Recovery Strategies for Textiles

Josef Ressel Centre

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110.000.000

1%

Background

Fiber types and their share in global demand 2021

Gschwandtner, C. (2022). Outlook on Global Fiber Demand and Supply 2030. Lenzinger Ber., 97, 11-19.

Background

Textiles in Europe
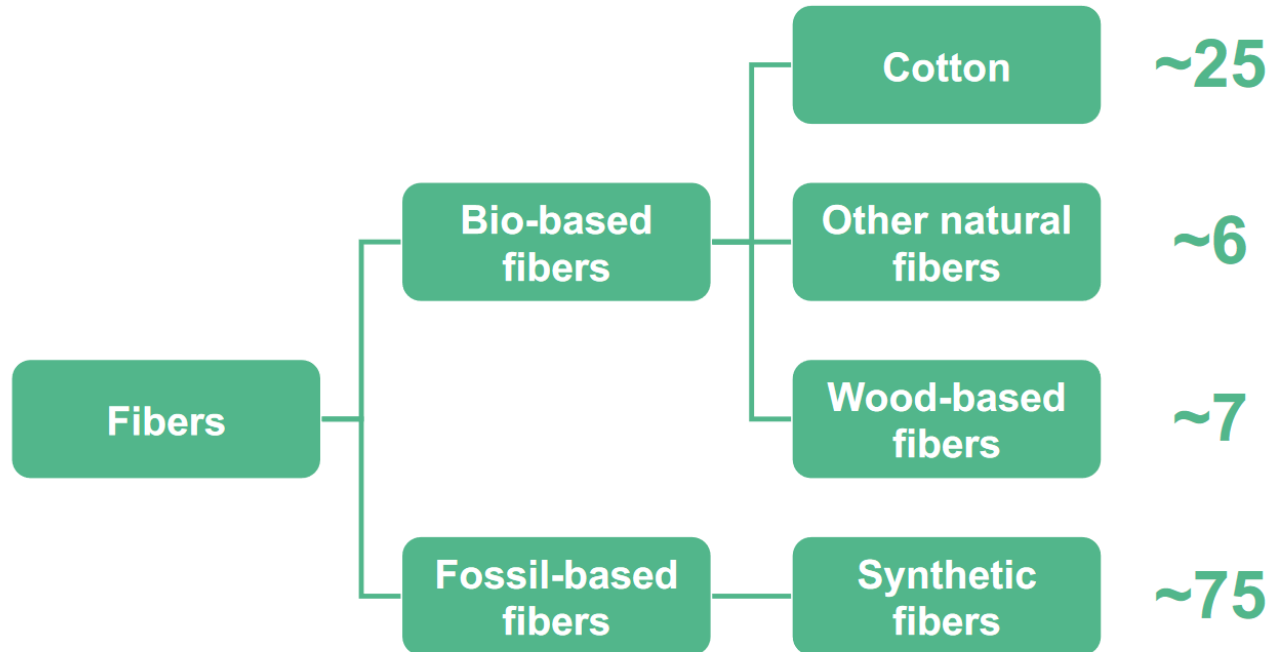
From: **Wie viel Polyester steckt in der Altkleidersammlung? Ergebnisse einer Voruntersuchung aus Wien** Content of polyester in separately collected waste textiles: a pre-investigation from Vienna

Zusammensetzung der analysierten Alttextilien mit Label

CO > 50 %   über 50% Baumwolle
PET > 50 %   über 50% Polyester
Komplex   komplexe Textilien
Sonstige   sonstige Textilien

