



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 02:16 AM UTC

PDB ID : 7O0E / pdb_00007o0e
Title : Crystal structure of GH30 (mutant E188A) complexed with aldetriuronic acid from *Thermothelomyces thermophila*.
Authors : Dimarogona, M.; Kosinas, C.; Feiler, C.; Weiss, M.S.; Topakas, E.; Nikolaivits, E.
Deposited on : 2021-03-26
Resolution : 1.85 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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
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)	:	2.49

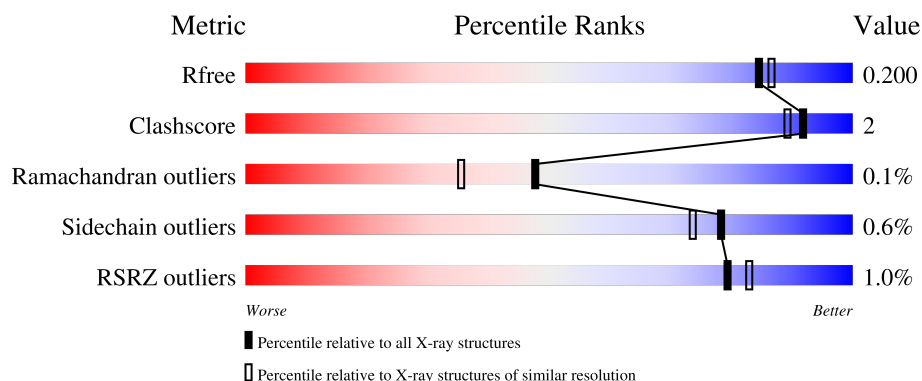
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.85 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}	180053	3428 (1.86-1.86)
Clashscore	190562	3579 (1.86-1.86)
Ramachandran outliers	187476	3553 (1.86-1.86)
Sidechain outliers	187428	3553 (1.86-1.86)
RSRZ outliers	180081	3429 (1.86-1.86)

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 ≥ 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.

Mol	Chain	Length	Quality of chain
1	A	452	% 94% ..
1	G	452	% 94% 5%
2	B	4	100%
3	D	3	100%
3	E	3	100%

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 7645 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 GH30 family xylanase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	G	452	Total	C	N	O	S	0	8	0
			3454	2149	606	684	15			
1	A	441	Total	C	N	O	S	0	3	0
			3346	2091	585	655	15			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	188	ALA	GLU	engineered mutation	UNP G2Q1N4
A	188	ALA	GLU	engineered mutation	UNP G2Q1N4

- Molecule 2 is an oligosaccharide called 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.



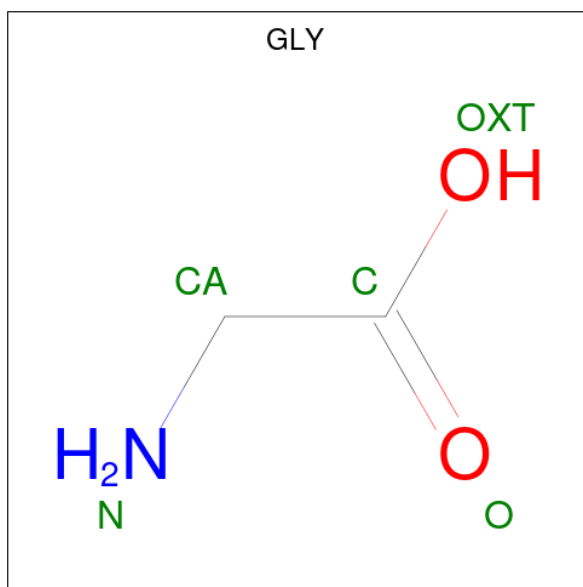
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	B	4	Total	C	N	O	0	0	0
			50	28	2	20			

- Molecule 3 is an oligosaccharide called 4-O-methyl-alpha-D-glucopyranuronic acid-(1-2)-beta-D-xylopyranose-(1-4)-beta-D-xylopyranose.



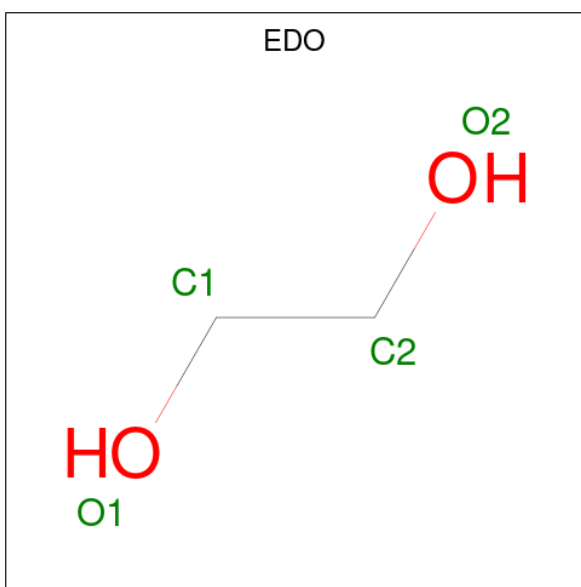
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
3	D	3	Total	C	O	0	0	0
			32	17	15			
3	E	3	Total	C	O	0	0	0
			32	17	15			

- Molecule 4 is GLYCINE (CCD ID: GLY) (formula: $C_2H_5NO_2$).



