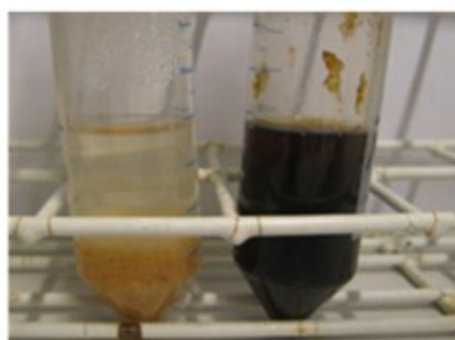
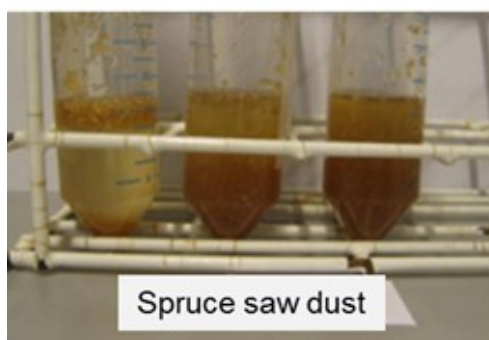
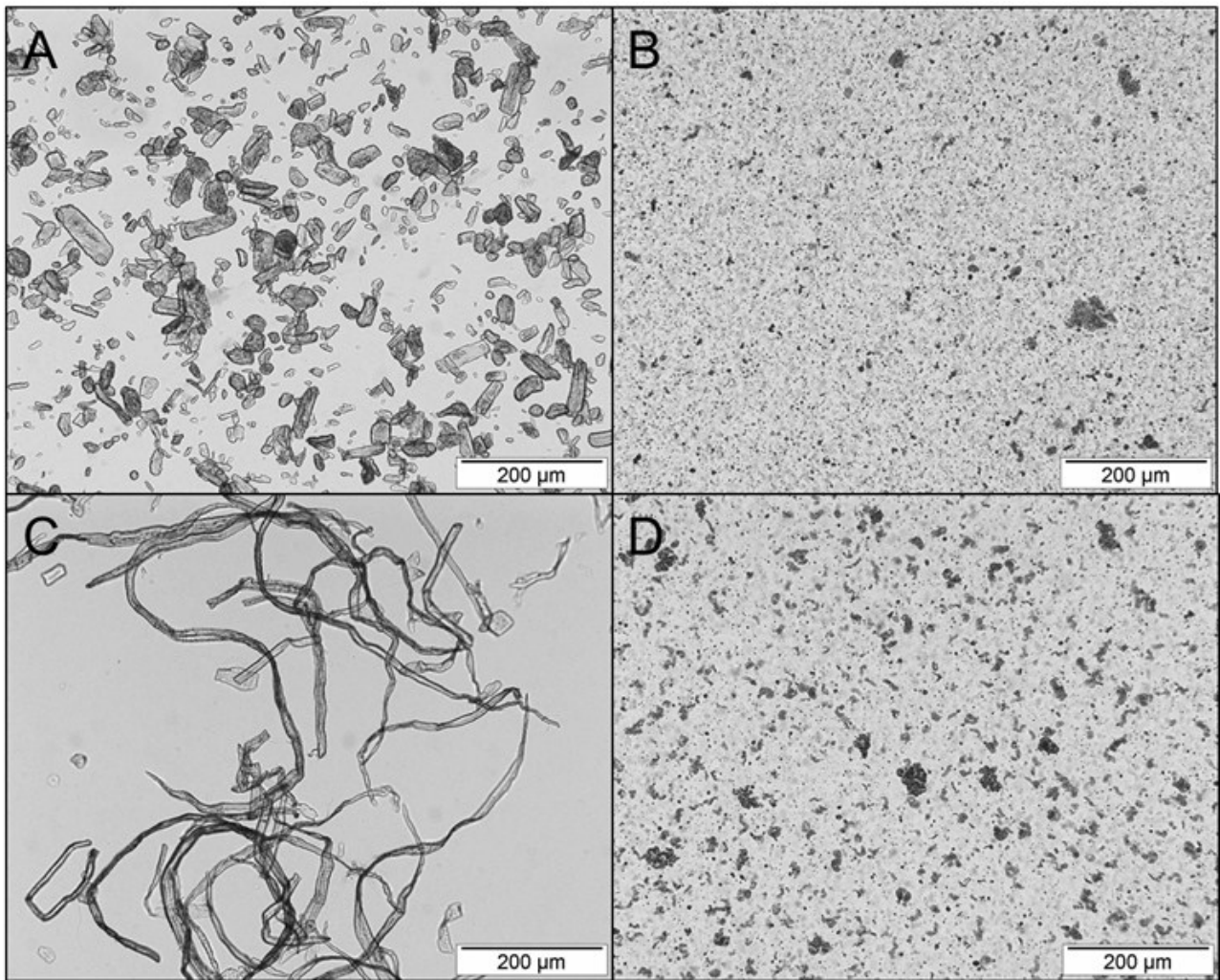


