



## MARITIME FORUM

### Cluster story: Algae and blue bioeconomy

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*Algae are critical to our existence. They produce roughly 50% of oxygen on earth, thus contributing to ocean and coastal productivity, as well as to food security.*



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Algae are fascinating life forms. Not only have they been around for over a billion years, they also reign as the ancestors of all aquatic and land plants on earth. Without plants to feed on, aquatic organisms would never have evolved into fish which, in turn, would never have evolved into land animals, including humans. And despite their ancient origins, algae continue to be critical to our existence even today, by contributing to ocean and coastal productivity, as well as to food security. They produce roughly 50% of oxygen on earth. They also absorb CO<sub>2</sub> and, in doing so, lend us a helping hand in our fight against global warming.

In addition, cultivation of algae leaves a low environmental footprint because, just as with shellfish, they

are not fed with crops or other marine life. Instead, they feed on nutrients – nutrients that might otherwise cause eutrophication.

Though of common usage in speech, the word “algae” is actually an umbrella term that encompasses a variety of species, ranging from unicellular microalgae organisms visible only through a microscope to multicellular macroalgae forms, such as the seaweed we’re all familiar with. The multicellular forms are traditionally broken down into red, brown and green macroalgae, based on – guess what? – their colour.

Having “fuelled” the evolution of all life on earth is already an outstanding achievement for algae, yet there’s even more. One of the most mind-boggling things about algae is their versatility. Studies are underway to investigate algae’s potential to mitigate climate change and to absorb nutrients. And this list below presents just some of the beneficial economic and environmental and healthcare options algae offer:

- **Eat them.** Algae have been a source of food for millennia. In East and South-East Asia, algae are a staple of local cuisine. While not equally popular in Europe, they are a growing sector.
- **Fertilise soil.** Algae have long been used to fertilise crops as they provide a rich source of nutrients and organic matter.
- **Make bioplastics.** Yes, algae produce polymers that can be used to make 100% marine-biodegradable plastic.
- **Develop medical drugs.** Compounds extracted from algae have proved to be effective against health conditions such as cancer, allergies, diabetes, neurodegenerative diseases and inflammation.
- **Skincare.** Microalgal extracts are part of various cosmetics such as anti-aging and rejuvenating creams, sun protectants and hair care products.
- **Fix what we break.** Algae can be used to remove, degrade, or render harmless pollutants in aquatic systems. Pollutants are introduced into the aquatic ecosystems as a result of human activities involving agricultural use, fuel use, industrial discharges, domestic effluents and agricultural runoff.
- **Burn cleaner fuel.** Algae’s biomass used in biofuel production has an advantage over the biofuel produced from agricultural feedstock. Algae cultivation has the advantage of not needing agricultural land and irrigation.

With such enormous potential, it is no wonder that the EU Commission has gone to great lengths to support the algae sector, as part of its effort to fully embed the blue economy into the Green Deal and the recovery strategy.

The [Communication on a new approach for a sustainable blue economy in the EU \(COM\(2021\) 240 final\)](#) [1] recognises algae’s potential for delivering a number of sustainable applications and calls for adopting a dedicated initiative in 2022 to support the development of the EU’s algae industry. The initiative will build on the results of “Blue bioeconomy – towards a strong and sustainable EU algae sector”, a [public consultation](#) [2] run from May to August 2021.

The recently launched [EU4Algae Forum](#) [3] will create a European algae stakeholder forum to support bringing more algae-based products to the market.

A dedicated [knowledge hub](#) [4], set up by the Joint Research Centre of the EU Commission, contains facts and figures about algae biomass production in Europe, including a dashboard with production locations. It also links to ongoing research projects, recent publications and other useful information.

Further, a number of cutting-edge research projects are being funded by the European Maritime and Fisheries Fund (EMFF).