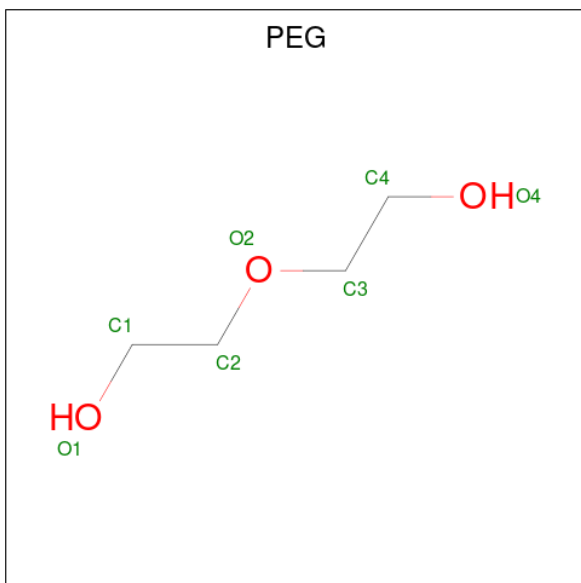
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	G	1	Total	C	N	O	0	0
			5	2	1	2		
4	G	1	Total	C	N	O	0	0
			5	2	1	2		
4	G	1	Total	C	N	O	0	0
			5	2	1	2		
4	A	1	Total	C	N	O	0	0
			5	2	1	2		
4	A	1	Total	C	N	O	0	0
			5	2	1	2		

- Molecule 5 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	G	1	Total	C	O	0	0
			4	2	2		
5	G	1	Total	C	O	0	0
			4	2	2		
5	A	1	Total	C	O	0	0
			4	2	2		
5	A	1	Total	C	O	0	0
			4	2	2		

- Molecule 6 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			7	4	3		

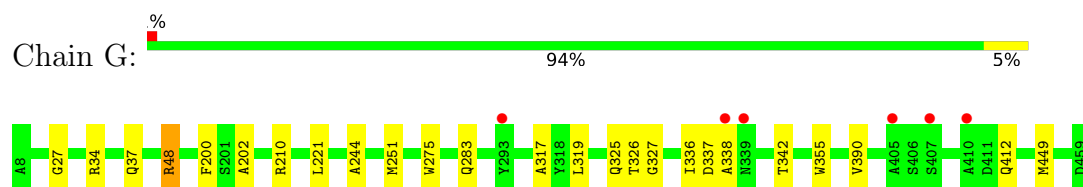
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	G	359	Total	O	0	0
			359	359		
7	A	324	Total	O	0	0
			324	324		

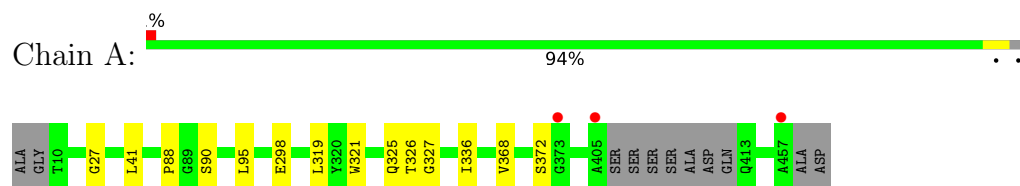
3 Residue-property plots [i](#)

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.

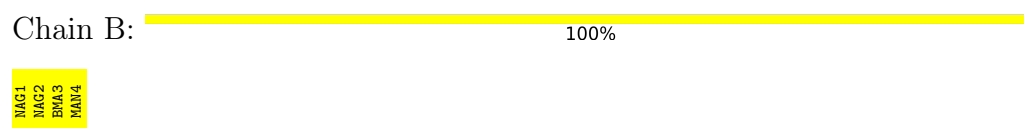
- Molecule 1: GH30 family xylanase



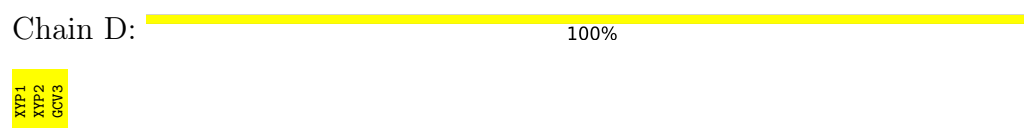
- Molecule 1: GH30 family xylanase



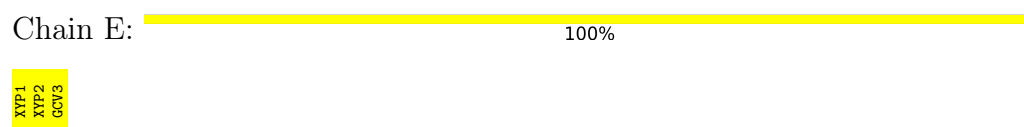
- Molecule 2: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 3: 4-O-methyl-alpha-D-glucopyranuronic acid-(1-2)-beta-D-xylopyranose-(1-4)-beta-D-xylopyranose



- Molecule 3: 4-O-methyl-alpha-D-glucopyranuronic acid-(1-2)-beta-D-xylopyranose-(1-4)-beta-D-xylopyranose



