



Spinnova

The Sustainable Fibre Company.

PUUPOHJAISTEN TEKSTIILIEN MARKKINA JA KEHITYSTYÖ

PÄÄTTÄJIEN 49. METSÄAKATEMIA
Seminaaripäivä, keskiviikko 9.9.2020
Majvik, Kirkkonummi
Pia Qvintus



Spinnova

The Sustainable Fibre Company.

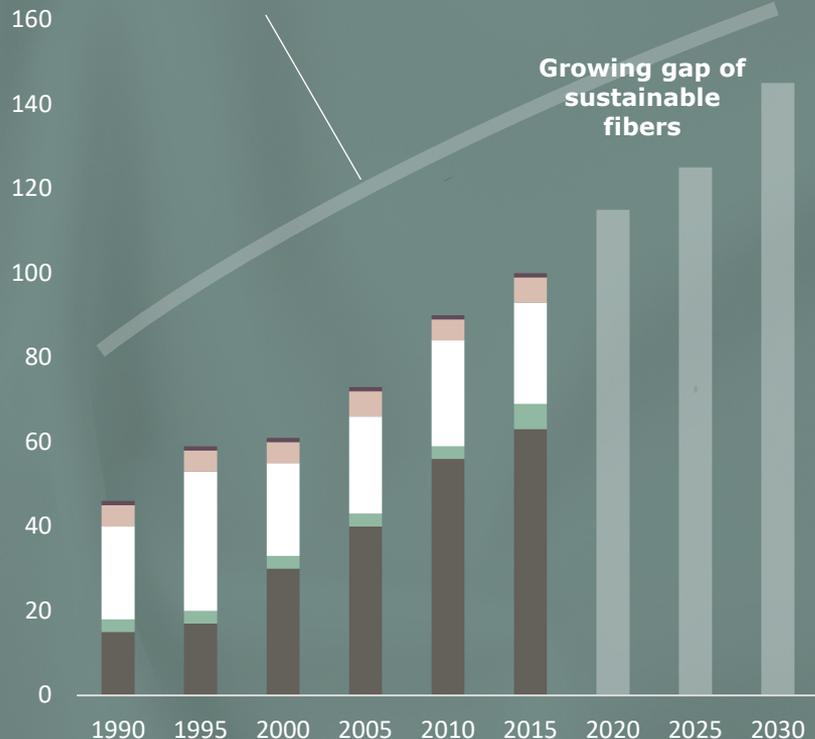
09/09/2020

Company Confidential



Global Fibre Market

Global Population



Cotton 24 %



Synthetics 63 %



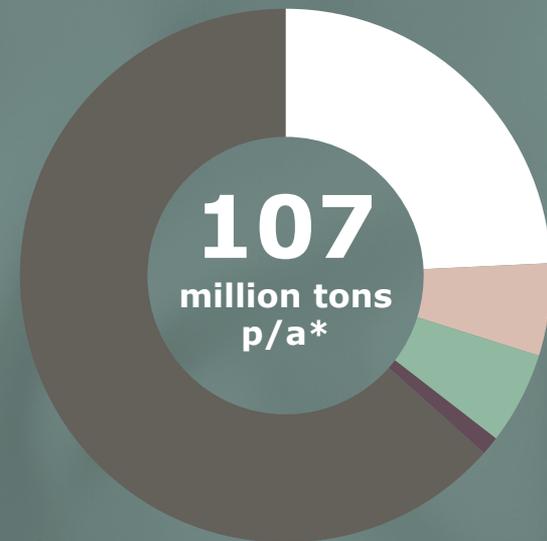
Cellulosics 6 %



Other naturals 6 %



Wool 1 %

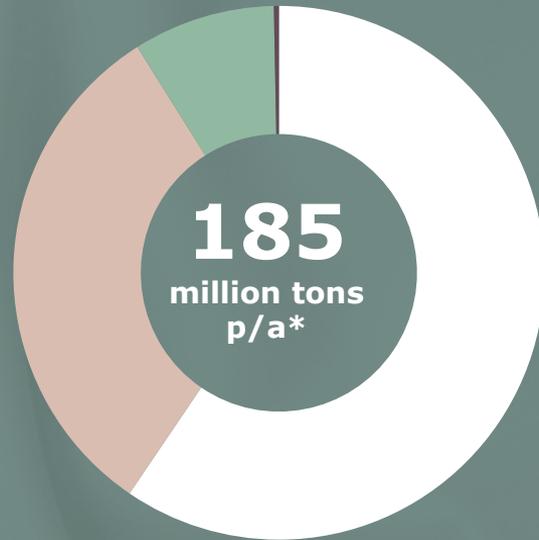


Depending on the application, Spinnova can replace cotton, viscose, modal, lyocell and wool.



Pulp & Cellulosic Fibre Markets

Global Pulp Production Volume

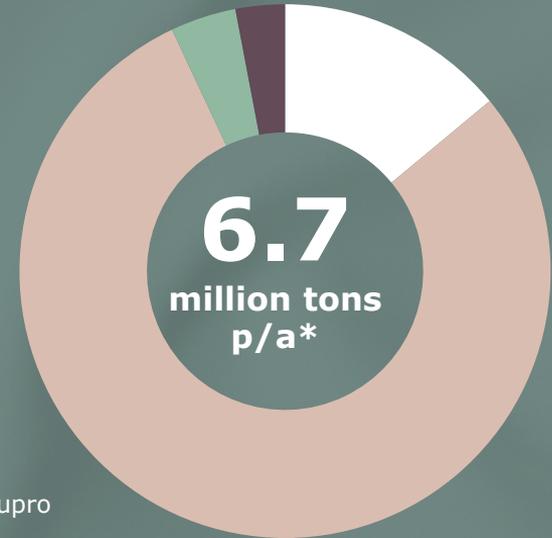


- Packaging paper & board
- Printing & writing
- Tissue paper
- Other paper & board

Total volume of pulp used for cellulosic textile fibre equals

only **3.6%**
of the total pulp volume produced.

Global Cellulosic Textile Fibre Volume



- Acetate
- Viscose
- Lyocell
- Modal&Cupro



Man made cellulosic fibres

Case - viscose

Viscose production

- Production mainly (>80%) in Asia, China and India
- Biggest producer Austrian Lenzing

Viscose uses

- Apparel
- Home textiles
- Medical textiles
- Technical textiles

Challenge

- Use of highly toxic chemistry in production

Viscose replacements

- Lyocell
- Infinited Fiber Company
- Ioncell-F, Aalto University
- Ioncell, MI Demo Oy (Metsä Group/Itochu)



Spinnova

The Sustainable Fibre Company.

Our Story

It all started with spider web.

