



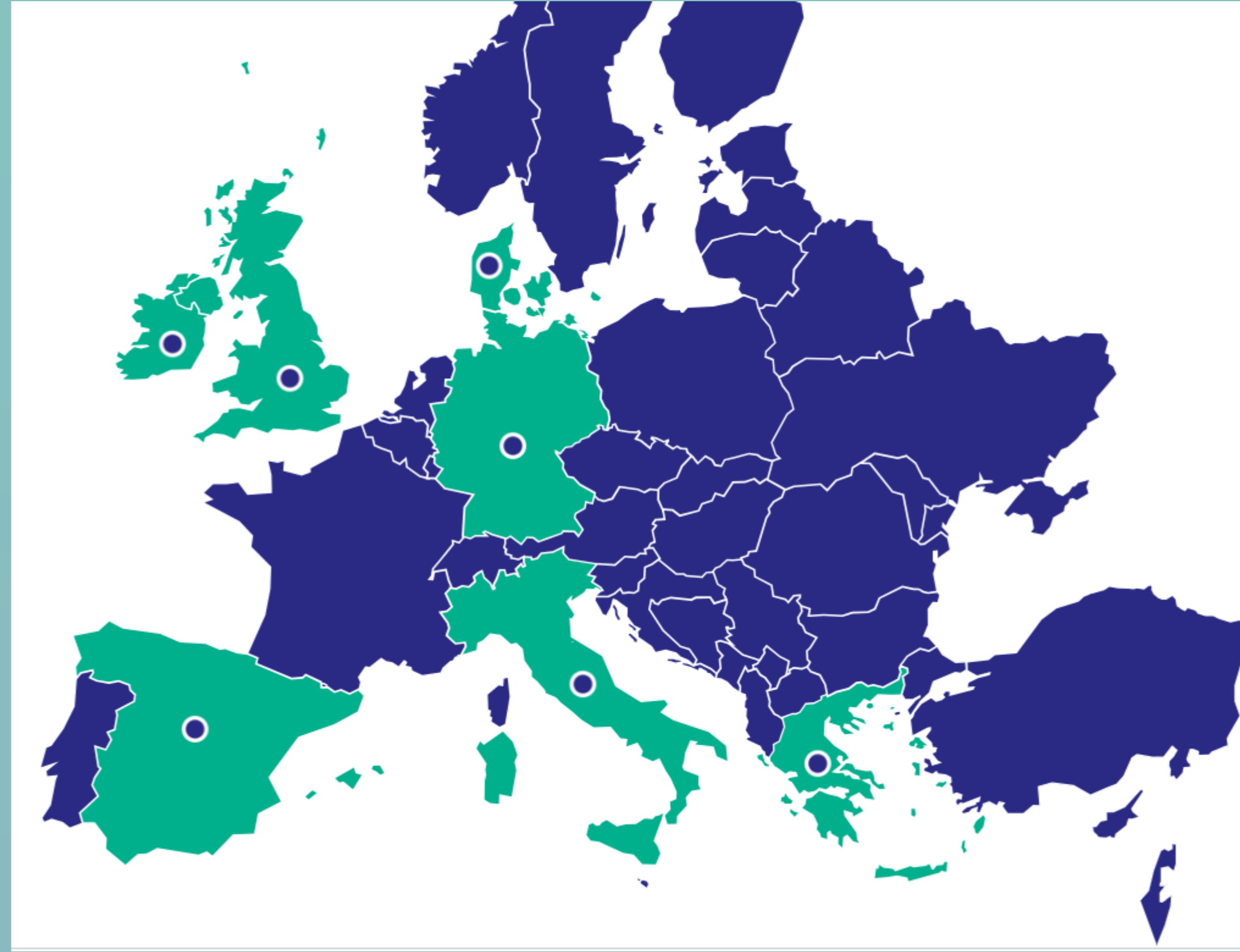
# Macroalgal biomass sourcing and biorefinery in the MARMADE project



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## Project objectives:

- Pioneer the future of food and feed ingredients by transforming locally sourced EU crustacean waste and macroalgae biomass into high-value ingredients.
- Create an integrated plan for sustainable biomass sourcing and use, including new methods to optimise harvesting, storage, and transportation, while maximising quality and yield.
- Optimise extraction technologies to ensure the highest sustainability, quality, and yield of ingredients.
- Develop innovative, affordable food and feed ingredients from sustainable sources to deliver technological, functional, or nutritional benefits to products.
- Improve the environmental, social, and economic sustainability of the project's solutions.