- Komplex 24%
- CO > 50 % 48%
- Sonstige 13%
- PET > 50 % 15%

100% = 134 kg
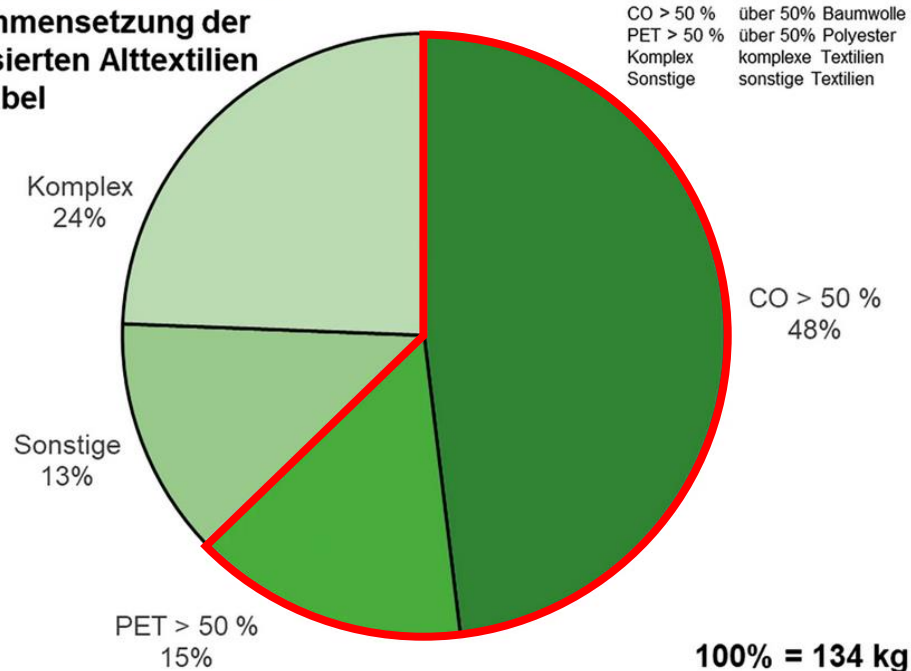
Zusammensetzung der analysierten Alttextilien mit Label aus Altkleidersammelcontainern

Lederer, J., Ipsmiller, W., Kählig, P. et al. Wie viel Polyester steckt in der Altkleidersammlung? Ergebnisse einer Voruntersuchung aus Wien. Österr Wasser- und Abfallw (2024). https://doi.org/10.1007/s00506-024-01058-z
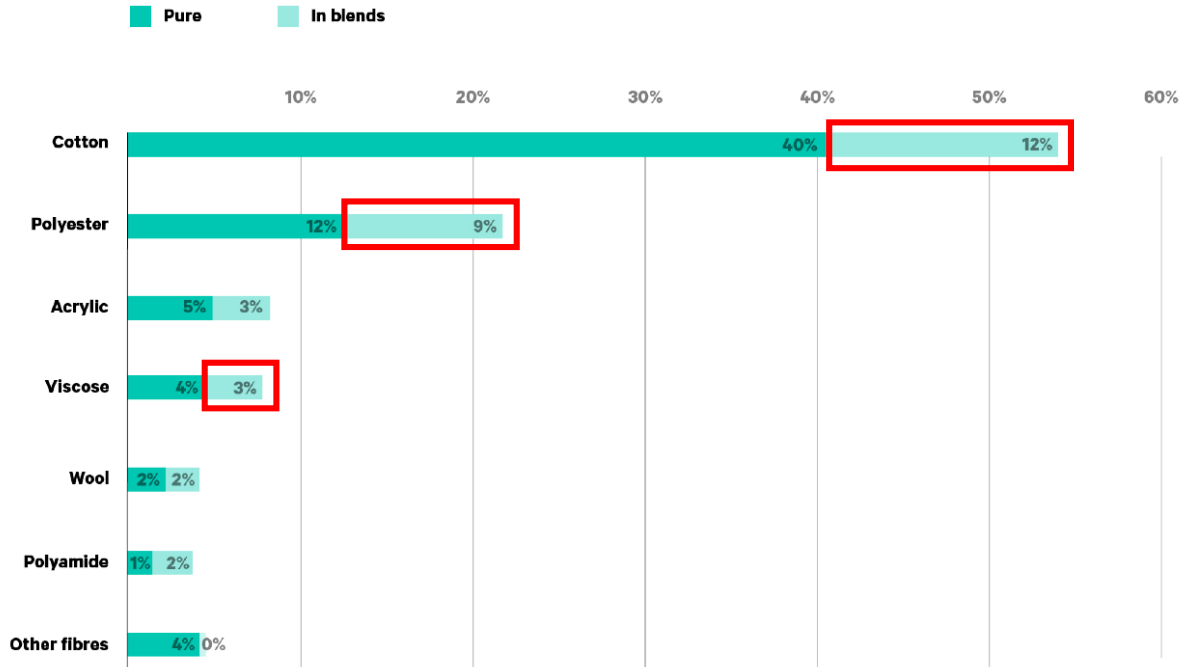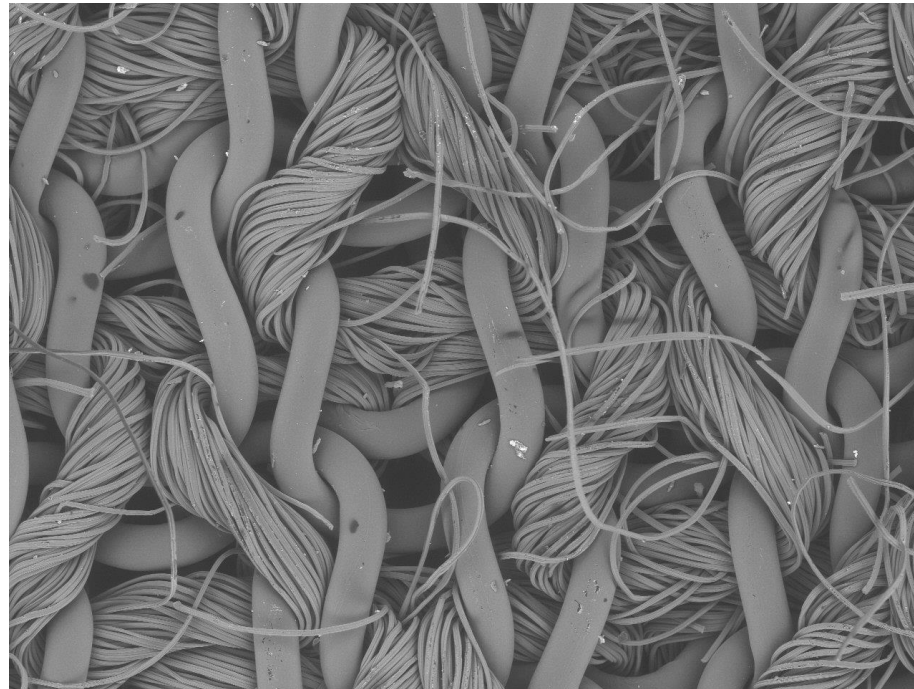
Background

