BIOFORCE

Uusiutuvia raaka-aineita kestävään biotalouteen

1.12.2020, Biotalousfoorumi Varsinais-Suomi

Lari Vähäsalo PhD
lari.vahasalo@ch-bioforce.com
+358 40 351 2820

CH-Bioforce Oy

2011 Three wood chemistry professionals Lari Vähäsalo, Sebastian von Schoultz and Nicholas Lax filed first patents within Ab BLN-Woods Ltd

2016 CH-Bioforce Oy was established in 2016 together with Oy Chemec Ab

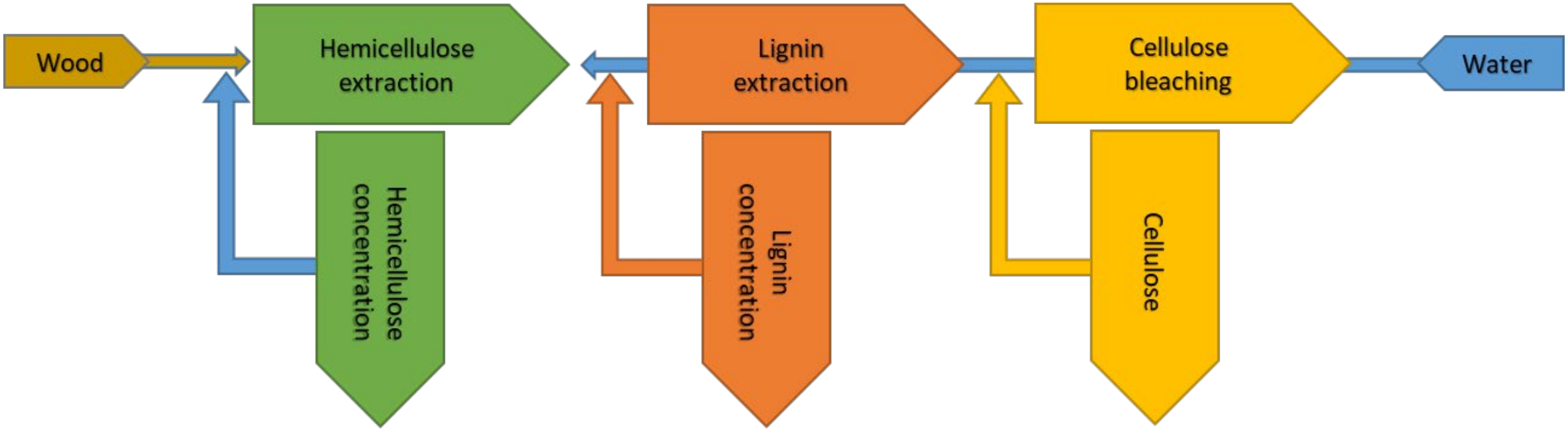
2017 Current pilot plant was built with support from owners and Business Finland

2018 Financial analysis, technology validation, material evaluation

2019 A significant funding from EU to support the final market entry

2020 ABInBev Accelerator 100+

Core technology



Based on modified pressurized hot-water extraction (PHWE) followed by soda cooking

Chemical recovery through membrane technology

Hemicellulose and Lignin concentration through membrane technology

CH-Bioforce R&D center and pilot plant at Raisio Smart Chemistry Park

Laboratory

- Fully equipped state of the art analytical laboratory
- Laboratory scale reactors for research purposes

Pilot plant

- Volume: 3.5 m^3
- Design pressure: 15 Bar
- Capacity: ~500 kg/batch
- Washing and bleaching line
- Membrane concentrators for hemicellulose and lignin

CH-Bioforce provides a revolutionary technology for converting all biomass into high-value material streams. We provide a sustainable alternative to oil- and food-based materials and cotton.

Consumer board / food packaging

Textiles

Medical devices

Prebiotics / dietary fiber

Plastics

Adhesives

CH-Bioforce converts biomass into high quality biopolymers, which are close to their natural form. These completely bio-based materials can be used in multiple applications.

