



Method for estimating the efficiency of chemical pretreatment for micro- and nanocellulose production

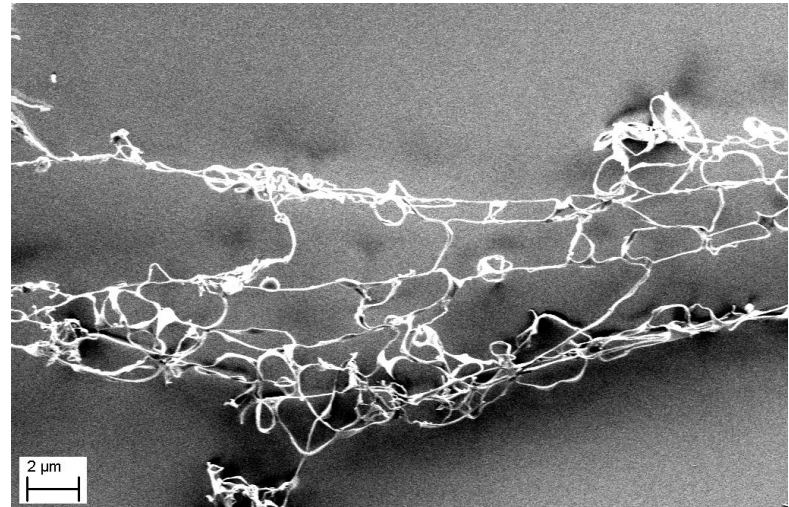
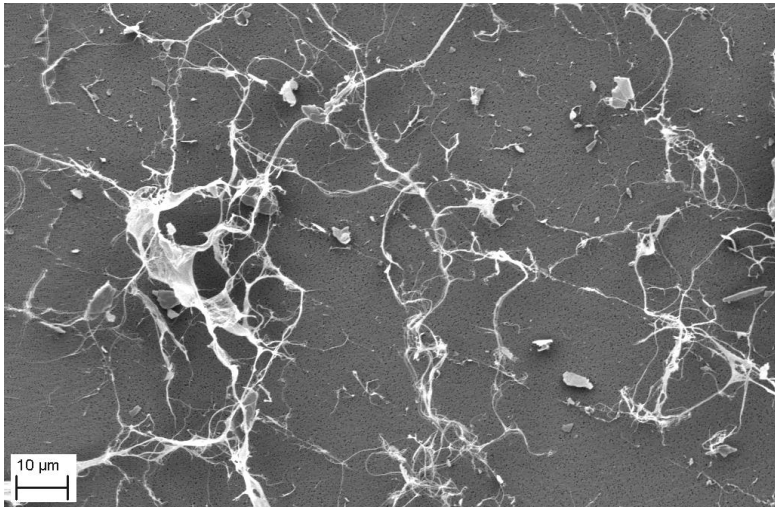
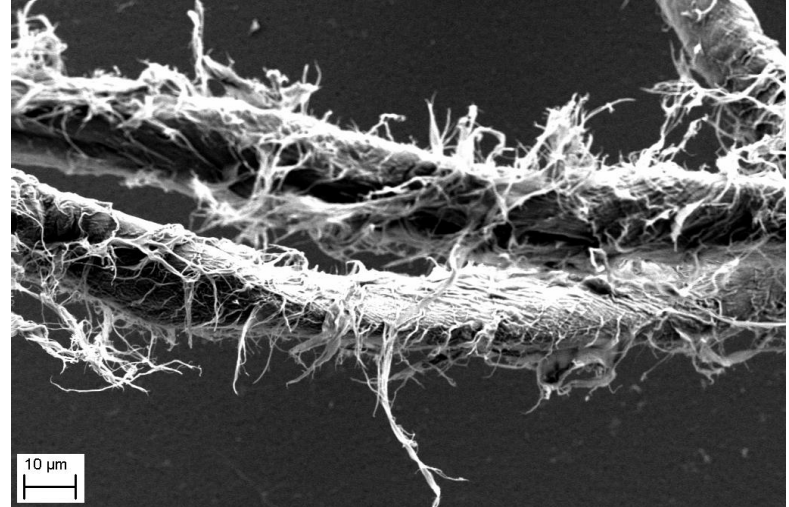
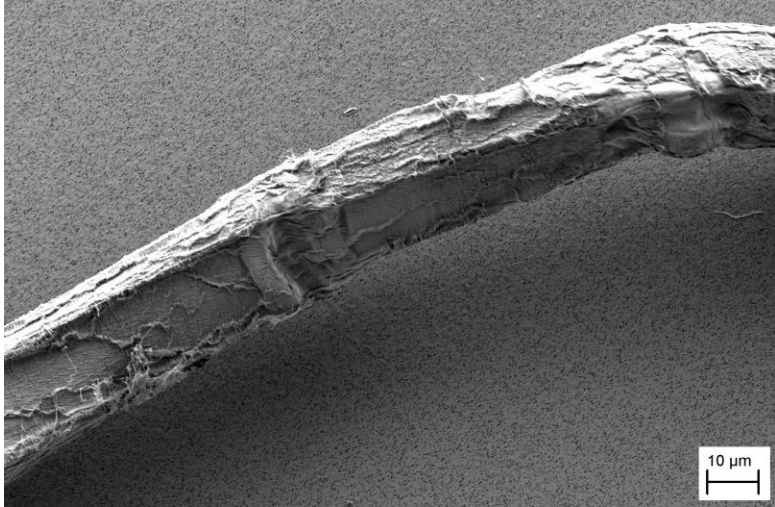
Kaarina KEKÄLÄINEN

