



Supporting Information

for

Comparative study on 3D morphologies of delignified, single tracheids and fibers of five wood species

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Additional experimental data

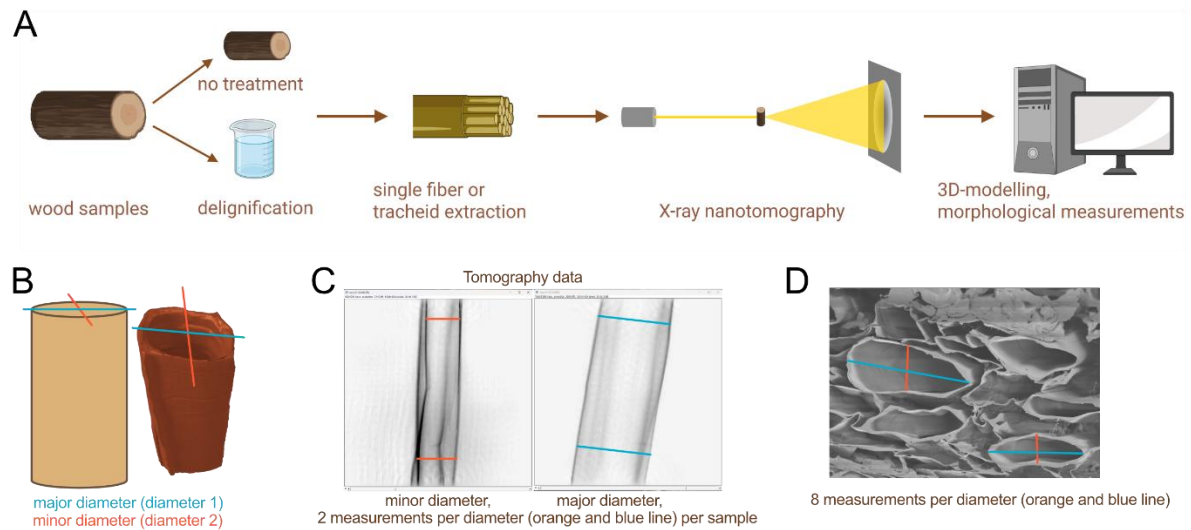


Figure S1: Experimental setup and diameter measuring method. (A) Experimental setup, from wood sample to either no treatment or delignification. Then single fiber/tracheid extraction and X-ray nanotomography. As the last step 3D-modelling and morphological measurements on the tomography data and SEM images. Figure 1(A) was created in BioRender. Gorges, H. (2026) <https://BioRender.com/qgpxmnp>. This content is not subject to CC BY 4.0. (B) Direction of the two measured diameters with major diameter (diameter 1) in blue and minor diameter (diameter 2) in orange. (C) Diameter measurement of the tomography data. We measured 2 minor (orange) and 2 major (blue) diameters of each sample, resulting in: spruce major $n = 8$, minor $n = 8$; beech major $n = 4$, minor $n = 4$; balsa hexagonal major $n = 4$, minor $n = 4$; balsa rectangular major $n = 4$, minor $n = 4$; Douglas fir major $n = 4$, minor $n = 4$; poplar major $n = 8$, minor $n = 8$. (D) Diameter measurement of SEM images, with major diameter in blue and minor diameter in orange. We measured 8 major diameters per species ($n = 8$) and 8 minor diameters per species ($n = 8$).

Links for each 3D model:

Spruce 1: single tracheid

<https://sketchfab.com/3d-models/spruce-1-single-tracheid-31a6667bfed049e583f55e4407602d26>

Spruce 2: double tracheid

<https://sketchfab.com/3d-models/spruce-2-double-tracheid-e008a473c15a4305952ec82da82a9975>

Beech 1: single fiber

<https://sketchfab.com/3d-models/beech-1-single-fiber-24ae48dea5fd4d67bdade548ab6a5934>

Beech 2: single fiber

<https://sketchfab.com/3d-models/beech-2-single-fiber-994b14802e2c4ef5b7124e4d322f44cd>

