Novel hemp-based cellulose fibers - natural material from environmentally friendly production

At the German Institutes of textile and fiber research Denkendorf (DITF), cellulose filaments are produced from hemp pulp. The material originates from sustainable and environmentally friendly cultivation. The joint project of DITF and RBX Créations was awarded the 'Natural Fibrenamics Award 2021 - honorable mention' at the 5th International Conference on Natural Fibers 2021 (RNCF). The research work is funded by the COSME program of the European Union for the competitiveness of enterprises and small and medium-sized enterprises.

The spinning process developed at DITF under the name HighPerCell® serves as the technical basis for producing novel hemp-based cellulose fibers. In the process, the starting material, fluffy cellulose pulp from hemp, is dissolved in ionic liquids and then spun out into fibers in a special wet spinning process. The solvent is non-toxic, environmentally friendly and can be almost completely recovered. Thus, no chemicals harmful to the environment or health are released by the process.

The hemp material is obtained from the ecological and sustainable cultivation of French agricultural land in cooperation with the French company RBX Créations from Neuillac. RBX Créations works with producers who are committed to environmentally friendly and soil-friendly cultivation methods and who do not use irrigation or pesticides. RBX Créations developed a process to turn this feedstock into pulp. This type of cooperation creates new synergies, as the aim is to utilize the hemp plant as fully as possible. In addition to the known uses as food or for the production of pharmaceutical and cosmetic products, the surplus plant parts are now also to be processed into new, high-quality textile and technical products.

For the DITF, the partnership with RBX Créations is a win-win situation: The DITF have many years of expertise in processing cellulose materials into high-quality fibers and textile materials. RBX Créations, on the other hand, through its good networking with producers and its own hemp transformation process, represents a suitable partner for the supply of high-quality starting material that is produced under ecological aspects. The resulting filaments under trademark Iroony® can be woven or knitted directly into the final textile, but can also be processed into staple fibers and yarns. Potential applications include high-quality clothing as well as casual and sportswear meeting the growing demand from brands and consumers for environmentally compatible materials.

The hemp-based cellulose fibers produced by the HighPerCell® process are also interesting for technical applications due to their properties such as high tensile strength and their elasticity and elongation characteristics. This significantly increases the value added for hemp cultivation.

This research is supported by ELIIT Partnership Project and is funded by COSME Program of the European Union for the Competitiveness of Enterprises and Small Medium-Sized Enterprises (SMEs).
wissenschaftliche Ansprechpartner:
Dr. Antje Ota
German Institutes of Textile- and Fiber Research
Competence Center Biopolymer Materials
Tel. +49 (0)711 / 9340-173
antje.ota@ditf.de
Hemp cultivation
Pulp from hemp and bobbins with hemp based Cellulose filaments from HighPerCell®-technology