Kaarina.Kekalainen@oulu.fi

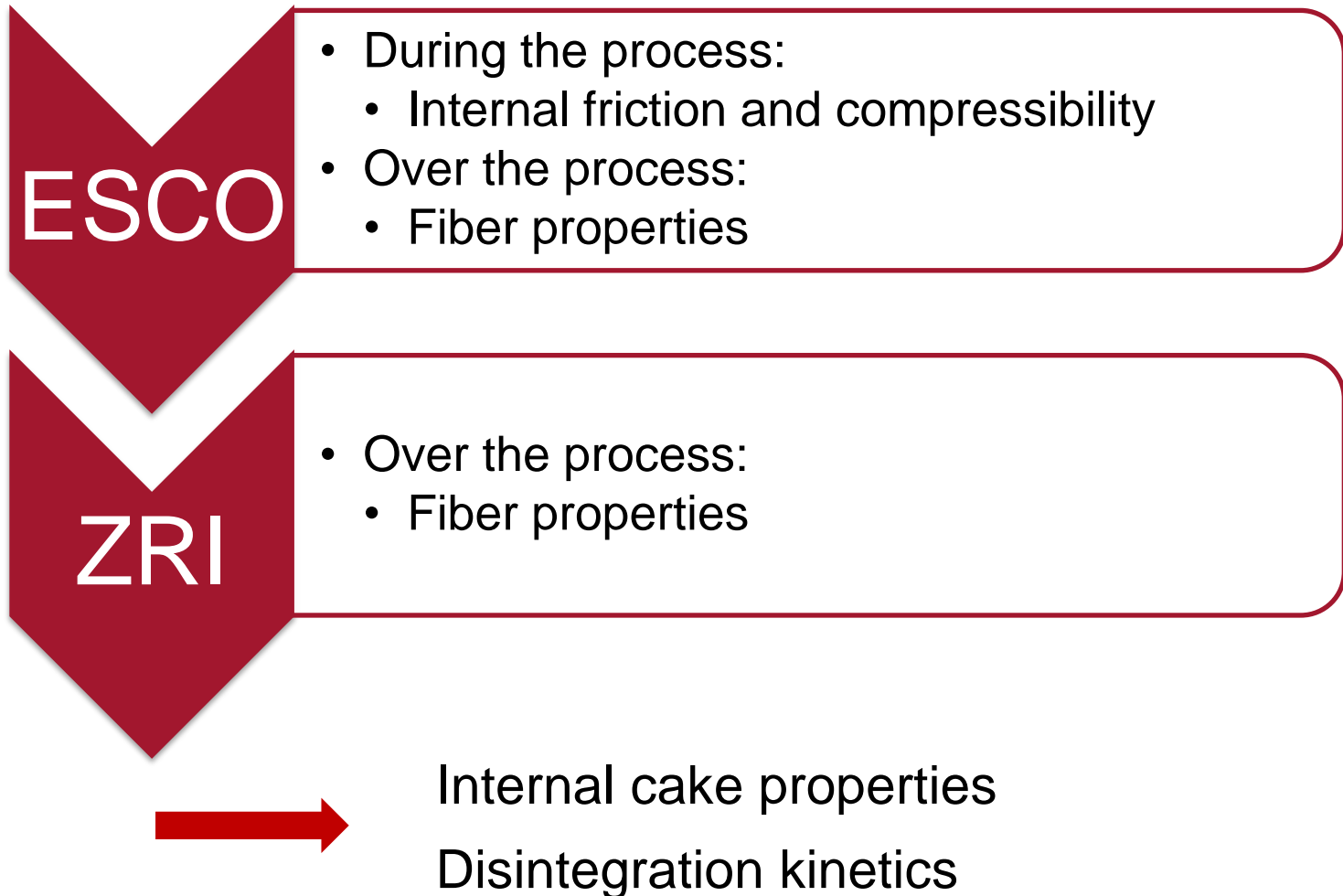
FIBRE AND PARTICLE ENGINEERING LABORATORY



