

What's new in the world of bioremediation?

Stay up to date with the latest developments in bioremediation and discover how innovative research is driving the future of environmental restoration. In this edition, we bring you the latest news, project updates, and scientific insights from the world of NYMPHE.

1. *Technology Booklet*
2. *Expert Interviews*
3. *Policy Workshop: Beyond Genetically Modified Microorganisms: Policy, Regulatory and Scientific Aspects of Using Laboratory-Trained Bacteria for Environmental Applications*
4. *NYMPHE Webinar: "The Next Frontier: Training Microorganisms for Combatting Pollution"*
5. *8th Nymphe Stakeholder General Assembly*
6. *ALL4BIOREM at BioRemid 2026*
7. *Upcoming events*



1. TECHNOLOGY BOOKLET

At the heart of the work of **NYMPHE Project** are innovative technologies designed to support environmental revitalization – from wastewater treatment to soil restoration and advanced microbiome modelling.



In our Technology Booklet, we present 10 cutting-edge solutions currently being developed within the project:

-  4 wastewater treatment technologies
-  3 soil remediation technologies
-  3 microbiome modelling technologies

1. Lab-scale Membrane Bioreactors (MBRs)

2. METland® Microbial Electrochemical Technologies (METs)

3. Electro-oxidation + biodegradation of microplastics

4. Biofiltration and biosorption using bivalves and bivalve shells

2

SOIL TECHNOLOGIES

SOIL TECHNOLOGY PRESENT Rhizoremediation University of Milan (UMIL) technology Research project: SOIL AND WATER CONTAMINATION PROBLEM SOILS CONTAMINATED WITH HIGH LEVELS OF PERSISTENT ORGANIC POLLUTANTS (E.G., HYDROCARBONS) ARE DIFFICULT AND COSTLY TO REMEDIATE USING CONVENTIONAL PHYSICAL OR CHEMICAL METHODS, HIGHLIGHTING THE NEED FOR SUSTAINABLE, LARGE SCALE BIOREMEDIATION SOLUTIONS. Target pollutants: Persistent organic pollutants, with focus on hydrocarbons. TECHNOLOGY System setup: Rhizoremediation relies on the cooperation of two key players: Sunflower plants selected for their tolerance to soil phytotoxicity. Native beneficial microbes isolated from the rhizosphere of sunflowers in contaminated soil. Operation: Sunflowers planted in hydrocarbon-contaminated soil. Plants recruit and enrich beneficial microbes through root exudates (the "key for μAP" mechanism). Sunflowers co-implant with hydrocarbon-degrading microbes to enhance soil remediation. Function: Plants stimulate microbial activity and pollutant degradation via root exudates, including signal molecules, transcription factors, and nutrients. Microbes degrade hydrocarbons and support plant growth through nutrient supply and phytohormone production. The integrated plant-microbe system accelerates bioremediation in polluted soils. WHERE IS: 	SOIL TECHNOLOGY PRESENT Enhanced in situ bioremediation of soils contaminated University of Bologna (UNIBO) and Eni Rewind technology Research project: SOIL AND WATER CONTAMINATION PROBLEM SOILS CONTAMINATED WITH COMPLEX HYDROCARBON AND CHLORINATED MIXTURES ARE DIFFICULT TO REMEDIATE, AS TOXICITY INHIBITS MICROBIAL ACTIVITY. BIODEGRADATION CONVENTIONAL SINGLE-STRAIN OR STANDARD BIODEGRADATION APPROACHES INSUFFICIENT. Target pollutants: Mixture of benzene, toluene, ethylbenzene, xylenes (BTEX), total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs) and chlorinated aliphatic hydrocarbons (CAHs). TECHNOLOGY System setup: Site-specific formulation of microbial inocula (bioaugmentation) and microsome inoculants (bioremediation). Inocula sourced from the contaminated site (autochthonous) or other sites (allochthonous) or other complementary biodegradation systems. Application methods adapted to site hydrogeology: direct injection, push-pull, or groundwater recirculation. Microsome enhancers ("bioreactor") chosen via site microbiome characterization and digital simulations. Operation: Microbial inocula and microsomes introduced into saturated soils and groundwater, either simultaneously or sequentially. Function: Soil conditions mediated with convenient amendments (e.g., sugar- or hydrogen-releasing compounds) to optimize microbial activity. Sequential or combined application ensures complementary degradation of hydrocarbons and chlorinated compounds. Microbial inocula degrade specific contaminants closer to the source under reduced redox conditions. Microsomes enhance and stimulate indigenous microbes, altering microsome composition and boosting pollutant biodegradation. Integrated bioaugmentation and bio-mutation accelerate in situ remediation of complex hydrocarbon-chlorinated mixtures. WHERE IS: 	SOIL TECHNOLOGY PRESENT PhytoRhizoProm University of Chemistry and Technology (vscht) technology Research project: SOIL AND WATER CONTAMINATION PROBLEM CONTAMINATED SOILS OFTEN CONTAIN PERSISTENT ORGANIC POLLUTANTS THAT ARE DIFFICULT TO REMOVE USING CONVENTIONAL METHODS. MICROBIAL DEGRADATION IS LIMITED BY LOW MICROBIAL ACTIVITY AND PLANT STRESS UNDER TOXIC CONDITIONS, WHILE PLANTS ALONE MAY NOT EFFICIENTLY EXTRACT OR BREAK DOWN POLLUTANTS. Target pollutants: Persistent organic pollutants, especially aromatic compounds. TECHNOLOGY System setup: Plants selected for phytoremediation (phytoextraction, phytostabilization, phytodegradation). Microbial communities (rhizosphere, endosphere, phyllosphere) associated with the plants. Operation: Plants established in contaminated soil. Microbes colonize roots and surrounding soil, enhancing pollutant degradation. Plant-microbe interactions optimized for growth under polluted conditions. Function: Phytoremediation: plants extract, stabilize, and degrade pollutants. Rhizodegradation: rhizosphere microbes degrade contaminants and support plant health. Genetic optimization: bacterial genes in plants enhance aromatic ring degradation. Mechanism: Plants + microbes form a holobiont for efficient pollutant breakdown and growth promotion. Synergistic interactions increase resilience and biomass for higher pollutant uptake. WHERE IS: 
Rhizoremediation University of Milan (UMIL) technology	Enhanced in situ bioremediation of soils contaminated University of Bologna (UNIBO) and Eni Rewind technology	PhytoRhizoProm University of Chemistry and Technology (vscht) technology

