



FROM WASTE TO VALUE

**SUSTAINABLE POLYMERS TO REPLACE
FOSSIL RAW MATERIALS**

BalticReed Hackathon

14th Feb 2024 | Lari Vähäsalo
lari.vahasalo@ch-bioforce.com

2016

CH-Bioforce established

2017

Small-scale plant in Raisio Finland, capacity 0,5 ton/batch

2019

Construction of automated pilot production line begins

2020

Technology develops and new collaborations and global projects.

2022

CHB technology used in real applications



2017

Support from Business Finland

2019

SME 2 funding from the European Union's Horizon 2020 research and innovation programme



2025

FIRST PLANT
to be commissioned, capacity 20.000 tons/year

Solution: Our unique, fully scalable Game-changing Technology

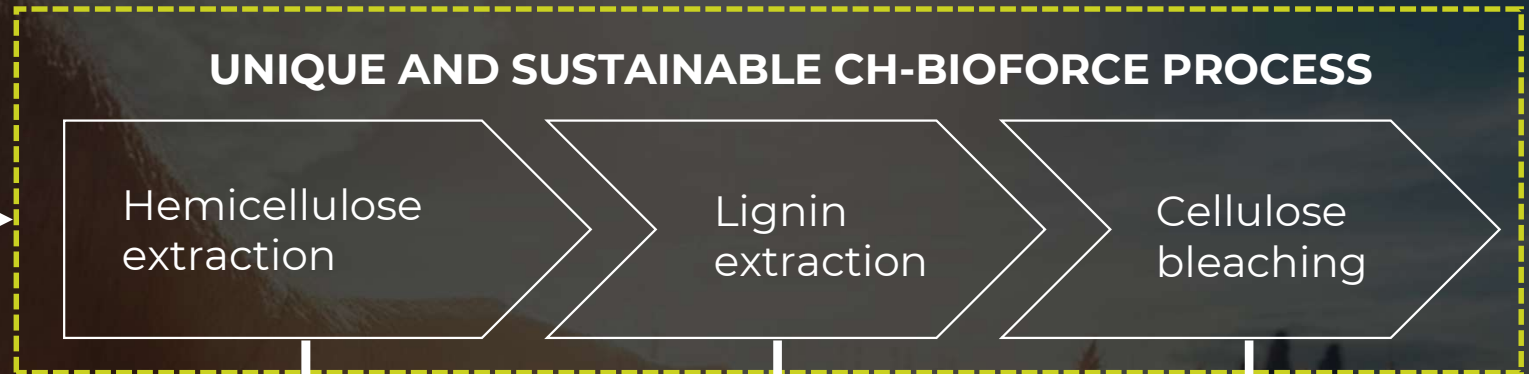
High material efficiency, carbon neutral, sustainable, low operating costs = high-quality products



Raw material from various agricultural or industrial sources



Ultra low Water Consumption



High-quality Polymeric Hemicellulose for **cosmetics and detergents**



High-quality Sulphur-free Lignin for **industrial gluing and cosmetics**



High-quality cellulose for **textiles** to replace cotton

Benefits of our technology

1.

Carbon neutral process produces carbon binding products

2.

Ultra low freshwater consumption

3.

A wide range of biomass, industrial and agricultural side streams, can be used as a raw material

4.

High product quality =
high purity **cellulose**
polymeric **hemicellulose**
sulphur-free **lignin**

5.

Material efficiency more than **twice as good** as in a traditional pulping process

6.

Production **costs are 42% lower** per ton produced compared to traditional pulp production

...that leads eventually to:



Cellulose

- Fabrics
- Textile fibres
- Viscose/Rayon
- Medical applications
- Food applications



Hemicellulose

- Cosmetics
- Detergents
- Binders and glues
- Pharma medical
- Sugars (sweeteners, biofuels)
- Packaging (barrier materials)
- Dietary fibers



Lignin

- Polyurethanes
- Carbon fibres
- 3D printing filaments
- Graphite and graphene
- Composites
- UV-Blocker



- Xylense – Emulsifier and more

CH
BIOFORCE
The Bioforce of Nature



in-cosmetics® global

Barcelona • 28–30 March 2023

MEET US AT STAND AP24

The advertisement features a close-up of hands holding a small, round, light-colored jar of cream. A white applicator is being used to apply the cream to the back of a hand. The background is a soft-focus image of green leaves.

CH
BIOFORCE
The Bioforce of Nature

HET・
KI・NEN
ヘトキネン



The advertisement shows a hand holding a small, round, light-colored jar of cream. The background is a soft-focus image of green leaves.

First in the World



Spinnova
The Sustainable Fibre Company.

