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Full wwPDB NMR Structure Validation Report (i)

May 28, 2020 – 10:46 pm BST

PDB ID	:	2K2Q
Title	:	complex structure of the external thioesterase of the Surfactin-synthetase with a carrier domain
Authors	:	Koglin, A.; Lohr, F.; Bernhard, F.; Rogov, V.V.; Frueh, D.P.; Strieter, E.R.; Mofid, M.R.; Guntert, P.; Wagner, G.; Walsh, C.T.; Marahiel, M.A.; Dotsch, V.
Deposited on	:	2008-04-10

This is a Full wwPDB NMR 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/NMRValidationReportHelp
with specific help available everywhere you see the (i) symbol.

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

|		
Cyrange	:	Kirchner and Güntert (2011)
NmrClust	:	Kelley et al. (1996)
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
ShiftChecker	:	2.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
SOLUTION NMR

The overall completeness of chemical shifts assignment was not calculated.

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.
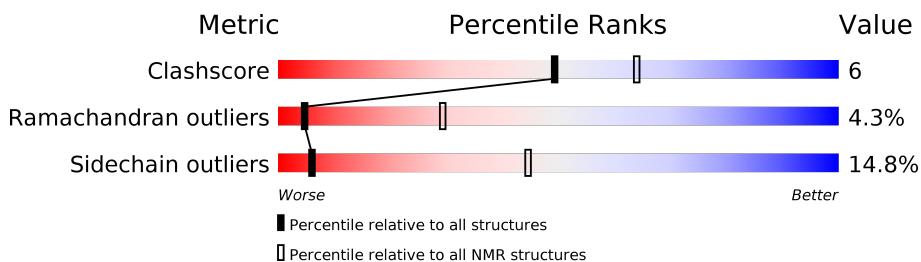
Metric	Whole archive (#Entries)	NMR archive (#Entries)
Clashscore	158937	12864
Ramachandran outliers	154571	11451
Sidechain outliers	154315	11428

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and 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 <=5%

Mol	Chain	Length	Quality of chain
1	A	82	82% 18%
2	B	242	78% 22%

2 Ensemble composition and analysis ⓘ

This entry contains 18 models. The atoms present in the NMR models are not consistent. Some calculations may have failed as a result. All residues are included in the validation scores. Model 9 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *closest to the average*.

The following residues are included in the computation of the global validation metrics.

Well-defined (core) protein residues			
Well-defined core	Residue range (total)	Backbone RMSD (Å)	Medoid model
1	A:1-A:82, B:1-B:242 (324)	1.09	9

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 3 clusters. No single-model clusters were found.

Cluster number	Models
1	2, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16
2	1, 10, 17
3	3, 18

3 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 5125 atoms, of which 2548 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Tyrocidine synthetase 3 (Tyrocidine synthetase III).

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	82	1272	407	644	105	114	2	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	EXPRESSION TAG	UNP O30409
A	2	GLY	-	EXPRESSION TAG	UNP O30409

- Molecule 2 is a protein called Surfactin synthetase thioesterase subunit.

| Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
2	B	242	3853	1253	1904	329	357	10	0

4 Residue-property plots ⓘ

4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA and DNA chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-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 outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

- Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)
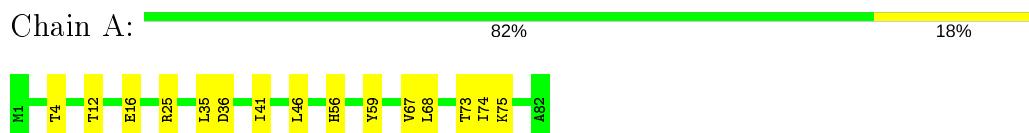
- Molecule 2: Surfactin synthetase thioesterase subunit
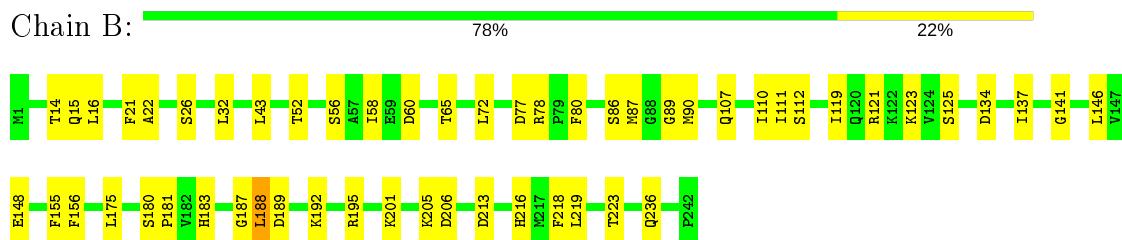
4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

- Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)
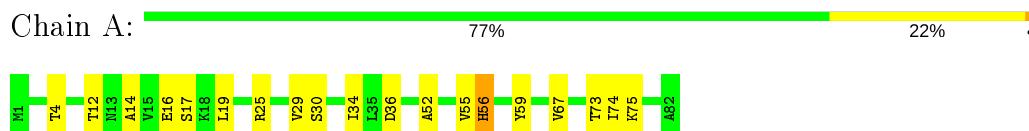
- Molecule 2: Surfactin synthetase thioesterase subunit
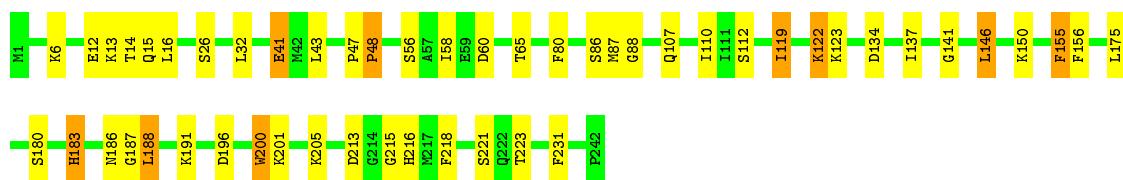
4.2.2 Score per residue for model 2

• Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

• Molecule 2: Surfactin synthetase thioesterase subunit
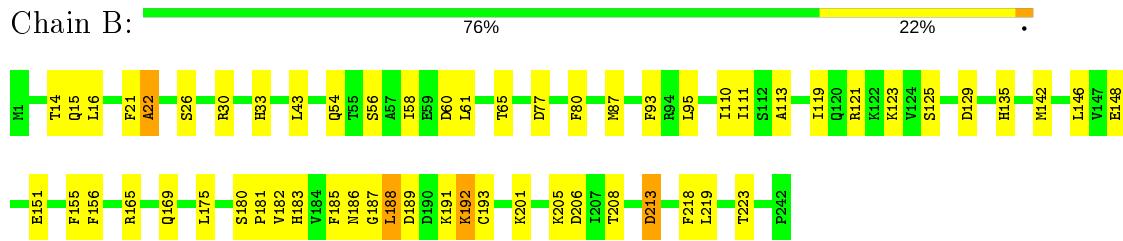
4.2.3 Score per residue for model 3

• Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)
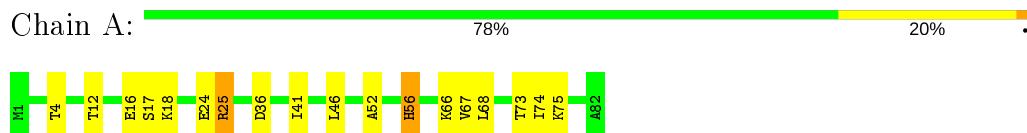

• Molecule 2: Surfactin synthetase thioesterase subunit
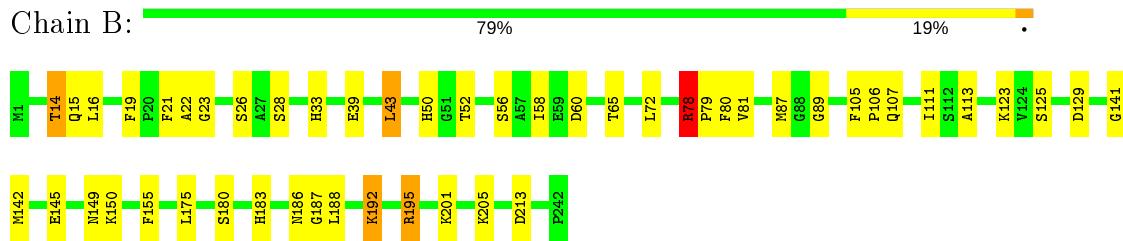
4.2.4 Score per residue for model 4

• Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A: 78% 20%

M1 T4 E16 L19 A20 E21 I22 W23 E24 R25 I34 L35 D36 H44 K47 A52 A53 Q54 V55 H56 V67 A70 T73 I74 K75 A82

● Molecule 2: Surfactin synthetase thioesterase subunit

Chain B: 81% 17%

M1 L4 T14 F21 S28 Q37 L43 H50 G51 T52 S56 D60 T65 M87 G88 G89 L95 K98 E102 Q107 I110 I111 S112 I119 Q120 R121 K122 K123 V124 S125 D134 H135 I136 I137 G141 E145 L146 F155

S180 H183 V184 F185 N186 G187 L188 D189 K192 R195 K201 K205 D213 H216 M217 F218 I219 L220 T223 P242
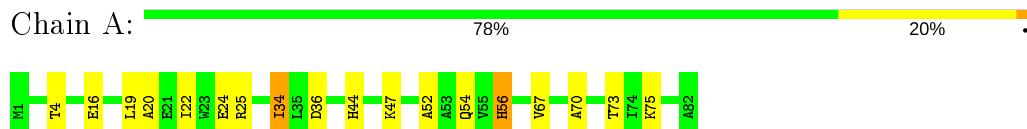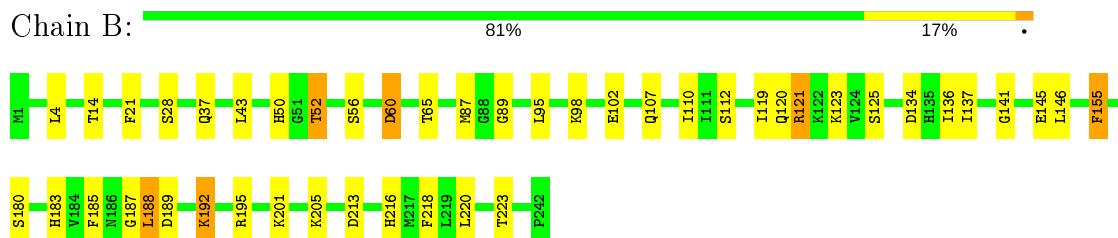
4.2.5 Score per residue for model 5

● Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A: 82% 15%

M1 T4 T12 S17 K18 E24 I32 D36 I41 A52 A53 Q54 V55 H56 Q60 V67 L68 K75 A82

● Molecule 2: Surfactin synthetase thioesterase subunit

Chain B: 76% 22%

M1 L4 T14 C18 F19 P20 F21 A22 S26 H33 Q37 L43 H50 G51 T52 T55 S56 A57 I58 E59 D60 E71 V81 S86 M87 T92 L95 K98 E102 I110 I111 S112 H118 I119 Q120 R121 K122 K123 L146 V147 E148

E151 V152 F155 F156 R165 Q169 L175 I178 Q179 S180 H183 V184 F185 N186 G187 L188 D189 D190 K191 K192 W200 K201 K202 W203 A204 K205 G215 H216 L219 L220 Q236 I239 P242
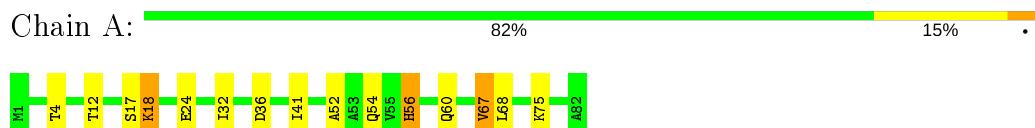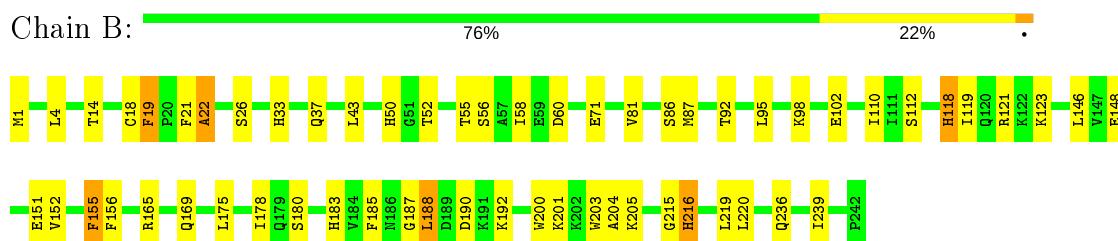
4.2.6 Score per residue for model 6

● Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A: 72% 27%

M1 T4 T12 V15 E16 S17 K18 E21 E24 V29 S30 I34 L35 D36 Q40 I41 G42 L46 V61 V67 L68 T73 I74 K75 A82

● Molecule 2: Surfactin synthetase thioesterase subunit

Chain B: 77% 21%
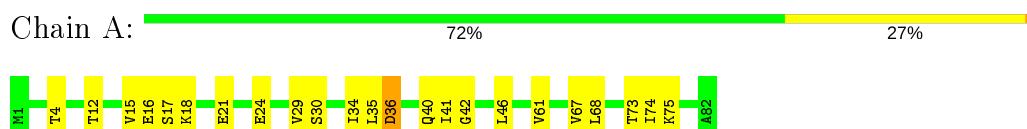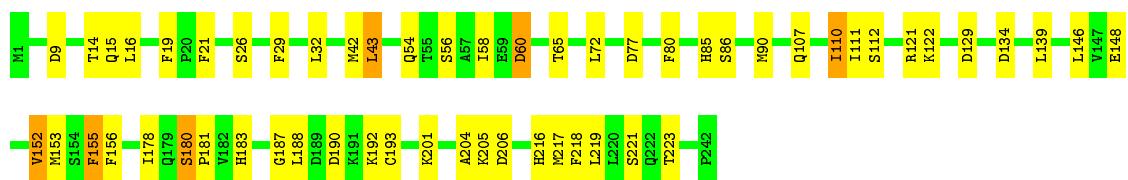
4.2.7 Score per residue for model 7

• Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A:

• Molecule 2: Surfactin synthetase thioesterase subunit

Chain B:
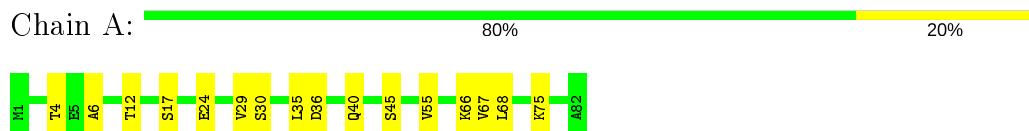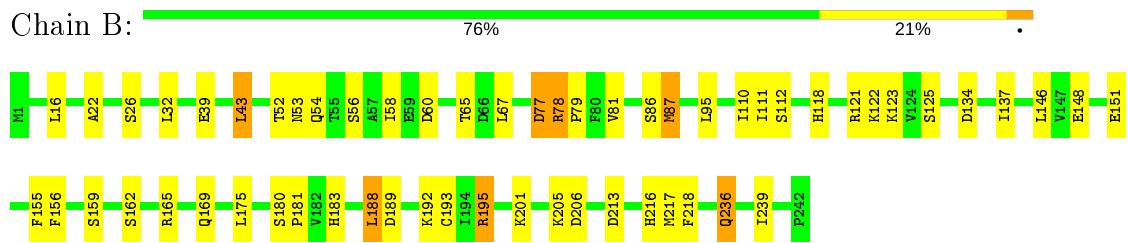
4.2.8 Score per residue for model 8

• Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A:

