

Overview of LignoCOST

Duration 4-10-2018 - 3-10-2022

Dr. Richard Gosselink (chair)

- Content

Grant holder institution

Relevance of lignin network

Objectives and deliverables

Core management team and Working Groups

Grant holder Wageningen Food & Biobased Research

Applied research for sustainable innovations

- In-depth knowledge of the entire agri-food chain
- Market oriented R&D approach
- Multi-disciplinary applied R&D project teams; 250 employees
- Up-scaling: from lab to pilot
- Connection with the University of Wageningen



Sustainable Food Chains

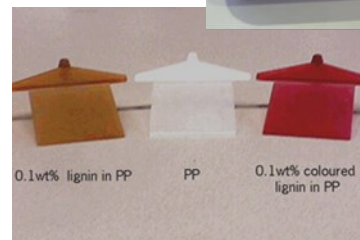
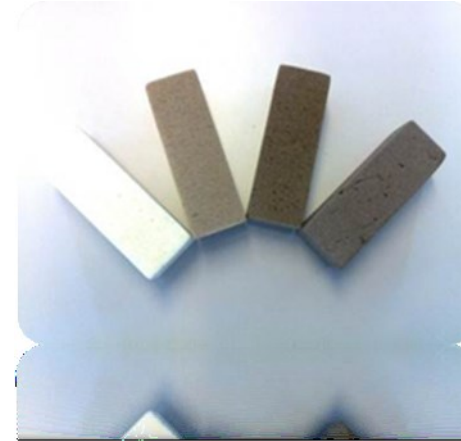
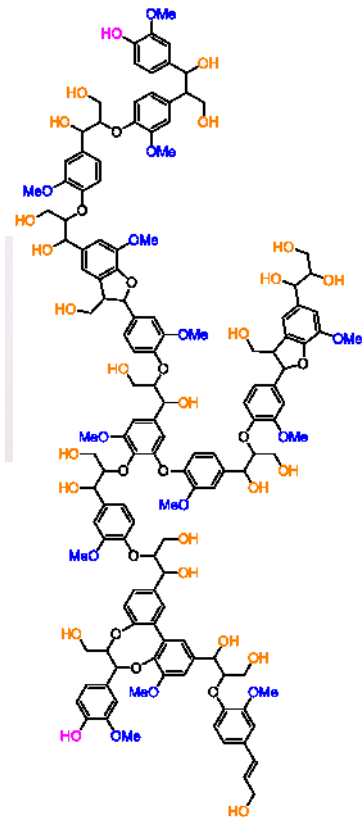