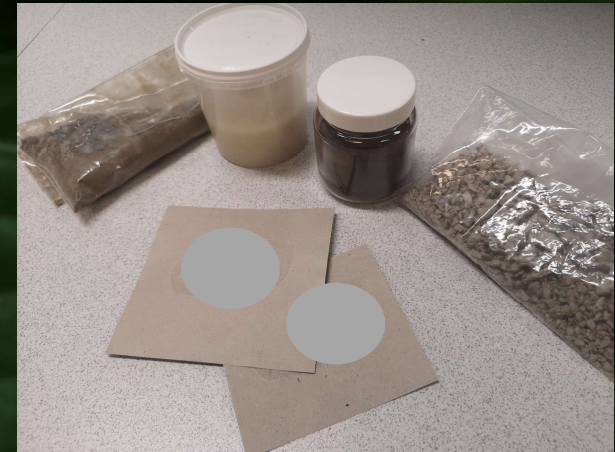


Lake Reed



Source, Maaseudun Tulevaisuus

CH
BIOFORCE



Beachhead Market C

Licensing: Beer Brewing Waste to high value food components



BREWERS SPENT GRAIN

HIGH QUALITY POLYMERIC HEMICELLULOSE AND PROTEINS

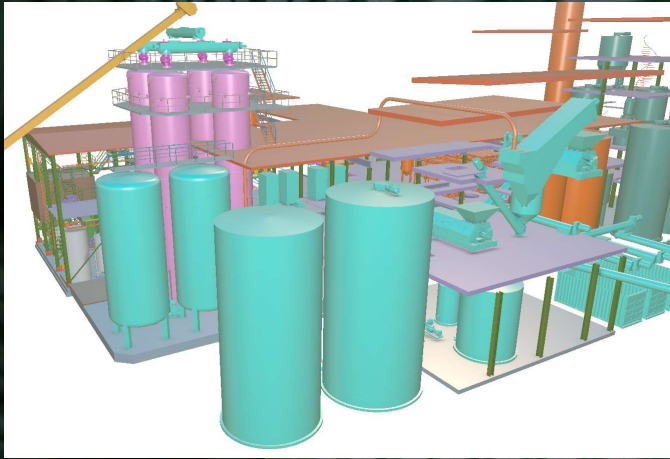


CH-Bioforce R&D center and pilot plant at Raisio Smart Chemistry Park

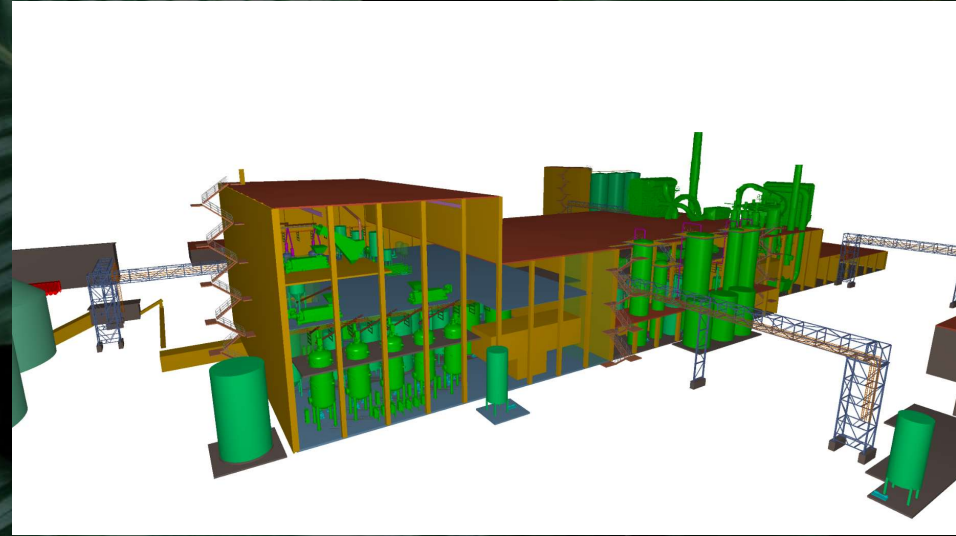
- Laboratory
 - Fully equipped state of the art analytical laboratory
 - Laboratory scale reactors for research purposes
- Pilot plant
 - Volume: 3 m³
 - Design pressure: 15 Bar
 - Capacity: ~500 kg/batch
 - Washing and bleaching line
 - Membrane concentrators for hemicellulose and lignin



- **Pre-engineered production plants**



- ***Mid-scale plant***
- Capacity 20,000 tons/year
- CAPEX €35 million



- ***Large-scale plant***
- Capacity 100,000 tons/year
- CAPEX €220 million

CH

BIOFORCE

The Bioforce of Nature

**MAKING THE WORLD MORE
SUSTAINABLE BY CONVERTING
WASTE TO HIGH VALUE**