Balsa hexagonal: single fiber

<https://sketchfab.com/3d-models/balsa-hexagonal-single-fiber-1eb70a22aab742ef961c55924d628202>

Balsa rectangular: single fiber

<https://sketchfab.com/3d-models/balsa-rectangular-single-siber-3bcfddb059fe4c6e9fbe7a18a3d95d37>

Douglas fir 1: single tracheid

<https://sketchfab.com/3d-models/douglas-fir-1-single-tracheid-6b7c7ddef0bd45b7b88daee08700f9bf>

Douglas fir 2: single tracheid

<https://sketchfab.com/3d-models/douglas-fir-2-single-tracheid-58d57fb0310246008ee4e6a4e7d59930>

Poplar 1: single fiber

<https://sketchfab.com/3d-models/poplar-1-single-fiber-e09cede049b0464f8f00174c13bbcc48>

Poplar 2: single fiber

<https://sketchfab.com/3d-models/poplar-2-single-fiber-3ccccc042b045bb83e1c84ef0fde816>

Table S1: Statistical significances of tracheid diameters. Kruskal-Wallis ANOVA ($p = 2.20\text{E-}16$) with Dunn's post-hoc test and a Holm's correction.

Group 1	Group 2	Z	P.unadj	P.adj
Balsa hexagonal delignified	Balsa hexagonal untreated	-1.37303	1.70E-01	1.00E+00
	Balsa rectangular diameter 1 delignified	-0.63187	5.27E-01	1.00E+00
	Balsa rectangular diameter 1 untreated	-1.63751	1.02E-01	1.00E+00
	Balsa rectangular diameter 2 delignified	1.411762	1.58E-01	1.00E+00
	Balsa rectangular diameter 2 untreated	0.946946	3.44E-01	1.00E+00
	Beech diameter 1 delignified	1.742818	8.14E-02	1.00E+00
	Beech diameter 1 untreated	3.093082	1.98E-03	3.15E-01
	Beech diameter 2 delignified	3.550892	3.84E-04	6.64E-02
	Beech diameter 2 untreated	4.503163	6.69E-06	1.34E-03
	Douglas fir diameter 1 delignified	-2.66277	7.75E-03	1.00E+00
	Douglas fir diameter 1 untreated	-2.38597	1.70E-02	1.00E+00
	Douglas fir diameter 2 delignified	3.137072	1.71E-03	2.73E-01
	Douglas fir diameter 2 untreated	3.659595	2.53E-04	4.42E-02
	Poplar diameter 1 delignified	2.238688	2.52E-02	1.00E+00
	Poplar diameter 1 untreated	0.90973	3.63E-01	1.00E+00
	Poplar diameter 2 delignified	4.859208	1.18E-06	2.46E-04
	Poplar diameter 2 untreated	3.920109	8.85E-05	1.63E-02
	Spruce diameter 1 delignified	-0.12292	9.02E-01	1.00E+00
	Spruce diameter 1 untreated	-1.58376	1.13E-01	1.00E+00
	Spruce diameter 2 delignified	4.534912	5.76E-06	1.16E-03
	Spruce diameter 2 untreated	0.430054	6.67E-01	1.00E+00

