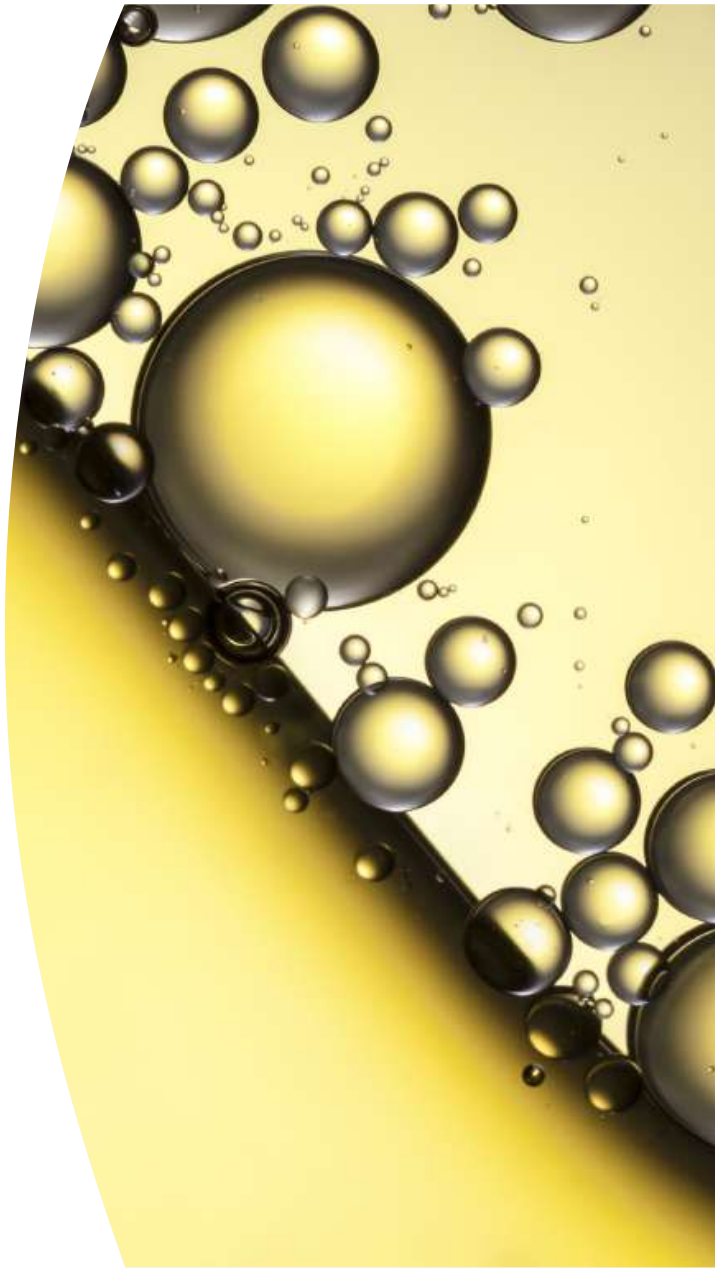
Enhancing hemicellulose utilization through pressurized hot water extraction

