

LAnd-Based solutions for PLAstics in theSea

The LABPLAS Project wraps up after pioneering advances in plastic pollution research

- *The LABPLAS Project has successfully finished. During the last four years, LABPLAS has worked to understand the sources, transport, distribution and impact of plastic pollution.*
- *During this time, LABPLAS has developed new tools for sampling microplastics between 1 mm and 10µm for a wide range of environmental matrices, from freshwater to ocean, sediment, air and biota.*
- *The project also developed and validated novel methods to identify and quantify microplastics, both in terms of number of particles and mass; assess biodegradability, toxicity and environmental impact. Five environmental models to identify and predict transport mechanisms and potential transfer of chemicals to biota have been improved to guide future research directions and policy.*

Vigo, Spain. 22 May 2025 — The LABPLAS project has come to an end. After four years of research to understand plastic pollution, LABPLAS has made great leaps on several fronts. The project covered land-to-sea pollution research to equip European authorities with robust scientific evidence needed to inform effective plastic governance policies. It harmonized sampling tools, expanding the monitorable size fraction down to 10 µm, developed novel analytic techniques to detect and identify nanoplastics below 1µm, integrated toxicity testing schemes to assess the impact across food webs and developed a suite of environmental models to fill in the large gaps in time and space not covered by field measurements.

LABPLAS has pioneered field sampling techniques to map the journey of source-to-sea plastic pollution and better understand the heterogeneous distribution of microplastics. The project also calculated the plastic-to-zooplankton ratio for the Mediterranean basin to provide new insights into the environmental risk of microplastic pollution on marine food webs.

LABPLAS developed matrix-specific analytical workflows for reliable and robust analysis of small micro and nanoplastics (SMNPs), combining particle and mass-based detection, including tuneable quantum-cascade laser infrared spectroscopy (QCL-IR), thermal desorption and pyrolysis-gas chromatography-mass spectrometry. The project also developed combined polymer-additive analysis for tyre wear particles (TWPs) and advanced Raman spectroscopy methods, including surface-enhanced Raman scattering (SERS) to detect and identify nanoplastics down to a size of 35nm.

At the macro level, LABPLAS optimised the POS2IDON framework to detect the locations of floating marine plastic debris and other ocean features using high-resolution Sentinel-2 satellite imagery enhanced with machine learning algorithms.

LABPLAS developed biodegradation test methods for freshwater, marine and soil environments and generated a comprehensive Life Cycle Assessment (LCA) framework for assessing biodegradable plastics.

To understand the impact of plastics in the environment across food webs, the LABPLAS Toxicity Testing Scheme was developed. It assesses both chemicals leaching from plastics and the particles themselves.

LAnd-Based solutions for PLAstics in theSea

A suite of environmental models to identify or predict transport mechanisms and potential transfer of chemicals to biota was developed to aid in mapping plastic-impacted hotspots. Field and laboratory experiments on biofilm growth on plastics have provided valuable data for particle transport models, whilst sedimentation rates and theoretical drag models considering particle shape were also taken into account.

The scientific evidence generated by the LABPLAS project during these last four years will support the development of effective policies and mitigation strategies to address plastic pollution. Thus, the project has convened a series of high-level dialogues, policy briefs, technical recommendations and a free interactive online course to bridge research and regulation.

Overall, the LABPLAS project has taken remarkable strides towards understanding, measuring, modelling, and addressing plastic pollution. Its scientific findings are intended to guide future research directions and inform effective plastic governance policies.

About the LABPLAS project

The EU-funded LABPLAS project developed new techniques and models for the quantification of small micro- and nano plastics (SMNP). Specifically, LABPLAS determined reliable identification methods for a more accurate assessment of the abundance, distribution, and toxicity determination of SMNP and associated chemicals in the environment. It also developed practical computational tools to facilitate the mapping of plastic-impacted hotspots and promote scientifically sound plastic governance.

The consortium

The consortium is composed of seventeen partners from eight different countries: UNIVERSIDADE DE VIGO (Spain), UNIVERSIDADE DA CORUÑA (Spain), GERMAN FEDERAL INSTITUTE OF HYDROLOGY (Germany), LABORATORIO IBERICO INTERNACIONAL DE NANOTECNOLOGIA (Portugal), KATHOLIEKE UNIVERSITEIT LEUVEN (Belgium), GEOMAR HELMHOLTZ ZENTRUM FUR OZEANFORSCHUNG KIEL (Germany), NATIONAL OCEANOGRAPHY CENTRE (United Kingdom), SORBONNE UNIVERSITE (France), OPEN UNIVERSITEIT NEDERLAND (The Netherlands), RADBOUD UNIVERSITEIT (The Netherlands), LEIBNIZ-INSTITUT FUR OSTSEEFORSCHUNG WARNEMUNDE STIFTUNG (Germany), ASSOCIACAO PARA O DESENVOLVIMENTO DO ATLANTIC INTERNATIONAL RESEARCH CENTRE (Portugal), UNIVERSIDADE FEDERAL DO PARÁ (Brazil), BASF SE (Germany), TG Environmental Research (United Kingdom), CONTACTICA S. L. (Spain) and EGI FOUNDATION (The Netherlands).

For more information:

Project Coordinator: cynthia.gomez@uvigo.gal

Communication Manager: estibaliz.garmendia@contactica.es