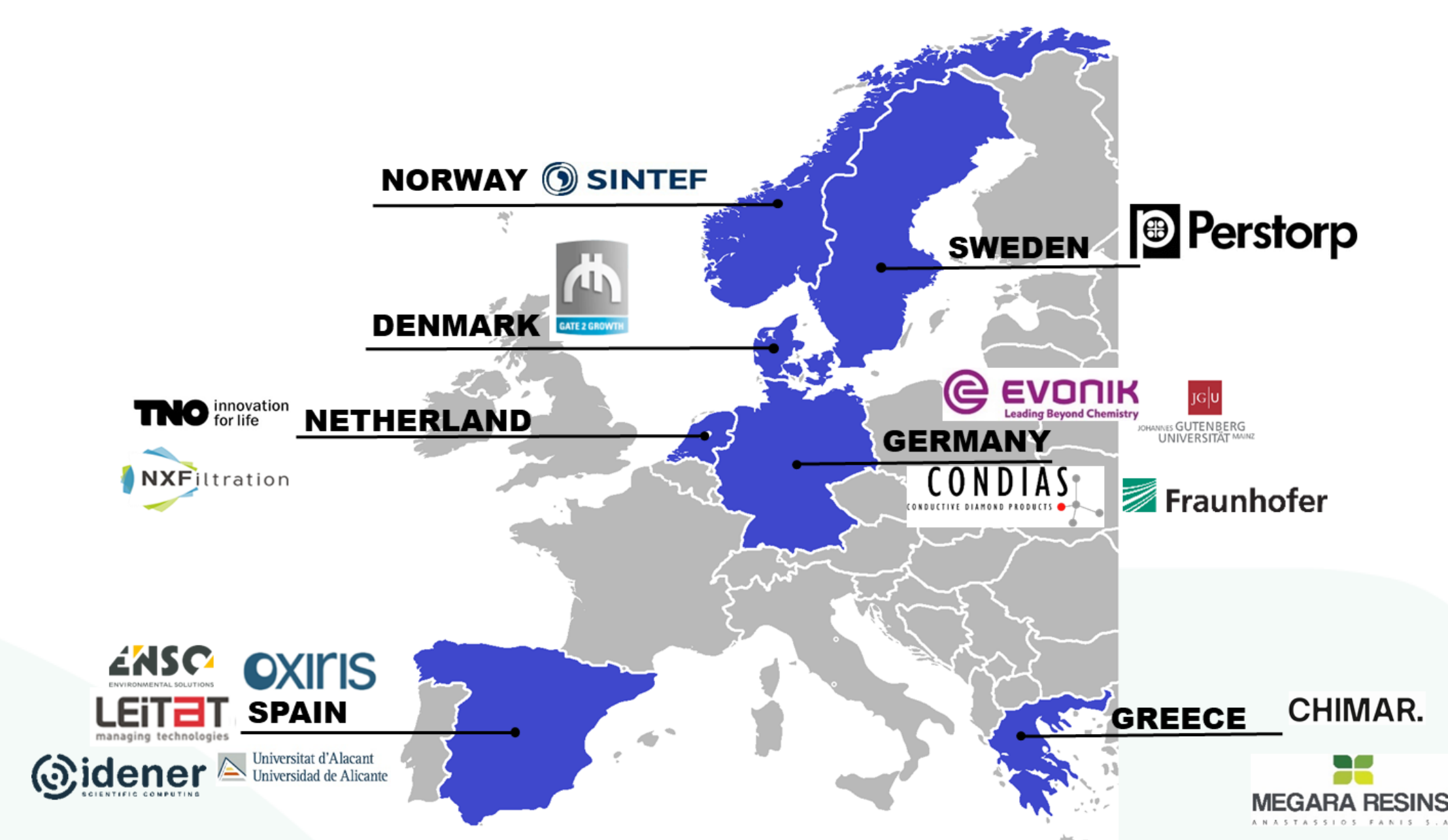


Liberate

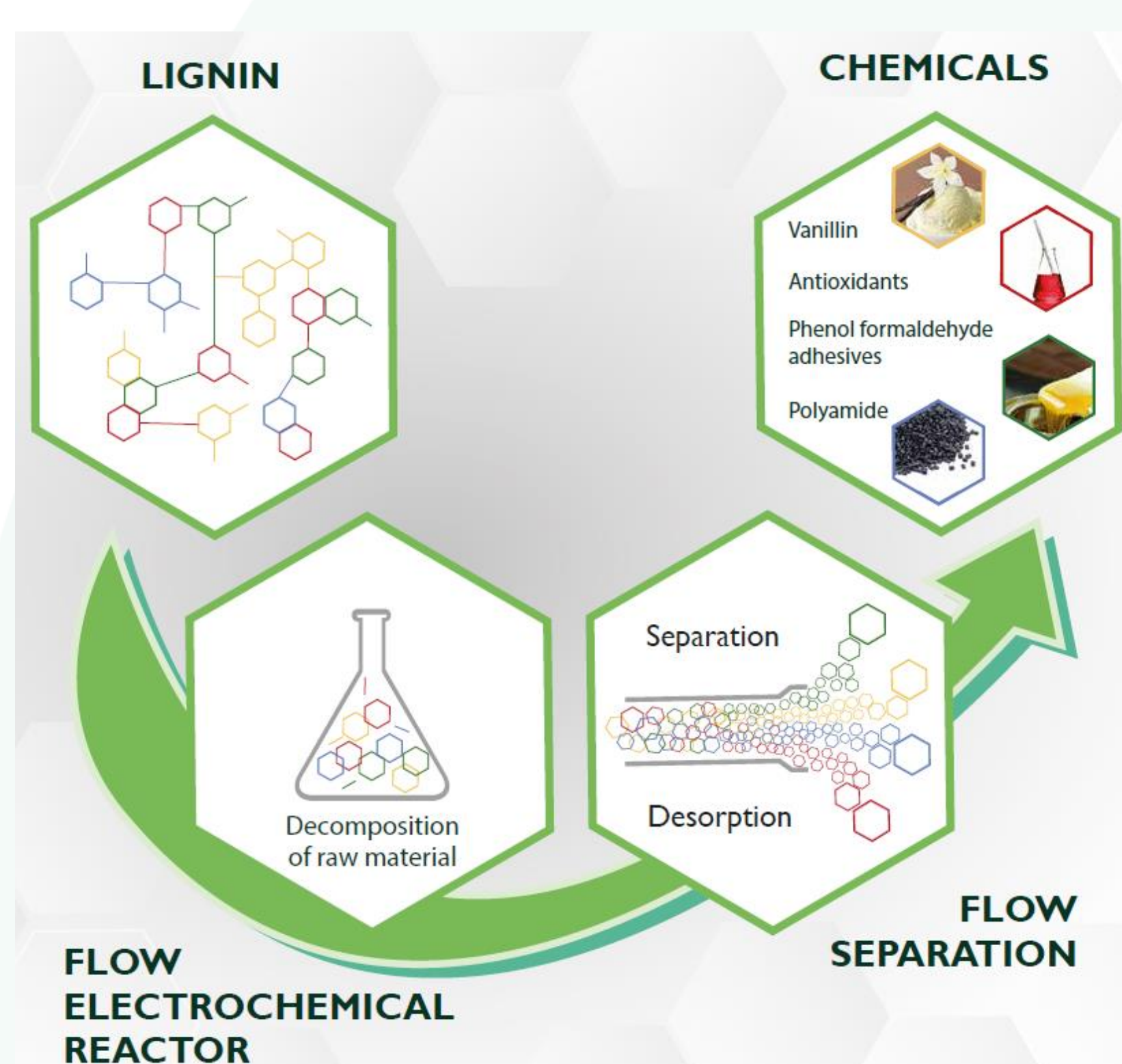
Lignin Biorefinery Approach using Electrochemical Flow

