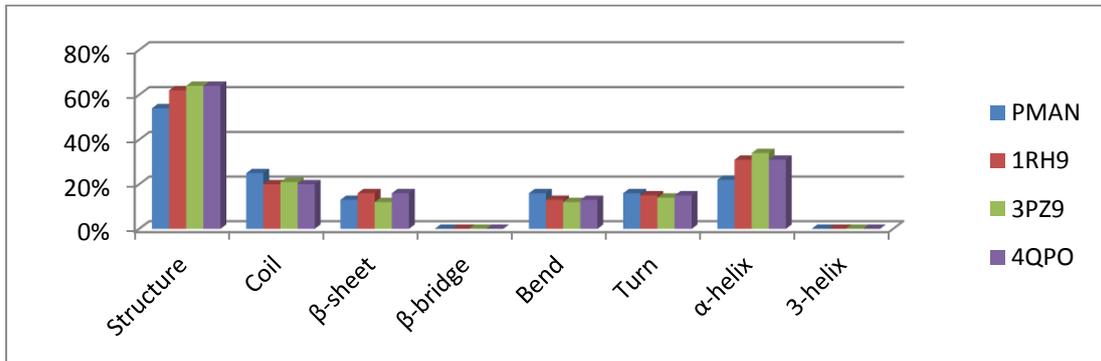


**Figure S1.** Secondary structure percentages of mannanases at 12°C



**Figure S2.** Secondary structure percentages of different mannanases at 80°C

**Table S1.** Model evaluation summary using different tools

Model evaluation tool	Evaluation scheme	Obtained score	Normal range of the score
PROCHECK	The number of residues in allowed region based on Psi/Phi Ramachandran plot	99.00%	>90%
VERIFY3D	The number of residues having an average 3D-1D score above 0.2	90.06%	>80%
ERRAT	The overall quality for nonbonded atomic interactions	89.33%	>50%

**Table S2.** Secondary structure percentages of mannanases at 12°C

	Structure	Coil	$\beta$ -sheet	$\beta$ -bridge	Bend	Turn	$\alpha$ -helix	3-helix
PMAN	55%	26%	12%	0.03%	13%	17%	23%	0.06%
1RH9	60%	18%	15%	0.02%	10%	15%	36%	0.04%
3PZ9	65%	21%	12%	0.04%	10%	14%	35%	0.03%
4QPO	63%	19%	15%	0.03%	14%	14%	32%	0.03%

**Table S3.** Secondary structure percentages of mannanases at 80°C

	Structure	Coil	$\beta$ -sheet	$\beta$ -bridge	Bend	Turn	$\alpha$ -helix	3-helix
PMAN	54%	25%	13%	0.02%	16%	16%	22%	0.04%
1RH9	64%	20%	16%	0.02%	13%	15%	31%	0.03%
3PZ9	64%	21%	12%	0.04%	12%	14%	34%	0.04%
4QPO	64%	20%	16%	0.02%	13%	15%	31%	0.03%