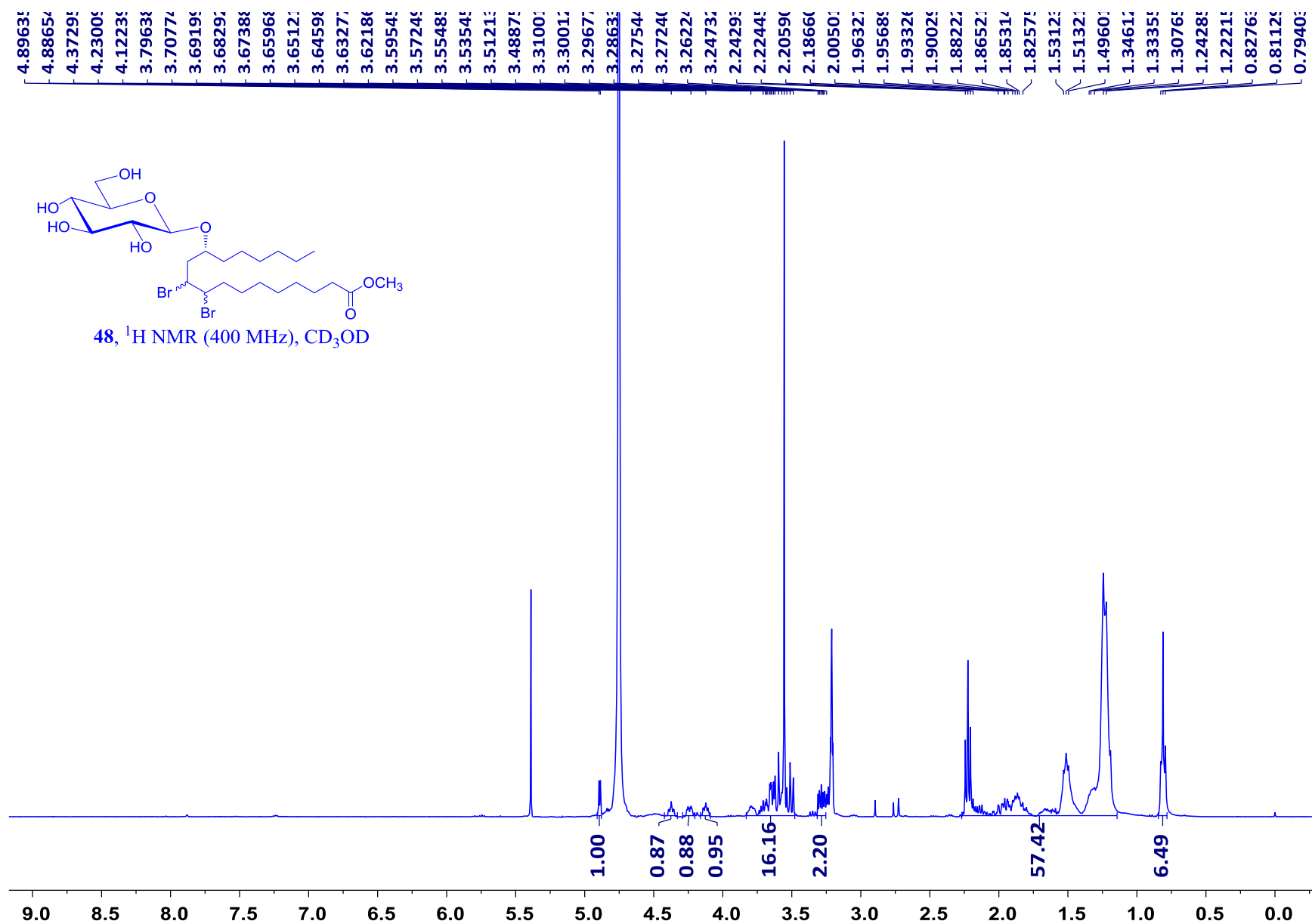
47, ¹H-¹H gCOSY, (400 MHz), CDCl₃

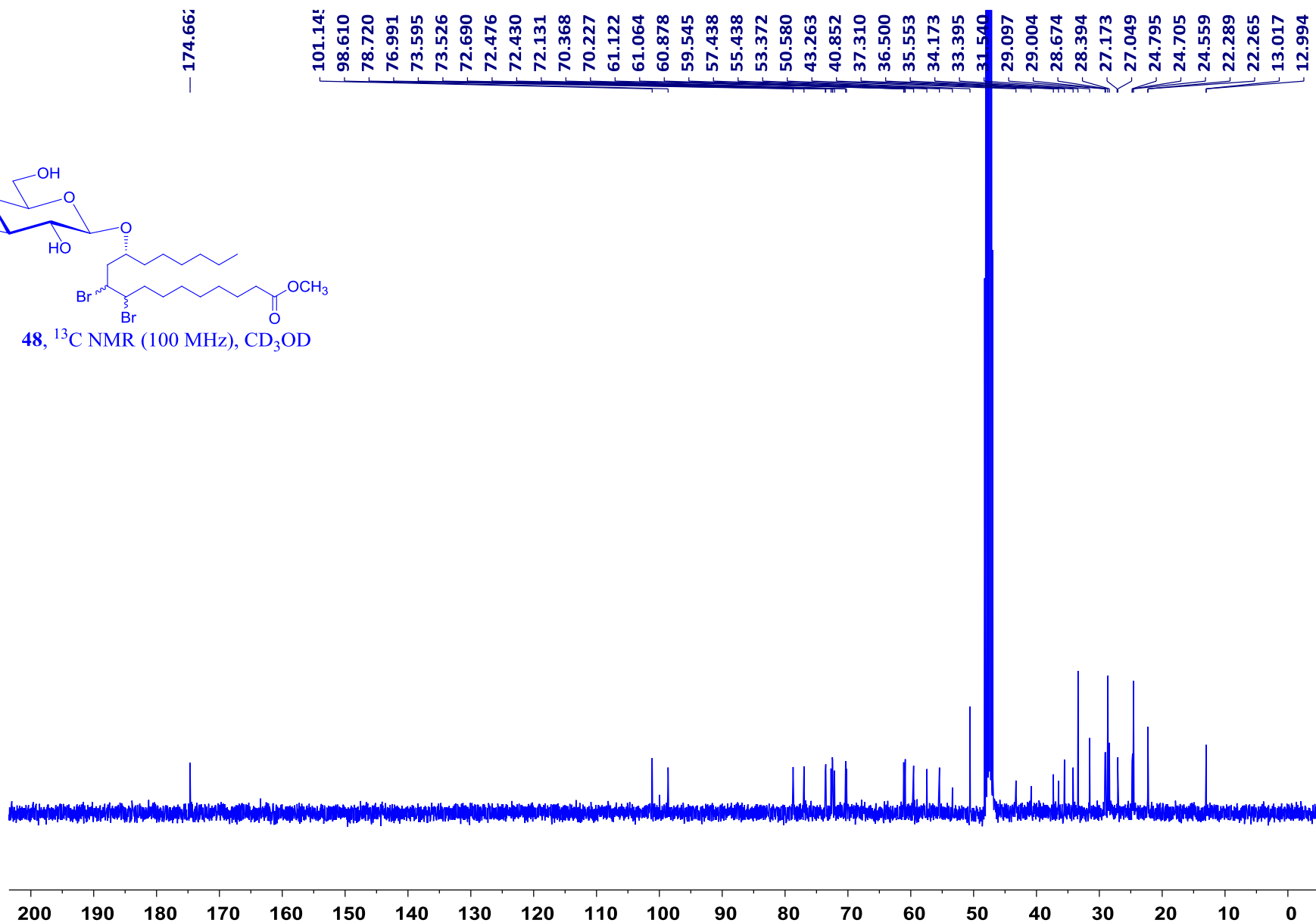
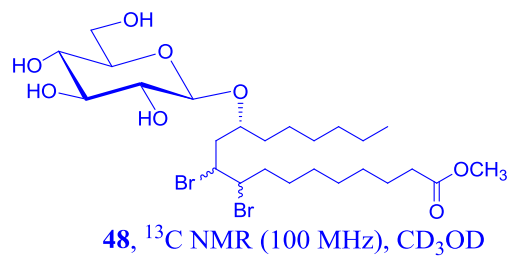


