

Summary of integrative structure determination of A representative atomistic model of the Populus Secondary Cell Wall (PDB ID: 9A3U, PDB-Dev ID: PDBDEV_00000215)

1. Model Composition	
	<ul style="list-style-type: none"> - Cellulose: Chain FK (40 residues) - SODIUM ION: Chain HQ (Not available residues) - Lignin: Chain F (20 residues) - Cellulose: Chain HJ (40 residues) - Cellulose: Chain AG (40 residues) - Cellulose: Chain GK (40 residues) - Cellulose: Chain TK (40 residues) - SODIUM ION: Chain RS (Not available residues) - SODIUM ION: Chain XS (Not available residues) - SODIUM ION: Chain SQ (Not available residues) - Xylan-m8: Chain YE (45 residues) - SODIUM ION: Chain YU (Not available residues) - SODIUM ION: Chain GQ (Not available residues) - Xylan-m8: Chain WE (45 residues) - water: Chain PY (7 residues) - Lignin: Chain J (20 residues) - Cellulose: Chain OH (40 residues) - SODIUM ION: Chain WV (Not available residues) - Cellulose: Chain YG (40 residues) - Cellulose: Chain ZI (40 residues) - water: Chain PZ (3 residues) - Xylan-m4: Chain NE (45 residues) - SODIUM ION: Chain SL (Not available residues) - Cellulose: Chain DK (40 residues) - Cellulose: Chain JJ (40 residues) - Xylan-m4: Chain PE (45 residues) - Lignin: Chain VB (20 residues) - Cellulose: Chain EJ (40 residues) - Cellulose: Chain EL (40 residues) - Lignin: Chain CB (20 residues) - Lignin: Chain OC (20 residues) - water: Chain EX (11 residues) - Cellulose: Chain UF (40 residues) - Lignin: Chain TC (20 residues) - Cellulose: Chain DH (40 residues) - SODIUM ION: Chain VL (Not available residues) - SODIUM ION: Chain IS (Not available residues) - SODIUM ION: Chain GV (Not available residues) - water: Chain AAA (2 residues) - SODIUM ION: Chain TQ (Not available residues) - SODIUM ION: Chain PU (Not available residues) - Lignin: Chain B (20 residues) - SODIUM ION: Chain TS (Not available residues) - Lignin: Chain M (20 residues) - SODIUM ION: Chain UV (Not available residues) - Lignin: Chain LB (20 residues) - SODIUM ION: Chain EM (Not available residues) - SODIUM ION: Chain OV (Not available residues) - Cellulose: Chain UG (40 residues) - water: Chain HX (47 residues) - Cellulose: Chain SG (40 residues) - SODIUM ION: Chain VM (Not available residues) - Cellulose: Chain OI (40 residues) - water: Chain LZ (3 residues) - Lignin: Chain ZB (20 residues) - water: Chain AZ (29 residues)

- water: Chain EZ (20 residues)
- SODIUM ION: Chain VU (Not available residues)
- Xylan-m4: Chain IF (45 residues)
- SODIUM ION: Chain ML (Not available residues)
- SODIUM ION: Chain TL (Not available residues)
- Cellulose: Chain OJ (40 residues)
- SODIUM ION: Chain KN (Not available residues)
- Cellulose: Chain WK (40 residues)
- water: Chain OX (69 residues)
- Cellulose: Chain KH (40 residues)
- SODIUM ION: Chain NQ (Not available residues)
- SODIUM ION: Chain RQ (Not available residues)
- SODIUM ION: Chain ZS (Not available residues)
- Lignin: Chain JA (20 residues)
- Cellulose: Chain RK (40 residues)
- water: Chain OAA (6 residues)
- Lignin: Chain EB (20 residues)
- SODIUM ION: Chain IV (Not available residues)
- water: Chain KAA (15 residues)
- Xylan-m4: Chain HF (45 residues)
- Lignin: Chain WB (20 residues)
- Lignin: Chain OB (20 residues)
- Cellulose: Chain VJ (40 residues)
- Cellulose: Chain MK (40 residues)
- water: Chain ZW (45 residues)
- SODIUM ION: Chain NV (Not available residues)
- Cellulose: Chain CG (40 residues)
- Cellulose: Chain GI (40 residues)
- SODIUM ION: Chain JN (Not available residues)
- SODIUM ION: Chain ES (Not available residues)
- Cellulose: Chain JH (40 residues)
- SODIUM ION: Chain LQ (Not available residues)
- water: Chain JY (11 residues)
- Cellulose: Chain IJ (40 residues)
- Lignin: Chain A (20 residues)
- SODIUM ION: Chain FN (Not available residues)
- SODIUM ION: Chain OO (Not available residues)
- SODIUM ION: Chain QR (Not available residues)
- Lignin: Chain NB (20 residues)
- Cellulose: Chain BI (40 residues)
- SODIUM ION: Chain BR (Not available residues)
- Lignin: Chain SA (20 residues)
- water: Chain TX (29 residues)
- SODIUM ION: Chain CN (Not available residues)
- water: Chain CY (2 residues)
- SODIUM ION: Chain XU (Not available residues)
- SODIUM ION: Chain AS (Not available residues)
- water: Chain ZX (22 residues)
- water: Chain XY (10 residues)
- SODIUM ION: Chain HP (Not available residues)
- Xylan-m2: Chain MD (45 residues)
- Cellulose: Chain CK (40 residues)
- Lignin: Chain FA (20 residues)
- water: Chain ZY (10 residues)
- SODIUM ION: Chain EO (Not available residues)
- Cellulose: Chain KI (40 residues)
- SODIUM ION: Chain XP (Not available residues)
- Lignin: Chain BA (20 residues)
- Lignin: Chain ZC (20 residues)
- SODIUM ION: Chain IR (Not available residues)
- water: Chain OZ (13 residues)
- SODIUM ION: Chain VT (Not available residues)
- SODIUM ION: Chain KO (Not available residues)
- SODIUM ION: Chain AP (Not available residues)