1. Rhizoremediation

Developed by: University of Milan (UMIL)

2. Enhanced in situ bioremediation of soils contaminated

Developed by: University of Bologna (UNIBO) and Eni Rewind

3. PhytoRhizoProm

Developed by: University of Chemistry and Technology (vscht)

MICROBIOME TECHNOLOGIES



1. Prebiotics intervention to enhance pollutant removal

Developed by: Blossom Microbial Technologies (BLOM)

2. Automated Synthetically-Primed Evolution of new biodegradative activities

Developed by: Spanish National Research Council (CSIC)

3. Sediment-filled flow path tubes activities

Developed by: Leibniz-Institut für Gewässerökologie und Binnenfischerei (IGB) Berlin

Have your say on bioremediation technologies:

Help us shape future solutions by sharing your views on wastewater, soil and microbiome modelling technologies.

Tell us about your expectations, needs, and perceived risks related to different bioremediation pathways.

Take the questionnaires:

- Microbial/microbiome Innovation: <https://forms.gle/74Hqcs32U7bvGfWR6>
- Wastewater Treatment: <https://forms.gle/rVk6yBqqHm1H8nBs6>
- Soil Bioremediation: <https://forms.gle/BrzqitEsHCijSvkV9>

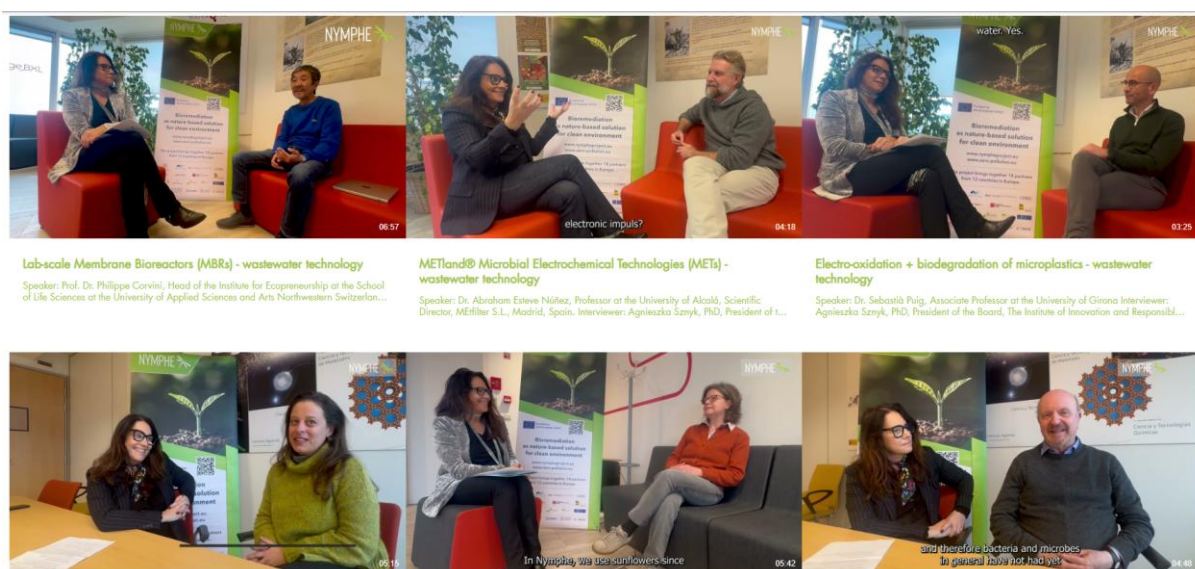
More information: <https://www.nympheproject.eu/technologies>

2. EXPERT INTERVIEWS

At the core of the NYPHE Project are **innovative technologies** aimed at restoring polluted environments – from advanced wastewater treatment and soil remediation to cutting-edge microbiome modelling.

To bring these innovations closer to you, we've launched a **series of interviews** with NYPHE partners. In each episode, experts explain their technologies and the impact they can have – breaking down complex science into clear, accessible insights.

Discover interviews, expert perspectives, and video insights presenting the latest developments, challenges, and innovations explored within the project:
<https://www.nympheproject.eu/educational-materials-professionals>



Read the full technology overview: <https://www.nympheproject.eu/technologies>

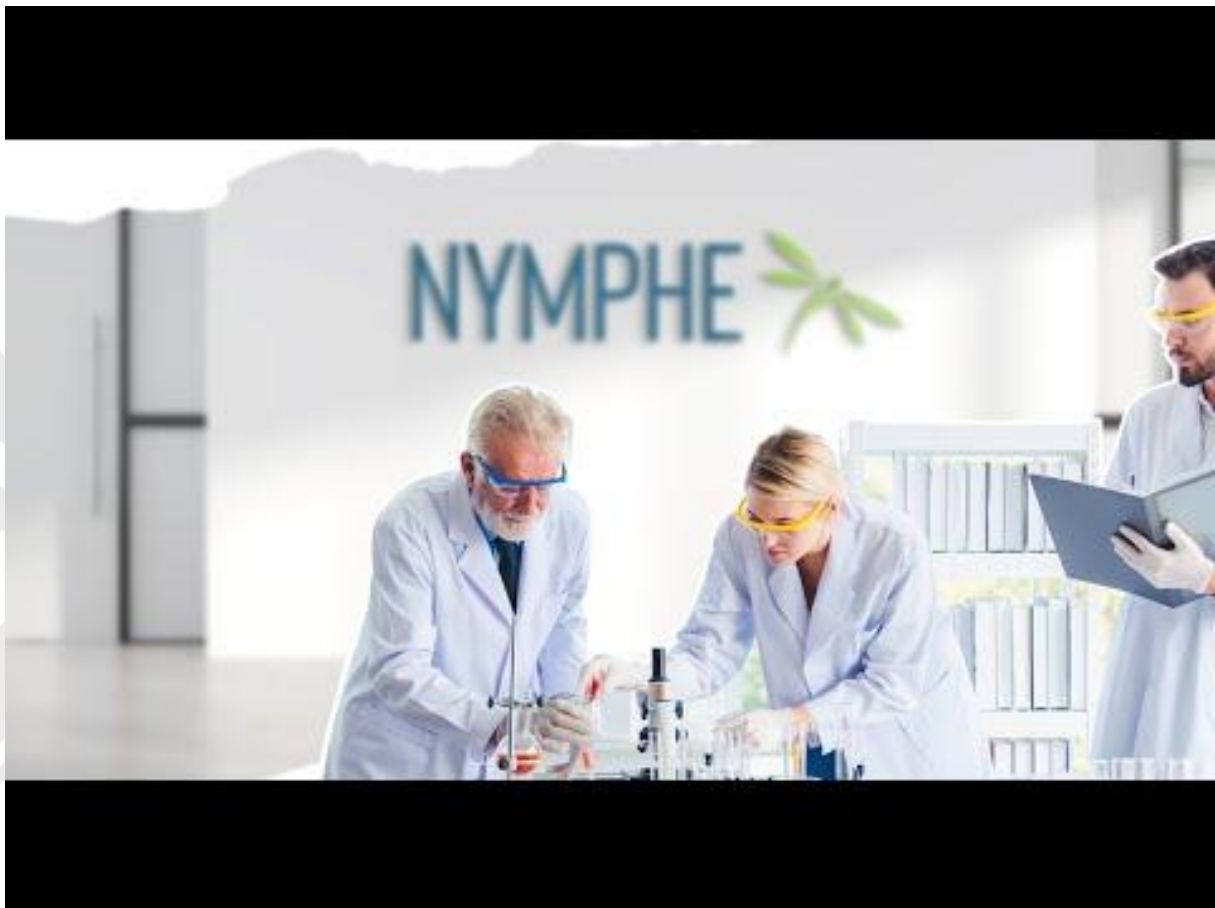
3. AIMING FOR A ZERO POLLUTION FUTURE: IS BIOREMEDIATION A SOLUTION?

