Supporting Information for:
Fractionation of organic matter due to reaction with ferrihydrite: coprecipitation versus adsorption

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Figure SI-1: Turbidity (absorbance at 860 nm) during coprecipitation experiments.
Figure SI-2: Particle-associated C (adsorbed and coprecipitated) versus C concentration of the equilibrium solution for experiments with the forest-floor extract and lignin. Data of adsorption experiments are fitted with a Langmuir-type isotherm.
Figures SI-3 and SI-4: ^{13}C CPMAS NMR spectra of supernatants from adsorption and coprecipitation experiments performed with both the forest-floor extract and lignin.
Table SI-1: Peak assignment of FTIR-absorption bands for the forest-floor extract. Band positions of the forest-floor extract are determined from minima of the 2nd derivative.
Figures SI-5 and SI-6: All FTIR spectra of products from adsorption and coprecipitation experiments performed with both the forest-floor extract and lignin.
Figure SI-7: Relation between total sugar and total organic C (a) and arabinose and total sugar (b) concentrations of supernatants from adsorption and coprecipitation experiments with the forest floor extract. Figure 7c shows the relation of galactose + mannose (GM) vs. arabinose + xylose (AX).
References with regard to the peak assignments in Table SI-1

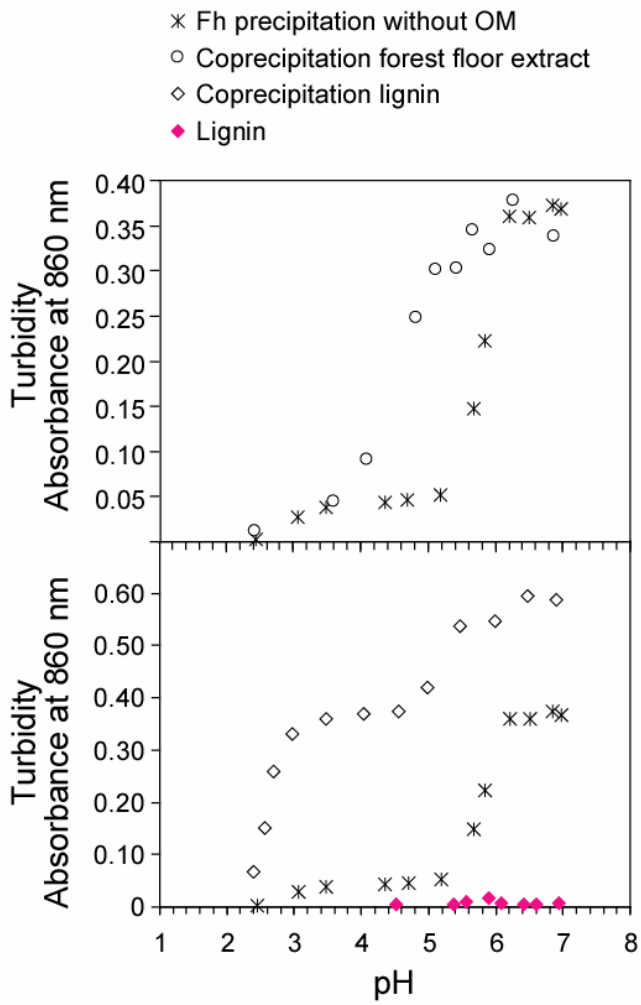

Figure SI-1: Turbidity during coprecipitation experiments was measured as the absorbance at 860 nm (Cary 50 Conc UV-Visible Spectrophotometer, Varian, Darmstadt) and is interpreted as a measure of the amount of suspended particles in solution. These data show that ferrihydrite precipitation in OM-free solutions rapidly starts at pH 5.8, whereas coprecipitation with the forest-floor extract begins at pH 4.5. During coprecipitation with lignin, we observed a first increase in turbidity immediately after KOH addition and a second one at pH 5. We assume that the first turbidity increase is related to the formation of Fe-OM complexes, while the one at pH 5 is caused by ferrihydrite coprecipitation. In a pure lignin solution, we did not observe any colloid formation.