- SODIUM ION: Chain CP (Not available residues)
- SODIUM ION: Chain YP (Not available residues)
- Cellulose: Chain QH (40 residues)
- Cellulose: Chain ZG (40 residues)
- Cellulose: Chain JI (40 residues)
- Xylan-m4: Chain TD (45 residues)
- water: Chain YY (1 residues)
- water: Chain IY (23 residues)
- water: Chain AY (72 residues)
- water: Chain BZ (1 residues)
- Lignin: Chain R (20 residues)
- SODIUM ION: Chain ZO (Not available residues)
- SODIUM ION: Chain OL (Not available residues)
- Xylan-m2: Chain ND (45 residues)
- Cellulose: Chain WG (40 residues)
- Cellulose: Chain VH (40 residues)
- Cellulose: Chain AJ (40 residues)
- Cellulose: Chain XH (40 residues)
- Cellulose: Chain RI (40 residues)
- Lignin: Chain CD (20 residues)
- SODIUM ION: Chain LS (Not available residues)
- Lignin: Chain K (20 residues)
- SODIUM ION: Chain LM (Not available residues)
- Xylan-m8: Chain AF (45 residues)
- Cellulose: Chain BG (40 residues)
- Xylan-m2: Chain PD (45 residues)
- Cellulose: Chain UJ (40 residues)
- Cellulose: Chain BK (40 residues)
- Lignin: Chain KA (20 residues)
- SODIUM ION: Chain JU (Not available residues)
- water: Chain GZ (251 residues)
- SODIUM ION: Chain FP (Not available residues)
- Lignin: Chain N (20 residues)
- Cellulose: Chain LH (40 residues)
- SODIUM ION: Chain GP (Not available residues)
- SODIUM ION: Chain OW (Not available residues)
- Xylan-m2: Chain DF (45 residues)
- Cellulose: Chain TF (40 residues)
- SODIUM ION: Chain DO (Not available residues)
- Xylan-m2: Chain KE (45 residues)
- SODIUM ION: Chain MV (Not available residues)
- Cellulose: Chain DI (40 residues)
- Lignin: Chain XB (20 residues)
- Xylan-m4: Chain RD (45 residues)
- SODIUM ION: Chain NO (Not available residues)
- Lignin: Chain JB (20 residues)
- SODIUM ION: Chain CQ (Not available residues)
- SODIUM ION: Chain ZR (Not available residues)
- SODIUM ION: Chain MN (Not available residues)
- SODIUM ION: Chain OU (Not available residues)
- Cellulose: Chain LJ (40 residues)
- Cellulose: Chain TJ (40 residues)
- SODIUM ION: Chain RN (Not available residues)
- SODIUM ION: Chain FM (Not available residues)
- SODIUM ION: Chain KT (Not available residues)
- Cellulose: Chain YJ (40 residues)
- water: Chain YX (61 residues)
- Lignin: Chain HA (20 residues)
- Lignin: Chain C (20 residues)
- Xylan-m4: Chain GF (45 residues)
- Xylan-m2: Chain OD (45 residues)
- SODIUM ION: Chain WU (Not available residues)
- SODIUM ION: Chain CV (Not available residues)
- Lignin: Chain YA (20 residues)

- Cellulose: Chain HH (40 residues)
- Cellulose: Chain CJ (40 residues)
- Cellulose: Chain FI (40 residues)
- SODIUM ION: Chain HT (Not available residues)
- SODIUM ION: Chain QM (Not available residues)
- SODIUM ION: Chain NN (Not available residues)
- Cellulose: Chain LK (40 residues)
- SODIUM ION: Chain FO (Not available residues)
- Xylan-m8: Chain QF (45 residues)
- SODIUM ION: Chain NS (Not available residues)
- Lignin: Chain XA (20 residues)
- SODIUM ION: Chain LT (Not available residues)
- water: Chain KY (148 residues)
- SODIUM ION: Chain XM (Not available residues)
- SODIUM ION: Chain QU (Not available residues)
- Lignin: Chain ZA (20 residues)
- SODIUM ION: Chain MQ (Not available residues)
- SODIUM ION: Chain QS (Not available residues)
- SODIUM ION: Chain EN (Not available residues)
- Xylan-m6: Chain UE (45 residues)
- SODIUM ION: Chain QV (Not available residues)
- SODIUM ION: Chain WS (Not available residues)
- water: Chain RX (134 residues)
- SODIUM ION: Chain RP (Not available residues)
- Cellulose: Chain EK (40 residues)
- Cellulose: Chain RH (40 residues)
- Cellulose: Chain IG (40 residues)
- SODIUM ION: Chain QW (Not available residues)
- Cellulose: Chain QK (40 residues)
- Lignin: Chain BC (20 residues)
- water: Chain MZ (3 residues)
- Xylan-m4: Chain ME (45 residues)
- Cellulose: Chain GJ (40 residues)
- SODIUM ION: Chain SO (Not available residues)
- Cellulose: Chain YK (40 residues)
- SODIUM ION: Chain UN (Not available residues)
- SODIUM ION: Chain EW (Not available residues)
- SODIUM ION: Chain KS (Not available residues)
- Cellulose: Chain QI (40 residues)
- SODIUM ION: Chain GR (Not available residues)
- water: Chain EAA (13 residues)
- SODIUM ION: Chain XN (Not available residues)
- Cellulose: Chain EH (40 residues)
- Xylan-m8: Chain EE (45 residues)
- Cellulose: Chain QJ (40 residues)
- Lignin: Chain FB (20 residues)
- Cellulose: Chain FL (40 residues)
- SODIUM ION: Chain AQ (Not available residues)
- SODIUM ION: Chain PS (Not available residues)
- water: Chain JX (54 residues)
- water: Chain YW (2 residues)
- SODIUM ION: Chain IW (Not available residues)
- Xylan-m2: Chain BF (45 residues)
- SODIUM ION: Chain EV (Not available residues)
- Lignin: Chain WA (20 residues)
- Lignin: Chain MA (20 residues)
- SODIUM ION: Chain KP (Not available residues)
- water: Chain UX (21 residues)
- Cellulose: Chain KK (40 residues)
- water: Chain QX (4 residues)
- Cellulose: Chain XF (40 residues)
- water: Chain MX (3 residues)
- SODIUM ION: Chain GT (Not available residues)
- Cellulose: Chain GH (40 residues)