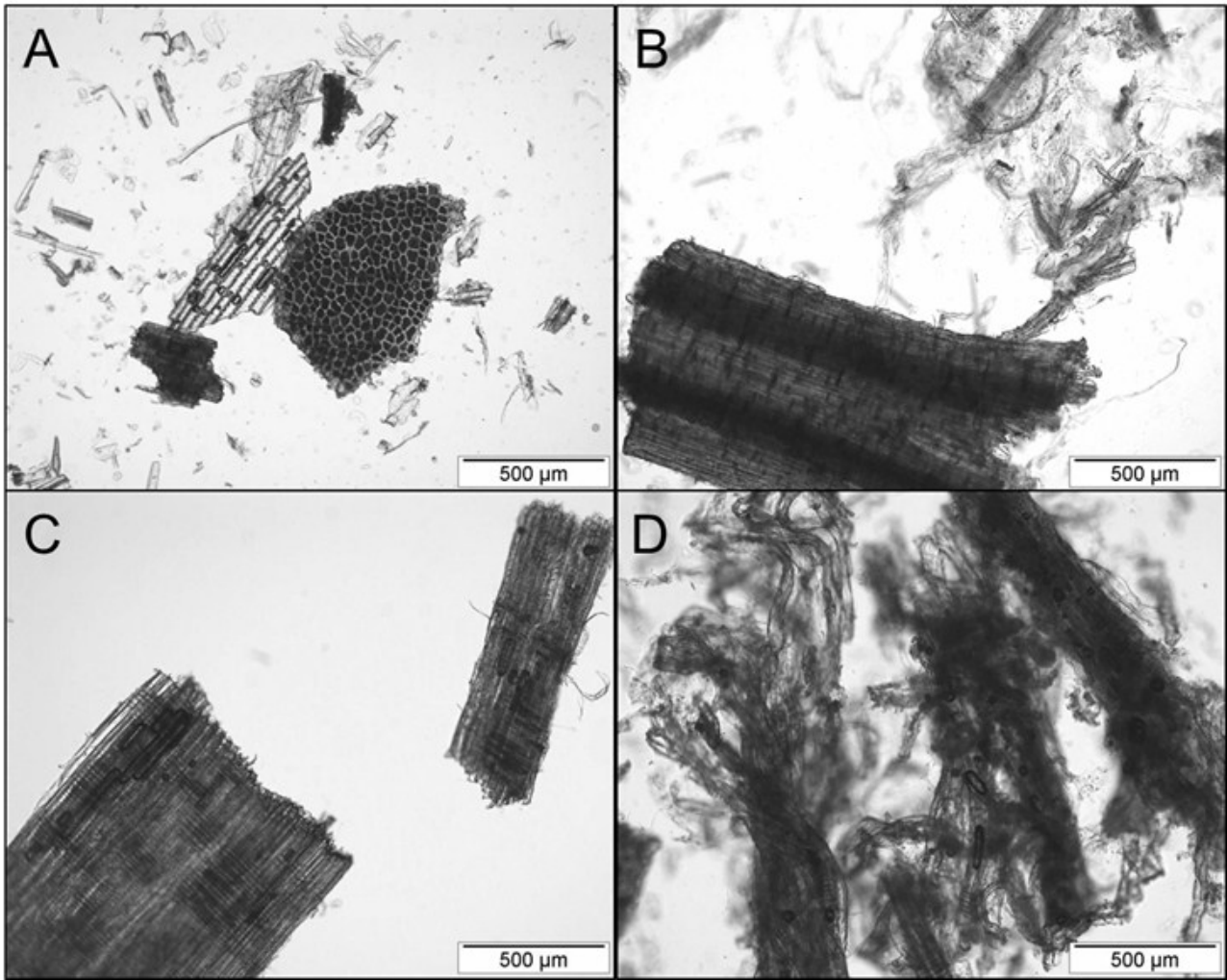
Supplementary Information



ESI1. Appearance of pretreatment mixtures. Upper left MCC, upper right eucalyptus dissolving pulp, centre shredded wheat straw and lower row spruce saw dust after pretreatment. The order of used pretreatment chemicals (90 % w/w concentration) is in every picture from left: [Chol]Cl : boric acid (5:2), [Chol]Cl : glycerol (1:1), betaine : glycerol (1:1), 0.050 M citrate buffer (pH 5.0) and [EMIM]AcO.



