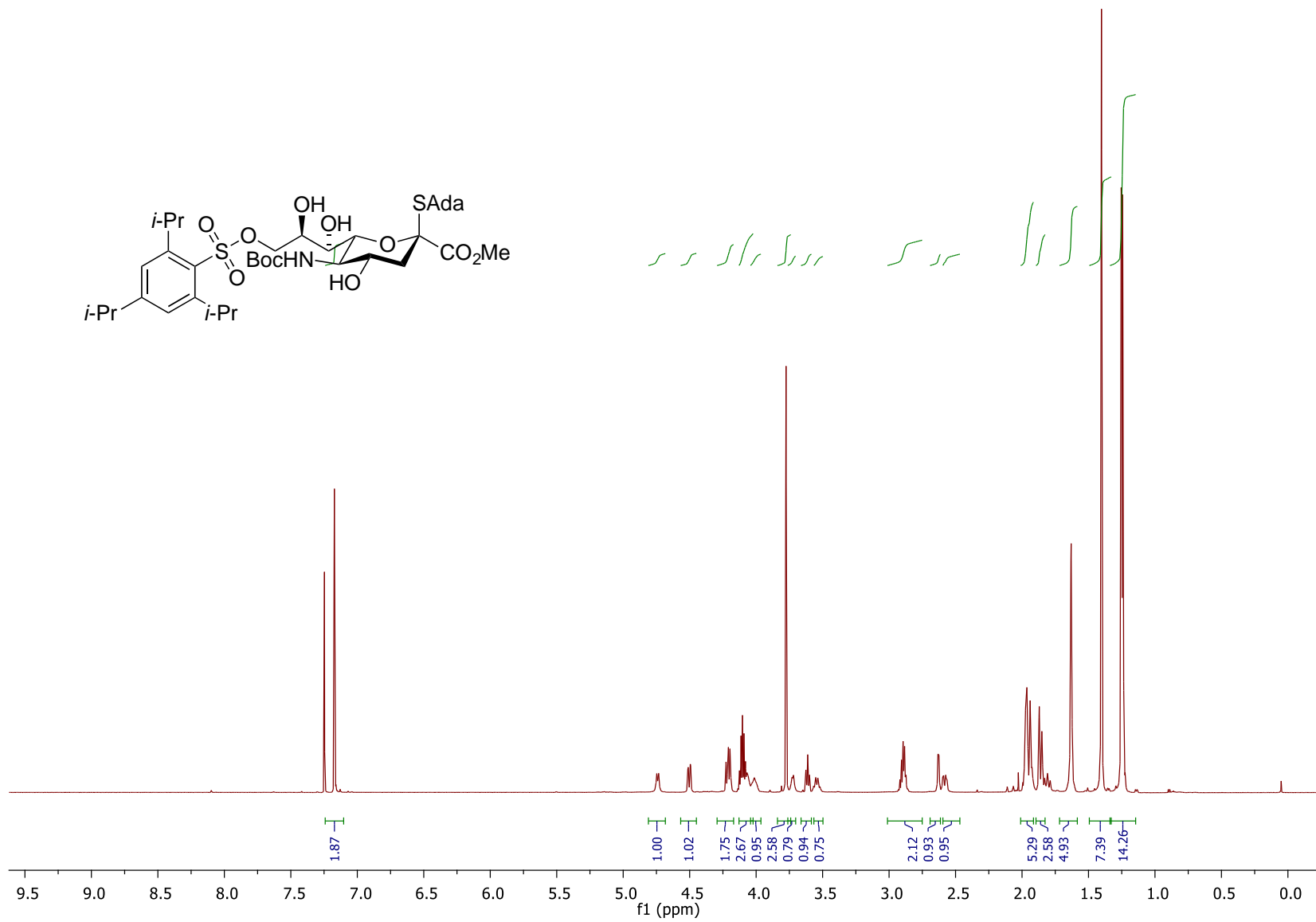
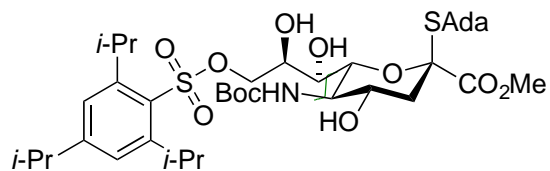


Supporting Information For
“Stereoselective Synthesis of the Equatorial Glycosides of Legionaminic Acid”
Oskar Popik, Bibek Dhakal, and David Crich*
Department of Chemistry, Wayne State University, Detroit, MI 48202, USA

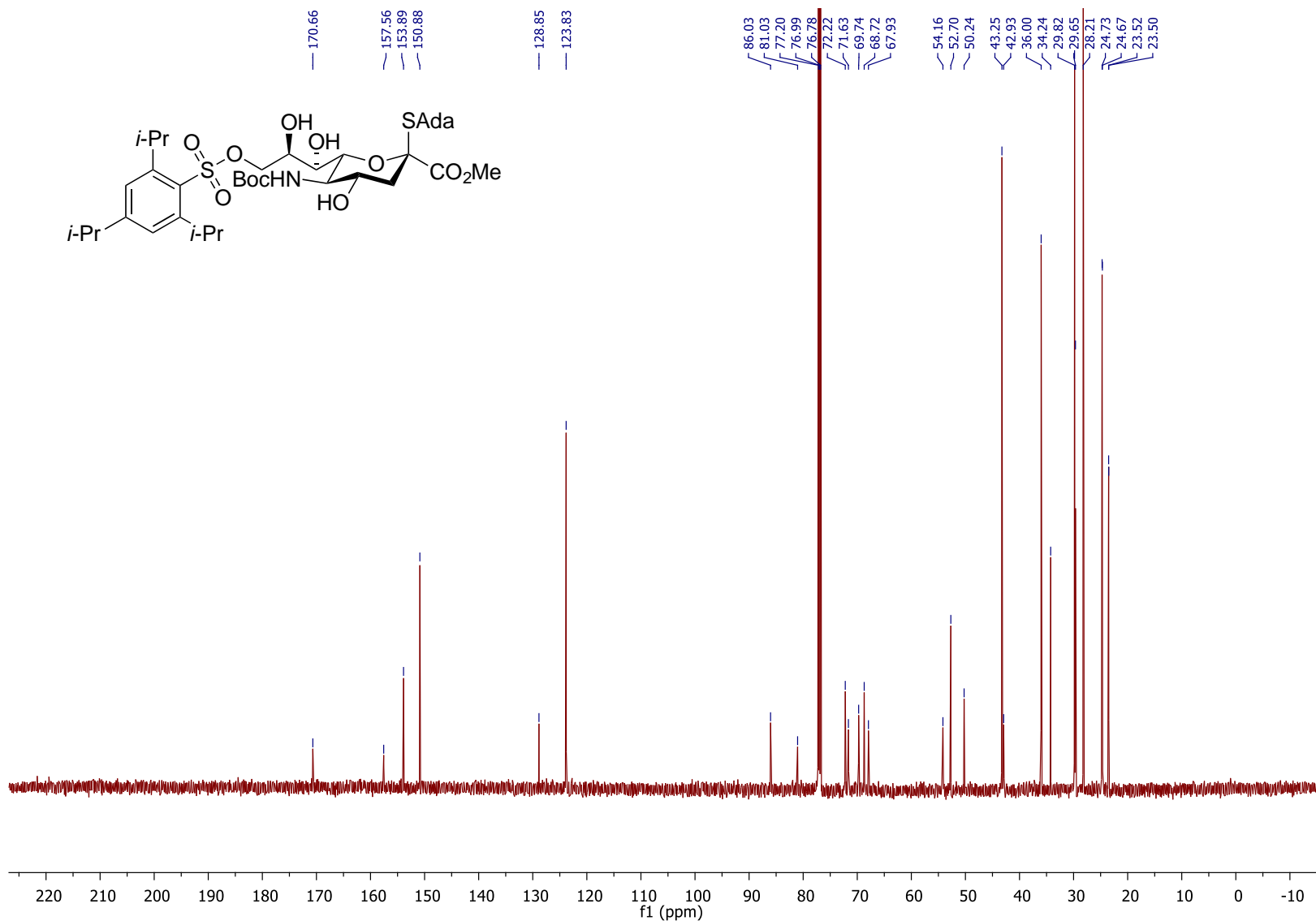
Compounds	Spectra
Methyl (1-adamantanyl 3,5-dideoxy-5- <i>N</i> -(1,1-dimethylethoxy)carbonyl-9- <i>O</i> -((2,4,6-triisopropylphenyl)sulfonyl)oxy-2-thio- <i>D</i> -glycero- β - <i>D</i> -galacto-non-2-ulopyranosid)onate (8)	S3-6
Methyl (1-adamantanyl 3,5,9-trideoxy-9-iodo-5- <i>N</i> -(1,1-dimethylethoxy) carbonyl-2-thio- <i>D</i> -glycero- β - <i>D</i> -galacto-non-2-ulopyranosid)onate (9)	S7-11
Methyl (1-adamantanyl 4,8-di- <i>O</i> -benzoyl-3,5,9-trideoxy-9-iodo-5- <i>N</i> -(1,1-dimethylethoxy)carbonyl-2-thio- <i>D</i> -glycero- β - <i>D</i> -galacto-non-2-ulopyranosid)onate (10)	S12-16
Methyl (1-adamantanyl 5-azido-4,8-di- <i>O</i> -benzoyl-3,5,9-trideoxy-2-thio- <i>D</i> -glycero- β - <i>D</i> -galacto-non-2-ulopyranosid)onate (13)	S17-21
Methyl (1-adamantanyl 5-azido-4,8-di- <i>O</i> -benzoyl-3,5,9-trideoxy-7-oxo-2-thio- <i>D</i> -glycero- β - <i>D</i> -galacto-non-2-ulopyranosid)onate (14)	S22-26
Methyl (1-adamantanyl 5-azido-4,8-di- <i>O</i> -benzoyl-3,5,9-trideoxy-2-thio- <i>D</i> -glycero- β - <i>L</i> -altro-non-2-ulopyranosid)onate (15)	S27-31
Methyl (1-adamantanyl 5,7-diazido-4,8-di- <i>O</i> -benzoyl-3,5,7,9-tetradecoxy-2-thio- <i>D</i> -glycero- β - <i>D</i> -galacto-non-2-ulopyranosid)onate (5)	S32-36
Methyl (1-adamantanyl 5-azido-3,5,9-trideoxy-2-thio- <i>D</i> -glycero- β - <i>D</i> -galacto-non-2-ulopyranosid)onate (19)	S37-41
Methyl (1-adamantanyl 5-azido-7,8-di- <i>O</i> -benzoyl-3,5,9-trideoxy-2-thio- <i>D</i> -glycero- β - <i>D</i> -galacto-non-2-ulopyranosid)onate (20)	S42-46
Methyl (methyl 5-azido-3,5-dideoxy- <i>D</i> -glycero- <i>D</i> -galacto-non-2-ulopyranosid)onate (22)	S47-51
Methyl (methyl 5-azido-3,5-dideoxy-8,9- <i>O</i> -isopropylidene- <i>D</i> -glycero- <i>D</i> -galacto-non-2-ulopyranosid)onate (23)	S52-56
Methyl (methyl 5-azido-4- <i>O</i> -(<i>tert</i> -butyldimethylsilyl)-3,5-dideoxy-8,9- <i>O</i> -isopropylidene- <i>D</i> -glycero- <i>D</i> -galacto-non-2-ulopyranosid)onate (24)	S57-61
Methyl (methyl 7- <i>O</i> -acetyl-5-azido-4- <i>O</i> -(<i>tert</i> -butyldimethylsilyl)-3,5-dideoxy-8,9- <i>O</i> -isopropylidene- <i>D</i> -glycero- <i>D</i> -galacto-non-2-ulopyranosid)onate (25)	S62-66
Methyl (methyl 7- <i>O</i> -acetyl-5-azido-3,5-dideoxy-8,9- <i>O</i> -isopropylidene- <i>D</i> -glycero- <i>D</i> -galacto-non-2-ulopyranosid)onate (26)	S67-71
Methyl [1-benzyl (5,7-diazido-4,8-di- <i>O</i> -benzoyl-3,5,7,9-tetradecoxy- <i>D</i> -glycero- α - <i>D</i> -galacto-non-2-ulopyranosid)onate] (30)	S72-73
Methyl [methyl (5,7-diazido-4,8-di- <i>O</i> -benzoyl-3,5,7,9-tetradecoxy- <i>D</i> -glycero- α - <i>D</i> -galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 6)-2,3,4-tri- <i>O</i> -benzyl- β - <i>D</i> -galactopyranoside (31α)	S74-78
Methyl [methyl (5,7-diazido-4,8-di- <i>O</i> -benzoyl-3,5,7,9-tetradecoxy- <i>D</i> -glycero- β - <i>D</i> -galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 6)-2,3,4-tri- <i>O</i> -benzyl- β - <i>D</i> -galactopyranoside (31β)	S79-83
Methyl [methyl (5,7-diazido-4,8-di- <i>O</i> -benzoyl-3,5,7,9-tetradecoxy- <i>D</i> -glycero- α - <i>D</i> -galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 3)-2,6-di- <i>O</i> -benzyl- β - <i>D</i> -galactopyranoside (34α)	S84-88
Methyl [methyl (5,7-diazido-4,8-di- <i>O</i> -benzoyl-3,5,7,9-tetradecoxy- <i>D</i> -glycero- β - <i>D</i> -galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 3)-2,6-di- <i>O</i> -benzyl- β - <i>D</i> -galactopyranoside (34β)	S89-93
Methyl [methyl (5,7-diazido-4,8-di- <i>O</i> -benzoyl-3,5,7,9-tetradecoxy- <i>D</i> -glycero- α - <i>D</i> -galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 4)-2,6-di- <i>O</i> -benzyl- β - <i>D</i> -galactopyranoside (35)	S94-98

Methyl [1-adamantanyl (5,7-diazido-4,8-di- <i>O</i> -benzoyl-3,5,7,9-tetradecoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate] (36α)	S99-103
Methyl [1-adamantanyl (5,7-diazido-4,8-di- <i>O</i> -benzoyl-3,5,7,9-tetradecoxy-D-glycero- β -D-galacto-non-2-ulopyranosid)onate] (36β)	S104-108
Methyl [methyl (5,7-diazido-4,8-di- <i>O</i> -benzoyl-3,5,7,9-tetradecoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 4)-methyl 7- <i>O</i> -acetyl-5-azido-3,5-dideoxy-8,9- <i>O</i> -isopropylidene-D-glycero-D-galacto-non-2-ulopyranoside (32α)	S109-113
Methyl [methyl (5,7-diazido-4,8-di- <i>O</i> -benzoyl-3,5,7,9-tetradecoxy-D-glycero- β -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 4)-methyl 7- <i>O</i> -acetyl-5-azido-3,5-dideoxy-8,9- <i>O</i> -isopropylidene-D-glycero-D-galacto-non-2-ulopyranoside (32β)	S114-118
Methyl [methyl (5,7-diazido-3,4,5,7,8,9-hexadeoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 6)-2,3,4-tri- <i>O</i> -benzyl- β -D-galactopyranoside (37)	S119-120
Methyl [methyl (5,7-diazido-3,4,5,7,8,9-hexadeoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 3)-2,4,6-tri- <i>O</i> -benzyl- β -D-galactopyranoside (33α)	S121-125
Methyl [methyl (5,7-diazido-4,8-di- <i>O</i> -benzoyl-3,5,7,9-tetradecoxy-D-glycero- β -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 3)-2,6-di- <i>O</i> -benzyl- β -D-galactopyranoside (33β)	S126-130
Methyl [methyl (5,7-diazido-3,4,5,7,8,9-hexadeoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 3)-2,6-di- <i>O</i> -benzyl- β -D-galactopyranoside (41)	S131-135
Methyl [methyl (4,8-di- <i>O</i> -acetyl-5,7-diacetamido-3,5,7,9-tetradecoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 6)-2,3,4-tri- <i>O</i> -benzyl- β -D-galactopyranoside (38)	S136-140
Methyl [methyl (4,8-di- <i>O</i> -acetyl-5,7-diacetamido-3,5,7,9-tetradecoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 3)-2,4,6-tri- <i>O</i> -benzyl- β -D-galactopyranoside (40)	S141-145
Methyl [5,7-diacetamido-3,5,7,9-tetradecoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onic acid]-(2 \rightarrow 6)-2,3,4-tri- <i>O</i> -benzyl- β -D-galactopyranoside (39)	S146-150
Methyl [5,7-diacetamido-3,5,7,9-tetradecoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onic acid]-(2 \rightarrow 3)-2,4,6-tri- <i>O</i> -benzyl- β -D-galactopyranoside (42)	S151-155

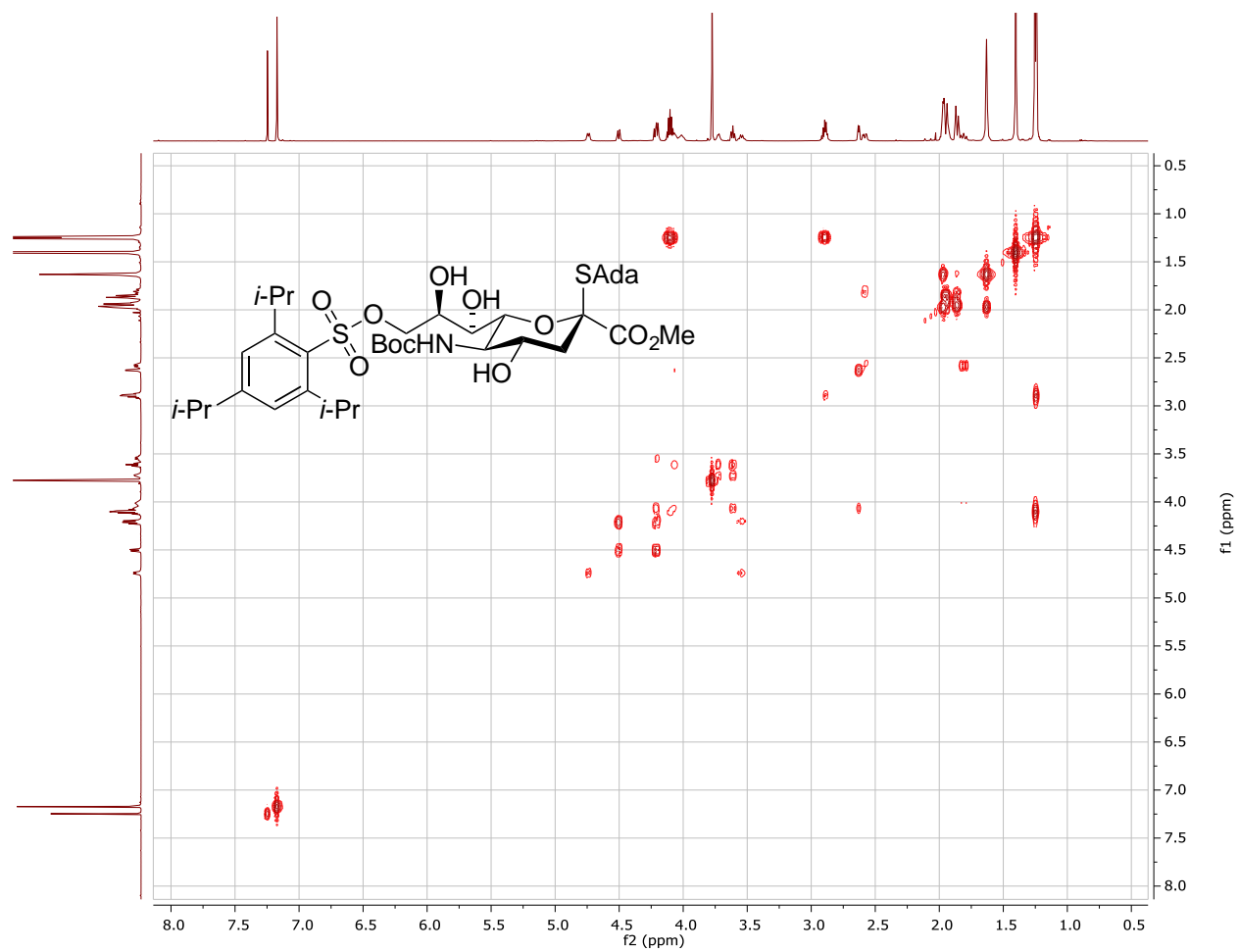
¹H NMR (600 MHz, CDCl₃) Methyl (1-adamantanyl 3,5-dideoxy-5-*N*-(1,1-dimethylethoxy)carbonyl-9-*O*-((2,4,6-triisopropylphenyl)sulfonyl)oxy-2-thio-*D*-glycero-β-*D*-galacto-non-2-ulopyranosid)onate (8)



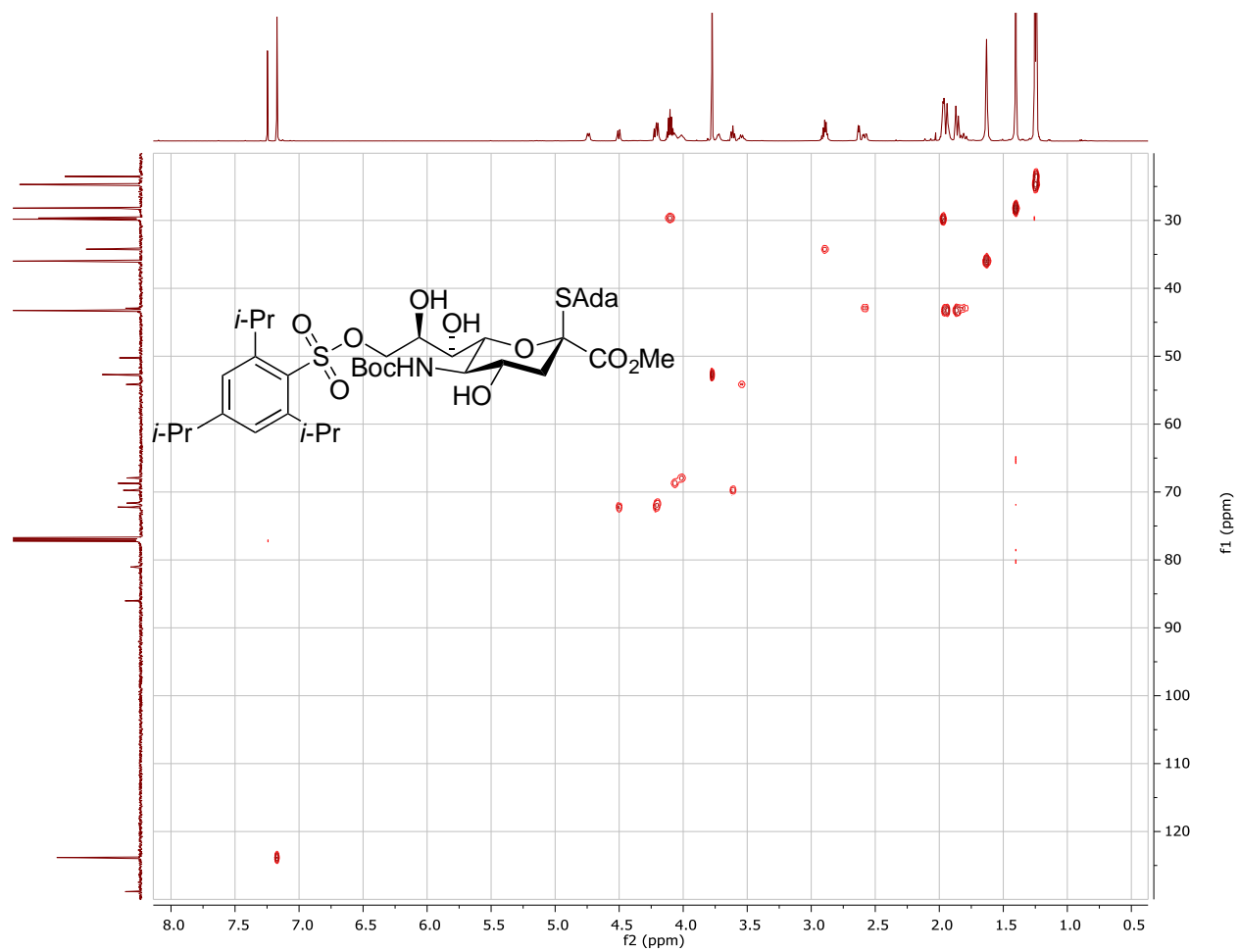
¹³C NMR (151 MHz, CDCl₃) Methyl (1-adamantanyl 3,5-dideoxy-5-*N*-(1,1-dimethylethoxy)carbonyl-9-*O*-((2,4,6-triisopropylphenyl)sulfonyl)oxy-2-thio-*D*-glycero-β-*D*-galacto-non-2-ulopyranosid)onate (8)



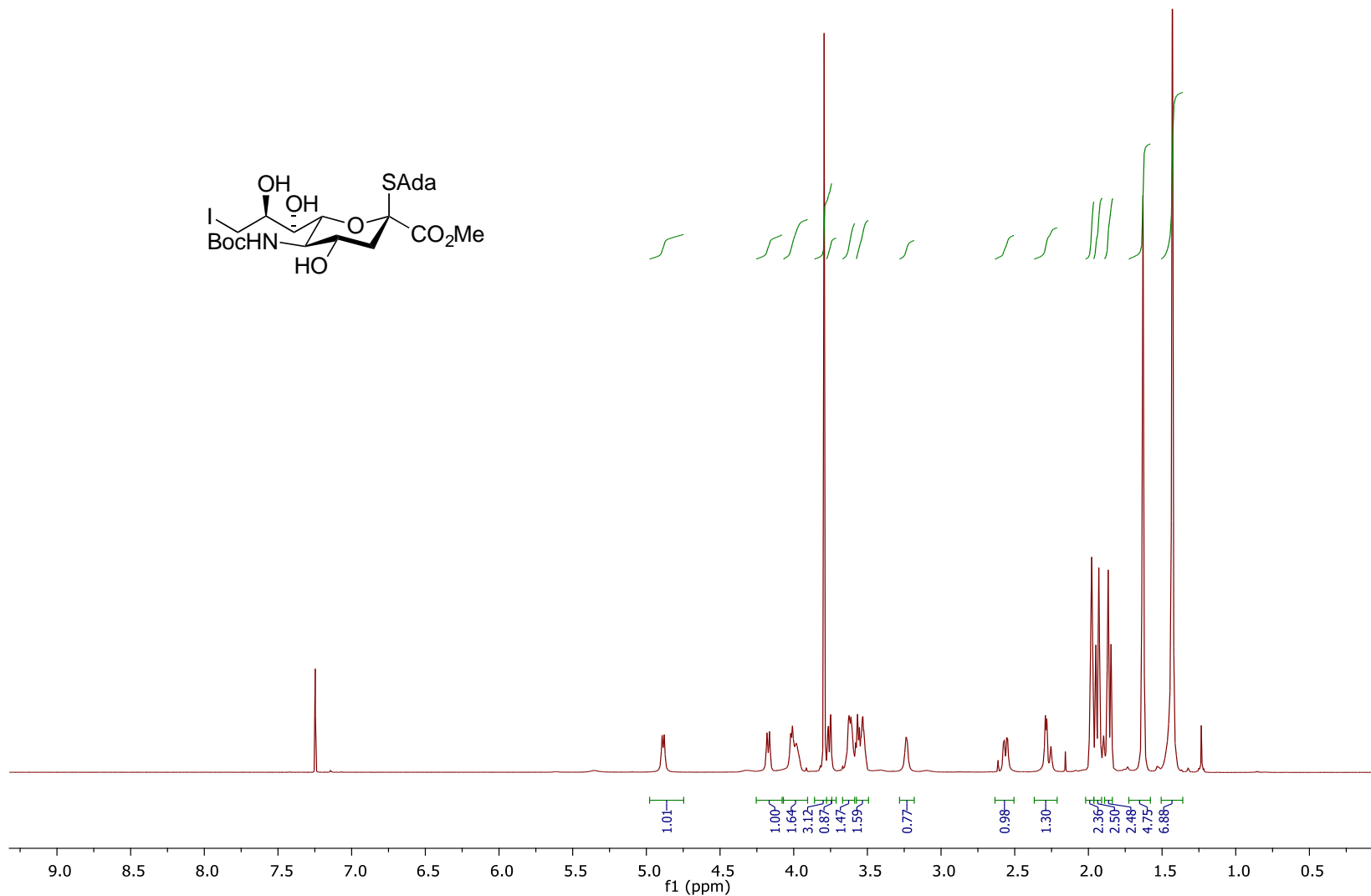
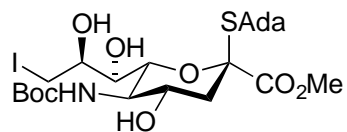
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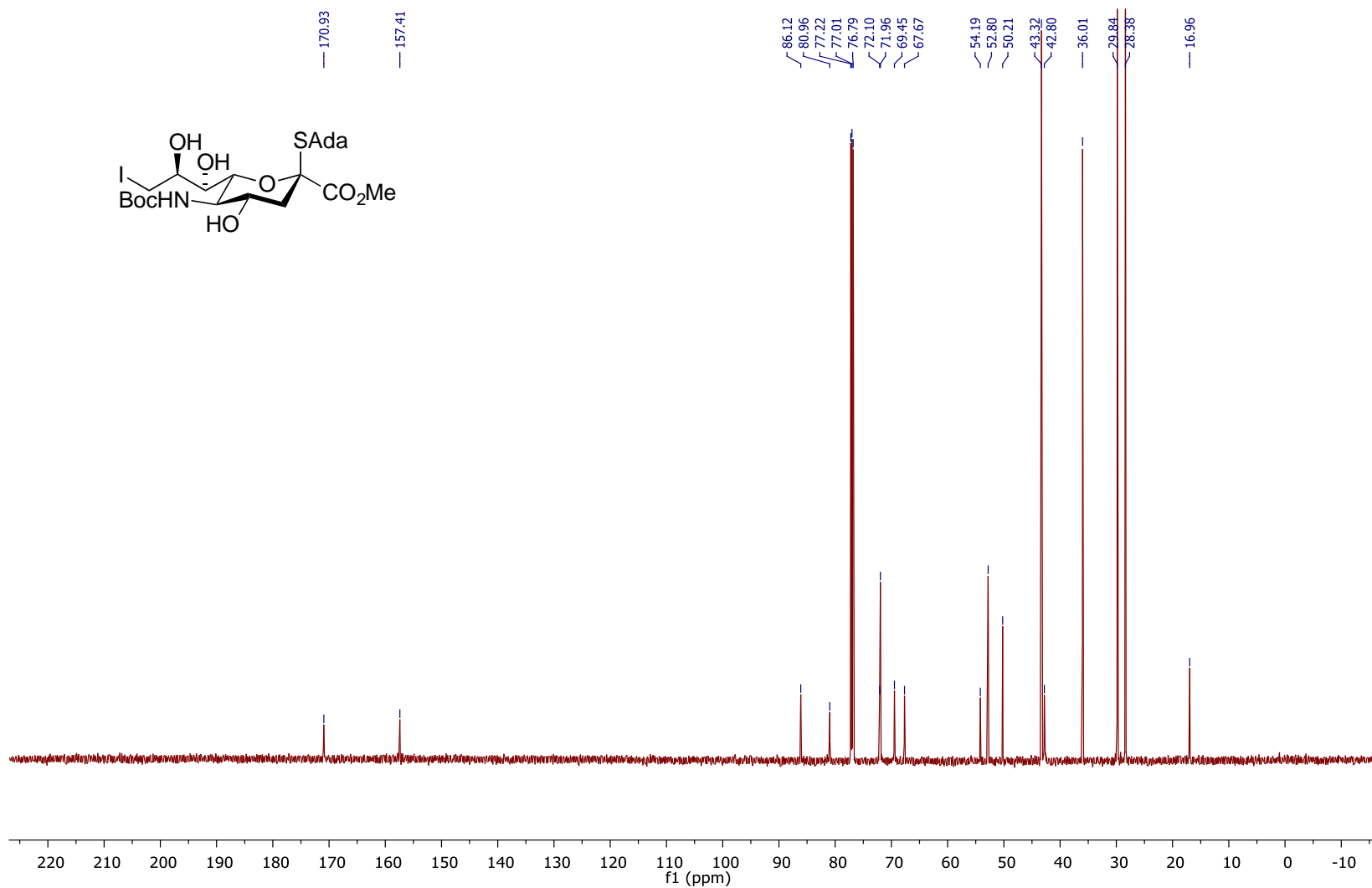
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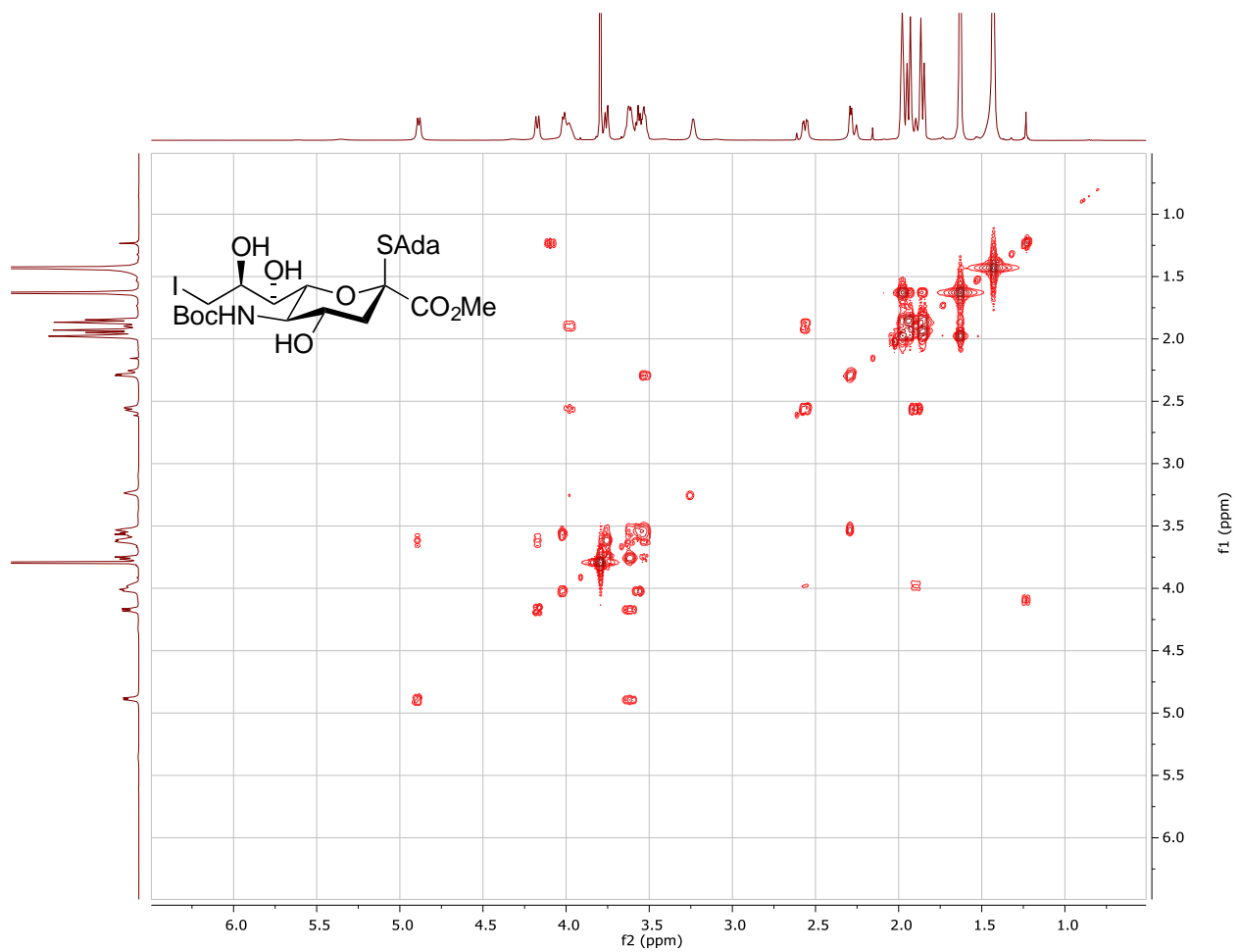
¹H NMR (600 MHz, CDCl₃) Methyl (1-adamantanyl 3,5,9-trideoxy-9-iodo-5-*N*-(1,1-dimethylethoxy)carbonyl-2-thio-D-glycero-β-D-galacto-non-2-ulopyranosid)onate (9)



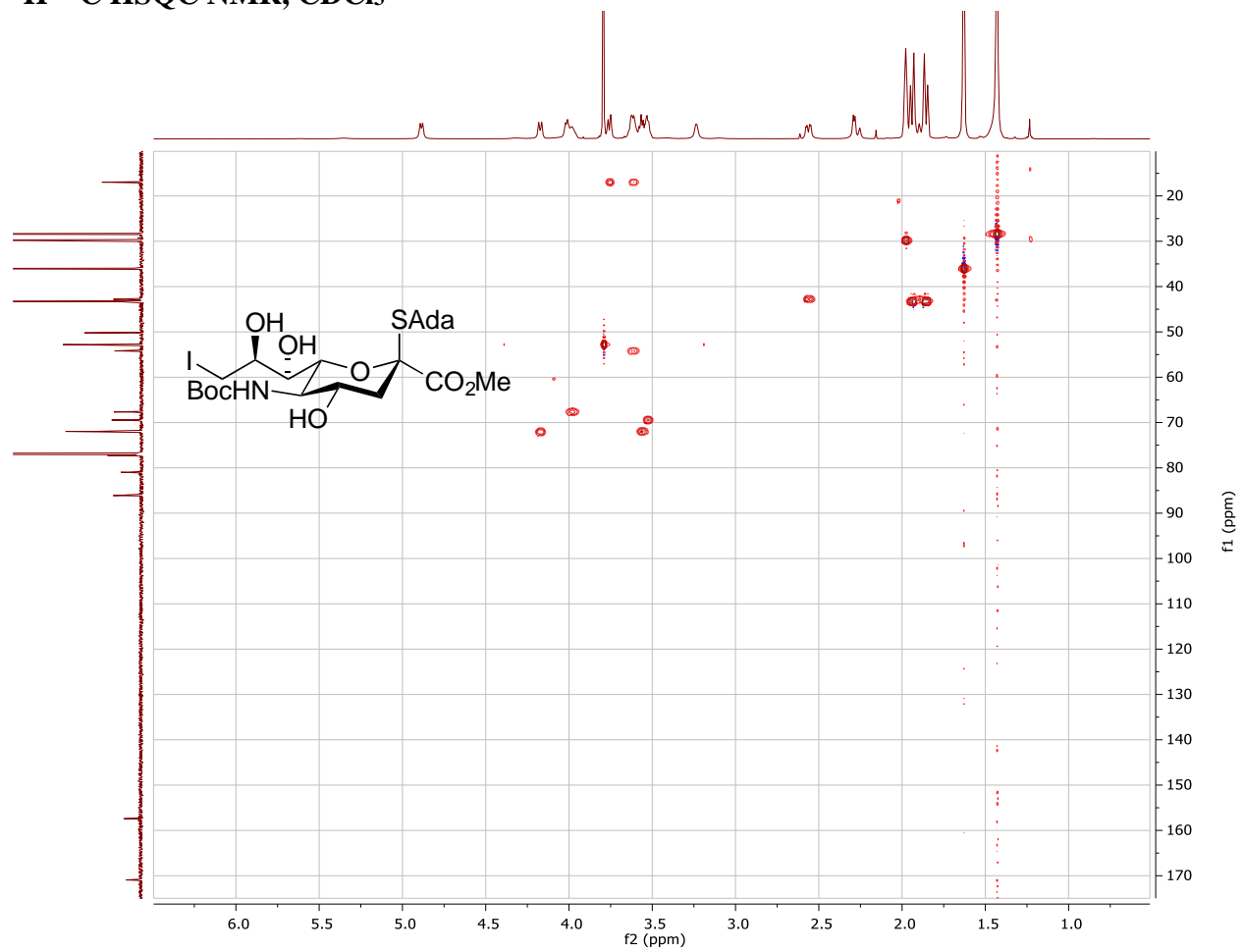
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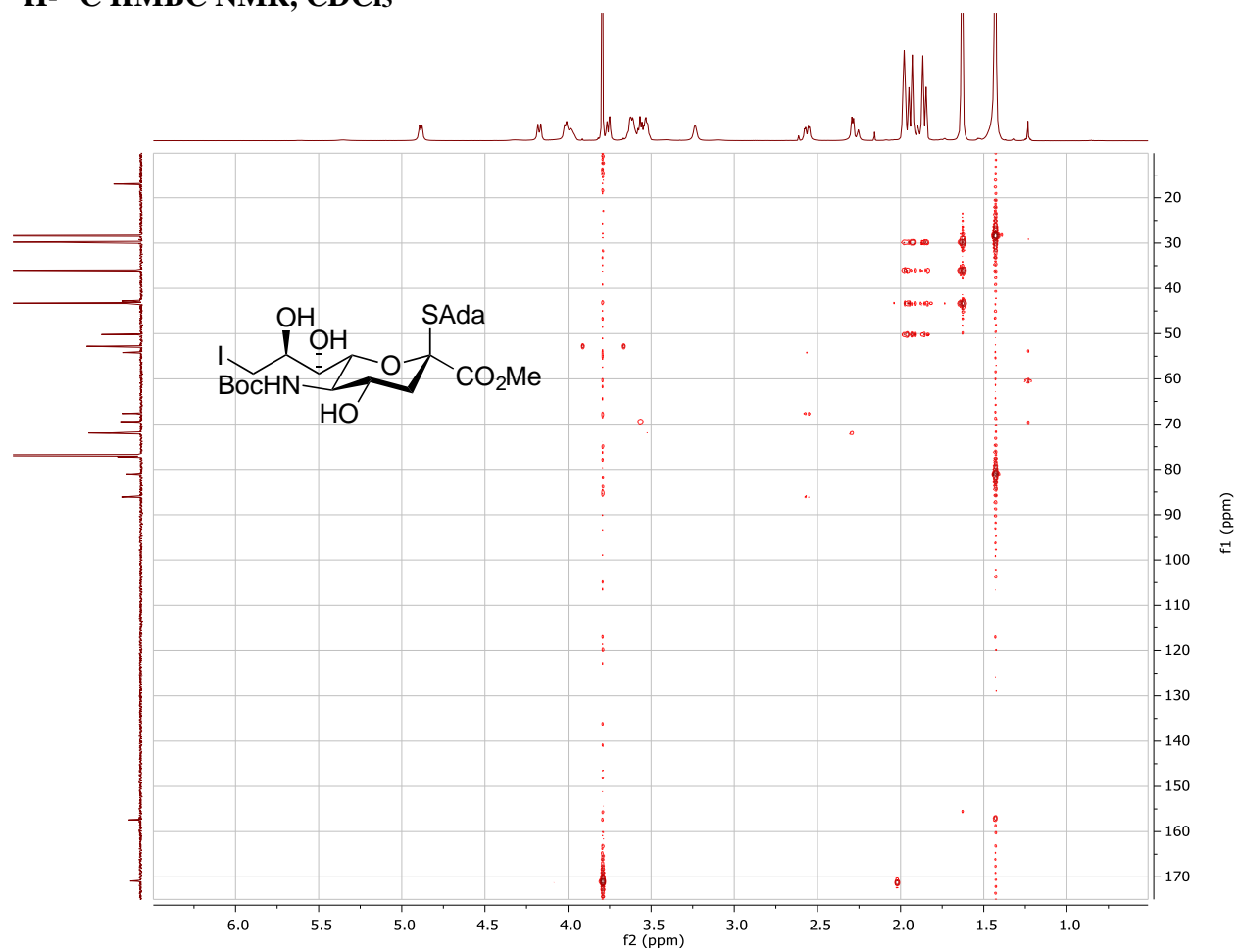
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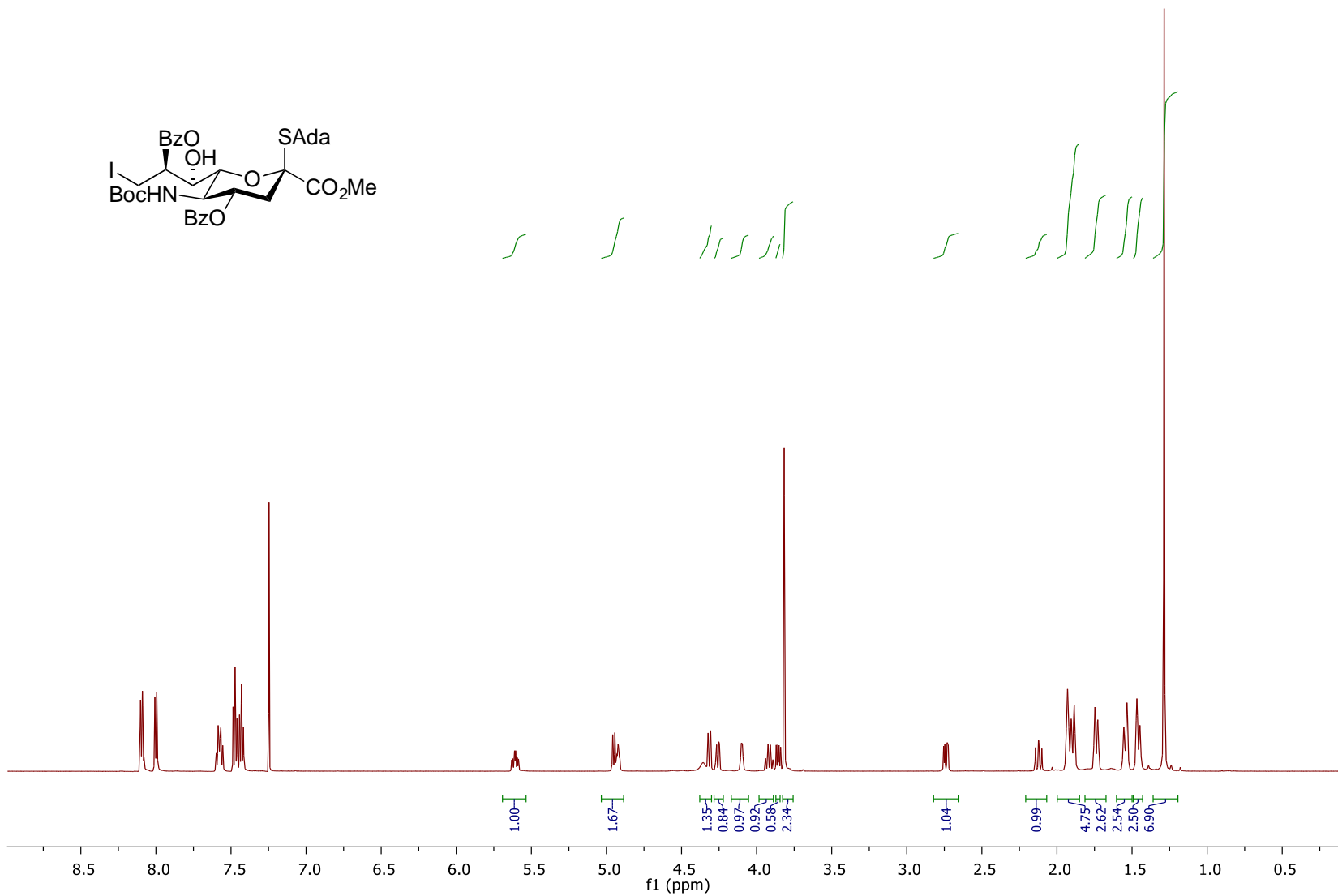
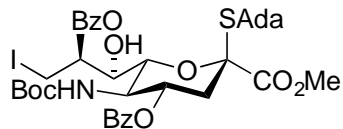
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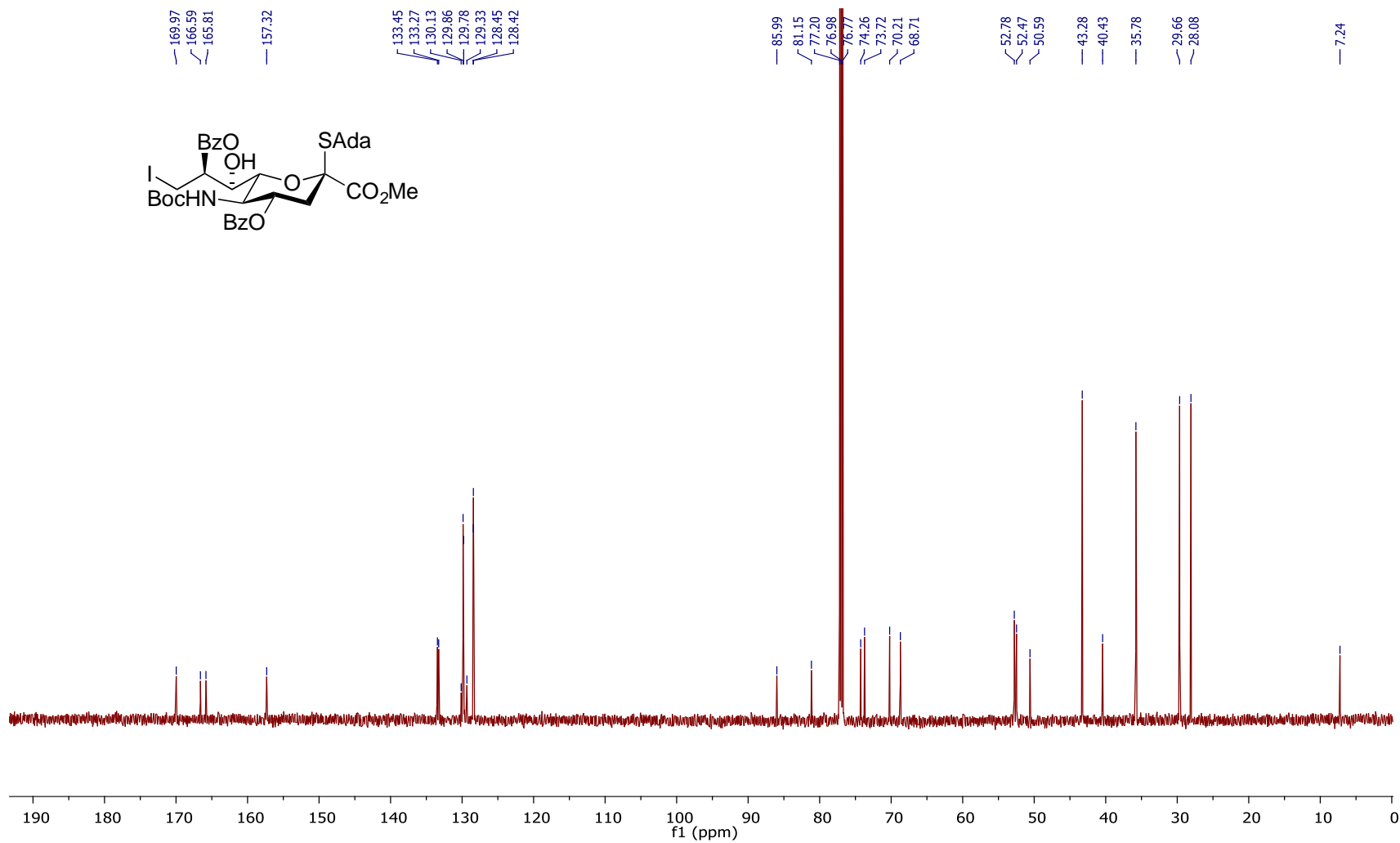
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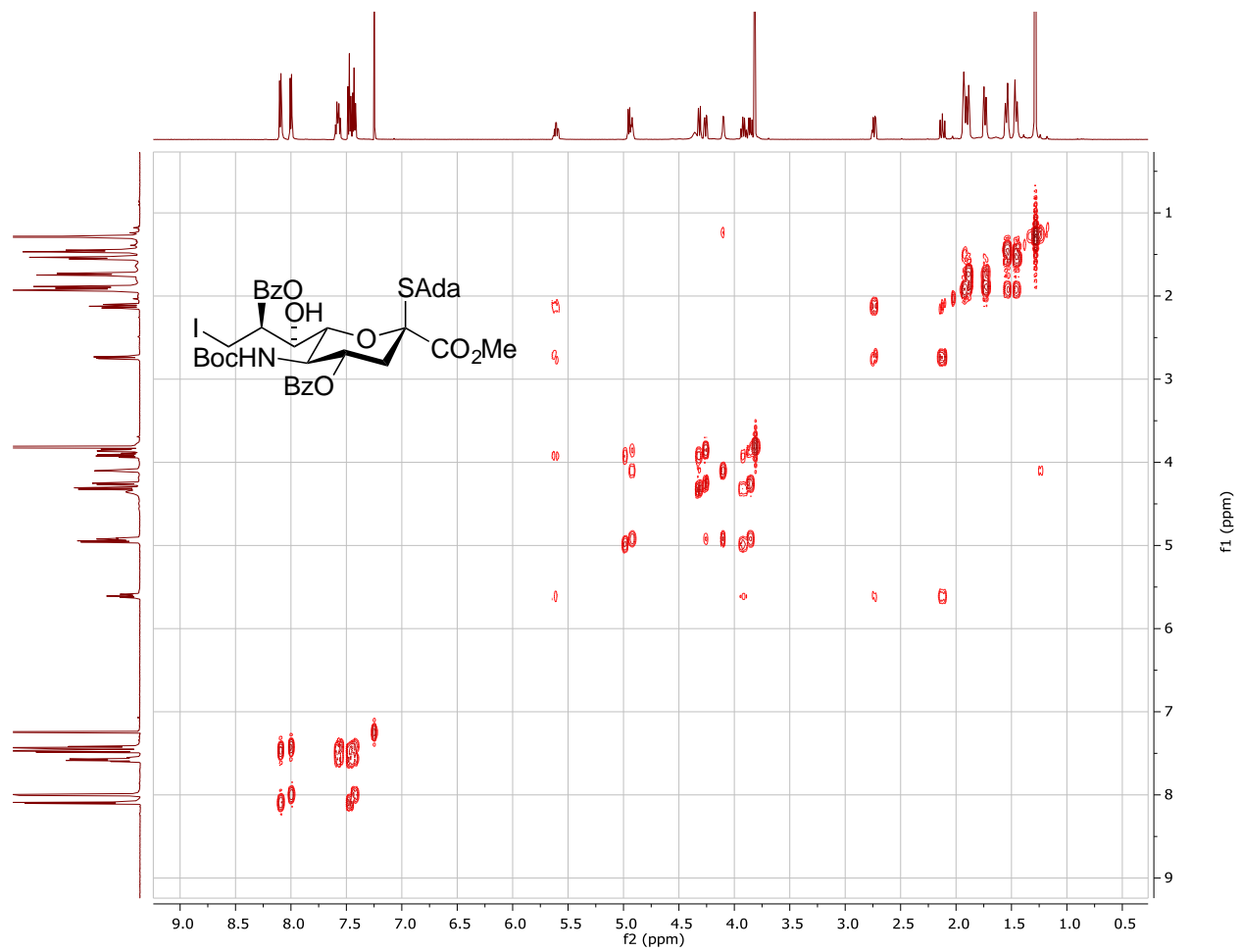
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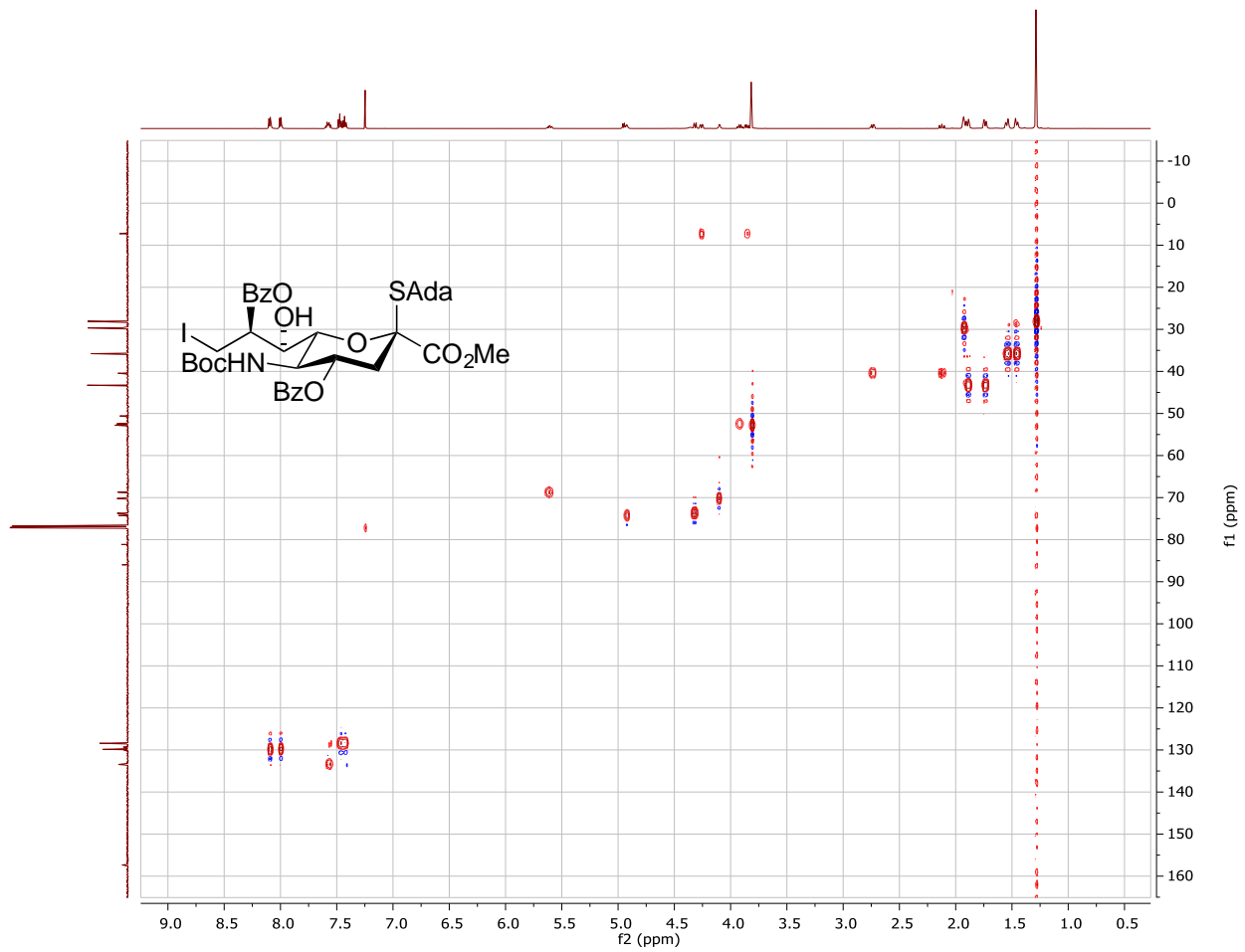
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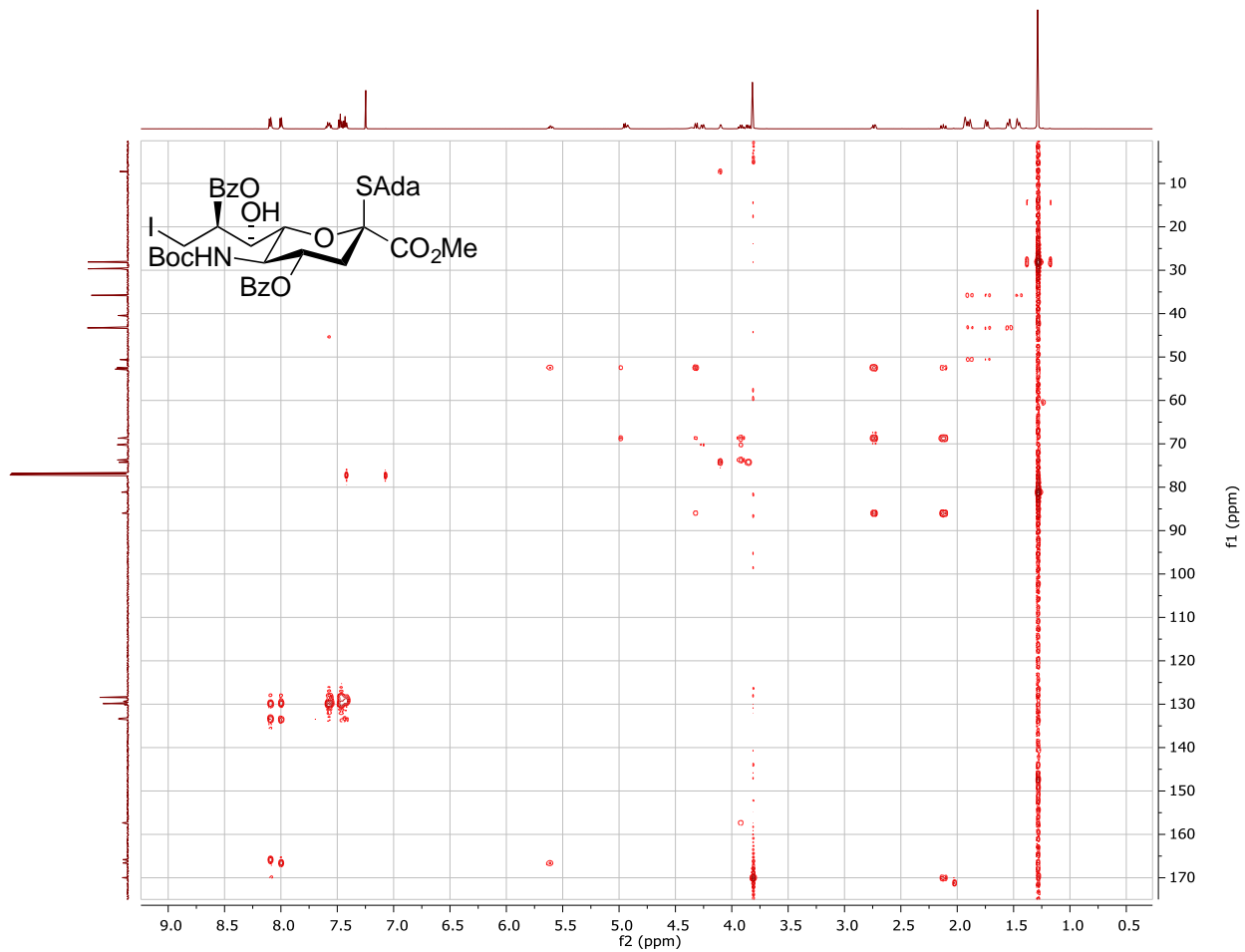
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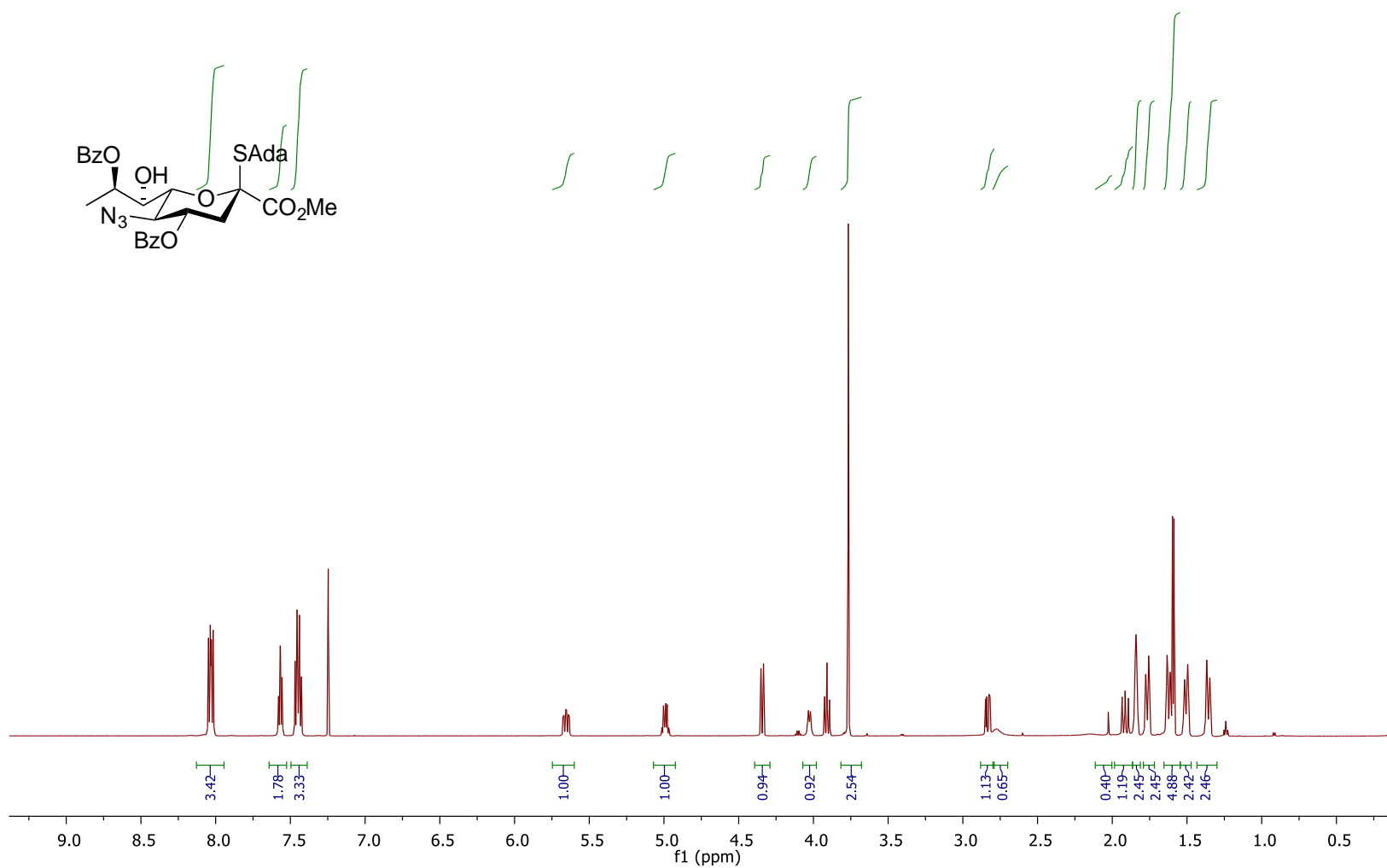
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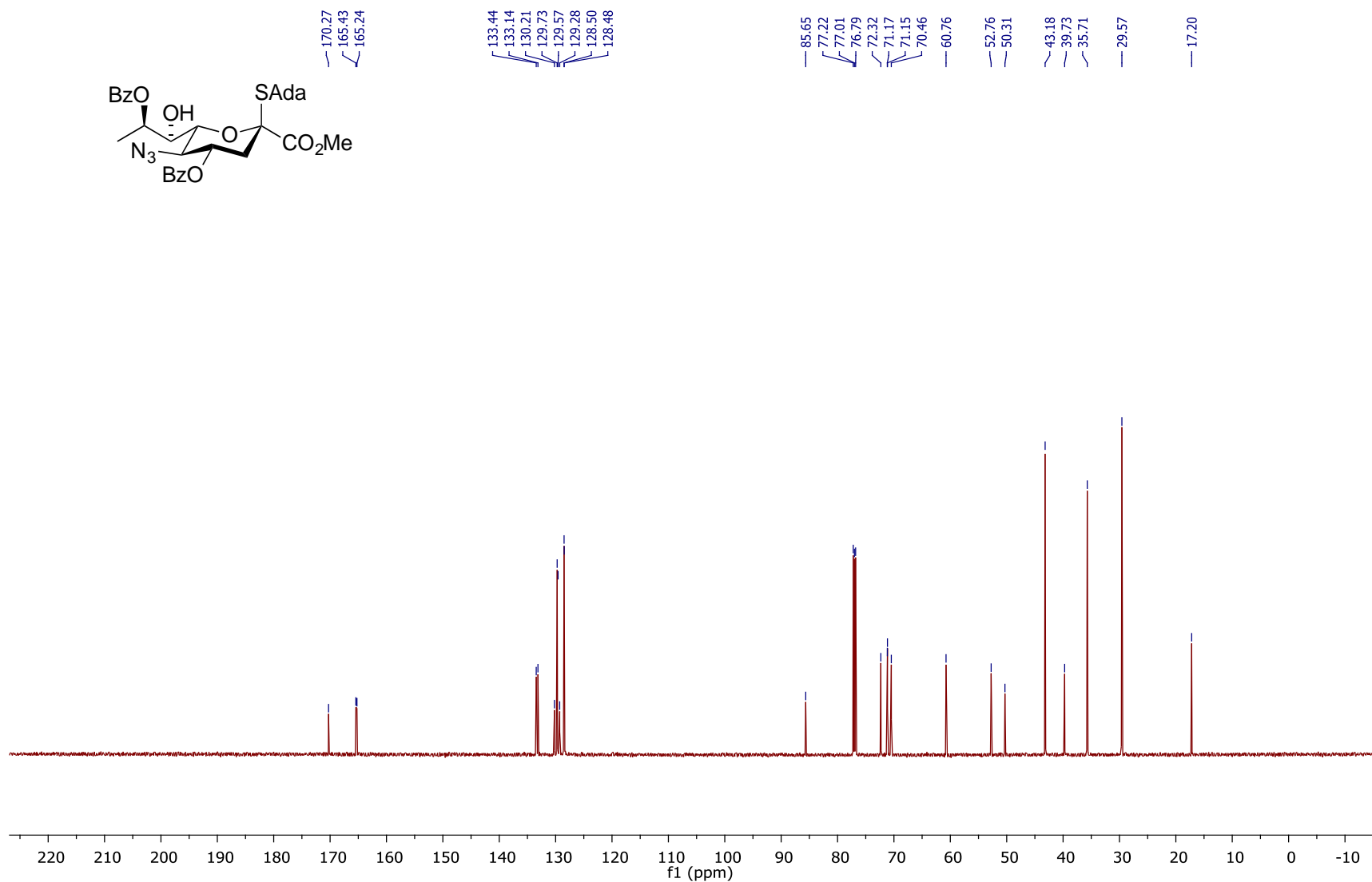
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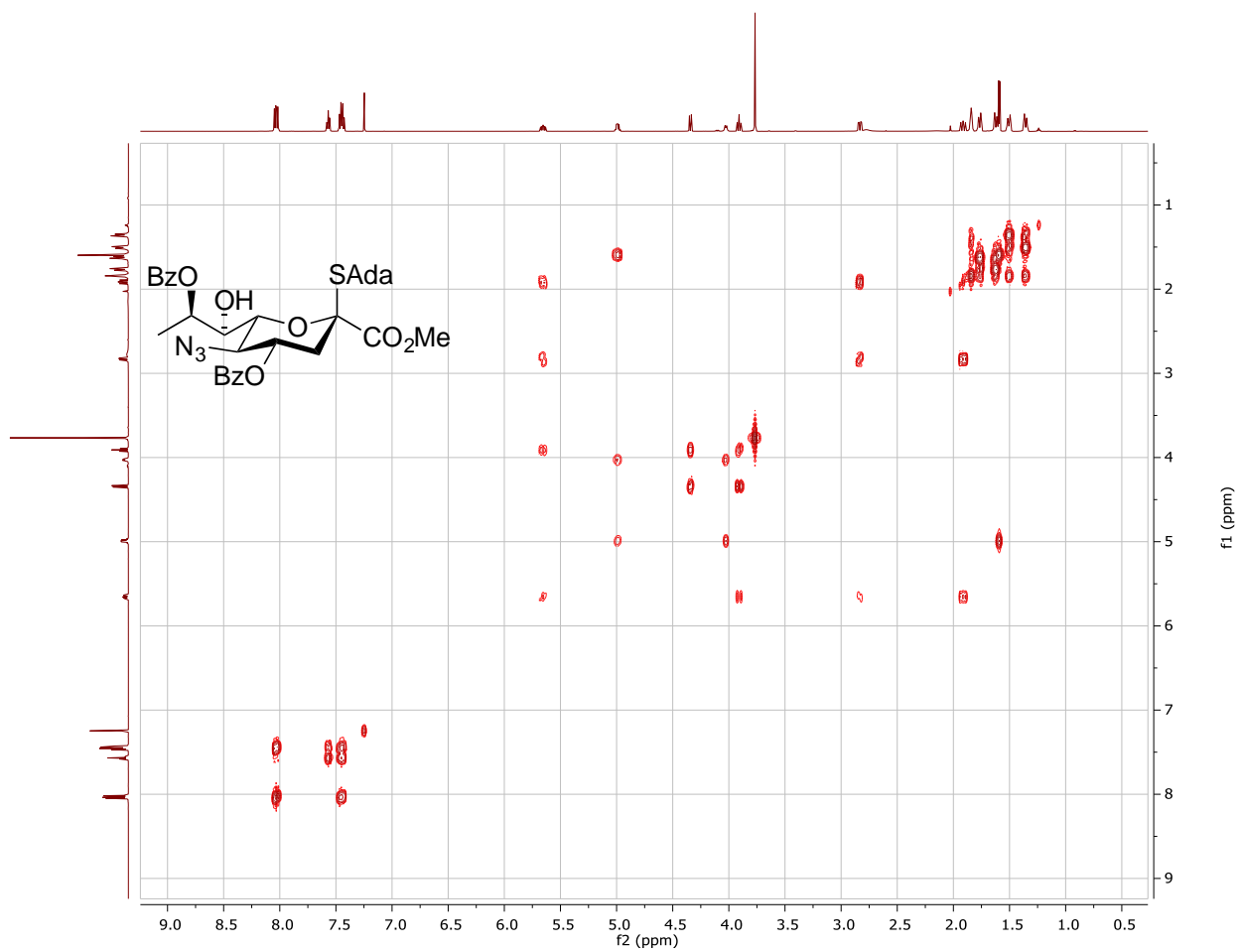
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¹³C NMR (151 MHz, CDCl₃) Methyl (1-adamantanyl 5-azido-4,8-di-O-benzoyl-3,5,9-trideoxy-2-thio-D-glycero-β-D-galactonon-2-ulopyranosid)onate (13)



