



# Full wwPDB X-ray Structure Validation Report i

Jan 26, 2026 – 02:27 PM EST

PDB ID : 9N3U / pdb\_00009n3u  
Title : Structure of glyoxal oxidase from *Fusarium graminearum* at 1.28 Angstroms resolution  
Authors : Fong, J.K.; Cordeiro, R.L.; Van Petegem, F.; Brumer, H.  
Deposited on : 2025-01-31  
Resolution : 1.28 Å (reported)

This is a Full wwPDB X-ray Structure Validation 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 i symbol.

The types of validation reports are described at  
<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtriaage (Phenix) : 2.0  
EDS : 3.0  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
CCP4 : 9.0.010 (Gargrove)  
Density-Fitness : 1.0.12  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.47

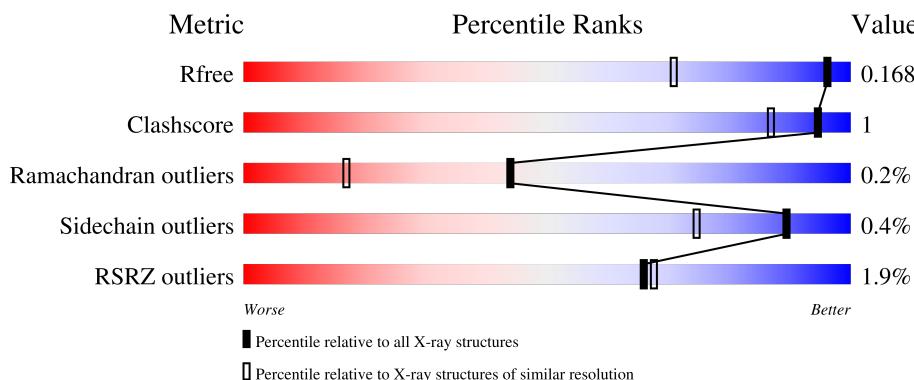
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

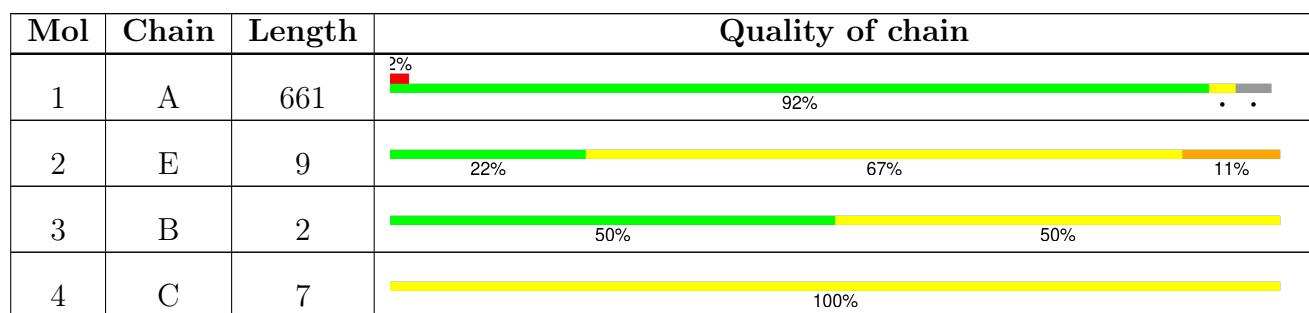
The reported resolution of this entry is 1.28 Å.

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))
$R_{free}$	164625	2484 (1.30-1.26)
Clashscore	180529	2694 (1.30-1.26)
Ramachandran outliers	177936	2628 (1.30-1.26)
Sidechain outliers	177891	2627 (1.30-1.26)
RSRZ outliers	164620	2481 (1.30-1.26)

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 of 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  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.



## 2 Entry composition (i)

There are 9 unique types of molecules in this entry. The entry contains 5813 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 Chromosome 3, complete genome.

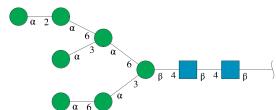
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
1	A	632	Total	C 4979	N 3157	O 833	S 959	30	0	18	0

There are 23 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	902	ALA	-	expression tag	UNP A0A0E0SJJ3
A	903	LEU	-	expression tag	UNP A0A0E0SJJ3
A	904	GLU	-	expression tag	UNP A0A0E0SJJ3
A	905	GLN	-	expression tag	UNP A0A0E0SJJ3
A	906	LYS	-	expression tag	UNP A0A0E0SJJ3
A	907	LEU	-	expression tag	UNP A0A0E0SJJ3
A	908	ILE	-	expression tag	UNP A0A0E0SJJ3
A	909	SER	-	expression tag	UNP A0A0E0SJJ3
A	910	GLU	-	expression tag	UNP A0A0E0SJJ3
A	911	GLU	-	expression tag	UNP A0A0E0SJJ3
A	912	ASP	-	expression tag	UNP A0A0E0SJJ3
A	913	LEU	-	expression tag	UNP A0A0E0SJJ3
A	914	ASN	-	expression tag	UNP A0A0E0SJJ3
A	915	SER	-	expression tag	UNP A0A0E0SJJ3
A	916	ALA	-	expression tag	UNP A0A0E0SJJ3
A	917	VAL	-	expression tag	UNP A0A0E0SJJ3
A	918	ASP	-	expression tag	UNP A0A0E0SJJ3
A	919	HIS	-	expression tag	UNP A0A0E0SJJ3
A	920	HIS	-	expression tag	UNP A0A0E0SJJ3
A	921	HIS	-	expression tag	UNP A0A0E0SJJ3
A	922	HIS	-	expression tag	UNP A0A0E0SJJ3
A	923	HIS	-	expression tag	UNP A0A0E0SJJ3
A	924	HIS	-	expression tag	UNP A0A0E0SJJ3

