



# wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 7, 2020 – 01:54 AM BST

PDB ID : 2RFZ  
Title : Crystal structure of cellobiohydrolase from *Melanocarpus albomyces* complexed with cellotriose  
Authors : Parkkinen, T.; Koivula, A.; Vehmaanper, J.; Rouvinen, J.  
Deposited on : 2007-10-02  
Resolution : 1.80 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.13.1  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.13.1

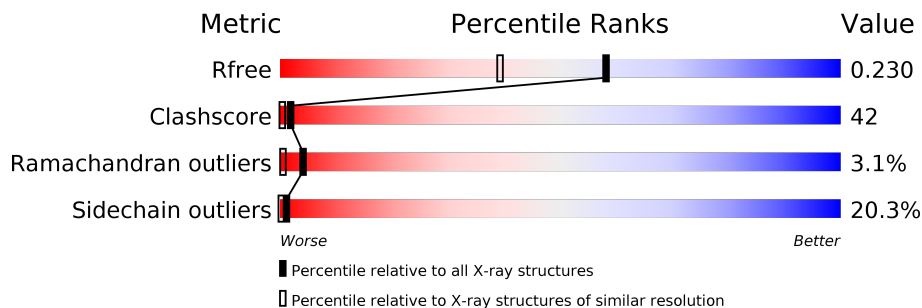
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.80 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.






Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	5950 (1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	A	430	23% (green), 55% (yellow), 20% (orange), 2% (red), 0% (grey)
1	B	430	33% (green), 49% (yellow), 17% (orange), 1% (red), 0% (grey)
1	C	430	40% (green), 47% (yellow), 13% (orange), 0% (red), 0% (grey)
1	D	430	43% (green), 46% (yellow), 10% (orange), 1% (red), 0% (grey)
2	E	3	100% (orange)
2	F	3	33% (yellow), 67% (orange)
2	G	3	33% (yellow), 67% (orange)

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Mol	Chain	Length	Quality of chain	
2	H	3		
2	I	3		
2	J	3		

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
1	PCA	A	1	-	-	X	-
2	GLC	E	1	X	-	-	-
2	GLC	F	1	X	-	-	-
2	GLC	G	1	X	-	-	-
2	GLC	H	1	X	-	-	-
2	GLC	I	1	X	-	-	-
2	GLC	J	1	X	-	-	-

## 2 Entry composition [i](#)

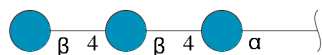
There are 3 unique types of molecules in this entry. The entry contains 14399 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Cellulose 1,4-beta-cellobiosidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	430	3333	2075	558	669	31	0	0	0
1	B	430	3333	2075	558	669	31	0	0	0
1	C	430	3333	2075	558	669	31	0	0	0
1	D	430	3333	2075	558	669	31	0	0	0

- Molecule 2 is an oligosaccharide called beta-D-glucopyranose-(1-4)-beta-D-glucopyranose-(1-4)-alpha-D-glucopyranose.



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
			Total	C	O			
2	E	3	34	18	16	0	0	0
2	F	3	34	18	16	0	0	0
2	G	3	34	18	16	0	0	0
2	H	3	34	18	16	0	0	0
2	I	3	34	18	16	0	0	0
2	J	3	34	18	16	0	0	0

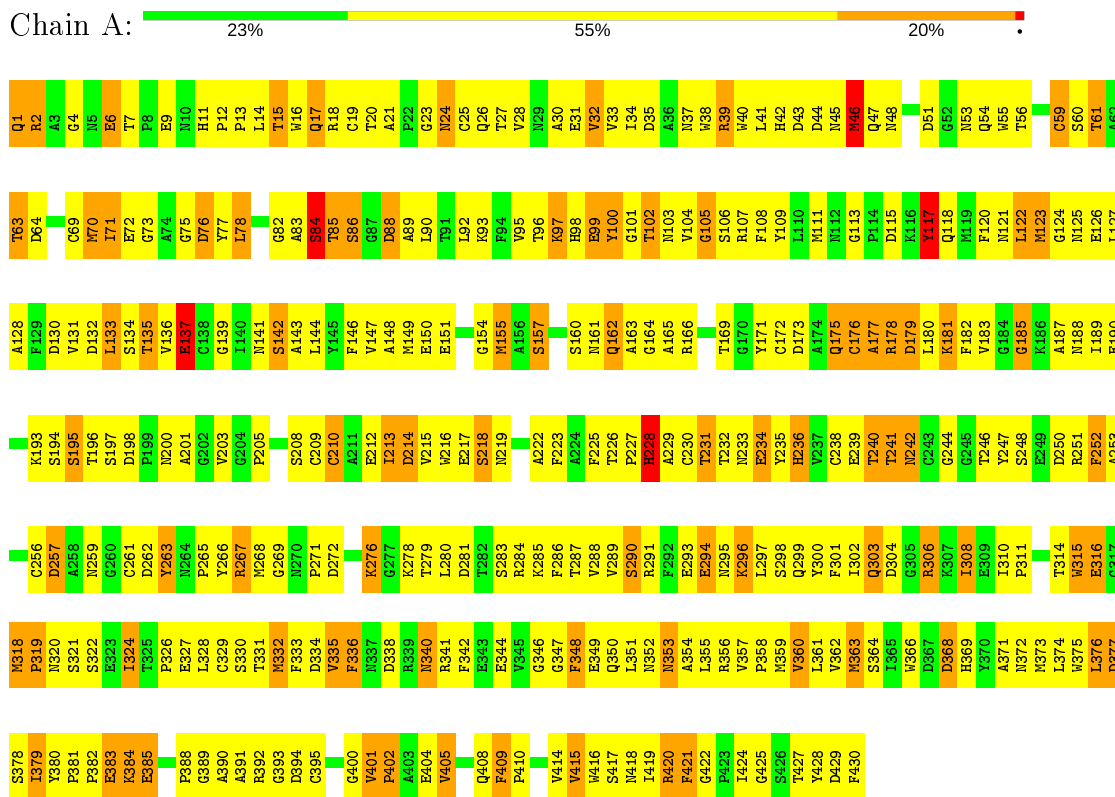
- Molecule 3 is water.

<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
3	A	202	Total 202	O 202	0	0
3	B	191	Total 191	O 191	0	0
3	C	225	Total 225	O 225	0	0
3	D	245	Total 245	O 245	0	0