Textiles in Europe

FIGURE 7: PRESENCE OF FIBRE TYPES IN THE FRACTION, OCCURRENCE AS PURE MATERIALS VS. IN BLENDS.
SOURCE: CIRCLE ECONOMY AND FASHION FOR GOOD (2022)

Fashion for Good: „Sorting for Circularity Europe", September 2022

Textile Recycling

Chemical recycling of blends

TM3030_3764   2022/07/27 15:28 HL   x100   1 mm

Recovery Strategies for Textiles

TEX2MAT Project

Fiber to Fiber Recycling
 of Textile Waste

2017-2019

Piribauer B. et al. Enzymatic textile recycling – best practices and outlook. *Waste Management & Research*.39(10) 2021
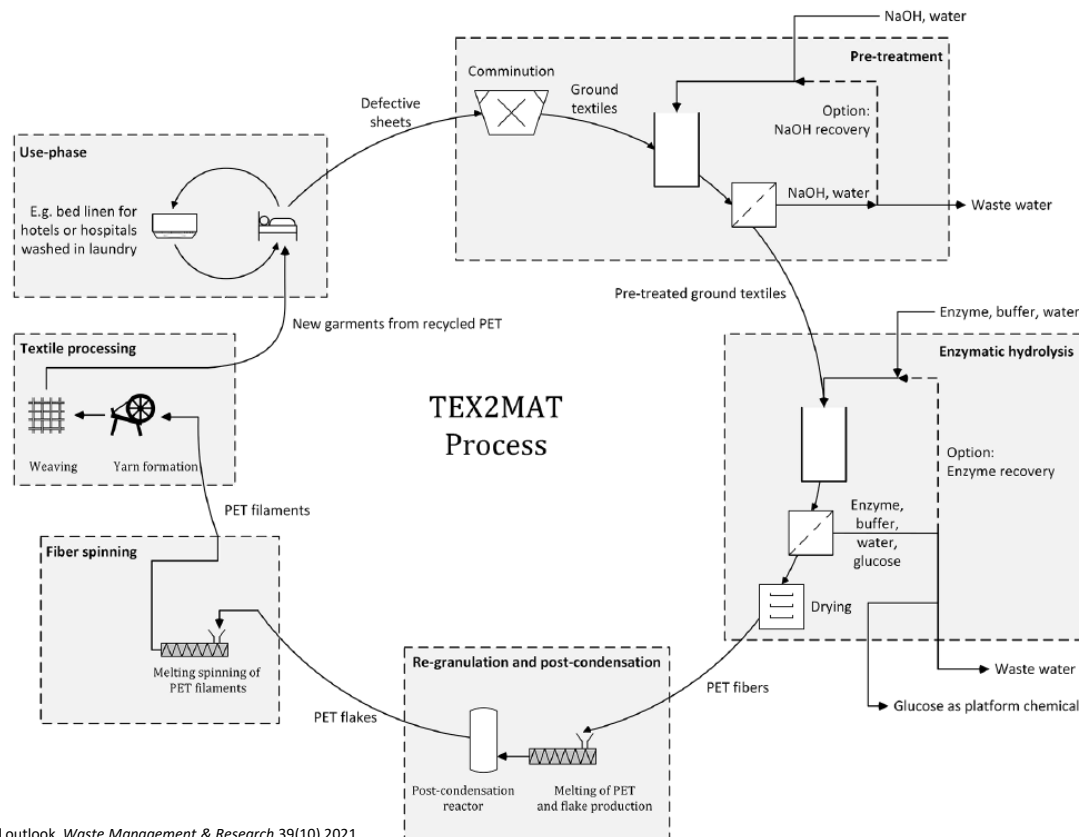
Recovery Strategies for Textiles

