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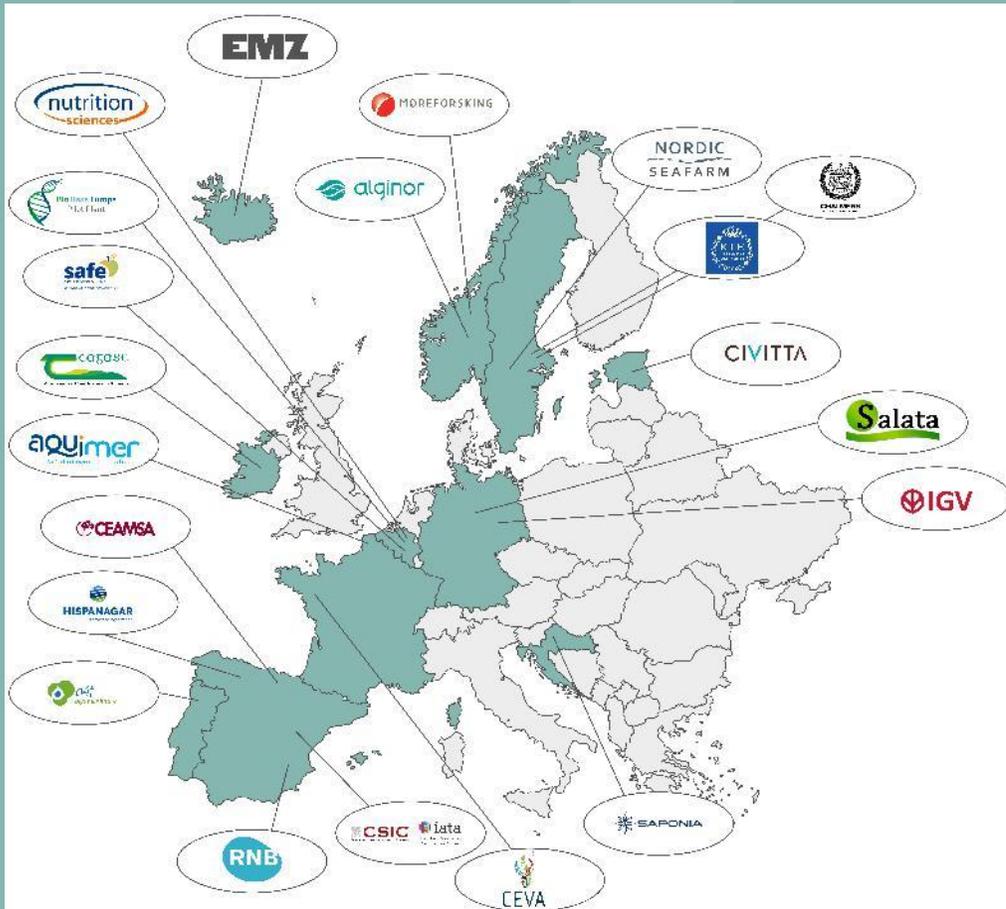
# Key takeaways from the CIRCALGAE “Report of the current algae industry in Europe”

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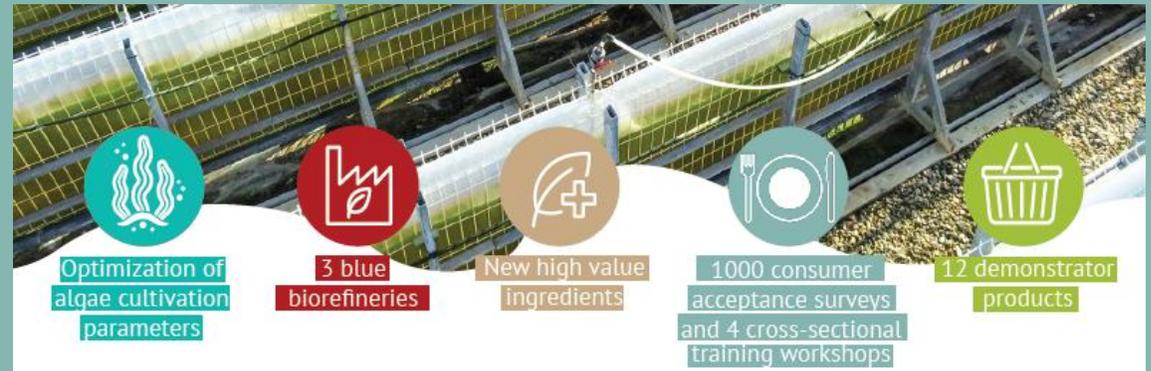


