Supplementary data for article:

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Electronic Supplementary Information for the paper:

A short stereoselective synthesis of (+)-aza-galacto-fagomine (AGF)

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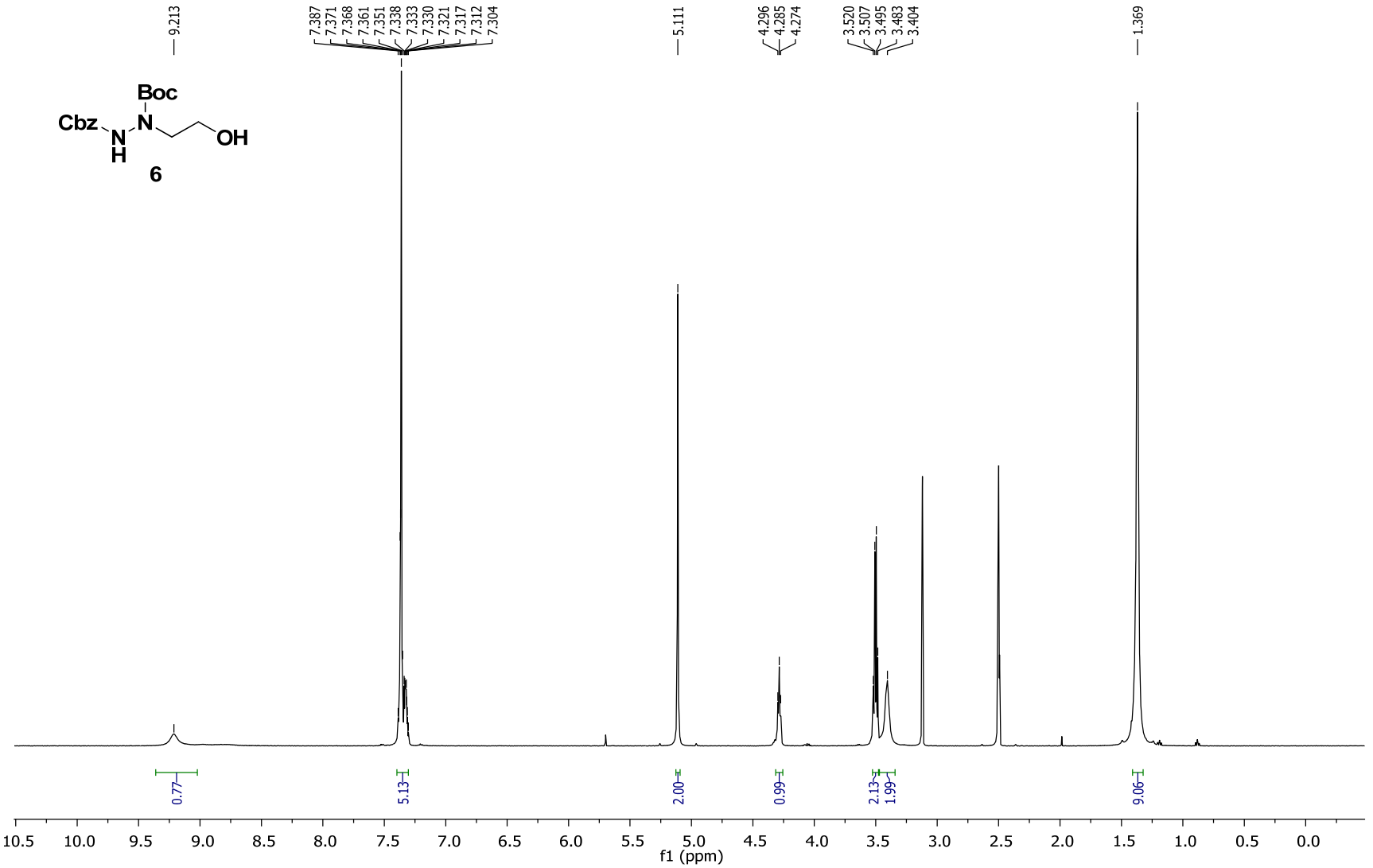
Content:

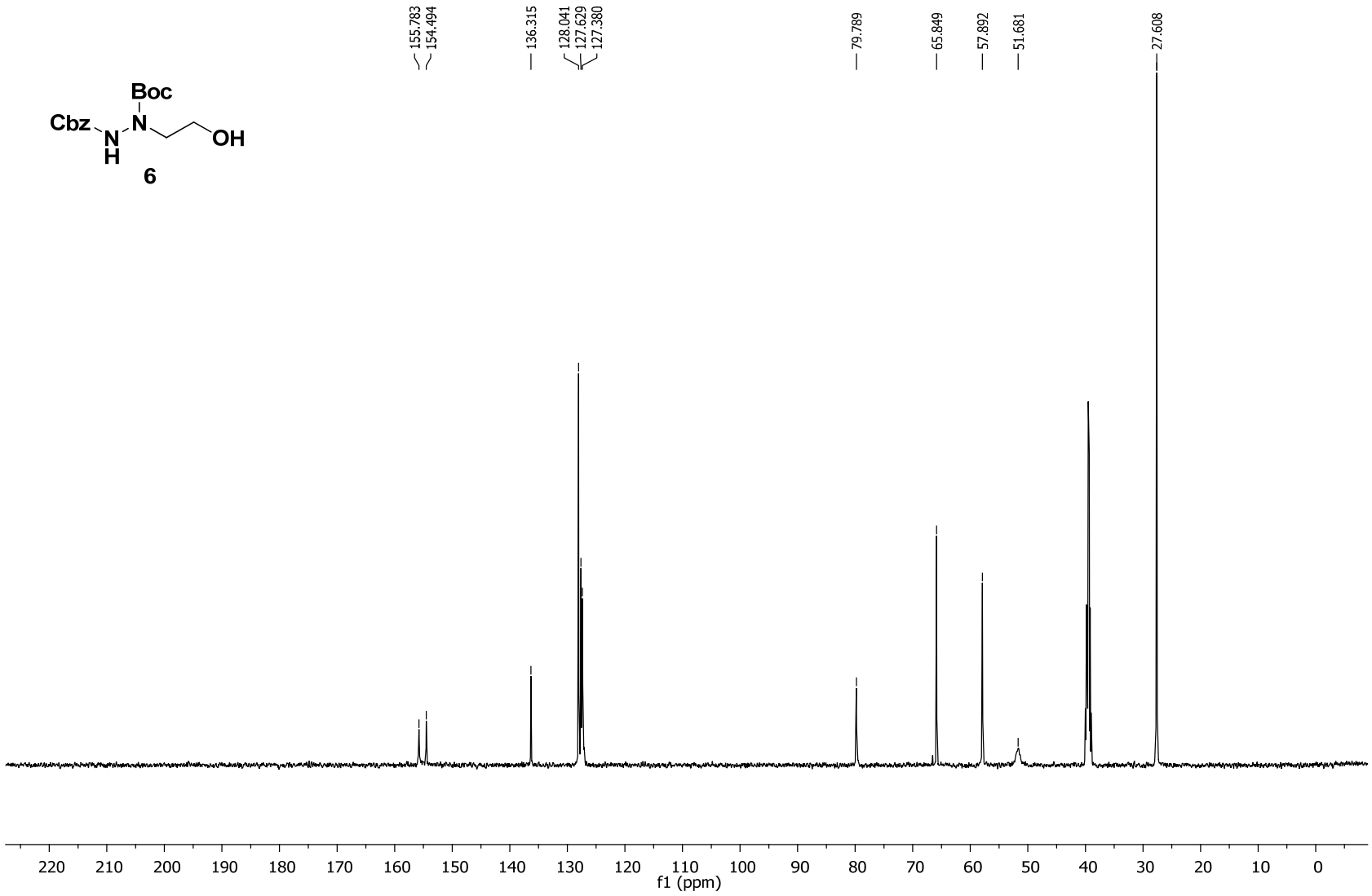
^{1}H and ^{13}C NMR Spectra for compounds 6, 7, 8, 9 and 1 **S2-11**

Determinatin of optical purity of compound 8 by chiral HPLC **S12-13**

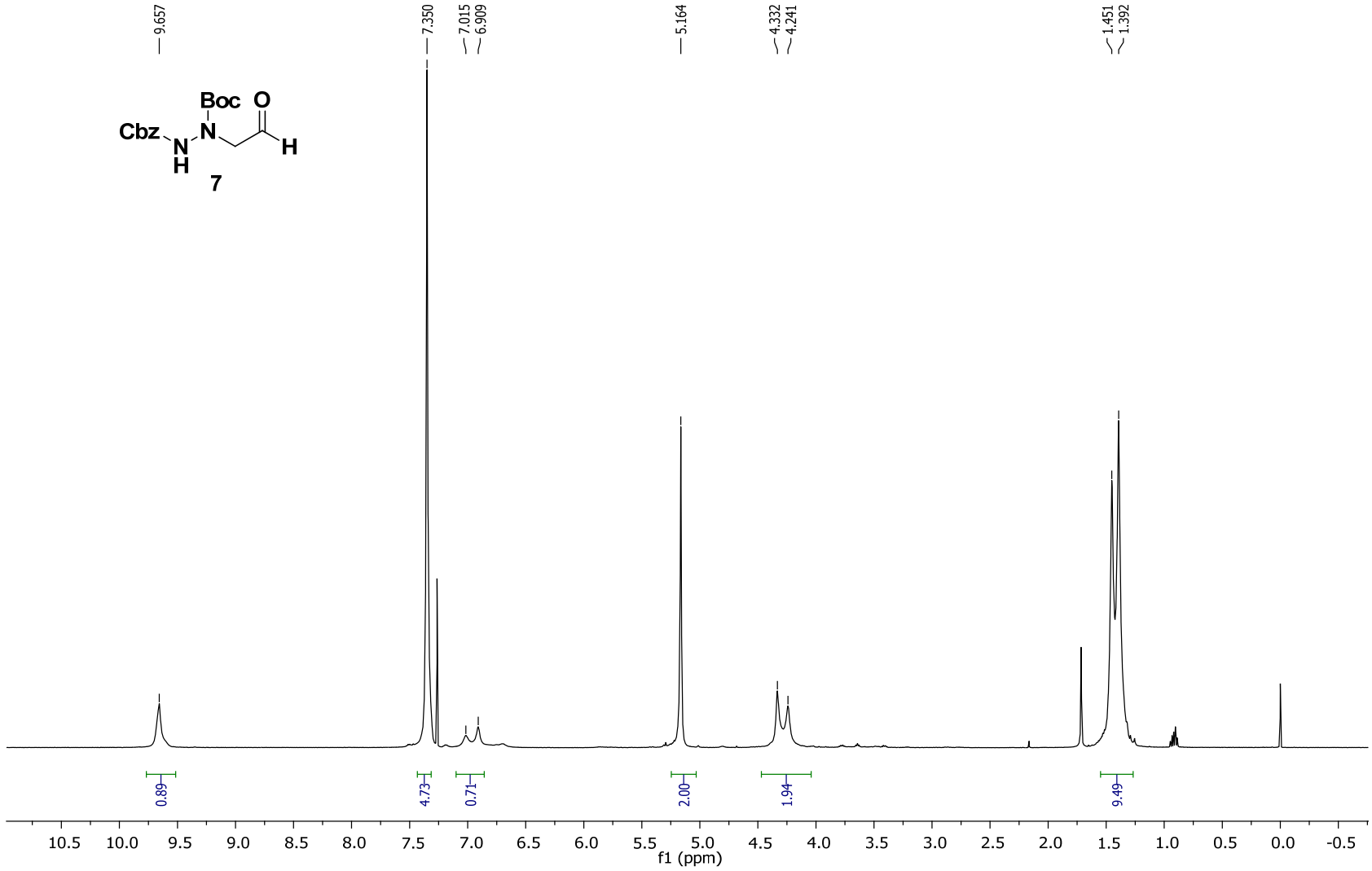
500 MHz ^{1}H NMR spectrum of 2-Benzyl 1-*tert*-butyl 1-(2-hydroxyethyl)hydrazine-1,2-dicarboxylate (**6**) in DMSO-d_6, 65 °C