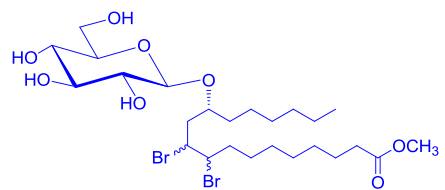


47, ^1H - ^{13}C gHSQC, (400 MHz), CDCl_3

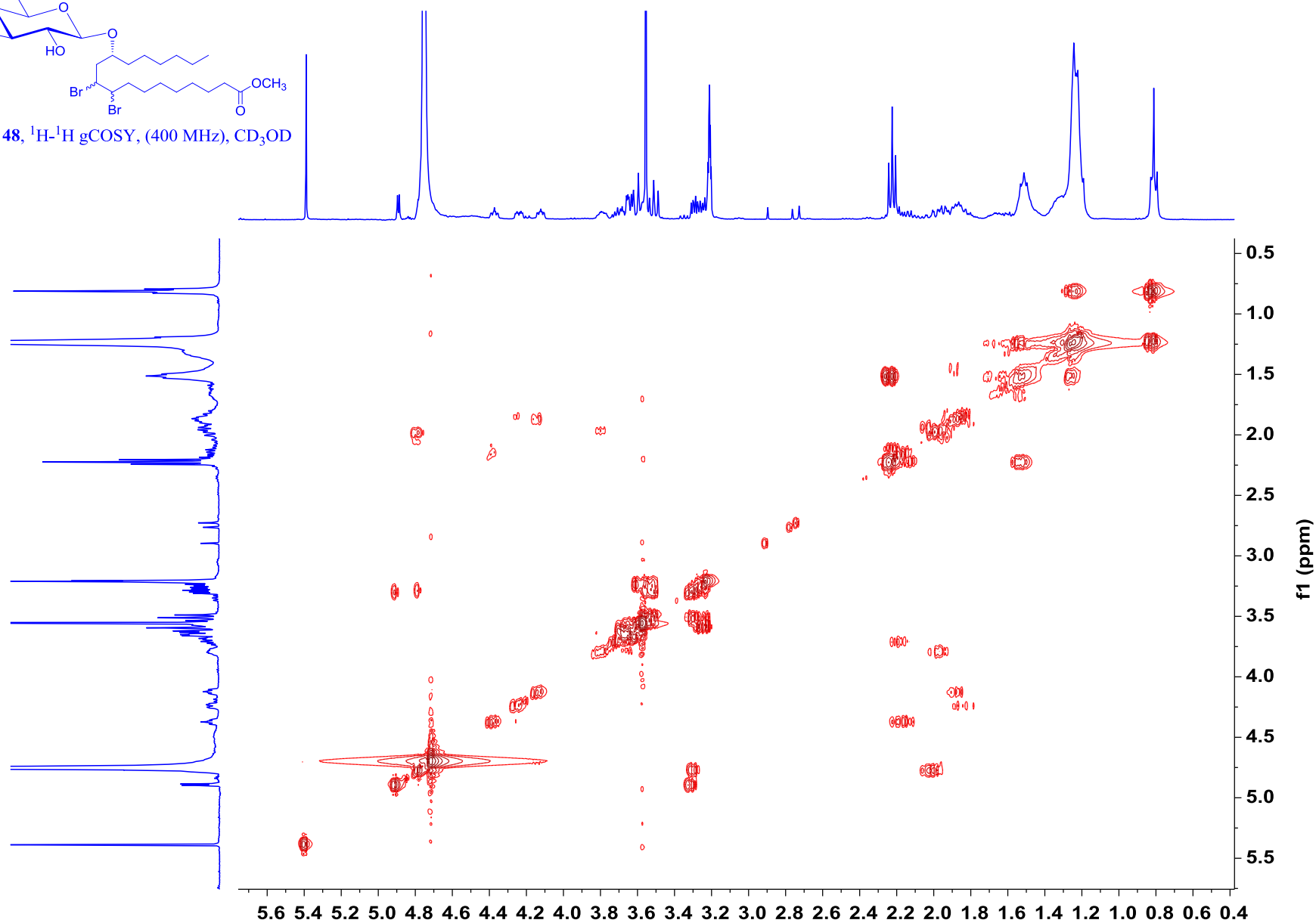


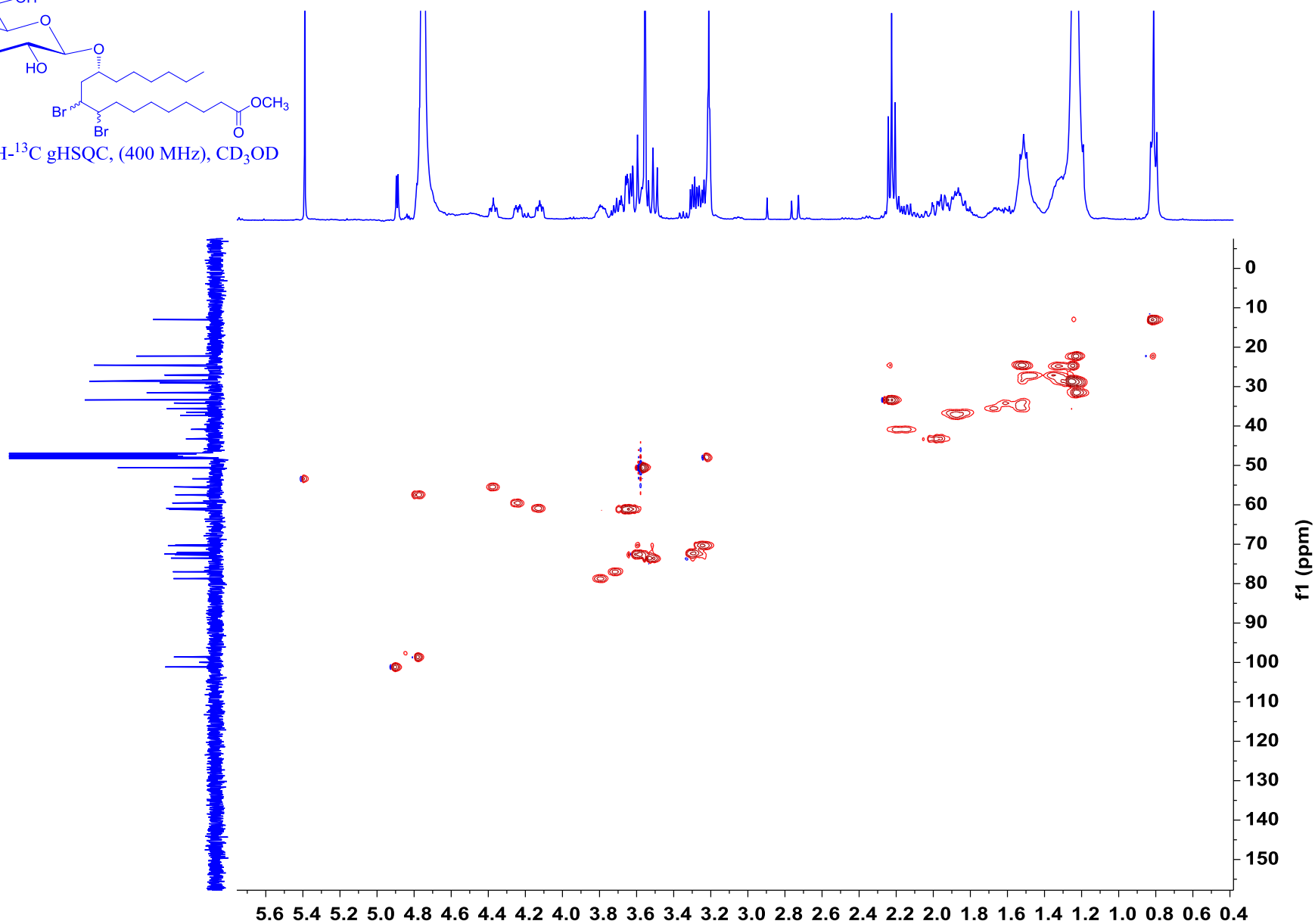
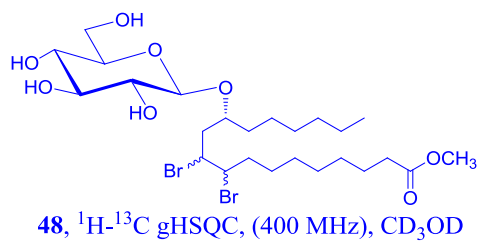


