

Supplementary information: Substituting phenol in phenol-formaldehyde resins with pyrolysis cleavage products obtained from softwood kraft lignin for the modification of different wood species

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Table S1: WPG and bulking of the samples from different wood species treated with three different resins.

Wood sample	100 PF		70/30 IF		55/45 hF	
	WPG / %	Bulking / %	WPG / %	Bulking / %	WPG / %	Bulking / %
Beech	19.8 ± 0.6	8.2 ± 1.4	15.9 ± 1.2	5.6 ± 1.2	13.3 ± 0.6	5.8 ± 0.8
Birch	23.1 ± 0.9	9.2 ± 0.5	22.1 ± 1.4	8.1 ± 0.9	24.6 ± 5.2	7.6 ± 0.7
Pine	23.2 ± 1.6	7.9 ± 0.5	19.5 ± 0.8	7.8 ± 0.4	17.6 ± 0.9	7.4 ± 0.5
Poplar	21.6 ± 0.5	8.2 ± 0.6	20.2 ± 0.7	8.0 ± 0.8	20.2 ± 1.5	8.0 ± 1.3
Spruce	30.3 ± 1.2	6.5 ± 1.0	23.2 ± 1.3	7.0 ± 0.8	22.3 ± 0.8	6.7 ± 1.0

Table S2: Mass loss in relation to the overall sample weight (ML_{Wood}) and the resin weight (ML_{Resin}) of the samples from different wood species treated with three different resins.

Wood sample	100 PF ML _{Wood} / %	100 PF ML _{Resin} / %	70/30 IF ML _{Wood} / %	70/30 IF ML _{Resin} / %	55/45 hF ML _{Wood} / %	55/45 hF ML _{Resin} / %
Beech	1.3 ± 0.1	7.7 ± 0.5	1.5 ± 0.2	10.7 ± 1.4	1.6 ± 0.1	13.3 ± 1.2
Birch	1.1 ± 0.1	5.6 ± 0.6	0.9 ± 0.3	4.7 ± 1.5	1.0 ± 0.2	5.5 ± 1.8
Pine	0.8 ± 0.1	4.1 ± 0.7	1.4 ± 0.1	8.6 ± 0.8	1.1 ± 0.2	7.1 ± 1.5
Poplar	1.2 ± 0.2	6.8 ± 1.0	1.6 ± 0.1	9.6 ± 0.8	1.5 ± 0.2	8.9 ± 1.2
Spruce	0.9 ± 0.1	4.0 ± 0.5	1.4 ± 0.2	7.4 ± 1.2	1.6 ± 0.1	8.7 ± 0.8

Table S3: ASE of the samples from different wood species treated with three different resins.

Wood sample	100 PF	70/30 IF	55/45 hF
Beech	51.6 ± 1.3	44.4 ± 2.4	40.2 ± 2.1
Birch	63.8 ± 0.8	60.6 ± 1.3	57.7 ± 2.2
Pine	52.5 ± 3.4	51.0 ± 2.8	48.5 ± 3.0
Poplar	55.4 ± 1.8	55.1 ± 1.4	52.4 ± 2.1
Spruce	57.3 ± 5.3	56.0 ± 6.6	47.5 ± 2.7

Table S4: Bulking, bulking after ASE tests, as well as bulking loss in percent of the samples from different wood species treated with three different resins.

Resin		Beech	Birch	Pine	Poplar	Spruce
100 PF	Bulking / %	8.2 ± 1.4	9.2 ± 0.5	7.9 ± 0.5	8.2 ± 0.6	6.5 ± 1.0
	Bulking after ASE / %	5.5 ± 1.2	6.7 ± 0.5	6.1 ± 0.5	5.3 ± 0.7	4.9 ± 0.7
	Bulking loss / %	33.1 ± 6.6	27.3 ± 2.5	22.9 ± 5.2	35.4 ± 5.0	24.8 ± 5.8
70/30 IF	Bulking / %	5.6 ± 1.2	8.1 ± 0.9	7.8 ± 0.4	8.0 ± 0.8	7.0 ± 0.8
	Bulking after ASE / %	3.3 ± 1.3	5.5 ± 0.8	6.1 ± 0.2	5.4 ± 0.8	4.4 ± 0.6
	Bulking loss / %	43.1 ± 17.0	32.2 ± 4.1	21.7 ± 3.5	32.0 ± 4.3	37.0 ± 4.8
55/45 hF	Bulking / %	5.8 ± 0.8	7.6 ± 0.7	7.4 ± 0.5	8.0 ± 1.3	6.7 ± 1.0
	Bulking after ASE / %	3.0 ± 0.7	5.0 ± 0.7	5.5 ± 0.4	4.8 ± 1.2	4.0 ± 0.7
	Bulking loss / %	47.9 ± 8.7	34.0 ± 4.9	25.2 ± 5.1	41.6 ± 6.7	40.0 ± 6.2