## Consortium:

- UNIVERSITA' DEGLI STUDI DI CAMERINO (Camerino, Italy) - Lead Partner
- BIOCHICA SRL (Fermo, Italy)
- AGENZIA PER LA PROMOZIONE DELLA RICERCA EUROPEA (Roma, Italy)
- ENA SYMVOULOI ANAPTYXIS G P (Xanthi, Greece)
- SYDDANSK UNIVERSITET (Odense, Denmark)
- UNIVERSIDAD DE GRANADA (Granada, Spain)
- FUNDACION CENTRO TECNOLÓGICO ACUICULTURA DE ANDALUCIA (El Puerto de Santa Maria, Spain)
- FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV (Munich Germany)
- UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK (Cork, Ireland)
- ALGAE SCOPE LTD (Letchworth Garden City, United Kingdom)
- WUNDERFISH GMBH (Berlin, Germany)

## WP1: Sourcing of biomass from circular processes and sustainable cultivation

Partners: CTAQUA (lead), UNICAM, ALGAE-SCOPE, BIOCHICA, F-IVV, UCC, UGR

### Objectives:

- To sustainably source biomass for WP2. This involves evaluating the effects of biomass storage conditions on primary composition, biorefinery potential, and extraction yields, including the impact of different storage methods on biomass quality and usability.
- To examine regulatory and administrative issues related to selected biomass sources, focusing on safety concerns, storage requirements for by-products from aquaculture and seafood processing, compliance with genetic resource regulations (Nagoya Protocol), and management of residual biomass from invasive species.
- To secure biomass supply chain stability until M30, establishing reliable and regular supply chains.

## Project value chains

VC1: crustacean residues (shrimp shells, blue crabs, etc.)  
VC2: seaweed

Crustacean residues processing industry (shells and scales), penaeid shrimps, lobsters, etc.

Invasive species: blue crab (*Callinectes sapidus*) and brown alga *Rugulopteryx okamurae*



*Litopenaeus vannamei*  
(Image Mercado municipal de Cádiz - A.M. Arias)



*Penaeus monodon* (Image CSIRO, CC BY 3.0)

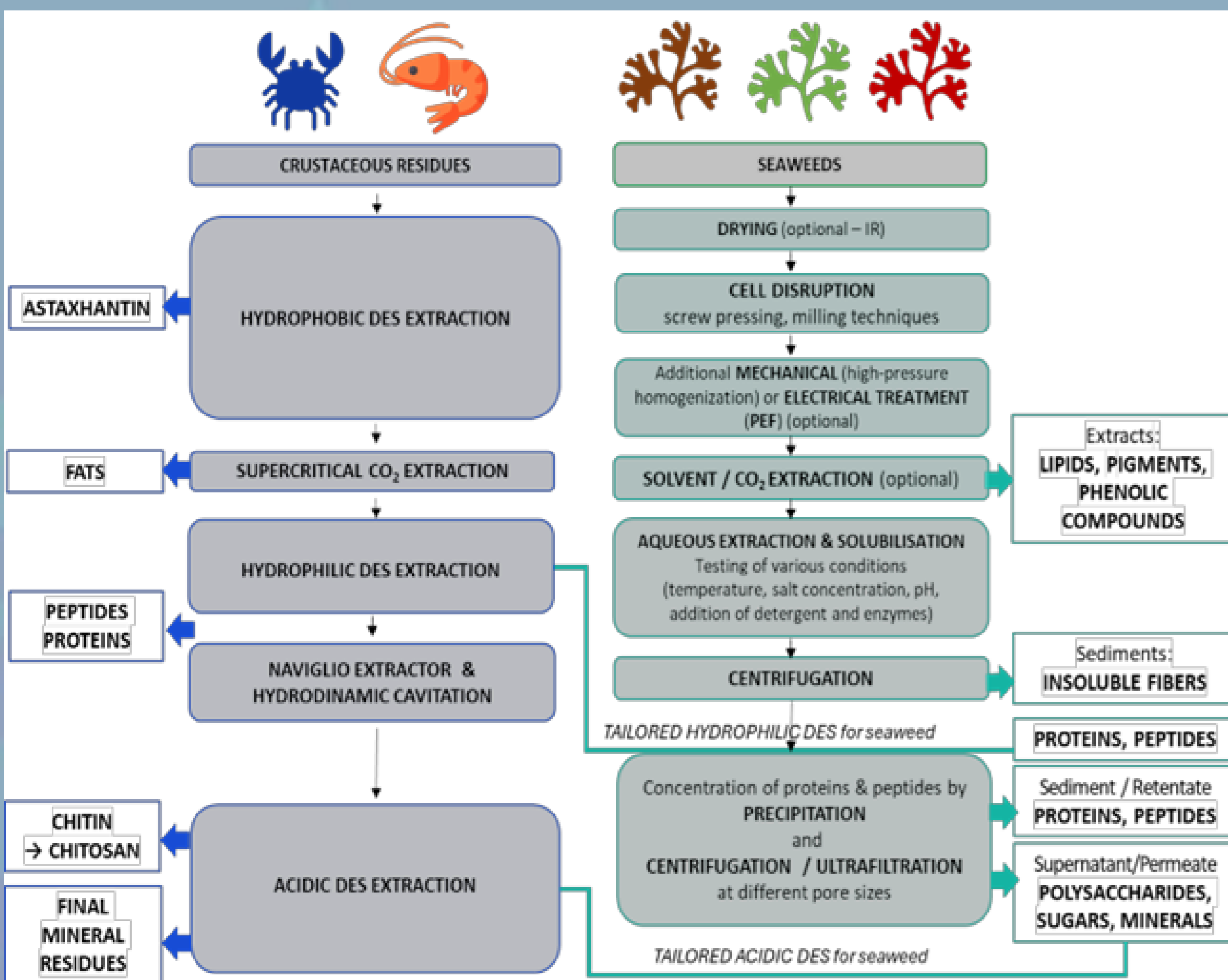


Selected species seaweed cultivation (e.g. *Codium* spp., *Alaria esculenta*, *Palmaria palmata*, *Gracilaria* spp.)

