






Circular Value Chains for Bio-Based Products: the BIO-MATTERS Cluster

 26 June  15:30- 17:30  Exhibition Forum

ORGANISED BY:

 NewWave

 **ambiance**

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EUBCE 2024

32nd European Biomass Conference & Exhibition



Six projects joining forces



BIOMATTERS

Manufacturing technologies
for bio-based materials

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Funded by
the European Union



Building a sustainable & circular economy through innovative, biobased manufacturing lines

*“Circular Value Chains for Bio-Based Products”:
the BIO-MATTERS cluster*



BIOMATTERS

EUBCE - June 26, 2024



This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 101058369.





General project info

| | |
|--------------|--|
| Acronym: | NewWave |
| Title: | Building a sustainable & circular economy through innovative, biobased manufacturing lines |
| Coordinator: | BTG Biomass Technology Group BV |
| Duration: | 48 months |
| Period: | April 1, 2022 – March 31, 2026 |
| Budget: | 5,576,330 € (Including Switzerland) |

Overall Objective

Transformation of existing fossil-based manufacturing lines into new bio-based manufacturing lines. The bio-based products must exhibit similar, or better, mechanical, physical, and chemical properties compared to the existing products, and must be non-toxic and recyclable.

Background NewWave

- NewWave uses ThermoChemical Fractionation as starting point
- Fractionation Process developed to TRL6 in the EU-project “Bio4Products”

