

# TransPharm Press

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## TRANSPHARM KEY FEATURES

- 11 partners
- 8 countries
- 8 M€ grant
- 48 months

## TRANSPHARM MAJOR OBJECTIVES

- Optimize the use of existing and new data for greening drug synthesis and development
- Identify greener and more sustainable-by-design APIs as proof of concept.
- Reduce the inputs and outputs of API synthesis through introducing shortcuts in API synthesis schemes.
- Provide new methodologies to assess the sustainability of pharmaceuticals over their entire life cycle.

## THE ECO-PHARMA DILEMMA: TRADE-OFFS

Do safety and sustainability always go hand in hand? Regrettably, the answer is 'No'. There could even be a substantial trade-off between the two, as we showed in a [recent article](#) about measures that improve sustainability of pharmaceutical use. For each of these measures, care should be taken that an improvement in one aspect does not lead to a worsening in other aspects (burden shifting or regrettable substitutions). Some measures may lead to a reduction of medicinal residues in water but have a larger environmental footprint due to material- and energy use.

[In the paper](#), we show examples of trade-offs that play a multi-faceted role in decision-making along the whole life cycle of a pharmaceutical, from design to end-of-life. When making environment-driven choices, stakeholders in this life cycle (e.g., procurers, prescribers) may not be aware of all consequences (environmental, social, or economic). Information may be ambiguous or unknown due to data gaps, complex and interdependent local, national and global healthcare systems, and unknown future developments. Thus, trade-offs may happen at temporal or spatial scales outside of the daily practice of stakeholders.

This commentary aims to initiate a discussion on these trade-offs, the need for a holistic view, the use of multi-criteria decision-making tools, and clear environmental sustainability guidelines. To prevent burden shifting, it is important to systematically map trade-offs. This can be done using an (holistic) assessment system, which we try to establish with TransPharm WP4.

# TRANSPHARM TRAINING MATERIALS

The consortium continues to develop a suite of training materials that will be published online and made freely available by the end of the year. The **'Sustainable Pharmaceuticals: Learning and Advanced Science Hub'** (SPLASH) as it is known offers content for three target audiences. There is detailed information for **scientists working in academia and research centres** on the topics of **Green Chemistry, engineering, environmental impacts and planetary boundaries**. Content for **healthcare professionals** describes the principles of **drug design and manufacturing** and the **impact of pharmaceuticals in the environment**. There is also a section for the **general public** who are interested in Green Chemistry, sustainability, and the role of the pharmaceutical industry in modern society.

**SPLASH**  
Sustainable Pharmaceuticals: Learning and Advanced Science Hub

1. For healthcare professionals -  
2. For R&D and academia -  
3. For members of the public -

*Peterson et al. (2014)* have addressed DCM usage in chromatography in a thorough review of the subject. This focus is particularly relevant since flash chromatography represents a significant contributor to chlorinated solvent waste in academic and drug discovery laboratories. DCM is a commonly utilised chromatography solvent due to its characteristics as a non-polar eluent capable of dissolving a diverse range of chemical compounds. It is often paired with methanol (MeOH), with or without acidic or basic modifiers, for the purification of heterocyclic compounds. However, the widespread use of DCM raises concerns about its toxicity to humans, environmental risks, and the disposal challenges associated with its non-flammable nature, ruling out incineration as a viable option.

Amgen has developed a [chromatography guide](#) designed to aid in the selection of solvent/eluent combinations as alternatives to DCM/MeOH mixtures ([Tayebchi et al. 2012](#)). These charts are based on an extensive selection of drug-like molecules with diverse functionalities and physicochemical characteristics, enabling the identification of solvent mixtures that possess comparable elution strengths.

**Green chromatography solvent mixtures**

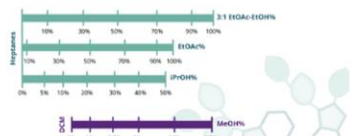


Figure adapted from [Tayebchi et al. 2012](#). From a suitable concentration of DCM/MeOH, please a vertical trace to pinpoint an alternative solvent combination based on heptanes and either isooctane (IPOH) ethyl acetate.