125 MHz ^{13}C NMR spectrum of 2-Benzyl 1-*tert*-butyl 1-(2-hydroxyethyl)hydrazine-1,2-dicarboxylate (**6**) in DMSO-d_6, 65 °C



500 MHz ^{1}H NMR spectrum of 2-Benzyl 1-*tert*-butyl 1-(2-oxoethyl)hydrazine-1,2-dicarboxylate (**7**) in $CDCl_3$



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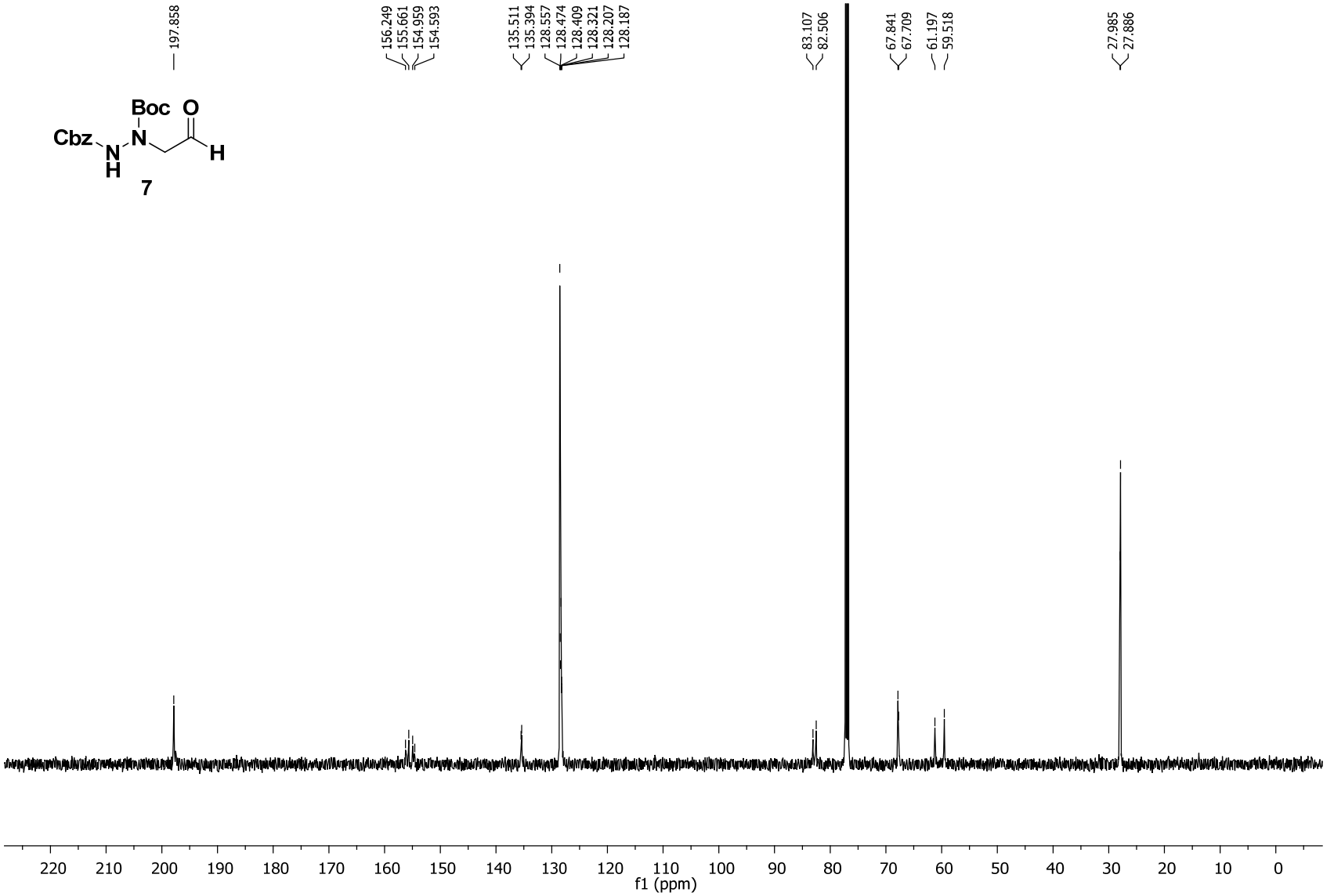
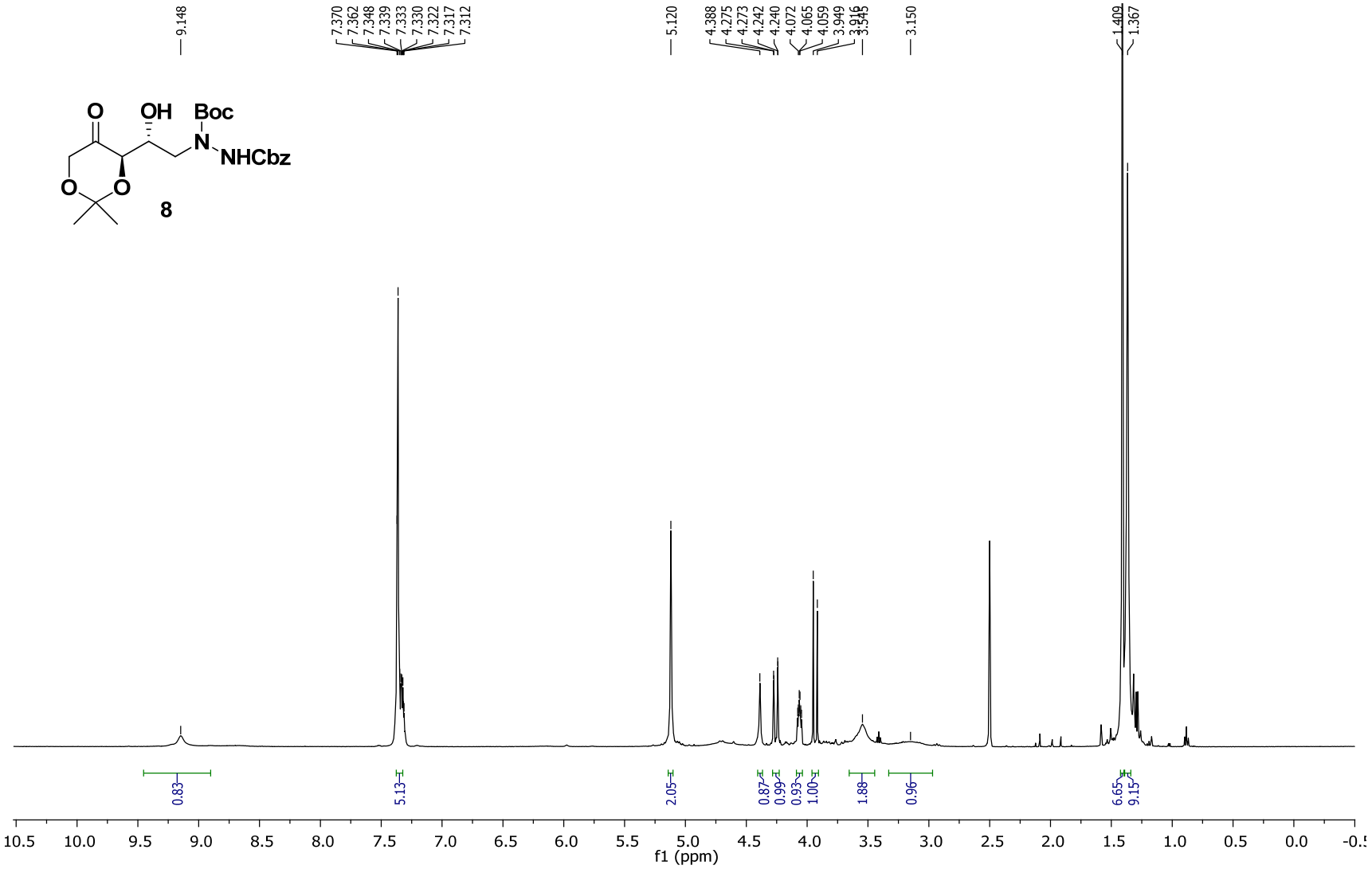


500 MHz ^{1}H NMR spectrum of 2-Benzyl 1-*tert*-butyl 1-((*R*)-2-((*R*)-2,2-dimethyl-5-oxo-1,3-dioxan-4-yl)-2-hydroxyethyl)hydrazine-1,2-dicarboxylate (**8**) in DMSO-d_6, 65 °C