ESI2. Light microscopy images of microcrystalline cellulose treated in A) 0.050 M citrate buffer (pH 5.0) or B) 90 % (w/w) [EMIM]AcO and milled eucalyptus dissolving pulp treated in C) 0.050 M citrate buffer (pH 5.0), or D) 90 % (w/w) [EMIM]AcO.



ESI3. Light microscopy pictures of shredded barley straw treated in A) 0.050 M citrate buffer (pH 5.0) or B) 90 % (w/w) [EMIM]AcO and spruce saw dust treated in C) 0.050 M citrate buffer (pH 5) or D) 90 % (w/w) [EMIM]AcO.

Sample	Pretreatment	Lignin (% of dry substance)			Saccharides (% of dry substance)								As polysaccharides (% of dry substance)	Total saccharides and lignin
		Insol.	Sol.	Total	Ram	Ara	Gal	Glc	Xyl	Man	Fru	Total		
MCC	Untreated	0.4	0.0	0.4	<0.1	<0.1	<0.1	97.3	1.2	1.4	<0.1	99.9	89.8	90.2
MCC	[Chol]Cl:BA 5:2	1.7	0.0	1.7	<0.2	<0.2	<0.2	101.9	1.0	1.4	0.1	104.4	93.9	95.7
MCC	[Chol]Cl:Gly 1:1	0.7	0.0	0.7	<0.3	<0.3	<0.3	94.4	1.2	1.4	0.1	97.1	87.4	88.1
MCC	Bet:Gly 1:1	0.4	0.0	0.4	<0.4	<0.4	<0.4	81.1	0.9	1.3	0.1	83.4	75.0	75.5
MCC	Buffer	0.9	0.0	0.9	<0.5	<0.5	<0.5	102.3	1.3	1.6	0.1	105.3	94.7	95.6
MCC	[EMIM]AcO	0.7	22.6*	23.3*	<0.6	<0.6	<0.6	40.4	0.3	0.6	<0.1	41.3	37.2	37.2
Dissolving pulp	Untreated	0.3	0.1	0.4	<0.1	<0.1	<0.1	96.9	2.5	0.1	<0.1	99.6	89.6	89.9
Dissolving pulp	[Chol]Cl:BA 5:2	0.5	0.0	0.5	<0.1	<0.1	<0.1	9.9	0.1	0.0	<0.1	10.5	9.4	9.9
Dissolving pulp	[Chol]Cl:Gly 1:1	0.9	0.0	1.0	<0.1	<0.1	<0.1	10.9	0.1	<0.1	<0.1	11.0	9.9	10.8
Dissolving pulp	Bet:Gly 1:1	0.1	0.2	0.3	<0.1	<0.1	<0.1	14.3	0.2	<0.1	<0.1	14.5	13.0	13.4
Dissolving pulp	Buffer	0.2	0.1	0.2	<0.1	<0.1	<0.1	92.3	2.4	0.1	<0.1	94.8	85.3	85.5
Dissolving pulp	[EMIM]AcO	0.1	25.4*	25.4*	<0.1	<0.1	<0.1	30.1	0.6	<0.1	<0.1	30.7	27.6	27.6
Spruce saw dust	Untreated	28.0	1.1	29.1	0.2	1.0	1.8	44.9	5.3	11.4	<0.1	64.6	58.0	87.0
Spruce saw dust	[Chol]Cl:BA 5:2	30.3	0.3	30.6	0.1	0.7	1.7	49.5	5.2	11.8	<0.1	69.1	62.1	92.7
Spruce saw dust	[Chol]Cl:Gly 1:1	27.9	0.3	28.2	0.1	1.0	1.8	41.9	5.0	10.8	<0.1	60.7	54.5	82.7
Spruce saw dust	Bet:Gly 1:1	25.5	0.3	25.8	0.1	0.9	1.8	42.5	4.8	10.8	<0.1	61.1	54.9	80.6
Spruce saw dust	Buffer	29.5	0.2	29.7	0.1	1.0	2.0	47.0	5.4	12.1	<0.1	67.8	60.9	90.6
Spruce saw dust	[EMIM]AcO	16.7	15.7*	32.4*	<0.1	0.6	1.1	27.6	3.3	6.8	<0.1	39.7	35.6	35.6
Wheat straw	Untreated	20.9	7.8	28.7	0.1	2.3	0.7	40.2	21.2	0.5	<0.1	65.0	58.0	86.7
Wheat straw	[Chol]Cl:BA 5:2	23.6	1.4	25.0	<0.1	0.9	0.2	25.8	12.6	0.3	<0.1	39.9	35.7	60.6
Wheat straw	[Chol]Cl:Gly 1:1	15.4	1.3	16.7	0.1	1.7	0.4	28.5	15.3	0.3	<0.1	46.4	41.4	58.1
Wheat straw	Bet:Gly 1:1	10.6	0.8	11.4	<0.1	1.2	0.3	21.2	11.3	0.3	<0.1	34.3	30.6	42.0