Biobased Products



Healthy & Delicious Foods

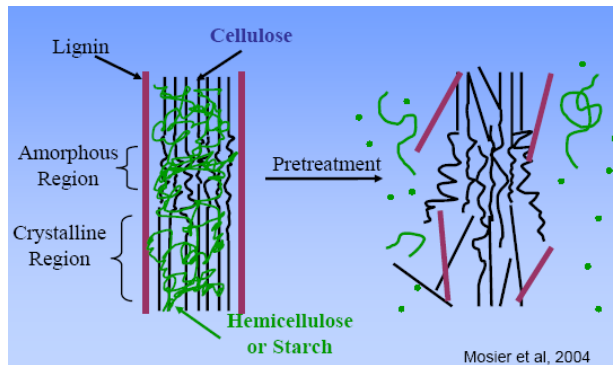
Lignin research @ WFBR



Production of cellulose and lignin

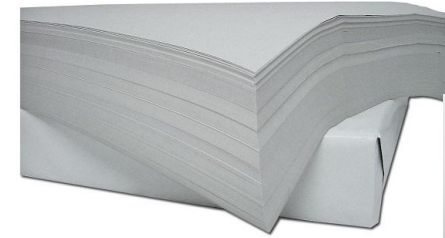


Pulping /
fractionation



Cellulose

Paper, textiles or
biofuel, biochemicals



Lignin



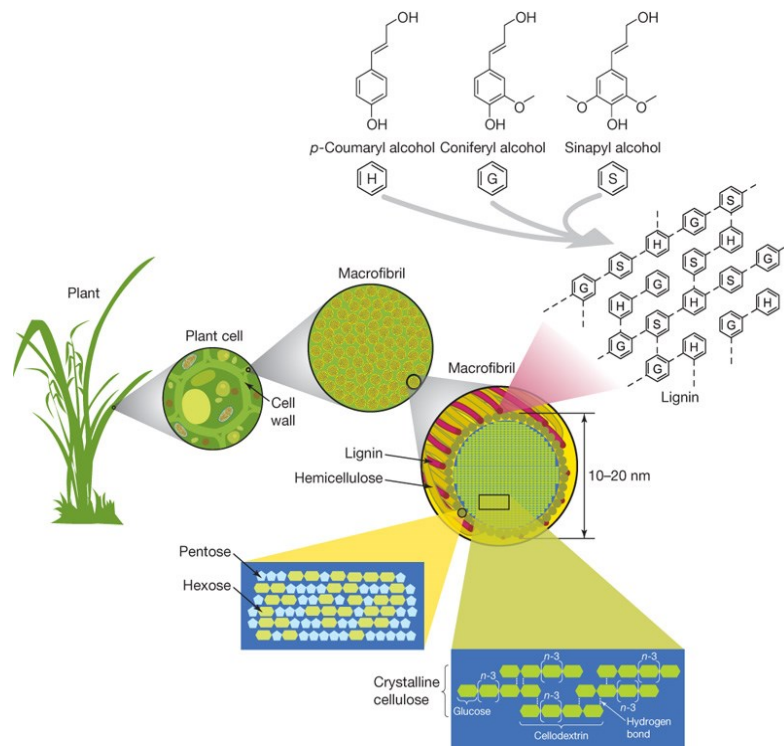
Materials, fuels and chemicals



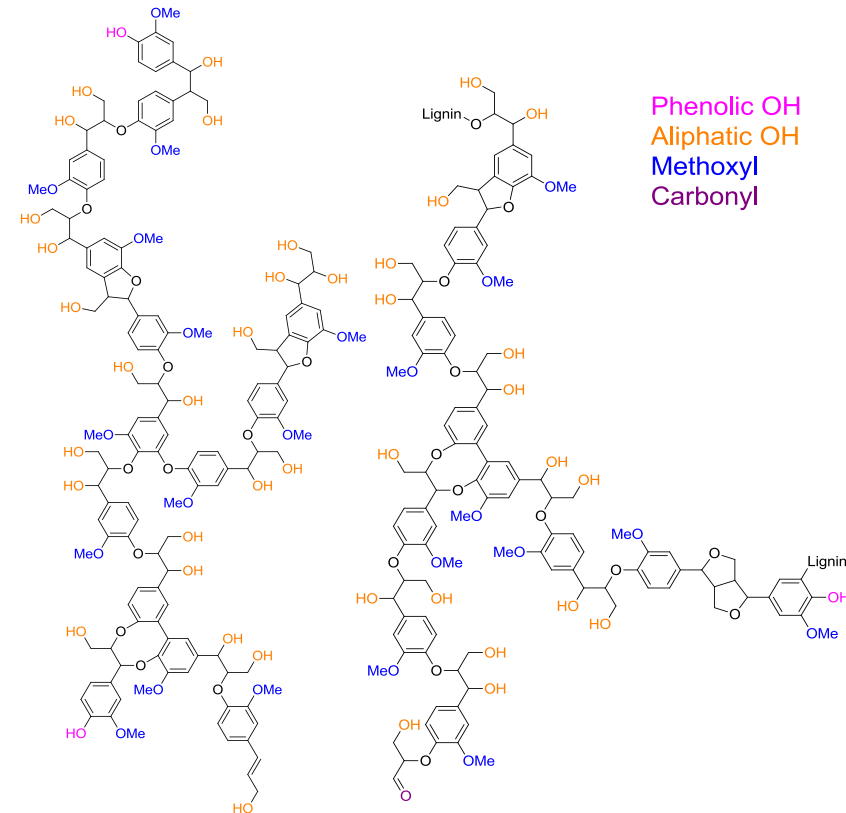
WAGENINGEN
UNIVERSITY & RESEARCH

Lignin structure

Lignin



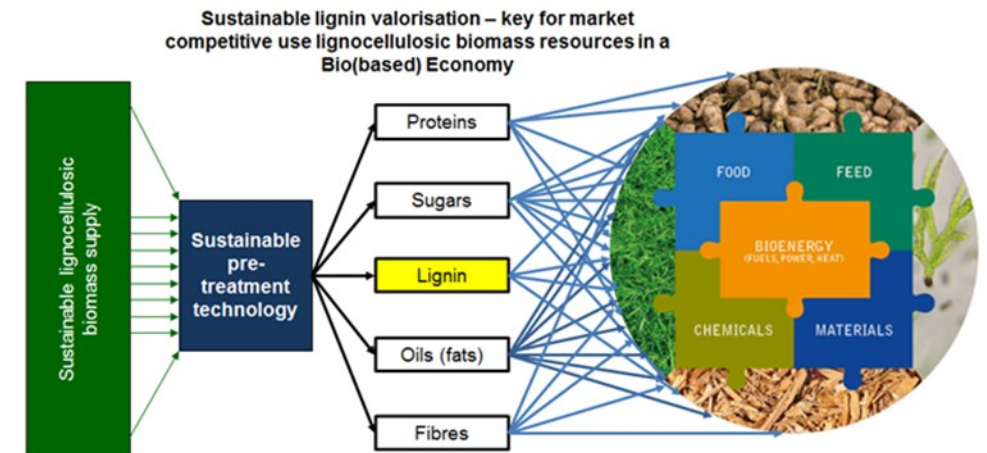
Lignocellulose architecture: Rubin 2008



Model softwood lignin: Brunow 2001

Drivers for lignin valorisation

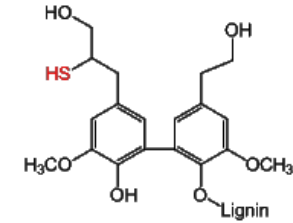
- Additional revenues beyond energy value to make a biorefinery more profitable
- Development of sustainable processes and products
- Biobased and circular economy
- Unique functionality
 - Aromatic structure
 - Polymer properties
 - Crosslinking ability (*softwood lignin*)
 - UV stability
 - Flame retardance
 - Hydrophobicity
- Bulk versus niche markets



Technical lignin availability (dry ton/y)

■ Pulp & Paper industry

- 1 M ton lignosulphonates
- >100 kton kraft lignins
- 5-10 kton soda sulphur-free lignins

