HIGFLY

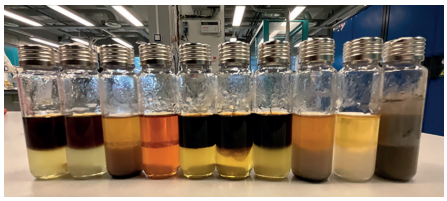
HIGEE TO FURANIC-BASED JET-FUEL TECHNOLOGY

Newsletter 2

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°101006618. The present publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

Welcome to the second edition of the HIGFLY project´s newsletter. In this latest publication you will discover updates on the project´s research into deep eutectic solvents, the HiGee reactor, and catalytic processes. You will also get insights into the latest developments in the sustainable aviation sector, notifications on upcoming events, and introduced to a related project *BioSPRINT*.

PROJECT PROGRESS



Bio-based deep eutectic solvents for the continuous synthesis of furfural and bio-oxygenates in bi-phasic media

One primary goal within the HIGFLY project is to minimise the energy consumption involved in producing sustainable aviation fuel. This objective is pursued by optimising various stages of the process, focusing on enhancing the efficiency of reactor technologies, catalysts, solvents, and membranes.
An overarching ambition is to establish a more circular process by employing solvents...

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Higee reactor development for the single and two-step synthesis of furfural and bio-oxygenates

Furfural is the primary jet fuel precursor and building block within the HIGFLY concept. The existing methodologies employed for converting biomass feedstocks into furfural exhibit notable inefficiencies in resource utilisation, substantial costs, and high energy consumption. These methods result in a yield of less than 50% of the potential value and a complete loss of cellulose and lignin.
In response to these...

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Design of a catalytic process for the hydrodeoxygenation of condensed intermediates

This HIGFLY project´s research into the design of a catalytic process for the hydrodeoxygenation (HDO) of condensed intermediates aims to streamline and enhance the production of oxygen-free fuel samples for jet fuel applications.
Johnson Matthey selected and provided heterogeneous HDO catalysts, with a particular emphasis on commercially scalable routes. Six catalysts...

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RELATED NEWS & UPDATES

Plant-powered planes may be no pipe dream

Professor David Chiaramonti is looking down at the ground to help resolve a problem up in the sky: aeroplanes' emissions of carbon dioxide (CO2) and other pollutants.
An expert in energy systems and power generation at the Polytechnic University of Turin in Italy, Chiaramonti...

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Navigating the future of sustainable aviation fuel in 2024

In 2024, the sustainable aviation fuel (SAF) sector is experiencing a transformative phase, driven by key legislative agreements and technological advancements. This article explores the dynamic landscape of SAF, drawing insights from...

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Skynrg's higfly project: addressing challenges in unlocking the potential of lignocellulosic biomass

Scaling up production capacity for sustainable aviation fuel (SAF): How the ReFuelEU Mandate stimulates the implementation of advanced biobased pathways for SAF production post-2030...

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RELATED PROJECT

HIGFLY partner ifeu are also members of the **BioSPRINT** Project that focuses on implementing process intensification within biorefining operations, specifically targeting the enhancement of efficiency in purifying and converting sugars from the hemicelluloses fraction of lignocellulosic biomass. The primary aim is to facilitate the transformation of these sugars into innovative bio-based resins, serving as substitutes for petroleum-based polymers across various applications. The overarching goal is to achieve cost reduction in operations, minimise reliance on feedstock and energy resources, decrease greenhouse gas emissions, and enhance overall yields. Emphasising the adoption of technologies capable of intensifying processing methods, **BioSPRINT** is designed to establish an integrated biorefinery concept with a keen focus on improving operational safety.

