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## **Extraction of biomass with green solvents**

The aim of my study is to develop extractions of biomass using non-organic solvents. Extractions can be done with supercritical carbon dioxide (SFE) and pressurized hot water extraction (PHWE). Both methods are environmentally friendly and leave no organic waste. Supercritical fluid extraction will be used to extract non-polar compounds from biomasses. Pressurized hot water gives a possibility to extract more polar compounds. I have worked on new extraction equipment, which allows integration of these extraction methods. I am planning to use wood, both hardwoods and softwoods, as the main type of biomass. There is also a possibility to use other biomasses for example moss, peat and canary reed grass to examine the extraction efficiency of different biomasses.

This research will be done mostly at the Finnish forest research institute (METLA) co-operating with Åbo Akademi University (AAU) and the University of Helsinki. So far, I have extracted birch sawdust with pressurized hot water using a flow-through vessel, which can extract water-soluble oligo- and polysaccharides from wood without causing too much degradation products such as sugar monomers and a large amount of furfurals, that may be a risk when using traditional batch extractors. The hemicelluloses in the birch extract from the flow-through extraction have most of their natural acetyl groups present, which renders them water-soluble. There is also a very low amount of furfurals present after extraction.