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	89.60Å 41.00Å 107.79Å 90.00° 91.98° 90.00°	Depositor
Resolution (Å)	46.88 – 1.85 46.88 – 1.85	Depositor EDS
% Data completeness (in resolution range)	100.0 (46.88-1.85) 99.9 (46.88-1.85)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.74 (at 1.86Å)	Xtriage
Refinement program	REFMAC 5.8.0257	Depositor
R, R_{free}	0.155 , 0.191 0.167 , 0.200	Depositor DCC
R_{free} test set	3293 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å ²)	20.5	Xtriage
Anisotropy	0.260	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 38.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.017 for h,-k,-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7645	wwPDB-VP
Average B, all atoms (Å ²)	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.40% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: EDO, BMA, XYP, MAN, GCV, NAG, PEG

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	1.04	0/3431	1.25	3/4682 (0.1%)
1	G	1.05	0/3537	1.25	5/4826 (0.1%)
All	All	1.05	0/6968	1.25	8/9508 (0.1%)

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	327	GLY	CA-C-O	-6.21	117.98	122.45
1	G	327	GLY	CA-C-O	-5.72	118.00	122.52
1	A	298	GLU	CA-C-N	5.39	126.08	119.99
1	A	298	GLU	C-N-CA	5.39	126.08	119.99
1	G	221	LEU	CA-C-N	5.33	127.42	120.28
1	G	221	LEU	C-N-CA	5.33	127.42	120.28
1	G	200	PHE	CA-CB-CG	5.24	119.04	113.80
1	G	336	ILE	CB-CA-C	5.12	118.46	110.83

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	3346	0	3179	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	G	3454	0	3269	17	0
2	B	50	0	43	0	0
3	D	32	0	9	0	0
3	E	32	0	9	0	0
4	A	10	0	4	0	0
4	G	15	0	6	3	0
5	A	8	0	12	0	0
5	G	8	0	12	0	0
6	A	7	0	10	1	0
7	A	324	0	0	0	0
7	G	359	0	0	2	0
All	All	7645	0	6553	22	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 2.

All (22) 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:G:37:GLN:HE21	4:G:601:GLY:HA3	1.56	0.69
1:G:37:GLN:HE21	4:G:601:GLY:CA	2.05	0.69
1:G:48:ARG:HH21	1:G:48:ARG:HG2	1.58	0.68
1:A:325:GLN:HG2	1:A:326:THR:O	2.04	0.57
1:A:41:LEU:HD21	1:A:336:ILE:HG23	1.89	0.55
1:G:283:GLN:NE2	7:G:702:HOH:O	2.40	0.52
1:G:337:ASP:HB3	1:G:342:THR:OG1	2.10	0.52
1:G:325:GLN:HG2	1:G:326:THR:O	2.13	0.48
1:G:48:ARG:HG2	1:G:48:ARG:NH2	2.27	0.47
1:A:368:VAL:H	6:A:605:PEG:H42	1.79	0.46
1:G:275:TRP:CG	1:G:317:ALA:HB3	2.50	0.46
1:G:37:GLN:HE21	4:G:601:GLY:HA2	1.78	0.46
1:G:338:ALA:HA	7:G:734:HOH:O	2.15	0.45
1:G:27:GLY:O	1:G:319[B]:LEU:HA	2.18	0.44
1:G:355:TRP:CD1	1:G:449:MET:HE1	2.52	0.44
1:G:210[A]:ARG:NH1	1:G:251:MET:HE1	2.34	0.43
1:G:27:GLY:O	1:G:319[A]:LEU:HA	2.19	0.43
1:G:202:ALA:HB1	1:G:244:ALA:HB3	2.01	0.43
1:A:88:PRO:HG3	1:A:95:LEU:HD23	2.01	0.43
1:G:390:VAL:HG13	1:G:449:MET:HE3	2.00	0.41
1:G:34:ARG:HG3	1:G:325:GLN:HB2	2.02	0.41
1:A:27:GLY:O	1:A:319:LEU:HA	2.20	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	440/452 (97%)	426 (97%)	13 (3%)	1 (0%)	43	31
1	G	458/452 (101%)	443 (97%)	15 (3%)	0	100	100
All	All	898/904 (99%)	869 (97%)	28 (3%)	1 (0%)	48	35

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	321	TRP

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	348/352 (99%)	346 (99%)	2 (1%)	78	73
1	G	360/352 (102%)	358 (99%)	2 (1%)	78	73
All	All	708/704 (101%)	704 (99%)	4 (1%)	78	73

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	48	ARG
1	G	412	GLN

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Mol	Chain	Res	Type
1	A	90	SER
1	A	372	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	G	37	GLN
1	G	67	ASN
1	G	92	ASN
1	G	152	GLN
1	G	160	GLN
1	G	217	GLN
1	G	283	GLN
1	G	401	ASN
1	A	67	ASN
1	A	160	GLN
1	A	217	GLN
1	A	401	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

10 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	NAG	B	1	1,2	14,14,15	0.56	0	17,19,21	0.93	1 (5%)
2	NAG	B	2	2	14,14,15	0.61	0	17,19,21	1.59	3 (17%)
2	BMA	B	3	2	11,11,12	0.48	0	15,15,17	1.53	3 (20%)
2	MAN	B	4	2	11,11,12	0.57	0	15,15,17	1.55	4 (26%)
3	XYP	D	1	3	10,10,10	1.63	4 (40%)	14,14,14	1.53	2 (14%)
3	XYP	D	2	3	9,9,10	1.59	3 (33%)	10,12,14	1.15	2 (20%)
3	GCV	D	3	3	13,13,14	1.21	1 (7%)	14,18,20	0.95	0
3	XYP	E	1	3	10,10,10	2.31	3 (30%)	14,14,14	0.99	1 (7%)
3	XYP	E	2	3	9,9,10	1.49	1 (11%)	10,12,14	0.83	0
3	GCV	E	3	3	13,13,14	1.20	1 (7%)	14,18,20	1.07	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
2	NAG	B	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	B	2	2	-	2/6/23/26	0/1/1/1
2	BMA	B	3	2	-	0/2/19/22	0/1/1/1
2	MAN	B	4	2	-	2/2/19/22	0/1/1/1
3	XYP	D	1	3	-	-	0/1/1/1
3	XYP	D	2	3	-	-	0/1/1/1
3	GCV	D	3	3	-	0/6/23/26	0/1/1/1
3	XYP	E	1	3	-	-	0/1/1/1
3	XYP	E	2	3	-	-	0/1/1/1
3	GCV	E	3	3	-	0/6/23/26	0/1/1/1