- Molecule 2 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-6)-alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deox

$\gamma$ -beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



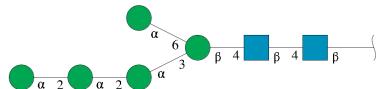
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
2	E	9	Total C N O 105 58 2 45	0	1	0

- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



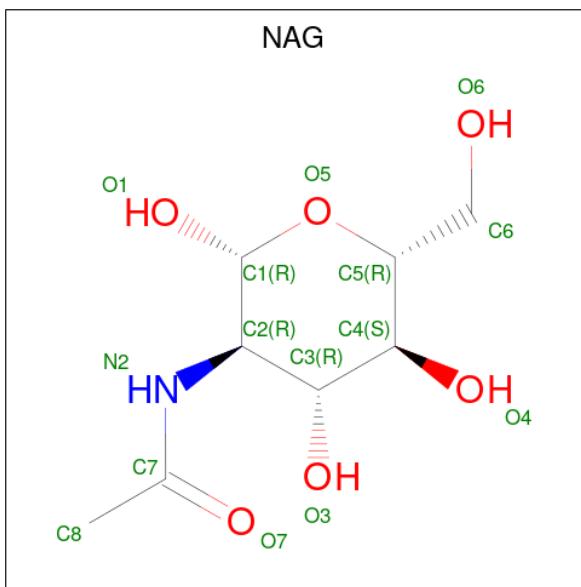
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
3	B	2	Total C N O 28 16 2 10	0	0	0

- Molecule 4 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
4	C	7	Total C N O 83 46 2 35	0	0	0

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).

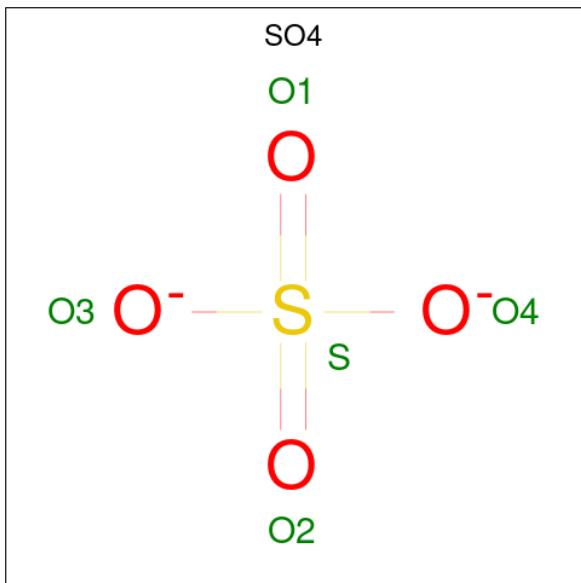


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 6 is COPPER (II) ION (CCD ID: CU) (formula: Cu).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	1	Total Cu		0	0
			1	1		

- Molecule 7 is SULFATE ION (CCD ID: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total O S 5 4 1	0	0
7	A	1	Total O S 5 4 1	0	0

- Molecule 8 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total Na 1 1	0	0

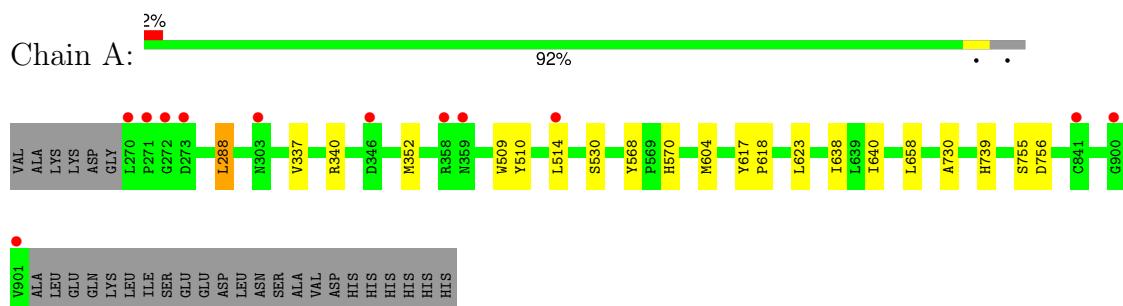
- Molecule 9 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	592	Total O 592 592	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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). 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: Chromosome 3, complete genome



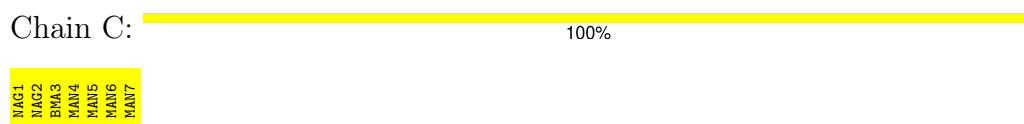
- Molecule 2: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-6)-alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 4: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



## 4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	86.00 Å   129.98 Å   134.05 Å 90.00°   90.00°   90.00°	Depositor
Resolution (Å)	46.66 – 1.28 46.66 – 1.28	Depositor EDS
% Data completeness (in resolution range)	97.6 (46.66-1.28) 92.6 (46.66-1.28)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.05 (at 1.28 Å)	Xtriage
Refinement program	PHENIX 1.21.2_5419	Depositor
$R$ , $R_{free}$	0.140 , 0.168 0.140 , 0.168	Depositor DCC
$R_{free}$ test set	1999 reflections (1.07%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	15.2	Xtriage
Anisotropy	0.359	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 39.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	5813	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	20.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.06% 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: NAG, MAN, CU, SO4, NA, BMA

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	0.54	0/5127	0.72	0/6996

There are no bond length outliers.