Background

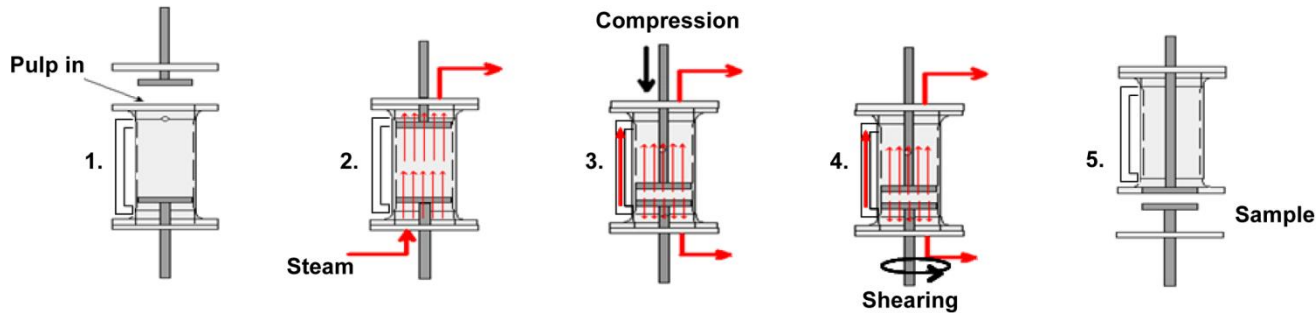


Analysis procedure and outcomes



ESCO: Equipment of shear and compression

Internal properties



Parameter	
Compression pressure [bar]	0.5 – 8.0
Rotational speed [rpm]	8 – 84
Temperature [°C]	20, 100 – 170