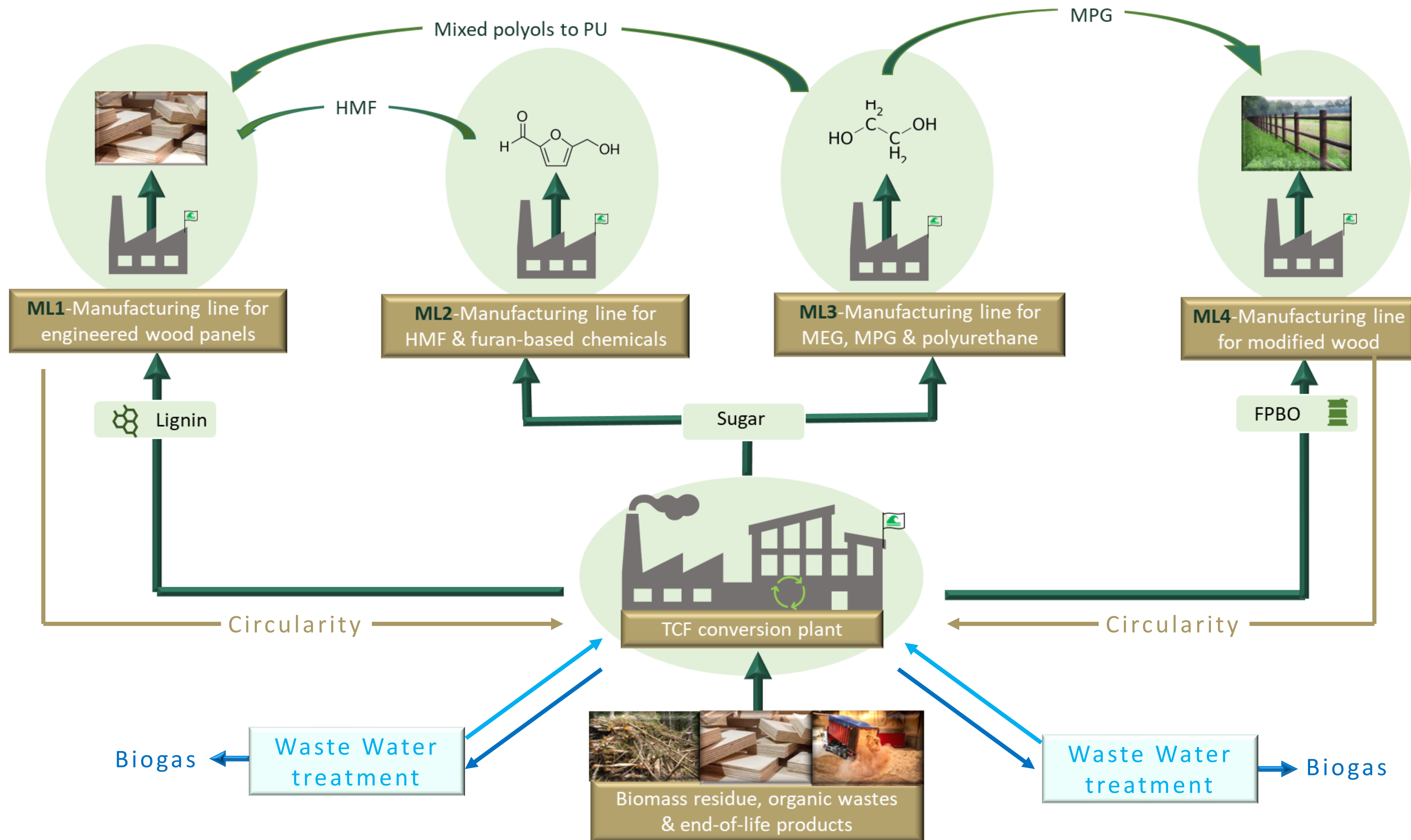


Thermo Chemical Fractionation (TCF): “an innovative, disruptive two-step conversion process to transform different bio-resources into sustainable raw materials”.

1. Sustainable biomass residues are converted by fast pyrolysis into a liquid Fast Pyrolysis Bio-Oil (FPBO).
