



Sustainability validation of SEARCULAR solutions

SEARCULAR has developed four innovative solutions to reduce marine litter from European fisheries. To evaluate their impact, SEARCULAR conducted a multidimensional sustainability assessment of gear performance across technical, environmental, economic, and social dimensions. This comprehensive analysis covered the entire gear life cycle, providing insights into the feasibility of SEARCULAR's alternative materials for fishing gear and port solutions.

Background

The uptake of new technologies and gear is dependent on social acceptance and demonstrating the observable benefits of the solutions. SEARCULAR has undertaken a comprehensive sustainability assessment to explore how each solution performs against their primary objective of reducing marine litter and wider sustainability criteria.

SEARCULAR's combined sustainability assessment was comprised of:

- **Technical assessment:** Evaluating the operational performance of SEARCULAR solutions under real-world conditions.
- **Environmental assessment:** Evaluating the environmental impacts of fishing gear through complementary approaches, including **degradation, biodegradation, and toxicity testing** of materials in marine environments, as well as **Life Cycle Assessment (LCA)** to evaluate impacts across the full life cycle, from design to end-of-life.

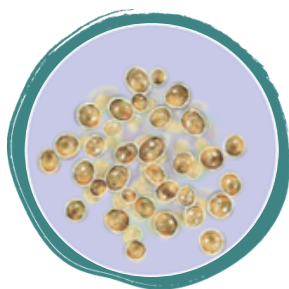
- **Economic assessment:** Evaluating the value of each solution via Cost-Benefit Analysis.
- **Social assessment:** Evaluating behavioural change by comparing 'Awareness, Desire, Knowledge, Ability, Reinforcement' (ADKAR[®]) before and after implementation.

Our Research

Overall, SEARCULAR's technical assessments have demonstrated that fishing gear circularity can be achieved without compromising operational performance. SEARCULAR's gear-based solutions were durable enough to support their intended function, while reducing plastic pollution and their associated impacts, as no significant toxic effects were observed.

While SEARCULAR's four solutions performed strongly against their primary objective of reducing marine litter, the results of SEARCULAR's sustainability assessment highlight the need to consider environmental trade-offs across the whole lifecycle. For example, using alternative materials such as organic cotton, can lead to impacts elsewhere such as an increased demand for water for growing cotton. However, by conducting a full life cycle assessment, short-term trade-offs like these can be identified and addressed via iterative design and material choice, and ultimately support the transition to a circular economy.

This report summarises SEARCULAR's D5.2 report on sustainability assessments conducted on SEARCULAR's solutions. More information about SEARCULAR's solutions can be found [here](#).



Left: Microalgal toxicity tests



Right: End-of-life gear in ports