TEX2MAT Project

Fiber to Fiber Recycling
of Textile Waste
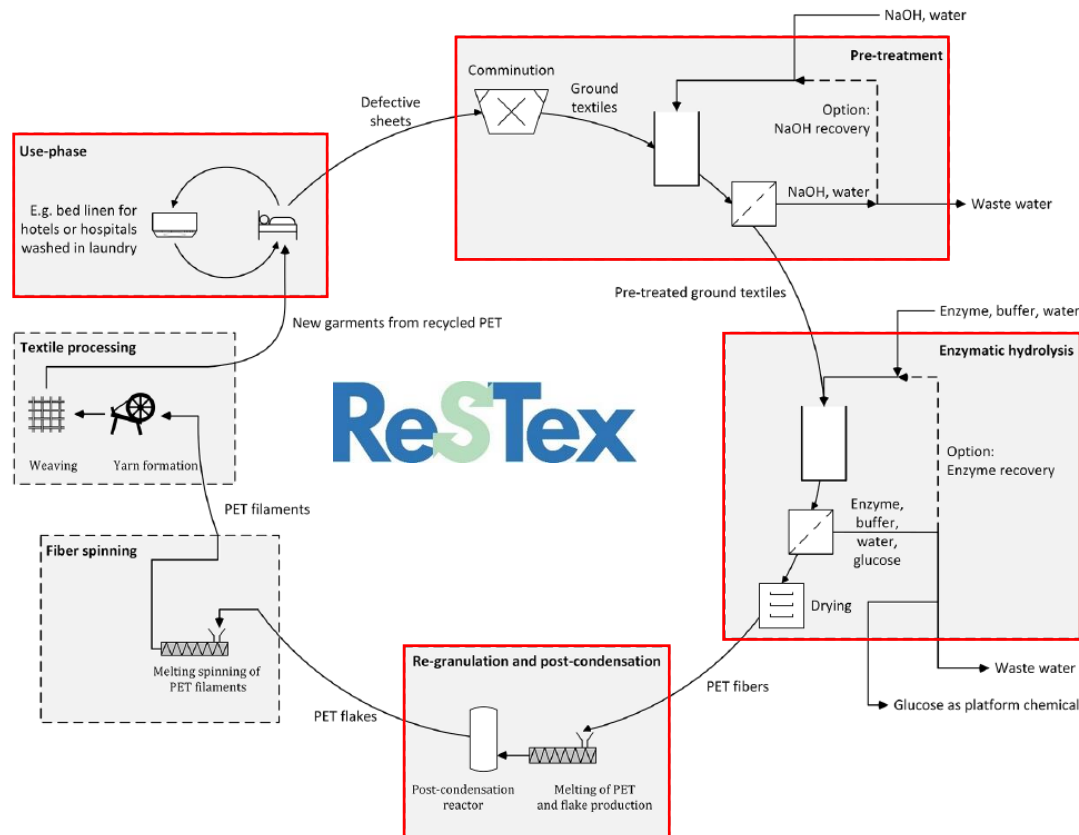
2017-2019

Recovery Strategies for Textiles

ReSTex Project

Involved partners

The research project

Cellulose fiber Pulp Quality

Cycle oriented product Design
Optimize composition of articles
Replace PET sewing yarns

Cellulose rich material
Selective dissolution of cellulose fractions

Cellulose fraction for Dissolution
Optimisation of input material

Salesianer textile material

Pretreatment
Mechanical disintegration
Swelling agents

Identify materials

Define requirements for recyclability

LCA

Polyester rich material
Optimisation of Cellulose **hydrolysis**

Upscaling
Process design
Optimization of enzymatic hydrolysis
Semi-industrial production runs
Separation process