Balsa hexagonal untreated	Balsa rectangular diameter 1 delignified	0.575421	5.65E-01	1.00E+00
	Balsa rectangular diameter 1 untreated	-0.52047	6.03E-01	1.00E+00
	Balsa rectangular diameter 2 delignified	2.467457	1.36E-02	1.00E+00
	Balsa rectangular diameter 2 untreated	1.916183	5.53E-02	1.00E+00
	Beech diameter 1 delignified	2.773956	5.54E-03	8.14E-01
	Beech diameter 1 untreated	3.939579	8.16E-05	1.51E-02
	Beech diameter 2 delignified	4.447907	8.67E-06	1.70E-03
	Beech diameter 2 untreated	5.269017	1.37E-07	3.02E-05
	Douglas fir diameter 1 delignified	-1.30483	1.92E-01	1.00E+00
	Douglas fir diameter 1 untreated	-1.22612	2.20E-01	1.00E+00
	Douglas fir diameter 2 delignified	4.064784	4.81E-05	8.99E-03
	Douglas fir diameter 2 untreated	4.473694	7.69E-06	1.52E-03
	Poplar diameter 1 delignified	3.29703	9.77E-04	1.63E-01
	Poplar diameter 1 untreated	1.881096	6.00E-02	1.00E+00
	Poplar diameter 2 delignified	5.689226	1.28E-08	2.90E-06
	Poplar diameter 2 untreated	4.719308	2.37E-06	4.90E-04
	Spruce diameter 1 delignified	1.141188	2.54E-01	1.00E+00
	Spruce diameter 1 untreated	-0.46979	6.39E-01	1.00E+00
	Spruce diameter 2 delignified	5.393186	6.92E-08	1.54E-05
	Spruce diameter 2 untreated	1.428853	1.53E-01	1.00E+00
Balsa rectangular diameter 1 delignified	Balsa rectangular diameter 1 untreated	-0.97519	3.29E-01	1.00E+00
	Balsa rectangular diameter 2 delignified	1.769838	7.68E-02	1.00E+00

	Balsa rectangular diameter 2 untreated	1.33642	1.81E-01	1.00E+00
Balsa rectangular diameter 1 delignified	Beech diameter 1 delignified	2.056541	3.97E-02	1.00E+00
	Beech diameter 1 untreated	3.255982	1.13E-03	1.86E-01
	Beech diameter 2 delignified	3.622379	2.92E-04	5.08E-02
	Beech diameter 2 untreated	4.517197	6.27E-06	1.26E-03
	Douglas fir diameter 1 delignified	-1.75881	7.86E-02	1.00E+00
	Douglas fir diameter 1 untreated	-1.64463	1.00E-01	1.00E+00
	Douglas fir diameter 2 delignified	3.264001	1.10E-03	1.82E-01
	Douglas fir diameter 2 untreated	3.762687	1.68E-04	2.96E-02
	Poplar diameter 1 delignified	2.477035	1.32E-02	1.00E+00
	Poplar diameter 1 untreated	1.303132	1.93E-01	1.00E+00
	Poplar diameter 2 delignified	4.691779	2.71E-06	5.58E-04
	Poplar diameter 2 untreated	3.995697	6.45E-05	1.20E-02
	Spruce diameter 1 delignified	0.481114	6.30E-01	1.00E+00
	Spruce diameter 1 untreated	-0.92711	3.54E-01	1.00E+00
	Spruce diameter 2 delignified	4.417699	9.98E-06	1.95E-03
	Spruce diameter 2 untreated	0.874097	3.82E-01	1.00E+00
Balsa rectangular diameter 1 untreated	Balsa rectangular diameter 2 delignified	2.558183	1.05E-02	1.00E+00
	Balsa rectangular diameter 2 untreated	2.110203	3.48E-02	1.00E+00
	Beech diameter 1 delignified	2.814618	4.88E-03	7.28E-01
	Beech diameter 1 untreated	3.862515	1.12E-04	2.03E-02
	Beech diameter 2 delignified	4.215146	2.50E-05	4.72E-03
	Beech diameter 2 untreated	5.013842	5.34E-07	1.15E-04

