SARGEX

Marie Skłodowska-Curie Actions Staff Exchanges
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Marine biomass valorisation for a circular bioeconomy

Turning sargassum from a coastal burden into a bioeconomy resource

SARGEX: Sargassum Bioeconomy, From Coastal Biomass to Advanced Sustainable Materials

Researchers and innovators from Europe and Cuba are developing circular, zero-waste routes that convert sargassum into agricultural bioinputs, alginates, bioactive compounds, biogas and biochar, while building the skills and partnerships needed to take them into practice.



The challenge

Massive seasonal sargassum landings are hitting Caribbean coastlines; in Cuba, annual blooms exceed 24 million tonnes. Decomposing biomass releases hydrogen sulphide and harms tourism, fisheries, public health and biodiversity, with clean-up costs of around €30,000 per kilometre of coastline.

Rising sea temperatures, shifting currents and nutrient loading increase the risk of blooms in the Mediterranean, the Baltic and other European waters.

Supporting EU priorities

- European Green Deal
- Circular Economy Action Plan
- EU Biodiversity Strategy for 2030

How the work is organised

WP1 — Collection and processing of sargassum raw material
Lead: ICIMAR
Collection protocols in landing areas, standardised pre-processing and extraction, quality benchmarks and logistics.

WP2 — Development and characterisation of functional materials
Lead: FUH
Bioinputs with zeolites and microorganisms, alginate encapsulation and bioactive compounds.

WP3 — Biodigester-enabled pilot plant and validation of formulations
Lead: AERIS
Modular 250-litre pilot plant with integrated biodigester, field validation and a technical usage guide.

WP4 — Exploitation of products and processes
Lead: SITES
IP and technology transfer, scalability and feasibility studies, standardisation and commercialisation planning.

WP5 — Dissemination, communication and networking
Lead: SITES
Stakeholder outreach, workshops, Bioinputs & Bites events and open science.

WP6 — Project management
Lead: UAB
Coordination, quality assurance, risk management and reporting.

What we aim to achieve

- Collection and processing protocols for 2 pilot zones with over 95% processing efficiency, validated by life cycle assessment
- Bioinputs with up to 50% sargassum-derived nutrients; field trials targeting a 20% productivity increase in crops such as tomato and potato
- A modular pilot plant with integrated biodigester achieving over 80% resource conversion efficiency
- 15% lower CO_2-equivalent emissions and €20 per tonne savings compared with current sargassum management
- Solutions tested in pilot zones in the EU and Cuba and optimised up to TRL 6

Agricultural bioinputs
Biostimulants and biofertilisers combining sargassum extracts, natural zeolites and beneficial microorganisms.

Alginates
Standardised extraction for encapsulation and controlled-delivery systems.

Bioactive compounds
Metabolites with antiviral activity, validated in the laboratory at TRL 4 for biomedical formulations.

Biogas and biochar
Energy recovery from processing residues and soil-enhancing by-products for zero-waste valorisation.

94 intersectoral staff secondments

12 research disciplines connected

25+ secondees trained

3 training modules for researchers, SMEs and policymakers

4 Bioinputs & Bites public events

1,000+ stakeholders reached

Consortium: 9 organisations, 6 countries

- UAB Universitat Autònoma de Barcelona — Spain · Coordinator
- Università degli Studi di Napoli Federico II — Italy
- Universiteit Antwerpen — Belgium
- Blue Ecotech — Malta
- aeris Tecnologías Ambientales — Spain
- SiTeS — Ireland
- Fundación Universitaria de Innovación y Desarrollo, Universidad de La Habana — Cuba · Associated partner
- ICIMAR Instituto de Ciencias del Mar — Cuba · Associated partner
- Estación Experimental Indio Hatuey — Cuba · Associated partner

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