Cellulose pulp

- High purity dissolving pulp
- Examples of applications: Textiles, nonwovens, sausage skins, cosmetics, biomaterials…

Lignin

- Sulphur-free, reactive
- Low M_W molar mass, about 2000 g/mol
- Examples of applications: Plastics, foams, polyurethane, composites, concrete additive, biomaterials…

Hemicellulose

- Polymeric, natural form
- High M_W molar mass, over 5000 g/mol
- Examples of applications: Paper and board barriers, food stabilizer, sweeteners, dietary fibers, adhesives, paints and coatings…

Cellulose biopolymers

Nano cellulose

- Paper and board reinforcement
- Plastics replacement
- Barrier films
- Textiles

Regenerated cellulose

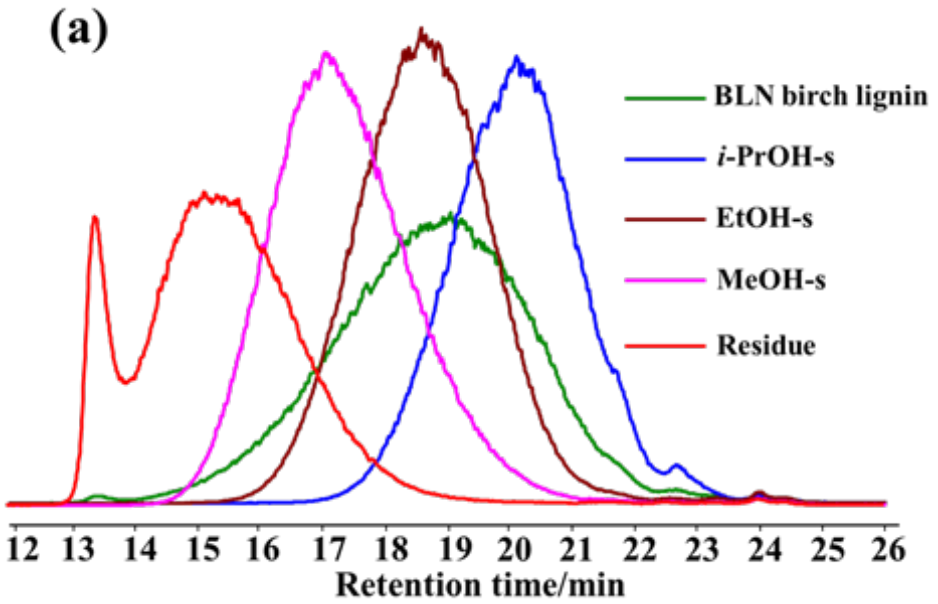
- Apparels
- Food packaging

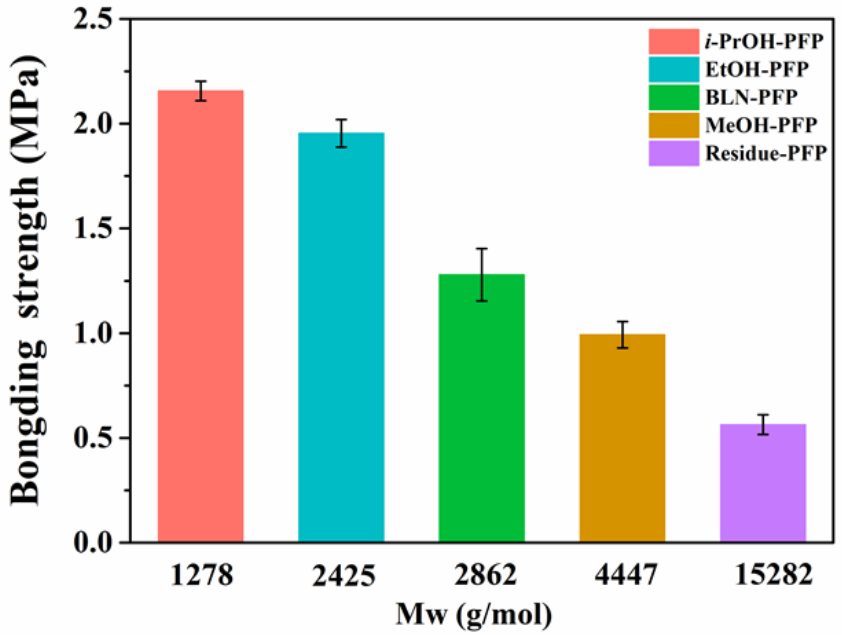
Cellulose derivatives

- Fibers
- Films

Lignin biopolymers

- 3D filaments
- Polyols
- Phenolresins

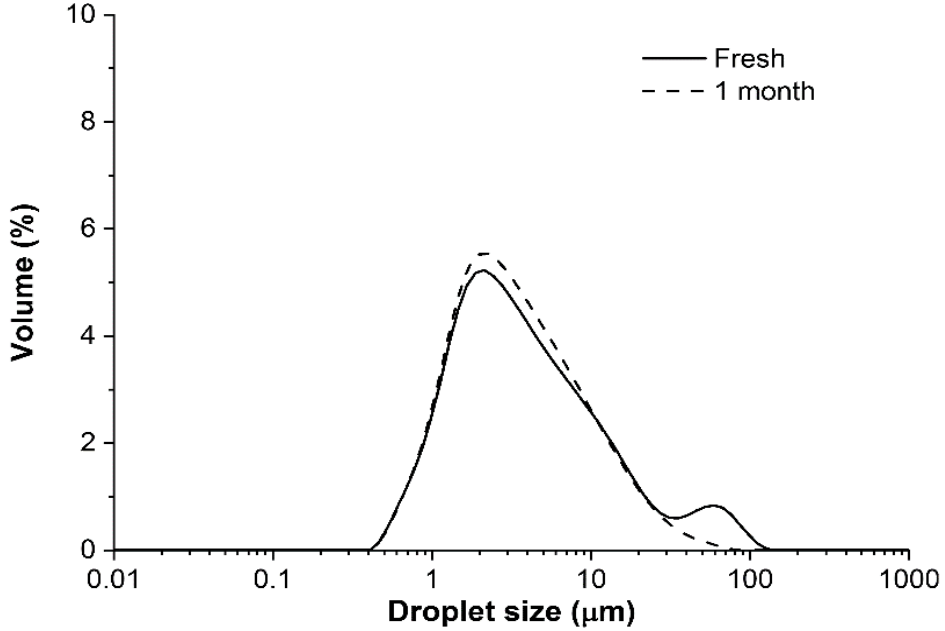




Wang et. Al: " Tailored Thermosetting Wood Adhesive Based on Well-defined Hardwood Lignin Fractions", ACS Sustainable Chem. Eng. Accepted (2020)

Emulsifiers

- Wood hemicelluloses are excellent emulsifiers in oil-in-water applications
- Produces stable emulsions
- Applications such as the food, paint and cosmetics industry