	Douglas fir diameter 1 delignified	-0.59794	5.50E-01	1.00E+00
Balsa rectangular diameter 1 untreated	Douglas fir diameter 1 untreated	-0.61111	5.41E-01	1.00E+00
	Douglas fir diameter 2 delignified	3.894603	9.84E-05	1.79E-02
	Douglas fir diameter 2 untreated	4.325072	1.52E-05	2.93E-03
	Poplar diameter 1 delignified	3.212482	1.32E-03	2.13E-01
	Poplar diameter 1 untreated	2.079816	3.75E-02	1.00E+00
	Poplar diameter 2 delignified	5.165703	2.40E-07	5.25E-05
	Poplar diameter 2 untreated	4.53778	5.68E-06	1.15E-03
	Spruce diameter 1 delignified	1.452245	1.46E-01	1.00E+00
	Spruce diameter 1 untreated	0.043892	9.65E-01	1.00E+00
	Spruce diameter 2 delignified	4.923987	8.48E-07	1.80E-04
	Spruce diameter 2 untreated	1.688162	9.14E-02	1.00E+00
Balsa rectangular diameter 2 delignified	Balsa rectangular diameter 2 untreated	-0.24657	8.05E-01	1.00E+00
	Beech diameter 1 delignified	0.286703	7.74E-01	1.00E+00
	Beech diameter 1 untreated	1.67299	9.43E-02	1.00E+00
	Beech diameter 2 delignified	1.852541	6.39E-02	1.00E+00
	Beech diameter 2 untreated	2.934205	3.34E-03	5.18E-01
	Douglas fir diameter 1 delignified	-3.52865	4.18E-04	7.14E-02
	Douglas fir diameter 1 untreated	-3.22763	1.25E-03	2.05E-01
	Douglas fir diameter 2 delignified	1.494162	1.35E-01	1.00E+00
	Douglas fir diameter 2 untreated	2.179695	2.93E-02	1.00E+00
	Poplar diameter 1 delignified	0.584999	5.59E-01	1.00E+00
	Poplar diameter 1 untreated	-0.27986	7.80E-01	1.00E+00

	Poplar diameter 2 delignified	2.799743	5.11E-03	7.57E-01
Balsa rectangular diameter 2 delignified	Poplar diameter 2 untreated	2.412706	1.58E-02	1.00E+00
	Spruce diameter 1 delignified	-1.41092	1.58E-01	1.00E+00
	Spruce diameter 1 untreated	-2.5101	1.21E-02	1.00E+00
	Spruce diameter 2 delignified	2.525663	1.15E-02	1.00E+00
	Spruce diameter 2 untreated	-0.70889	4.78E-01	1.00E+00
Balsa rectangular diameter 2 untreated	Beech diameter 1 delignified	0.503007	6.15E-01	1.00E+00
	Beech diameter 1 untreated	1.752312	7.97E-02	1.00E+00
	Beech diameter 2 delignified	1.903535	5.70E-02	1.00E+00
	Beech diameter 2 untreated	2.903639	3.69E-03	5.61E-01
	Douglas fir diameter 1 delignified	-2.90955	3.62E-03	5.54E-01
	Douglas fir diameter 1 untreated	-2.72132	6.50E-03	9.30E-01
	Douglas fir diameter 2 delignified	1.582991	1.13E-01	1.00E+00
	Douglas fir diameter 2 untreated	2.214869	2.68E-02	1.00E+00
	Poplar diameter 1 delignified	0.77583	4.38E-01	1.00E+00
	Poplar diameter 1 untreated	-0.03039	9.76E-01	1.00E+00
	Poplar diameter 2 delignified	2.729051	6.35E-03	9.15E-01
	Poplar diameter 2 untreated	2.427577	1.52E-02	1.00E+00
	Spruce diameter 1 delignified	-0.98441	3.25E-01	1.00E+00
	Spruce diameter 1 untreated	-2.06631	3.88E-02	1.00E+00
	Spruce diameter 2 delignified	2.487335	1.29E-02	1.00E+00
	Spruce diameter 2 untreated	-0.42204	6.73E-01	1.00E+00
Beech diameter 1 delignified	Beech diameter 1 untreated	1.416555	1.57E-01	1.00E+00