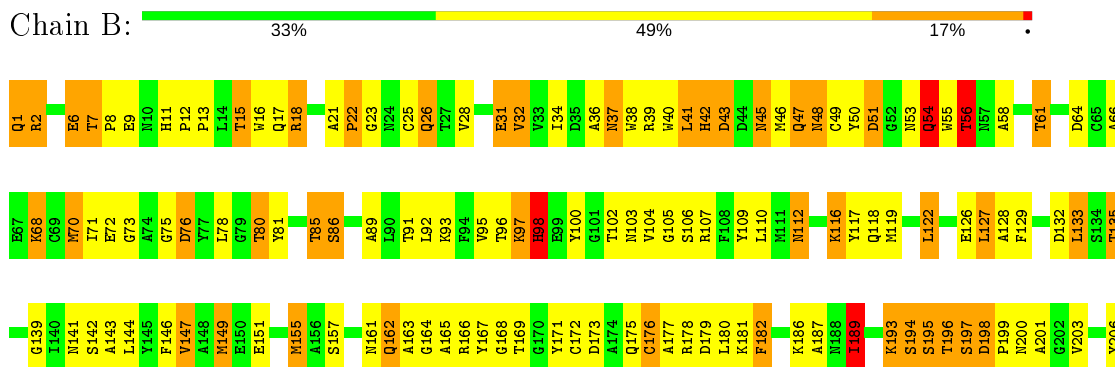
### 3 Residue-property plots i

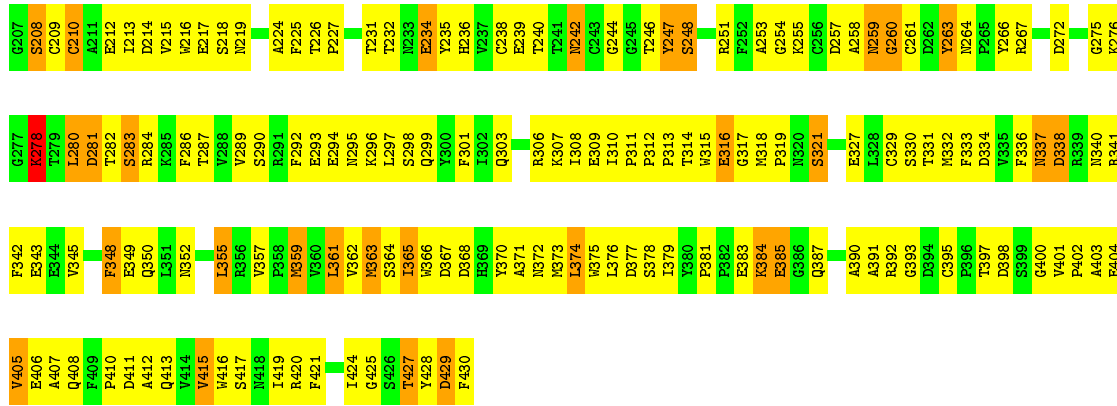
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Cellulose 1,4-beta-cellobiosidase

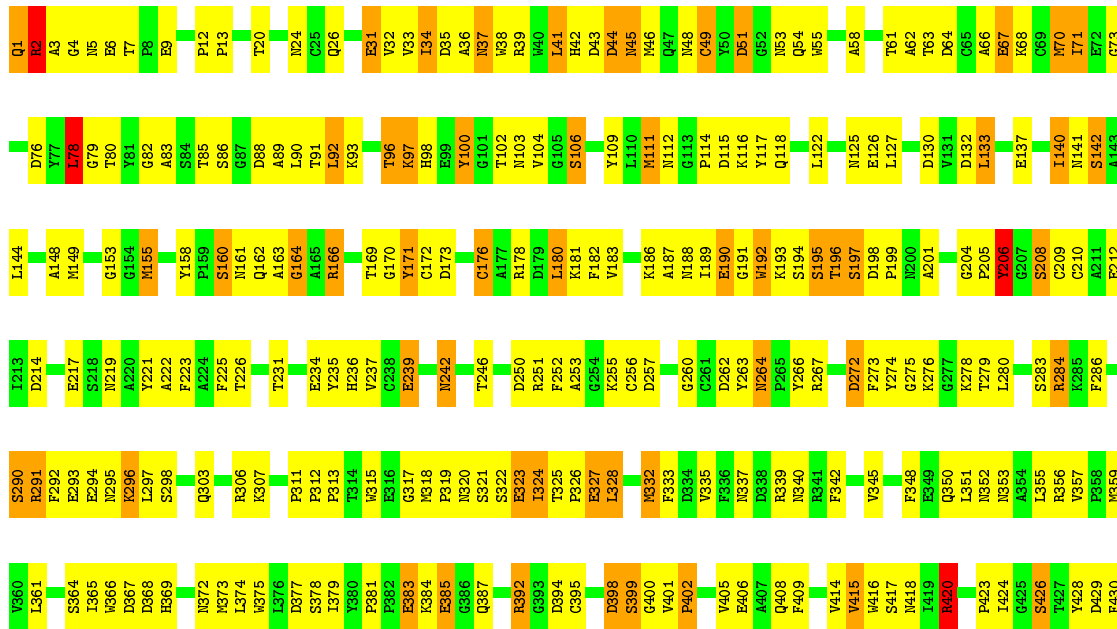


- Molecule 1: Cellulose 1,4-beta-cellobiosidase

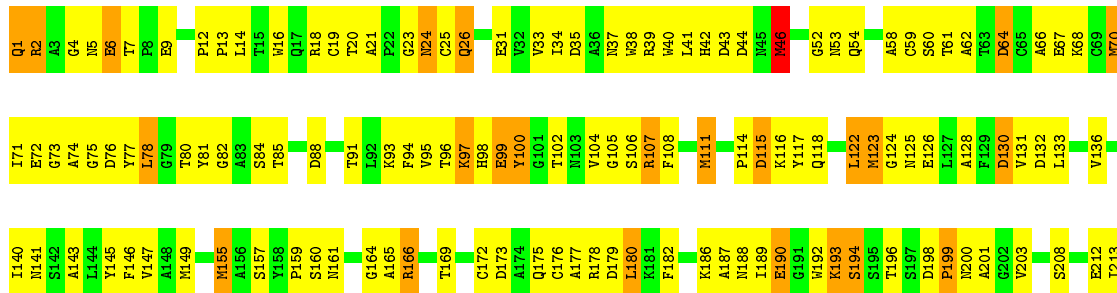


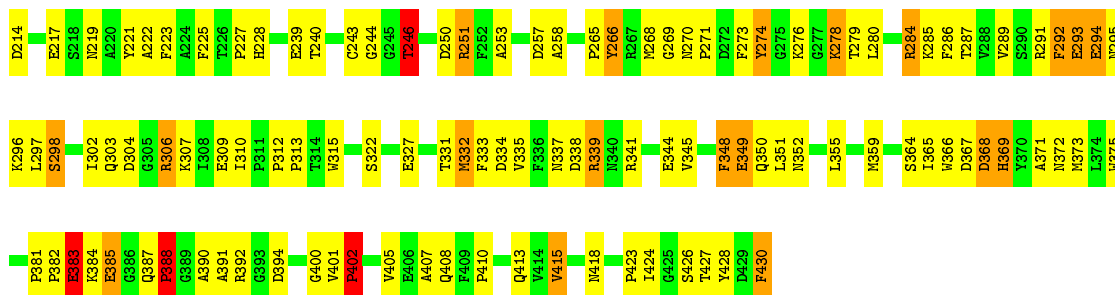


• Molecule 1: Cellulose 1,4-beta-cellobiosidase



• Molecule 1: Cellulose 1,4-beta-cellobiosidase





- Molecule 2: beta-D-glucopyranose-(1-4)-beta-D-glucopyranose-(1-4)-alpha-D-glucopyranose

Chain E:  100%

GLC1  
BGC2  
BGC3

- Molecule 2: beta-D-glucopyranose-(1-4)-beta-D-glucopyranose-(1-4)-alpha-D-glucopyranose

Chain F:  33% 67%

GLC1  
BGC2  
BGC3

- Molecule 2: beta-D-glucopyranose-(1-4)-beta-D-glucopyranose-(1-4)-alpha-D-glucopyranose

Chain G:  33% 67%

GLC1  
BGC2  
BGC3

- Molecule 2: beta-D-glucopyranose-(1-4)-beta-D-glucopyranose-(1-4)-alpha-D-glucopyranose

Chain H:  33% 67%

GLC1  
BGC2  
BGC3

- Molecule 2: beta-D-glucopyranose-(1-4)-beta-D-glucopyranose-(1-4)-alpha-D-glucopyranose

Chain I:  33% 67%

GLC1  
BGC2  
BGC3

- Molecule 2: beta-D-glucopyranose-(1-4)-beta-D-glucopyranose-(1-4)-alpha-D-glucopyranose