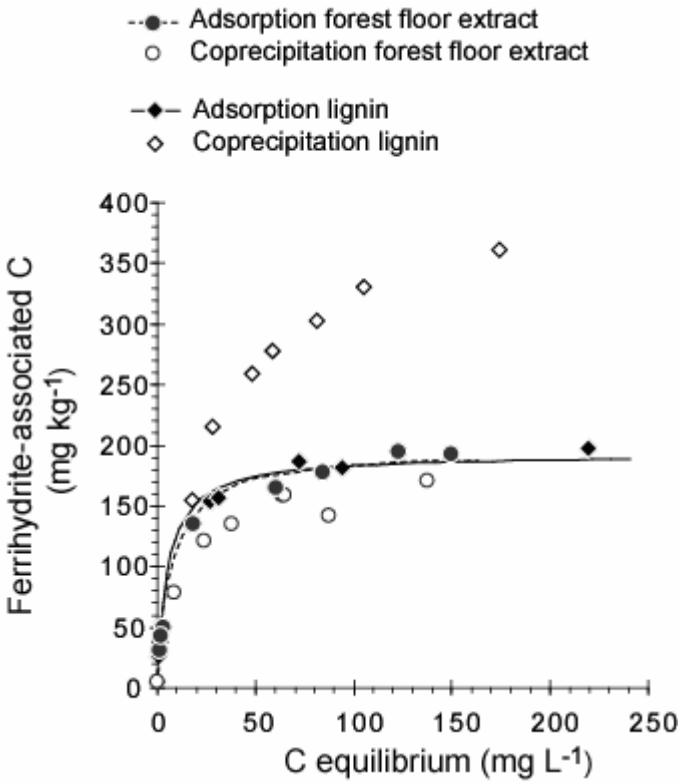

Figure SI-2: Ferrihydrite-associated C (adsorbed and coprecipitated) versus C concentration of the equilibrium solution for experiments with the forest-floor extract and lignin. Data of adsorption experiments are fitted with Langmuir isotherms