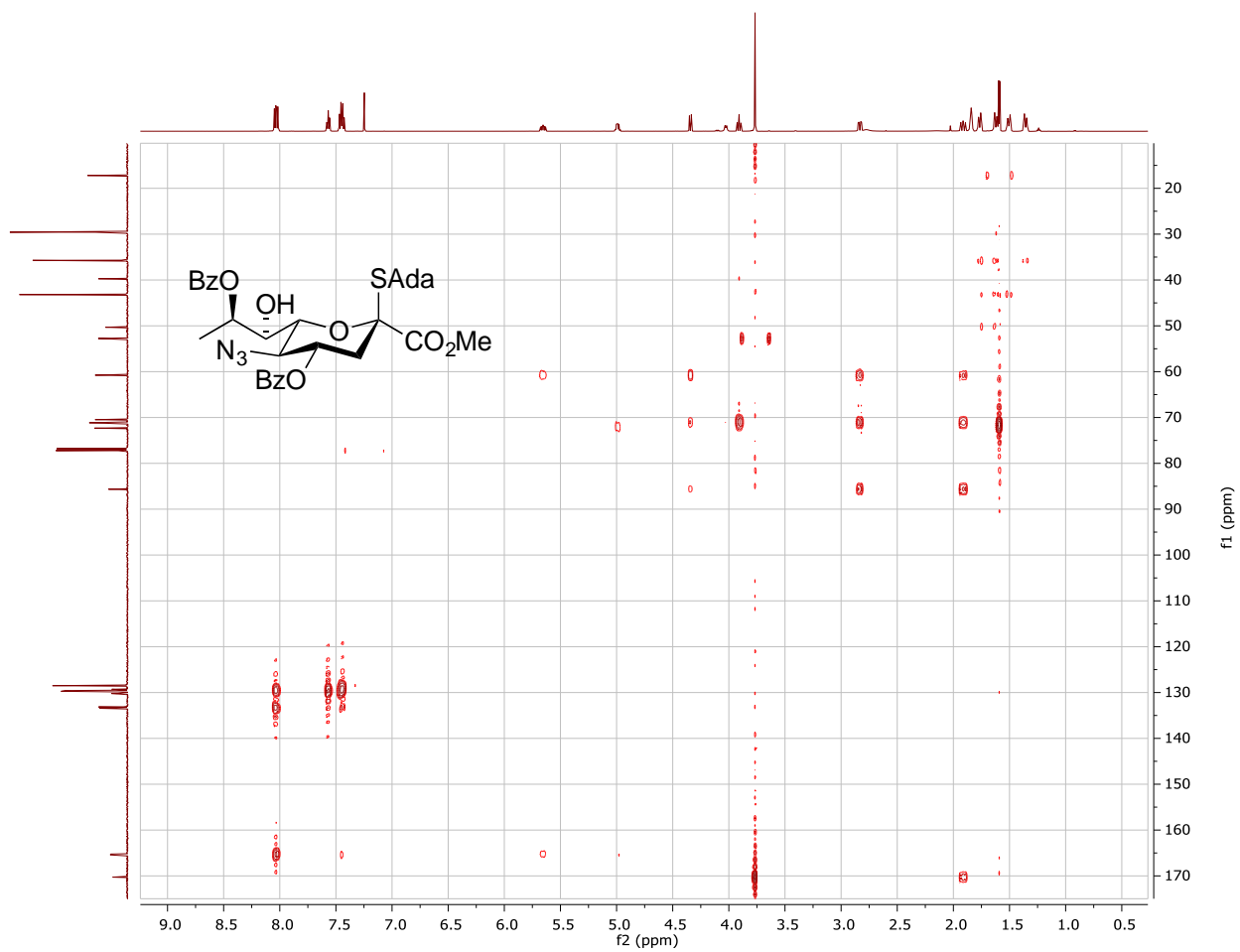
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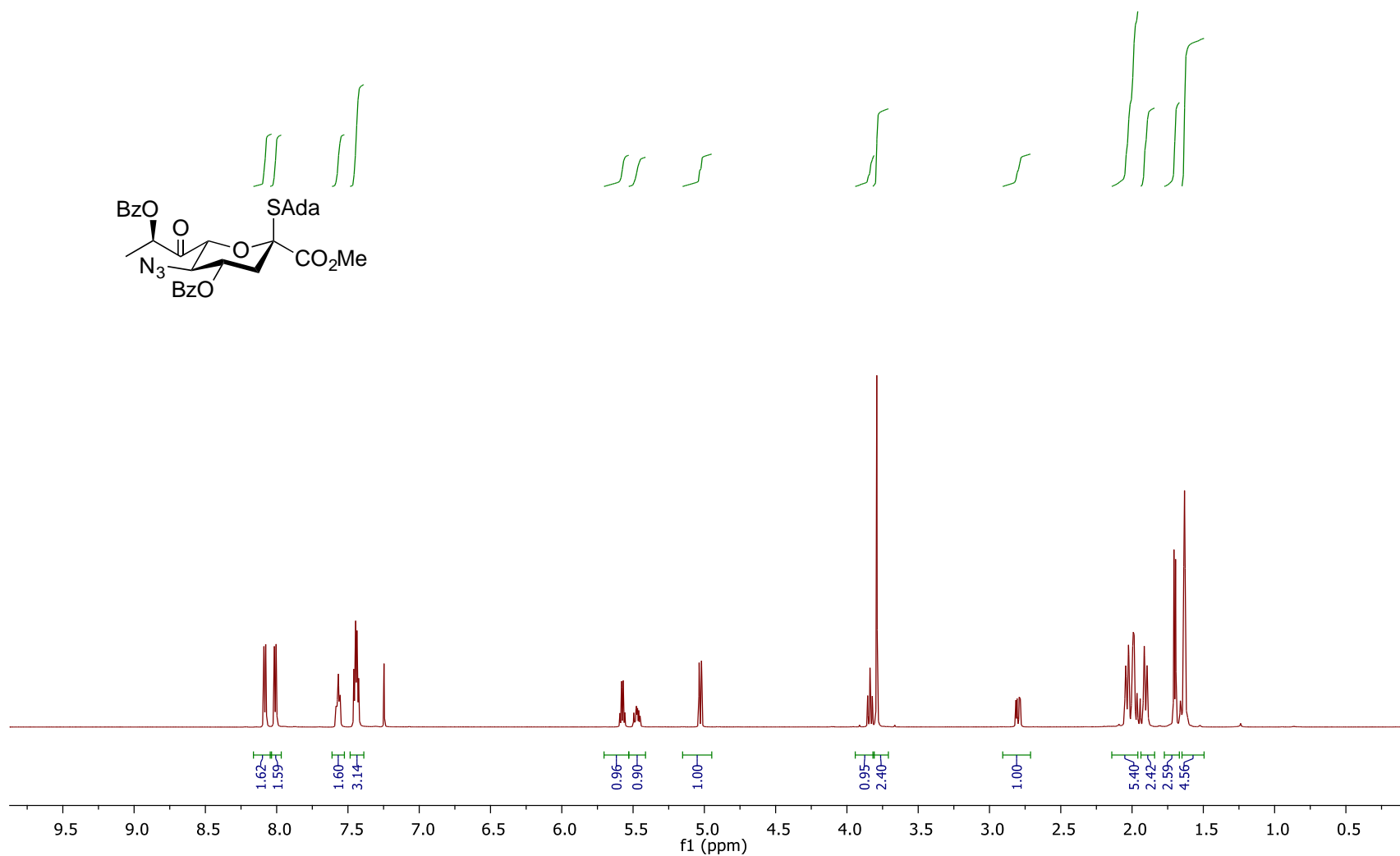
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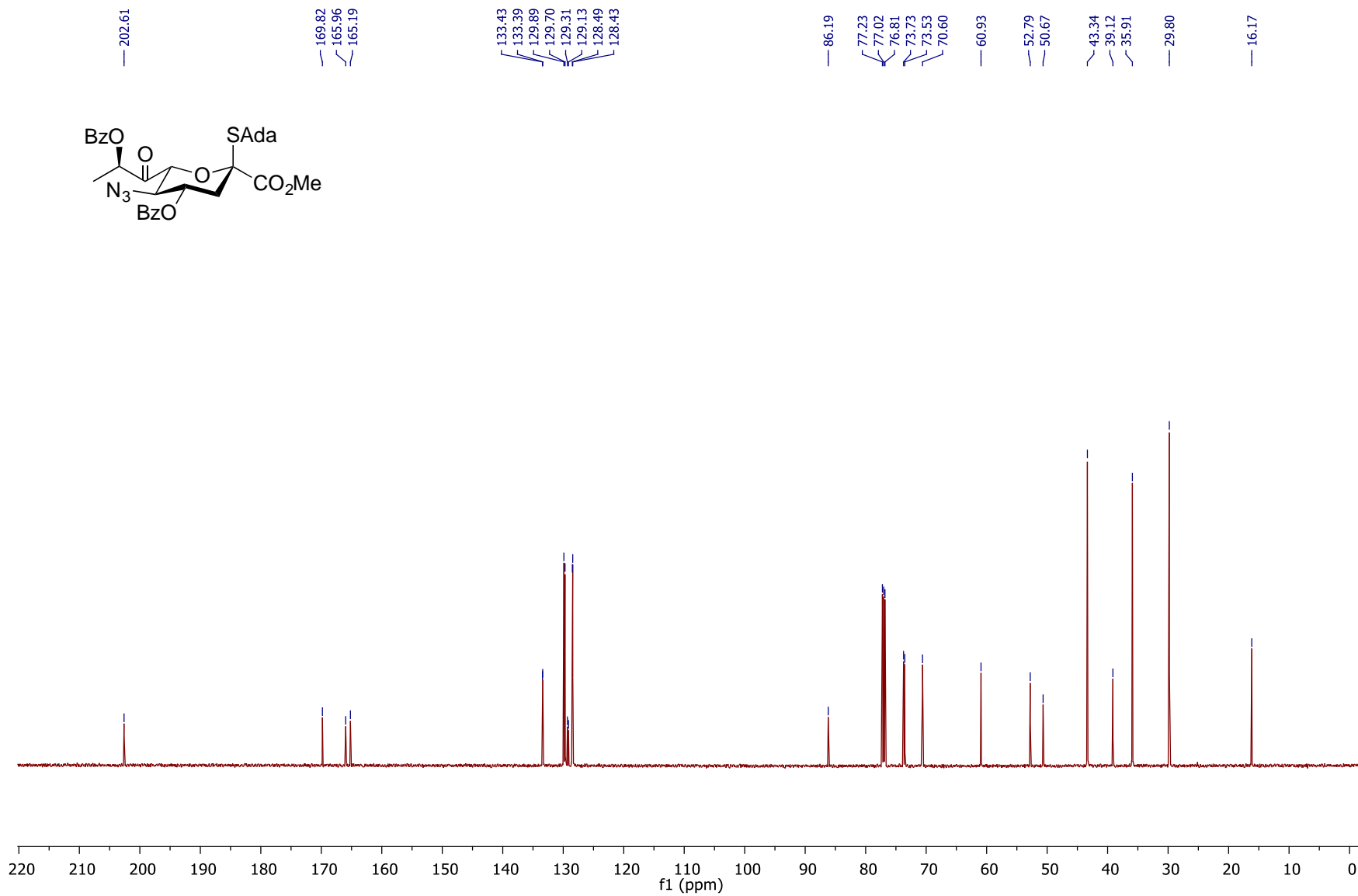
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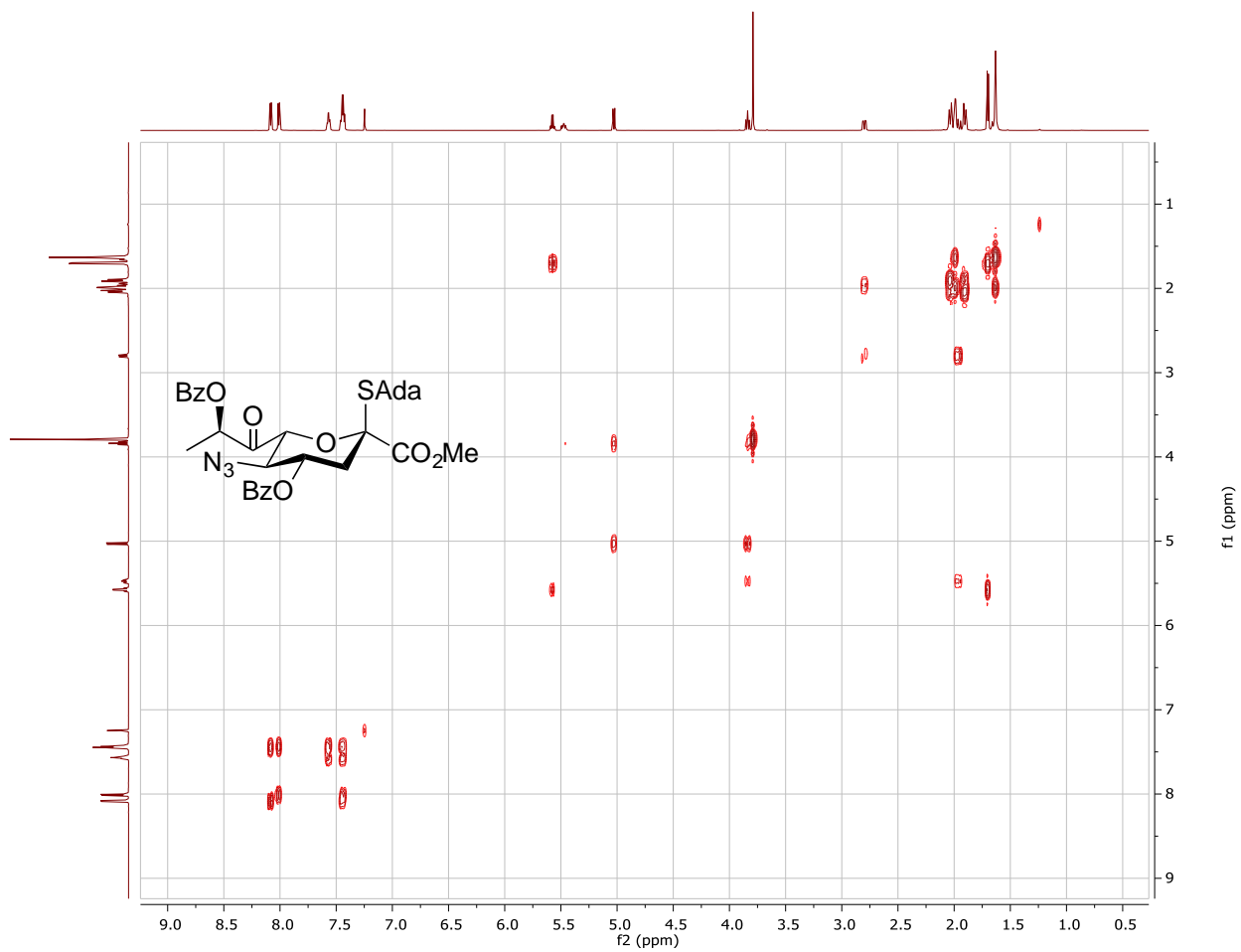
¹H NMR (600 MHz, CDCl₃) Methyl (1-adamantanyl 5-azido-4,8-di-*O*-benzoyl-3,5,9-trideoxy-7-oxo-2-thio-D-glycero-β-D-galacto-non-2-ulopyranosid)onate (14)



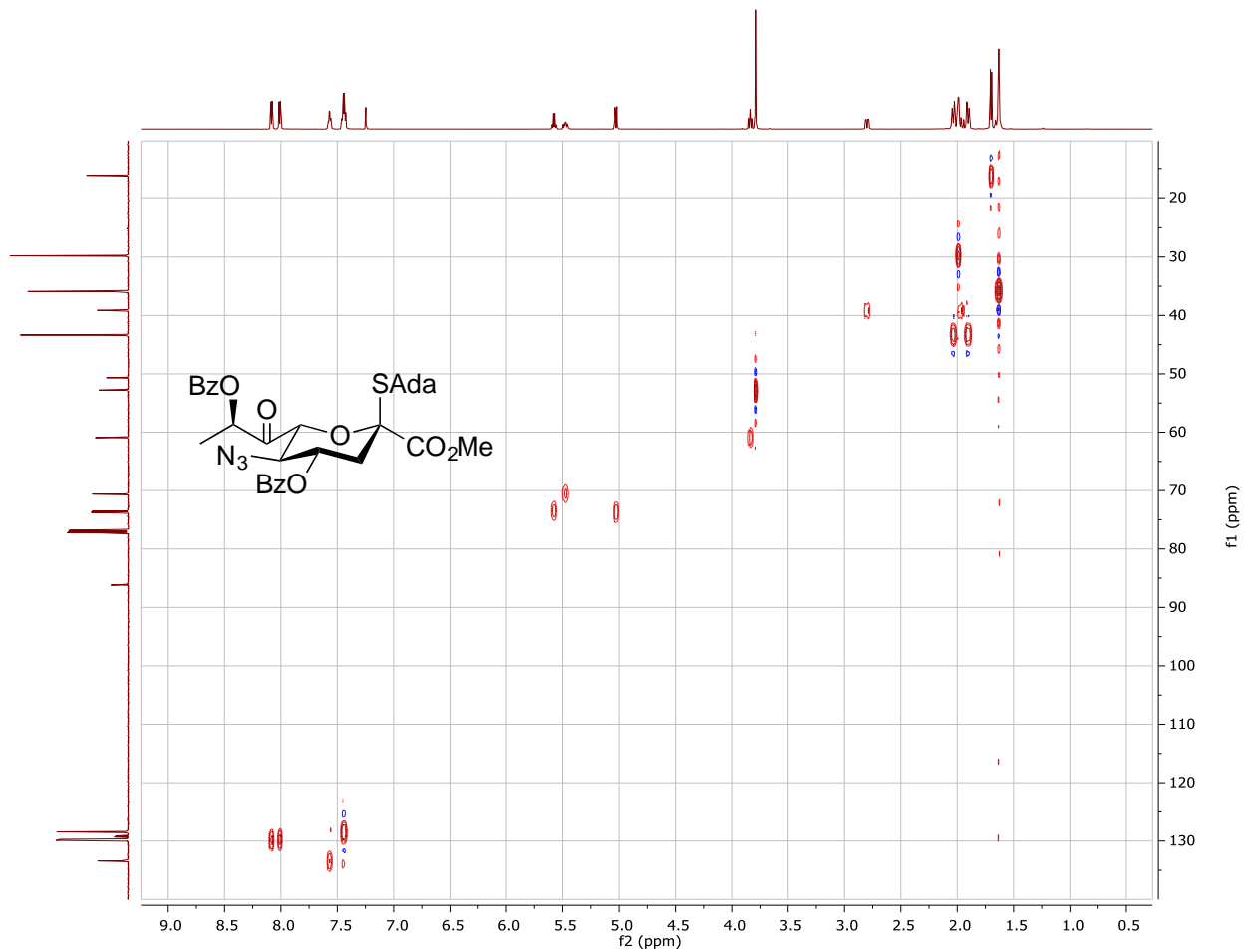
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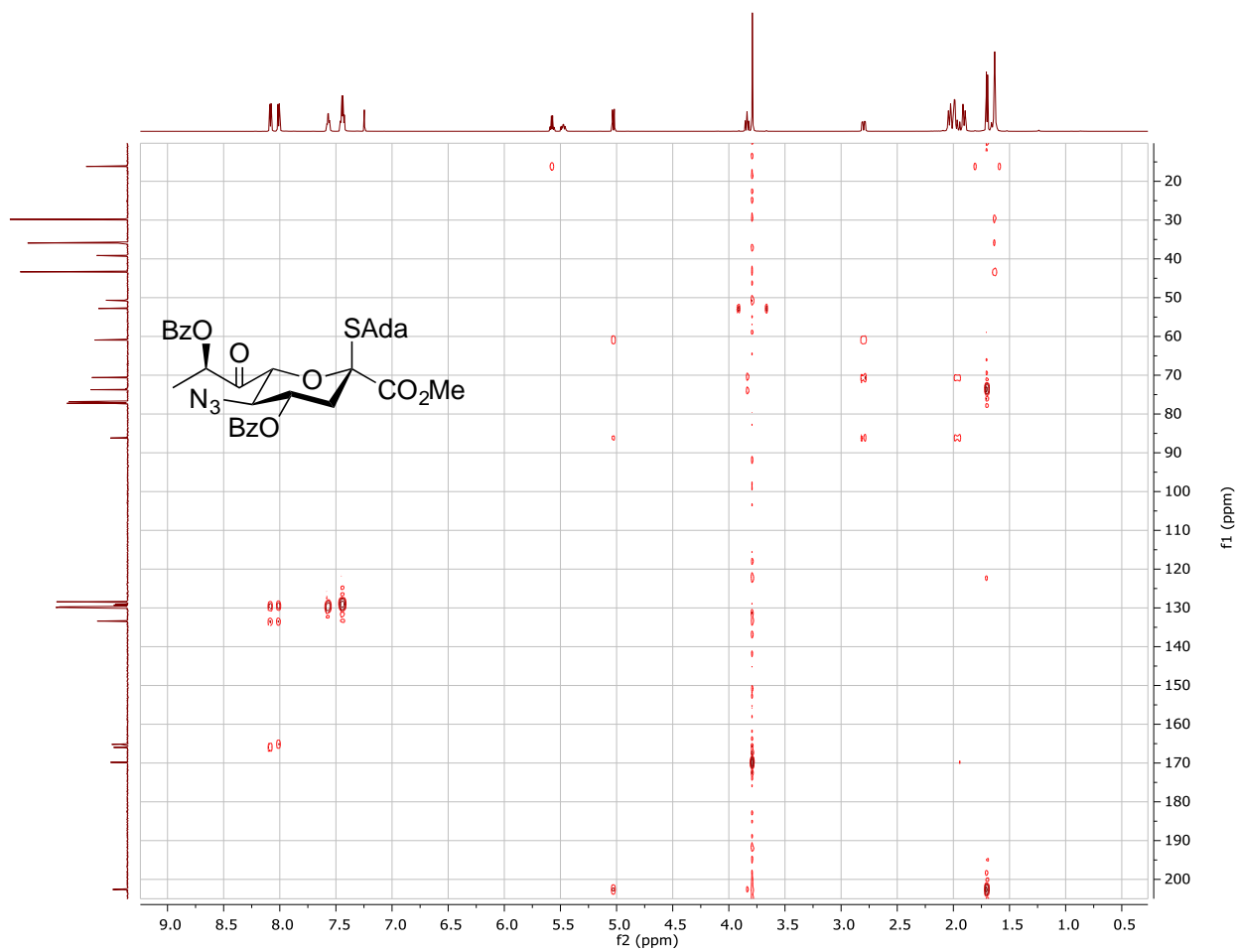
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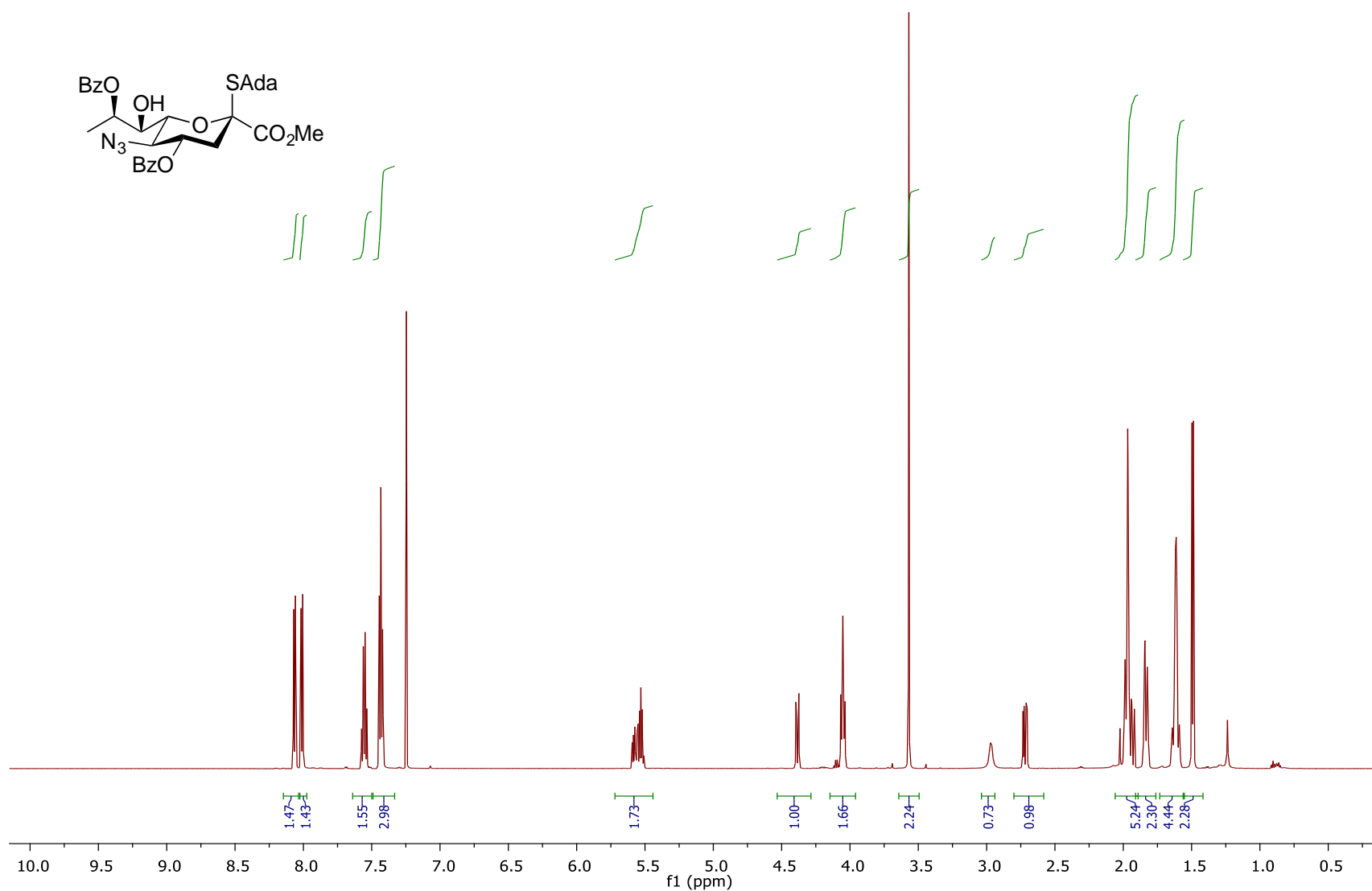
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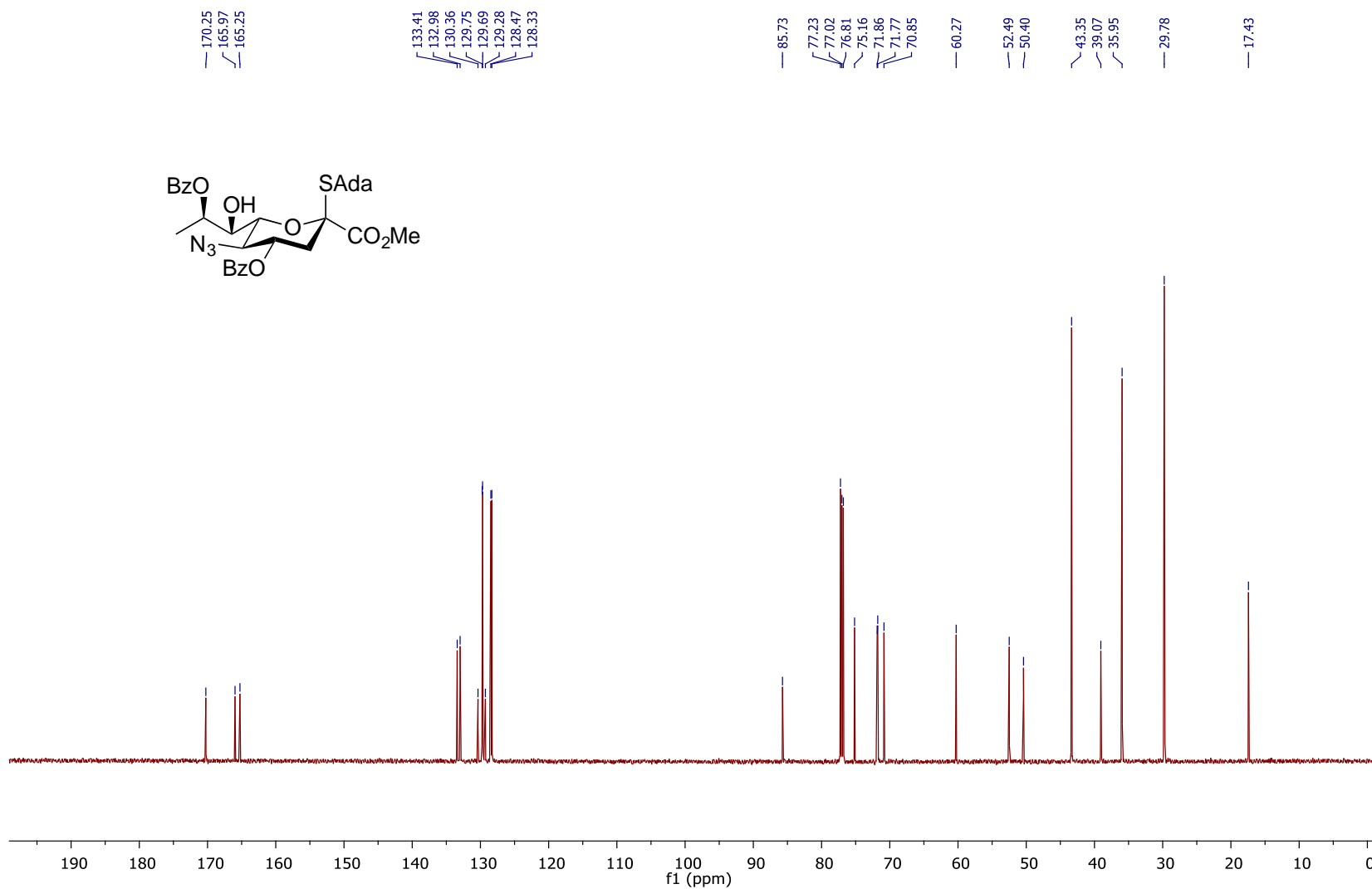
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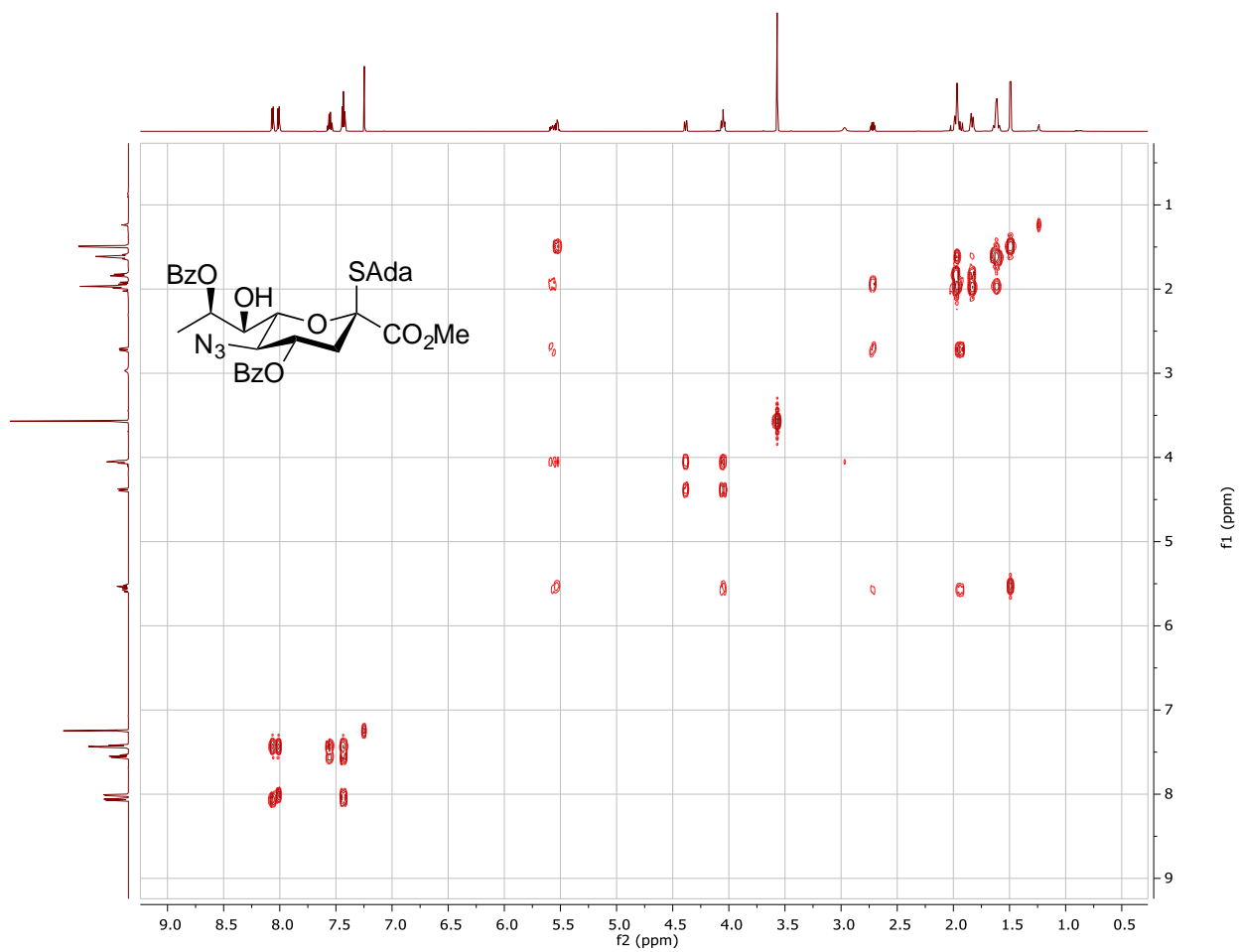
¹H NMR (600 MHz, CDCl₃) Methyl (1-adamantanyl 5-azido-4,8-di-O-benzoyl-3,5,9-trideoxy-2-thio--glycero-β-L-altro-non-2-uloopyranosid)onate (15)



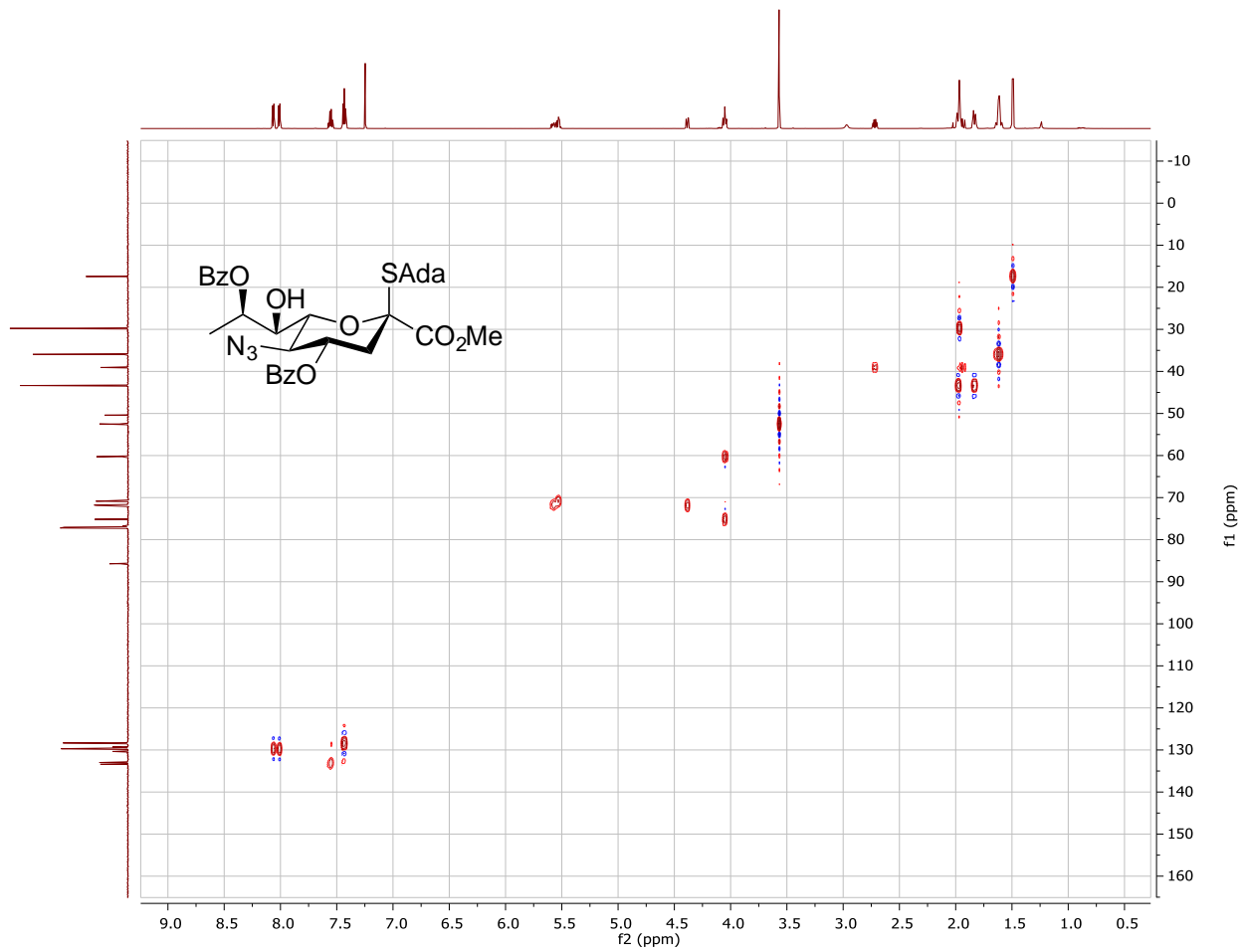
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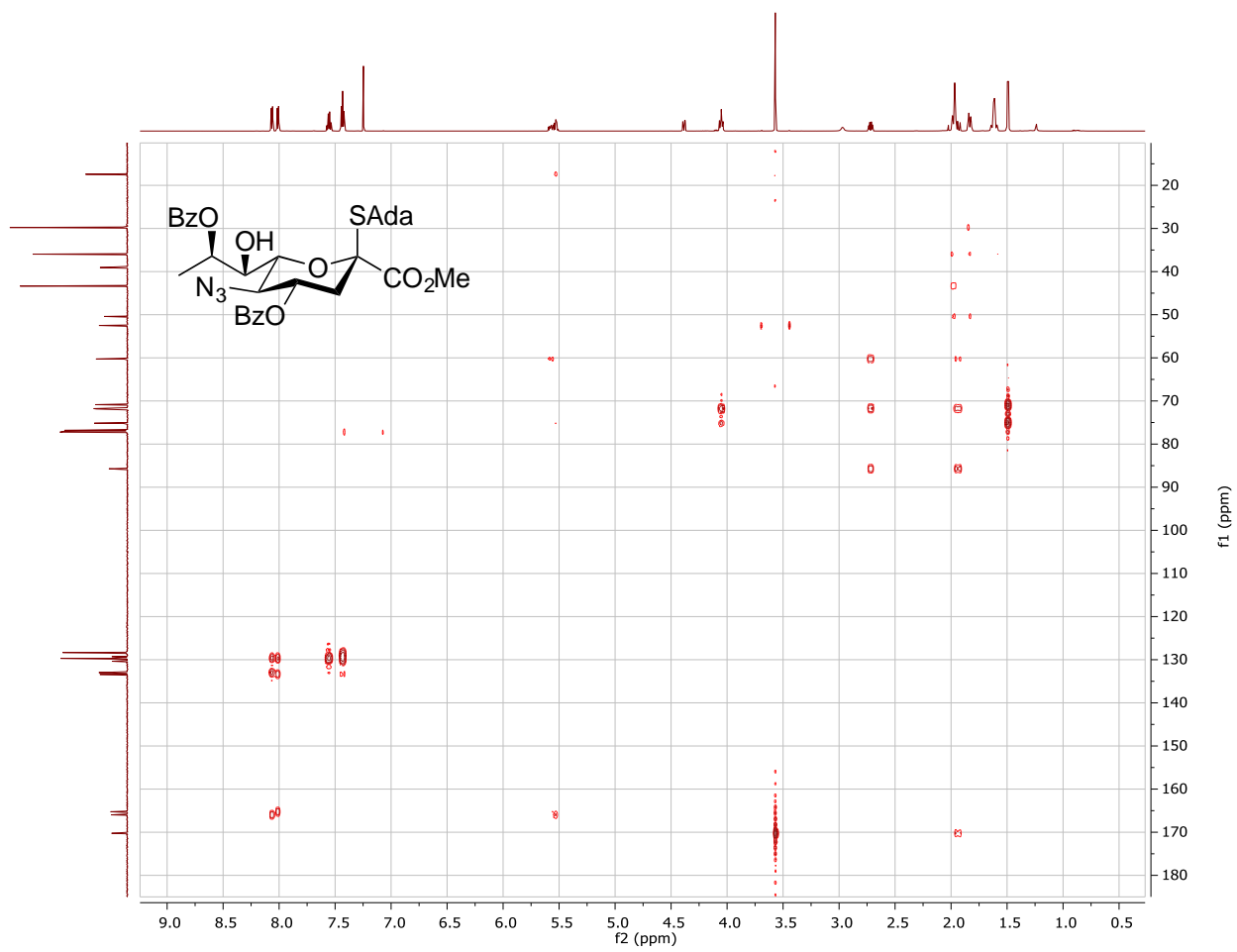
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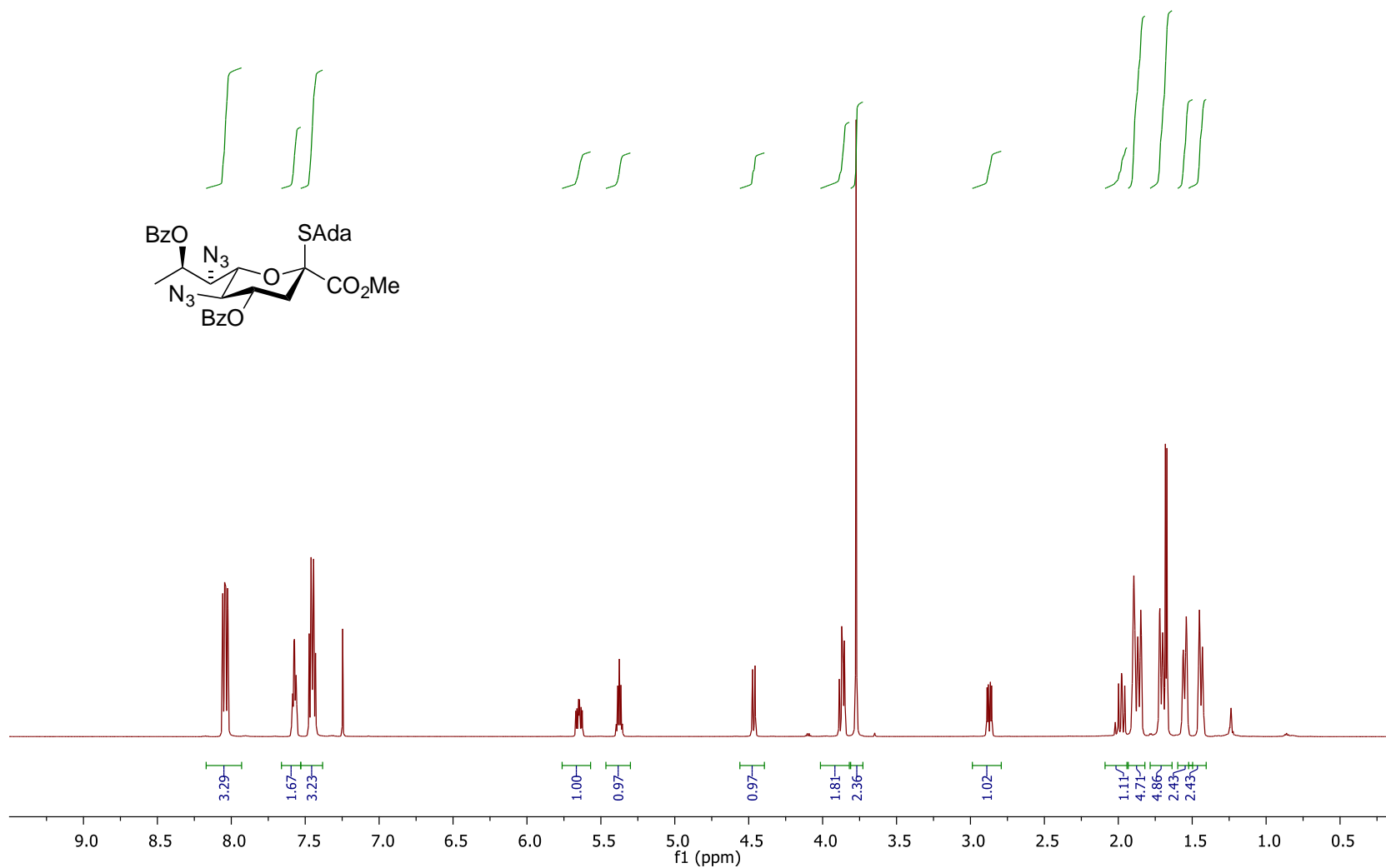
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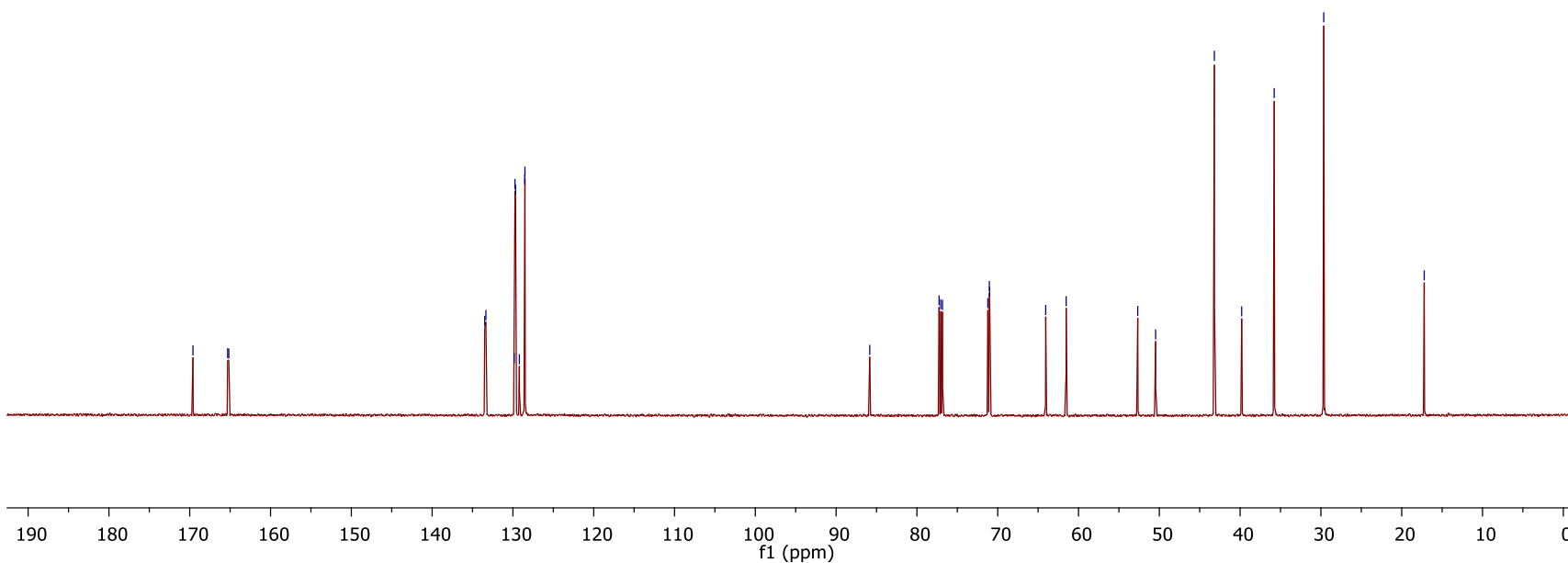
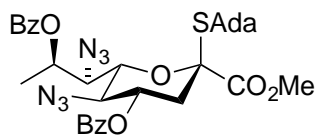
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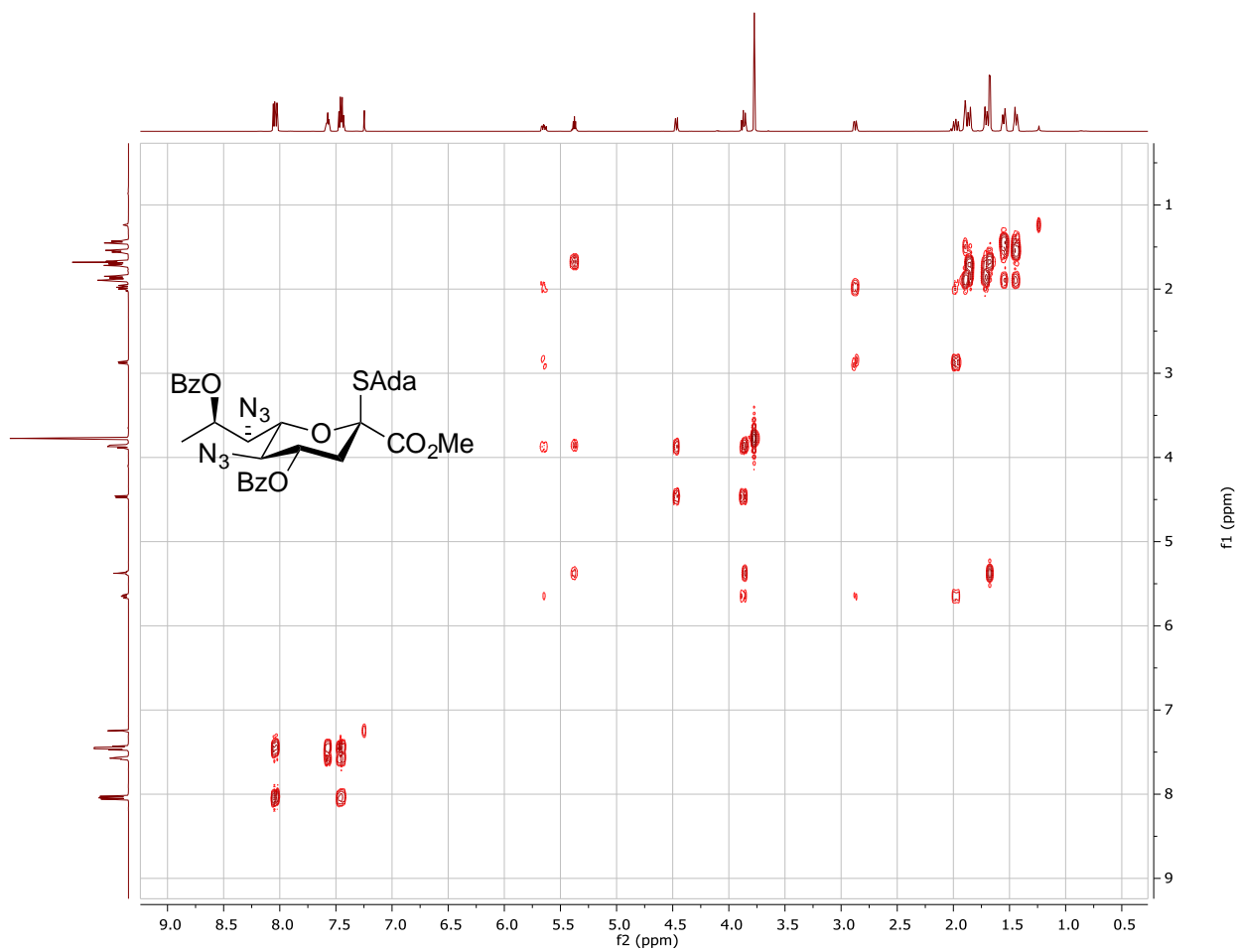
¹H NMR (600 MHz, CDCl₃) Methyl (1-adamantanyl 5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-2-thio-D-glycero-β-D-galacto-non-2-ulopyranosid)onate (5)



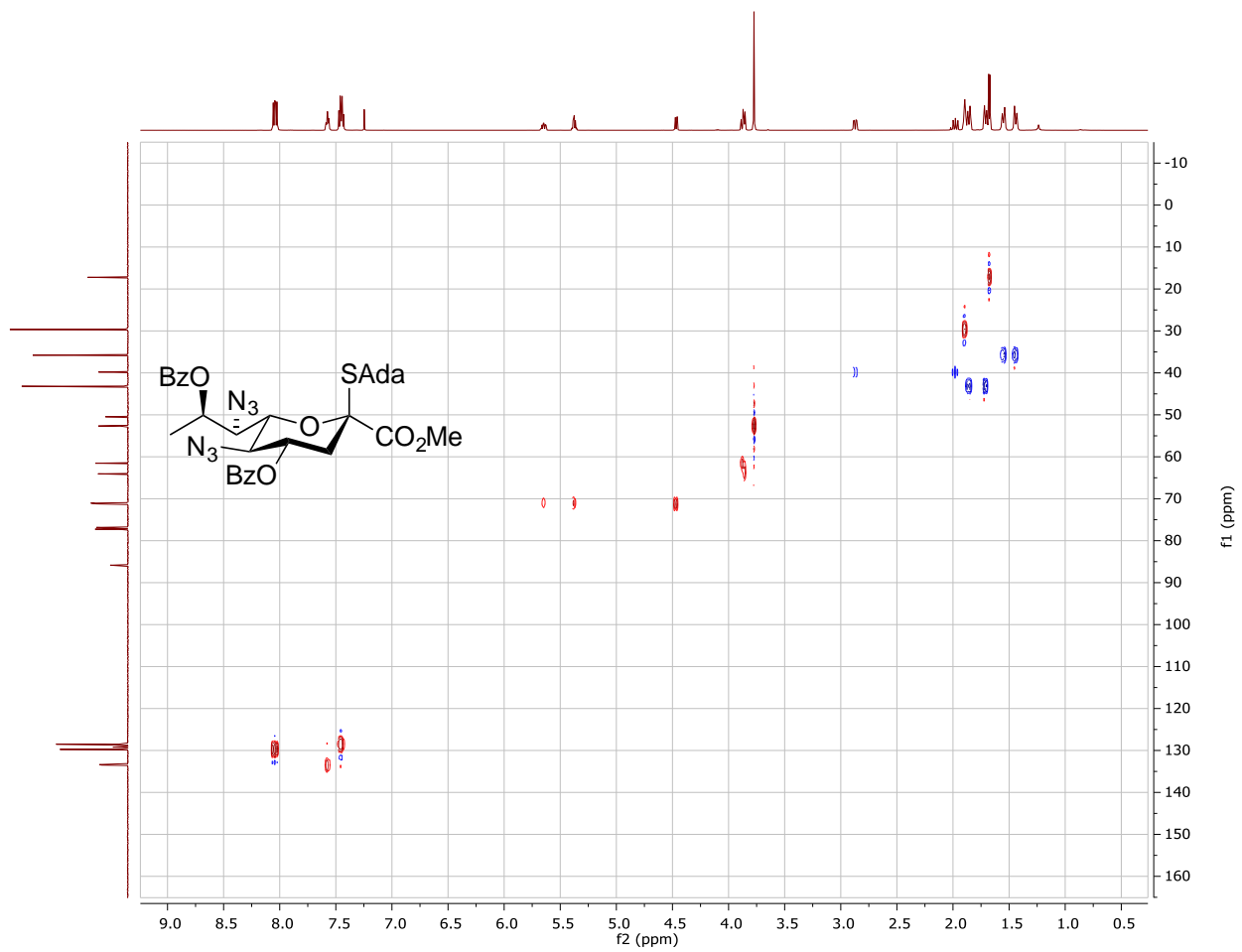
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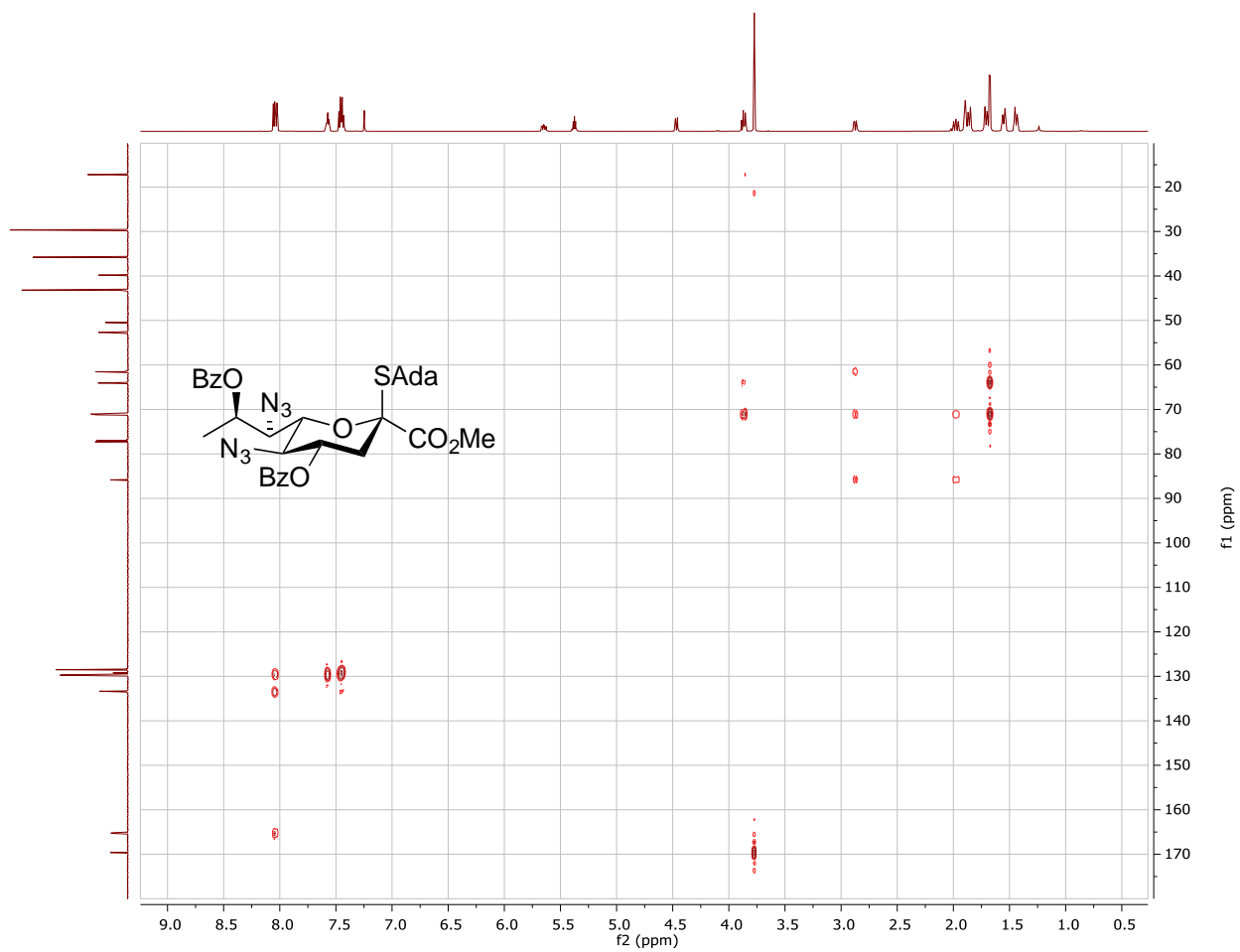
^1H - ^1H COSY NMR, CDCl_3



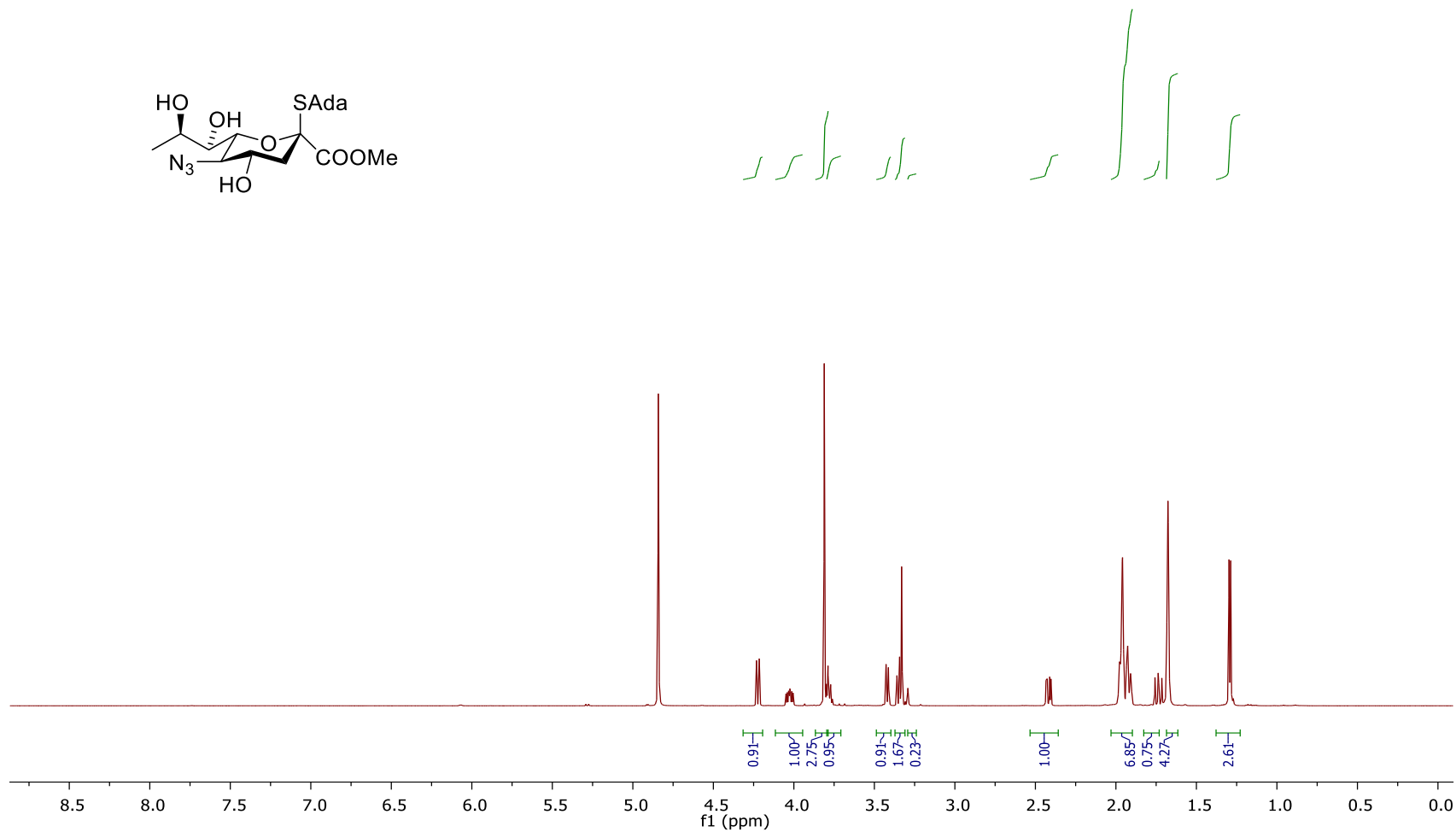
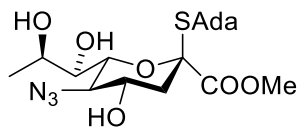
^1H - ^{13}C HSQC NMR, CDCl_3



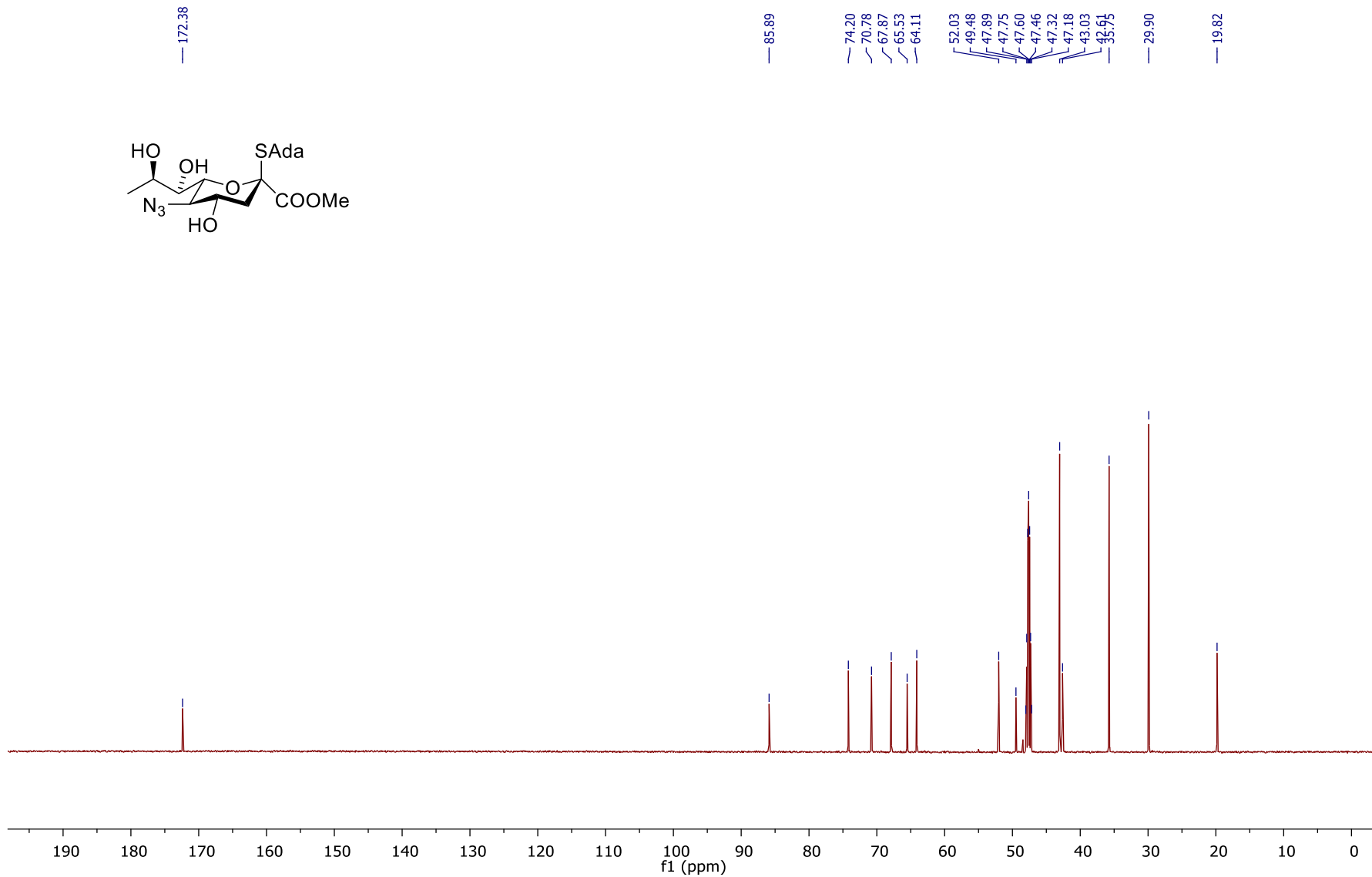
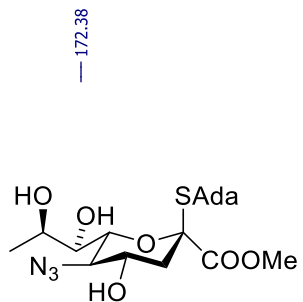
^1H - ^{13}C HMBC NMR, CDCl_3



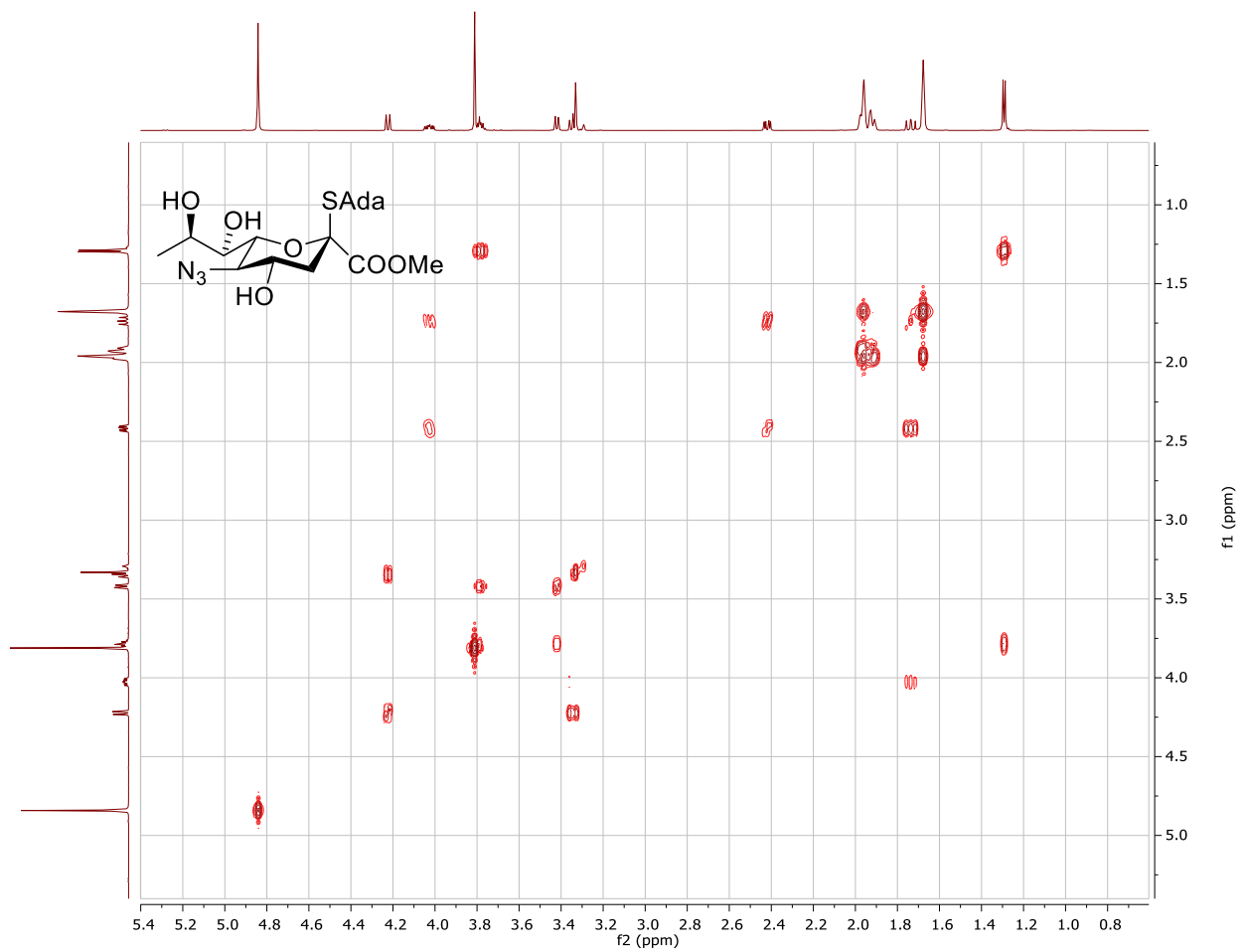
¹H NMR (600 MHz, CD₃OD) Methyl (1-adamantanyl 5-azido-3,5,9-trideoxy-2-thio-D-glycero-β-D-galacto-non-2-uloxyranoside)onate (19)



