Fiber analysis 2.0: Transitioning from Hazardous Solvents to Green Solvent Systems

Fabian Schäfer*[1,2], Thomas Mayer-Gall†‡[1,2], and Jochen Gutmann§[1,2]

[1]Deutsches Textilforschungszentrum Nord-West gGmbH – Germany
[2]Universität Duisburg-Essen = University of Duisburg-Essen [Essen] – Germany

Abstract

Conventional fiber analysis according to the DIN EN ISO 1833 series of standards relies heavily on hazardous or acidic solvents to quantify fiber content via extraction. Commonly used compounds, such as dimethylacetamide for elastane fibers, phenol/tetrachloroethane and trichloroacetic acid/chloroform mixtures for polyester, pose significant safety and environmental risks and are heavily regulated.
As the adoption of circular economy principles grows across the textile and polymer industries, replacing hazardous compounds in fiber analysis becomes increasingly relevant. In search of sustainable alternatives, we investigated a range of green solvents, including bio-based solvents such as Cyrene and deep eutectic solvents (DES), which are readily available, can be produced on demand and are generally easier to handle.
Our preliminary results demonstrate the potential of these solvents for fiber quantification, especially for elastane, with ongoing research aimed at refining extraction parameters to improve selectivity.

Keywords: fiber analysis, green solvents, sustainability, elastane

*Corresponding author: fabian.schaefer@dtnw.de
†Speaker
‡Corresponding author: mayer-gall@dtnw.de
§Corresponding author: jochen.gutmann@uni-due.de