Algae from Integrated Multitrophic Aquaculture: *Ulva ohnoi*

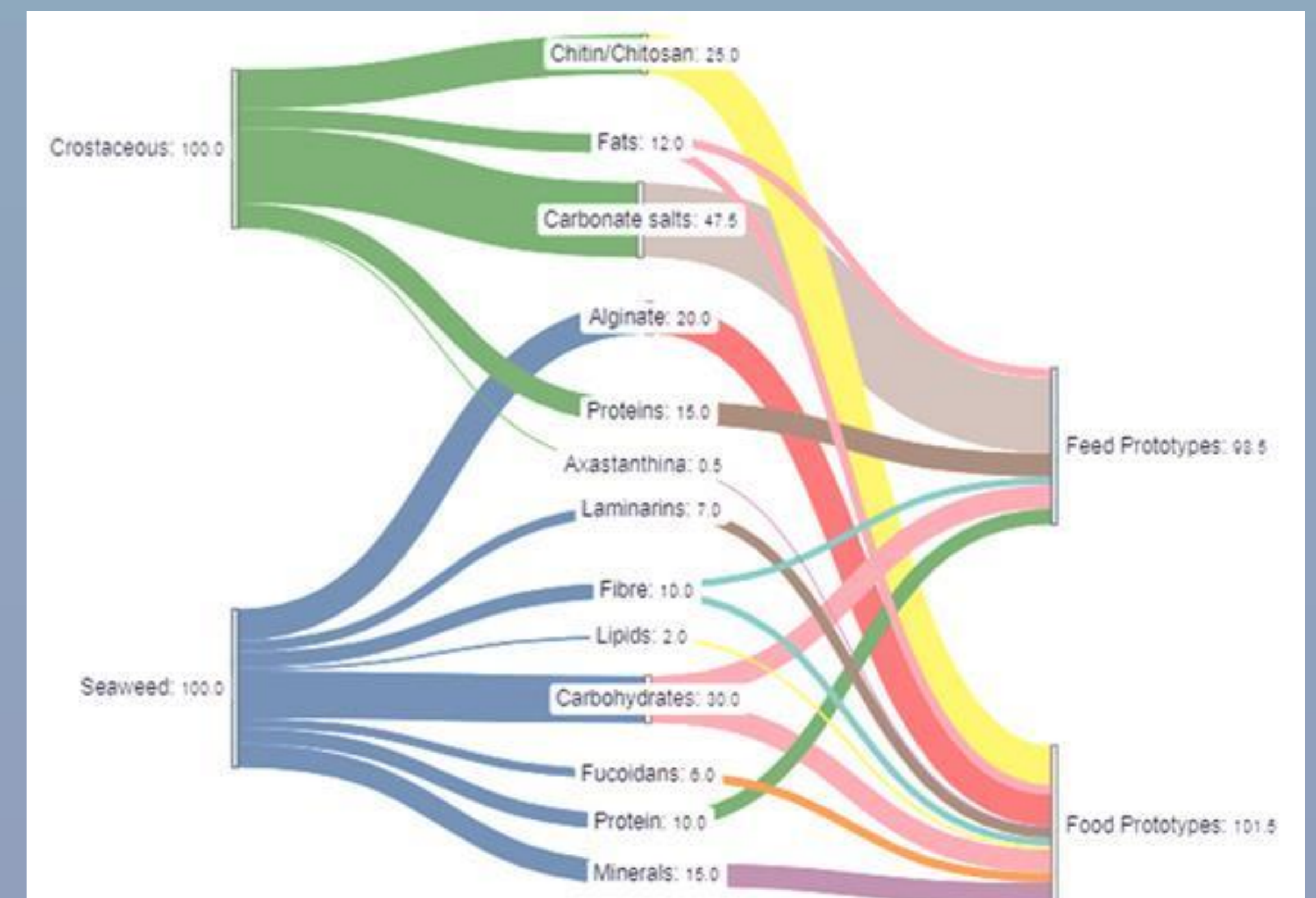


*Codium* and *Gracilaria* long line cultivation in Spain



## Other WPs: Extraction and valorization

- Green chemistry extraction methods
- Focus on specific compounds
- Humand food and aquafeed applications
- Studies on LCA, consumer acceptance, etc.



The project is supported by the Circular Bio-based Europe Joint Undertaking and its members. Funded by the European Union under grant agreement No.101213231 Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CBE JU. Neither the European Union nor the CBE JU can be held responsible for them.



Co-funded by the European Union