Wheat straw	Buffer	22.4	0.9	23.3	0.1	2.4	0.6	45.8	24.9	0.4	<0.1	74.2	66.2	89.5
Wheat straw	[EMIM]AcO	3.2	28.1*	31.2*	<0.1	0.8	0.2	13.4	7.0	0.2	<0.1	21.6	19.3	19.3

ESI4A. Composition analysis (% of dry substance) of untreated and in 90 % (w/w) DES or [EMIM]AcO, or in buffer pretreated microcrystalline cellulose

(MCC), milled eucalyptus dissolving pulp, spruce saw dust or shredded wheat straw. Abbreviations: Insol. = acid insoluble lignin, Sol. = acid soluble lignin,

Ram = rhamnose, Ara = arabinose, Gal = galactose, Glc = glucose, Xyl = xylose, Man = mannose, Fru = fructose. Acid soluble lignin content marked by * is

presumed to be influenced by absorption of [EMIM]AcO contaminants.

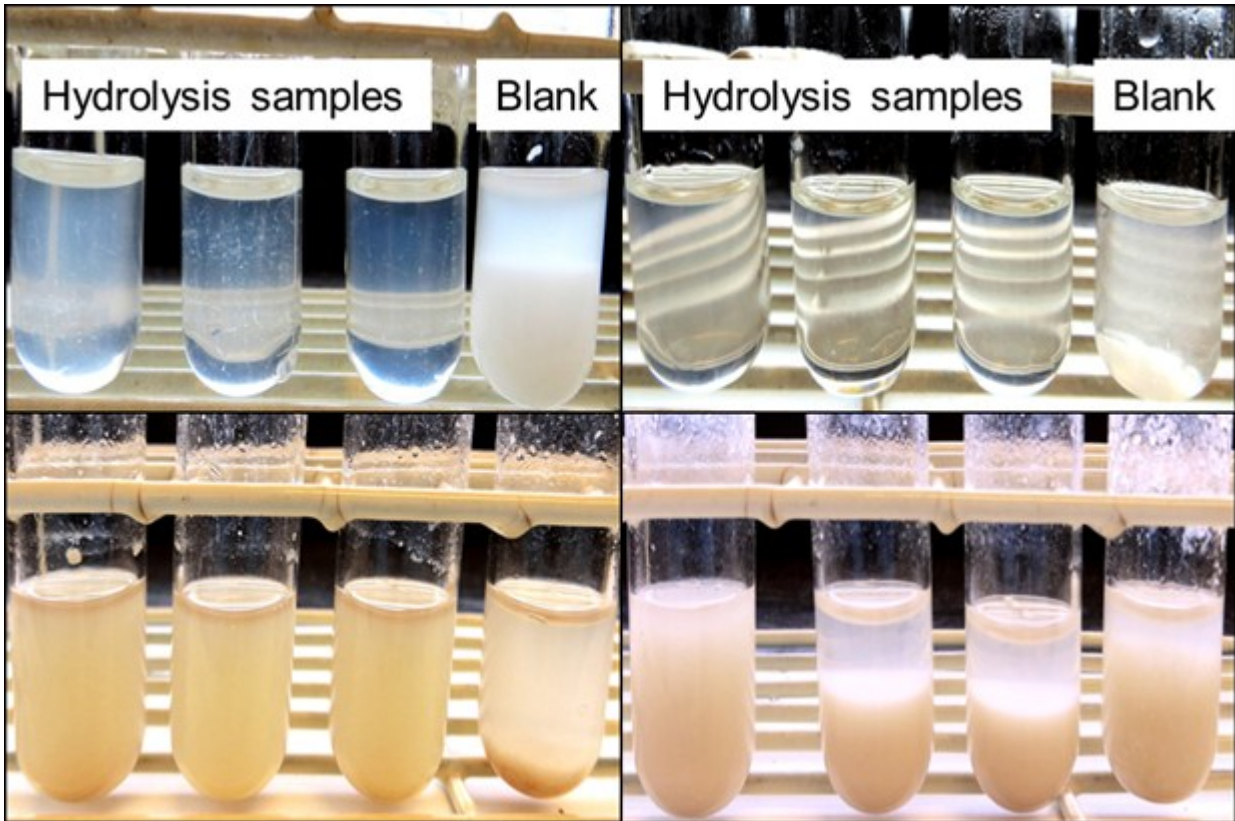
Sample	Pretreatment	Saccharides (% of dry substance)						
		Ram	Ara	Gal	Glc	Xyl	Man	Fru
MCC	Untreated	0.0	0.0	0.0	97.4	1.2	1.4	0.0
MCC	[Chol]Cl:BA 5:2	0.0	0.0	0.0	97.6	1.0	1.4	0.1
MCC	[Chol]Cl:Gly 1:1	0.0	0.0	0.0	97.2	1.2	1.5	0.1
MCC	Bet:Gly 1:1	0.0	0.0	0.0	97.2	1.1	1.5	0.1
MCC	Buffer	0.0	0.0	0.0	97.1	1.3	1.5	0.1
MCC	[EMIM]AcO	0.0	0.0	0.0	97.8	0.8	1.4	0.0