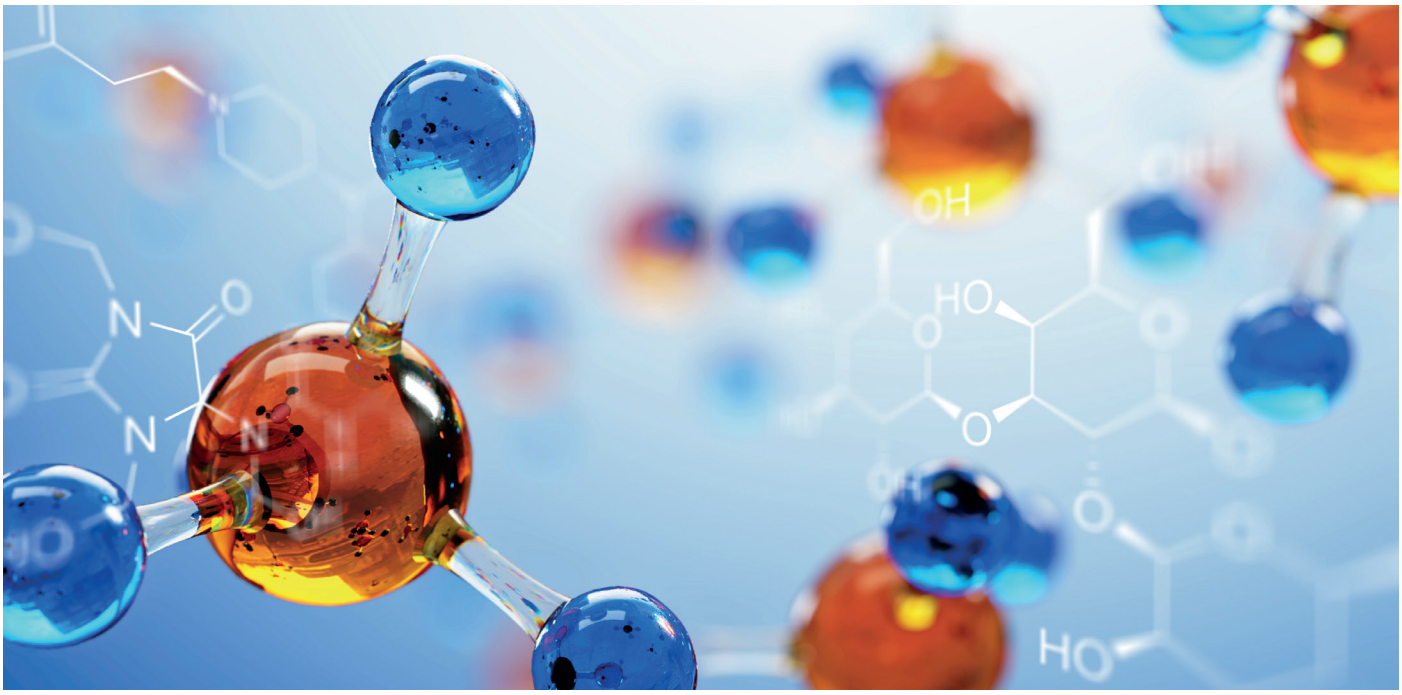
A key aspect of **BioSPRINT** is the valorisation of hemicelluloses streams obtained from hard wood and straw, particularly those derived from processes involved in paper pulp or biofuels production. The project concentrates on four main activity areas:

- Upstream purification
- Catalytic conversion
- Downstream purification
- Polymerisation

Noteworthy technological advancements include an intensified and integrated purification strategy utilising anti-solvent precipitation and membrane separation methods, novel catalytic processes for dehydrating C5 and C6 hemicelluloses sugars into monomers, extractive-reaction methods for in-situ isolation of reaction products from the medium, deployment of heterogeneous catalysts, and an intensified polymerisation process for furan-based derivatives. Cross-cutting activities encompass process simulation and optimisation, integrated lifecycle sustainability assessment, standardisation, as well as dissemination and exploitation initiatives.

To learn more about **BioSPRINT**, visit their website at: *https://biosprint-project.eu/*

UPCOMING EVENTS



1

Eindhoven University of Technology (*TU/e*) have submitted a poster presentation for the The Netherlands' Catalysis and Chemistry Conference (*NCCC*) taking place March 4th – 6th 2024 in Noordwijkerhout, The Netherlands.

The presentation primarily focuses on the utilisation of alternative feedstocks to substitute fossil-based products, with a specific emphasis on lignocellulosic biomass, particularly hemicellulose-rich sources such as cornstalks, corncobs, bagasse, and husks of peanuts and oats. The key objective is to produce furfural, an attractive building block, through the dehydration of pentose sugars (e.g., xylose and arabinose) using heterogeneous catalysts and co-solvents as alternatives to traditional methods.

Learn more by visiting the conference *website*.

2

Johnson Matthey (*JM*) have submitted a poster presentation for the 9th EuChemS chemistry conference taking place in Dublin, Ireland from the 7th – 11th July 2024.

The presentation addresses the global imperative for the chemical industry to decarbonise and mitigate greenhouse gas emissions and highlights HIGFLY´s research into the catalytic conversion of furfural through aldol condensation reactions with bio-derived ketones. Additionally, the hydrodeoxygenation treatment of model condensate products are explored with the potential to achieve significant deoxygenation and carbon yield for the production of drop-in sustainable aviation fuel.

Learn more by visiting the conference *website*.

3

Eindhoven University of Technology (*TU/e*) and *CSIC-ITQ* have submitted an abstract to the International Congress on Catalysis due to be held in Lyon, France from the 14th – 19th July 2024.

The paper addresses the necessity to develop cost-effective and energy-efficient methods for sustainable fuel and chemical production, and how technology development and more cost-efficient processes for the production of furfural, a biomass-derived platform chemical, could help achieve these targets.

Learn more by visiting the conference *website*.

PROJECT VIDEO

HIGFLY: Eindhoven University of Technology´s Chemical and Sustainable Process Engineering Laboratory

Eindhoven University of Technology is the HIGFLY project leader and a renowned academic and research institution, specialising in engineering science and technology. As part of the HIGFLY project, they are developing novel reactor technologies to improve the efficiency and cost effectiveness of the production of jet fuel precursors.

WATCH THE VIDEO

COMING UP IN THE NEXT EDITION!

In the third edition of the HIGFLY newsletter we will be bringing you updates on the project´s research into the separation of furfural and bio-oxygenates using deep eutectic solvents, HiGee reactor development, catalyst selection, lifecycle and social impact assessments, and much more!

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Don´t forget you can stay up to date by visiting our website:

www.higfly.eu/

And you can follow us on our social networks:

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