

up Textile recycling. From cotton (glucose) to FDCA (PEF)

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Motivation

Avantium is working on various alternative feedstock options for **glucose** (to produce **FDCA**). Currently, the Delfzijl Flagship will use **starch** (1st generation glucose). In our biorefinery technology DAWN, we aim to produce glucose from the **cellulose** fraction of wood residues (2nd generation glucose). We also found that **cotton** from textile waste can be used for glucose production in our DAWN process. As an extra benefit we now also liberate polyester (PET) from mixed waste.

Globally we annually produce **110 million tons of textile waste**, of which **24 million tons is cotton**.

Aims

Produce FDCA from the cotton fraction of mixed textile waste.
Subsequently, produce rPET from the polyester residue after cotton removal.

Approach

- Two stage production:
 - Static hydrolysis of cotton with highly concentrated acid to glucose
 - Conversion of glucose to FDCA

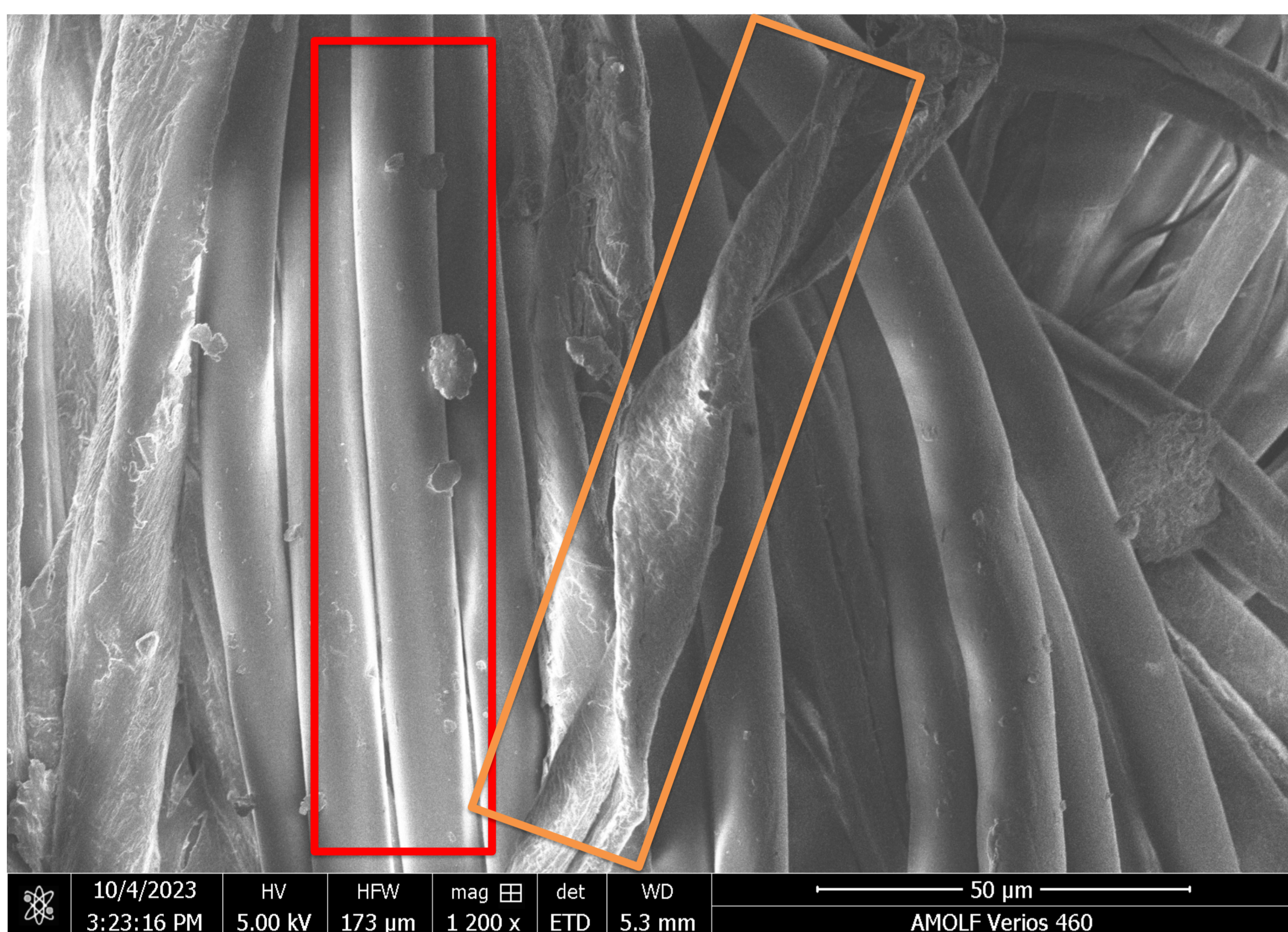


Fig 1: Textile made from polyester (red) and cotton (orange) before hydrolysis.