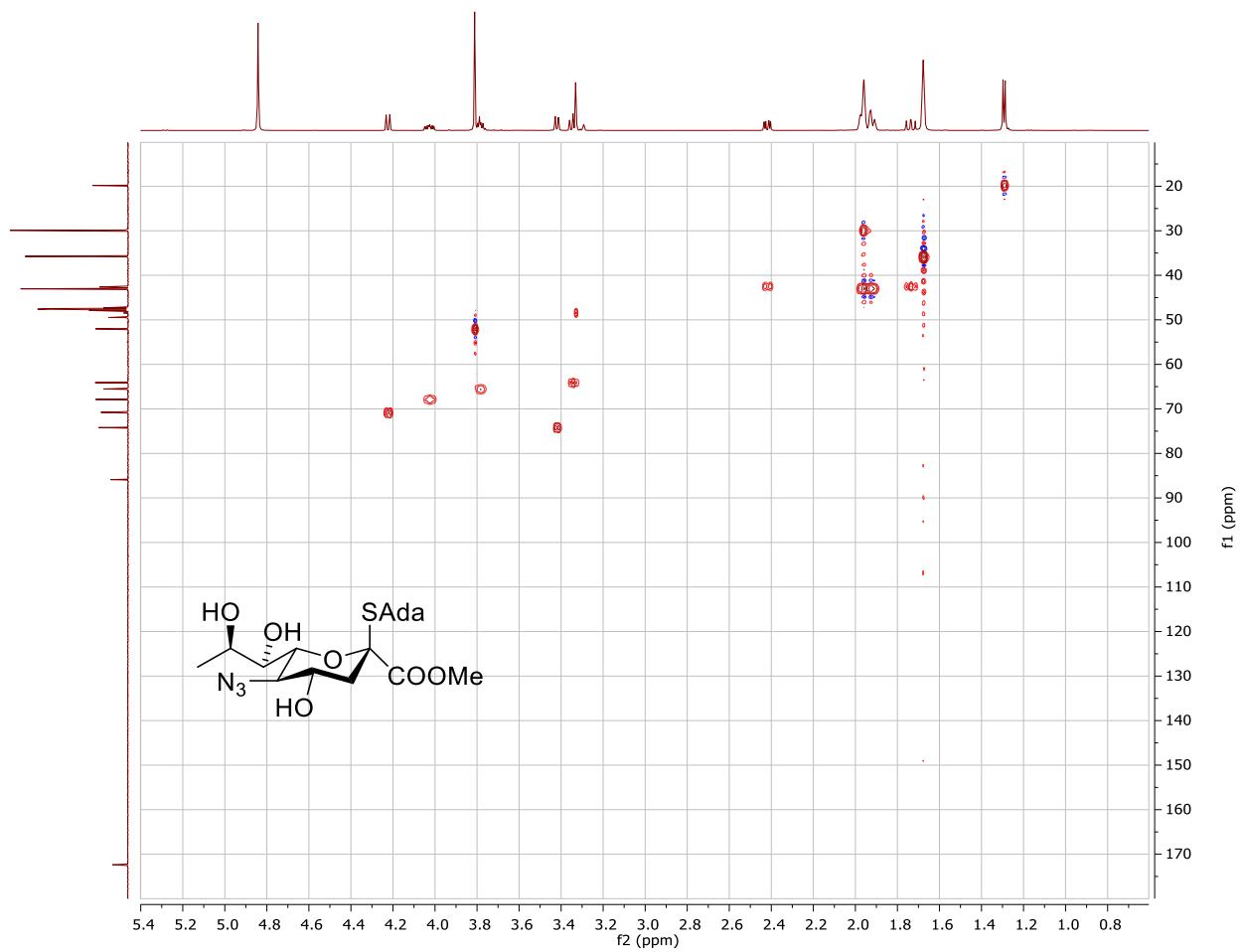
¹³C NMR (151 MHz, CD₃OD) Methyl (1-adamantanyl 5-azido-3,5,9-trideoxy-2-thio-D-glycero-β-D-galacto-non-2-uloxyranoside)onate (19)



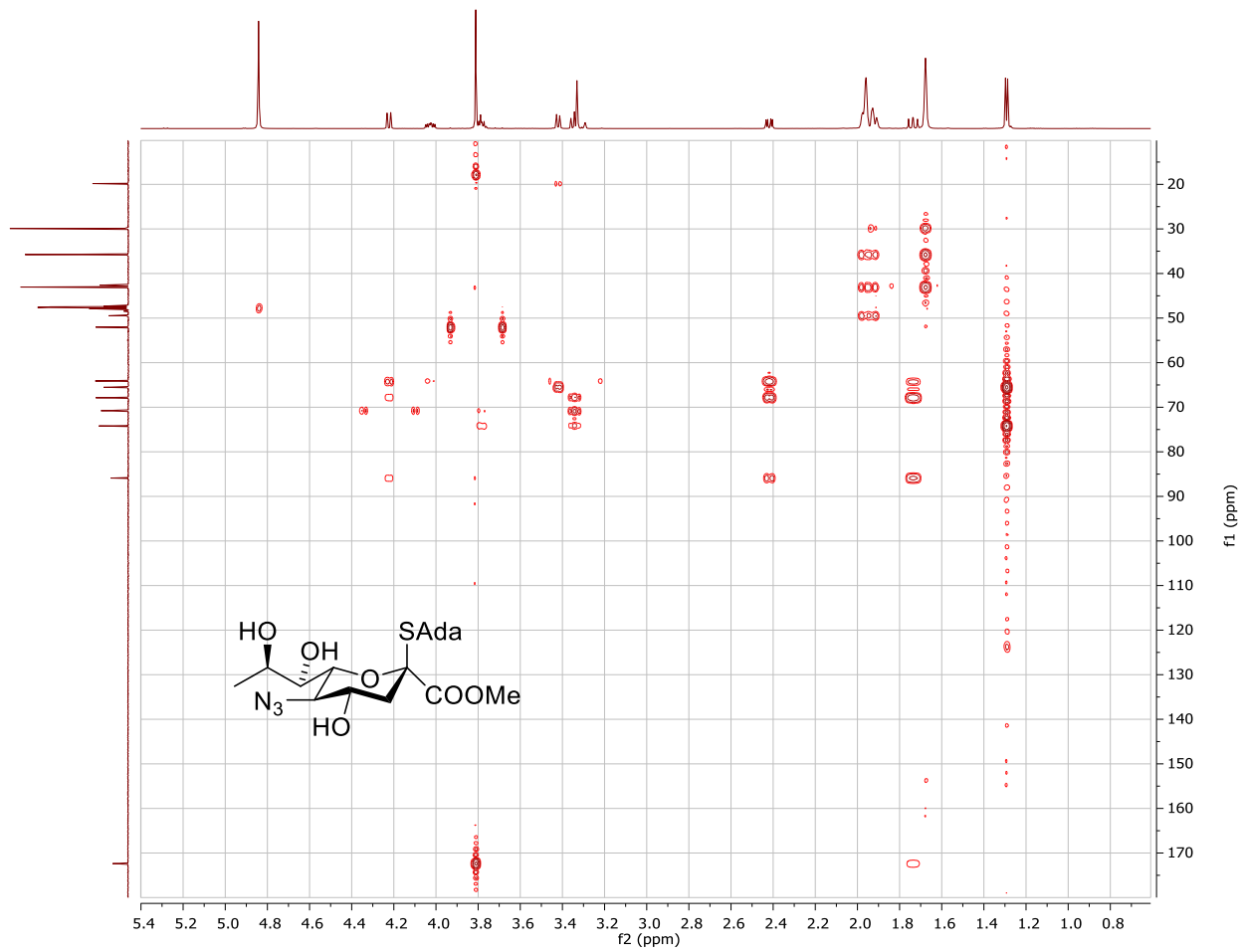
^1H - ^1H COSY NMR, CD_3OD



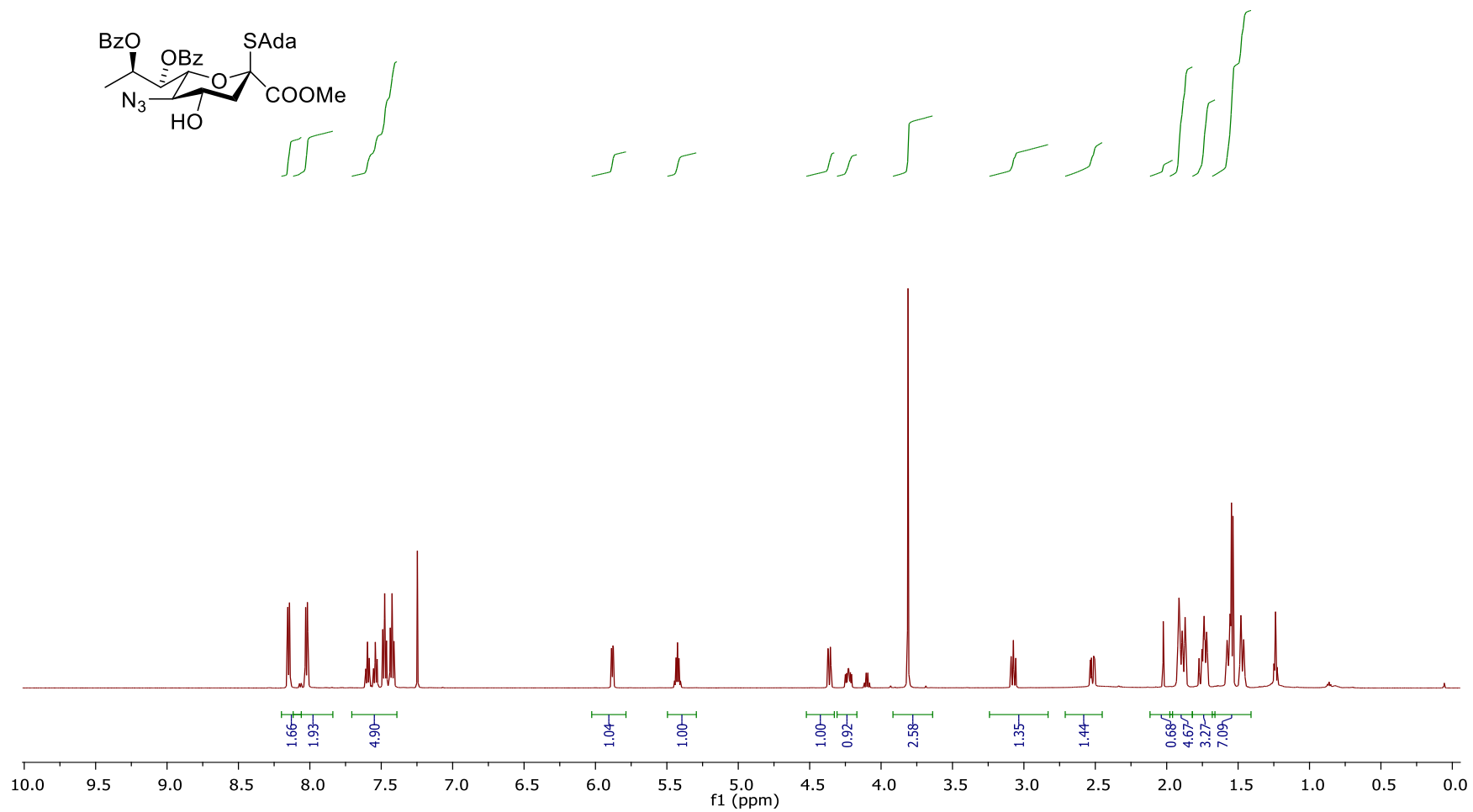
^1H - ^{13}C HSQC NMR, CD_3OD



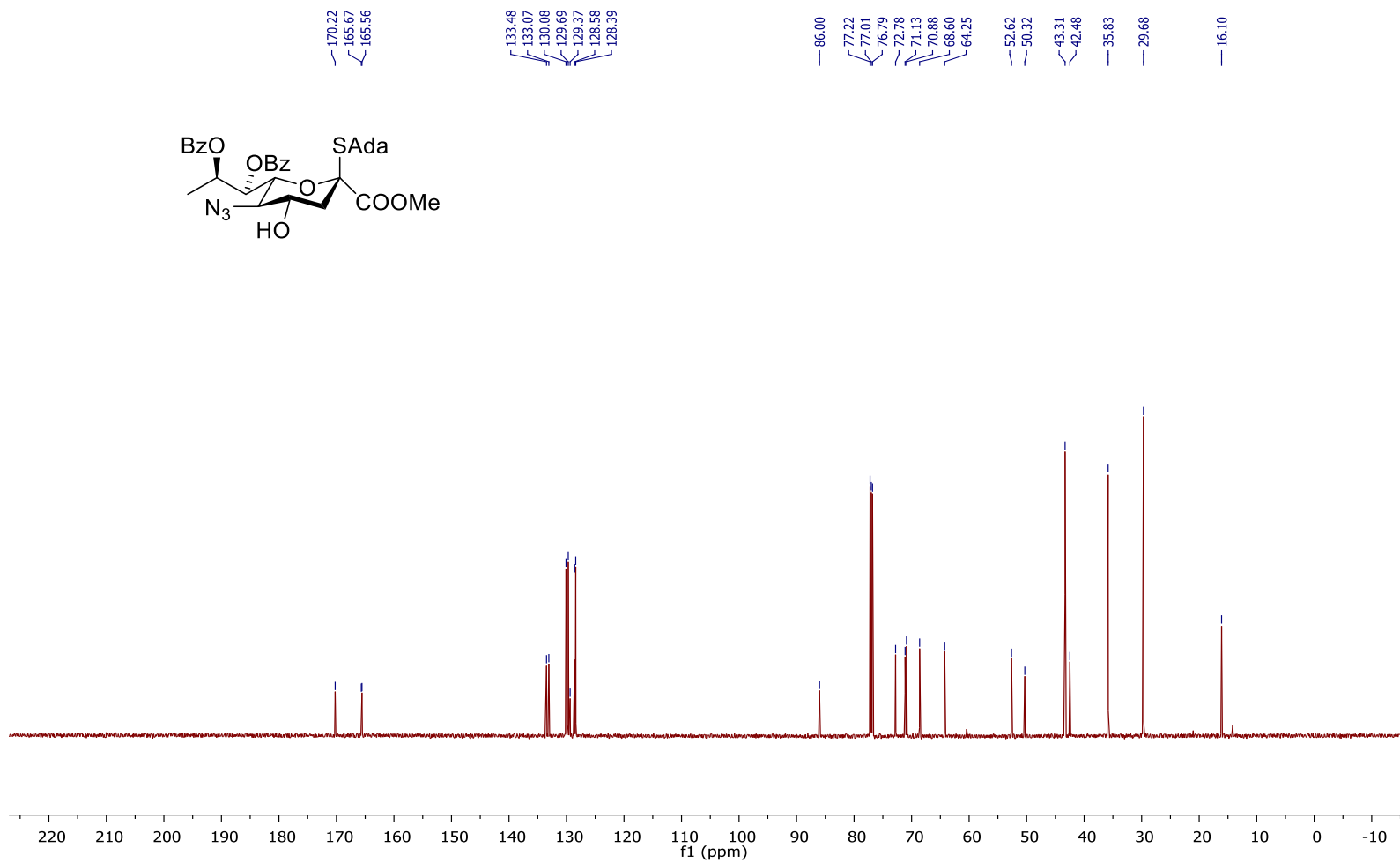
^1H - ^{13}C HMBC NMR, CD_3OD



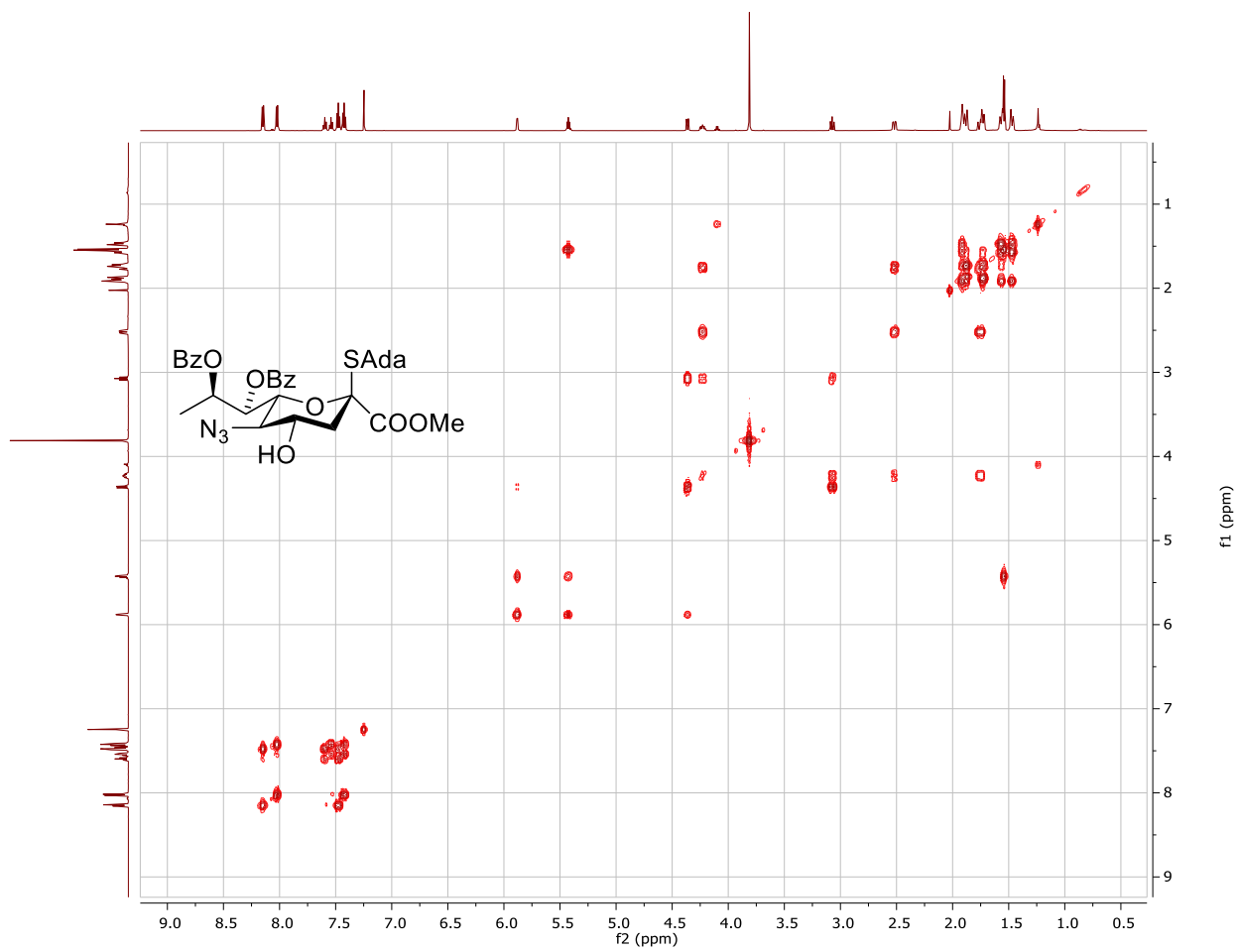
¹H NMR (600 MHz, CDCl₃) Methyl (1-adamantanyl 5-azido-7,8-di-O-benzoyl-3,5,9-trideoxy-2-thio-D-glycero-β-D-galacto-non-2-ulopyranosid)onate (20)



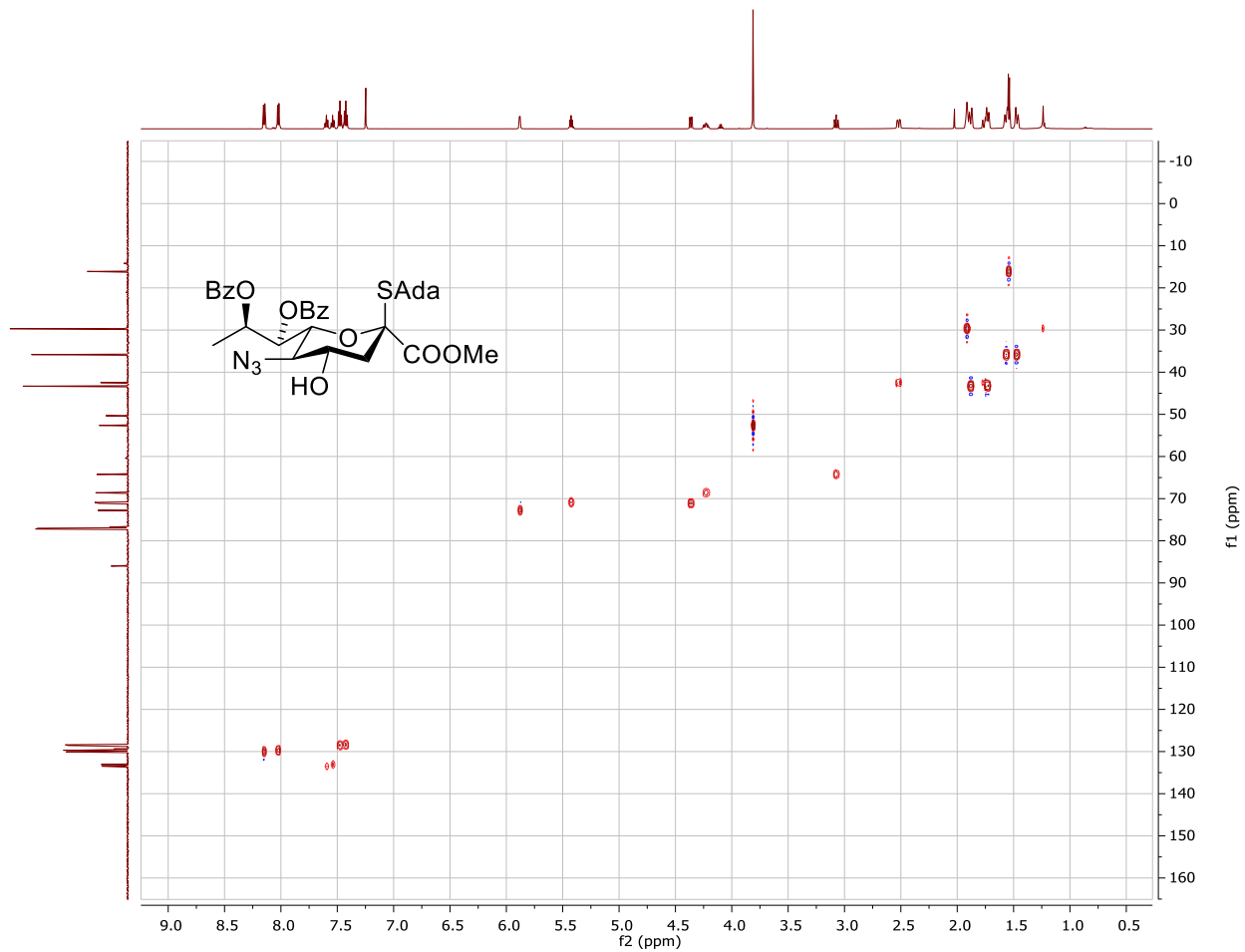
¹³C NMR (600 MHz, CDCl₃) Methyl (1-adamantanyl 5-azido-7,8-di-*O*-benzoyl-3,5,9-trideoxy-2-thio-D-glycero-β-D-galacto-non-2-ulopyranosid)onate (20)



^1H - ^1H COSY NMR, CDCl_3



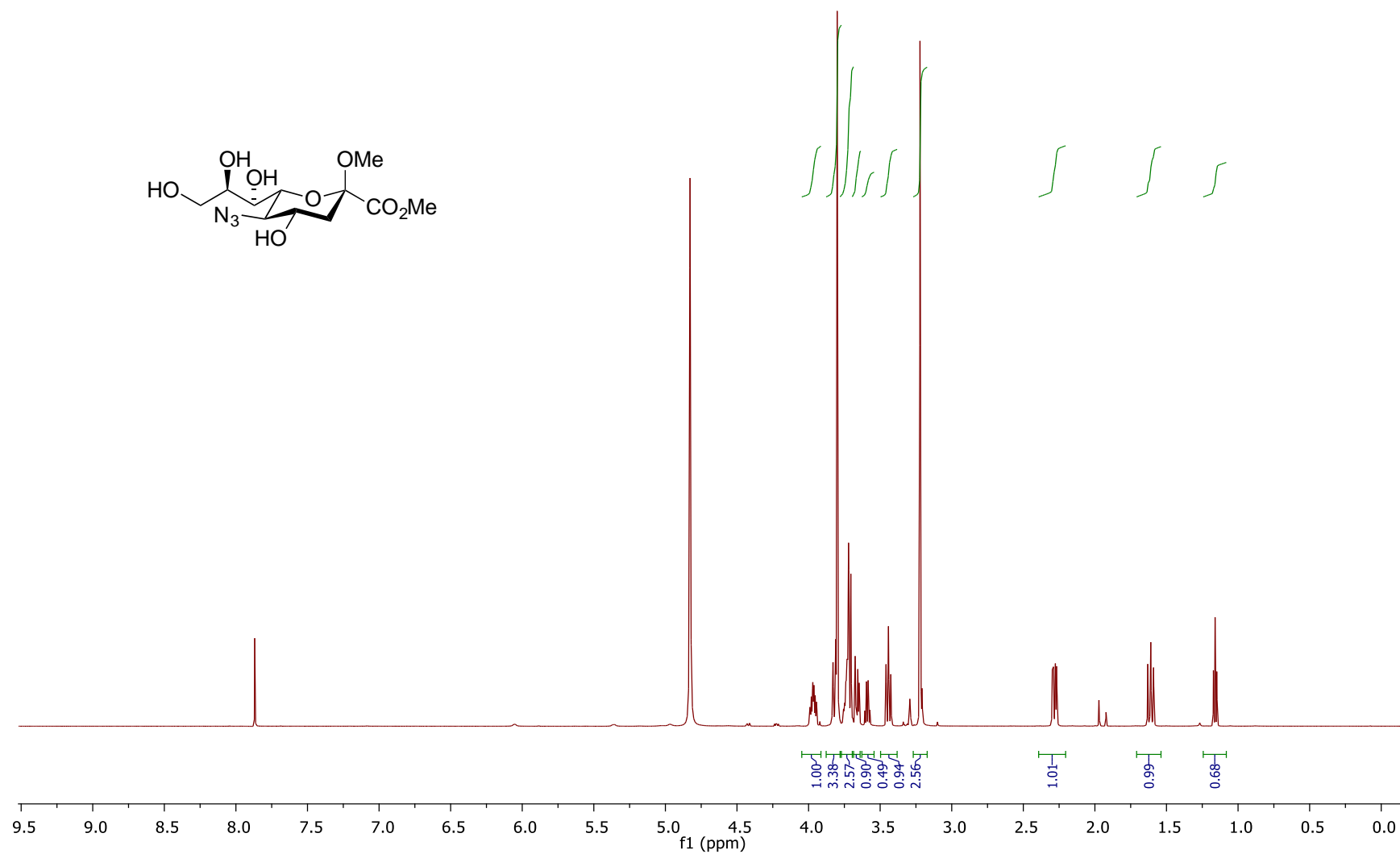
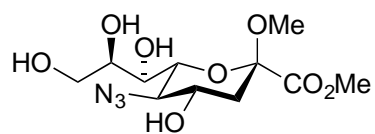
^1H - ^{13}C HSQC NMR, CDCl_3



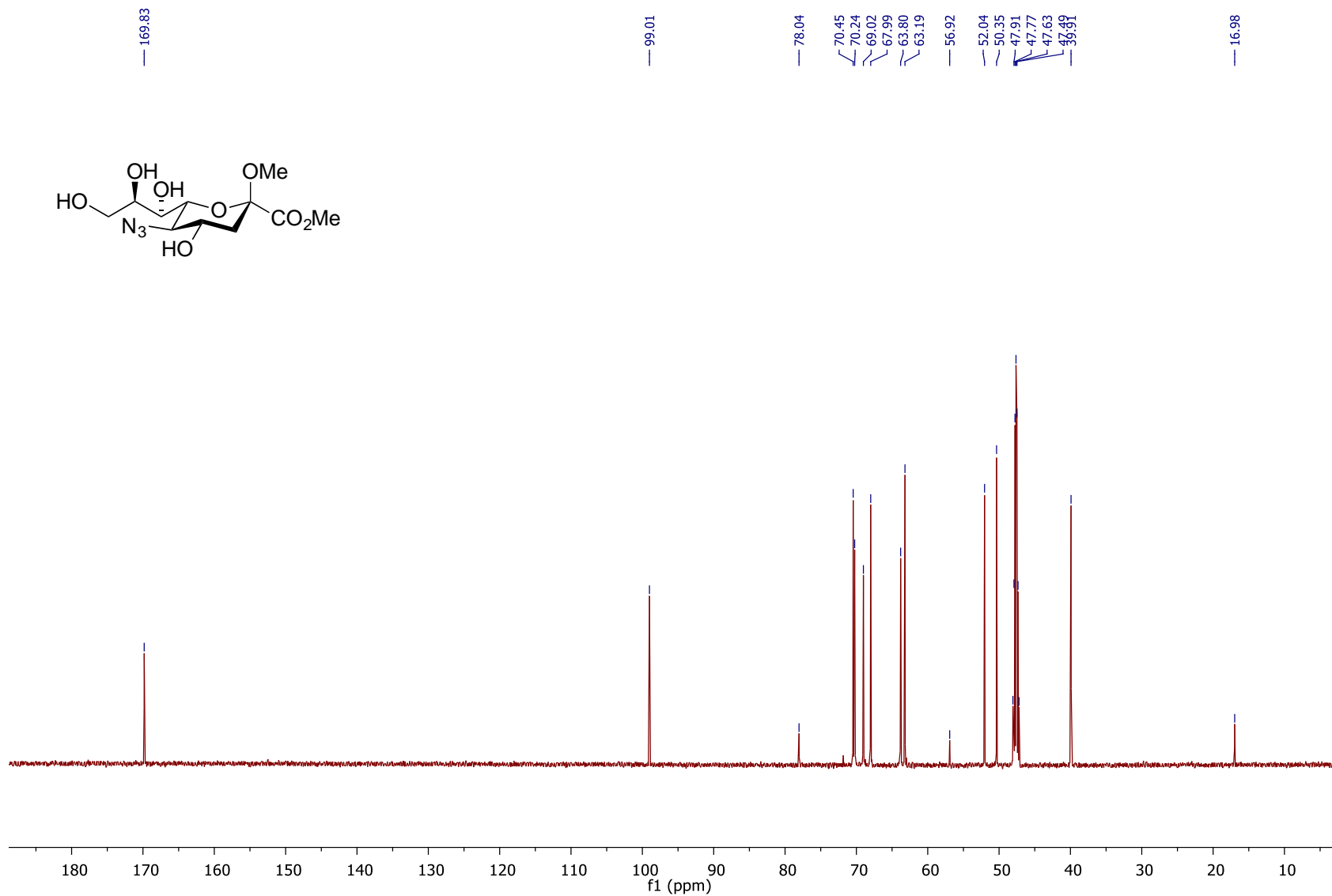
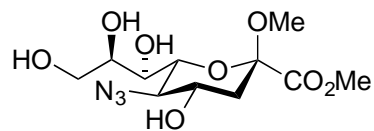
^1H - ^{13}C HMBC NMR, CDCl_3



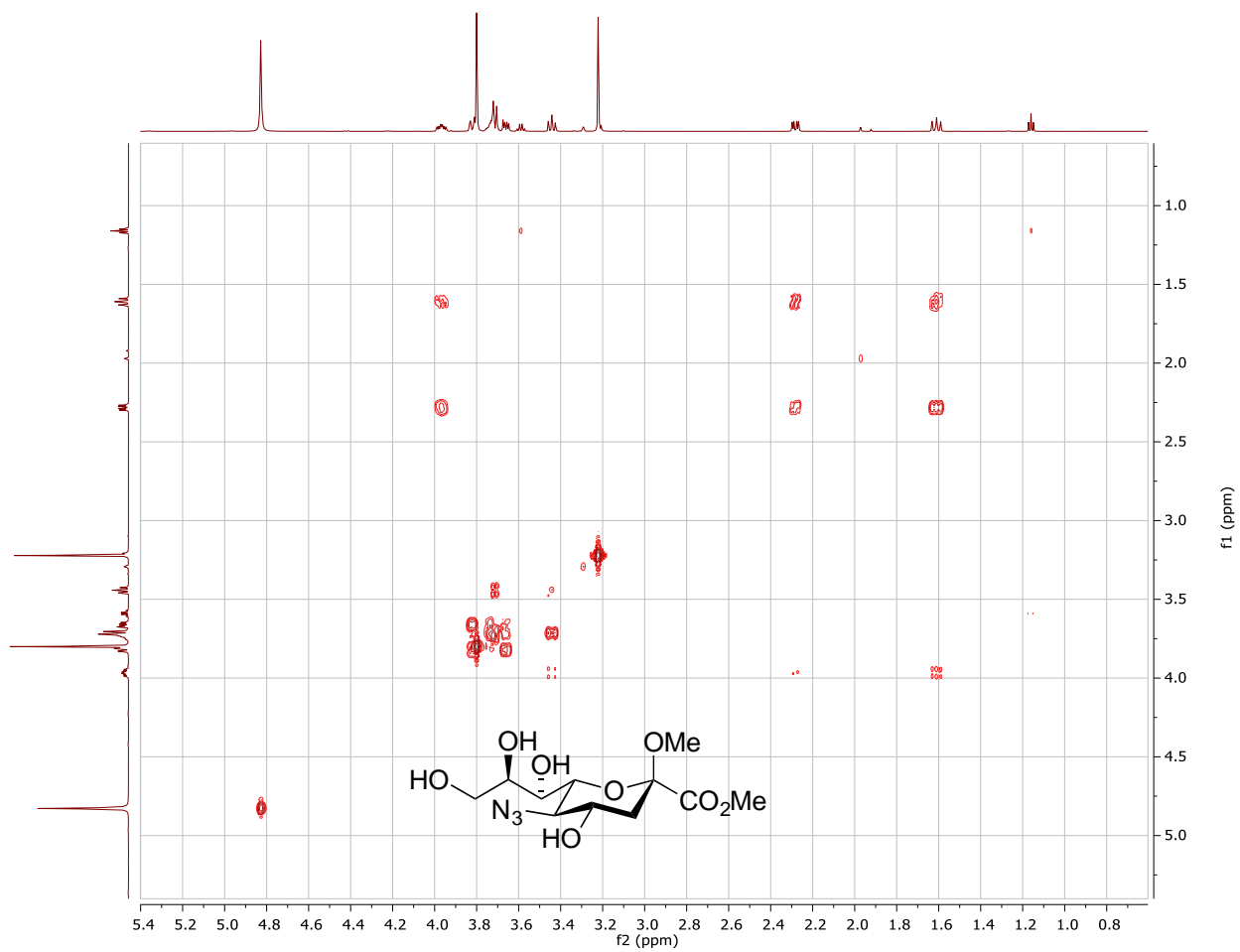
¹H NMR (600 MHz, CD₃OD) Methyl (methyl 5-azido-3,5-dideoxy-D-glycero-D-galacto-non-2-ulopyranosid)onate (22)



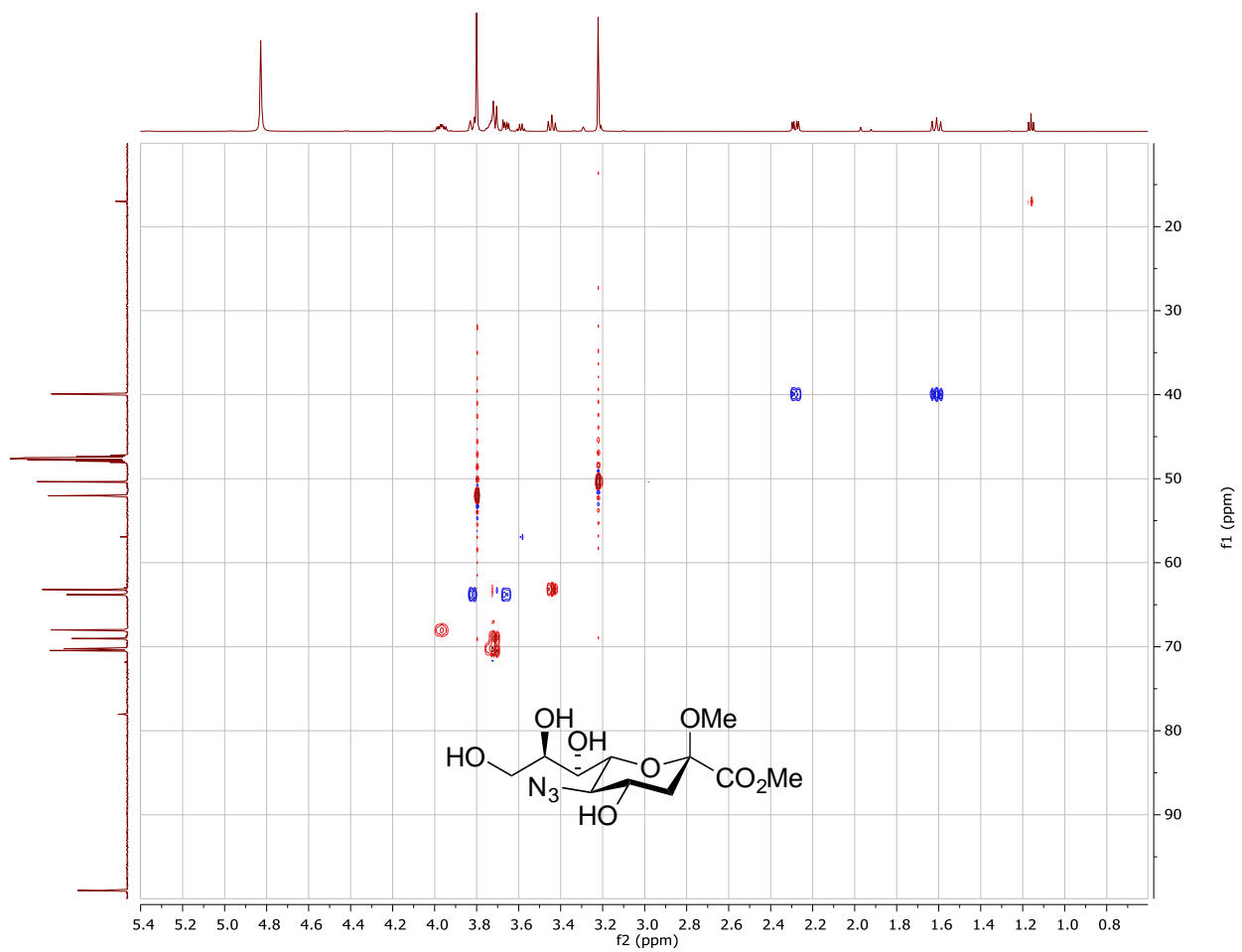
¹³C NMR (151 MHz, CD₃OD) Methyl (methyl 5-azido-3,5-dideoxy-D-glycero-D-galacto-non-2-uloopyranosid)onate (22)



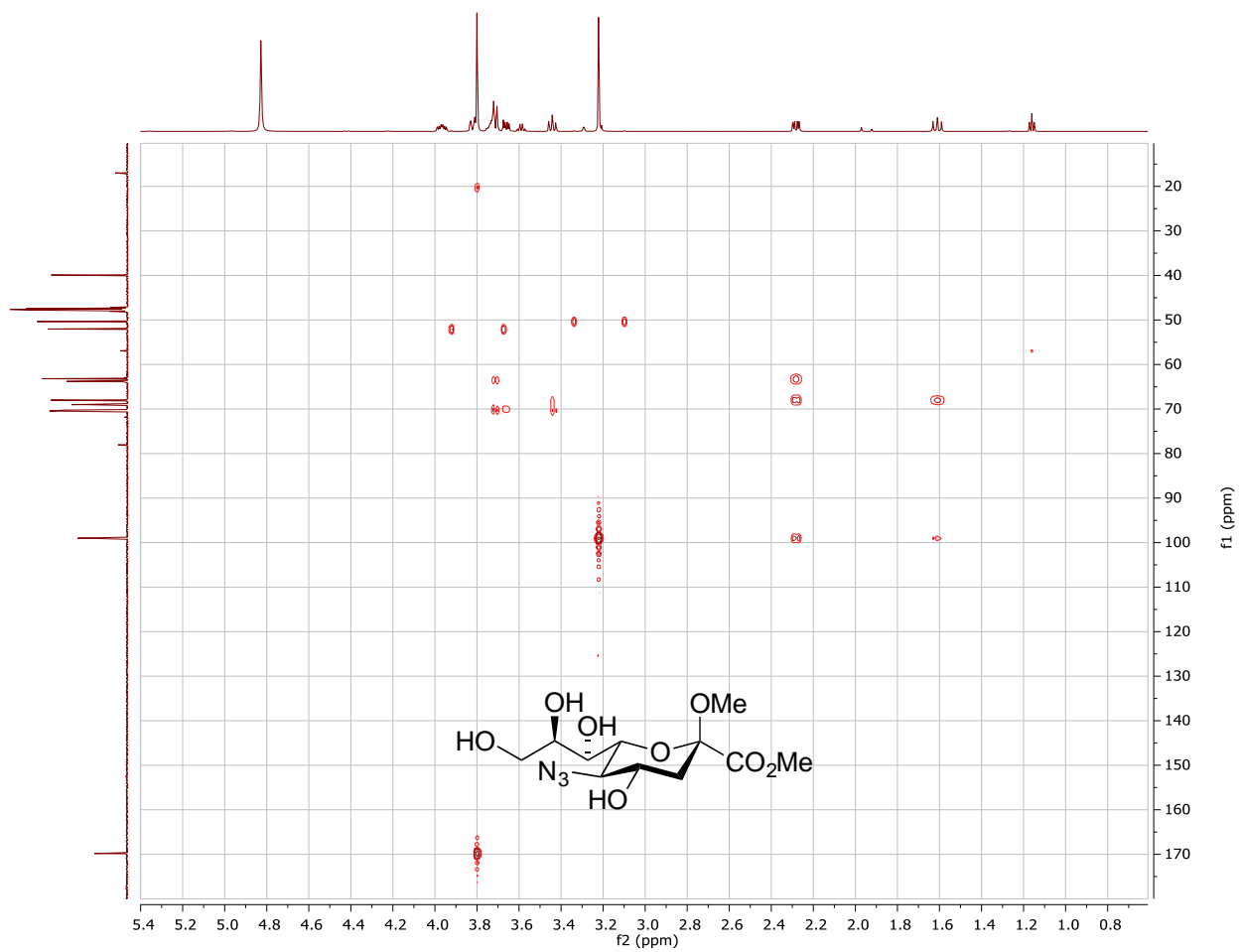
^1H - ^1H COSY NMR, CD_3OD



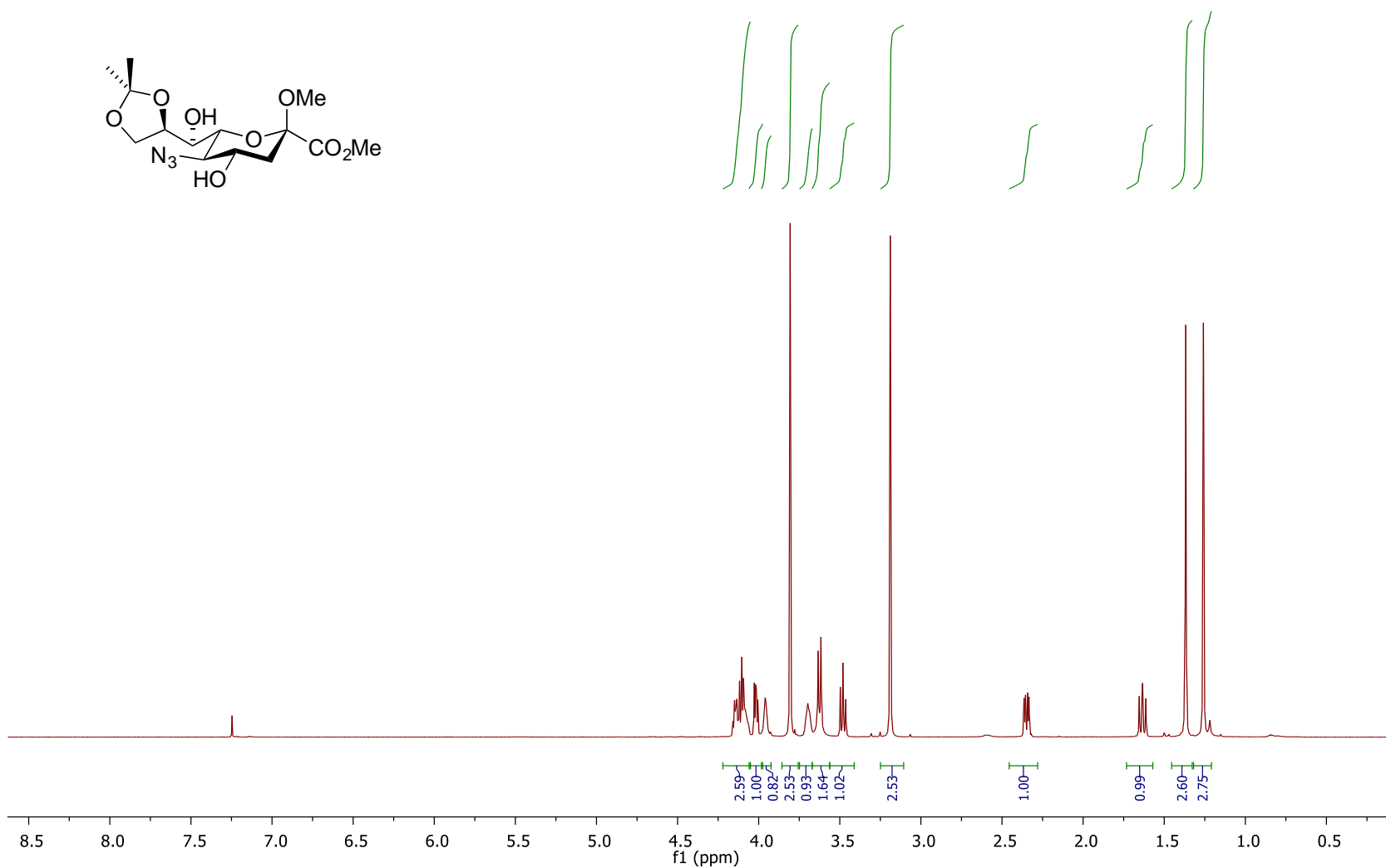
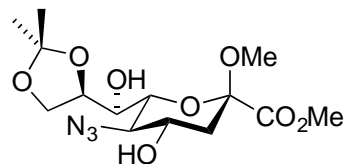
^1H - ^{13}C HSQC NMR, CD_3OD



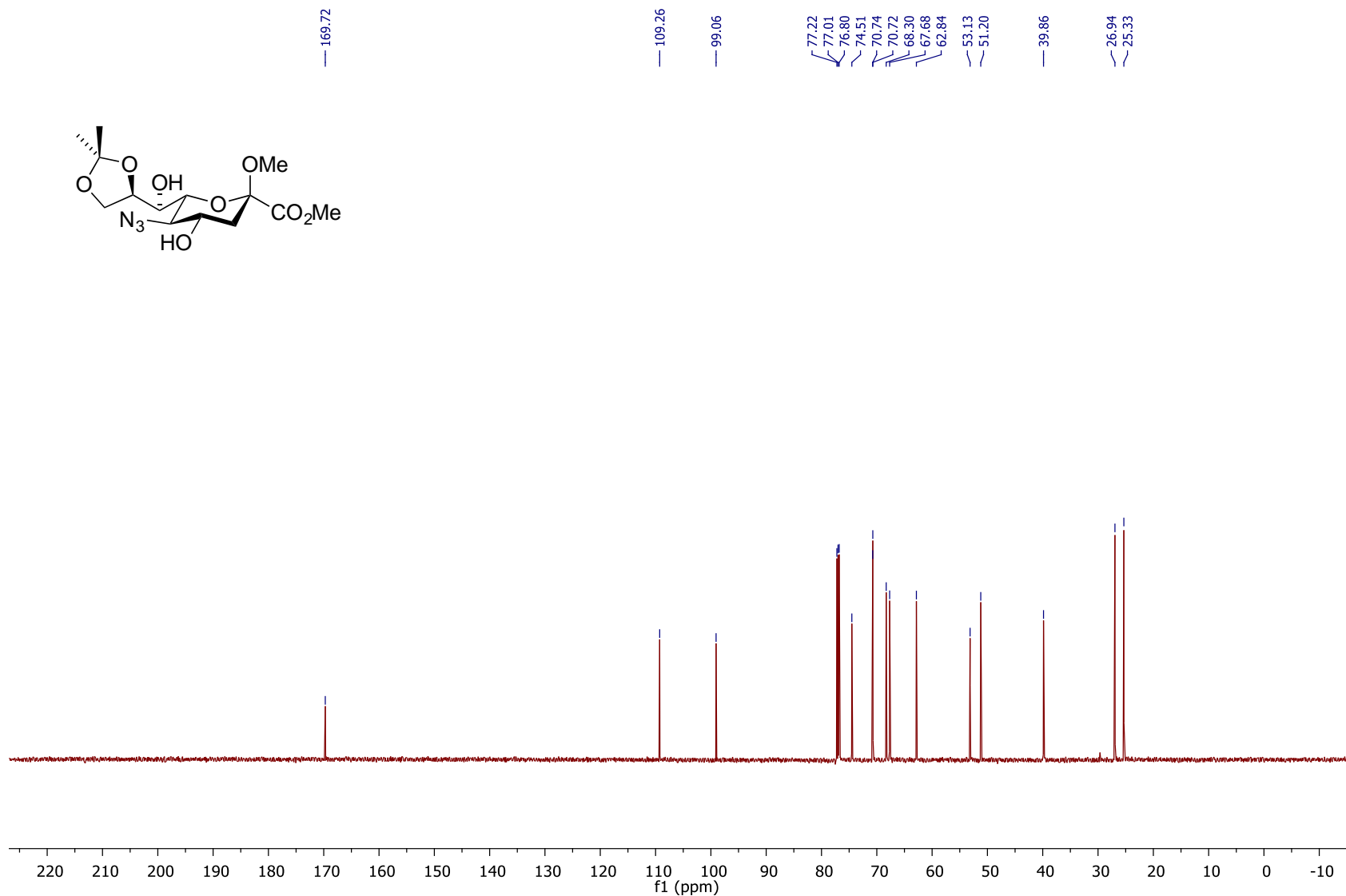
^1H - ^{13}C HMBC NMR, CD_3OD



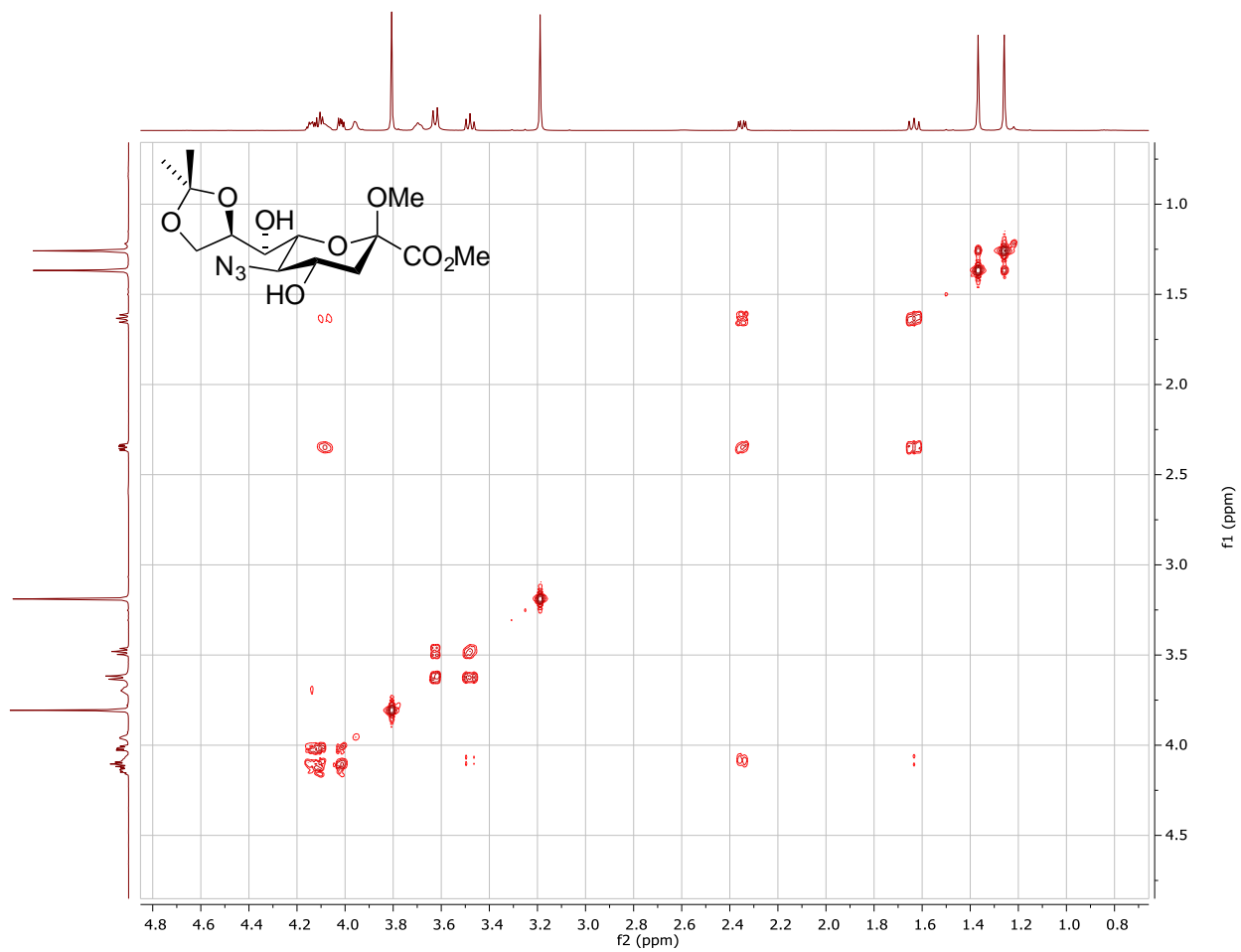
¹H NMR (600 MHz, CDCl₃) Methyl (methyl 5-azido-3,5-dideoxy-8,9-*O*-isopropylidene-*D*-glycero-*D*-galacto-non-2-uloxyranosid)onate (23)



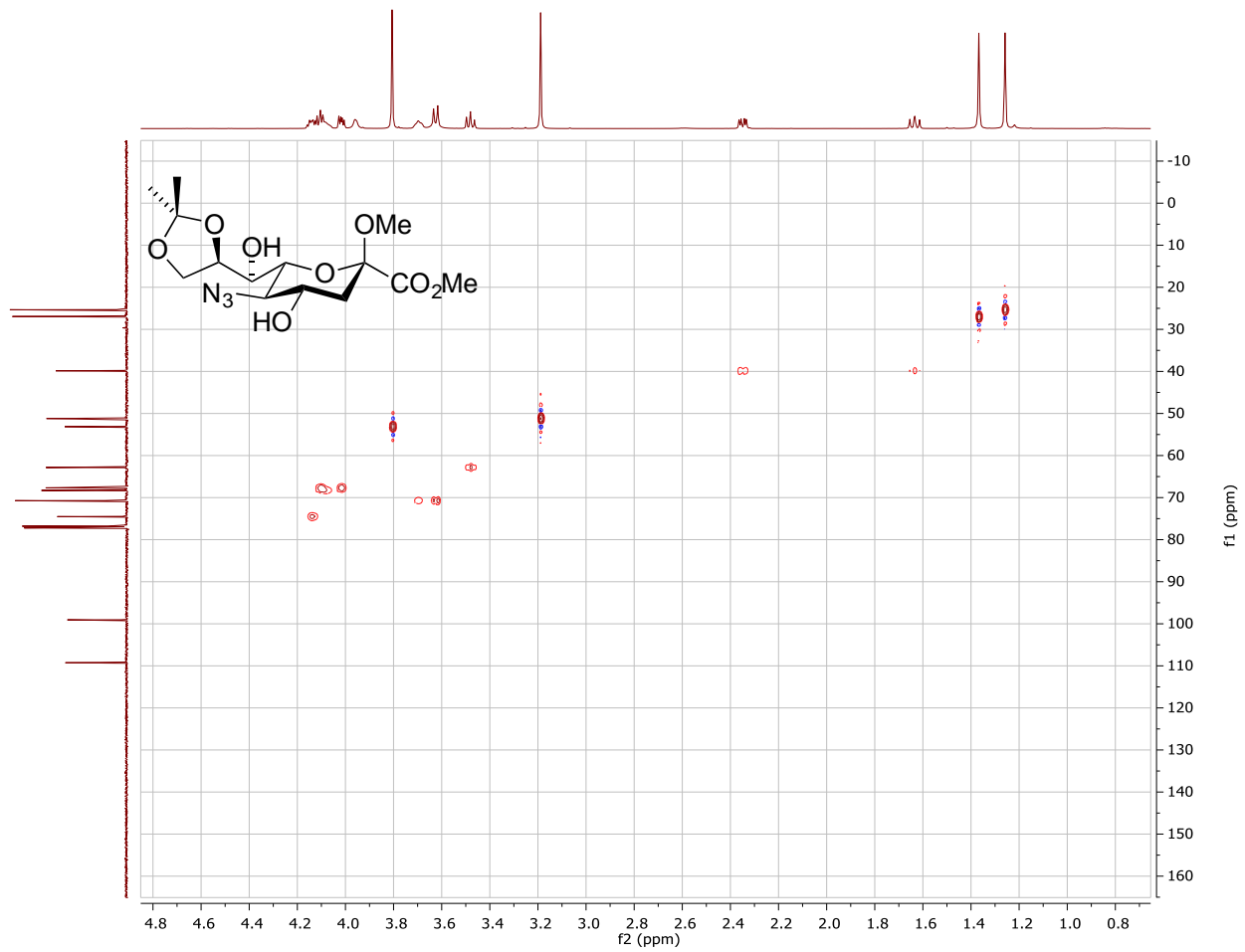
¹³C NMR (151 MHz, CDCl₃) Methyl (methyl 5-azido-3,5-dideoxy-8,9-*O*-isopropylidene-D-glycero-D-galacto-non-2-uloopyranosid)onate (23)



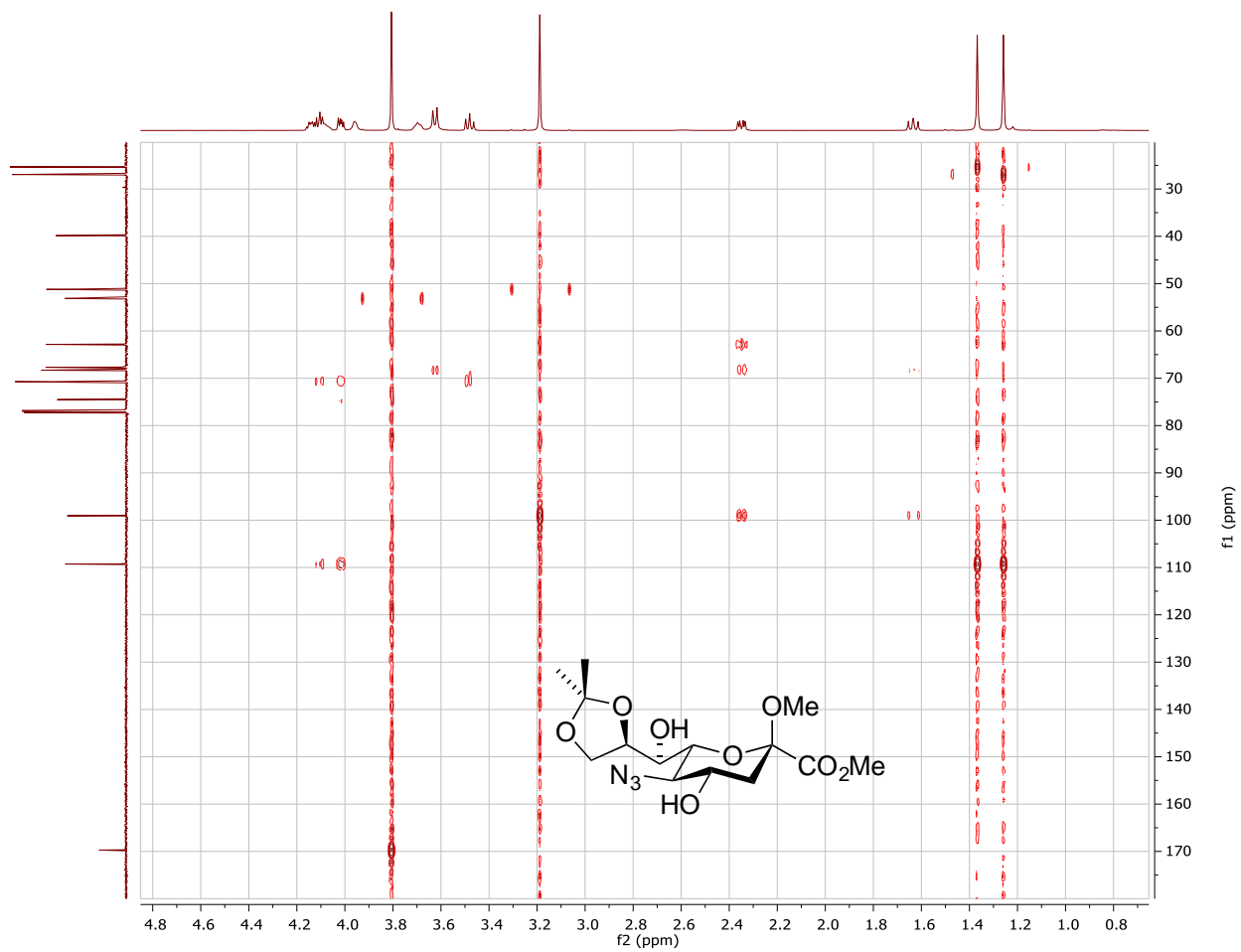
^1H - ^1H COSY NMR, CDCl_3



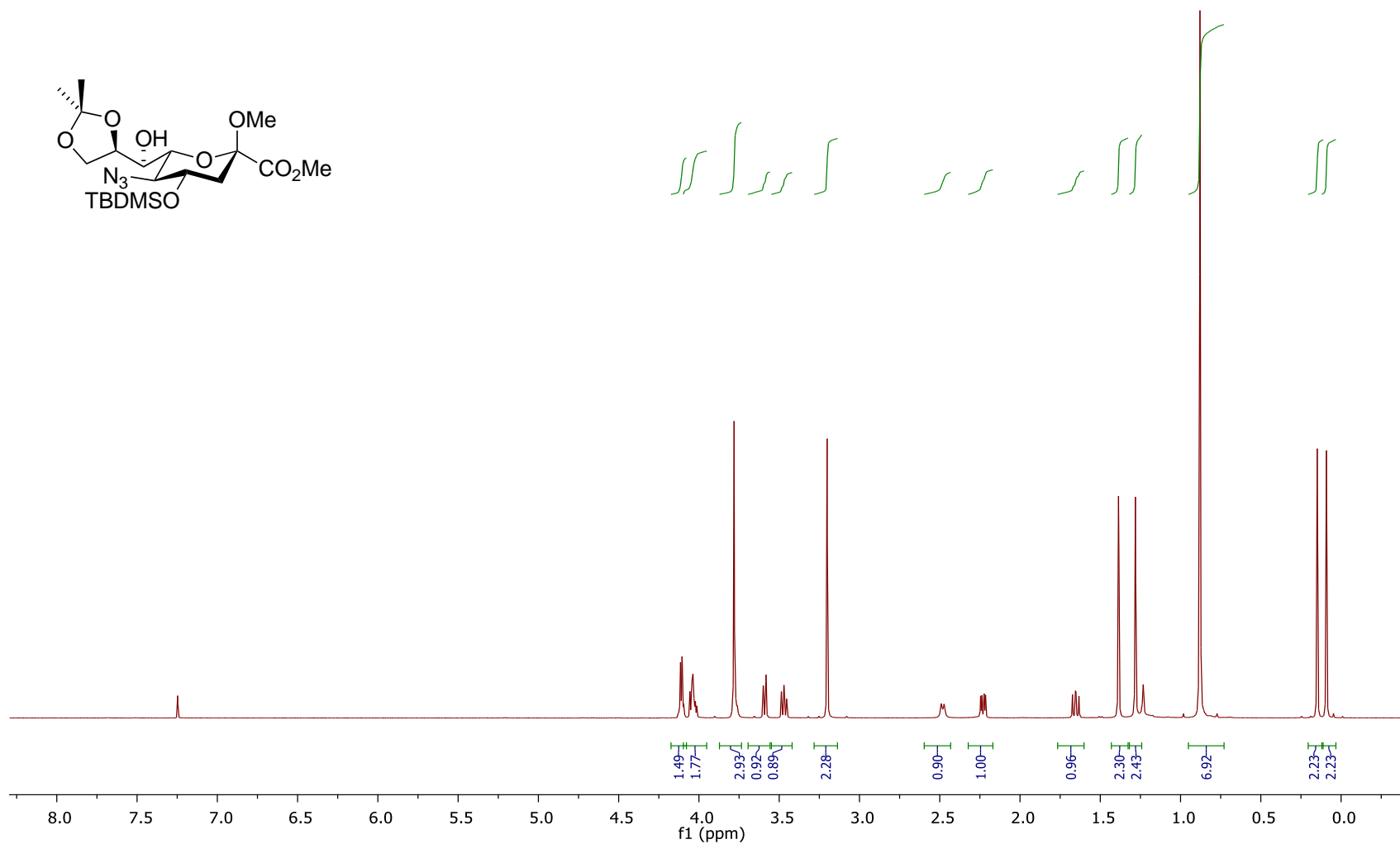
^1H - ^{13}C HSQC NMR, CDCl_3



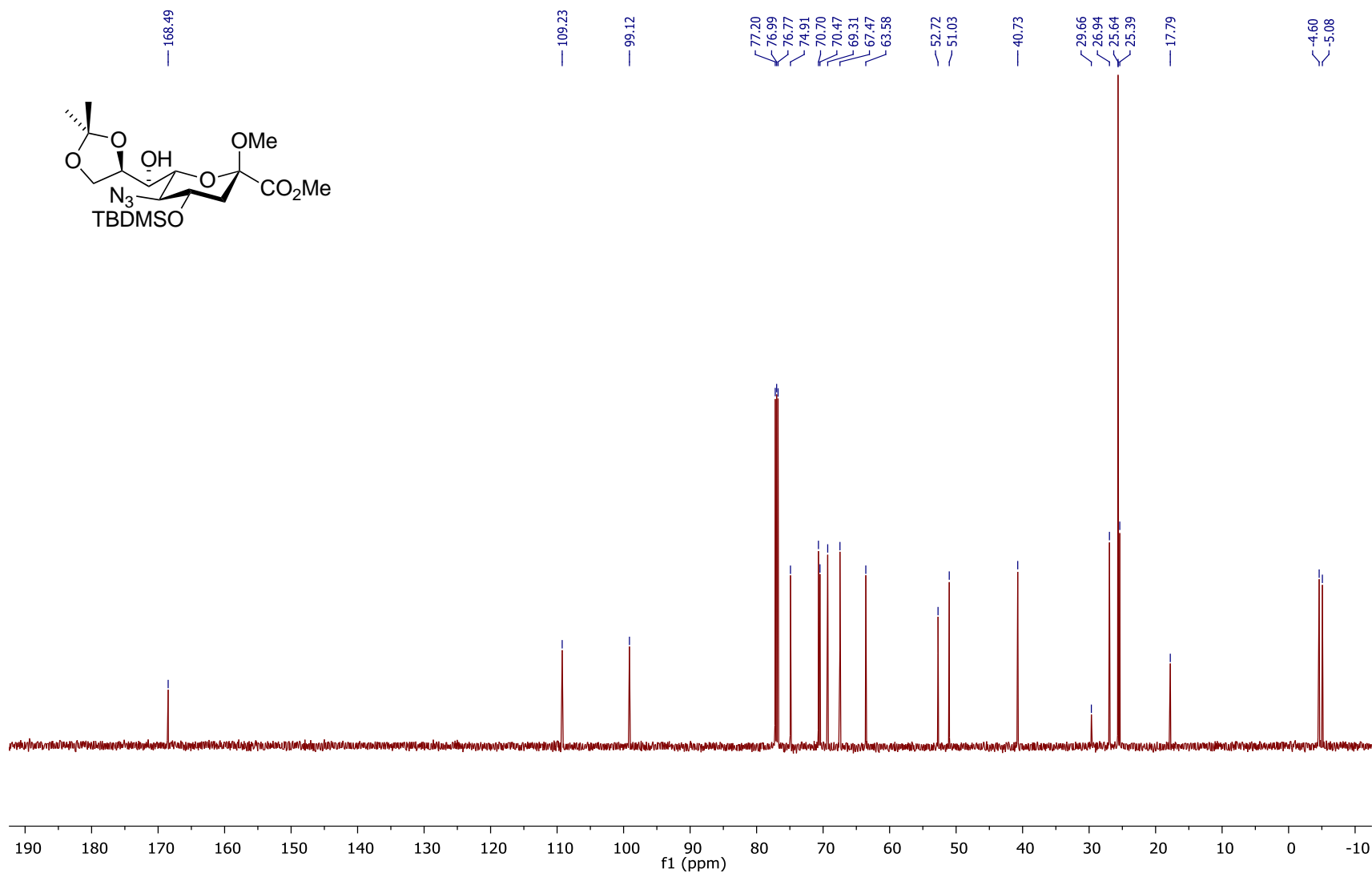
^1H - ^{13}C HMBC NMR, CDCl_3



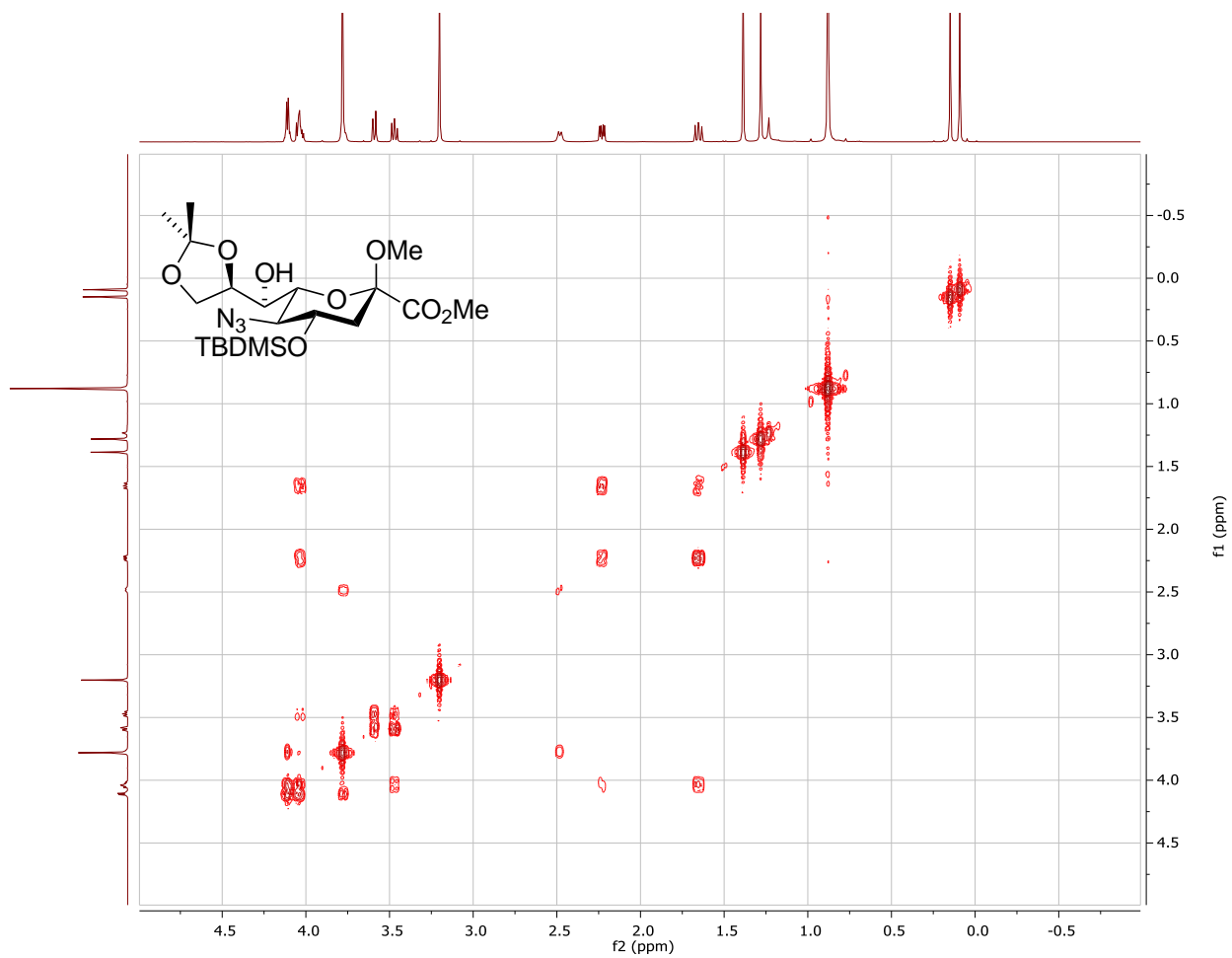
¹H NMR (600 MHz, CDCl₃) Methyl (methyl 5-azido-4-*O*-(*tert*-butyldimethylsilyl)-3,5-dideoxy-8,9-*O*-isopropylidene-D-glycero-D-galacto-non-2-uloopyranosid)onate (24)