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	E	1	XYP	O5-C1	5.18	1.51	1.43
3	E	1	XYP	C4-C3	3.43	1.57	1.52
3	E	2	XYP	C2-C3	3.15	1.57	1.52
3	D	1	XYP	O5-C5	3.04	1.48	1.43
3	E	3	GCV	O5-C5	2.34	1.47	1.43
3	D	1	XYP	O1-C1	2.30	1.46	1.39
3	D	1	XYP	C1-C2	2.23	1.57	1.52
3	E	1	XYP	O4-C4	2.16	1.47	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	2	XYP	O5-C5	2.16	1.47	1.43
3	D	1	XYP	C4-C3	2.07	1.55	1.52
3	D	3	GCV	O4-C4	2.06	1.47	1.42
3	D	2	XYP	C2-C3	2.06	1.55	1.52
3	D	2	XYP	C4-C3	2.05	1.55	1.52

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	2	NAG	O6-C6-C5	-4.07	97.46	111.33
2	B	3	BMA	C3-C4-C5	3.89	117.29	110.23
2	B	1	NAG	C1-O5-C5	3.27	116.57	112.19
2	B	4	MAN	C3-C4-C5	3.06	115.77	110.23
2	B	4	MAN	O3-C3-C2	-2.85	104.25	110.05
2	B	4	MAN	C2-C3-C4	2.72	115.64	110.86
2	B	2	NAG	C6-C5-C4	-2.70	106.38	113.02
2	B	2	NAG	O5-C1-C2	-2.66	107.17	111.29
3	D	1	XYP	C1-C2-C3	2.48	115.42	110.36
2	B	3	BMA	C6-C5-C4	-2.43	107.04	113.02
3	D	2	XYP	C5-O5-C1	-2.29	107.72	111.42
2	B	3	BMA	C1-O5-C5	2.24	115.19	112.19
2	B	4	MAN	C1-C2-C3	2.24	112.90	109.64
3	E	1	XYP	O5-C5-C4	-2.22	105.50	110.79
3	D	1	XYP	C5-O5-C1	-2.17	107.95	112.46
3	D	2	XYP	C1-C2-C3	2.16	112.79	109.64

There are no chirality outliers.

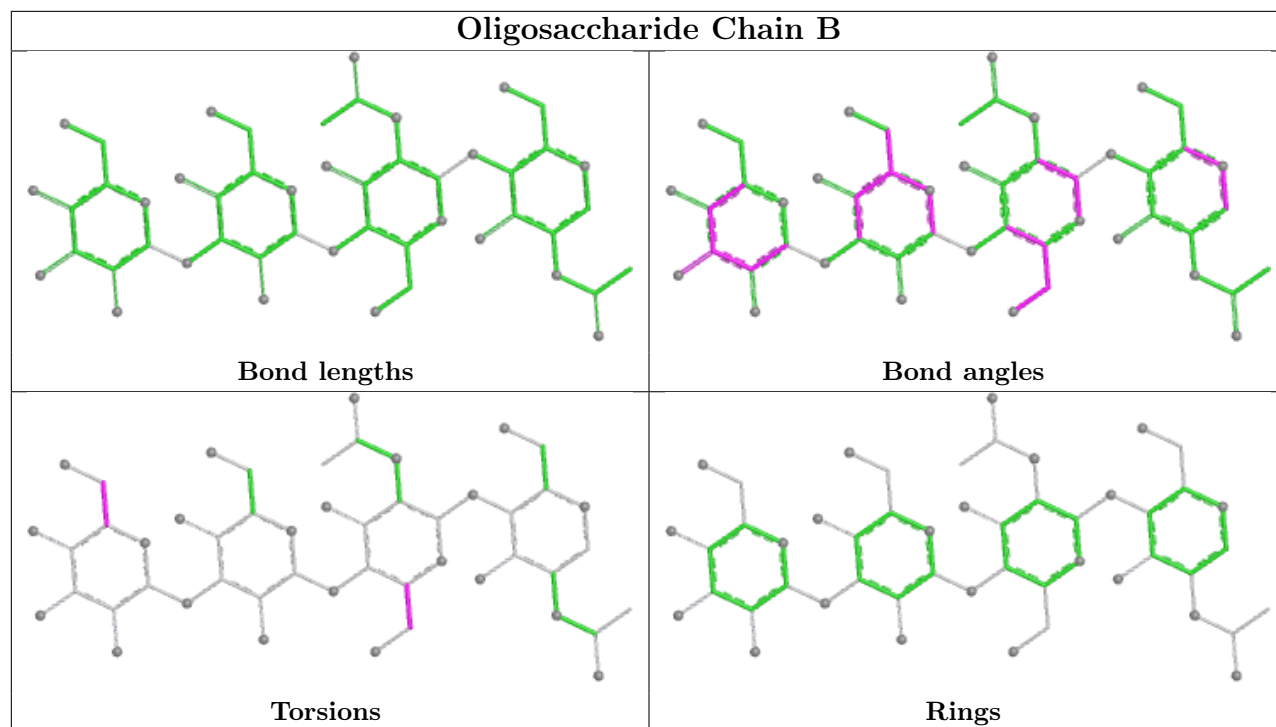
All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	4	MAN	O5-C5-C6-O6
2	B	4	MAN	C4-C5-C6-O6
2	B	2	NAG	C4-C5-C6-O6
2	B	2	NAG	O5-C5-C6-O6