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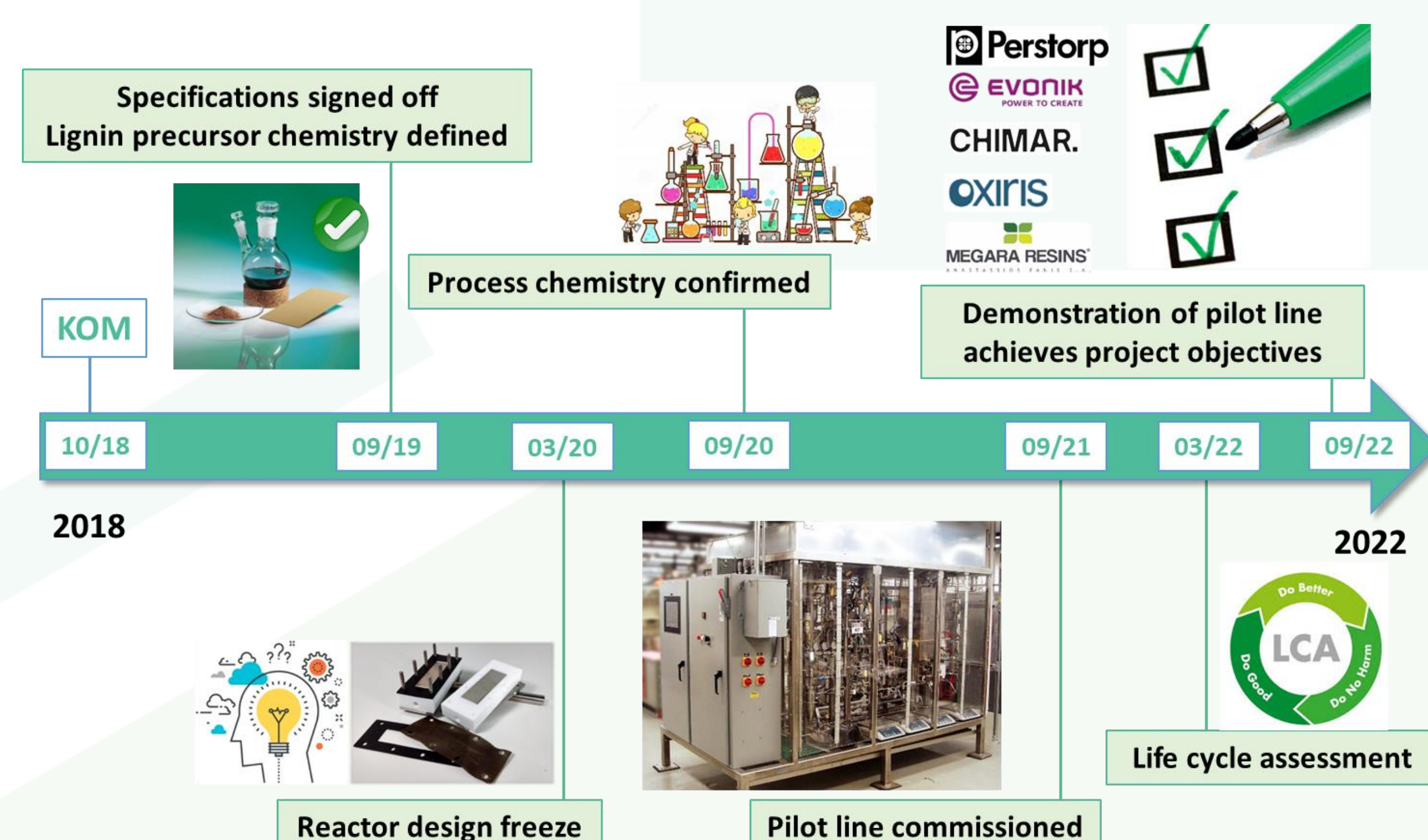
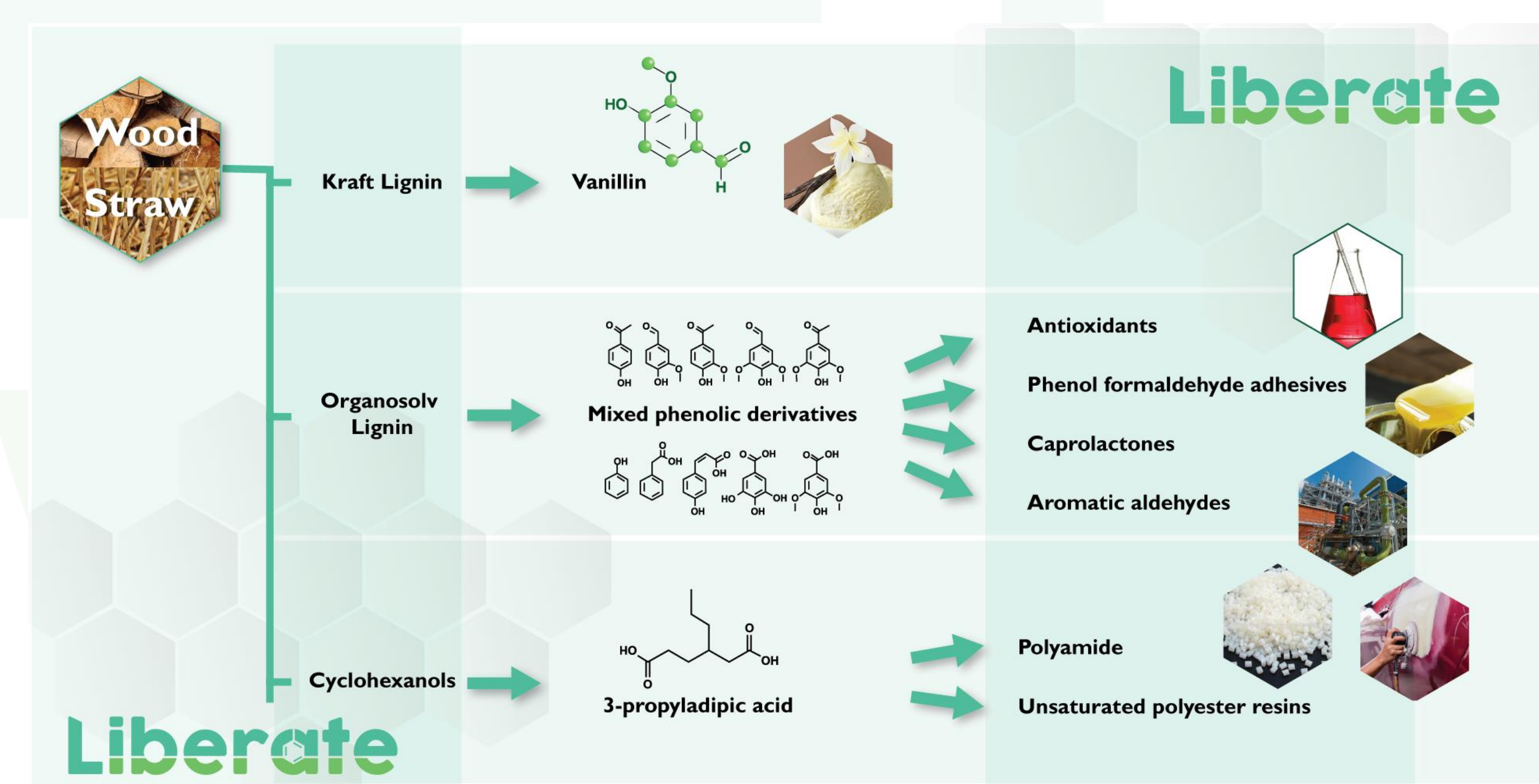
LIBERATE will deliver a pilot scale electrochemical plant to demonstrate the commercial opportunities of converting low cost lignin feedstock in high value biosustainable chemicals.



