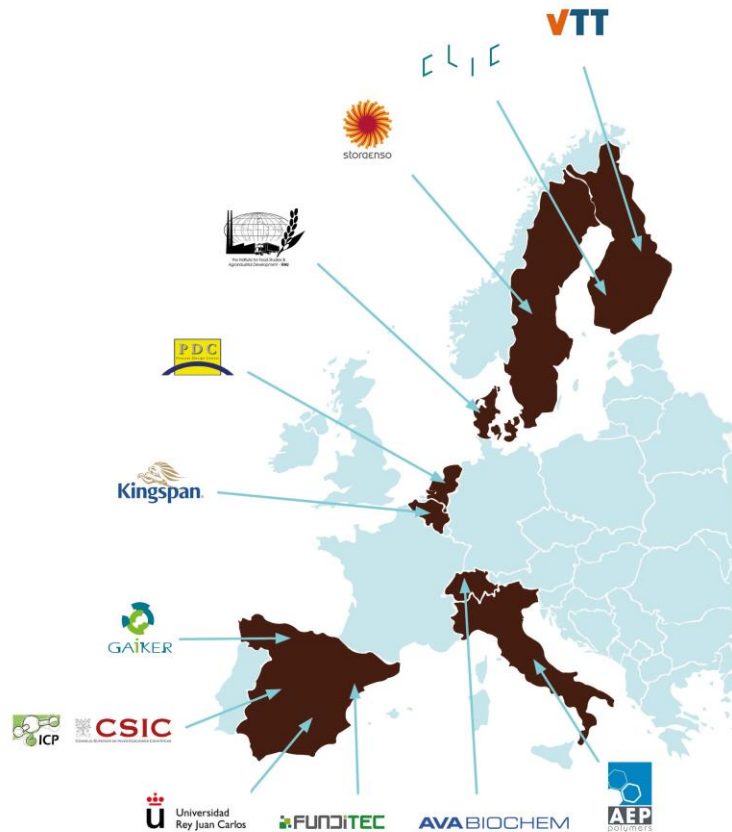




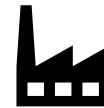
# FRACTION project presentation

2022

# FRACTION project



- Novel lignocellulose fractionation process for high purity lignin, hemicellulose and cellulose valorisation into added value products
- **Project lead:** CSIC (Spain)
- **BBI JU contribution:** € 5,307,662.50
- **Duration:** 1.06.2021-31.05.2024



2 Large Companies



5 SMEs



5 RTOs



Process modelling and simulation | Life cycle studies | End-of-life testing



### 2<sup>nd</sup> GENERATION LIGNOCELLULOSE

- Agricultural residue
- Old corrugated cardboard
- Dedicated crops
- Hardwood and softwood

10 different types of biomass tested, sole, and combined, wet or dry



### GVL/WATER FRACTIONATION

- High biomass loading
- Feedstock flexibility
- Closed solvent loop
- Adjustable yield and high purity of streams
- TRL 3 in lab scale, scaling to TRL 4-5

Successful scale up to 1 kg/d of biomass processing, >95% purity of lignin, > 90% purity of hemicellulose, >90% purity of cellulose

## HEMICELLULOSE VALORISATION



## CELLULOSE VALORISATION



## LIGNIN VALORISATION



Communication and Dissemination | Outline of industrial innovation business plan for technology transfer



# Context

- **Main challenge:**
  - **Demonstrate** the sustainability and techno-economic viability of a novel lignocellulose biorefinery flexibly
  - **To optimize** the production process to
    - a wide range of feedstocks,
    - variable market demand and fluctuating economics



# Objective

- **To develop** a fractionation technology based in aqueous  $\gamma$ -valerolactone (GVL) mixtures aiming to obtain high purity lignin and hemicellulose streams while maintaining the value of high grade cellulose as main output
- **To apply** the GVL-fraction scheme to various types of biomass
  - agri-food and forestry industries residues,
  - specific fractions of municipal waste
  - and dedicated crops from marginal, degraded or abandoned lands.
- **To transform** the hemicellulose into sustainable monomers and polymers and lignin into aromatics, phenolic resins and polyurethanes.



# Benefits to society and the environment

- **Interconnecting**

- the primary sector (biowaste from the agri-food, forestry and pulp & paper) with the bio-based processing industries (pre-treatment and conversion technologies)
- end user sectors using bio-based chemicals and material
- **Increase** the total economic value of the end products from lignocellulose processing by at least 20%.
- **Reduce** greenhouse gas (including CO<sub>2</sub>) emissions by at least 20%.
- **Increase** in energy efficiency of at least 20% in the envisaged value chain.

# Circular economy targets

- Potential for **creating** new job opportunities in the bio-based sector in rural, coastal and/or urban areas and the forestry sector with successful project results.
- **Contribute** to the EU's 2050 long-term strategy for a climate-neutral Europe by replacing fossil-based material with bio-based, renewable material.





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