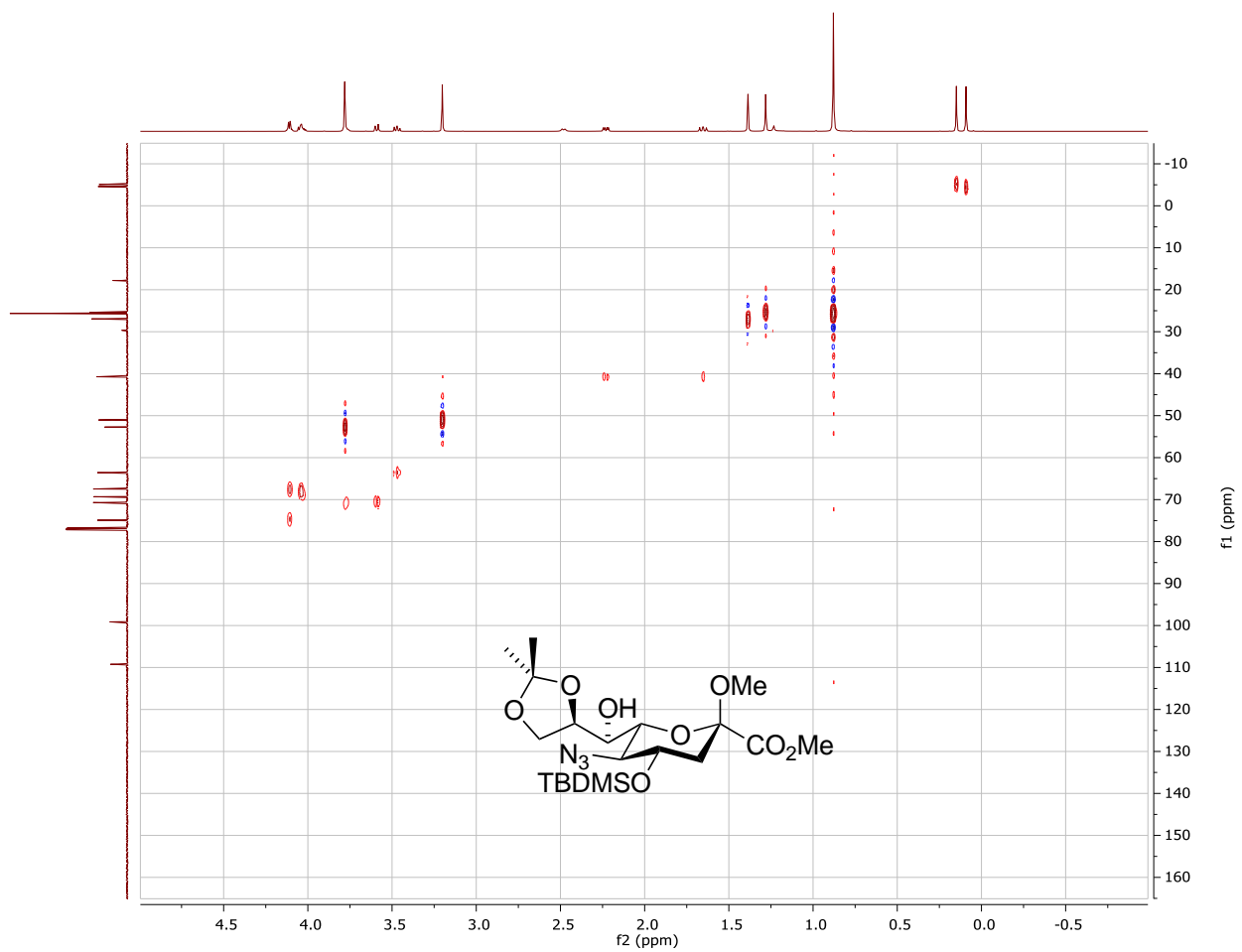
^{13}C NMR (151 MHz, CDCl_3) Methyl (methyl 5-azido-4-*O*-(*tert*-butyldimethylsilyl)-3,5-dideoxy-8,9-*O*-isopropylidene-D-glycero-D-galacto-non-2-ulopyranosid)onate (24)



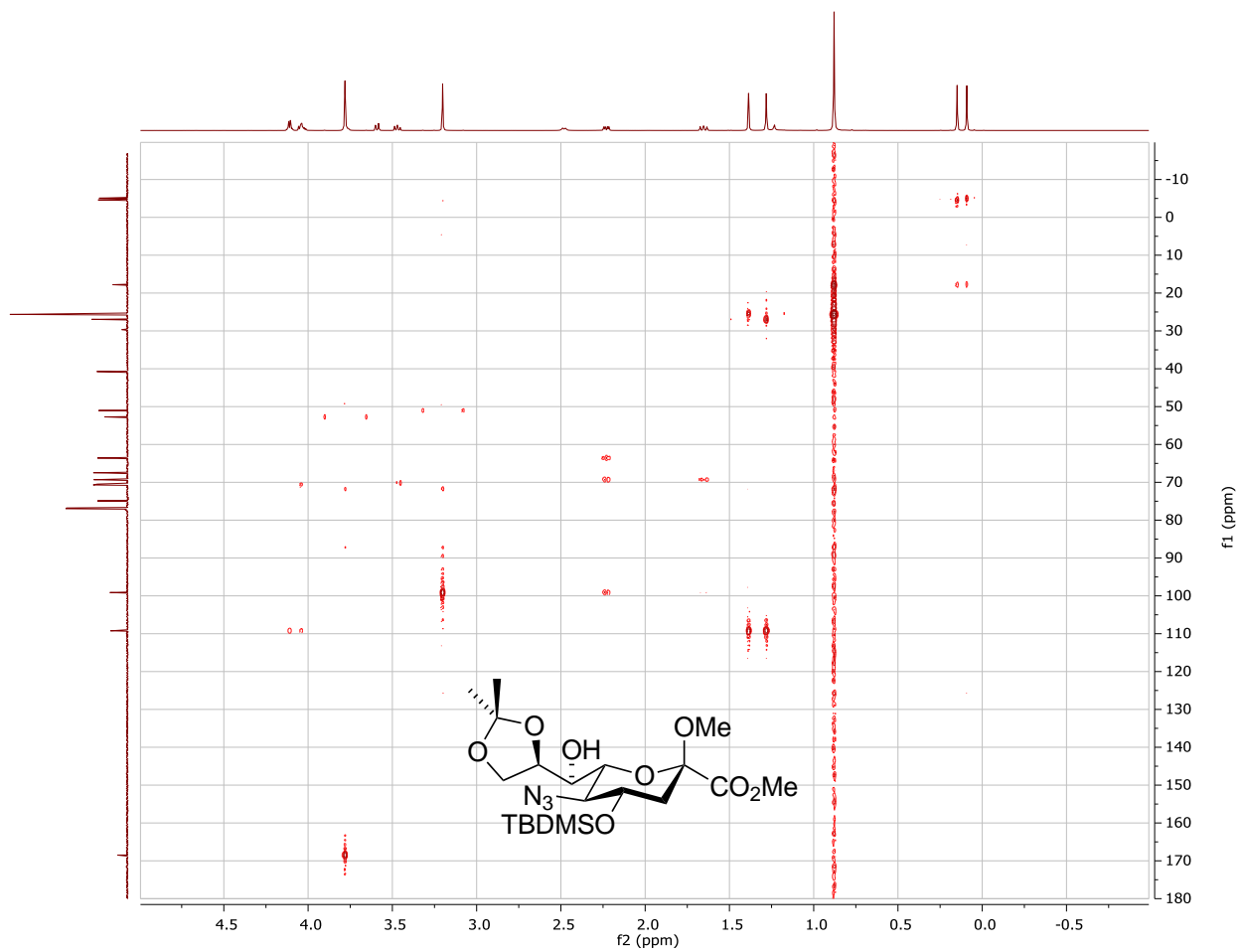
^1H - ^1H COSY NMR, CDCl_3



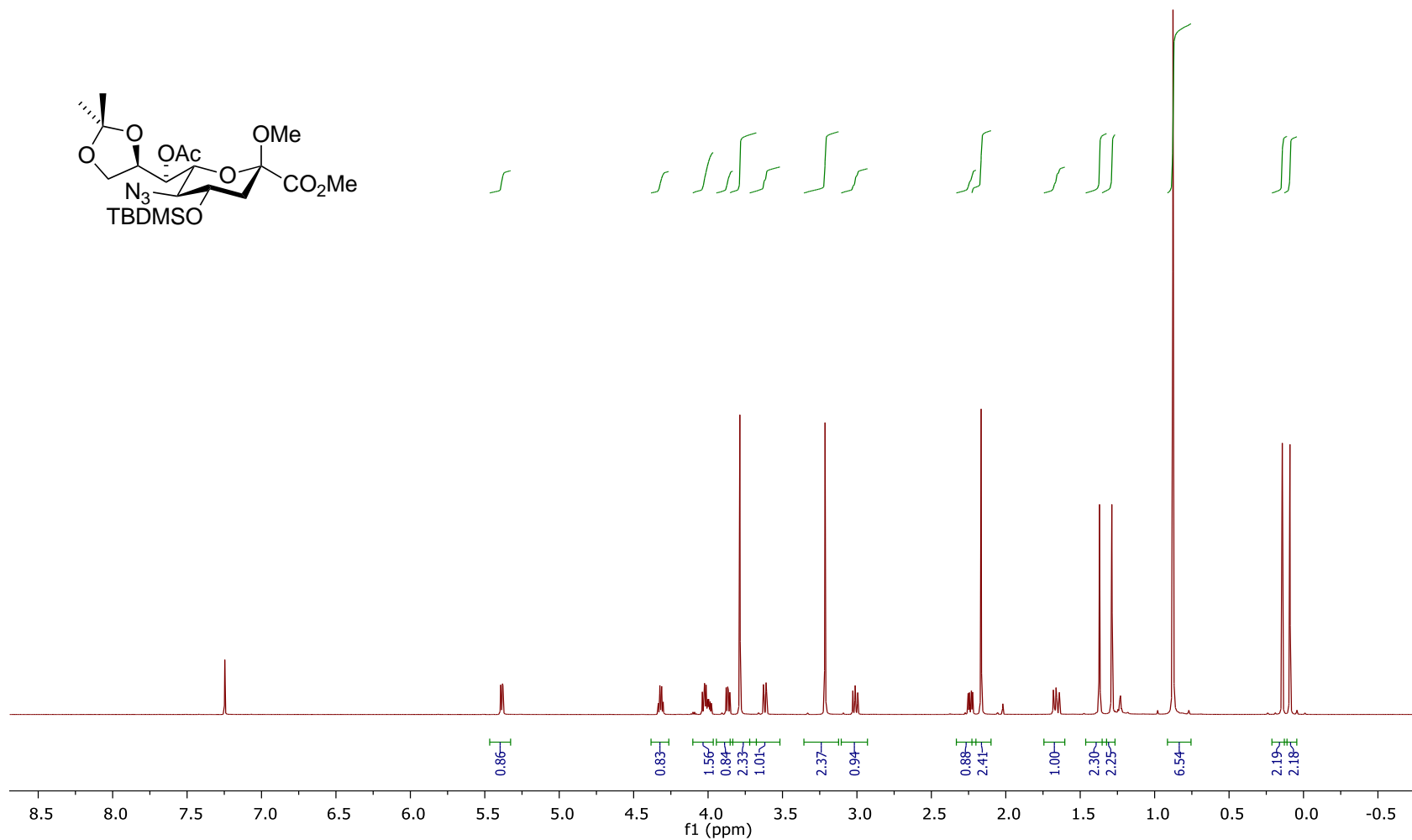
^1H - ^{13}C HSQC NMR, CDCl_3



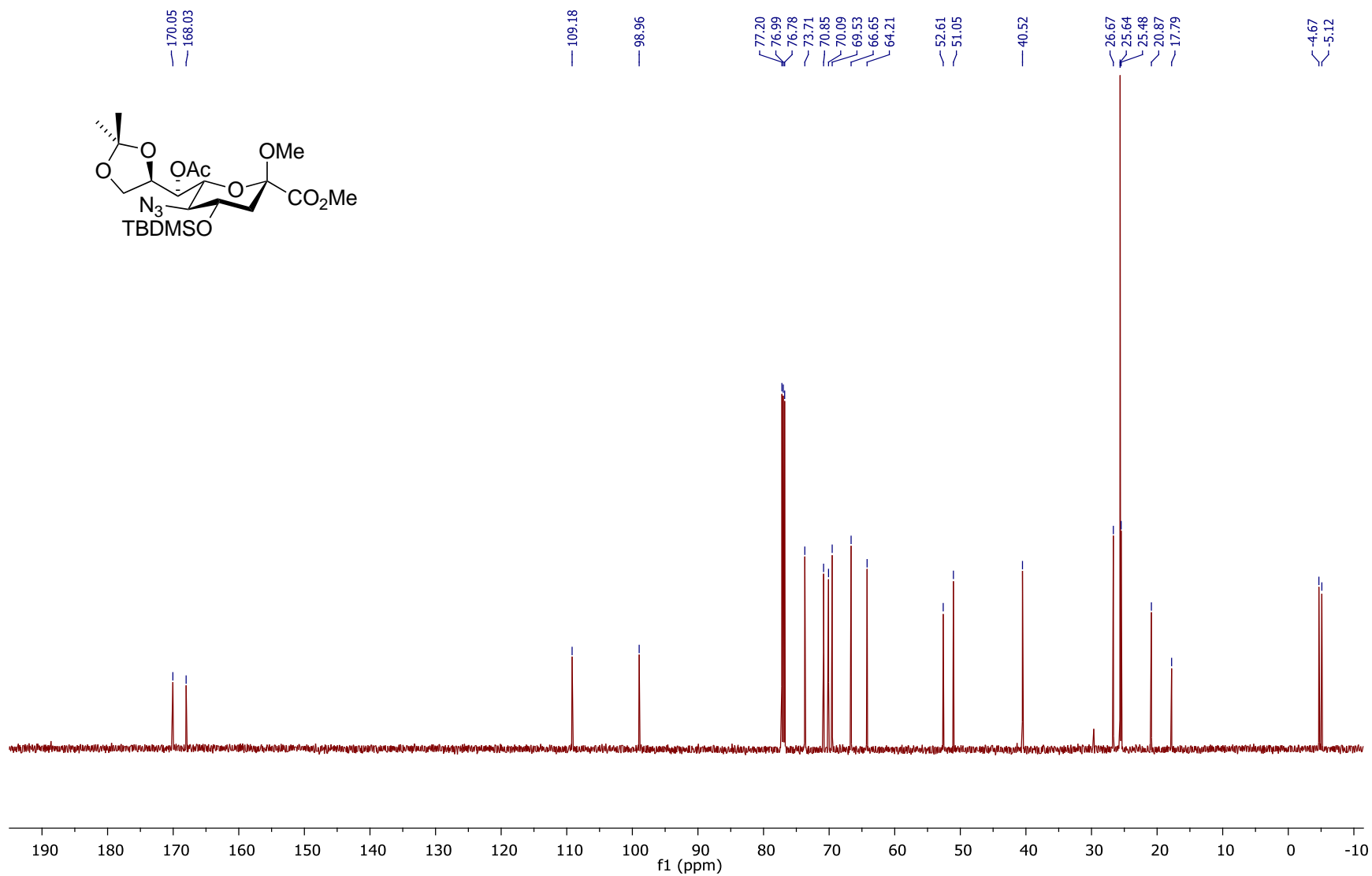
^1H - ^{13}C HMBC NMR, CDCl_3



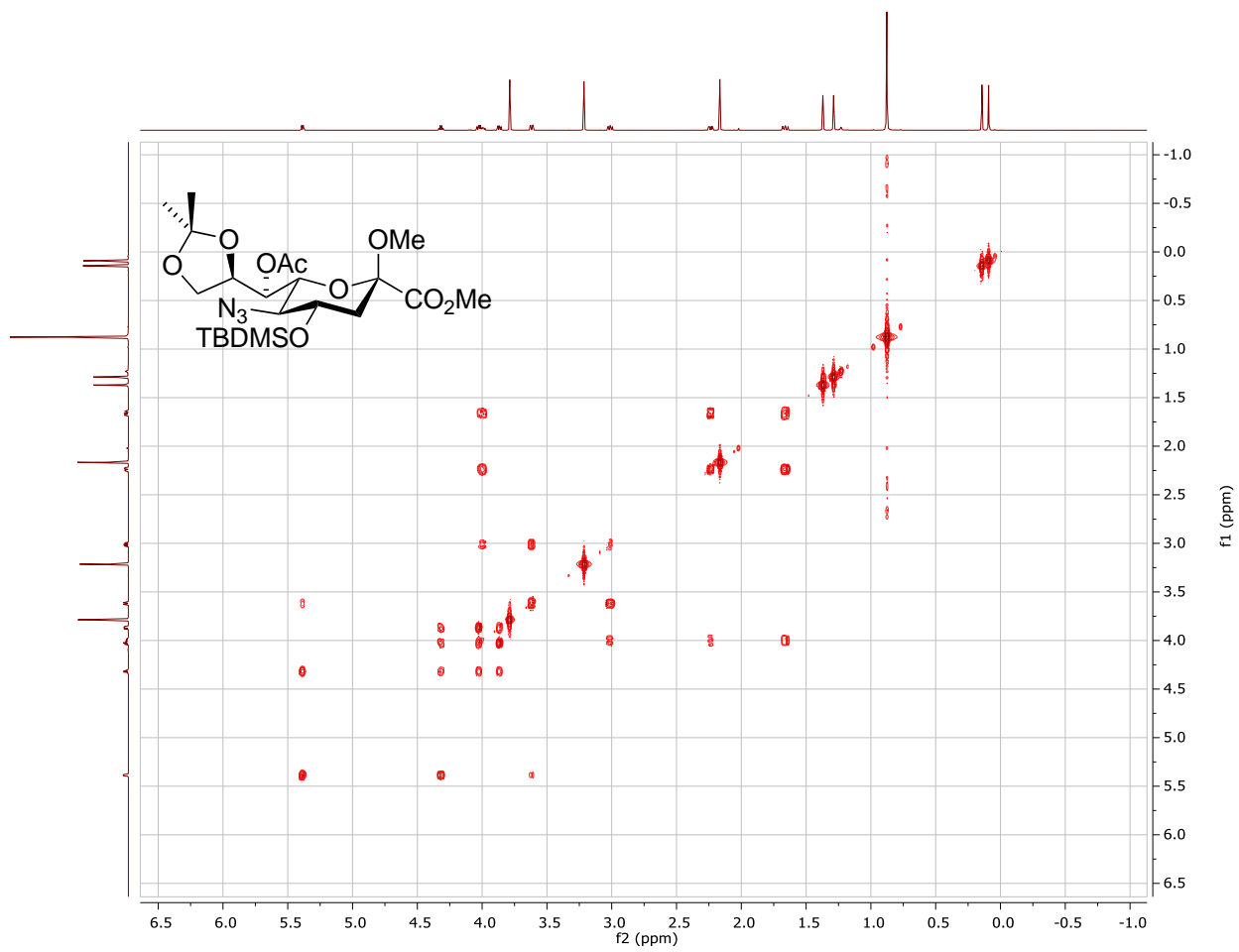
¹H NMR (600 MHz, CDCl₃) Methyl (methyl 7-*O*-acetyl-5-azido-4-*O*-(*tert*-butyldimethylsilyl)-3,5-dideoxy-8,9-*O*-isopropylidene-D-glycero-D-galacto-non-2-ulopyranosid)onate (25)



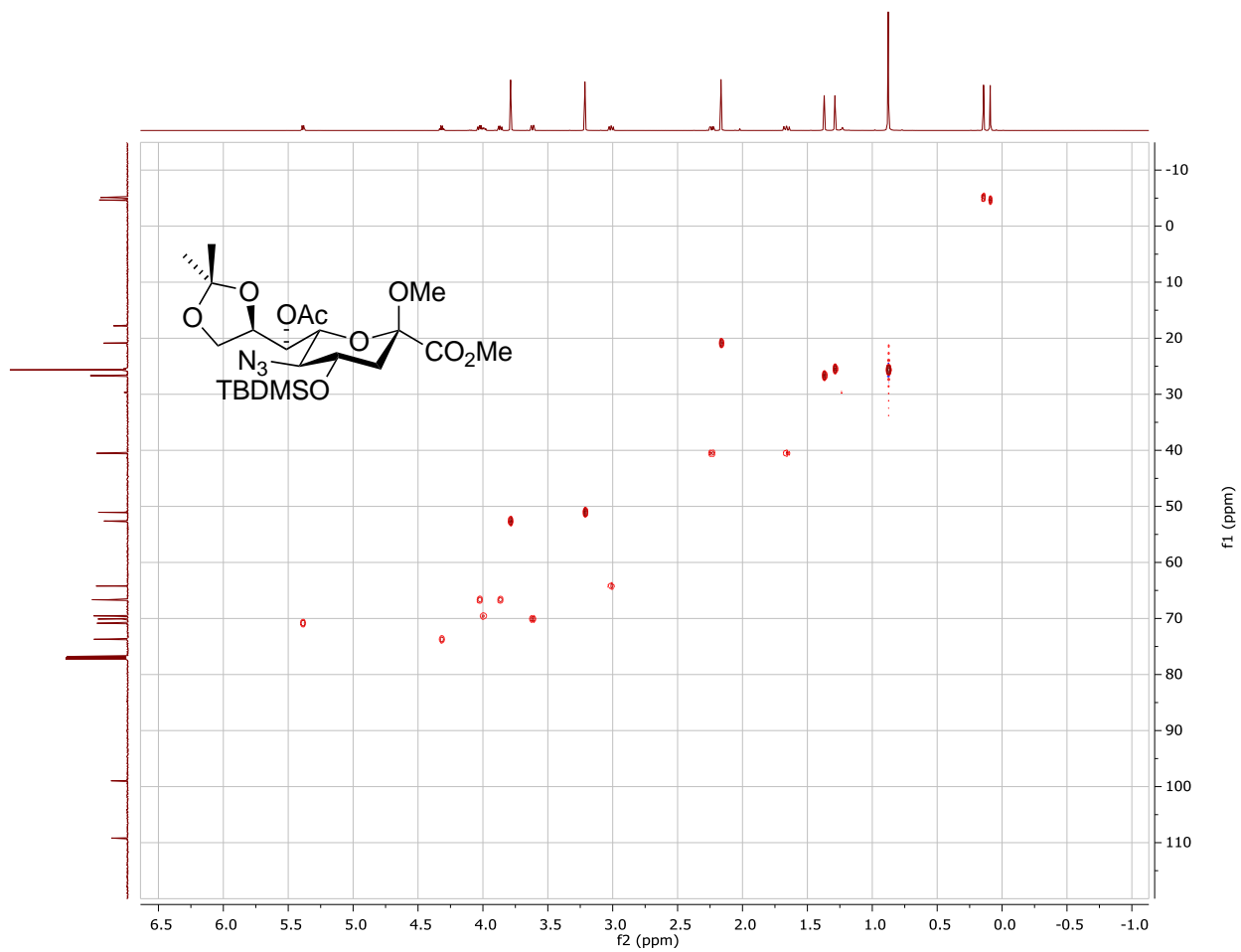
¹³C NMR (151 MHz, CDCl₃) Methyl (methyl 7-*O*-acetyl-5-azido-4-*O*-(*tert*-butyldimethylsilyl)-3,5-dideoxy-8,9-*O*-isopropylidene-*D*-glycero-*D*-galacto-non-2-uloopyranosid)onate (25)



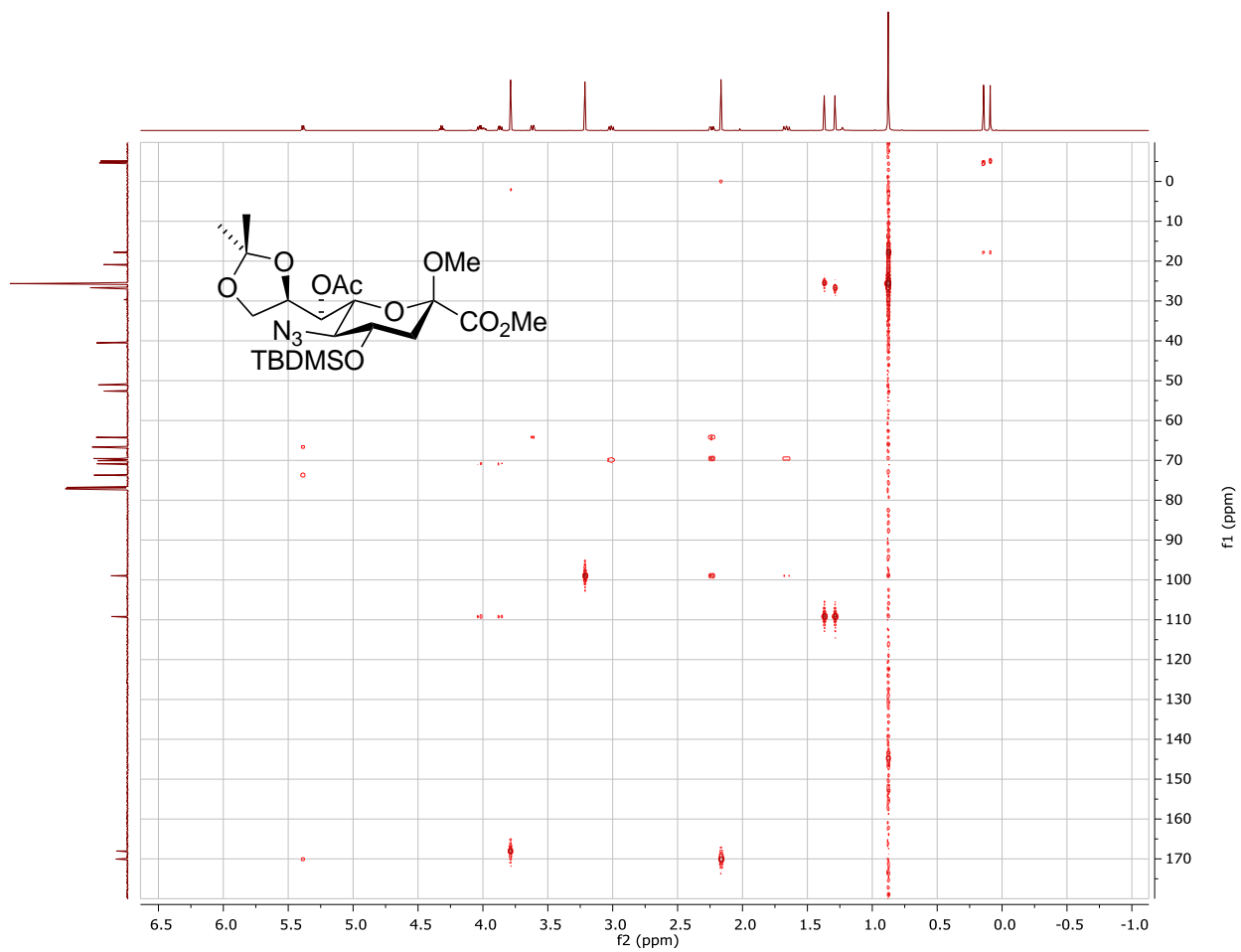
^1H - ^1H COSY NMR, CDCl_3



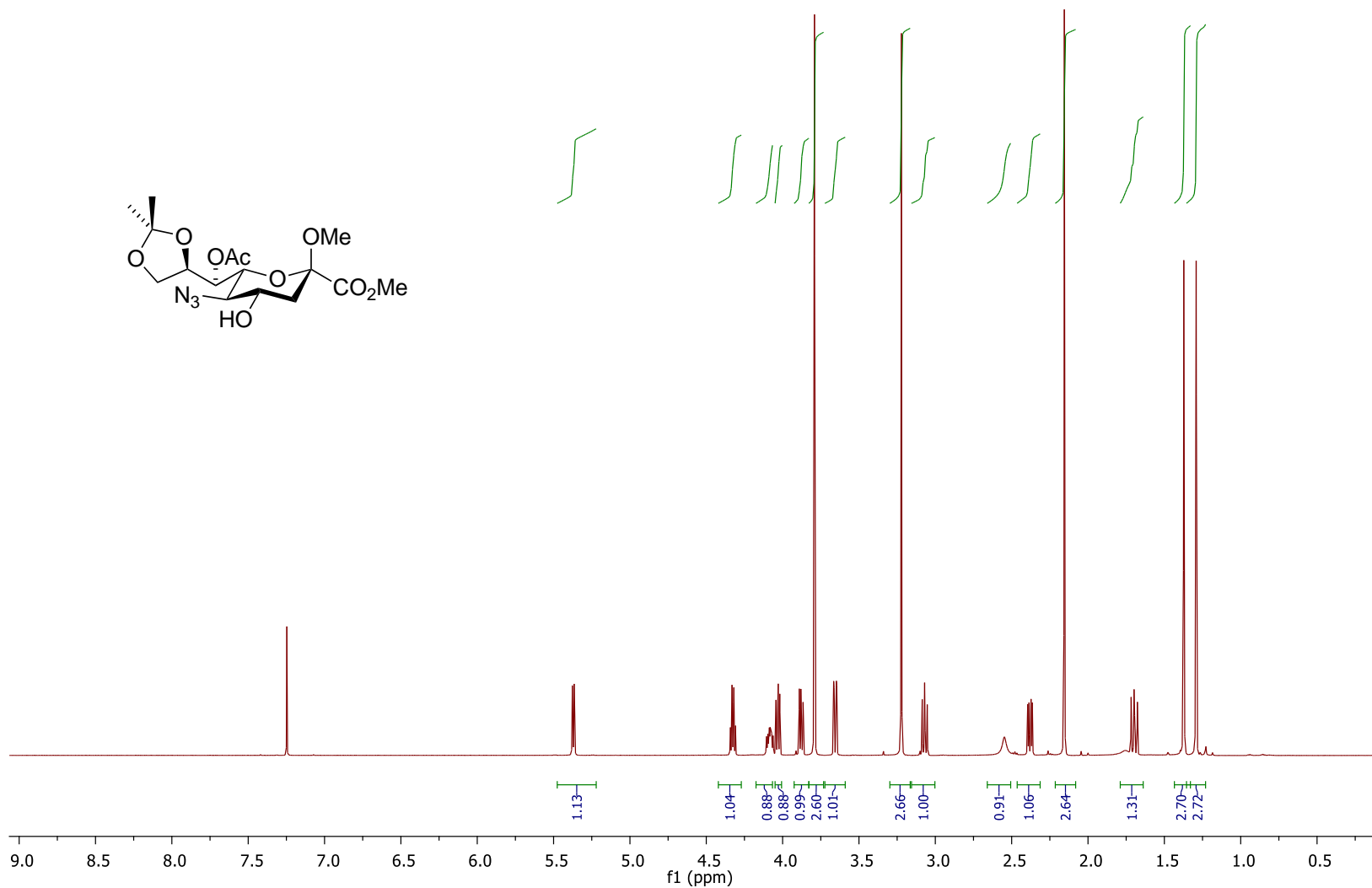
^1H - ^{13}C HSQC NMR, CDCl_3



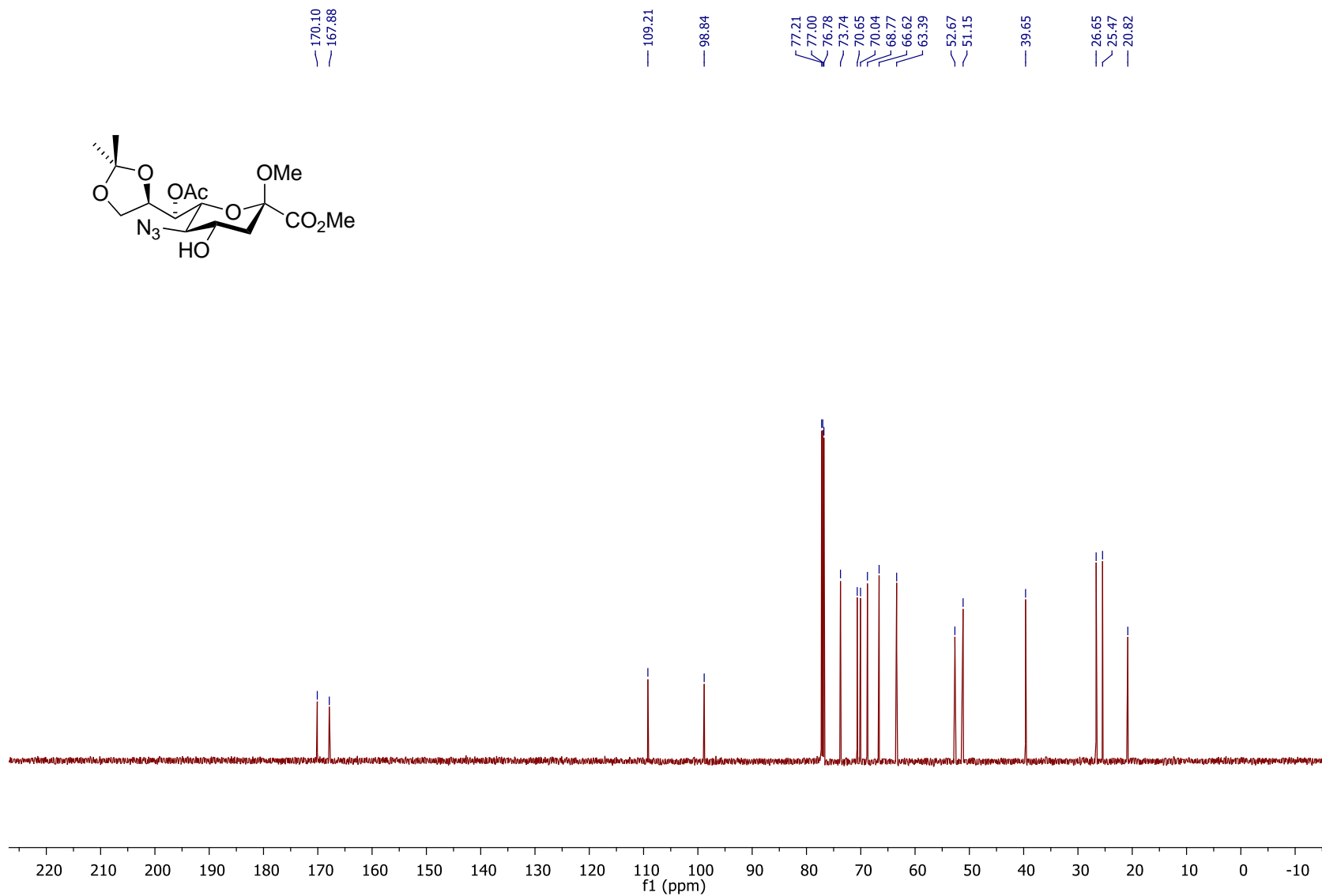
^1H - ^{13}C HMBC NMR, CDCl_3



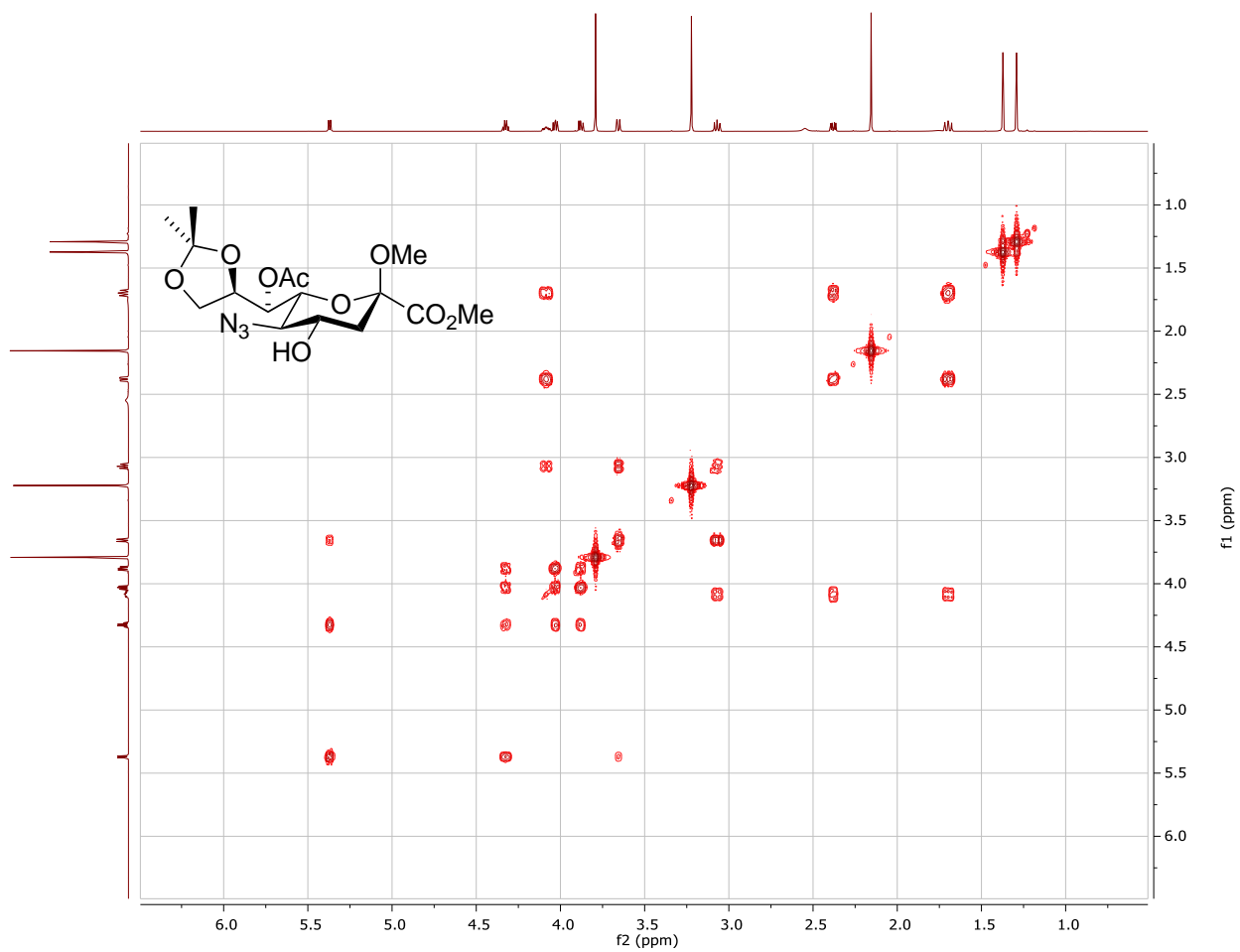
¹H NMR (600 MHz, CDCl₃) Methyl (methyl 7-*O*-acetyl-5-azido-3,5-dideoxy-8,9-*O*-isopropylidene-D-glycero-D-galacto-non-2-uloxyranosid)onate (26)



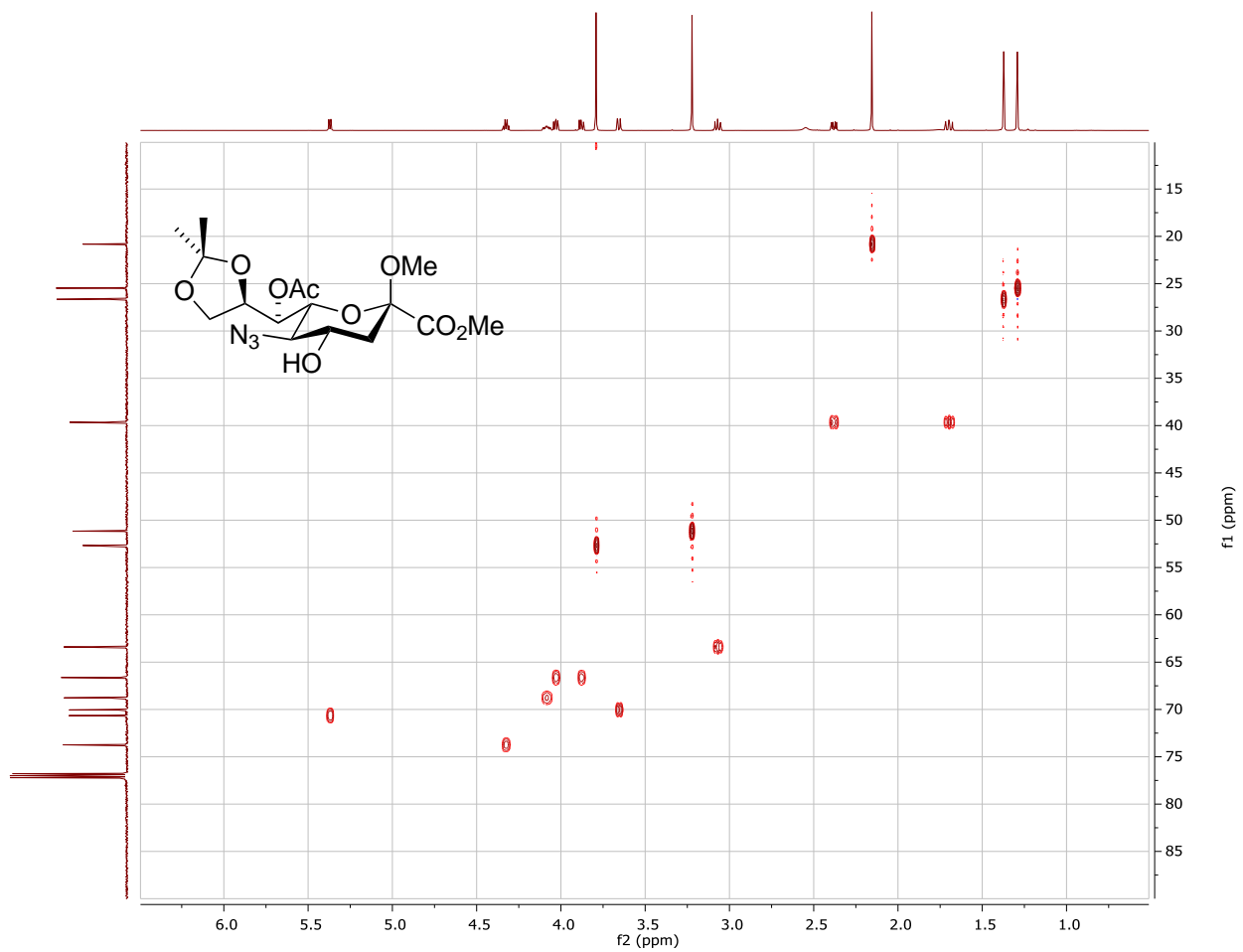
¹³C NMR (151 MHz, CDCl₃) Methyl (methyl 7-*O*-acetyl-5-azido-3,5-dideoxy-8,9-*O*-isopropylidene-*D*-glycero-*D*-galacto-non-2-uloxyranosid)onate (26)



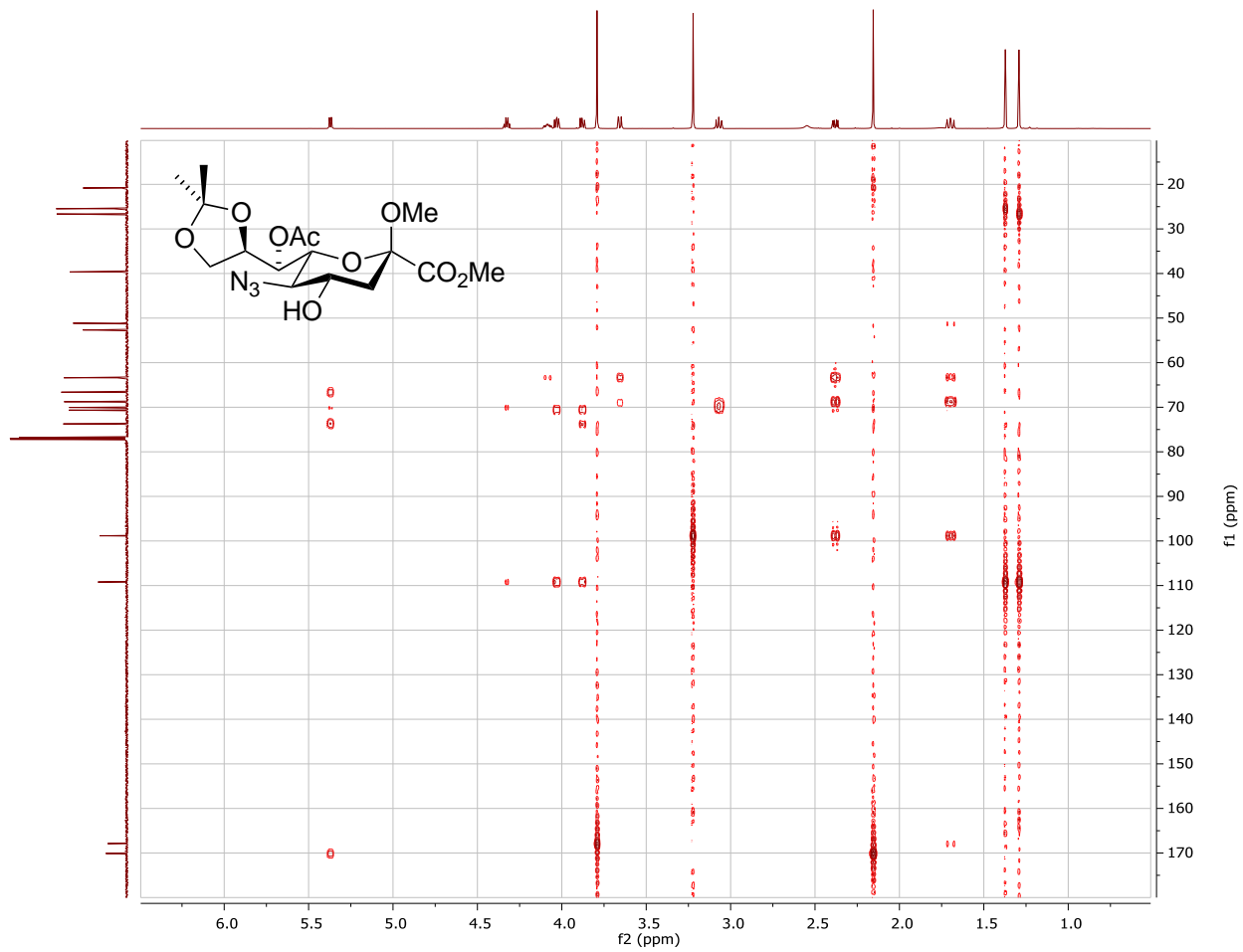
^1H - ^1H COSY NMR, CDCl_3



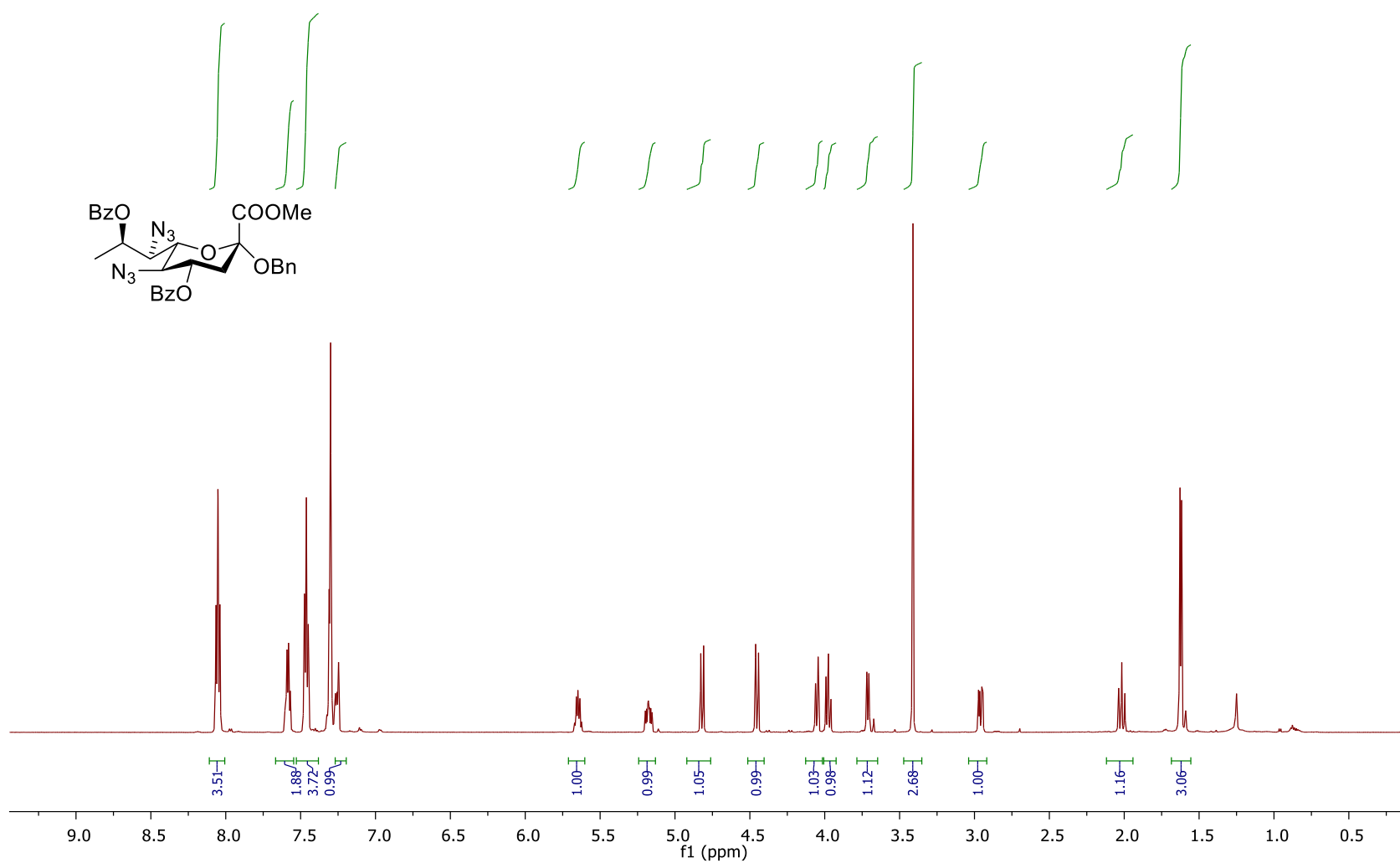
^1H - ^{13}C HSQC NMR, CDCl_3



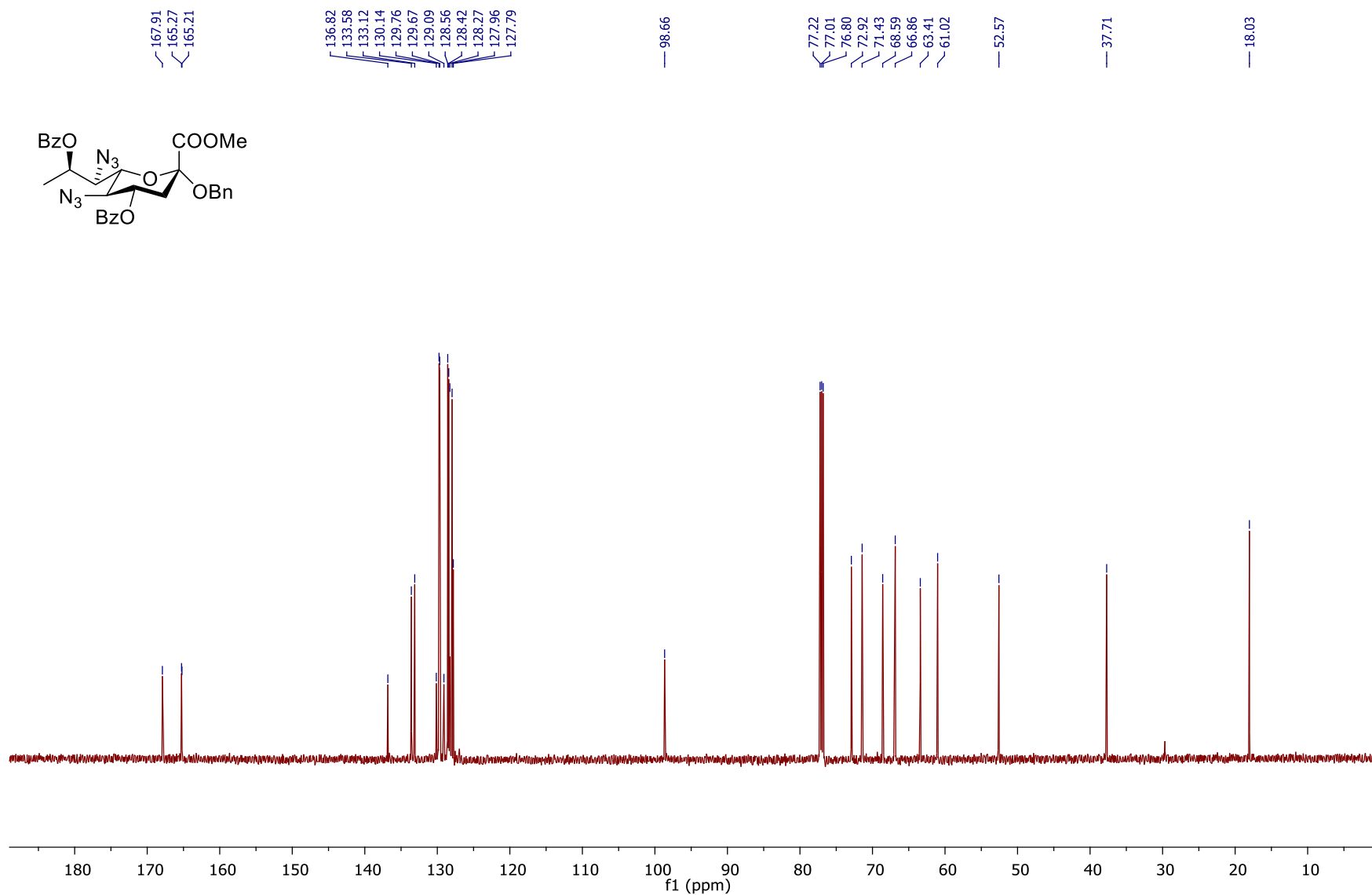
^1H - ^{13}C HMBC NMR, CDCl_3



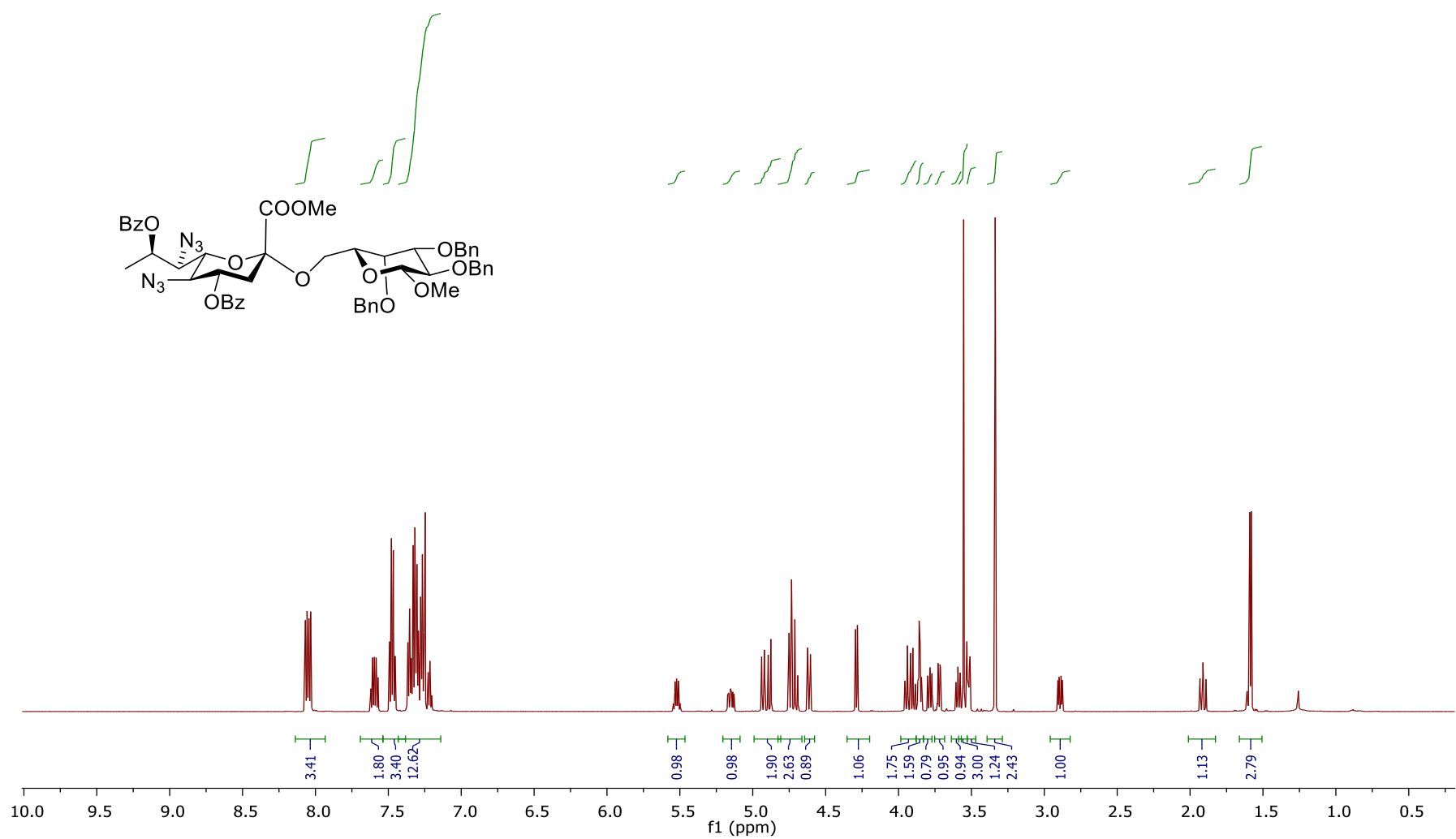
¹H NMR (600 MHz, CDCl₃) Methyl [1-benzyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetraoxy-D-glycero- α -D-galacto-non-2-uloypyranosid)onate] (30)



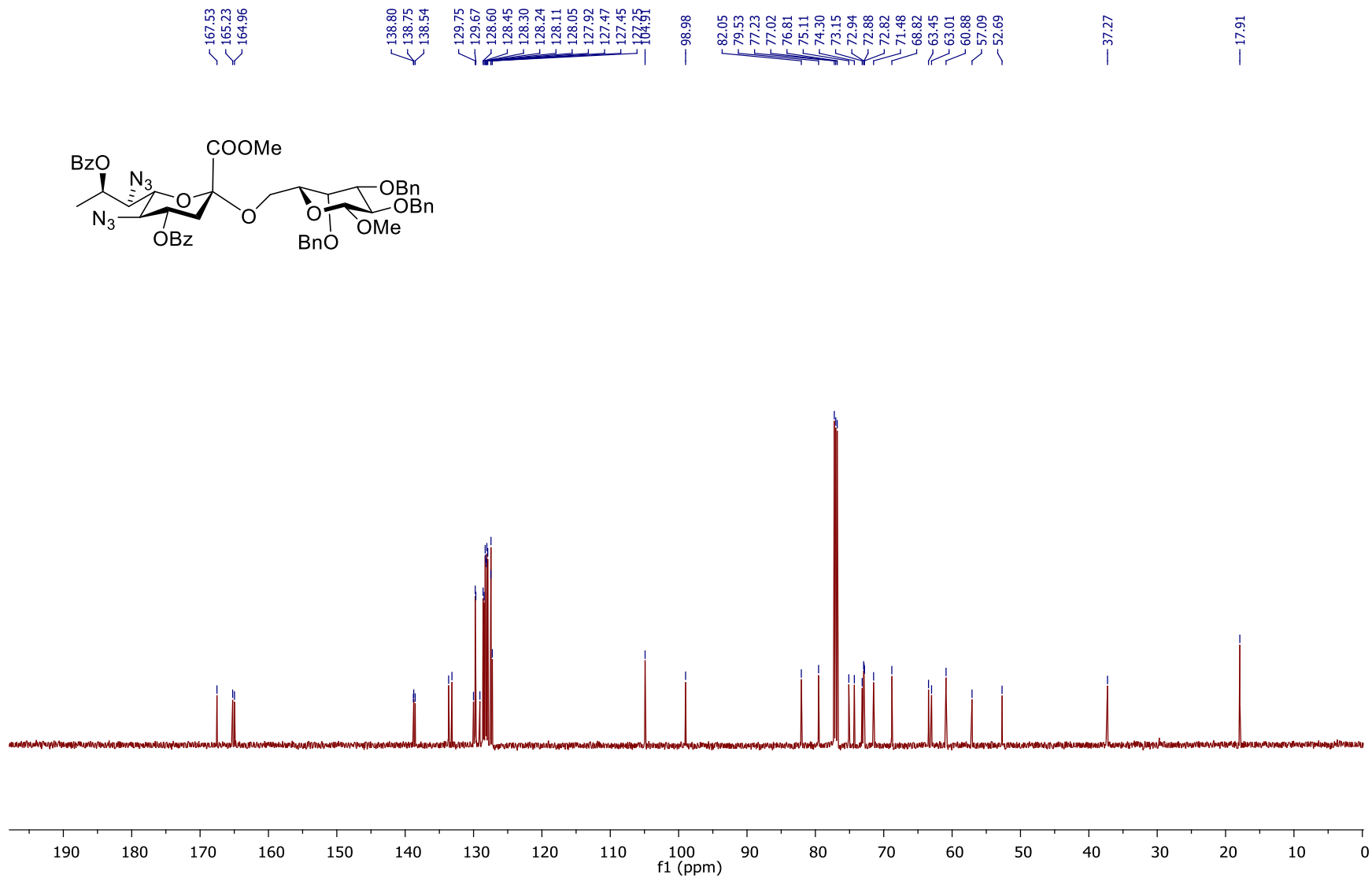
¹³C NMR (151 MHz, CDCl₃) Methyl [1-benzyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-D-glycero- α -D-galacto-non-2-ulo-pyranosid)onate] (30)



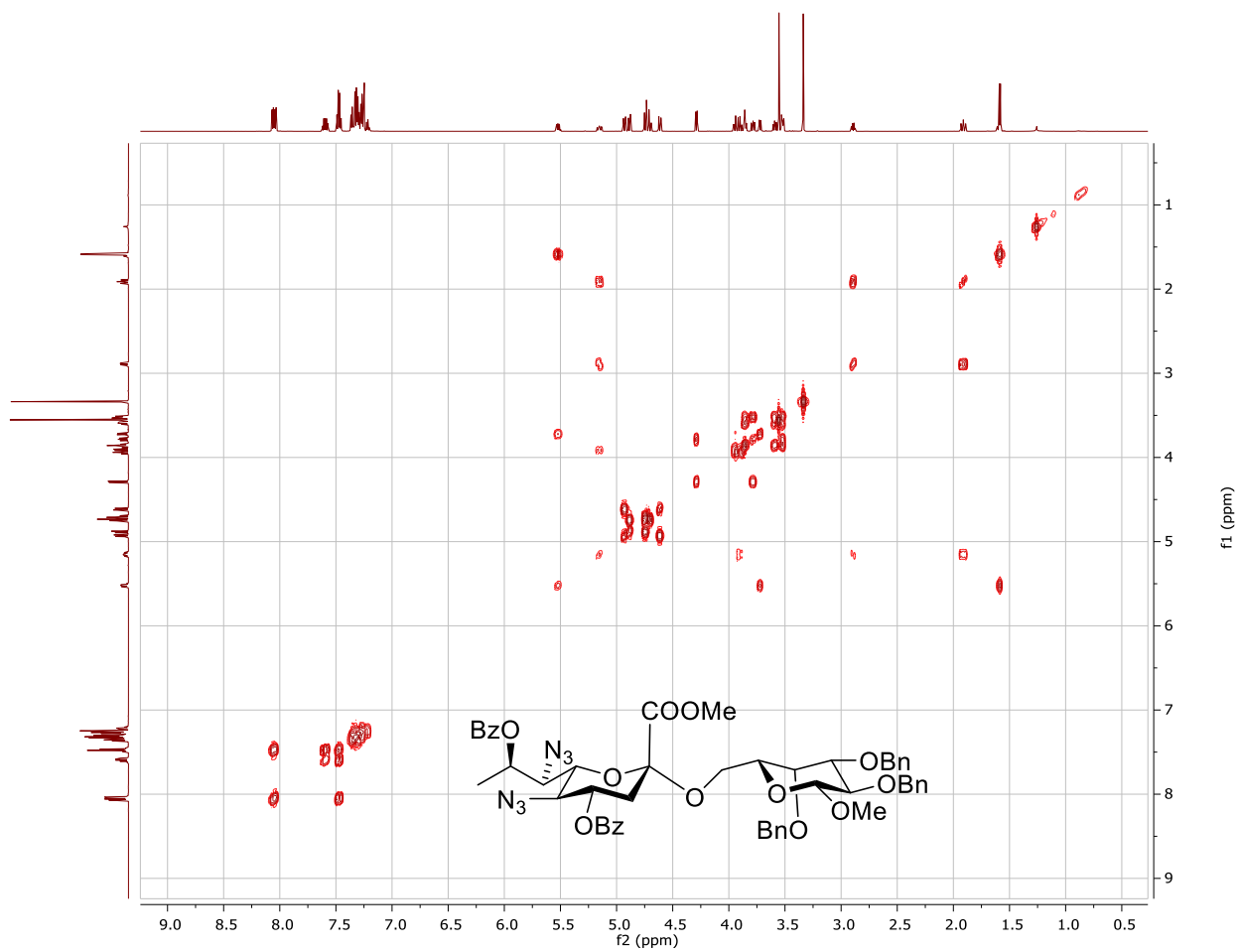
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (5,7-diazo-4,8-di-*O*-benzoyl-3,5,7,9-tetraoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 6)-2,3,4-tri-*O*-benzyl- β -D-galactopyranoside (31 α)



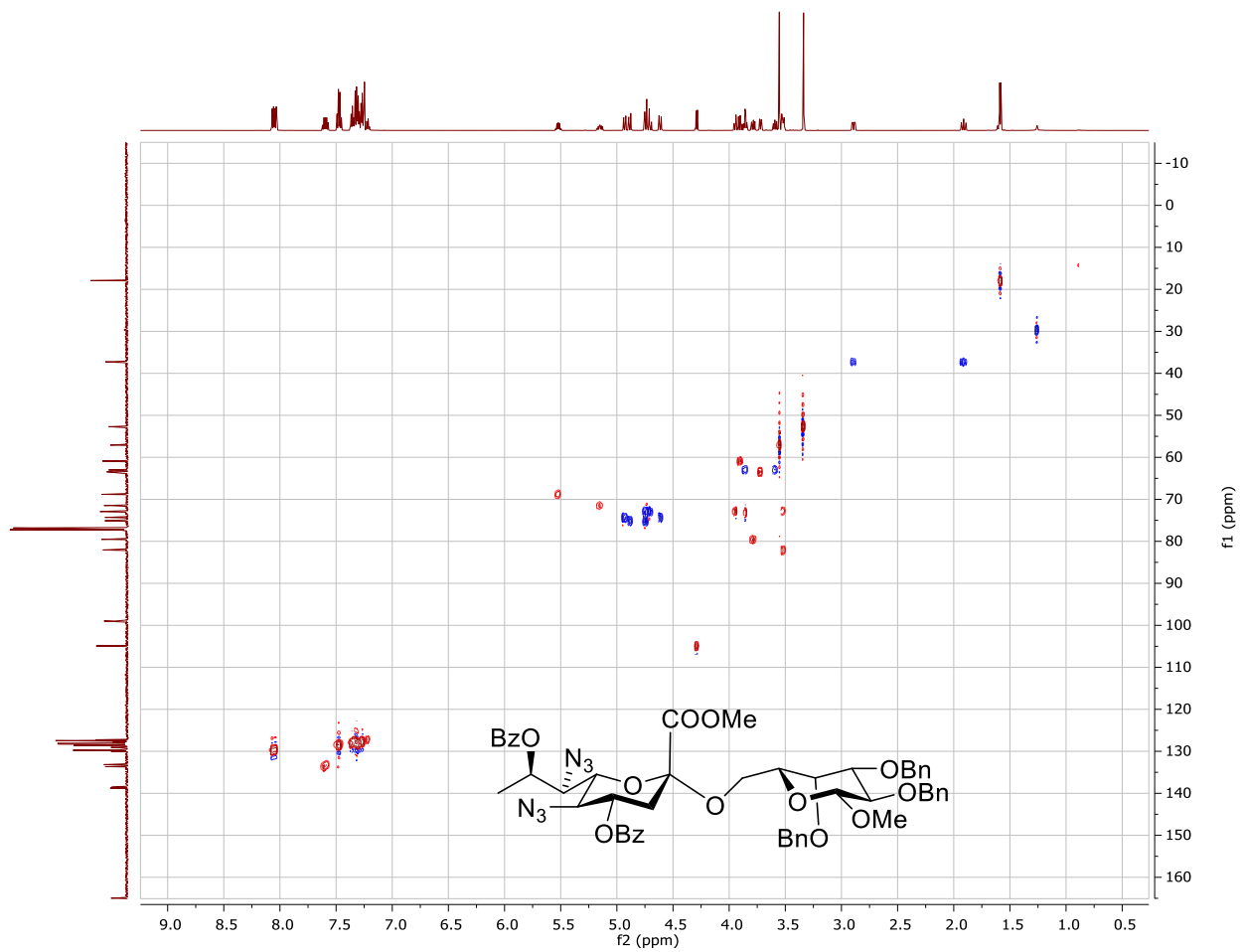
¹³C NMR (151 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-*D*-glycero- α -*D*-galacto-non-2-ulo-pyranosid)onate]-(2 \rightarrow 6)-2,3,4-tri-*O*-benzyl- β -*D*-galactopyranoside (31 α)



