RESTEX: Josef Ressel Centre for Recycling Strategies for Textiles

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The Josef Ressel Centre (JRC) "ReSTex – Recovery Strategies for Textiles", addresses one of the central targets on the way to more sustainable societies and bioeconomies: the recycling of textiles. The focus is on cellulose-containing textiles and the separation of cotton/polyester blends. The JRC is located at the University of Applied Sciences Wiener Neustadt and funded by the Christian Doppler Research Association (CDG). It combines the expertise of three research institutions and three partner companies: Salesianer Miettex GmbH, a textile rental company, and Starlinger & Co Gesellschaft m.b.H. and EREMA GmbH, both PET recycling experts.
Two general recycling routes will be explored: cellulose hydrolysis by biotechnological methods and the selective dissolution of blended textiles. The research plan and initial work from the following research areas will be presented. Textile blends are characterized using spectral analysis and AI processing to establish a database. Several pre-treatment methods and special cellulose solvents for separation of cotton-rich articles are tested. Enzymatic hydrolysis studies include evaluation of mechanical pretreatment, chemical activation procedures, conditions for enzymatic action, and screening of commercially available enzyme formulations. Follow-up work optimizes the solvents/solvent systems towards improved selectivity with suitable conditions for minimal impact on polymer integrity. Understanding the influence of cellulose residues in the separated PET fraction that can negatively influence the extrusion process is also emphasized with two potential solutions: elimination by selective dissolution and stabilization of cellulose for the extrusion process. In later phases, process engineering will allow scale-up of the processes to pilot scale. All developments will be accompanied by eco-nomic and ecological considerations, including Life Cycle Analysis.

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