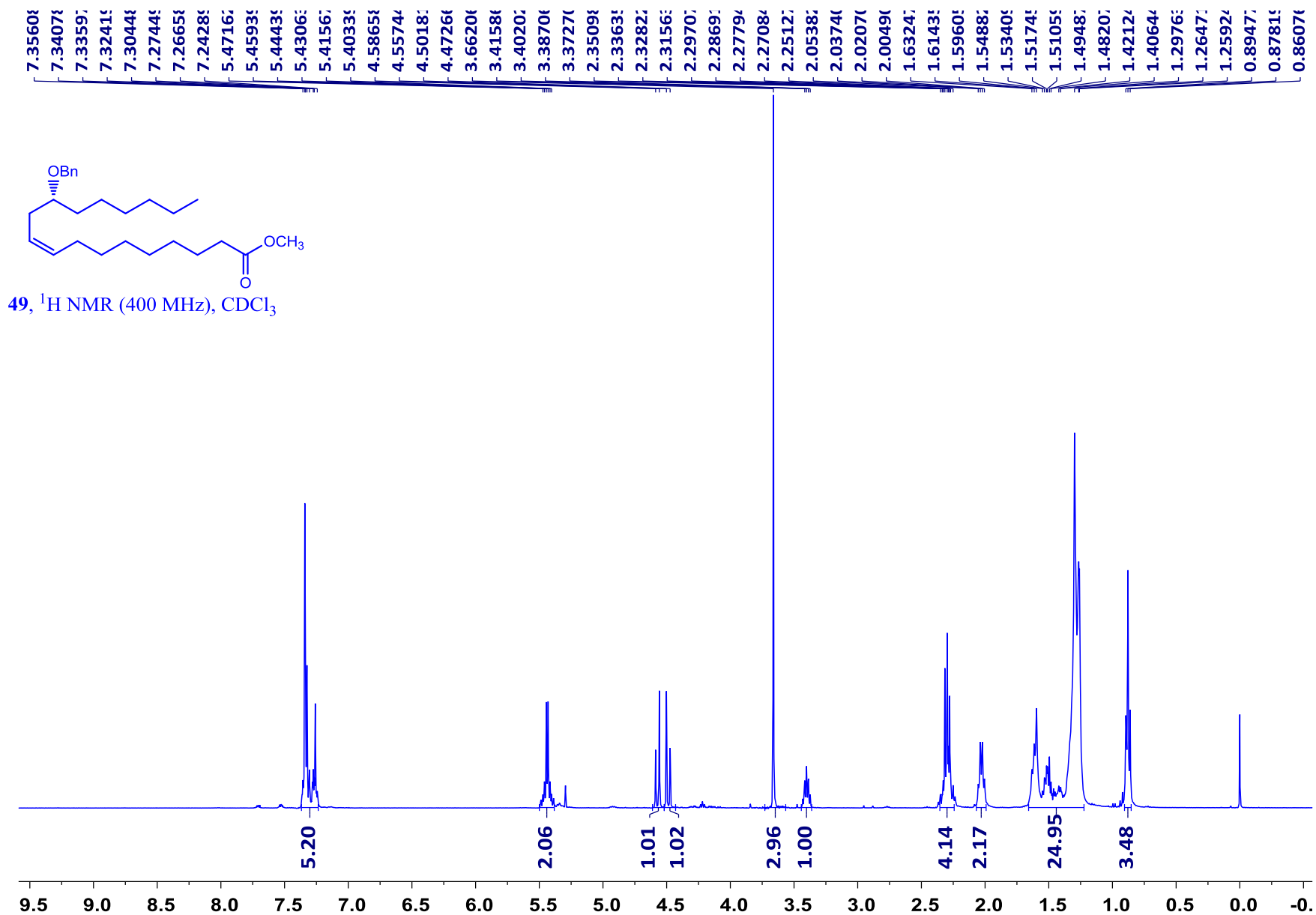


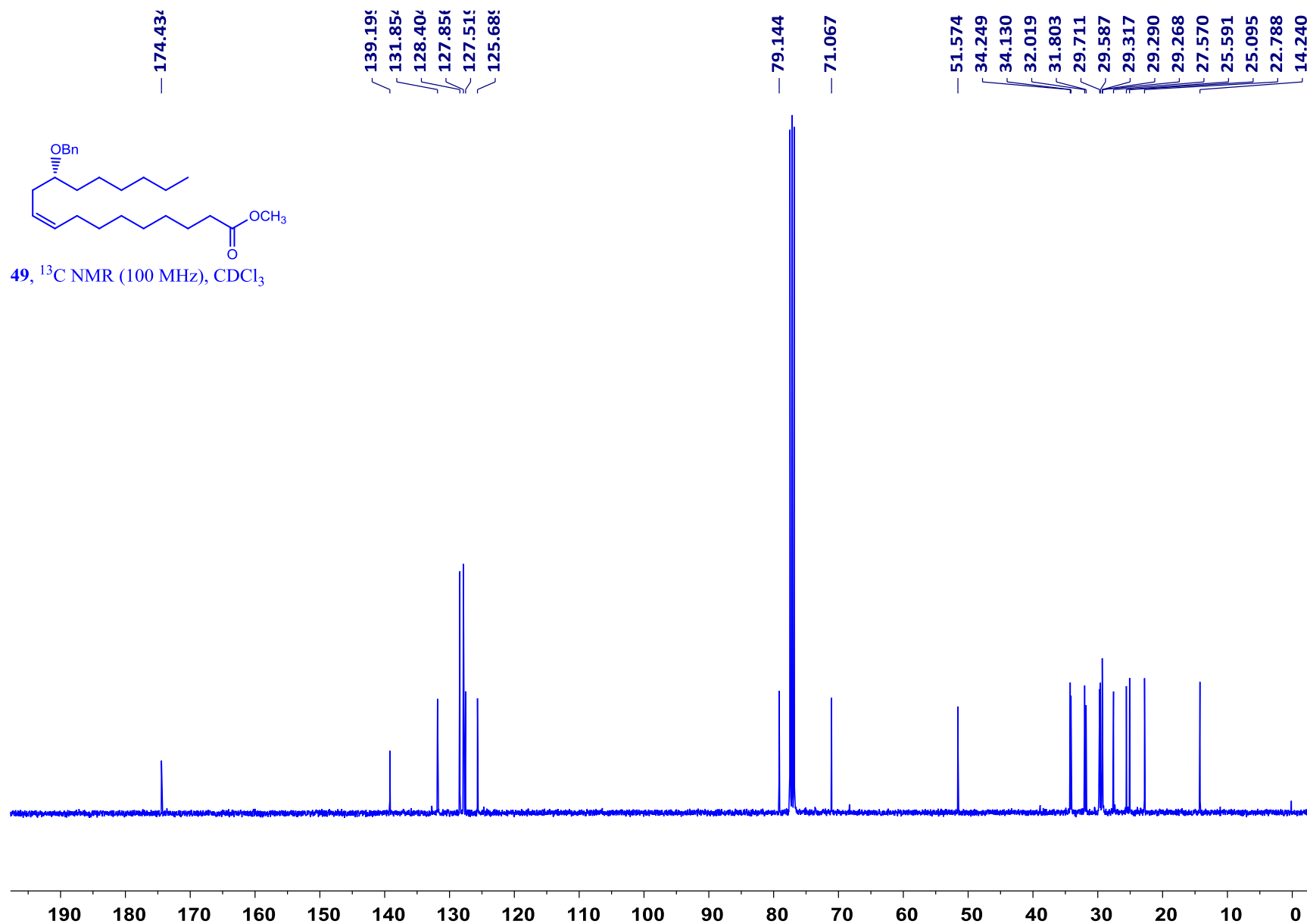


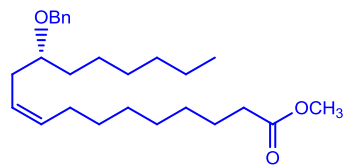
48, ^1H - ^1H gCOSY, (400 MHz), CD_3OD



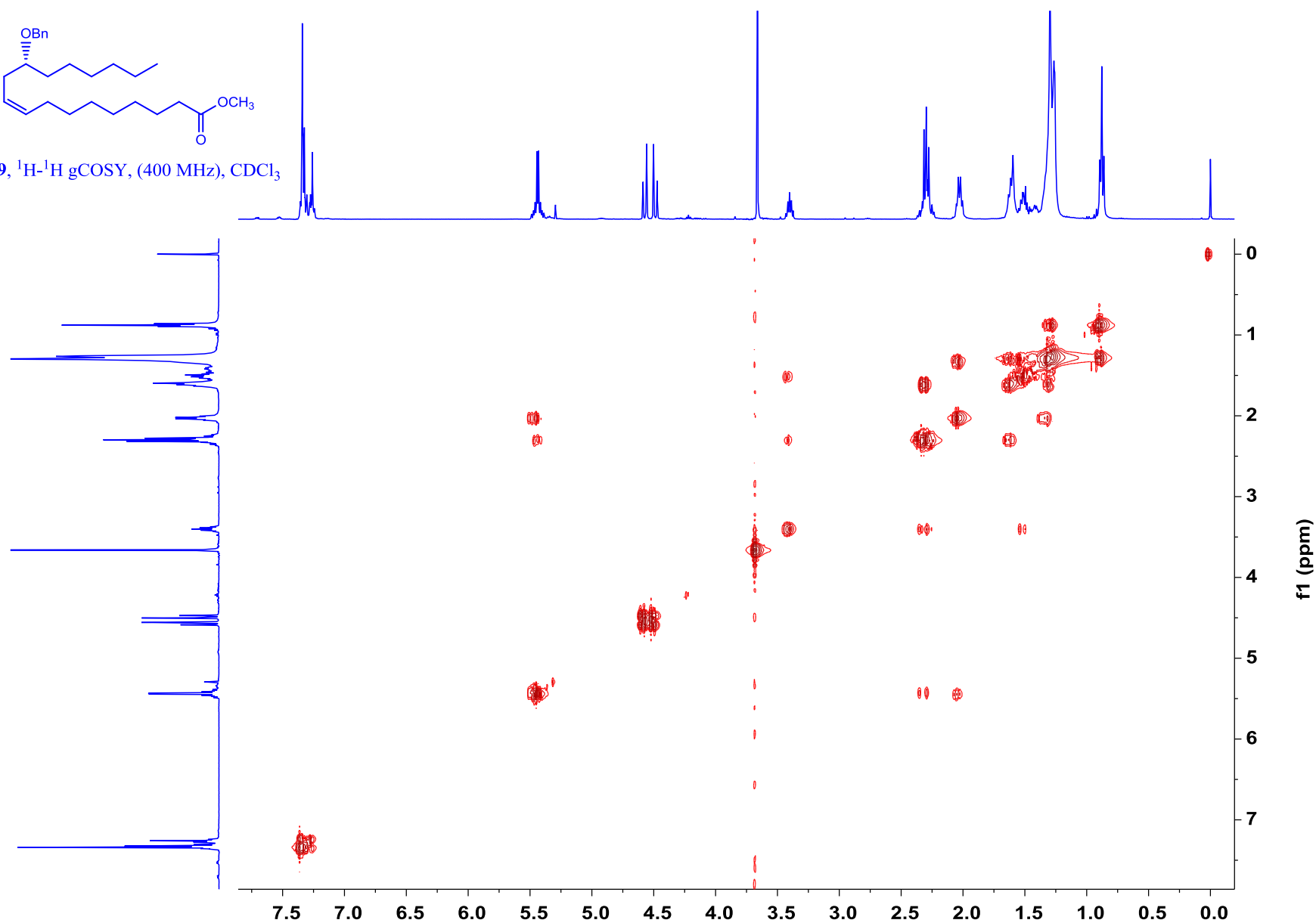


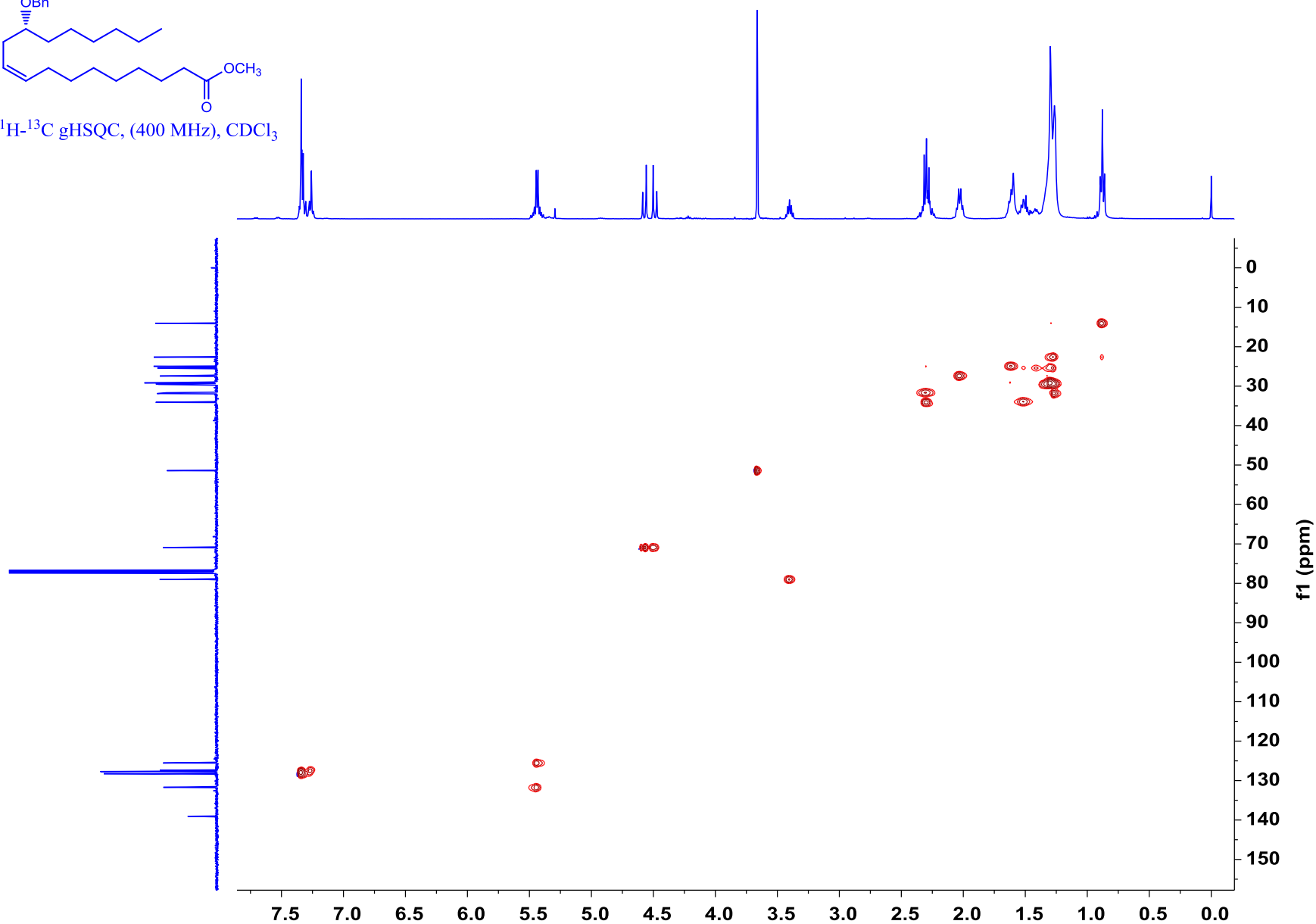
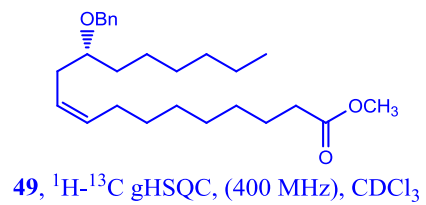