^1H - ^1H COSY NMR, CDCl_3



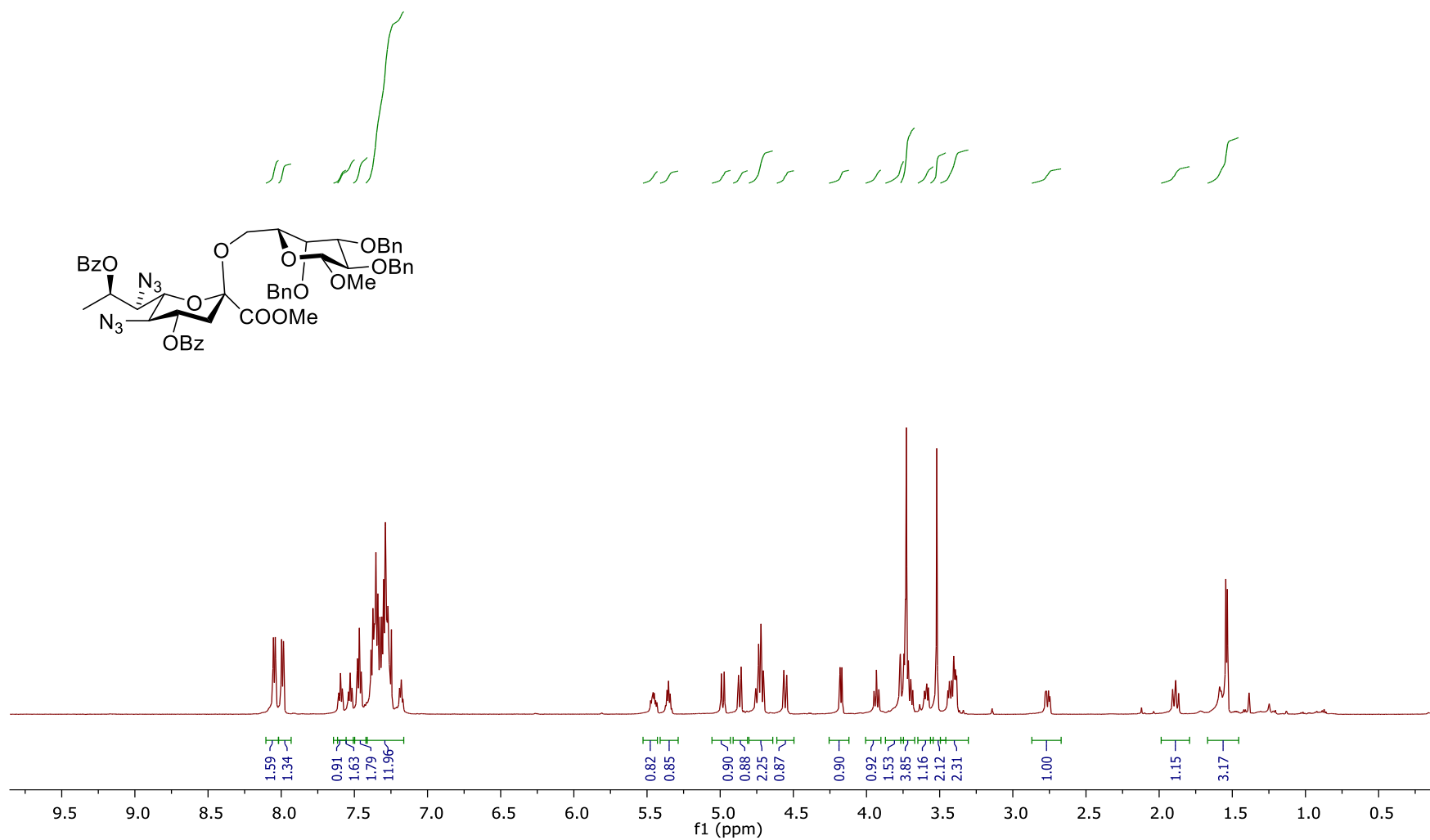
^1H - ^{13}C HSQC NMR, CDCl_3



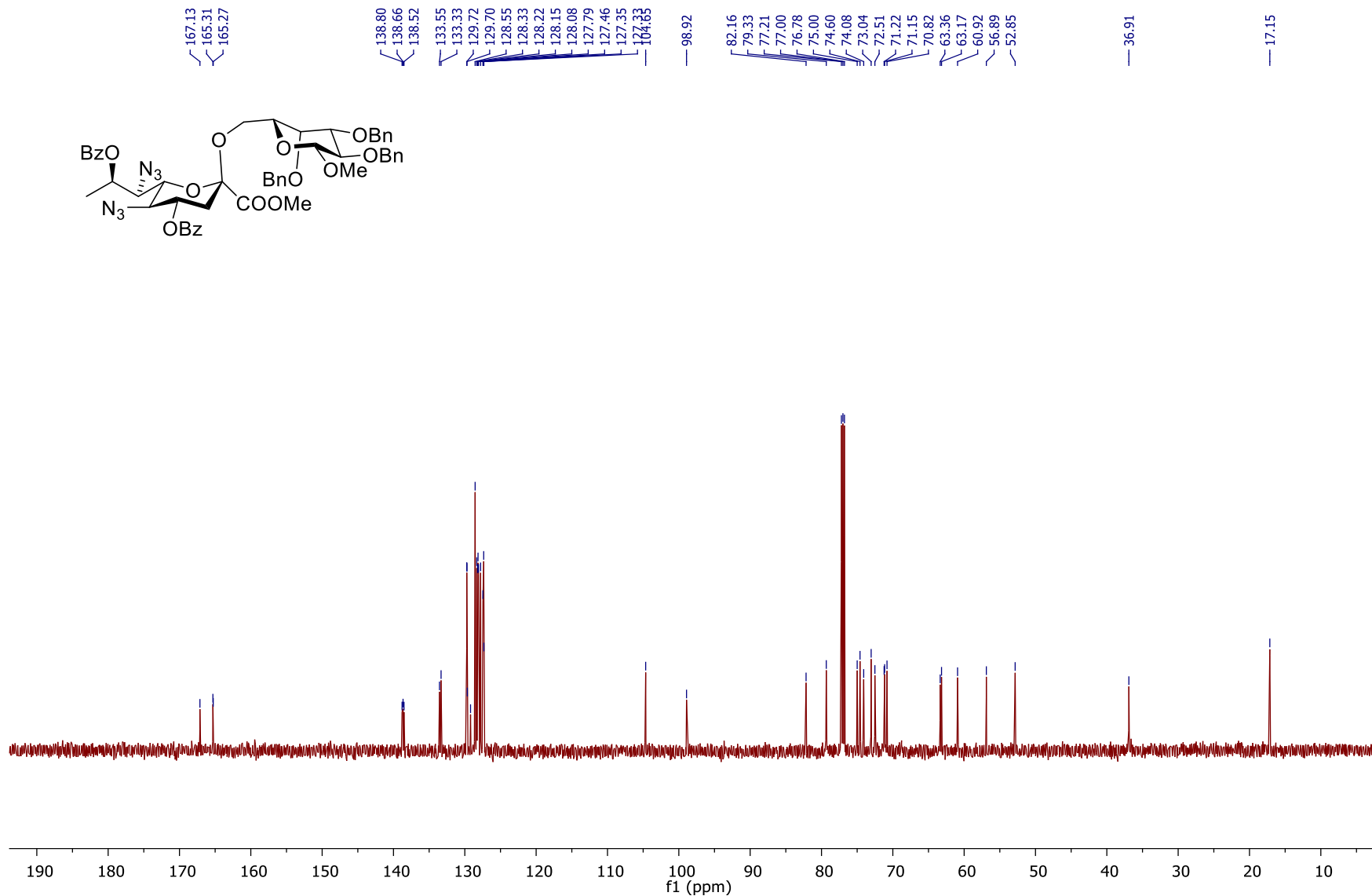
^1H - ^{13}C HMBC NMR, CDCl_3



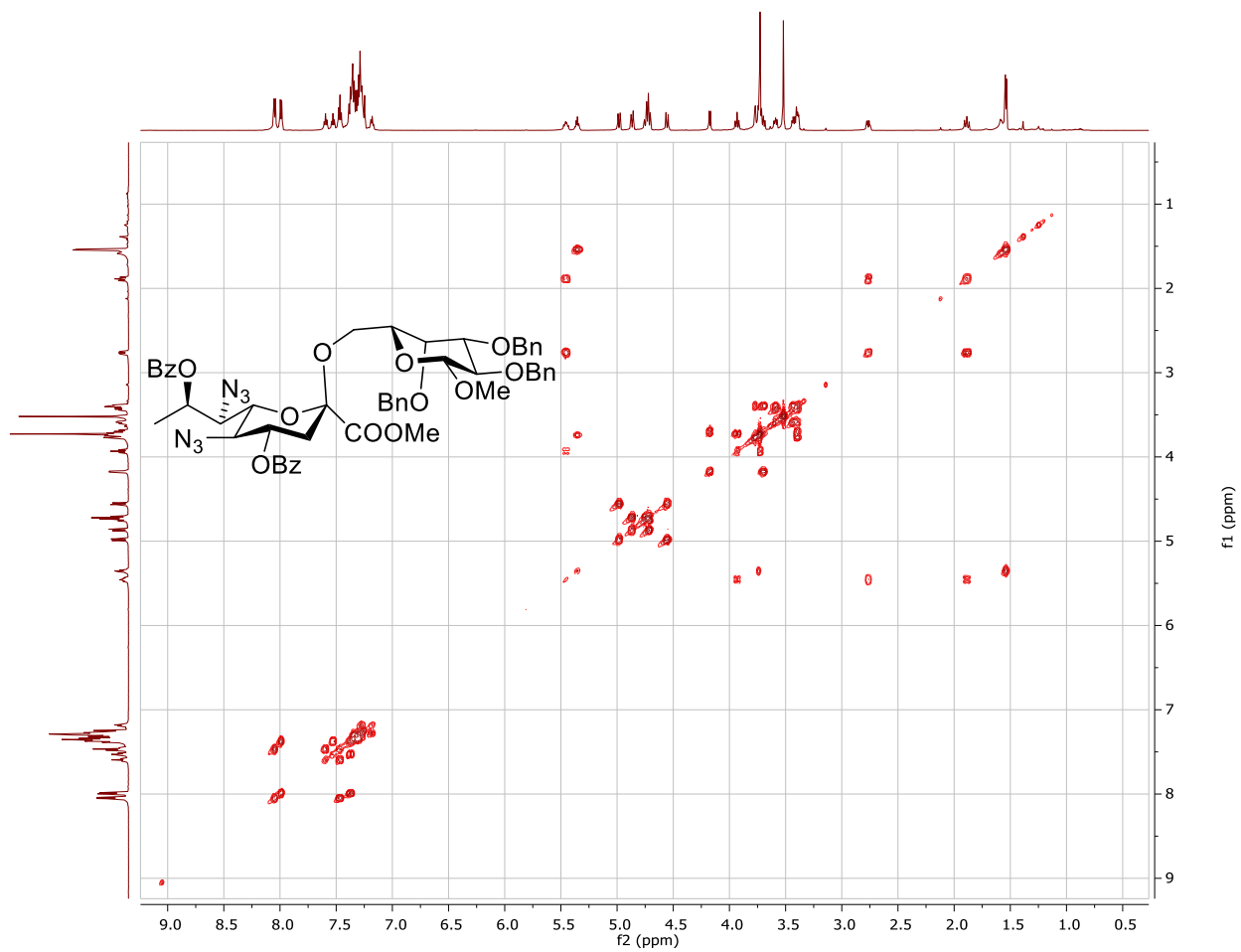
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-*D*-glycero- β -*D*-galacto-non-2-ulo-pyranosid)onate]-(2 \rightarrow 6)-2,3,4-tri-*O*-benzyl- β -*D*-galactopyranoside (31 β)



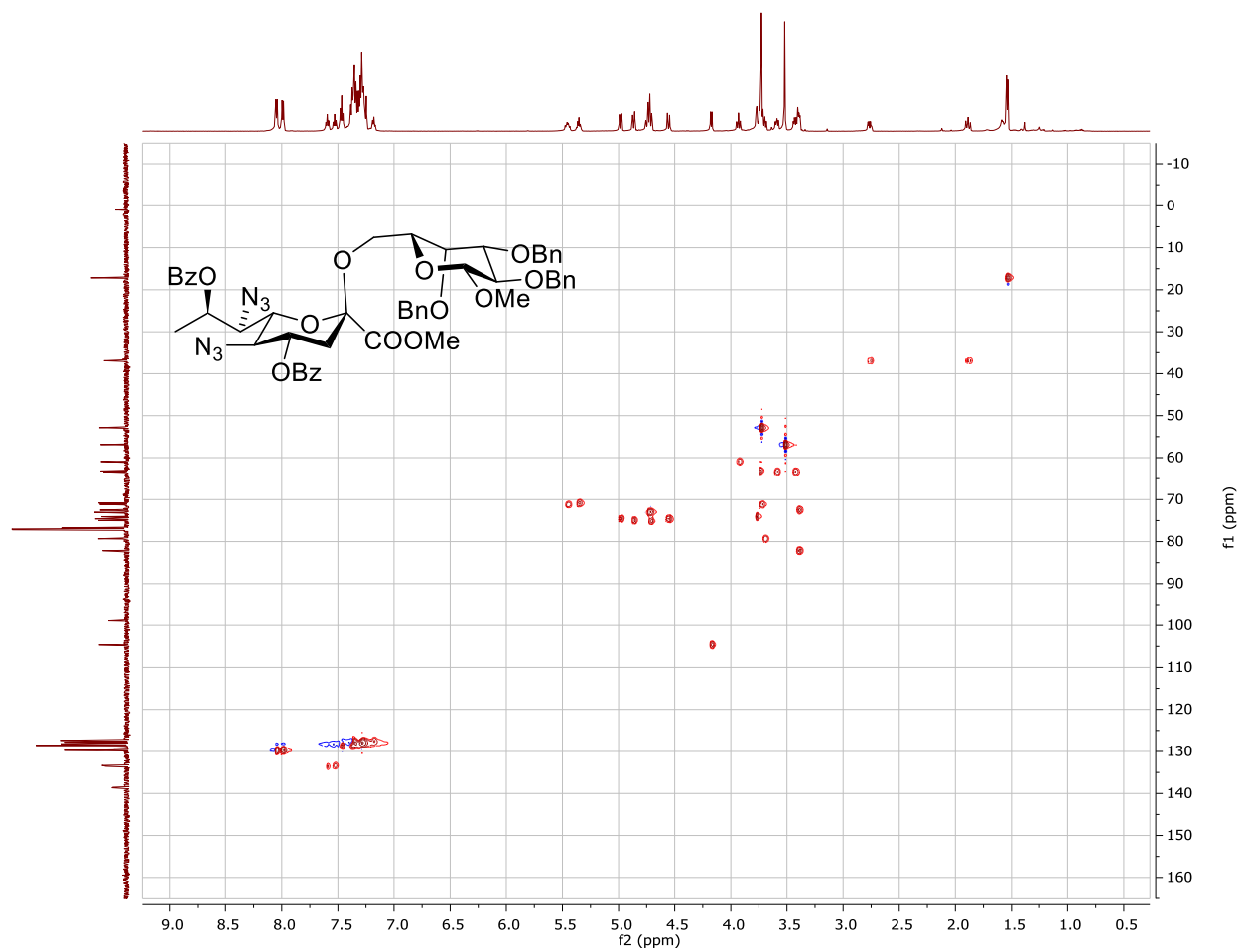
¹³C NMR (151 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-*D*-glycero- β -*D*-galactono-2-ulopyranosid)onate]-(2 \rightarrow 6)-2,3,4-tri-*O*-benzyl- β -*D*-galactopyranoside (31 β)



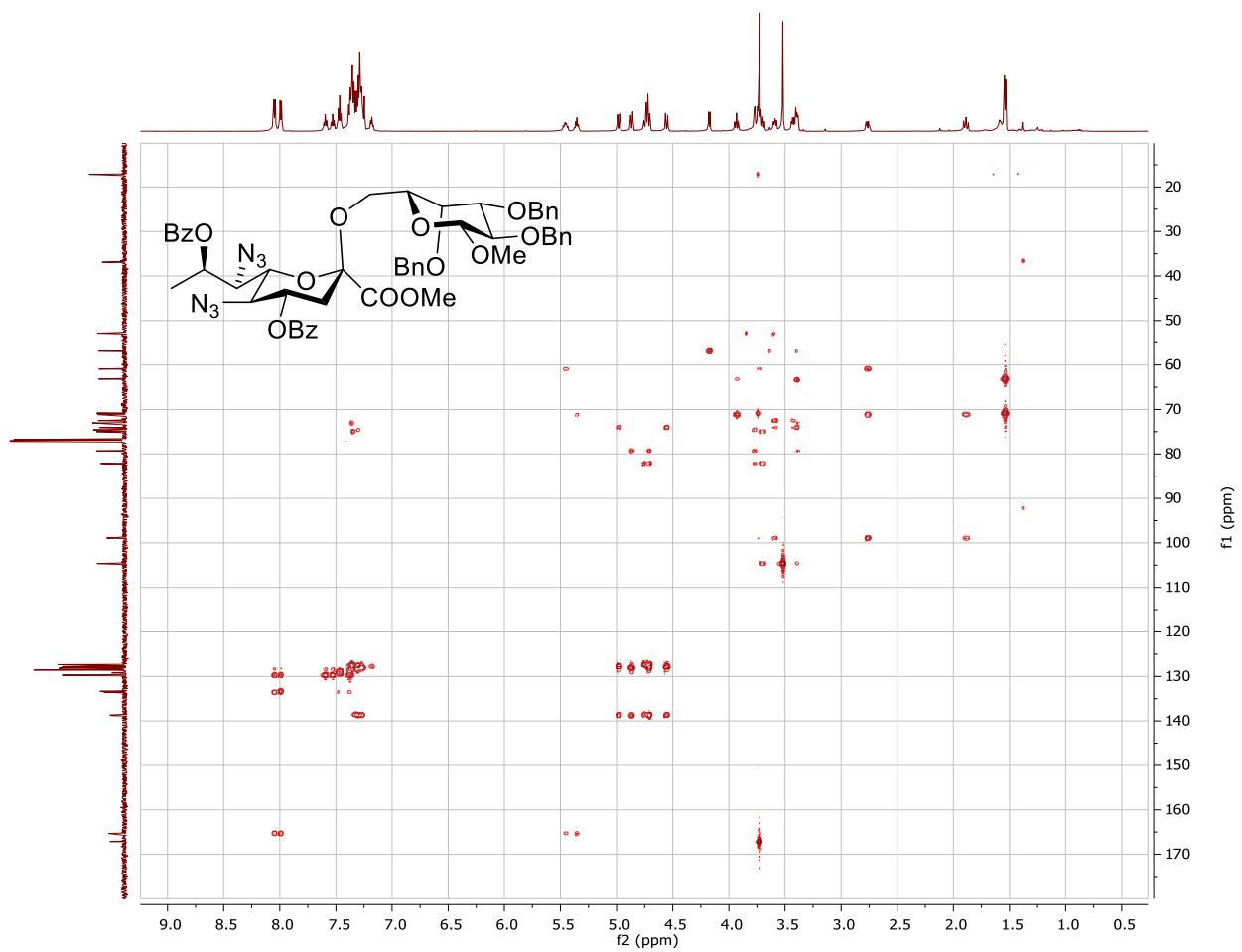
^1H - ^1H COSY NMR, CDCl_3



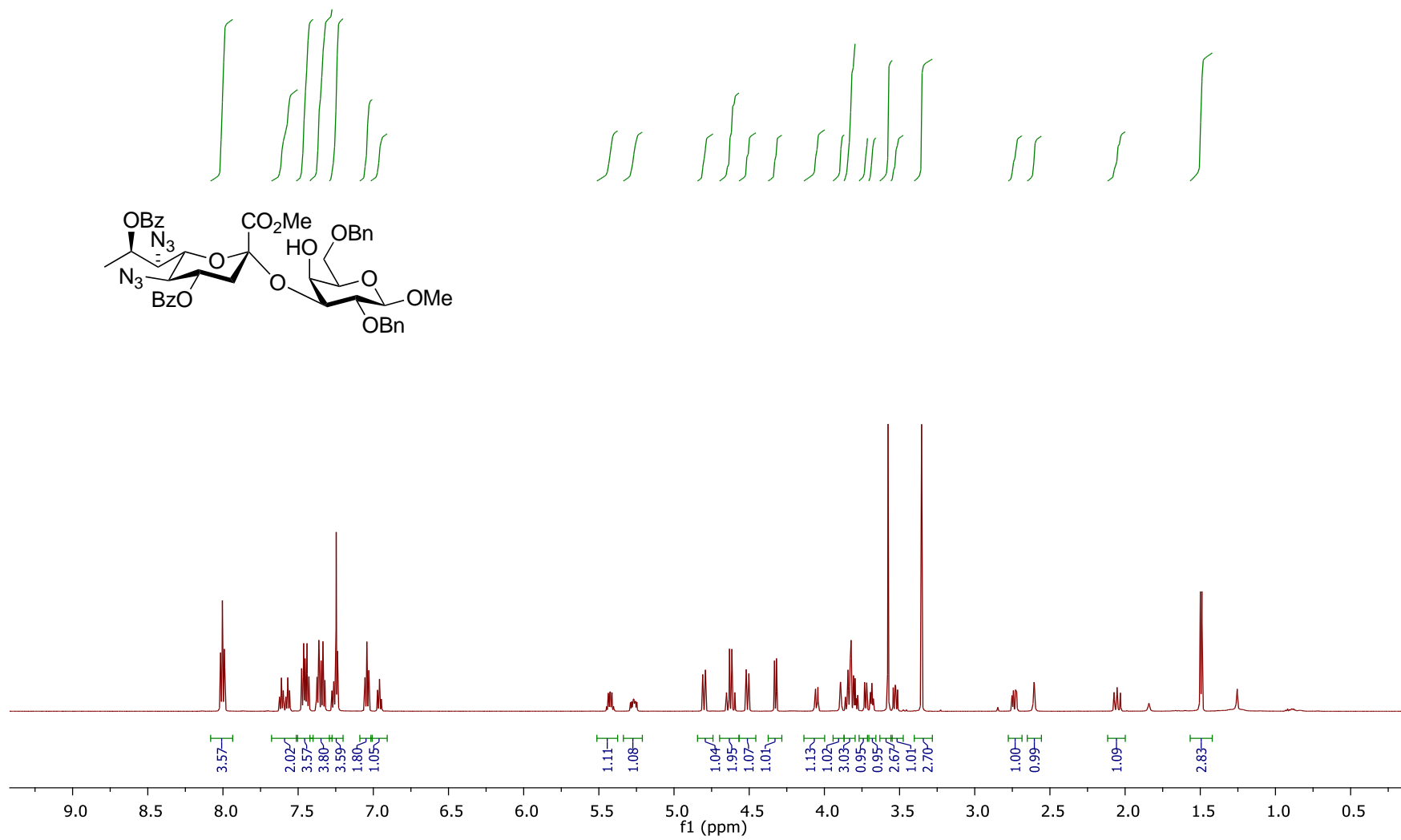
^1H - ^{13}C HSQC NMR, CDCl_3



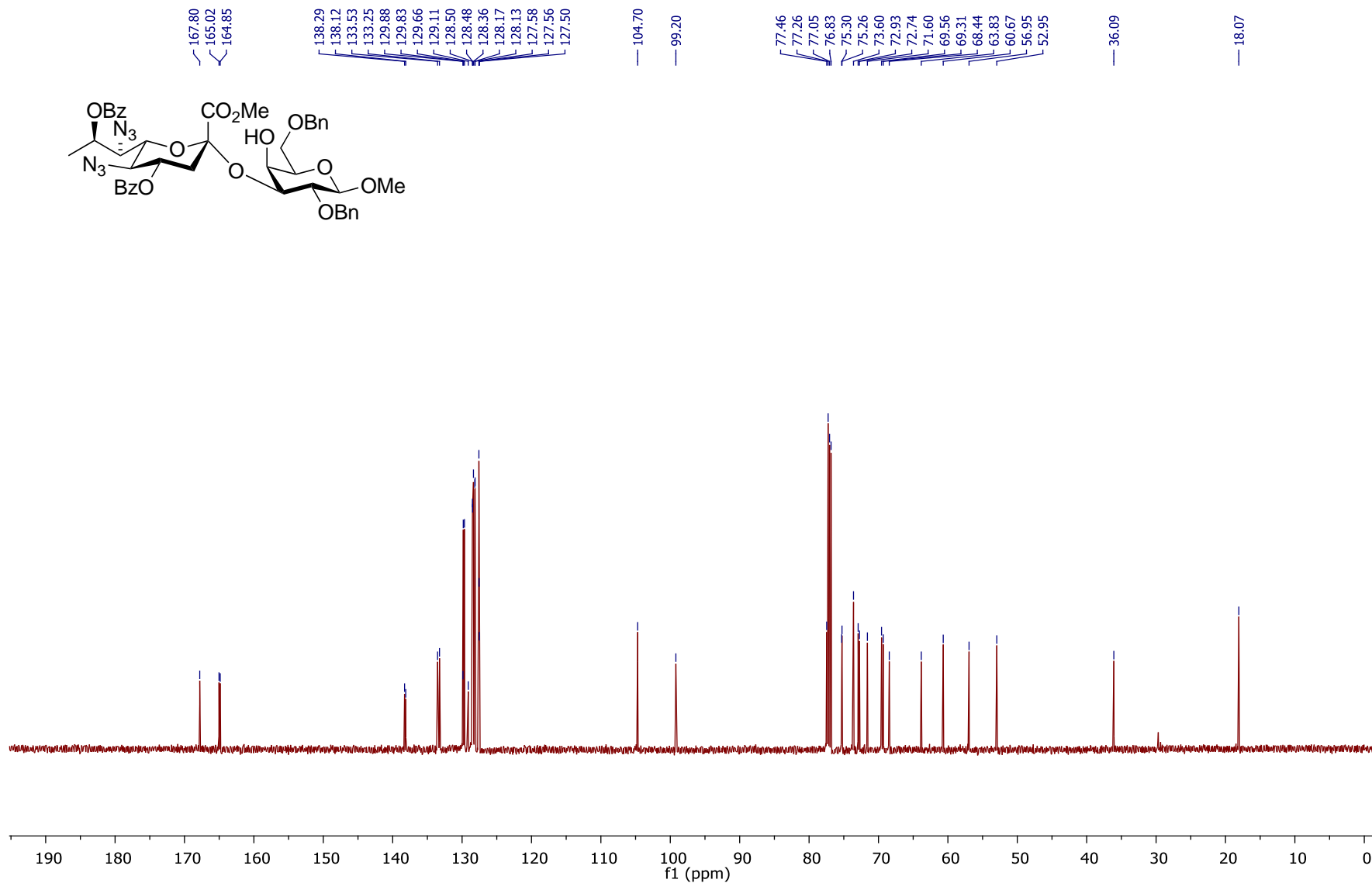
^1H - ^{13}C HMBC NMR, CDCl_3



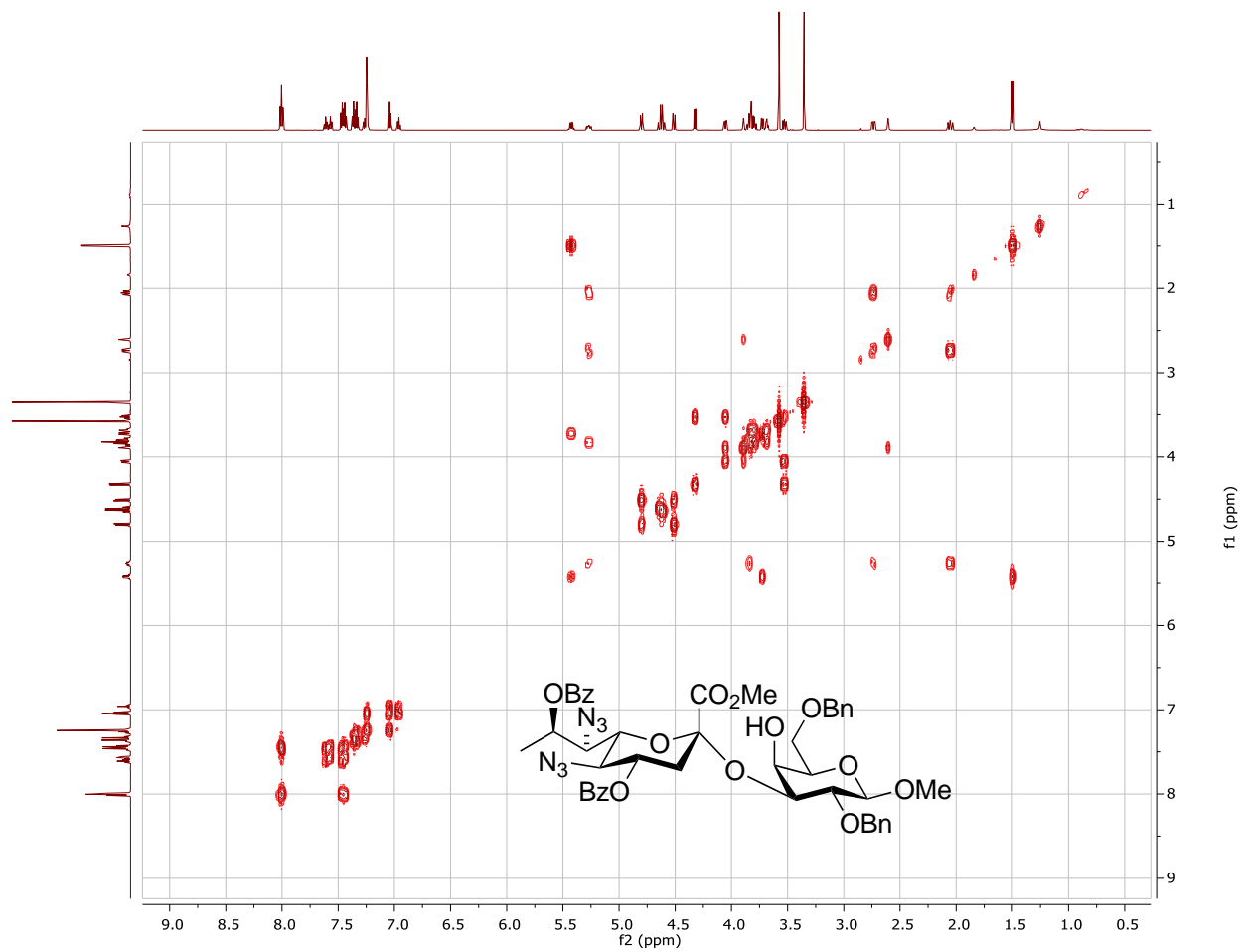
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-D-glycero- α -D-galacto-non-2-ulo-pyranosid)onate]-(2 \rightarrow 3)-2,6-di-*O*-benzyl- β -D-galactopyranoside (34 α)



¹³C NMR (151 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetraoxy-*D*-glycero- α -*D*-galacto-non-2-ulopyranosid)onate]-(2→3)-2,6-di-*O*-benzyl- β -*D*-galactopyranoside (34 α)



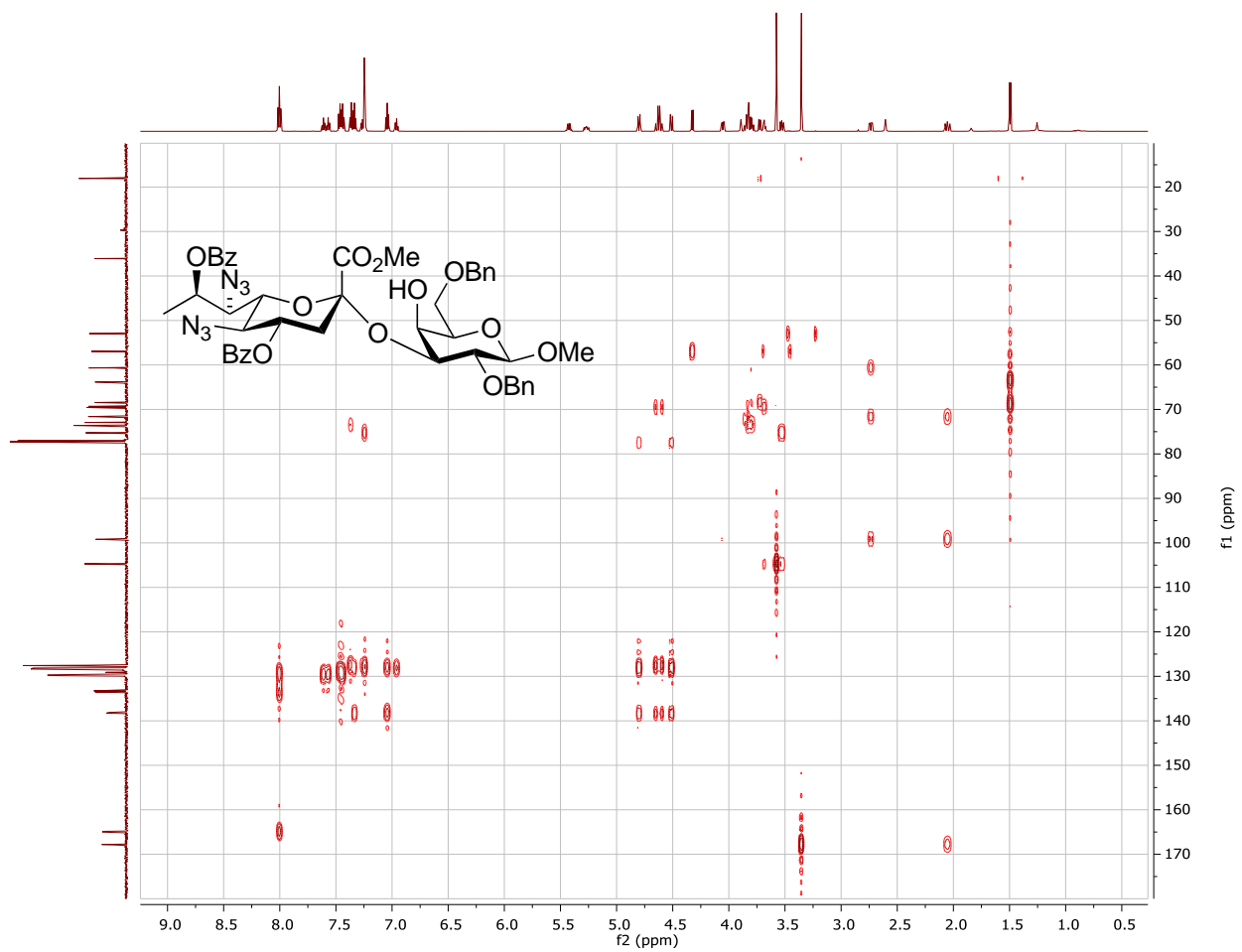
^1H - ^1H COSY NMR, CDCl_3



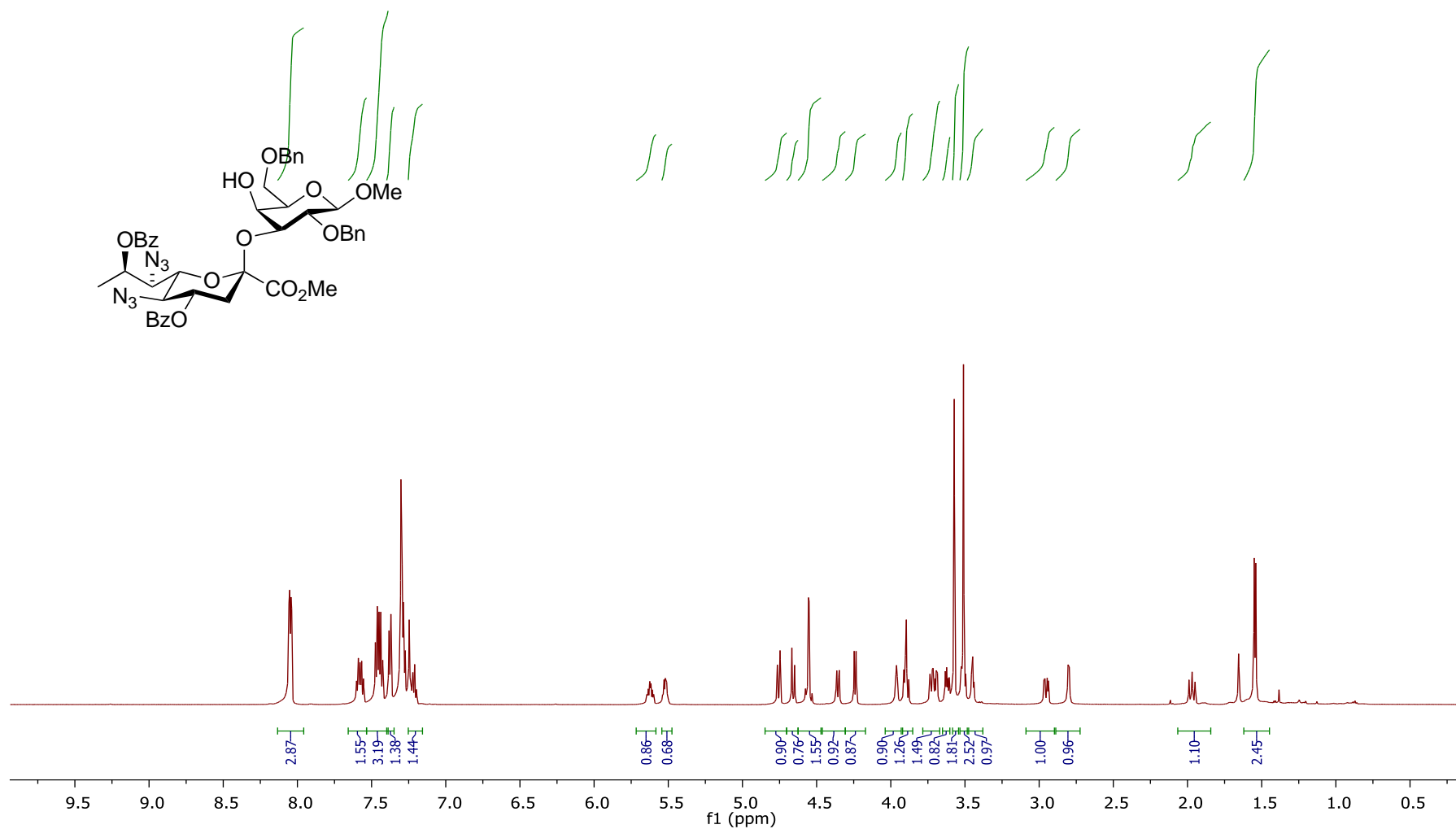
^1H - ^{13}C HSQC NMR, CDCl_3



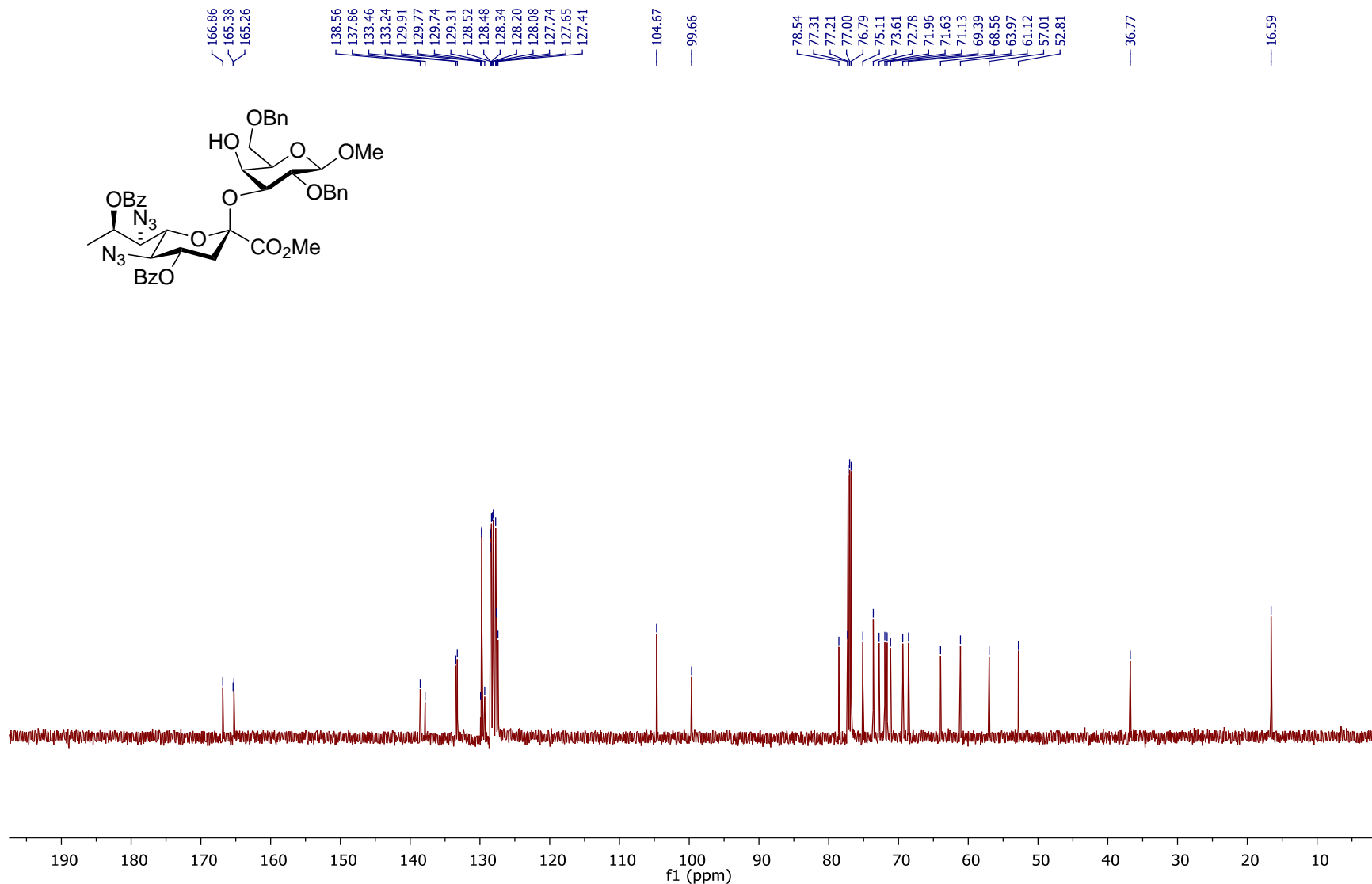
^1H - ^{13}C HMBC NMR, CDCl_3



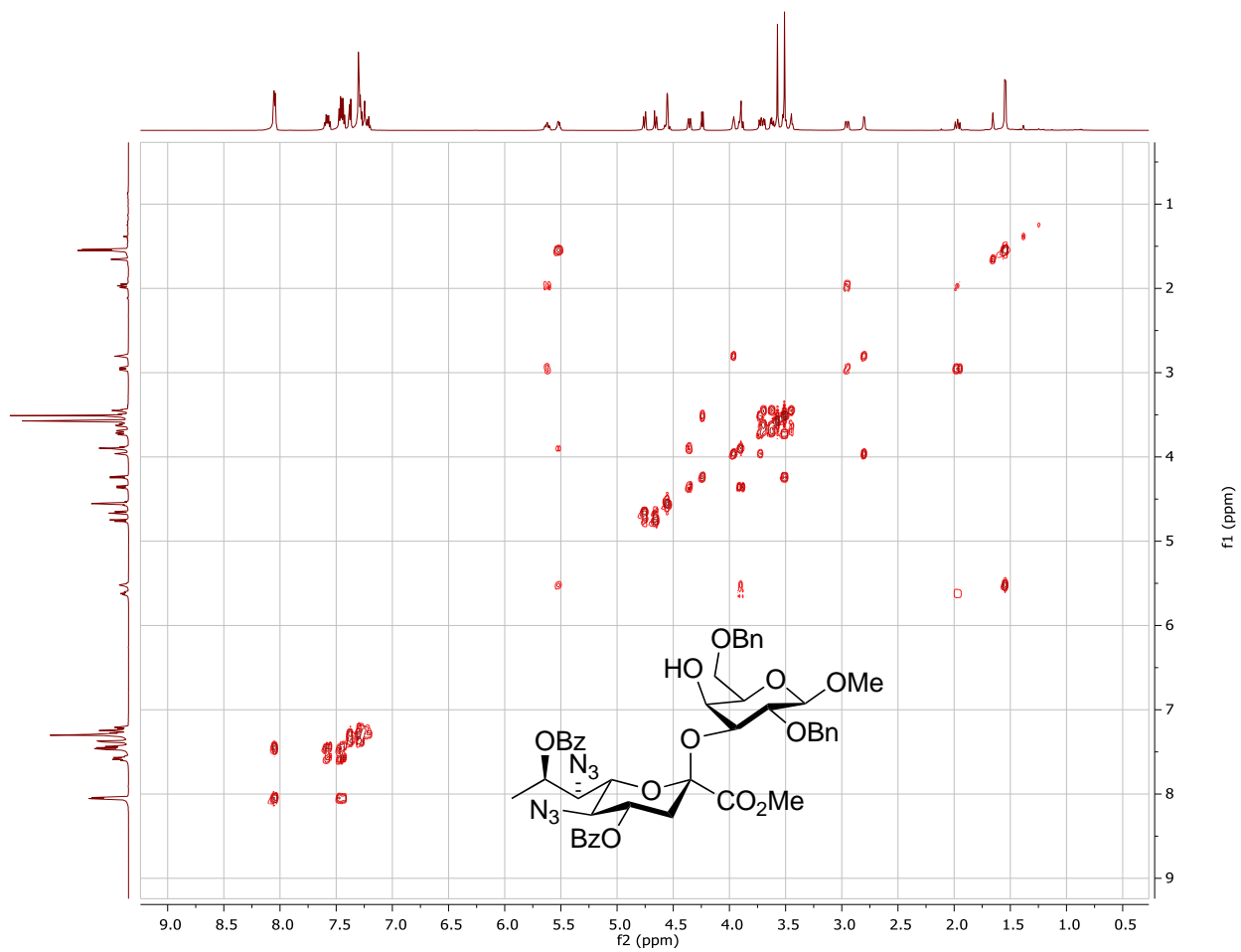
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-D-glycero-β-D-galacto-non-2-ulopyranosid)onate]-(2→3)-2,6-di-*O*-benzyl-β-D-galactopyranoside (34β)



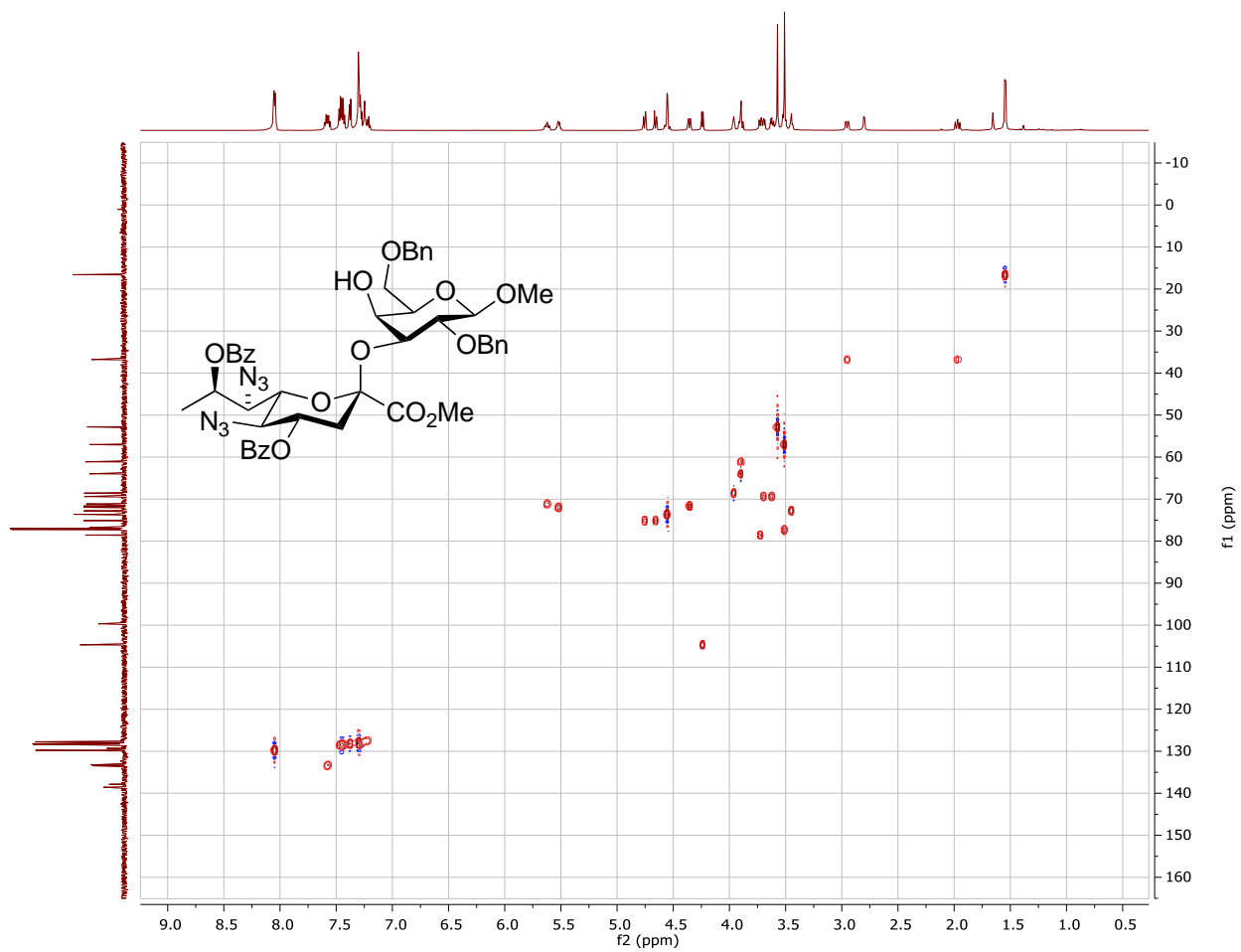
¹³C NMR (151 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-*D*-glycero-β-*D*-galacto-non-2-ulo-pyranosid)onate]-(2→3)-2,6-di-*O*-benzyl-β-*D*-galactopyranoside (34β)



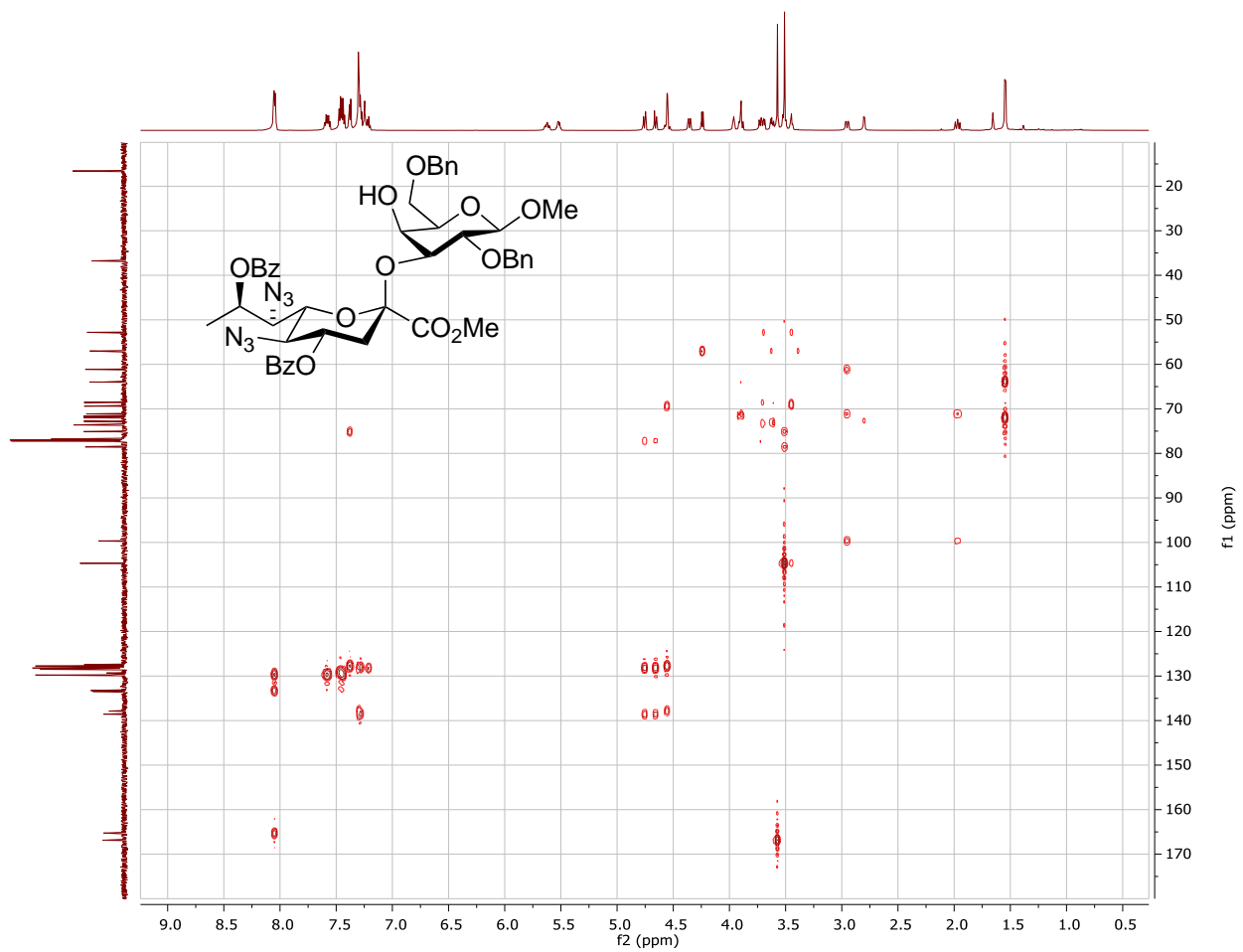
^1H - ^1H COSY NMR, CDCl_3



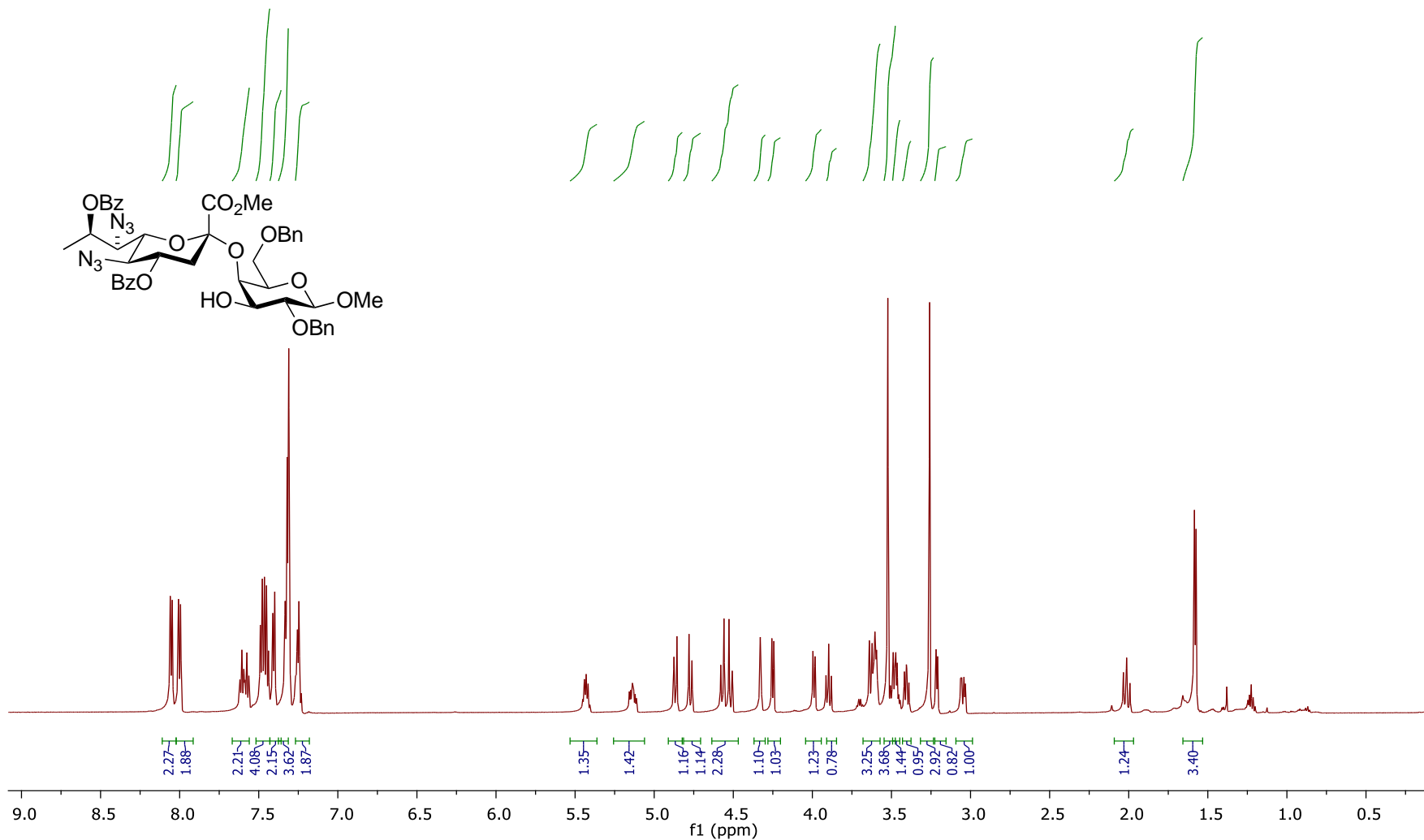
^1H - ^{13}C HSQC NMR, CDCl_3



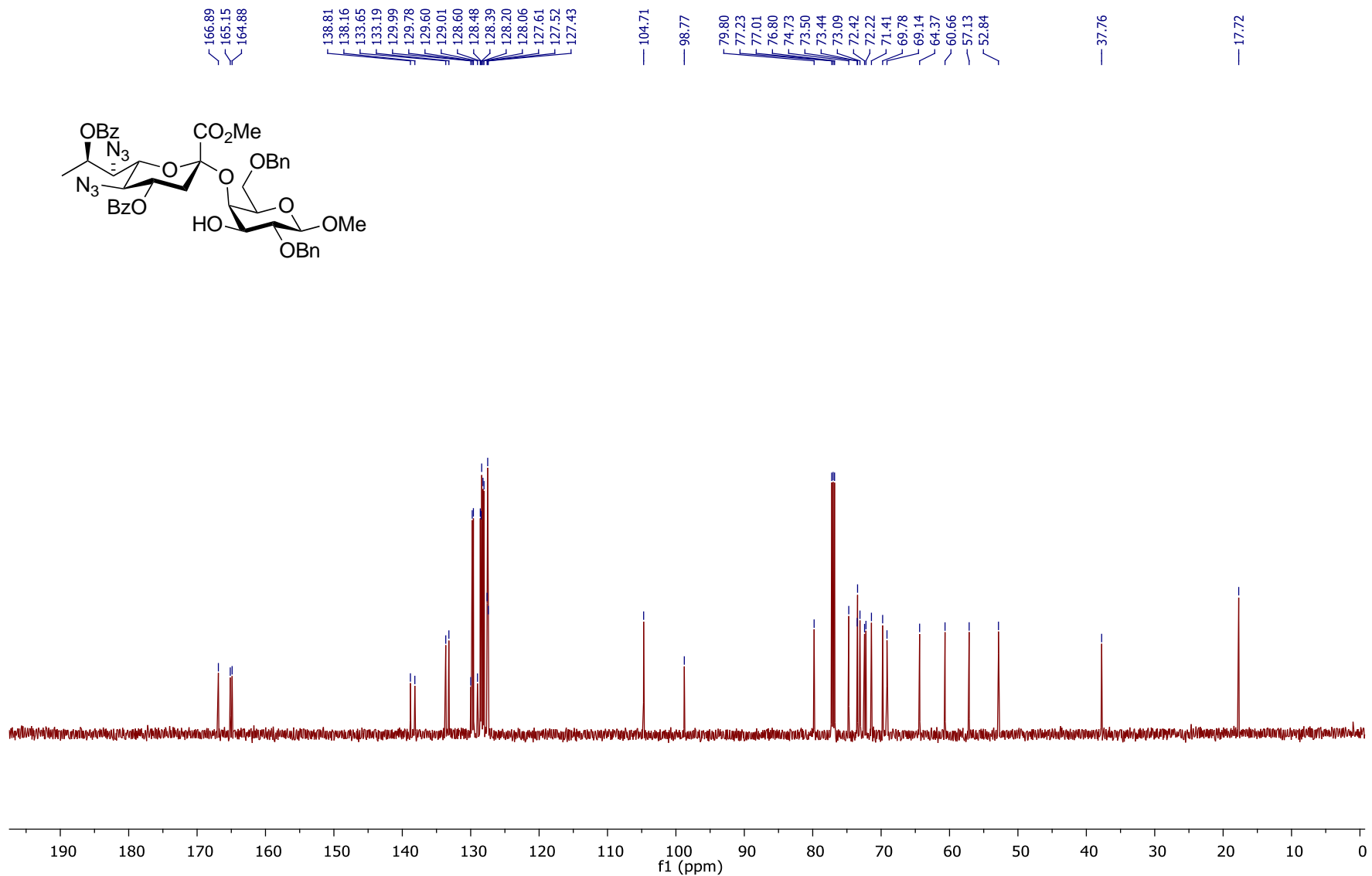
^1H - ^{13}C HMBC NMR, CDCl_3



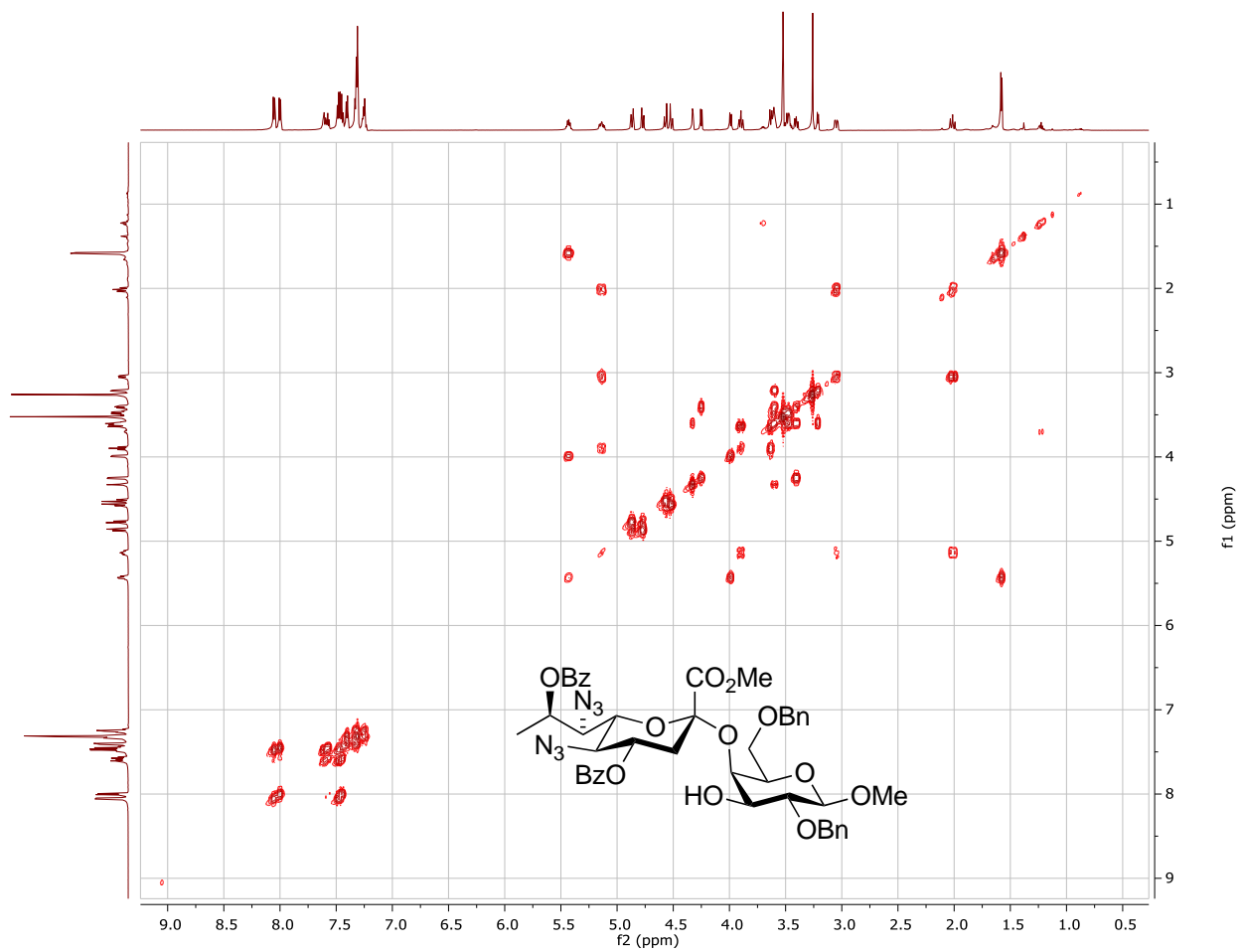
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (5,7-diazo-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-D-glycero- α -D-galacto-non-2-ulo-pyranosid)onate]-(2 \rightarrow 4)-2,6-di-*O*-benzyl- β -D-galactopyranoside (35)



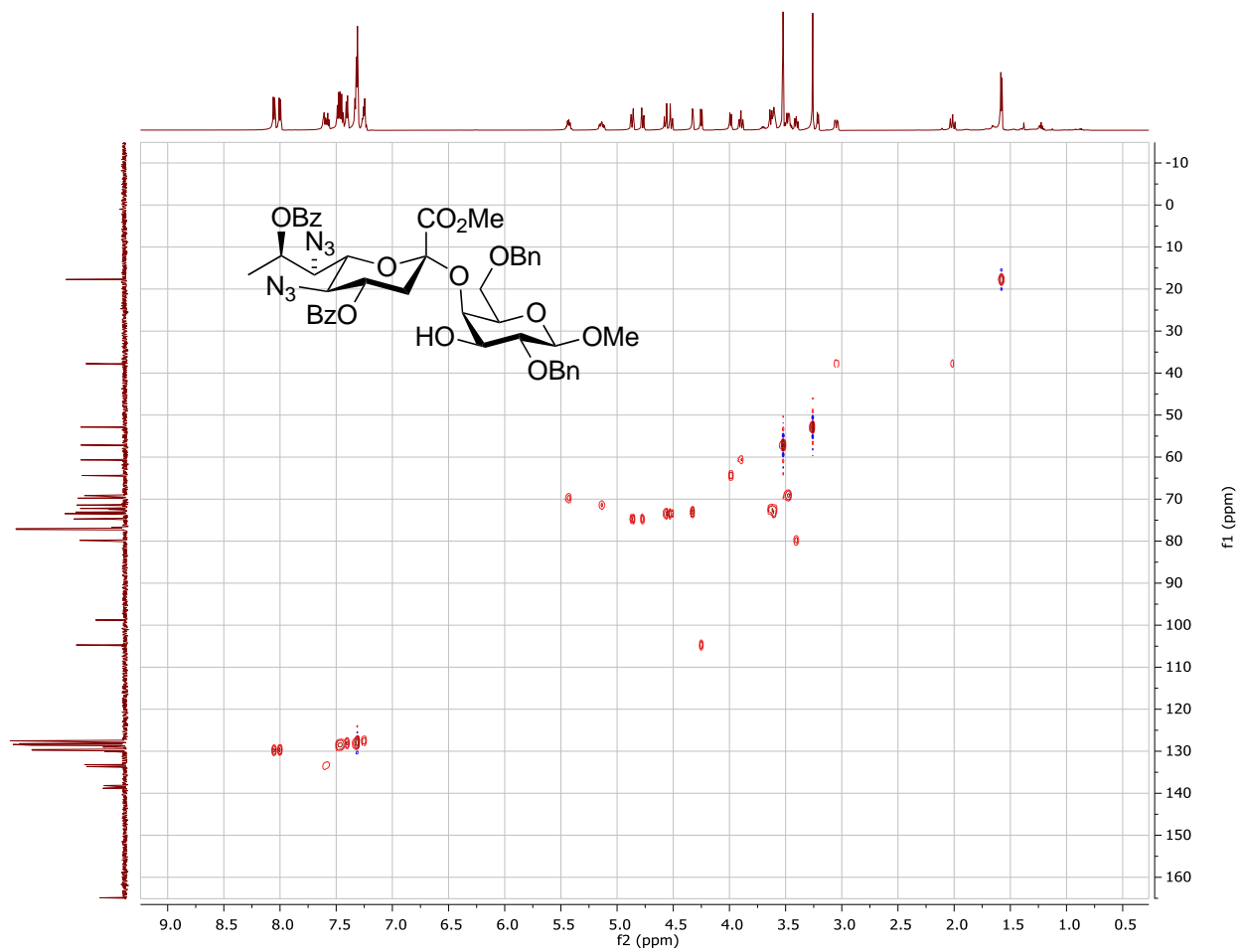
¹³C NMR (151 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetraoxy-D-glycero- α -D-galacto-non-2-uloxyranosid)onate]-(2 \rightarrow 4)-2,6-di-*O*-benzyl- β -D-galactopyranoside (35)