What if polluted soils and waters could be restored to healthy ecosystems? Our **animated video**, “Aiming for a Zero Pollution Future: Is Bioremediation a Solution?”, explains the environmental challenges addressed by the NYMPHE project and introduces bioremediation as a sustainable, nature-based solution developed within the project.

Why bioremediation? Bioremediation is a more sustainable alternative to standard remediation options like burying polluted soils in landfills or chemical remediation that increases the health risk for workers. Unlike these conventional physicochemical remediation processes, which can be disruptive, bioremediation is less intrusive and can facilitate the remediation of environmental impacts without damaging delicate ecosystems.

Discover the power of microbes in action:

<https://www.youtube.com/watch?v=tiqjSVpgmc0>



4. POLICY WORKSHOP: Beyond GMO's: Policy, Regulatory and Scientific Aspects of Using Laboratory-Trained Bacteria for Environmental Applications

On 3 February 2026, researchers, regulators and policy specialists gathered in Brussels to examine a rapidly evolving question at the intersection of biotechnology and environmental governance: how should we regulate and manage laboratory-trained bacteria designed to work outside the lab?

The workshop was organised within the framework of the Horizon Europe project NYMPHE, bringing together partners working on innovative bioremediation approaches and their broader policy, regulatory and societal implications. **It focused on microorganisms engineered not for industrial tanks or clinical settings, but for direct interaction with natural ecosystems – soils, waters and polluted environments.** Across disciplines, speakers agreed that this shift in application challenges both traditional biosafety concepts and long-standing regulatory structures.

A unifying theme quickly emerged: the need to move beyond a narrow focus on control and containment and towards a broader model of stewardship, monitoring and adaptive governance.

The workshop summary is available on the website:

<https://www.nympheproject.eu/post/beyond-gmos-how-laboratory-trained-bacteria-could-transform-environmental-remediation-workshop>

NYMPHE WORKSHOP BEYOND GMOs

POLICY, REGULATORY AND SCIENTIFIC
ASPECTS ON THE USE OF LABORATORY-
TRAINED BACTERIA FOR
ENVIRONMENTAL APPLICATIONS



5. NYMPHE WEBINAR: “The Next Frontier: Training Microorganisms for Combatting Pollution”



How can biological processes help tackle environmental pollution while supporting the goals of the EU Zero Pollution Action Plan and accelerating the shift toward a circular economy? These topics were discussed during the webinar “The Next Frontier: Training Microorganisms for Combatting Pollution”, where experts from the NYMPHE project shared their latest work on biological approaches to pollution remediation.

The discussion explored how microorganisms, plants, fungi, and algae can remove, transform, or neutralise pollutants in soil, water, and industrial waste streams – all while enabling more sustainable resource use.