	Beech diameter 2 delignified	1.565838	1.17E-01	1.00E+00
Beech diameter 1 delignified	Beech diameter 2 untreated	2.677771	7.41E-03	1.00E+00
	Douglas fir diameter 1 delignified	-3.81535	1.36E-04	2.42E-02
	Douglas fir diameter 1 untreated	-3.48406	4.94E-04	8.40E-02
	Douglas fir diameter 2 delignified	1.20746	2.27E-01	1.00E+00
	Douglas fir diameter 2 untreated	1.923261	5.44E-02	1.00E+00
	Poplar diameter 1 delignified	0.278501	7.81E-01	1.00E+00
	Poplar diameter 1 untreated	-0.53629	5.92E-01	1.00E+00
	Poplar diameter 2 delignified	2.493245	1.27E-02	1.00E+00
	Poplar diameter 2 untreated	2.156271	3.11E-02	1.00E+00
	Spruce diameter 1 delignified	-1.71742	8.59E-02	1.00E+00
	Spruce diameter 1 untreated	-2.76654	5.67E-03	8.27E-01
	Spruce diameter 2 delignified	2.219164	2.65E-02	1.00E+00
	Spruce diameter 2 untreated	-0.96533	3.34E-01	1.00E+00
Beech diameter 1 untreated	Beech diameter 2 delignified	-0.01603	9.87E-01	9.87E-01
	Beech diameter 2 untreated	1.151327	2.50E-01	1.00E+00
	Douglas fir diameter 1 delignified	-4.82911	1.37E-06	2.85E-04
	Douglas fir diameter 1 untreated	-4.47363	7.69E-06	1.51E-03
	Douglas fir diameter 2 delignified	-0.33657	7.36E-01	1.00E+00
	Douglas fir diameter 2 untreated	0.462556	6.44E-01	1.00E+00
	Poplar diameter 1 delignified	-1.24757	2.12E-01	1.00E+00
	Poplar diameter 1 untreated	-1.7827	7.46E-02	1.00E+00
	Poplar diameter 2 delignified	0.705654	4.80E-01	1.00E+00

	Poplar diameter 2 untreated	0.675265	5.00E-01	1.00E+00
Beech diameter 1 untreated	Spruce diameter 1 delignified	-3.0078	2.63E-03	4.13E-01
	Spruce diameter 1 untreated	-3.81862	1.34E-04	2.40E-02
	Spruce diameter 2 delignified	0.463939	6.43E-01	1.00E+00
	Spruce diameter 2 untreated	-2.17435	2.97E-02	1.00E+00
Beech diameter 2 delignified	Beech diameter 2 untreated	1.277242	2.02E-01	1.00E+00
	Douglas fir diameter 1 delignified	-5.38119	7.40E-08	1.64E-05
	Douglas fir diameter 1 untreated	-4.88459	1.04E-06	2.19E-04
	Douglas fir diameter 2 delignified	-0.35838	7.20E-01	1.00E+00
	Douglas fir diameter 2 untreated	0.522732	6.01E-01	1.00E+00
	Poplar diameter 1 delignified	-1.39545	1.63E-01	1.00E+00
	Poplar diameter 1 untreated	-1.93682	5.28E-02	1.00E+00
	Poplar diameter 2 delignified	0.819293	4.13E-01	1.00E+00
	Poplar diameter 2 untreated	0.755743	4.50E-01	1.00E+00
	Spruce diameter 1 delignified	-3.39137	6.95E-04	1.18E-01
	Spruce diameter 1 untreated	-4.16706	3.09E-05	5.80E-03
	Spruce diameter 2 delignified	0.545213	5.86E-01	1.00E+00
	Spruce diameter 2 untreated	-2.36586	1.80E-02	1.00E+00
Beech diameter 2 untreated	Douglas fir diameter 1 delignified	-6.09033	1.13E-09	2.58E-07
	Douglas fir diameter 1 untreated	-5.62496	1.86E-08	4.17E-06
	Douglas fir diameter 2 delignified	-1.59779	1.10E-01	1.00E+00
	Douglas fir diameter 2 untreated	-0.68877	4.91E-01	1.00E+00
	Poplar diameter 1 delignified	-2.577	9.97E-03	1.00E+00