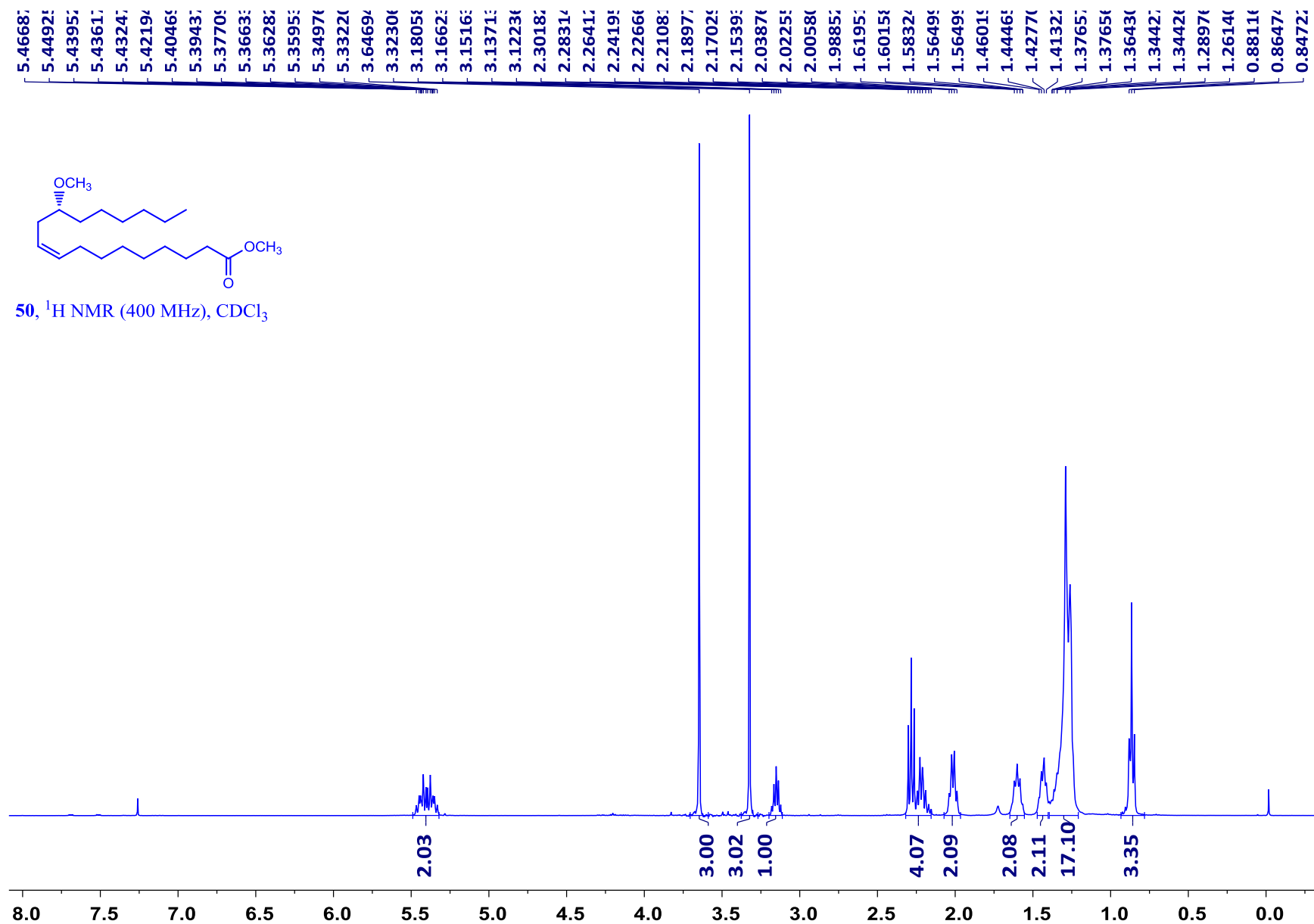


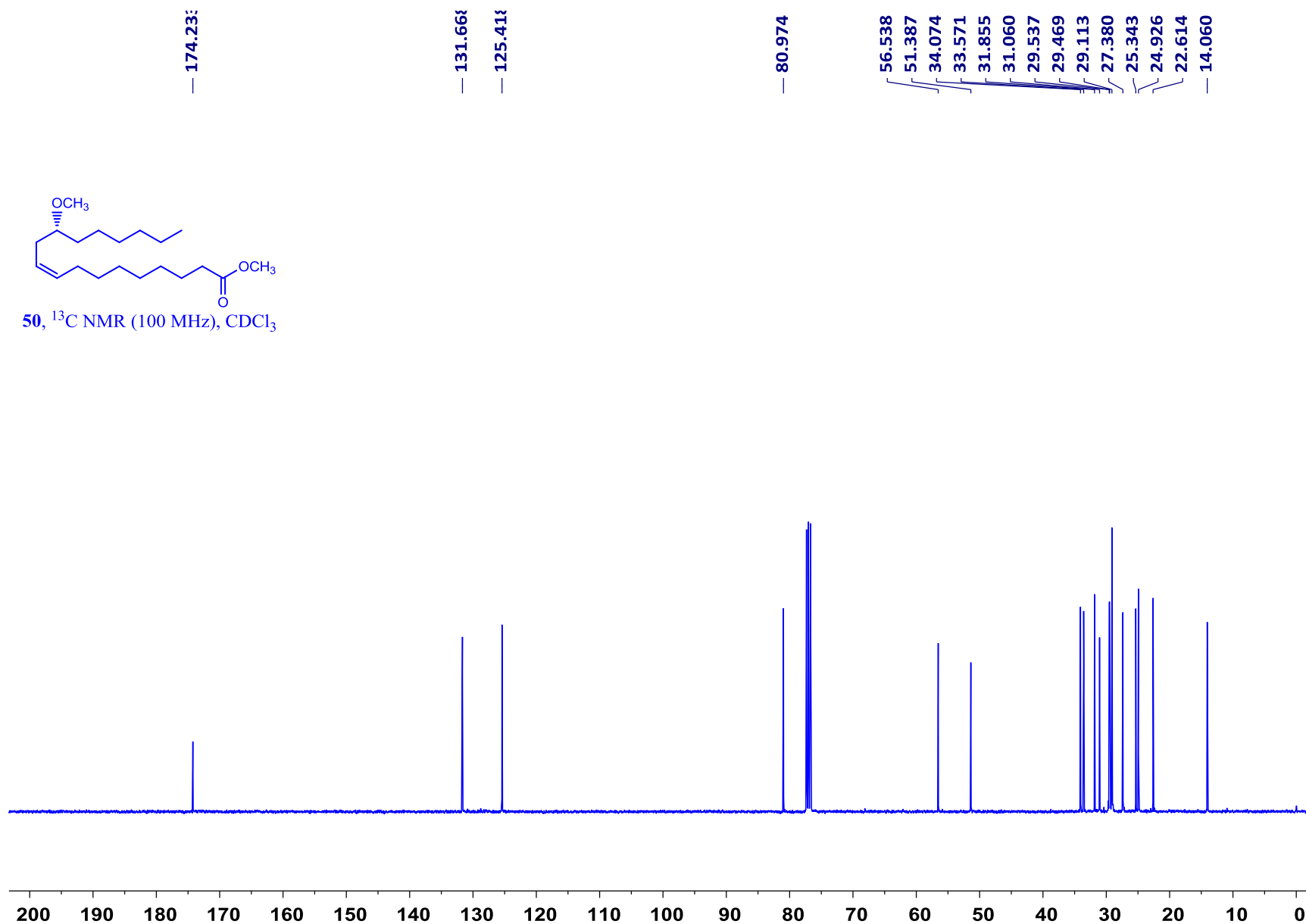
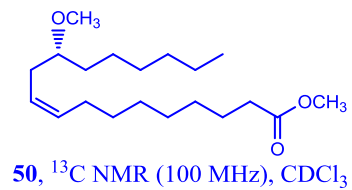