- water: Chain XW (2 residues)
- Lignin: Chain TB (20 residues)
- SODIUM ION: Chain MT (Not available residues)
- water: Chain UAA (15 residues)
- water: Chain XX (1 residues)
- water: Chain TY (31 residues)
- SODIUM ION: Chain FT (Not available residues)
- Cellulose: Chain AI (40 residues)
- Cellulose: Chain IK (40 residues)
- Lignin: Chain RB (20 residues)
- Cellulose: Chain HK (40 residues)
- Lignin: Chain U (20 residues)
- Xylan-m8: Chain VE (45 residues)
- Xylan-m2: Chain JE (45 residues)
- Cellulose: Chain NG (40 residues)
- Cellulose: Chain EI (40 residues)
- SODIUM ION: Chain JR (Not available residues)
- Lignin: Chain AC (20 residues)
- SODIUM ION: Chain MP (Not available residues)
- SODIUM ION: Chain ST (Not available residues)
- water: Chain GY (22 residues)
- SODIUM ION: Chain GM (Not available residues)
- Cellulose: Chain BJ (40 residues)
- Lignin: Chain IB (20 residues)
- Cellulose: Chain HG (40 residues)
- SODIUM ION: Chain US (Not available residues)
- Lignin: Chain OA (20 residues)
- SODIUM ION: Chain OS (Not available residues)
- Cellulose: Chain RG (40 residues)
- SODIUM ION: Chain XV (Not available residues)
- Lignin: Chain SC (20 residues)
- Lignin: Chain ED (20 residues)
- water: Chain WY (41 residues)
- SODIUM ION: Chain IQ (Not available residues)
- Lignin: Chain PC (20 residues)
- SODIUM ION: Chain DS (Not available residues)
- SODIUM ION: Chain ZT (Not available residues)
- water: Chain DX (4 residues)
- Cellulose: Chain GG (40 residues)
- Cellulose: Chain TI (40 residues)
- Cellulose: Chain AK (40 residues)
- SODIUM ION: Chain XT (Not available residues)
- Xylan-m2: Chain FF (45 residues)
- SODIUM ION: Chain VO (Not available residues)
- water: Chain FX (41 residues)
- Xylan-m2: Chain LD (45 residues)
- Lignin: Chain MC (20 residues)
- SODIUM ION: Chain QL (Not available residues)
- SODIUM ION: Chain YS (Not available residues)
- SODIUM ION: Chain PP (Not available residues)
- water: Chain EY (36 residues)
- Xylan-m8: Chain FE (45 residues)
- SODIUM ION: Chain JT (Not available residues)
- SODIUM ION: Chain MM (Not available residues)
- SODIUM ION: Chain FV (Not available residues)
- Lignin: Chain G (20 residues)
- Lignin: Chain UA (20 residues)
- Cellulose: Chain YF (40 residues)
- Cellulose: Chain VK (40 residues)
- SODIUM ION: Chain FW (Not available residues)
- Cellulose: Chain SJ (40 residues)
- Lignin: Chain IC (20 residues)
- SODIUM ION: Chain PW (Not available residues)
- Lignin: Chain D (20 residues)

[Entry composition](#)