2. The FPBO is fractionated *-based on chemical functionality-* by liquid-liquid extraction yielding a reactive **lignin fraction** and a **sugar-rich fraction**, both being excellent starting materials to produce sustainable, bio-based chemicals & materials.



NewWave approach

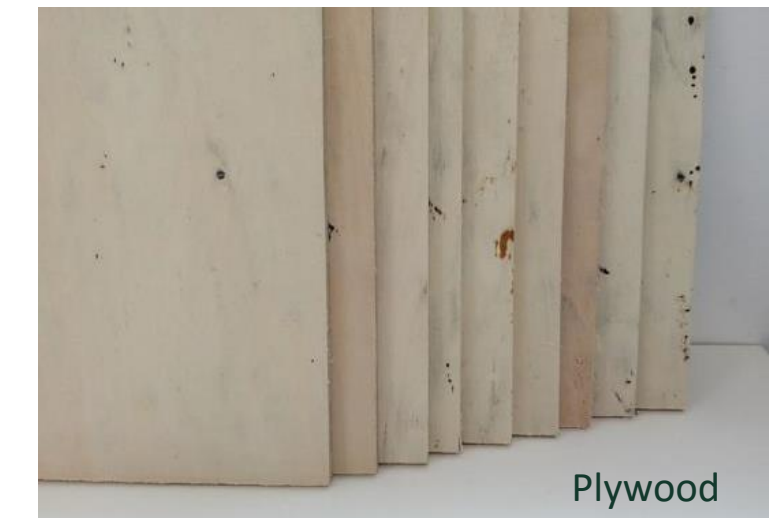
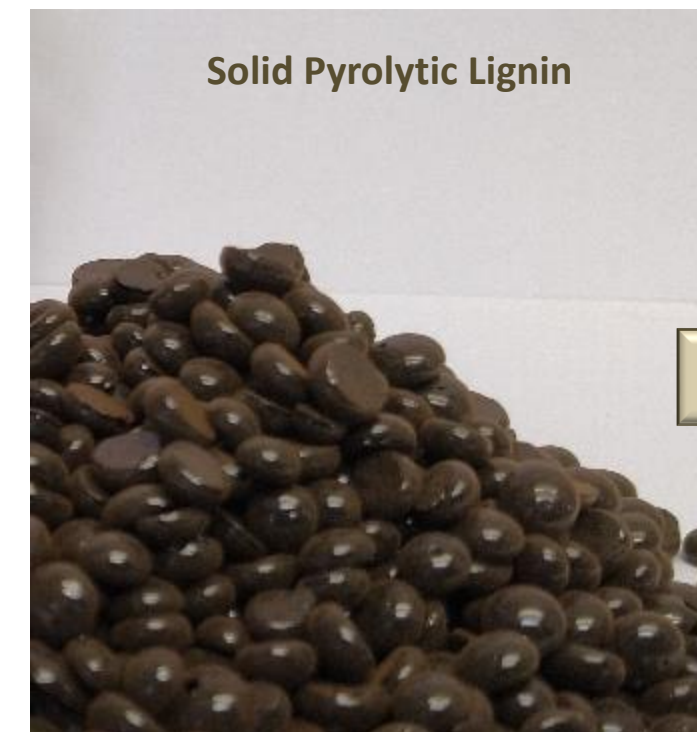


