

EU4Algae Factsheet – WG2

Provide an overview of the microalgae production impacts and future needs according to EU4Algae WG2 discussions.

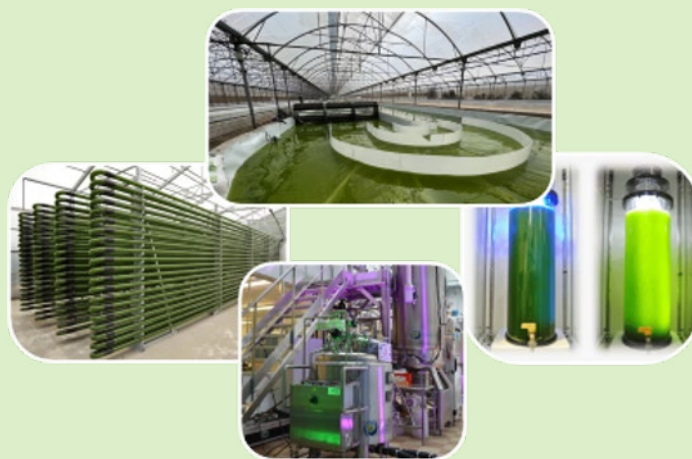
Microalgae production is exclusively operated on land and hence requires water, nutrients and carbon supplement in the feed. Impact assessments of microalgae cultivation is generally done through a Life Cycle Analysis (LCA). A total of 4 impact categories are generally reported : water use, energy use, land use and global warming potential (carbon emissions). As any production system, microalgae cultivation impacts all 4 categories.

It is important to highlight that data presenting the Carbon Footprint of algae production systems varies tremendously. The [Algae and Climate CINEA Report](#) published global mean impacts varying from 11 to 1085 kg eq. CO₂ / kg DW algae biomass (this means CO₂ equivalent counted in kg per algae dry weight in kg).

Reasons for the variability in reported impacts are:

- Algae specific: algae species, algae production technologies, the scale of production units and the origin of nutrients used.
- LCA specific : the use of different boundaries, different types of considered contributions (material, energy, nutrients), different productivity levels and how DM content is measured, avoided emissions not always considered.

| Impact categories (LCA) | Involved in microalgae cultivation |
|---|---|
| Blue fresh water <i>L water / eq. kg DW product</i> | + increases with freshwater strains |
| Global Warming Potential <i>kg CO2/ eq. kg DW product</i> | + Increases with the use of conventional fertilisers and pure CO2 input |
| Energy use <i>MJ/ eq. kg DW product</i> | + Increases with infrastructure, heating, lights, drying... |
| Land use <i>m2/ eq. kg DW product</i> | + Increases with cultivation in open ponds if in arable areas |



The pending issues are:

- The difficulty to compare algae production impacts to other feedstocks due to the huge variability in LCA results
- The lack of regulation to use nutritious (N, P or C) side streams such as wastewater or fluegas instead of conventional chemicals in order to reduce impacts

Need to accelerate technology development and legislation allowing the use of algae production units on industrial sites to capture carbon rich flue gas (cement plant). i.e this can reduce the Carbon impact of an algae production process by 30%.

Need more robust LCA data. LCA method is key to estimate Carbon balance but there is a need for guidelines on how to do good LCA (define boundaries, contributions, substitutions...) and how to interpret the data.

Need to identify and develop the use of local waste streams for cultivating non-food microalgae (bio refinery for bio-materials or agriculture...)

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This factsheet was produced based on the bottom-up discussions with stakeholders of the EU4Algae Working Group 2 on microalgae, on key topics of interest for the sector. If you are willing to contribute to improvement, [please complete this form](#).

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