In 2009, Technical Research Centre of Finland's (VTT) pulp & paper scientist **Juha Salmela** heard a presentation from a spider researcher in Oxford university, explaining the similarities between a spider web's protein and nanocellulose.

That's when the idea came to Juha: what if wood fibre could be spun into textile fibre in the same way, without breaking the structure with chemicals?

What if we could imitate Mother Nature herself?



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Heureka!

A Very Short History



Idea

*What if we could
mimic spider web?*



Testing

in VTT Technical Research
Centre of Finland



Spinoff

from VTT



Lab scale

development



Small industrial

scale development



Big industrial

scale pilot

20
09

20
14

20
19



Our Founders



CEO Dr. Janne Poranen

Born in 1972, **Janne Poranen is the CEO and co-founder of Spinnova.**

Before spinning the business off from VTT with Salmela, he headed VTT's Fibers and Bio-based materials research area. He also held other managerial positions in his ten years with the VTT and was a visiting scientist at the University of Maine.

Poranen holds a PhD in physics, completed with business and innovation leadership training in the IMD Business School. He is a hybrid of scientist, industrial expert and entrepreneur.



CTO Juha Salmela

Born in 1973, **Juha Salmela is the CTO and co-founder of Spinnova.**

Prior to inventing the method for spinning fibre out of cellulose, physicist Salmela was a team leader of VTT's rheology and process flows team. His main focus was on experimental research of paper making related fibre suspension flows and rheology.