• Molecule 2: Surfactin synthetase thioesterase subunit

Chain B:
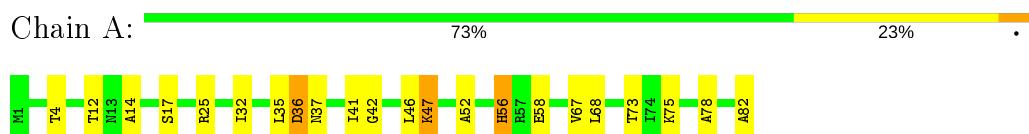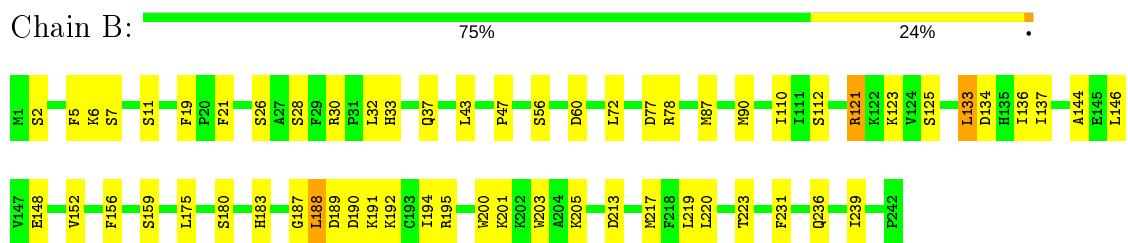
4.2.9 Score per residue for model 9 (medoid)

• Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A: 82%   15%

M1 T12 N13 A14 K18 R25 L35 D36 Q40 L46 V55 Y59 Q60 K66 V67 T73 I74 K75 A82

• Molecule 2: Surfactin synthetase thioesterase subunit

Chain B: 78%   21%

M1 L4 F5 L16 A22 S26 R30 P31 L32 H33 A34 F35 L43 P47 S56 A57 I58 E59 D60 T65 D66 L67 M87 M90 L95 L99 Q107 I110 A113 R121 K122 K123 V124 S125 D130 D134 I137 G141

L146 F155 F156 R165 Q169 L175 S180 P181 V182 H183 V184 F185 N186 G187 L188 D189 D190 K191 K192 K201 K205 D206 H216 M217 T223 F231 Q236 P242
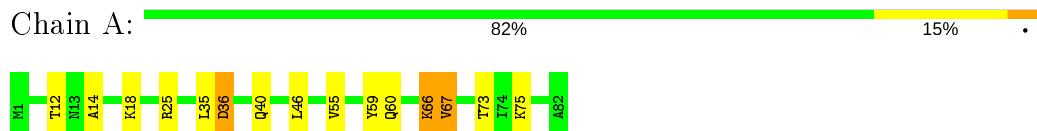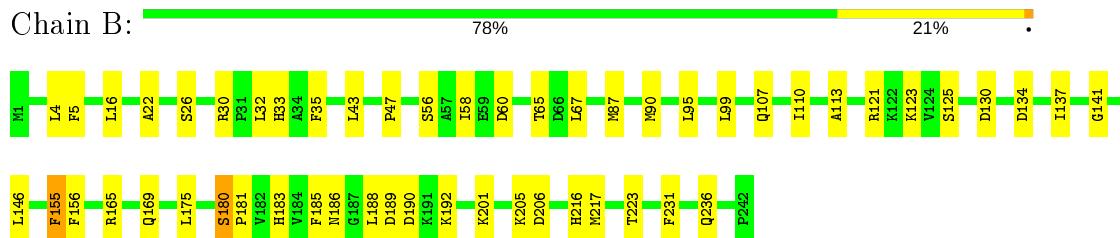
4.2.10 Score per residue for model 10

• Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A: 82%   17%

M1 T4 T12 E16 L19 I34 L35 D36 V55 Y59 K66 V67 L68 T73 I74 K75 A82

• Molecule 2: Surfactin synthetase thioesterase subunit

Chain B: 75%   21%

M1 T14 Q15 L16 F21 S26 F29 L32 E39 L43 H50 G51 T52 S56 A57 I58 E59 D60 L67 D77 R78 P79 H85 S86 M87 G88 G89 M90 I110 I111 S112 A113 I119 Q120 R121 K122 K123 V124 S125 F132 I136 I137 G141

L146 V147 E148 V152 F156 L157 P158 S159 R165 E168 E171 D174 S180 P181 V182 H183 N186 G187 L188 K192 C193 I194 R195 K205 D206 F218 L219 L220 Q236 P242
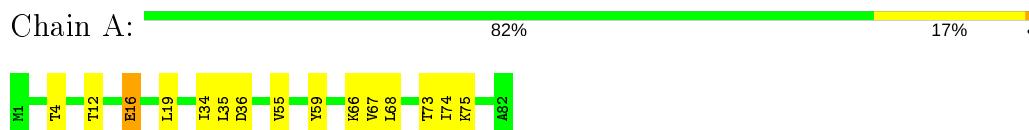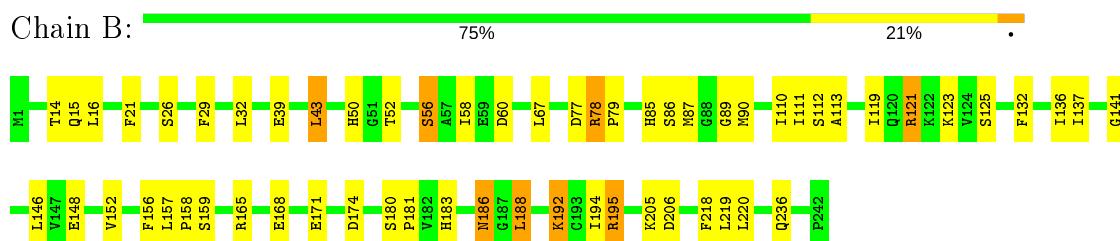
4.2.11 Score per residue for model 11

• Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A: 79%   21%

M1 T4 T12 N13 A14 V15 E16 E24 I32 G33 I34 L35 D36 G42 L46 V55 H56 V67 T73 I74 K75 A78 A82

• Molecule 2: Surfactin synthetase thioesterase subunit

Chain B: 73%   25%
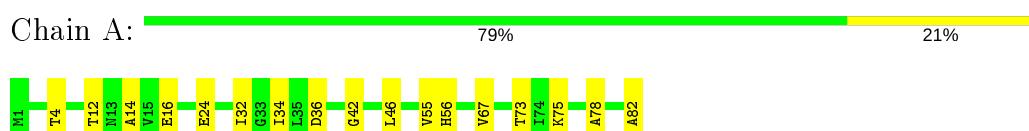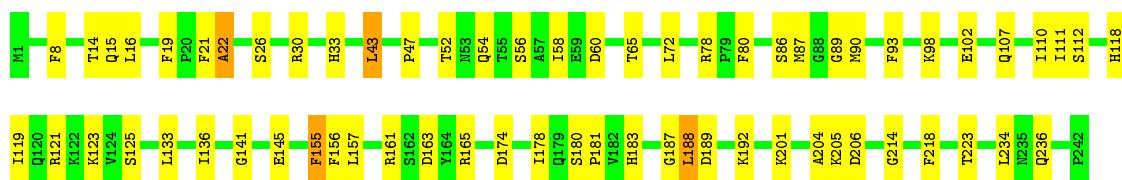
4.2.12 Score per residue for model 12

• Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)
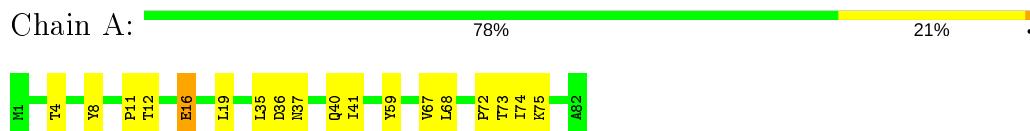
• Molecule 2: Surfactin synthetase thioesterase subunit
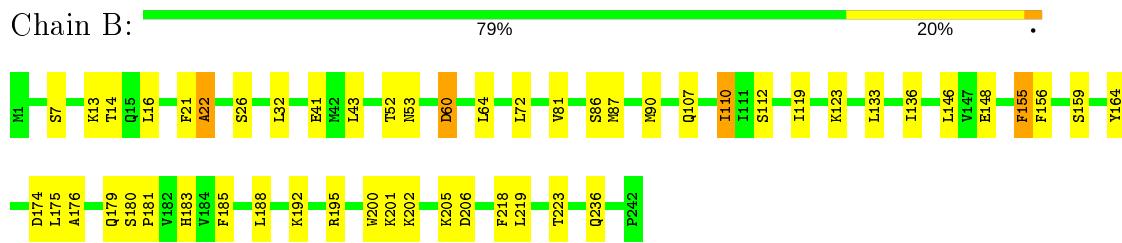
4.2.13 Score per residue for model 13

• Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)
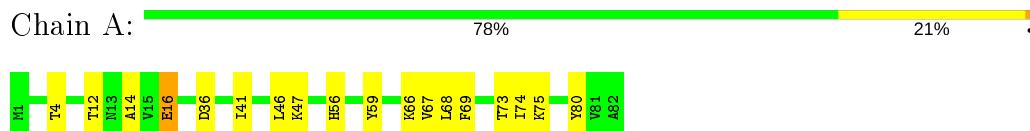
• Molecule 2: Surfactin synthetase thioesterase subunit
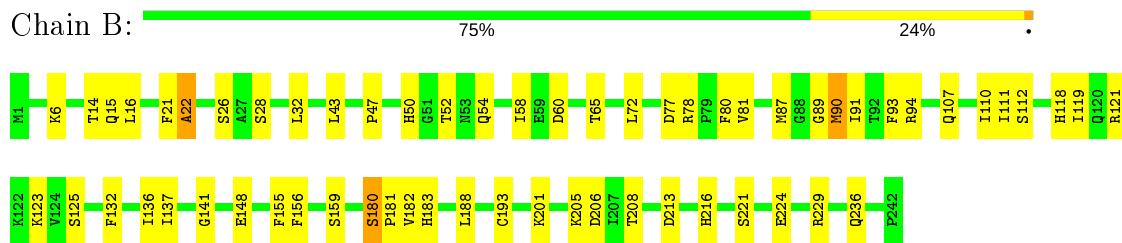

4.2.14 Score per residue for model 14

• Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A: 83%   17%

M1 T4 T12 E16 L19 R25 G28 V29 D36 I41 L46 Q54 V67 L68 K75 A82

- Molecule 2: Surfactin synthetase thioesterase subunit

Chain B: 77%   21%

M1 K6 S7 E12 K13 T14 Q15 L16 I17 F21 A22 S26 L32 E41 M42 L43 H50 G51 T52 N53 Q54 T55 S56 A57 I58 E59 D60 T65 L72 F80 S86 M87 G88 G89 F93 Q107 I110 H118 I119 Q120 R121 K122 K123 V124 S125

L133 I136 L139 G140 G141 E148 V152 M153 F156 D174 S180 P181 V182 H183 G187 L188 D189 W200 K201 K205 D206 M217 F218 L219 L220 S221 R229 P242
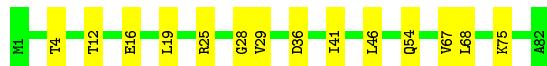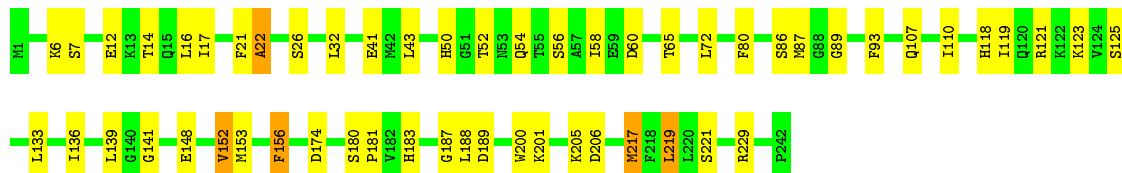
4.2.15   Score per residue for model 15

- Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A: 73%   24%

M1 T4 T12 E16 L19 I34 L35 D36 I41 S45 L46 V55 H56 Y59 Q60 V61 E62 L63 V67 L68 T73 I74 K75 V81 A82

- Molecule 2: Surfactin synthetase thioesterase subunit

Chain B: 75%   22%

M1 S2 Q3 T14 Q15 L16 G23 S26 L32 E39 L43 E46 H50 G51 T52 N53 S56 D60 T65 K69 L72 D77 R78 P79 F80 V81 M87 G88 G89 M90 Q107 I110 I111 S112 Q115 R121 K122 K123 V124 S125

D134 I137 G141 L146 V147 E148 E151 S154 F155 F156 R165 Q169 S180 H183 V184 F185 N186 G187 L188 D189 K192 C193 I194 R195 W200 K201 K205 D213 H216 M217 F218 Q222 I233 P242
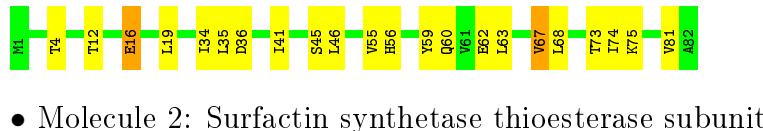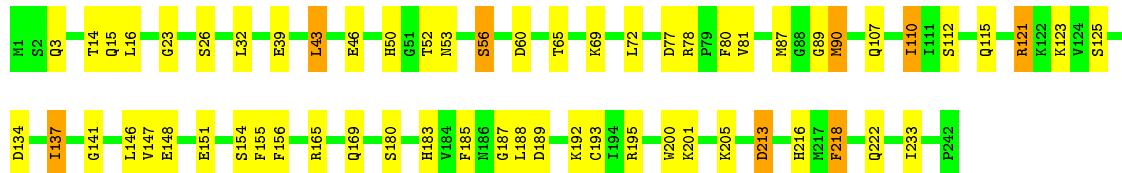
4.2.16   Score per residue for model 16

- Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A: 78%   21%

M1 T4 Y8 T12 E16 E24 R25 V29 S30 D36 Q40 V51 V55 H56 R57 L65 K66 V67 T73 I74 K75 A82

- Molecule 2: Surfactin synthetase thioesterase subunit

Chain B: 75%   24%

M1 T14 Q15 L16 I17 C18 S26 L32 E39 L43 P48 N53 S56 A57 I58 E59 D60 L64 T65 R78 P79 F80 V81 L82 F83 S86 M87 G88 G89 M90 I91 T92 F93 Q107 I110 I111 R121 K122 K123 V124 S125 D134 I137

G141 L146 V147 E148 V152 F156 L157 P158 S159 S162 L167 L175 S180 P181 V182 H183 G187 L188 K192 R195 K201 D206 D213 H216 M217 F218 L219 L220 S221 Q222 T223 Q236 P242
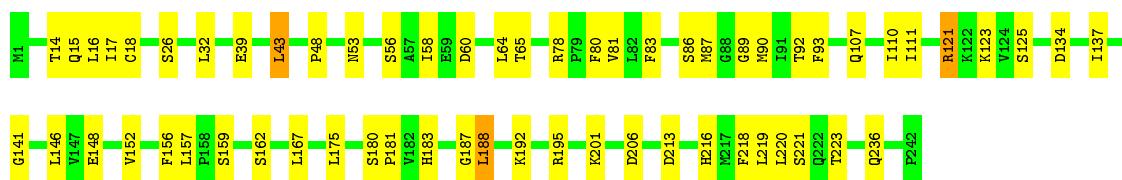
4.2.17 Score per residue for model 17

- Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A: 77% 22%

M1 T4 T12 E16 S17 K18 E21 R25 L35 D36 I41 G42 V51 H56 Y59 K66 V67 L68 T73 I74 K75 A82

- Molecule 2: Surfactin synthetase thioesterase subunit

Chain B: 78% 20%

M1 S11 E12 K13 T14 Q15 L16 S26 L32 Q37 L43 Q54 T55 S56 D60 T65 D77 R78 P79 F80 V81 F93 Q107 I110 I111 I119 Q120 R121 K122 K123 V124 S125 D129 F132 L133 Q138 L139 M142 P143 L146 V147 E148

