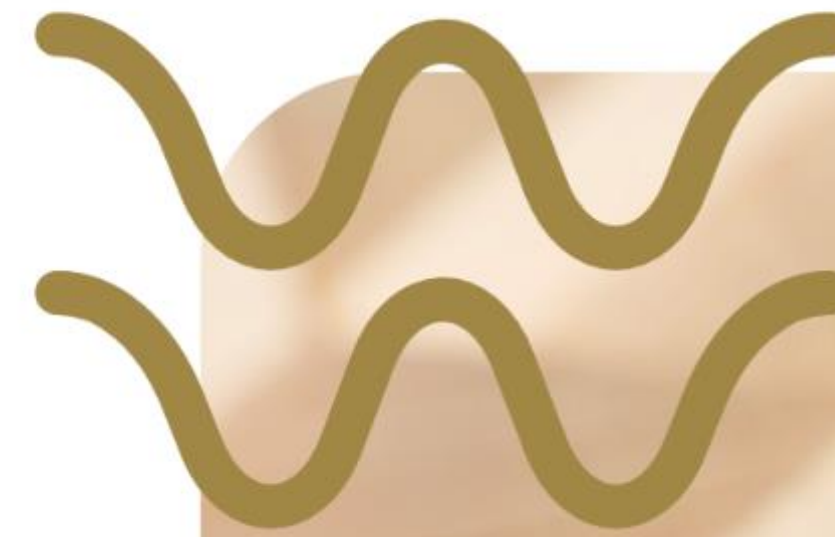




Building a sustainable & circular economy through innovative, biobased manufacturing lines



ThermoChemical Fractionation of biomass (TCF)



EUBCE – June 10, 2025



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



ThermoChemical Fractionation of biomass

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



Sugars



Liquid Lignin



Solid Lignin

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.