There are no bond angle outliers.

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	4979	0	4727	12	0
2	E	105	0	82	1	0
3	B	28	0	25	0	0
4	C	83	0	70	0	0
5	A	14	0	13	0	0
6	A	1	0	0	0	0
7	A	10	0	0	0	0
8	A	1	0	0	0	0
9	A	592	0	0	0	0
All	All	5813	0	4917	12	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 1.

All (12) 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:288:LEU:HD11	1:A:337[A]:VAL:HG22	1.86	0.57
1:A:730:ALA:HA	2:E:1:NAG:H82	1.88	0.56
1:A:288:LEU:HD22	1:A:340:ARG:HG3	1.91	0.53
1:A:509:TRP:CE2	1:A:530:SER:HA	2.45	0.52
1:A:288:LEU:HD11	1:A:337[B]:VAL:HG12	1.94	0.48
1:A:739:HIS:HB2	1:A:756:ASP:HB3	1.95	0.48
1:A:604[A]:MET:SD	1:A:640:ILE:HD12	2.57	0.44
1:A:638:ILE:O	1:A:658[B]:LEU:HD12	2.18	0.43
1:A:570:HIS:HB3	1:A:623:LEU:HD13	2.01	0.43
1:A:352[A]:MET:HE3	1:A:352[A]:MET:HB2	1.96	0.42
1:A:617:TYR:CD2	1:A:618:PRO:HA	2.54	0.42
1:A:510:TYR:CG	1:A:568:TYR:CE2	3.10	0.40

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	648/661 (98%)	624 (96%)	23 (4%)	1 (0%)	44 17

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	755	SER

#### 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	540/554 (98%)	538 (100%)	2 (0%)	89   74

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	288	LEU
1	A	514	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	284	ASN
1	A	620	GLN
1	A	628	HIS

### 5.3.3 RNA [\(i\)](#)

There are no RNA molecules in this entry.

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

There are no non-standard protein/DNA/RNA residues in this entry.

### 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	$\# Z  > 2$
3	NAG	B	1	1,3	14,14,15	0.60	0	17,19,21	1.17	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	NAG	B	2	3	14,14,15	0.64	0	17,19,21	0.76	0
4	NAG	C	1	4,1	14,14,15	0.59	0	17,19,21	1.12	1 (5%)
4	NAG	C	2	4	14,14,15	1.03	1 (7%)	17,19,21	1.09	0
4	BMA	C	3	4	11,11,12	0.93	0	15,15,17	1.09	1 (6%)
4	MAN	C	4	4	11,11,12	0.63	0	15,15,17	1.22	2 (13%)
4	MAN	C	5	4	11,11,12	0.60	0	15,15,17	0.97	1 (6%)
4	MAN	C	6	4	11,11,12	0.85	1 (9%)	15,15,17	1.02	1 (6%)
4	MAN	C	7	4	11,11,12	0.88	1 (9%)	15,15,17	1.27	1 (6%)
2	NAG	E	1	1,2	14,14,15	0.52	0	17,19,21	0.88	1 (5%)
2	NAG	E	2	2	14,14,15	0.88	1 (7%)	17,19,21	0.98	0
2	BMA	E	3	2	11,11,12	1.03	0	15,15,17	1.04	1 (6%)
2	MAN	E	4	2	11,11,12	0.54	0	15,15,17	0.93	0
2	MAN	E	6	2	11,11,12	0.81	0	15,15,17	0.91	1 (6%)
2	MAN	E	7	2	11,11,12	0.92	0	15,15,17	1.16	1 (6%)
2	MAN	E	8	2	11,11,12	0.69	0	15,15,17	0.96	1 (6%)
2	MAN	E	9	2	11,11,12	0.71	0	15,15,17	1.45	2 (13%)

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
3	NAG	B	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	B	2	3	-	0/6/23/26	0/1/1/1
4	NAG	C	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	C	2	4	-	0/6/23/26	0/1/1/1
4	BMA	C	3	4	-	0/2/19/22	0/1/1/1
4	MAN	C	4	4	-	2/2/19/22	0/1/1/1
4	MAN	C	5	4	-	0/2/19/22	0/1/1/1
4	MAN	C	6	4	-	0/2/19/22	0/1/1/1
4	MAN	C	7	4	-	0/2/19/22	0/1/1/1
2	NAG	E	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	E	2	2	-	0/6/23/26	0/1/1/1
2	BMA	E	3	2	-	0/2/19/22	0/1/1/1
2	MAN	E	4	2	-	0/2/19/22	0/1/1/1
2	MAN	E	6	2	-	0/2/19/22	0/1/1/1
2	MAN	E	7	2	-	0/2/19/22	0/1/1/1
2	MAN	E	8	2	-	0/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	MAN	E	9	2	-	0/2/19/22	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	2	NAG	O5-C1	-2.67	1.39	1.43
4	C	2	NAG	O5-C1	-2.65	1.39	1.43
4	C	6	MAN	O5-C1	-2.40	1.39	1.43
4	C	7	MAN	O5-C1	-2.24	1.39	1.43

