WoodWisdom-Net

LiLo: Development of advanced *Li*gnin-cellulose-composites with high impact properties for *Lo*gistic

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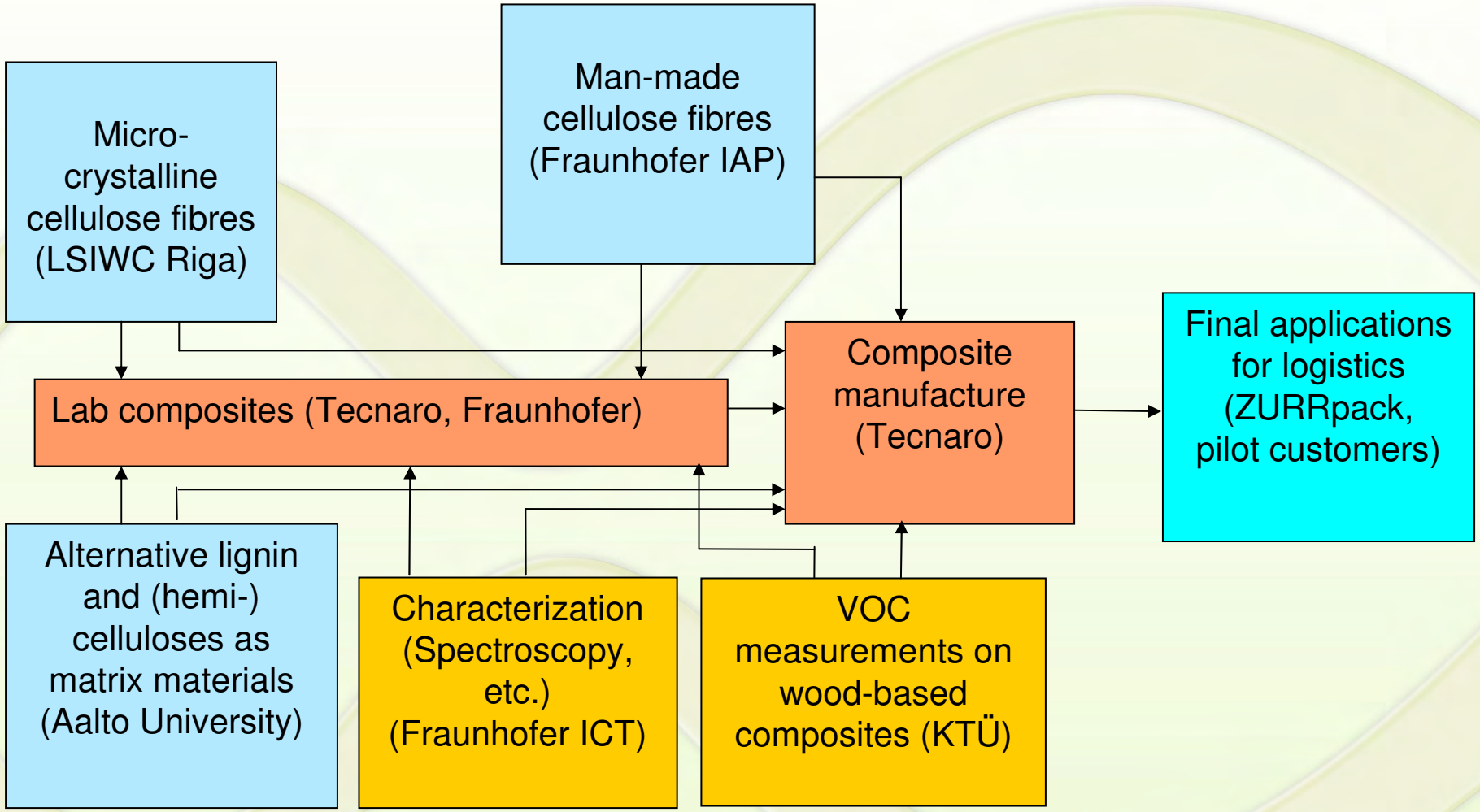
Project Objectives