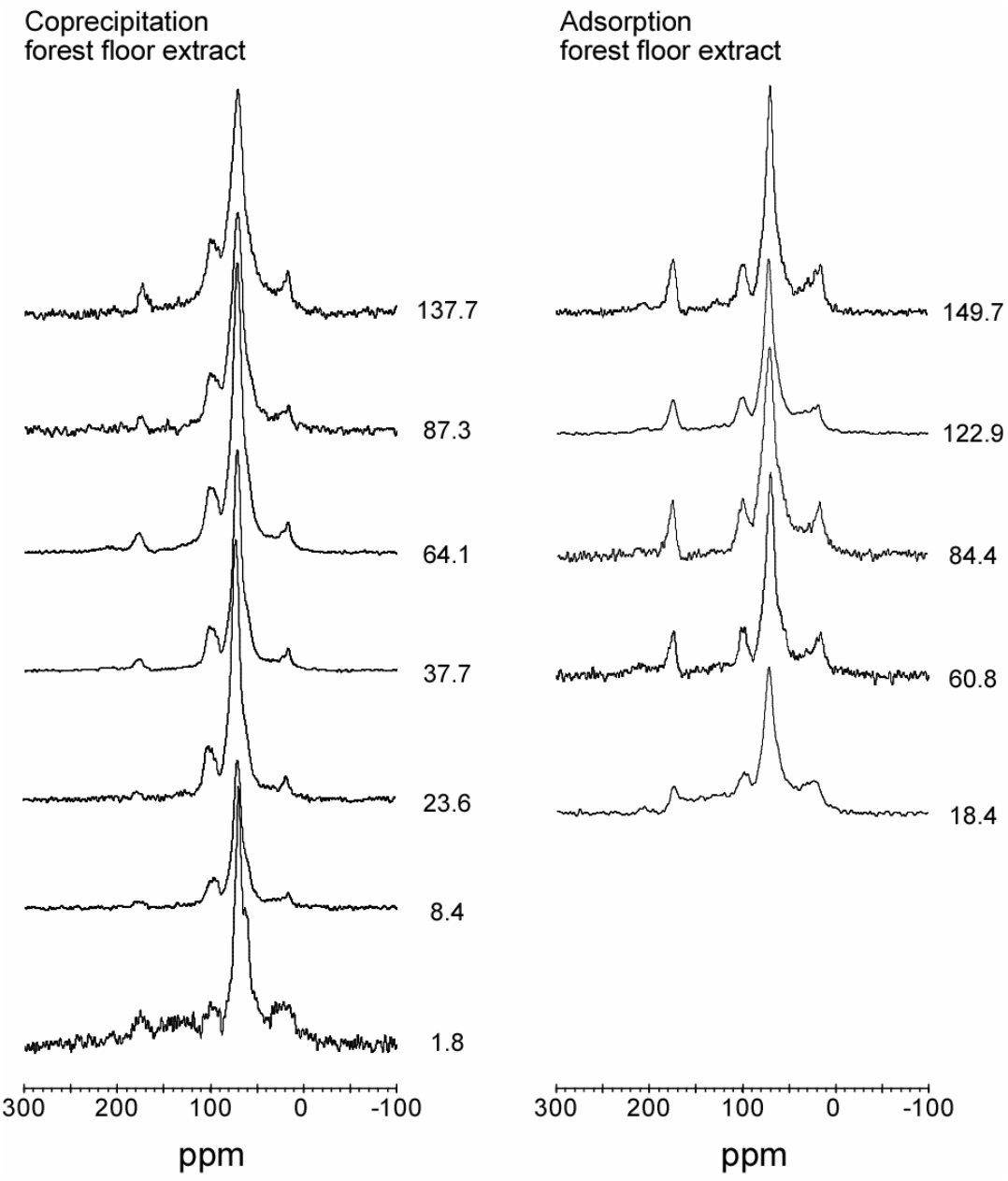

Figure SI-3: ^{13}C CP MAS NMR spectra of the supernatants from coprecipitation (left) and adsorption (right) experiments with the forest-floor extract. Numbers to the right of each spectrum give the C concentration of the equilibrium solution in mg L^{-1}. The corresponding spectrum of the original forest-floor extract is given in Figure 2.

