Valorisation of Algae Production Waste Streams

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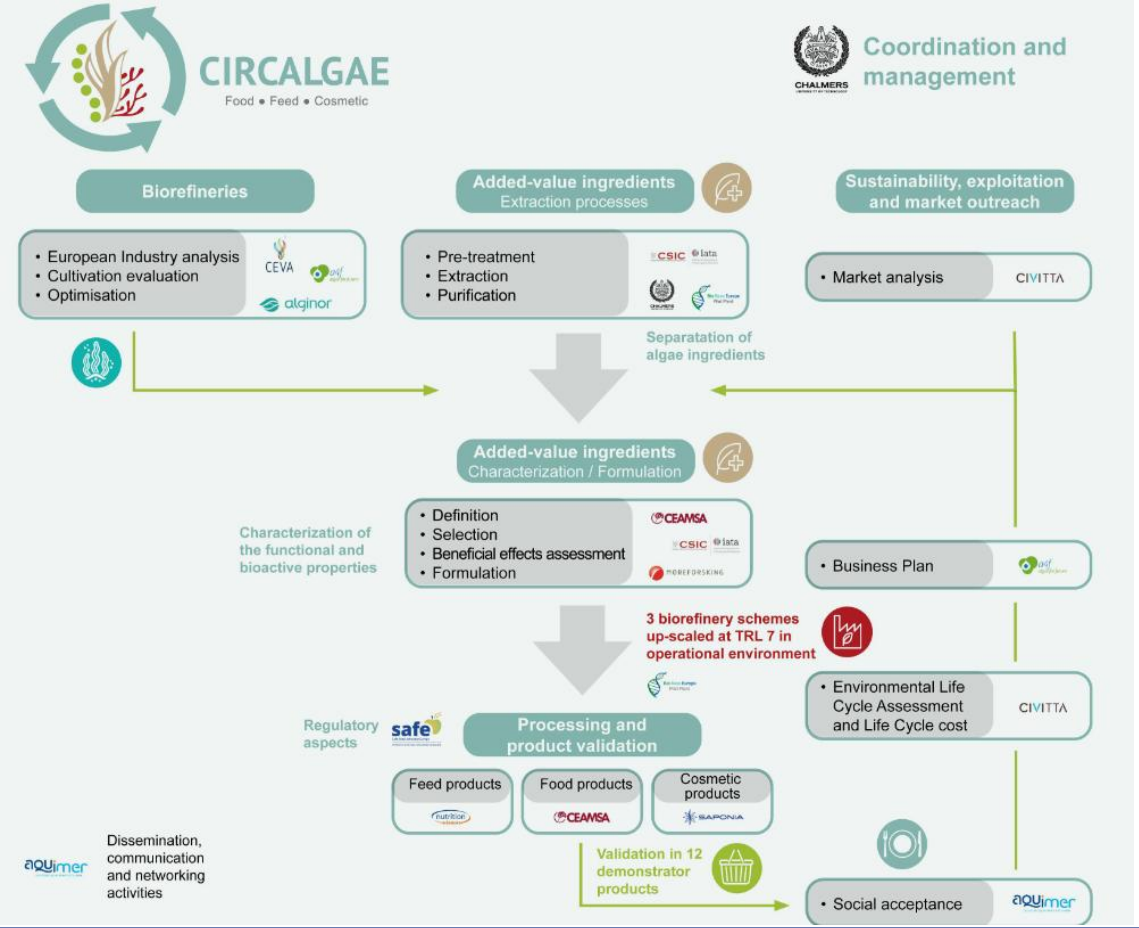
Scope of the project

- Valorisation of industrially relevant macro- and microalgal waste streams into food, feed and cosmetic ingredients
- Developing a new blue biorefinery concept through valorisation of under-utilized side streams from algae industries
- The main stakeholders are consumers and algae producers
- An initial LCA-like estimation is one of the parameters for the choice of food, feed and cosmetics ingredients