N149 K150 E151 F155 F156 L157 S180 H183 V184 F185 N186 G187 L188 K201 K202 W203 A204 K205 Q211 G215 H216 M217 F218 L219 T223 P242
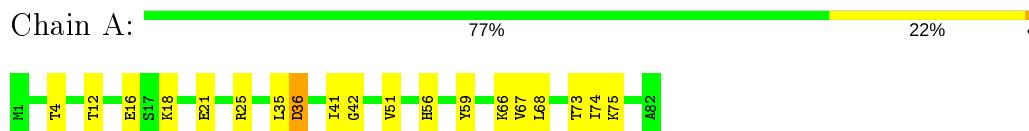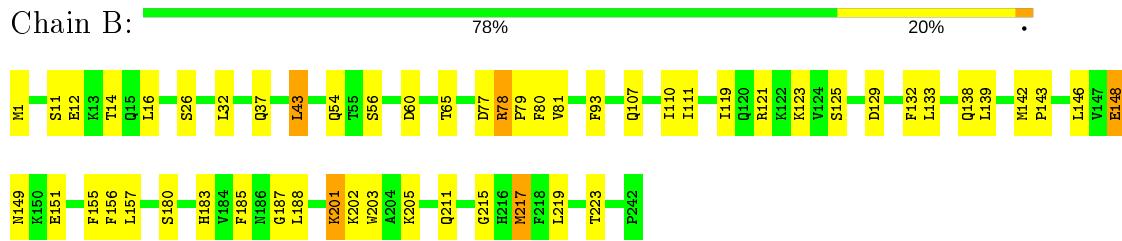
4.2.18 Score per residue for model 18

- Molecule 1: Tyrocidine synthetase 3 (Tyrocidine synthetase III)

Chain A: 72% 26%

M1 T4 E5 T12 E16 S17 I22 L35 D36 I41 G42 G43 H44 S45 L46 V55 H56 Y59 Q60 V61 K66 V67 L68 Q71 P72 T73 I74 K75 A82

- Molecule 2: Surfactin synthetase thioesterase subunit

Chain B: 74% 24%

M1 F5 T14 Q15 L16 I17 C18 F19 P20 S28 L32 Q37 L43 G49 T52 N53 Q54 T55 S56 D60 T65 L72 D77 R78 P79 F80 M87 G88 G89 M90 I91 T92 F93 K98 L99 E100 R101 E102 Q107 I110 I111 S112 A113

R121 K122 K123 V124 S125 F132 L133 D134 H135 I136 I137 Q138 L146 V147 K150 E151 F155 F156 L157 S180 P181 V182 H183 M186 G187 L188 D189 K192 C193 I194 R195 K201 K205 D213 H216 M217 F218 P242

5 Refinement protocol and experimental data overview (i)

The models were refined using the following method: *simulated annealing.*

Of the 200 calculated structures, 18 were deposited, based on the following criterion: ?.

The following table shows the software used for structure solution, optimisation and refinement.

Software name	Classification	Version
CNS	structure solution	1.2
CNS	refinement	1.2

No chemical shift data was provided. No validations of the models with respect to experimental NMR restraints is performed at this time.

6 Model quality (i)

6.1 Standard geometry (i)

There are no covalent bond-length or bond-angle outliers.

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

There are no planarity outliers.

6.2 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 each 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 averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	A	628	644	644	10±6
2	B	1949	1904	1904	22±8
All	All	46386	45884	45864	563

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 6.

All unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models Worst	Models Total
1:A:16:GLU:CD	1:A:74:ILE:CD1	1.51	1.79	2	3
2:B:16:LEU:HD22	2:B:80:PHE:CZ	1.40	1.49	6	10
1:A:16:GLU:CD	1:A:74:ILE:HD12	1.40	0.98	2	4
1:A:45:SER:C	1:A:46:LEU:HD12	1.36	1.36	2	2
1:A:16:GLU:OE2	1:A:74:ILE:HB	1.35	1.17	17	1
1:A:16:GLU:OE1	1:A:74:ILE:CD1	1.32	1.77	2	4
1:A:45:SER:O	1:A:46:LEU:HD12	1.31	1.20	15	2
2:B:21:PHE:CE2	2:B:85:HIS:CE1	1.27	2.22	6	1
1:A:16:GLU:CD	1:A:74:ILE:HD13	1.26	1.49	16	4
1:A:16:GLU:OE2	1:A:74:ILE:HD12	1.26	1.12	18	2
1:A:16:GLU:OE2	1:A:74:ILE:CB	1.25	1.83	17	1
1:A:16:GLU:OE2	1:A:34:ILE:CD1	1.25	1.83	4	2
1:A:16:GLU:OE1	1:A:74:ILE:HD13	1.20	1.27	2	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:16:GLU:CD	1:A:74:ILE:HB	1.20	1.57	17	2
2:B:21:PHE:CE2	2:B:85:HIS:NE2	1.17	2.11	6	1
2:B:21:PHE:HE2	2:B:85:HIS:NE2	1.16	1.35	6	1
1:A:16:GLU:OE2	1:A:74:ILE:CD1	1.13	1.97	18	4
1:A:45:SER:O	1:A:46:LEU:CD1	1.12	1.97	2	2
1:A:16:GLU:CG	1:A:74:ILE:HB	1.08	1.77	2	3
2:B:16:LEU:CD2	2:B:80:PHE:HZ	1.08	1.61	13	4
1:A:16:GLU:OE2	1:A:74:ILE:HD13	1.07	1.47	17	2
2:B:14:THR:HG22	2:B:16:LEU:CD1	1.07	1.77	16	9
1:A:16:GLU:CG	1:A:74:ILE:HD13	1.06	1.80	10	4
2:B:14:THR:HG22	2:B:16:LEU:HD11	1.06	1.23	16	10
2:B:14:THR:CG2	2:B:16:LEU:HD11	1.06	1.81	16	8
1:A:16:GLU:OE2	1:A:74:ILE:CG1	1.04	2.06	17	2
1:A:16:GLU:HG2	1:A:74:ILE:HB	1.03	1.27	16	6
1:A:45:SER:C	1:A:46:LEU:CD1	1.02	2.26	2	2
1:A:16:GLU:HG2	1:A:74:ILE:CB	1.02	1.83	2	3
1:A:16:GLU:OE2	1:A:34:ILE:HD12	1.02	1.44	4	2
2:B:16:LEU:CD2	2:B:80:PHE:CZ	1.02	2.42	6	5
2:B:16:LEU:HD13	2:B:80:PHE:CE1	1.01	1.90	6	5
2:B:16:LEU:HD22	2:B:80:PHE:CE1	0.99	1.93	3	9
2:B:16:LEU:HG	2:B:43:LEU:HD21	0.98	1.31	3	8
1:A:16:GLU:OE2	1:A:34:ILE:HD11	0.98	1.58	4	4
2:B:21:PHE:CD2	2:B:22:ALA:N	0.94	2.35	13	7
1:A:16:GLU:OE1	1:A:74:ILE:HD11	0.94	1.63	6	1
2:B:16:LEU:CD1	2:B:80:PHE:CE1	0.93	2.51	6	4
2:B:16:LEU:HD22	2:B:80:PHE:HZ	0.92	1.24	11	7
2:B:16:LEU:CG	2:B:43:LEU:HD21	0.92	1.93	3	6
1:A:16:GLU:CG	1:A:74:ILE:HD12	0.90	1.97	2	2
2:B:16:LEU:HG	2:B:43:LEU:CD2	0.88	1.98	18	6
1:A:16:GLU:OE1	1:A:74:ILE:CG2	0.85	2.23	3	1
2:B:21:PHE:HE2	2:B:85:HIS:HE2	0.84	0.96	6	1
2:B:16:LEU:CD1	2:B:43:LEU:HD21	0.84	2.03	15	8
2:B:16:LEU:CD2	2:B:80:PHE:CE1	0.83	2.60	6	6
1:A:16:GLU:OE1	1:A:19:LEU:CB	0.83	2.27	15	3
1:A:16:GLU:CG	1:A:74:ILE:CD1	0.81	2.57	16	5
1:A:16:GLU:OE1	1:A:19:LEU:HD22	0.81	1.74	4	2
2:B:16:LEU:HG	2:B:43:LEU:HD23	0.81	1.53	13	4
1:A:46:LEU:HD13	1:A:46:LEU:C	0.80	1.96	11	2
2:B:16:LEU:CD1	2:B:43:LEU:HD23	0.78	2.08	14	4
2:B:16:LEU:CD1	2:B:80:PHE:HE1	0.78	1.87	6	2
2:B:21:PHE:CE2	2:B:85:HIS:HE1	0.77	1.90	6	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models Worst	Total
2:B:21:PHE:CG	2:B:22:ALA:N	0.77	2.50	5	7
1:A:16:GLU:OE1	1:A:19:LEU:HB3	0.76	1.79	15	2
1:A:16:GLU:OE1	1:A:74:ILE:HD12	0.76	1.79	1	2
1:A:16:GLU:OE1	1:A:74:ILE:HG21	0.73	1.83	3	1
1:A:16:GLU:HG3	1:A:74:ILE:CD1	0.73	2.14	16	3
1:A:16:GLU:OE1	1:A:19:LEU:HD12	0.73	1.83	14	1
1:A:16:GLU:OE1	1:A:19:LEU:HB2	0.72	1.83	10	2
2:B:21:PHE:CD2	2:B:85:HIS:CE1	0.69	2.80	6	1
2:B:21:PHE:HE2	2:B:85:HIS:CE1	0.69	1.74	6	1
1:A:16:GLU:CD	1:A:74:ILE:CB	0.68	2.47	17	1
1:A:16:GLU:HG3	1:A:74:ILE:HD13	0.68	1.66	10	2
2:B:16:LEU:CG	2:B:43:LEU:HD23	0.68	2.18	14	4
2:B:16:LEU:N	2:B:16:LEU:HD12	0.67	2.05	6	6
1:A:63:LEU:HD12	1:A:63:LEU:N	0.67	2.05	15	1
2:B:16:LEU:HD12	2:B:16:LEU:N	0.67	2.05	10	7
2:B:16:LEU:HG	2:B:43:LEU:HD11	0.67	1.67	2	2
1:A:46:LEU:HD12	1:A:46:LEU:N	0.67	2.05	18	1
2:B:16:LEU:HD22	2:B:80:PHE:HE1	0.66	1.50	14	2
1:A:46:LEU:N	1:A:46:LEU:HD12	0.66	2.05	3	2
2:B:4:LEU:HD21	2:B:60:ASP:HB3	0.66	1.68	4	1
2:B:6:LYS:HB3	2:B:43:LEU:HD13	0.66	1.68	8	4
1:A:46:LEU:CD1	1:A:46:LEU:C	0.66	2.64	11	2
2:B:21:PHE:CD2	2:B:85:HIS:NE2	0.65	2.64	6	1
1:A:63:LEU:N	1:A:63:LEU:HD12	0.65	2.05	2	1
1:A:55:VAL:HG13	2:B:218:PHE:CD1	0.65	2.27	1	1
2:B:16:LEU:HD22	2:B:80:PHE:CE2	0.64	2.25	11	1
1:A:16:GLU:OE1	1:A:74:ILE:CG1	0.64	2.45	6	1
2:B:15:GLN:C	2:B:16:LEU:HD12	0.63	2.14	18	10
2:B:16:LEU:CD2	2:B:80:PHE:HE1	0.62	2.05	3	3
1:A:14:ALA:HB2	2:B:47:PRO:HB3	0.62	1.69	1	3
2:B:16:LEU:CD2	2:B:80:PHE:CE2	0.61	2.83	11	1
2:B:21:PHE:CD2	2:B:22:ALA:O	0.60	2.54	3	1
1:A:16:GLU:CG	1:A:74:ILE:CB	0.60	2.61	2	2
2:B:187:GLY:O	2:B:188:LEU:HG	0.60	1.97	11	6
1:A:16:GLU:O	1:A:16:GLU:OE1	0.60	2.20	13	4
2:B:14:THR:CG2	2:B:16:LEU:CD1	0.59	2.59	16	1
1:A:14:ALA:CB	2:B:47:PRO:HB3	0.59	2.27	1	1
2:B:21:PHE:CE2	2:B:22:ALA:HB3	0.59	2.33	5	5
1:A:78:ALA:HA	1:A:82:ALA:HB3	0.59	1.74	8	2
2:B:16:LEU:CD1	2:B:43:LEU:CD2	0.59	2.79	3	3
1:A:15:VAL:HG21	2:B:21:PHE:HZ	0.59	1.58	6	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models Worst	Total
1:A:16:GLU:OE1	1:A:16:GLU:O	0.58	2.21	15	2
2:B:16:LEU:CD1	2:B:16:LEU:N	0.58	2.67	15	8
2:B:16:LEU:N	2:B:16:LEU:CD1	0.58	2.67	12	5
1:A:46:LEU:N	1:A:46:LEU:CD1	0.58	2.67	3	2
2:B:110:ILE:O	2:B:183:HIS:HA	0.57	1.98	15	17
1:A:63:LEU:N	1:A:63:LEU:CD1	0.57	2.67	15	2
1:A:46:LEU:CD1	1:A:46:LEU:N	0.57	2.67	18	2
2:B:16:LEU:CG	2:B:43:LEU:CD2	0.56	2.82	14	3
2:B:133:LEU:HA	2:B:136:ILE:HG22	0.56	1.76	8	4
1:A:55:VAL:HA	2:B:218:PHE:CE1	0.56	2.35	7	2
2:B:217:MET:SD	2:B:219:LEU:HB2	0.56	2.41	14	1
1:A:24:GLU:OE1	1:A:24:GLU:HA	0.56	2.01	3	1
1:A:46:LEU:CD1	1:A:46:LEU:O	0.55	2.54	11	1
2:B:17:ILE:HG22	2:B:83:PHE:HB2	0.55	1.79	16	1
2:B:16:LEU:HD12	2:B:43:LEU:HD21	0.55	1.78	2	2
1:A:24:GLU:OE1	1:A:32:ILE:HG12	0.55	2.02	11	2
2:B:16:LEU:HG	2:B:43:LEU:CD1	0.54	2.32	2	1
1:A:55:VAL:HA	2:B:218:PHE:CE2	0.54	2.38	10	1
1:A:40:GLN:NE2	1:A:72:PRO:HA	0.54	2.17	12	1
1:A:55:VAL:HG22	2:B:218:PHE:CZ	0.54	2.37	7	1
2:B:90:MET:HA	2:B:154:SER:O	0.54	2.03	15	1