Chain J:  33% 67%

6161  
B6C2  
B6C3

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	50.80Å 94.37Å 189.91Å 90.00° 90.19° 90.00°	Depositor
Resolution (Å)	20.00 – 1.80 24.53 – 1.80	Depositor EDS
% Data completeness (in resolution range)	92.8 (20.00-1.80) 96.6 (24.53-1.80)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.10	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.78 (at 1.80Å)	Xtrriage
Refinement program	SHELX, SHELXL-97	Depositor
R, $R_{free}$	0.261 , 0.237 0.190 , 0.230	Depositor DCC
$R_{free}$ test set	8100 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	13.1	Xtrriage
Anisotropy	0.110	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.26 , 70.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.40$ , $\langle L^2 \rangle = 0.22$	Xtrriage
Estimated twinning fraction	0.430 for h,-k,-l	Xtrriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	14399	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	25.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 17.70% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: GLC, BGC, PCA

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.36	0/3416	1.09	11/4648 (0.2%)
1	B	0.36	0/3416	1.12	10/4648 (0.2%)
1	C	0.37	0/3416	1.16	10/4648 (0.2%)
1	D	0.38	0/3416	1.15	14/4648 (0.3%)
All	All	0.37	0/13664	1.13	45/18592 (0.2%)

There are no bond length outliers.

The worst 5 of 45 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	58	ALA	C-N-CA	10.35	147.57	121.70
1	D	166	ARG	NE-CZ-NH1	-9.23	115.68	120.30
1	D	107	ARG	NE-CZ-NH1	-8.17	116.21	120.30
1	B	306	ARG	CD-NE-CZ	7.89	134.65	123.60
1	C	392	ARG	NE-CZ-NH2	-7.81	116.39	120.30

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3333	0	3028	345	0
1	B	3333	0	3028	287	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	3333	0	3028	239	0
1	D	3333	0	3027	239	0
2	E	34	0	30	8	0
2	F	34	0	30	7	0
2	G	34	0	30	5	0
2	H	34	0	30	4	0
2	I	34	0	30	5	0
2	J	34	0	30	5	0
3	A	202	0	0	18	0
3	B	191	0	0	15	0
3	C	225	0	0	19	0
3	D	245	0	0	19	0
All	All	14399	0	12291	1086	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 42.

The worst 5 of 1086 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:97:LYS:HD3	1:D:6:GLU:HG3	1.38	1.01
1:A:128:ALA:HB2	1:A:289:VAL:HG13	1.44	1.00
1:D:123:MET:HE2	1:D:294:GLU:H	1.25	0.98
1:C:298:SER:HB3	1:C:323:GLU:HG3	1.49	0.95
1:C:132:ASP:HB3	1:C:415:VAL:HG13	1.49	0.93

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	428/430 (100%)	359 (84%)	54 (13%)	15 (4%)	3	0
1	B	428/430 (100%)	355 (83%)	56 (13%)	17 (4%)	3	0
1	C	428/430 (100%)	379 (89%)	37 (9%)	12 (3%)	5	1
1	D	428/430 (100%)	373 (87%)	46 (11%)	9 (2%)	7	1
All	All	1712/1720 (100%)	1466 (86%)	193 (11%)	53 (3%)	4	0

5 of 53 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	46	MET
1	A	47	GLN
1	A	148	ALA
1	A	240	THR
1	A	384	LYS

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	354/354 (100%)	260 (73%)	94 (27%)	0	0
1	B	354/354 (100%)	274 (77%)	80 (23%)	1	0
1	C	354/354 (100%)	292 (82%)	62 (18%)	2	0
1	D	354/354 (100%)	303 (86%)	51 (14%)	3	0
All	All	1416/1416 (100%)	1129 (80%)	287 (20%)	1	0

5 of 287 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	157	SER
1	B	355	LEU
1	D	251	ARG
1	B	189	ILE
1	B	278	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 49 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	369	HIS
1	C	125	ASN
1	D	352	ASN
1	B	408	GLN
1	C	162	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

4 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
1	PCA	D	1	1	7,8,9	2.05	2 (28%)	9,10,12	1.94	2 (22%)
1	PCA	C	1	1	7,8,9	2.11	1 (14%)	9,10,12	2.12	3 (33%)
1	PCA	B	1	1	7,8,9	2.00	1 (14%)	9,10,12	1.72	3 (33%)
1	PCA	A	1	1	7,8,9	2.06	1 (14%)	9,10,12	1.58	4 (44%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	PCA	D	1	1	-	0/0/11/13	0/1/1/1
1	PCA	C	1	1	-	0/0/11/13	0/1/1/1
1	PCA	B	1	1	-	0/0/11/13	0/1/1/1
1	PCA	A	1	1	-	0/0/11/13	0/1/1/1

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1	PCA	CD-N	5.12	1.48	1.34
1	C	1	PCA	CD-N	5.12	1.48	1.34
1	B	1	PCA	CD-N	4.99	1.47	1.34
1	D	1	PCA	CD-N	4.90	1.47	1.34
1	D	1	PCA	CB-CG	-2.00	1.48	1.53

The worst 5 of 12 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	1	PCA	OE-CD-CG	-4.19	119.46	126.76
1	C	1	PCA	OE-CD-CG	-4.15	119.51	126.76
1	B	1	PCA	OE-CD-CG	-3.65	120.40	126.76
1	C	1	PCA	CB-CA-C	-3.26	108.22	112.70
1	D	1	PCA	CB-CA-C	-2.64	109.07	112.70

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	D	1	PCA	2	0
1	C	1	PCA	2	0
1	B	1	PCA	2	0
1	A	1	PCA	5	0

## 5.5 Carbohydrates [i](#)

18 monosaccharides are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	GLC	E	1	2	12,12,12	0.76	0	17,17,17	1.52	3 (17%)
2	BGC	E	2	2	11,11,12	0.45	0	15,15,17	1.52	3 (20%)
2	BGC	E	3	2	11,11,12	0.47	0	15,15,17	1.39	2 (13%)
2	GLC	F	1	2	12,12,12	0.49	0	17,17,17	1.15	2 (11%)
2	BGC	F	2	2	11,11,12	0.51	0	15,15,17	2.03	5 (33%)
2	BGC	F	3	2	11,11,12	0.48	0	15,15,17	1.54	2 (13%)
2	GLC	G	1	2	12,12,12	0.59	0	17,17,17	0.85	0
2	BGC	G	2	2	11,11,12	0.53	0	15,15,17	1.55	2 (13%)
2	BGC	G	3	2	11,11,12	0.57	0	15,15,17	1.17	1 (6%)
2	GLC	H	1	2	12,12,12	0.81	0	17,17,17	2.06	2 (11%)
2	BGC	H	2	2	11,11,12	0.56	0	15,15,17	1.34	3 (20%)
2	BGC	H	3	2	11,11,12	0.47	0	15,15,17	1.03	0
2	GLC	I	1	2	12,12,12	0.61	0	17,17,17	1.24	4 (23%)
2	BGC	I	2	2	11,11,12	0.61	0	15,15,17	1.13	1 (6%)
2	BGC	I	3	2	11,11,12	0.37	0	15,15,17	1.46	2 (13%)
2	GLC	J	1	2	12,12,12	0.80	0	17,17,17	1.39	2 (11%)
2	BGC	J	2	2	11,11,12	0.57	0	15,15,17	1.68	5 (33%)
2	BGC	J	3	2	11,11,12	0.32	0	15,15,17	2.08	1 (6%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GLC	E	1	2	1/1/5/5	1/2/22/22	0/1/1/1
2	BGC	E	2	2	-	0/2/19/22	0/1/1/1
2	BGC	E	3	2	-	2/2/19/22	0/1/1/1
2	GLC	F	1	2	1/1/5/5	1/2/22/22	0/1/1/1
2	BGC	F	2	2	-	2/2/19/22	0/1/1/1
2	BGC	F	3	2	-	2/2/19/22	0/1/1/1
2	GLC	G	1	2	1/1/5/5	2/2/22/22	0/1/1/1
2	BGC	G	2	2	-	2/2/19/22	0/1/1/1
2	BGC	G	3	2	-	2/2/19/22	0/1/1/1
2	GLC	H	1	2	1/1/5/5	1/2/22/22	0/1/1/1
2	BGC	H	2	2	-	2/2/19/22	0/1/1/1
2	BGC	H	3	2	-	2/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GLC	I	1	2	1/1/5/5	0/2/22/22	0/1/1/1
2	BGC	I	2	2	-	1/2/19/22	0/1/1/1
2	BGC	I	3	2	-	0/2/19/22	0/1/1/1
2	GLC	J	1	2	1/1/5/5	0/2/22/22	0/1/1/1
2	BGC	J	2	2	-	0/2/19/22	0/1/1/1
2	BGC	J	3	2	-	2/2/19/22	0/1/1/1