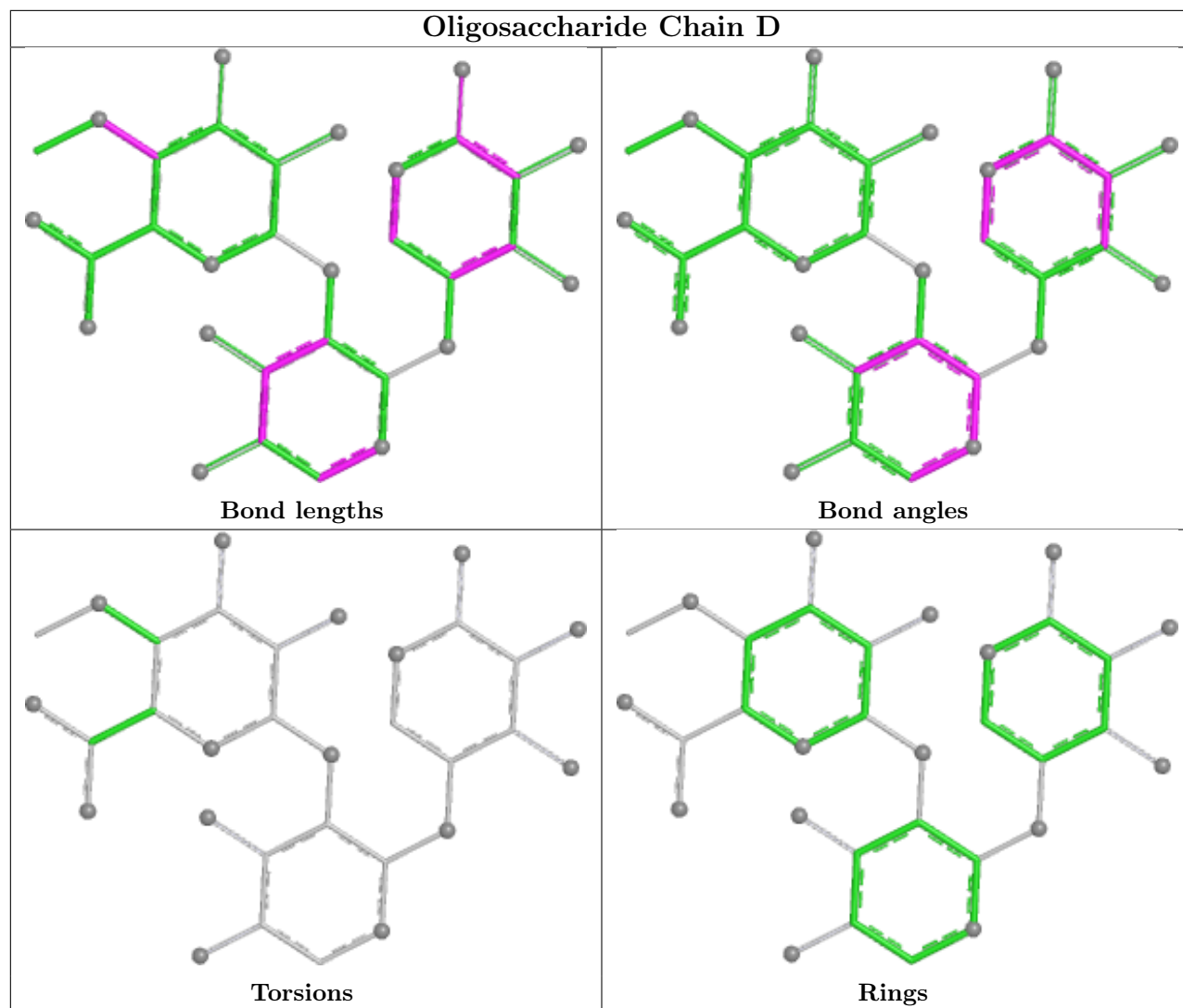
There are no ring outliers.