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Value chain(s) analysed

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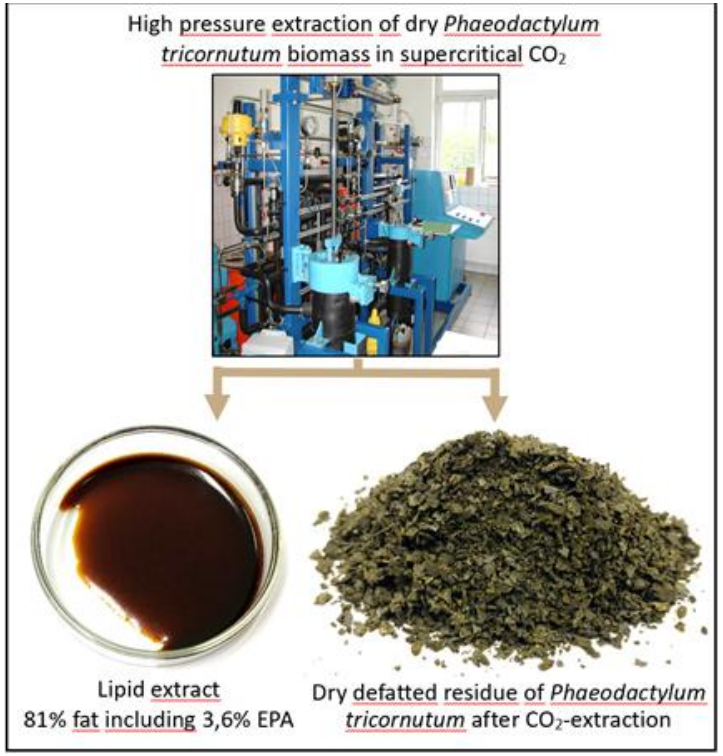
- Biorefinery cascade processing of microalgae from residues of Phaeodactylum tricornutum, Spirulina and Nannochloropsis gaditana.
- *Proteins, pigment, lipid,*
- *Processes: extraction with ethanol, ultrasound treatment, centrifugation, precipitation, purification, protein solubilisation, ultrasound treatment, centrifugation, pH shift, solid purification*



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Value chain(s) analysed

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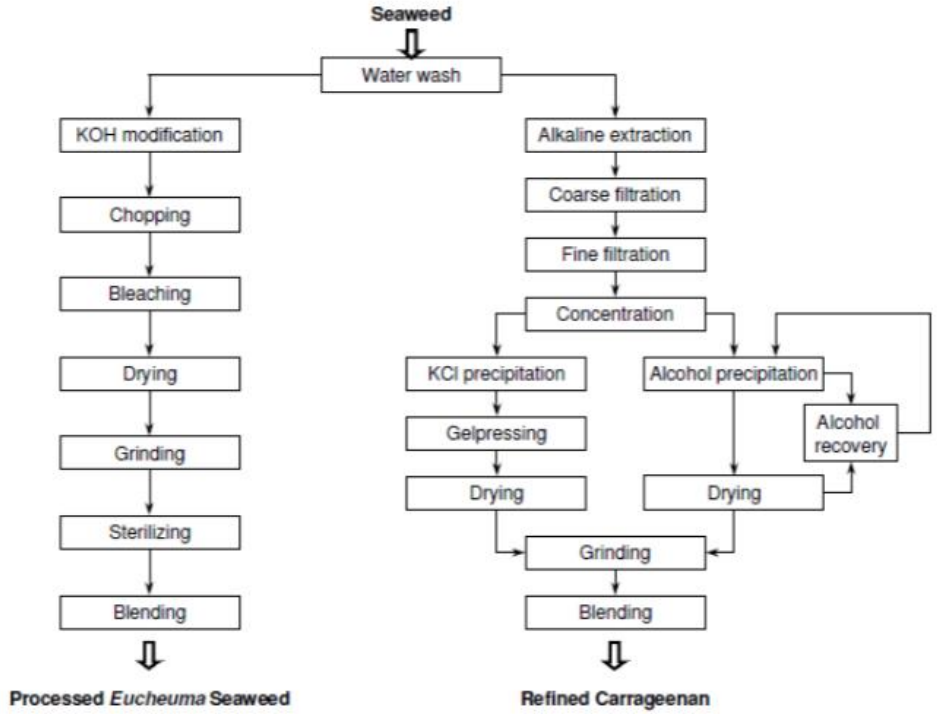
- Biorefinery cascade processing of red algae from residues of Gracilaria chilensis and Gelidium sesquipedale
  - *Peptides, soluble protein, phenolics and carbohydrates.*
  - *Processes: centrifugation, dilution, ultrafiltration, pH shift, precipitation, drying and subcritical water extraction*