Glucose/PET slurry
Separation of PET & Glc
Removal of impurities
Elimination of process chemicals

PET
Purification
Enzymatic peeling
Chemical peeling
Derivatisation of Cellulose

PET Extruder
Stabilisation of Cellulose impurities
Optimisation of process conditions

PET Granules
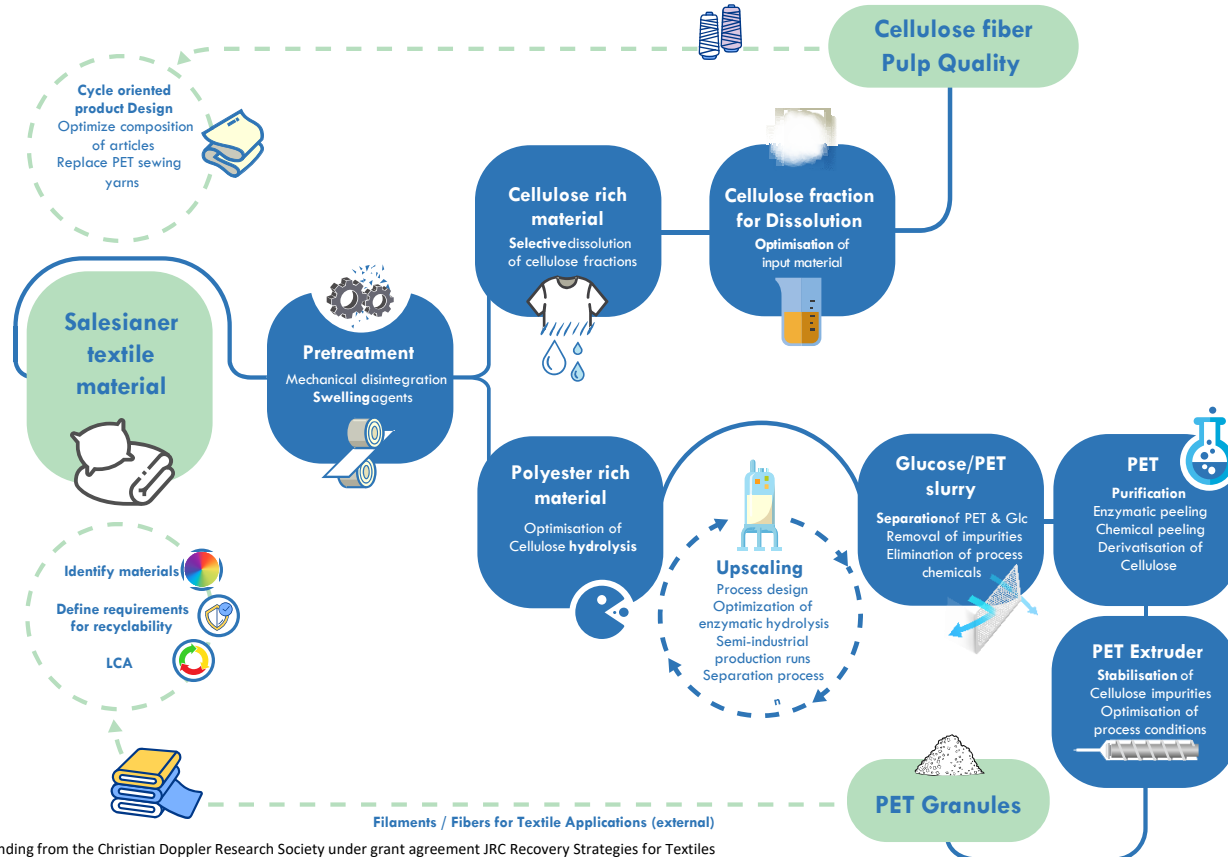
Filaments / Fibers for Textile Applications (external)

Recovery Strategies for Textiles

ReSTex Project

- Summary of Activities
  - Optimization of pretreatments for enzymatic hydrolysis
  - Selective dissolution of a polymer
  - Circular design (towel)
  - LCA of 3 article types
  - Combination of mechanical & thermal recycling
  - Influence parameters for thermal recycling
  - Build up spectroscopy database & evaluation of different technologies

https://www.fhwn.ac.at/forschung/josef-ressel-zentrum
www.linkedin.com/company/**jrc-restex**