There are no bond length outliers.

The worst 5 of 40 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	J	3	BGC	C1-C2-C3	7.18	118.50	109.67
2	H	1	GLC	O5-C5-C4	6.73	121.91	109.69
2	F	2	BGC	C1-O5-C5	-4.00	106.78	112.19
2	F	3	BGC	O5-C1-C2	-3.90	104.75	110.77
2	F	2	BGC	C1-C2-C3	3.89	114.45	109.67

5 of 6 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	J	1	GLC	C1
2	H	1	GLC	C1
2	G	1	GLC	C1
2	E	1	GLC	C1
2	F	1	GLC	C1

5 of 22 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	F	2	BGC	C4-C5-C6-O6
2	F	3	BGC	C4-C5-C6-O6
2	J	3	BGC	C4-C5-C6-O6
2	F	3	BGC	O5-C5-C6-O6
2	E	3	BGC	O5-C5-C6-O6

There are no ring outliers.

15 monomers are involved in 34 short contacts:

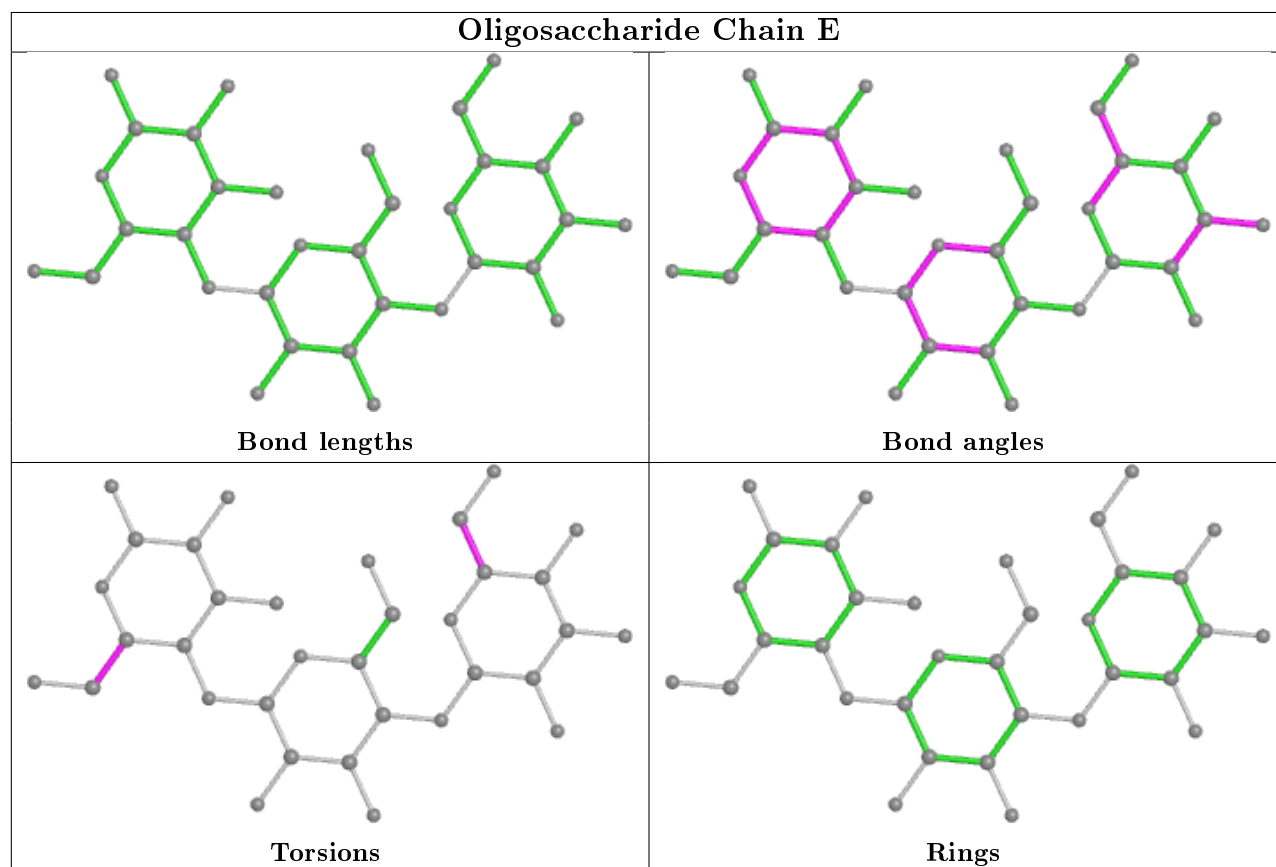
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	H	3	BGC	2	0
2	J	3	BGC	4	0