	Poplar diameter 1 untreated	-2.93403	3.35E-03	5.15E-01
Beech diameter 2 untreated	Poplar diameter 2 delignified	-0.62378	5.33E-01	1.00E+00
	Poplar diameter 2 untreated	-0.47606	6.34E-01	1.00E+00
	Spruce diameter 1 delignified	-4.33724	1.44E-05	2.78E-03
	Spruce diameter 1 untreated	-4.96995	6.70E-07	1.43E-04
	Spruce diameter 2 delignified	-0.8655	3.87E-01	1.00E+00
	Spruce diameter 2 untreated	-3.32568	8.82E-04	1.48E-01
Douglas fir diameter 1 delignified	Douglas fir diameter 1 untreated	-0.07151	9.43E-01	1.00E+00
	Douglas fir diameter 2 delignified	5.022812	5.09E-07	1.10E-04
	Douglas fir diameter 2 untreated	5.335815	9.51E-08	2.10E-05
	Poplar diameter 1 delignified	4.357284	1.32E-05	2.55E-03
	Poplar diameter 1 untreated	2.876261	4.02E-03	6.08E-01
	Poplar diameter 2 delignified	6.572028	4.96E-11	1.15E-08
	Poplar diameter 2 untreated	5.568826	2.56E-08	5.74E-06
	Spruce diameter 1 delignified	2.361362	1.82E-02	1.00E+00
	Spruce diameter 1 untreated	0.646018	5.18E-01	1.00E+00
	Spruce diameter 2 delignified	6.297947	3.02E-10	6.94E-08
	Spruce diameter 2 untreated	2.447226	1.44E-02	1.00E+00
Douglas fir diameter 1 untreated	Douglas fir diameter 2 delignified	4.564045	5.02E-06	1.03E-03
	Douglas fir diameter 2 untreated	4.936186	7.97E-07	1.70E-04
	Poplar diameter 1 delignified	3.918137	8.92E-05	1.63E-02
	Poplar diameter 1 untreated	2.690931	7.13E-03	1.00E+00
	Poplar diameter 2 delignified	5.871357	4.32E-09	9.86E-07

	Poplar diameter 2 untreated	5.148895	2.62E-07	5.71E-05
Douglas fir diameter 1 untreated	Spruce diameter 1 delignified	2.157899	3.09E-02	1.00E+00
	Spruce diameter 1 untreated	0.655007	5.12E-01	1.00E+00
	Spruce diameter 2 delignified	5.629641	1.81E-08	4.08E-06
	Spruce diameter 2 untreated	2.299277	2.15E-02	1.00E+00
Douglas fir diameter 2 delignified	Douglas fir diameter 2 untreated	0.843276	3.99E-01	1.00E+00
	Poplar diameter 1 delignified	-1.01233	3.11E-01	1.00E+00
	Poplar diameter 1 untreated	-1.61628	1.06E-01	1.00E+00
	Poplar diameter 2 delignified	1.202416	2.29E-01	1.00E+00
	Poplar diameter 2 untreated	1.076286	2.82E-01	1.00E+00
	Spruce diameter 1 delignified	-3.00825	2.63E-03	4.15E-01
	Spruce diameter 1 untreated	-3.84652	1.20E-04	2.16E-02
	Spruce diameter 2 delignified	0.928336	3.53E-01	1.00E+00
	Spruce diameter 2 untreated	-2.04531	4.08E-02	1.00E+00
Douglas fir diameter 2 untreated	Poplar diameter 1 delignified	-1.78168	7.48E-02	1.00E+00
	Poplar diameter 1 untreated	-2.24526	2.48E-02	1.00E+00
	Poplar diameter 2 delignified	0.17154	8.64E-01	1.00E+00
	Poplar diameter 2 untreated	0.212708	8.32E-01	1.00E+00
	Spruce diameter 1 delignified	-3.54192	3.97E-04	6.83E-02
	Spruce diameter 1 untreated	-4.28118	1.86E-05	3.55E-03
	Spruce diameter 2 delignified	-0.07018	9.44E-01	1.00E+00
	Spruce diameter 2 untreated	-2.63691	8.37E-03	1.00E+00
Poplar diameter 1 delignified	Poplar diameter 1 untreated	-0.81092	4.17E-01	1.00E+00

