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Press release
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As part of a collaboration initiated at the end of 2021, IFP Energies nouvelles (IFPEN) and ResiCare, a Michelin Group entity, announce that they have co-developed a process for producing the molecule 5-

hydroxymethylfurfural (5-HMF) from fructose, particularly used in the manufacture of bio-based resins. All the stages of industrial development have been completed, from tests on various scales to pre-FEED and FEED engineering studies for an industrial unit.

5-HMF, a biobased molecule with multiple applications

Following ten years of laboratory research on the conversion of fructose into a biosourced molecule, 5-HMF, IFPEN joined forces with ResiCare in 2021 to develop a process for producing 5-HMF on an industrial scale.

ResiCare, a Michelin Group entity, develops and markets innovative adhesive resins combining high performance, non-toxicity and renewable materials. Initially developed for the tyre industry, ResiCare technology is now being deployed in a range of industrial applications (wood, insulation, abrasives, composites, etc.).

5-HMF is a particularly interesting platform molecule for the chemical industry, as it can be used to replace products of fossil origin with biobased products in a wide range of applications: adhesives and resins, plastic polymers, solvents and acids, amines and amides, fuels and fuel additives, pharmaceuticals, food and feed. In all these areas, the use of this non-toxic molecule, produced from fructose of plant origin, could significantly reduce the impact on the environment and health.

Towards an industrial first

Pilot-scale trials have resulted in the production of 1.2 tonnes of 5-HMF. The first samples of 5-HMF produced by IFPEN have been validated by ResiCare in the manufacture of their resins. In parallel with the finalisation of the large-scale tests, Technip Energies has been awarded the contract to carry out a basic engineering study (pre-FEED) in 2022, followed by a detailed design study (FEED) in 2023 for an industrial unit.

> "We are delighted to have been able to work with our partner ResiCare to develop the 5-HMF production process, drawing on our expertise in homogeneous catalysis and in scaling up processes from the laboratory to the industrial unit," says Abdelhakim Koudil, Biomass to Chemistry Programme Manager at IFPEN.

> "Thanks to this partnership with IFPEN, ResiCare has confirmed the feasibility of biosourced, non-toxic chemistry on an industrial scale, paving the way for petroleum-free chemistry. This is a key step in scaling up our new adhesive technology. We believe that this is a promising movement, and we invite other industry players to join us," adds Laurent Lemonnier, Executive Vice-President in charge of ResiCare.

*Not meeting the criteria for Substances of Very High Concern (SVHC) as defined by the European REACH regulation.

About IFPEN IFP Energies nouvelles (IFPEN) is a major player in research and training in the fields of energy,

transport and the environment. From scientific concepts in fundamental research to technological solutions in applied research, innovation is at the heart of IFPEN's activities, which are structured around four strategic areas: climate, environment and circular economy; renewable energies; sustainable mobility; responsible hydrocarbons. For more information: www.ifpenergiesnouvelles.fr

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IFP Energies nouvelles and ResiCare, leaders in the development of a production process for the non-toxic* biobased molecule 5-HMF
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