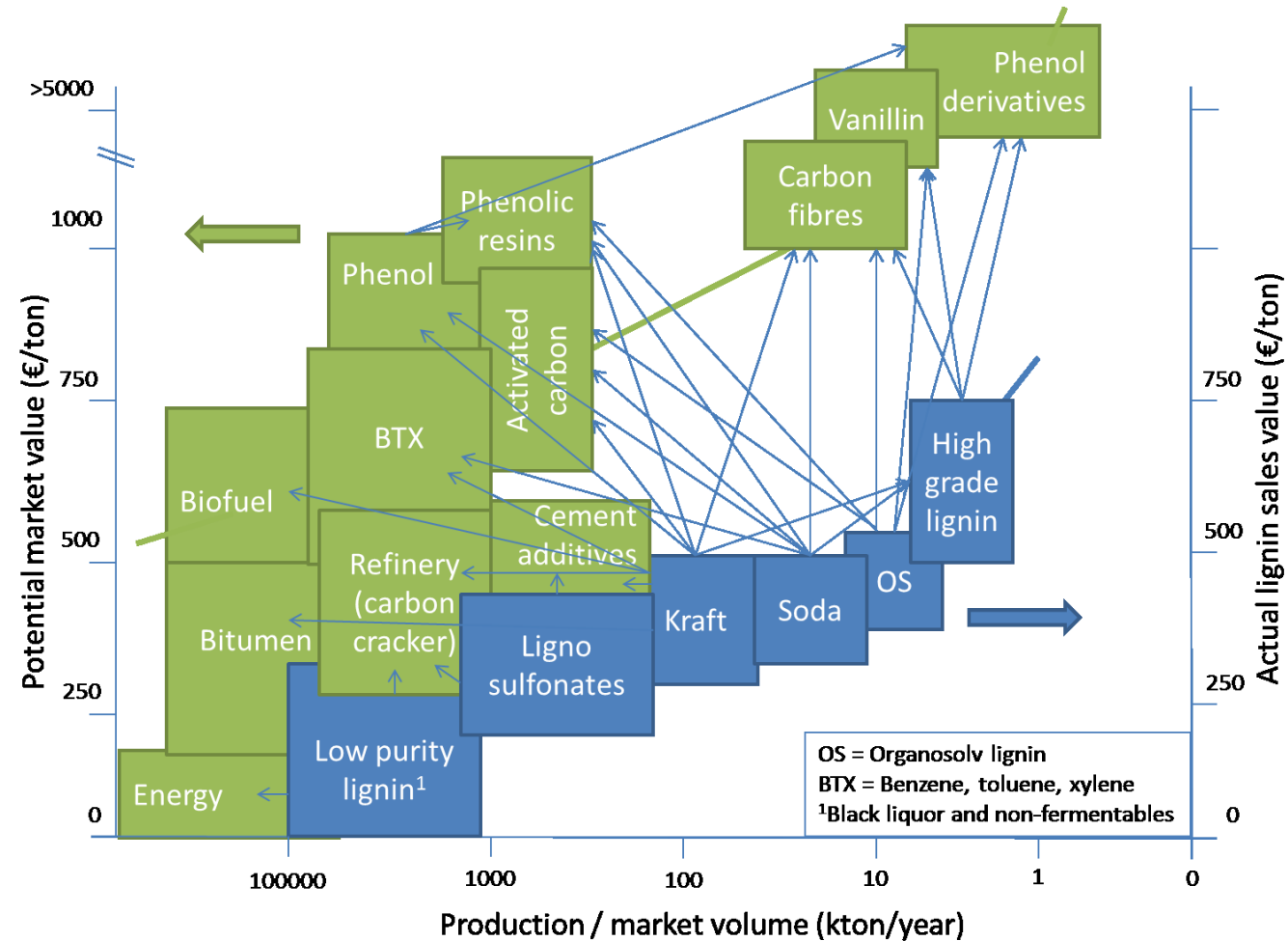


Kraft lignin

■ Biomass conversion (Biorefinery)

- Sulphur-free lignins, several pilot/demo initiatives
 - Acid hydrolysis lignins
 - Steam explosion
 - Organosolv lignins

Lignin production versus utilisation



History



































- International Lignin Institute (1990-present)
- Euro lignin (2002-2005): WFBR coordinator
- LigniMatch: Scandinavian network (2007-2009): Rise, VTT,
- LignoWorks: Canadian network (2011-2016)
- CSA taskforce for standardisation of lignin analytics (2017-present)
- COST FP1306 / LignoVAL WG lignin depolymerisation: Uni Cordoba chair
- Wageningen Lignin Platform (2010-present): WFBR coordinator: LignoCOST initiated

Need for pan-Europe network

- Lignin has large potential, but also large challenges
- Industry is now more convinced of valorisation of side streams (e.g. lignin)
- Last 5 years industrial lignin production increased
- Knowledge is scattered in Europe
- To overcome challenges, hurdles
- Multi-actor network needed to connect whole development-deployment chain
- Development knowledge to built new value chains including industrial valorisation of lignin
- Not only focusing on connecting Academic persons but also on SMEs and industry

Participants

- 34 countries
- 4 NNC request in progress
 -  Ukraine (UA)
 -  Lebanon (LB)
 -  Georgia (GE)
 -  Algeria (DZ)
- 1 IPC request in progress (proposal contributor)
 -  Canada (CA)

 Austria [AT]	
 Belgium [BE]	
 Bosnia and Herzegovina [BA]	
 Bulgaria [BG]	
 Croatia [HR]	
 Cyprus [CY]	
 Czech Republic [CZ]	
 Denmark [DK]	
 Estonia [EE]	
 Finland [FI]	
 France [FR]	
 Germany [DE]	
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	 Poland [PL]
	 Portugal [PT]
	 Romania [RO]
	 Serbia [RS]
	 Slovakia [SK]
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	 Sweden [SE]
	 Switzerland [CH]
	 Turkey [TR]
	 United Kingdom [UK]
	 FYR Macedonia [MK]