- The aim of the LiLo project is to investigate and develop lignin-cellulose-based composites for the application in logistic systems, like e.g. containers, pallets and other parts for transport systems.
- Combination of the advantages of wood with plastics processing technologies
- Complete substitution of mineral oil-containing plastics
- The use of lignin matrices/resins completely avoids the emission of formaldehyde

Main Tasks


Micro-crystalline cellulose fibres (LSIWC Riga)
Man-made cellulose fibres (Fraunhofer IAP)
Lab composites (Tecnaro, Fraunhofer)
Composite manufacture (Tecnaro)
Final applications for logistics (ZURRpack, pilot customers)
Alternative lignin and (hemi-) celluloses as matrix materials (Aalto University)
Characterization (Spectroscopy, etc.) (Fraunhofer ICT)
VOC measurements on wood-based composites (KTÜ)

Project Partners and their Roles

- ***Aalto University of Helsinki:*** Expertise in, and supply, and modification of lignin and (hemi-)cellulose
- ***Latvian State Institute of Wood Chemistry Riga:*** Expertise in, and supply, and modification of microcrystalline cellulose fibres
- ***Fraunhofer IAP:*** Leader of WP 2 Wood based raw materials; expertise in, and supply, use, and modification of man-made cellulose fibres
- ***Fraunhofer ICT:*** Leader of WP 3 Lignin-cellulose based reactions; Characterisation of reactions, process monitoring, on-line measurement

Project Partners and their Roles

- ***Karadeniz Technical University, Faculty of Forestry:*** Studies and evaluation of VOC emissions
- ***Tecnaro GmbH:*** Project coordinator and leader of WP 4 Development of lignin-cellulose composites with high impact strength suitable for logistics applications
- ***ZURRpack GmbH:*** Leader of WP 1 Specification and WP 5 Demonstration; product development for logistic applications

ZURRpack and Tecnaro are members of the ZIM-Network Green Logistics.

Project Highlights

- ***Innovative methods/materials used:*** broad use of renewable, preferably wood based raw materials in logistics applications due to a new approach which allows the combination of the advantages of wood with plastic technologies: new applications for lignins, hemicelluloses as well as cellulose in novel bio-based thermoplastic materials for logistics applications.
- ***Products to be obtained:*** e.g. containers, pallets and parts for other transport systems made from the novel wood based materials.

Expected Impact and Target Groups

- The use of renewable raw materials for the proposed composites contributes to the reduction of CO_2 emissions and reduces negative climate changes.
- Hemicelluloses and lignin applied as material components reduce waste and do not lose their intrinsic energy. During lifetime of the products CO_2 remains bound in the material.
- Production of the new materials and products creates new jobs and/or contributes to secure existing jobs in forestry, pulp industry, compounding, logistics, etc.

Expected Impact and Target Groups

- For the companies from the forestry and pulp sector new applications with added value will be created for lignins, hemicelluloses as well as cellulose. This improves their competitiveness.
- Tecnaro will produce novel bio-based materials for logistics and many other applications which are so far not feasible.
- ZURRpack and other (pilot) customers will apply the wood based materials in their products.
- End-users and society will profit from more sustainable products.

Added Value from Transnational Approach

- The international collaboration allows joint input from the international partners contributing with modified, value added raw materials e.g. from Finland, Latvia and Germany to the compounding and processing in Germany.
- Marketing of the transport systems will be European wide through the partners.
- For the industrial companies from the forestry and pulp sector new applications for lignins, hemicelluloses as well as cellulose improve their competitiveness.

Thank you very much for your attention and for supporting the LiLo project!

Forest signs in Bavarian State Forests made from extruded and thermoformed ARBOBLEND® sheets; Picture: Jochen Rümmelein