Manufacturing line #1



- Resins ('glue') in wood products like plywood, CLT, MDF are typically based on formaldehyde combined with Phenol, Urea or Melamine.
- Aim to develop a P/F resin on basis of pyrolytic lignin.
- Phenol replacement of 50 – 75%.

- Formaldehyde replacement by HMF (HydroxyMethylFurfural), a less toxic chemical.
- Development of a process to produce HMF from pyrolytic sugar (ML2).

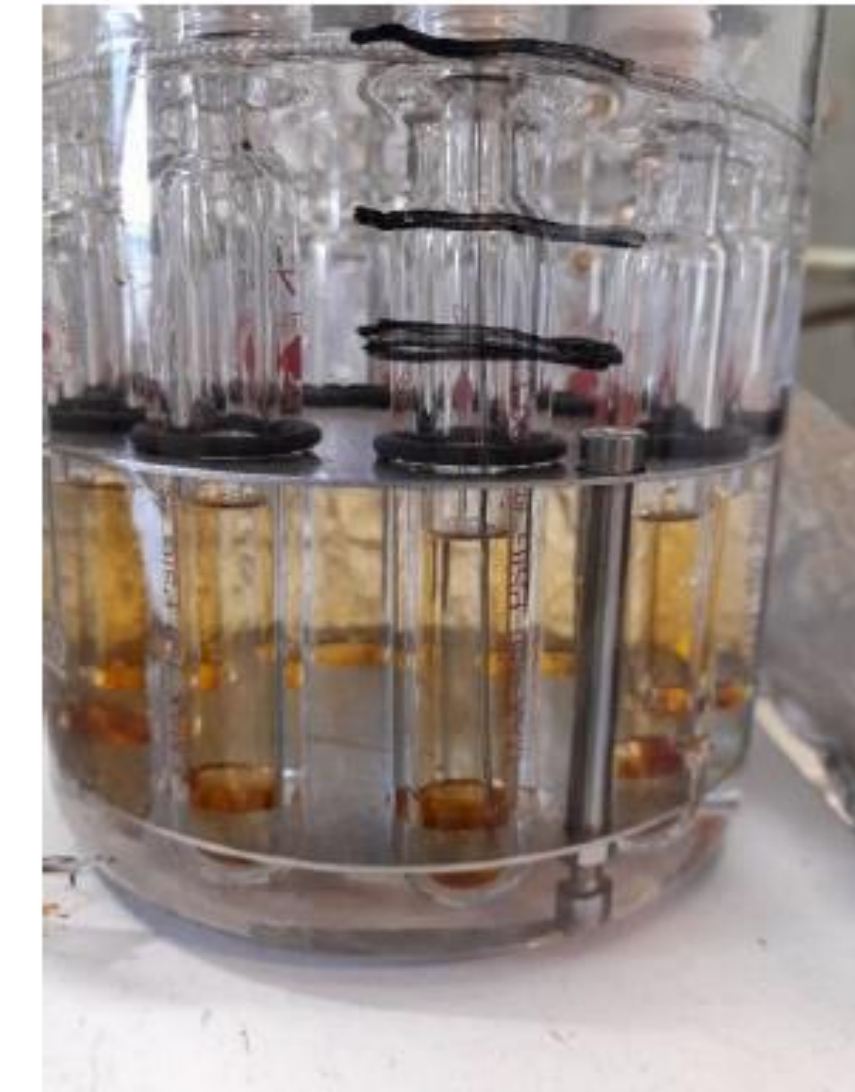


CLT – Cross laminated Timber

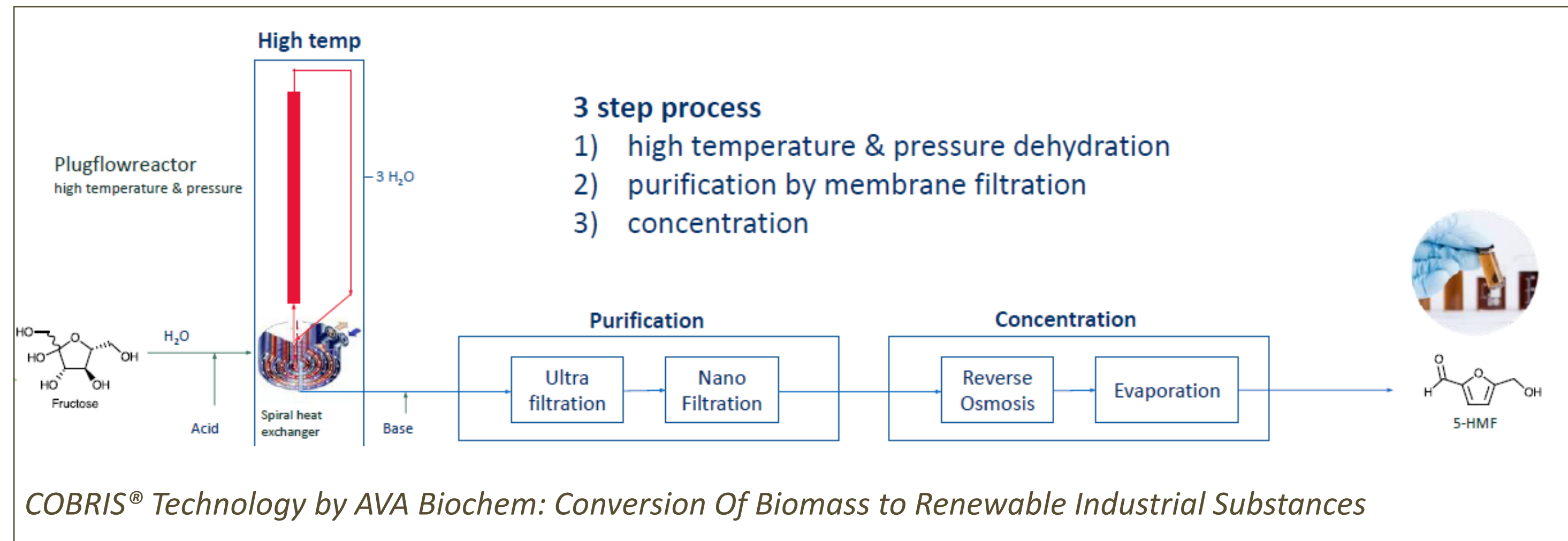
Manufacturing line #2



- Development of a process to produce HydroxyMethylFurfural (HMF) from pyrolytic sugar.
- Development a process for the conversion of different furan-based derivatives, including 5-HMF, to other bio-based products with various applications (e.g. green solvents, fuel additives, fine chemicals.)