[Biogears](#) [5] is developing biobased ropes useful in offshore mussel and algae aquaculture. These ropes are an important step towards a greener aquaculture industry. [OpenMode](#) [6] is testing floating connectable modules for intensive farming in open waters. Eight modules will be installed in Spain, Denmark, Croatia, Montenegro and Malta; local farmers will share these modules to harvest molluscs or macroalgae. They will learn through trainings how to use them to avoid predation, achieve more phytoplankton or scale-up compensation measures, and then they will share their user experience with the designers and other farmers. [AMALIA](#) [7] aims to screen marine invasive macroalgae in order to identify high-value molecules and enriched extracts with pharmacological, feed and food potential and, in turn, to boost the development of high added value products that may be deployed in the market within 2 to 4 years. [AlgaeDemo](#) [8] aims to demonstrate the sustainable, large-scale industrial cultivation of select native bred seaweed species in the open sea. By applying a state-of-the-art autonomous underwater vehicle for monitoring the growth of the macroalgae and the condition of the substrates and anchoring, a largely automated and highly reliable seaweed farm will be built to reduce costs as well as risks to people, property and global warming. [AFRIMED](#) [9] will develop and promote robust protocols to restore damaged or degraded macroalgal forests in the Mediterranean. It will also provide a framework for scaling up the approach in other regions.

## More info on algae

### Complete list of EMFF-funded projects

Project name	Start date	End date	Total budget in €	EU contribution in €
Biobased gears as solutions for the creation of an eco-friendly offshore aquaculture sector, in a multitrophic approach, and new biobased value chains ( <a href="#">Biogears</a> [5])	01/11/2019	30/04/2023	1,179,025	943,220
Demonstration of intensive shellfish farming in OPEN waters with resilient and affordable MODuLEs ( <a href="#">OpenMode</a> [6])	01/11/2019	31/10/2021	844,967	549,228
Algae-to-Market Lab Ideas - Adding value to marine invasive seaweeds of the Iberian northwest ( <a href="#">AMALIA</a> [7])	01/02/2017	31/01/2019	581,413	465,129
Demonstration of large scale seaweed cultivation at open sea and the positive effects thereof on the ocean ( <a href="#">AlgaeDemo</a> [8])	01/01/2019	31/12/2022	1,538,203	999,833
Algal Forest Restoration In the MEDiterranean Sea ( <a href="#">AFRIMED</a> [9])	01/01/2019	31/12/2022	1,858,354	1,486,111
Promotion of large scale sea cultivation of green seaweed ( <a href="#">ULVA FARM</a> [10])	01/10/2021	31/12/2023	1,209,555	846,689
An innovative, sector-leading seaweed biorefinery that enables the European blue circular economy ( <a href="#">KELP-EU</a> [11])	01/10/2021	31/03/2023	3,091,347	2,158,801
Eco-friendly and sustainable new family of biopesticides based on microalgae via circular economy approach ( <a href="#">ALGAENAUTS</a> [12])	01/10/2021	30/09/2023	1,358,836	951,185
Fish substitute from algae to preserve marine wildlife and develop algaculture ( <a href="#">SEAFOOD ALGTERNATIVE</a> [13])	01/08/2021	31/07/2023	2,837,219	1,986,053
Replacing soy with Pekilo protein in aquafeed ( <a href="#">AquaPekilo</a> [14])	01/10/2021	30/09/2024	1,678,830	1,175,181
Sustainably produced Marine Coral for Innovative Applications in Bio-medicine for Human Health ( <a href="#">CORAL4HEALTH</a> [15])	01/11/2019	31/10/2021	872,390	567,053

### Useful links

[Knowledge hub on algal biomass](#) [4]

[Phycomorph website](#) [16]

[Report on the Community of Practice Workshop: Algae production in Europe: status, challenges and future developments](#) [17]

[EUMOFA Blue Bioeconomy Report, 2018](#) [18]

[EUMOFA Blue Bioeconomy Report, 2020](#) [19]

[EMODnet data set on algae production facilities](#) [20]

[Discovering algae's power as a renewable resource](#) [21]

[ValGOrize \(Interreg project\)](#) [22]