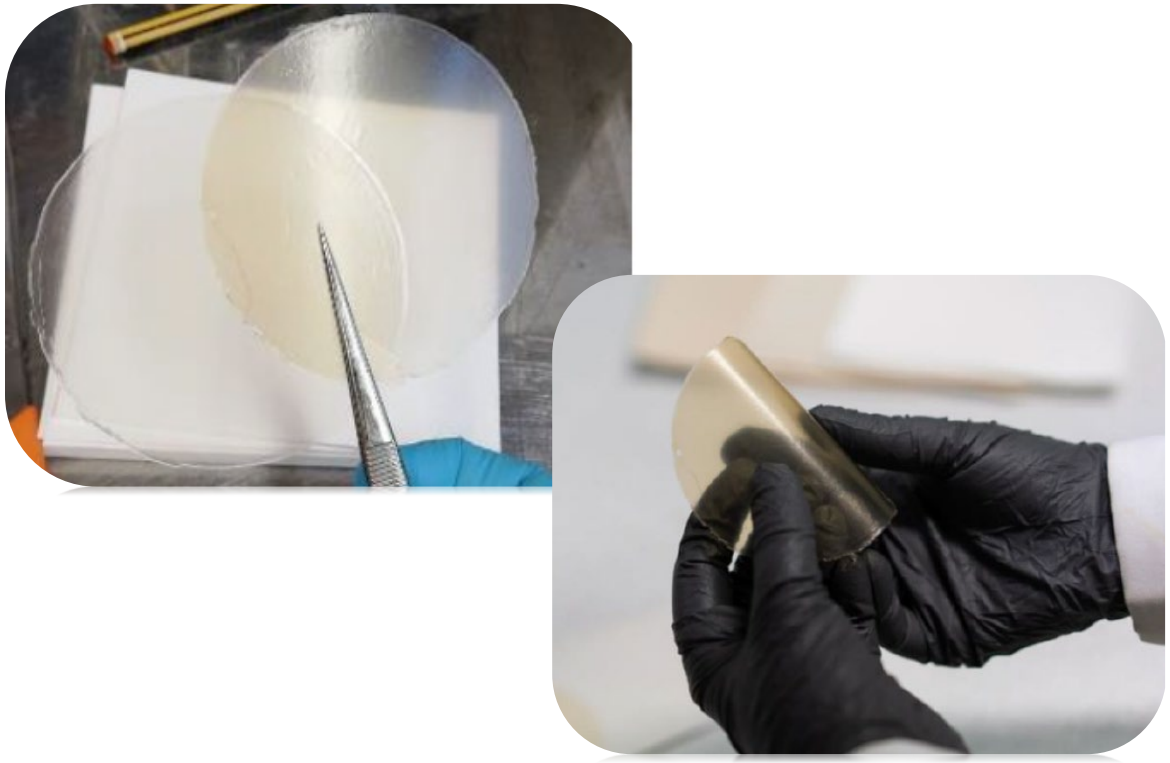


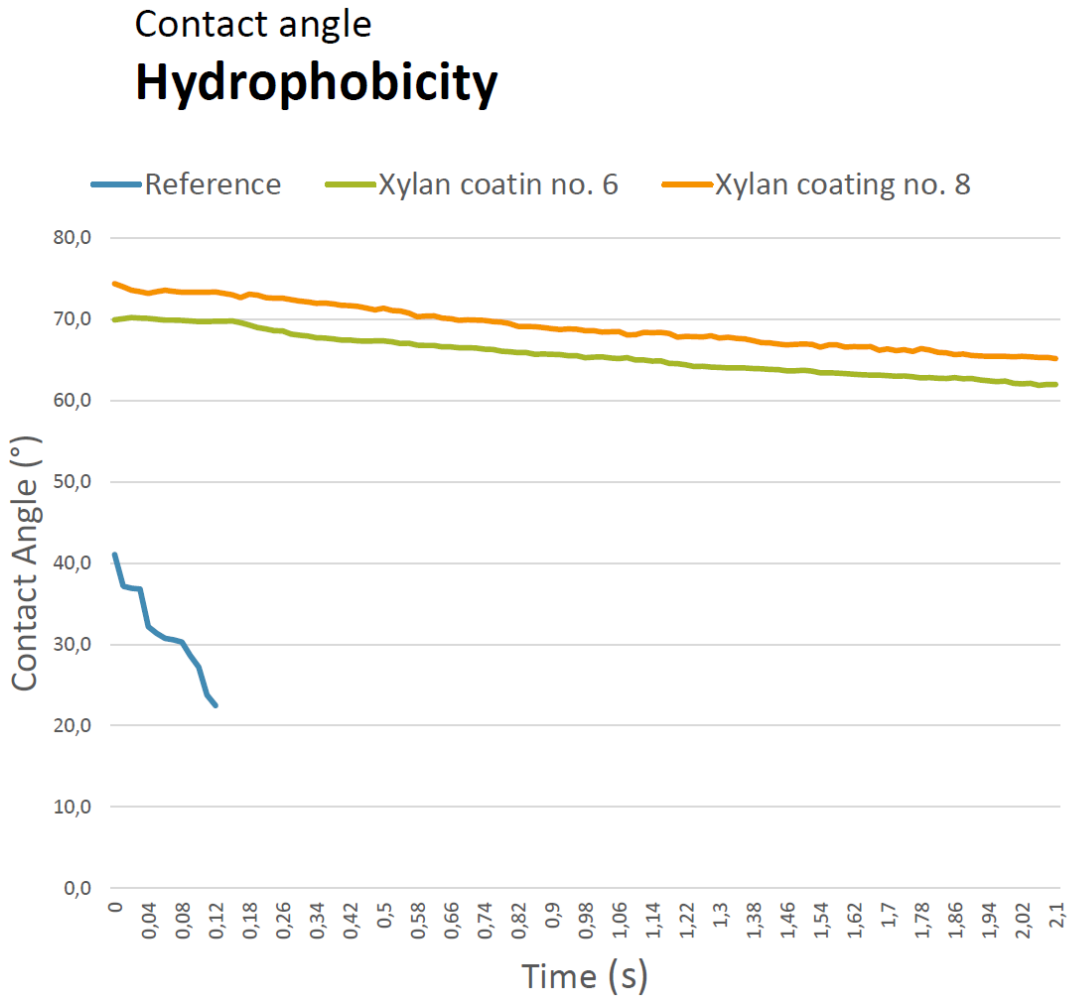
GGM in water 5% rapeseed emulsion

Mikkonen et al. Industrial Crops and Products 133, 212-220

Xylan films and barriers

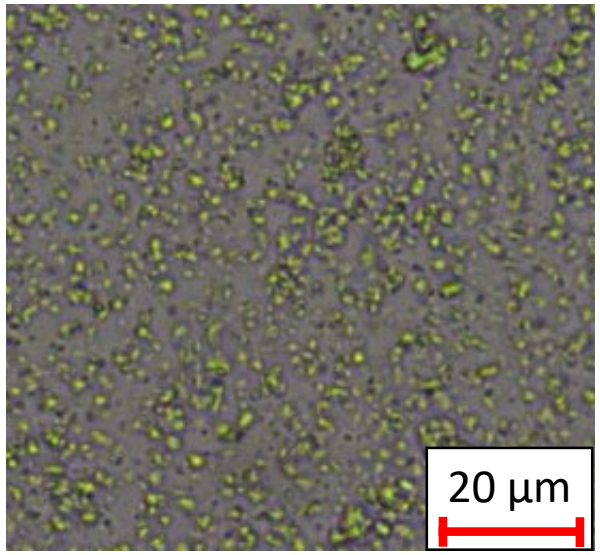
- Can be made hydrophobic or hydrophilic
- Good air/gas barrier properties

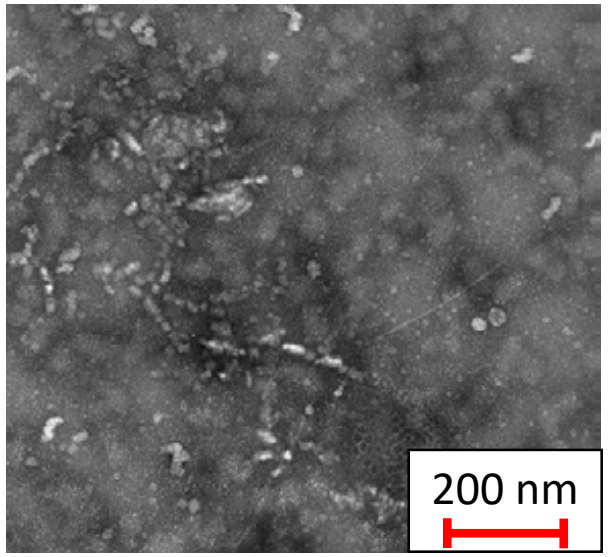


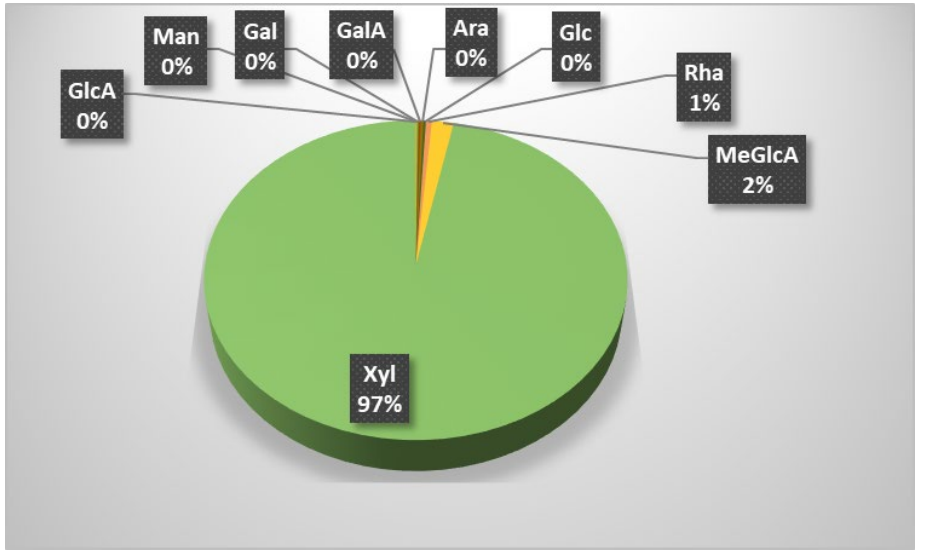


Xylan Micro/Nano Crystals (XMC / XNC)

- Polymeric Xylans (> 95% xylose content)
- Adjustable crystal size (ca. 20nm – 10µm)
- Insoluble in water
- More versatile and easy to process compared to CNC







Our financing is a mix of private investments, revenue, national public funding and EU-funding

Chemec Oy was the first one who trusted and invested in CH-Bioforce´s technology. Today, CH-Bioforce Oy is part of Chemec Group.