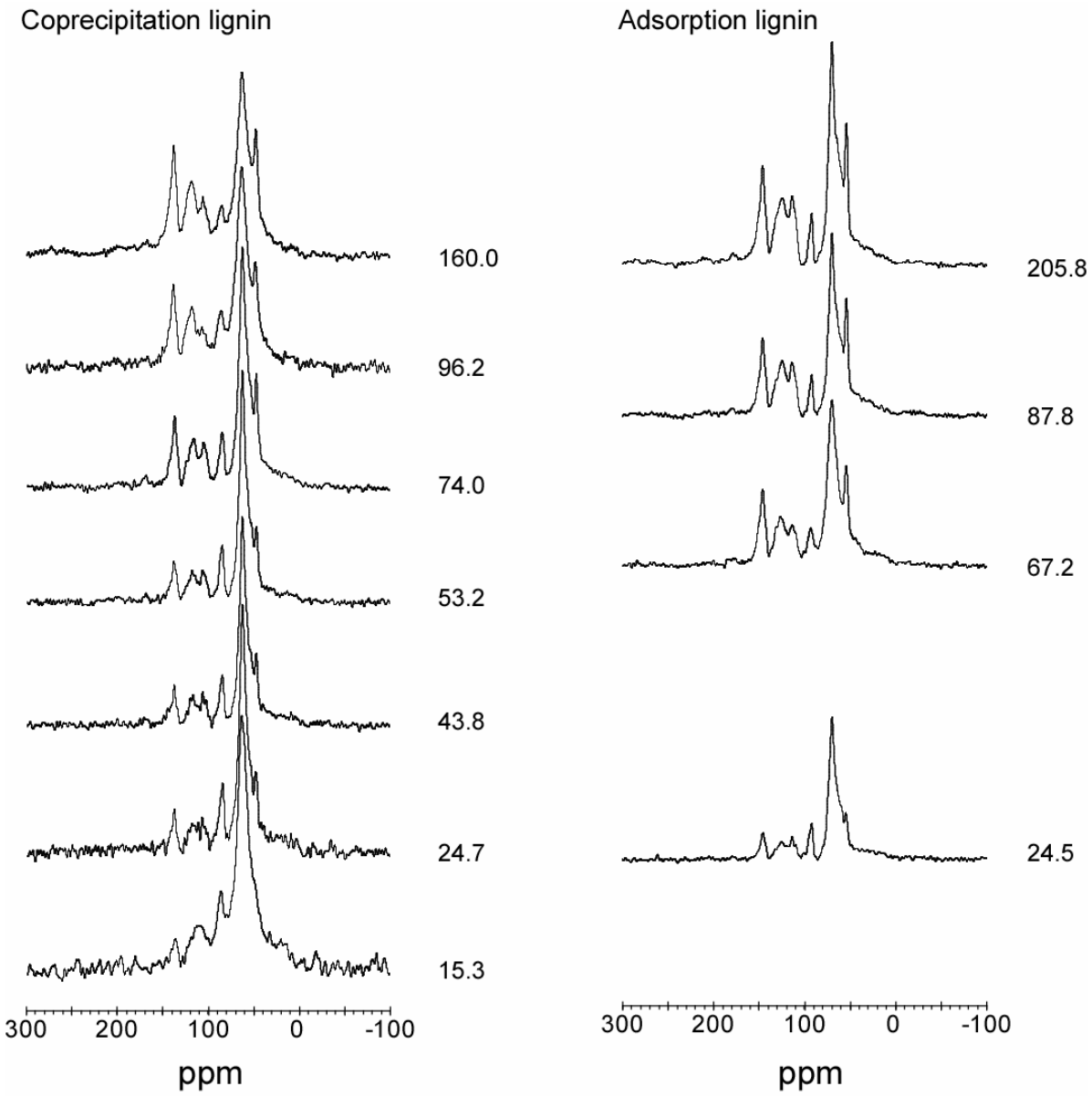

Figure SI-4: ^{13}C CP MAS NMR spectra of the supernatants from coprecipitation (left) and adsorption (right) experiments with lignin. Numbers to the right of each spectrum give the C concentration of the equilibrium solution in mg L^{-1}. The corresponding spectrum of the original lignin is given in Figure 2.

69 Table SI-1: Peak assignment of FTIR-absorption bands for the forest-floor extract. Band positions of
70 the forest-floor extract are determined from minima of the 2nd derivative.
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Peak position reference (cm^{-1})	Peak position forest floor extract (cm^{-1})	Peak assignment	Reference
1780-1760	1783	C=O stretch of γ– lactones	*(1)*
1725-1710	1726	C=O stretch of COOH or COOR	*(2, 3, 4, 1)*
1650-1600	1631	asym. C-O stretching in COO^-, aromatic C=C stretching; H_2O; C=O in amide I	*(2, 3, 5, 4, 1)*
1550-1542	1548	N-H in plane deformation and C-N stretching of amide II	*(3, 6, 7, 8, 1)*
1525-1512	1517	aromatic C=C stretching	*(2, 3, 5, 6, 1)*
1460-1440	1462	$C-H_2$, $C-H_3$ deformation (scissoring) in polysaccharides	*(9, 3 7, 2, 1)*
1425-1400	1409	sym. stretch of COO-, C-OH def. of COOH	*(3, 5, 7, 1)*
1420-1200	1377	O-H in plane def. coupled with C-H def. in polysaccharide	*(9)*
1280-1180	1266	C-O stretch of phenolic OH or aryl ethers; asym. C-O stretch of ester and COOH	*(2, 8, 4)*
	1232		
	1205		
1160-1150	1148	C-O-C stretch of glucosidic link. in polysacch., coupled with C-OH stretch and OH def.	*(6, 9, 8)*
1079-1060	1077	C-O stretch coupled with C-C stretch and O-H def. in polysaccharides	*(10, 9, 8)*
1056-1033	1032	C-O stretch coupled with C-C stretch and O-H def. in polysaccharides	*(10, 9, 8)*
953-807	885	C1-H deformation of polysaccharides	*(10, 9)*
	813		
765	777	ring breathing of polysaccharides	*(9)*