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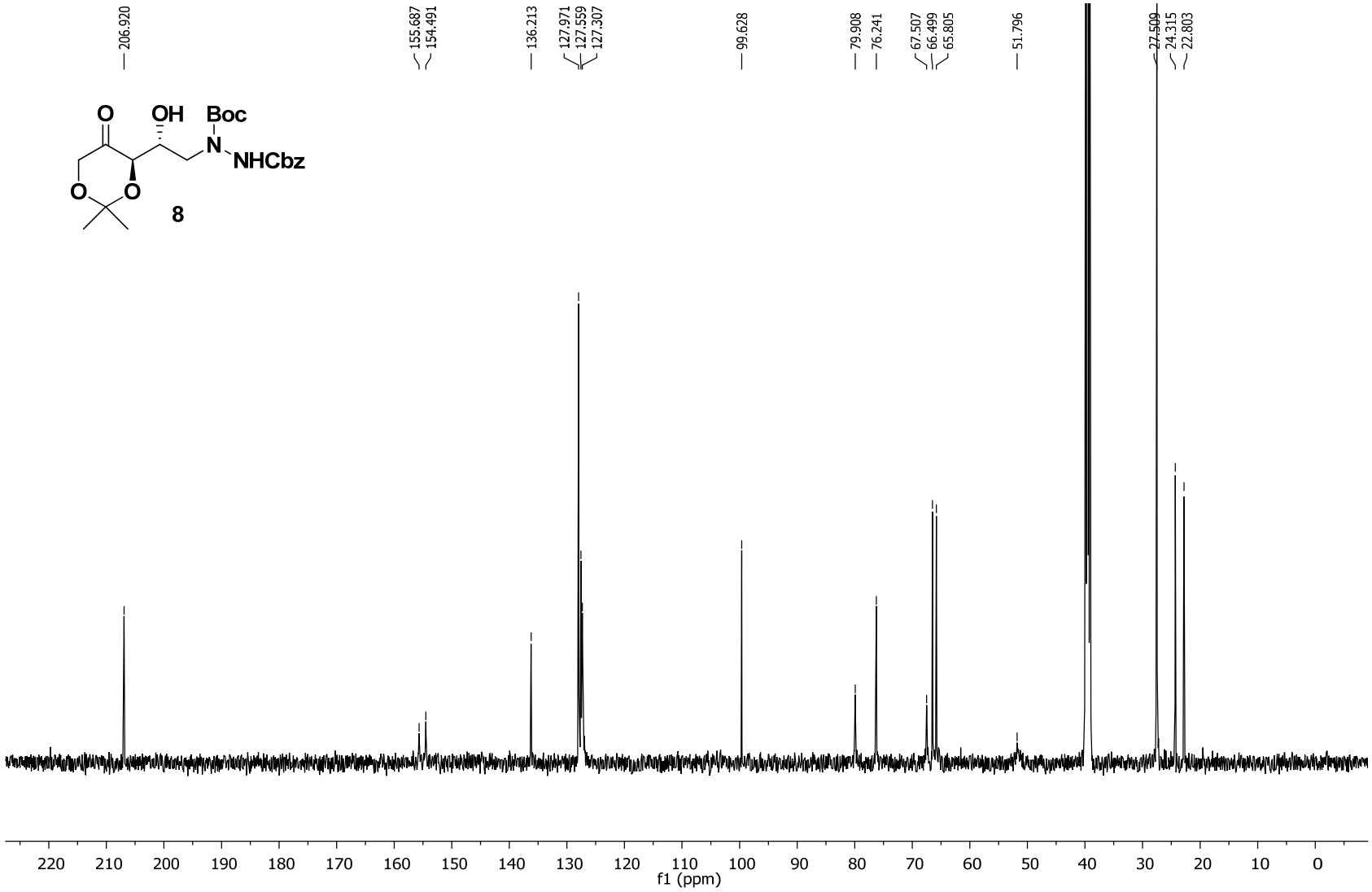
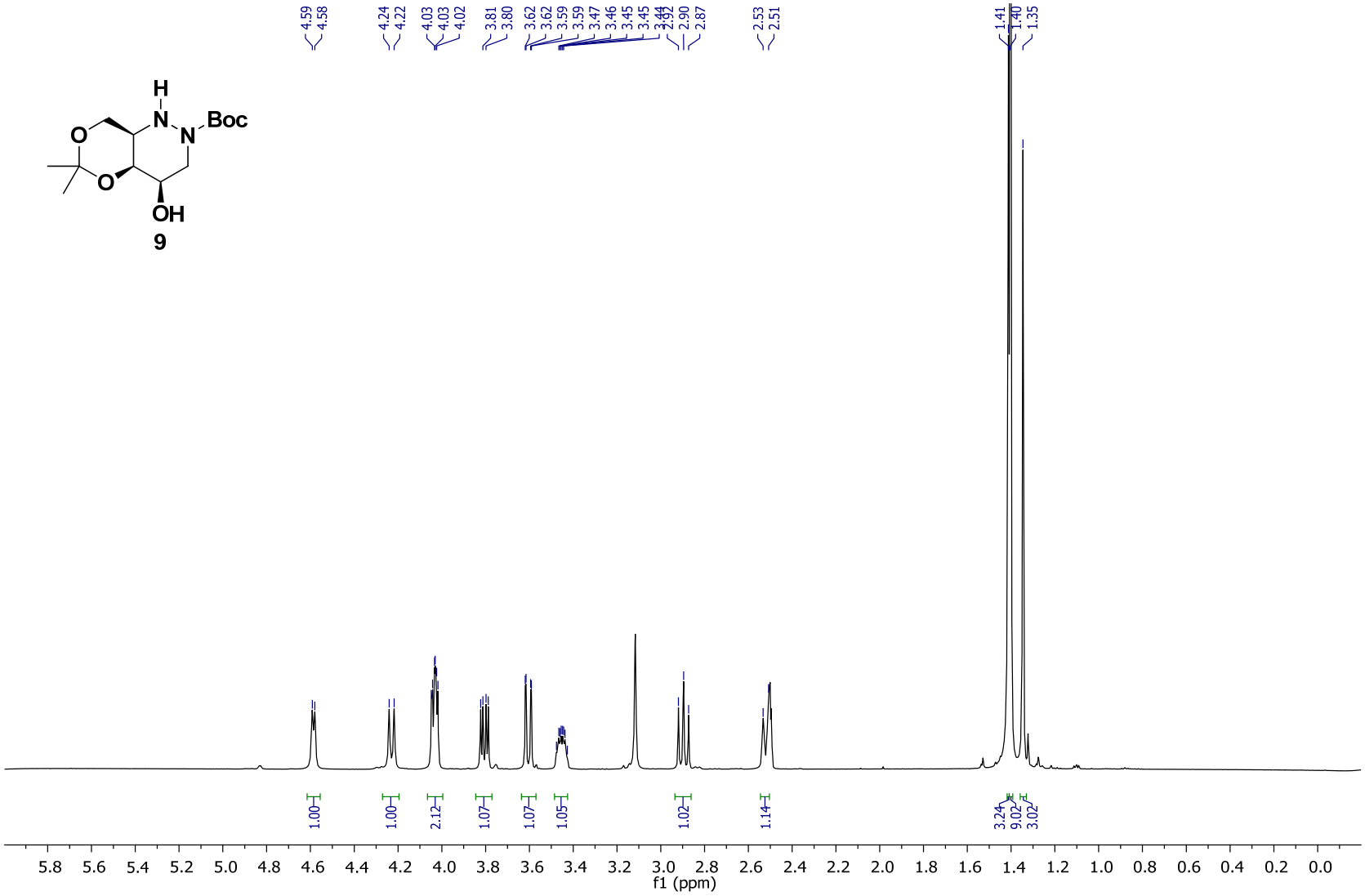