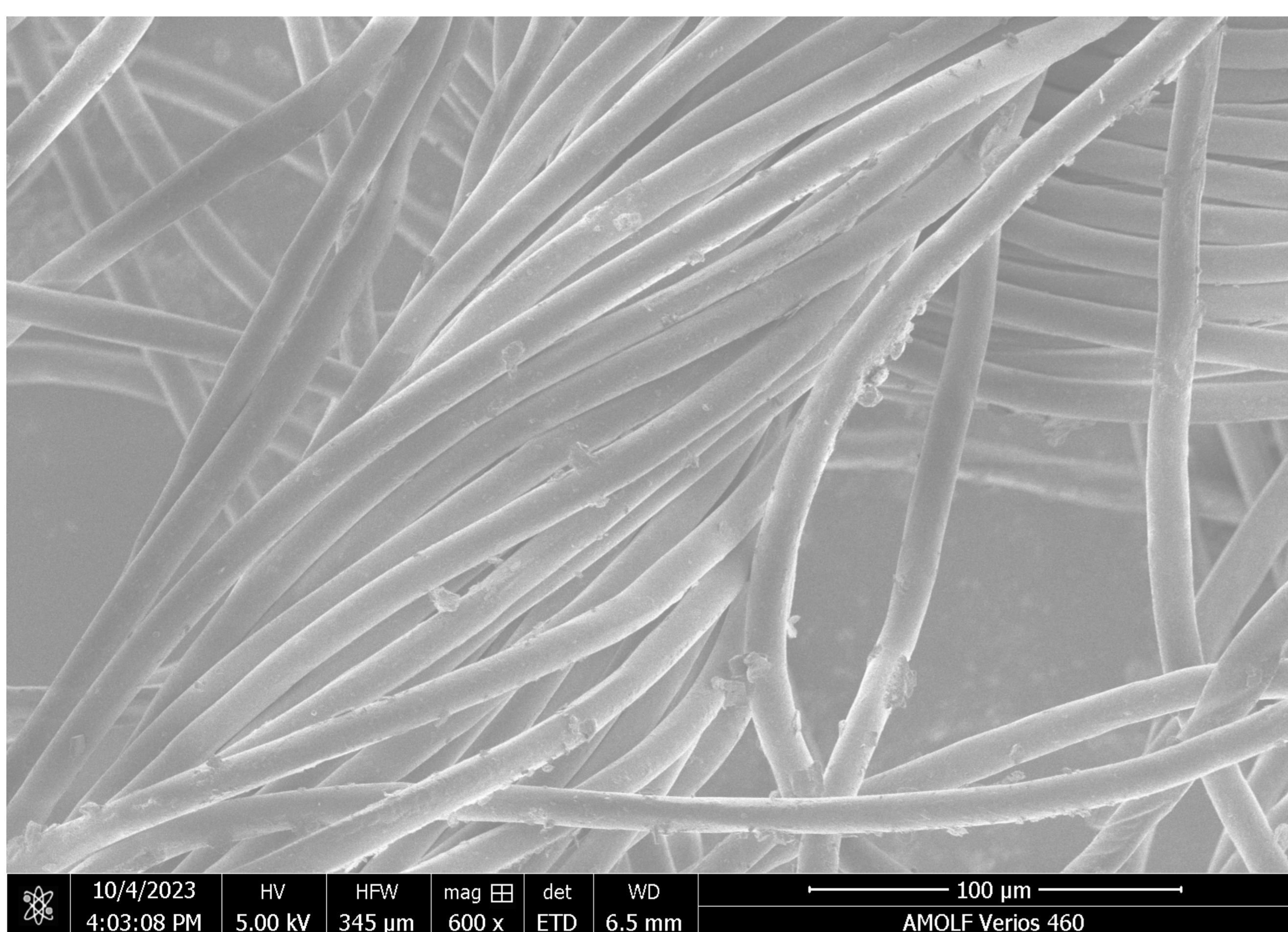


Fig 2: Textile after hydrolysis, only polyester remaining.

