

Eco-friendly method for extracting xylan from birch developed

March 26 2015

In his doctoral thesis, researcher Petri Kilpeläinen of the Natural Resources Institute Finland has developed an eco-friendly method for extracting xylan from birch sawdust using pressurised hot water as a solvent.

The new method is highly useful for e.g. biorefineries that require efficient and environment-friendly processes for separating compounds from biomasses for industrial purposes. One of these compounds is [xylan](#), found in birch.

"Xylan is a [hemicellulose](#) compound which is proposed to be used e.g. in food product packaging requiring films and surfaces that are not oxygen-permeable," says researcher Petri Kilpeläinen.

Xylitol, a sweetener that prevents dental cavities, can also be produced from xylan.

Extraction method based on high water temperatures

The extraction properties of water change as its temperature rises, facilitating the extraction of higher amounts of compounds from wood. Organic acids, including acetic acid, are also released from wood during pressurised hot water extraction.

"As a consequence, the reactions that disintegrate wood are accelerated

and more xylan can be extracted," says Kilpeläinen.

Pressurised [hot water](#) penetrates the [wood](#), extracting and breaking down the hemicellulose collected during extraction. Because water-soluble hemicellulose can be modified further in water, no organic solvents or acids and alkali are required for the process.

In the doctoral research completed for Åbo Akademi University's Wood and Paper Chemistry laboratory, xylan was successfully extracted in laboratory conditions and in a larger-scale pilot. The results could be used for expanding the method for industrial purposes.

More out of sawdust

Sawdust, which was once used for pulp production, is now exploited on a very small scale. In most cases, sawmills burn sawdust for energy.

"Hemicellulose derived from sawdust should be exploited for industrial purposes. In this way, it would be more beneficial than as a mere energy source. Because hemicellulose has a very low thermal value, it would be useful to extract it from sawdust for other purposes," says Kilpeläinen.

More information: Petri Kilpeläinen's doctoral dissertation: "Pressurized hot water flow-through extraction of birch wood." Juvenes Print - Suomen Yliopistopaino OY 2015. ISBN 978-952-12-3178-0

Provided by Natural Resources Institute Finland

Citation: Eco-friendly method for extracting xylan from birch developed (2015, March 26)
retrieved 23 April 2024 from
<https://phys.org/news/2015-03-eco-friendly-method-xylan-birch.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.