- Lignin: Chain DD (20 residues)
- Xylan-m6: Chain RE (45 residues)
- Cellulose: Chain NH (40 residues)
- water: Chain QAA (5 residues)
- Cellulose: Chain PH (40 residues)
- Cellulose: Chain NJ (40 residues)
- SODIUM ION: Chain RV (Not available residues)
- Lignin: Chain V (20 residues)
- SODIUM ION: Chain PO (Not available residues)
- SODIUM ION: Chain JL (Not available residues)
- Xylan-m8: Chain BE (45 residues)
- SODIUM ION: Chain YT (Not available residues)
- SODIUM ION: Chain DN (Not available residues)
- Lignin: Chain PA (20 residues)
- SODIUM ION: Chain AM (Not available residues)
- Cellulose: Chain KG (40 residues)
- SODIUM ION: Chain FQ (Not available residues)
- Xylan-m2: Chain EF (45 residues)
- SODIUM ION: Chain UQ (Not available residues)
- Lignin: Chain SB (20 residues)
- water: Chain IAA (9 residues)
- SODIUM ION: Chain VV (Not available residues)
- Xylan-m6: Chain SE (45 residues)
- Cellulose: Chain WI (40 residues)
- SODIUM ION: Chain YR (Not available residues)
- Cellulose: Chain TG (40 residues)
- Lignin: Chain VA (20 residues)
- SODIUM ION: Chain QN (Not available residues)
- SODIUM ION: Chain BS (Not available residues)
- SODIUM ION: Chain PV (Not available residues)
- water: Chain GAA (100 residues)
- Xylan-m6: Chain PF (45 residues)
- water: Chain QY (2 residues)
- Lignin: Chain YB (20 residues)
- water: Chain JZ (29 residues)
- Cellulose: Chain JG (40 residues)
- SODIUM ION: Chain YN (Not available residues)
- SODIUM ION: Chain FR (Not available residues)
- Lignin: Chain RC (20 residues)
- SODIUM ION: Chain XR (Not available residues)
- SODIUM ION: Chain OT (Not available residues)
- SODIUM ION: Chain CO (Not available residues)
- SODIUM ION: Chain UO (Not available residues)
- SODIUM ION: Chain OQ (Not available residues)
- SODIUM ION: Chain BN (Not available residues)
- SODIUM ION: Chain HV (Not available residues)
- Cellulose: Chain ZH (40 residues)
- Cellulose: Chain QG (40 residues)
- water: Chain KX (1 residues)
- Xylan-m2: Chain GE (45 residues)
- SODIUM ION: Chain KL (Not available residues)
- Cellulose: Chain VF (40 residues)
- Cellulose: Chain MH (40 residues)
- Xylan-m6: Chain ZD (45 residues)
- water: Chain JAA (2 residues)
- SODIUM ION: Chain JS (Not available residues)
- Lignin: Chain Y (20 residues)
- Lignin: Chain KB (20 residues)
- SODIUM ION: Chain PQ (Not available residues)
- SODIUM ION: Chain BW (Not available residues)
- Xylan-m6: Chain MF (45 residues)
- Xylan-m6: Chain VD (45 residues)
- SODIUM ION: Chain OM (Not available residues)
- Lignin: Chain PB (20 residues)

- Cellulose: Chain FJ (40 residues)
- Lignin: Chain GA (20 residues)
- water: Chain VY (5 residues)
- SODIUM ION: Chain BO (Not available residues)
- Xylan-m4: Chain UD (45 residues)
- Cellulose: Chain TH (40 residues)
- SODIUM ION: Chain WR (Not available residues)
- SODIUM ION: Chain IP (Not available residues)
- SODIUM ION: Chain VR (Not available residues)
- SODIUM ION: Chain SU (Not available residues)
- Lignin: Chain MB (20 residues)
- SODIUM ION: Chain CT (Not available residues)
- Xylan-m2: Chain HE (45 residues)
- water: Chain AX (43 residues)
- Lignin: Chain KD (20 residues)
- SODIUM ION: Chain LP (Not available residues)
- SODIUM ION: Chain YM (Not available residues)
- SODIUM ION: Chain UL (Not available residues)
- Cellulose: Chain LI (40 residues)
- SODIUM ION: Chain BU (Not available residues)
- water: Chain FY (19 residues)
- SODIUM ION: Chain BV (Not available residues)
- SODIUM ION: Chain IL (Not available residues)
- SODIUM ION: Chain RM (Not available residues)
- SODIUM ION: Chain DT (Not available residues)
- SODIUM ION: Chain WT (Not available residues)
- water: Chain FAA (9 residues)
- Cellulose: Chain PG (40 residues)
- water: Chain VW (2 residues)
- Cellulose: Chain OK (40 residues)
- SODIUM ION: Chain HO (Not available residues)
- SODIUM ION: Chain JP (Not available residues)
- Cellulose: Chain RJ (40 residues)
- Cellulose: Chain XK (40 residues)
- SODIUM ION: Chain EU (Not available residues)
- SODIUM ION: Chain DM (Not available residues)
- water: Chain SAA (2 residues)
- SODIUM ION: Chain WP (Not available residues)
- Xylan-m8: Chain AE (45 residues)
- SODIUM ION: Chain JO (Not available residues)
- Xylan-m4: Chain OE (45 residues)
- SODIUM ION: Chain BP (Not available residues)
- water: Chain SX (16 residues)
- SODIUM ION: Chain DW (Not available residues)
- Lignin: Chain HB (20 residues)
- water: Chain VZ (1 residues)
- SODIUM ION: Chain ZL (Not available residues)
- water: Chain UY (5 residues)
- SODIUM ION: Chain AT (Not available residues)
- SODIUM ION: Chain UP (Not available residues)
- SODIUM ION: Chain TN (Not available residues)
- Lignin: Chain WC (20 residues)
- SODIUM ION: Chain SW (Not available residues)
- SODIUM ION: Chain AW (Not available residues)
- SODIUM ION: Chain PN (Not available residues)
- Lignin: Chain CA (20 residues)
- SODIUM ION: Chain CM (Not available residues)
- SODIUM ION: Chain NT (Not available residues)
- Cellulose: Chain ZJ (40 residues)
- SODIUM ION: Chain BQ (Not available residues)
- water: Chain DAA (2 residues)
- SODIUM ION: Chain LU (Not available residues)
- Cellulose: Chain NI (40 residues)
- SODIUM ION: Chain TM (Not available residues)