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	7	MAN	C1-O5-C5	3.55	116.94	112.19
4	C	4	MAN	C1-O5-C5	3.39	116.73	112.19
2	E	9	MAN	C1-O5-C5	3.28	116.58	112.19
2	E	7	MAN	C1-O5-C5	3.06	116.29	112.19
4	C	6	MAN	C1-O5-C5	2.88	116.05	112.19
4	C	1	NAG	C1-C2-N2	-2.79	106.03	110.43
2	E	9	MAN	O6-C6-C5	-2.61	102.46	111.33
2	E	8	MAN	C1-O5-C5	2.44	115.46	112.19
4	C	5	MAN	C1-O5-C5	2.43	115.44	112.19
2	E	3	BMA	C1-O5-C5	2.37	115.37	112.19
2	E	1	NAG	O4-C4-C5	-2.26	103.75	109.32
4	C	4	MAN	O2-C2-C3	-2.16	105.69	110.15
2	E	6	MAN	O2-C2-C3	2.13	114.56	110.15
3	B	1	NAG	C2-N2-C7	2.12	125.73	122.90
4	C	3	BMA	C2-C3-C4	-2.07	107.23	110.86
3	B	1	NAG	C6-C5-C4	2.06	118.08	113.02

There are no chirality outliers.

All (2) torsion outliers are listed below:

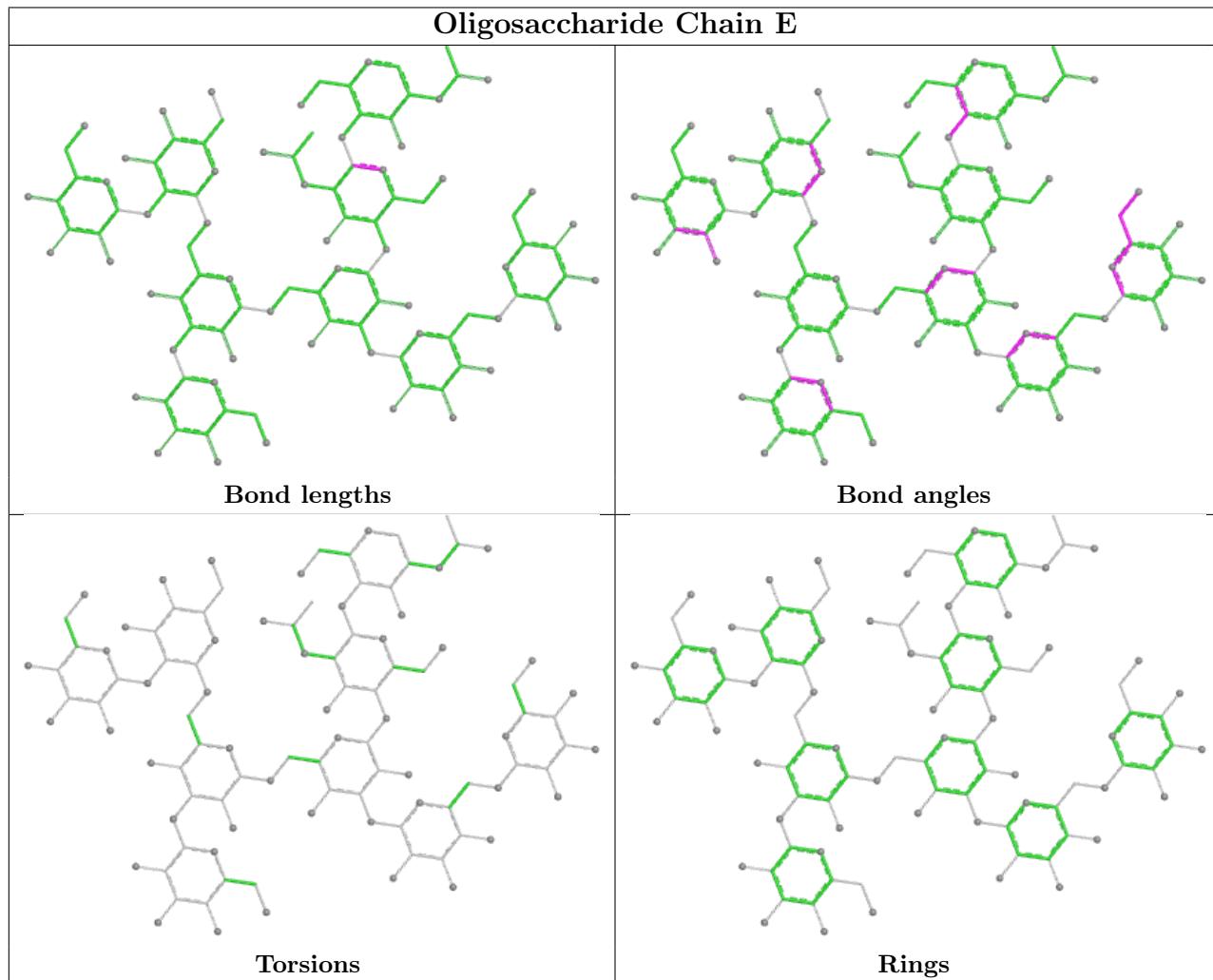
Mol	Chain	Res	Type	Atoms
4	C	4	MAN	O5-C5-C6-O6
4	C	4	MAN	C4-C5-C6-O6