Dissolving pulp	Untreated	0.0	0.0	0.0	97.3	2.5	0.1	0.0
Dissolving pulp	[Chol]Cl:BA 5:2	0.0	0.0	0.0	94.7	1.3	0.2	0.0
Dissolving pulp	[Chol]Cl:Gly 1:1	0.0	0.0	0.0	99.4	0.6	0.0	0.0
Dissolving pulp	Bet:Gly 1:1	0.0	0.0	0.0	98.7	1.3	0.0	0.0
Dissolving pulp	Buffer	0.0	0.0	0.0	97.3	2.6	0.1	0.0
Dissolving pulp	[EMIM]AcO	0.0	0.0	0.0	97.9	2.0	0.0	0.0
Spruce saw dust	Untreated	0.2	1.6	2.8	69.5	8.1	17.6	0.0
Spruce saw dust	[Chol]Cl:BA 5:2	0.2	1.0	2.5	71.7	7.5	17.0	0.0
Spruce saw dust	[Chol]Cl:Gly 1:1	0.2	1.6	3.0	69.1	8.2	17.8	0.0
Spruce saw dust	Bet:Gly 1:1	0.2	1.5	3.0	69.6	7.9	17.6	0.0
Spruce saw dust	Buffer	0.2	1.5	2.9	69.4	8.0	17.8	0.0
Spruce saw dust	[EMIM]AcO	0.0	1.6	2.9	69.5	8.3	17.3	0.0
Wheat straw	Untreated	0.1	3.5	1.1	61.8	32.6	0.8	0.0
Wheat straw	[Chol]Cl:BA 5:2	0.0	2.2	0.5	64.6	31.6	0.7	0.0
Wheat straw	[Chol]Cl:Gly 1:1	0.1	3.7	0.9	61.5	33.0	0.7	0.0
Wheat straw	Bet:Gly 1:1	0.0	3.5	0.8	61.8	33.0	0.7	0.0
Wheat straw	Buffer	0.1	3.2	0.8	61.7	33.6	0.6	0.0
Wheat straw	[EMIM]AcO	0.0	3.8	0.9	62.0	32.5	0.8	0.0

ESI4B. Proportional distribution of saccharides (%) in microcrystalline cellulose (MCC), milled Eucalyptus