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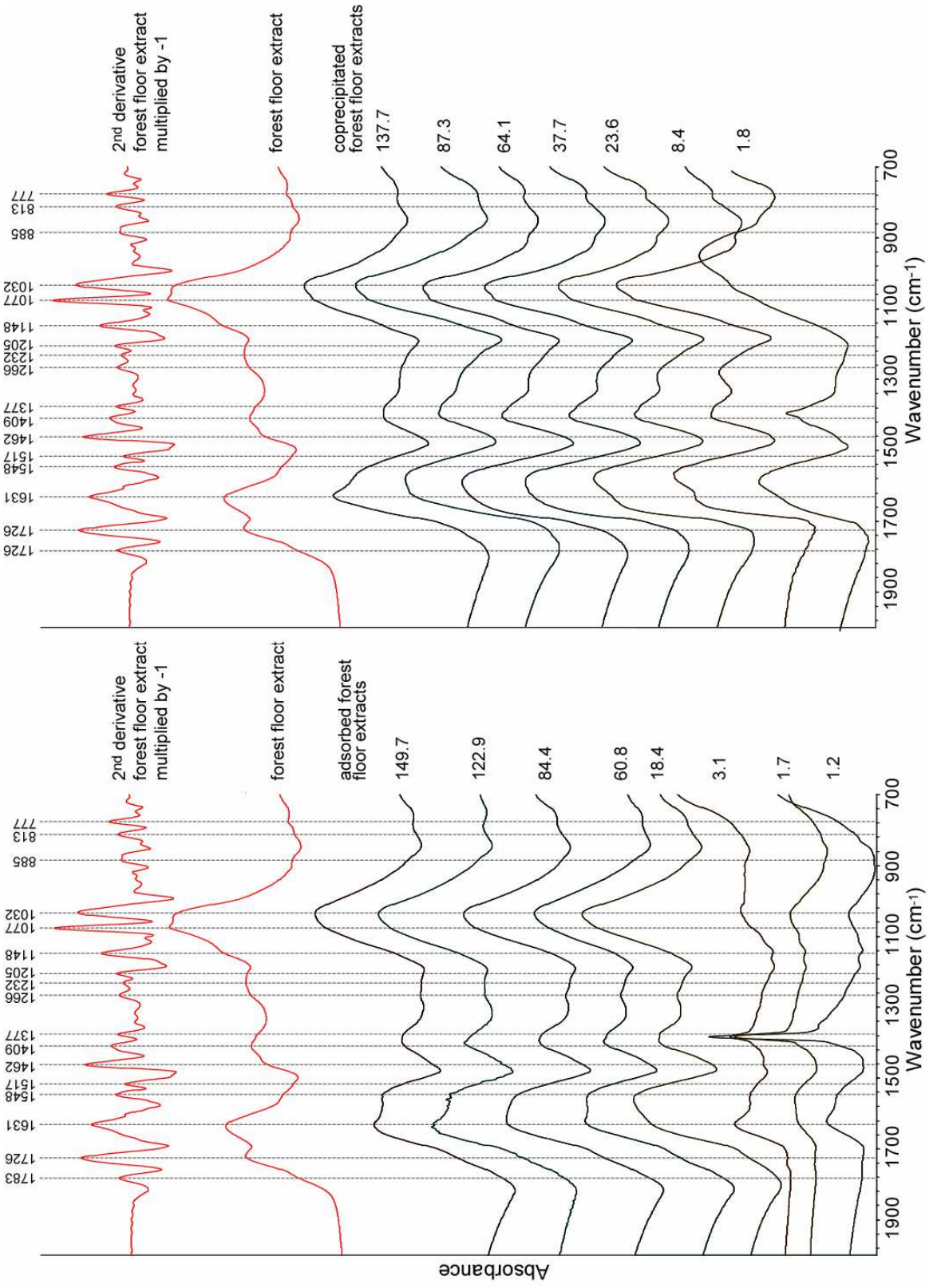