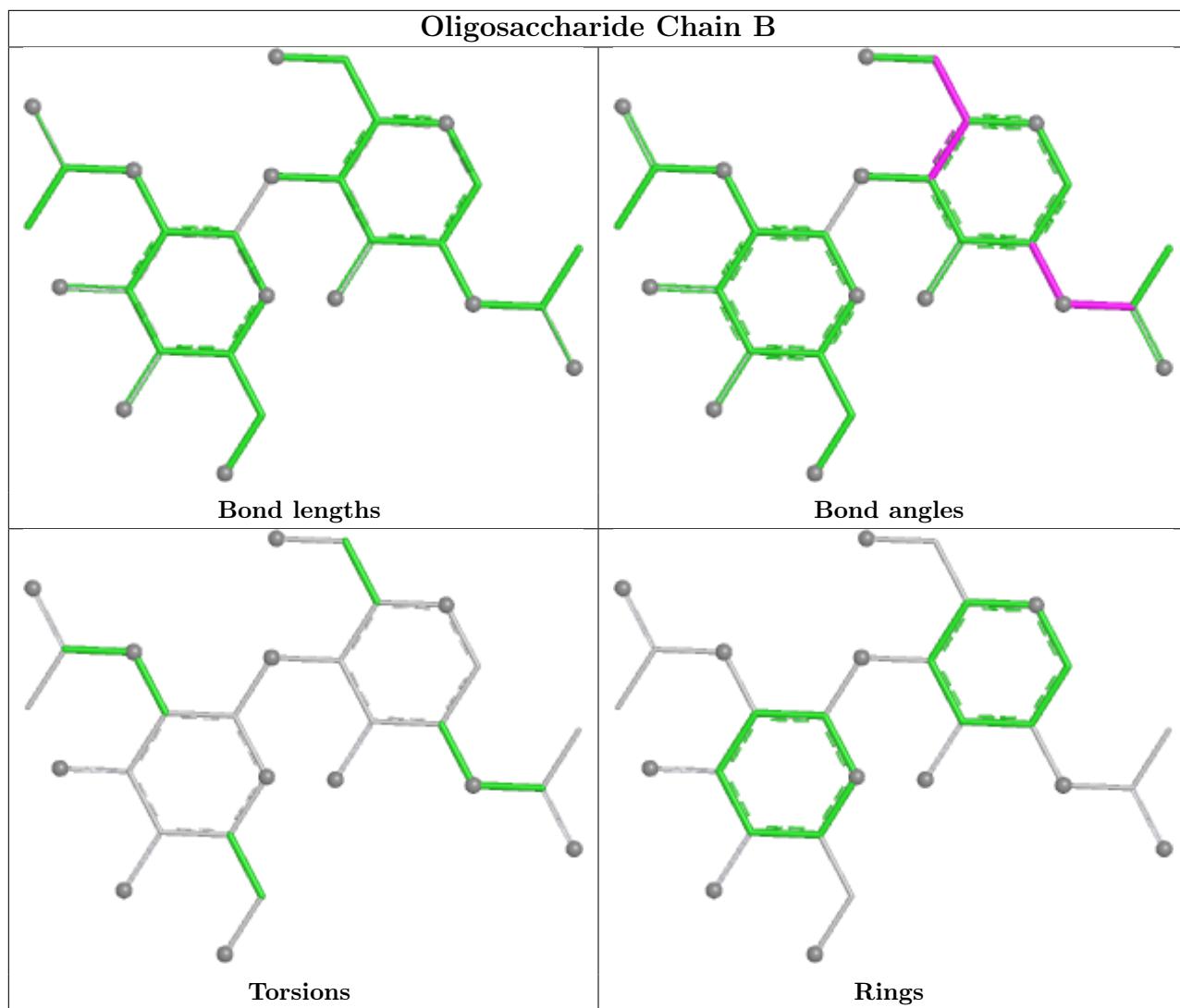
There are no ring outliers.

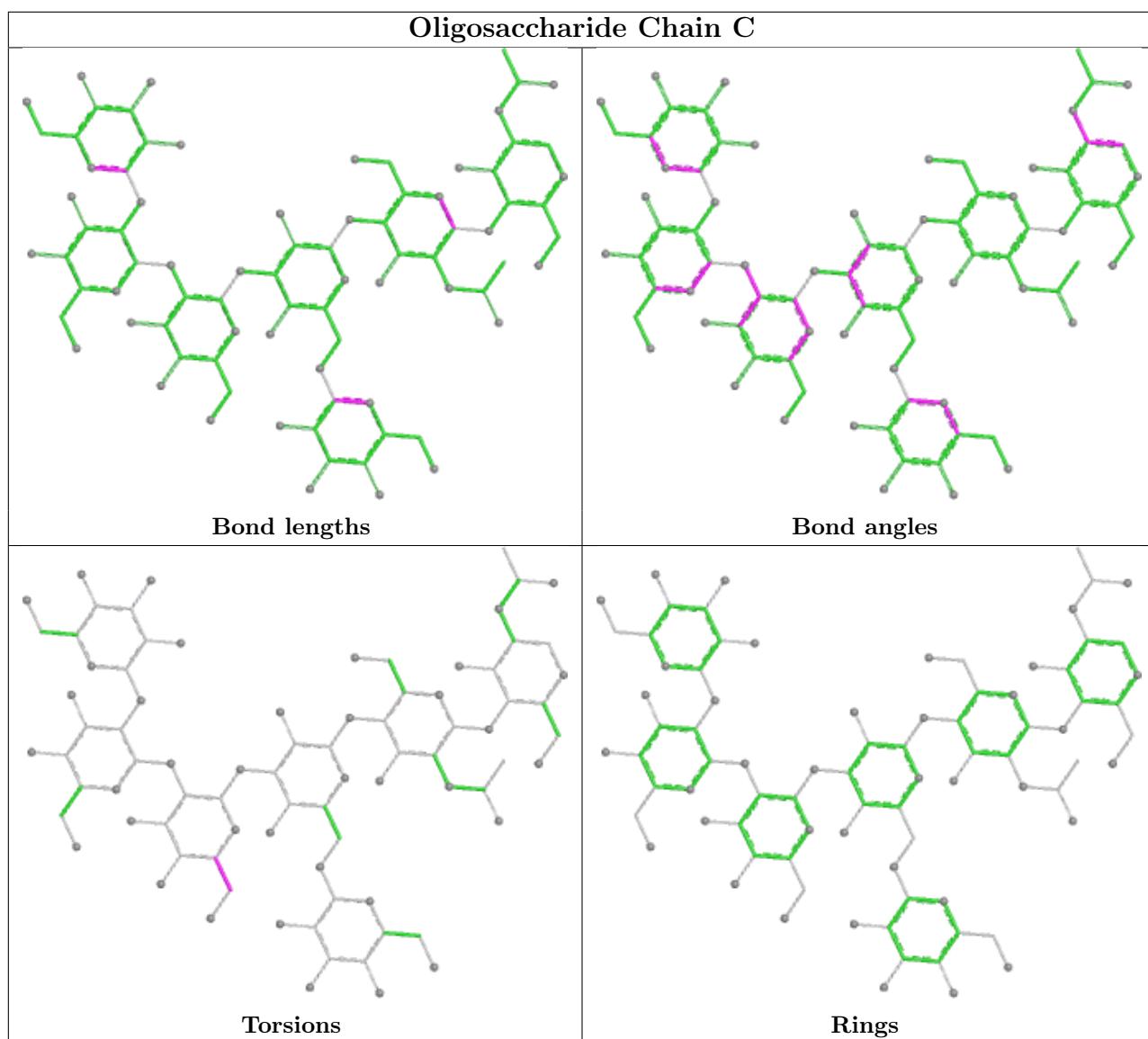
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	1	NAG	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)