1:A:16:GLU:OE1	1:A:74:ILE:HG13	0.53	2.03	6	1
2:B:132:PHE:O	2:B:136:ILE:HB	0.53	2.04	13	3
1:A:17:SER:O	1:A:21:GLU:HG2	0.53	2.02	6	1
2:B:16:LEU:HD11	2:B:43:LEU:HD23	0.53	1.80	14	1
2:B:3:GLN:HB2	2:B:46:GLU:HB2	0.53	1.81	15	1
2:B:217:MET:SD	2:B:219:LEU:HG	0.53	2.43	17	1
2:B:121:ARG:HA	2:B:134:ASP:OD2	0.53	2.03	8	5
2:B:137:ILE:HD11	2:B:144:ALA:HB3	0.53	1.80	8	1
2:B:60:ASP:O	2:B:64:LEU:HG	0.53	2.04	16	2
2:B:119:ILE:HD12	2:B:134:ASP:HA	0.52	1.81	4	1
1:A:16:GLU:HG2	1:A:74:ILE:HD13	0.52	1.77	10	1
2:B:5:PHE:O	2:B:43:LEU:HA	0.52	2.04	9	3
1:A:51:VAL:O	1:A:55:VAL:HG23	0.52	2.04	16	1
1:A:20:ALA:O	1:A:24:GLU:HB3	0.52	2.05	4	1
2:B:21:PHE:CE2	2:B:22:ALA:O	0.51	2.63	3	1
1:A:16:GLU:OE1	1:A:19:LEU:HD11	0.51	2.06	1	1
2:B:122:LYS:HG3	2:B:134:ASP:OD1	0.51	2.05	1	2
2:B:192:LYS:O	2:B:195:ARG:HG3	0.50	2.04	10	4
2:B:16:LEU:HD11	2:B:80:PHE:HE1	0.50	1.65	6	1
2:B:107:GLN:HA	2:B:107:GLN:OE1	0.50	2.07	11	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:B:190:ASP:HA	2:B:216:HIS:CB	0.50	2.37	5	1
2:B:165:ARG:O	2:B:169:GLN:HG2	0.50	2.07	7	5
1:A:17:SER:OG	2:B:48:PRO:HD2	0.49	2.07	1	1
2:B:187:GLY:C	2:B:188:LEU:HG	0.49	2.28	1	9
1:A:25:ARG:NH2	2:B:1:MET:SD	0.49	2.86	17	1
2:B:176:ALA:HA	2:B:202:LYS:O	0.49	2.08	12	1
2:B:196:ASP:O	2:B:200:TRP:HB2	0.49	2.08	1	1
1:A:16:GLU:O	1:A:16:GLU:CD	0.49	2.51	10	1
2:B:90:MET:O	2:B:94:ARG:HB2	0.49	2.07	13	1
2:B:178:ILE:O	2:B:204:ALA:HB1	0.49	2.08	5	3
2:B:98:LYS:O	2:B:102:GLU:HG2	0.49	2.08	4	4
1:A:52:ALA:O	1:A:56:HIS:HB2	0.48	2.08	1	5
2:B:16:LEU:HD11	2:B:43:LEU:HD21	0.48	1.84	2	2
2:B:16:LEU:HD21	2:B:60:ASP:OD2	0.48	2.08	6	1
1:A:18:LYS:O	1:A:21:GLU:HG2	0.48	2.08	17	1
2:B:187:GLY:O	2:B:213:ASP:HA	0.48	2.08	3	3
2:B:147:VAL:O	2:B:151:GLU:HB2	0.48	2.09	18	1
2:B:181:PRO:HD2	2:B:206:ASP:OD1	0.48	2.09	10	6
2:B:85:HIS:HB3	2:B:87:MET:SD	0.48	2.49	10	1
1:A:55:VAL:HG11	2:B:216:HIS:O	0.47	2.10	9	1
2:B:188:LEU:HD13	2:B:195:ARG:HG2	0.47	1.86	7	1
2:B:181:PRO:HD2	2:B:206:ASP:OD2	0.47	2.08	16	4
1:A:14:ALA:HA	2:B:47:PRO:HB3	0.47	1.86	11	2
1:A:18:LYS:HD2	2:B:18:CYS:SG	0.47	2.50	5	1
1:A:32:ILE:HB	1:A:37:ASN:OD1	0.47	2.10	2	1
2:B:182:VAL:HG13	2:B:208:THR:HB	0.47	1.85	2	2
2:B:30:ARG:HA	2:B:33:HIS:CD2	0.46	2.46	2	4
2:B:18:CYS:SG	2:B:92:THR:HG21	0.46	2.50	16	1
1:A:22:ILE:HG23	2:B:91:ILE:HD13	0.46	1.86	18	1
1:A:55:VAL:HG11	2:B:218:PHE:HA	0.46	1.87	15	1
2:B:113:ALA:HA	2:B:186:ASN:O	0.46	2.09	3	5
2:B:146:LEU:O	2:B:150:LYS:HE2	0.46	2.11	1	1
1:A:60:GLN:OE1	1:A:67:VAL:HG11	0.46	2.10	9	3
2:B:16:LEU:CG	2:B:43:LEU:HD11	0.46	2.39	2	1
2:B:152:VAL:HG23	2:B:157:LEU:HD22	0.46	1.87	16	2
1:A:62:GLU:C	1:A:63:LEU:HD12	0.45	2.30	15	2
2:B:16:LEU:HD13	2:B:80:PHE:CZ	0.45	2.46	13	1
1:A:16:GLU:CD	1:A:16:GLU:O	0.45	2.54	15	3
2:B:201:LYS:HG3	2:B:202:LYS:N	0.45	2.26	17	1
1:A:46:LEU:HD13	1:A:47:LYS:N	0.45	2.25	8	1
2:B:190:ASP:OD1	2:B:217:MET:HA	0.44	2.12	8	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:B:118:HIS:CD2	2:B:151:GLU:HB3	0.44	2.48	7	1
1:A:34:ILE:HG23	1:A:40:GLN:HE22	0.44	1.72	6	1
2:B:122:LYS:HG2	2:B:134:ASP:OD1	0.44	2.12	7	1
1:A:46:LEU:HD13	1:A:46:LEU:O	0.44	2.12	11	1
1:A:16:GLU:OE1	1:A:19:LEU:CD1	0.44	2.65	1	1
2:B:152:VAL:HG13	2:B:153:MET:H	0.44	1.73	6	2
2:B:90:MET:HG2	2:B:91:ILE:HD12	0.44	1.89	13	1
2:B:13:LYS:O	2:B:41:GLU:HB3	0.44	2.12	12	2
2:B:161:ARG:O	2:B:165:ARG:HB2	0.44	2.13	11	1
2:B:180:SER:HB2	2:B:181:PRO:HD3	0.43	1.90	9	3
2:B:21:PHE:CE2	2:B:22:ALA:CB	0.43	3.01	13	1
2:B:78:ARG:N	2:B:79:PRO:HD2	0.43	2.28	17	2
2:B:191:LYS:O	2:B:194:ILE:HG22	0.43	2.13	8	1
1:A:55:VAL:HG13	2:B:218:PHE:CZ	0.43	2.49	11	1
1:A:24:GLU:O	1:A:25:ARG:HD2	0.43	2.13	3	1
2:B:78:ARG:H	2:B:79:PRO:HD2	0.43	1.73	10	3
1:A:60:GLN:CD	1:A:64:PRO:HA	0.43	2.34	2	1
2:B:188:LEU:HD12	2:B:192:LYS:HA	0.43	1.88	2	1
2:B:179:GLN:CB	2:B:206:ASP:HA	0.43	2.43	12	1
2:B:165:ARG:HA	2:B:171:GLU:OE1	0.43	2.14	10	1
2:B:183:HIS:NE2	2:B:206:ASP:OD1	0.43	2.51	9	3
1:A:35:LEU:O	1:A:36:ASP:HB3	0.42	2.14	18	3
2:B:236:GLN:HA	2:B:239:ILE:O	0.42	2.14	7	3
2:B:158:PRO:HB3	2:B:188:LEU:CD2	0.42	2.44	10	1
1:A:16:GLU:HG2	1:A:74:ILE:HD12	0.42	1.91	13	1
2:B:65:THR:O	2:B:69:LYS:HB2	0.42	2.14	15	1
2:B:147:VAL:O	2:B:151:GLU:HG3	0.42	2.15	15	1
2:B:157:LEU:HD23	2:B:157:LEU:H	0.42	1.73	11	1
1:A:55:VAL:CG1	2:B:216:HIS:O	0.42	2.68	1	1
1:A:55:VAL:O	2:B:221:SER:CB	0.42	2.68	1	1
1:A:6:ALA:HB1	1:A:35:LEU:HD12	0.42	1.91	7	1
2:B:183:HIS:NE2	2:B:206:ASP:OD2	0.41	2.53	2	4
2:B:148:GLU:HA	2:B:151:GLU:OE2	0.41	2.15	17	1
2:B:157:LEU:HD21	2:B:163:ASP:HB2	0.41	1.91	11	1
1:A:55:VAL:HG22	2:B:218:PHE:CE2	0.41	2.51	7	1
2:B:93:PHE:CE1	2:B:156:PHE:HB2	0.41	2.51	14	1
1:A:67:VAL:HG13	1:A:68:LEU:H	0.41	1.75	18	1
1:A:37:ASN:ND2	1:A:40:GLN:H	0.41	2.14	2	1
2:B:100:GLU:HB3	2:B:107:GLN:NE2	0.41	2.31	18	1
2:B:54:GLN:OE1	2:B:54:GLN:HA	0.41	2.15	18	1
1:A:51:VAL:HG22	2:B:143:PRO:HD2	0.41	1.92	17	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models Worst	Total
2:B:138:GLN:O	2:B:139:LEU:HB2	0.41	2.16	17	1
2:B:18:CYS:O	2:B:19:PHE:HB2	0.41	2.16	5	1
2:B:118:HIS:NE2	2:B:151:GLU:HB3	0.41	2.31	5	1
2:B:130:ASP:O	2:B:134:ASP:HB2	0.41	2.15	9	1
2:B:95:LEU:O	2:B:99:LEU:HG	0.41	2.16	9	1
2:B:157:LEU:H	2:B:157:LEU:HD23	0.41	1.74	17	1
2:B:1:MET:HG2	2:B:55:THR:OG1	0.41	2.16	5	1
1:A:16:GLU:CG	1:A:74:ILE:CG1	0.40	3.00	2	1
2:B:78:ARG:CB	2:B:79:PRO:HD3	0.40	2.47	3	1
1:A:16:GLU:HG3	1:A:74:ILE:HD12	0.40	1.90	16	1
2:B:148:GLU:HA	2:B:151:GLU:OE1	0.40	2.16	2	1
2:B:77:ASP:OD1	2:B:79:PRO:HD2	0.40	2.15	7	1
2:B:105:PHE:HB3	2:B:106:PRO:HD3	0.40	1.92	3	1
1:A:14:ALA:CA	2:B:47:PRO:HB3	0.40	2.47	1	1
1:A:16:GLU:OE1	1:A:19:LEU:CD2	0.40	2.59	4	1
2:B:136:ILE:O	2:B:138:GLN:HG2	0.40	2.17	18	1