500 MHz ^{1}H NMR spectrum of (4*R*,4a*S*,8a*R*)-*tert*-butyl 4-hydroxy-6,6-dimethyltetrahydro-1*H*-[1,3]dioxino[5,4-c]pyridazine-2(3*H*)-carboxylate (**9**) in DMSO-d_6, 65 °C



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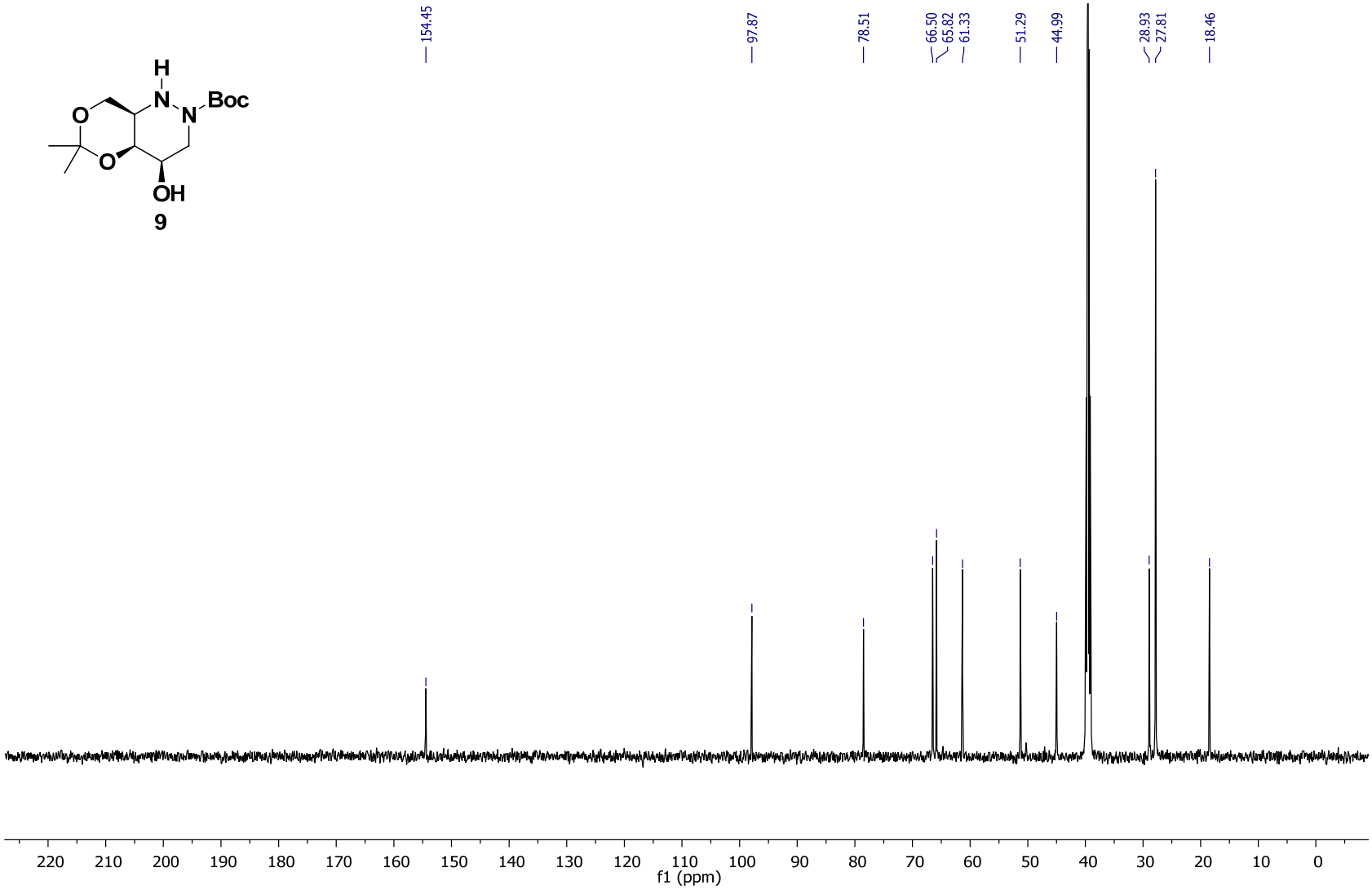
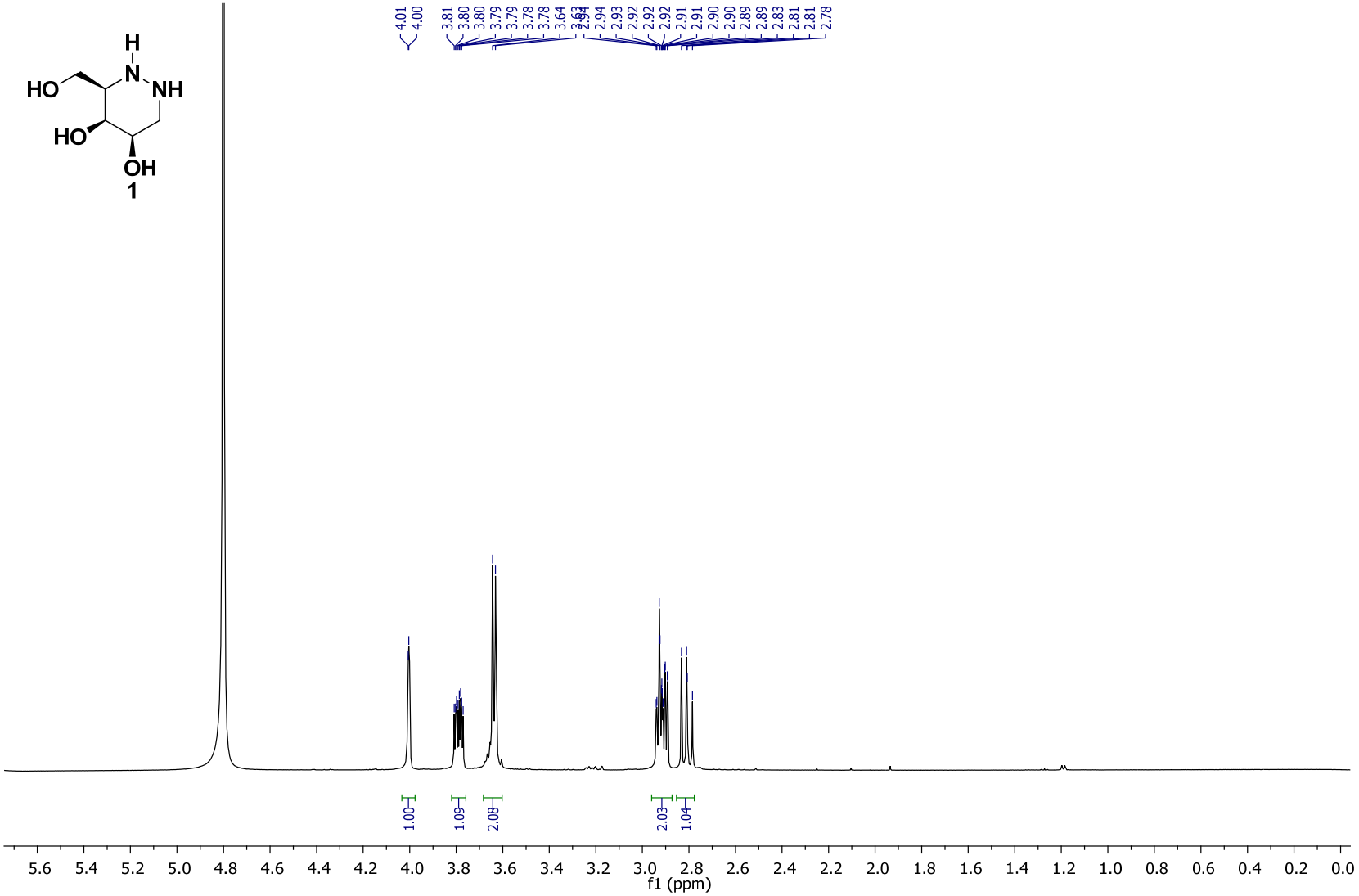
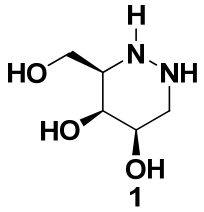


500 MHz ^{1}H NMR spectrum of (3*R*,4*S*,5*R*)-3-(hydroxymethyl)piperazine-4,5-diol (aza-galacto-fagomine) (**1**) in D_2O



125 MHz ^{13}C NMR spectrum of (3*R*,4*S*,5*R*)-3-(hydroxymethyl)piperazine-4,5-diol (aza-galacto-fagomine) (**1**) in D_2O