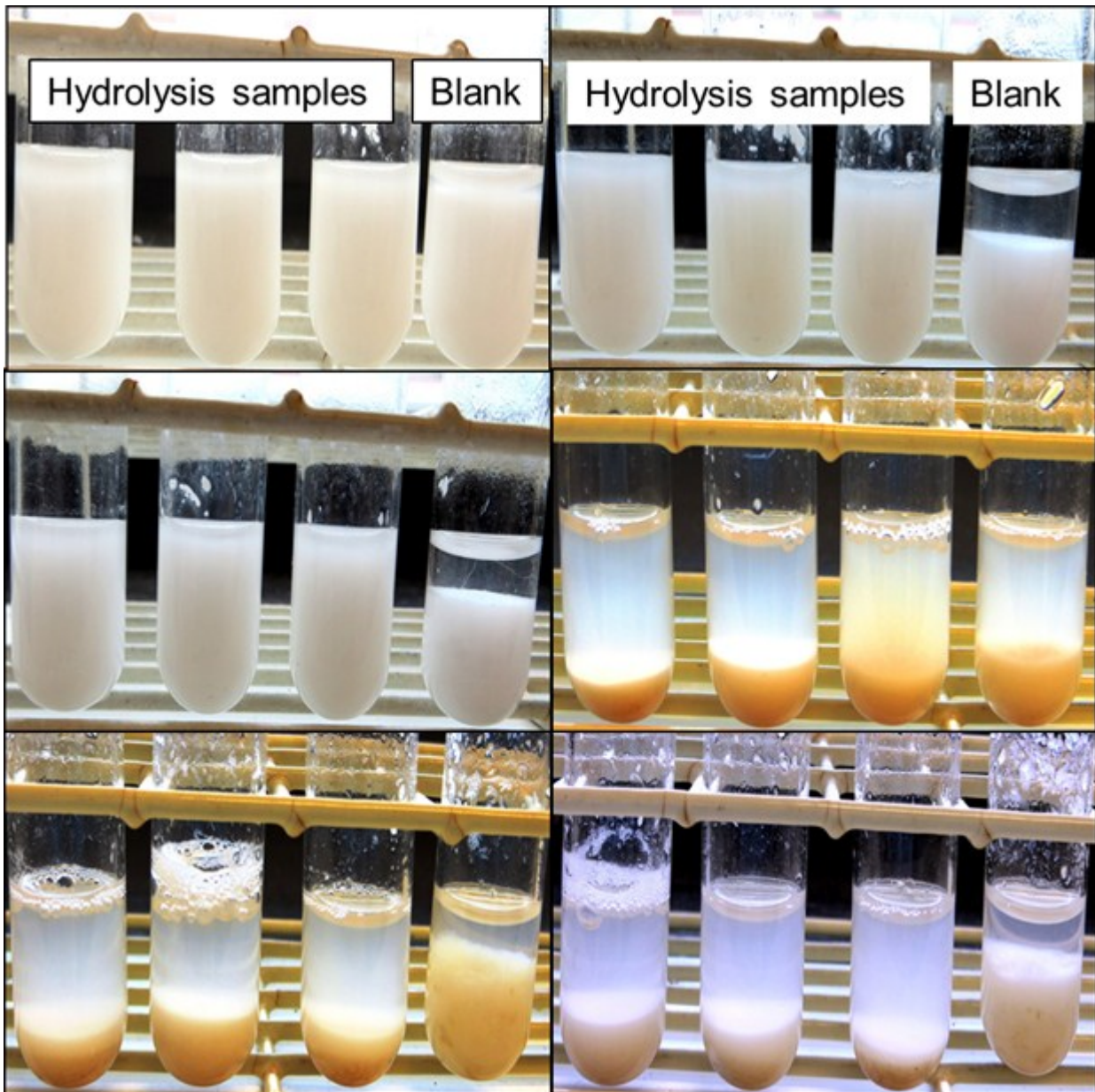
dissolving pulp, spruce saw dust or shredded wheat straw after pretreatment in 90 % (w/w) DES or

[EMIM]AcO or in 0.050 M citrate buffer (reference). Abbreviations: Ram = rhamnose, Ara = arabinose, Gal =

galactose, Glc = glucose, Xyl = xylose, Man = mannose, Fru = fructose.



ESI5. Visual inspection of hydrolysis end mixtures of [EMIM]AcO-pretreated MCC (upper left), dissolving pulp (upper right), wheat straw (lower left) and spruce saw dust (lower right).



ESI6. Visual inspection of hydrolysis end mixtures of MCC pretreated with [Chol]Cl : boric acid (5:2) (upper left), [Chol]Cl : glycerol (1:1) (upper right), betaine : glycerol (1:1) (centre left), and spruce saw dust pretreated with [Chol]Cl : boric acid (5:2) (centre right), [Chol]Cl : glycerol (1:1) (lower left), and betaine : glycerol (1:1) (lower right).