Novel strengthening technology for paper and board - plant fibril boosted surface sizing

Watti Lehtimäki / BioHUB Webinar 21 April 2026

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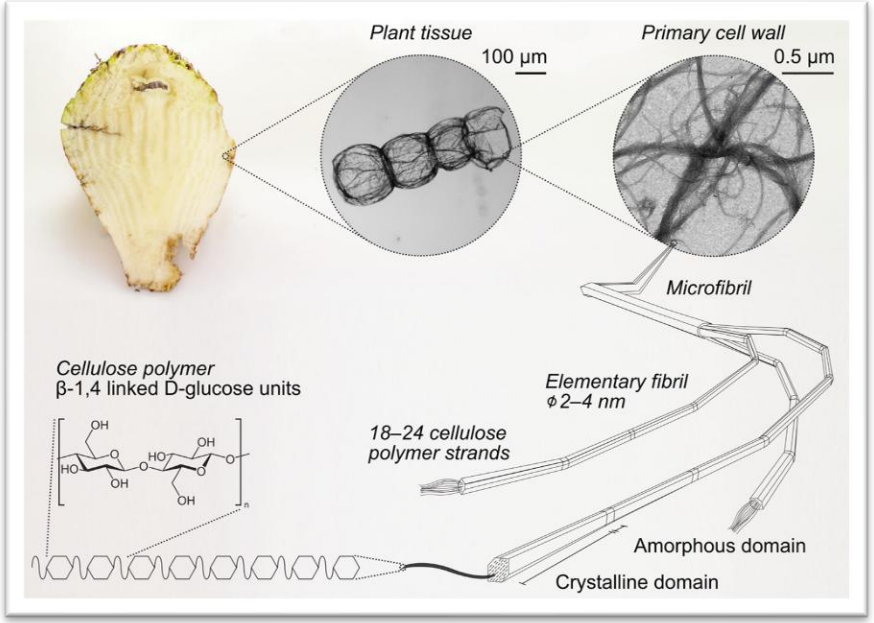

Sugarbeet primary cell wall fibrils

The problem to be solved

- *The utilisation of old newspapers and magazines declined by 16% while the utilisation of old corrugated and kraft products moved up by 1.7%. (in 2025)*

  – CEPI

- *"Without a steady input of new fibre, the recycling loop would eventually collapse, making it impossible to maintain both the quality and volume of recycled paper and paperboard."*
- *"fresh fibre isn't just helpful, it's essential to keep the system going"*

  – Holmen

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Innovations are needed to combat *Fiber fatigue, or* the decrease in quality of recycled fibre feedstocks.

Introducing primary cell wall fibrils - Manufacturing

A new technology has been developed for producing a fibril product out of non-wood raw materials.

- Sugar beet pulp
- Cassava pulp
- Potato pulp

SB0765

This production process has been proven to be scalable:

- Refining energy need only **~600** kWh/ton
- Yearly production capacity of 400 dry tons
  - ➢ Enough to supply ~1.8 Mt/a of board production

Alkali extraction + washing

Cellulose

Fibrillation

Hemicelluloses

Proteins

Plant fibrils in surface sizing – Pilot trial October 2025

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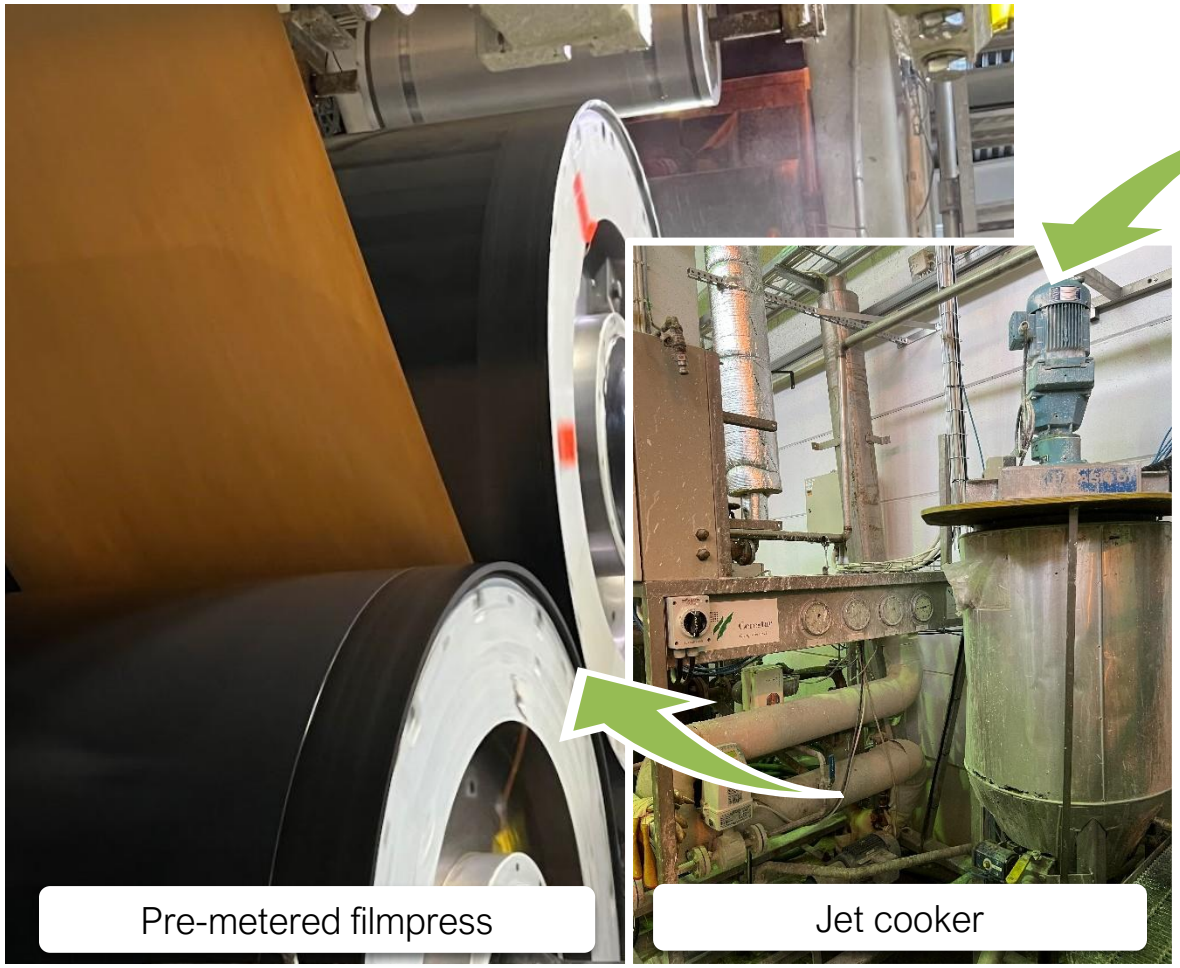
Process & recipes