**SPLASH**  
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**3.1.9. Principle #9**

## Catalysis

Catalytic reagents (as selective as possible) are superior to stoichiometric reagents.



Catalysis is the action of a substance (the catalyst) on a chemical reaction so that (1) the reaction is accelerated and (2) the catalyst is unchanged once the reaction is complete. Catalysis allows reactions to be performed faster, or potentially at lower temperatures, and the catalyst can be reused to avoid waste.

Catalysis is central to green synthetic chemistry, presenting an opportunity for substantial savings in materials, energy, and costs. Compared to reagents that are consumed in a reaction, catalyst molecules can perform multiple transformations and so can be used in lower quantities. Frequently the amount of catalyst needed is less than 1%.

A schematic showing two molecules (as circles) combining by the formation of a new chemical bond. This can occur without a catalyst (high energy route) or with a catalyst (represented as a striped) (low energy route).

The topics have been curated with the expert advice of **TRANS PHARM** members, who have created **introductory videos and web apps** to engage users. There is a variety of **case studies and quizzes** to reinforce the fundamental principles of sustainable pharmaceuticals.

We intend this resource to become an important tool for the **education of students and professionals towards a safer and more sustainable chemical industry and healthcare sector**. Keep a look out for future updates and the **launch of the website later in 2025!**

## VIDEOS ON GREEN PHARMA

### "How does the project cluster contribute to greening pharmaceutical production in Europe?"

« The consortium of partners will really have an impact on the greening of the Pharmaceutical industry in Europe, because every project focuses on other types of technologies and by working together, we try to get an integrated view on the different technologies and also on LCA methods which will finally realize a greener production and a lower environmental impact of the production of pharmaceuticals in Europe. So, by working together we really try to bring back the production of pharmaceuticals to Europe and try to reduce the environmental impact on the environment in Europe. »



## "What are the challenges of the business case for greener pharmaceuticals in Europe?"

« There are quite a few challenges to actually get greener pharmaceuticals with the patients and within the TransPharm project we're working on identifying these challenges, but also the opportunities. These lie within the whole chain of the pharmaceutical process from the developments, the production, the use until the waste stages. Some of these challenges apply to all phases. These are general ones, such as the lack of knowledge or lack of awareness, or the fear that sustainability issues may affect the availability of medicines to patients or may affect the costs. Others are more specific, for instance, they could apply specifically to the use stage or the waste stage. And to really identify these challenges, you also want to make a good assessment of the sustainability aspects to see whether these and the safety aspects do not coincide. Within the TransPharm project, we're working on such an assessment system to transparently identify which is the most sustainable choice for a pharmaceutical.

Other challenges lie in the regulatory domain. Sometimes when greening pharmaceutical production, refiling of regulatory dossiers may be necessary and of course that is very costly and time intensive. Within TransPharm, we are working to identify these challenges and make recommendations on how to solve them. »



## WORKSHOP N°2 “ADVANCING GREEN CHEMISTRY TECHNOLOGIES” - DECEMBER 2024

On 11 December 2024, the TransPharm and GREEN CHEM consortium hosted the workshop “**Advancing Green Chemistry Technologies**” in Ghent — a dynamic event bringing together academic and industrial leaders to explore the future of **sustainable methodologies for fine chemicals and APIs**.

The workshop focused on four key goals:

- ✓ **Exploring green technologies** for the production of biobased fine chemicals and active pharmaceutical ingredients (APIs).
- ✓ **Fostering proactive collaboration** between academia and industry to drive green innovation.
- ✓ **Showcasing real-world applications** and successes in green chemistry while raising awareness of sustainable alternatives.
- ✓ **Mapping current and future developments** with a strong emphasis on **sustainability, circularity, and carbon footprint reduction**.

