Bioactive Polymers for Healthier Soil

EU context

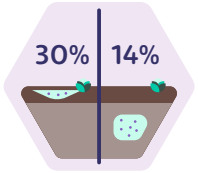
Modern agriculture is heavily dependent on synthetic fertilisers, pesticides and plastic materials, with over 90% of EU farmland relying on agrochemicals. While these inputs boost productivity, their overuse is contaminating ecosystems, degrading soil and water quality, and posing risks to both wildlife and human health.

At the same time, agricultural plastics (such as mulch films and growth foams) are contributing to a growing pollution crisis, with millions of tonnes used globally each year. Existing alternatives often still contain oil-based components or do not always fully degrade in soil, adding to long-term environmental burdens. A shift is urgently needed towards safer, more sustainable inputs and practices in agriculture.

Photo: Zoe Schaeffer / Unsplash

Facts

Over 90% of EU farmland depends on synthetic fertilisers and pesticides, making agriculture a major driver of ecosystem contamination and nutrient pollution.



Excess nutrients from agriculture negatively affect 30% of Europe's surface waters and 14% of groundwater.

The EU imported over 4.9 million tonnes of fertilisers in 2024, representing 26% of total imports, highlighting growing reliance on external suppliers and exposure to geopolitical risks.

Europe generates over 1.3 million tonnes of agricultural plastic waste annually, much of it from non-biodegradable mulching films and foams, contributing to persistent soil and ecosystem contamination.

Resources

- Bioeconomy Strategy
- Circular economy action plan
- Circular economy monitoring framework
- Reduction of the release of microplastics in the environment and restriction of microplastics intentionally added to products
- European Bioplastics website for relevant news and developments

Project Overview

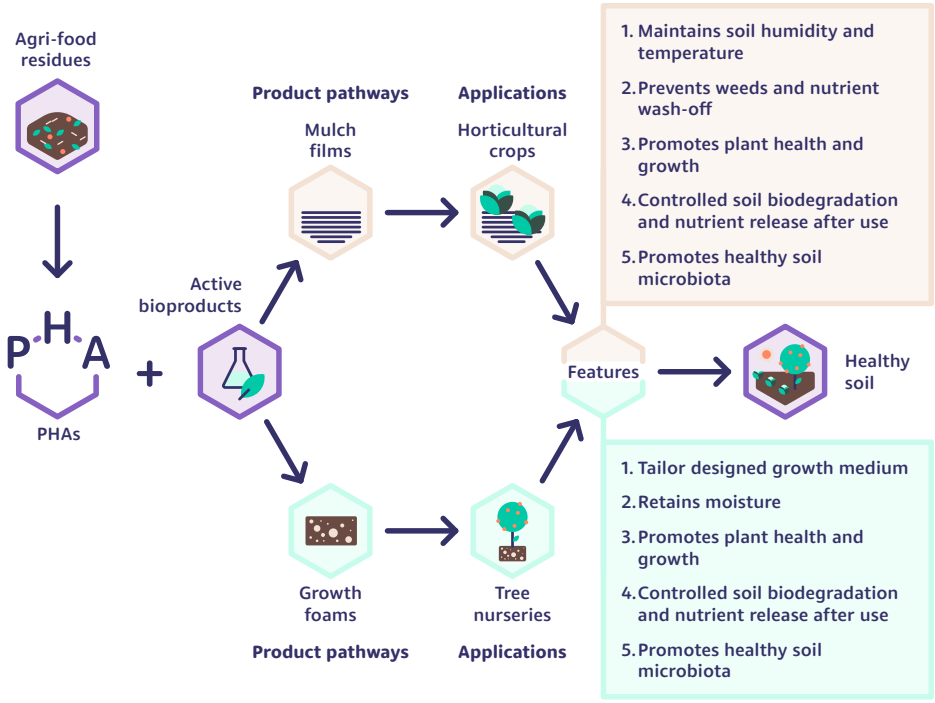
PHAntastic

About

The PHAntastic project is facilitating the sustainable transition of the agricultural sector by addressing the environmental impacts of agrochemicals and plastic pollution. By developing delivery systems based on PHAs, a type of bio-based, biodegradable polymers, the project replaces non-biodegradable plastics and synthetic agrochemicals with fully biodegradable eco-friendly mulch films and growth foams.

Through demonstrations on horticultural crops and trees in Northern and Southern Europe, these proposed solutions, containing active bioproducts such as amino acids and microelements, have the potential to reduce fertilizer and pesticide use, while decreasing microplastic pollution and promoting soil health.

phantastic-project.eu



Partners

ARCHA · AVASA · cetec · cetec Biotechnology · CSIC · Helian Polymers Home of PHA · IDEA · CHALMERS UNIVERSITY OF TECHNOLOGY · GREENPORT REGIO BOSKOOP · proexport · Probelte · REVOLVE · RTDS GROUP · VERTIFY

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Keywords

- Agricultural biotechnology
- Industrial biotechnology
- Materials engineering
- Nanotechnology
- Agrochemicals
- Delivery systems
- Agricultural plastics
- Biopolymers
- Polyhydroxyalkanoates
- PHAs
- Mulch film
- Foam
- Fertiliser
- Pesticide
- Circular economy.

General info

- **Total budget:** € 7.3 million
- **Duration:** September 2024 – August 2028 (48 Months)
- **Partners:** 15 from 7 countries

For more details about the Partners and Budget, please visit the CORDIS database