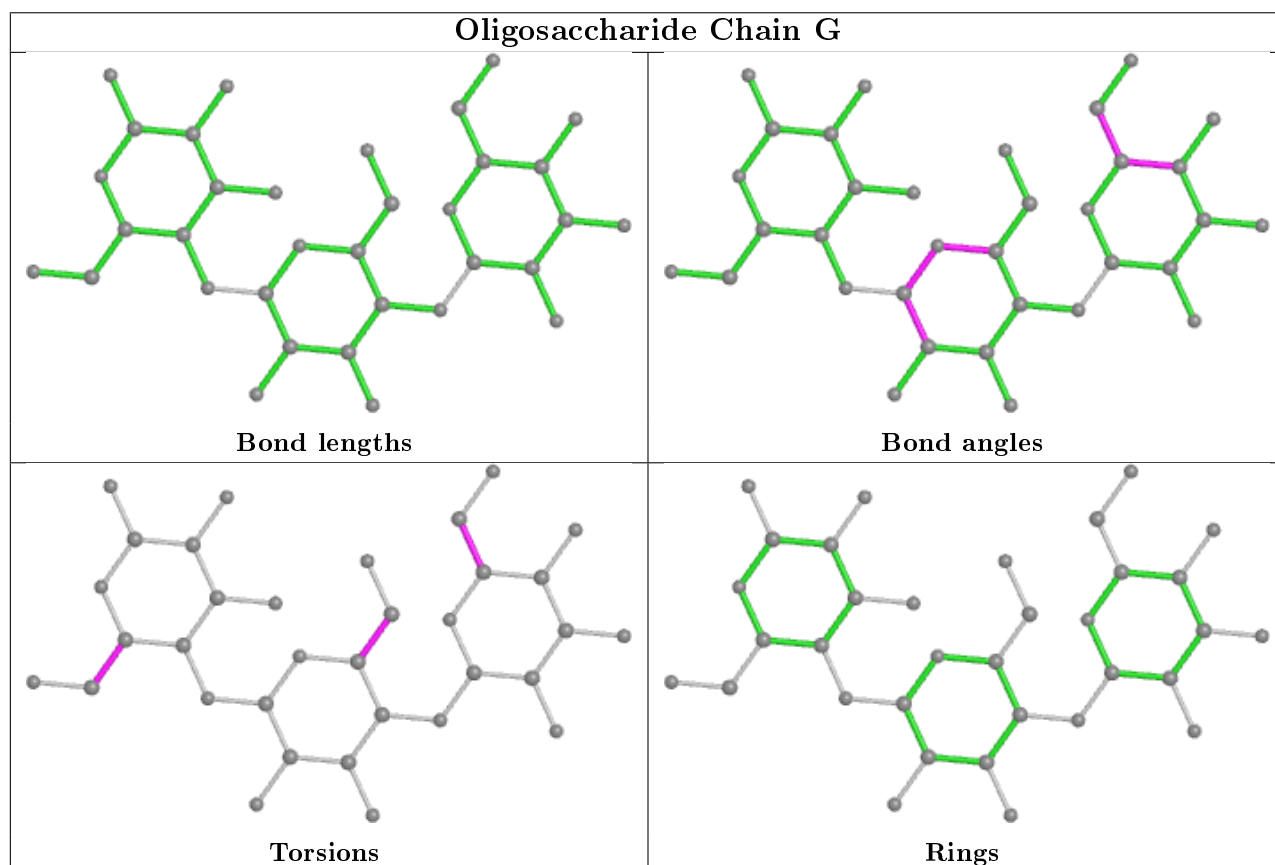
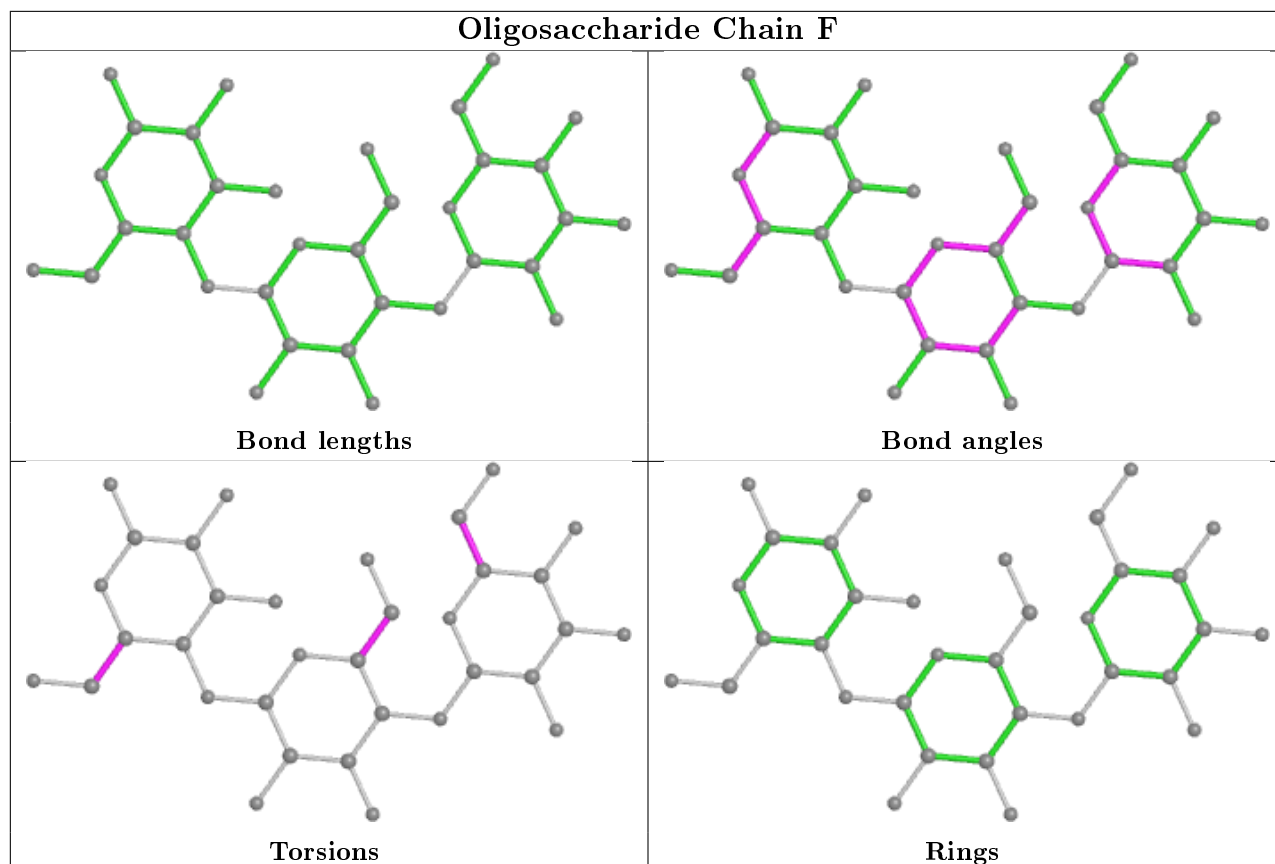
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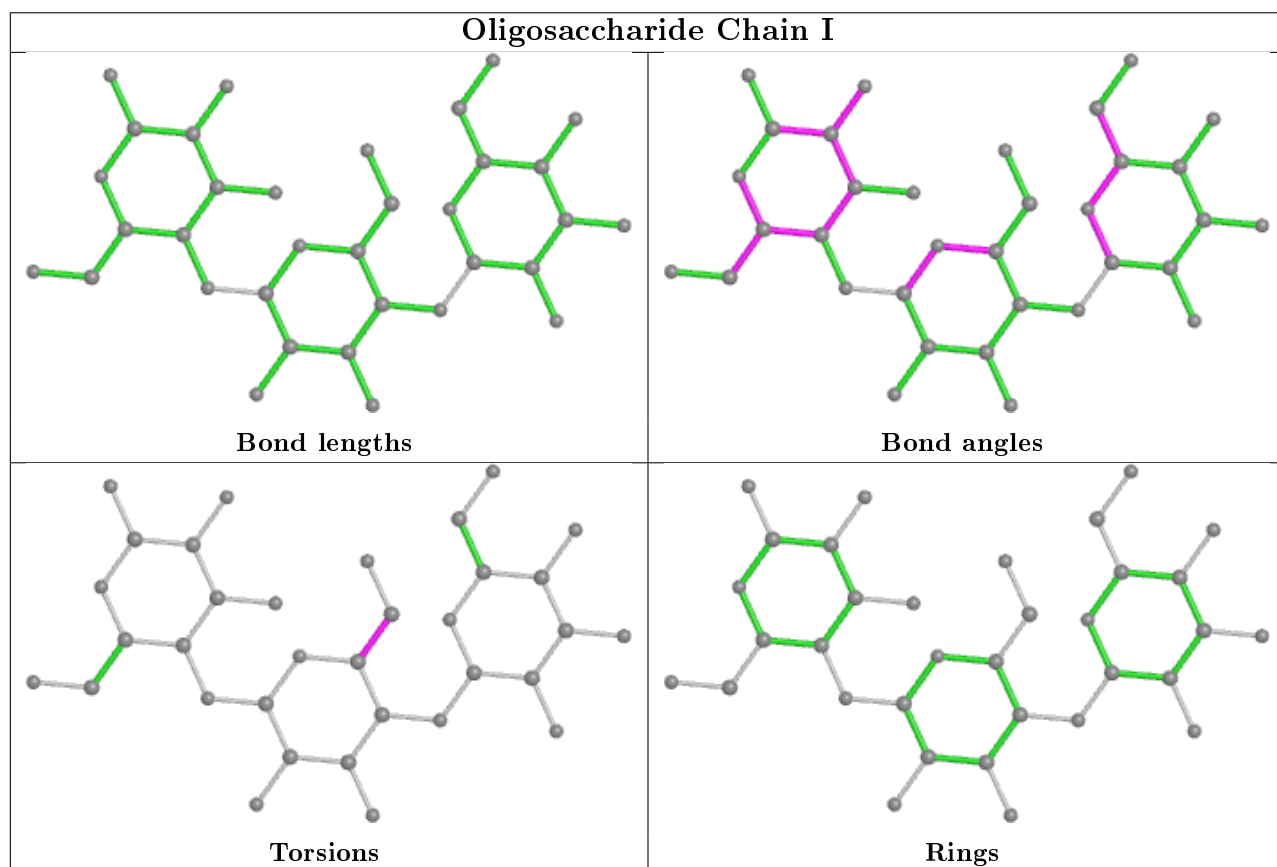
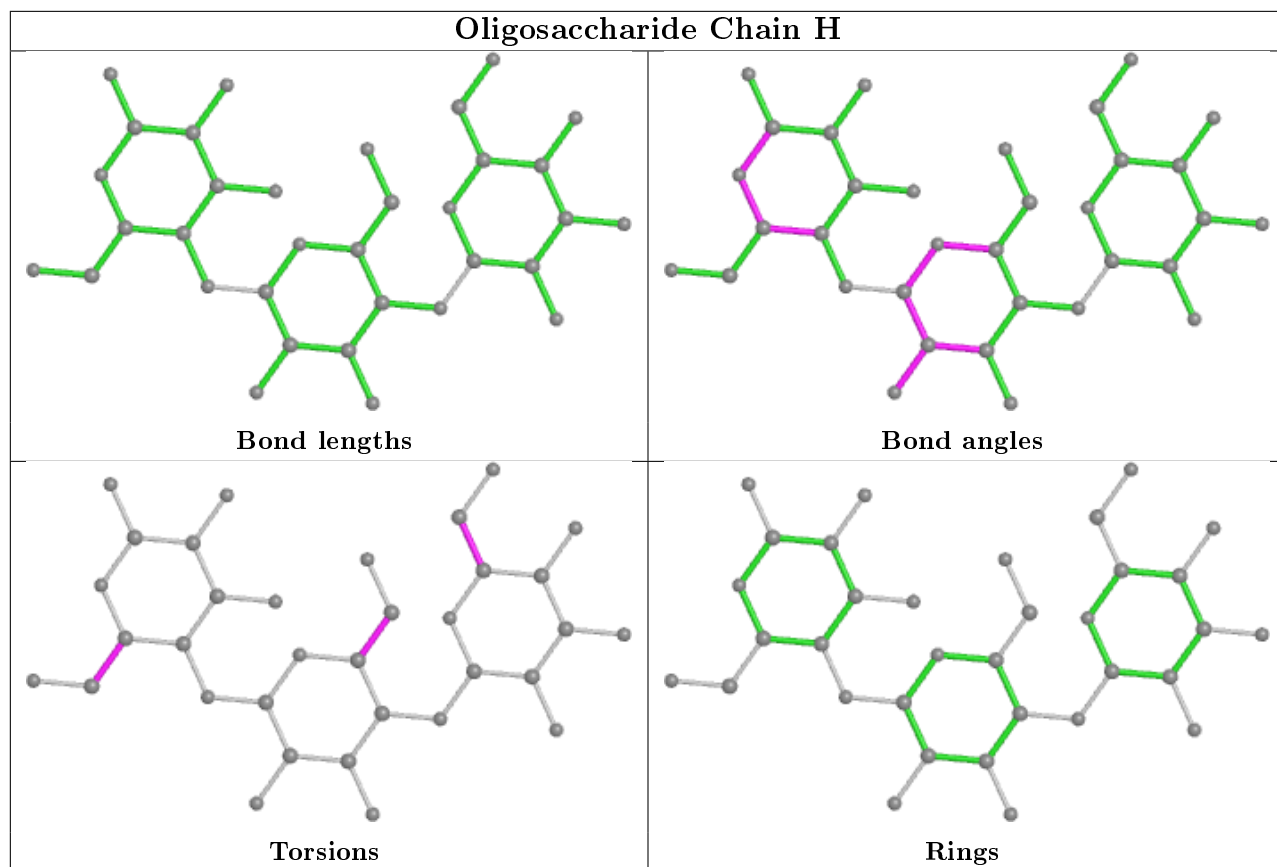
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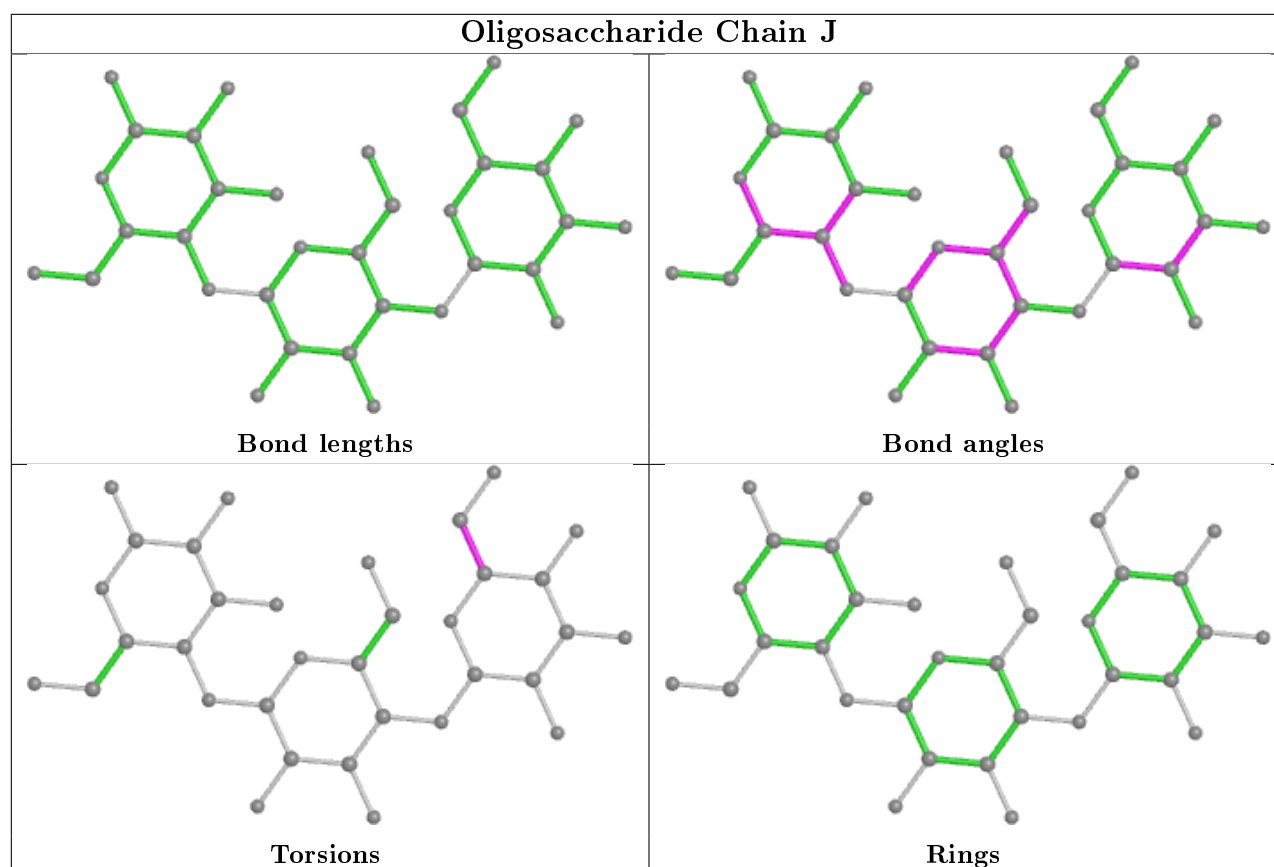
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	2	BGC	2	0
2	G	2	BGC	3	0
2	J	2	BGC	1	0
2	H	1	GLC	2	0
2	G	1	GLC	2	0
2	G	3	BGC	1	0
2	F	3	BGC	3	0
2	H	2	BGC	1	0
2	E	3	BGC	4	0
2	E	1	GLC	3	0
2	F	1	GLC	4	0
2	I	2	BGC	4	0
2	I	1	GLC	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.