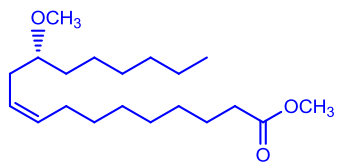
49, ^1H - ^1H gCOSY, (400 MHz), CDCl_3



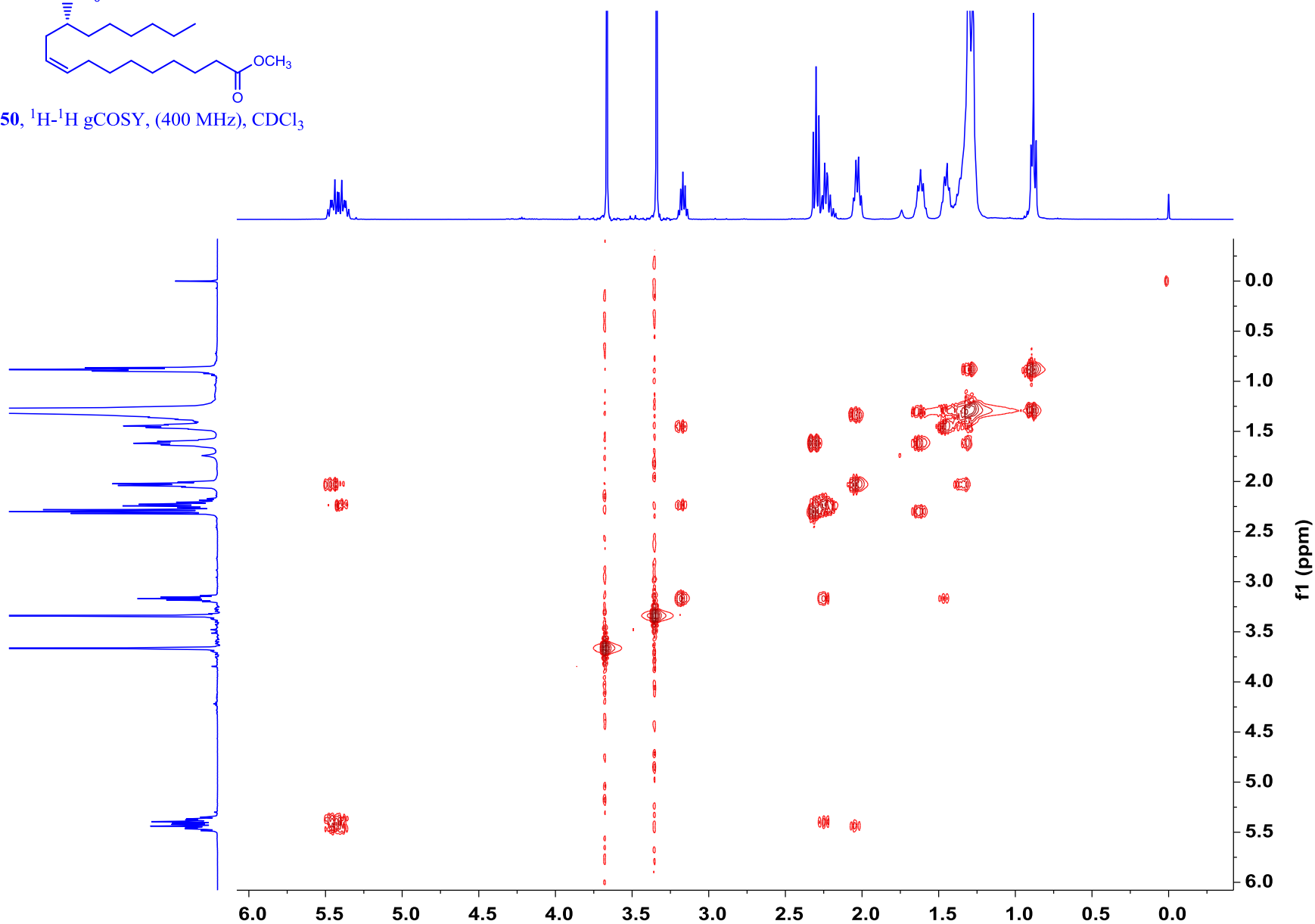


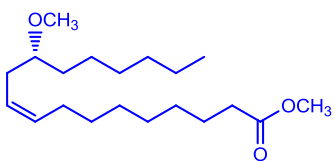




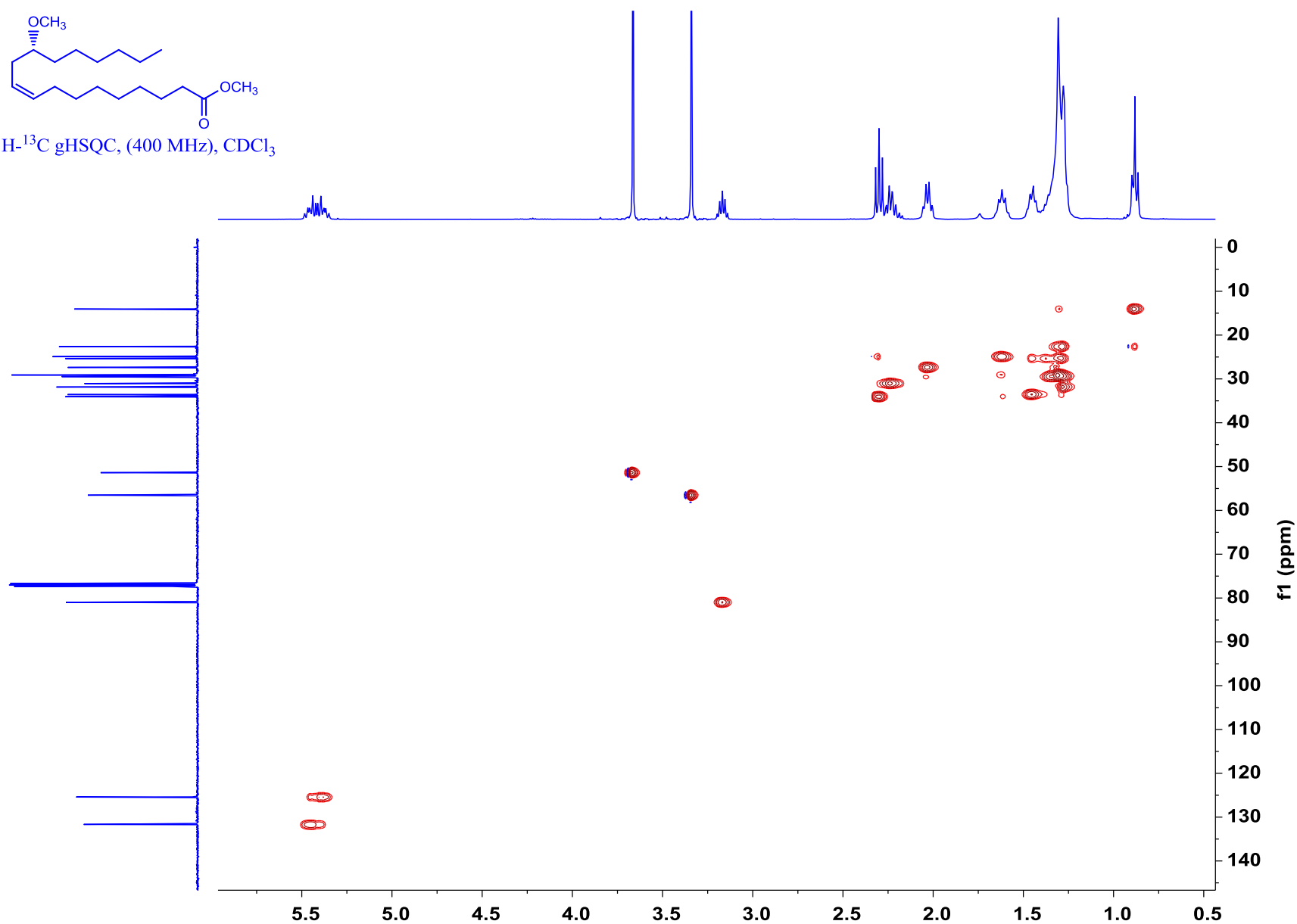


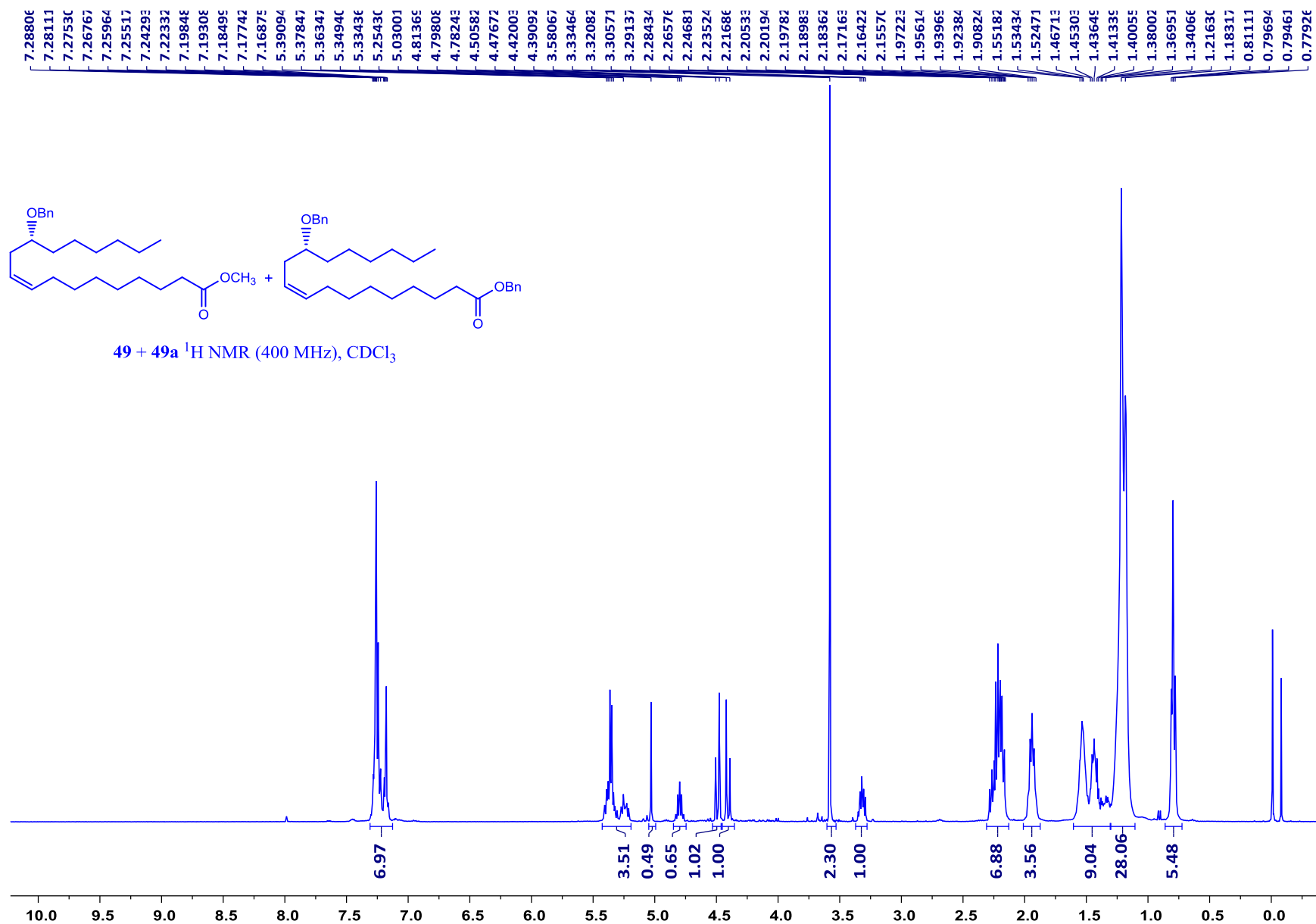
50, ^1H - ^1H gCOSY, (400 MHz), CDCl_3