Business Finland support enabled CH-Bioforce to grow from lab scale to piloting phase.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 848596.

Our cumulative revenue from 2016 is over €3 million.

Our team combines over 200 years of expertise. In addition, we utilize facilities, and networks of mother company Chemec Oy and sister company CH-Polymers Oy

Mr. von Schoultz
Chief Business Officer,
Co-founder

Dr. Lari Vähäsalo
R&D Director,
Co-founder

Mr. Nicholas Lax
CTO,
Co-founder

Ms. Mari Taipale
Chief Operating Officer

Mr Björn Lax
Senior advisor,
Co-founder

Ms. Frida Sjögren
Development engineer

Mr. Karri Koho
Technician

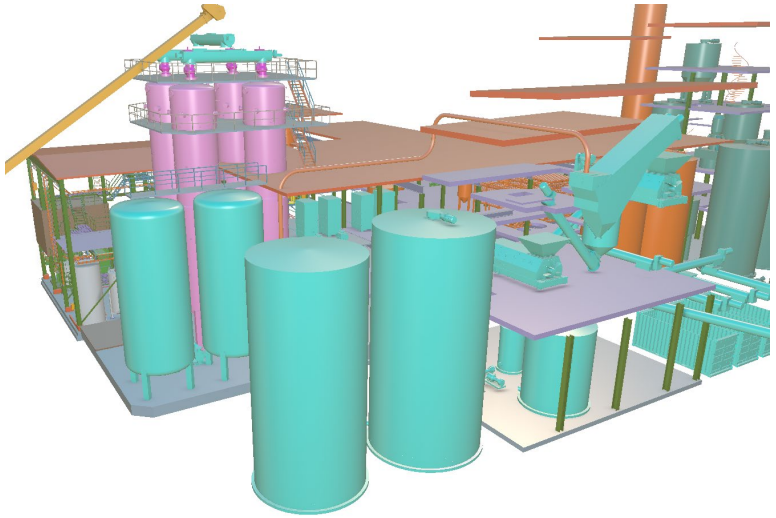
Mr. Mikko Maijala
Chair of Board,
Chair of Board at Chemec

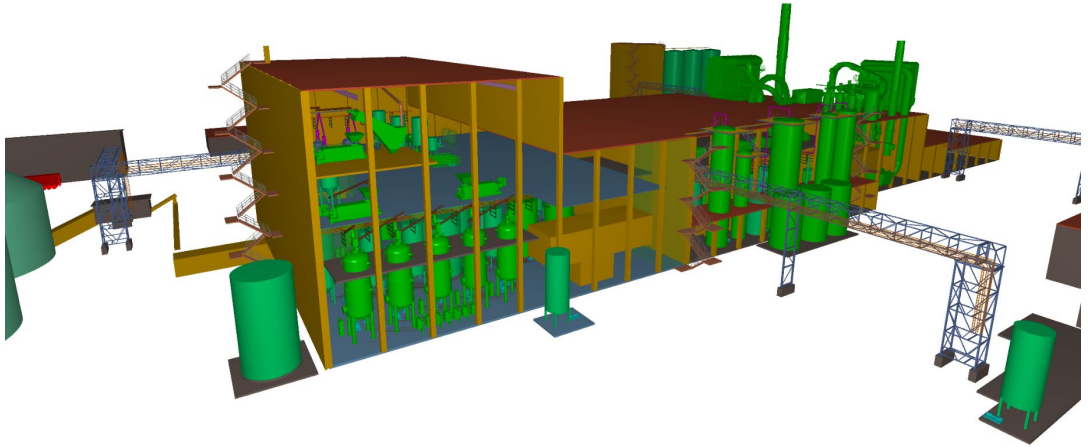
Mr. Mattias Strandberg
Process engineer

Ms. Irina Saarinen
Laboratory analyst

Business development ***Continuous R&D*** ***Implementation*** ***Operations***

Pre-engineered production plants





Mid-scale plant

- Capacity 15,000 tons/year
- CAPEX €35 million

Large-scale plant

- Capacity 100,000 tons/year
- CAPEX €220 million

CONTACT US!

CH-Bioforce Oy
Ahventie 4 A 21-22
FI-02170 Espoo, FINLAND

Raisionkaari 55
FI-21200 Raisio, FINLAND

info@ch-bioforce.com
+358 9 502 4410

The BioForce of Nature

BIOFORCE