

# NEWSLETTER

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## TRIPYR FOCUS : HOMOGENEOUS CATALYSIS FOR RESIDUES VALORIZATION

TRIPyr project is currently advancing in the development of catalytic processes to transform important residues at both sides of the Pyrenees: lindane, a pesticide currently banned, and fatty acid residues coming from the agri-food industry. This newsletter is focused on the recent advances in the design of homogeneous catalysts and catalytical processes.

### Homogeneous catalysts

Catalysts are compounds that, when added to chemical reactions accelerate those without being consumed as part of the reaction process. Homogeneous catalysts are in the same phase as the species reacting, favouring a high degree of interaction between catalyst and reactant molecules. The homogeneous catalysts being used within TRIPyr by ICIQ include organometallic complexes based on abundant metals, such as Nickel (Ni), Aluminum (Al) and Iron (Fe). The organometallic complexes used include a central metal atom and an organic ligand, these complexes are added to the reactions designed to activate the selected molecules coming from waste.

On one hand, Ni and Fe complexes including organic ligands based on diols or diphosphines, are being used to convert gamma hexachlorocyclohexane ( $\gamma$ -HCH), the chlorinated compound and main component of the Lindane pesticide, into useful intermediates. The intention is to activate the Cl-alkyl bonds of this molecule and apply synthetic transformations to get added-value molecules that can be introduced again in industrial processes. Photochemical strategies, where the reactions are irradiated by light, are also being explored. Halogenated molecules are valuable for instance for the pharmaceutical industry to synthesize new active compounds or as solvents or refrigerants in industrial processes.

On the other hand, pre-treated fatty acids by the TRIPyr partner SAPOVAL are now being explored at ICIQ to be included in catalytic transformations leading to new polymers.

Oleic acid and other unsaturated acids (containing at least one double bond), coming from crude duck fat residues, are transformed into polyesters. The catalysed processes are driven by binary catalysts based on the combination of metal-centred (Al or Fe) complexes having phenolate ligands with the presence of an amine, as a base catalyst. The new polyesters are being used in cross-linking reactions and their properties are being studied to examine potential applications. Common polyester applications include packaging materials for beverages and food, transparent screens or textile components.

The partners also enjoyed a visit to the state-of-the-art equipment and infrastructures available at ICIQ. Invited speakers have also joined the two-day gathering, providing insight into their fields of expertise. Prof. Ana Aguiar, president of the Division of Green & Sustainable Chemistry of the European Chemical Society and expert in green chemistry and supercritical CO<sub>2</sub> technology from the New Lisbon University, delivered the talk "Rethinking supercritical CO<sub>2</sub> use;" Dr. François Jérôme, from the Institute of Chemistry of Poitiers: Materials and Natural Resources, who has extensive experience in the coupling of catalysis with alternative technologies presented "Alternative technologies for biomass conversion;" and the third invitee, Alessandro Zedda, director of Zedda Innovation Consulting & Labs gave the talk entitled "Monetization Strategies for Intellectual Properties. Know the value of your IP, choose the best industrial partner to negotiate more and better licensing deals."

### Évents



The seven partners of the TRIPyr consortium have met on the 29th and 30th of November at ICIQ for their annual meeting. The gathering has brought together the members of the consortium to share the development of the project and discuss future actions.

### UPCOMING EVENTS

**The closing meeting of TRIPyr project,  
scheduled for 2 & 3 May, 2022  
will be held in Pau.**