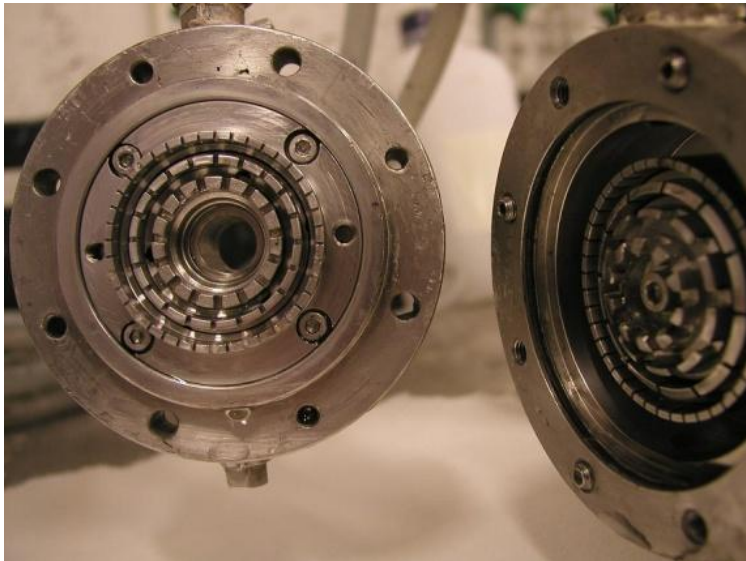
1. Volume fraction of the compressed pulp
2. Disruptive shear stress
3. In-pad attrition