Of 5 ligands modelled in this entry, 2 are monoatomic - leaving 3 for Mogul analysis.

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$
5	NAG	A	1001	1	14,14,15	0.91	1 (7%)	17,19,21	0.84	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
7	SO4	A	1004	-	4,4,4	0.60	0	6,6,6	0.48	0
7	SO4	A	1003	8	4,4,4	1.09	0	6,6,6	0.58	0

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
5	NAG	A	1001	1	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1001	NAG	C1-C2	2.02	1.55	1.52

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	632/661 (95%)	0.02	12 (1%) 66 67	7, 18, 32, 69	18 (2%)

All (12) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	273	ASP	5.0
1	A	841	CYS	4.6
1	A	901	VAL	3.9
1	A	346	ASP	3.3
1	A	271	PRO	2.8
1	A	359	ASN	2.7
1	A	270	LEU	2.7
1	A	272	GLY	2.4
1	A	514	LEU	2.2
1	A	303	ASN	2.2
1	A	900	GLY	2.1
1	A	358	ARG	2.0

### 6.2 Non-standard residues in protein, DNA, RNA chains i

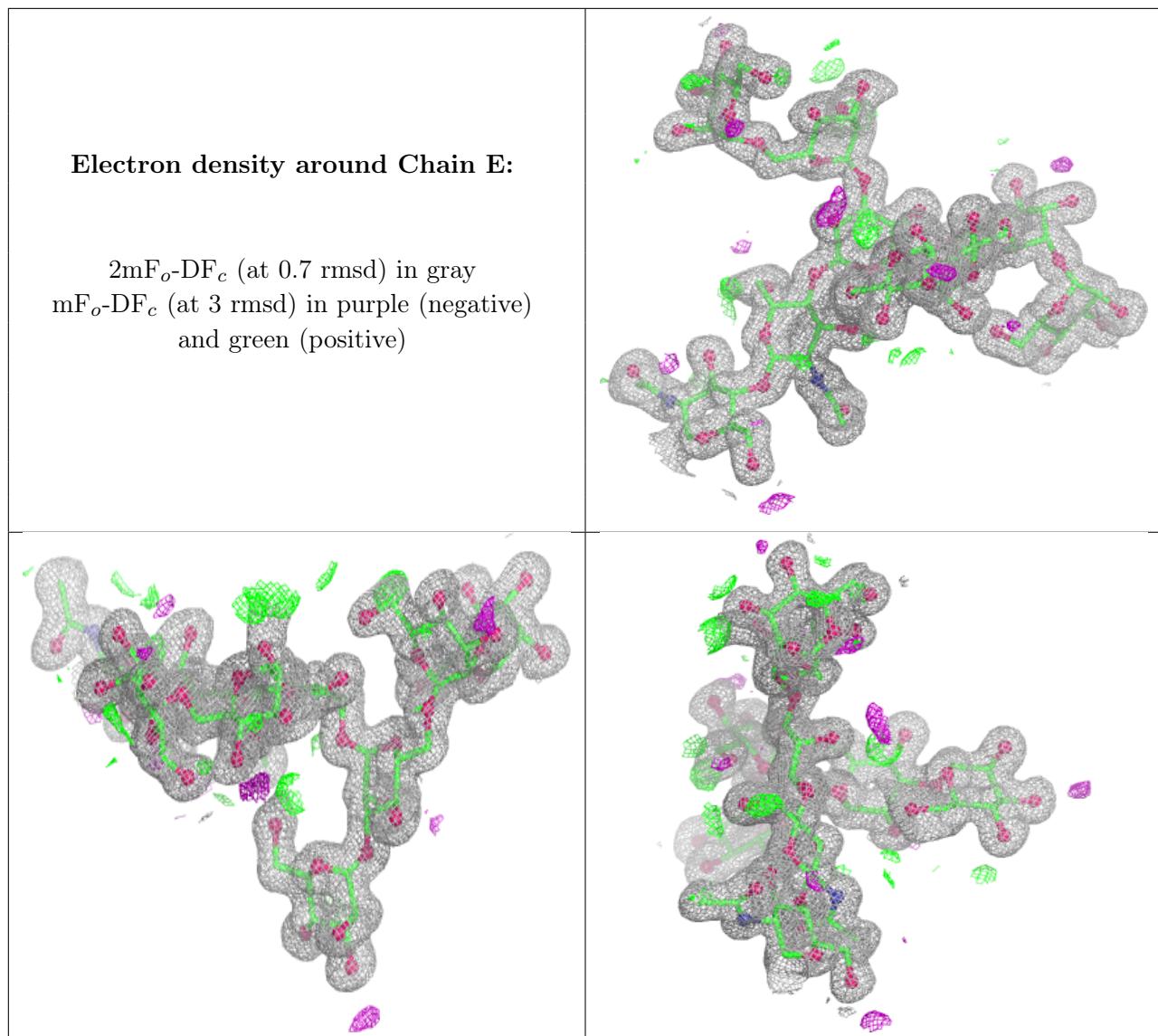
There are no non-standard protein/DNA/RNA residues in this entry.