Source: van de Velde and Ruiter 2002

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Value chain(s) analysed

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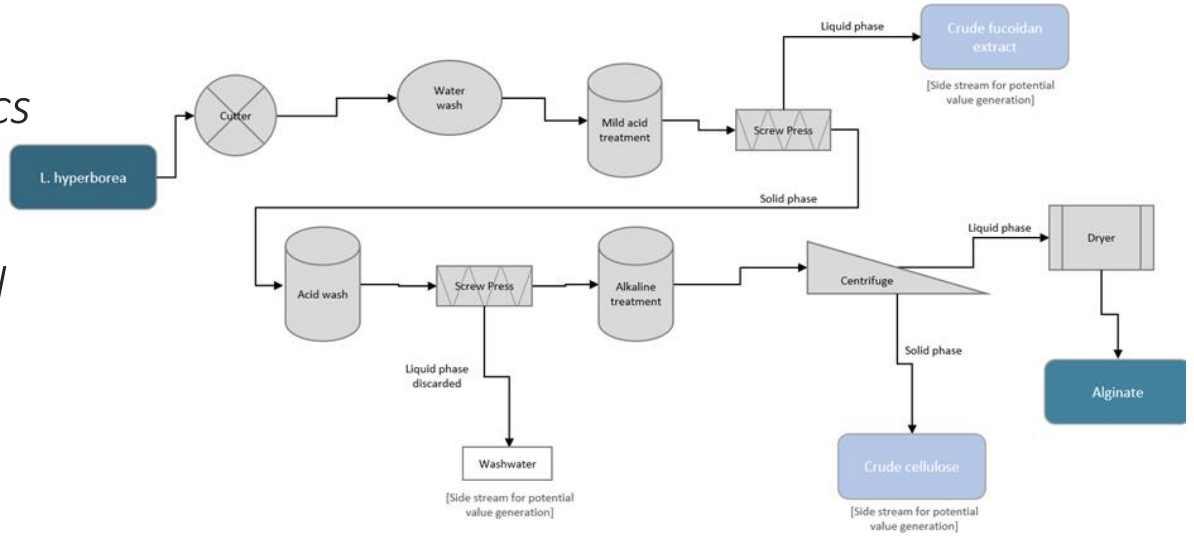
- Biorefinery cascade processing of brown algae from residues of Laminaria hyperborea and Saccharina Latissima
  - *Fucoidan, alginate, soluble proteins, phenolics and carbohydrates*
  - *Processes: acid extraction, ultra filtration, acid wash, alkaline treatment and subcritical water extraction*



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Methodology

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- The Product Environmental Footprint methodology
  - *Goal and scope – According to the final products chosen for LCA. Boundary planned cradle-to-gate*
  - *LCI – According to boundaries, with some data pre-collected for a preliminary assessment*
  - *LCIA – According to rules of PEF*
  - *Interpretation – Heavily dependant on which assumptions will be made*
- The European Commissions initiative to develop a common way of measuring environmental performance.
- Choice has been made to align with a central European system under development

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System and data providers

- Main data system will be SimaPro using EcoInvent database
- Chosen at the moment for prelevance in algae LCA systems, EcoInvent updated quarterly so it is also easier to use up to date data.
- SimaPro has various methodologies, impact assessment methods available and it provides access to different databases if needed.
- EcoInvent is widely used for offering comprehensive set of LCI data for different industries and product systems.

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Results

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Foreseen results:

- Variability (especially regarding up-scaling) and uncertainty will be important in analysis
- Main challenge will be allocation regarding waste streams
- Main outcomes of the LCA will be disseminated by the project.

In conclusion: At the moment it is too early to provide more in-depth choices besides general approaches

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Thank you for your attention!

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