- Xylan-m6: Chain YD (45 residues)
- Cellulose: Chain XI (40 residues)
- SODIUM ION: Chain HR (Not available residues)
- SODIUM ION: Chain TV (Not available residues)
- water: Chain FZ (1 residues)
- SODIUM ION: Chain GU (Not available residues)
- SODIUM ION: Chain TU (Not available residues)
- SODIUM ION: Chain AU (Not available residues)
- Cellulose: Chain VG (40 residues)
- SODIUM ION: Chain QT (Not available residues)
- SODIUM ION: Chain RL (Not available residues)
- Lignin: Chain HC (20 residues)
- SODIUM ION: Chain RO (Not available residues)
- water: Chain DZ (9 residues)
- SODIUM ION: Chain EQ (Not available residues)
- SODIUM ION: Chain QP (Not available residues)
- Lignin: Chain W (20 residues)
- Cellulose: Chain MG (40 residues)
- water: Chain TZ (7 residues)
- SODIUM ION: Chain SN (Not available residues)
- SODIUM ION: Chain PM (Not available residues)
- Xylan-m6: Chain WD (45 residues)
- Cellulose: Chain BL (40 residues)
- SODIUM ION: Chain KQ (Not available residues)
- SODIUM ION: Chain VS (Not available residues)
- water: Chain KZ (147 residues)
- SODIUM ION: Chain KU (Not available residues)
- water: Chain MAA (5 residues)
- Lignin: Chain EC (20 residues)
- SODIUM ION: Chain TT (Not available residues)
- SODIUM ION: Chain WO (Not available residues)
- Lignin: Chain QB (20 residues)
- Xylan-m8: Chain ZE (45 residues)
- SODIUM ION: Chain MR (Not available residues)
- water: Chain MY (21 residues)
- SODIUM ION: Chain DQ (Not available residues)
- SODIUM ION: Chain RW (Not available residues)
- SODIUM ION: Chain XQ (Not available residues)
- water: Chain IX (5 residues)
- Xylan-m6: Chain XD (45 residues)
- SODIUM ION: Chain BM (Not available residues)
- Lignin: Chain ID (20 residues)
- SODIUM ION: Chain NL (Not available residues)
- SODIUM ION: Chain ZN (Not available residues)
- Xylan-m4: Chain SD (45 residues)
- Cellulose: Chain UH (40 residues)
- SODIUM ION: Chain LO (Not available residues)
- SODIUM ION: Chain LW (Not available residues)
- Cellulose: Chain SK (40 residues)
- Lignin: Chain DB (20 residues)
- SODIUM ION: Chain SR (Not available residues)
- water: Chain RZ (234 residues)
- Lignin: Chain P (20 residues)
- SODIUM ION: Chain XO (Not available residues)
- SODIUM ION: Chain KW (Not available residues)
- Cellulose: Chain WJ (40 residues)
- Xylan-m4: Chain QD (45 residues)
- Lignin: Chain NA (20 residues)
- Cellulose: Chain DJ (40 residues)
- SODIUM ION: Chain DP (Not available residues)
- SODIUM ION: Chain LR (Not available residues)
- SODIUM ION: Chain CR (Not available residues)
- water: Chain HY (2 residues)
- Lignin: Chain BD (20 residues)

- SODIUM ION: Chain BT (Not available residues)
- water: Chain YZ (79 residues)
- SODIUM ION: Chain ET (Not available residues)
- Lignin: Chain DA (20 residues)
- water: Chain IZ (1 residues)
- Xylan-m4: Chain JF (45 residues)
- water: Chain WX (25 residues)
- SODIUM ION: Chain TW (Not available residues)
- Lignin: Chain NC (20 residues)
- Cellulose: Chain AH (40 residues)
- SODIUM ION: Chain ON (Not available residues)
- SODIUM ION: Chain KV (Not available residues)
- Lignin: Chain CC (20 residues)
- SODIUM ION: Chain JV (Not available residues)
- Xylan-m6: Chain TE (45 residues)
- SODIUM ION: Chain WQ (Not available residues)
- SODIUM ION: Chain ZP (Not available residues)
- SODIUM ION: Chain GS (Not available residues)
- SODIUM ION: Chain VQ (Not available residues)
- Lignin: Chain T (20 residues)
- Cellulose: Chain ZF (40 residues)
- SODIUM ION: Chain LV (Not available residues)
- Lignin: Chain JD (20 residues)
- SODIUM ION: Chain FS (Not available residues)
- SODIUM ION: Chain UT (Not available residues)
- SODIUM ION: Chain HW (Not available residues)
- Lignin: Chain QA (20 residues)
- Lignin: Chain Q (20 residues)
- Lignin: Chain BB (20 residues)
- Lignin: Chain L (20 residues)
- SODIUM ION: Chain LN (Not available residues)
- Cellulose: Chain SI (40 residues)
- Cellulose: Chain NK (40 residues)
- water: Chain QZ (12 residues)
- Lignin: Chain YC (20 residues)
- SODIUM ION: Chain EP (Not available residues)
- SODIUM ION: Chain JQ (Not available residues)
- Xylan-m6: Chain OF (45 residues)
- SODIUM ION: Chain RU (Not available residues)
- water: Chain TAA (2 residues)
- SODIUM ION: Chain IM (Not available residues)
- SODIUM ION: Chain PL (Not available residues)
- SODIUM ION: Chain MS (Not available residues)
- water: Chain BAA (40 residues)
- Cellulose: Chain ZK (40 residues)
- SODIUM ION: Chain MW (Not available residues)
- Cellulose: Chain IH (40 residues)
- SODIUM ION: Chain IN (Not available residues)
- water: Chain WZ (5 residues)
- water: Chain SZ (13 residues)
- SODIUM ION: Chain UM (Not available residues)
- SODIUM ION: Chain UW (Not available residues)
- Cellulose: Chain UI (40 residues)
- Cellulose: Chain DG (40 residues)
- Lignin: Chain RA (20 residues)
- SODIUM ION: Chain QQ (Not available residues)
- SODIUM ION: Chain RR (Not available residues)
- Cellulose: Chain XG (40 residues)
- SODIUM ION: Chain WN (Not available residues)
- Lignin: Chain AA (20 residues)
- water: Chain SY (47 residues)
- water: Chain HAA (6 residues)
- Cellulose: Chain BH (40 residues)
- Cellulose: Chain PJ (40 residues)