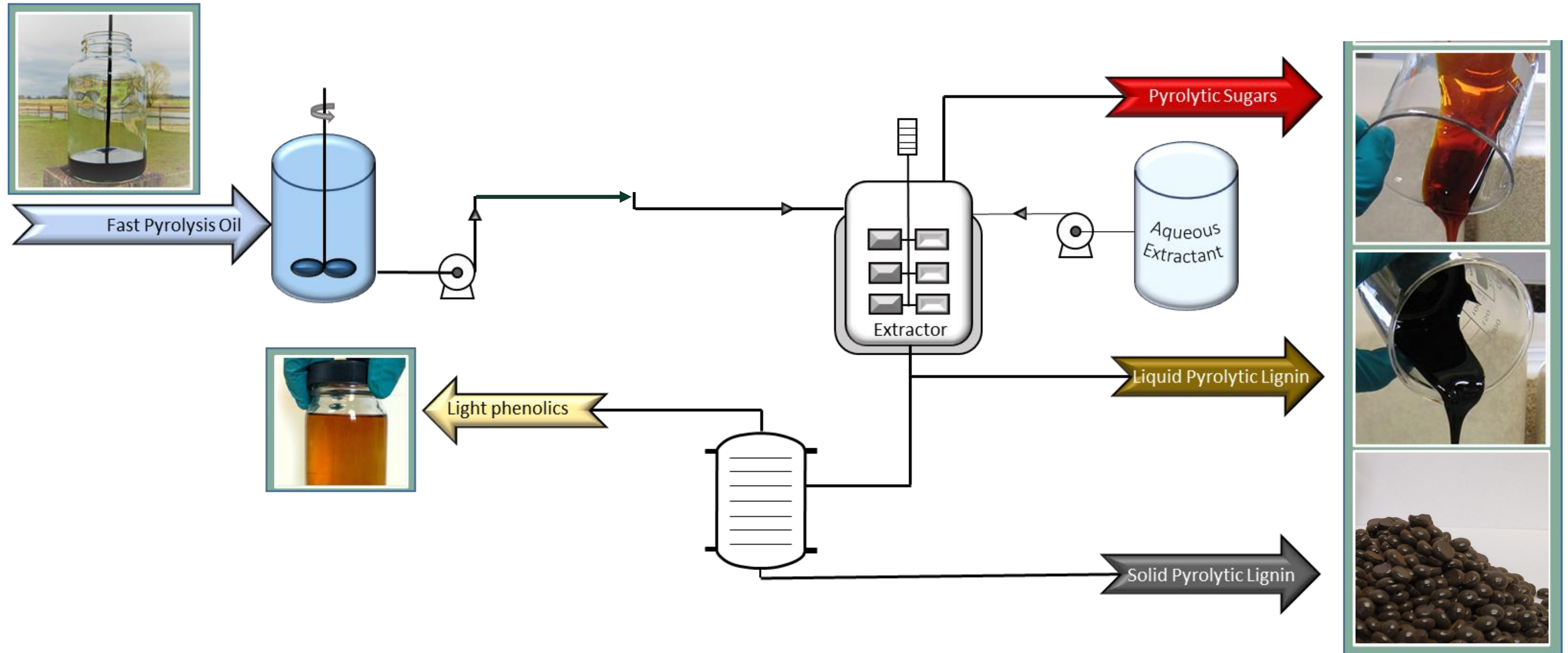
1. Fast pyrolysis



- Thermal depolymerisation of organic material in absence of oxygen
- Main product: liquid bio-oil (FPBO)
- Typical Process conditions
 - $T = 400 - 600\text{ }^{\circ}\text{C}$
 - $P = \text{atmospheric}$
- 'Liquid Composition': carboxylic acids, ketones, aldehydes, alcohols, carbohydrates, depolymerized lignin, extractives, water,...
- Multiple functionalities in FPBO, but raw materials for chemicals/material often require specific or limited functionalities

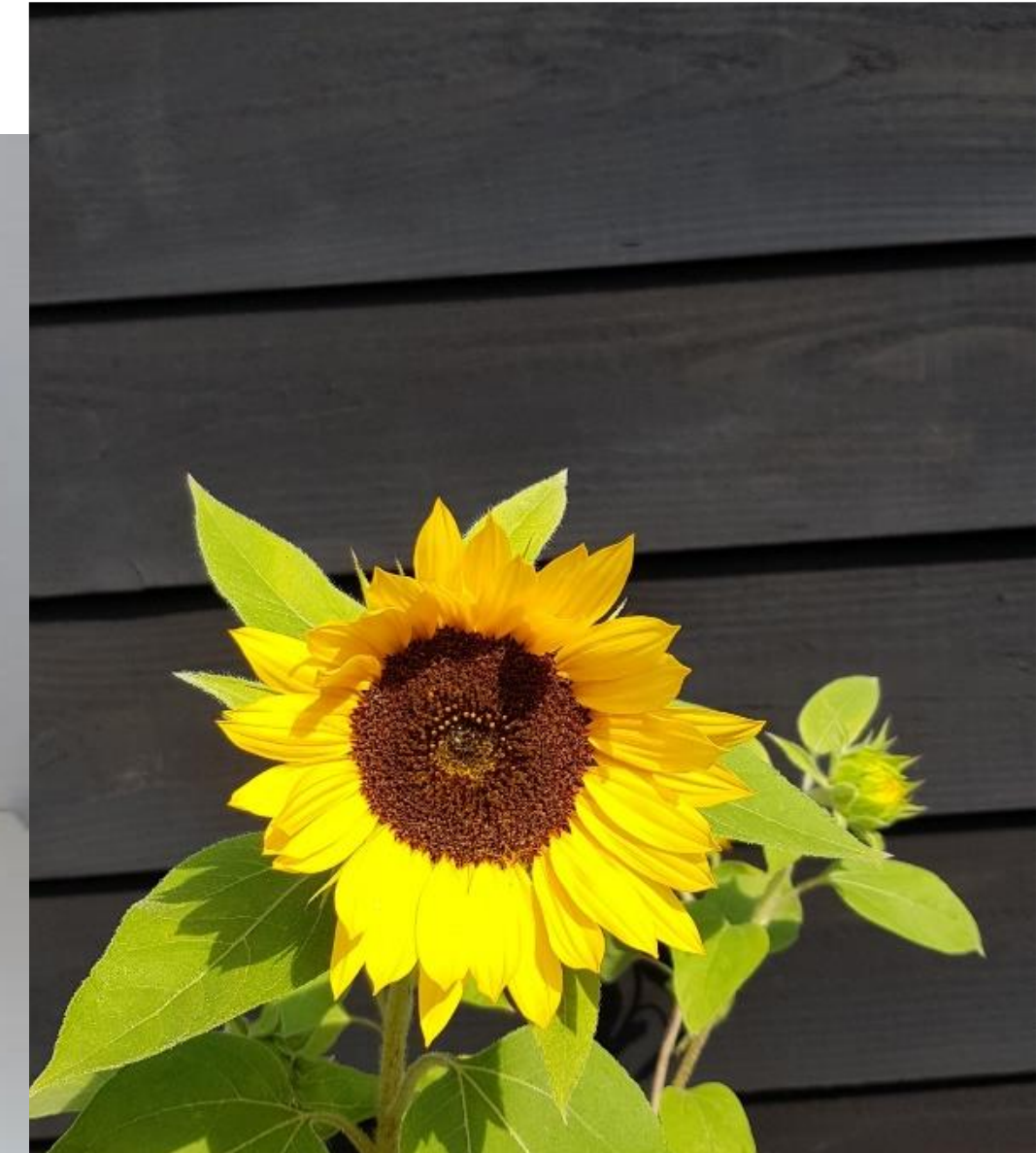
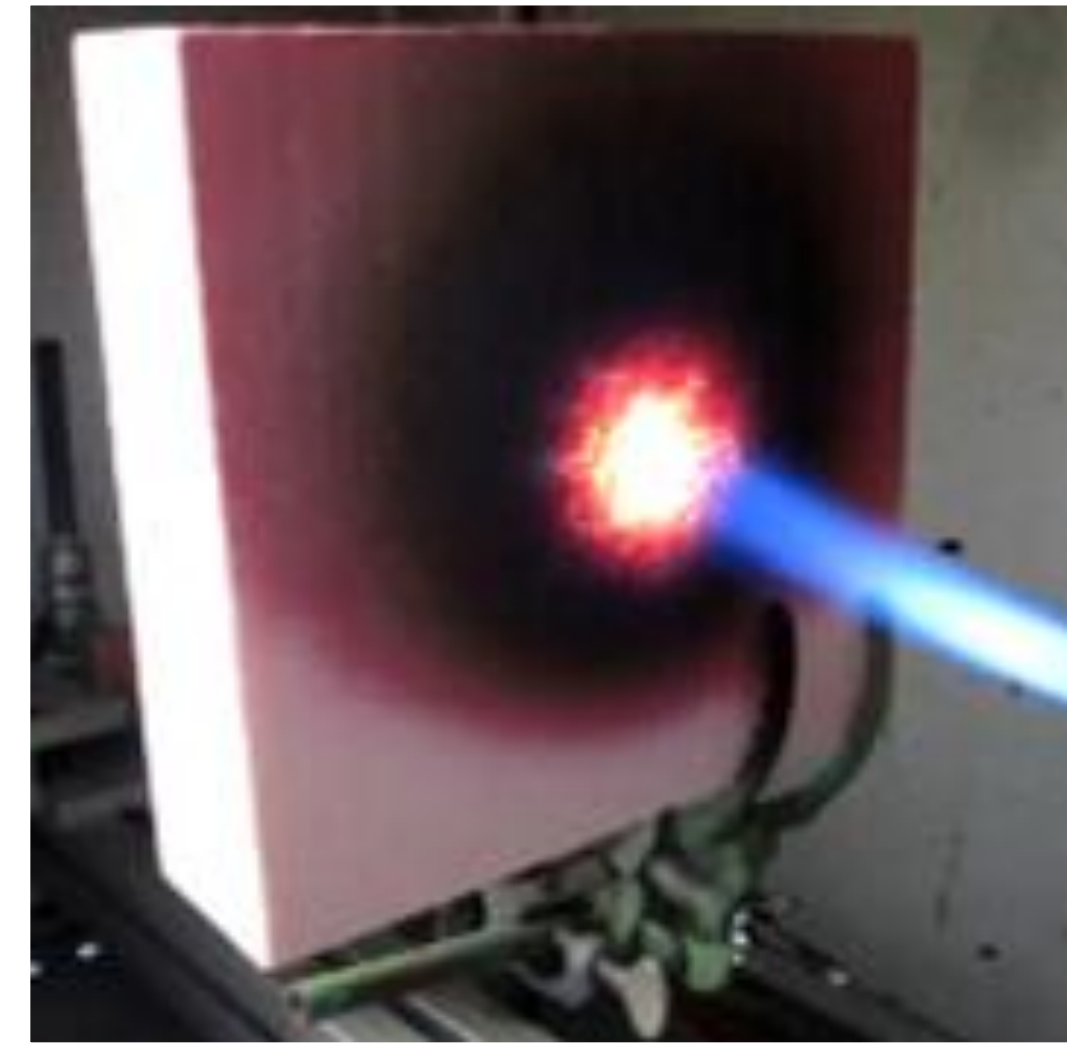


2. Liquid-Liquid extraction of FPBO





- Lignin in a.o. insulation foam and paints
- Phenol/formaldehyde resins (plywood, CLT)
- Biobinder – metallurgy (MECALO project)
- Chemicals (e.g. phenols)
- Sugars a.o. in wood modification & moulding resins
- Chemicals (polyols, HMF)



Status



- Fast Pyrolysis is commercially available (www.btg-bioliquids.com)
- Standardized design – capacity 5 t/h dry biomass
- Delivery of turn-key plants

Fractionation

- Fractionation proven by BTG on pilot-scale (125 kg/h FPBO feed)
- REACH Registration for 1-10 t/y Pyrolytic Sugar & liquid Lignin
- BTG concluded License agreement with sister company BTG Bioliquids to commercialize the process
- Design of 1 t/h feed completed $\equiv$ 1,000 - 1,500 t solid pyrolytic lignin/year
- Demonstration plant foreseen for 2026

Biorefinery Twente

De-risking and low investment using existing pyrolysis plant





Thank you!

 New Wave Project

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Member of



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Manufacturing technologies
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