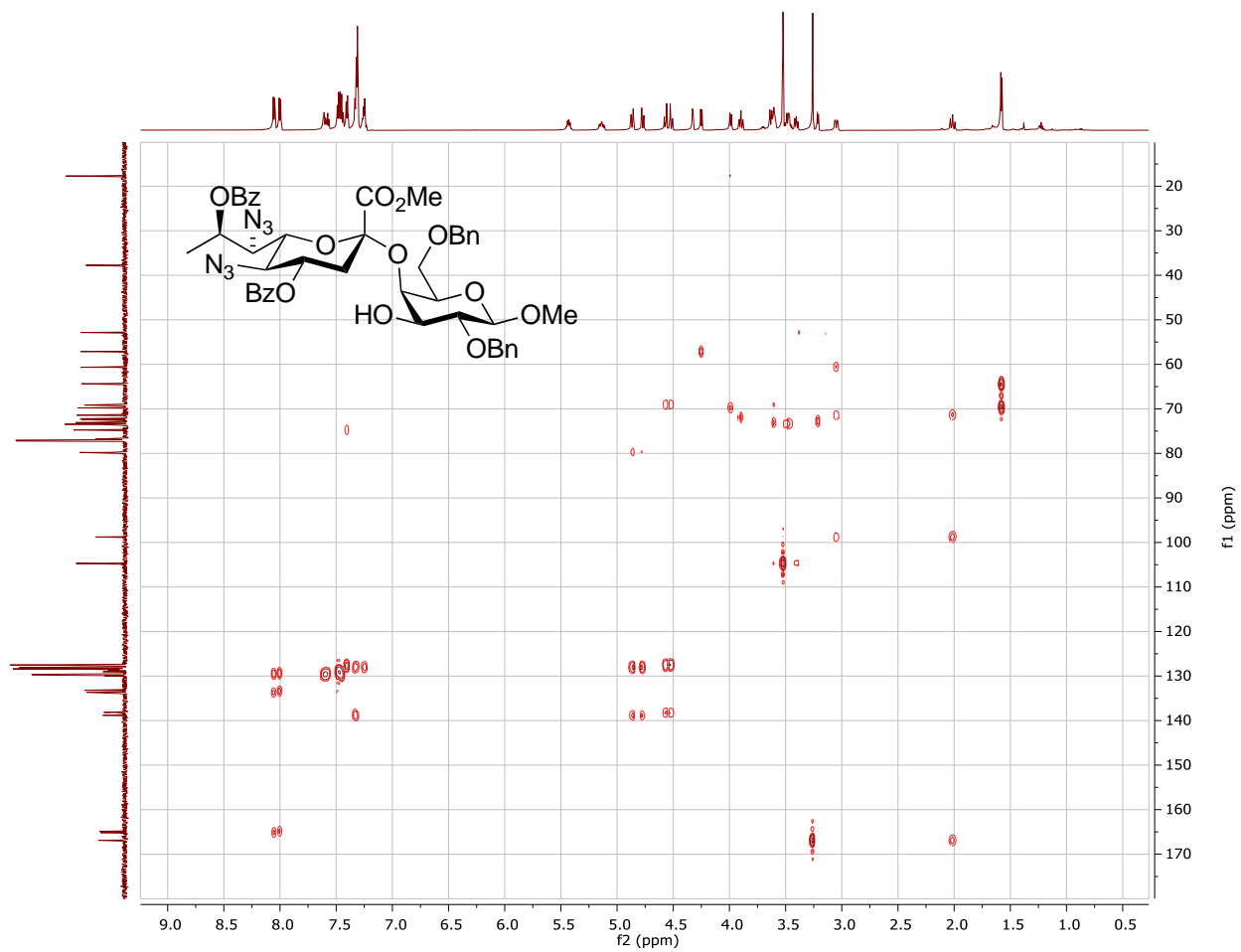
^1H - ^1H COSY NMR, CDCl_3



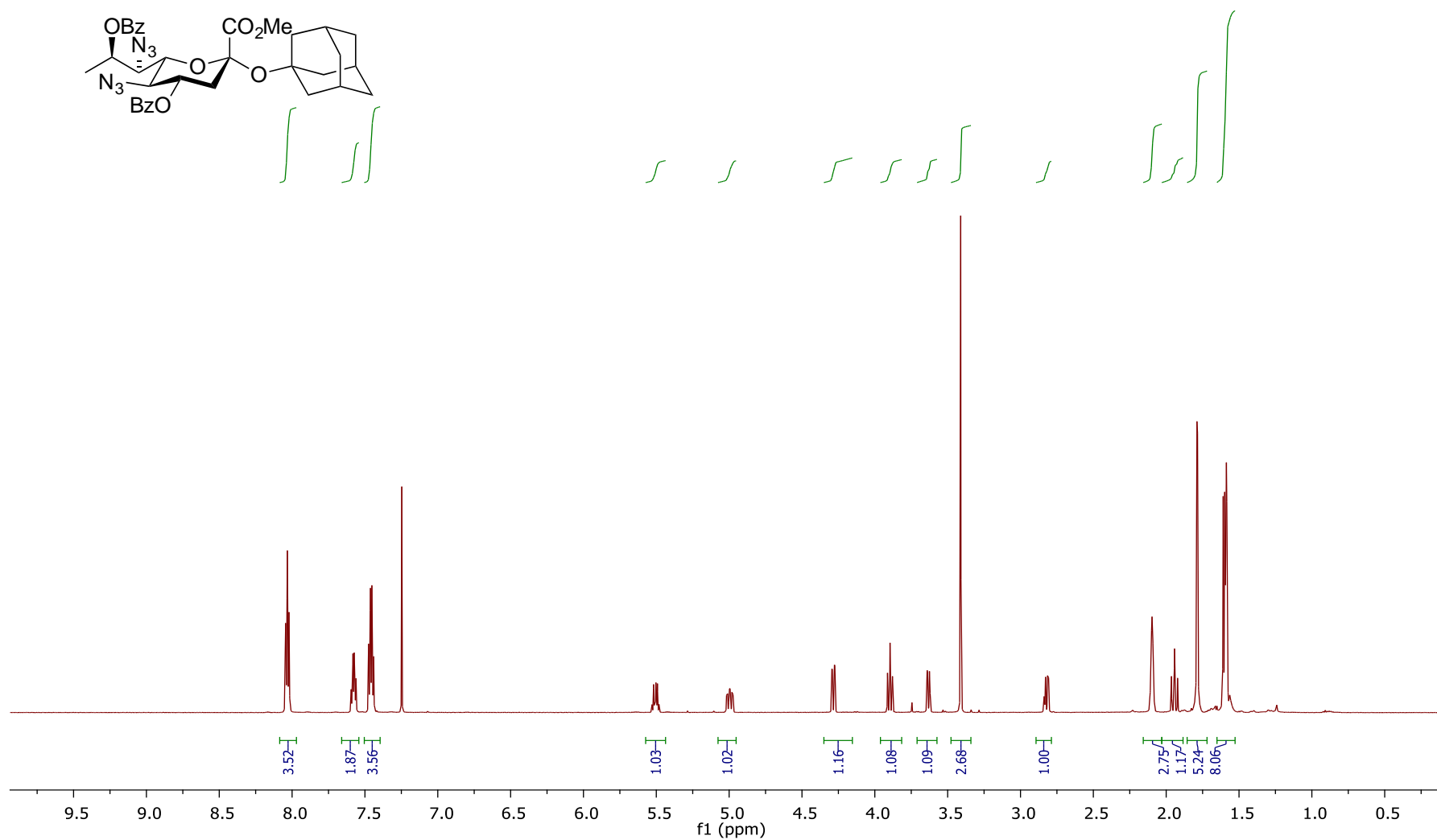
^1H - ^{13}C HSQC NMR, CDCl_3



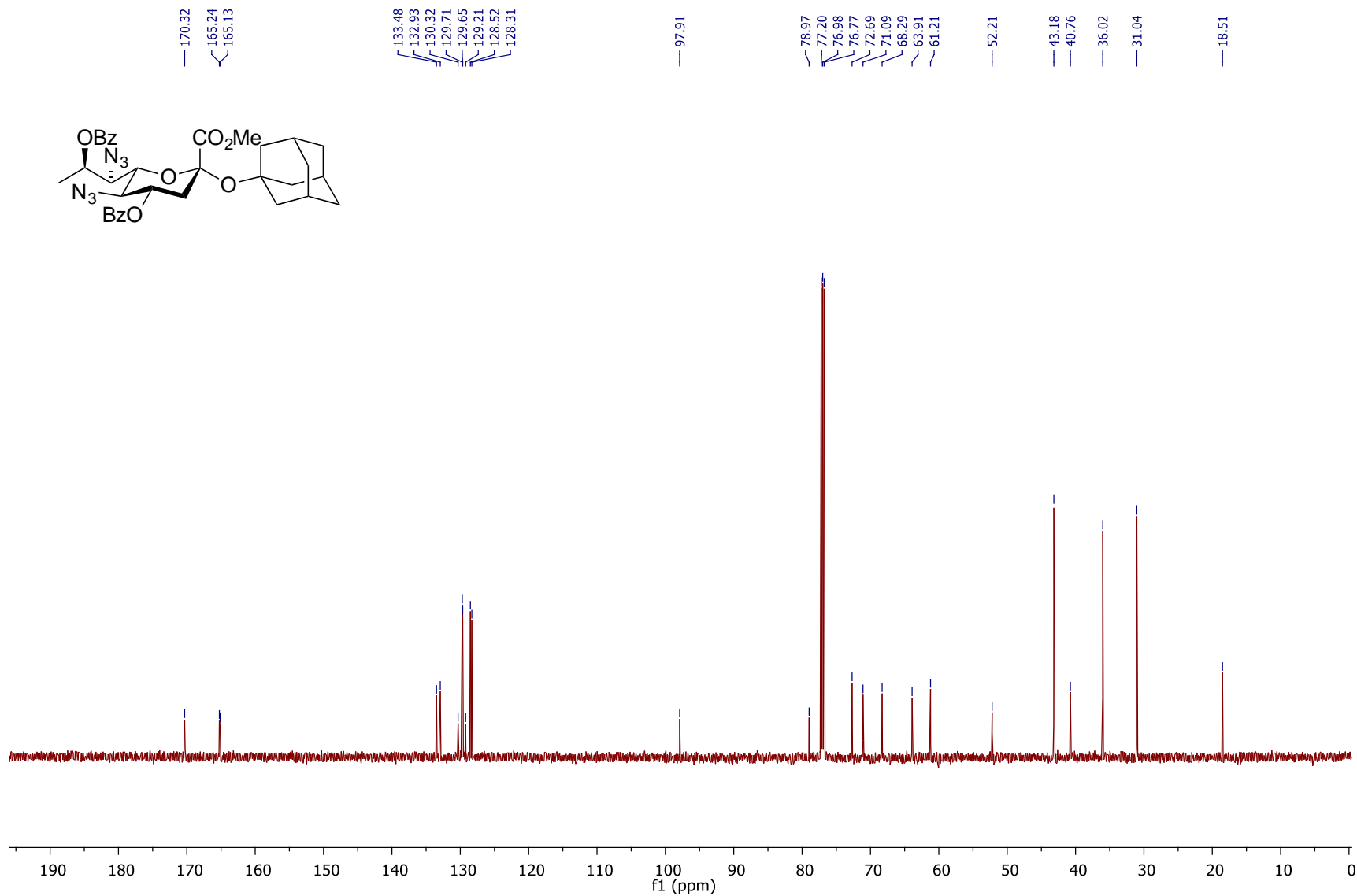
^1H - ^{13}C HMBC NMR, CDCl_3



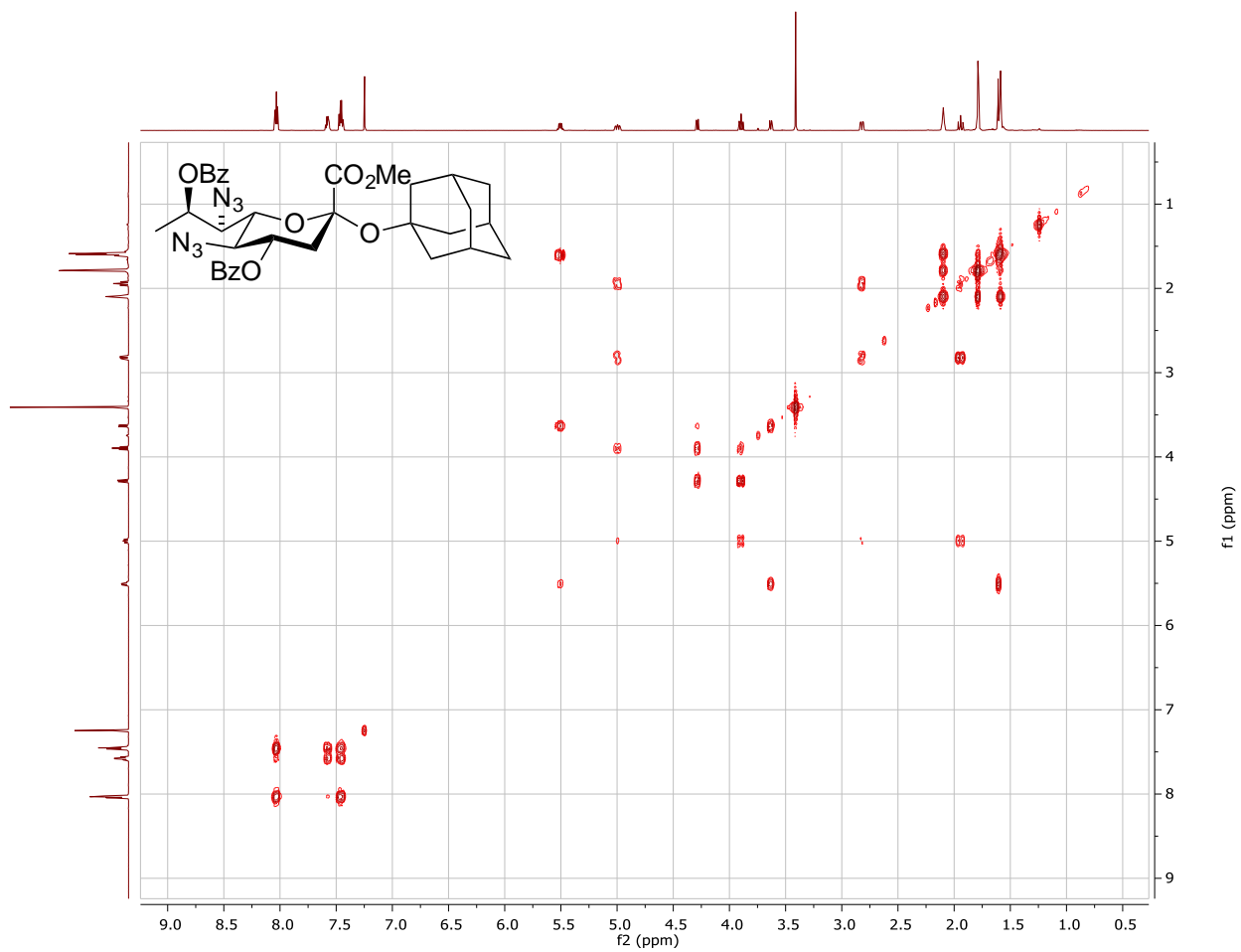
¹H NMR (600 MHz, CDCl₃) Methyl [1-adamantanyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-D-glycero- α -D-galactonon-2-ulopyranosid)onate] (36 α)



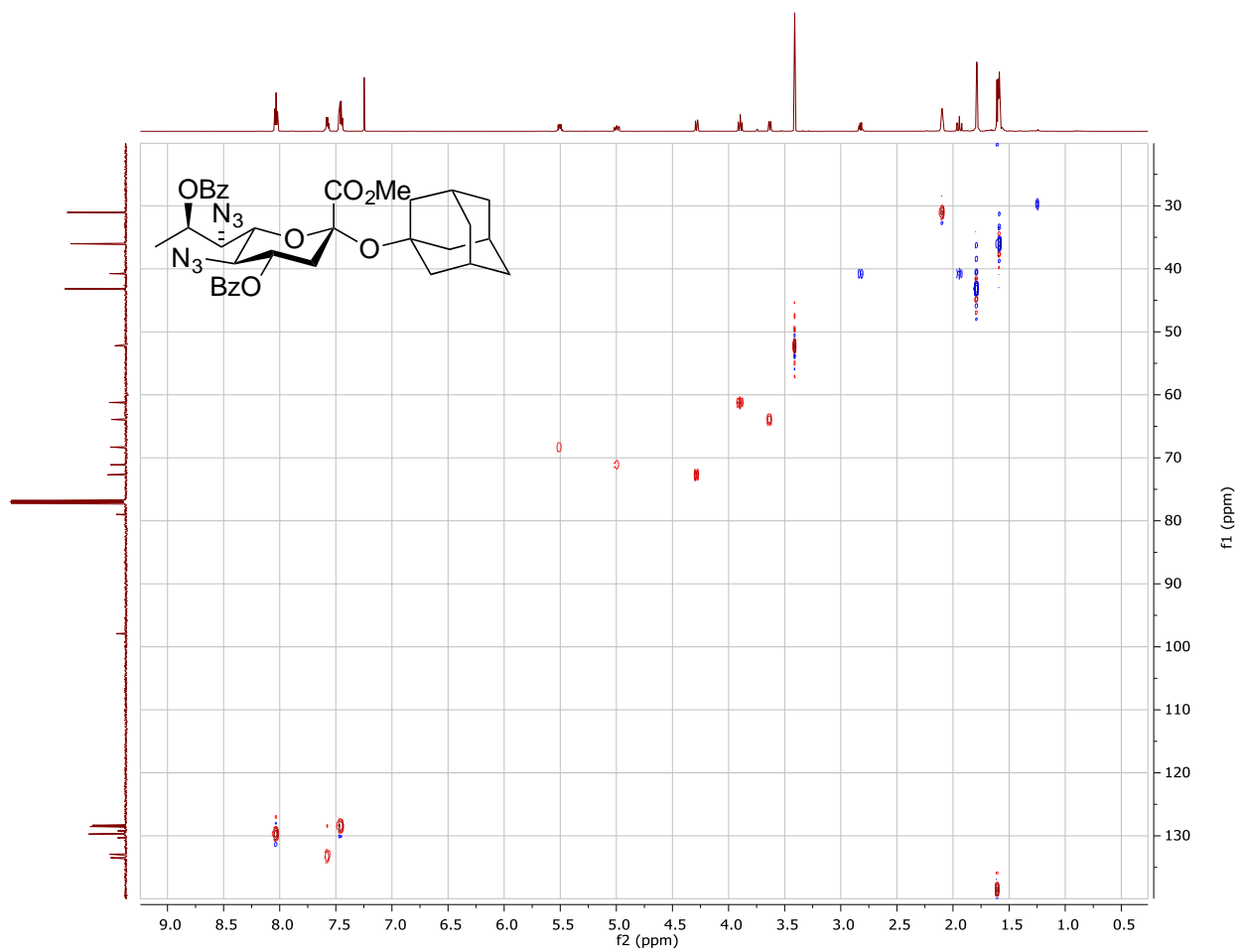
¹³C NMR (151 MHz, CDCl₃) Methyl [1-adamantanyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate] (36 α)



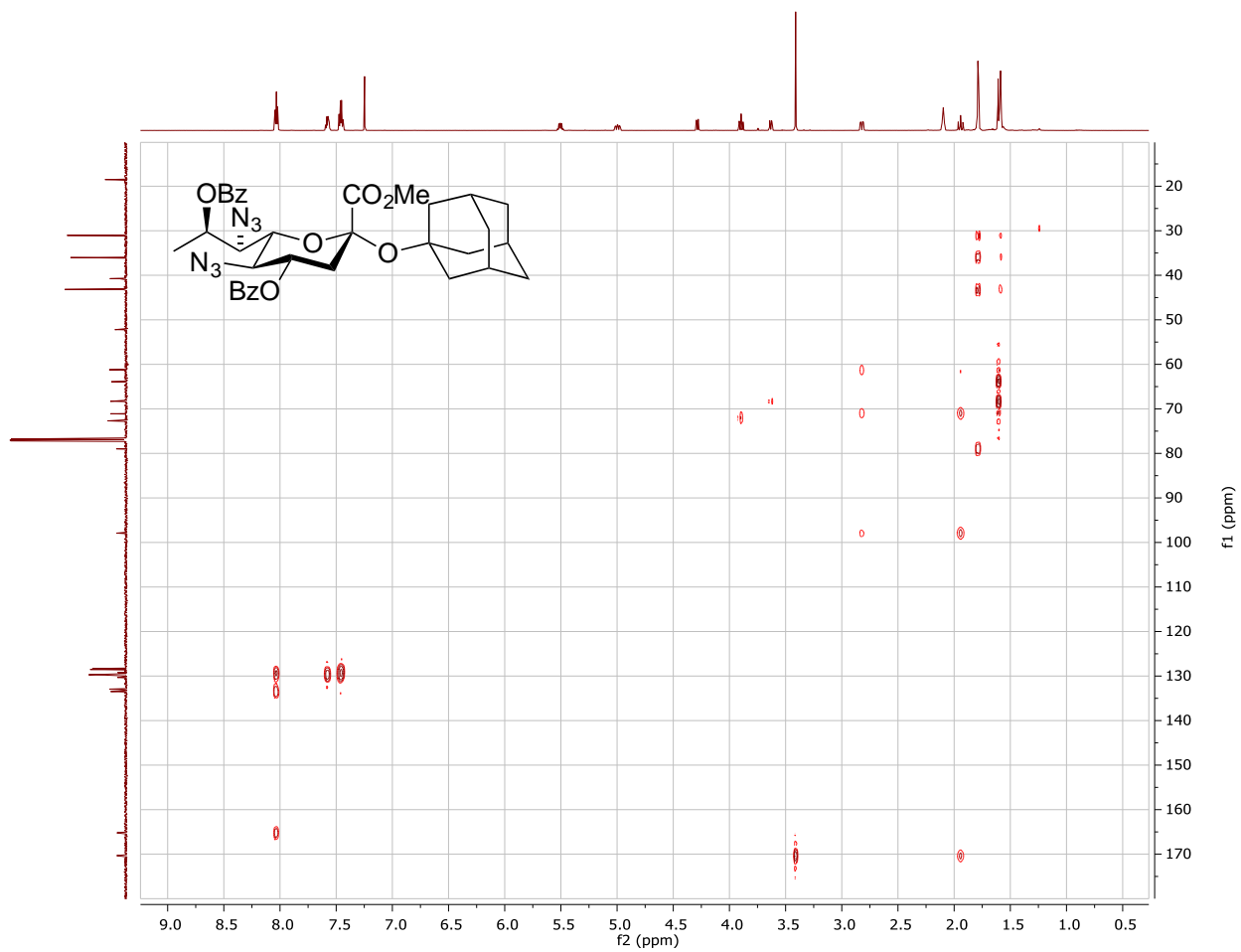
^1H - ^1H COSY NMR, CDCl_3



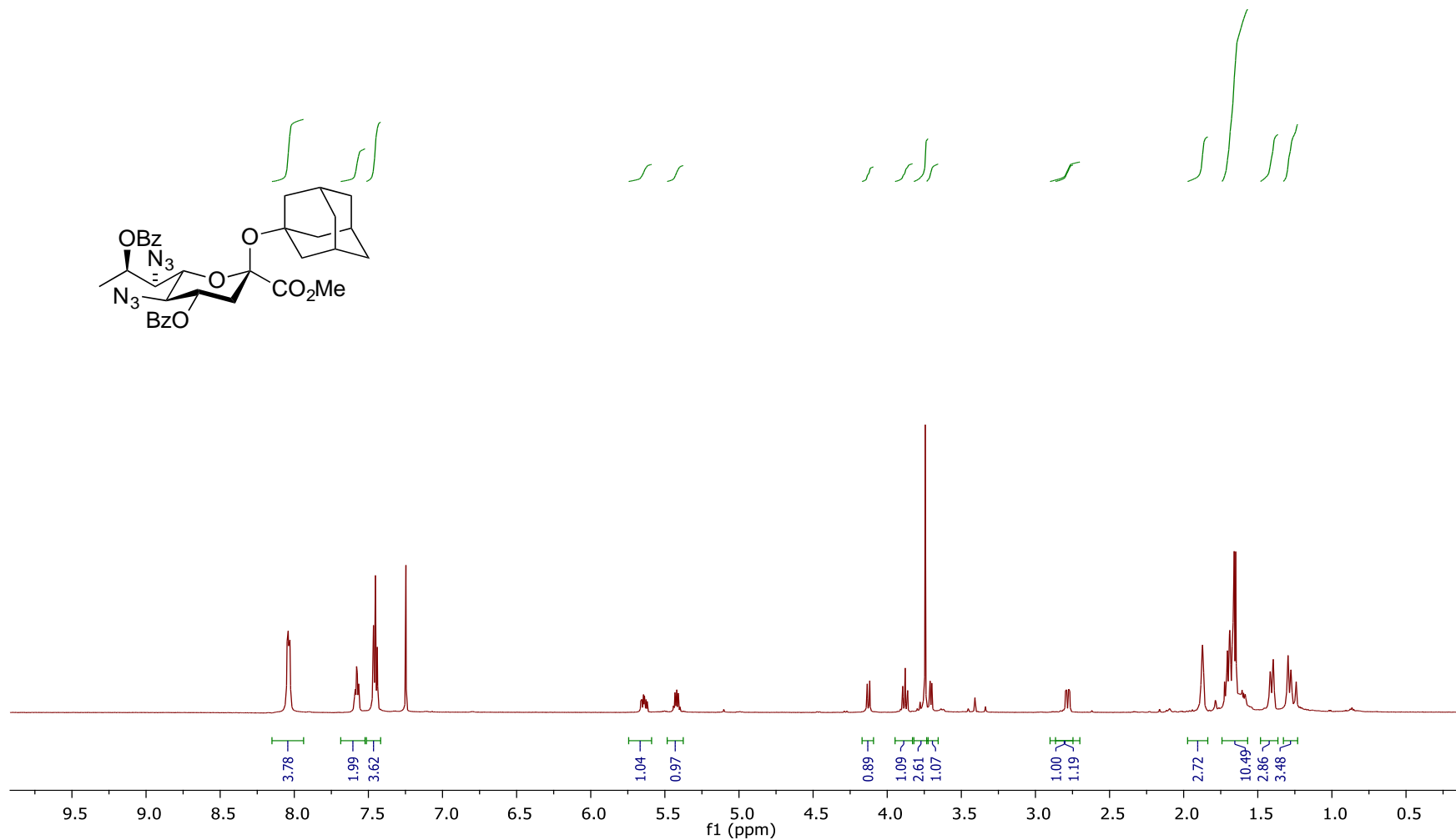
^1H - ^{13}C HSQC NMR, CDCl_3



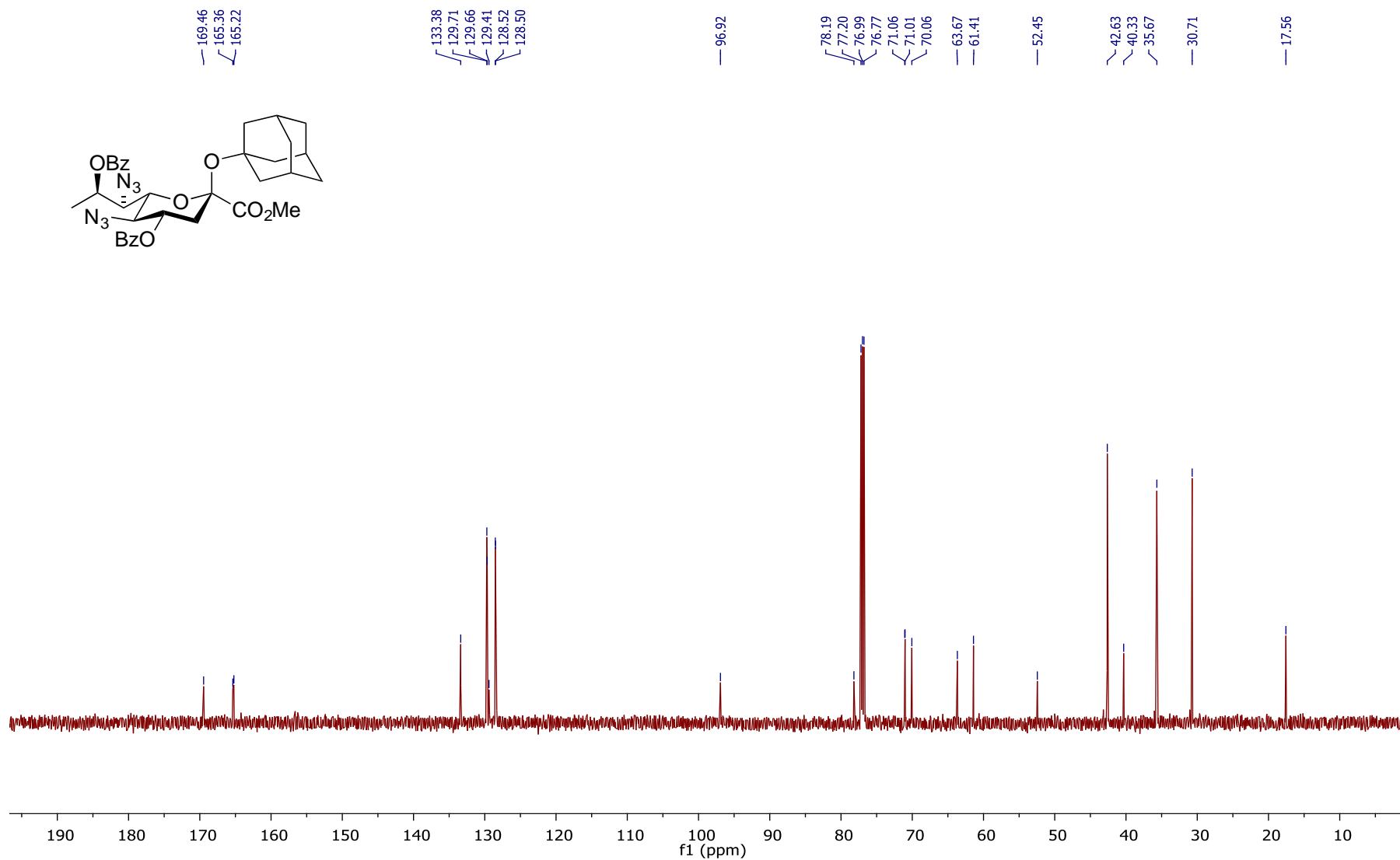
^1H - ^{13}C HMBC NMR, CDCl_3



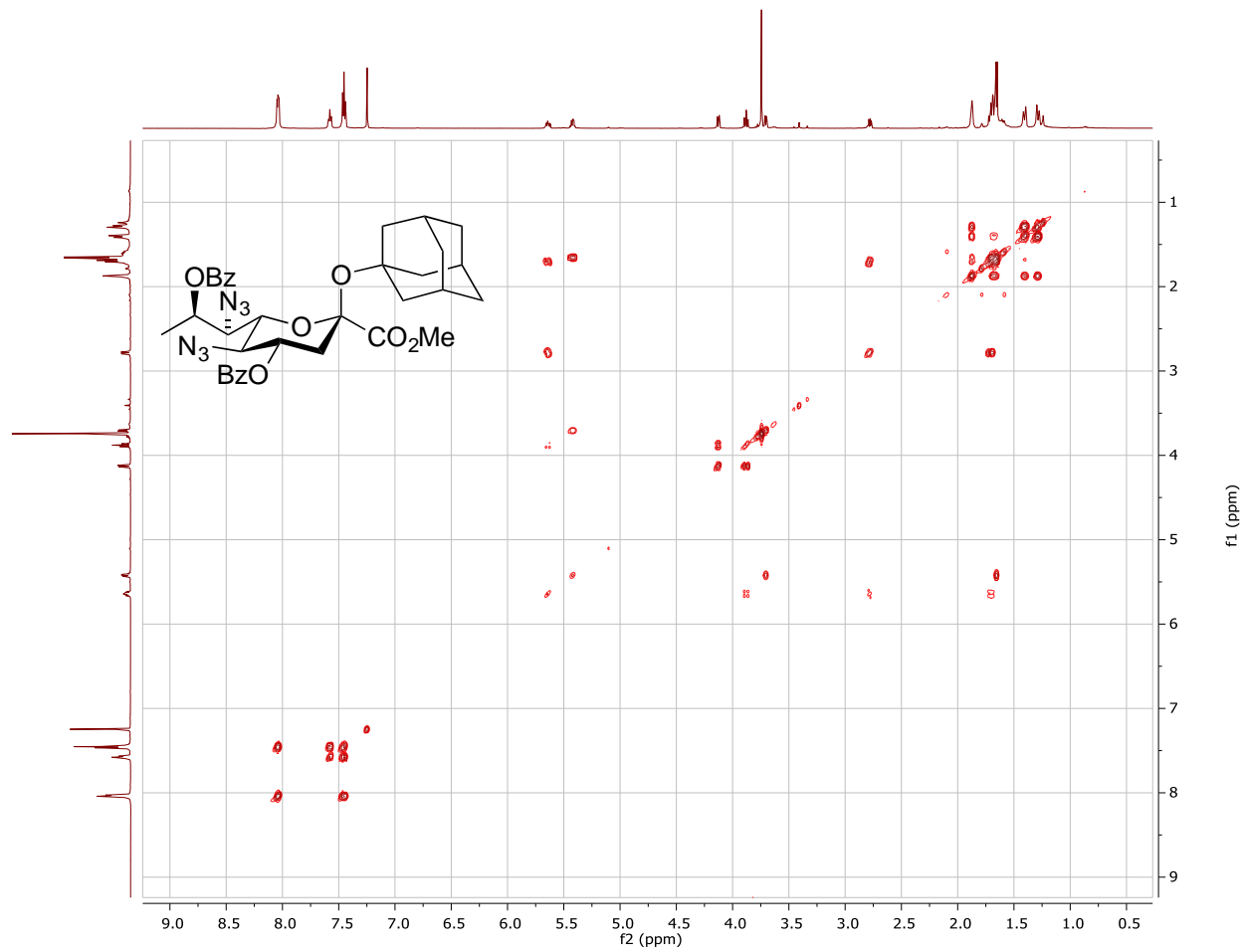
¹H NMR (600 MHz, CDCl₃) Methyl [1-adamantanyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-D-glycero-β-D-galacto-non-2-ulo-pyranosid)onate] (36β)



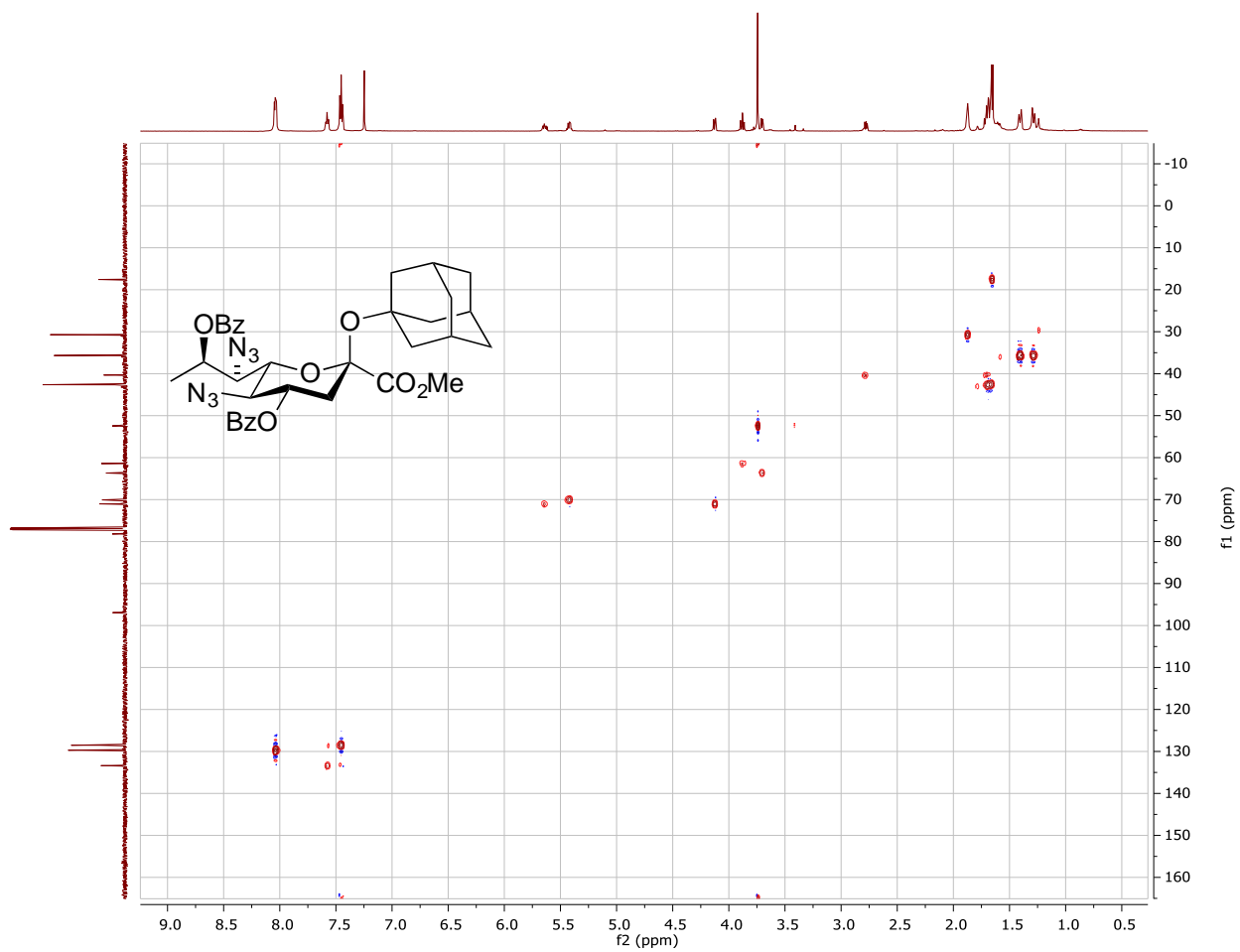
¹³C NMR (151 MHz, CDCl₃) Methyl [1-adamantanyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetraoxy-D-glycero-β-D-galactono-2-uloopyranosid)onate] (36β)



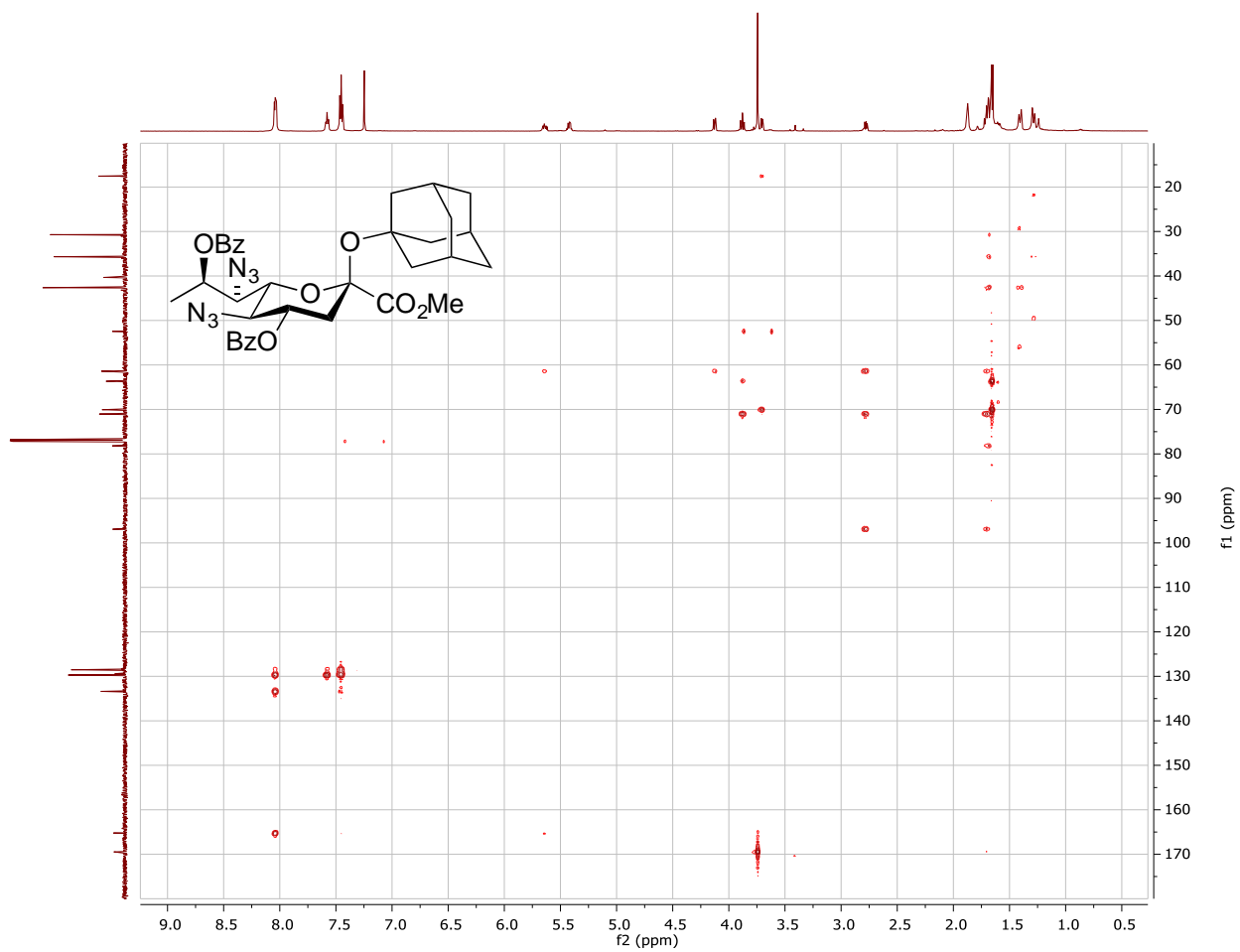
^1H - ^1H COSY NMR, CDCl_3



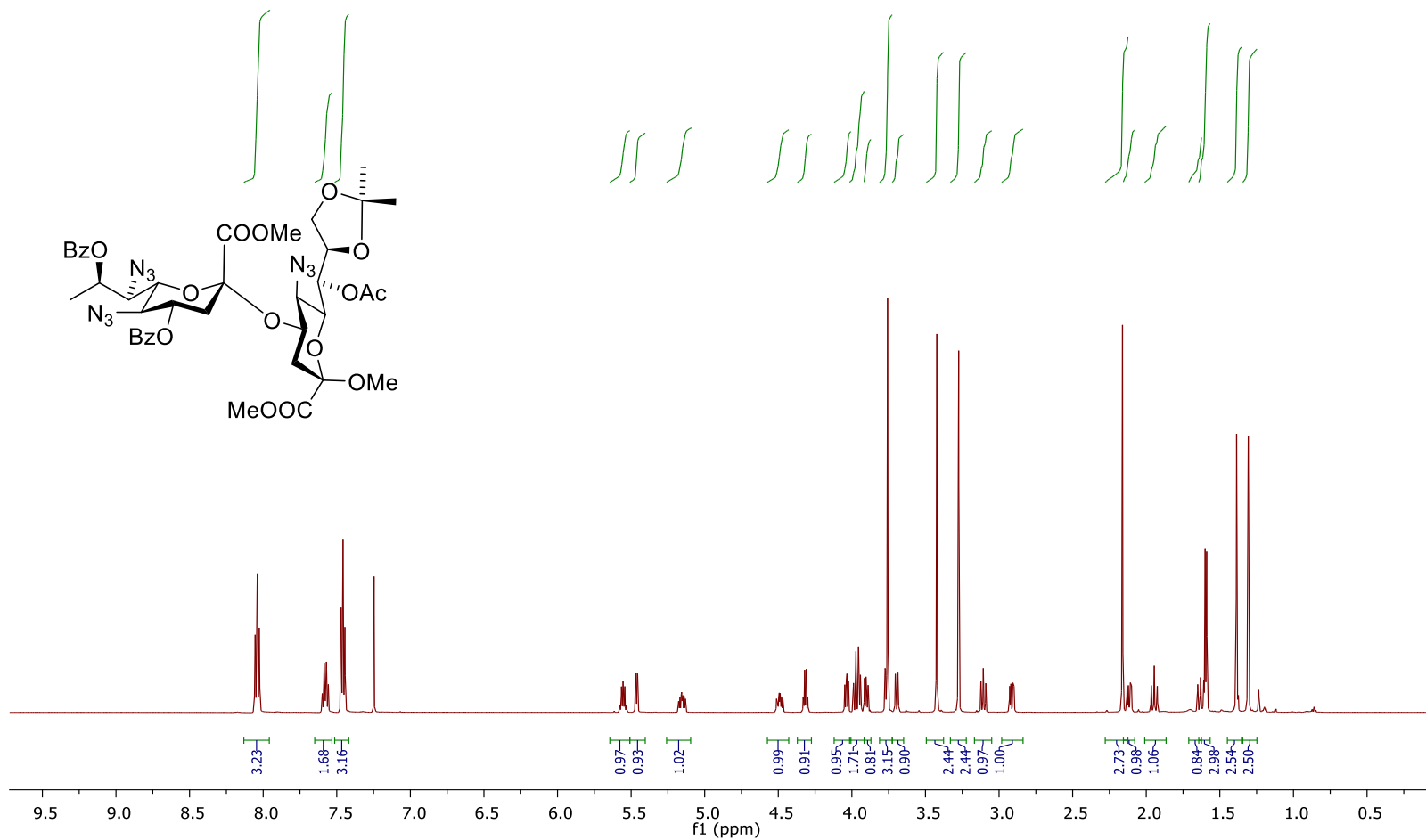
^1H - ^{13}C HSQC NMR, CDCl_3



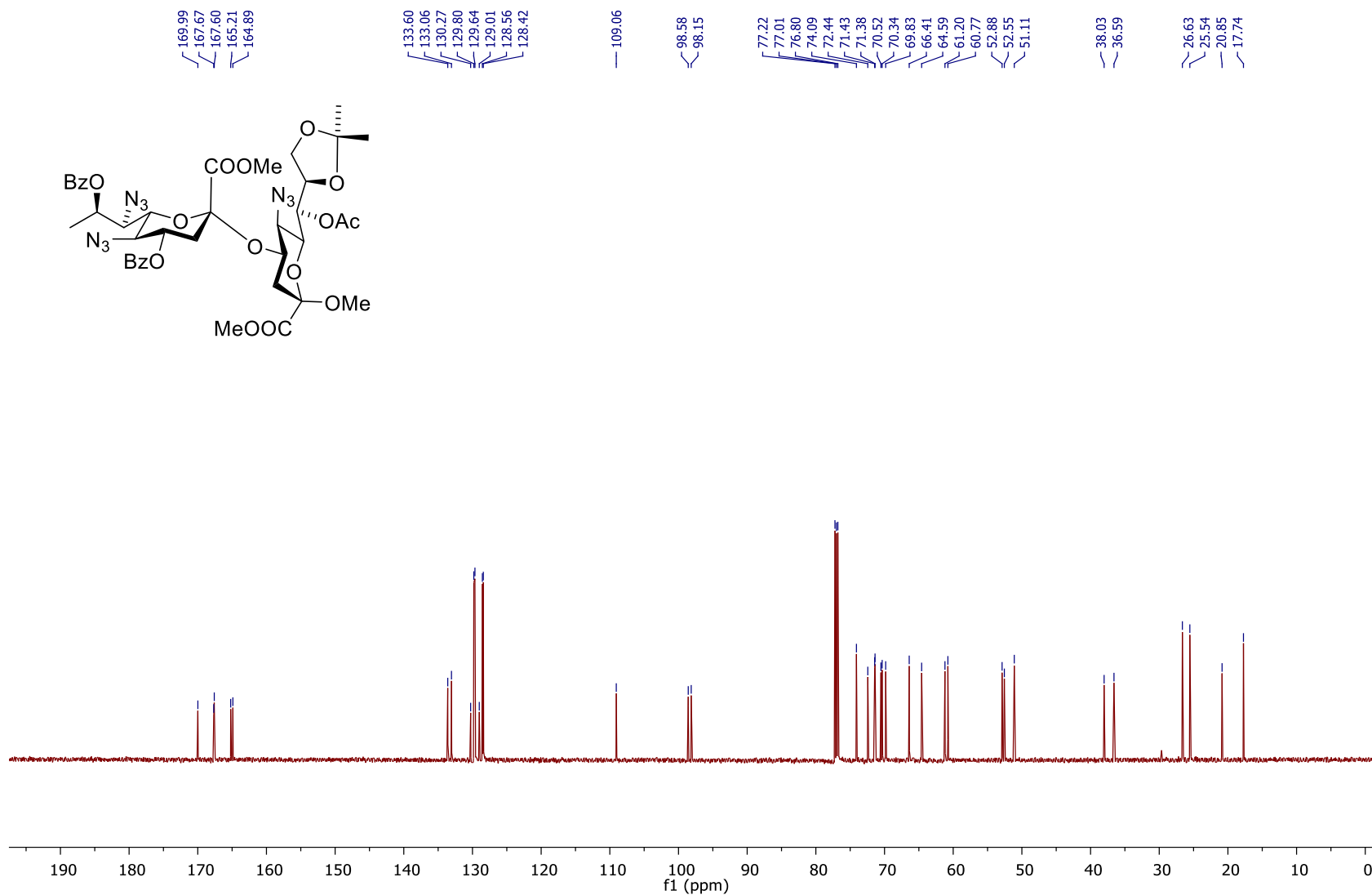
^1H - ^{13}C HMBC NMR, CDCl_3



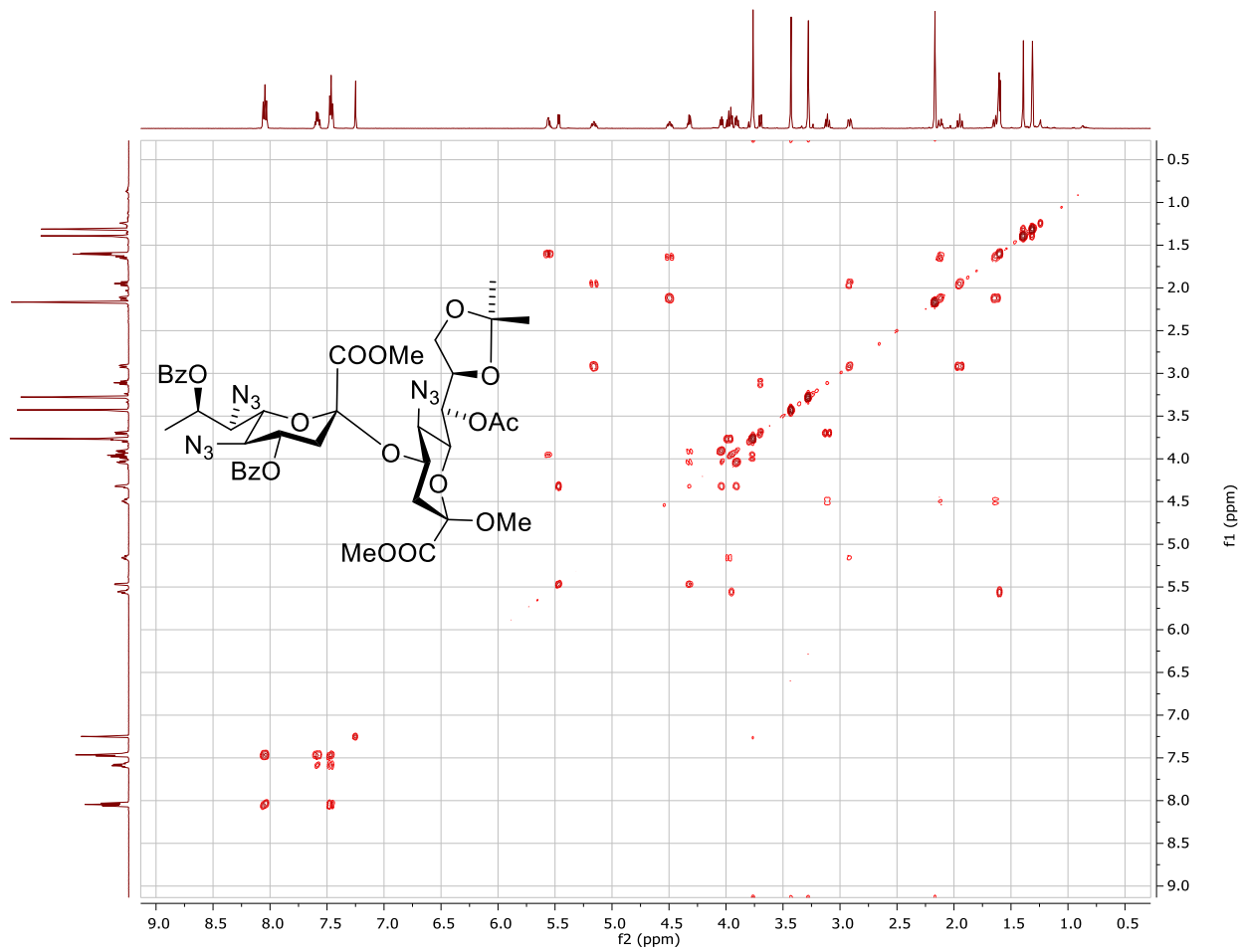
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (5,7-diazo-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-D-glycero- α -D-galacto-non-2-ulo-pyranosid)onate]-(2 \rightarrow 4)-methyl 7-*O*-acetyl-5-azido-3,5-dideoxy-8,9-*O*-isopropylidene-D-glycero-D-galacto-non-2-ulo-pyranoside (32 α)



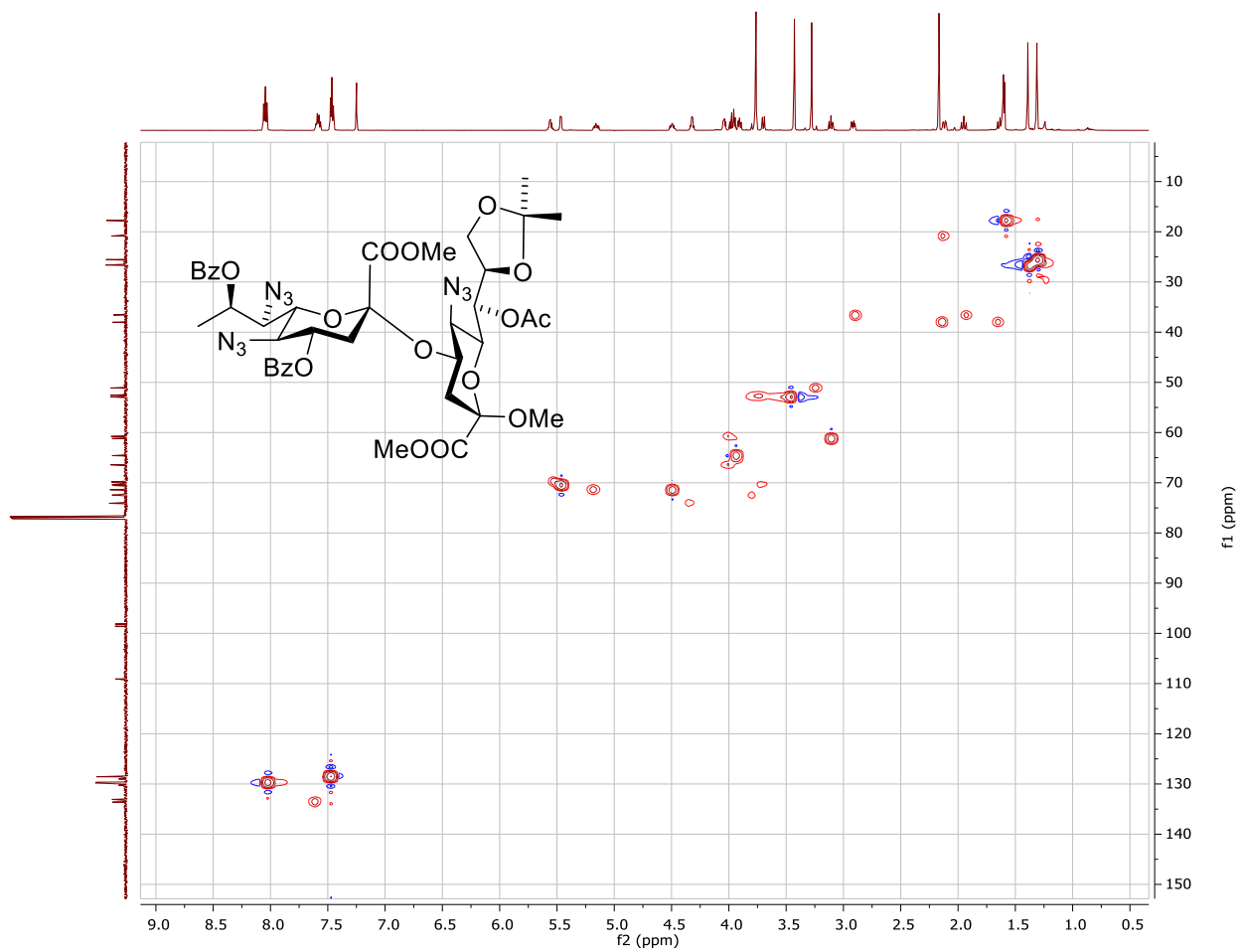
¹³C NMR (151 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-D-glycero- α -D-galacto-non-2-ulo-pyranosid)onate]-(2 \rightarrow 4)-methyl 7-*O*-acetyl-5-azido-3,5-dideoxy-8,9-*O*-isopropylidene-D-glycero-D-galacto-non-2-ulo-pyranoside (32 α)



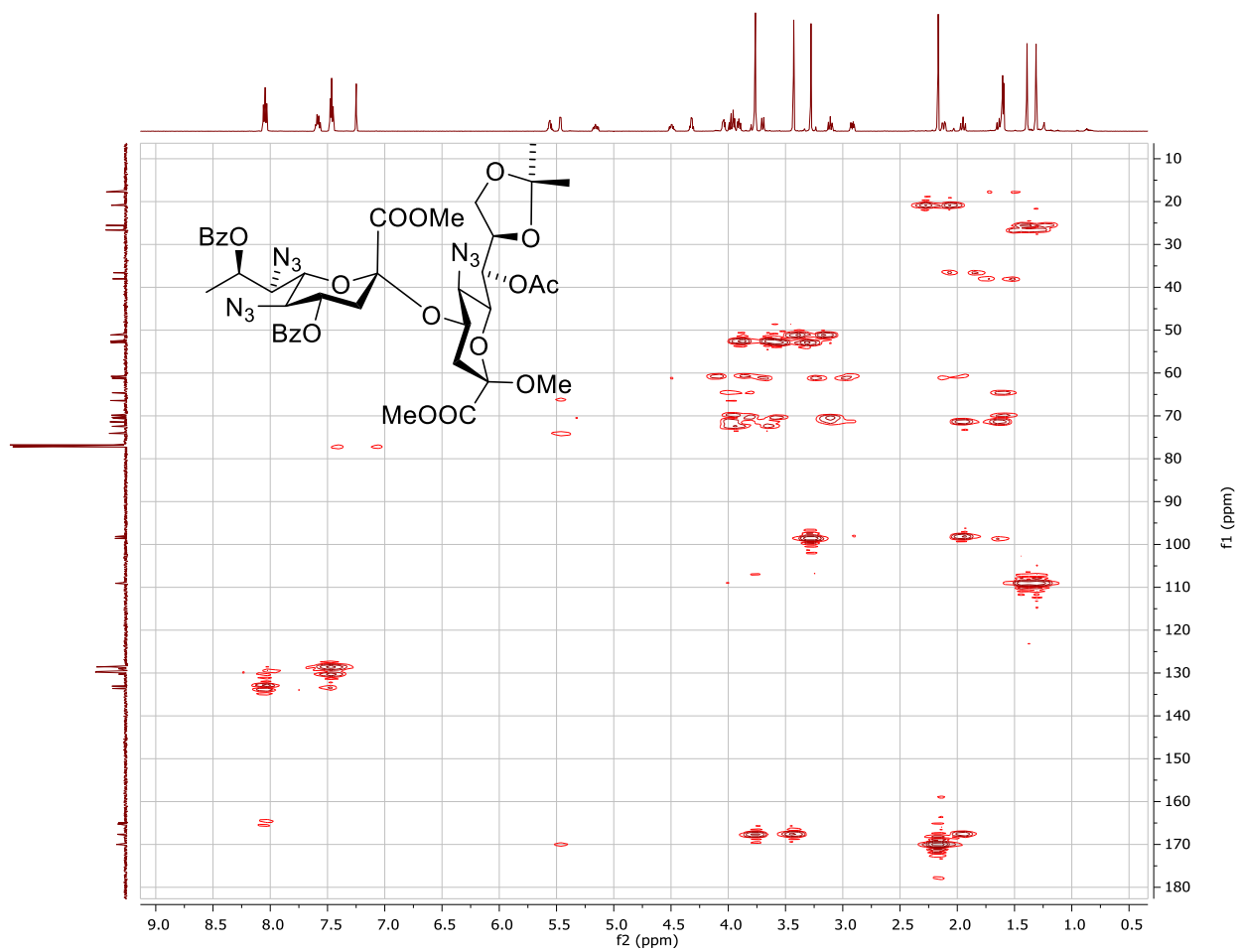
^1H - ^1H COSY NMR, CDCl_3



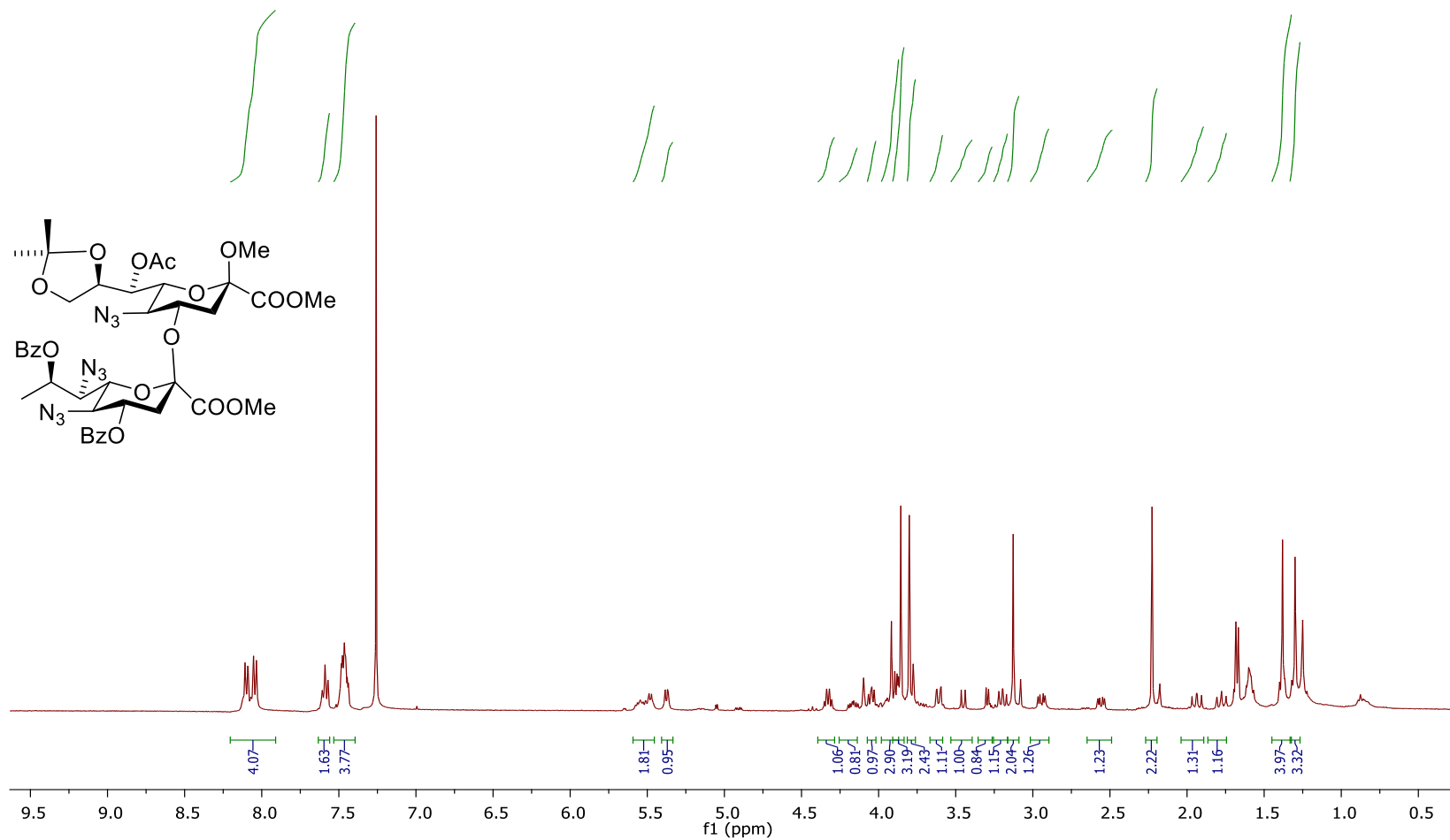
^1H - ^{13}C HSQC NMR, CDCl_3



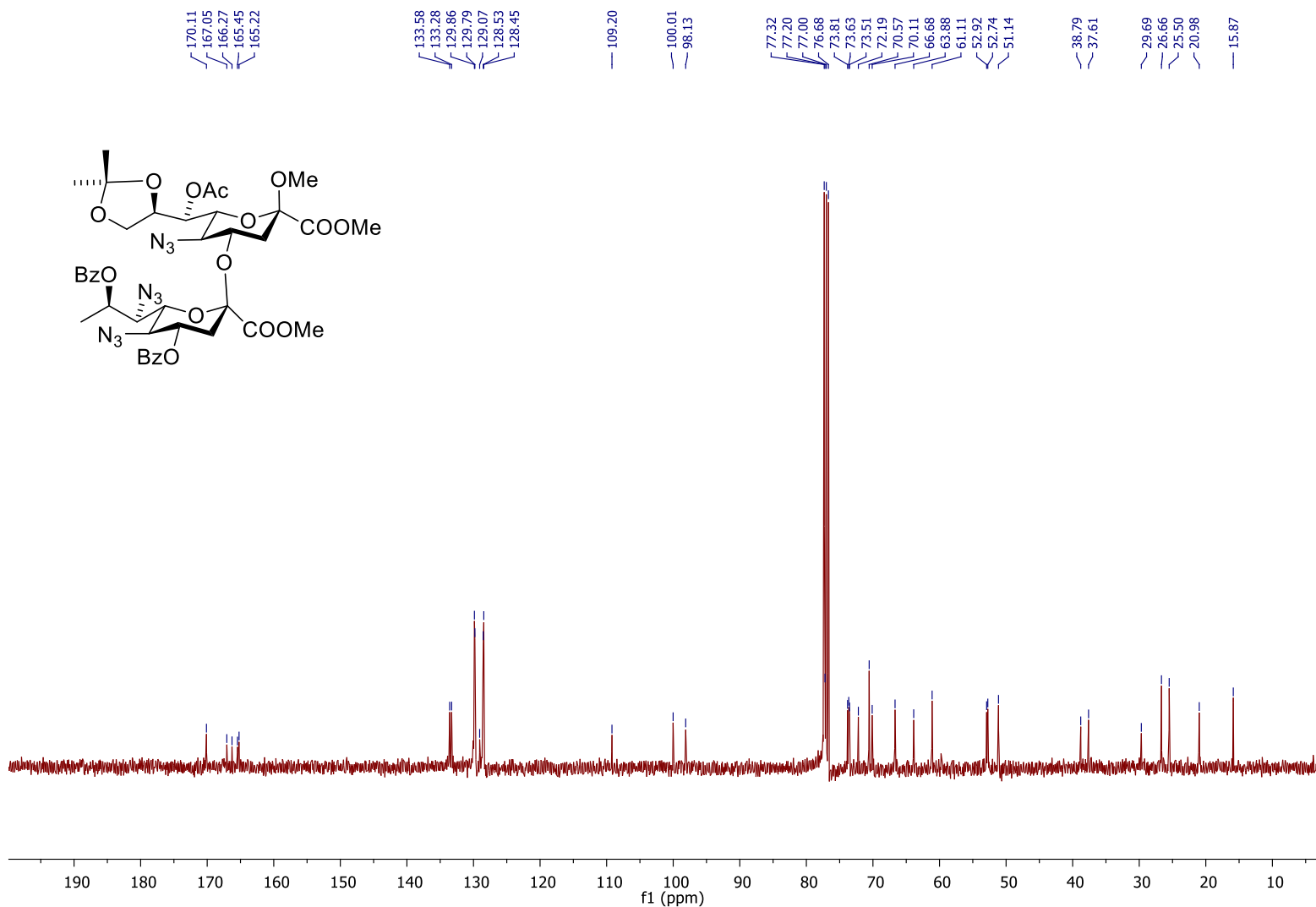
^1H - ^{13}C HMBC NMR, CDCl_3



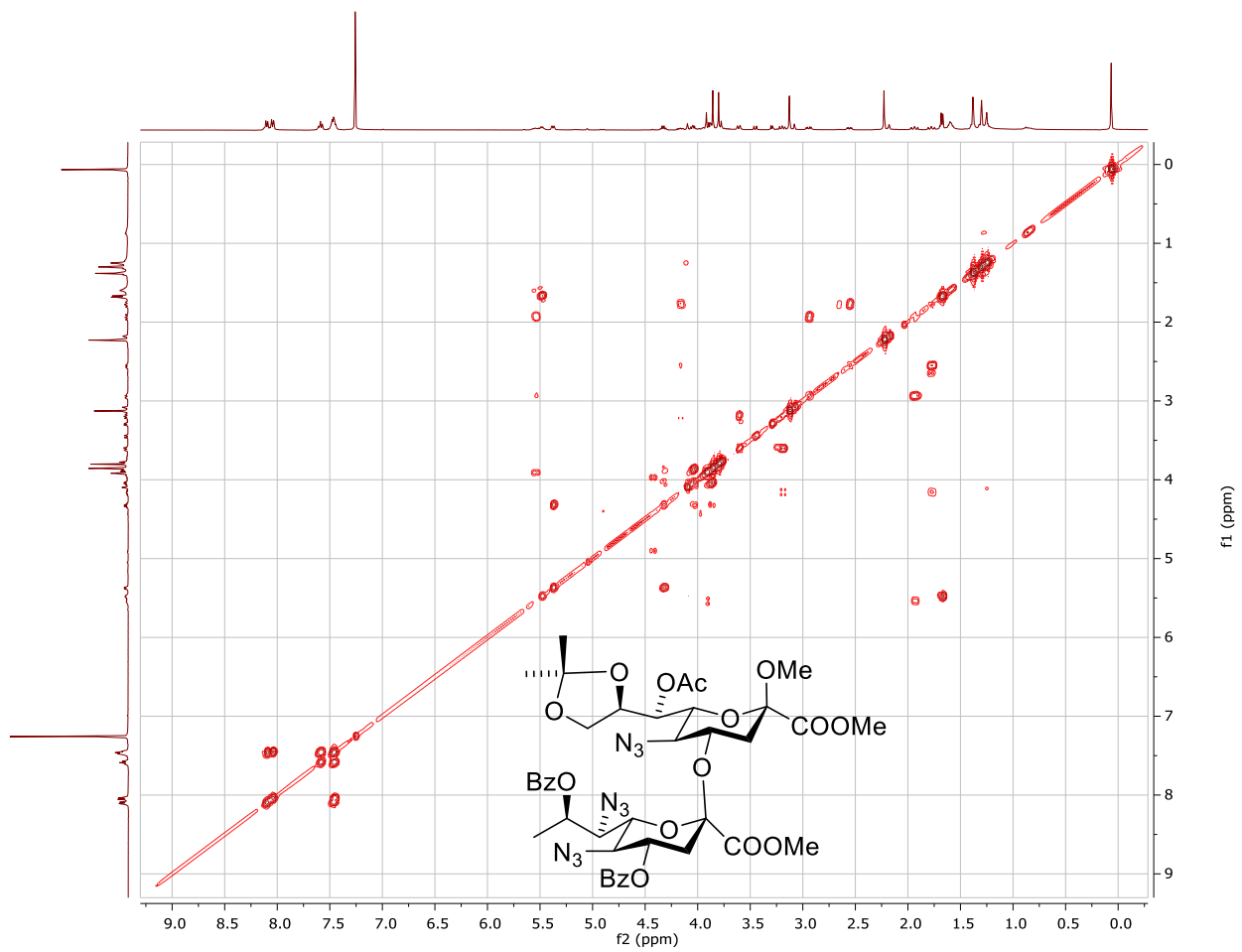
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-D-glycero-β-D-galacto-non-2-ulo-pyranosid)onate]-(2→4)-methyl 7-*O*-acetyl-5-azido-3,5-dideoxy-8,9-*O*-isopropylidene-D-glycero-D-galacto-non-2-ulo-pyranoside (32β)



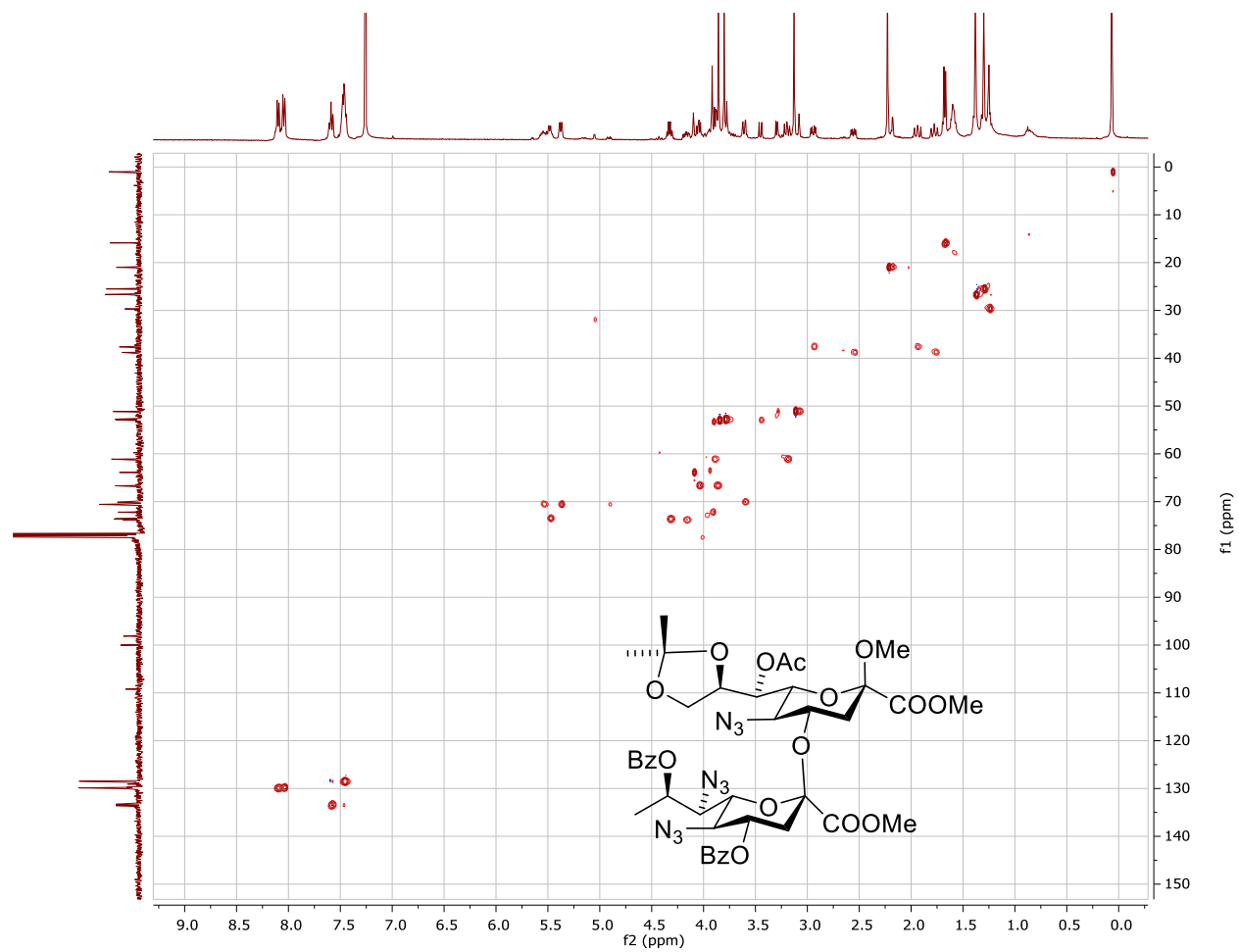
¹³C NMR (151 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-D-glycero-β-D-galacto-non-2-ulo-pyranosid)onate]-(2→4)-methyl 7-*O*-acetyl-5-azido-3,5-dideoxy-8,9-*O*-isopropylidene-D-glycero-D-galacto-non-2-ulo-pyranoside (32β)