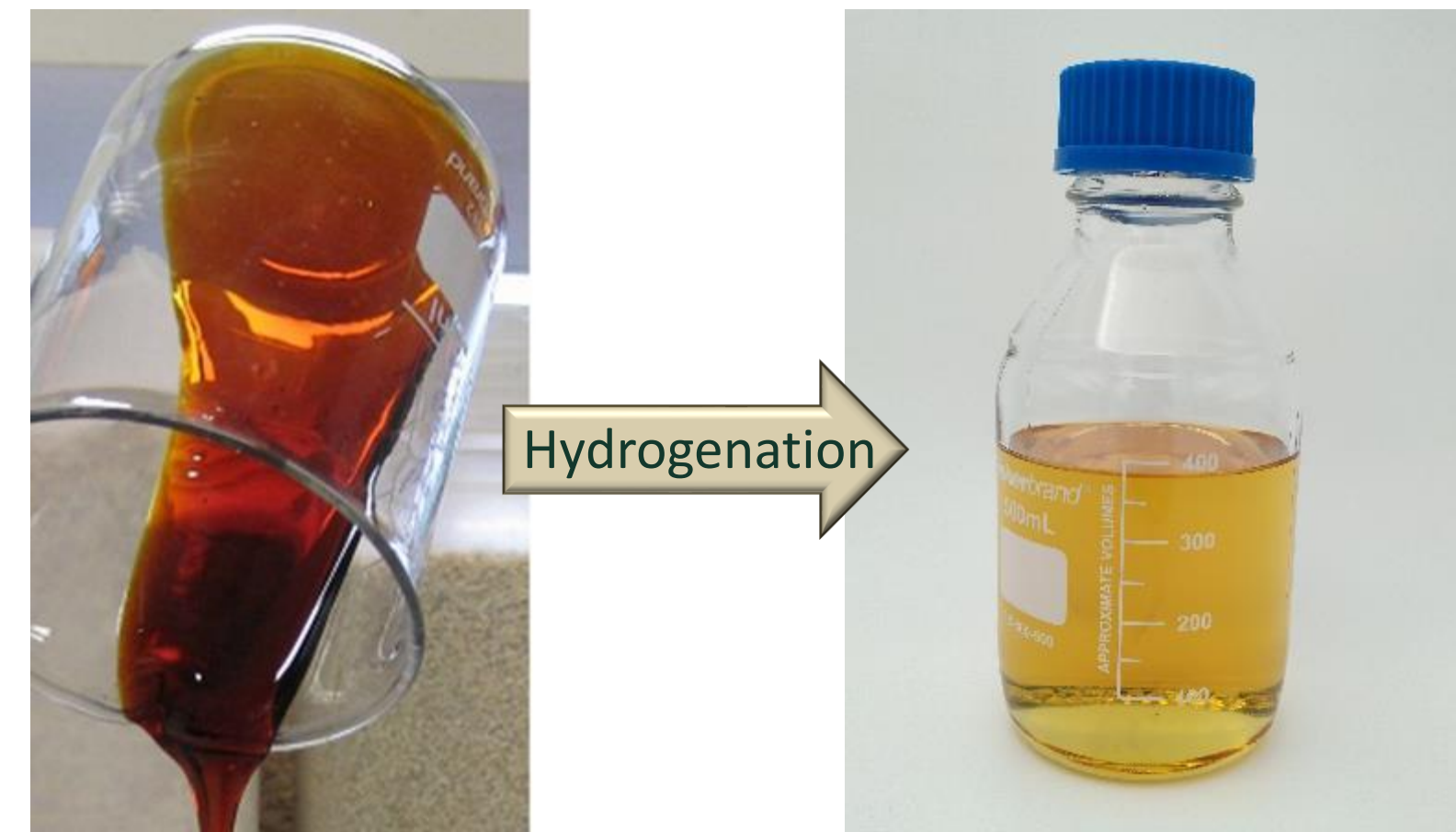
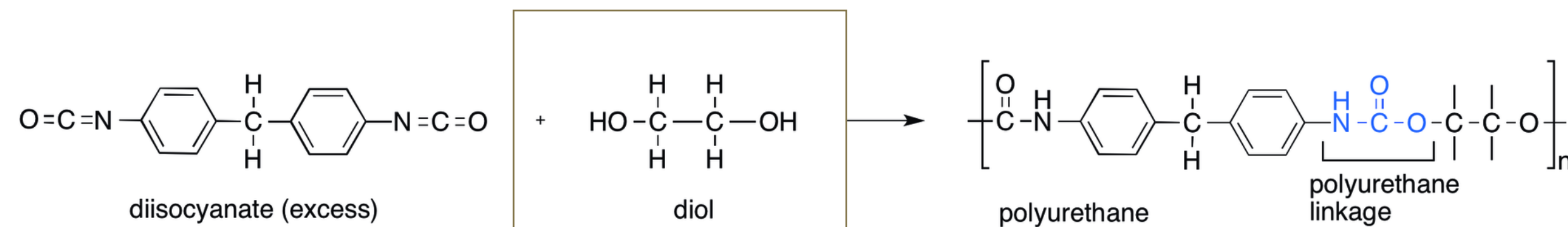
Research at RUG to convert pyrolytic sugars into HMF.