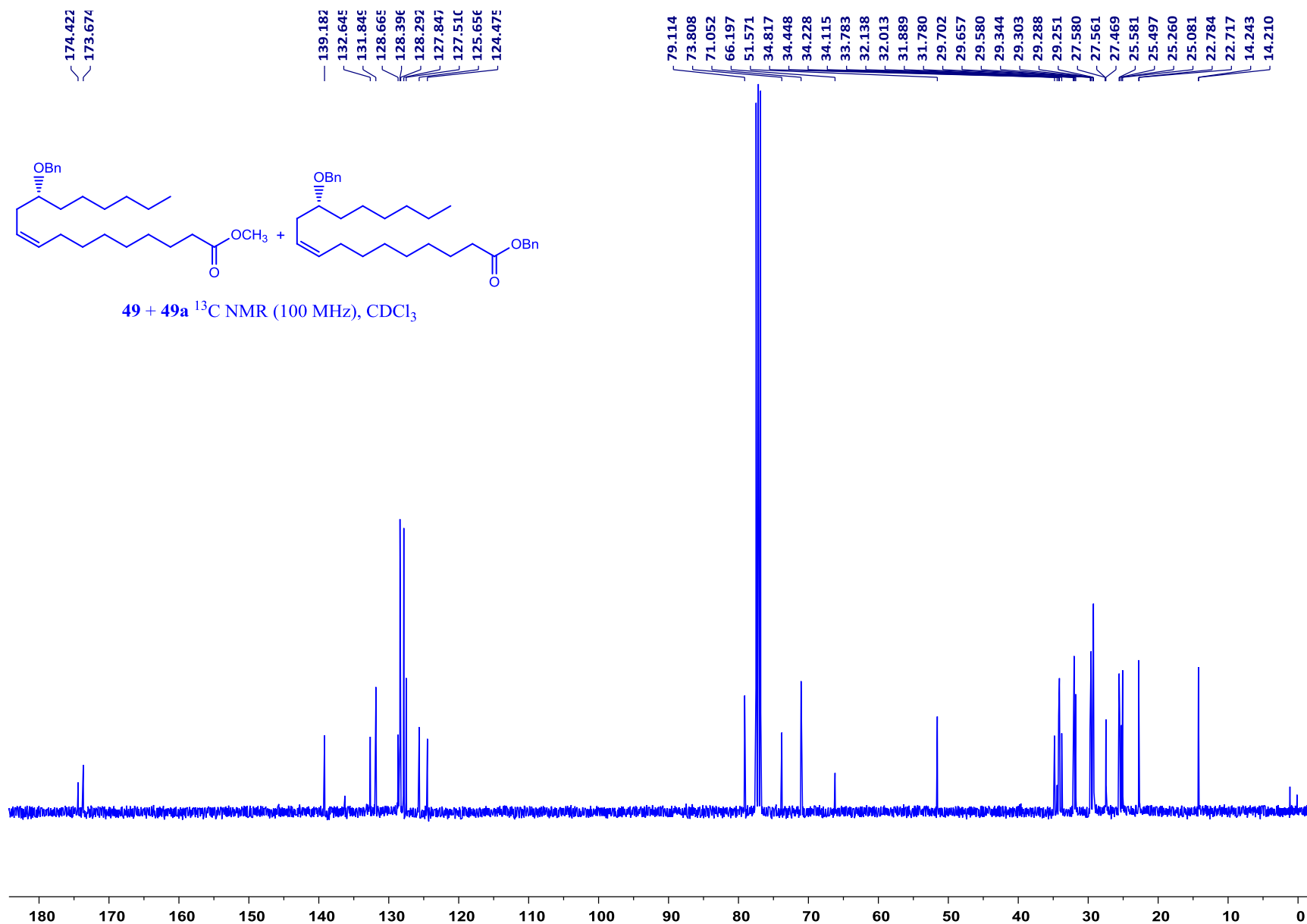


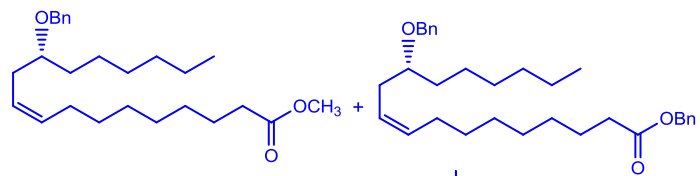


50, ^1H - ^{13}C gHSQC, (400 MHz), CDCl_3

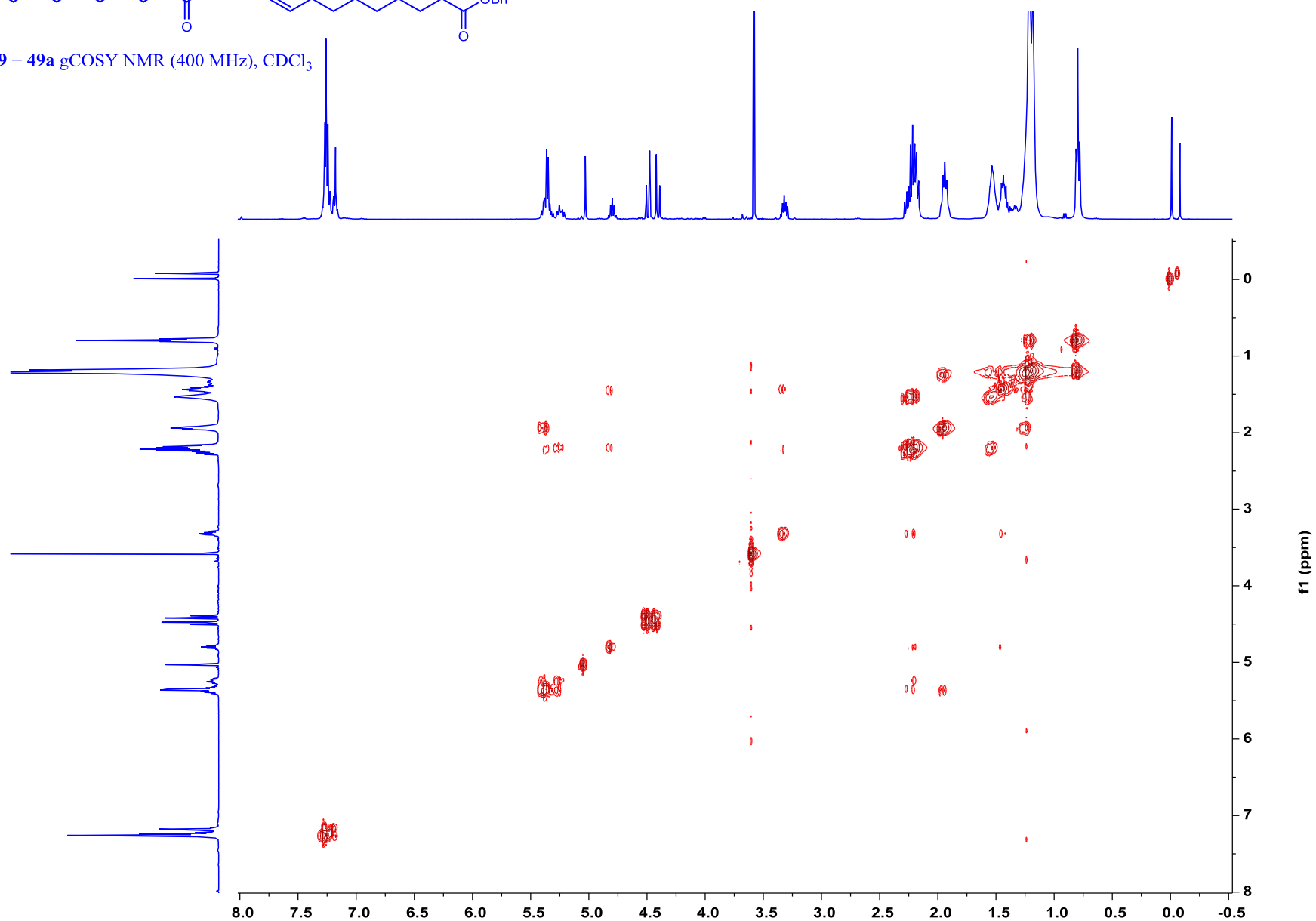


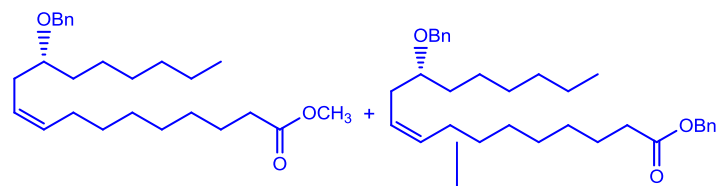




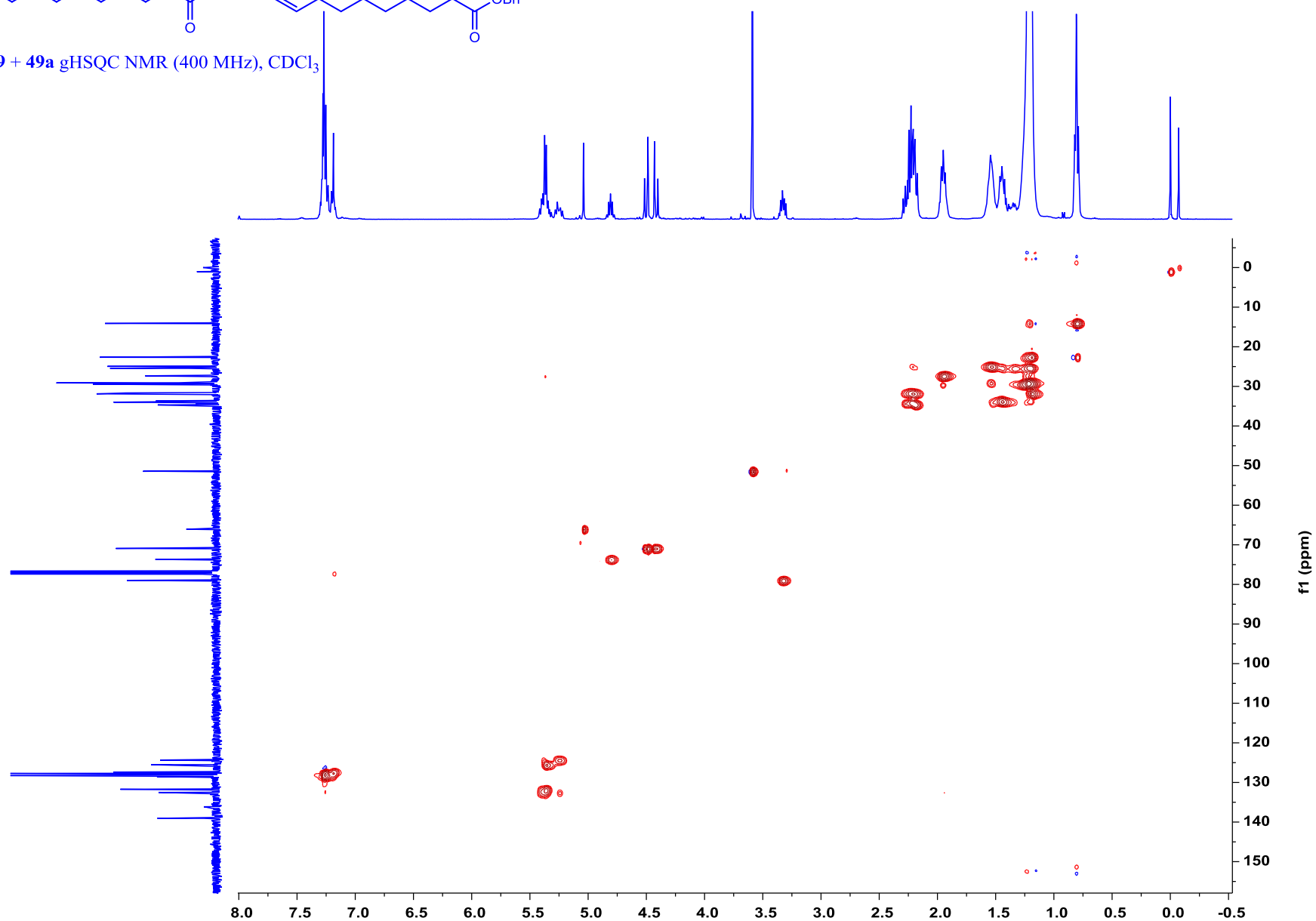


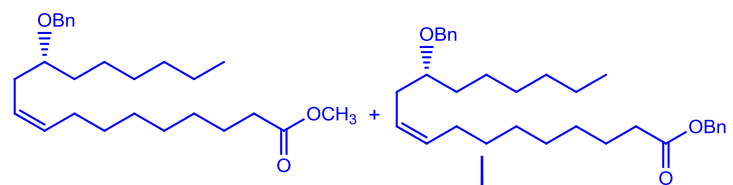