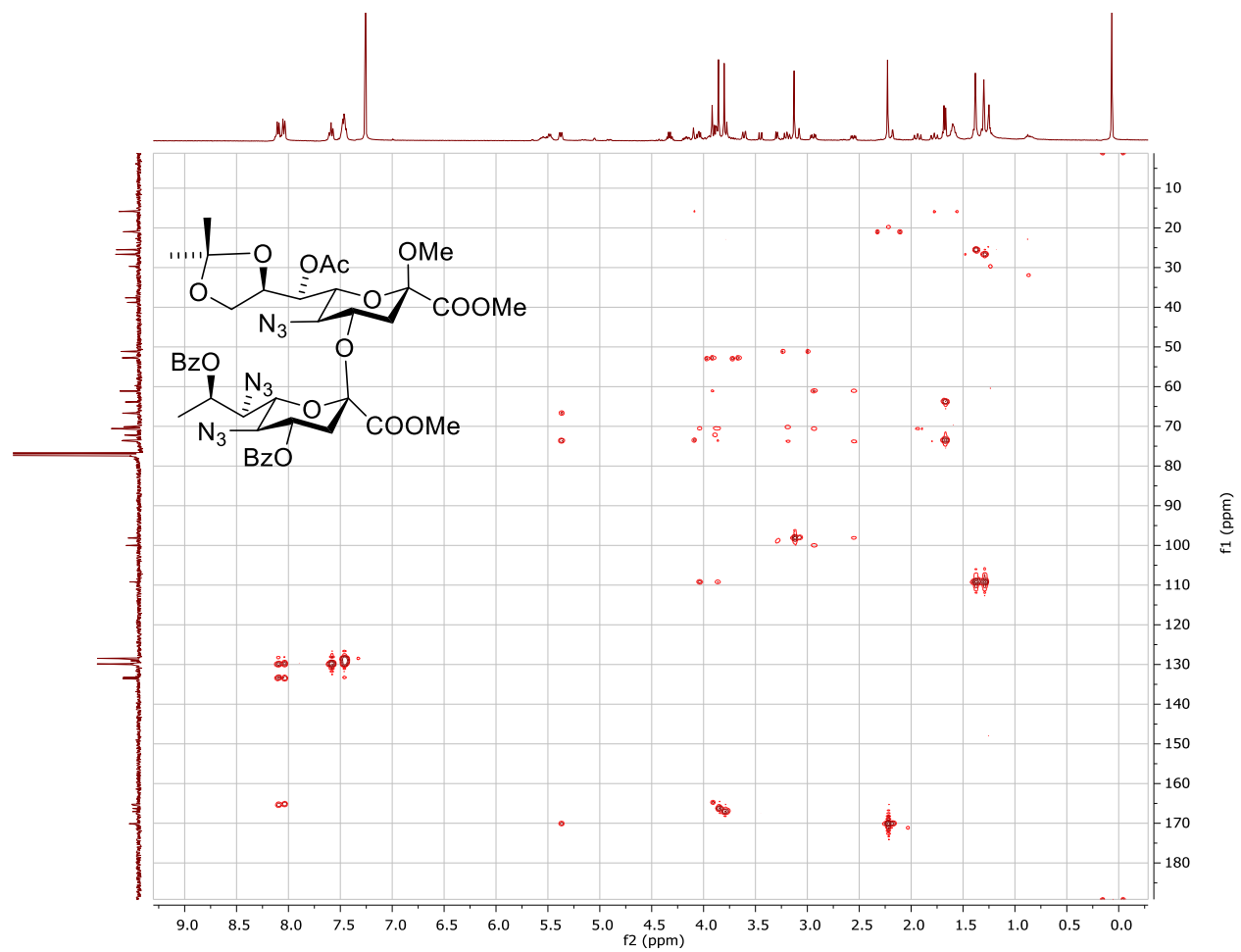
^1H - ^1H COSY NMR, CDCl_3



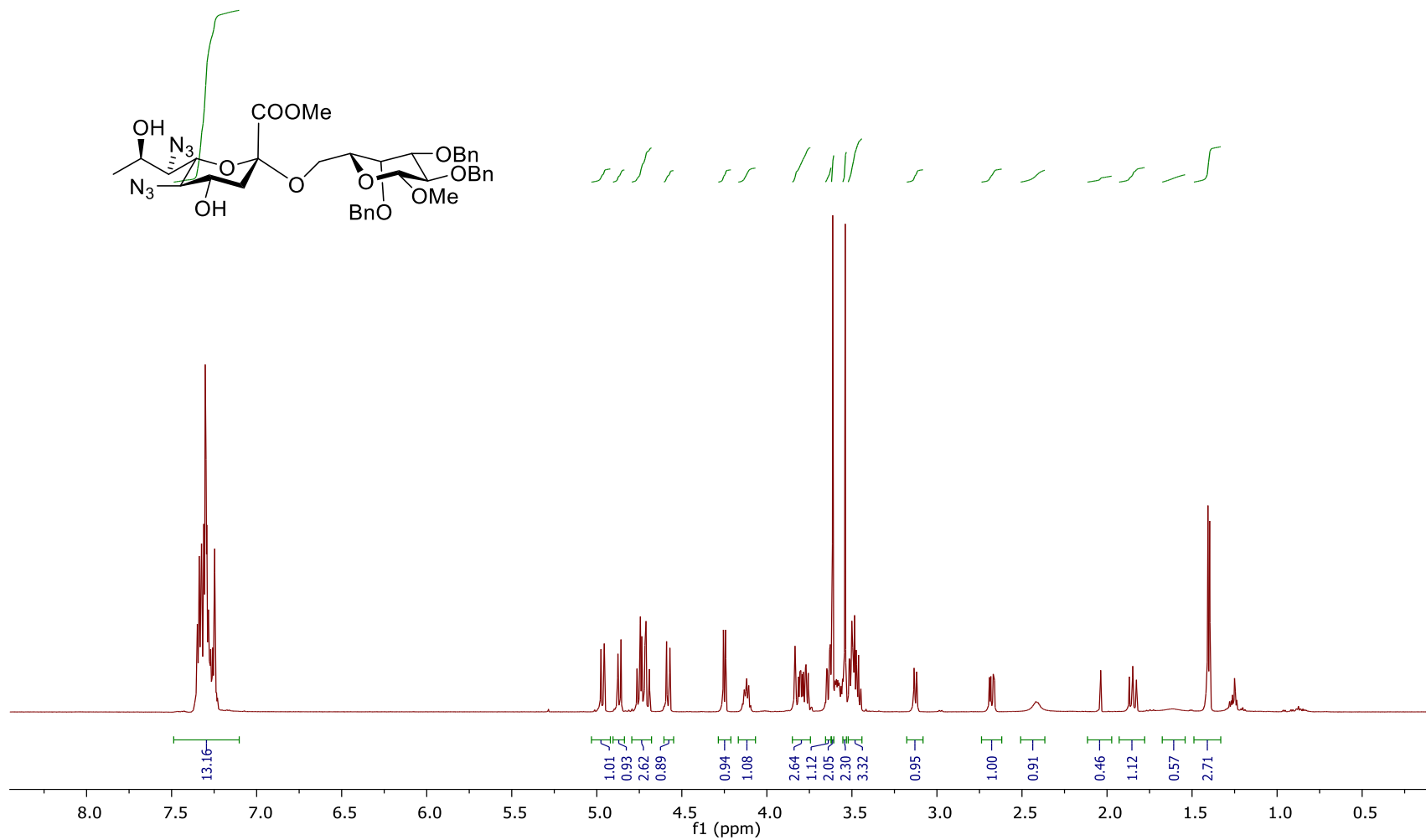
^1H - ^{13}C HSQC NMR, CDCl_3



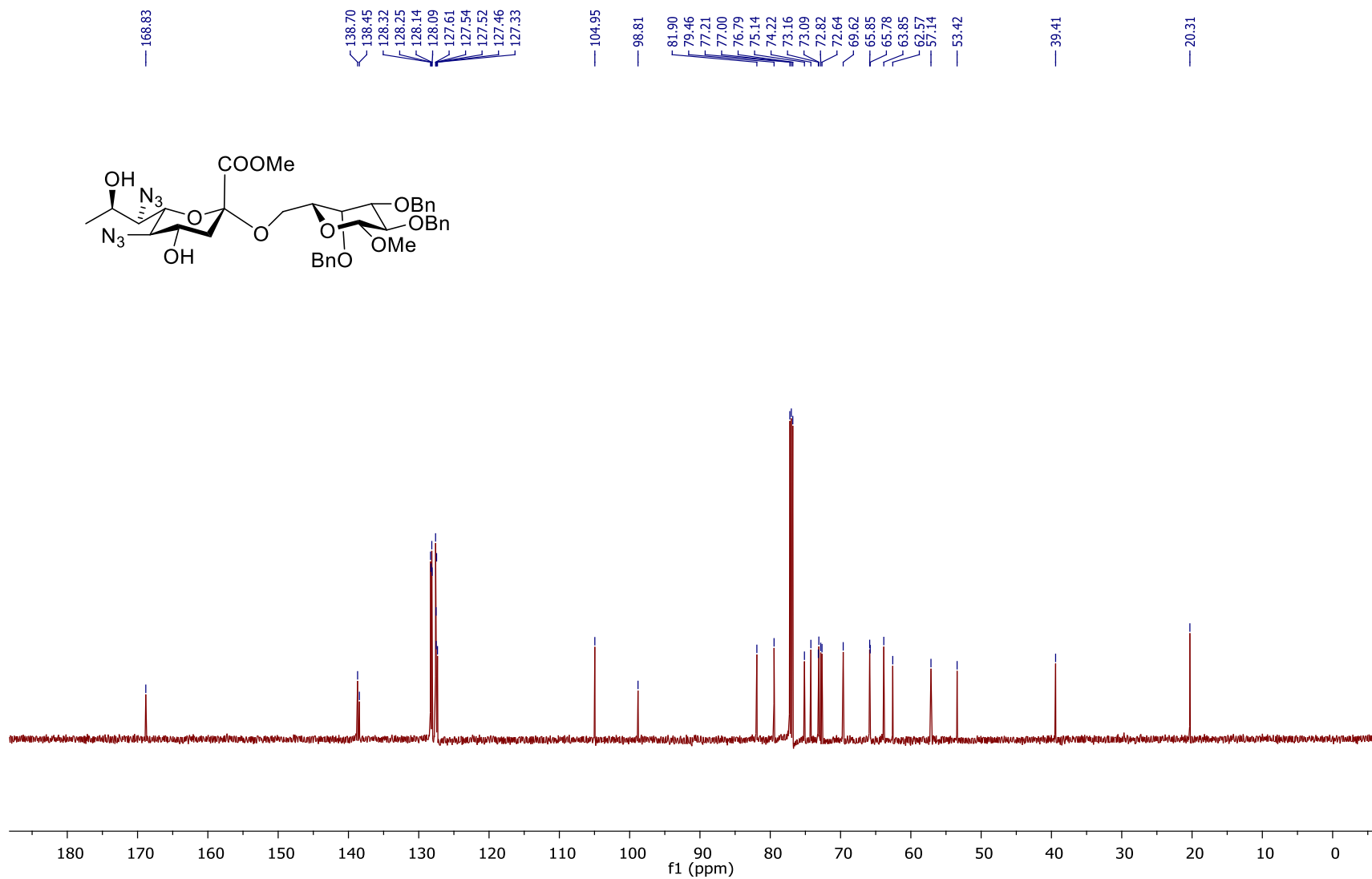
^1H - ^{13}C HMBC NMR, CDCl_3



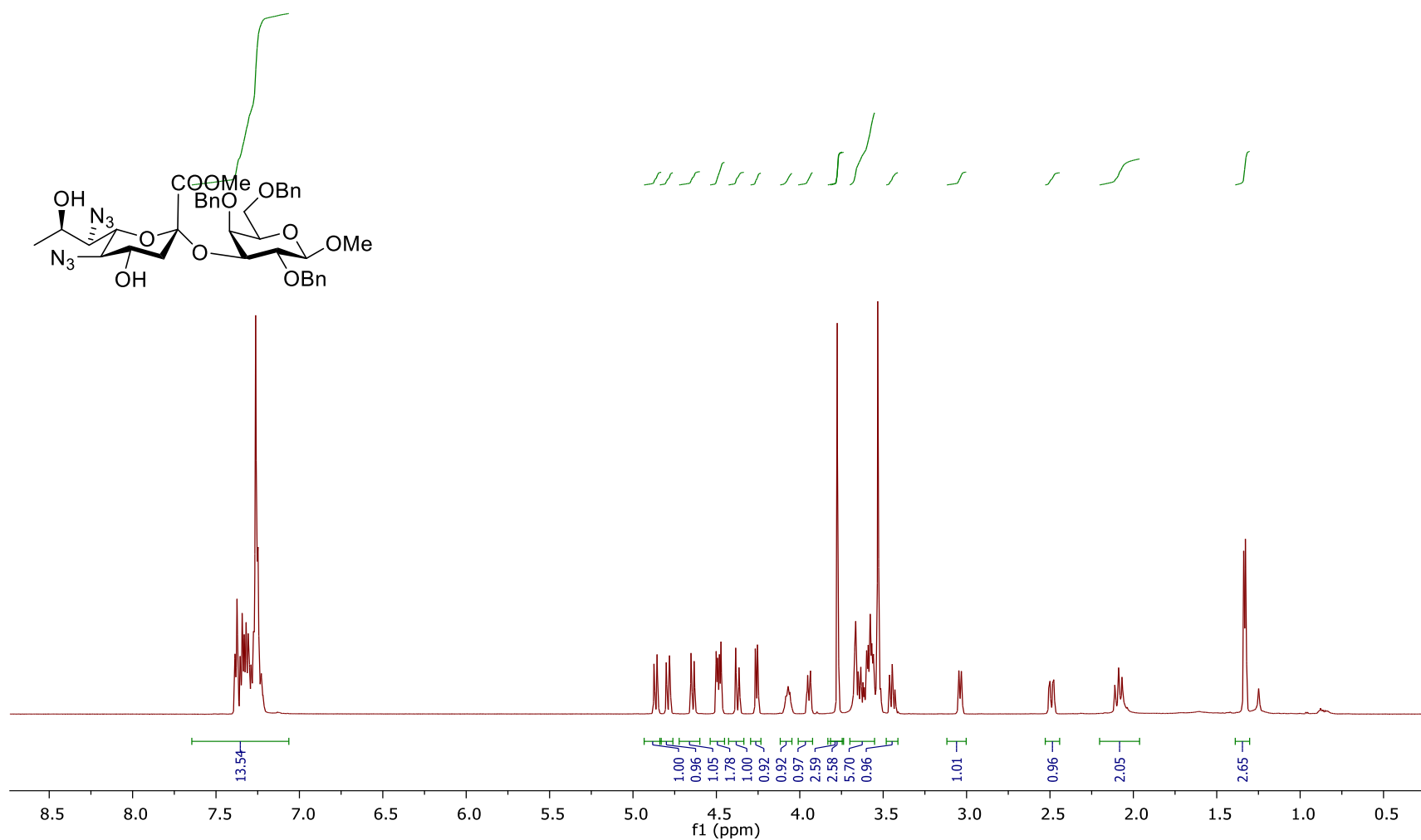
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (5,7-diazido-3,4,5,7,8,9-hexadeoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 6)-2,3,4-tri-O-benzyl- β -D-galactopyranoside (37)



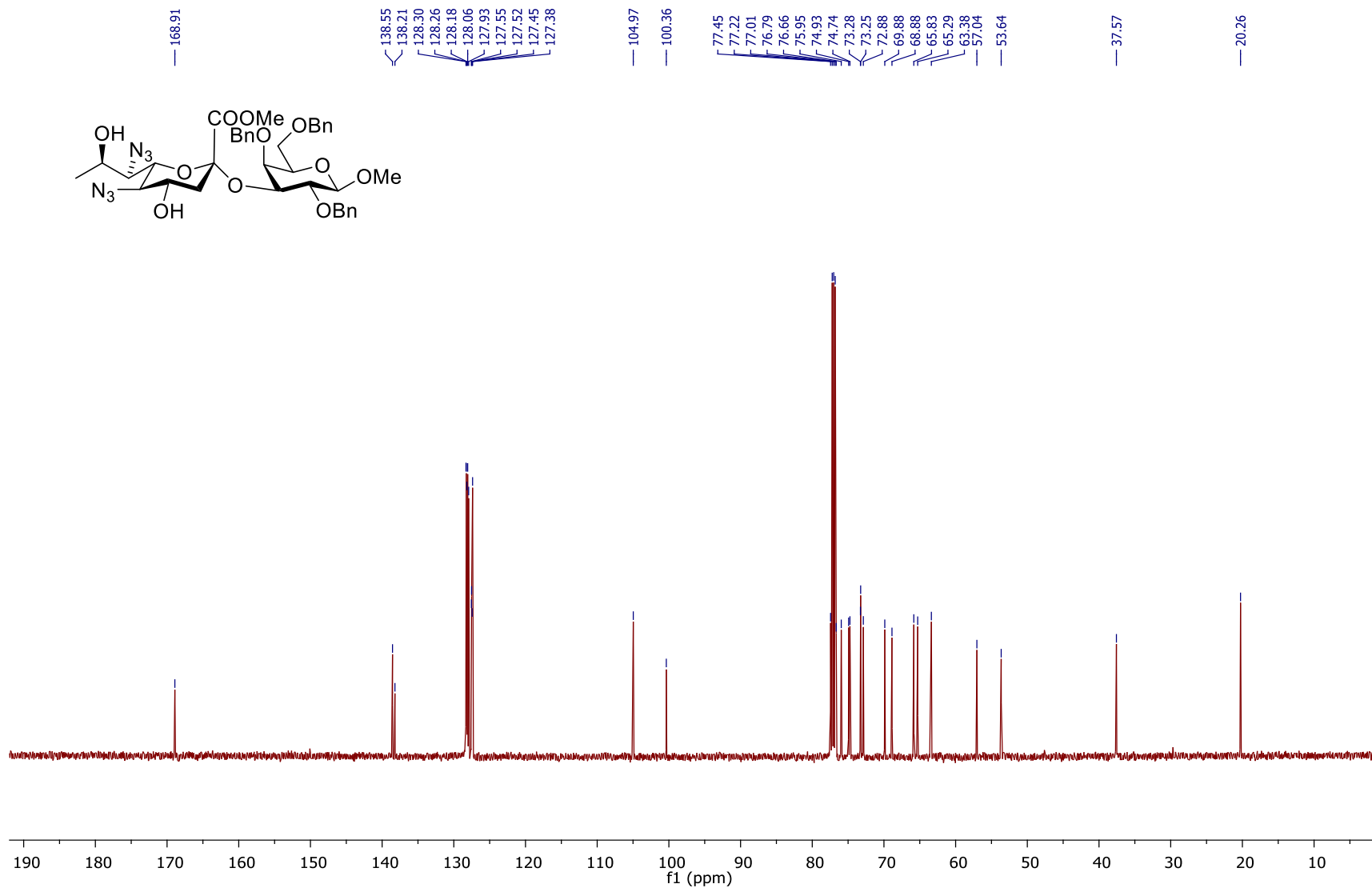
**¹³C NMR (151 MHz, CDCl₃) Methyl [methyl (5,7-diazido-3,4,5,7,8,9-hexadeoxy-D-glycero- α -D-galacto-non-2-
ulopyranosid)onate]-(2 \rightarrow 6)-2,3,4-tri-O-benzyl- β -D-galactopyranoside (37)**



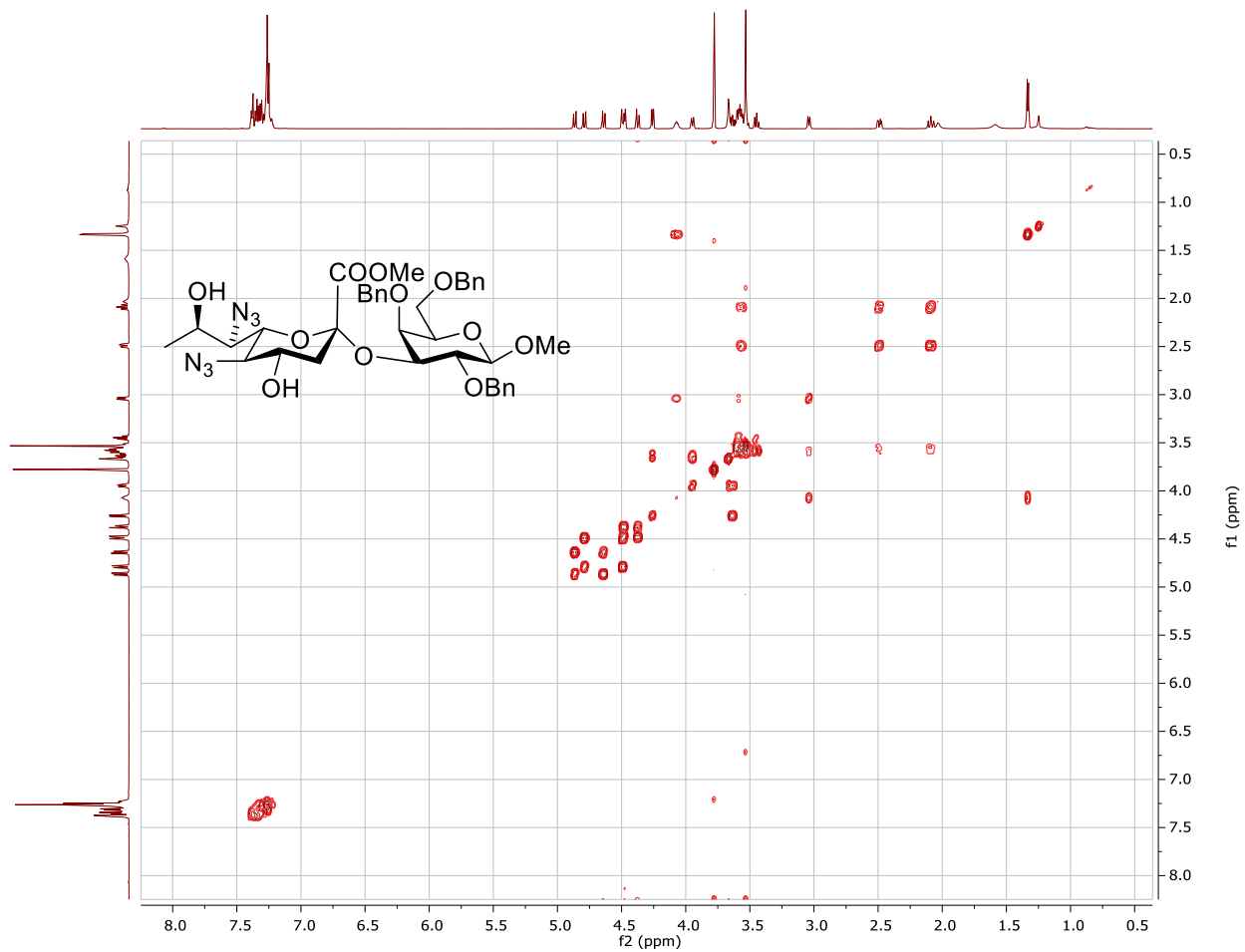
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (5,7-diaziido-3,4,5,7,8,9-hexadeoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 3)-2,4,6-tri-O-benzyl- β -D-galactopyranoside (33 α)



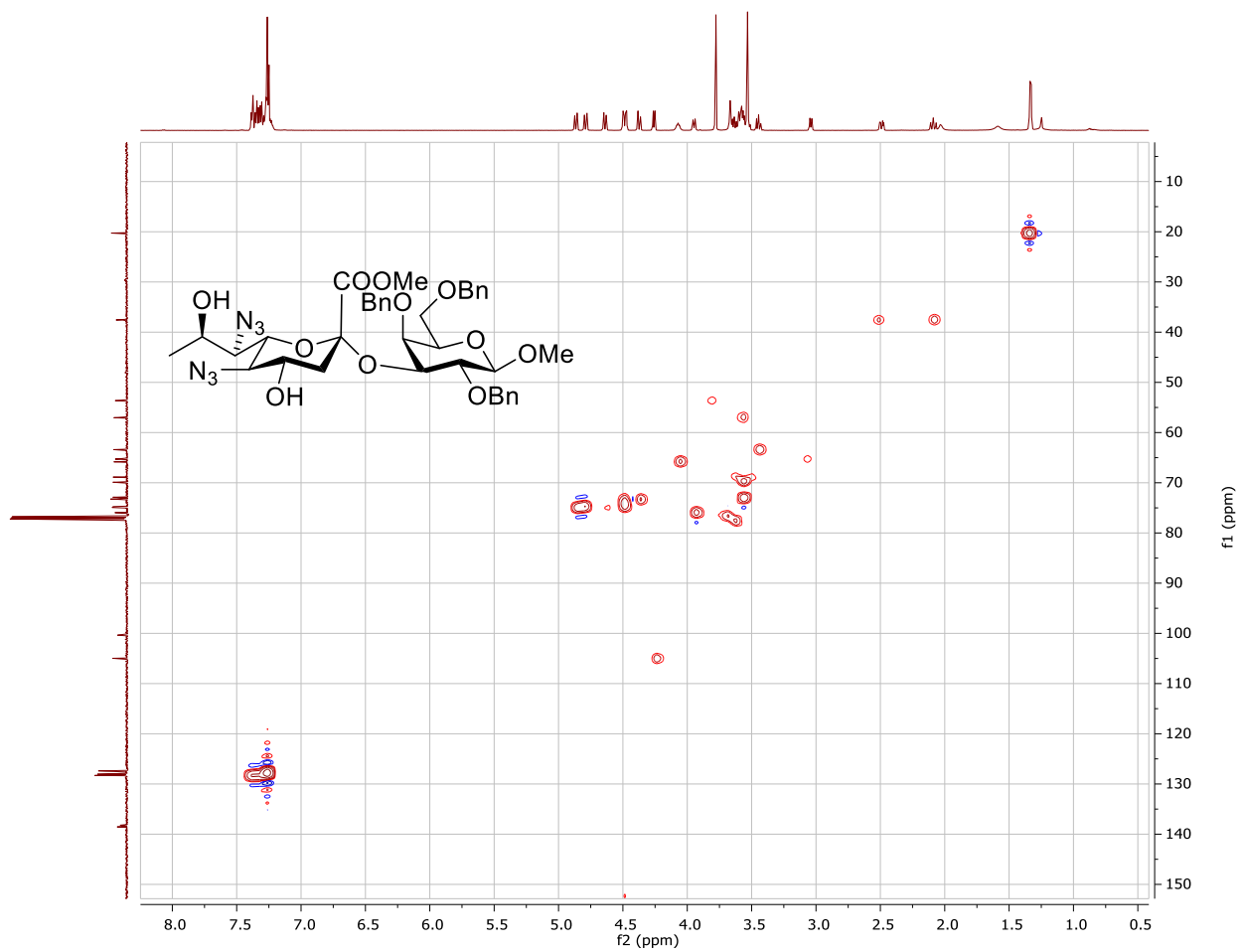
**^{13}C NMR (151 MHz, CDCl_3) Methyl [methyl (5,7-diazido-3,4,5,7,8,9-hexadeoxy-D-glycero- α -D-galacto-non-2-
ulopyranosid)onate]-(2 \rightarrow 3)-2,4,6-tri-*O*-benzyl- β -D-galactopyranoside (33 α)**



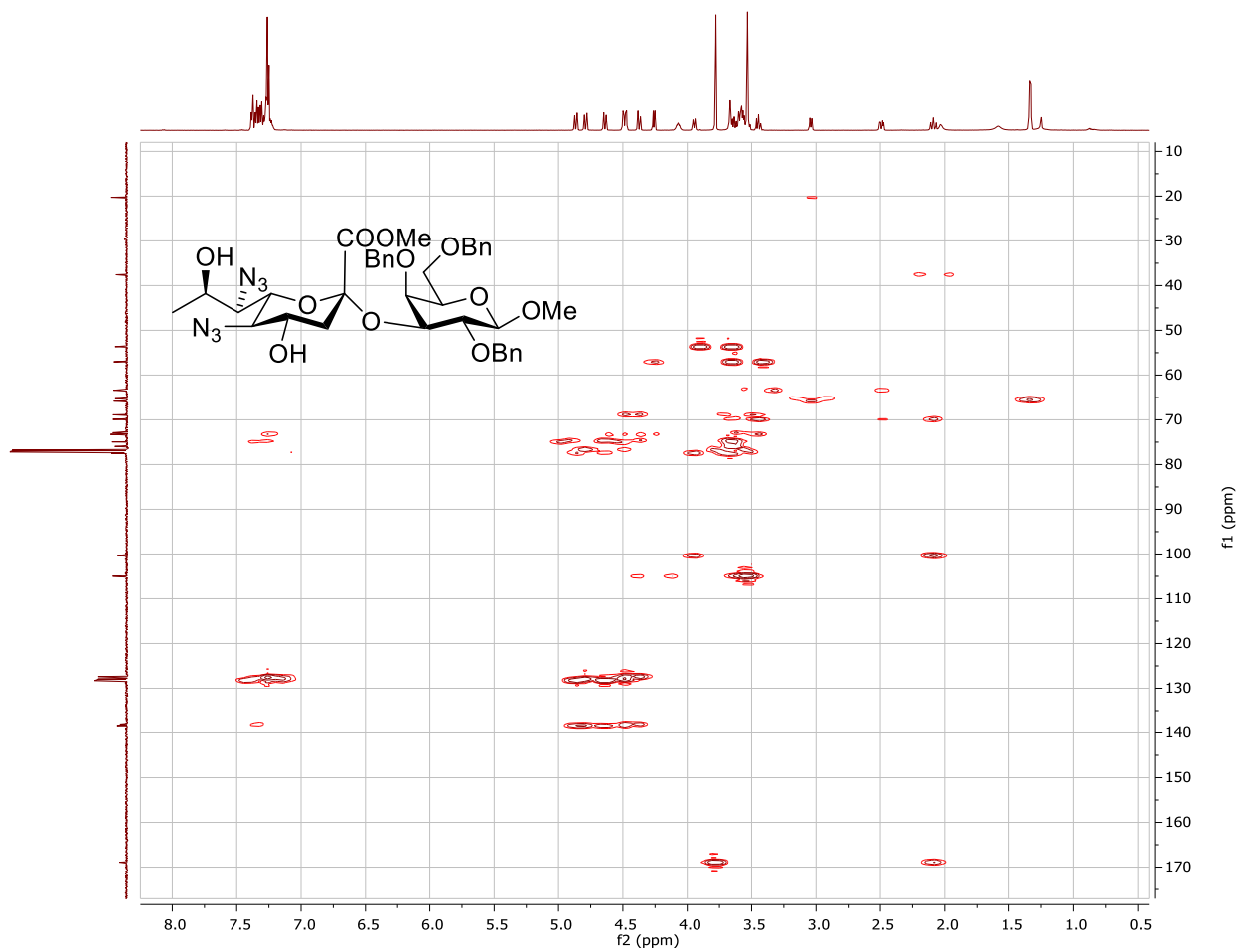
^1H - ^1H COSY NMR, CDCl_3



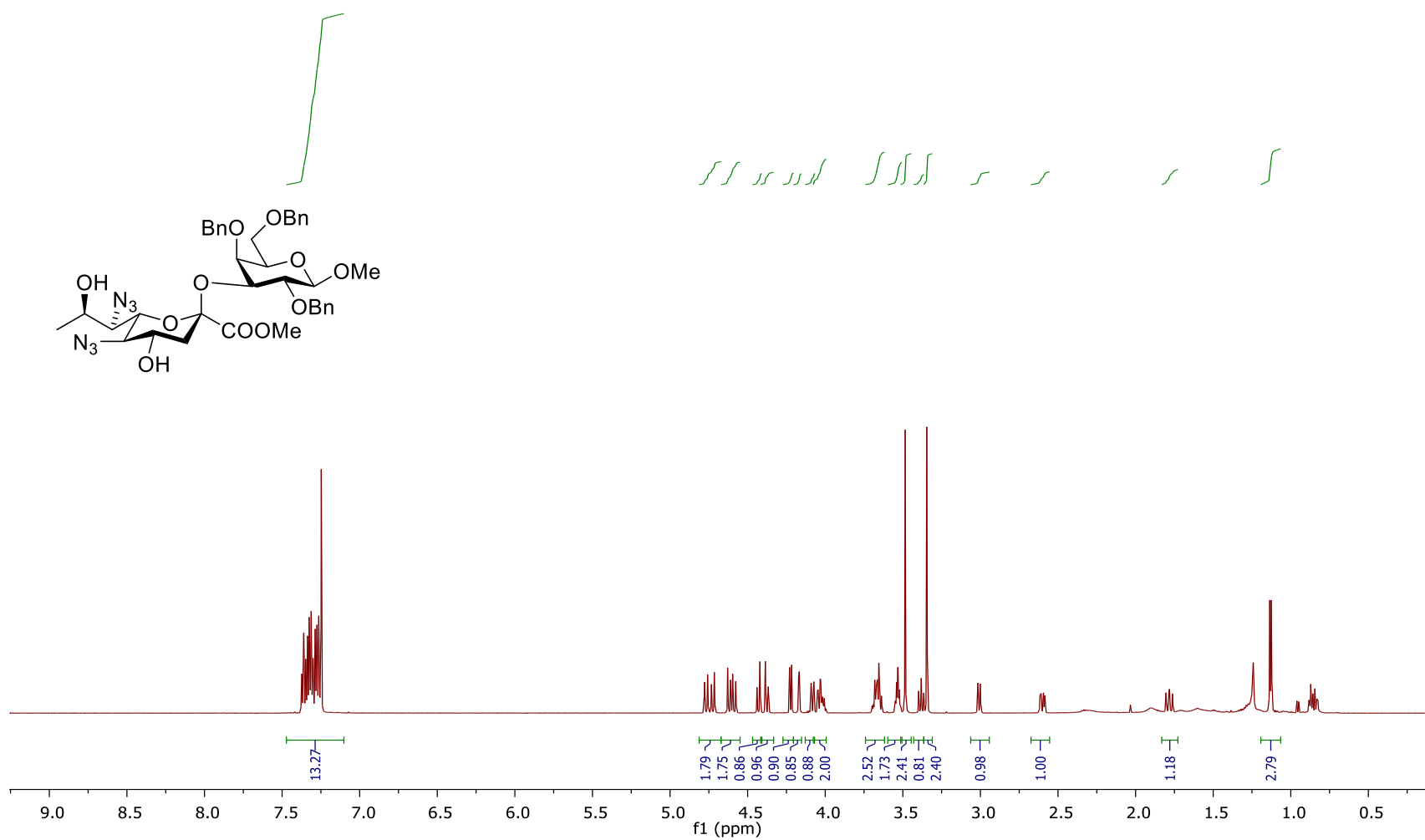
^1H - ^{13}C HSQC NMR, CDCl_3



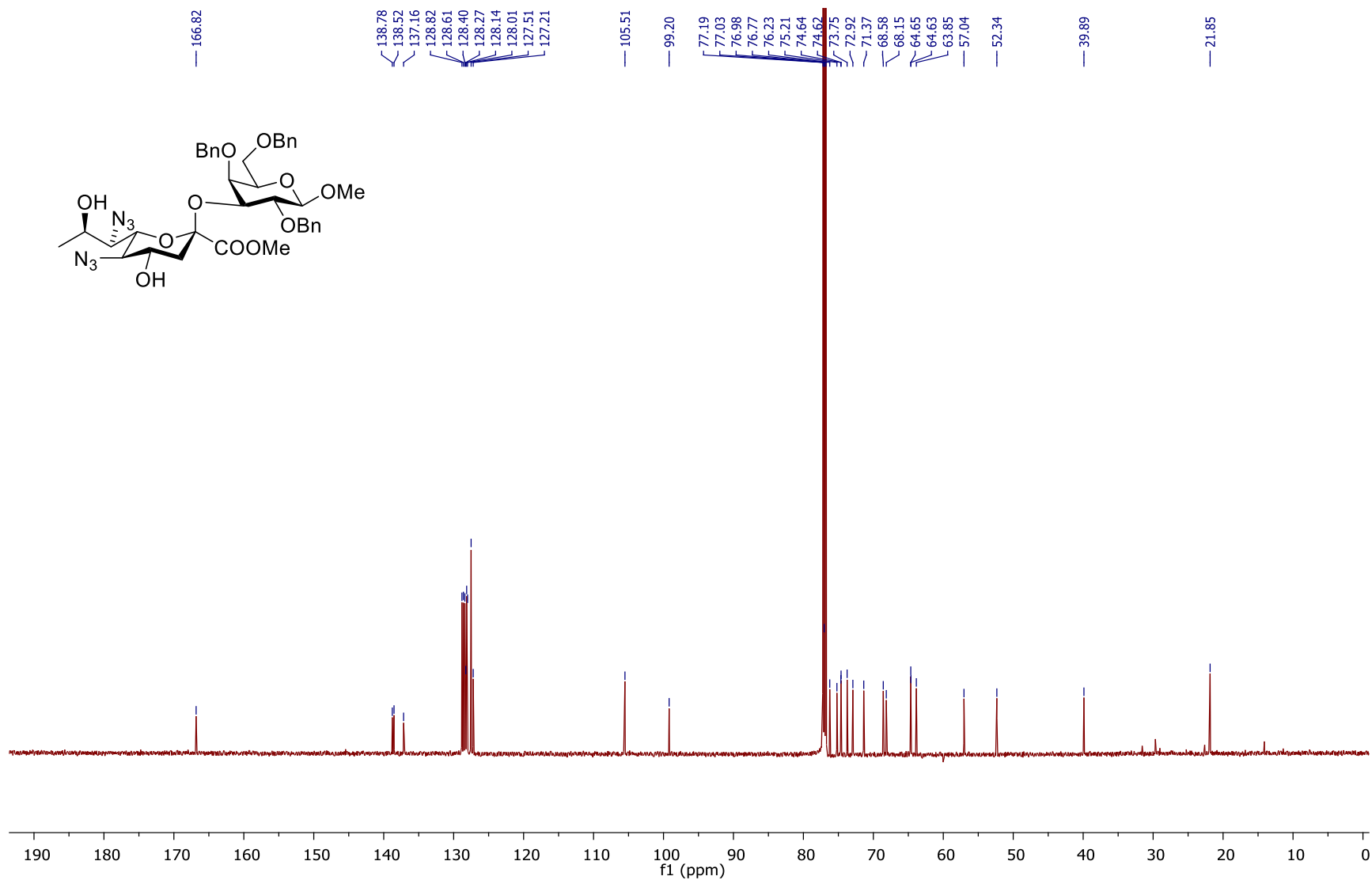
^1H - ^{13}C HMBC NMR, CDCl_3



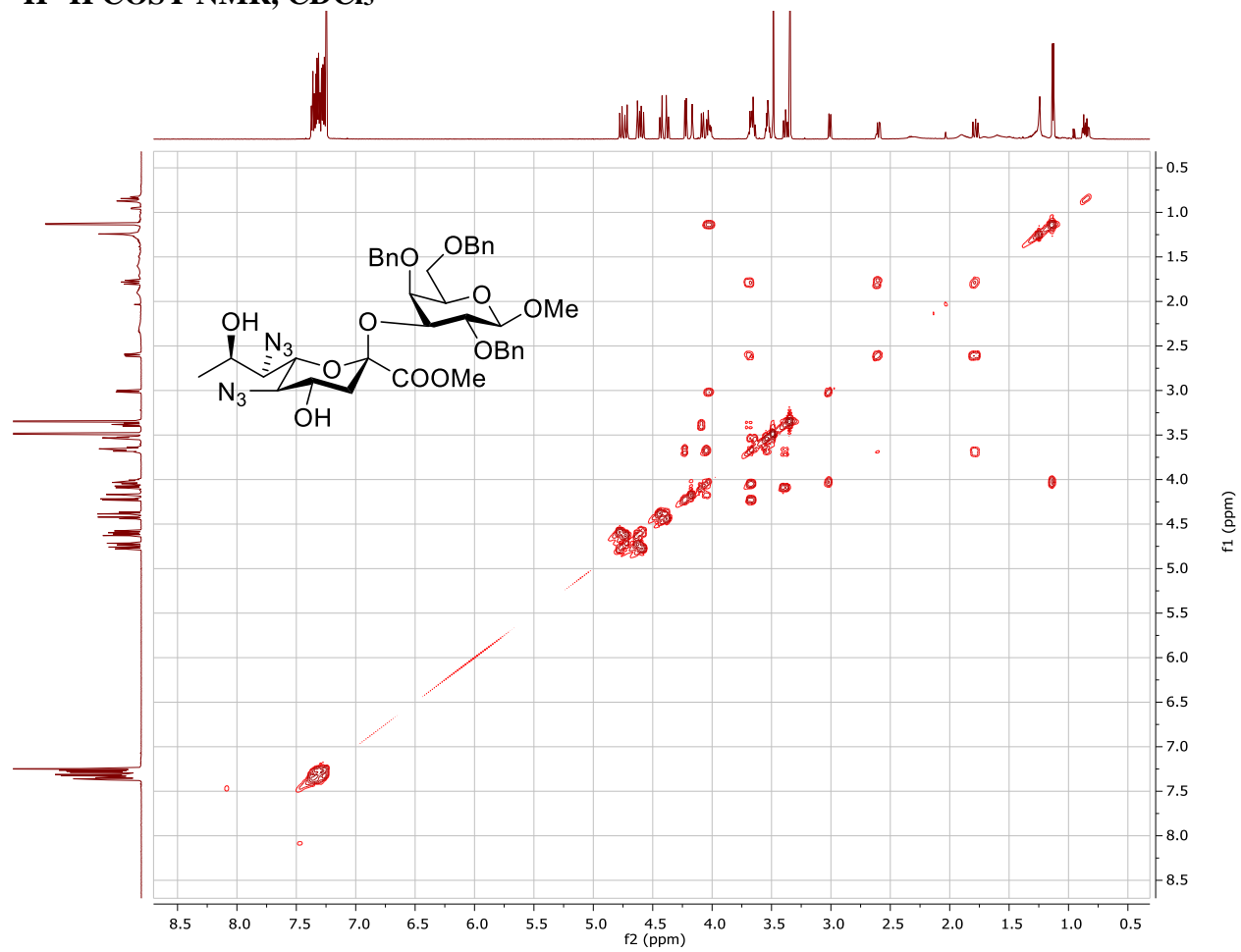
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetraoxy-D-glycero-β-D-galacto-non-2-ulopyranosid)onate]-(2→3)-2,6-di-*O*-benzyl-β-D-galactopyranoside (33β)



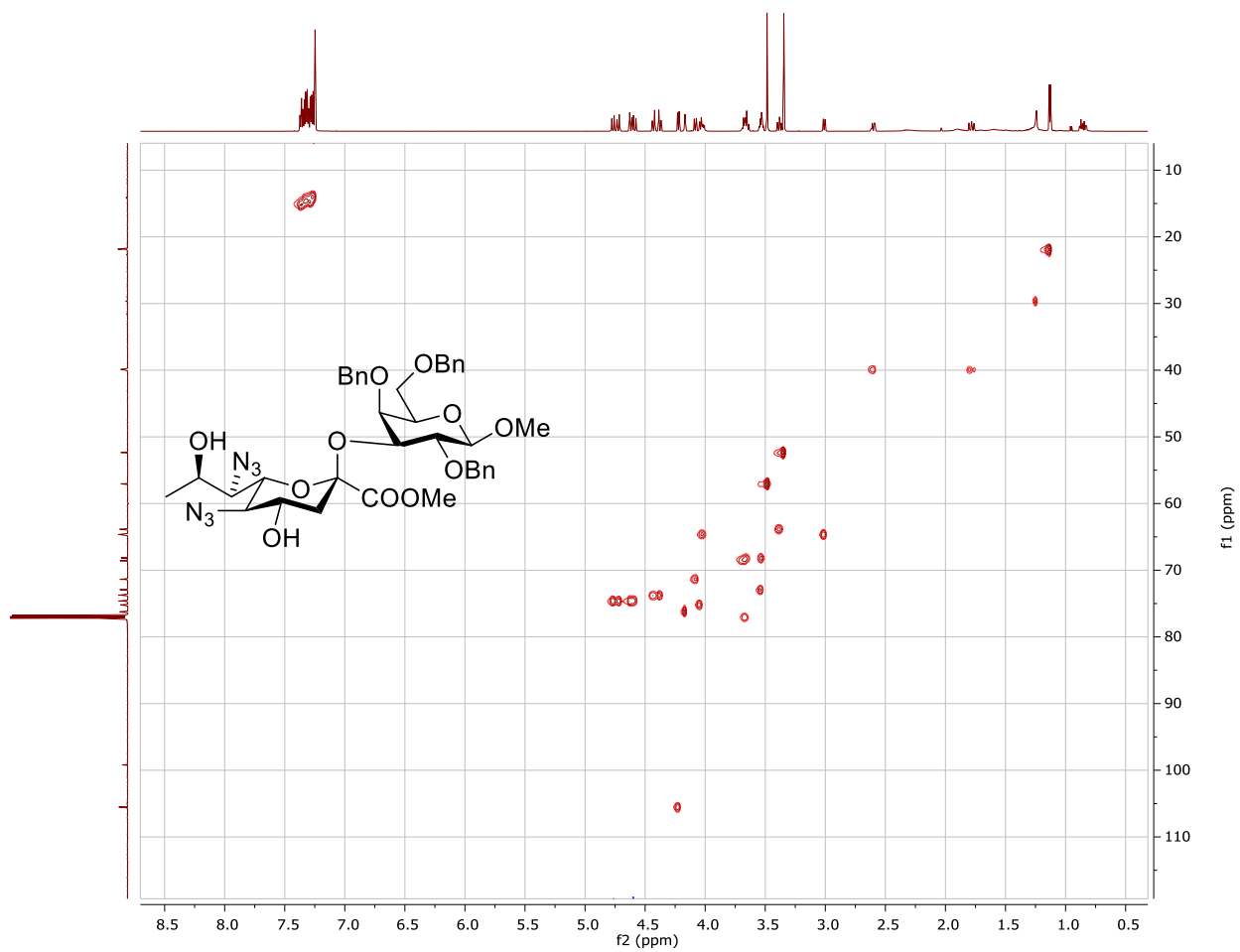
¹³C NMR (151 MHz, CDCl₃) Methyl [methyl (5,7-diazido-4,8-di-*O*-benzoyl-3,5,7,9-tetra-deoxy-D-glycero-β-D-galacto-non-2-ulo-pyranosid)onate]-(2→3)-2,6-di-*O*-benzyl-β-D-galactopyranoside (33β)



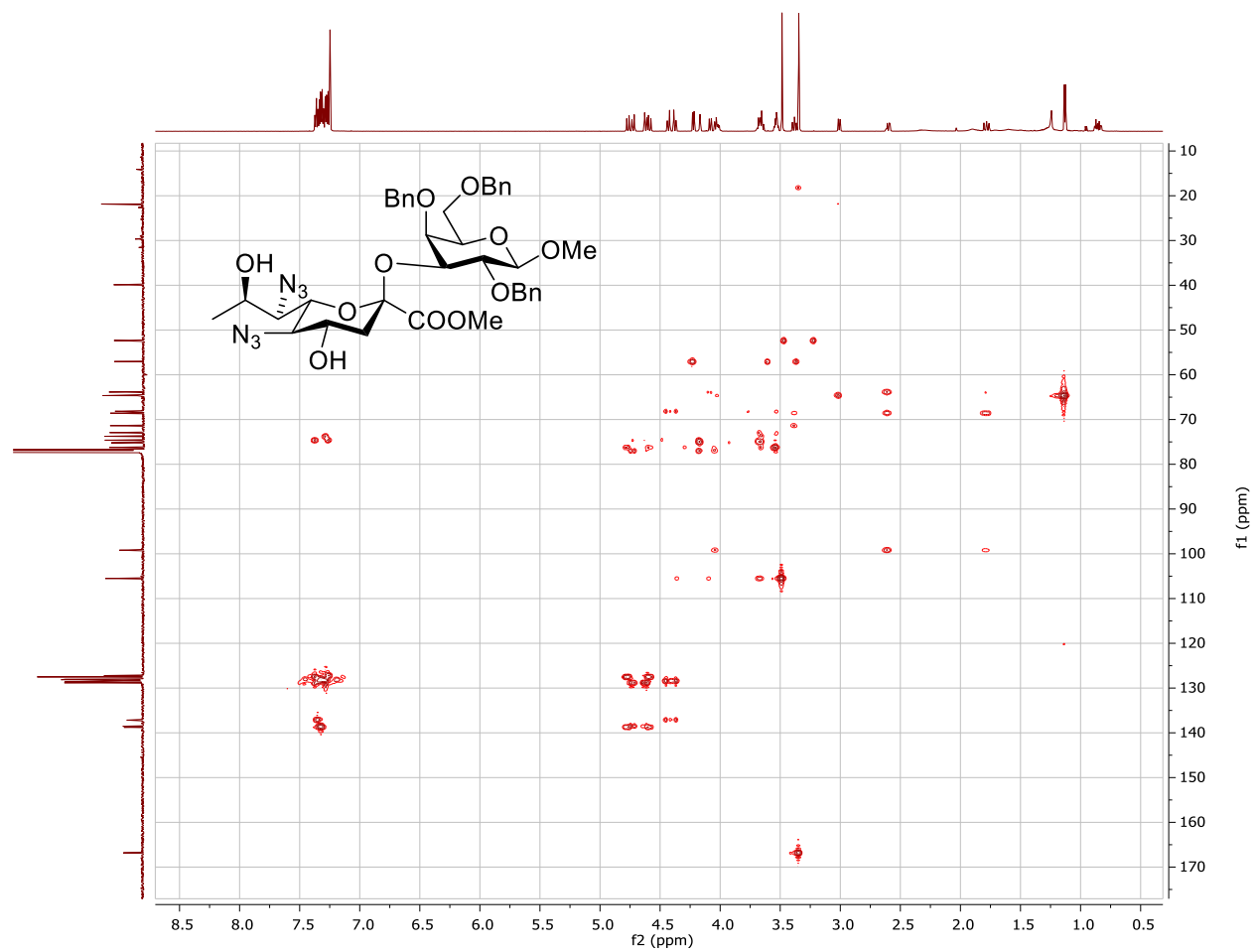
^1H - ^1H COSY NMR, CDCl_3



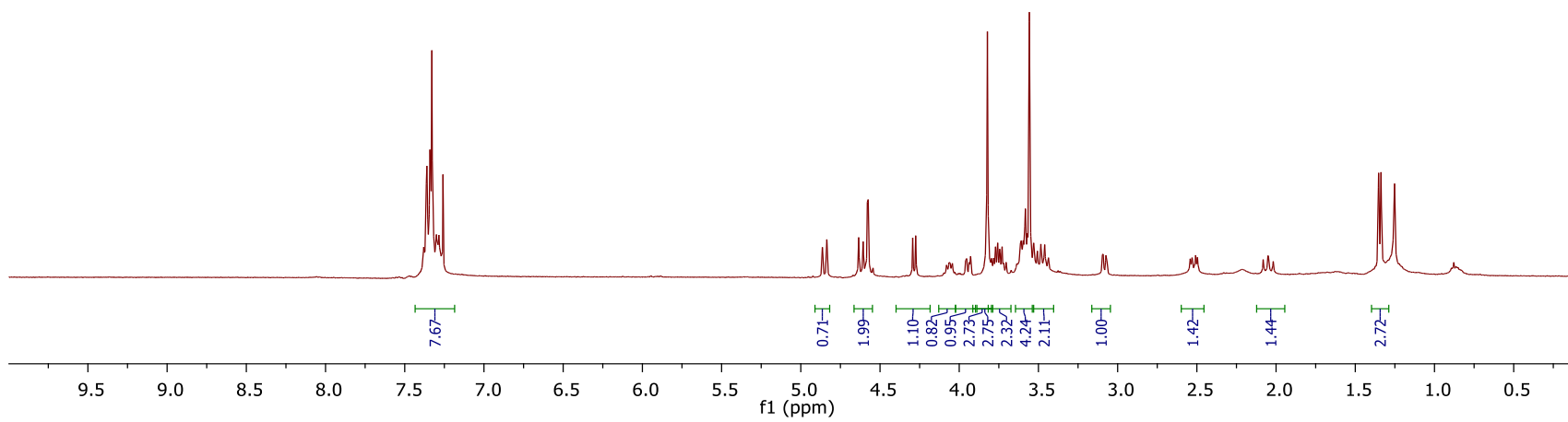
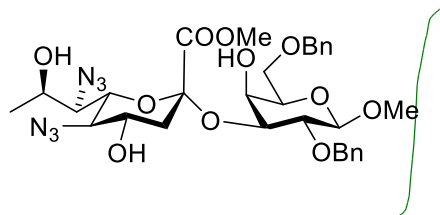
^1H - ^{13}C HSQC NMR, CDCl_3



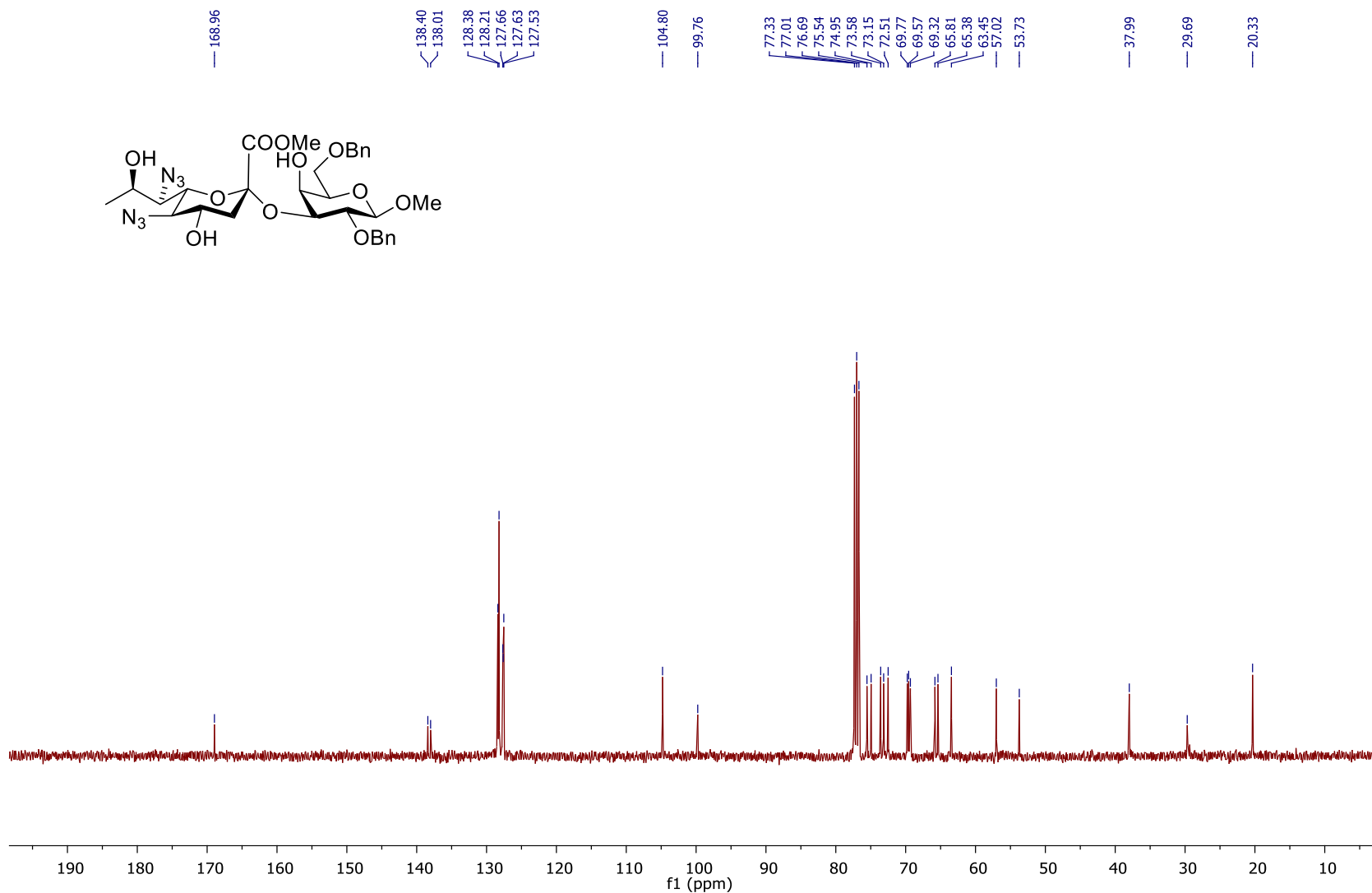
^1H - ^{13}C HMBC NMR, CDCl_3



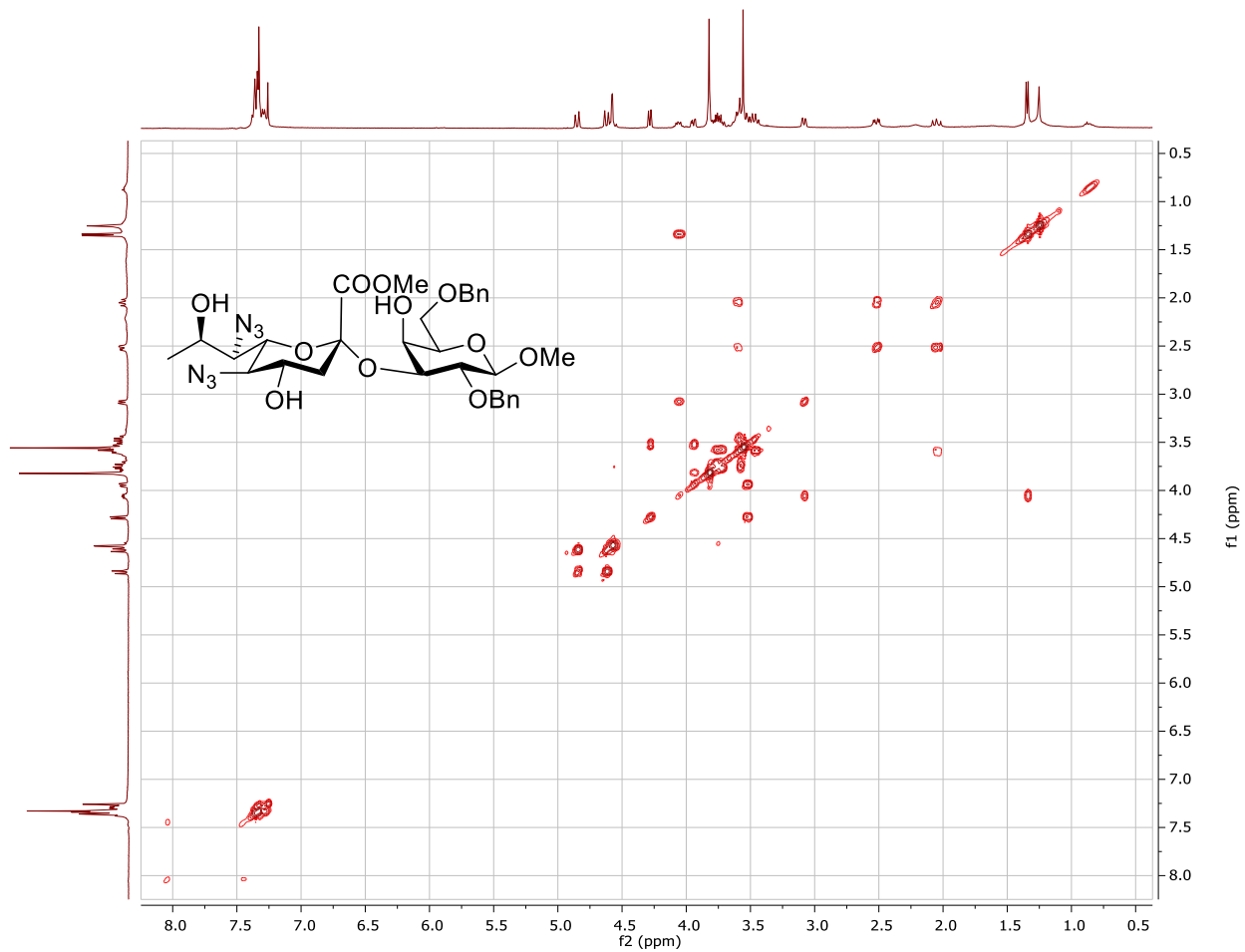
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (5,7-diaziido-3,4,5,7,8,9-hexadeoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 3)-2,6-di-O-benzyl- β -D-galactopyranoside (41)



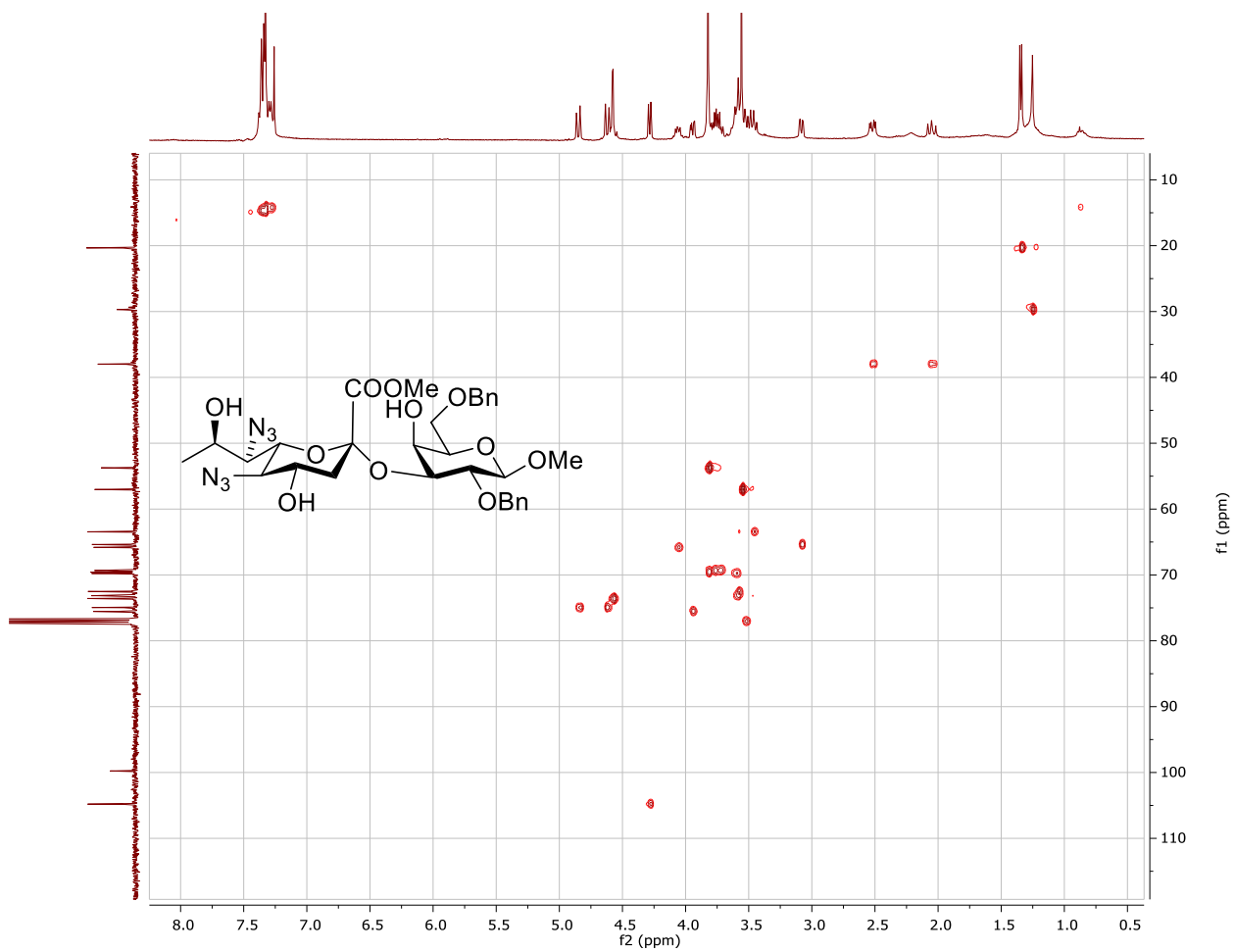
**¹³C NMR (151 MHz, CDCl₃) Methyl [methyl (5,7-diazido-3,4,5,7,8,9-hexadeoxy-D-glycero- α -D-galacto-non-2-
ulopyranosid)onate]-(2 \rightarrow 3)-2,6-di-O-benzyl- β -D-galactopyranoside (41)**



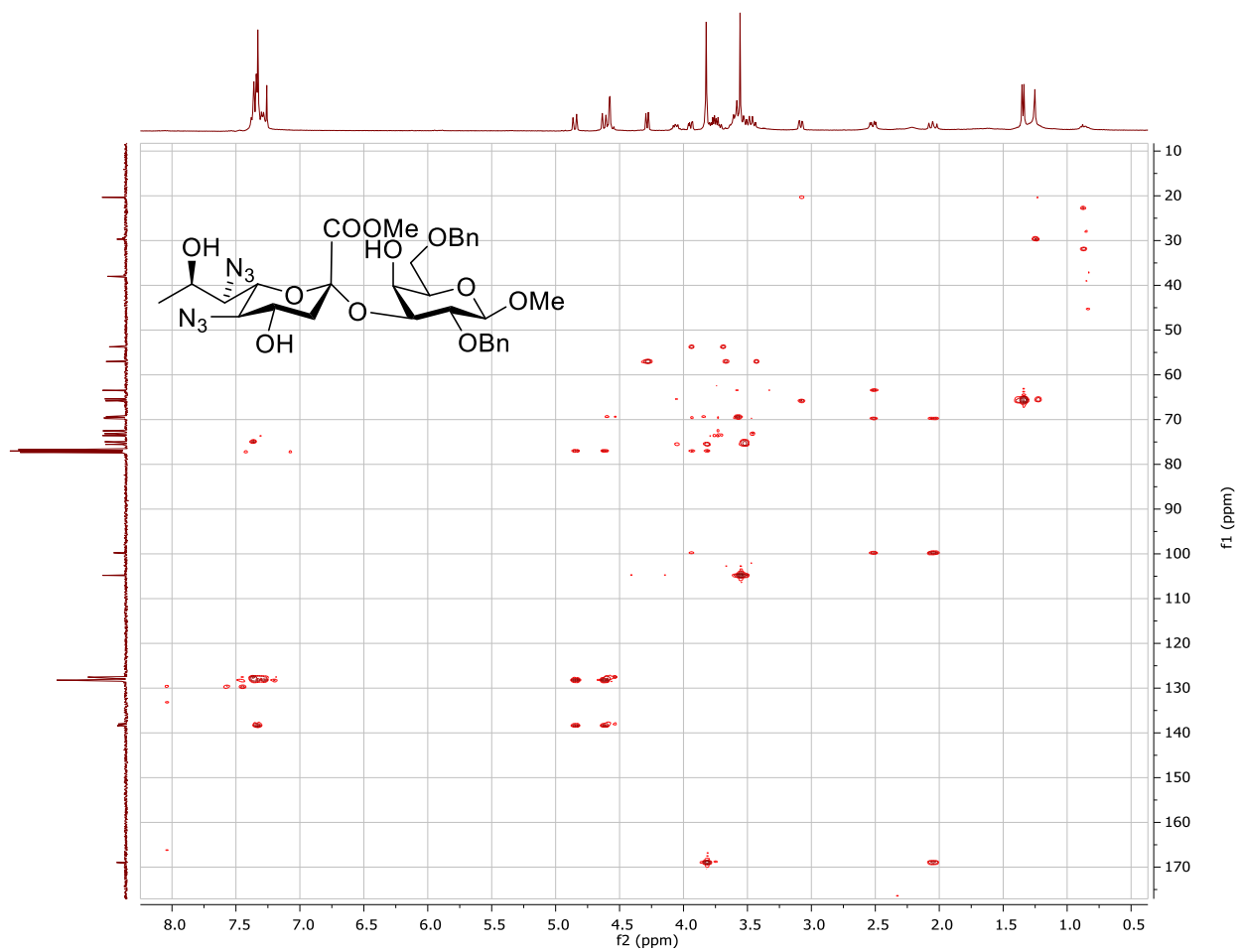
^1H - ^1H COSY NMR, CDCl_3



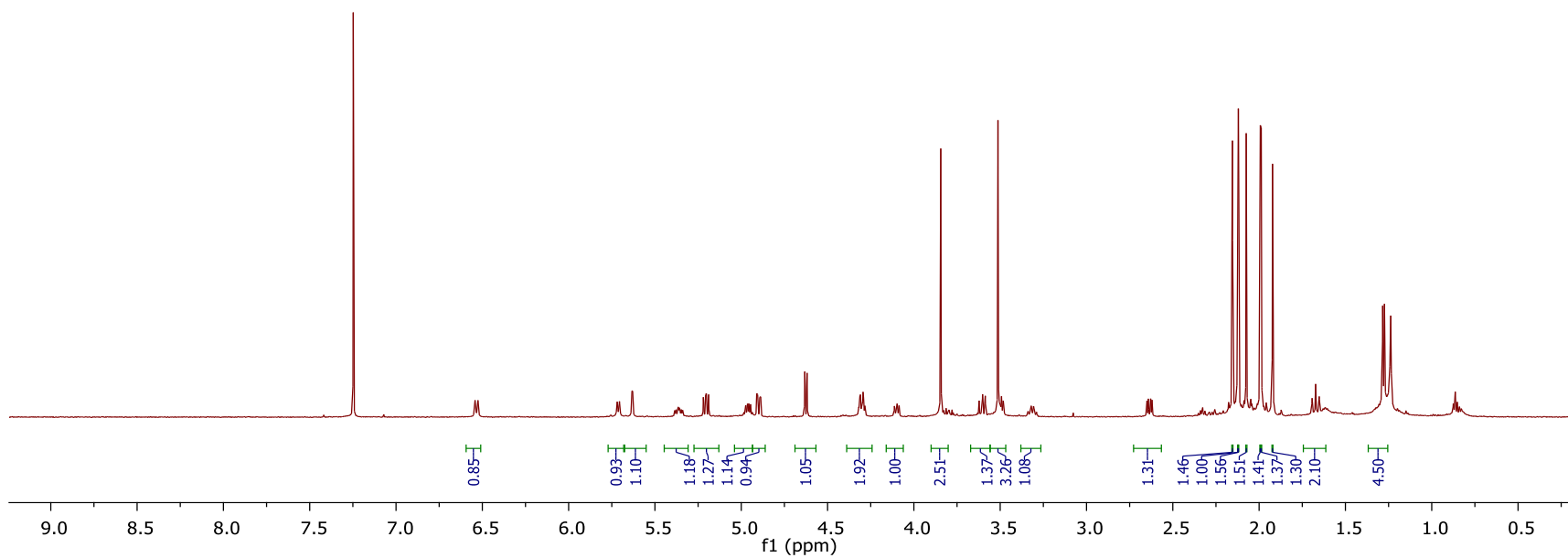
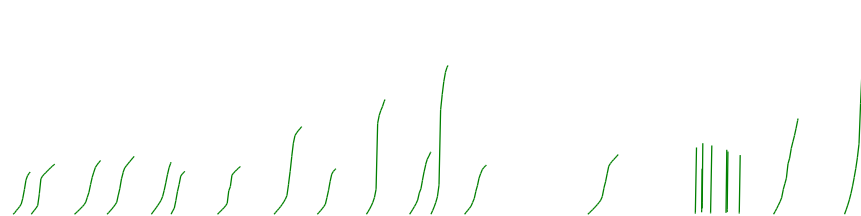
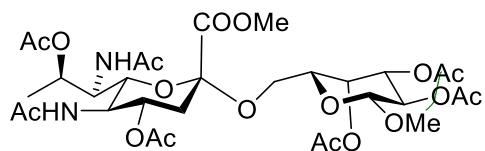
^1H - ^{13}C HSQC NMR, CDCl_3