The webinar summary and recording are available on our website:

<https://www.nympheproject.eu/post/the-future-of-bioremediation-training-microorganisms-to-tackle-environmental-pollution>



This event was part of **EU Green Week 2026**, organised by the European Commission’s Directorate-General for Environment.

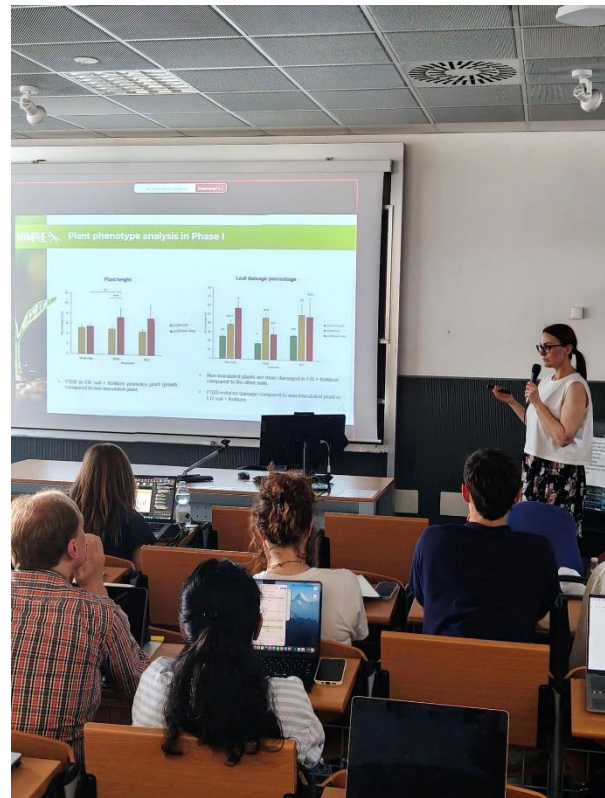
6. 8th Nymphe Stakeholder General Assembly

In June, the NYMPHE Consortium met at the University of Milan, Italy, for its 8th General Assembly, bringing partners together to review project progress and plan the next steps.

Over the two-day meeting, partners reviewed progress across all work packages and discussed priorities for the final phase of the project. With the interim reporting completed, the focus is now shifting towards upcoming activities and increasing the visibility of project results.

Let's take a look at the meeting overview:

<https://www.linkedin.com/posts/bioremediation-biotechnology-euprojects-ugc>





7. ALL4BIOREM at BioRemid 2026

From **23–26 June 2026**, Florence hosted **BIOREMID 2026 – the 4th International Meeting on New Strategies in Bioremediation and Restoration Processes**, one of the leading international conferences dedicated to bioremediation and environmental restoration. The event brought together researchers, industry representatives, policymakers, and other stakeholders to explore the latest scientific advances and discuss how innovative solutions can support cleaner soils, water resources, and a more sustainable future.

As part of the conference, the **ALL4BIOREM Workshop – "The Contribution of Environmental Bioremediation to the Clean Industrial Deal in Europe"** served as the final joint workshop of the three sister projects: **NYMPHE**, **BIOSYSMO** and **SYMBIOREM**.

The workshop began with flash presentations introducing the projects of the ALL4BIOREM Cluster. Giulio Zanaroli (University of Bologna), coordinator of the NYMPHE project, presented the project's objectives and latest achievements. The introductory session was followed by scientific presentations. NYMPHE partners showcasing innovative biotechnology, artificial intelligence, and electrochemical approaches for the next generation of bioremediation technologies.

Three presentations highlighted innovative strategies for tackling some of today's most pressing environmental challenges:

- **AI-Reprogrammed Biological Systems for the Degradation of Recalcitrant Pollutants (Microplastics) – Manuel Ferrer (CSIC)** presented AI-assisted biological systems designed to enhance the degradation of persistent pollutants, including microplastics.
- **Tuning an Electric Plastic Breakdown Symphony: The Fenton Overture, the Microbe Finale – Luis Bañeras Vives (University of Girona)** demonstrated how combining electrochemical treatment with microbial processes can improve plastic degradation.
- **Eco-Boost: Accelerating River Sediment Purification from Pharmaceuticals with Bioaugmentation – Marcus Horn (Leibniz University Hannover)** presented bioaugmentation strategies for accelerating the removal of pharmaceutical contaminants from river sediments, while also highlighting the role of earthworms in supporting bioplastic degradation.