Objectives

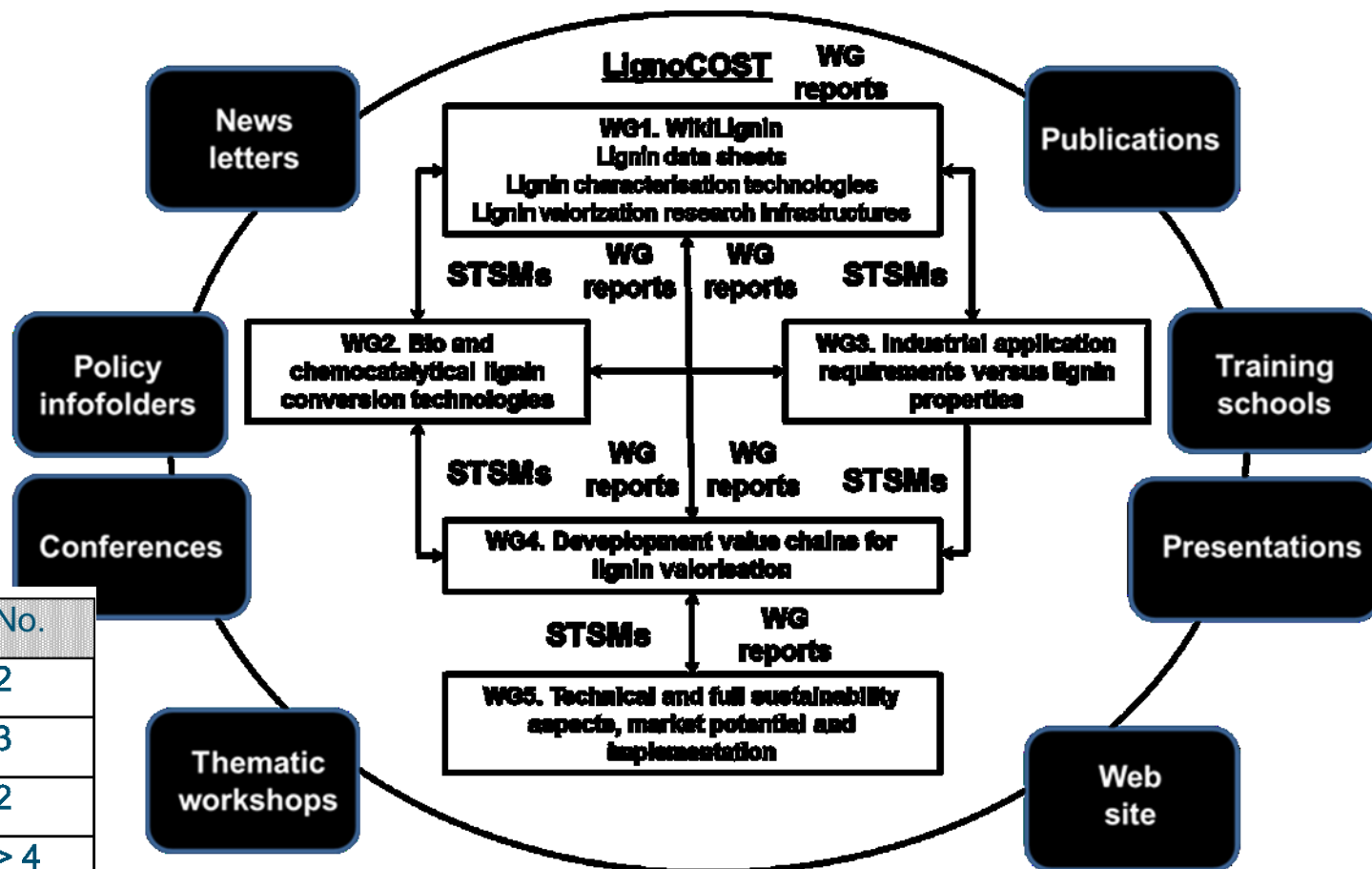
- To establish a whole chain network focusing on sustainable lignin production, conversion and valorisation
- To deliver answers for the main scientific, technical, engineering and market deployment questions on lignin valorisation
- To create a platform for the actors to cooperate and exchange know-how of experienced and young researchers and other (industrial) stakeholders

Secondary objectives

- Set-up an inventory of industrial market application requirements versus lignin properties
- Develop a web tool-based lignin information portal (WikiLignin)
- Develop knowledge on (standardisation, regulation (REACH), improvement of lignin's intrinsic properties by innovative processing
- Assess the international state-of-the-art (lignin providers, technologies, stakeholders) as reference to support European lignin-based business development.
- Assess the performance of lignin conversion processes at relevant technology readiness levels (TRLs)
- Evaluate technical and sustainability aspects, market potential and implementation potential, of most promising lignin valorisation routes

Deliverables

Deliverable	No.	Deliverable	No.
Website	1	Training schools	2
WG reports	13	Conferences	3
Progress reports	15	Thematic workshops	2
Policy infolders	8	Publications	> 4
STSMs	30	Presentations	> 6
Newsletters	8		



Management core group

Role	Nominated person	Company	Country
Action chair	Richard Gosselink	WFBR	NL
Action vice-chair	Tarja Tamminen	VTT	FI
Grant Holder scientific representative	Richard Gosselink	WFBR	NL
Grant Holder manager	Ted Slaghek	WFBR	NL
STSM coordinator	Filomena Barreiro	Instituto Politécnico de Bragança (IPB)	P
Science communication manager	Konstantinos Triantafyllidis	Aristotle University of Thessaloniki	GR

Working groups

Working Group	Title	Nominated WG Leader
1	WikiLignin	Bernard Kurek, INRA (FR)
2	Production and catalytic conversion technologies, incl. TRL assessment	Pieter Bruijnincx, UU (NL)
3	Industrial application requirements versus lignin properties	Karolien van Broekhoven, VITO (B)
4	Development of value chains for lignin valorisation	Per Tomani, RISE (SE)
5	Technical and full sustainability aspects, LCA, market deployment potential and implementation	Apostolis Koutinas, AUA (GR)