PShapes aims to transform wood components into products in diagnostics, pharmaceuticals and more

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Åbo Akademi University is coordinating the international research project "PShapes". PShapes stands for "Polysaccharides bio shapes – chemical design and shaping into new biomaterials" and started in May 2014. This is a three years collaborative project funded by Woodwisdom-Net Plus and involving five research institutions and four industrial partners.

International partners are Friedrich Schiller University of Jena (Germany), University of Maribor (Slovenia) , University of Graz (Austria), Thuringian Institute for Textile and Plastic research Rudolstadt (Germany), Senova GmbH (Germany), Litija Predlinica Litija (Slovenia), Suominen Corporation (Finland), Stora Enso (Finland). In order to transform the research results into consumer oriented products, the industrial partners play a vital role because of their different areas such as biomaterial producers, textile processors and biotechnology firms.

The project budget of 1.3 million euro is funded by National Funding agencies, i.a. The Academy of Finland, and the European Commission.

The overall goal of the project is to create innovative functional nano- and microsized particles from wood components for various value chains, closely listening the needs of the industrial partners involved. "PShapes" aim is to open up completely new areas of application or

value-chains for wood-based raw materials in diagnostics, pharmaceuticals, construction industry, foods and cosmetics as well as in the paper, textile and non-woven industries.

A key role is played by the working group headed by Prof. Dr. Pedro Fardim from the Laboratory of Fibre and Cellulose Technology, Faculty of Natural Sciences and Technology, Åbo Akademi University in Turku, Finland.

– Our role in this project is multidisciplinary. We are involved in project management, transnational dissemination and research activities of the project. Our research area in this project includes isolation of raw materials from pulp and wood for further chemical modifications and designing of polysaccharide beads from micrometer to millimeter range, Professor Fardim says.

For example cellulose and hemicellulose beads can be prepared from polymer solutions by the formation of droplets using spinning atomizer and the subsequent coagulation of the droplets in a non-solvent bath. The particle diameters obtained in this case can be tuned from 50 μm to few millimeters. They have an outstanding porosity, over 90%, and high specific surface area, over 400 m2/g. These beads can be utilized in controlled delivery of active ingredient and other suitable application areas are such as separation science (chromatographic systems), chelating sorbents, and filter materials.

The new products obtained from this project have been foreseen as specialty products such as the medical and hygiene products area to very specific "high-end" products in the sensors and diagnostics.

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