- Cellulose: Chain DL (40 residues)
- water: Chain NZ (13 residues)
- water: Chain WW (4 residues)
- Cellulose: Chain GL (40 residues)
- SODIUM ION: Chain XL (Not available residues)
- SODIUM ION: Chain PT (Not available residues)
- Lignin: Chain TA (20 residues)
- SODIUM ION: Chain KR (Not available residues)
- SODIUM ION: Chain TP (Not available residues)
- water: Chain NAA (1 residues)
- Lignin: Chain AB (20 residues)
- Xylan-m8: Chain DE (45 residues)
- SODIUM ION: Chain WM (Not available residues)
- SODIUM ION: Chain TO (Not available residues)
- water: Chain RY (110 residues)
- SODIUM ION: Chain TR (Not available residues)
- Cellulose: Chain AL (40 residues)
- Lignin: Chain LC (20 residues)
- Cellulose: Chain LG (40 residues)
- SODIUM ION: Chain NM (Not available residues)
- Cellulose: Chain SH (40 residues)
- SODIUM ION: Chain UU (Not available residues)
- Cellulose: Chain JK (40 residues)
- Cellulose: Chain EG (40 residues)
- SODIUM ION: Chain NU (Not available residues)
- Lignin: Chain I (20 residues)
- water: Chain LY (6 residues)
- Lignin: Chain FC (20 residues)
- Lignin: Chain XC (20 residues)
- SODIUM ION: Chain NP (Not available residues)
- Lignin: Chain X (20 residues)
- Cellulose: Chain PI (40 residues)
- SODIUM ION: Chain GO (Not available residues)
- Lignin: Chain H (20 residues)
- water: Chain NX (10 residues)
- SODIUM ION: Chain HN (Not available residues)
- Cellulose: Chain VI (40 residues)
- Cellulose: Chain XJ (40 residues)
- SODIUM ION: Chain DR (Not available residues)
- Lignin: Chain FD (20 residues)
- SODIUM ION: Chain HS (Not available residues)
- water: Chain CX (8 residues)
- Cellulose: Chain WF (40 residues)
- Cellulose: Chain HI (40 residues)
- Xylan-m6: Chain LF (45 residues)
- SODIUM ION: Chain AR (Not available residues)
- SODIUM ION: Chain YQ (Not available residues)
- water: Chain VX (10 residues)
- SODIUM ION: Chain VN (Not available residues)
- Xylan-m4: Chain LE (45 residues)
- SODIUM ION: Chain YV (Not available residues)
- water: Chain NY (20 residues)
- Lignin: Chain DC (20 residues)
- Cellulose: Chain FG (40 residues)
- Lignin: Chain AD (20 residues)
- Cellulose: Chain II (40 residues)
- water: Chain LX (8 residues)
- SODIUM ION: Chain SM (Not available residues)
- water: Chain HZ (4 residues)
- Lignin: Chain Z (20 residues)
- water: Chain OY (2 residues)
- SODIUM ION: Chain SV (Not available residues)
- Lignin: Chain HD (20 residues)
- water: Chain RAA (263 residues)

- SODIUM ION: Chain GW (Not available residues)
- SODIUM ION: Chain GN (Not available residues)
- Lignin: Chain KC (20 residues)
- Cellulose: Chain YH (40 residues)
- water: Chain ZZ (8 residues)
- SODIUM ION: Chain MU (Not available residues)
- water: Chain PX (105 residues)
- Lignin: Chain EA (20 residues)
- SODIUM ION: Chain VP (Not available residues)
- SODIUM ION: Chain CS (Not available residues)
- Cellulose: Chain MI (40 residues)
- Lignin: Chain GC (20 residues)
- Cellulose: Chain OG (40 residues)
- water: Chain XZ (55 residues)
- Cellulose: Chain PK (40 residues)
- Lignin: Chain LA (20 residues)
- Lignin: Chain GB (20 residues)
- SODIUM ION: Chain NR (Not available residues)
- Cellulose: Chain CH (40 residues)
- Cellulose: Chain UK (40 residues)
- SODIUM ION: Chain JW (Not available residues)
- Xylan-m8: Chain SF (45 residues)
- SODIUM ION: Chain UR (Not available residues)
- Xylan-m8: Chain CE (45 residues)
- Lignin: Chain S (20 residues)
- Cellulose: Chain KJ (40 residues)
- SODIUM ION: Chain DU (Not available residues)
- SODIUM ION: Chain PR (Not available residues)
- SODIUM ION: Chain ZU (Not available residues)
- Lignin: Chain GD (20 residues)
- SODIUM ION: Chain ER (Not available residues)
- SODIUM ION: Chain CW (Not available residues)
- SODIUM ION: Chain ZV (Not available residues)
- water: Chain LAA (50 residues)
- Lignin: Chain IA (20 residues)
- SODIUM ION: Chain KM (Not available residues)
- SODIUM ION: Chain AO (Not available residues)
- Xylan-m6: Chain NF (45 residues)
- Cellulose: Chain FH (40 residues)
- SODIUM ION: Chain CU (Not available residues)
- Cellulose: Chain MJ (40 residues)
- Cellulose: Chain WH (40 residues)
- SODIUM ION: Chain YO (Not available residues)
- SODIUM ION: Chain YL (Not available residues)
- SODIUM ION: Chain OP (Not available residues)
- SODIUM ION: Chain LL (Not available residues)
- SODIUM ION: Chain WL (Not available residues)
- SODIUM ION: Chain MO (Not available residues)
- Xylan-m8: Chain RF (45 residues)
- water: Chain PAA (14 residues)
- Xylan-m6: Chain QE (45 residues)
- Xylan-m8: Chain XE (45 residues)
- SODIUM ION: Chain NW (Not available residues)
- SODIUM ION: Chain HU (Not available residues)
- SODIUM ION: Chain DV (Not available residues)
- water: Chain CAA (68 residues)
- water: Chain BY (97 residues)
- water: Chain BX (17 residues)
- Cellulose: Chain YI (40 residues)
- Lignin: Chain E (20 residues)
- Cellulose: Chain CI (40 residues)
- water: Chain DY (241 residues)
- water: Chain UZ (1 residues)
- SODIUM ION: Chain AV (Not available residues)