## 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

Unable to reproduce the depositors R factor - this section is therefore empty.

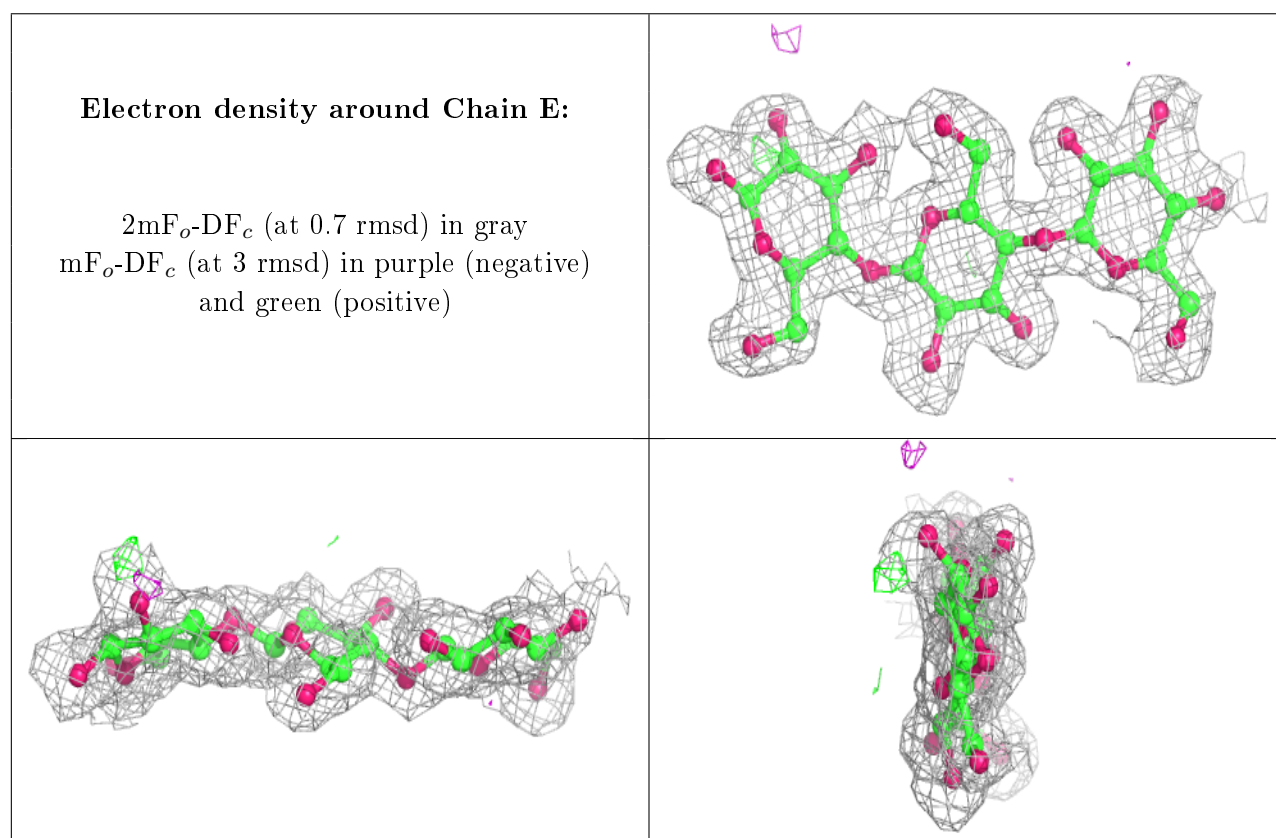
### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.3 Carbohydrates [i](#)

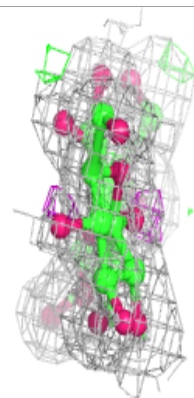
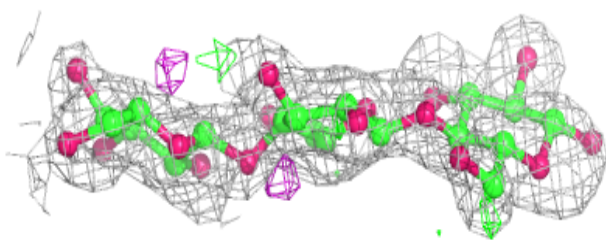
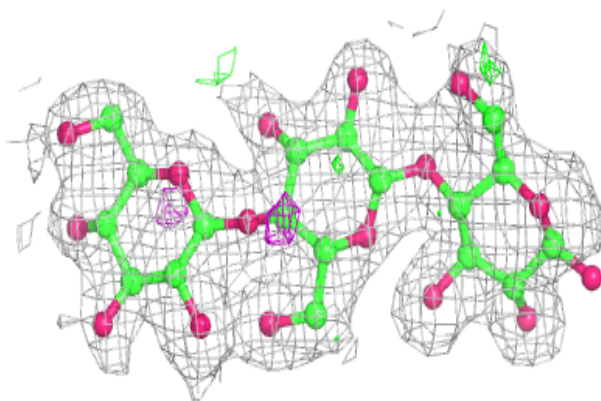
Unable to reproduce the depositors R factor - this section is therefore empty.