With a rich program of expert talks, case studies, and networking moments, the event served as a fertile ground for new ideas and partnerships in the realm of sustainable pharmaceutical production.



## WORKSHOP N°3 “AN ASSESSMENT FRAMEWORK FOR MORE SUSTAINABLE PHARMACEUTICAL PRODUCTS” - APRIL 2025

Across Europe, different systems are being developed to assess (environmental) sustainability of pharmaceutical products. These can be used when selecting pharmaceutical products for procurement, preferential supply, insurance coverage and reimbursement, as well as for clinical formularies or guidelines for prescription and treatment. Some initiatives focus only on the carbon footprint, others only on ecotoxicity of pharmaceutical residues in water. Several criteria are used in these systems, each with their own level of detail, evidence, and data required. When developing an assessment framework for sustainable medicines, (regulatory) harmonization is essential. This will lead to consistent assessments, increased efficiency and improve data availability.



To work on this harmonization, RIVM organized a workshop on 7 and 8 April with international experts who are each involved in developing assessment frameworks for sustainable pharmaceuticals. The shared vision, collaboratively defined by the end of the workshop, was clear and ambitious: "We need a scientifically sound ESA system, with consensus from all stakeholders, which is tiered, robust, harmonized, and adaptable to different contexts." This vision reflects the collective aspiration to develop an assessment system that is both credible and flexible, ensuring it can be effectively implemented across diverse settings.

The participants were clearly in favor of forming a ‘coalition of the willing’ and try to advance this field. A follow-up meeting (in 2026?) will probably be held in York (UK).

## COLLABORATION WITH THE SISTER PROJECTS: MOVING FORWARD TOGETHER: CLUSTERED IMPACT IN GREEN AND SUSTAINABLE CHEMISTRY

In the call HORIZON HLTH 2021 IND 07 01 about Green Pharmaceuticals 5 projects were approved. It is the aim to cooperate on 3 common topics:

*Working Group 1 - **Life Cycle Assessment**, with the aim of sharing knowledge and information on the life cycle assessments of pharmaceuticals*

*Working Group 2 - **API synthesis**, to explore possible synergies on the different API synthesis approaches developed by the different projects*

*Working Group 3 - **Communication and Dissemination***

*We are looking for a series of collaborative initiatives:*

### GREEN PHARMACEUTICALS

Funded projects under the call HORIZON-HLTH-2021-IND-07-01

- [TRANSPHARM](#)
- [SUSPHARMA](#)
- [ETERNAL](#)
- [IMPACTIVE](#)
- [ENVIROMED](#)



Joint  
EU Project



A set of  
clustered  
publications



A joint final  
dissemination  
event



A series  
of webinars

## CONGRATULATIONS TO DR. DOBBELAERE

We are proud to share that Maarten Dobbelaere successfully defended his PhD in Chemical Engineering at [Ghent University](#) on 19 May 2025. His dissertation, "Molecular Machine Learning for Chemical Reaction Engineering," explored the intersection of two transformative fields.

Maarten's groundbreaking work focused on the innovative use of Artificial Intelligence in Reaction Engineering, a field ripe for disruption. His research has opened new avenues for optimizing chemical processes and promises significant impact on industrial applications.



## WE WERE THERE



- BOS2024 – July 2024, Riga, Latvia
- Electrochemistry – September 2024, Manchester, UK
- CESPE conference – October 2024, Ghent, Belgium
- Beltox annual meeting – December 2024, Ghent, Belgium
- SETAC Europe 2025 – May 2025, Vienna, Austria

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**Person in charge:** Nathalie De Coensel

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Visit our website:

<https://transforming-pharma.eu/>



## Upcoming events

- EUPAT 12 – June 2025: Keynote lecture Jo De Wulf
- MNE 2025 – September 2025
- EuroTox 2025 - September 2025

*More details will be disclosed shortly.*