Petri Kilpeläinen
8.10.2026



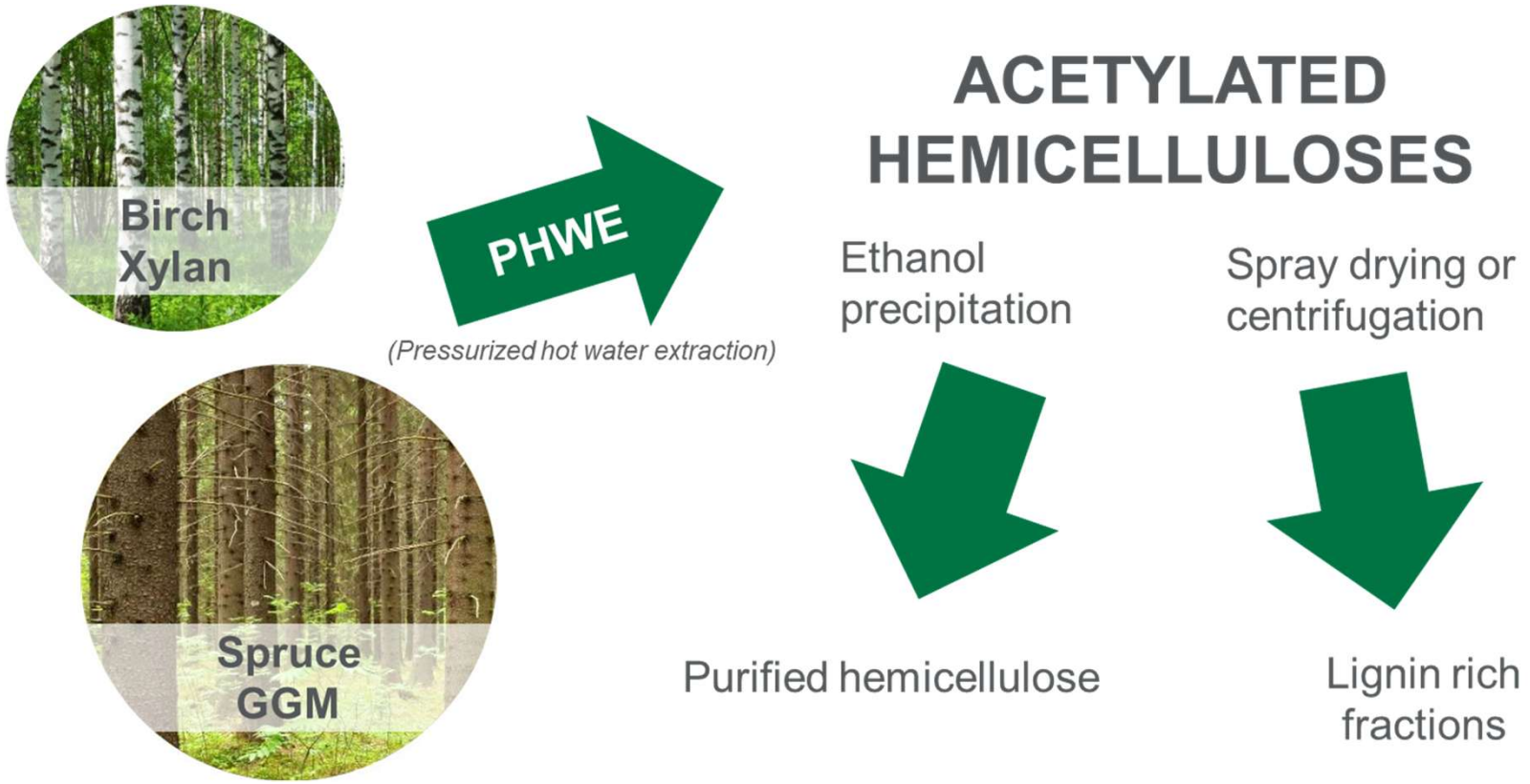
Hemicelluloses

- **SCALE-UP — PHWE progressed from laboratory to pilot scale.**
- **APPLICATIONS — emulsions, foods, microcapsules, paints, gels and packaging.**
- **IMPLICATION — define the target fraction and product before selecting extraction severity or scale.**



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Hemicellulose extraction and purification



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Hemicelluloses products and target customers

Offer	Initial customer	Value proposition
Xylo-oligosaccharides (XOS) **Arabino xylo-oligosaccharides (AXOS) ingredient**	Ingredient formulators, supplement, pet-food and feed companies	Specified prebiotic oligosaccharide from traceable side streams, with controlled DP and impurity profile
GGM functional concentrate	Food, cosmetic, coating and encapsulation formulators	Renewable emulsification, stabilization, binding or film functionality from softwood residues
Xylan material intermediate	Paper/packaging, adhesive and coating formulators	Bio-based polymer with tunable barrier, binding or modification potential
C5 sugar platform stream	Xylitol, fermentation or furfural producers	Concentrated, characterized C5 feedstock integrated with residue valorization

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A stage-gated pilot path turns fractions into products

Extraction → fractionation → functionality → application validation

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Selected co-authored publications

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HEMICELLULOSE FUNCTION & APPLICATIONS

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PHWE, SEPARATION & SCALE-UP

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