ZRI: Shear homogenisator

Disintegration kinetics

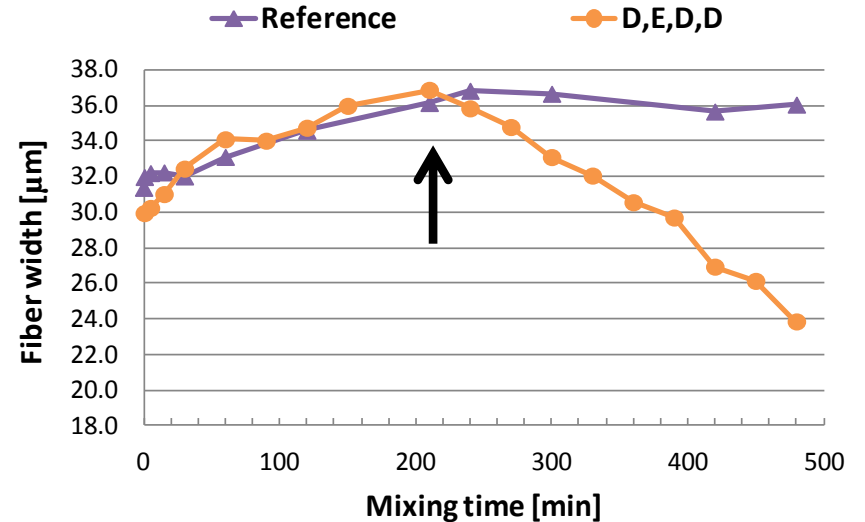
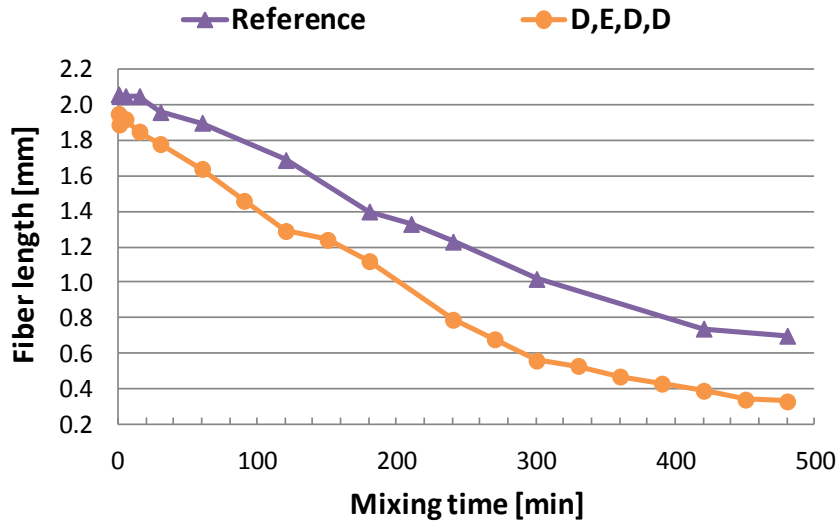
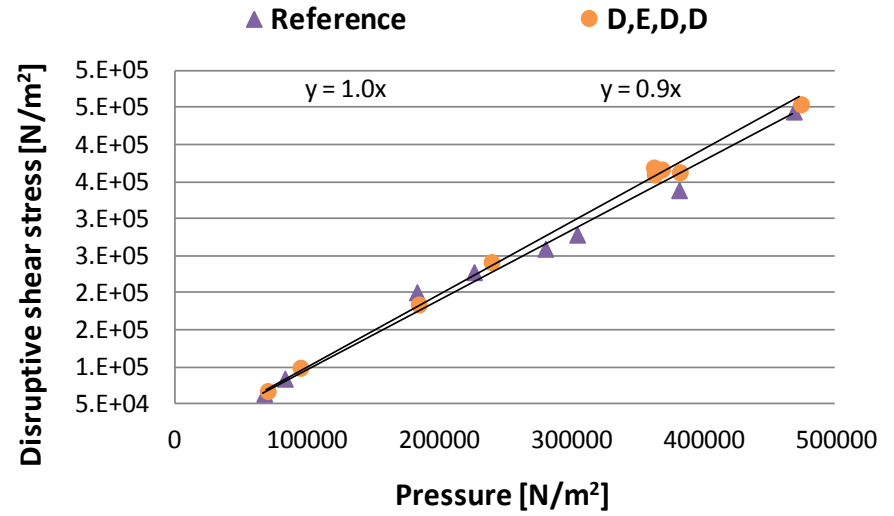
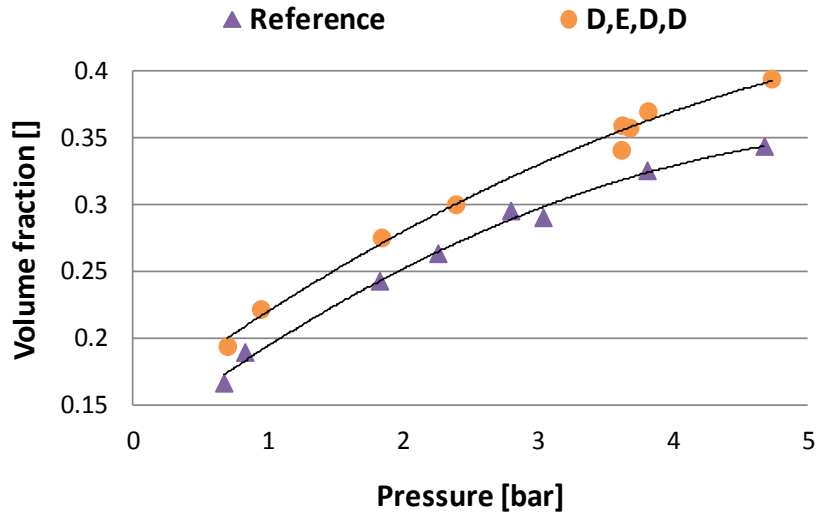
4. In-fluid shear homogenisation



Parameter	Maximum
Pressure [bar]	10
Temperature [°C]	140
Rotational speed [rpm]	18 000



Effect of chemical pretreatment on the internal properties and disintegration kinetics of fibers





Conclusions on the method

- The analysis procedure presented offers a good tool to compare the disintegration tendency of different fibers
- Optimisation of micro- and nanocellulose production
 - Estimate the effectiveness of chemical treatment
 - Optimize the chemical dosages and conditions in micronisation processes





Contact:

Professor Niinimäki: Jouko.Niinimaki@oulu.fi

FIBRE AND PARTICLE ENGINEERING LABORATORY

University of Oulu, Finland

<http://www.oulu.fi/pyokui/>