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# CIRCular valorisation of industrial ALGAE waste streams into high-value products to foster future sustainable blue biorefineries in Europe



- 21 Partners, 11 countries
- Duration of 48 months
- Budget : € 10.3 M, Funding: € 8.5M
- [www.circalgae.eu](http://www.circalgae.eu)



# Algae Biorefinery Landscape - Current State and Focus Areas

## Solid Co-Products Management

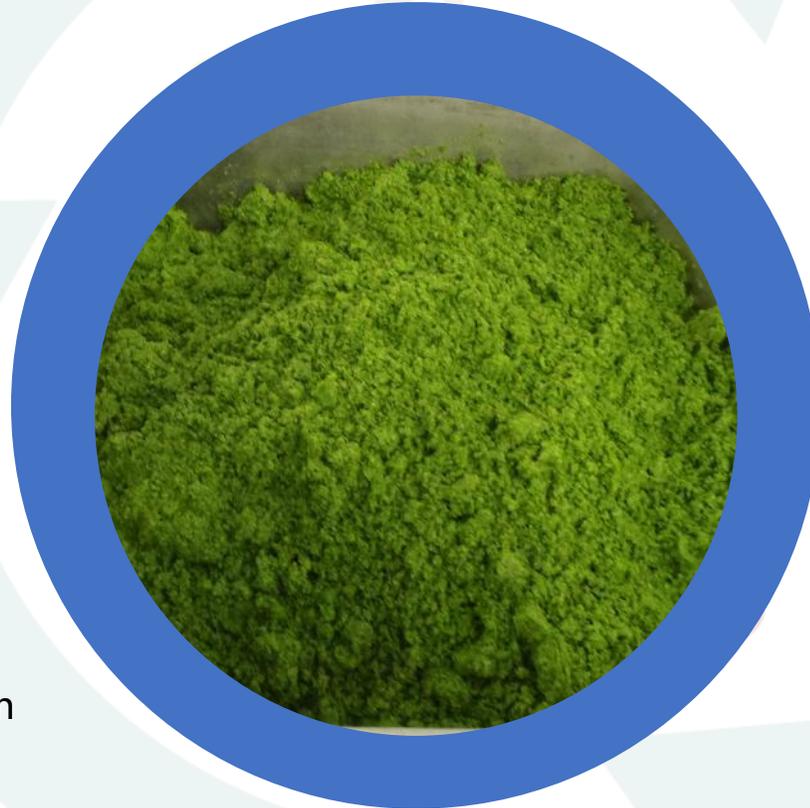
Companies processing large algae volumes analyze and understand solid by-products.

Common valorization: agriculture, composting, biogas — mainly cost-saving, low revenue.

## Contaminant Restrictions

Contaminants like arsenic or cadmium can limit applications due to regulations.

Processing effluents often treated as waste despite valuable compounds.



## Liquid Effluents Knowledge Gap

Lack data on volumes and compositions. Large companies try to recycle water (sometimes chemicals) ; most minimally treat before disposal and send to treatment plants, missing resource potential.

## Confidentiality Challenges

Companies sometimes withhold effluent / co-products details, blocking collaborations and downstream opportunities for co-product use.

# Technical and Processing Hurdles

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## Residues/Effluents Logistics

Solids at 20-30% dry weight raise transport costs due to weight. Drying is energy-intensive. Storage can induce preservation challenges / quality loss.

Liquids need on-site processing due to dilution.

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## Stabilization Trade-offs

Composting solid residues stabilizes but loses organics; mainly for agriculture.



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## Processing aids impact

Inert mineral aids improve filtration but mix with solids, diluting valuables. Incompatible with downstream processing, needing better separation techniques. Undesired chemicals can also be present.