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Determination of the optical purity of aldol 8

98% ee; HPLC: Chiracel OZ-H (250 x 46 mm), *n*-heptane/*i*PrOH = 80/20, 0.5 mL/min, t_{R1} = 19.63 min i t_{R2} = 22.39 min

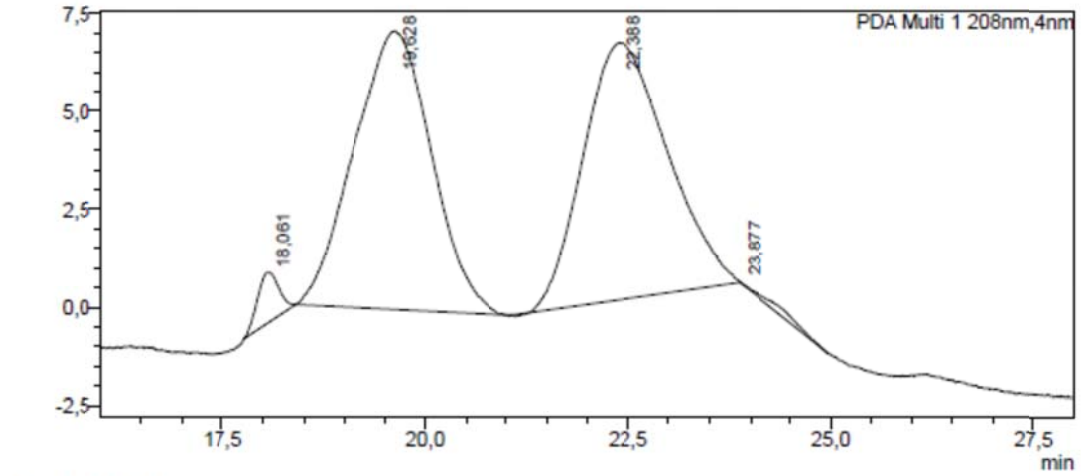
#

HPLC chromatogram of the racemic aldol **8-rac** for control

<Sample Information>

Sample Name	: 462-dl		
Sample ID	: 462-dl_6		
Data Filename	: 462-dl_6.lcd		
Method Filename	: C6 80_20 60 min fl 0.5.lcm		
Batch Filename	: 20170212.lcb		
Vial #	: 1-94	Sample Type	: Unknown
Injection Volume	: 5 uL		
Date Acquired	: 18-2-2017 0:35:55	Acquired by	: System Administrator
Date Processed	: 18-2-2017 1:35:57	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

PDA Ch1 208nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	18,061	23555	1288	0,000		M	
2	19,628	472928	7120	0,000		M	
3	22,388	474170	6580	0,000		M	
4	23,877	5383	9	0,000		M	
Total		976037	14997				

#

Peak	Retention time (min)	Area	Area %
1	19.628	472928	49.9
2	22.388	474170	50.1
Total		947098	100

HPLC Chromatogram of aldol **8**

<Sample Information>

Sample Name	: 462-d		
Sample ID	: 462-d_6		
Data Filename	: 462-d_6.lcd		
Method Filename	: C6 80_20 60 min fl 0.5.lcm		
Batch Filename	: 20170212.lcb		
Vial #	: 1-26	Sample Type	: Unknown
Injection Volume	: 5 uL		
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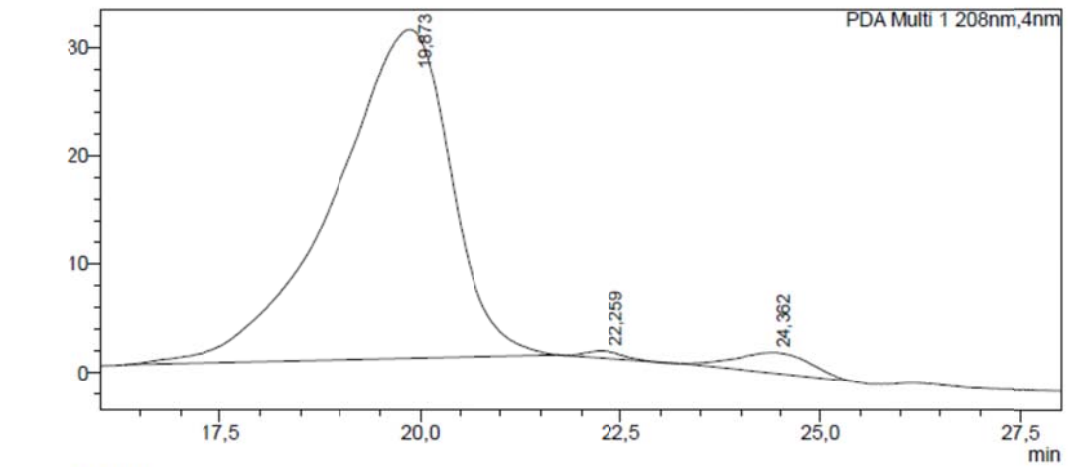
Date Processed	: 20-2-2017 6:46:14	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

PDA Ch1 208nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	19,873	3061673	30273	0,000		M	
2	22,259	21510	692	0,000		M	
3	24,362	123388	1858	0,000		M	
Total		3206570	32824				

Peak	Retention time (min)	Area	Area %
1	19.873	3061673	99.3
2	22.259	21510	0.7
Total		3083183	100