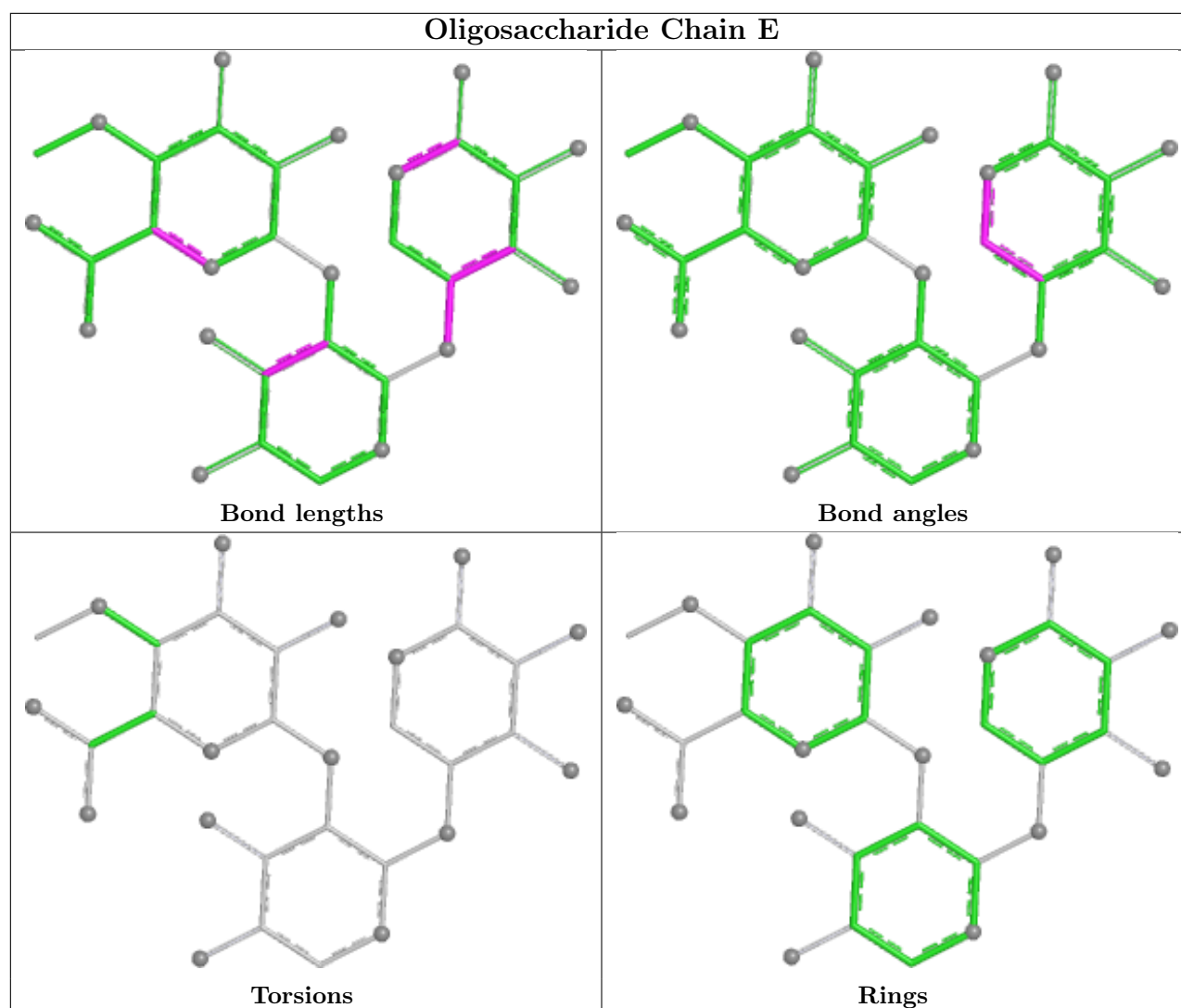
No monomer is involved in short contacts.

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



Oligosaccharide Chain D





5.6 Ligand geometry [i](#)

10 ligands 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	$\# Z > 2$
5	EDO	G	604	-	3,3,3	0.05	0	2,2,2	0.16	0
4	GLY	G	605	-	4,4,4	1.05	0	3,4,4	1.08	0
5	EDO	G	603	-	3,3,3	0.09	0	2,2,2	0.20	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	PEG	A	605	-	6,6,6	0.32	0	5,5,5	0.24	0
5	EDO	A	603	-	3,3,3	0.09	0	2,2,2	0.10	0
4	GLY	G	601	-	4,4,4	0.90	0	3,4,4	1.42	0
4	GLY	G	602	-	4,4,4	1.63	1 (25%)	3,4,4	1.75	1 (33%)
5	EDO	A	604	-	3,3,3	0.08	0	2,2,2	0.25	0
4	GLY	A	601	-	4,4,4	1.36	1 (25%)	3,4,4	0.34	0
4	GLY	A	602	-	4,4,4	1.18	1 (25%)	3,4,4	1.52	1 (33%)

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	EDO	G	604	-	-	1/1/1/1	-
4	GLY	G	605	-	-	2/2/2/2	-
5	EDO	G	603	-	-	1/1/1/1	-
6	PEG	A	605	-	-	3/4/4/4	-
5	EDO	A	603	-	-	1/1/1/1	-
4	GLY	G	601	-	-	2/2/2/2	-
4	GLY	G	602	-	-	0/2/2/2	-
5	EDO	A	604	-	-	1/1/1/1	-
4	GLY	A	601	-	-	2/2/2/2	-
4	GLY	A	602	-	-	0/2/2/2	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	G	602	GLY	OXT-C	-3.20	1.20	1.30
4	A	601	GLY	OXT-C	-2.36	1.23	1.30
4	A	602	GLY	OXT-C	-2.24	1.23	1.30

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	G	602	GLY	OXT-C-O	-2.67	116.46	123.33
4	A	602	GLY	OXT-C-O	-2.09	117.96	123.33