Figure SI-5: All FTIR spectra of adsorbed (left) and coprecipitated (right) forest-floor extracts. Numbers at the right of each spectrum give the C concentration of the equilibrium solution in mg L^{-1}. The spectrum of the original forest-floor extract and its 2nd derivative (multiplied by -1) are given for comparison. Table SI-1 of the supporting information summarizes the peak assignment.

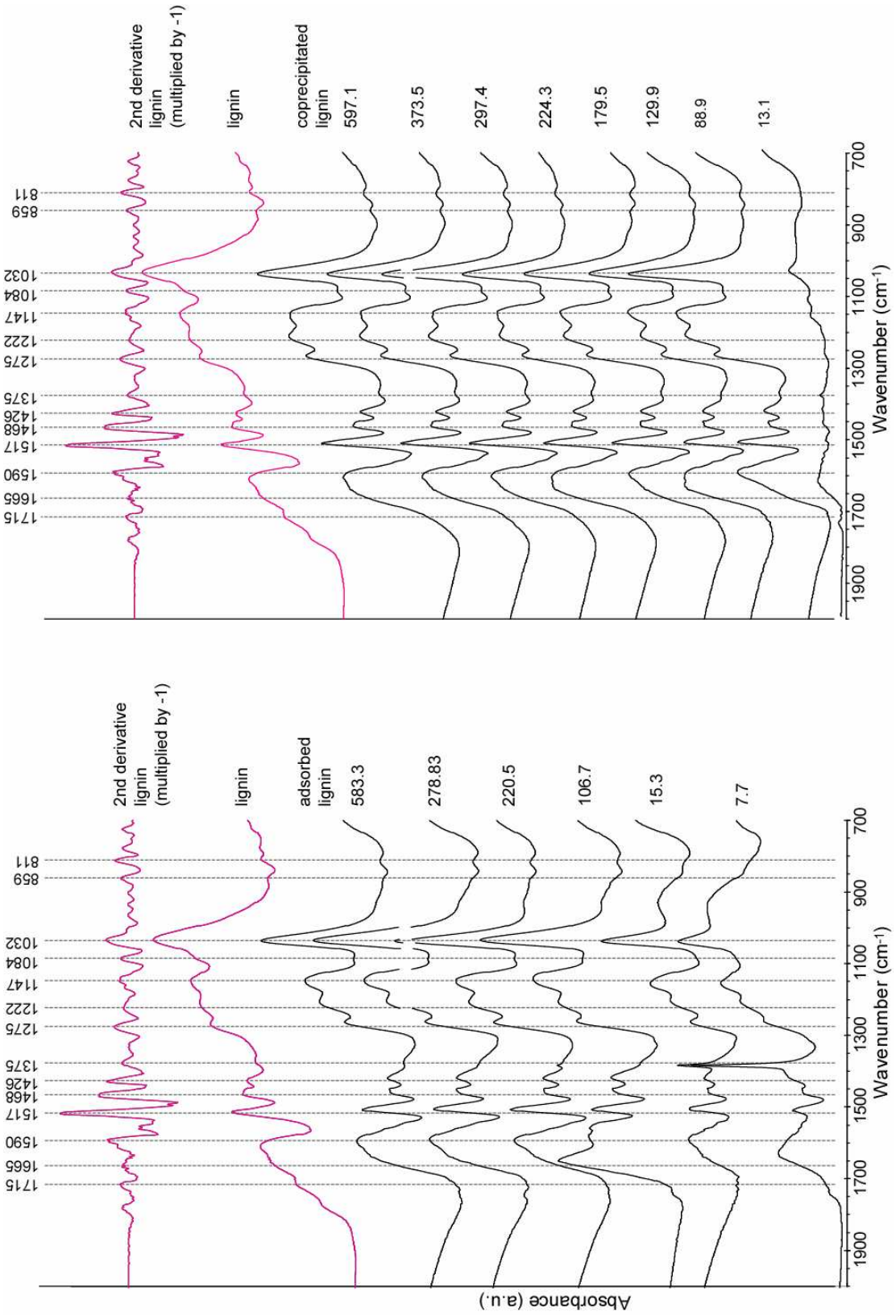
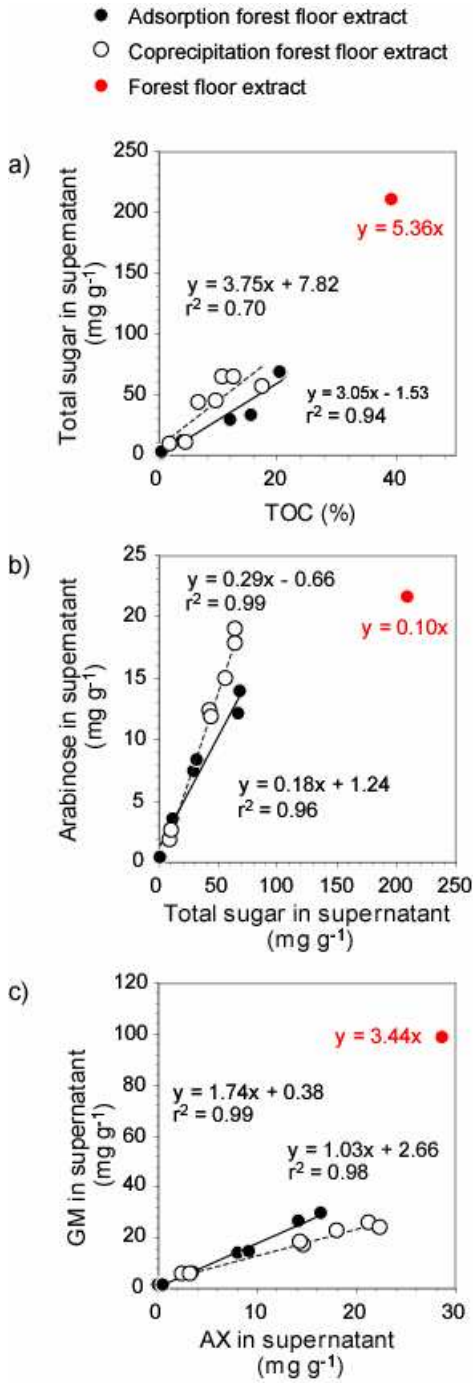


Figure SI-6: All FTIR spectra of the adsorbed (left) and coprecipitated (right) lignin. Numbers at the right of each spectrum give the C concentration of the equilibrium solution in mg L^{-1}. The spectrum of the original lignin and its 2nd derivative (multiplied by -1) are given for comparison.



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88 Figure SI-7: Relation between total sugar and total organic C (a) and arabinose and total sugar (b)
89 concentrations of supernatants from adsorption and coprecipitation experiments with the forest-floor
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