49 + 49a gCOSY NMR (400 MHz), CDCl₃



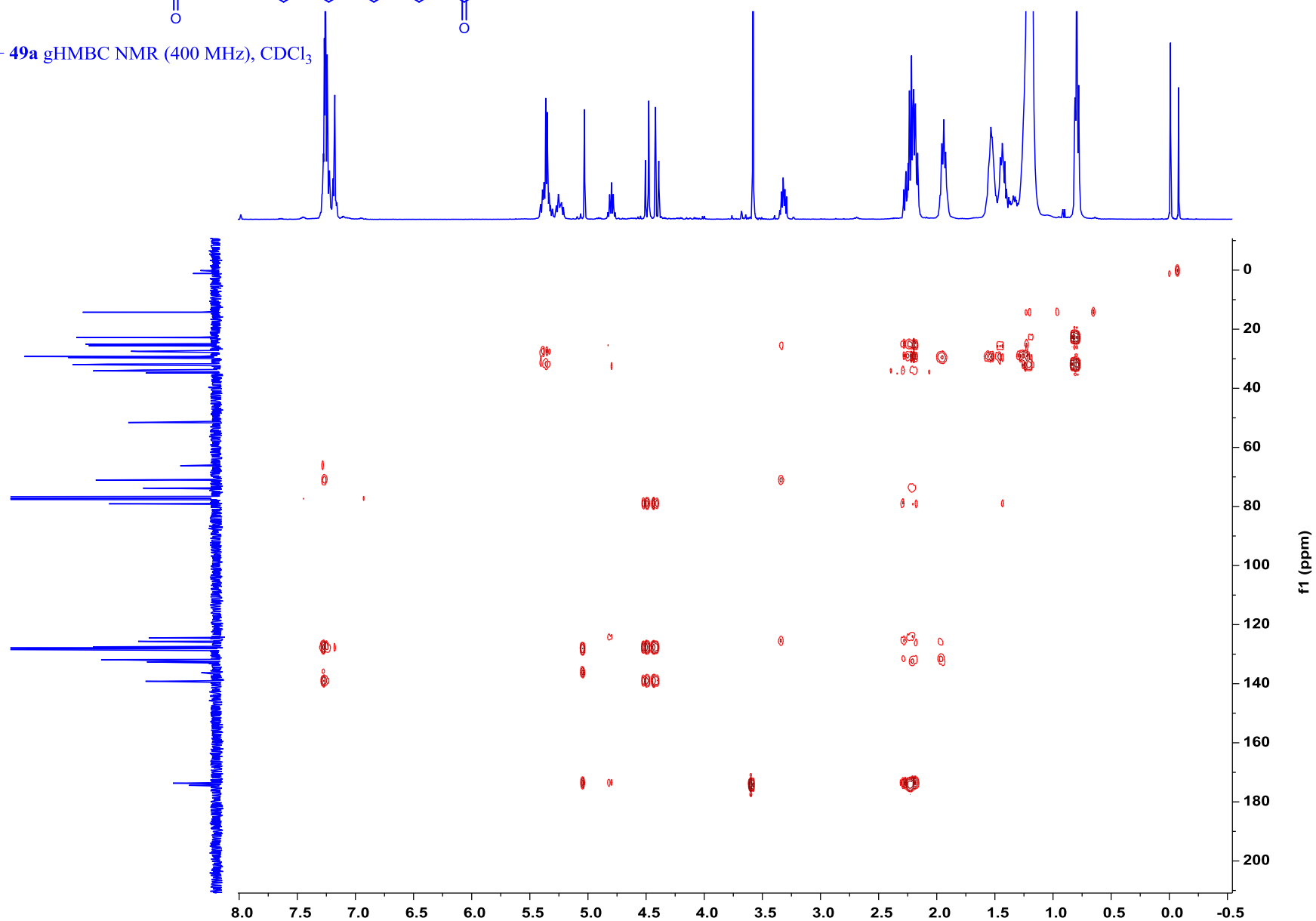


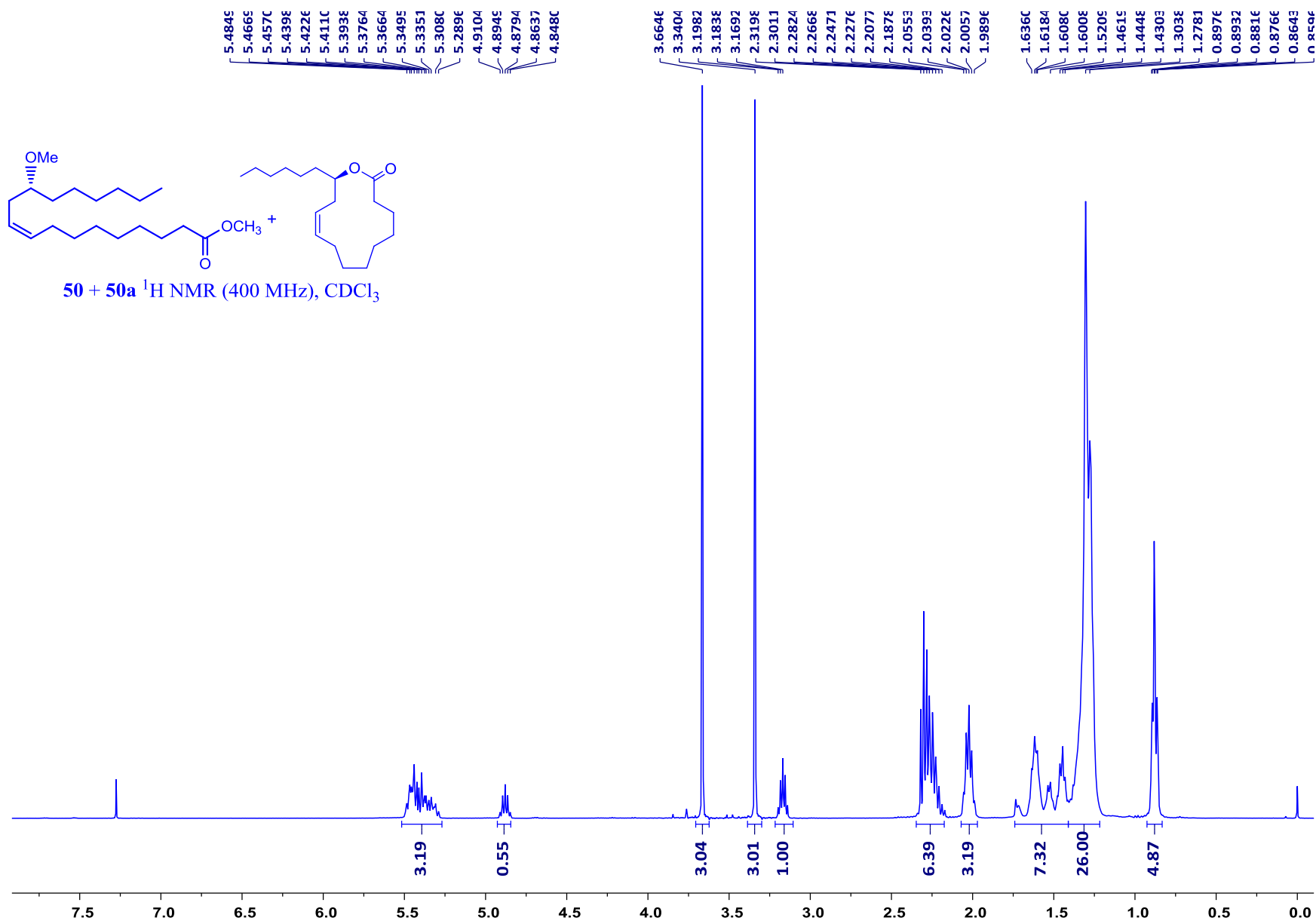
49 + 49a gHSQC NMR (400 MHz), CDCl₃

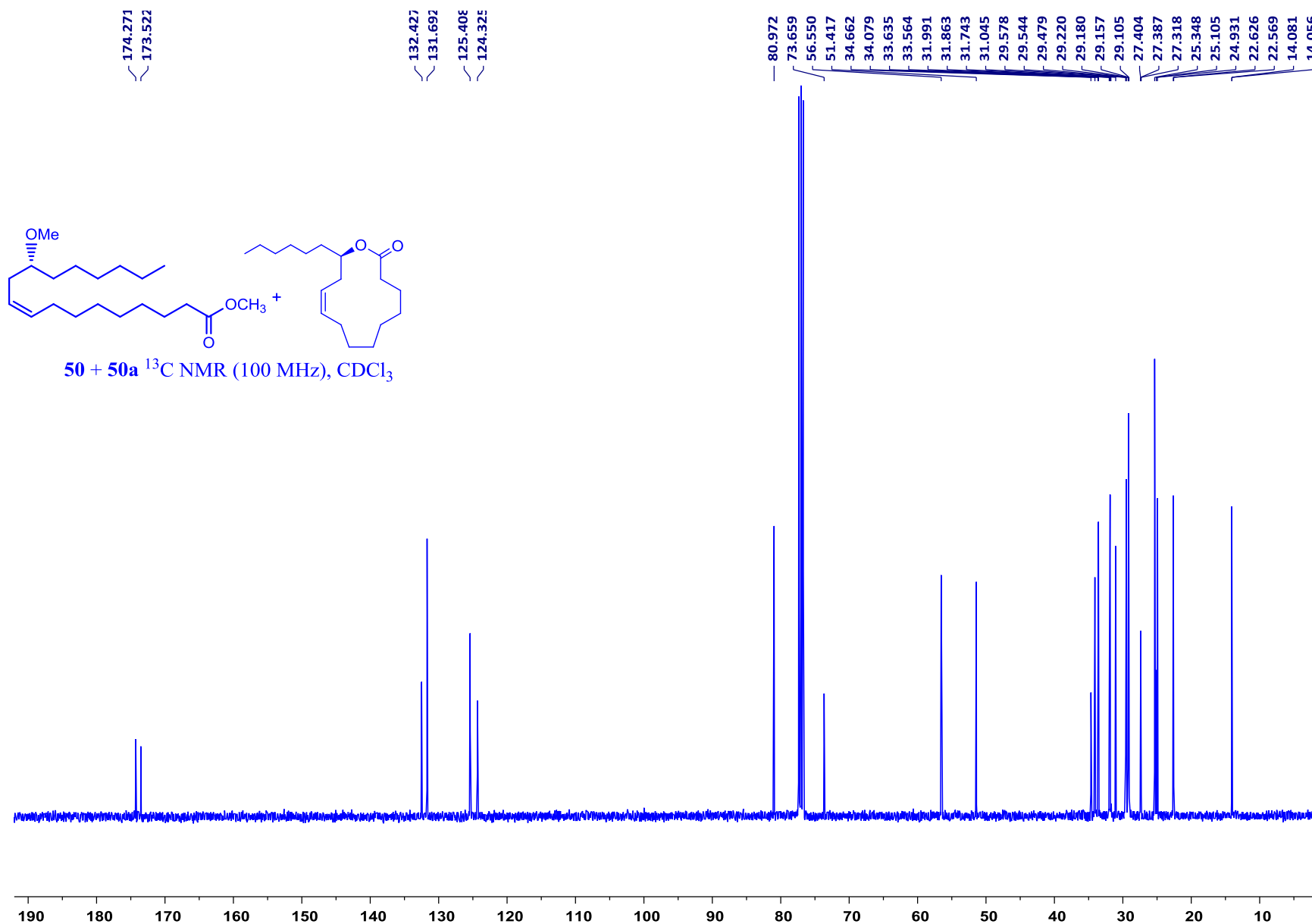


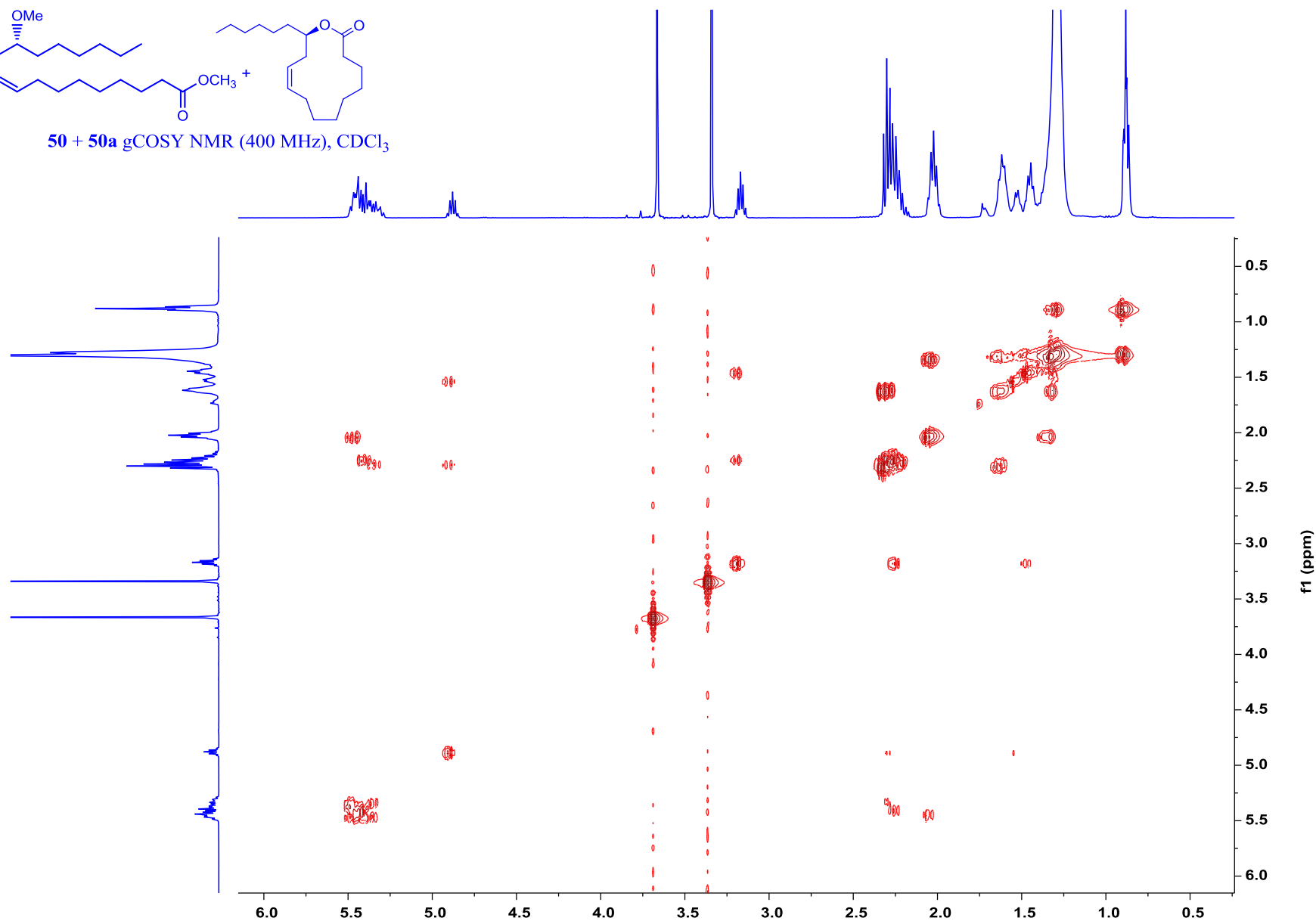
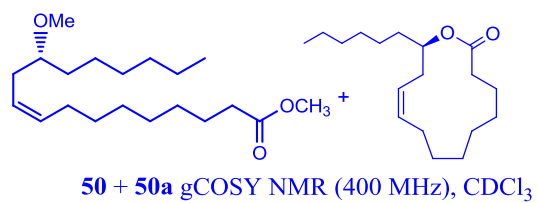


