

Hemicelluloses belong to a family of polysaccharides with interesting properties for possible products such as paper chemicals, barrier materials and new composite materials. Innventia is teaming up for the development of new production process.

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Forest-based new materials

It is a matter of biorefinery. Of the three main components of wood, we can currently refine both lignin and cellulose to create a number of products, while hemicellulose remains an unused resource. Hemicellulose is a polysaccharide with interesting properties for possible products such as paper chemicals, barrier materials and new composite materials. It is also a matter of what we call residue streams, the value of which currently lies solely in their heat content. We want to base the processes and products of tomorrow on this unused resource.

Innventia has a committed team with in-depth expertise spanning the entire value chain for hemicellulose – from the fibre line, separation processes, chemical modifications and product properties, to chemical analyses, material analyses and system analyses. Our new focus involves bringing all this knowledge together to develop a new and attractive production process for hemicellulose products, based on pulp mill residue streams. We are working towards effective separation and upgrading. This is essential, since the valuable component often exists in low concentrations, together with many other components. We are also developing new ways to modify hemicellulose in order to create a product with the desired properties. Development work

on different scales is an important skill for us, since clear effects in the lab can give different outcomes on a full factory scale. The goal is a full-scale factory process.

One example of an interesting application for hemicellulose from pulp mill residue streams is materials for oxygen barriers. Working together with its partners, Innventia has created hemicellulose films with excellent barrier properties and high strength from various pulp mill residue streams. In future, this material could replace aluminium, polyethylene and other non-renewable layers in food packaging. Examples of potential residue streams include wood hydrolysate, black liquor and process water from mechanical pulp mills. Wood hydrolysate can be a residual product from dissolving pulp plants that produce pulp for textile fibres, for example. As more and more plants are converted from paper pulp production to dissolving pulp production, more and more hydrolysate will become available. In dissolving pulp, hemicellulose damages or destroys the pulp product. It is therefore particularly relevant to find new application areas for hemicellulose that can create income for the pulp mill. ●

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Further information

- Saadatmand, S., U. Edlund, A.-C. Albertsson, S. Danielsson and O. Dahlman (2012). "Prehydrolysis in Softwood Pulping Produces a Valuable Biorefinery Fraction for Material Utilization." *Environmental Science & Technology* 46(15): 8389-8396.
- Johanna Persson, Licentiate thesis 2012 "Birch xylan modification by lactide grafting"
- Jasna Stevanic Srndovic PhD thesis (2011) "Interactions between Wood Polymers in Wood Cell Walls and Cellulose/Hemicellulose Biocomposites"



Av huvudkomponenterna i ved

kan vi idag förädla både lignin och cellulosa medan hemicellulosa utgör en outnyttjad resurs. Hemicellulosa är en polysackarid med intressanta egenskaper för tänkbara produkter som t.ex papperskemikalie, barriärmaterial och nya kompositmaterial. Innventia har ett engagerat team med djup expertis som täcker hela värdekedjan; från fiberlinjen, separationsprocesser, kemiska modifieringar och produkttegenskaper till kemiska analyser, materialanalyser och systemanalys. Alla dessa kunskaper förenas nu för att ta fram en ny attraktiv produktionsprocess av hemicellulosaprodukter baserad på restströmmar i massabruket.