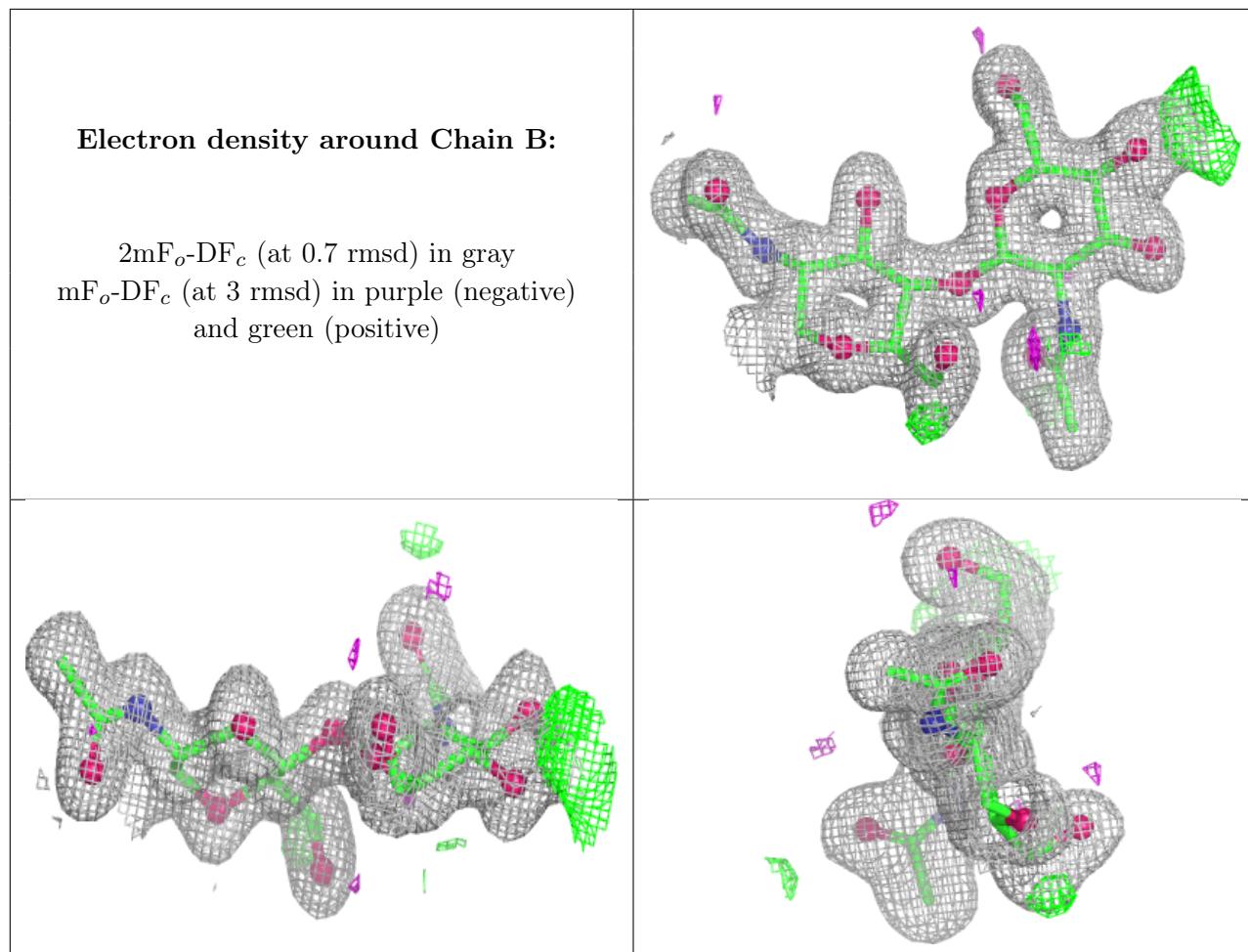
### 6.3 Carbohydrates i

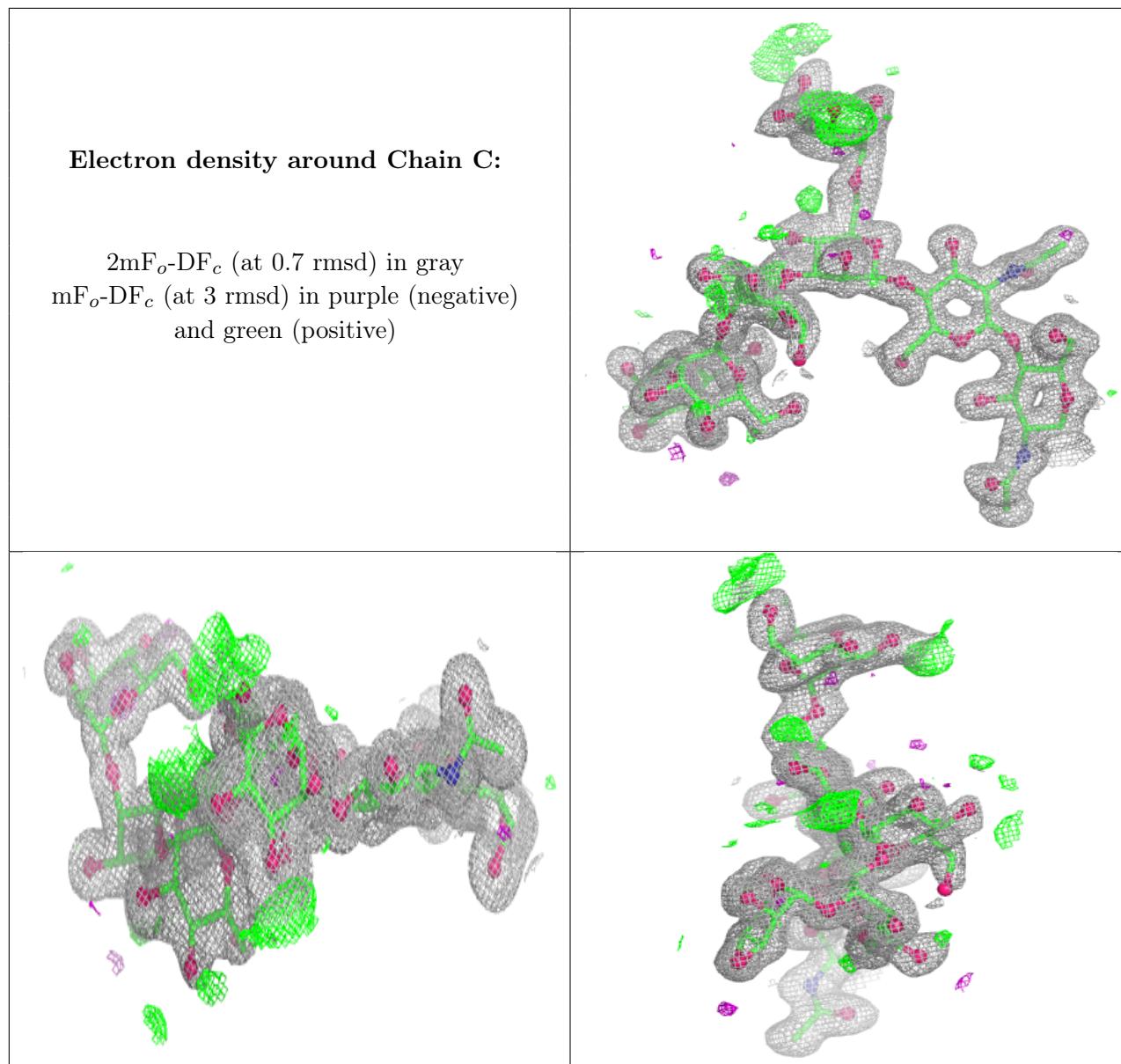
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	NAG	E	1	14/15	-	-	16,17,23,24	0
2	NAG	E	2	14/15	-	-	18,19,22,24	0
2	BMA	E	3	11/12	-	-	17,18,21,22	0
2	MAN	E	4	11/12	-	-	16,16,18,18	1
2	MAN	E	5[B]	11/12	-	-	16,18,20,22	1
2	MAN	E	6	11/12	-	-	15,16,16,17	0
2	MAN	E	7	11/12	-	-	18,20,24,25	0
2	MAN	E	8	11/12	-	-	20,23,29,31	11
2	MAN	E	9	11/12	-	-	19,21,22,25	11
4	NAG	C	2	14/15	0.94	0.08	17,19,24,27	0
4	NAG	C	1	14/15	0.97	0.06	17,18,24,25	0
3	NAG	B	1	14/15	0.97	0.06	17,18,21,22	1
3	NAG	B	2	14/15	0.98	0.05	22,28,33,34	0
4	BMA	C	3	11/12	-	-	21,23,27,29	1
4	MAN	C	4	11/12	-	-	21,24,35,58	11
4	MAN	C	5	11/12	-	-	17,19,24,33	11
4	MAN	C	6	11/12	-	-	24,29,35,75	11
4	MAN	C	7	11/12	-	-	33,37,38,38	0

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.







## 6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
7	SO4	A	1004	5/5	0.91	0.13	14,19,24,26	5
5	NAG	A	1001	14/15	0.92	0.10	25,29,35,36	2
8	NA	A	1005	1/1	0.96	0.08	20,20,20,20	0
6	CU	A	1002	1/1	0.97	0.08	18,18,18,18	1
7	SO4	A	1003	5/5	0.99	0.04	11,12,13,14	5

## 6.5 Other polymers [\(i\)](#)

There are no such residues in this entry.