Preliminary Findings

- Static cotton hydrolysis:
 - Full cotton removal, up to 850 grams glucose per 1 kg cotton obtained
 - Proof of principle for subsequent PET fibres recycling obtained

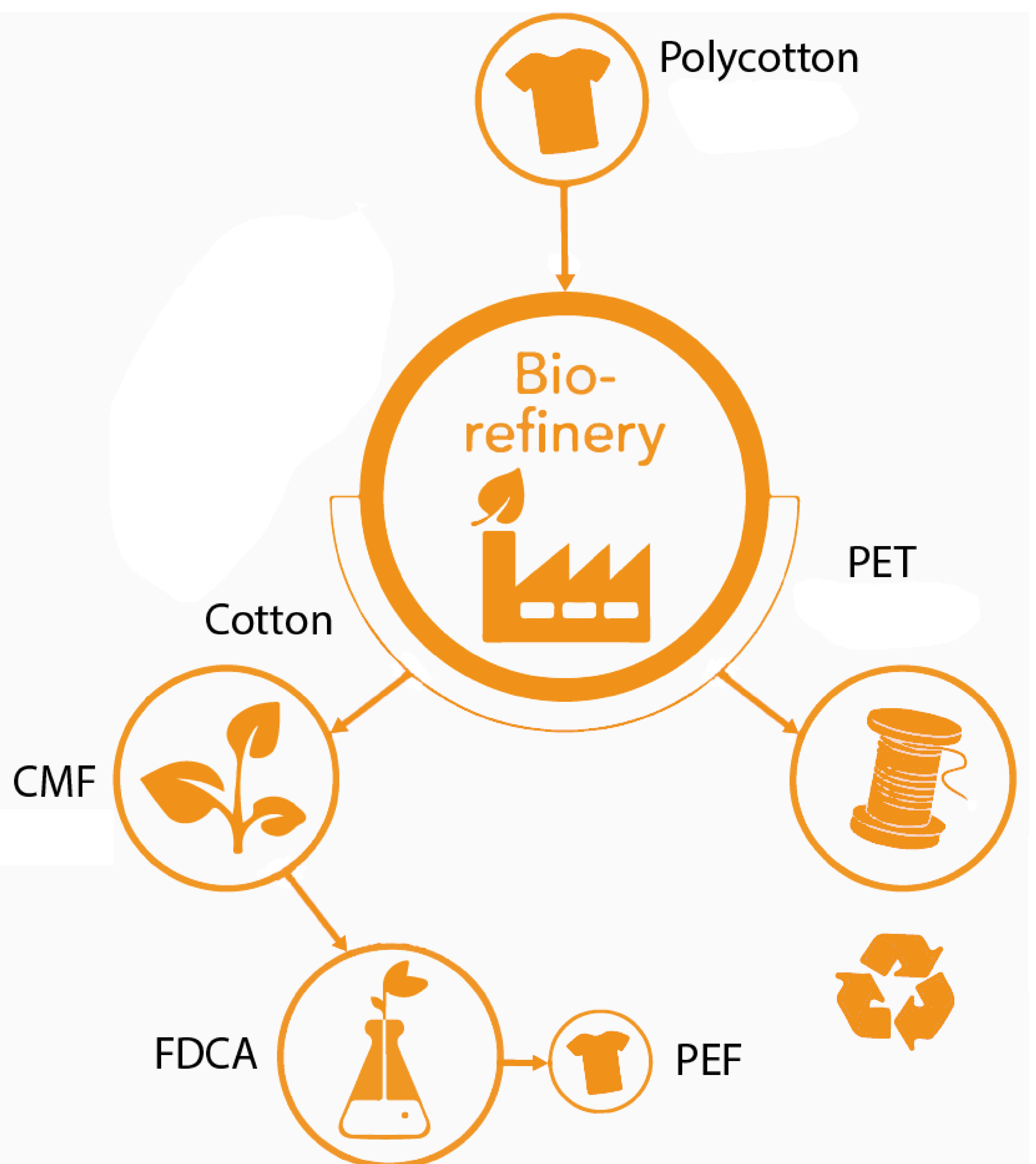


Fig 3: How we produce PEF from cotton.

Future Avenues

- Further optimization of current processes
- Scale up in DAWN pilot plant
- Investigate effect of different textile fibres on glucose recovery rate