	<ul style="list-style-type: none"> - SODIUM ION: Chain SP (Not available residues) - SODIUM ION: Chain JM (Not available residues) - Lignin: Chain UC (20 residues) - SODIUM ION: Chain HM (Not available residues) - SODIUM ION: Chain ZM (Not available residues) - SODIUM ION: Chain OR (Not available residues) - SODIUM ION: Chain AN (Not available residues) - SODIUM ION: Chain RT (Not available residues) - SODIUM ION: Chain ZQ (Not available residues) - SODIUM ION: Chain QO (Not available residues) - SODIUM ION: Chain HL (Not available residues) - water: Chain CZ (10 residues) - Lignin: Chain UB (20 residues) - Lignin: Chain QC (20 residues) - Lignin: Chain JC (20 residues) - Lignin: Chain O (20 residues) - Xylan-m4: Chain KF (45 residues) - Lignin: Chain VC (20 residues) - SODIUM ION: Chain IU (Not available residues) - Xylan-m2: Chain IE (45 residues) - SODIUM ION: Chain IT (Not available residues) - SODIUM ION: Chain SS (Not available residues) - Cellulose: Chain CL (40 residues) - water: Chain GX (10 residues) - Xylan-m2: Chain CF (45 residues) - SODIUM ION: Chain IO (Not available residues) - SODIUM ION: Chain FU (Not available residues)
<i>Datasets used for modeling</i>	<ul style="list-style-type: none"> - NMR data, BMRB: big94 - De Novo model, File: 10.5281/zenodo.10179190
2. Representation	
<i>Resolution</i>	Atomic
<i>Number of rigid bodies, flexible units</i>	0, 723
	<ul style="list-style-type: none"> - A: 1-20 - B: 1-20 - C: 1-20 - D: 1-20 - E: 1-20 - F: 1-20 - G: 1-20 - H: 1-20 - I: 1-20 - J: 1-20 - K: 1-20 - L: 1-20 - M: 1-20 - N: 1-20 - O: 1-20 - P: 1-20 - Q: 1-20 - R: 1-20 - S: 1-20 - T: 1-20 - U: 1-20 - V: 1-20 - W: 1-20 - X: 1-20 - Y: 1-20

- Z: 1-20
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- BA: 1-20
- CA: 1-20
- DA: 1-20
- EA: 1-20
- FA: 1-20
- GA: 1-20
- HA: 1-20
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- JA: 1-20
- KA: 1-20
- LA: 1-20
- MA: 1-20
- NA: 1-20
- OA: 1-20
- PA: 1-20
- QA: 1-20
- RA: 1-20
- SA: 1-20
- TA: 1-20
- UA: 1-20
- VA: 1-20
- WA: 1-20
- XA: 1-20
- YA: 1-20
- ZA: 1-20
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- CB: 1-20
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- CC: 1-20
- DC: 1-20
- EC: 1-20
- FC: 1-20
- GC: 1-20
- HC: 1-20
- IC: 1-20
- JC: 1-20
- KC: 1-20

- LC: 1-20
- MC: 1-20
- NC: 1-20
- OC: 1-20
- PC: 1-20
- QC: 1-20
- RC: 1-20
- SC: 1-20
- TC: 1-20
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- XC: 1-20
- YC: 1-20
- ZC: 1-20
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- DD: 1-20
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- XD: 1-45
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- OH: 1-40
- PH: 1-40
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- RJ: 1-40
- SJ: 1-40
- TJ: 1-40
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- YJ: 1-40
- ZJ: 1-40
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- DK: 1-40
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- NL: None-None
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- PL: None-None
- QL: None-None
- RL: None-None
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- UL: None-None
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- WL: None-None
- XL: None-None
- YL: None-None
- ZL: None-None
- AM: None-None
- BM: None-None
- CM: None-None
- DM: None-None
- EM: None-None
- FM: None-None
- GM: None-None

Flexible units

- HM: None-None
- IM: None-None
- JM: None-None
- KM: None-None
- LM: None-None
- MM: None-None
- NM: None-None
- OM: None-None
- PM: None-None
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- WN: None-None
- XN: None-None
- YN: None-None
- ZN: None-None
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- BO: None-None
- CO: None-None
- DO: None-None
- EO: None-None
- FO: None-None
- GO: None-None
- HO: None-None
- IO: None-None
- JO: None-None
- KO: None-None
- LO: None-None
- MO: None-None
- NO: None-None
- OO: None-None
- PO: None-None
- QO: None-None
- RO: None-None
- SO: None-None