# Market and Supply Chain Dynamics

## SME Volume Limitations

Numerous SMEs produce mixed, low-volume co-products from various species, complicating specific valorization routes.

## Core Competency Gaps

SMEs can struggle with biorefining, and multiple markets and regulations to address.

## Inadequate product streams balance

Co-products from small-sized facilities may not be sufficient for a new product line; Inversely, some bioactives value is intricately linked with their scarcity



## Price / Availability Fluctuations

Seaweed prices can vary extensively (COVID, Gelidium crisis); climate change with diseases and warming waters can threaten supply.

## Resource-Market Mismatch

European algae culture expansion does not always favor market-demanded species, needing adaptive practices. Imported seaweed still highly represented in processing

# Evolving Regulatory and Strategic Environment

## Co-Products as Resources

From waste to value via upcycling; driven by sustainability demands and EU support.

## Broader Societal Transition

Marine resources replace fossils/agriculture; consumer push for responsible production.

## EU and National Initiatives for Progress

EU4Algae Initiative; new strategies for seaweed licensing and spatial planning; focus on contaminants in edibles to support bioeconomy.



2<sup>nd</sup> EU Algae  
Awareness  
Summit

16 · 17 October, Berlin

#EU4Algae

## A need for standards

European standardization committee  
CEN/TC 454 'Algae and algae products'

## Inadequate/missing regulations

Regulations not tailored for biorefineries, or not considering seaweed, create uncertainty; Cross-border variations can hinder market access.

Cultivation on effluents still restricted.



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# Innovation, Technology and Collaborations

## Process Optimization Opportunities



Improve strain selection, cultivation techniques, harvesting, extraction;  
Adapt for seasonal / geographical variations to preserve co-product quality;  
Address knowledge gaps.

## Industry Synergies

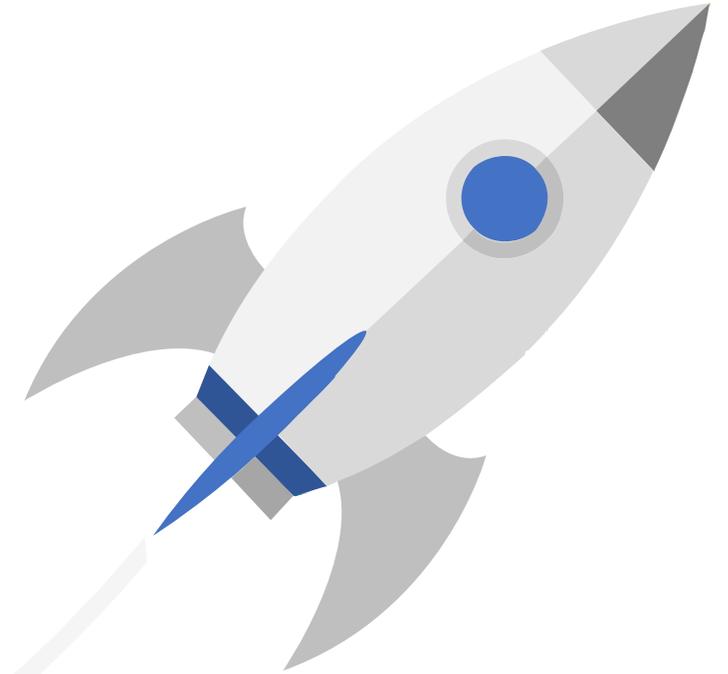


Share facilities and knowledge for integrated biorefineries;  
Optimize/upgrade existing plants and processes;  
Cooperate for co-product collection/logistics/processing.

## Multi-market agility



Design facilities for diverse products;  
Stay responsive to regulations and tech.



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# Full report available on ZENODO

## [10.5281/zenodo.13375430](https://zenodo.org/doi/10.5281/zenodo.13375430)

The work described in this presentation has been co-funded by the European Commission under the Horizon Europe Framework Programme, CIRCALGAE, 101060607. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or The Research Executive Agency.



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## D1.1 – Report of the current algae industry in Europe

GRANT AGREEMENT: 101060607  
PROJECT START DATE: 01/10/2022  
DURATION: 48 MONTHS