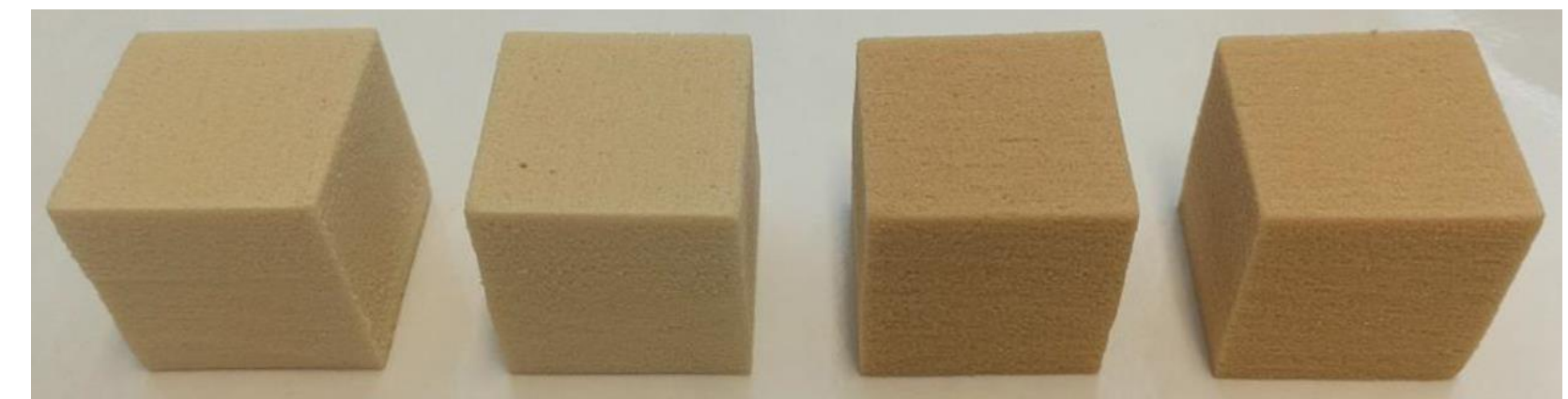
Manufacturing line #3



- W Main components to produce a polyurethane are di- and tri-isocyanates and polyols.
- W Polyols can be obtained by catalytic hydrogenation of pyrolytic sugars followed by purification.
- W The sustainable polyols are used to produce polyurethane foams.



Ethylene/Propylene glycol mixtures by hydrogenation of pyrolytic sugars (catalyst PICULA™)