49 + 49a gHMBC NMR (400 MHz), CDCl₃









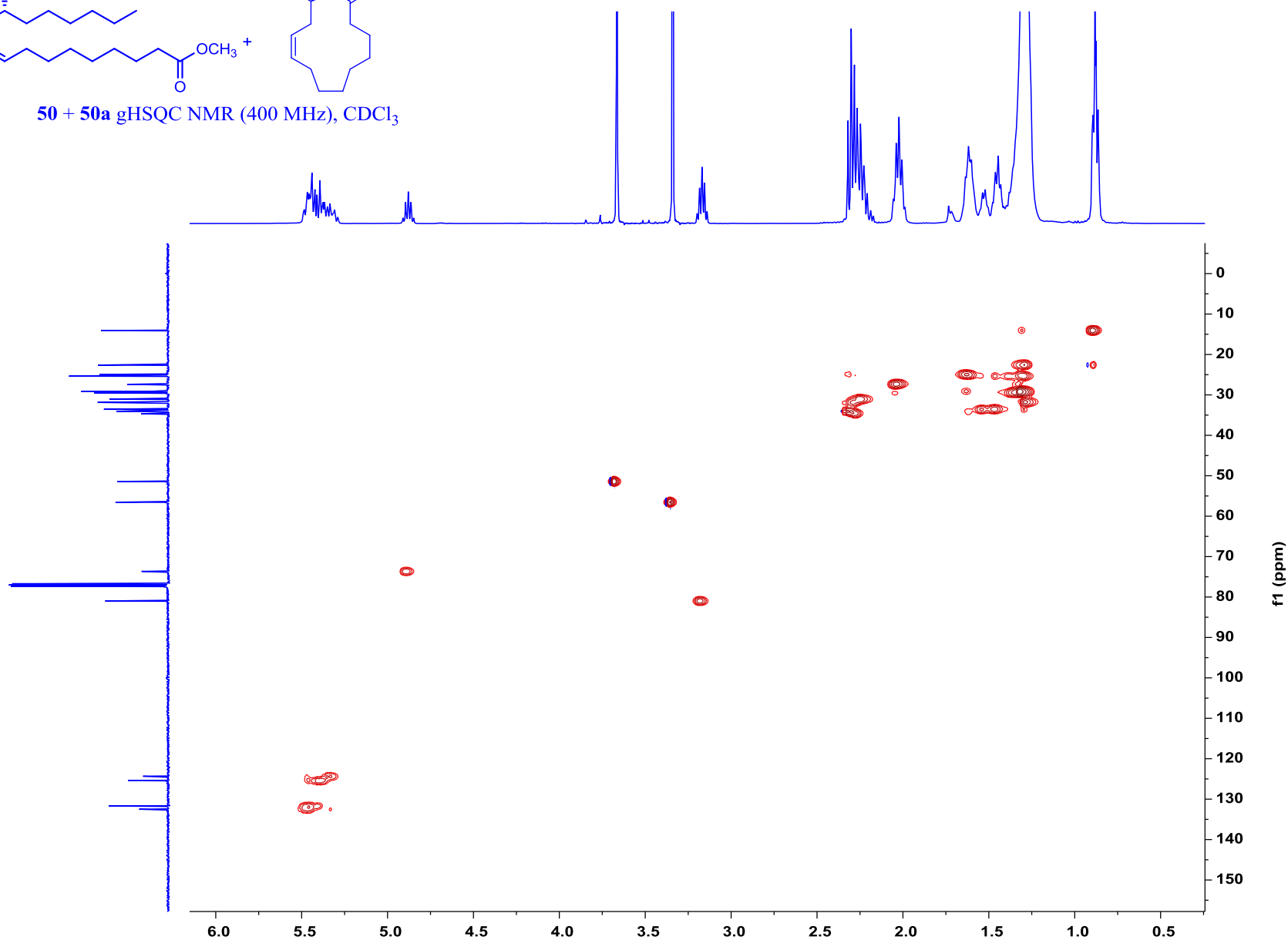
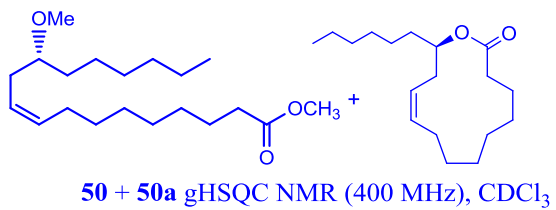


Table S1: Antimicrobial activity of ricinoleic acid glycosides against Gram's +ve and Gram's –ve bacterial strai

Test strains Compounds	<i>E. coli</i> MTCC- 739	<i>Micrococcus</i> <i>luteus</i> MTCC- 2470	<i>Pseudomonas</i> <i>aeruginosa</i> MTCC-2453	<i>Staphylococcus</i> <i>aureus</i> MTCC-96	<i>Bacillus</i> <i>subtilis</i> MTCC- 121	<i>Klebsiella</i> <i>planticola</i> MTCC- 530	<i>Candida</i> <i>albicans</i> MTCC- 3017
26	NZ	NZ	NZ	NZ	NZ	NZ	NZ
29	NZ	15 mm	NZ	12 mm	10 mm	NZ	NZ
45	NZ	NZ	NZ	10mm	NZ	NZ	NZ
31	NZ	NZ	NZ	NZ	NZ	NZ	NZ
38	NZ	NZ	NZ	NZ	NZ	NZ	NZ
40	NZ	NZ	NZ	NZ	NZ	NZ	NZ
33	NZ	NZ	NZ	NZ	NZ	NZ	NZ
3	NZ	NZ	NZ	NZ	NZ	NZ	NZ
46	NZ	NZ	NZ	NZ	NZ	NZ	NZ
41	NZ	NZ	NZ	NZ	NZ	NZ	NZ
36	NZ	12 mm	NZ	NZ	NZ	NZ	NZ
27	NZ	NZ	NZ	NZ	NZ	NZ	NZ
24	NZ	NZ	NZ	NZ	NZ	NZ	NZ
23	NZ	NZ	NZ	NZ	NZ	NZ	NZ
35	NZ	NZ	NZ	NZ	NZ	NZ	NZ
25	NZ	15 mm	NZ	NZ	NZ	NZ	NZ
34	NZ	NZ	NZ	NZ	NZ	NZ	NZ
32	NZ	NZ	NZ	NZ	NZ	NZ	NZ
47	NZ	NZ	NZ	NZ	NZ	NZ	NZ
30	NZ	NZ	NZ	NZ	NZ	NZ	NZ
28	NZ	NZ	NZ	NZ	NZ	NZ	NZ
43	NZ	NZ	NZ	NZ	NZ	NZ	NZ
37	NZ	NZ	NZ	NZ	10 mm	NZ	NZ
39	NZ	12 mm	NZ	NZ	NZ	NZ	NZ
7	NZ	NZ	NZ	NZ	NZ	NZ	NZ

42	NZ	NZ	NZ	10 mm	NZ	NZ	NZ
21	NZ	NZ	NZ	NZ	NZ	NZ	NZ
44	NZ	NZ	NZ	NZ	12 mm	NZ	NZ
22	NZ	NZ	NZ	10 mm	NZ	NZ	NZ
50	NZ	NZ	NZ	NZ	NZ	NZ	NZ
49	NZ	NZ	NZ	NZ	NZ	NZ	NZ
48	NZ	12	NZ	10 mm	NZ	NZ	NZ
2a	NZ	NZ	NZ	NZ	NZ	NZ	NZ
1	NZ	NZ	NZ	NZ	NZ	NZ	NZ
Ampicillin	20 mm	26 mm	15 mm	19 mm	28 mm	14 mm	NA
Amoxycillin	23 mm	28 mm	18 mm	25 mm	30 mm	16 mm	NA
Ampho. B	NA	NA	NA	NA	NA	NA	17 mm

Test compounds: 1000 µg/ml; Ampicillin, Amoxicillin & Amphotericin B: 50µg/ml
50 µl of above concentration of test as well as control were loaded in the well during agar
well diffusion bioassay. NZ: No Zone; NA: Not Applicable; Zone size: mm

Table S2: Cell viability on J774A.1 cells and their standard deviations

Compound	5 µg/mL	10 µg/mL	100 µg/mL	250 µg/mL	500 µg/mL	1000 µg/mL	SD (5)	SD (10)	SD (100)	SD (250)	SD (500)	SD (1000)
7	95.6	95.1	92.9	90.3	87.1	79.2	5.4	6.1	2.3	2.8	1.9	3.1
29	97.4	96.4	95.1	90.5	79.4	76.3	3.4	4.5	1.2	3.7	1.56	4.9
22	97.6	97.1	94.8	91.4	86.3	72.7	0.4	1.3	2.5	2.7	2.3	1.2
33	96.5	95.6	95.2	91.2	89.4	74.5	2.3	3.4	1.6	2.8	1.8	3.9
25	97.8	97.4	94.3	87.4	82.4	56.2	3.4	1.2	2.5	1.2	4.2	2.7
36	97.1	96.3	94.1	89.6	82.5	75.3	2.5	3.1	2.7	4.8	1.9	4.2
39	97.8	97.6	95.1	92.9	84.3	71.8	2.3	3.4	4.1	2.9	3.7	3.9
42	95.6	95.4	93.1	83.6	75.8	68.4	5.2	2.9	3.6	3.7	0.78	4.9
45	97.5	97.4	95.3	92.3	81.4	67.5	4.1	1.4	2.6	3.4	1.6	3.8
48	98.3	97.4	95.6	90.4	87.4	56.8	2.5	1.7	4.3	3.5	0.67	1.6