	Poplar diameter 2 delignified	2.392197	1.67E-02	1.00E+00
Poplar diameter 1 delignified	Poplar diameter 2 untreated	2.027295	4.26E-02	1.00E+00
	Spruce diameter 1 delignified	-2.15584	3.11E-02	1.00E+00
	Spruce diameter 1 untreated	-3.1618	1.57E-03	2.52E-01
	Spruce diameter 2 delignified	2.096156	3.61E-02	1.00E+00
	Spruce diameter 2 untreated	-1.26316	2.07E-01	1.00E+00
Poplar diameter 1 untreated	Poplar diameter 2 delignified	2.764138	5.71E-03	8.28E-01
	Poplar diameter 2 untreated	2.457964	1.40E-02	1.00E+00
	Spruce diameter 1 delignified	-0.94932	3.42E-01	1.00E+00
	Spruce diameter 1 untreated	-2.03592	4.18E-02	1.00E+00
	Spruce diameter 2 delignified	2.522422	1.17E-02	1.00E+00
	Spruce diameter 2 untreated	-0.39165	6.95E-01	1.00E+00
Poplar diameter 2 delignified	Poplar diameter 2 untreated	0.074074	9.41E-01	1.00E+00
	Spruce diameter 1 delignified	-4.54804	5.41E-06	1.10E-03
	Spruce diameter 1 untreated	-5.11502	3.14E-07	6.81E-05
	Spruce diameter 2 delignified	-0.29604	7.67E-01	1.00E+00
	Spruce diameter 2 untreated	-3.21638	1.30E-03	2.12E-01
Poplar diameter 2 untreated	Spruce diameter 1 delignified	-3.78753	1.52E-04	2.69E-02
	Spruce diameter 1 untreated	-4.49389	6.99E-06	1.39E-03
	Spruce diameter 2 delignified	-0.31579	7.52E-01	1.00E+00
	Spruce diameter 2 untreated	-2.84962	4.38E-03	6.57E-01
Spruce diameter 1 delignified	Spruce diameter 1 untreated	-1.40156	1.61E-01	1.00E+00
	Spruce diameter 2 delignified	4.251998	2.12E-05	4.03E-03

	Spruce diameter 2 untreated	0.497077	6.19E-01	1.00E+00
Spruce diameter 1 untreated	Spruce diameter 2 delignified	4.873304	1.10E-06	2.30E-04
	Spruce diameter 2 untreated	1.64427	1.00E-01	1.00E+00
Spruce diameter 2 delignified	Spruce diameter 2 untreated	-2.97467	2.93E-03	4.58E-01

Table S2: Statistical significances of tracheid wall thickness. Kruskal–Wallis ANOVA ($p = 6.09282\text{E-}07$) with Dunn's post-hoc test and Holm's correction.

Group 1	Group 2	Z	P.unadj	P.adj
Balsa delignified	Balsa untreated	3.6949	2.20E-04	9.24E-03
	Beech delignified	0.7877	4.31E-01	1.00E+00
	Beech untreated	1.7843	7.44E-02	1.00E+00
	Douglas fir delignified	3.4927	4.78E-04	1.91E-02
	Douglas fir untreated	0.9661	3.34E-01	1.00E+00
	Poplar delignified	0.4976	6.19E-01	1.00E+00
	Poplar untreated	1.0097	3.13E-01	1.00E+00
	Spruce delignified	-0.2187	8.27E-01	1.00E+00
	Spruce untreated	-2.7592	5.79E-03	1.85E-01
Balsa untreated	Beech delignified	-2.7228	6.47E-03	2.01E-01
	Beech untreated	-1.5776	1.15E-01	1.00E+00
	Douglas fir delignified	-0.7477	4.55E-01	1.00E+00
	Douglas fir untreated	-2.2532	2.42E-02	6.79E-01
	Poplar delignified	-3.1453	1.66E-03	6.30E-02
	Poplar untreated	-2.2172	2.66E-02	7.18E-01
	Spruce delignified	-3.6889	2.25E-04	9.23E-03
	Spruce untreated	-5.3293	9.86E-08	4.44E-06
Beech delignified	Beech untreated	0.9946	3.20E-01	1.00E+00
	Douglas fir delignified	2.3167	2.05E-02	5.95E-01
	Douglas fir untreated	0.2546	7.99E-01	1.00E+00
	Poplar delignified	-0.3121	7.55E-01	1.00E+00
	Poplar untreated	0.2939	7.69E-01	1.00E+00
	Spruce delignified	-0.9285	3.53E-01	1.00E+00
	Spruce untreated	-3.1151	1.84E-03	6.80E-02
Beech untreated	Douglas fir delignified	1.0321	3.02E-01	1.00E+00
	Douglas fir untreated	-0.6756	4.99E-01	1.00E+00
	Poplar delignified	-1.3237	1.86E-01	1.00E+00
	Poplar untreated	-0.6397	5.22E-01	1.00E+00
	Spruce delignified	-1.8673	6.19E-02	1.00E+00
	Spruce untreated	-3.7517	1.76E-04	7.55E-03
Douglas fir delignified	Douglas fir untreated	-1.7942	7.28E-02	1.00E+00