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**Links**

- [1] <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0240&qid=1624869846426&from=EN>
- [2] <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12780-Towards-a-strong-and-sustainable-EU-Algae-sector>
- [3] <https://webgate.ec.europa.eu/maritimeforum/en/frontpage/1727>
- [4] [https://knowledge4policy.ec.europa.eu/bioeconomy/topic/algae-biomass\\_en](https://knowledge4policy.ec.europa.eu/bioeconomy/topic/algae-biomass_en)
- [5] <https://biogears.eu/>
- [6] <https://open-mode.eu/>
- [7] <http://www.amaliaproject.eu/>
- [8] [https://Users/nancyhart/Library/Containers/com.apple.mail/Data/Library/Mail%20Downloads/B80E5D24-C9F4-42BA-8F96-9B8FD77F3A41/aims%20to%20demonstrate%20the%20sustainable,%20large-scale%20\(1.4%20ha\)%20industrial%20cultivation%20of%20select%20native%20bred%20seaweed%20species%20at%20open%20sea,%20more%20specific%20inn%20the%20North%20Sea%20area.%20Along%20this%20route%20the%20right%20cultivar%20for%20the%20location%20will%20be%20selected,%20which%20we%20will%20mechanically%20seed%20an%20harvest%20on%20advanced%20large-scale%20textile%20cultivation%20substrates.%20By%20applying%20a%20state-of-the-art%20Autonomous%20Underwater%20Vehicle%20\(AUV\)%20for%20monitoring%20the%20growth%20of%20the%20macroalgae%20and%20the%20condition%20of%20the%20substrates%20and%20anchoring,%20a%20largely%20automated%20and%20highly%20reliable%20seaweed%20farm%20is%20built%20to%20both%20reduce%20costs,%20risk%20to%20people%20and%20property%20and%20global%20warming%20-%20by%20minimalizing%20ship%20movement.](https://Users/nancyhart/Library/Containers/com.apple.mail/Data/Library/Mail%20Downloads/B80E5D24-C9F4-42BA-8F96-9B8FD77F3A41/aims%20to%20demonstrate%20the%20sustainable,%20large-scale%20(1.4%20ha)%20industrial%20cultivation%20of%20select%20native%20bred%20seaweed%20species%20at%20open%20sea,%20more%20specific%20inn%20the%20North%20Sea%20area.%20Along%20this%20route%20the%20right%20cultivar%20for%20the%20location%20will%20be%20selected,%20which%20we%20will%20mechanically%20seed%20an%20harvest%20on%20advanced%20large-scale%20textile%20cultivation%20substrates.%20By%20applying%20a%20state-of-the-art%20Autonomous%20Underwater%20Vehicle%20(AUV)%20for%20monitoring%20the%20growth%20of%20the%20macroalgae%20and%20the%20condition%20of%20the%20substrates%20and%20anchoring,%20a%20largely%20automated%20and%20highly%20reliable%20seaweed%20farm%20is%20built%20to%20both%20reduce%20costs,%20risk%20to%20people%20and%20property%20and%20global%20warming%20-%20by%20minimalizing%20ship%20movement.)
- [9] <http://afrimed-project.eu/>
- [10] <https://www.nordicseafarm.com/ulva-farm>
- [11] <https://oceanium.world/kelp-eu/>
- [12] <https://www.algaenauts.eu/>
- [13] <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/org-details/999999999/project/101038453/program/31098847/details>
- [14] <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/org-details/999999999/project/101038541/program/31098847/details>
- [15] <https://zoanbiomed.com/coral-4-health/>
- [16] <https://www.phycomorph.org/>
- [17] [https://knowledge4policy.ec.europa.eu/publication/report-community-practice-workshop-algae-production-europe-status-challenges-future\\_en](https://knowledge4policy.ec.europa.eu/publication/report-community-practice-workshop-algae-production-europe-status-challenges-future_en)
- [18] [https://www.eumofa.eu/documents/20178/84590/Blue+bioeconomy\\_Final.pdf](https://www.eumofa.eu/documents/20178/84590/Blue+bioeconomy_Final.pdf)
- [19] <https://www.eumofa.eu/documents/20178/84590/blue+bioeconomy.pdf/f5a87949-c541-416b-16e7-521155>