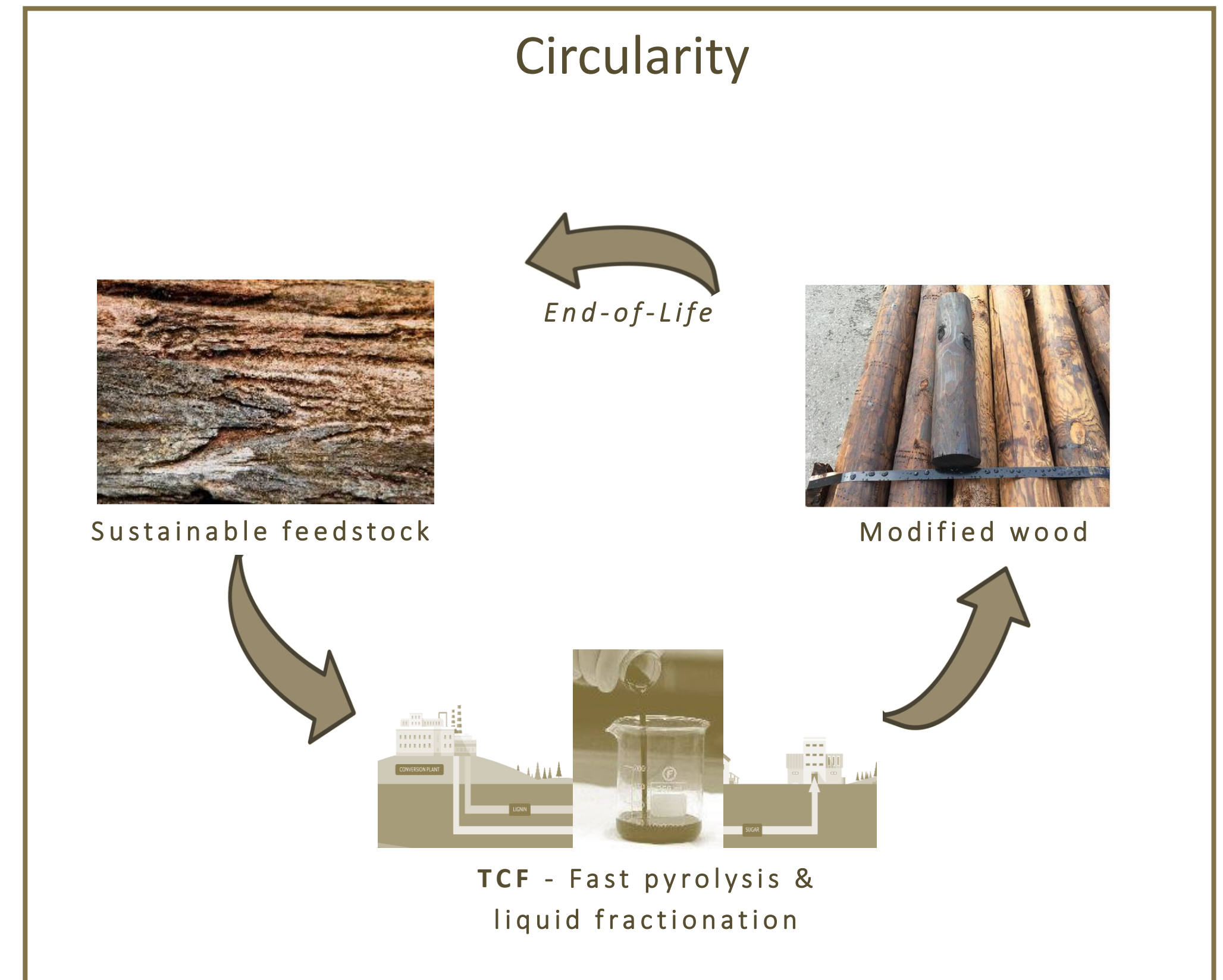
Polyurethane foam samples containing polyols produced from pyrolytic sugars



Manufacturing line #4



- W Improve wood durability by impregnation
- W Formulations based on
 - Whole pyrolysis oil (70-85%)
 - Additives incl. e.g. polyols from ML3
- W Modified wood samples prepared and tested on durability.



Common challenge and approach in different MLs



Common challenge

- ⌘ Raw materials modified to be compatible with a manufacturing line (ML).
- ⌘ Manufacturing line (process and/or conditions) adapted to enable the use of the new raw materials.
- ⌘ Evaluation of the quality of final product(s).

Common approach

- ⌘ Relevant industrial party in the lead for a specific ML.
- ⌘ Support by science (universities / institutes).



Thank you!

 New Wave Project

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Member of



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Manufacturing technologies
for bio-based materials

The NewWave consortium



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