	Poplar delignified	-2.8161	4.86E-03	1.60E-01
	Poplar untreated	-1.7537	7.95E-02	1.00E+00
Douglas fir delignified	Spruce delignified	-3.4593	5.42E-04	2.11E-02
	Spruce untreated	-5.2645	1.41E-07	6.18E-06
Douglas fir untreated	Poplar delignified	-0.5436	5.87E-01	1.00E+00
	Poplar untreated	0.0359	9.71E-01	9.71E-01
	Spruce delignified	-1.0872	2.77E-01	1.00E+00
	Spruce untreated	-3.0761	2.10E-03	7.34E-02
Poplar delignified	Poplar untreated	0.5851	5.58E-01	1.00E+00
	Spruce delignified	-0.6658	5.06E-01	1.00E+00
	Spruce untreated	-3.0084	2.63E-03	8.93E-02
Poplar untreated	Spruce delignified	-1.1287	2.59E-01	1.00E+00
	Spruce untreated	-3.1120	1.86E-03	6.69E-02
Spruce delignified	Spruce untreated	-2.4648	1.37E-02	4.11E-01

Table S3: Shrinking/Expansion rate of the diameters after delignification. Median values of the diameters of untreated and delignified samples with the shrinking rate (-) and the expansion rate (+) after delignification.

Species	Treatment	Shape	Diameter [μm]		Shrinkage (-) /Expansion (+)
			untreated	delignified	
spruce (<i>P. abies</i>)	Diameter1	rectangular	40.3	26.9	-33.3%
	Diameter 2		26.7	9.9	-63%
beech (<i>F. sylvatica</i>)	Diameter1	rectangular	17.2	21.8	+26.5%
	Diameter 2		10.8	16.7	+53.5%
balsa (<i>O. pyramidale</i>)	Diameter1	hexagonal	32.8	26.6	-18.9%
	Diameter1	rectangular	37.7	29.4	-22.1%
	Diameter 2		24.7	22.4	-9.4%
Douglas fir (<i>P. menziesii</i>)	Diameter1	oval	43	40.9	-4.8%
	Diameter 2	oval	12.7	17.6	+38.4%
poplar (<i>P. spp.</i>)	Diameter1	pentagonal	23.2	20.6	-11%
	Diameter 2		14.2	14.5	+1.7%

Table S4: Shrinking/Expansion rate of the wall thickness after delignification. Median values of the wall thickness of untreated and delignified samples with the shrinking rate (-) and the expansion rate (+) after delignification.

Species	Treatment	Wall thickness [μm]	Shrinkage (-) /Expansion (+)
spruce (<i>P. abies</i>)	untreated	4.1	-58.4%
	delignified	1.7	
beech (<i>F. sylvatica</i>)	untreated	1.3	+11.5%
	delignified	1.4	
balsa (<i>O. pyramidale</i>)	untreated	0.8	+165.8%
	delignified	2.1	
Douglas fir (<i>P. menziesii</i>)	untreated	1.4	-40.9%
	delignified	0.8	
poplar (<i>P. spp.</i>)	untreated	1.5	+9.2%
	delignified	1.6	