pHYBi Project – 2nd Press Release Oviedo, October 22nd, 2025

From Contaminated Soils to Sustainable Textiles: First-Year Insights from the pHYBi Project

The pHYBi project is celebrating its first year of activities, advancing circular bio-based textile solutions through soil restoration and biomass valorisation.

The CBE JU-funded pHYBi project combines the remediation of contaminated soils with the production of valuable lignocellulosic biomass for textile applications, supporting both environmental sustainability and a circular bio-based economy. The project monitors pilot sites across Europe and tests innovative phytomanagement strategies using woody and herbaceous industrial crops. Harvested biomass is thoroughly characterised and valorised to ensure suitability for high-quality textiles. A key innovation will be the Virtual Replication Tool, which simulates these processes for other regions, linking biomass producers with biorefineries.

Characterisation of Pilot Phytomanagement Sites

During its first year, pHYBi investigated and monitored existing and newly implemented pilot sites to promote sustainable land use and restore degraded soils. Sites across Europe, affected by pyrite ash, wastewater, oil spills, hydrocarbons, and salinity, have been surveyed, documented, and characterised. Soil sampling and detailed contamination analysis are underway, following standardized protocols developed by project partners.

Protocols focus on soil health indicators (physical, chemical, microbiological) and feedstock quality metrics, including contaminant tracking. Additionally, remote sensing techniques are being tested to monitor soil pollution and plant health, with initial drone flights conducted in saline zones. Salinity models are being developed and will be validated against field sampling data.

Advancing Sustainable Phytomanagement Strategies

The pHYBi team is testing and optimising phytomanagement strategies using woody and herbaceous crops such as *Miscanthus × giganteus* and *Cannabis sativa*. Crop management protocols, including irrigation, fertilisation, and pest control, have been defined for all species. Currently, experimental trials are evaluating the phytoremediation potential of these crops.

Microbial consortia, mycorrhiza, and soil amendments are being explored by project partners to enhance biomass production and remediation efficiency. Promising microbial strains isolated from contaminated soils are being cultivated for further testing. Additionally, genome-scale metabolic models are being developed to detect and simulate plant-microbe interactions, as well as to guide optimisation strategies for microbial interventions.

A consolidated set of optimisation approaches proposed by the consortium is guiding the next phase of experiments.

Circular Bio-based Europe Joint Undertaking
Bio-based Industries Consortium
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On October 22–23, the pHYBi consortium gathered in Oviedo to celebrate the project's first year, including a visit to a phytoremediation trial site on a brownfield in Asturias contaminated with pyrite ashes.

Next steps

pHYBi partners will continue testing and optimising phytomanagement strategies, while harvested biomass will undergo valorisation trials. The focus is on improving the fractionation of lignocellulosic biomass and characterisation to identify potential market routes for textile applications. Additionally, the project is developing a Virtual Replication Tool that integrates phytomanagement, biomass valorisation, and end-product applications, providing guidelines, recommendations, and thresholds for replicating pHYBi case studies in other regions.

Stakeholder engagement and collaboration with related initiatives are becoming increasingly important. In December, coinciding with the signing of the EU Soil Mission Manifesto at the University in Burgos, stakeholders are invited to a co-creation workshop in Sargentes to discuss sustainable land use and the restoration of degraded or contaminated soils. Such co-creation and exchange are essential for refining pHYBi solutions, fostering acceptance, and learning from broader research efforts.

More Information
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