6.3 Torsion angles ⓘ

6.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all NMR entries. 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	80/82 (98%)	55±2 (69±3%)	19±3 (24±3%)	6±1 (7±2%)	2	17
2	B	240/242 (99%)	193±5 (81±2%)	39±5 (16±2%)	8±2 (3±1%)	6	37
All	All	5760/5832 (99%)	4471 (78%)	1044 (18%)	245 (4%)	5	29

All 48 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	36	ASP	18
1	A	67	VAL	18
2	B	180	SER	18
2	B	87	MET	15
2	B	121	ARG	15

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Mol	Chain	Res	Type	Models (Total)
1	A	68	LEU	12
2	B	58	ILE	12
1	A	41	ILE	11
2	B	141	GLY	10
2	B	89	GLY	9
2	B	137	ILE	9
1	A	59	TYR	9
2	B	22	ALA	8
2	B	155	PHE	8
1	A	66	LYS	7
1	A	42	GLY	6
1	A	29	VAL	5
2	B	19	PHE	5
2	B	53	ASN	4
2	B	215	GLY	3
2	B	78	ARG	3
2	B	12	GLU	3
2	B	152	VAL	3
2	B	56	SER	3
2	B	52	THR	2
1	A	44	HIS	2
2	B	23	GLY	2
2	B	48	PRO	2
2	B	11	SER	2
1	A	61	VAL	2
1	A	34	ILE	2
2	B	181	PRO	1
1	A	70	ALA	1
2	B	149	ASN	1
2	B	20	PRO	1
2	B	139	LEU	1
2	B	88	GLY	1
1	A	45	SER	1
1	A	5	GLU	1
1	A	65	LEU	1
1	A	81	VAL	1
2	B	119	ILE	1
2	B	49	GLY	1
2	B	214	GLY	1
1	A	28	GLY	1
1	A	47	LYS	1
1	A	11	PRO	1

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Mol	Chain	Res	Type	Models (Total)
1	A	32	ILE	1

6.3.2 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 PDB entries followed by that with respect to all NMR entries. 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	64/64 (100%)	56±2 (88±3%)	8±2 (12±3%)	8	50
2	B	210/210 (100%)	177±3 (84±2%)	33±3 (16±2%)	5	43
All	All	4932/4932 (100%)	4202 (85%)	730 (15%)	6	44

All 134 unique residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	75	LYS	18
2	B	123	LYS	17
2	B	60	ASP	17
1	A	12	THR	17
1	A	4	THR	17
2	B	205	LYS	17
2	B	201	LYS	17
2	B	26	SER	16
2	B	156	PHE	16
2	B	56	SER	15
1	A	73	THR	15
2	B	125	SER	14
2	B	192	LYS	14
2	B	188	LEU	14
2	B	155	PHE	14
2	B	146	LEU	14
2	B	32	LEU	13
2	B	65	THR	13
2	B	112	SER	12
2	B	148	GLU	11
2	B	107	GLN	11
1	A	56	HIS	11
2	B	43	LEU	11

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Mol	Chain	Res	Type	Models (Total)
2	B	52	THR	10
2	B	90	MET	10
2	B	223	THR	10
2	B	119	ILE	9
2	B	72	LEU	9
2	B	77	ASP	9
2	B	213	ASP	9
2	B	111	ILE	9
2	B	175	LEU	9
2	B	86	SER	9
2	B	189	ASP	9
2	B	78	ARG	8
2	B	216	HIS	8
2	B	219	LEU	8
2	B	195	ARG	8
2	B	81	VAL	8
2	B	54	GLN	7
1	A	25	ARG	7
2	B	185	PHE	7
2	B	50	HIS	7
2	B	236	GLN	7
2	B	14	THR	6
2	B	93	PHE	6
2	B	200	TRP	6
1	A	16	GLU	6
2	B	159	SER	6
2	B	218	PHE	6
1	A	35	LEU	6
2	B	39	GLU	5
2	B	193	CYS	5
2	B	217	MET	5
2	B	28	SER	5
2	B	220	LEU	5
1	A	17	SER	5
2	B	37	GLN	5
1	A	18	LYS	5
2	B	118	HIS	4
2	B	129	ASP	4
2	B	221	SER	4
1	A	46	LEU	4
2	B	174	ASP	4
2	B	95	LEU	4

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Mol	Chain	Res	Type	Models (Total)
1	A	54	GLN	4
1	A	30	SER	4
1	A	24	GLU	3
2	B	7	SER	3
1	A	37	ASN	3
2	B	142	MET	3
2	B	21	PHE	3
1	A	40	GLN	3
2	B	110	ILE	3
2	B	67	LEU	3
2	B	231	PHE	3
2	B	145	GLU	3
2	B	203	TRP	3
1	A	36	ASP	2
2	B	29	PHE	2
2	B	4	LEU	2
2	B	33	HIS	2
2	B	194	ILE	2
2	B	41	GLU	2
2	B	183	HIS	2
2	B	162	SER	2
2	B	191	LYS	2
2	B	229	ARG	2
2	B	133	LEU	2
2	B	150	LYS	2
1	A	47	LYS	2
2	B	186	ASN	2
1	A	8	TYR	2
2	B	190	ASP	2
2	B	211	GLN	1
2	B	87	MET	1
2	B	2	SER	1
2	B	122	LYS	1
1	A	71	GLN	1
2	B	149	ASN	1
2	B	137	ILE	1
2	B	8	PHE	1
2	B	42	MET	1
2	B	17	ILE	1
2	B	121	ARG	1
2	B	157	LEU	1
2	B	139	LEU	1

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Mol	Chain	Res	Type	Models (Total)
2	B	164	TYR	1
2	B	135	HIS	1
2	B	9	ASP	1
1	A	66	LYS	1
1	A	22	ILE	1
2	B	168	GLU	1
2	B	16	LEU	1
1	A	58	GLU	1
1	A	80	TYR	1
2	B	234	LEU	1
1	A	69	PHE	1
2	B	233	ILE	1
2	B	120	GLN	1
2	B	35	PHE	1
2	B	18	CYS	1
1	A	57	ARG	1
2	B	92	THR	1
1	A	60	GLN	1
2	B	132	PHE	1
2	B	115	GLN	1
2	B	136	ILE	1
2	B	61	LEU	1
2	B	167	LEU	1
2	B	152	VAL	1
2	B	71	GLU	1
2	B	222	GLN	1
2	B	224	GLU	1

6.3.3 RNA (i)

There are no RNA molecules in this entry.

6.4 Non-standard residues in protein, DNA, RNA chains (i)

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

6.5 Carbohydrates (i)

There are no carbohydrates in this entry.

6.6 Ligand geometry (i)

There are no ligands in this entry.

6.7 Other polymers (i)

There are no such molecules in this entry.

6.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

7 Chemical shift validation (i)

No chemical shift data were provided