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	G	605	GLY	O-C-CA-N
4	G	605	GLY	OXT-C-CA-N
4	A	601	GLY	O-C-CA-N
4	A	601	GLY	OXT-C-CA-N
4	G	601	GLY	OXT-C-CA-N
4	G	601	GLY	O-C-CA-N
5	G	603	EDO	O1-C1-C2-O2
6	A	605	PEG	O1-C1-C2-O2
6	A	605	PEG	O2-C3-C4-O4
5	A	603	EDO	O1-C1-C2-O2
5	A	604	EDO	O1-C1-C2-O2
6	A	605	PEG	C1-C2-O2-C3
5	G	604	EDO	O1-C1-C2-O2

There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	605	PEG	1	0
4	G	601	GLY	3	0

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, 95th 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 ²)	Q<0.9
1	A	441/452 (97%)	-0.23	3 (0%) 84 87	12, 22, 35, 50	3 (0%)
1	G	452/452 (100%)	-0.32	6 (1%) 75 79	7, 19, 38, 69	8 (1%)
All	All	893/904 (98%)	-0.28	9 (1%) 79 83	7, 21, 36, 69	11 (1%)

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	407	SER	3.0
1	G	405	ALA	2.8
1	A	373	GLY	2.5
1	G	338	ALA	2.4
1	A	457	ALA	2.3
1	A	405	ALA	2.2
1	G	293	TYR	2.2
1	G	339	ASN	2.1
1	G	410	ALA	2.1

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, 95th 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.

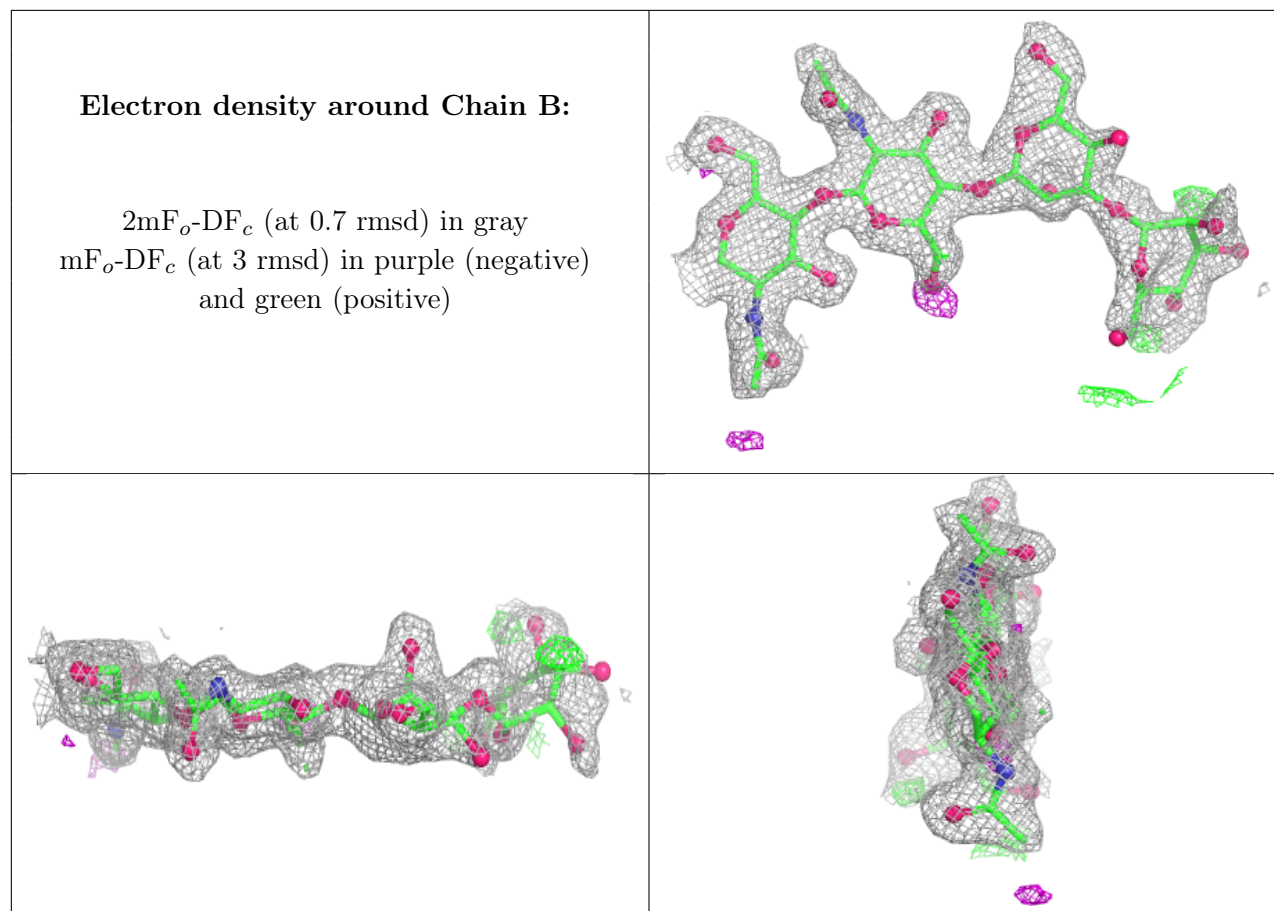
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	NAG	B	1	14/15	-	-	19,21,22,23	0