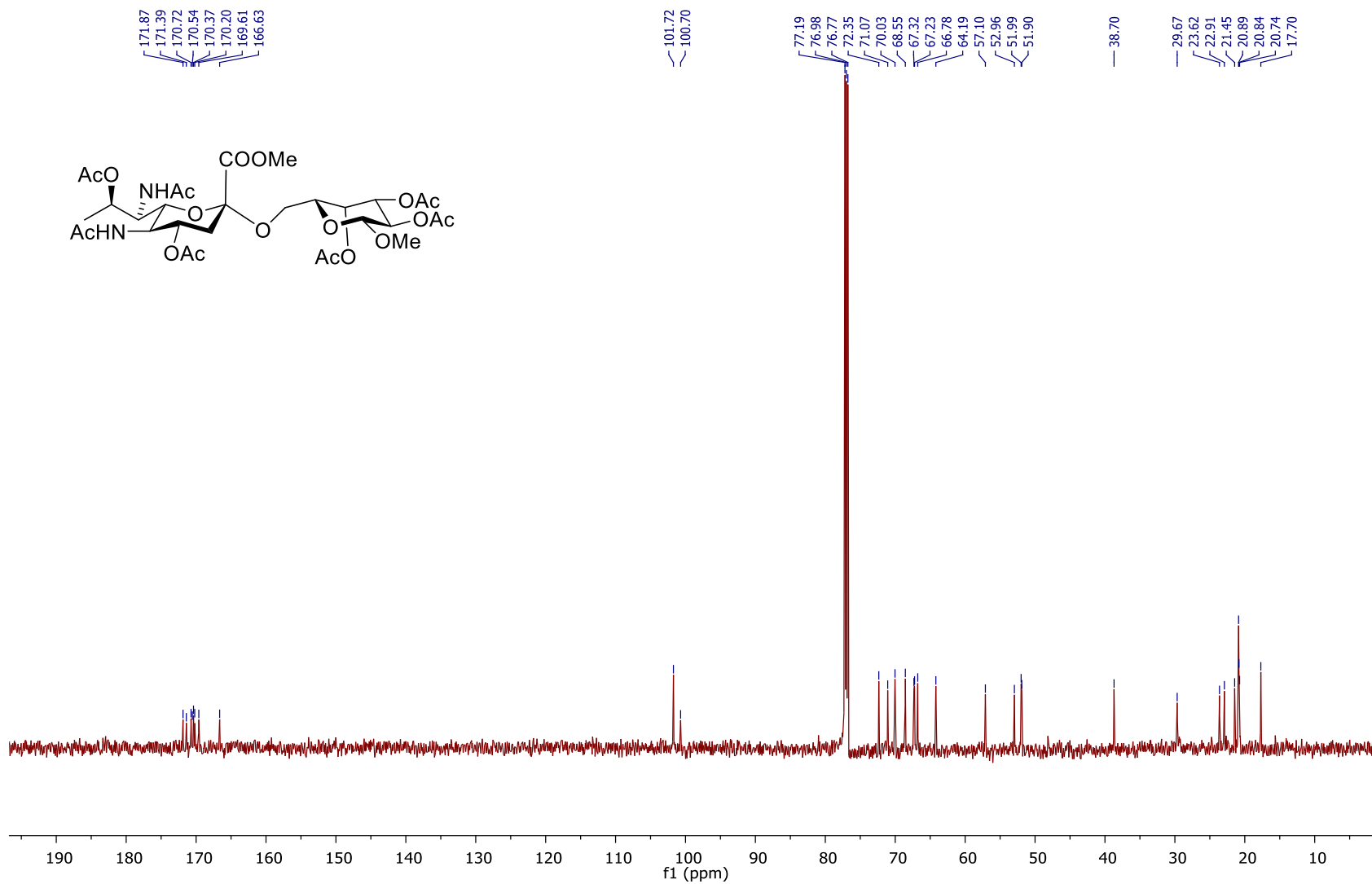
^1H - ^{13}C HMBC NMR, CDCl_3



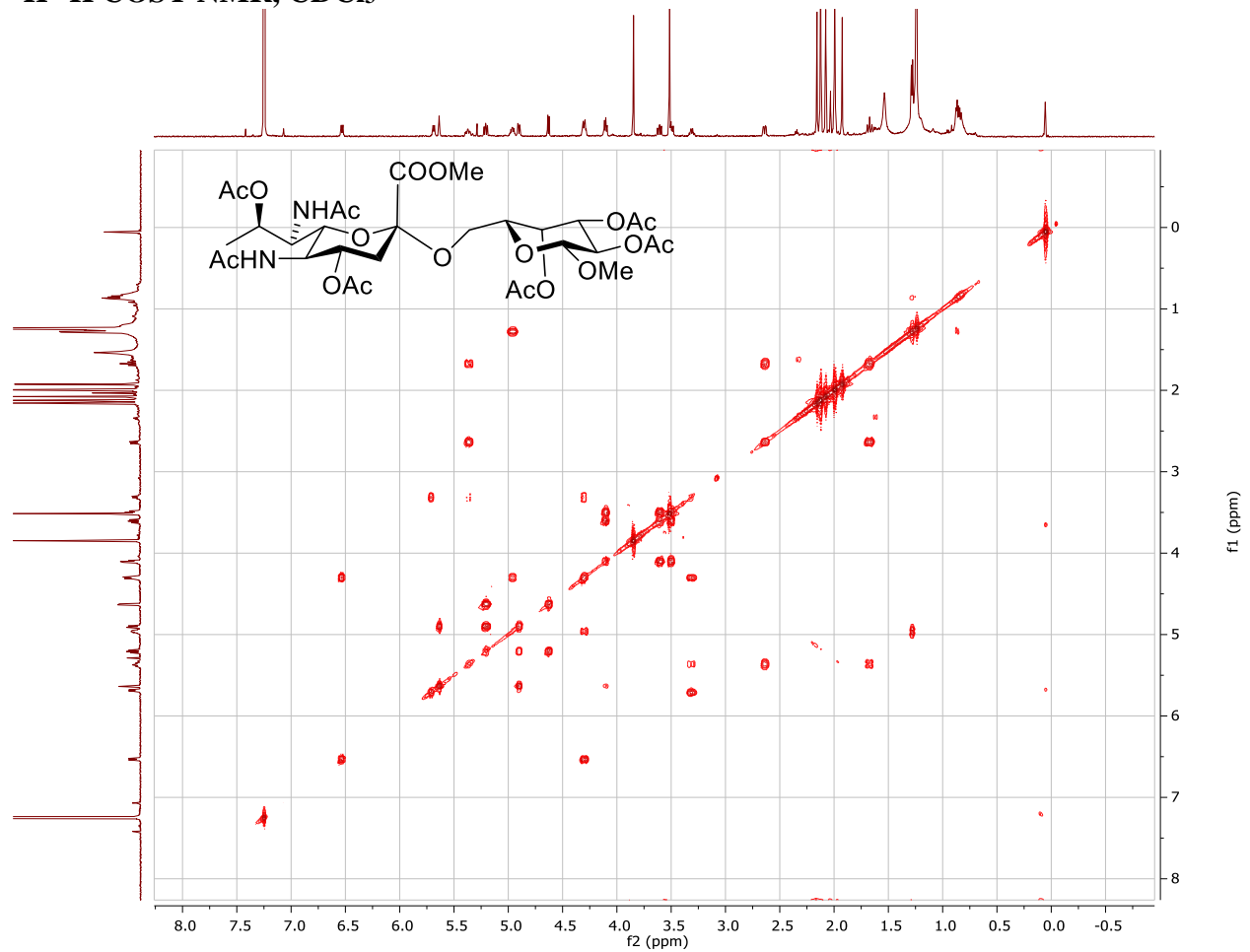
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (4,8-di-*O*-acetyl-5,7-diacetamido-3,5,7,9-tetra-deoxy-D-glycero- α -D-galacto-non-2-ulo-pyranosid)onate]-(2 \rightarrow 6)-2,3,4-tri-*O*-benzyl- β -D-galactopyranoside (38)



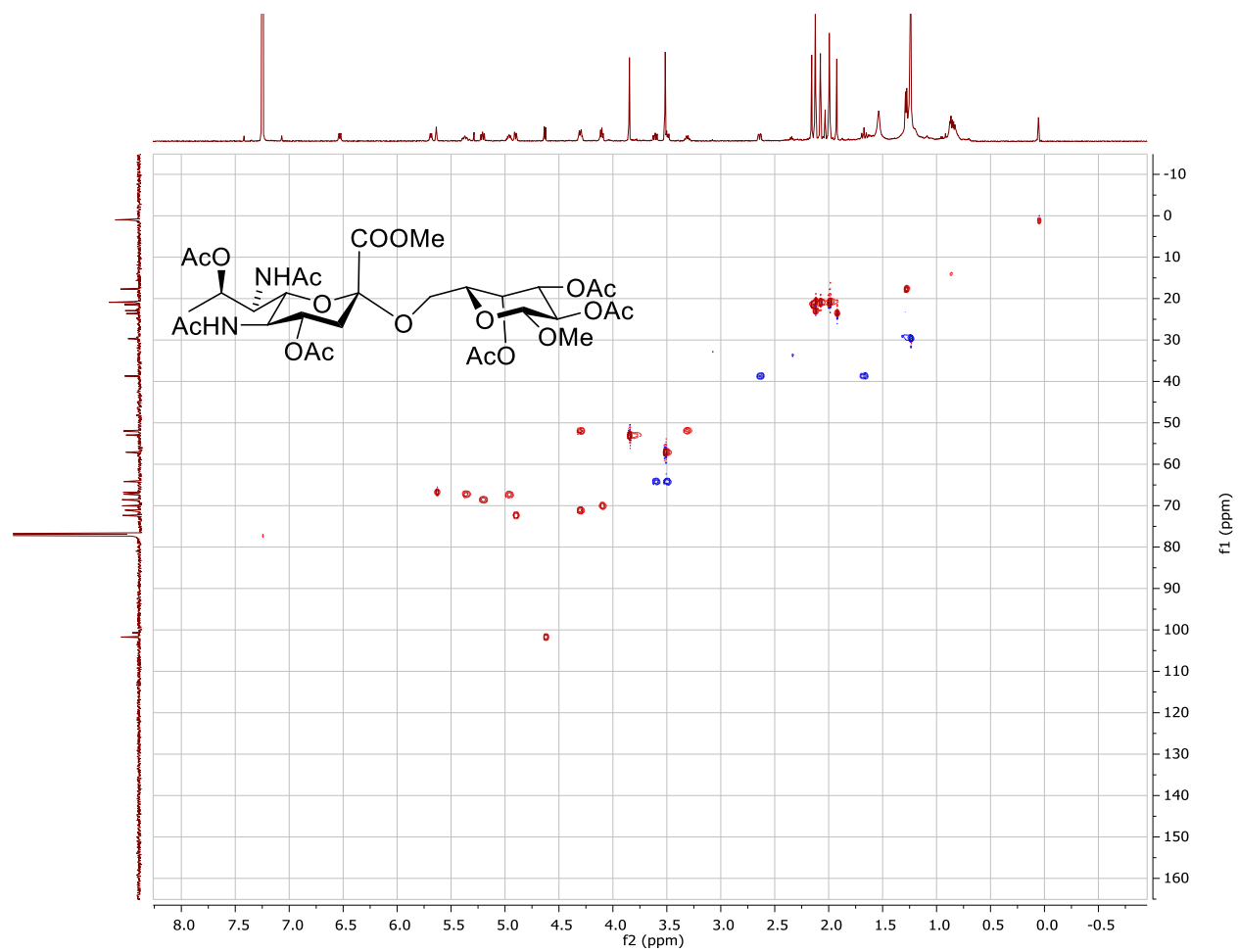
¹³C NMR (151 MHz, CDCl₃) Methyl [methyl (4,8-di-*O*-acetyl-5,7-diacetamido-3,5,7,9-tetraoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 6)-2,3,4-tri-*O*-benzyl- β -D-galactopyranoside (38)



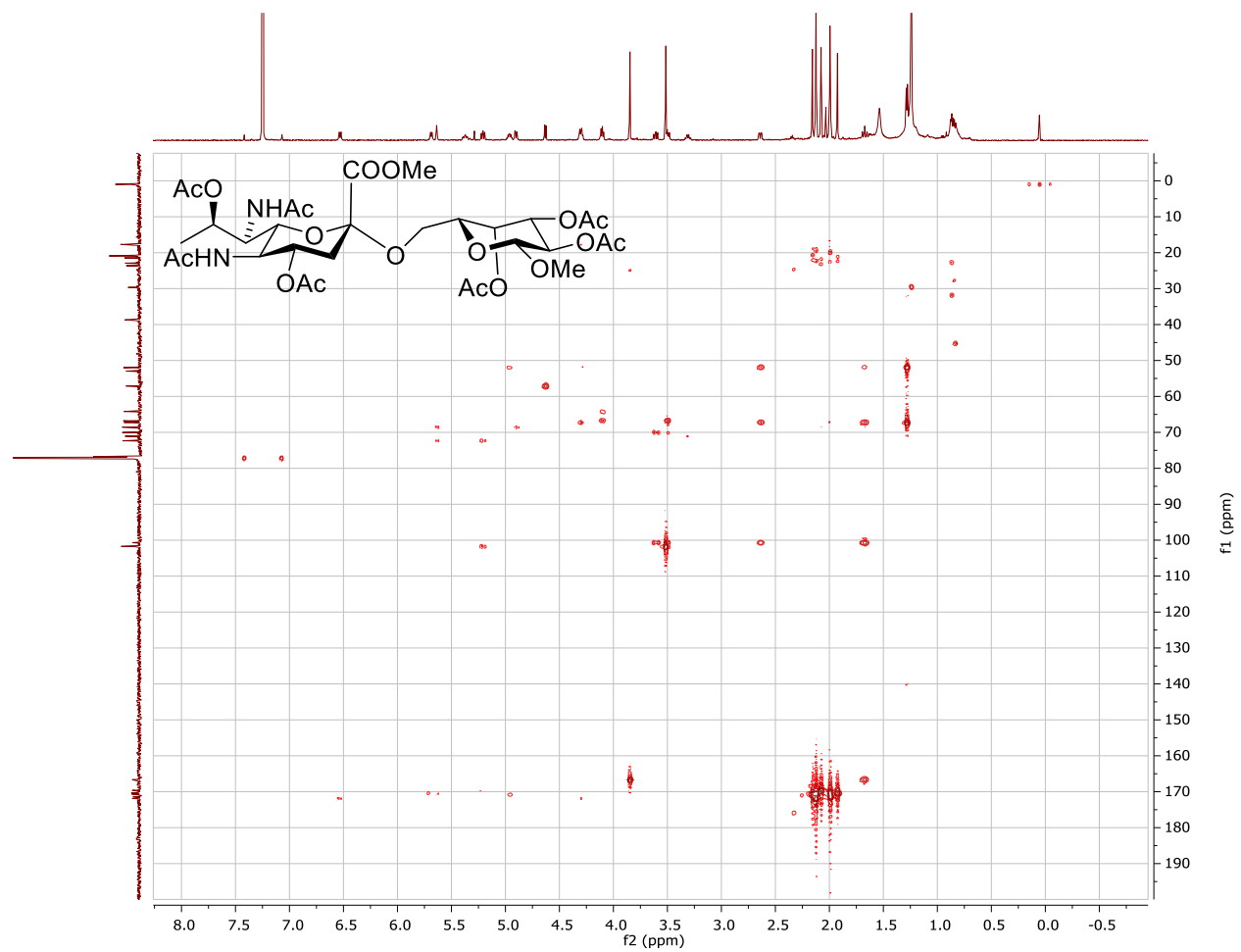
^1H - ^1H COSY NMR, CDCl_3



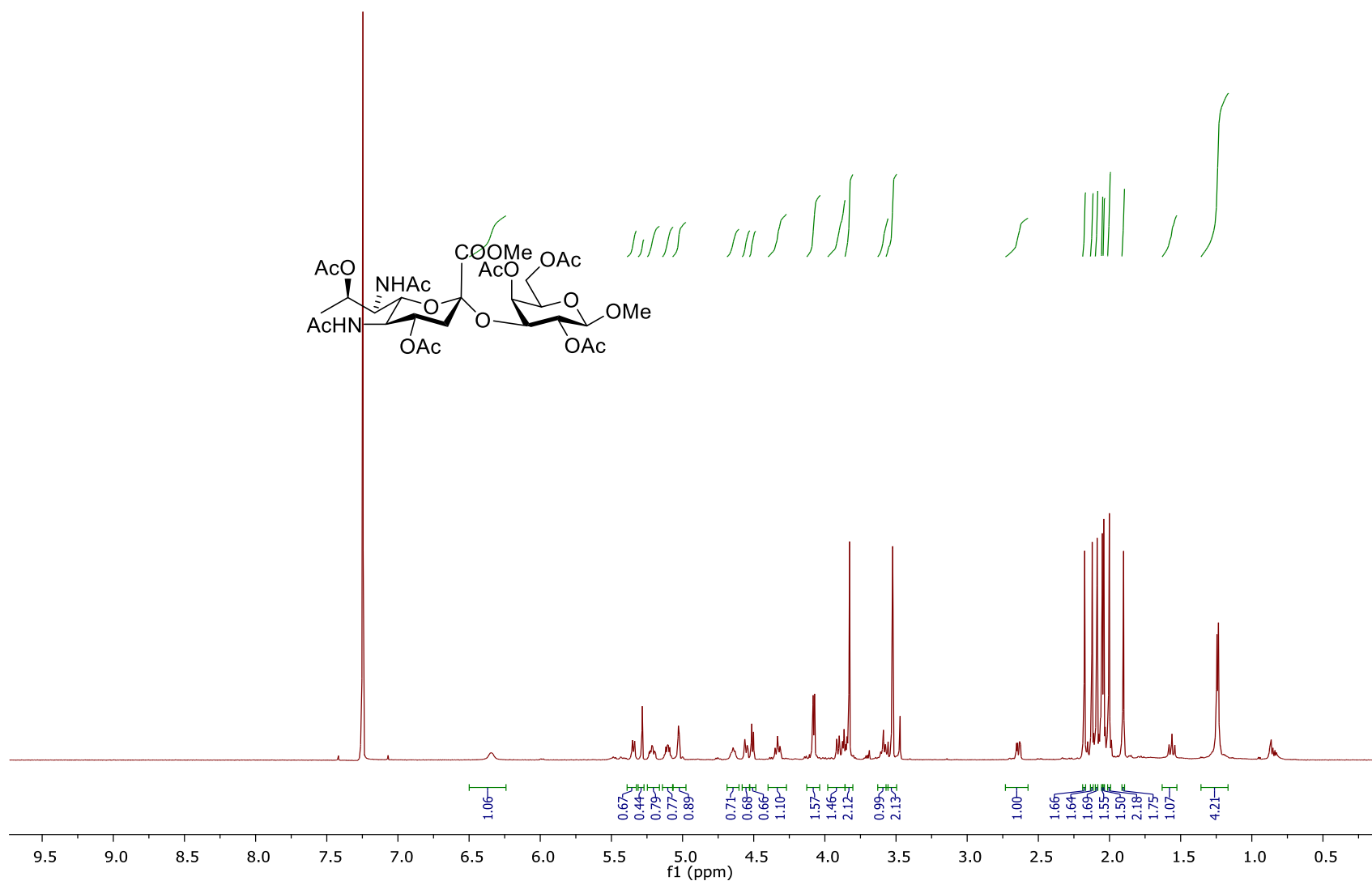
^1H - ^{13}C HSQC NMR, CDCl_3



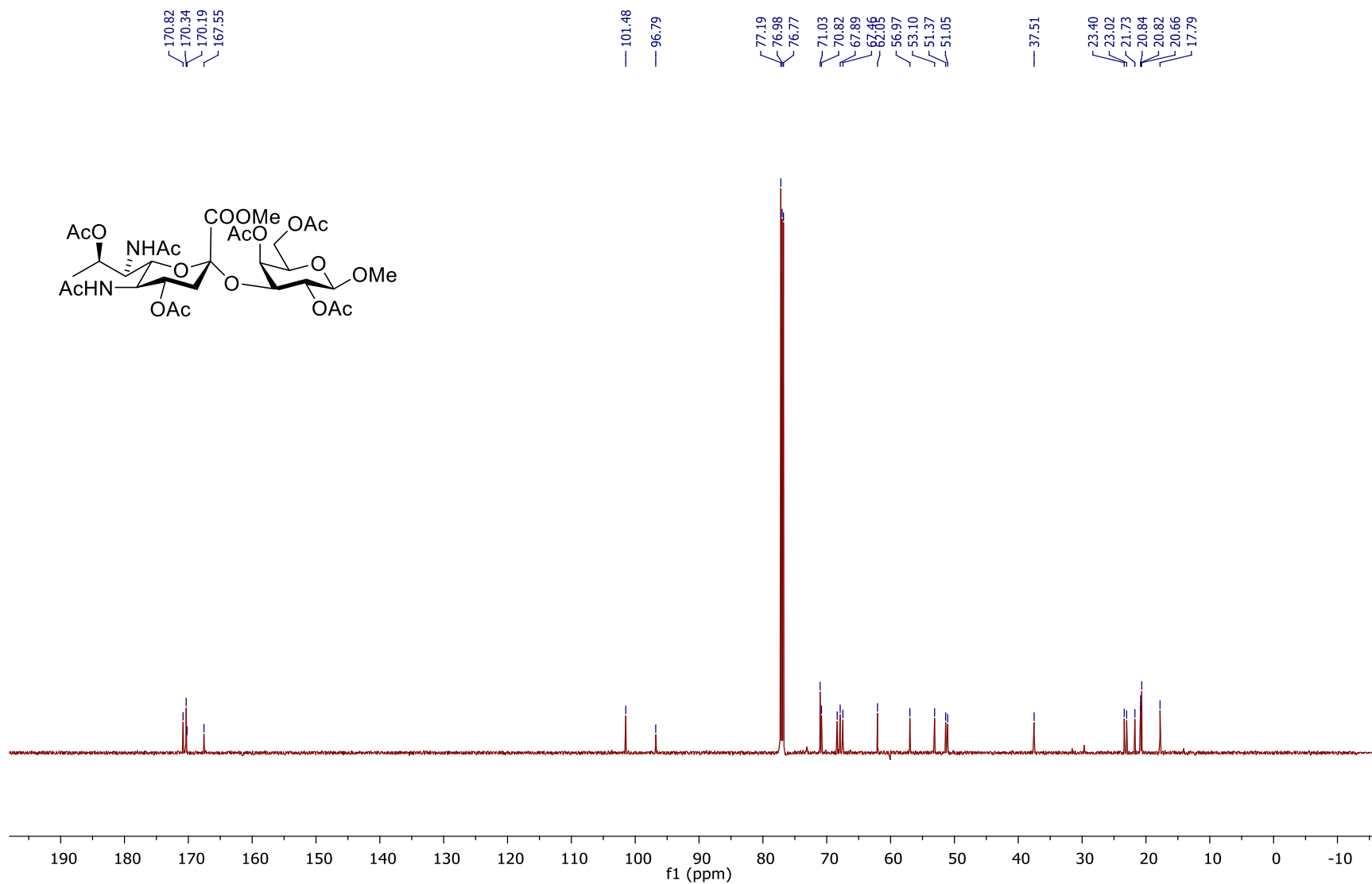
^1H - ^{13}C HMBC NMR, CDCl_3



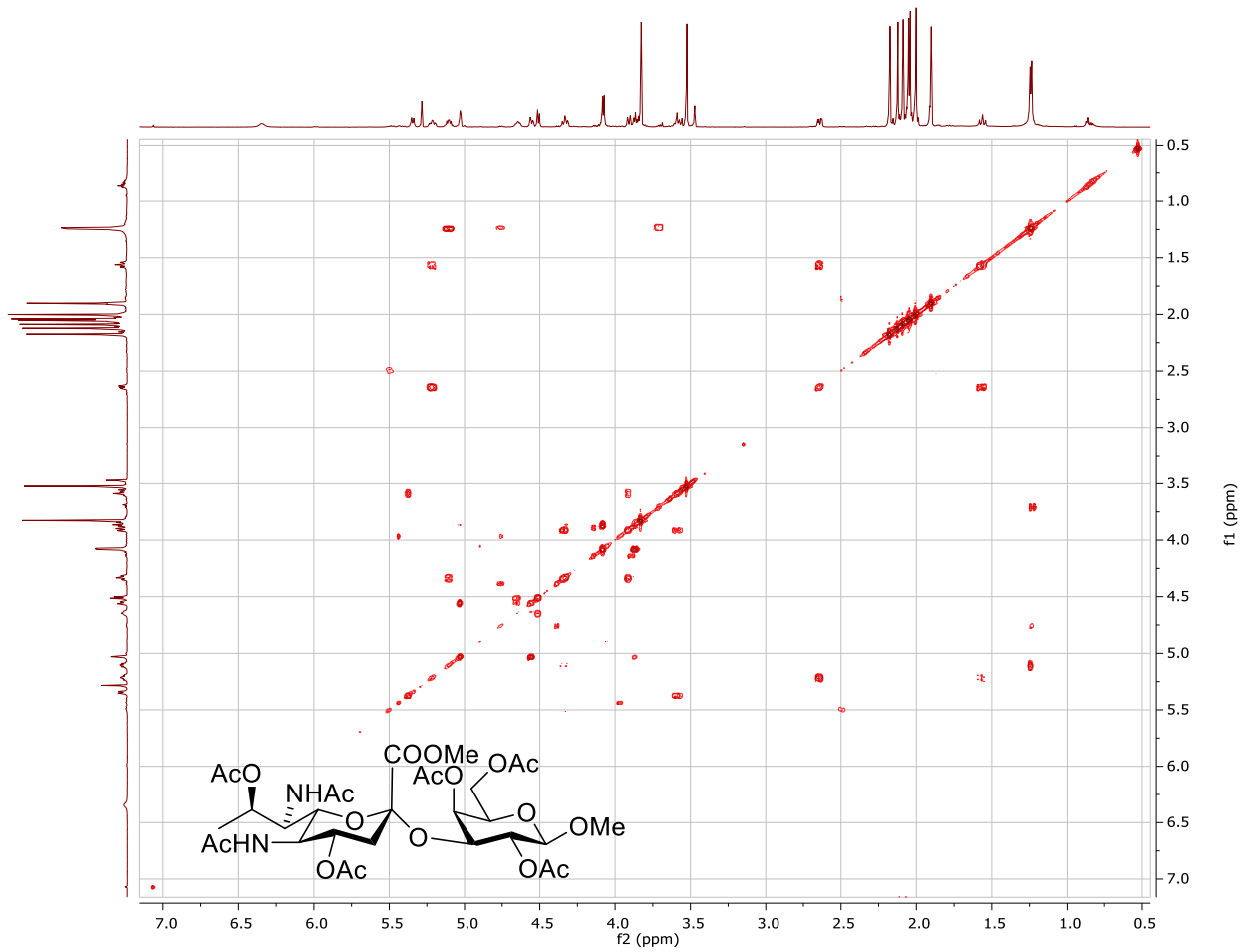
¹H NMR (600 MHz, CDCl₃) Methyl [methyl (4,8-di-*O*-acetyl-5,7-diacetamido-3,5,7,9-tetra-deoxy-*D*-glycero- α -*D*-galacto-non-2-ulo-pyranosid)onate]-(2 \rightarrow 3)-2,4,6-tri-*O*-benzyl- β -*D*-galactopyranoside (40) (obtained from 33 α)



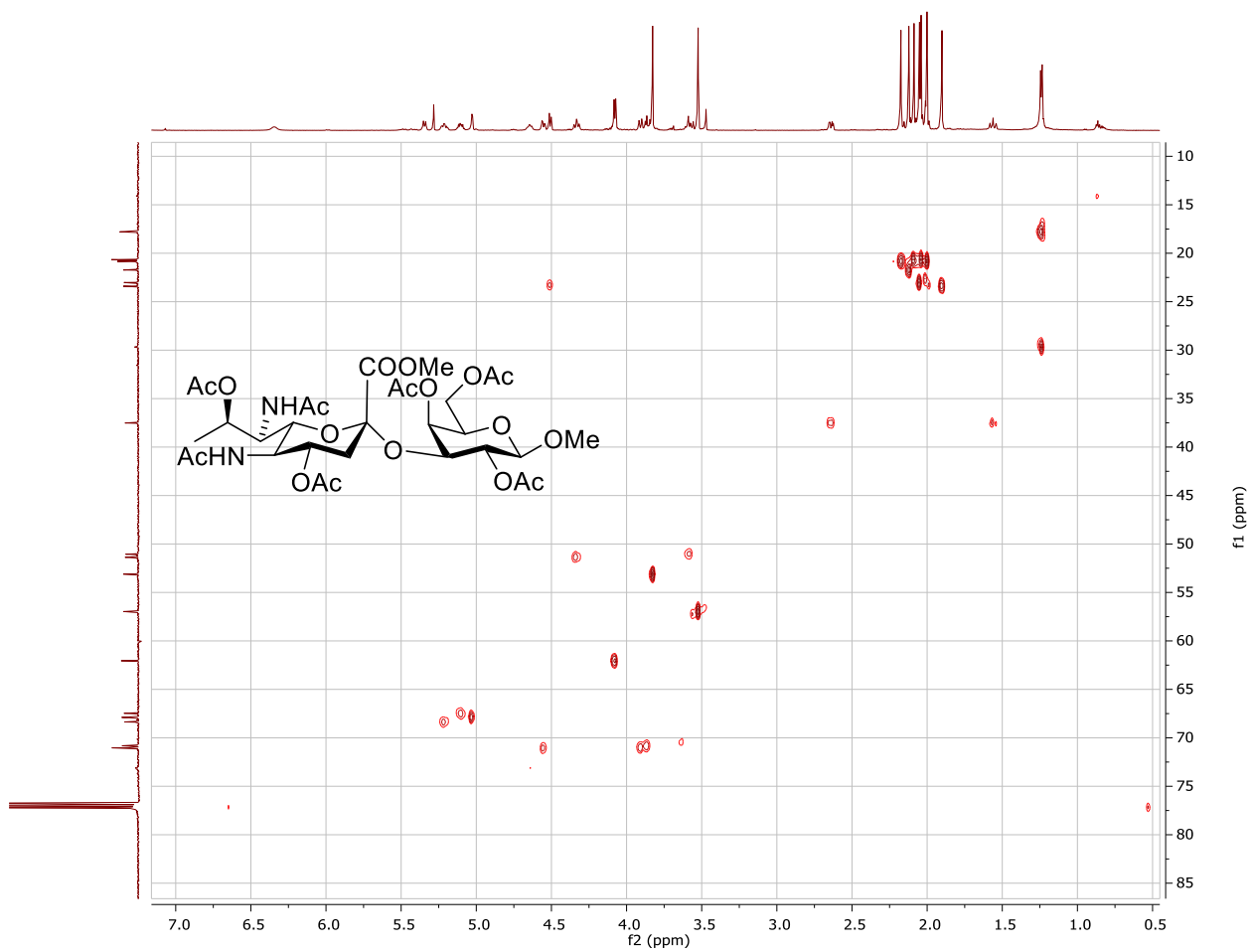
¹³C NMR (151 MHz, CDCl₃) Methyl [methyl (4,8-di-*O*-acetyl-5,7-diacetamido-3,5,7,9-tetraoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onate]-(2 \rightarrow 3)-2,4,6-tri-*O*-benzyl- β -D-galactopyranoside (40) (obtained from 33 α)



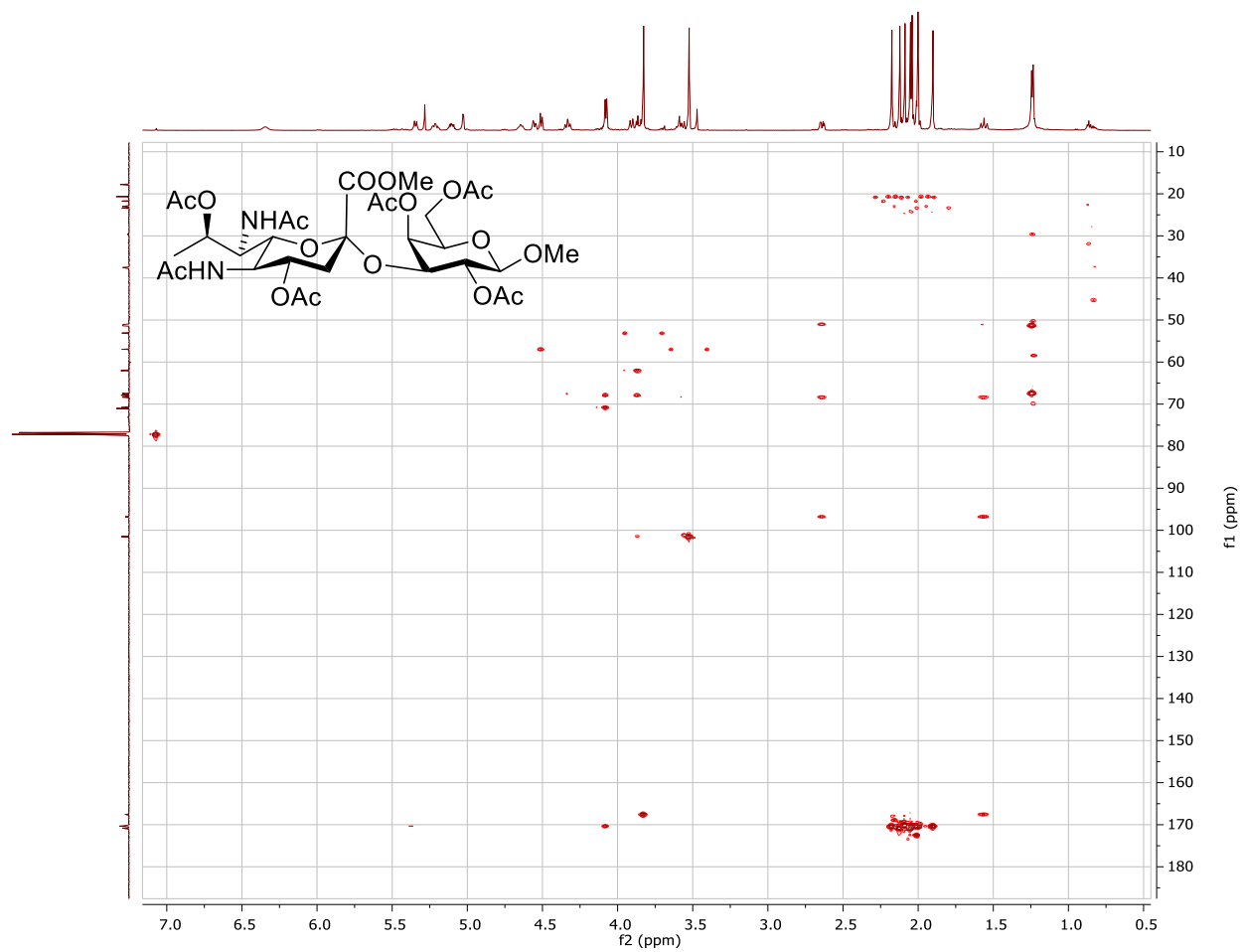
^1H - ^1H COSY NMR, CDCl_3



^1H - ^{13}C HSQC NMR, CDCl_3

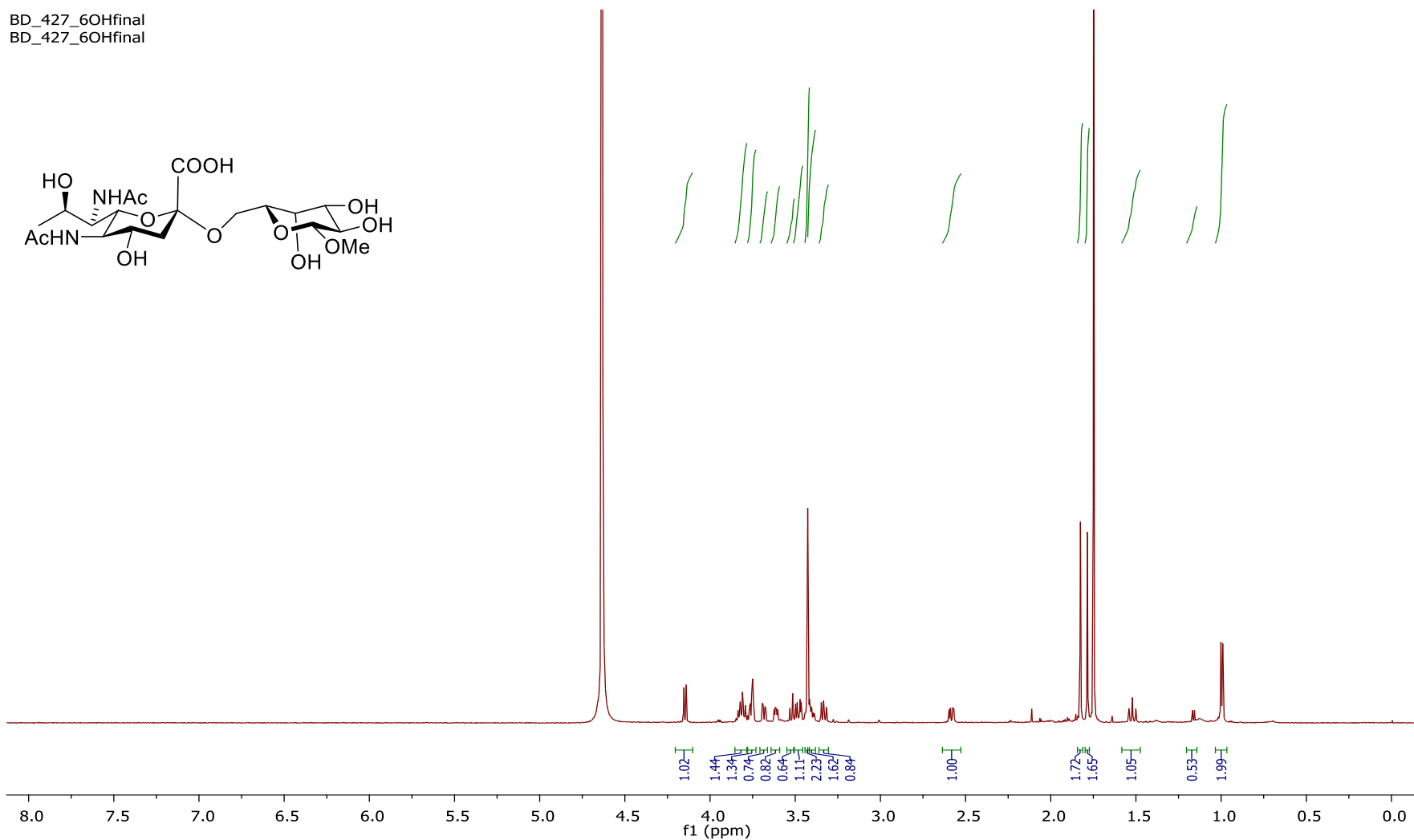
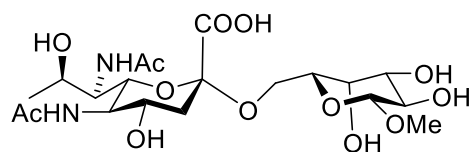


^1H - ^{13}C HMBC NMR, CDCl_3

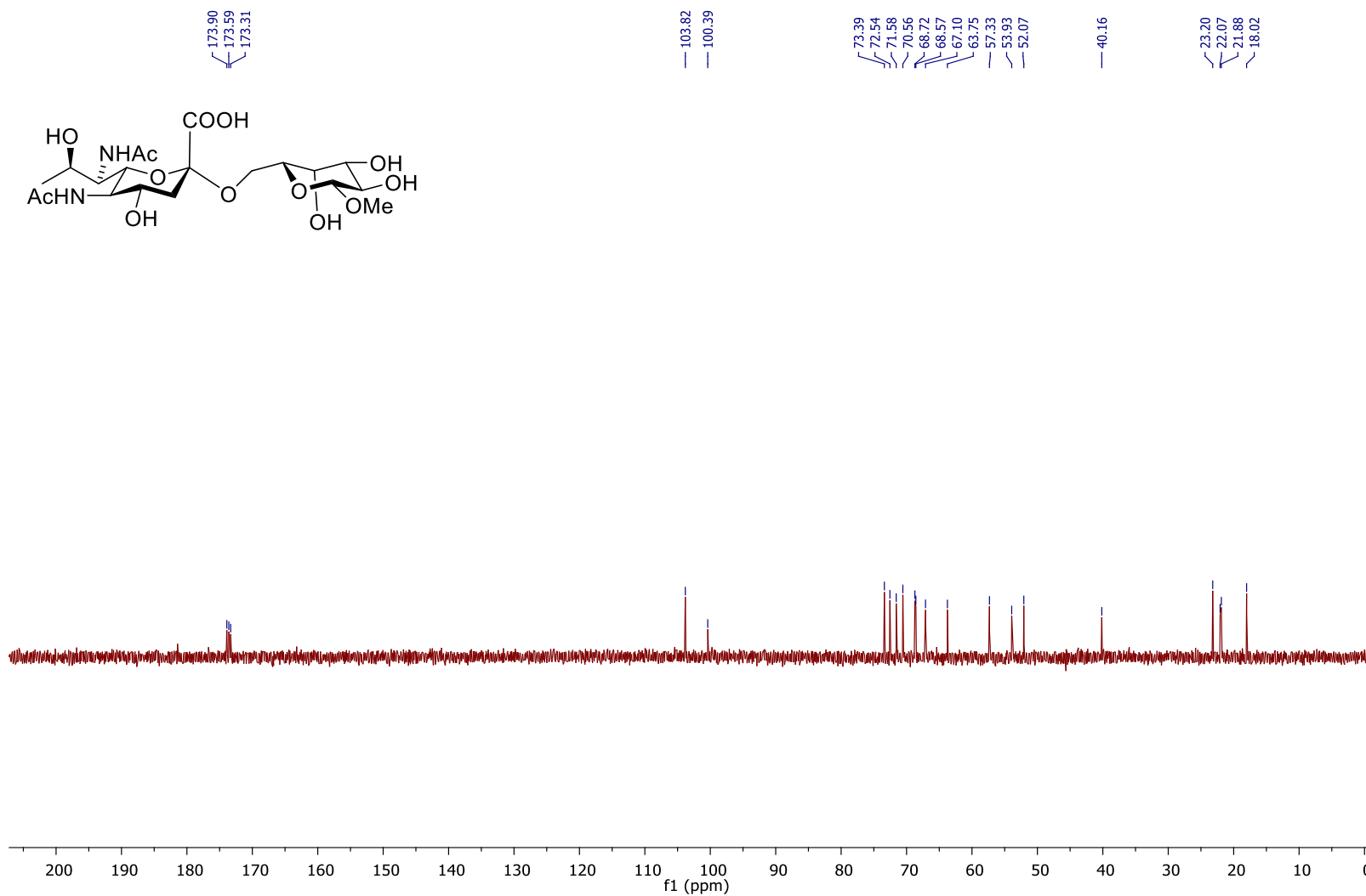


**¹H NMR (600 MHz, D₂O) Methyl [5,7-Diacetamido-3,5,7,9-tetra-deoxy-D-glycero- α -D-galacto-non-2-ulo-pyranosid)onic acid]-
(2 \rightarrow 6)-2,3,4-tri-*O*-benzyl- β -D-galactopyranoside (39)**

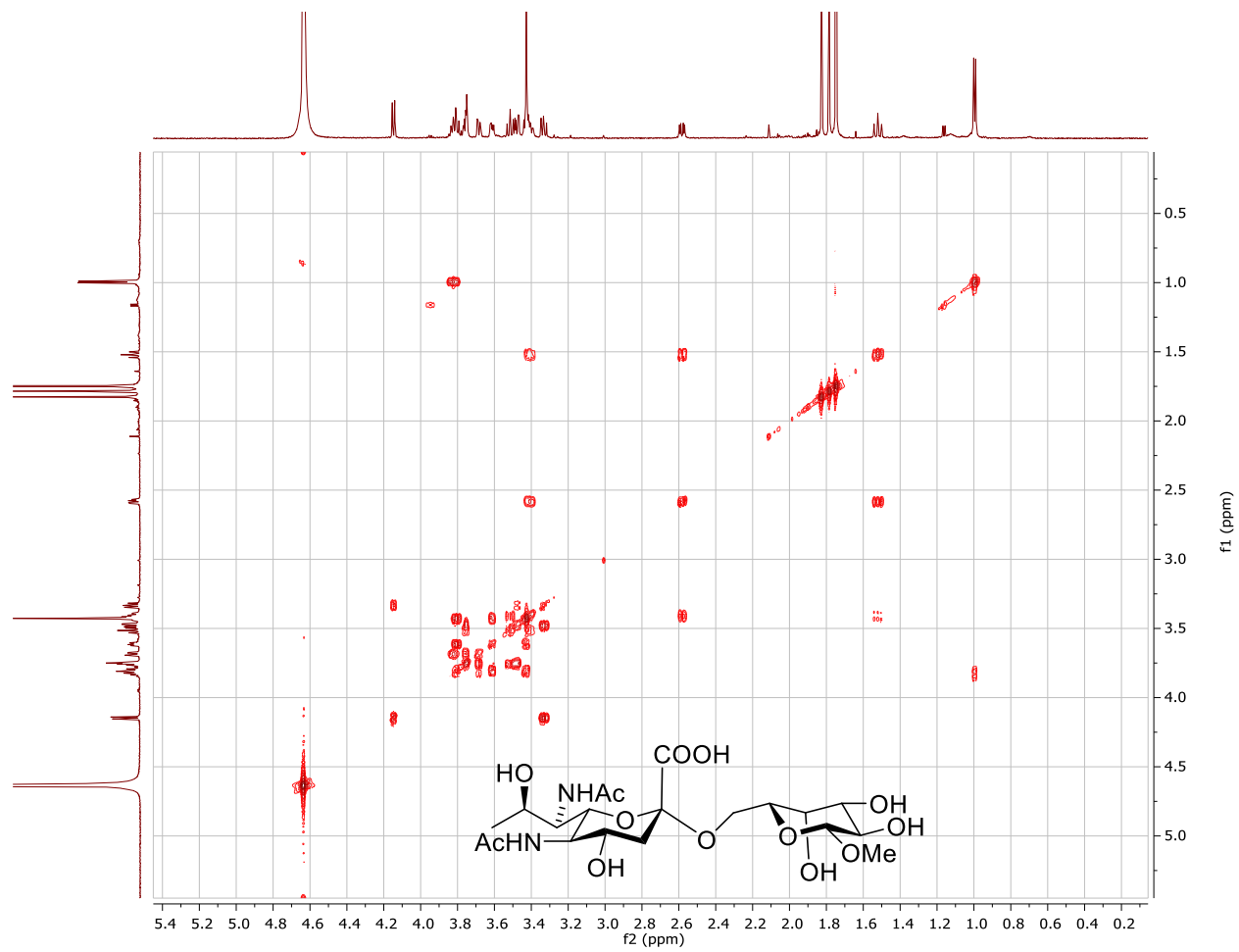
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BD_427_6OHfinal



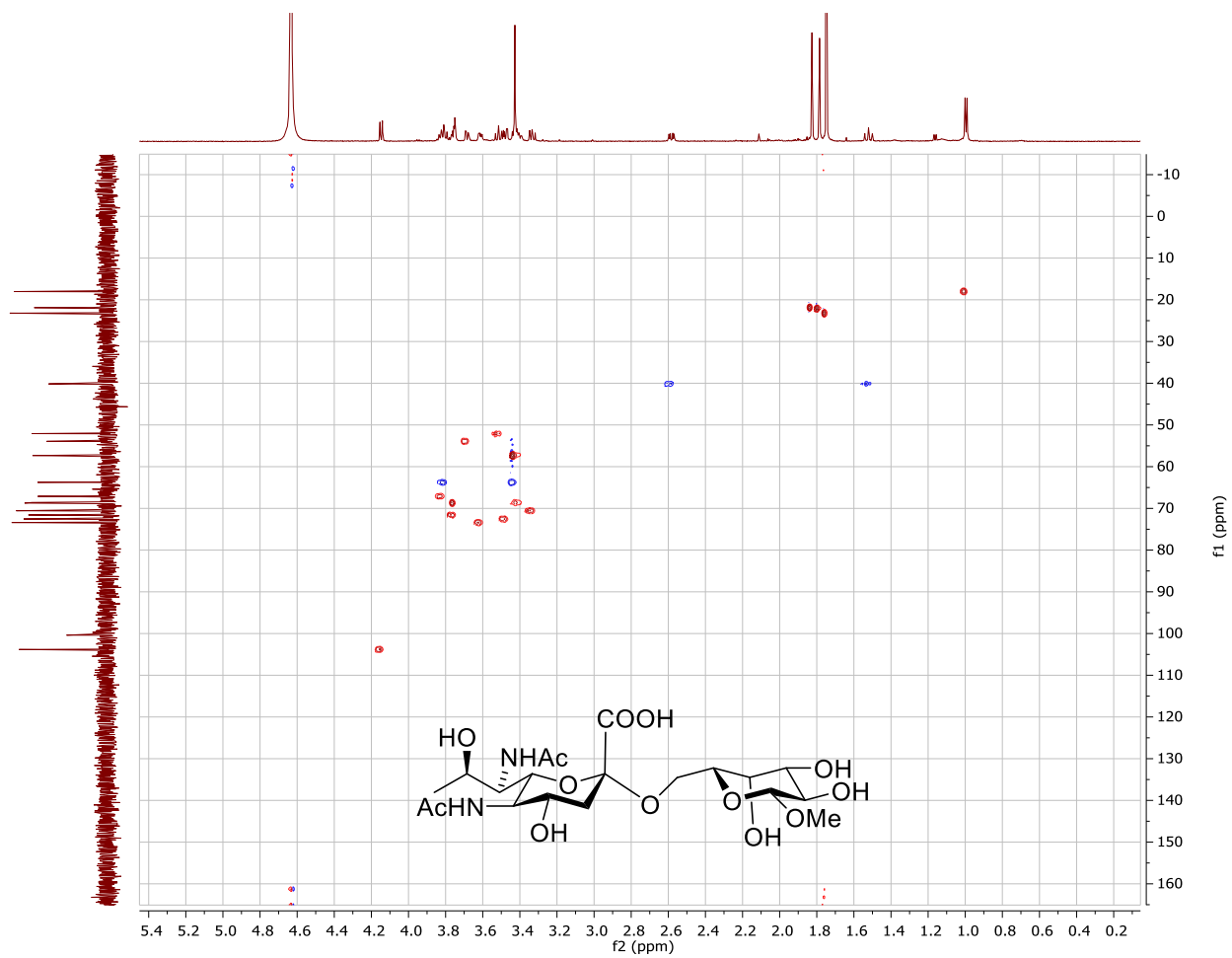
**¹³C NMR (151 MHz, D₂O) Methyl [5,7-Diacetamido-3,5,7,9-tetra-deoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onic acid]-
(2 \rightarrow 6)-2,3,4-tri-*O*-benzyl- β -D-galactopyranoside (39)**



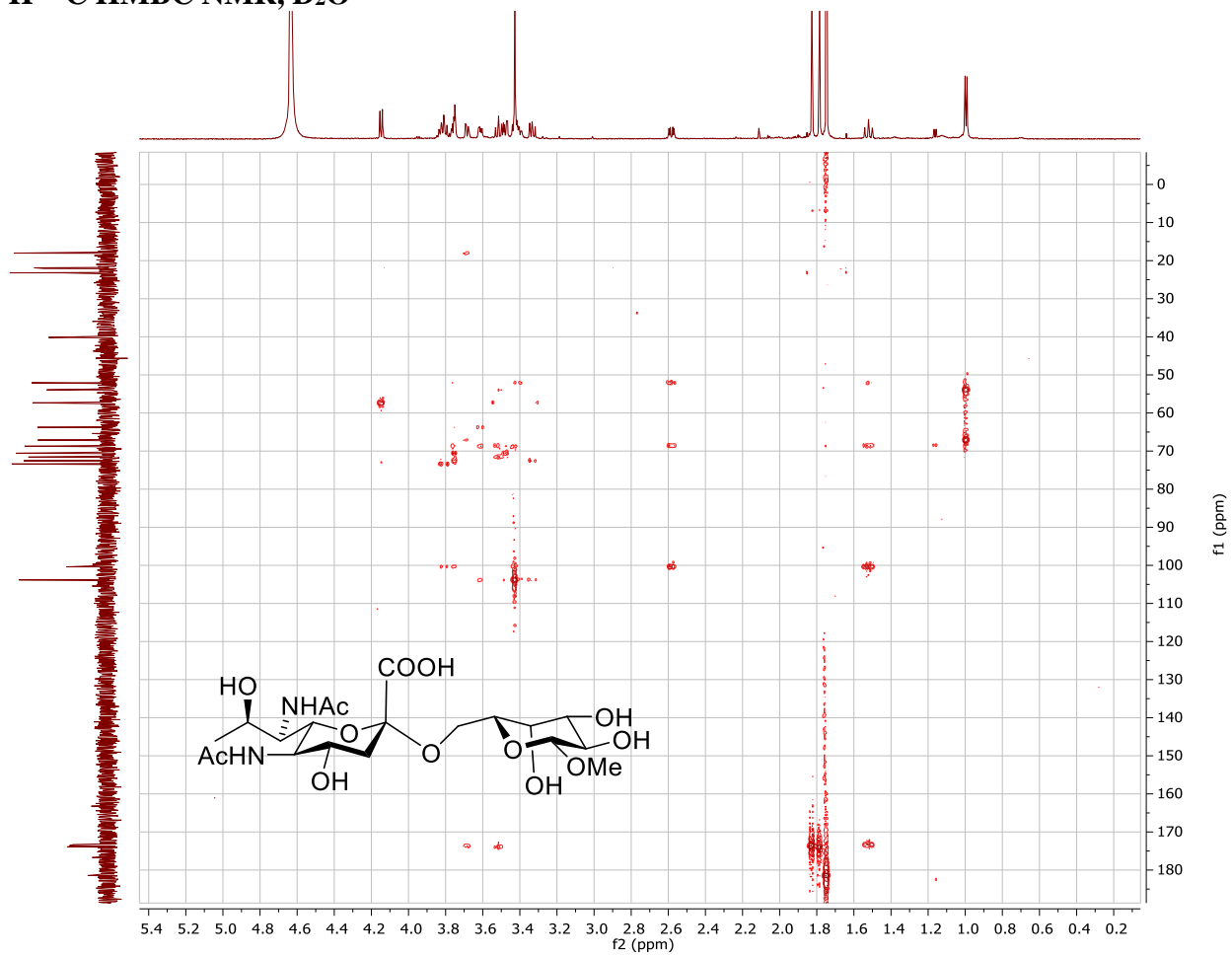
^1H - ^1H COSY NMR, D_2O



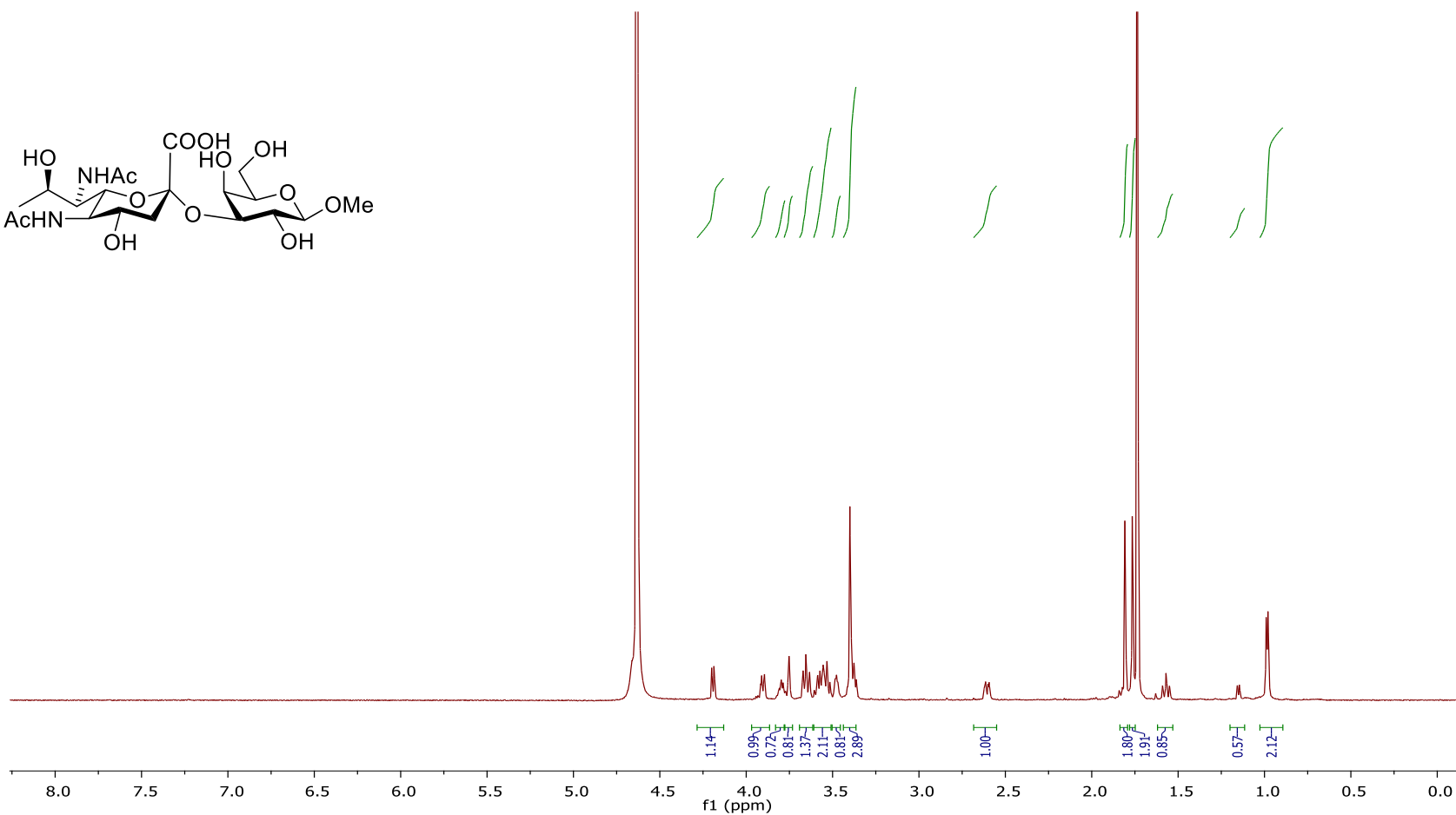
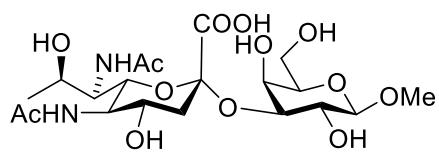
^1H - ^{13}C HSQC NMR, D_2O



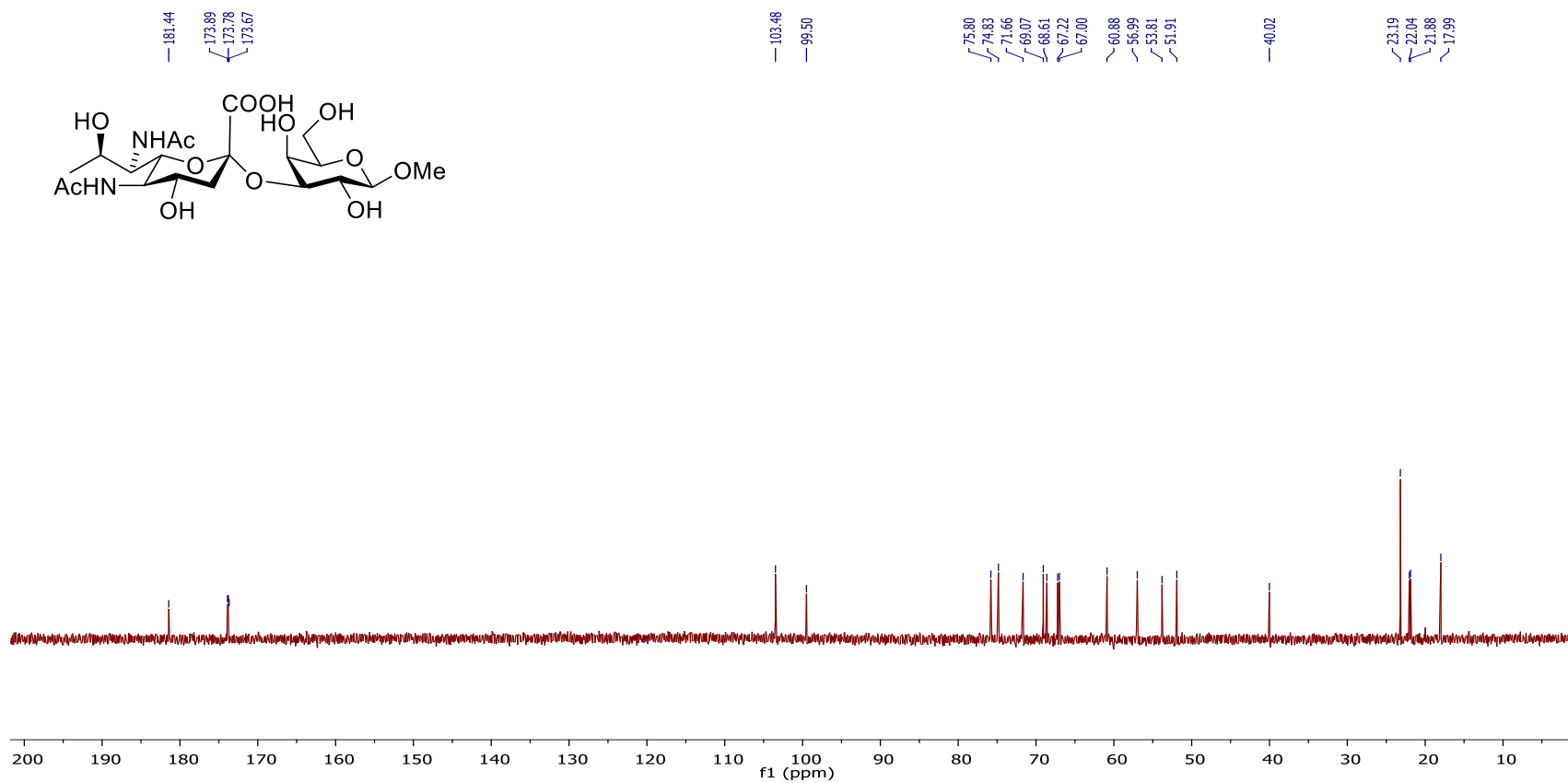
^1H - ^{13}C HMBC NMR, D_2O



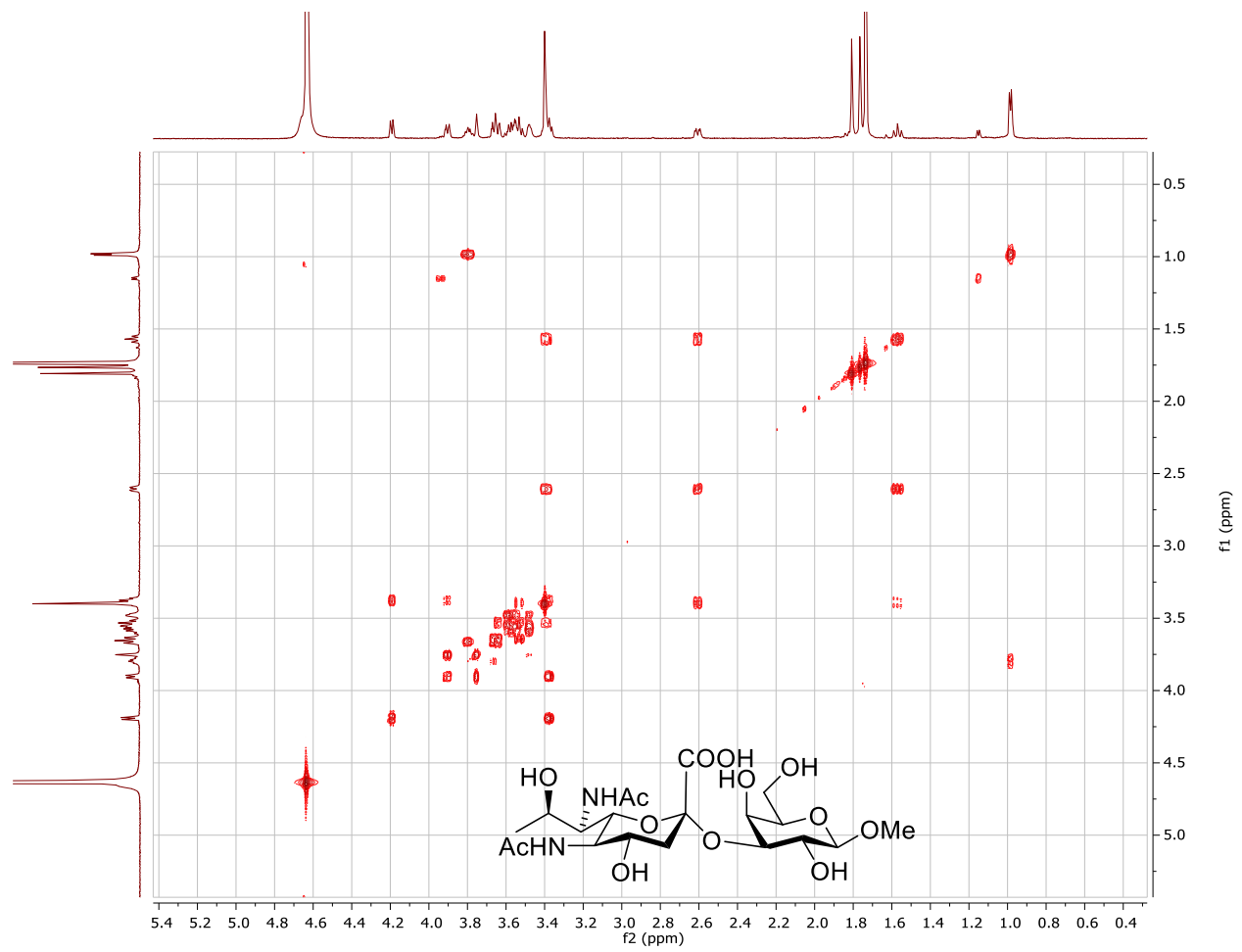
**¹H NMR (600 MHz, D₂O) Methyl [5,7-Diacetamido-3,5,7,9-tetraoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onic acid]-
(2 \rightarrow 3)-2,4,6-tri-O-benzyl- β -D-galactopyranoside (42)**



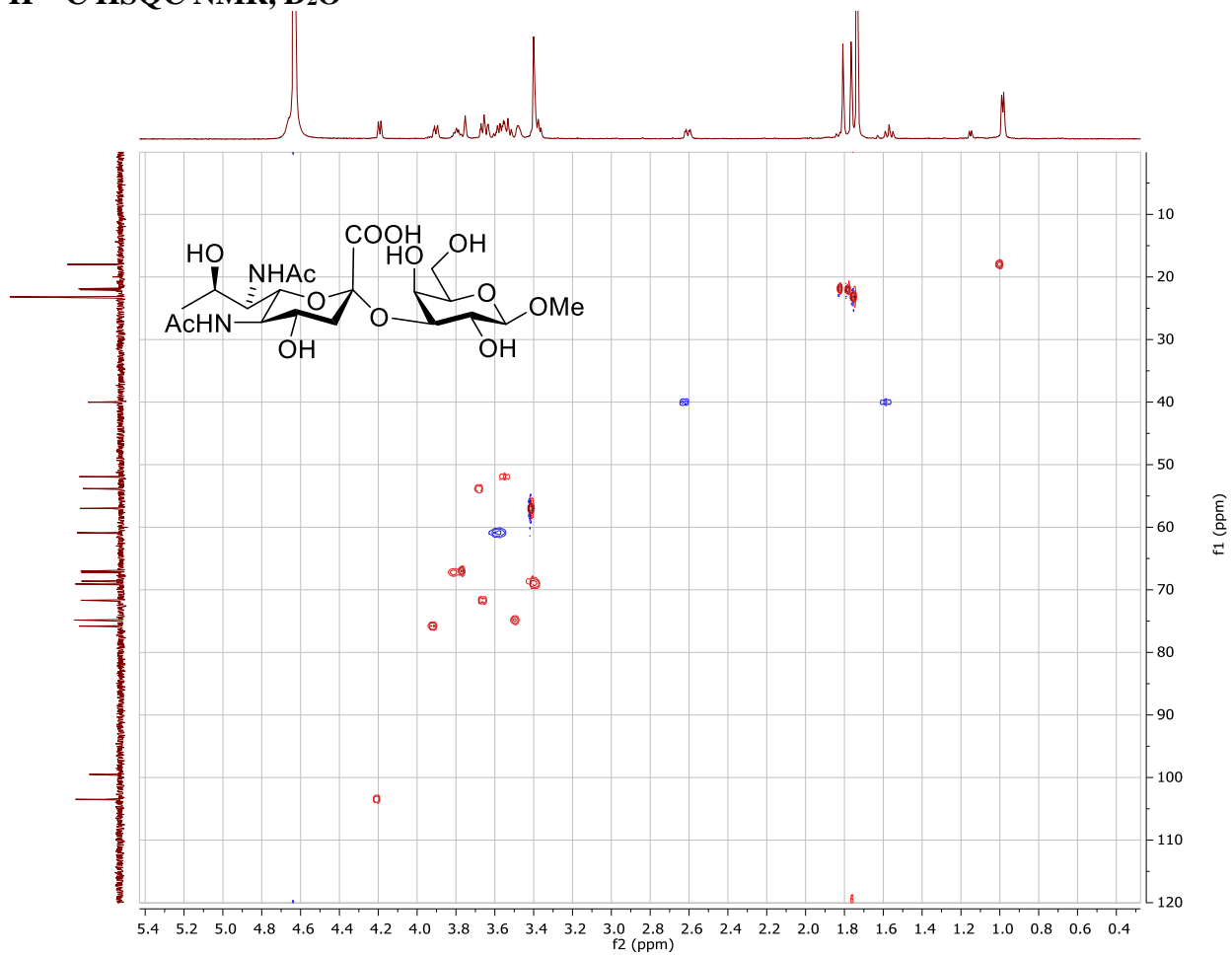
**^{13}C NMR (151 MHz, D_2O) Methyl [5,7-Diacetamido-3,5,7,9-tetraoxy-D-glycero- α -D-galacto-non-2-ulopyranosid)onic acid]-
(2 \rightarrow 3)-2,4,6-tri-*O*-benzyl- β -D-galactopyranoside (42)**



^1H - ^1H COSY NMR, D_2O



^1H - ^{13}C HSQC NMR, D_2O



^1H - ^{13}C HMBC NMR, D_2O