The morning session concluded with a roundtable discussion involving representatives of the NYMPHE, BIOSYSMO, and SYMBIOREM projects. Participants explored the challenges of transferring innovative bioremediation technologies from laboratory research to practical environmental applications.

The discussion highlighted that successful implementation depends not only on scientific excellence but also on overcoming regulatory, environmental, and social barriers. Building trust with stakeholders, adapting microbial solutions to local environmental conditions, and responding to climate change were identified as essential factors for the successful deployment of bioremediation technologies.

24 th June	
Auditorium Sant'Apollonia	
The contribution of environmental bioremediation to the Clean Industrial Deal in Europe	
Morning session: BIOSYSMO, NYMPHE and SHAMBIOREM Joint Final Event	
09:30 Welcome by Leticia Landa, Project Adviser, European Research Executive Agency & Simona di Gregorio, University of Pisa, Bioremid 2026 Organising Committee	5
09:35 Flash Project Introductions by: BIOSYSMO, Sara Gil, Project Coordinator NYMPHE, Giulio Janowski, Project Coordinator SHAMBIOREM, Leire Ruiz Rubio, Project Coordinator	30
09:35 A computational framework supporting biosystem design Lila Otero, IDENER	15
09:50 Soil phytoremediation from lab to field Michael Chazot, INRAE	15
10:05 Scaling-up of BES for groundwater bioremediation Edward Borras, LEITAT	15
10:20 AI-Reprogrammed Biological Systems for the Degradation of Recalcitrant Pollutants (Microplastics) Manuel Ferrer, IZP-CRS	15
10:35 Tuning an electric plastic breakdown symphony: The Fenton Overture, the Microbe Finale Luis Barrena Vives, University of Girona	15
10:50 Eco-Boost: Accelerating River Sediment Purification from Pharmaceuticals with Bioaugmentation Marcus Horn, Leibniz University Hannover	15
11:05 Coffee break	
11:30 Smart Ecobio: A Sustainable and Effective Strategy for the Remediation of Heavy Metals and PAHs Leire Ruiz Rubio, University of the Basque Country	15
11:45 Assisted soil remediation - challenges in the remediation of multi-contaminated soils Agnieszka Madyńska-Jurasek, Wrocław University of Environmental and Life Sciences	15
12:00 Floating Treatment Wetlands as a Nature-Based Solution for water treatment Katarzyna Paweńska, Wrocław University of Environmental and Life Sciences	15
12:15 Round table with representative of the three projects moderated by Concepción Calvo and Elisabet Aranda, University of Granada, Bioremid 2026 Organising Committee	45
13:00 Lunch break	
Afternoon Session: ALL4BIOREM Cluster Session	
14:00 Welcoming and introduction by Akanksha Mishra, PHYB project	5
Block#1: Innovations in bioremediation technologies 14:05 → 14:45	40
Potential of microbiome-based bioremediation Thomas Reichenauer (AIT), project: MIBIREM	
Innovative approaches in bioremediation Nazeem Goufo (INTEVA University Lisbon), project: ISLANDR	
Block#2: Addressing barriers: Bioremediation from lab to field 14:45 → 15:25	40
Advancing bioremediation of TPH-contaminated soils towards real-scale implementation Carrie Bosch, Eusecal - project: InBioSoil	
Understanding Plant-Microbe-Soil Interactions for Effective Bioremediation Rocio Barrios Garcia (UBU), project: BIOREM	
15:25 Coffee break	
Block#2: Addressing barriers: Bioremediation from lab to field 16:00 → 16:20	20
Curing contaminated and saline land with industrial crops for bio-based products Marcelo Cocchi (IITA-Florencia), project: IASIS	
Block#3: Expanding the applications of bioremediation Bio-based materials 16:20 → 17:00	40
Use of lignocellulosic biomass from remediation practices in the textile industry Formosa Neri, NIT - project: PHYB	
Natural-based materials as key agents to broaden the applicability of bioremediation technologies Cynthia Alcántara (Kapler), project: BIOREM	
17:00 Q&A with audience Wrap up and closing by Akanksha Mishra, PHYB project	
17:30 Wrap up and closing by Akanksha Mishra, PHYB project	

The afternoon session featured presentations from pHYBi, MIBIREM, InBioSoil, BIOREM, PHY2SHINE, ISLANDR, and IASIS, focusing on innovative remediation technologies, strategies for scaling solutions from laboratory to field conditions, and the use of bio-based materials to improve remediation performance.