- TO: None-None
- UO: None-None
- VO: None-None
- WO: None-None
- XO: None-None
- YO: None-None
- ZO: None-None
- AP: None-None
- BP: None-None
- CP: None-None
- DP: None-None
- EP: None-None
- FP: None-None
- GP: None-None
- HP: None-None
- IP: None-None
- JP: None-None
- KP: None-None
- LP: None-None
- MP: None-None
- NP: None-None
- OP: None-None
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- QP: None-None
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- SP: None-None
- TP: None-None
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- WP: None-None
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- WV: None-None
- XV: None-None
- YV: None-None
- ZV: None-None
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- BW: None-None
- CW: None-None

- DW: None-None
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- GW: None-None
- HW: None-None
- IW: None-None
- JW: None-None
- KW: None-None
- LW: None-None
- MW: None-None
- NW: None-None
- OW: None-None
- PW: None-None
- QW: None-None
- RW: None-None
- SW: None-None
- TW: None-None
- UW: None-None
- VW: 1-2
- WW: 1-4
- XW: 1-2
- YW: 1-2
- ZW: 1-45
- AX: 1-43
- BX: 1-17
- CX: 1-8
- DX: 1-4
- EX: 1-11
- FX: 1-41
- GX: 1-10
- HX: 1-47
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- KX: 1-1
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- MX: 1-3
- NX: 1-10
- OX: 1-69
- PX: 1-105
- QX: 1-4
- RX: 1-134
- SX: 1-16
- TX: 1-29
- UX: 1-21
- VX: 1-10
- WX: 1-25
- XX: 1-1
- YX: 1-61
- ZX: 1-22
- AY: 1-72
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- CY: 1-2
- DY: 1-241
- EY: 1-36
- FY: 1-19
- GY: 1-22
- HY: 1-2
- IY: 1-23
- JY: 1-11
- KY: 1-148
- LY: 1-6
- MY: 1-21
- NY: 1-20
- OY: 1-2

- PY: 1-7
- QY: 1-2
- RY: 1-110
- SY: 1-47
- TY: 1-31
- UY: 1-5
- VY: 1-5
- WY: 1-41
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- YY: 1-1
- ZY: 1-10
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- BZ: 1-1
- CZ: 1-10
- DZ: 1-9
- EZ: 1-20
- FZ: 1-1
- GZ: 1-251
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- JZ: 1-29
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- OZ: 1-13
- PZ: 1-3
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- YZ: 1-79
- ZZ: 1-8
- AAA: 1-2
- BAA: 1-40
- CAA: 1-68
- DAA: 1-2
- EAA: 1-13
- FAA: 1-9
- GAA: 1-100
- HAA: 1-6
- IAA: 1-9
- JAA: 1-2
- KAA: 1-15
- LAA: 1-50
- MAA: 1-5
- NAA: 1-1
- OAA: 1-6
- PAA: 1-14
- QAA: 1-5
- RAA: 1-263
- SAA: 1-2
- TAA: 1-2
- UAA: 1-15

Structural coverage (rigid bodies)

100%

3. Restraints

Physical principles	Information about physical principles was not provided
Experimental data	
4. Validation	
Number of ensembles	0
Number of models in ensembles	Not applicable
Number of deposited models	1
Model precision (uncertainty of models)	Model precision can not be calculated with one structure
Data quality	Data quality has not been assessed
Model quality: assessment of atomic segments	Model-1: Clashescore = 0.0, Number of Ramachandran outliers = 0, Number of sidechain outliers = 0
Model quality: assessment of excluded volume	Not applicable
Fit to data used for modeling	Fit of model to information used to compute it has not been determined
Fit to data used for validation	Fit of model to information not used to compute it has not been determined
5. Methodology and Software	
1. Method	Initial Polymer Placement
Name	Molecular Placement of Cellulose, Xylan and Lignin
2. Method	Equilibration with Molecular Dynamics
Name	A series of compression simulations to assemble the matrix polymers (xylan and lignin) onto the xylan coated cellulose microfibril. This is followed by the placement of water molecules and ions for charge neutrality. Experimentally observed density values are used as a validation metric at this stage. For further details see cited manuscript DOI:10.1126/sciadv.adi7965
3. Method	Production Simulations in the NVT ensemble

<i>Name</i>	This step involves running molecular dynamics for 100ns (50,000,000 steps with a 2fs timestep) to explore the dynamics of biopolymeric components. Periodic boundary conditions are considered for the simulations. For further details see cited manuscript DOI:10.1126/sciadv.adi7965 . CHARMM compatible files for this system are available for download, visualization and analsis at https://doi.org/10.5281/zenodo.10179190
4. <i>Method</i>	Proximity Calculations for Reproduction of ssNMR Observables
<i>Name</i>	This step involves calculating the fraction of 'sink' atom type within 1nm of a 'source' atom type. The source and sink atoms are chosen based on ssNMR experiments. There are two types of sources Xylan-sourced (methyl carbon on the acetate group attached to xylose) or Lignin-Sourced (Ring atoms C3 and C5 on the Syringyl residues and atoms C4 and C3 on the Guaicol residues of lignin). The sink atoms for Xylan-sources include Cellulose atoms (C4 atom on Glucose) and Lignin atoms (Ring atoms C3 and C5 on the Syringyl residues and atoms C4 and C3 on the Guaicol residues). The sink atoms for Lignin-sources include Cellulose atoms (C4 atom on Glucose) and Xylan atoms (methyl carbon (CA2) on the acetate group attached to xylose). For a chosen source atom in the system, a count of sink atoms within 1nm of that source atom is calculated. This is repeated for each and every source atom and the total count is used to calculate the fraction of sink atoms within 1nm of the source atom. This metric also measured by ssNMR, is used to validate the spatial arrangement of polymers in the atomistic model. For further details see cited manuscript DOI:10.1126/sciadv.adi7965
<i>Software</i>	CHARMM (version C44a)