Salmela has led several large industrial process development projects in his 18 years with the VTT. He was also a visiting scientist at the university of British Columbia in Vancouver. He is a member of the Pulp and Paper Fundamental Research Committee.

Salmela was chosen European CTO of the Year 2018 by Spinverse and EIRMA.



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The Method



Disruptive technology for drop-in fibre



Zero harmful chemicals.

Closed process



Zero waste.



Evaporated water



Drying

HARMFUL ZERO PERCENT

0%



Wood & Waste

Pulping



Mechanical refining



Patented Spinning Technology



Fibre



Disruptively sustainable technology



1

Wood / Waste



2

Pulping



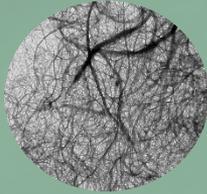
3

Mechanical Refining



4

Micro Fibrillated Cellulose



5

Fibril Suspension



6

Extrusion & Drying



Staple fibre/filament



Non-wovens



Apparel & Footwear



Home Textiles



Key Differentiators

Spinnova



Mechanical treatment

Grinding wood fibres into tiny micro fibrils.

- Grinding pulp mechanically
- Micro fibrillated cellulose
- Dry spinning and drying
- No washes / rinses
- No side / waste streams

Man-made Cellulosics



Dissolving

Chemically breaking wood fibres into cellulose polymers.

- Chemically dissolving wood fibres into a polymer solution
- Wet spinning with chemicals
- Several wash and rinse cycles
- Side and waste streams*

* Lyocell uses a complex chemical process, however in a closed cycle, so it's more sustainable than a viscose process.

Patents and IPR

Spinnova's proprietary method, technology and trademark are very well protected around the world.

18

Patents
granted

37

Patents pending



Name and logo
trademark
registered



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Wood or
waste

Spinnova
Virgin Fibre

Brand
Takeback
Programme

Brand
Manufacture

A New Item

Amazingly Circular Fibre

An Item

Brand
Manufacture

Brand
Takeback
Programme

Spinnova
Reuse Fibre

No dissolving, no
harmful chemicals.
Improved quality!





Circular Collection of Tomorrow

A maverick experiment

- 100% circular, subscription-based textile concept
- Involves consumers in R&D from 1st prototype phase
- Customer gets co-ownership of the circulating material
- Developing collection will provide the next product, only charging for cutting and sewing

1st Product: A recyclable backpack

- No metal. No plastic. No zippers. No dye. No PU coating.
- Only natural materials; quickly biodegradable at end-of-life
- Recyclable in Spinnova's process without dismantling
- Completely unique concept that can revolutionize sports and outdoor textiles





Waste Circularity Potential

Causes huge emissions!



Agri Waste

Agricultural waste such as straw is currently mostly burned, creating emissions – making that circular is underway

Pre-treatment process
Undergoes pulping before mechanical refining

Massive waste problem!



Cotton Upcycling

Making pre and post consumer cotton circular with eco-friendly technology would have massive environmental impacts

Pre-treatment process
100% cellulose; mechanical refining only

Unlimited opportunities!



Other Cellulosic Waste

A number of waste streams such as biowaste from industrial processes are feasible for our technology

Pre-treatment process
Depends on the raw material's cellulosic content



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The Fibre



Sustainable fibre with great properties

Fibre properties

- Mechanically closest to cotton
- Drop-in, customizable fibre
- Good thermal and acoustic insulation properties
- Water repellent/absorbing
- Resistant to solvents
- Electrically non-conductive
- Non-allergenic
- Can replace a number of fibres
- Suits a variety of applications

Sustainability Facts

- 100% Natural
- 100% Biodegradable
- 100% Circular
- 0% Microplastics
- 0% Harmful Chemicals
- 0% Volatile organic compounds (VOCs)
- 99% less water use than cotton
- Reusable post-consumer with improved quality
- Renewable raw material; certified wood / waste upcycling
- Low carbon footprint



Our Demos





AFTER
(OZONE)
(+ENZYME)

AFTER
(ENZYME)

BEFORE
WEFT: 75-25
(lyocell)
WARP: COTON



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Thank you!

www.spinnova.com