Product	Reference recipe	Trial recipe
Wheat starch Cargill C*Film 07391	100 %	98 %
Plant fibrils KCL SB0765	-	2 %
Solids content	18 %	18 %
Coatweight	14 g/m^2	13 g/m^2

Plant fibrils in surface sizing – Pilot trial October 2025

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The data from the tested material shows the effect:

- Starch surface sizing improves mechanical properties.
- Plant fibril boosted sizing further improves mechanical properties.
- Biggest differences can be seen in cross directional properties.

Base material is 120 g/m^2 uncoated white top testliner.

Value creation

Benefits for end customer

- Lightweighting.
- Improved mechanical properties.
- Improved environmental performance.

Benefits for paper & board producer

- Reduce long fibre pulp use.
- Increase recycled fibre use.
- Increase filler use.
- Improved mechanical properties.
- Improved coating coverage, lower barrier coatweight.
- Improved runnability in downstream coating.

Practical effects

- No increased drying energy usage.
  - Surface sizing needs to be diluted after cooking anyways.
- No effect on drainage.
  - The most common problem for wet-end fibrillar strength additives.
- No big investment needed.
  - Proper stirring in starch slurry tank.
  - Feed system for paste.

How to proceed

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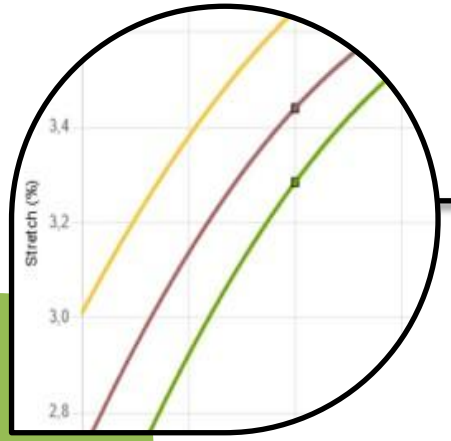
Lab validation

- Prove the effectiveness on your paper or board at lab scale.

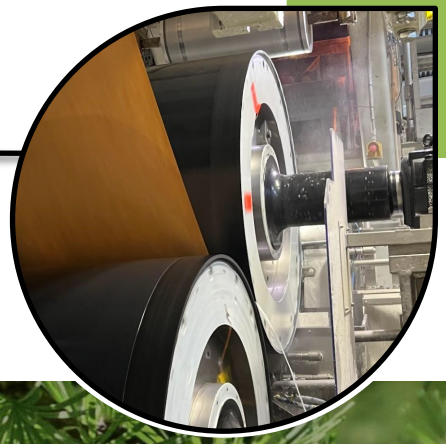


Digital simulation

- Simulate cost-cutting potential and performance increases with GloCell software.

Pilot trials

- Prove the concept at real speeds.
- Produce demo material for customers.



Mill trials

- Ask us to help implement the technology in your production process.

Conclusions

- Plant fibrils can be made **cheaply** and **at scale** from agro waste streams.
- Plant fibrils form a micro-network within the paper, and **boost mechanical properties**.
- By adding the fibrils to paper through surface sizing, wet-end challenges such as **slow drainage can be avoided**.
- By adding plant fibrils, **costs can be reduced** through cheaper raw materials and **specifications can be secured** when raw materials change.

Thank you for your attention!

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