The consortium was also honoured to welcome the European Commission Project Officer, whose participation highlighted the importance of clustering activities and cross-project collaboration in maximising the impact of EU-funded research.

Overall, the workshop brought together representatives of numerous European projects to exchange knowledge, discuss common challenges, and identify new opportunities for collaboration in environmental bioremediation.

BIOREMID 2026 in numbers

The conference welcomed:

- 259 participants
- 90 students
- 3 keynote speakers
- 6 plenary speakers
- 33 Scientific Committee members
- 27 represented nationalities

Researchers, students, companies, and stakeholders from across Europe and beyond came together to exchange knowledge, build new partnerships, and explore how scientific advances in bioremediation can be translated into practical solutions for industry, public authorities, and society.

Read the summary: <https://www.nympheproject.eu/post/nymphe-showcases-innovative-bioremediation-solutions-at-the-all4biorem-workshop>









Organising Committee:

Philippe Corvini, HLS-FHNW, Switzerland
 Simona Di Gregorio, University of Pisa, Italy
 Olga Nunes, University of Porto, Portugal
 Ana Rita Lado Ribeiro, University of Porto, Portugal
 Concepción Calvo, University of Granada, Spain
 Elisabet Aranda, University of Granada, Spain

**Join Us in Shaping the
Future of Environmental
Research**



The Alliance for Environmental Bioremediation – **ALL4BIOREM** – Cluster addresses the challenge of restoring contaminated soils and water by providing tools and methods and helping stakeholders develop targeted, effective strategies for sustainable and risk-based land management.

This effort contributes to the European Clean Industrial Deal and the Zero Pollution Strategy by reducing soil and water contamination and promoting sustainable land use.

The ALL4BIOREM cluster gathers 10 bioremediation projects funded by the EU: NYMPHE, BIOSYSMO, EDAPHOS, IASIS, MIBIREM, INBIOSOIL, pHYBi, SYMBIOREM, BIOREM, ISLANDR.

8. UPCOMING EVENTS

1. INVESTMENT WORKSHOP

24 September, 14:00–16:00 (CEST)

As the NYMPHE project enters its final phase, the upcoming Investment Workshop will bring together project partners, investors, and key stakeholders to explore the market potential of the project's innovative bioremediation technologies.

The workshop will focus on exploitation opportunities, commercialization pathways, and strategies for accelerating the uptake of sustainable environmental solutions developed within NYMPHE.

This event will be held under the European Circular Economy Stakeholder Platform.

 Save the date and stay tuned for more details!

2. NYMPHE FINAL CONFERENCE AT ECOMONDO 2026

3–6 November 2026 at ECOMONDO 2026, Rimini

The final workshop will be held at the professional fair Ecomondo (Italy).
SAVE THE DATE: Thursday November 5, 14:00-18:00

Other Relevant Events:

- **Soils for Europe: Healthy Soils for a Sustainable Future**
7–11 September 2026, Portugal
- **ISTPS2026 – 20th International Symposium on Persistent Toxic Substances and Health**
9–13 September 2026, Bologna
- **CIRCULAR WEEK 2026**
26–30 October 2026 | Warsaw/online

An international series of events and initiatives dedicated to the circular economy and sustainable development, taking place across Europe. The aim of Circular Week is to promote the concept of a closed-loop economy, support sustainable business models, and foster collaboration among stakeholders.

More information: [Circular Week 2026](#)

More information: <https://www.nympheproject.eu/>

Follow NYMPHE on social media for the latest updates and project results!
<https://www.linkedin.com/company/nymphe-bioremediation/?viewAsMember=true>

About Nyphe project

Nyphe is a four years European project dedicated to tackling environmental pollution by developing innovative bioremediation solutions funded by the **European Union**.

New system-driven bioremediation of polluted habitats and environment

Topic: Environmental services – improved bioremediation and revitalization strategies for soil, sediments and water for a clean environment and zero pollution.

This project is funded by the European Union under the Horizon Europe research and innovation programme, Grant Agreement No. 101060625.