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

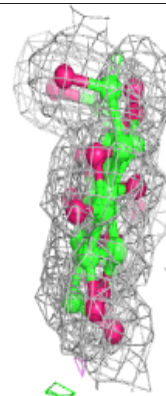
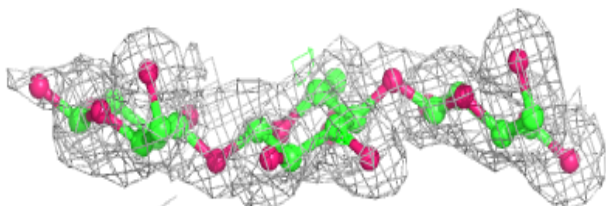
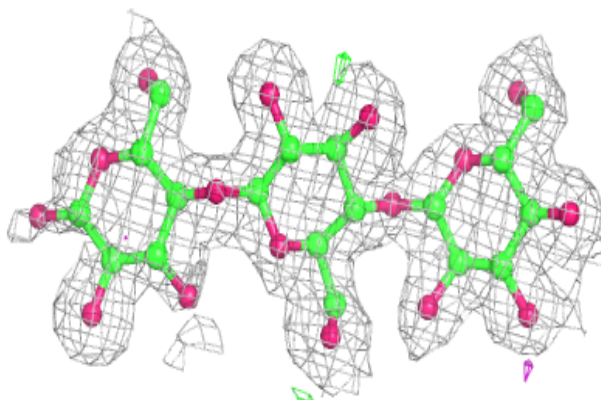


**Electron density around Chain F:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

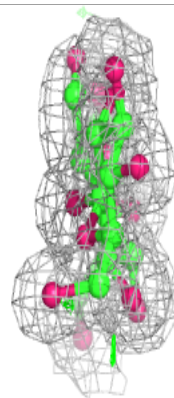
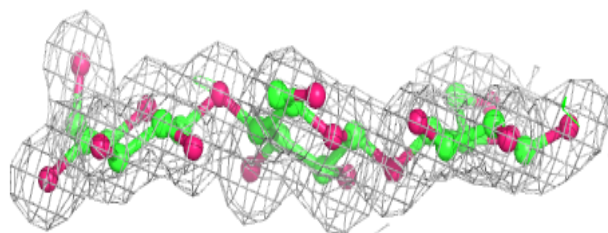
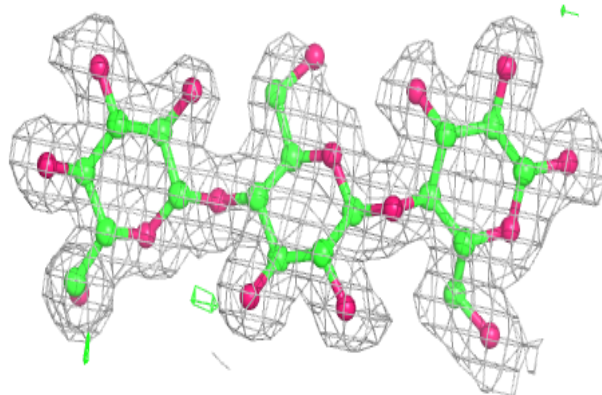
**Electron density around Chain G:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

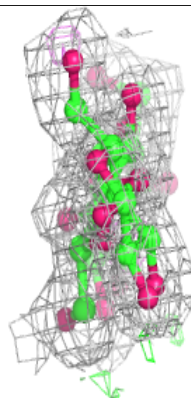
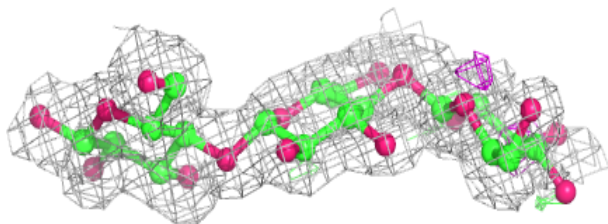
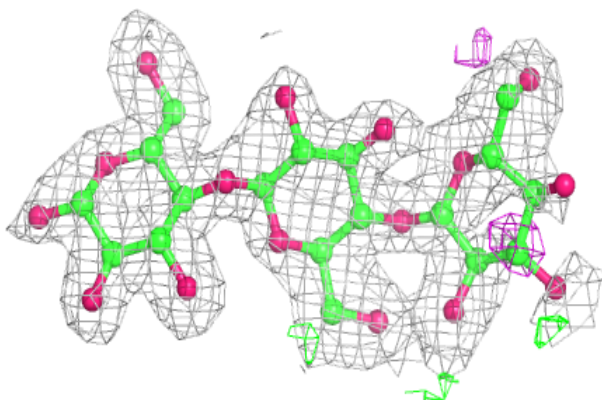


**Electron density around Chain H:**

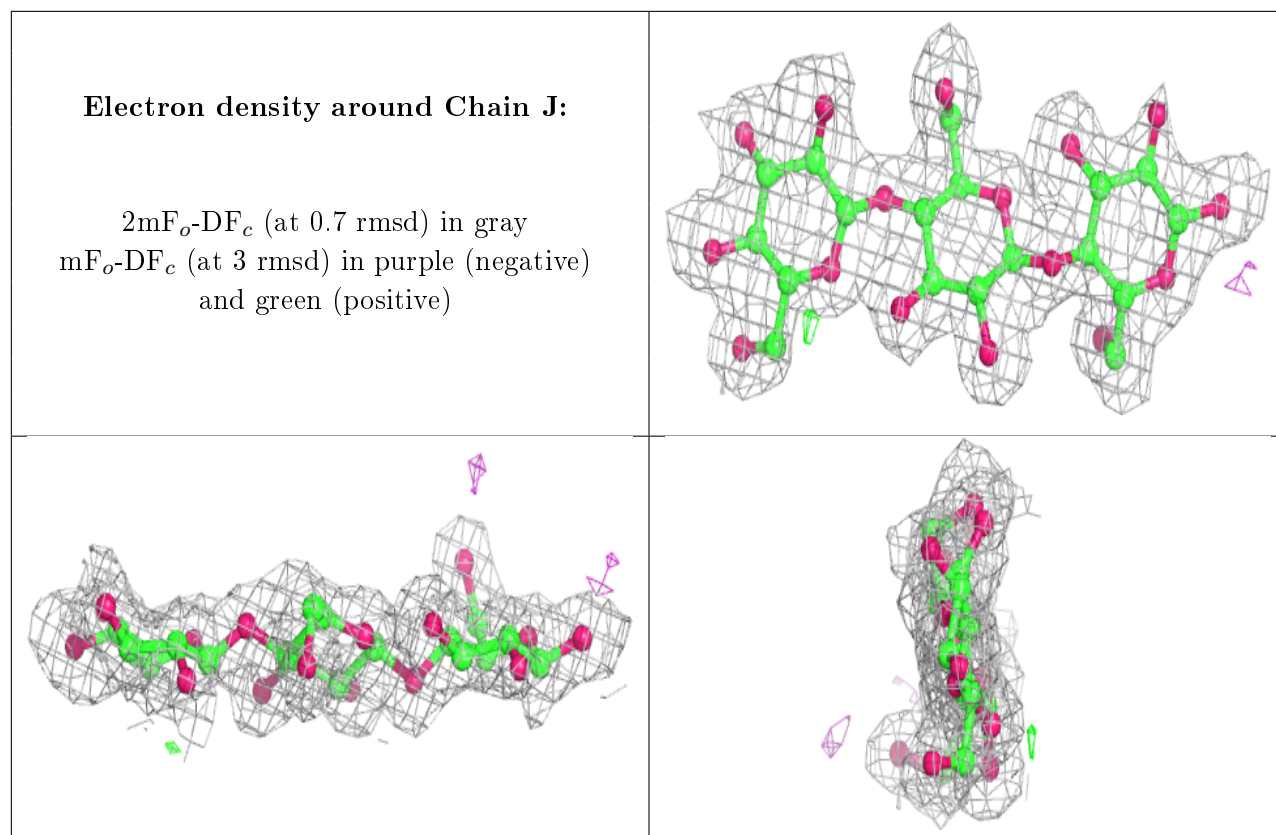
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around Chain I:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)







## 6.4 Ligands [i](#)

Unable to reproduce the depositor's R factor - this section is therefore empty.

## 6.5 Other polymers [i](#)

Unable to reproduce the depositor's R factor - this section is therefore empty.