



SusPharma is an Horizon Europe-funded project that develops sustainable technologies for pharmaceutical manufacturing, combining flow chemistry, heterogeneous catalysis, photocatalysis, biomass valorisation, AI tools and robotics.

The project promotes continuous, safe and scalable APIs production with reduced environmental impact, supporting the transition to a greener pharmaceutical industry.

Impacts

- Up to 90% less solvent and chemical waste in APIs production;
- Scalable green synthesis routes for industrial implementation;
- Reduced reliance on petrochemical feedstocks;
- Support to EU resilience in pharmaceutical manufacturing and supply chains.

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Horizon Europe
European Health and Digital
Executive Agency (HaDEA)

www.suspharma.eu



Greener-by-design Pharmaceuticals

Sustainable and digital
chemistry for a cleaner
future



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Funded by the European Union

Why suspharma?

Today's pharmaceutical manufacturing is resource-intensive, batch-based, and fossil-dependent, producing up to 200 kg of waste for every 1 kg of APIs (active pharmaceutical ingredient).

The pharmaceutical industry emits as much CO₂ as the automotive sector—up to 50 megatonnes of CO₂ emissions/year.

SusPharma addresses this challenge by redesigning APIs production around six key principles:

1. **Green-by-design synthesis** from renewable feedstocks
2. Continuous, safe and efficient **flow-based processes**
3. **Catalysis and crystallization** strategies to minimize solvent use
4. **AI tools** to optimise and automate chemical workflows
5. **Biodegradable delivery systems** and downstream innovation
6. Scalable solutions aligned with EU resilience and **sustainability goals**



Science for sustainable future

SusPharma will train the next generation EU scientists to implement new pharmaceutical manufacturing paradigms and boost the transition towards a sustainable world

- **Life Cycle Assessment**
Using real-time tools to measure and improve environmental performance
- **Policy & Regulation**
Ensuring alignment with EU green pharmaceutical strategies, contributing to the 2030 EU Agenda for Sustainable Development and advancing the Sustainable Development Goals (SDGs).

SusPharma structure

Cat to-Pharma

WP1

New heterogeneous nanocatalysts for C-X (C-C, C-F and C-I) bond formation
Leader: POLIMI Co-leaders: C2CAT/FEYECON/VITO

Waste to-Pharma

WP2

Biomass chemistry for the synthesis of pharmaceutical building blocks and scaffolds
Leader: UCO

Flow to-Pharma

WP3

Development of new flow chemistry routes for the synthesis of Pharmaceuticals
Leader: UNIBA Co Leader: UVA

Pur to-Pharma

WP4

Holistic and systematic development, optimal design and operation of continuous crystallization for the purification of pharmaceuticals
Leader: ULO

Digital to-Pharma

WP5

Development of automation and artificial intelligence tools for the prediction of reaction experimental conditions, and for the robotic automation of flow reactor systems
Leader: ULO

Green Tech-to-Pharma

WP6

Applying green strategies and technologies to API synthesis and repositioning of well-known medicines
Leader: DOMPE

Capsule to-Pharma

WP9

All-aqueous High-Yield Processing of Tailorable Drug Delivery Systems and Biological Assessment of Purified and Encapsulated Drugs
Leader: UAveiro

The project

10 EU partners

Leading universities, research institutes, and companies: University of Bari, Politecnico di Milano, University of Amsterdam, University of Córdoba, University of Aveiro, Loughborough University, Dompé, C2CAT, VITO, and FeyeCon.

€6.2 million EU funding

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