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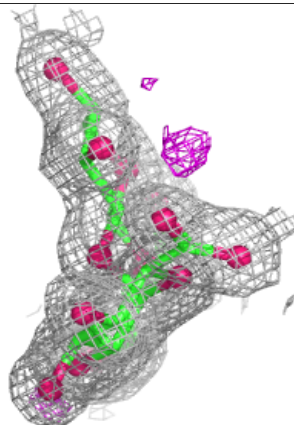
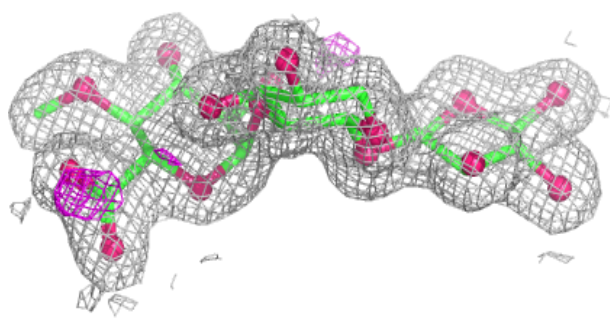
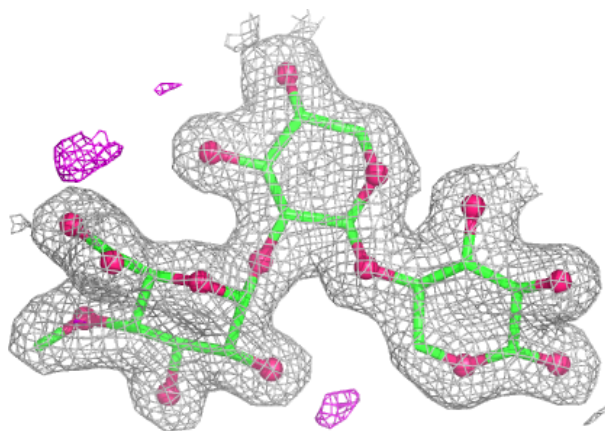
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	NAG	B	2	14/15	-	-	27,28,35,37	0
2	BMA	B	3	11/12	-	-	46,51,53,53	0
2	MAN	B	4	11/12	-	-	58,64,66,66	0
3	GCV	D	3	13/14	0.96	0.05	21,22,25,25	0
3	XYP	D	2	9/10	0.97	0.04	20,21,21,21	0
3	XYP	D	1	10/10	0.97	0.05	19,19,20,20	0
3	GCV	E	3	13/14	0.97	0.04	16,16,17,17	0
3	XYP	E	2	9/10	0.98	0.04	14,14,15,15	0
3	XYP	E	1	10/10	0.98	0.04	14,15,15,15	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.

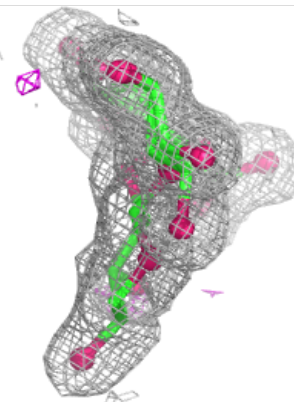
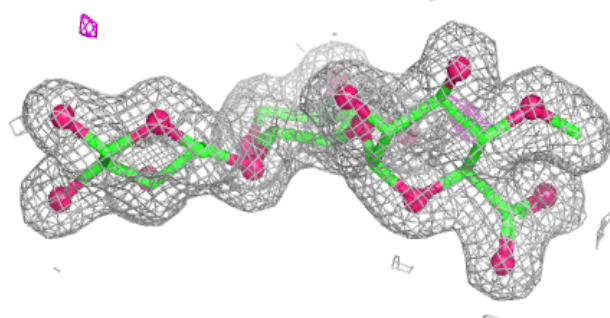
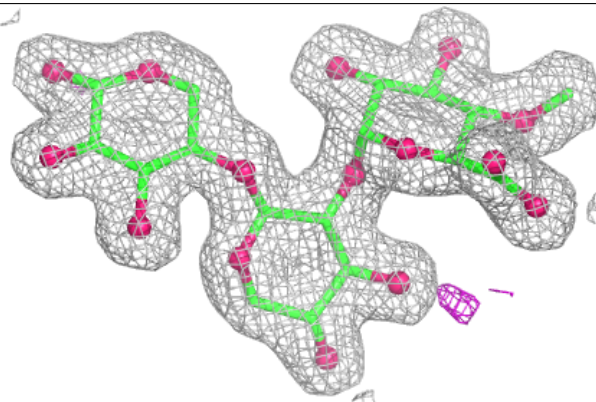


Electron density around Chain D:

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

**Electron density around Chain E:**

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



6.4 Ligands [i](#)

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, 95th 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 ²)	Q<0.9
5	EDO	G	604	4/4	0.82	0.15	48,50,50,50	0
6	PEG	A	605	7/7	0.82	0.13	44,45,46,46	0
4	GLY	G	605	5/5	0.84	0.17	52,53,56,58	0
4	GLY	G	601	5/5	0.85	0.13	38,41,42,44	0
4	GLY	G	602	5/5	0.87	0.11	43,44,45,47	0
5	EDO	A	604	4/4	0.87	0.14	47,48,48,49	0
4	GLY	A	601	5/5	0.87	0.13	36,37,40,42	0
5	EDO	G	603	4/4	0.88	0.15	48,48,48,49	0
5	EDO	A	603	4/4	0.88	0.13	50,50,51,51	0
4	GLY	A	602	5/5	0.91	0.10	44,46,49,52	0

6.5 Other polymers [i](#)

There are no such residues in this entry.