Main Objectives:

1. From Kraft lignin → 7% yield of Vanillin
2. Organosolv lignin → > 35% yield of Phenolic derivate
3. Cyclohexanol → up to 80% of propyl adipic acid
4. A biorefinery process:
 - Renewable energy fluctuations without loss in efficiency
 - Better energy efficiency (95% improvement) and Resource efficiency (350% improvement)
 - 29 times less CO₂ than the conventional petrochemical alternatives.

Processes and Time line:



What we have achieved?

Organosolv Lignin

- Production of different organosolv lignins for improved electrochemical depolymerisation efficiency (differences in depolymerisation rates validated)

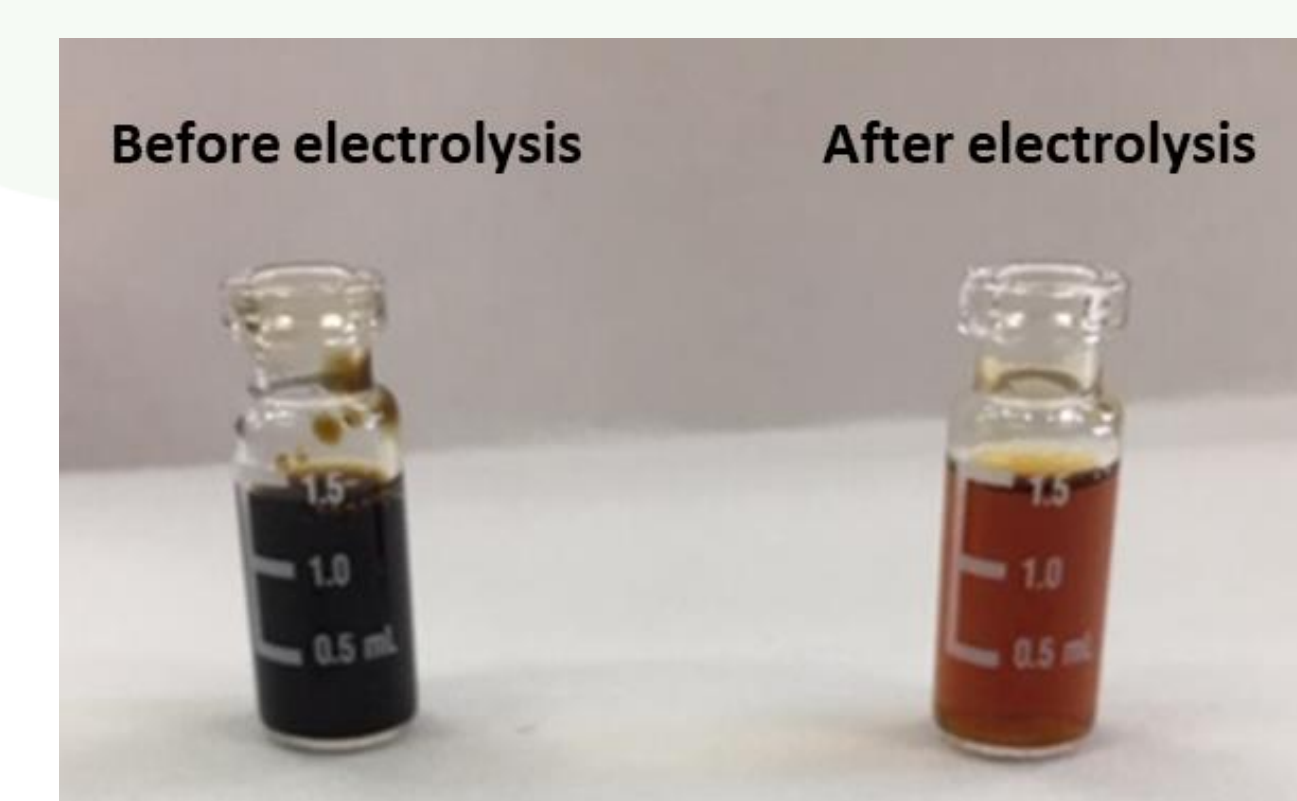


Electrochemical Reactors

- Electrode materials and shapes were performed using different techniques.
- Currents up to 240 mA/cm² without micro- or macroscopic corrosion or significant loss of efficiency
- Reactors are under validation

Electrochemical process and downstream

- Vanillin from commercial kraft lignin up to 6 % of yield
- Propyl adipic acid production: 60% of yield.
- Downstream process: Selectivities around 85% for lignin and up to 75% for different phenolic compounds. Coupling with ion exchange resins, nearly 100% of the mono aromatic phenols could be recovered.



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